Draft bill

of the Federal Ministry for Economic Affairs and Climate Action and of the Federal Ministry of Housing, Urban Development and Building

Draft Act amending the Buildings Energy Act, amending the Heating Costs Ordinance and amending the Chimney Sweeping and Inspection Code

A. Problem and objective

The energy transition in the heating sector is a key area for achieving climate policy goals and for reducing dependence on imports of fossil energy. More than a third of the total energy consumed in Germany is used for heating buildings and supplying hot water.

Over 80 per cent of the demand for heating is still met by the burning of fossil fuels. Natural gas dominates the building heating sector. More than 40 per cent of the natural gas consumed in Germany every year is burnt to heat our buildings and supply them with hot water. Of the approximately 41 million households in Germany, almost one in two is heated with natural gas, followed by heating oil at just under 25 per cent and district heating at around 14 per cent. Direct electric heating and heat pumps do not even account for 3 per cent each. The remaining 6 per cent comes from combustion plants powered by solid fuels, such as wood, wood pellets, other biomass and coal. The proportion of newly-installed heating systems running on gas in 2021 was as high as 70 per cent.

Without a rapid change in course in the heating for buildings sector, Germany will not be able to achieve its climate targets nor rapidly reduce its dependence on fossil fuels. The Coalition Agreement therefore stipulated that from 2025, every newly-installed heating system was to be operated on the basis of 65 per cent renewable energy. Against the background of the Russian attack on Ukraine, the coalition government has decided to bring this date forward so that, from 2024, any newly-installed heating system is to meet this requirement.

The present Act enshrines this central requirement in the Buildings Energy Act (Gebäudeenergiegesetz – GEG), thus ensuring that in the future, only modern, future-proof heating systems that are at least 65 per cent based on renewable energy may be installed in Germany. The Act allows this obligation to be met in a variety of ways and in a technology-neutral manner, and also still allows the partial use of fossil energy when new heating systems are being installed in existing buildings. However, property owners responsible must bear in mind with any heating system replacement that, by 2045 at the latest, the use of fossil fuels will have to end and thereafter all heating systems must be fully operated using renewable energy.

In view of the tense situation in the energy markets, the Act also lays down a number of requirements for increasing energy efficiency in the buildings energy sector, which are intended to have a rapid effect and to ensure that heating energy is used efficiently, regardless of whether it is produced using fossil fuels or renewables.

In addition, the Federal Government is currently pursuing ambitious minimum efficiency standards for buildings at EU level in the context of the Green Deal and the discussions on the Energy Performance of Buildings Directive (EPBD) in order to reduce demand for heating and, together with the requirement for the gradual decarbonisation of heat genera-

tion which is enshrined in this Act, to significantly advance the transition in the heating sector.

Conversion of the heat supply involves considerable and numerous challenges due to the wide variety of different buildings, the different ownership situations and the impact on tenants. The current crisis in the energy markets and the sharp price rises for natural gas and other fossil fuels indicate, however, that this conversion in the heating sector is urgently needed, not only for climate policy reasons but also for social policy reasons. Maintaining the current fossil-dominated supply structures would lead to repeated jumps in prices that are difficult to predict due to the scarcity of fossil fuels on the markets and their concentration in geopolitical conflict regions, resulting in significant social upheaval that can only be mitigated to a limited and temporary degree by State aid measures. A heat supply being based on renewable energy means it will be much more predictable, cost-effective and stable in the medium to long term. A decisive role, in particular, will be played by the use of renewable environmental heat available free of charge by means of heat pumps and solar thermal energy.

The Russian war of aggression on Ukraine marks a turning point in Germany's energy supply. Because of its considerable dependence on natural gas, the heating sector has been affected by this change like no other. Energy sovereignty has become a matter of national and European security. Speeding up the heating transition, as encouraged by this Act, is therefore not only necessary for climate policy reasons, but also – in light of the current crisis – for geopolitical and economic reasons.

The Act thus contributes to the achievement of Sustainable Development Goals 7 and 13 under the UN 2030 Agenda, which call for urgent action to combat climate change while ensuring access to affordable, sustainable and modern energy for all.

B. Solution

Introducing an obligation to use at least 65 per cent renewable energy, as far as is possible, in every installation of a new heating system in new or existing buildings is a central step on the way to greenhouse gas neutrality in Germany by 2045. However, in order to achieve the objective of greenhouse gas neutrality, all buildings will have to produce their heat in the future in a climate-neutral manner or obtain climate-neutral heat from a heating network. The introduction of the 65 per cent renewable energy requirement will, at the same time, help to gradually reduce the high dependence on fossil fuels in the heating sector as heating systems are replaced. Expert cost-effectiveness studies confirm that the relevant level of economic requirement continues to meet the cost optimality criterion enshrined in the EPBD.

Efficient operation of the heating systems, which is made transparent by elements of the heating inspection and metering and thus allows optimisation to further increase economic efficiency, is also crucial for a good carbon footprint and a cost-effective heat supply. In order to keep the efficiency of heating systems as high as possible during operation and thus to minimise the energy consumption of buildings, a new rule requiring the operational testing of heat pumps is being introduced and the regulative requirements laid down in the Ordinance on Medium-term Energy Security Measures (EnSimiMaV), which only applies on a temporary basis, are being made permanent. These requirements concern heating inspection and heating optimisation, and also address fossil-fuelled systems in particular. Hydronic balancing is envisaged as an essential optimisation measure. The current shortage of skilled workers and the high administrative burden is being taken into account by limiting these measures to buildings with more than six rented-out dwellings.

The Draft Act ensures that fossil-fuelled heating systems will no longer be in operation by 2045 at the latest.

C. Alternatives

None. Alternative solutions have been examined thoroughly. Despite the availability of extensive funding, in particular through the Federal funding scheme for efficient buildings (Bundesförderung für effiziente Gebäude – BEG), fossil-fuelled heating systems (in particular natural gas boilers) are still installed in around one third of new buildings and three-quarters of existing buildings. At around 15 per cent in 2021, the share of renewable energy in the provision of building heat is largely stagnant at a very low level. The mix of tools chosen so far, consisting of voluntary information campaigns, funding, market economy measures and regulative requirements, therefore needs to be adapted and further developed in line with the requirements that result from the more ambitious climate targets for 2030 and 2045. Regulation by means of statute is necessary to achieve Germany's ambitious climate targets and to reduce dependence on fossil fuels.

The strengthening of clear regulative requirements, accompanied by further measures in parallel to this legislative process (such as the diversification and realignment of existing funding programmes and the intensification of skills measures for tradespeople), will provide property owners and investors as well as manufacturers and installers of heating systems with the planning certainty they need in order to implement the necessary investments in time to ensure the success of the heating transition.

D. Budgetary expenditure exclusive of compliance costs

The following information has not yet been fully verified and is subject to change.

Investment costs will be incurred by Federal Government, the Länder (federal states) and municipalities in order to meet the 65 per cent requirement for renewable energy in heating systems in public buildings.

Additional needs at Federal Government level must be covered financially and in terms of jobs in the respective budget section, regardless of whether such needs are prompted by the planned measures themselves or by the administrative burden associated with the measures.

In addition, enforcement of the Act by the Länder will lead to procedural costs.

E. Compliance costs

The following information has not yet been fully verified and is subject to change.

Compliance costs for citizens, businesses and the authorities are outlined below. In each case below, compliance costs are set out against the savings that can be achieved over the service life of the systems concerned so as to give an indication of the cost-effectiveness of the requirements.

Because the legislation is intended to be technology-neutral and there is a wide range of potential investment costs, compliance costs for the heating-with-renewables provision can only be outlined roughly. The range of possible investment costs as well as the impact on operating costs are therefore set out below in each case.

E.1 Compliance costs for citizens

(1) Compliance costs excluding the heating-with-renewables provision

(a) Summary

As a result of the Act, citizens will incur compliance costs totalling approximately EUR 50 million per year.

Aggregated over the respective service life of the systems concerned (3 to 20 years), compliance costs are offset by savings in operating costs of around EUR 238 million.

In addition, there are one-off compliance costs of approx. EUR 182 million. This is offset over the respective service life of the systems concerned (5 to 20 years) by around EUR 989 million in savings.

(b) In detail

Deletion of the provisions in § 34 to § 45 and § 52 to § 56 of the Buildings Energy Act (GEG) causes no increase or decrease in costs for citizens.

The amendment to § 51(1) subparagraph 2 of the GEG and the introduction of the new § 51(1) second sentence of the GEG (requirements for an existing building in the event of extension and upgrading) give rise to annual compliance costs of approximately EUR 667 800.

The newly-introduced heating optimisation obligations (§ 60a, § 60b and § 64) give rise to annual compliance costs of approximately EUR 2.4 million. In aggregated terms, savings are made with respect to the systems concerned totalling around EUR 6.7 million over the service life of the systems concerned. In addition, there are one-off compliance costs of approx. EUR 99.9 million. This, in turn, is offset over the respective service life of the systems concerned (3 to 20 years) by savings of approximately EUR 493 million.

The new provision concerning cooling distribution and cold water pipes as well as fittings for ventilation technology and air-conditioning systems in Annex 8 also gives rise to annual compliance costs of approximately EUR 18.5 million. The additional insulation will save about EUR 91.5 million over 20 years.

Annual compliance costs of approximately EUR 3.7 million per year will arise from the mandatory fitting of metering equipment and building automation for newly installed heating systems as required by § 71a(1) to (3) GEG. The requirements for building automation laid down in § 71a(4) to (7) will give rise to annual compliance costs of approximately EUR 11.7 million. In addition, there are one-off compliance costs of approx. EUR 138 million. Annual compliance costs are offset by savings over the service life of the systems concerned (15 years) of EUR 17 million. One-off compliance costs are offset by savings over the service life of the systems concerned (15 years) of approx. EUR 396 million.

The amendment to the Heating Costs Ordinance (deletion of the exemption from the obligation to record consumption and to bill by consumption in the case of heat pumps) gives rise to annual compliance costs of approx. EUR 13.4 million. This is offset by savings over the service life of the systems concerned (20 years) of approx. EUR 67 million.

Compliance costs for citizens (excluding the heating-with-renewables provision)			
Annual compliance costs	Savings over the respective service life of the systems concerned	One-off compliance costs	Savings over the respective service life of the systems concerned
EUR 50 million	EUR 182 million	EUR 238 million	EUR 989 million

(2) Compliance costs for the heating-with-renewables provision

Up to 2028, the requirement to use renewable energy when installing new heating systems will give rise to annual compliance costs for citizens of around EUR 9.157 billion. This is offset by savings over the 18-year operating life of approximately EUR 11.014 billion. From 2029 onwards, annual compliance costs will only be around EUR 5.039 billion. This is offset by savings of around EUR 11.125 billion.

Annual compliance costs for citizens	Investment costs	Savings over 18 years
Up to 2028	EUR 9.157 billion	EUR 11.014 billion
From 2029 onwards	EUR 5.039 billion	EUR 11.125 billion

E.2 Compliance costs for businesses

Under the ‘one in, one out’ principle, the draft legislation results in an ‘in’ (or increase) of approximately EUR 453 000 per year for businesses (administration costs arising from obligations to provide information). The obligations to provide evidence for the purpose of justifying an exemption under § 60b(7) give rise to time expenditure equivalent to approximately EUR 18 127 per year for businesses. In addition, monthly notification of the remotely-read results of the recorded consumption for heat pumps under the Heating Costs Ordinance gives rise to costs of EUR 355 200 per year, and the preparation of consumption-based billing under the Heating Costs Ordinance gives rise to costs of approximately EUR 79 704 per year.

The Act partly serves to transpose individual requirements of the Energy Performance of Buildings Directive 2010/31/EU (EPBD) which have not yet been transposed. Increased costs arising from 1:1 transposition of EU requirements (§ 71a(4) to (7)) are not to be taken into account under the ‘one in, one out’ principle.

Administrative compliance costs arising from obligations to provide information are offset by other savings that fall under the auspices of the Federal Ministry for Economic Affairs and Climate Action.

SMEs are mainly affected by the legislative changes as building owners. Compliance costs incurred by these building owners are included in compliance costs for businesses. The provisions on building automation only affect them if they operate heating systems or combined space heating and ventilation systems/air-conditioning systems or combined air-conditioning and ventilation systems with a rated power of more than 290 kilowatts in their non-residential buildings. The extent to which enterprises are affected by the legislative changes generally depends on the buildings that enterprises use for their business and not on the size of the enterprise (the number of employees in the business and the annual turnover of the business). They are affected by the heating-with-renewables provision to the same extent as larger enterprises, citizens and the authorities, as the requirements concerning the installation or establishment of new heating systems apply to everyone. The legislation offers various compliance options so that SMEs can find a solution that suits their needs. As many trade contractors are SMEs, they will benefit from the fact that the new rules may generate higher demand for their services and they will also be able to offer new services (cf. § 60a, § 60b and § 64 GEG).

(1) Compliance costs excluding the heating-with-renewables provision

(a) Summary

As a result of the Act, businesses will incur compliance costs totalling approximately EUR 1.12 billion per year. Aggregated over the respective service life of the systems con-

cerned (3 to 20 years), this is offset by savings in operating costs of around EUR 1.558 billion.

In addition, there are one-off compliance costs of approx. EUR 12.472 billion. This is offset over the respective service life of the systems concerned (3 to 20 years) by around EUR 35.903 billion.

(b) In detail

Deletion of the provisions in § 34 to § 45 and § 52 to § 56 of the GEG causes no increase or decrease in costs for businesses.

The amendment to § 51(1) subparagraph 2 of the GEG and the introduction of the new § 51(1) second sentence of the GEG (requirements for an existing building in the event of extension and upgrading) give rise to annual compliance costs of approximately EUR 60.1 million.

The newly-introduced heating optimisation obligations (§ 60a, § 60b and § 64) give rise to annual compliance costs of approximately EUR 540 000. In aggregated terms, savings are made with respect to the systems concerned totalling around EUR 2.3 million over the respective service life of the systems concerned (3 to 20 years). In addition, there are one-off compliance costs of approx. EUR 72 million. This, in turn, is offset over the respective service life of the systems concerned (3 to 20 years) by savings of approximately EUR 203 million. In addition, annual training costs of approximately EUR 3.9 million and one-off training costs of approximately EUR 38.5 million are incurred.

The new provision concerning cooling distribution and cold water pipes as well as fittings for ventilation technology and air-conditioning systems in Annex 8 also gives rise to annual compliance costs of approximately EUR 2 million. The additional insulation will save about EUR 10.4 million over 20 years.

Annual compliance costs of approximately EUR 517 000 per year will arise from the mandatory fitting of metering equipment and building automation for newly-installed heating systems as required by § 71a(1) to (3) GEG. The requirements for building automation laid down in § 71a(4) to (7) will give rise to annual compliance costs of approximately EUR 1.052 billion. In addition, there are one-off compliance costs of approx. EUR 12.4 billion. Annual compliance costs are offset by savings over the service life of the systems concerned (15 years) of around EUR 1.538 billion. One-off compliance costs are offset by savings over the service life of the systems concerned (15 years) of approx. EUR 35.7 billion.

The amendment to the Heating Costs Ordinance (deletion of the exemption from the obligation to record consumption and to bill by consumption in the case of heat pumps) gives rise to annual compliance costs of approx. EUR 1.5 million. This is offset by savings over the service life of the systems concerned (20 years) of approx. EUR 8.4 million.

Compliance costs for businesses (excluding the heating-with-renewables provision)			
Annual compliance costs	Savings over the respective service life of the systems concerned	One-off compliance costs	Savings over the respective service life of the systems concerned
EUR 1.12 billion	EUR 1.558 billion	EUR 12.472 billion	EUR 35.903 billion

(2) Compliance costs for the heating-with-renewables provision

Up to 2028, the requirement to use renewable energy when installing new heating systems will give rise to annual compliance costs for businesses of around EUR 2.693 billion. This is offset by savings over the 18-year operating life of approximately EUR 8.268 bil-

lion. From 2029 onwards, annual compliance costs will only be around EUR 2.534 billion. This is offset by savings of around EUR 8.222 billion.

Annual compliance costs for businesses	Investment costs	Savings over 18 years
Up to 2028	EUR 2.693 billion	EUR 8.268 billion
From 2029 onwards	EUR 2.534 billion	EUR 8.222 billion

E.3 Compliance costs for the authorities

(1) Compliance costs excluding the heating-with-renewables provision

(a) Summary

As a result of the Act, the authorities will incur compliance costs totalling approximately EUR 112 million per year. Aggregated over the respective service life of the systems concerned (5 to 20 years), this is offset by savings in operating costs of around EUR 158 million.

In addition, there are one-off compliance costs of approx. EUR 1.243 billion. This is offset over the respective service life of the systems concerned (5 to 20 years) by EUR 3.586 billion.

Of this, 1 per cent of the costs are attributable to Federal Government and 99 per cent to the Länder and municipalities, given how many buildings are estimated to be owned by the Federal Government and the Länder. No data is available on the exact split between non-residential and residential buildings attributable to the federal, Land and municipal authorities, and this split is therefore based on an estimate of the Federal Statistical Office, which in turn is based on assumptions.

(b) In detail

Deletion of the provisions in § 34 to § 45 and § 52 to § 56 of the GEG causes no increase or decrease in costs for the authorities.

The amendment to § 51(1) subparagraph 2 of the GEG and the introduction of the new § 51(1) second sentence of the GEG (requirements for an existing building in the event of extension and upgrading) give rise to annual compliance costs of approximately EUR 6 million.

The newly introduced heating optimisation obligations (§ 60a, § 60b and § 64) give rise to annual compliance costs of approximately EUR 62 905. In aggregated terms, savings are made with respect to the systems concerned totalling around EUR 184 000 over the service life of the systems concerned. In addition, there are one-off compliance costs of approx. EUR 2.6 million. This, in turn, is offset over the respective service life of the systems concerned (5 to 20 years) by savings of approximately EUR 16 million.

The new provision concerning cooling distribution and cold water pipes as well as fittings for ventilation technology and air-conditioning systems in Annex 8 also gives rise to annual compliance costs of approximately EUR 420 000. The additional insulation will save about EUR 2.1 million over 20 years.

Annual compliance costs of approximately EUR 81 900 per year will arise from the mandatory fitting of metering equipment and building automation for newly- installed heating systems as required by § 71a(1) to (3) GEG. The requirements for building automation laid down in § 71a(4) to (7) will give rise to annual compliance costs of approximately EUR 105 million. In addition, there are one-off compliance costs of approx. EUR 1.24 billion. Annual compliance costs are offset by savings over the service life of the systems

concerned (15 years) of approx. EUR 154 million. One-off compliance costs are offset by savings over the service life of the systems concerned (15 years) of approx. EUR 3.57 billion.

The amendment to the Heating Costs Ordinance (deletion of the exemption from the obligation to record consumption and bill by consumption in the case of heat pumps) gives rise to annual compliance costs of approx. EUR 299 288. This is offset by savings over the service life of the systems concerned (20 years) of approx. EUR 1.7 million.

Compliance costs for the authorities (excluding the heating-with-renewables provision)			
Annual compliance costs	Savings over the respective service life of the systems concerned	One-off compliance costs	Savings over the respective service life of the systems concerned
EUR 112 million	EUR 158 million	EUR 1.243 billion	EUR 3.586 billion

(2) Compliance costs for the heating-with-renewables provision

Up to 2028, the requirement to use renewable energy when installing new heating systems will give rise to annual compliance costs for the authorities of around EUR 449 million. This is offset by savings over the 18-year operating life of the heating systems of approximately EUR 974 million. From 2029 onwards, annual compliance costs will only be around EUR 344 million. This is offset by savings of around EUR 945 million.

Annual compliance costs for the authorities	Investment costs	Savings over 18 years
Up to 2028	EUR 449 million	EUR 974 million
From 2029 onwards	EUR 344 million	EUR 945 million

F. Other costs

As service providers will have new information, documentation and training obligations, it is conceivable that they will pass on costs to their customers and thus increase the prices for their services. These costs have been factored in when estimating material costs. In addition, the costs arising from the amendment to the Heating Costs Ordinance may be passed on to users of dwellings or other property units. Chimney sweeps will also charge fees for their new tasks in accordance with the Schedule of Fees.

Draft bill of the Federal Ministry for Economic Affairs and Climate Action and of the Federal Ministry of Housing, Urban Development and Building

Draft Act amending the Buildings Energy Act, amending the Heating Costs Ordinance and amending the Chimney Sweeping and Inspection Code*)

Dated…

The Bundestag has passed the following Act:

Article 1

Amendments to the Buildings Energy Act

The Buildings Energy Act of 8 August 2020 (Federal Law Gazette (BGBl.) I p. 1728), as last amended by Article 18a of the Act of 20 July 2022 (BGBl. I p. 1237), is amended as follows[1)]:

1. The table of contents is amended as follows:

   a) After the entry for § 9, the following entry is inserted:

      '§ 9a Regulation at Land level'.

   b) Part 2 is amended as follows:

      a%6) The entry for the heading of Part 2 Section 4 is deleted.

      b%6) The entries for § 34 to § 45 are replaced by the following entries:

      '§ 34(repealed)

      § 35 (repealed)

      § 36 (repealed)

      § 37 (repealed)

      § 38 (repealed)

      § 39 (repealed)

      § 40 (repealed)

      § 41 (repealed)

*) *)Notified in accordance with Directive (EU) 2015/1535 of the European Parliament and of the Council of 9 September 2015 laying down a procedure for the provision of information in the field of technical regulations and of rules on Information Society services (OJ L 241, 17.9.2015, p. 1).

1)This Act transposes Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (OJ L 153, 18.6.2010, p. 13), Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings, and Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (OJ L 328, 21.12.2018, p. 82).

§ 42 (repealed)

§ 43 (repealed)

§ 44 (repealed)

§ 45 (repealed)'.

c) The entry for Part 3 is worded as follows:

'Part 3 Requirements for existing buildings'.

d) The entry for the heading of Part 3 Section 1 is deleted.

e) The entry for the heading of Part 3 Section 2 is deleted.

f) The entries for § 52 to § 56 are replaced by the following entries:

'§ 52(repealed)

§ 53 (repealed)

§ 54 (repealed)

§ 55 (repealed)

§ 56 (repealed)'.

g) After the entry for § 60, the following entry is inserted:

'§ 60a Operational testing of heat pumps

§ 60b Heating inspection and heating optimisation

§ 60c Hydronic balancing and further heating optimisation measures'.

h) The entry for Part 4 Section 2 Subsection 4 is worded as follows:

'Subsection 4

Requirements for heating systems; Ban on the operation of boilers

§ 71 Requirements for heating systems

§ 71a Metering equipment for heating systems, obligations to provide information, building automation

§ 71b Requirements for connection to a heating network and obligations for heating network operators

§ 71c Requirements for the use of heat pumps

§ 71d Requirements for the use of direct electric heating

§ 71e Requirements for solar thermal systems

§ 71f Requirements for biomass and hydrogen, including derivatives thereof

§ 71g Requirements for heating systems when using solid biomass

§ 71h Requirements for hybrid heat pump heating

§ 71i Transitional periods in the event of heating system breakdowns

§ 71j Transitional periods for new and expanded heating networks

§ 71k Transitional periods for heating systems capable of burning both natural gas and hydrogen

§ 71l Transitional period for storey heating or single-room combustion plants

§ 71m Transitional period for hall heating

§ 71n Procedures for property owners' associations

§ 71o Provisions on the protection of tenants

§ 71p Power to issue ordinances on the use of refrigerants in electric heat pumps and hybrid heat pump heating

§ 72 Ban on the operation of boilers

§ 73 Exemption'.

i) After the entry for § 114, the following entry is inserted:

'§ 115 Transitional provision on fines'.

2. § 1 is amended as follows:

a) Paragraph (1) is worded as follows:

(1) ' The aim of this Act is to make a significant contribution to the achievement of national climate protection targets. This is to be achieved by cost-effective and socially acceptable measures for the efficient use of energy and the increasing use of renewable energy or unavoidable waste heat in the energy supply for buildings.'

b) In paragraph (2), the words 'conservation of fossils' are replaced by the words 'continuous reduction of fossils'.

c) The following paragraph (3) is added:

(1) ' The construction and operation of a system as well as the associated ancillary systems for the production and transport of heating, cooling and electricity from renewable energy as well as efficiency measures in buildings are in the overriding public interest and serve public security. Until buildings in the Federal territory are operated so as to be greenhouse gas neutral, renewable energy and efficiency measures are to be incorporated as priority concerns in the necessary resource-protection considerations. The second sentence shall not apply to matters of national and Alliance defence'.

3. § 3 is amended as follows:

a) Paragraph (1) is amended as follows:

a%6) After subparagraph 4, the following subparagraph 4a is inserted:

'4a. 'blue hydrogen' means hydrogen produced from natural gas by reformation or pyrolysis and which, in accordance with Commission Delegated Regulation (EU) 2021/2139 of 4 June 2021 supplementing Regulation (EU) 2020/852 of the European Parliament and of the Council by establishing the technical screening criteria for determining the conditions under which an economic activity qualifies as contributing substantially to climate change mitigation or climate change adaptation and for determining whether that economic activity causes no significant harm to any of the other environmental objectives (OJ L 442, 9.12.2021, p. 1), as last amended by Delegated Regulation (EU) 2022/1214 (OJ L 188, 15.7.2022, p. 1), satisfies the technical screening criteria in force for

demonstrating it contributes substantially to climate change mitigation; with regard to the reduction of greenhouse gas emissions, the minimum 73.4 per cent threshold for saving life-cycle GHG emissions compared to a fossil fuel comparator must be achieved accordingly; in accordance with Delegated Regulation (EU) 2021/2139 supplementing Regulation (EU) 2020/852 (Taxonomy Regulation), this reduction shall be demonstrated against a comparator of 94 grams of carbon dioxide equivalent per megajoule by capturing and storing the resulting carbon dioxide or binding it permanently into products; the requirements laid down in Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012 (OJ L 334, 31.12.2018, p. 1), as last amended by Delegated Regulation (EU) 2021/2139 (OJ L 442, 9.12.2021, p. 1), or corresponding EU requirements, shall apply with respect to the fulfilment of the obligation to provide evidence for the permanent storage or binding of carbon dioxide; the savings in life-cycle greenhouse gas emissions shall be calculated using the method specified in Article 28(5) of Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (OJ L 328, 21.12.2018, p. 82; OJ L 139, 18.5.2022, p. 1) or alternatively in accordance with ISO 14067:2018 (119) or ISO 14064-1:2018 (120); where the EU imposes, in another binding legal act, other sustainability requirements for the production of blue hydrogen for the fields of use covered by this Act, they shall be applied'.

b%6) After subparagraph 8, the following subparagraph 8a is inserted:

'8a. 'energy performance contract' means a contractual arrangement between the beneficiary and the provider of an energy efficiency improvement measure, verified and monitored throughout the whole term of the contract, where investments with respect to work, supply or service in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement or other agreed energy performance criterion, such as financial savings'.

c%6) After subparagraph 9, the following subparagraph 9a is inserted:

'9a. 'building network' means a network for the exclusive supply of heating and cooling of at least 2 and up to 16 buildings and up to 100 residential units'.

d%6) After subparagraph 10, the following subparagraph 10a is inserted:

'10a. 'technical building systems' means the technical equipment of a building or building unit for space heating, space cooling, ventilation, domestic hot water, built-in lighting, building automation and control, on-site electricity generation or for a combination thereof, including systems that use energy from renewable sources'.

e%6) After subparagraph 13, the following subparagraphs 13a and 13b are inserted:

'13a. 'major renovation' means the renovation of a building in which more than 25 per cent of the heat-transmitting envelope area is undergoing renovation;

13b. ‘green hydrogen’ means hydrogen meeting the requirements laid down in the seventh subparagraph of Article 27(3) and Article 28(5) in conjunction with Article 25(2) of Directive (EU) 2018/2001, as amended, whereby the hydrogen may also be stored chemically or physically in other energy sources for storage or transport’.

f%6) After subparagraph 14, the following subparagraph 14a is inserted:

‘14a. ‘heating system’ means a system for the production of space heat, hot water or a combination thereof, including transfer stations, with the exception of hand-fed single-room combustion plants within the meaning of § 2 subparagraph 3 and open fireplaces pursuant to § 2 subparagraph 12 of the Ordinance on Small and Medium Combustion Plants of 26 January 2010 (BGBl. I p. 38), as last amended by Article 1 of the Ordinance of 13 October 2021 (BGBl. I p. 4676), in the applicable version,’.

g%6) Subparagraph16 is worded as follows:

‘16. (repealed)’.

h%6) In subparagraph 29, the words ‘solid heat storage units’ are replaced by the words ‘heat storage units’.

i%6) After subparagraph 29, the following subparagraph 29a is inserted:

‘29a. ‘building automation and control system’ means a system comprising all products, software and engineering services that can support the energy-efficient, economical and safe operation of technical building systems through automatic controls and by facilitating the manual management of those technical building systems’.

j%6) After subparagraph 30, the following subparagraph 30a is inserted:

‘30a. ‘unavoidable waste heat’ means the proportion of heat generated as a by-product in an industrial or commercial facility or in the tertiary sector due to thermodynamic laws, which cannot be avoided by applying the latest technology, is not usable in a production process and without access to a heating network would be discharged unused in air or water’.

b) Paragraph (2) is amended as follows:

a%6) In subparagraph 5, the expression ‘; or’ is replaced by a comma.

b%6) Subparagraph 6 is replaced by the following subparagraphs 6 and 7:

1. ‘ the heat produced from green hydrogen or derivatives thereof, or

2. the cold taken from the ground or water and made technically usable or made technically usable from heat referred to in subparagraphs 1 to 6’.

c) Paragraph (3) subparagraph 1 is worded as follows:

1. ‘biomass within the meaning of the Biomass Ordinance of 21 June 2001 (BGBl. I p. 1234), as amended’.

4. § 4 is amended as follows:

a) In paragraph (2), the words ‘fundamental renovation in accordance with § 52(2)’ are replaced by the words ‘major renovation in accordance with § 3 subparagraph 13a’.

b) The following paragraph (4) is added:

(1) ‘ The Länder may, by means of legislation adopted at Land level, with respect to public buildings, with the exception of public buildings belonging to the Federal Government, make their own regulations governing the fulfilment of the role model function and for this purpose may deviate from the provisions of this Act. This does not apply to requirements concerning the calculation bases and methods referred to in Part 2 Section 3’.

5. In the first sentence of § 6a, the words ‘Economic Affairs and Energy’ are replaced by the words ‘Economic Affairs and Climate Action’ and the words ‘Federal Ministry of Justice and Consumer Protection’ by the words ‘Federal Ministry of Justice’.

6. In § 7(1) and (5) respectively, the words ‘Economic Affairs and Energy’ are replaced by the words ‘Economic Affairs and Climate Action’ and the words ‘Federal Ministry of the Interior, for Building and Community’ by the words ‘Federal Ministry of Housing, Urban Development and Building’.

7. In § 9(1) and (2) respectively, the words ‘Economic Affairs and Energy’ are replaced by the words ‘Economic Affairs and Climate Action’ and the words ‘Federal Ministry of the Interior, for Building and Community’ by the words ‘Federal Ministry of Housing, Urban Development and Building’.

8. After § 9, the following § 9a is inserted:

‘§ 9a

Regulation at Land level

The Länder may impose, by means of legislation at Land level, further requirements for the production and use of electricity or heating and cooling from renewable energy in spatial context with buildings, as well as further requirements or restrictions on direct electric heating’.

9. § 10 is amended as follows:

a) Paragraph 2 subparagraph 3 is worded as follows:

1. ‘ the requirements set out in § 71 to § 71h are met’.

b) Paragraph (5) is repealed.

10. § 22(5) is amended as follows:

a) In the first sentence, the words ‘Economic Affairs and Energy’ are replaced by the words ‘Economic Affairs and Climate Action’ and the words ‘Federal Ministry of the Interior, for Building and Community’ by the words ‘Federal Ministry of Housing, Urban Development and Building’.

b) In the third sentence, the words ‘district heating network’ are replaced by the words ‘heating network’.

c) In the fourth sentence, the words ‘Economic Affairs and Energy’ are replaced by the words ‘Economic Affairs and Climate Action’ and the words ‘Federal Ministry of the Interior, for Building and Community’ by the words ‘Federal Ministry of Housing, Urban Development and Building’.

11. § 31 is amended as follows:

a) In paragraph (1), the words ‘and § 34 to § 45’ are deleted.

b) In paragraph (2), the words ‘Economic Affairs and Energy’ are replaced by the words ‘Economic Affairs and Climate Action’ and the words ‘Federal Ministry of the Interior, for Building and Community’ by the words ‘Federal Ministry of Housing, Urban Development and Building’.

12. The heading for Part 2 Section 4 is deleted.

13. § 34 to § 45 are worded as follows:

‘§ 34(repealed)

§ 35 (repealed)

§ 36 (repealed)

§ 37 (repealed)

§ 38 (repealed)

§ 39 (repealed)

§ 40 (repealed)

§ 41 (repealed)

§ 42 (repealed)

§ 43 (repealed)

§ 44 (repealed)

§ 45 (repealed)’.

14. The heading of Part 3 is worded as follows:

‘Part 3

Requirements for existing buildings’.

15. The heading for Part 3 Section 1 is deleted.

16. In § 47(4), after the word ‘are’, the words ‘in the case of residential buildings with no more than two dwellings, of which the owner themselves occupies one dwelling’ are inserted.

17. In the fourth sentence of § 50(4), the words ‘Economic Affairs and Energy’ are replaced by the words ‘Economic Affairs and Climate Action’ and the words ‘Federal

Ministry of the Interior, for Building and Community' by the words 'Federal Ministry of Housing, Urban Development and Building'.

18. In § 51(1), the following sentence is added:

'By way of derogation from subparagraph 2 of the first sentence, in cases where the additional contiguous usable area exceeds 100 per cent of the useable area of the existing building or is greater than 250 square metres, the requirements laid down in § 18 and § 19 shall be met'.

19. The heading for Part 3 Section 2 is deleted.

20. § 52 to § 56 are worded as follows:

'§ 52(repealed)

§ 53 (repealed)

§ 54 (repealed)

§ 55 (repealed)

§ 56 (repealed)'.

21. After § 60, the following § 60a is inserted:

'§ 60a

Inspection and optimisation of heat pumps

(1) Heat pumps, which are installed or established, after the end of 31 December 2023, as heating systems for the purpose of being put into service in a building with at least six dwellings or other self-contained property units or for the purpose of feeding into a building network to which at least six dwellings or other self-contained property units are connected, must undergo operational testing after a complete heating season, but no later than two years after the date of being put into service. The first sentence shall not apply to hot water heat pumps or air-to-air heat pumps. The operational testing referred to in the first sentence shall be repeated at the latest every five years for heat pumps without remote monitoring.

(2) The operational testing referred to paragraph (1) shall include:

1. a check as to whether hydronic balancing has been performed;

2. a check of the system's control parameters, including the settings for

a) the heating curve;

b) the switch-off or reduced-temperature times;

c) the heating limit temperature;

d) the setting parameters for hot water;

e) the pump settings; and

f) the bivalence point and mode of operation settings in the case of hybrid heat pump heating;

3. a check of the flow temperature and return flow temperature and the proper functioning of the expansion vessel;

4. metrological analysis of the seasonal energy efficiency ratio and, in the event of major deviations from the expected seasonal energy efficiency ratio, recommendations for improving efficiency through measures with respect to the heating system, heating distribution, behaviour or building envelope;

5. a check of the fill level in the refrigerant circuit;

6. inspection of hydraulic components;

7. inspection of electrical connections;

8. a check of the condition of the external unit, if any; and

9. visual inspection of pipe insulation in the water heating facility.

(3) The operational testing referred to in paragraph (1) in conjunction with paragraph (2) shall be carried out by a qualified person who has successfully completed training in the field of heat pump inspection covering the content of paragraph (2).

(4) The following, in particular, are deemed to be so qualified:

1. chimney sweeps in accordance with point 12 of Annex A to the Trades and Crafts Code;

2. tradespeople working as fitters or heating engineers in accordance with point 24 of Annex A to the Trades and Crafts Code;

3. refrigeration plant engineers in accordance with point 18 of Annex A to the Trades and Crafts Code;

4. stove heating and air heating engineers in accordance with point 2 of Annex A to the Trades and Crafts Code;

5. electrical technicians in accordance with point 25 of Annex A to the Trades and Crafts Code; or

6. energy consultants who are on the list of energy efficiency experts for Federal funding programmes.

(5) The result of the testing and any need for optimisation with regard to the requirements referred to in paragraph (1) shall be documented in writing and sent to the person responsible for their records. Any necessary optimisation measures must be carried out within one year of the operational testing. The result of the testing referred to in the first sentence and a record of the work carried out in accordance with the second sentence must be provided to the tenant without delay upon request. The third sentence shall apply, mutatis mutandis, to leases and to other forms of providing buildings or dwellings for use in return for consideration’.

22. After § 60a, the following § 60b and § 60c are inserted:

‘§ 60b

Inspection and optimisation of older heating systems

(1) A heating system using water as the heat carrier, which was installed or established after 30 September 2009, is not a heat pump and is operated in a building with at least six dwellings or other self-contained property units, shall undergo a heating inspection and heating optimisation within one year of the end of the 15-year period after installation or establishment. A heating system using water as the heat carrier, which was installed or established before 1 October 2009 and is operated in a building with at least six dwellings or other self-contained property units, must undergo a heating inspection and heating optimisation by the end of 30 September 2027. In the heating inspection referred to in the first and second sentences, the following shall be inspected:

1. whether the technical parameters that can be set for the operation of the heat production system are optimised in terms of energy efficiency;

2. whether an efficient heating pump is used in the heating system;

3. the extent to which insulation measures for pipes or fittings should be carried out; and

4. what measures for lowering the flow temperature can be carried out after inspection.

(2) In order to optimise a heat production system in accordance with paragraph (1) third sentence subparagraph 1, the following shall often be necessary, taking into account possible negative impacts on the fabric of the building and human health:

1. lowering of the flow temperature or optimisation of the heating curve in the case of grossly incorrect settings;

2. activation of night-time reduced temperatures, night-time switch-off or other periods of reduced temperatures and switch-off for the heating system appropriate to the usage profile and ambient temperature, and provision of information to the operator, in particular concerning summer switch-off, reduced temperatures for holiday periods or presence control;

3. optimisation of circulation operation, taking into account applicable health protection regulations;

4. a check to ensure the circulator settings are correct;

5. reduction of hot water temperatures, taking into account applicable health protection regulations;

6. lowering of the heating limit temperature to reduce the heating season and heating days; and

7. provision of information to the owner or user about further saving measures and the use of renewable energy, in particular the requirements of § 71(1) for heating systems.

(3) The heating inspection referred to in paragraph (1) shall be carried out by a qualified person within the meaning of § 60a(3). In particular the people referred to in § 60a(4) subparagraphs 1, 2 and 4 are considered to be qualified.

(4) The heating inspection referred to in paragraph (1) and subsequently necessary optimisation measures should be offered and carried out in connection with activities or measures already being performed by the qualified persons referred to in paragraph (3), in particular when carrying out chimney sweeping and inspection activities or a fireplace check in accordance with the Chimney Sweep Trade Act (SchfHwG) of 26 November 2008 (BGBl. I p. 2242) as amended, or during heating maintenance work. The heating inspection can also be demonstrated as part of hydronic balancing.

(5) The result of the inspection referred to in the third sentence of paragraph (1) and any need for optimisation shall be documented in writing and sent to the person responsible for their records. If the inspection identifies a need for optimisation in accordance with paragraph (1) third sentence subparagraph 1 in conjunction with paragraph (2), the optimisation measures shall be carried out within one year of the heating inspection and documented. The result of the inspection referred to in the first sentence and the record in accordance with the second sentence must be provided to the tenant without delay upon request. The fourth sentence of § 60a(5) shall apply, mutatis mutandis.

(6) The inspection does not need to be repeated if no changes have been made to the heating system concerned or the combined heating and ventilation system concerned since the inspection, or if no changes have occurred in relation to the heating demand of the building or the conditioned area.

(7) The obligation to have a heating inspection is waived for heating systems with standardised building automation in accordance with § 71a as well as for heat pumps which are subject to operational testing in accordance with § 60a. Also exempt from the obligation referred to in paragraph (1), provided that the overall impact of such an approach is equivalent, are heating systems or combined heating and ventilation systems which:

1. are covered by a contractual arrangement concerning energy performance levels or energy efficiency improvements, in particular by an energy performance contract in accordance with § 3(1) subparagraph 8a; or

2. are operated by a utility company or a network operator and are therefore subject to system-side measures for monitoring efficiency.

(8) In the case of an exemption from the inspection obligation as referred to in the first sentence of paragraph (7), project documents in verifiable form shall be submitted in order to demonstrate that the building is equipped with building automation systems in accordance with § 71a. For an exemption from the inspection obligation as referred to in the second sentence of paragraph (7), the following documents and evidence shall be submitted in order to demonstrate the equivalence of the measures:

1. documents detailing building, system and operator data;

2. evidence that the systems fall under an agreed energy performance criterion, in the form of an appropriate energy performance contract; and

3. evidence that the systems are operated by a utility company or a network operator, with submission of an appropriate operator contract.

§ 60c

Hydronic balancing and further heating optimisation measures

(1) Heating facilities using water as the heat carrier shall undergo hydronic balancing after installation or establishment for the purpose of being put into service in buildings with at least six dwellings or other self-contained property units.

(2) Hydronic balancing within the meaning of this provision shall, taking into account all the essential components of the heating system, cover at least the following planning and implementation services:

1. a room heat load calculation;

2. a check and, if necessary, optimisation of the heating surfaces with a view to achieving the lowest possible flow temperature; and

3. adjustment of flow temperature regulation.

The method provided for in DIN EN 12831, Part 1, September 2017 edition, in conjunction with DIN/TS 12831, Part 1, April 2020 edition,[*)] shall be used for the room heat load calculation.

(3) Hydronic balancing shall be carried out using Method B of the ZVSHK technical rule ‘Optimisation of existing heating systems’, VdZ – Wirtschaftsvereinigung Gebäude und Energie e.V., 1st updated re-issue of April 2022, point 4.2. or using an equivalent method.

(4) Confirmation of the hydronic balancing shall be documented, including the setting values, the building heat load, the heat generator output that has been set and the room heat load calculation, the design temperature, the control settings and the pressures in the expansion vessel, and communicated to the person responsible. The confirmation referred to in the first sentence shall be provided to the tenant without delay upon request. The fourth sentence of § 60a(5) shall apply, mutatis mutandis’.

23. § 64 is amended as follows:

a) Paragraph (1) is repealed.

b) The previous paragraph (2) becomes paragraph (1).

c) The following paragraphs (2) to (6) are added:

(1) ‘ Standalone circulators in heating or cooling circuits that are not integrated into a heat or cooling generator, as well as drinking water circulation pumps shall be replaced by the end of 31 December 2026 if they do not meet the conditions laid down in paragraphs (3) to (5). The deadline specified in the first sentence shall be extended by six months if replacement of the heating system is carried out within that period.

(2) Glandless circulators may not exceed an energy efficiency index of 0.23. They must comply with the requirements laid down in point 1.2 of Annex I to Commission Regulation (EC) No 641/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to

*) For the room heat load calculation, the method set out in DIN EN 12831, Part 1, September 2017 edition, in conjunction with DIN/TS 12831, Part 1, April 2020 edition, which are available from Beuth Verlag GmbH, Berlin and are archived at the German Patent Office, shall apply.

ecodesign requirements for glandless standalone circulators and glandless circulators integrated into products (OJ L 191, 23.7.2009, p. 35), as last amended by Regulation (EU) 2019/1781 (OJ L 272, 25.10.2019, p. 74).

(3) Glanded circulators may not fall below a minimum efficiency index of 0.4. They must comply with the requirements of Commission Regulation (EU) No 547/2012 of 25 June 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for water pumps (OJ L 165, 26.6.2012), as last amended by Regulation (EU) 2016/2282 (OJ L 346, 20.12.2016, p. 51).

(4) Drinking water circulation pumps must have an electronically commutated motor.

(5) Paragraphs (2) to (5) shall only apply to buildings with at least six dwellings or other self-contained property units'.

24. § 69 is worded as follows:

a) The existing wording becomes paragraph (1).

b) The following paragraph (2) is added:

(1) ' The owner of a building shall ensure that the heat dissipation from previously uninsulated, accessible heat distribution and hot water pipes that are not in heated rooms is limited in accordance with Annex 8'.

25. The heading of Part 4 Section 2 Subsection 4 is worded as follows:

'Subsection 4

Requirements for heating systems; Ban on the operation of boilers'.

26. § 71 is replaced by the following § 71 to § 71o:

§ 1'

Requirements for heating systems

(1) Heating systems may be installed or established for the purpose of being put into service in a building only if they produce at least 65 per cent of the heat provided by the system using renewable energy or unavoidable waste heat in accordance with paragraphs (4) to (6) and § 71b to § 71h. The first sentence shall apply, mutatis mutandis, to heating systems that feed into a building network.

(1) The owner of the building is free to choose the heating system that is used to meet the requirements set out in paragraph (1). Compliance with the requirements of paragraph (1) in conjunction with § 71a to § 71h first sentence shall be verified before the systems is put into service on the basis of calculations in accordance with DIN V 18599: 2018-09 by a person authorised under § 88. The building owner is required to install or establish and operate the heating system in accordance with the requirements laid down in the verification documents. Verification shall be kept by the owner and the issuer of the documents for at least 10 years and shall be submitted to the authority that is competent under Land-level law and the authorised district chimney sweep upon request. By way of derogation from the first sentence, no heating system

using biomass shall be installed or established in a new build in order to comply with the requirements of paragraph (1).

(2) The requirements of paragraph (1) shall be deemed to have been fulfilled individually or in combination with each another for the following systems, to the effect that verification as referred to in the second sentence of paragraph (2) is not required if they are installed or established for the purpose of being put into service in a building or for the purpose of feeding into a building network and they fully cover the heat demand of the building, of the dwellings or other self-contained property units supplied by the systems or of the building network:

1. transfer station for connection to a heating network in accordance with § 71b;

2. electrically powered heat pump in accordance with § 71c;

3. direct electric heating in accordance with § 71d;

4. solar thermal system in accordance with § 71e;

5. heating system using biomass or green or blue hydrogen, including derivatives thereof, in accordance with § 71f and § 71g; or

6. hybrid heat pump heating consisting of an electrically-powered heat pump in combination with a gas, biomass or liquid fuel combustion unit in accordance with § 71h.

Subparagraph 5 of the first sentence shall not apply to heating systems using biomass that are installed or established for the purpose of being put into service in a new build or are newly-installed or established for the purpose of supplying a new build via a building network. During operation of a heating system in accordance with subparagraphs 5 and 6 of the first sentence, the operator must ensure that the requirements concerning the supply of the respective fuel arising from § 71f(2) to (4) and § 71 g(3) subparagraph 2 are met.

(3) The obligation referred to in paragraph (1) shall apply,

1. in the case of a heating system that produces both space heat and hot water, to the whole system;

2. in the case of a heating system in which space heat and hot water are produced separately, only to the individual system that is being newly installed or established; or

3. in the case of multiple heating systems in one building or in buildings connected for heat supply purposes as referred to in the second sentence of paragraph (1), either to the individual heating system which is being replaced and newly installed or established, or to the entirety of all installed heating systems.

(4) If the hot water is provided decentrally and independently of the production of space heat, the requirement laid down in paragraph (1) shall also be deemed to have been fulfilled for the hot water system if the decentralised hot water is provided electrically. In the case of decentrally provided hot water using electric instantaneous water heaters, these must be controlled electronically in order to fulfil the obligation laid down in paragraph (1).

(5) Unavoidable waste heat may be counted when demonstrating fulfilment of the requirement in accordance with paragraph (1), provided that it is made usable via a

technical system and is used in the building to cover the heat demand. When operating a decentralised, hand-fed single-room combustion plant, a value of 0.10, deviating from the standard value laid down in DIN V 18599-5:2018-09, may be counted for the portion of useful heat demand covered in order to demonstrate fulfilment of the requirement in accordance with paragraph (1).

(6) The requirement laid down in paragraph (1) shall not apply to heating systems which are operated, installed or established for the exclusive supply of national and Alliance defence buildings, where fulfilment of the requirement is contrary to the nature and main purpose of national and Alliance defence.

§ 71a

Metering equipment for heating systems, obligations to provide information, building automation

(1) A heating system installed after the end of 31 December 2024 must be equipped, before being put into service, with metering equipment to record energy consumption and the amount of heat generated, as well as with an energy consumption and efficiency indicator. The measured values must be displayed via the equipment's user interface, a higher-level energy management system, an external device or an external application, while ensuring data security according to the latest technology. The efficiency indicator must be accessible and have adequate protection against access by third parties. In the case of an electric heat pump, the amount of electricity required for the operation of electric immersion heaters and heat source pumps must also be recorded. The first sentence shall not apply to biomass heating in accordance with § 71 g or air-to-air heat pumps.

(2) Energy consumed and heat generated by the heating system installed after the end of 31 December 2024 must be recorded by metrological means. The measured values shall be kept in a machine-readable format for three years with a monthly resolution. Measured values with more frequent resolution may only be retained by the person responsible for operating the heating system with the consent of the data subjects. In the case of hybrid heat pump heating, the proportion of the heat supply accounted for by the individual heat generators must also be shown. In the case of a solar thermal system, the solar yields and a comparison with yields of past periods must be indicated. The fifth sentence of paragraph (1) shall apply, mutatis mutandis.

(3) For compliance with the requirements laid down in paragraphs (1) and (2), the data collected may be transmitted via a smart meter gateway in accordance with § 2 subparagraph 19 of the Act on Metering Point Operation of 29 August 2016 (BGBl. I p. 2034), as amended. Insofar as the sourcing of energy for heating systems involves operation of a metering point within the meaning of § 3 of the Act on Metering Point Operation, the provisions of the Act on Metering Point Operation shall apply.

(4) Non-residential buildings where the rated power of the heating system or the combined space heating and ventilation system exceeds 290 kilowatts must be equipped with a building automation and control system in accordance with paragraphs (5) to (7) by the end of 31 December 2024. The first sentence shall also apply to non-residential buildings in which the rated power of an air-conditioning system or a combined air-conditioning and ventilation system is more than 290 kilowatts.

(5) For compliance with the requirement laid down in paragraph (4), a non-residential building must be equipped with digital energy monitoring technology by means of which:

1. the consumption of all main energy sources and by all technical building systems can be continuously monitored, logged and analysed;

2. the data collected is made accessible via a common and freely configurable interface, so that evaluations can be carried out independently of company and manufacturer;

3. requirements for the energy efficiency of the building can be established;

4. efficiency losses from technical building systems can be detected; and

5. the person responsible for the facility or technical building management can be informed of possible improvements in energy efficiency.

In addition, a person or company responsible for building energy management must be appointed or commissioned to analyse and exploit the potential for energy-optimised building operations in a continuous improvement process.

(6) In addition to meeting the requirement laid down in paragraph (5), a non-residential new build must:

1. be equipped with a building automation system meeting level of automation B under DIN V 18599-11: 2018-09 or better; and

2. undergo technical start-up management, including the initial setting of the technical building systems in order to ensure optimum operation.

When choosing the building automation system referred to in subparagraph 1 of the first sentence, it must be ensured that this system enables communication between interconnected, technical building systems and other applications within the building and can be operated together with other types of technical building systems, including in the case of different proprietary technologies, equipment and manufacturers. The technical start-up management referred to in subparagraph 2 of the first sentence must cover at least the period of one heating season for heat production systems and at least one cooling season for cooling systems.

(7) Where a building automation system meeting level of automation B under DIN V 18599-11: 2018-09 or better is already being used in an existing non-residential building, communication between interconnected, technical building systems and other applications within the building must be enabled by the end of 31 December 2024, and it must be ensured that these systems can be operated together with other types of technical building systems, including in the case of different proprietary technologies, equipment and manufacturers.

§ 71b

Requirements for connection to a heating network and obligations for heating network operators

(1) When installing or establishing a transfer station for connection to a new heating network, the construction of which starts after the end of 31 December 2023, at least 65 per cent of the total heat distributed in the heating network (annual cumulative useful heat output by generators) must come from renewable energy or unavoidable waste heat. A new heating network as referred to in the first sentence is deemed to exist if its heat is not, or less than 20 per cent of its heat (annual average) is not provided thermally by direct hydraulic connection or indirectly by means of heat

transfer from an existing upstream heating network. When concluding a network connection contract, the heating network operator must confirm to the subscriber that the conditions set out in the first sentence are fulfilled.

(2) When installing or establishing a transfer station for connection to a heating network, the construction of which starts before 1 January 2024 and in which less than 65 per cent of the total distributed heat comes from renewable energy or unavoidable waste heat, the heating network operator must have a transformation plan for the connection area by the end of 31 December 2026. The transformation plan must comply with the applicable legal requirements. The transformation plan must, in particular, set out in detail a step-by-step transition of the heat supply by the end of 31 December 2029 to at least a 50 per cent share from renewable energy or unavoidable waste and the complete decarbonisation of the heat supply through the transition to renewable energy or unavoidable waste heat by the end of 31 December 2044. If the transformation plan envisages a lower share of renewable energy and unavoidable waste heat, this discrepancy must be justified. When concluding a network connection contract, the heating network operator shall confirm to the subscriber that it has drawn up a transformation plan in accordance with the first and second sentences and that it will submit or has submitted it to the competent body within the time limit specified in the first sentence.

(3) Confirmation by the heating network operator in accordance the third sentence of paragraph (1) and the fifth sentence of (2) is equivalent to fulfilment of the requirements laid down in paragraphs (1) and (2) for the person responsible under § 71(1).

§ 71c

Requirements for the use of heat pumps

When installing one or more electric heat pumps, the requirements of § 71(1) are deemed to be met if one or more of the heat pumps cover the heat demand of the building or of buildings connected via a building network.

§ 71d

Requirements for the use of direct electric heating

(1) Direct electric heating may be installed or established in a new build for the purpose of being put into service only if the building’s structural thermal insulation parameters are at least 45 per cent below those specified in § 16 and § 19.

(2) Direct electric heating may be installed or established in an existing building for the purpose of being put into service only if the building’s structural thermal insulation parameters are at least 30 per cent below those specified in § 16 and § 19. If an existing building already has a heating system using water as the heat carrier, the installation of direct electric heating is permitted only if the building’s structural thermal insulation parameters are at least 45 per cent below those specified in § 16 and § 19. Compliance with the requirements laid down in the first and second sentences shall be verified by a person authorised within the meaning of § 88. Verification shall be retained by the owner for at least 10 years and shall be submitted to the authority that is competent under Land-level law upon request.

(3) Paragraph (2) shall not apply to the replacement of existing individual single-room direct electric heaters.

(4) Paragraphs (1) and (2) shall not apply:

1. to direct electric heaters in a building in which a decentralised heating facility is installed or established for heating building zones with a room height exceeding 4 metres; and

2. in a residential building with no more than two dwellings, of which the owner themselves occupies one dwelling.

§ 71e

Requirements for solar thermal systems

Where a solar thermal system using liquids as the heat carrier is used, the collectors contained therein or the system shall be certified with the European 'Solar Keymark' certification mark as long as and to the extent that the use of CE marking is not mandatory in accordance with an implementing act based on Directive 2009/125/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for the setting of ecodesign requirements for energy-related products (OJ L 285, 31.10.2009, p. 10), as last amended by Directive 2012/27/EU (OJ L 315, 14.11.2012, p. 1). Certification must be carried out in accordance with the recognised rules of technology.

§ 71f

Requirements for biomass and hydrogen including derivatives thereof

(1) The operator of a heating system fuelled with liquid or gaseous fuels shall ensure that at least 65 per cent of the heat supplied by the system is produced from biomass or green or blue hydrogen, including derivatives thereof. The first sentence shall not apply to the extent that the verification referred to in the fourth sentence of § 71(2) permits a lower proportion of the heat provided by the system to be produced from biomass or green or blue hydrogen, including derivatives thereof.

(2) The operator of the heating system shall ensure that the liquid biomass used meets the requirements for sustainable cultivation and production laid down in the Biomass Energy Sustainability Ordinance of 2 December 2021 (BGBl. I p. 5126) as amended.

(3) The operator of the heating system shall ensure that the use of biomethane complies with the requirements laid down in § 22(1) first sentence subparagraph 2 letters c and d. When using biogenic liquefied petroleum gas, the requirements laid down in § 22(1) first sentence subparagraph 3 letter c shall be complied with. Where green or blue hydrogen, including derivatives thereof, are used that are supplied through a network-based system, the quantity of withdrawn green or blue hydrogen or derivatives thereof in heat equivalent at the end of a calendar year shall be equal to the quantity of green or blue hydrogen or derivatives thereof fed into the network elsewhere, and mass balance systems shall have been used for the entire transport and distribution of the green or blue hydrogen or derivatives thereof from its production through to it being fed into the network and its transport in the network until it is withdrawn from the network. Where other green or blue hydrogen is used, the quantity of withdrawn green or blue hydrogen or derivatives thereof at the end of a calendar year shall be equal to the quantity of green or blue hydrogen or derivatives thereof produced elsewhere, and mass balance systems shall have been used for the entire transport and

distribution of the green or blue hydrogen or derivatives thereof from its production through to its temporary storage and its transport until it is deposited in the feed tank.

(4) The percentage of grain or maize used for the production of gaseous biomass in each calendar year may not exceed 40 per cent by mass. Maize within the meaning of the first sentence shall be regarded as whole plants, corn/cob mixtures, maize grain and ground ear maize. The first sentence shall apply only to new fermentation plants put into operation after the end of 31 December 2023.

§ 71g

Requirements for heating systems when using solid biomass

(1) A heating system using solid biomass shall:

1. be equipped with a buffer tank that is at least dimensioned in accordance with DIN V 18599-5: 2018-09;

2. be combined with a solar thermal system or system for producing electricity from solar radiation energy for electrical hot water heating; and

3. be equipped with a device to reduce particulate emissions, which verifiably achieves a separation level of 80 per cent.

Subparagraph 2 of the first sentence shall not apply to single-room combustion plants, hall heating systems, buildings without a central hot water supply and to hybrid heat pump heating systems within the meaning of § 71h, which use biomass. Subparagraph 3 of the first sentence shall not apply to heating systems for solid biomass, which achieve an 80 per cent reduction in particulate emissions by design.

(2) Where the requirement laid down in paragraph (1) first sentence is met by means of a solar thermal system, it shall be dimensioned at least in accordance with the standard values specified in DIN V 18599-8:2018-09. The requirement for the solar thermal system is deemed to be met if:

1. in the case of residential buildings with a maximum of two dwellings, solar thermal systems with an aperture area at least 0.04 square metres per square metre of usable space are installed and operated; or

2. in the case of residential buildings with more than two dwellings, solar thermal systems with an aperture area of at least 0.03 square metres per square metre of usable space are installed and operated.

In the case of a system for producing electricity from solar radiation energy, an equivalent amount of heat must be produced. This requirement is deemed to be met if the rated power in kilowatts is at least 0.03 times the usable space or the entire suitable roof area is covered by photovoltaic modules.

(3) The operator of a combustion plant within the meaning of § 1(1) and § 2 subparagraph 5 of the Ordinance on Small and Medium Combustion Plants shall ensure, when using solid biomass, that:

1. the biomass is used in an automatically-fed biomass stove using water as the heat carrier or a biomass boiler; and

2. only biomass in accordance with § 3(1) subparagraphs 4, 5, 5a, 8 or 13 of the Ordinance on Small and Medium Combustion Plants is used.

§ 71h

Requirements for hybrid heat pump heating

Hybrid heat pump heating consisting of an electrically-powered heat pump in combination with a gas, biomass or liquid fuel combustion unit may only be installed or established and operated if the requirements set out in the second and third sentences are met. The requirements of § 71(1) are deemed to be met if:

1. operation for space heat or space heat and hot water is bivalent parallel or bivalent partially parallel with priority for the heat pump, meaning that the peak load generator is used only if the heat demand can no longer be met by the heat pump;

2. the individual heat generators of which the hybrid heat pump heating is composed have a common control system that can be accessed remotely; and

3. the peak load generator, where gaseous or liquid fuels are used, is a condensing boiler.

In the case of § 71(3) first sentence subparagraph 6, the thermal output of the heat pump must also be at least 30 per cent of the heat load of the building or building unit supplied by the hybrid heat pump heating system. The requirement set out in the second sentence is deemed to be met if the output of the heat pump at partial load point 'A' under DIN EN 14825[*)] is at least 30 per cent of the output of the peak load generator.

§ 71i

Transitional periods in the event of heating system breakdowns

(1) Following a heating system breakdown, an old heating system may be replaced on a transitional basis once and for a maximum of three years, and a new heating system that does not meet the requirements laid down in § 71(1) may be installed or established for the purpose of being put into service and operated. The period referred to in the first sentence shall start from the date on which work to replace the heating system is first carried out. The first sentence shall not apply to storey heating within the meaning of 71l(1), single-room combustion plants within the meaning of § 71l(7) and hall heating systems within the meaning of § 71m.

(2) By way of derogation from paragraph (1), following a heating system breakdown in a residential building with no more than six dwellings where one is occupied by the owner themselves and the owner, at the time of the installation or establishment of a new heating system for the purpose of being put into service or after the period referred to in paragraph (1) comes to end, has reached the age of 80, an old heating system may be replaced, on multiple occasions and without the time constraints specified in paragraph (1), and a new heating system that does not meet the requirements laid down in § 71(1) may be installed or established for the purpose of being put into use and operated. In the case of co-owners, the first sentence shall apply

*) DIN EN 14825, July 2019 edition, available from Beuth Verlag GmbH, Berlin and archived at the German Patent Office.

only if all owners have reached the age of 80. The age of the owner(s) and the ownership of the building at the time of installation or establishment of the heating system for the purpose of being put into service shall be demonstrated to the authorised district chimney sweep:

1. as part of the fireplace check for the heating system; or

2. by means of a self-declaration in writing.

After a change of ownership, the new owner shall comply with the requirements laid down in § 71 to § 71h at the latest two years after the change of ownership if the heating system is still in operation, or shall install a heating system that meets the requirements laid down in § 71 to § 71h.

§ 71j

Transitional periods for new and expanded heating networks

(1) Until its connection to a heating network in accordance with § 71b(1) or (2), a heating system that does not meet the requirements laid down in § 71(1) may be installed or established for the purpose of being put into service and operated, if:

1. the owner of the building demonstrates a contract for the supply of at least 65 per cent heat from renewable energy or unavoidable waste heat, on the basis of which the owner will be supplied from the date of the building's connection to the heating network, no later however than by 31 December 2034;

2. the heating network operator has submitted, to the authority that is competent under Land-level law for the supply area, an investment plan which is consistent with the applicable legal requirements and includes two to three-year milestones for the development of the area with a heating network; and

3. the heating network operator has guaranteed to the building owner that the heating network will be put into operation within 10 years, no later however than by 31 December 2034.

The heating network operator shall confirm compliance with the conditions set out in subparagraphs 1 and 2 to the building owner. § 71b(3) shall apply, mutatis mutandis.

(2) The competent authority shall determine by means of official decision that the heating network operator is more than two years late in implementing the investment plan compared to the milestones provided for in the investment plan as referred to in subparagraph 2 of paragraph (1), or that the implementation of the project has been abandoned. Any heating system which is newly installed within one year of the decision referred to in the first sentence being final and conclusive or being incontestable must comply with the requirements laid down in §71(1) with a transitional period of one year.

(3) If the heating system cannot be operated or supplied via the heating network with at least 65 per cent heat from renewable energy or unavoidable waste heat after the timeframe specified in paragraph (1) subparagraph (3) has passed, the building owner is required to comply with the requirements laid down in § 71 to § 71h. The first sentence shall apply, mutatis mutandis, one year after the date on which the competent authority has determined that the intended heating network is not being pursued or that implementation is late by more than two years.

(4) The building owner shall, in the cases referred to in paragraphs (2) or (3), be entitled to reimbursement of the additional costs incurred from the heating network operator who has guaranteed connection in accordance with paragraph (1) first sentence subparagraph 3. This shall not apply if the heating network operator is not responsible for the additional costs incurred.

§ 71k

Transitional periods for heating systems capable of burning both gas and hydrogen

(1) Where a heating system, which can burn both natural gas and 100 per cent hydrogen, is installed or established for the purpose of being put into service, the owner may still use only natural gas for heat production until 31 December 2034 without complying with the requirements of § 71, if:

1. the gas distribution network operator to whose network the heating system is connected has submitted a transformation plan for the mandatory, complete transition of its customer supply to hydrogen by 31 December 2034 in accordance with paragraphs (1) and (2);

2. the building owner uses 50 per cent gaseous biomass or green or blue hydrogen, including derivatives thereof, from 1 January 2030, and 65 per cent green or blue hydrogen from 1 January 2035, and demonstrates this by the respective deadline;

3. in the event that the heating system is connected to an existing gas distribution network that is to be converted to hydrogen, for this gas distribution network the legal conditions are met for network conversion at the time the heating system is installed, in particular for discontinuing the supply of natural gas to the connected customers via the network being transformed by 31 December 2034, and this has been confirmed to the person responsible by the competent regulatory authority; and

4. the gas distribution network operator to whose network the heating system is connected guarantees to the building owner that the hydrogen infrastructure will be put into operation within 10 years, at the latest by 1 January 2035.

(2) In the transformation plan referred to in paragraph (1) subparagraph 1, the gas network operator to whose network the heating system is connected must outline how, in its network area, the conversion of the gas network infrastructure to a hydrogen infrastructure by 31 December 2034 will take place. The transformation plan must include an investment plan with two- to three-year milestones for the implementation of the new construction or the conversion of the gas network to hydrogen.

(3) The transformation plan referred to in paragraph (1) subparagraph 1 and paragraph (2) shall take effect after approval by the competent regulatory authority. Approval shall be granted if:

1. completion of the network transformation by 31 December 2034 appears legally, technically and economically secure and the supply of the hydrogen distribution network via the higher network levels is ensured; or

2. the gas network operator envisages decoupling of its network from the upstream network and a secure hydrogen supply by means of local production is demonstrated.

(4) If the heating system cannot be operated with at least 65 per cent green or blue hydrogen by 31 December 2034 because the new construction or conversion of the distribution network has not been completed or the distribution network is not connected to an upstream hydrogen transport network or to secure local hydrogen production, the building owner is required to comply with the requirements laid down in § 71 to § 71h. The first sentence shall apply, mutatis mutandis, one year following the date on which the competent authority or the regulatory authority determines that the intended conversion or construction of a hydrogen distribution network is not being pursued or that the planned implementation referred to in paragraph (2) is late by more than two years. In the cases referred to in the first and second sentences, the building owner is entitled to reimbursement of the additional costs incurred from the gas distribution network operator to whose network the building owner's heating system is connected. This shall not apply if the gas distribution network operator is not responsible for the additional costs incurred.

§ 71l

Transitional periods for storey heating or single-room combustion plants

(1) In buildings in which at least one storey heating system is operated, the requirements laid down in § 71(1) shall only apply to storey heating systems three years after the date on which the first storey heating system or central heating system was replaced and a new heating system was installed or established in the building for the purpose of being put into service. The second sentence of § 71i(1) shall apply, mutatis mutandis.

(2) If, in a building in which at least one storey heating system is operated, the person responsible, within the period of time indicated in paragraph (1), decides to partially or completely convert the heat supply of the building to a central heating system in order to meet the requirement laid down in § 71(1), the period indicated in paragraph (1) shall be extended for all dwellings and other self-contained property units included in the conversion to a central heating system by the period of time until the completion of the central heating system, but no later than 10 years. After completion of the central heating system, no later than 13 years after the date on which the first storey heating system or central heating system was replaced and a new heating system was installed or established for the purpose of being put into service, all dwellings and other self-contained property units included in the conversion to the central heating system and whose storey heating is being replaced, shall be connected to the central heating system as soon as they have to be replaced. Storey heating systems which are installed or established within the period indicated in the second sentence for the purpose of being put into service shall only be connected to the central heating system once another year has passed. With respect to dwellings and other self-contained property units which are to continue to be supplied with storey heating, any storey heating system newly installed or established after the period indicated in paragraph (1) for the purpose of being put into service must comply with the requirements of § 71(1). With respect to storey heating systems that have been installed or established within the period indicated in paragraph (1) for the purpose of being put into service, the requirements laid down in § 71(1) shall only apply after another year has passed. With respect to dwellings and other self-contained property units with storey heating systems, which are connected to an existing central heating system, the requirements laid down in § 71(1) are deemed to be fulfilled. By way of derogation from the fourth sentence, in the event of a storey heating breakdown in dwellings in which the owner has reached the age of 80 at the time of the replacement of the first storey heating system or central heating system and the installation or establishment of a new heating system for the purpose of being put into service in accordance with the first sentence or after the period indicated in the first sen-

tence of paragraph (1) has passed and occupies one of the dwellings, an old storey heating system may be replaced, on multiple occasions and without the time constraints specified in paragraph (1) and a new heating system that does not meet the requirements laid down in § 71(1) may be installed or established for the purpose of being put into use and operated. The second to fourth sentences of § 71i(2) shall apply, mutatis mutandis.

(3) If, in a building in which at least one storey heating system is operated, the person responsible, within the period of time indicated in (1), decides that the dwellings and other self-contained property units with storey heating will continue to be operated with storey heating or that additional dwellings or self-contained property units will be operated with storey heating in the future, any storey heating system newly installed or established after this period shall comply with the requirements laid down in § 71(1). The fifth and seventh sentences of paragraph (2) shall apply, mutatis mutandis.

(4) If the person responsible does not make a decision in accordance with the first sentence of paragraph (2) or in accordance with the first sentence of paragraph (3) within the period indicated in paragraph (1), they are obligated to implement full conversion to a central heating system. The requirements laid down in paragraph (2) shall apply to the conversion.

(5) The decision referred to in paragraphs (2) or (3) shall be notified to the authorised district chimney sweep in text form without delay.

(6) In a building in which at least one single-room combustion plant within the meaning of § 2 subparagraph 3 of the Ordinance on Small and Medium Combustion Plants is operated for producing space heat, hot water or a combination thereof, paragraphs (1) to (5) shall apply once the first single-room combustion plant has been installed or established in the building for the purpose of being put into service.

§ 71m

Transitional period for hall heating

(1) By way of derogation from the requirements laid down in § 71(1), a new individual decentralised blower heater or radiant heater may be installed or established for the purpose of being put into service and operated in existing buildings for heating building zones with a room height exceeding 4.00 metres, for a maximum of 10 years after the replacement of the first individual blower heater or radiant heater, provided that the new systems comply with the best available technology. All individual decentralised blower heaters or radiant heaters in the hall or a central heating system must comply with the requirements laid down in § 71(1) at the latest within one year of the end of the period indicated in the first sentence. The second sentence of § 71i(1) shall apply, mutatis mutandis.

(2) By way of derogation from the requirements laid down in § 71(1), a decentralised heating system may be installed or established for the purpose of being put into service and operated in existing buildings for heating building zones with a room height exceeding 4.00 metres on one occasion and not more than two years after the replacement of the old system. After two years have passed, the newly installed or established decentralised heating system must be operated with at least 65 per cent renewable energy, unless the operator demonstrates that the final energy consumption of the building for space heating has been reduced by at least 40 per cent over a period of one year compared to the final energy consumption prior to the renewal of the heating system. If final energy consumption as referred to in the second sentence

has been reduced by less than 40 per cent, but by at least 25 per cent, the percentage shortfall with respect to the 40 per cent reduction in final energy consumption can be offset by the same percentage with respect to the use of 65 per cent of renewable energy. The second sentence of § 71i(1) shall apply, mutatis mutandis.

§ 71n

Procedures for property owners' associations

(1) For buildings in which residential units or other building units are owned separately and in which at least one storey heating system is installed or established for the purpose of being put into service, the property owners' association is obligated to request from the authorised district chimney sweep, by 31 May 2024, the information available in the chimney sweep records which is necessary for the decision on a future heat supply. This includes information that is necessary for planning centralisation of the supply of heat. The information referred to in the first and second sentences includes that relating to:

1. the system type;

2. the age of the system,

3. the proper functioning of the system; and

4. the rated heat output of the system.

At the request of property owners' association, the authorised district chimney sweep is required to send to the property owners' association, within two months of the request and for each storey heating system, the form most recently submitted pursuant to § 4(1) of the Chimney Sweep Trade Act of 26 November 2008 (BGBl. I p. 2242), as amended, or the information required by the second sentence and available in the chimney sweep records, in return for a fee covering the chimney sweep's expenses.

(2) The property owners' association is required to request, by 31 May 2024, from the owners of the residential properties or other self-contained property units in which a storey heating system is installed or established for the purpose of being put into service, information on systems and equipment that make up individually held property, which may be useful for the initial assessment of any need for action in order to comply with the requirements of § 71(1). This includes, in particular, information on:

1. the condition of the heating system, which the property owner has obtained from their own experience of using it or from tradespeople they have engaged;

2. any other components of the heating system that make up individually-held property, such as pipes and radiators, as well as any modifications carried out by the property owner or by tradespeople they have engaged; and

3. equipment for increasing efficiency, which constitutes individually-held property.

The property owners are required to provide the above-mentioned information in text form within two months of the request. The property owners shall inform the property owners' association without delay of the failure of an old storey heating system, the installation or establishment of a new storey heating system for the purpose of being

put into service and of any further changes to the information referred to in the second sentence of paragraph (1) and the first sentence.

(3) After the period for providing the information as specified in the second sentence of paragraph (2) has passed, the property owners' association shall make the information it has received available to the property owners in consolidated form within one month.

(4) As soon as the property owners' association becomes aware that the first storey heating system has been replaced and a new heating system has been installed or established for the purpose of being put into service, the administrator shall immediately convene a meeting of the property owners. At the property owners' meeting, discussions shall be held on how to comply with the requirements laid down in § 71(1) and the legal consequences indicated in § 71l(4) shall be pointed out.

(5) The property owners shall make a decision on how to comply with the requirements laid down in § 71(1) within the period of time indicated in § 71l(1). In order to comply with these requirements, an implementation concept must be drawn up, adopted and realised. Until full implementation, the property owners' meeting shall report on progress with regard to fulfilling the requirements of § 71(1) at least once a year.

(6) Two thirds of the votes cast and half of all co-ownership shares are required to retain at least one storey heating system. § 71 l(4) and (5) shall apply, mutatis mutandis.

(7) The property owners whose residential properties or other self-contained property units are being connected to a central heating system shall bear the costs of converting the heat supply to a central heating system in line with their ratio of co-ownership shares. Property owners may decide, by means of resolution, on the allocation of costs arising from the implementation of measures in individually-held property. If the distribution network necessary for connection or a central heating system is already in place, the property owners, whose residential properties or other self-contained property units are being connected to it, shall pay appropriate compensation. The second sentence of § 16(2) of the Act on the Ownership of Dwellings shall apply, mutatis mutandis.

(8) Paragraphs (1) to (7) shall apply, mutatis mutandis, to dwellings and other self-contained property units in which at least one single-room combustion plant within the meaning of § 71 l(7) is installed or established and operated.

§ 71o

Provisions on the protection of tenants

(1) Where a heating system in accordance with § 71 to 71n, which is operated entirely or partially with a biogenic fuel or with green or blue hydrogen or derivatives thereof for producing space heat or space heat and hot water, is installed or established in a building for the purpose of being put into service, the tenant shall bear the cost of the fuel consumed only up to the cost that would be incurred for corresponding energy consumption when applying the average electricity price, divided by the value of 2.5. For the entire billing period, the average electricity price shall be calculated from electricity prices for households collected every six months by the Federal Statistical Office in accordance with Regulation (EU) 2016/1952 of the European Parliament and of the Council of 26 October 2016 on European statistics on natural gas and electricity prices and repealing Directive 2008/92/EC (OJ L 311, 17.11.2016, p. 1)

as average prices, including taxes, levies and fees, and published on its website. For one billing period, the average electricity price shall be calculated as an arithmetic mean of electricity prices for households in the 'Total' category for the reporting periods that overlap with the billing period. If, in the cases referred to in the first sentence, the tenant supplies themselves with space heat or with space heat and hot water, they shall be entitled to reimbursement of the costs of the fuel consumed from the landlord, insofar as these go beyond the costs that would be incurred for corresponding energy consumption when applying the average electricity price, divided by the value of 2.5.

(2) In a building with dwellings that are rented out, the landlord may, when installing a heat pump in accordance with § 71c, demand a rent increase due to a modernisation measure pursuant to § 559(1) of the Civil Code in the full amount only if the landlord has provided proof that the seasonal energy efficiency ratio of the heat pump exceeds 2.5. Proof as referred to in the first sentence is not required if the building:

1. was built after 1996;

2. was constructed at least in accordance with the provisions of the Thermal Insulation Ordinance of 16 August 1994 (BGBl. I p. 2121) in the version in force until 31 January 2002 or the building owner proves that the annual heating demand does not exceed the specifications laid down in the Third Thermal Insulation Ordinance;

3. after renovation, meets at least the requirements of efficiency house level 115 or 100; or

4. can be heated at a flow temperature not exceeding 55 degrees Celsius at local standard outside temperature.

The proof referred to in the first sentence must be provided by a specialist contractor. The seasonal energy efficiency ratio shall be determined on the basis of VDI 4650 Sheet 1: 2019-03[*)] or using a similar method, usually before the system is put into service and not on the basis of values during operation.

(3) If the proof referred to in paragraph (2) is not provided, the landlord may only base the rent increase in accordance with § 559(1) of the Civil Code on 50 per cent of the costs spent on the dwelling.

(4) Paragraph (1) shall apply, mutatis mutandis, to leases and to other forms of providing buildings or parts thereof or dwellings or parts thereof for use in return for consideration.

§ 71p

Power to issue ordinances on the use of refrigerants in electric heat pumps and hybrid heat pump heating

The Federal Government is empowered to require, by means of an ordinance and with the assent of the Bundesrat, the use of natural refrigerants in electric heat pumps and hybrid heat pump heating installed or established in a building for the purpose of being put into service. Such an ordinance shall specify the permissible refrig-

*) The seasonal energy efficiency ratio shall be determined on the basis of VDI Standard 4650 Sheet 1: 2019-03, published in March 2019, which is available from VDI Verein Deutscher Ingenieure, Düsseldorf, or Beuth Verlag GmbH, Berlin, and is archived at the German Patent Office.

erants. Where necessary, exemptions may be provided for in cases in which flammable natural refrigerants cannot be used for safety reasons'.

27. § 72(4) and (5) are replaced by the following paragraph (4):

(1) ' Boilers may be powered by fossil fuels until the end of 31 December 2044 at the latest'.

28. § 73 is amended as follows:

a) In paragraph (1), the words 'requirements laid down in § 71' are replaced by the words 'requirements laid down in § 69(2)' and the reference '§ 72(1) and (2)' is deleted.

b) The following paragraph (2) is inserted:

'(2) In a residential building with no more than six dwellings where the owner lives in the building and has reached the age of 80 when the permissible operating period for boilers powered by a liquid or gaseous fuel has passed in accordance with § 72(1) and (2), the obligations laid down in § 72(1) and (2) shall be fulfilled only in the event of a change of ownership. The second to fourth sentences of § 71i shall apply, mutatis mutandis'.

c) The previous paragraph (2) becomes paragraph (3).

d) The following paragraph (4) is added:

(1) ' § 72(4) shall apply, mutatis mutandis'.

29. § 74(3) is worded as follows:

(1) ' In the case of a non-residential building, the obligation laid down in paragraph (1) shall not apply:

1. if the building is equipped with a building automation system and building control pursuant to § 71a(5); or

2. provided that the overall impact of such an approach is equivalent, if the air-conditioning or combined air-conditioning and ventilation system

a) are covered by a contractual arrangement concerning energy performance levels or energy efficiency improvements, in particular by an energy performance contract in accordance with § 3(1) subparagraph 8a, or

b) are operated by a utility company or a network operator and are therefore subject to system-side measures for monitoring efficiency'.

30. § 85 is amended as follows:

a) Paragraph (1) subparagraph 15 is worded as follows:

1. ' type of renewable energy used in order to fulfil the obligation laid down in § 71(1)',

b) In paragraph (3) subparagraph 6, the words 'Economic Affairs and Energy' are replaced by the words 'Economic Affairs and Climate Action' and the words 'Federal Ministry of the Interior, for Building and Community' by the words 'Federal Ministry of Housing, Urban Development and Building'.

c) In paragraph (8), the words ‘Economic Affairs and Energy’ are replaced by the words ‘Economic Affairs and Climate Action’ and the words ‘Federal Ministry of the Interior, for Building and Community’ by the words ‘Federal Ministry of Housing, Urban Development and Building’.

31. § 88 is amended as follows:

a) In paragraph (3), the words ‘or in accordance with paragraph (5)’ are inserted after the reference ‘subparagraph 2’.

b) The following paragraph (5) is added:

(1) ‘ By way of derogation from paragraph (1), a person who has successfully completed a BAFA Qualification Examination in [Energy Consulting] shall also be authorised to issue an energy certificate’.

32. In the third sentence of § 89, the words ‘Economic Affairs and Energy’ are replaced by the words ‘Economic Affairs and Climate Action’.

33. §90(2) first sentence is amended as follows:

a) Subparagraph 2 letter a is worded as follows:

a) ‘ 89 per cent in the case of a heating or hot water system which serves to meet the requirement laid down in § 71 or an obligation laid down in § 4(4) or § 9a’.

b) In subparagraph 3, the reference ‘Directive 2009/28/EC’ is replaced by the reference ‘Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (OJ L 328, 21.12.2018, p. 82), as last amended by Delegated Regulation (EU) 2022/759 (OJ L 139, 18.5.2022, p. 1)’.

34. § 91 is amended as follows:

a) In paragraph (1), the reference ‘§ 52(1)’ is replaced by the reference ‘§ 71(1)’ and the reference ‘§ 56’ by the words ‘§ 4(4) or § 9a.

b) Paragraph (2) is amended as follows:

a%6) Subparagraph 3 is amended as follows:

a%7%7) In letter a, the words ‘of § 10(2) subparagraph 3 are replaced by the words ‘of § 71 to § 71h’, the words ‘specified in said provisions’ are placed after the word ‘requirements’ and the words ‘in accordance with § 35 to § 41’ are deleted.

b%7%7) In letter b, the words ‘in the case of § 56’ are replaced by the words ‘in the cases of § 4(4) and § 9a’.

b%6) Subparagraph 4 is amended as follows:

a%7%7) Letter a is worded as follows:

a) ‘ in the cases of § 71 to § 71h, exceeds 65 per cent renewable energy or’.

b%7%7) In letter b, the words ‘in the case of § 56’ are replaced by the words ‘in the cases of § 4(4) and § 9a’.

35. § 96 is amended as follows:

a) Paragraph (1) is amended as follows:

a%6) In the clause before subparagraph 1, the words ‘subparagraphs 1 to 8’ are replaced by the words ‘subparagraphs 1 to 11.

b%6) In subparagraph 6, the words ‘§ 69 and § 71’ are replaced by the reference ‘§ 69’.

c%6) In subparagraph 7, the word ‘or’ at the end is replaced by a comma.

d%6) In subparagraph 8, the full stop at the end is replaced by a comma.

e%6) The following subparagraphs 9 to 11 are added:

1. ‘ hydronic balancing and other measures carried out to optimise heating in accordance with § 60c,

2. metering equipment for heating systems as well as components of monitoring technology and building automation systems installed in accordance with § 71a, or

3. heating systems installed or established for the purpose of being put into service in order to meet the requirements laid down in § 71(1) to (3), § 71i(1), § 71k(1) first clause and § 71m’.

f%6) The following sentence is added:

‘The first sentence shall apply, mutatis mutandis, to:

1. the results of operational testing of heat pumps in accordance with § 60a(5) first sentence and the evidence of optimisation measures carried out in accordance with § 60a(5) second sentence;

2. the results of heating inspections and heating optimisation in accordance with § 60b(5) first sentence and the evidence of optimisation measures carried out in accordance with § 60b(5) second sentence;

3. confirmation by the heating network operator in accordance with § 71b(1) third sentence and § 71b(2) fifth sentence; or

4. proof of at least 40 per cent reduction in the final energy consumption in accordance with § 71m(2) second sentence’.

b) Paragraph (4) is worded as follows:

‘(4) Anyone who commercially supplies a building with solid, gaseous or liquid biomass, green or blue hydrogen or derivatives thereof for the purpose of meeting the requirements of this Act must confirm to the supplied person, through the billing, that the respective requirements under § 71f(2) to 4, § 71g(3) subparagraph 2 and § 71k(1) subparagraph 2 are met’.

c) Paragraph (5) is amended as follows:

a%6) In the first sentence, the words ‘§ 38 to §40’ are replaced by the words ‘§ 71f(2) to (4) and § 71g(3) subparagraph 2’.

b%6) In the second sentence, the words ‘In the cases of paragraph (4) subparagraphs 1 to 3’ are replaced by the words ‘Where liquid or gaseous biomass or green or blue hydrogen including derivatives thereof are used’ and after the word ‘owner’ the words ‘or supplied person’ are inserted.

c%6) The third sentence is worded as follows:

‘The bills and confirmations shall be submitted, upon request, to the authority that is competent under Land-level law’.

36. § 97 is amended as follows:

a) Paragraph (1) is amended as follows:

a%6) In the clause before subparagraph 1, the words ‘Chimney Sweep Trade Act of 26 November 2008 (BGBl. I p. 2242), as last amended by Article 57(7) of the Act of 12 December 2019 (BGBl. I p. 2652)’ are replaced by the words ‘Chimney Sweep Trade Act of 26 November 2008 (BGBl. I p. 2242) as amended’.

b%6) The following subparagraph 1 is placed before the current subparagraph 1:

‘1. a circulator is to be replaced in accordance with § 64(2)’.

c%6) The previous subparagraph 1 becomes subparagraph 2, and in it the words ‘§ 72(1) to (3)’, are replaced by the words ‘end of the transitional periods indicated in § 71i to § 71m or in § 72,’.

d%6) The previous subparagraph 2 becomes subparagraph 3, and in it the reference ‘§ 71’ is replaced by the reference ‘§ 69(2)’.

e%6) The previous subparagraph 3 becomes subparagraph 4 and is worded as follows:

1. ‘ the bills and confirmations referred to in § 96(5) are available’.

b) Paragraph (2) is amended as follows:

a%6) Subparagraph 3 is worded as follows:

‘3. a boiler fed with a liquid or gaseous fuel is installed contrary to § 71 to § 71m; the inspection shall be limited in this respect to ensuring that the corresponding necessary evidence, supporting documents or declarations are available’.

b%6) In subparagraph 4, after the reference ‘§ 69’, the reference ‘(1)’ is inserted and the full stop at the end is replaced by a comma.

c%6) The following subparagraphs 5 to 7 are added:

1. ‘ the metering equipment installed complies with the requirements laid down in § 71a(1) and (2),

2. the requirements for the installation of heating systems when using solid biomass in accordance with § 71g are complied with, and

3. the requirements for the installation of hybrid heat pump heating in accordance with § 71h are complied with'.

d%6) The following sentences are added:

'The first sentence subparagraphs 2 to 6 shall apply, mutatis mutandis, to new builds. The legal basis under § 71 to § 71m or § 102 on which the owner relies when installing or establishing a new heating system fed with liquid, solid or gaseous fuels shall be entered in the chimney sweep records'.

37. § 102 is amended as follows:

a) In the second sentence of paragraph (1), the full stop at the end is replaced by the following words:

', that is, if the necessary investments are not reasonably proportionate to the return. Unreasonable hardship also exists if the necessary investments are not reasonably proportionate to the value of the building. In this regard, taking account of the purpose of this Act, account shall be taken of price developments, which can be expected for achieving this purpose, of energy, including greenhouse gas prices under European and national emissions trading'.

b) The following paragraph (5) is added:

(1) ' The authorities that are competent under Land-level law shall, at the request of the owner, exempt the owner from the requirements laid down in § 71(1), if the owner draws income-dependent social benefits at the time of the request'.

38. § 107 is amended as follows:

a) In paragraph (1) second sentence subparagraph 2, the words '§ 10(2) subparagraph 3' are replaced by the words '§ 71 to § 71h'.

b) In paragraph (3), the words '§ 10(2) subparagraph 3' are replaced by the words '§ 71 to § 71h' and the reference '§ 35 to § 45' by the reference '§ 71 to § 71h'.

39. § 108 is amended as follows:

a) Paragraph (1) is amended as follows:

a%6) After subparagraph 3, the following subparagraphs 4 to 7 are inserted:

'4. contrary to § 60a(1) first sentence, does not subject a heat pump to operational testing or does not do so on time,

5. contrary to § 60a (5) second sentence or § 60b(5) second sentence, does not carry out an optimisation measure or does not do so on time,

6. contrary to § 60b(1) first or second sentence, does not subject a heating system to a heating inspection or does not do so on time,

7. contrary to § 60c(1), does not subject a heating system to hydronic balancing or does not do so on time'.

b%6) The previous subparagraphs 4 to 6 become subparagraphs 8 to 10.

c%6) After the new subparagraph 10, the following subparagraph 11 is inserted:

‘11. contrary to §64(2), does not replace a circulator or a drinking water circulation pump or does not do so on time’.

d%6) The previous subparagraph 7 becomes subparagraph 12 and the words ‘§ 69, § 70 or § 71(1)’ are replaced by the reference ‘§ 69 or § 70’.

e%6) After the new subparagraph 12, the following subparagraphs 13 to 19 are inserted:

‘13. contrary to the third sentence of § 71(2), does not properly install, does not properly establish or does not properly operate a heating system,

14. contrary to the first sentence of § 71a(1), does not equip a heating system, does not do so properly or does not do so on time,

15. contrary to the first sentence of § 71a(4), also in conjunction with the second sentence, does not equip a non-residential building, does not do so properly or does not do so on time,

16. contrary to the third sentence of § 71b(1) or the fifth sentence of paragraph (2), does not provide a confirmation, does not do so properly, does not do so in full or does not do so on time,

17. contrary to § 71d(1) or (2) first or second sentence, installs or establishes direct electric heating,

18. contrary to the first sentence of § 71f(1), does not ensure that at least 65 per cent of the heat provided by the system is produced from the fuels mentioned in said provision,

19. contrary to the first sentence of § 71 g(1), does not equip a heating system, does not do so properly or does not do so on time, or does not combine a heating system with a system mentioned in said provision, does not do so properly or does not do so on time,

20. contrary to § 71g(3) does not ensure that the solid biomass is used in an automatically-fed biomass stove using water as the heat carrier or in a biomass boiler and that only the biomass mentioned in said provision is used,

21. contrary to the first sentence of § 71h, installs or establishes hybrid heat pump heating,

22. contrary to § 71k(1) subparagraph 2, uses natural gas’.

f%6) The previous subparagraph 8 becomes subparagraph 23 and the words ‘(1) or (2)’ are replaced by the words (1), (2) or (4)’.

g%6) The previous subparagraph 9 is repealed.

h%6) The previous subparagraphs 10 to 21 become subparagraphs 24 to 35.

i%6) In the new subparagraph 32, the reference ‘or (4)’ is inserted after the reference ‘(1)’.

b) Paragraph (2) is worded as follows:

‘(2) The regulatory offence may be punished,

1. in the cases referred to in paragraph (1) subparagraphs 1 to 3, 8 to 10, 12 and 23, by a fine of up to fifty thousand euros,

2. in the cases referred to in paragraph (1) subparagraphs 24 to 31, by a fine of up to ten thousand euros,

3. In the cases referred to in paragraph (1)

a) subparagraphs 4 to 7, 11, 14 to 16, 32 to 34 and 35,

b) subparagraphs 13, 17 to 21 and 22,

by a fine of up to five thousand euros.

In the cases referred to in the first sentence of subparagraph 3 letter b, the third sentence of § 30(2) of the Act on Regulatory Offences shall apply'.

40. In the first sentence of § 111(1) and in the first sentence of § 111(2), the word 'fundamental' is replaced by the word 'major'.

41. After § 114, the following § 115 is added:

'§ 115

Transitional provisions on fines

§ 108(1) subparagraphs 13 and 17 to 22, § 108(2) first sentence subparagraph 3 letter b and the second sentence shall not apply to owners of residential buildings with six dwellings or fewer, whose owners live in the building themselves, until 1 January 2025'.

42. Annex 8 is amended as follows:

a) The heading is worded as follows:

'Annex 8

(to § 69 and § 70)

Requirements for the insulation of pipes and fittings'.

b) Subparagraph 1 is amended as follows:

a%6) In the clause before letter a, the reference '§ 69 and § 71(1)' is deleted.

b%6) Letter a is amended as follows:

a%7%7) In double letter hh, the reference '(1)' is added after the reference '§ 69'.

b%7%7) The following second sentence is added:

'The thermal conductivity of the insulation shall be based on an average temperature of 40 degrees Celsius'.

c%6) In letters b and c, the reference ‘(1)’ is added after the reference ‘§ 69’ .

c) Subparagraph 2 is worded as follows:

c) ‘2. For cooling distribution and cold water pipes and fittings of ventilation and air-conditioning systems with an internal diameter of up to 22 millimetres, the minimum thickness of the insulation layer is 9 millimetres, based on a thermal conductivity of the insulation layer of 0.035 watts per metre and Kelvin,

d) of more than 22 millimetres, the minimum thickness of the insulation layer is 19 millimetres, based on a thermal conductivity of the insulation layer of 0.035 watts per metre and Kelvin.

The thermal conductivity of the cold insulation shall be based on an average temperature of 10 degrees Celsius’.

Article 2

Amendment to the Ordinance on the Billing of Heating Costs

In the Ordinance on the Billing of Heating Costs in the version promulgated on 5 October 2009 (BGBl. I p. 3250), as amended by Article 1 of the Ordinance of 24 November 2021 (BGBl. I p. 4964), the words ‘heat pump or’ in § 11(1) subparagraph 3 letter a are deleted.

Article 3

Amendment to the Chimney Sweeping and Inspection Code

The Chimney Sweeping and Inspection Code of 16 June 2009 (BGBl. I p. 1292), as last amended by Article 1 of the Ordinance of 26 October 2021 (BGBl. I p. 4740), is amended as follows.

1. In Annex 2, the words ‘distance of the chimney exit opening from the roof sufficient (§ 19(1) subparagraph 1)’ are replaced by the words ‘sufficient height and ridge proximity of the chimney mouth (§ 19(1) first to fourth sentences, § 19(2) first sentence subparagraph 1)’ and each instance of the words ‘distance from ventilation openings, windows and doors sufficient (§ 19(1) subparagraph 2)’ is replaced by the words ‘distance from ventilation openings, windows and doors sufficient (§ 19(1) fifth sentence, § 19(2) first sentence subparagraph 2)’.

2. In Annex 3, points 3.3 to 3.12 are replaced by points 3.3. to 3.16:

‘3.3	Check whether a circulator is to be replaced (§ 14(1) SchfHwG, § 97(1) subparagraph 1 GEG)	3.0
3.4	Check whether a boiler that had to be taken out of service is still operating (§ 14(1) SchfHwG, § 97(1) subparagraph 2 GEG)	1.5
3.5	Check whether heat distribution and hot water pipes that had to be insulated are still uninsulated (§ 14(1) SchfHwG, § 97(1) subparagraph 3 GEG)	1.5
3.6	Check whether the bills and confirmations in accordance with § 96(5) GEG are available (§ 14(1) SchfHwG, § 97(1) subparagraph 4 GEG)	10.0

3.7	Review of the ‘no deterioration’ requirement (§ 14(1) SchfHwG, § 97(2) subparagraph 1 GEG)	
3.7.1	Where no deterioration is found	5.0
3.7.2	Where deterioration is found	30.0
3.8	Check whether central heating is equipped with certain facilities (§ 14(1) SchfHwG, § 97(2) subparagraph 2 GEG)	3.0
3.9	Verification of compliance with the requirements of § 71 to §71m (§ 14(1) SchfHwG, § 97(2) subparagraph 3)	8.0
3.10	Verification of the heat dissipation limit in heat distribution and hot water pipes and fittings (§ 14(1) SchfHwG, § 97(2) subparagraph 4 GEG)	2.0
3.11	Verification that metering equipment installed complies with the requirements of §71a GEG (§ 14(1) SchfHwG, § 97(2) subparagraph 5 GEG)	5.0
3.12	Verification that the requirements for installation of heating systems when using solid biomass are complied with (§ 14(1) SchfHwG, § 97(2) subparagraph 6 GEG)	8.0
3.13	Verification that the requirements for installation of hybrid heat pump heating are complied with (§ 14(1) SchfHwG, § 97(2) subparagraph 7 GEG)	8.0
3.14	Check whether the owner is required to retrofit the equipment for central heating systems in existing buildings and that this obligation has been fulfilled (§ 14(1) SchfHwG, § 97(4) GEG)	7.0
3.15	Event-related inspection of the combustion air supply or of smoke or exhaust gas routing following structural measures (§ 1(8)) insofar as a certificate of the result is issued, per minute of work	0.8
3.15.1	Where the inspection is file-based, per property unit, but not more than	35.0
3.15.2	Where the inspection involves an onsite visit, per property unit, but not more than	45.0
3.16	Event-related inspection under § 15 SchfHwG, per minute of work	0.8’.

Article 4

Entry into force

(1) This Act shall enter into force on 1 January 2024, subject to paragraph (2).

(2) By way of derogation from paragraph (1), Article 1 point 22 and Article 2 shall enter into force on 1 October 2024.

Explanatory notes

A. General part

I. Objective of and need for the provisions

Germany's entire climate, energy and economic policy is being aligned to the 1.5° climate change pathway, to which the European Union has committed itself under the Paris Agreement. The building stock therefore needs to be transformed so as to be sustainable and greenhouse gas-neutral by 2045. This involves the most economical use of energy and the exclusive use of renewable energy or unavoidable waste heat for the energy supply of buildings.

In 2021, the buildings sector (covering emissions from stationary and mobile combustion processes in the commercial, trade, services, household and military sectors) was responsible for greenhouse gas emissions of around 115.5 million tonnes of CO_2 equivalent (million t CO_2 equivalent) with 84.5 million tonnes of CO_2 equivalent being attributed to households alone. The buildings sector thus accounts for about 15 per cent of Germany's total emissions and corresponds to CO_2 equivalent emissions of around 1.4 tonnes per person. Emissions attributable to the buildings sector decreased by 55 per cent between 1990 and 2021, constituting a reduction of 94.3 million tonnes of CO_2 equivalent. In 1990, an average person emitted more than 2.6 million tonnes of CO_2 equivalent; emissions per capita have fallen by around 46 per cent since 1990. Nevertheless, in 2021, the buildings sector again exceeded the annual emissions allowed under the Climate Protection Act by 2.5 million tonnes of CO_2 equivalent, i.e. by 2.2 per cent (source: German Environment Agency (UBA) 2022, Trends in greenhouse gas emissions and target achievement in Germany, by sector under the Climate Protection Act (KSG).

As a major step in this transformation, every newly-installed heating system is to be operated using at least 65 per cent renewable energy ('65 per cent renewable energy requirement'). Against the background of the Russian war of aggression on Ukraine, the coalition decided on 23 March 2022 that this requirement should apply as far as possible to any heating system replacement in new or existing buildings as of 1 January 2024. This will play a lasting role in ending dependency on fossil fuels from conflict-affected regions and achieving climate protection targets. Since the existing Buildings Energy Act (GEG), as a contribution to these targets, strives for the most sparing use of energy in buildings, including the increasing use of renewable energy, the present Act aims to significantly accelerate the transformation to a sustainable and greenhouse gas-neutral building stock by 2045 at the latest. In order to achieve this target, considerable efforts are needed to implement the transition in the heating sector.

The share of heat demand in Germany, which was met in 2021 by the burning of fossil fuels, mainly oil and gas, was over 80 per cent. The share of renewable energy (solid, liquid and gaseous biomass, solar thermal, geothermal and environmental heat) in the final energy consumption for heat was only 16.5 per cent in 2021. Thus, the energy source natural gas, which was imported from Russia in particular, dominates the provision of space heat. In absolute terms, more than 410 terawatt hours (TWh) of natural gas were burned in the year to meet heat demand in buildings. This represents more than 40 per cent of the total natural gas consumed in Germany. Of the approximately 41 million households in Germany, almost one in two is heated with natural gas, followed by heating oil at just under 25 per cent and district heating at around 14 per cent. Direct electric heating and electric heat pumps do not even account for 3 per cent each. The remaining 6 per cent comes from combustion plants powered by solid fuels, such as wood, wood pellets, other biomass and coal (source: German Association of Energy and Water Industries (BDEW)

2022, Trends in the housing stock heating structure in Germany). The proportion of newly-installed heating systems running on gas was as high as 70 per cent. In absolute terms, around 13.6 million gas boilers (6.5 million low-temperature and 7.1 million condensing boilers) and 5.2 million oil-fired heating units (4.4 million low-temperature and 0.8 million condensing boilers) were operated in Germany in 2021. The stock of coal-fired heating units is estimated at approximately 85 000 (house central heating and single-room combustion plants). Compared to oil and gas boilers, the stock of installed heat pumps, at about 1 million systems, is still comparatively low.

In addition to enshrining the 65 per cent renewable energy requirement for new heating systems in the GEG, this Act, in view of the current situation in the energy markets, also lays down a number of requirements for increasing energy efficiency in the buildings energy sector, which are intended to have a rapid effect and to ensure that heating energy is used efficiently, regardless of whether it is produced using fossil energy or renewables.

In addition, the Federal Government is currently pursuing ambitious minimum efficiency standards for buildings at EU level in the context of the Green Deal and the discussions on the Energy Performance of Buildings Directive (EPBD) in order to reduce demand for heating and, together with the requirement for the gradual decarbonisation of heat generation which is enshrined in this Act, to significantly advance the transition in the heating sector.

This conversion of the heat supply involves considerable and numerous challenges due to the wide variety of different buildings, the different ownership situations and the impact on tenants. The current crisis in the energy markets and the sharp price rises for natural gas and other fossil-based resources indicate, however, that this conversion in the heating sector is urgently needed, not only for climate policy reasons but also for social policy reasons. Maintaining the current fossil-dominated supply structures would lead to repeated jumps in prices that are difficult to predict due to the scarcity of fossil fuels and their concentration in geopolitical conflict regions, resulting in significant social upheaval that can only be mitigated to a limited and temporary degree by State aid measures. A heat supply being based on renewable energy means it will be much more predictable, cost-effective and stable in the medium to long term. A decisive role, in particular, will be played by the use of renewable environmental heat available free of charge by means of heat pumps and solar thermal energy.

The Russian war of aggression on Ukraine marks a turning point in Germany’s energy supply. Because of its considerable dependence on natural gas, the heating sector has been affected by this change like no other. Speeding up the heating transition, as encouraged by this Act, is therefore not only necessary for climate policy reasons, but also – in light of the current crisis – for geopolitical and economic reasons.

II. Main content of the draft

The main content of this Act can be summarised as follows:

1. Equally possible (technology-neutral) compliance options for the 65 per cent renewable energy requirement

The GEG is structured so that a distinction is made between requirements for new builds (Part 2), existing buildings (Part 3) and systems for heating, cooling and ventilation technology as well as hot water supply (Part 4). The 65 per cent renewable energy requirement is to apply from 1 January 2024 to each newly-installed heating system – regardless of whether it is in an existing building or in a new build. Accordingly, amendments are necessary in all three parts of the GEG:

The core of the 65 per cent renewable energy requirement is implemented in Part 4 in § 71 – new – as a requirement for heating systems that are being newly installed or established. This is followed by further requirements concerning the various compliance options, which replace the existing provisions from the former Renewable Energy Heat Act (EEWärmeG) for certain (lower) shares of renewable energy for new builds and existing buildings in Part 2 (§ 34 to § 45) and Part 3 (§ 52 to § 56).

If the building owner does not have individual evidence of compliance with the 65 per cent renewable energy requirement for the new heating, the owner can freely choose between the following compliance options for the new installation or replacement, provided that these compliance options cover, individually or in combination, the complete heat demand of the building:

- connection to a heating network
- installation of an electrically-powered heat pump
- installation of direct electric heating
- installation of a solar thermal system
- installation of hybrid heat pump heating, where the renewable energy share must be at least 65 per cent, while the remaining energy demand can be met with fossil fuels
- installation of a heating system based on green or blue hydrogen or derivatives thereof.

As a further compliance option, biomass heating based on biomass including biomethane can only be installed in existing buildings.

Any new build can fundamentally be planned in such a way that the use of heat pumps or the connection to a heating network should be straightforward.

If the owner leaves the heating or hot water supply to a contractor, then in addition to the owner, the obligations with regard to the nature of the heating systems or other requirements for the building or efficiency levels also apply to the contractor in accordance with § 8(2), as a contractor acts on behalf of the owner. Leaving the means of implementation open also allows for district solutions.

2. Transitional periods in the event of heating system breakdowns, planned connection to a heating network and conversion of storey heating or single-room combustion plants

In some special cases and cases involving hardship, the obligated owners are given more time to implement the 65 per cent renewable energy requirement. This is the case, in particular, in the event of heating system breakdowns and where connection to a heating network is planned but not immediately possible and where storey heating systems and single-room combustion plants (‘single stoves’) are being replaced.

In the case of heating system breakdowns (the heating can no longer be operated as intended and no longer repaired) the obligated owners are given a transitional period for compliance. Installation of a fossil-fuelled heating system (that may be second hand) is possible once if, within three years of the failure of the heating system, conversion to a heating system meeting the 65 per cent renewable energy requirement is planned.

The 65 per cent renewable energy requirement for new heating systems will therefore apply from 1 January 2024 particularly for a planned heating replacement where the heating system is not yet broken.

To the extent that connection to a heating network is foreseeable but not yet possible, there is the option, for a transitional period after the failure of a heating system, to use a heating system that does not comply with the 65 per cent renewable energy requirement, if the obligated owner undertakes to have the heating system connected to the heating network within 10 years of the failure of the heating system, but by 31 December 2034 at the latest.

Where the gas distribution network is to be converted to hydrogen by 31 December 2034, the building owner can install a gas heating system that burns both gas and hydrogen. In this case, the building owner is required to use 50 per cent green gases (gaseous biomass or green or blue hydrogen including derivatives thereof) as of 1 January 2030 and 65 per cent green or blue hydrogen as of 1 January 2035.

For the conversion of storey heating and single-room combustion plants, a decision period of three years after the first storey heating system in a building has failed is granted in order to allow the planning of heating centralisation. Where heating centralisation is chosen, the owners are given another 10 years to implement this centralisation. In the case of property owners’ associations, centralisation is generally required if the property owners’ association fails to make a decision on decentralised technologies that meet the 65 per cent renewable energy requirement.

3. Hardship cases

In the event of cases involving unreasonable hardship, exemptions from mandatory compliance may – still – be allowed in individual cases, upon request to the authorities that are competent under Land-level law, as is fundamentally possible for all GEG requirements. The rules governing hardship cases are being clarified and extended, inter alia, to take into account the expected price developments in national and European emissions trading, against the background of the achievement of the Act’s objectives.

4. Accompanying measures for efficient operation

To accompany the 65 per cent renewable energy requirement, further requirements for the operational testing of heat pumps (§ 60a – new) are being included due to their substantive proximity. Furthermore, the measures arising from the EnSimiMaV on heating inspection and heating optimisation (§ 60b – new –) and on hydronic balancing (§ 60c – new –) are being absorbed and pump replacement (§ 64 – new –) are being introduced.

The rules are restricted to multi-family buildings to ensure that tenants are protected from inefficient operation of the heating system.

a) Operational testing of heat pumps

The newly-introduced operational testing for newly-installed heat pumps in residential buildings with at least six residential units or other property units is intended to ensure that the heat pumps also operate efficiently.

b) Heating inspection and heating optimisation

Owners of residential buildings with at least six residential units or other property units whose heating system using water as the heat carrier was put into operation before 1 January 2009 must have the operation of their heating system checked and confirmed with regard to energy efficiency. Such inspection also includes the efficiency of the heating pumps and the question of whether the heating system requires hydronic balancing (§ 60c). The legislation continues the provision from § 2 EnSimiMaV and transfers it to older heating systems using other fuels.

c) Hydronic balancing

The optimisation potential for heating systems is to be exploited effectively. Therefore, where a new heating system is installed in residential buildings with at least six residential units or other property units, it is being stipulated that hydronic balancing must be carried out as a statutory obligation.

d) Pump replacement

The replacement of inefficient, uncontrolled heating pumps saves operating electricity, because uncontrolled heating circulators and circulation pumps consume a lot of energy. The replacement of heating pumps usually pays for itself within the pump’s service life, sometimes several times over. This measure reduces electricity consumption in the building, because new pumps use significantly less operating power and the heating circuits work more efficiently, thus saving gas. The obligation covers residential buildings with at least six residential units and other property units.

5. New purpose of the Act

The Act's significant contribution to the achievement of climate change targets in the buildings sector is reflected in its new objectives and purpose. The aim is to gradually limit the service life of fossil-fuelled heating systems, so that boilers powered by fossil fuels can only be operated until 31 December 2044. This will counteract a wait-and-see position on the heating market. Furthermore, a special public interest in renewable energy and energy efficiency is being enshrined in the GEG.

6. Provisions on tenant protection

The technology-neutral choice of the building owner concerning the installation of a new heating system may be associated with very high costs for the operation of the system. This is particularly the case for boilers using bioenergy (biomethane, pellets) or other green gases (gaseous biomass or green or blue hydrogen including derivatives thereof). Therefore, tenants are being protected from being overcharged additional costs. Landlords are not able to transfer fuel costs on to their tenants exceeding the amount that would be incurred to produce the same amount of heat using a sufficiently efficient heat pump.

Furthermore, tenants are to be protected from high electricity costs, which may be likely following the installation of a heat pump in an existing building that has not yet been reno-

vated, because the heat losses are very high or the heat transfer and distribution are not designed for the operation of a heat pump. The operation of heat pumps may be inefficient in these buildings as the transmission heat losses can be high.

III. Alternatives

None. Alternative solutions have been examined thoroughly. Despite the availability of extensive funding, in particular through the Federal funding scheme for efficient buildings (Bundesförderung für effiziente Gebäude – BEG), fossil-fuelled heating systems (in particular natural gas boilers) are still installed in around one third of new buildings and three-quarters of existing buildings. At around 15 per cent in 2021, the share of renewable energy in the provision of building heat is largely stagnant at a very low level. The mix of tools chosen so far, consisting of voluntary information campaigns, funding, market economy measures and regulative requirements, therefore needs to be adapted and further developed in line with the requirements that result from the more ambitious climate targets for 2030 and 2045.

The strengthening of clear regulative requirements, accompanied by further measures in parallel to this legislative process (such as the diversification and realignment of existing funding programmes and the intensification of skills measures for tradespeople), will provide property owners and investors as well as manufacturers and installers of heating systems with the planning certainty they need in order to implement the necessary investments in time to ensure the success of the heating transition.

For the discussion of the individual regulative measures under consideration as part of the legislation design process, the Federal Ministry for Economic Affairs and Climate Action (BMWK) and the Federal Ministry of Housing, Urban Development and Building (BMWSB) put out a concept paper for public consultation, the results of which were incorporated into the drafting of this Act. The consultation began on 14 July 2022 with the publication of the joint concept paper of the BMWK and BMWSB entitled ‘65 per cent renewable energy for the installation of new heating systems from 2024’.[2)] Comments received during the consultation were published on the BMWK’s website. [3)]

As the process continued, the Länder and trade associations were consulted regarding the Act. To this end, the draft Act was sent to the Länder and trade associations on 3 April 2023. The Länder and trade associations had the opportunity to comment by 13 April 2023. Comments received were published on the BMWK’s website.[4)]

IV. Legislative powers

The powers of the Federal Government to enact the legislation arise from Article 74(1) subparagraph 11 and 24 of the Basic Law (GG).

The Act’s provisions fall within the area of air pollution control. A measure serves to control air pollution within the meaning of Article 74(1) subparagraph 24 GG, if the amount of pollutants is limited or reduced and thus the natural composition of the air is maintained. The emission of climate-damaging greenhouse gases affects the atmosphere, which is part of the environmental medium air. The purpose of the Act is to reduce greenhouse gas emissions and thus protect the climate. The use of renewable energy in buildings to produce heat is a starting point for achieving the desired climate protection. The Act will thus help to significantly reduce greenhouse gas emissions because, as a result of the Act, fos-

---

2)https://www.bmwk.de/Redaktion/DE/Downloads/Energie/65-prozent-erneuerbare-energien-beim-einbau-von-neuen-heizungen-ab-2024.pdf.

3)https://www.bmwk.de/Navigation/DE/Service/Stellungnahmen/65-prozent-erneuerbare-waerme/stellungnahmen-65-prozent-erneuerbare-waerme.html.

4)[…].

sil fuels will have to be substituted, carbon dioxide emissions will be reduced and thus air pollution will be controlled.

The subject matter governed by the Act also forms part of the law relating to economic matters, in particular the energy sector. The term ‘energy sector’ within the meaning of Article 74(1) subparagraph 11 GG is not limited to the production and distribution of energy, but also covers measures to reduce energy consumption. The purpose of the Act is to substitute fossil resources by increasing the use of renewable energy to generate heat in the interest of climate protection, to reduce dependence on energy imports and thus to contribute to security of supply. Insofar as the legislator is relying on the competence of the energy sector, regulation at federal level is required in order to safeguard legal and economic unity in the national interest within the meaning of Article 72(2) GG. Legal fragmentation of requirements concerning renewable energy would adversely affect the activities of planners, system engineering companies and the construction and real estate sectors; it would also inhibit the development of nationally-distributed systems, e.g. systems for the use of renewable energy to produce heat. For this reason, minimum standards that are uniform throughout Germany will ensure that companies in the system engineering, real estate, and trades and crafts sectors will have a predictable and reliable technical and legal framework for product development and production for the entire German market.

V. Compatibility with European Union law and international treaties

The Act is consistent with European Union law, in particular with the existing Energy Performance of Buildings Directive, the Energy Efficiency Directive, the Ecodesign Directive and the Renewable Energy Directive.

The Act also serves to transpose individual requirements of the Energy Performance of Buildings Directive 2010/31/EU (EPBD) which have not yet been transposed.

The Draft does not affect the scope of international treaties concluded by the Federal Republic of Germany.

VI. Consequences of the legislation

Easier and more effective enforcement is envisaged through the introduction of compliance options for the 65 per cent renewable energy requirement. The reader is referred to the comments on objectives and the overview of the main rules (see A.I. and A.II. above) as well as the individual explanatory notes.

1. Legal and administrative simplification

For the first time, the introduction of the 65 per cent renewable energy requirement creates a uniform system of regulation for new and old buildings with respect to the use of renewable energies for the provision of heat. The 65 per cent renewable energy requirement is laid down such that the responsible person receives evidence from a qualified person, which the responsible person is required to keep and must submit to the authority that is competent under Land-level law upon request. This makes enforcement of the 65 per cent renewable energy requirement easier and more effective.

2. Sustainability aspects

This Act meets the Federal Guiding Principles on Sustainable Development under the German Sustainability Strategy, which is intended to implement the UN’s 2030 Agenda for Sustainable Development. The Draft Act serves, in particular, to achieve SDG 7 (access to affordable, reliable, sustainable and modern energy for all) and SDG 13 (take urgent action to combat climate change and its impacts).

The Draft Act contributes specifically to the achievement of the targets in the field of primary energy consumption (indicator 7.1.b) of the German Sustainability Strategy by significantly reducing the primary energy consumption of the buildings sector through the requirement for a high share of renewables for new heating systems. It also contributes to the achievement of the targets in the field of greenhouse gas emissions (indicator 13.1.a) of the German Sustainability Strategy by reducing greenhouse gas emissions from the buildings sector through the increasing use of renewable energy for heating and cooling in buildings.

The Act thus follows the principles of the German Sustainability Strategy '(1.) Apply sustainable development as a guiding principle consistently in all areas and decisions', '(3.) Strengthen the natural resource base on which life depends', '(4.) Strengthen sustainable economic activity' and '(5.) Preserve and enhance social cohesion in an open society'.

3. Budgetary expenditure exclusive of compliance costs

Investment costs will be incurred by Federal Government, the Länder (federal states) and municipalities in order to meet the 65 per cent requirement for renewable energy in heating systems in public buildings.

In accordance with the federal budget, budgetary expenditure may arise from the financial support for heating systems and connections to a heating network. However, this depends largely on how the funding regime is designed in the future. Additional staffing and material resources are not inevitable.

Additional needs at Federal Government level must be covered financially and in terms of jobs in the respective budget section, regardless of whether such needs are prompted by the planned measures themselves or by the administrative burden associated with the measures.

In addition, enforcement of the Act by the Länder will lead to procedural costs.

4. Compliance costs

This section summarises the compliance costs arising from the new obligations. The costs are incurred by owner occupiers as well as private and commercial landlords. Below, the heading 'Citizens' covers anyone who is considered a private client for new builds (data collected by the Federal Statistical Office) and stated in the 2011 census that the building is owned by a private individual (existing building). Information on whether the private buildings are also rented out for commercial purposes is ignored.

Overall, the data situation concerning the buildings sector is incomplete. In particular, data is missing on the condition of existing buildings in Germany (especially on energy quality and the state of system technology) or data is partly obsolete due to the lack of ongoing collection (cf. e.g. Agora Energiewende, The energy transition in Germany: State of play 2022 Review of key developments and outlook for 2023 ANALYSE, p. 67) https://static.agora-energiewende.de/fileadmin/Projekte/2022/2022-10_DE_JAW2022/A-EW_283_JAW2022_WEB.pdf; Meta-study to improve the data situation in the buildings sector, bbh, dena, EY, FIW, heimrich+hannot, 2022, introduction, https://www.bmwk.de/Redaktion/DE/Publikationen/Energie/metastudie-verbesserung-datengrundlage-gebaeudebereich.pdf?__blob=publicationFile&v=4). For non-residential buildings, the data situation is worse than for residential buildings, as there are no complete official statistics and data is mainly based on surveys and extrapolations carried out by a research consortium in 2019, which has not been updated since then (cf. ENOB:dataNWG, https://www.-datanwg.de/home/aktuelles/). The data for these compliance costs mainly comes from the data sources relevant for the buildings sector (e.g. publications of the Federal Statistical Office, 2011 census, dena Building Report, ENOB:dataNWG) or from an academic opinion on the GEG, which is currently being drawn up. In addition, in some places, assump-

tions and estimates have had to be used, some of which were made by the authors, by the Federal Statistical Office or by an academic consortium. As a result, a depiction of the compliance costs that is as realistic as possible is to be provided by means of approximation, despite the partially missing data.

There is no reliable data as to the number and type of heating systems installed in buildings, which are attributable to citizens, to businesses or the authorities. The number of cases can therefore only be determined by means of approximation, especially since further development needs to be predicted in order to determine compliance costs. The increase in investment costs caused by the legislative amendment and the allocation of the number of cases to citizens, the authorities and businesses are estimated on the basis of figures for new builds in 2021 on which the client is an authority, a private household or a public-sector client (source: destatis, Building construction completions: Germany, Year, Construction activities, Type of building/client) and the known figures on the ownership of existing buildings.

In total, the building stock in Germany amounts to approximately 21 million buildings (residential buildings and heated non-residential buildings).

In 2021, around 19.4 million residential buildings were counted in Germany (source: dena Building Report 2023). At the last census in 2011, private individuals possessed 84.9 per cent of the residential buildings, the second most common owner being property owners' associations (9.2 per cent). Private housing companies possessed only 1.7 per cent of residential buildings, 1.6 per cent housing cooperatives, 1.7 per cent municipalities or municipal housing companies and 1 per cent others (source: Census 2011 Guide, Building and housing stock in Germany, Final results, 2015, https://www.zensus2011.de/SharedDocs/Downloads/DE/Publikationen/Aufsaetze_Archiv/2015_12_NI_GWZ_endgueltig.pdf?__blob=publicationFile&v=4). Newer figures are not available. However, it can be assumed that this split is still up to date. Thus in 2021, there were 16.1 million buildings in Germany with only one or two dwellings, which are typically privately owned (source: dena Building Report 2023).

In addition, there were around 1.98 million heated non-residential buildings in 2021 (source: research consortium extrapolation, ENOB:dataNWG project). Most of the heated non-residential buildings are workshops and industrial buildings, followed by office buildings, hotel and catering buildings (total number: about 1.24 million). Another 240 000 non-residential buildings are health and educational facilities and 220 000 buildings are attributable to leisure, culture and sport (source: dena Building Report 2023). It can be assumed that the above-mentioned 1.24 million heated non-residential buildings are mostly attributable to businesses, as these are mainly commercial properties. With respect to cultural, sports, leisure, health and educational facilities, a larger part of these are attributable to the authorities (keyword: services for the public), with the rest attributable to businesses (commercial use).

In 2021, a total of 125 313 buildings were newly-constructed (102 955 residential buildings and 22 358 non-residential buildings [of which 10 323 heated]).

Of the residential buildings, 79 753 (about 77 per cent) were built by citizens, 616 (about 0.6 per cent) by the public sector and 22 586 (about 22 per cent) by the private sector (including non-profit organisations) (destatis, Residential and non-residential construction completions, by client, long series, partly from 1980).

In the case of non-residential buildings, only the heated buildings are relevant for the GEG, i.e. 10 323 newly constructed non-residential buildings in 2021. Of all non-residential new builds, 2 031 were attributable to the public sector (approximately 9 per cent), 14 927 to the private sector (including non-profit organisations) (approximately 67 per cent) and 5 400 to citizens (approximately 24 per cent) (cf. destatis, Residential and non-

residential construction completions, by client, long series, partly from 1980). For the purpose of determining compliance costs, the newly-constructed heated non-residential buildings are therefore taken into account, due to the lack of available figures for the specific allocation to any client, on the basis of the general distribution of non-residential new builds among the individual clients and thus approximately 9 per cent are attributable to the public sector (approximately 929 buildings), approximately 67 per cent to the private sector (about 6 916) and approximately 24 per cent to citizens (2 478).

The potential demolition of buildings is irrelevant for further considerations, since, according to figures from the Federal Statistical Office, only about 71 000 buildings (= less than 0.3 per cent of the building stock) were demolished in the period from 2011 to 2021. In this respect, it can be assumed that future demolitions will not have any significant impact on the number of cases overall.

Based on these figures, it has been assumed when determining the overall number of cases, that of all the buildings (residential buildings and heated non-residential buildings), 2 per cent are attributable to the authorities, 10 per cent to businesses and 88 per cent to citizens (educated estimate). Due to the unclear data situation, this is only an estimated approximation, which enables the split to be made between the authorities, businesses and citizens.

When determining the number of cases for the heating-with-renewables provision, a distinction is made between non-residential buildings and residential buildings for calculating compliance costs, as the investment costs to be taken into account differ. This is also done if a provision concerns only non-residential buildings. Therefore, departing from the above distribution, the following split is assumed:

It is assumed here that about 90 per cent of existing heated non-residential buildings are attributable to businesses (approximately 1 782 000), about 9 per cent to the authorities (178 200) and about 1 per cent (19 800) to citizens (educated estimate).

In addition, it is assumed that about 96 per cent of existing residential buildings are attributable to citizens (approximately 18 624 000), about 2 per cent to the authorities (388 000) and about 2 per cent (388 000) of the private sector (educated estimate).

These figures, too, are only an estimated approximation in order to be able to provide a split between the authorities, businesses and citizens.

Material costs below include costs incurred by using third parties (e.g. services provided by tradespeople including the allocation of evidence obligations under the Act, obligations to provide information), maintenance costs, costs for the procurement of material or for the retrofitting of equipment or systems and possible material costs for travelling to the authorities or offices. In order to avoid double costing, these costs are then not mentioned again for the service providers, since it is assumed that either no costs are incurred directly by the service providers (documentation of service for invoicing is necessary anyway and part of the service itself) and they otherwise pass on the costs directly to the customers and are partly obligated to do so by law (cf. provisions of the Heating Costs Ordinance).

Only the material and acquisition costs directly incurred by the persons concerned through compliance with a requirement or a process (cf. Guide to Calculating and Setting Out Compliance Costs for Regulatory Projects of the Federal Government, 2022) are relevant here. This includes expenses for the use of external services. Imputed costs (e.g. the lost profit if the capital could have been used elsewhere) are not taken into account as compliance costs. When determining compliance costs, only the costs that are expected to be actually incurred are taken into account. Overheads are also not part of compliance costs (cf. Guide to Calculating and Setting Out Compliance Costs for Regulatory Projects of the Federal Government, 2022).

For compliance costs, the current prices for energy sources were not used, but forecast energy price paths (academic forecast of energy price development in the accompanying GEG report, as of March 2022). If there are no forecasts for certain energy sources and therefore current prices have been used, this is indicated in the text. It should be noted in general that the development of cost data for energy prices is currently difficult to predict.

Energy prices, residential buildings (forecast energy price paths)

Fuel	Energy price EUR/kWh
Natural gas	0.14
Biomethane (100 %)	0.20
Natural gas biomethane (65 %)	0.18
Pellets	0.09
Electricity, heat pump tariff	0.28
Electricity, household tariff	0.36
District heating, emission factor	0.14
District heating, multi-dwelling building	0.14

When setting out the savings, those savings made from the more economical operation of a system over its service life (lower operating costs) are shown. In most cases, savings offset the material costs over the system's service life.

a. Amendment to § 51(1) subparagraph 2 and new § 51(1) subparagraph 2 second sentence

§ 51(1) subparagraph 2 GEG stipulates, where existing non-residential buildings are being extended or upgraded, a tightening of the requirement level from 1.25 to 0.8 for mean thermal transmission coefficients (heat loss per square metre) of the heat-transmitting envelope area (U-values) in accordance with Annex 3 for building works that fall below the limit value.

In addition, the new § 51(1) second sentence provides that, by way of derogation from the second subparagraph of the first sentence, in cases in which the additional contiguous usable area exceeds 250 square metres or more than 30 per cent of the usable area of the existing building, the requirements laid down in § 18 (total energy demand) and § 19 (structural thermal insulation) must be complied with.

Determination of number of cases

There is no reliable data on extensions and upgrades to existing buildings per year. As a general guide it can be stated that, in 2021, a total of 44 304 construction projects were carried out on existing buildings (destatis, Construction activities and housing, 2021), and this includes extensions and upgrades. For the determination of compliance costs, it is estimated that approximately 12 000 cases per year are relevant for § 51(1) first sentence subparagraph 2 and second sentence. It is assumed that 50 per cent of cases fall under paragraph (1) subparagraph 2 GEG (6 000 cases) and 50 per cent under § 51(1) subparagraph 2 second sentence (6 000 cases). The limit value of 250 m² is regularly exceeded in the case of average construction projects (completed construction activities on existing buildings) involving the following types of buildings: institutional buildings (approximately 535 construction completions per year), factory and workshop buildings (approximately 2 320 construction measures per year), commercial and warehouse buildings (approximately 3 740 construction measures per year) (see statistics on building construction completions for the years 2001-2021).

In addition, it is necessary to deduct those cases where, even without the obligation under § 51 GEG, the requirements for additional thermal insulation laid down in the provision would have been met in order to avoid energy losses and thus save energy (‘costs that would have been incurred anyway’). It is assumed that, in 30 per cent of cases, costs would have been incurred anyway (estimate). For the determination of compliance costs, after this deduction has been made, 4 200 cases are still relevant for § 51(1) subparagraph 2 and 4 200 cases for § 51(1) second sentence.

Determination of time expenditure

There is no additional time expenditure as a result of the requirements being tightened.

Determination of material costs

Material costs, too, can only be estimated.

An improvement in the insulation value from 1.25 to 0.8 of the requirement level corresponds to an increase in the insulation value/U-value of about 33.3 per cent. The thickness of the insulation must therefore be increased accordingly (example: increase in the thickness of the insulation material for a flat roof from 100 mm to 140 mm; educated estimate by the Federal Statistical Office). One square metre of insulation material with a thickness of 100 mm for flat roofs costs EUR 25.25 for roofers to buy. One square metre of insulation material with a thickness of 140 mm for flat roofs costs EUR 34.55 for roofers to buy. The new requirement therefore gives rise to around EUR 10/m² (estimated) of additional costs if the prices are passed on to the clients without surcharges (cf. Bauder_Price List 2022).

For paragraph (1) subparagraph 2 GEG, an average extension is assumed to be 90 square metres per case (estimated). The additional costs would therefore total approximately EUR 3.8 million for 4 200 cases per year. For the second sentence of paragraph (1), the average extension is assumed to be approx. 300 square metres per case. An additional cost of EUR 50 per square metre is assumed here, as additional requirements are imposed. A reference point here can be taken from studies in which it is assumed that an extension costs approx. EUR 2 500 per square metre of living space and the additional requirements imposed by paragraph (1) second sentence make up only a small part of the additional costs. The costs would then amount to approximately EUR 63 million in 4 200 cases per year for paragraph (1) second sentence. In total, there would therefore be one-off compliance costs of approximately EUR 66.8 million in one year.

Total costs

Annual compliance costs

	Number of cases	Time expenditure per case (in minutes)	Material costs per case (in EUR)	Time expenditure (in hours)	Material costs
§ 51(1) subparagraph 2 GEG	4,200	No time expenditure	EUR 900	No time expenditure	3,780,000
§ 51(1) second sentence	4,200	No time expenditure	EUR 15,000	No time expenditure	63,000,000

Split between citizens, business and the authorities – costs per year

	Citizens	Businesses	Authorities
§ 51(1) subparagraph 2 GEG	(42 cases, 1 % of cases) approx. EUR 37 800	(3780 cases, 90% of cases) approx. EUR 3 402 000	(378 cases, 9% of cases) approx. EUR 340 200
§ 51(1) second sentence	(42 cases, 1% of cases) approx. EUR 630 000	(3,780 cases, 90% of cases)	(378 cases, 9% of cases) approx. EUR 5 670 000

		approx. EUR 56 700 000	
Total	approx. EUR 667 800	approx. EUR 60 102 000	approx. EUR 6 010 200

The better insulation results in lower energy consumption of the upgraded building part and thus leads to operating savings.

b. Obligation under § 60a for operational testing of heat pumps

Determination of number of cases

For heat pumps newly installed or established after 31 December 2023 in a building with more than six rented-out dwellings or other property units, operational testing must be carried out by a qualified person no later than two years after the heat pump is put into operation. The result of the testing must be documented in text form. Any necessary optimisation must be carried out within one year of the operational testing.

The industry's declared target is for a total of 500 000 heat pumps to be installed annually from 2024 onwards (existing buildings and new buildings); this figure is therefore taken as the average for the determination of compliance costs. It is also used to determine the split between businesses, the authorities and citizens. Since hot water and air-to-air heat pumps are not covered by the provision, an annual figure of 400 000 is assumed (deduction of an estimated 20 per cent of heat pumps [future forecast, based on hot water heat pump sales figures 2022, air-to-air heat pumps not indicated separately, BWP (German Heat Pump Association) Heat pump sales 2022: Growth of 53 per cent compared to previous year, https://www.waermepumpe.de/presse/pressemitteilungen/details/waermepumpenabsatz-2022-wachstum-von-53-prozent-gegenueber-dem-vorjahr/#content]).

There are no exact figures on how many heat pumps have been installed in residential buildings with at least six dwellings. Therefore, only an approximation of the figures can be made based on the power of installed heat pumps. Derived from the sales figures for large heat pumps (> 20 kW) which have been sold since 2009 until today (i.e. over about 14 years) and have been put into new or existing buildings, an existing stock of 60 000 such large heat pumps can be assumed (BWP estimate). At this power level, it can be assumed that the heat pumps were mostly installed in multi-family buildings or non-residential buildings. In multi-family buildings, a large part of the dwellings are usually rented out. However, the number of rented-out residential units cannot be quantified. Therefore, it is assumed here that the heat pumps were mainly installed in multi-family buildings with at least six rented-out residential units. As the sales of heat pumps for large residential buildings are expected to increase in the coming years, it is assumed for the purpose of determining compliance costs that approximately 4 286 heat pumps (60 000 heat pumps spread over 14 years) will be installed in residential buildings with at least six residential units per year (estimate). Further increases in sales figures for heat pumps for large residential buildings are to be expected, but cannot be predicted here.

The operational testing referred to in the first sentence of paragraph (1) shall also be repeated within five years if there is no remote monitoring.

It is necessary to deduct those cases where, even without the obligation, operational testing and/or optimisation of the heat pump would be carried out anyway ('costs that would have been incurred anyway'), as this could result in electricity savings during operation. Since the adjustment of key system parameters is alone sufficient to generate considerable efficiencies in many systems, it is assumed for the determination of compliance costs that in 20 per cent of cases costs would have been incurred anyway (estimate), meaning that approximately 3 429 heat pumps are still affected by the provision annually.

The split previously assumed for determining the number of cases in 4. above, namely that, of all buildings (residential buildings and heated non-residential buildings), 2 per cent

are attributable to the authorities, 10 per cent to businesses and 88 per cent to citizens (educated estimate), is departed from a little here, as it can be assumed that the large residential buildings concerned are more likely to be owned by businesses. It is therefore assumed that 25 per cent of the cases are attributable to businesses, 2 per cent to the authorities and 73 per cent to citizens (general guide, about 1 000 000 residential buildings with more than six residential units and about 1.7 per cent of residential buildings owned by private housing companies).

Determination of time expenditure

Each appointment required (heating inspection and heating optimisation) will take approximately one to one and a half hours of the customer's time to accommodate the visit of the service provider. With a forecast time range of 1 to 1.5 hours for the service provider, the lower value of 60 minutes is used as the basis for determining compliance costs. In addition, there are another approx. 7 minutes to find a service online and to arrange an appointment with an authorised person in accordance with paragraph (3), 1 minute for filing away the testing report in order to be able to produce it in the case of subsequent enquiries and about 10 minutes for checking and, where appropriate, forwarding the report. For the determination of compliance costs, it is assumed that the time required per case is 78 minutes.

Determination of material costs

Building owners will face the costs of the operational testing service and any resulting investment measures for the optimisation of their heating system. It is assumed that the average cost of the testing will be EUR 100 (estimate). The costs for any necessary optimisation depend on the specific individual case and can vary greatly depending on the measure. For the determination of compliance costs, a cost of EUR 150 per case is assumed across the board (estimate).

No material costs are incurred by the customer for organising the appointments. It can be assumed that appointments will be arranged by phone or via an online contact form. Therefore, there is no cost for postage.

The appointments for operational testing and/or optimisation involve travel costs for getting to the site, at an estimated EUR 60 per case. However, it can be assumed that in 50 per cent of cases, the measures will be combined with an already existing appointment. (Estimate; explanation: system warranties often depend on maintenance, manufacturers usually recommend annual maintenance). In these cases, there will be no travel costs.

Savings

Errors in the installation and adjustment of a heat pump can lead to higher power consumption. The new inspection obligation and the subsequent optimisation measures can help to remedy these errors and enable more efficient operation of the heat pump. As an example, doubling the pressure loss quadruples the power consumed by circulators, which also compromises the seasonal annual efficiency ratio of the heat pump (see Bienek, 'Heat Pump Doctor' for Two Years, BTGA-Almanach 2020). The provision in § 60a GEG does not specify how optimisation has to be achieved. This will be determined individually based on the need for optimisation after the heat pump has been operationally tested. Depending on the optimisation carried out, the electricity savings achieved can therefore vary. Therefore, only savings for an example individual case can be estimated and this individual case can then be extrapolated on the basis of the number of cases. If a specific heat consumption of 100 kWh/(m²a) and an area to be heated of 100 m^2 is taken as an example for a partially renovated single-family building, an air heat pump (seasonal annual efficiency ratio of 3.0) would consume 3 333 kWh on average per year, a geothermal heat pump (seasonal annual efficiency ratio of 4.0) would consume 2 500 kWh on av-

erage and a water heat pump (seasonal annual efficiency ratio of 5.0) would consume 2 000 kWh on average. It can be assumed that an air heat pump is installed in 80 per cent of cases, a geothermal heat pump in 10 per cent of cases and a water heat pump in another 10 per cent of cases. For determining savings, it is estimated that, without inspection and optimisation, the above-mentioned electricity consumption would be 10 per cent higher per year (assumed electricity price: EUR 0.28 per kWh including VAT of 19 per cent). The inspection itself may also lead to electricity savings, in particular by subsequent behavioural changes of users. For the calculation of the electricity savings, however, only the optimisations carried out are included below.

Time expenditure	Material costs, operational testing	Material costs, optimisation	Travel costs	Savings (electricity)
78 minutes per case	EUR 100	EUR 150	EUR 60	About 10 per cent per year (estimate)

(1) Citizens

Determination of number of cases

Based on the split indicated above (73 per cent of the number of cases are attributable to citizens), it can be assumed that a heat pump will be newly installed or established in buildings attributable to citizens in approximately 2 503 cases per year and therefore operational testing must also be carried out within one year.

In approximately 30 per cent of cases (§ 60a(1) and 2), optimisation measures will also be carried out after the operational testing has been carried out (estimate). This results in an additional 751 cases per year.

In total, there will therefore be approximately 3 254 individual measures per year (heating inspection (initial check) or optimisation measure).

In 30 per cent of heat pumps, it is also assumed that a follow-up inspection after five years in accordance with § 60a(1) fourth sentence will be necessary because remote maintenance is not possible (projected estimate). This results in an additional 751 cases per year. It should be borne in mind that, in the first years of the provision being in force, no follow-up inspections will take place, only initial checks.

Initial and follow-up checks	Optimisation
3,254 cases	751 cases

Determination of time expenditure

Citizens will incur time expenditure of approximately 5 207 hours for 4 005 cases (accommodating the visit of the service provider for initial and follow-up checks or heating optimisation). For one hour, EUR 36.90 (Compliance Costs Guide, Wage cost table, Private sector, Average for land and housing) is estimated. This results in one-off compliance costs of approximately EUR 192 138 per year.

Time expenditure per year	5,207 hours
Costs	EUR 192,138

Determination of material costs

Approximately 4 005 measures to be taken into account for the calculation of compliance costs will be carried out annually. Of these, approximately 3 254 are operational tests and approximately 751 are optimisation measures. In this respect, material costs of approximately EUR 558 200 (testing costs approx. 325 400 + optimisation costs approx. EUR 112 650 + travel costs approx. EUR 120 150) are incurred.

Annual material costs	Approx. EUR 558 200

Total costs and savings

Total compliance costs for operational testing (including follow-up checks) and optimisation of heat pumps incurred by citizens are approximately EUR 750 338 in one year.

This is offset by annual savings in electricity costs of approximately EUR 65 487 as a result of the 751 optimisation measures carried out each year. Over the average service life of a heat pump (18 years), these savings add up to around EUR 1.2 million. This means that the compliance costs of approximately EUR 750 338 incurred in one year are more than offset over the service life of the systems concerned.

Annual total costs (check, follow-up check, optimisation)	Savings (18-year service life)
Approx. EUR 750 338	Approx. EUR 1.2 million

(2) Businesses

Determination of number of cases

Operational testing and optimisation

Based on the split of cases indicated above (25 per cent of cases are attributable to businesses), it can be assumed that a heat pump will be newly installed or established in about 857 buildings attributable to businesses each year and operational testing must also be carried out within one year.

In approximately 30 per cent of cases (§ 60a(1)), it can also be assumed that optimisation measures will also be carried out after the operational testing. This results in an additional 257 cases per year.

In total, there will therefore be approximately 1 114 individual measures per year (heating inspection (initial check) or optimisation measure).

In approx. 30 per cent of heat pumps, it is also assumed that a follow-up inspection after five years in accordance with § 60a(1) fourth sentence will be necessary because remote maintenance is not possible (projected estimate). This results in an additional 257 cases per year. In the first years of the provision being in force, no follow-up checks will take place, only initial checks.

Initial and follow-up checks	Optimisation
1,114 cases	257 cases

Participation in training

In order to be able to carry out operational testing, one-off training of existing staff and ongoing training of newly-recruited employees is required. A starting point for determining the number of cases can be the number of employees in the trades, which are deemed ‘in particular’ as being qualified in § 60a(3).

The Federal Statistical Office puts the number of employees in the plumbing and heating professions at 275 000 in 2021 (Press Release No N 047 of 27 July 2022, Destatis) and GENESIS puts the number of people working in this field at 347 150 (including plant managers and mini-job employees; Table 53111-0002, Feature: HWO-A-24) and 276 115 employees subject to social security contributions.

Plumbing, heating and cooling is a very broad trade, and not all companies offer heating installation and maintenance. Currently, about 15 per cent of companies provide heat pump installation as part of their business model. Some of the employees will have al-

ready attended training on heat pump operation that meets the requirements of paragraph (2). Due to the increased demand for heat pumps, it is assumed that in the future, 45 per cent of the companies and about 55 per cent of employees (about 192 500) will offer the installation, maintenance and inspection of heat pumps.

In principle, training could be required for approximately 105 000 employees in the plumbing, heating and cooling trade. In this respect, those employees who have already attended appropriate training and those who would have attended training anyway, regardless of the new provision (costs that would have been incurred anyway), have been deducted from the previously estimated 192 500 employees who install, maintain and inspect heat pumps. In addition, there are about 13 000 listed energy consulting experts who have been included in the energy efficiency expert list for federal funding programmes. These have different professional backgrounds (e.g. trades, architecture, engineering). It is assumed that particularly those with a trade background, in particular in the plumbing, heating and cooling sector, will have an interest in carrying out the operational testing and optimisation of heat pumps. Under provisions laid down in the law governing trades, certain activities are only allowed to be carried out only by certain trades. It is therefore assumed that 2 500 energy consultants without a background in plumbing, heating and cooling will attend training on heat pump operational testing (estimate). Since about 11 000 of the approximately 21 000 employees in the chimney sweeping trade are also energy consultants, these are also included if they are listed on the energy efficiency expert list.

In addition, 2 500 other employees from other trades are expected to attend training on operational testing of heat pumps (estimate).

Overall, it is estimated that training will be required in about 110 000 cases. This initial and one-off training of existing staff will be mainly carried out during the first two to five years following the entry into force of the provision. In the following years, it is also assumed that approximately 11 000 new employees (approximately 10 per cent of the workforce) will be trained annually (estimate).

One-off need for training	110,000 cases
Annual need for training	11,000 cases

Determination of time expenditure

Operational testing and optimisation

For 1 371 individual measures per year, approximately 1 782 hours (accommodating the visit of the service provider) of time expenditure is incurred. For one hour, EUR 36.90 (Compliance Costs Guide, Wage cost table, Private sector, Average for land and housing) is estimated. Total time expenditure is estimated at around EUR 65 756 per year.

Time expenditure per year	Approx. 1 782 hours
Costs per year	Approx. EUR 65 756

Participation in training

Wage costs of EUR 29.20 per hour (Compliance Costs Guide, Wage cost table, Private sector, Average for building trade) for employees undergoing training and a training duration of 12 hours (720 minutes) per case are assumed. This results in staff costs per case of approximately EUR 350.40 for service providers who have their staff trained (estimate). Therefore, staff costs per year amount to approximately EUR 3.9 million for the training of newly-recruited employees. In addition, in the first years following the entry into force of the provision, one-off staff costs of approximately EUR 38.5 million are incurred for the training of staff.

Determination of material costs

Operational testing and optimisation

Approximately 1 371 measures will be implemented each year. Of these, approximately 1 114 are operational tests and approximately 257 are optimisation measures. In this respect, material costs of approximately EUR 191 080 (testing: approx. 111 4000 + travel: approx. EUR 41 130 + optimisation: approx. EUR 38 550) are incurred.

Annual material costs	Approx. EUR 191 080

Participation in training

The market price of training that covers the operational testing of heat pumps is about EUR 250-350 per day, depending on whether the course takes place in person or online. For the purpose of determining compliance costs, a daily price of EUR 250 is assumed and a training duration of 2 days at 6 hours each (total approx. EUR 500). Each year, material costs from approx. 11 000 cases are approximately EUR 5.5 million. In addition, in the first years following the entry into force of the provision, one-off staff costs of approximately EUR 55 million are incurred for the initial training of existing staff.

Total costs and savings

One-off total compliance costs for the operational testing and optimisation of heat pumps amount to approximately EUR 256 836 in one year. Annual costs for training measures amount to approximately EUR 9.4 million and in the first years (about 2-5 years after entry into force) there are one-off costs of EUR 93.5 million.

This is offset by annual electricity cost savings of approximately EUR 22 420 through 257 optimisation measures in one year. Over the average service life of a heat pump (18 years), these savings add up to around EUR 403 568. This means that the compliance costs of approximately EUR 256 836 incurred in one year are more than offset over the service life of the system concerned.

Annual total costs (check, follow-up check, optimisation)	Savings (18-year service life)
Approx. EUR 256 836	Approx. EUR 403 568

(3) Authorities

Determination of number of cases

Based on the split indicated above (2 per cent of cases are attributable to the authorities), it can be assumed that a heat pump will be newly installed or established in buildings attributable to the authorities in approximately 69 cases per year and therefore operational testing must also be carried out within one year.

In approximately 30 per cent of cases (§ 60 a(1) and 2 (estimate)), optimisation measures will also be carried out after the operational testing has been carried out (projected estimate). This results in an additional 21 cases per year.

In total, there will therefore be approximately 90 individual measures per year (heating inspection (initial check) or optimisation measure).

In 30 per cent of heat pumps, it is also assumed that a follow-up inspection after five years in accordance with § 60 a(1) fourth sentence will be necessary because remote maintenance is not possible (estimate). This results in an additional 21 cases per year.

Initial and follow-up checks	Optimisation
90 cases	21 cases

Determination of time expenditure

For 111 individual measures per year, approximately 144 hours of time expenditure is incurred. EUR 34 (Compliance Costs Guide, Wage cost table, Public sector, Hourly wage, Medium, *mittlerer Dienst*) is assumed for one hour. This results in compliance costs of approximately EUR 4 896 per year.

Time expenditure per year	Approx. 144 hours
Costs per year	Approx. EUR 4 896

Determination of material costs

Approximately 111 measures will be implemented each year. Of these, approximately 90 are operational tests and 21 are optimisation measures. In this respect, material costs of approximately EUR 15 480 (travel: approx. 3 330; testing: approx. EUR 9 000; optimisation: approx. EUR 3 150) are incurred.

Annual material costs	Approx. EUR 15 480

Total costs and savings

One-off total compliance costs for the operational testing and optimisation of heat pumps amount to approximately EUR 20 376 per year for the authorities.

This is offset by annual electricity cost savings of approximately EUR 1 831 through 21 optimisation measures in one year. Over the average service life of a heat pump (18 years), these savings add up to around EUR 32 959. This means that the compliance costs of approximately EUR 20 376 incurred in one year are more than offset over the service life of the systems concerned.

Annual total costs (check, follow-up check, optimisation)	Savings (18-year service life)
Approx. EUR 20 376	Approx. EUR 32 959

c. Obligation for heating inspection and optimisation under § 60b

The provisions stipulate that inspection and optimisation measures must be carried out on heating systems. In this respect, building owners incur material costs through maintenance and trade services and components that are to be replaced or upgraded.

Owners of all residential buildings with at least six dwellings whose heating system uses water as the heat carrier and is installed or established after 1 October 2009 are required to have a heating inspection and heating optimisation carried out within one year of the end of the 15-year period following installation or establishment of the heating system. If the systems were installed or established before 1 October 2009, the obligation must be fulfilled by 1 October 2027.

The obligation to have a heating inspection carried out does not apply to heating systems with standardised building automation in accordance with § 71a GEG or heat pumps which are subject to operational testing under § 60a. Further exemptions are provided for in § 60b(7) second sentence GEG. However, in order to make use of an exemption, the documents referred to in § 60b(8) must be provided.

The result of the heating inspection must be documented in text form. If the heating inspection indicates that optimisation within the meaning of § 60b (1) second sentence sub-

paragraph 1 in conjunction with paragraph (2) is required, the optimisation must be carried out within one year.

Determination of number of cases

Approximately 524 000 heating systems that use water as the heat carrier and reach the 15-year limit fall under the scope of § 60b each year (§ 60b(1) first sentence) and are not covered by the exemptions under paragraph (7), when taking all buildings into account (non-residential buildings and residential buildings). In addition, again when taking all buildings into account and allowing for the exemptions under § 60b(7), approximately 11.0 million heating systems would be covered by the provision laid down in the second sentence and must accordingly undergo inspection by 1 October 2027.

These figures are estimated on the basis of available sales data for heat carriers in recent years and the calculated stock of heating systems in Germany (about 24 million heat generators in 2020, primary heat generators or supplementary heating, source: dena Building Report 2023, Fig. 31, Existing heat generators, referencing BSW 2021, BWP 2021, AGFW 2020, Chimney sweeping association 2020, dena calculations, BDH, Total stock of central heat generators 2021, ZIV surveys of chimney sweeping trade 2021)).

However, the provision does not affect all buildings, only residential buildings with at least six dwellings. Taking this into account, a total of 26 200 cases are assumed for determining compliance costs. There are only about 1 million residential buildings in Germany with more than six dwellings (assumption by the Federal Statistical Office). These therefore account for only 5.5 per cent of the total number of residential buildings. On this basis, only 5 per cent of the 524 000 heating systems that could possibly be relevant were actually deemed to be so here (26 200).

Evidence under § 60b(8) must be provided in an estimated 7 860 cases per year (exemption from operational testing as a result of documented operational testing in accordance with § 60a).

In addition, the approximately 10.4 million gas heating systems that have already been inspected on the basis of the obligation under § 2 of the Ordinance on Medium-term Energy Security Measures (EnSimiMaV) by 15 September 2024 and of which for 5.2 million systems optimisation measures in accordance with § 2(2) EnSimiMaV have been carried out need to be deducted.

Taking this into account, the new provision still requires around 4.8 million systems installed before 1 October 2009 to undergo a heating inspection by 1 October 2027. As explained above, a deduction of 95 per cent is also made for these systems (see explanation above), so that approximately 240 000 systems remain. It is assumed that optimisation measures will also be necessary in 60 per cent of cases (estimate). This results in about 144 000 cases per year.

For systems that reach the 15-year limit after [entry into force of the Act], the provision results in approximately 12 052 heating inspections per year (taking into account the deduction of gas systems addressed by the EnSimiMaV). It is assumed that optimisation measures will also be necessary in 40 per cent of cases (estimate). This results in approximately 4 821 cases per year.

In addition, it is necessary to deduct those cases where, even without the obligation under § 60b, operational testing or optimisation would have been carried out (‘costs that would have been incurred anyway’) in order to increase the efficiency of the operation of the old heating system. It is assumed that, in 30 per cent of cases, costs would have been incurred anyway (estimate).

In total, there are therefore approximately 11 811 individual measures per year (8 436 heating inspections and 3 375 optimisation measures) and around 168 000 tests by 1 October 2027. Optimisation measures will also result in an additional 100 800 cases by 1 October 2027.

The split previously assumed for determining the number of cases in 4. above, namely that, of all buildings (residential buildings and heated non-residential buildings), 2 per cent are attributable to the authorities, 10 per cent to businesses and 88 per cent to citizens (educated estimate), is departed from a little here, as it can be assumed that the large residential buildings concerned are more likely to be owned by businesses. It is therefore assumed that 25 per cent of the cases are attributable to businesses, 2 per cent to the authorities and 73 per cent to citizens (general guide, about 1 000 000 residential buildings with more than six residential units and about 1.7 per cent of residential buildings owned by private housing companies).

Determination of time expenditure

Each of the appointments will take about one hour of the customer's time. In addition, it will take about 7 minutes to find a service online and to arrange the appointment with a qualified person. There will also be 1 minute for filing the inspection report so that it can be provided in the case of enquiries and 10 minutes for checking and, where appropriate, forwarding the report. This results in an estimated time expenditure of approximately 78 minutes per case.

Those who are exempted from the heating inspection and optimisation obligation must provide the documents and evidence referred to in § 60b(8). It is assumed that, on average, 5 minutes per case will be required for transmitting the information or data to the competent authorities and 10 minutes per case for obtaining the evidence. This means there is additional time expenditure of 15 minutes per case.

Determination of material costs

No material costs are incurred for organising the appointments. It can be assumed that appointments will be arranged by phone or via an online contact form and therefore there are no postage costs.

Costs of approximately EUR 100 per case are expected on average for the heating inspection (estimate). The costs for any necessary optimisation depend on the specific individual case, and different amounts will be incurred in this respect. For the determination of compliance costs, EUR 150 per case is assumed across the board (estimate).

For some of these appointments, there will be additional travel costs of EUR 60. It can be assumed that, in many of the cases, measures will be carried out on the occasion of another appointment (in particular, chimney sweeping and inspection activities, fireplace check) and therefore no additional travel costs will be incurred.

It can be assumed that, when the documents referred to in § 60b(8) GEG are sent, postage will be incurred for each letter and case of EUR 1, where electronic transmission is not used.

Achievable savings

The provision in § 60b mainly affects oil-fuelled systems, gas-fuelled systems and biomass plants.

The optimisation measures can lead to gas savings in gas systems. Depending on the optimisation carried out, the savings achieved can vary and so can only be estimated here.

If all buildings with a heating system using water as the heat carrier installed or established after 1 October 2009 were obligated at the end of 15 years after installation or establishment of the heating system to have a heating inspection and heating optimisation carried out within one year and also for all heating systems installed or established before 1 October 2009 the obligation had to fulfilled by 1 October 2027, it is assumed that approximately 2 per cent of the gas needed for space heating in Germany could be saved each year (estimate) through the optimisation of gas-fuelled systems, oil-fuelled systems and biomass plants. Assuming a gas-covered final energy consumption of approximately 1226.7 PJ / 300TWh for space heating in Germany per year (cf. AGEB, Application balances in Germany's energy balance Final energy consumption by fuel and application purpose, Total final energy consumption by fuel and application purpose – 2020 and 2021, in PJ, https://ag-energiebilanzen.de/wp-content/uploads/2023/01/AGEB_21p2_V3_20221222.pdf), this results in a potential gas saving of up to 6 TWh per year (cf. Final energy consumption 2021 by sector and fuel, Federal Environment Agency, only includes private households, majority of existing buildings, remainder overestimated https://www.umweltbundesamt.de/daten/energie/energieverbrauch-nach-energietraegern-sektoren#entwicklung-des-endenergieverbrauchs-nach-sektoren-und-energietragern). At a gas price of EUR 0.14 per kWh (expert prediction), this results in estimated savings of approximately EUR 840 million per year. However, since the provision covers only residential buildings with at least six dwellings, it is assumed that only about 5 per cent of these savings can be achieved. This results in savings of approximately EUR 42 million per year.

If all buildings with a heating system using water as the heat carrier installed or established after 1 October 2009 were obligated at the end of 15 years after installation or establishment of the heating system to have a heating inspection and heating optimisation carried out within one year and also for all heating systems installed or established before 1 October 2009 the obligation had to fulfilled by 1 October 2027, it is assumed that approximately 2 per cent of the oil needed for space heating in Germany each year could be saved each year (estimate) through the optimisation of oil-fuelled systems. Assuming an oil-covered final energy consumption of approximately 426 PJ / 118 TWh for space heating in Germany per year (cf. 2021, AGEB, Application balances in Germany's energy balance Final energy consumption by fuel and application purpose, Total final energy consumption by fuel and application purpose – 2020 and 2021, in PJ, https://ag-energiebilanzen.de/wp-content/uploads/2023/01/AGEB_21p2_V3_20221222.pdf), this results in a potential saving of around 2.36 TWh per year. At an oil price of EUR 0.0022028 per kWh (cf. 2022 Average price, Federal Statistical Office, Energy price development data, https://www.destatis.de/DE/Themen/Wirtschaft/Preise/Publikationen/Energiepreise/energiepreisentwicklung-pdf-5619001.pdf?__blob=publicationFile; Price including mineral oil tax and oil stockpiling contribution (EBV), excluding VAT, collection date 15th of the month)), this results in estimated savings of approximately EUR 5.2 million per year. However, since the provision covers only residential buildings with at least six dwellings, it is assumed that only about 5 per cent of these savings can be achieved. This results in savings of approximately EUR 260 000 per year.

If all buildings with a heating system using water as the heat carrier installed or established after 1 October 2009 were obligated at the end of 15 years after installation or establishment of the heating system to have a heating inspection and heating optimisation carried out within one year and also for all heating systems installed or established before 1 October 2009 the obligation had to fulfilled by 1 October 2027, it is assumed that approximately 2 per cent of the biomass needed for room heating in Germany each year could be saved each year (estimate) through the optimisation of heating systems fuelled by biomass. Assuming a biomass-covered final energy consumption of 200 PJ / 55.5 TWh for room heating in Germany per year (cf. AGEB, Application balances in Germany's energy balance Final energy consumption by fuel and application purpose, Total final energy consumption by fuel and application purpose – 2020 and 2021, in PJ, only renewable energy items in general, estimated deduction of biomass share), this results in a potential

saving of around 1.1 TWh per year. At a pellet price of EUR 0.09per kWh (expert prediction 2023) this results in estimated savings of approximately EUR 99 million per year. However, since the provision covers only residential buildings with at least six dwellings, it is assumed that only about 5 per cent of these savings can be achieved. This results in savings of approximately EUR 5 million per year.

If these savings are aggregated, savings of about EUR 47.3 million per year are made.

Time expenditure	Material costs, inspection	Material costs, optimisation	Travel costs	Savings
78 minutes per case	EUR 100	EUR 150	EUR 60	Reflecting the proportion of residential buildings with at least six residential units in the entire stock of residential buildings, approximately 5 per cent of the 2 per cent savings per year for the gas, oil, biomass required for space heating

(1) Citizens

Determination of number of cases

A total of approx. 8 622 cases per year (73 per cent of 11 811) are attributable to citizens. Of these, 6 158 are operational tests and 2 464 are optimisation measures.

In addition, 196 224 cases that fall under the second sentence of paragraph (1) are attributable to citizens, where accordingly the inspection must take place by 1 October 2027 (122 640 inspections and 73 584 optimisations).

It is assumed that an exemption will be used in approximately 5 738 cases. In these cases, there is an obligation to provide evidence in accordance with paragraph (8).

Inspection	Optimisation	Inspection by 1.10.2027	Optimisation by 2027	Obligation to provide evidence (paragraph (8))
6,158 cases	2,464 cases	122,640 cases	73,584 cases	5,738 cases

Determination of time expenditure

For citizens, time expenditure of approximately 11 209 hours per year is incurred for the heating inspection and optimisation appointments. For one hour, EUR 36.90 (Compliance Costs Guide, Wage cost table, Private sector, Average for land and housing) is estimated. The cost per year is approximately EUR 413 597.

For the heating systems covered by the second sentence of § 60b(1) where the heating inspection must take place by 1 October 2027, there is also time expenditure of approximately 255 091 hours and costs totalling approximately EUR 9.4 million (optimisation and inspection) are incurred.

For providing the evidence in order to justify an exemption from the obligation under § 60b(7), citizens will incur time expenditure of 1 435 hours and compliance costs of approximately EUR 52 952 per year (EUR 36.90 (Compliance Costs Guide, Wage cost table, Private sector, Average for land and housing).

Time expenditure per year	Approx. 11,209 hours
Costs per year	Approx. EUR 413 597
One-off time expenditure (up to 2027)	Approx. 255,091 hours
One-off costs (up to 2027)	Approx. EUR 9 412 865

Time expenditure to justify exemption, paragraph (7)	Approx. 1,435 hours
Costs per year (exemption, paragraph (7))	Approx. EUR 52 952

Determination of material costs

For the 8 822 measures (6 158 inspections and 2 464 optimisation measures) per year, at a cost of EUR 100 per inspection and EUR 150 per optimisation, total costs of approximately EUR 985 400 are incurred. For an estimated 40 per cent of appointments (departure from assumption for § 60a, since regular checks are often required in the case of other types of heating for safety reasons), an additional EUR 60 of travel costs are incurred (total approx. EUR 206 928). This results in costs of approximately EUR 1.2 million per year.

For the 196 224 cases (inspection and optimisation) covered by the second sentence of paragraph (1) where the heating inspection must take place by 1 October 2027, one-off material costs totalling approximately EUR 23 301 600 (122 640 inspections and 73 584 optimisations) are incurred by citizens. For an estimated 40 per cent of the appointments, there will be additional travel costs of EUR 60. This results in costs of approximately EUR 4 709 400 per year.

It can be assumed that the evidence required by § 60b(8) will be provided by post in 15 per cent of cases (861 cases). Each case is assumed to cost EUR 1, resulting in total costs per year of EUR 861.

Total material costs of approximately EUR 1.2 million are incurred annually and, in addition, one-off costs totalling approximately EUR 28 million are incurred up to 1 October 2027.

Annual material costs	Approx. EUR 1 193 189
One-off material costs (up to 2027)	Approx. EUR 28 011 000

Total costs and savings

Annual compliance costs for the heating inspection under § 60b therefore amount to approximately EUR 1.7 million for citizens, together with one-off costs of about EUR 37.4 million up to 1 October 2027.

This is offset by savings in operating costs of approximately EUR 34 529 000 (73 per cent of total savings, derived from the proportion of the building stock attributable to citizens) in one year. The breakdown of savings between the annual optimisations and optimisations until 2027 is based on the distribution of the corresponding numbers of cases for optimisations (approximately EUR 1 104 928 savings annually and EUR 33 434 072 one-off savings). For the annual inspections, the savings are assumed over the remaining service life of the heating systems after optimisation (based on a total service life of 20 years, 5 years in the case of annual operational optimisations); for the optimisations until 2027, a remaining service life of 3 years is assumed. Extrapolated over the remaining service life in each case, the savings amount to approximately EUR 5 524 640 for the annual operational optimisations and approximately EUR 100 302 216 for the operational optimisations up to 2027.

Annual total costs (inspection, optimisation, postage, evidence)	Savings (5-year remaining service life)
Approx. EUR 1 659 738	Approx. EUR 5 524 640
Total one-off costs up to 2027	Savings (3-year remaining service life) (up to 2027)
Approx. EUR 37 423 865	Approx. EUR 100 302 216

(2) Businesses

Determination of number of cases

Around 2 953 cases per year (25 per cent of 11 811) are attributable to businesses. Of these, 2 109 are operational tests and 844 are optimisation measures.

In addition, 42 000 heating systems fall under the inspection obligation and 25 000 under the optimisation obligation laid down in paragraph (1) second sentence, where inspection and optimisation must accordingly take place by 1 October 2027.

The evidence obligations under § 60b(8) apply to an estimated 1 965 cases attributable to businesses each year.

Inspection	Optimisation	Inspection by 1.10.2027	Optimisation by 2027	Obligation to provide evidence (paragraph (8))
2,109 cases	844 cases	42,000 cases	25,200 cases	1,965 cases

Determination of time expenditure

For businesses, time expenditure of approximately 3 839 hours per year is incurred for the heating inspection and optimisation appointments. For one hour, EUR 36.90 (Compliance Costs Guide, Wage cost table, Private sector, Average for land and housing) is estimated. The cost per year is therefore approximately EUR 141 659.

For the heating systems covered by the second sentence of paragraph (1) where the heating inspection must take place by 1 October 2027, there is also time expenditure of approximately 87 360 hours and costs totalling approximately EUR 3 223 84 (EUR 36.90 per hour (Compliance Costs Guide, Wage cost table, Private sector, Average for land and housing) are incurred.

For the obligations to provide evidence in order to justify an exemption under § 60b(7), businesses will incur time expenditure of 491 hours and compliance costs of approximately EUR 18 127 per year (EUR 36.90 per hour (Compliance Costs Guide, Wage cost table, Private sector, Average for land and housing).

Time expenditure per year (inspection and optimisation)	Approx. 3,839 hours
Costs per year	Approx. EUR 141 659
One-off time expenditure (up to 2027) (inspection and optimisation)	Approx. 87,360 hours
One-off costs (up to 2027)	Approx. EUR 3 233 584
Time expenditure to justify exemption, paragraph (7)	Approx. 491 hours
Annual costs	Approx. EUR 18 127

Determination of material costs

For the 2 953 measures (inspection and optimisation) per year, costs of approximately EUR 337 500 (approximately EUR 126 600 for optimisation and approx. EUR 210 900 for inspection) are incurred. An additional EUR 60 of travel costs are incurred for 25 per cent of these appointments, resulting in additional costs totalling around EUR 44 295. It is assumed here that many properties are owned by housing companies, where inspections and maintenance work take place anyway on a regular basis.

For the 42 000 heating systems covered by the second sentence of paragraph 1 where the heating inspection must take place by 1 October 2027, one-off material costs totalling approximately EUR 8.9 million (approximately 25 200 for optimisation and approximately 42 000 for inspection) are incurred. An additional EUR 60 of travel costs are incurred for 25 per cent of these appointments, resulting in additional costs totalling around EUR 1 008 000.

It can be assumed that the evidence required by § 60b(8) will be provided by post in 5 per cent of cases (98 cases) (digital transmission will be used in most cases). EUR 1 per case is assumed. Material costs are EUR 98 per year.

Total material costs of approximately EUR 381 893 are incurred annually and, in addition, one-off costs totalling approximately EUR 8 988 000 million are incurred up to 1 October 2027.

Annual material costs	Approx. EUR 381 893
One-off material costs (up to 2027)	Approx. EUR 8 988 000

Total costs and savings

For businesses, total annual compliance costs of approximately EUR 541 679 and additional one-off costs up to 1 October 2027 of approximately EUR 12 211 584 are therefore incurred.

This is offset by savings in operating costs of approximately EUR 11 825 000 (25 per cent of total savings derived above, calculated on the basis of proportion of the building stock attributable to businesses) in one year.

The breakdown of savings between the annual optimisations and optimisations until 2027 is based on the distribution of the corresponding numbers of cases for optimisations (EUR 378 400 annually and EUR 11 446 600 one-off). For the annual inspections, the savings are assumed over the remaining service life of the heating systems after optimisation (based on a total service life of 20 years, 5 years in the case of annual operational optimisations); for the optimisations until 2027, a remaining service life of 3 years is assumed. Extrapolated over the remaining service life in each case, the savings amount to approximately EUR 1 892 000 for the annual optimisations and approximately EUR 34 339 800 for the optimisations up to 2027.

Annual total costs (inspection, optimisation, postage, evidence)	Savings (5-year remaining service life)
Approx. EUR 541 679	Approx. EUR 1 892 000
Total one-off costs (up to 2027)	Savings (3-year remaining service life)
Approx. EUR 12 211 584	Approx. EUR 34 339 800

(3) Authorities

Determination of number of cases

Approximately 237 cases per year (2 per cent of the 11 811 total cases) are attributable to the authorities (see explanation for the split in 4.). Of these, 169 are operational tests and 68 are optimisation measures.

In addition, 5 376 heating systems that fall under the second sentence of paragraph (1) are attributable to the authorities, where accordingly the inspection must take place by 1 October 2027 (3 360 inspections and 2016 optimisations).

The obligations to provide evidence under § 60b(8) apply to 157 cases attributable to the authorities.

Inspection	Optimisation	Inspection by 1.10.2027	Optimisation (2027)	Obligation to provide evidence (paragraph (8))
169 cases	68 cases	3360 cases	2016 cases	157 cases

Determination of time expenditure

For the authorities, time expenditure of approximately 310 hours per year is incurred for the 237 heating inspection and optimisation appointments. For one hour, EUR 34 (Compliance Costs Guide, Wage cost table, Public sector, Hourly wage, Medium, *mittlerer Dienst*) is estimated. The cost per year is about EUR 10 540.

For the 5 376 heating systems covered by the second sentence of § 60b(1) where the heating inspection must take place by 1 October 2027, there is also time expenditure of approximately 6 989 hours and costs totalling approximately EUR 237 626 are incurred.

The obligations to provide evidence for the purpose of justifying an exemption under § 60b(8) give rise to time expenditure of 39 hours and compliance costs of EUR 1 326 per year for the authorities.

Time expenditure per year (inspection and optimisation)	Approx. 310 hours
Costs per year	Approx. EUR 10 540
One-off time expenditure (up to 2027) (inspection and optimisation)	Approx. 6,989 hours
One-off costs (up to 2027)	Approx. EUR 237 626
Time expenditure to justify exemption, paragraph (7)	Approx. 39 hours
Annual costs	Approx. EUR 1 326

Determination of material costs

For the 237 measures (169 inspections and 68 optimisation measures) per year, at a cost of EUR 100 per inspection and EUR 150 per optimisation, total costs of approximately EUR 27 100 are incurred. An additional EUR 60 of travel costs are incurred for an estimated 25 per cent of these appointments (EUR 3 555), resulting in costs totalling around EUR 30 655.

For the 5 376 heating systems covered by the second sentence of § 60b(1) where the heating inspection must take place by 1 October 2027, there are also one-off material costs totalling approximately EUR 638 400 for the authorities. For an estimated 25 per cent of the appointments, there will be additional travel costs of EUR 60. It is assumed that in many buildings managed professionally by the authorities, inspections and mainte-

nance work are carried out on a regular basis. As a result, costs of approximately EUR 80 640 are incurred each year.

It can be assumed that the evidence required by paragraph (8) will be provided by post in 5 per cent of cases (8 cases) (digital transmission will be used in most cases). EUR 1 per case is assumed. Material costs are EUR 8 per year.

Total material costs of approximately EUR 30 663 are incurred annually and, in addition, one-off costs totalling approximately EUR 719 040 are incurred up to 1 October 2027.

Annual material costs	Approx. EUR 30 663
One-off material costs (up to 2027)	Approx. EUR 719 040

Total costs and savings

One-off annual compliance costs for the heating inspection under § 60b therefore amount to approximately EUR 42 529 for the authorities, together with additional costs of about EUR 956 666 up to 1 October 2027.

This is offset by savings in operating costs of approximately EUR 946 000 (2 per cent of total savings, calculated on the basis of the proportion of the building stock attributable to the authorities) in one year.

The breakdown of savings between the annual optimisations and optimisations until 2027 is based on the distribution of the corresponding numbers of cases for optimisations (approximately EUR 30 272 annually and EUR 915 728 one-off). For the annual inspections, the savings are assumed over the remaining service life of the heating systems after optimisation (based on a total service life of 20 years, 5 years in the case of annual operational optimisations); for the optimisations until 2027, a remaining service life of 3 years is assumed. Extrapolated over the remaining service life in each case, the savings amount to approximately EUR 151 360 for the annual optimisations and approximately EUR 2 747 184 for the optimisationsup to 2027.

Annual total costs (inspection, optimisation, postage, evidence)	Savings (5-year remaining service life)
Approx. EUR 42 529	Approx. EUR 151 360
Total one-off costs up to 2027	Savings (3-year remaining service life)
Approx. EUR 956 666	Approx. EUR 2 747 184

d. § 60c Hydronic balancing and further heating optimisation measures

§ 60c stipulates that heating systems using water as the heat carrier must undergo hydronic balancing after the heating system has been installed or established for the purpose of being put into service.

In the case of newly-installed heating systems, hydronic balancing must be carried out anyway in order for the installation service to be performed correctly, resulting only in costs that would have been incurred anyway. No additional compliance costs are therefore incurred as a result of the new provision.

e. § 64 Requirements and obligations to replace heat pumps

Within two years of the Act entering into force, in rented-out buildings with more than six residential units, standalone circulators in heating and cooling circuits that are not integrated in a heat or cooling generator shall be replaced if they do not meet the efficiency requirements set out in paragraphs (3) to (5).

Determination of number of cases

In 2018, there were about 24 million inefficient heating circulators in Germany and about 2 million inefficient hot water circulation pumps (AREPO GmbH, Wuppertal Institut für Klima, Umwelt, Energie gGmbH, Market Analysis 2018). Since half of the stock of heating pumps are integrated in boilers, they cannot readily be replaced for efficient pumps. Currently, there is a replaceable stock of approximately 11 million pumps (approximately 9.7 million standalone circulators and approximately 1.2 million circulation pumps) that are to be replaced over the next two years.

Assuming that rented-out buildings with more than six residential units make up about 5 per cent of total residential buildings (1 million out of a total of 19.4 million residential buildings), it is assumed that 5 per cent of the 11 million pumps are affected by the obligation for replacement, i.e. 550 000.

Because pump replacement saves electricity and operating costs (further reasons: funding, information campaigns), it can be assumed that, in 50 per cent of the cases (estimate), replacement would have taken place anyway, so that the replacement in these cases involves costs that would have been incurred anyway and should not be taken into account as compliance costs. This leaves about 275 000 cases.

Determination of time expenditure

Each of the appointments will take about one hour of the customer's time (estimate). In addition, it will take about 7 minutes to find a service online and to arrange the appointment, meaning time expenditure of 67 minutes is incurred in each case.

Determination of material costs

No material costs are incurred for organising the appointments. It can be assumed that appointments will be arranged by phone or via an online contact form and therefore there are no postage costs.

For the pump replacement, costs of approx. EUR 400 including installation are expected. For 35 per cent of the appointments, there will be additional travel costs of EUR 60. It can be assumed that the majority of pump replacements will take place as part of another appointment (heating inspection, optimisation, hydronic balancing, etc., see figures above on other measures).

Circulators are products that are subject to wear, and it can be assumed that the investment would have taken place anyway within a certain period of time from an economic point of view. In part, the compliance costs incurred in such cases are therefore merely the bringing forward of a later investment. Therefore, in the case of replacement investments, half of the acquisition costs are considered compliance costs, while the remaining acquisition costs are regarded as costs that would have been incurred anyway. Thus, costs of EUR 200 are relevant for the compliance costs, with additional costs of EUR 30 (travel costs) in 35 per cent of cases. Thus, on average, material costs of EUR 270 are incurred per case.

Achievable savings

Since pump replacement reduces the energy consumption in the building because new pumps use significantly less operating power and the heat circuits operate more efficiently and are thus more energy-efficient, pump replacement usually pays for itself within the service life of the system, sometimes several times over (See the Explanatory notes on § 64 of the Act for individual potential savings by pump size).

By replacing approximately 11 million standalone pumps operating in the heating circuit, a total of just under 5.4 TWh/a per year can be saved (see Explanatory notes on § 64). Reflecting the proportion of the entire residential housing stock made up by rented-out buildings with more than six residential units, these account for 5 per cent of the savings, i.e. 0.27 TWh/a. As the replacement would take place anyway in 50 per cent of the cases, savings of 0.135 TWh/a must be taken into account for calculating compliance costs.

Half of the energy savings, 67.5 GWh/a, are attributable to electricity. At an assumed electricity price of 0.36 ct/kWh, savings are made of approximately EUR 24.34 million per year.

About 1.35 TWh/a gas will also be saved in gas-based systems each year (assumption: EUR 0.14 per KWh). This results in savings of approximately EUR 9.45 million per year.

The savings in electricity and gas totalling approximately EUR 33.75 million per year add up to around EUR 675 million over the average 20-year service life of the pumps installed in one year. These savings are offset by the one-off costs (time expenditure and material costs) for pump replacement.

(1) Citizens

Determination of number of cases

Of the 275 000 cases, a total of 200 750 cases (73 per cent of total cases) are attributable to citizens (see derivation of the number of cases for compliance costs for § 60a).

Determination of time expenditure

Total time expenditure of approximately 224 171 hours is incurred for the 200 750 cases. For one hour, EUR 36.90 (Compliance Costs Guide, Wage cost table, Private sector, Average for land and housing) is estimated. The costs for time expenditure are therefore put at approximately EUR 8 271 904 for the two-year duration of the provision.

Determination of material costs

Over the two-year duration, material costs are incurred by citizens totalling approximately EUR 54.2 million for the approx. 200 750 cases over two years.

Number of cases	Time expenditure in hours (67 minutes per case)	Costs for time expenditure	Material costs
200,750 cases	224,171 hours	Approx. EUR 8 271 904	Approx. EUR 54 202 500

Total costs and savings

In total, this results in one-off compliance costs of approximately EUR 62 million for citizens due to the pump replacement obligation under § 64 GEG.

This is offset by savings in operating costs of approximately EUR 24.63 million (73 per cent of total savings) in one year. Extrapolated over 20 years (service life), the one-off investments are offset by savings of approximately EUR 492.75 million.

Total one-off costs (up to 2026)	Savings (20-year service life)
Approx. EUR 62 474 404	Approx. EUR 492 750 000

(2) Businesses

Determination of number of cases

Of the 275 000 circulators to be replaced, a total of 68 750 cases (25 per cent of the total cases) are attributable to businesses (see explanation for the split under the compliance costs for § 60a).

Determination of time expenditure

Total time expenditure of approximately 76 770 hours is incurred for these cases. For one hour, EUR 36.90 (Compliance Costs Guide, Wage cost table, Private sector, Average for land and housing) is estimated. The costs for time expenditure are therefore put at approximately EUR 2.832 million for the two-year duration of the provision.

Determination of material costs

Over the two-year duration, material costs are incurred by businesses totalling approximately EUR 21 395 344 for the 68 750 cases.

Number of cases	Time expenditure in hours (67 minutes per case)	Costs for time expenditure	Material costs
68,750 cases	Approx. 76 770 hours	Approx. EUR 2 832 844	Approx. EUR 18 562 500

Total costs and savings

In total, this results in one-off compliance costs of approximately EUR 21.4 million for businesses due to the pump replacement obligation under § 64 GEG.

This is offset by savings in operating costs of approximately EUR 8.4 million (25 per cent of total savings in line with business percentage) in one year. Extrapolated over 20 years (service life), the one-off costs are offset by savings of approximately EUR 168.8 million.

Total one-off costs (up to 2026)	Savings (20-year service life)
Approx. EUR 21 395 344	Approx. EUR 168 750 000

(3) Authorities

Determination of number of cases

Of the 275 000 circulators to be replaced, a total of 5 500 cases (2 per cent of the total cases) are attributable to the authorities (see explanation for the split under the compliance costs for § 60a).

Determination of time expenditure

Total time expenditure of approximately 6 142 hours is incurred for the 5 500 cases. EUR 34 (Compliance Costs Guide, Wage cost table, Public sector, Hourly wage, Medium, *mittlerer Dienst*) is assumed for one hour. The costs for time expenditure are therefore put at approximately EUR 208 817 for the two-year duration of the provision.

Determination of material costs

Over the two-year duration, material costs are incurred by the authorities totalling approximately EUR 23.2 million for the 110 000 cases.

Number of cases	Time expenditure in hours (67 minutes per case)	Costs for time expenditure	Material costs
5,500 cases	6,142 hours	Approx. EUR 208 817	Approx. EUR 1 485 000

Total costs and savings

In total, this results in one-off compliance costs of approximately EUR 1.7 million for the authorities due to the pump replacement obligation under § 64 GEG.

This is offset by savings in operating costs of approximately EUR 675 000 (2 per cent of total savings) in one year. Extrapolated over 20 years (service life), the one-off investments are offset by savings of approximately EUR 13.5 million.

Total costs (one-off up to 2026)	Savings (20-year service life)
Approx. EUR 1 693 817	Approx. EUR 13 500 000

f. Annex 8

The new provision concerning cooling distribution and cold water pipes as well as fittings for ventilation technology and air-conditioning systems in Annex 8 entails an increase in the minimum thickness of the insulation layer. The number of cases and materials costs can only be approximated here as there is a lack of corresponding data.

Determination of number of cases

Of the approximately 43 million residential units in Germany, about 1.3 million are air-conditioned (approximately 3.14 per cent). Of the approximately 285 000 of the total 1.981 million non-residential buildings with a ventilation system, about 23 per cent are air-conditioned, which corresponds to 66 000 non-residential buildings. With regard to new builds, about 13 000 residential units (3.14 per cent of air-conditioned new builds) and 2 640 non-residential buildings (4 per cent of air-conditioned new builds) are expected to be affected by the changes every year. With regard to existing buildings, approximately 29 000 residential units are expected to be affected and approximately 6 000 non-residential units (source: expert approximation).

Determination of material costs

It is assumed that additional costs of approx. EUR 5.5 per metre of piping will be incurred as a result of the new insulation provision. With regard to residential buildings, about 50 metres of piping are insulated per unit, resulting in 650 km of insulation per year for new builds (expert approximation). This results in additional annual investment costs of approximately EUR 3.6 million for new residential buildings. With regard to non-residential buildings, it is assumed that 200 m of piping per unit are affected by the new insulation obligation and thus a total of 528 km. This results in one-off additional costs for non-residential new builds of approx. EUR 2.9 million. In total, the new provision gives rise to total one-off costs of approximately EUR 5.5 million. With regard to existing buildings, the same prices are assumed. In total, this results in additional one-off investment costs of approximately EUR 21 million.

Total costs and savings

This is offset by savings of around EUR 5.2 million per year. On average, it takes 4.1 years for the investments to pay off (the savings of 4 kWh/m per year from increased insulation in the academic opinion are based on assumptions from the article (Potential energy savings from optimised insulation of cooling water lines of air-conditioners, Jarema Chmielarski 2010, https://___.ihks-fachjournal.de/optimierte-daemmung-der-kuehlwasser-leitungen-von-klimaanlagen/; assumed energy price EUR 0.38).

(1) Citizens

One-off additional investment costs of approximately EUR 18.5 million will be incurred by citizens in one year. This is offset by savings in operating costs of approximately EUR 4.6 million in one year. Extrapolated over 20 years, the one-off investments are offset by savings of approximately EUR 91.5 million.

Total costs per year	Savings (20-year service life)
Approx. EUR 18.5 million	Approx. EUR 91.5 million

(2) Businesses

One-off additional investment costs of approximately EUR 2.1 million will be incurred by businesses in one year. This is offset by savings in operating costs of approximately EUR 520 000 in one year. Extrapolated over 20 years, one-off investments are offset by savings of approximately EUR 10.4 million.

Total costs per year	Savings (20-year service life)
Approx. EUR 2.1 million	Approx. EUR 10.4 million

(3) Authorities

One-off additional investment costs of approximately EUR 420 000 will be incurred by the authorities in one year. This is offset by savings in operating costs of approximately EUR 104 000 in one year. Extrapolated over 20 years, one-off investments are offset by savings of approximately EUR 2.1 million.

Total costs per year	Savings (20-year service life)
Approx. EUR 420 000	Approx. EUR 2.1 million

g. Requirements for heating systems (‘Heating-with-renewables’ provision; § 71, § 71b to § 71 m)

The ‘heating-with-renewables’ provision applies both to new builds and to existing buildings when a heating system is newly installed or established.

The provision allows various options for compliance, where it is assumed that the requirements are met, and also allows compliance with the ‘heating-with-renewables’ provision to be demonstrated mathematically.

An increase in investment costs therefore arises for anyone who would have actually installed a heating system based solely on fossil fuels, but could no longer do so due to the new provision. For everyone else, the investment costs for the installation or establishment of new heating systems are costs that would have been incurred anyway and not costs arising due to the introduction of the ‘heating-with-renewables’ provision. The time expenditure required by the customer to find a suitable tradesperson and to accommodate

their installation visit is also to be regarded as costs that would have been incurred anyway, since this time expenditure is incurred regardless of the type of heating installed.

Since the provision adopts a technology-neutral approach, a wide range of compliance options are conceivable. The choice of heating system is an individual decision that cannot be reliably predicted and is influenced by a variety of factors.

Some of the investment costs for the individual possible compliance options differ greatly and depend heavily on the building and on other circumstances onsite (connection to a heating network possible, heat pump can be established, etc.). They also depend on the financing available to the building owners (will a compliance option be chosen that involves rather low investment costs but possibly higher costs over the service life of the system, or a more expensive compliance option with potentially lower operating costs). If, for example, a gas-based heating system is installed (still permitted) that uses biomethane or green gases, there are no additional investment costs at all. However, the operating costs of this compliance option are significantly higher. Other factors influencing investment costs are the future design of funding schemes as well as the availability and cost development of certain technologies.

The compliance costs outlined can therefore only be used here to represent, for example, the dimension of economic costs. However, they cannot and should not be taken as a prediction of the actual technological implementation of the provision. Since the heating-with-renewables requirement leads to a transformation of the heating structure over a long period of time, compliance costs may change significantly due to developments that cannot be predicted today (energy price developments but also technological progress).

Determination of number of cases

The number of heating systems based exclusively on fossil fuels that would have been potentially integrated into new buildings and existing buildings by citizens, businesses and the authorities from 2024 onwards can therefore only be estimated on the basis of existing data about the status quo, taking into account future expected developments.

The approximation of the number of cases of newly-installed or newly-established heating systems in new builds is based on the figures available for 2021 for newly-built residential buildings and heated non-residential buildings. In 2021, 125 313 buildings were built (102 955 residential buildings and 22 358 non-residential buildings (10 323 of which heated).

Newly completed buildings (residential buildings and non-residential buildings) have seen a steady decline in fossil-fuel heating systems in recent years.

In 2019, the share of the heating supply from purely fossil-based heat suppliers for newly completed non-residential buildings was below 50 per cent for the first time, while for newly-completed residential buildings, the share was below 50 per cent for the first time in 2017.

In 2021, only 0.6 per cent of newly completed residential buildings used oil heating and in 34.3 per cent of new builds natural gas was chosen as the fuel. 70.7 per cent of new builds were completely or partially heated with renewable energy. 55.1 per cent mainly used renewables (source: destatis, Building permits/Residential and non-residential construction completions (new builds) by type of heating and type of heating energy used, long series from 1980, as at 2021). Even today, the Buildings Energy Act already provides for the proportional use of renewable energy in new builds (§10(2) subparagraph 3 GEG). This obligation can also be met, for example, by using a solar thermal system. This trend is expected to strengthen due to the energy crisis caused by Russia’s war of aggression on Ukraine, which has led to future gas prices that are difficult to predict and an associated desire for independence from fossil fuels.

From the existing heating structure, it can be inferred that about 21.2 million heating systems are installed in existing buildings in Germany (adding together the different types of heating system from BDEW 2022, Development of heat consumption in Germany). The rate of replacement for heating systems is about 2.5-3 per cent annually (source: dena Building Report 2022). At an assumed replacement rate of 3.5 per cent predicted for the future (expected increase in the replacement of fossil heating systems), an average of about 742 000 existing heating systems per year would be replaced.

The trend away from fossil-based heating is also expected to strengthen in existing buildings. For example, the Federation of the German Heating Industry (BDH) reports that in the first half of 2022, the largest increase, of 25 per cent, was seen in the sales of heat pumps, and biomass boilers with an increase of 6 per cent. In 2022, 9.1 per cent of newly-installed heating systems were biomass heating systems and 24.1 per cent were heat pumps, i.e. around 33 per cent of heating systems used renewables. In the previous year, biomass heating systems and heat pumps accounted for only about 24.8 per cent of newly-installed heating systems (source: BDH Development of the heat generator market in Germany 2013-2022 https://www.bdh-industrie.de/fileadmin/user_upload/Presseg-rafiken/Marktstruktur_zehn_Jahre_2022_DE_022023.pdf). Gas-based appliances saw a decrease of 6 per cent, but about 65 per cent of sales continued to be for fossil-fuelled heating systems (source: BDH, Heating industry: Solid market in a dynamic environment, 12.08.2022 Press Releases, https://www.bdh-industrie.de/presse/pressemeldungen/artikel/heizungsindustrie-solider-markt-in-dynamischem-umfeld basierend auf BDH Bericht, Marktentwicklung Wärmemarkt, 2022, https://www.bdh-industrie.de/fileadmin/user_upload/Pressemeldungen/
Marktentwicklung_Waermemarkt_Deutschland_1_Halbjahr_2022.pdf). The sales figures cover sales for new and existing buildings. The trend is also apparent in the application figures for BEG funding for renewable energy sources. By the end of 2022 (31.12.2022), a total of 662 499 applications for the funding of heat production systems had been submitted for individual funding under the BEG scheme, of which 348 715 applications related to funding for heat pumps (approximately 52.6 per cent). In the previous year, only 66 491 applications for heat pump funding were submitted in the whole year, out of a total of 234 953 applications for heat production systems overall (approximately 28 per cent).

Since 15.8.2022, the eligibility of gas-powered heating systems for federal funding under the efficient buildings scheme has been suspended. A bonus of 10 per cent will now also be paid for the replacement of functioning oil, coal and night storage heating systems as well as for the replacement of functioning gas heating systems (must have been put into service at least 20 years ago at the time of application). After the replacement, the building may no longer be heated using fossil fuels in the building or close to the building. Excluding gas-powered heating systems from funding will reinforce the trend away from fossil-fuelled heating systems. In addition, it can be assumed that, in view of Germany's goal of becoming climate neutral in 2045, the trend away from fossil-fuelled heating systems will further strengthen in the coming years. If heating systems are assumed to have a service life of 20-30 years, building owners must be prepared to replace heating systems that are not compatible with the climate targets before the end of their service life, which is usually not cost effective.

For the forecast, it is therefore assumed that, in the future, only about 10 per cent of new builds per year (estimated proportion of those that do not meet the obligation arising from § 10(2) subparagraph 3 GEG via a heating system) and 60 per cent of existing buildings would still use heating systems based exclusively on fossil fuels if this were not prevented by the 'heating-with-renewables' provision in the future. The number of cases involving replacement of heating systems in existing buildings is approximated on the basis of the figures on heated non-residential buildings and residential buildings.

Split of the number of cases

In order to determine the number of cases attributable to citizens, businesses and the authorities, only an approximation is possible. A distinction is made here between non-residential buildings and residential buildings, as the increase in investment costs is noticeably different depending on the type of building, and more data is available for residential buildings than for non-residential buildings. For the split of the number of cases between citizens, the authorities and businesses, see 4.

Determination of material costs

Because the provision is intended to be technology-neutral and there is a wide range of potential investment costs, material costs per case can only be outlined extremely roughly. It is therefore assumed when outlining the compliance costs below that building owners choose the compliance option that is the most economically advantageous over the service life of the heating system.

The figures are based on expert cost-effectiveness calculations. In this respect, the cost of replacing heat generators in accordance with the ‘heating-with-renewables’ provision has been calculated for different types of residential buildings (single-family building, six-family building). Various structural conditions have also been taken into account (unrenovated existing buildings with structural thermal insulation from 1958-1968; existing buildings with structural thermal insulation about 20-25 years old; renovated existing buildings HT' 100), various technical constraints as well as cases with and without funding. For non-residential buildings, a school, an administrative building and a kindergarten were examined as representative examples. The investment costs were adjusted approximately to the 2022 price level (as at 2nd half of 2020 + 20 per cent). For compliance costs, figures are based on costs without funding.

Likewise, the consumption costs (energy costs including supplementary energy) and operational costs (maintenance/chimney sweep, repair costs: as per VDI 2067 Part 1) including the repair factor have been determined depending on the investments in the system component. The energy price paths (as of December 2022) mentioned above in 4. were used. It should be noted that changes in cost data for energy prices are difficult to predict and are therefore subject to uncertainty.

With regard to the investment costs, any necessary replacement of heating surfaces was taken into account.

The following compliance options were examined for the cost-effectiveness calculations:

– air-to-water heat pump (hereinafter HP)

– connection to a heating network

– direct electric heating

– gas boiler using 65 per cent biomethane

– pellet heating (insofar as drinking water heating is not decentralised using solar drinking water heating)

– hybrid heat pump heating.

– Benchmark for all calculations: new fossil-fuelled gas condensing boiler

Which of the compliance options is the most economical for the buildings examined is outlined in each case below. The investment costs are offset by the savings that can be

achieved in each case (compared to the operating costs of a gas boiler) over an expected operating period of 18 years.

As the cost of heat pumps is expected to come down significantly, 30 per cent lower investment costs for the heat pump part of the investment costs are assumed from 2029 onwards (experts expect cost degression for heat pumps over the next few years of up to 40 per cent; source: Öko-Institut and Fraunhofer ISE (2022): Breakthrough for the heat pump. Practical options for an efficient heating transition in the building stock. Study commissioned by Agora Energiewende).

Outline of costs for the various compliance options:

Single-family building:

Building examined	Most economical compliance option	Additional investment costs compared to gas condensing boiler	Savings in operating costs compared to gas condensing boiler aggregated over 18 years
Single-family building, unrenovated	Air-water HP	EUR 34 540	-EUR 40 446
Single-family building, existing	Air-water HP	EUR 17 640	-EUR 22 122
Single-family building, HT' 70	Air-water HP	EUR 11 440	-EUR 12 096
Single-family building, HT' 100	Air-water HP	EUR 12 840	-EUR 13 320
Arithmetic mean		**EUR 19 115**	**-EUR 21 996**

In the single-family building, the air-to-water heat pump is the most economical option in all states of building renovation. Additional investment costs are fully offset by savings in operating costs over 18 years.

Single-family building with heat pump cost degression of 30 per cent (from 2029)

Building examined	Most economical compliance option	Additional investment costs compared to gas condensing boiler	Savings in operating costs compared to gas condensing boiler aggregated over 18 years
Single-family building, unrenovated	Air-water HP	EUR 20 720	-EUR 42 426
Single-family building, existing	Air-water HP	EUR 9 120	-EUR 23 382
Single-family building, HT' 70	Air-water HP	EUR 4 720	-EUR 13 356
Single-family building, HT' 100	Air-water HP	EUR 5 720	-EUR 14 580
Arithmetic mean		**EUR 10 070**	**-EUR 23 436**

Multi-family building

Building examined	Most economical compliance option	Additional investment costs compared to gas condensing boiler	Savings in operating costs aggregated over 18 years
Multi-family building, unrenovated	Pellet boiler + solar drinking water heating	EUR 39 700	-EUR 82 098
	Air-water HP	EUR 59 000	-EUR 69 444
Multi-family building, existing	Pellet boiler + solar drinking water heating	EUR 33 200	-EUR 41 598
	Air-water HP	EUR 43 100	-EUR 43 866
Multi-family building, HT' 70	Air-water HP	EUR 24 300	-EUR 25 182
Multi-family building, HT' 100	Air-water HP	EUR 27 300	-EUR 27 720
Arithmetic mean		**EUR 37 767**	**-EUR 48 318**

In a renovated multi-family building, a heat pump is the most economical compliance option. For an existing multi-family building, a pellet boiler with solar drinking water heating is cheaper in terms of acquisition costs (around EUR 33 000) than a heat pump (approximately EUR 43 000). However, in both cases, over an operating period of 18 years, the additional investment costs are offset. The same is true in the case of an unrenovated multi-family building. Here too, a pellet boiler with solar drinking water heating is cheaper in terms of acquisition and the costs are offset by far over an operating period of 18 years. But even with a heat pump, the higher acquisition costs are offset over 18 years. Therefore, both technologies are used to form a mean.

Multi-family building with heat pump cost degression of 30 per cent (from 2029)

Building examined	Most economical compliance option	Additional investment costs with cost degression	Savings in operating costs aggregated over 18 years
Multi-family building, unrenovated	HP	EUR 35 720	-EUR 72 324
Multi-family building, existing	HP	EUR 25 920	-EUR 46 386
Multi-family building, HT' 70	HP	EUR 12 820	-EUR 27 162
Multi-family building, HT' 100	HP	EUR 14 920	-EUR 29 880
Arithmetic mean		**EUR 22 345**	**-EUR 43 938**

Assuming a 30 per cent cost degression for heat pumps, a heat pump is also the most economical option for multi-family buildings in all states of renovation.

Non-residential buildings

Building examined	Most economical compliance option	Additional investment costs compared to gas condensing boiler	Savings in operating costs aggregated over 18 years
School	Pellet boiler	EUR 83 300	-EUR 470 250
Administrative building	Pellet boiler	EUR 46 100	-EUR 96 894
Kindergarten	Pellet boiler + solar drinking water heating	EUR 51 800	-EUR 44 154
Arithmetic mean		**EUR 60 400**	**-EUR 203 766**

In the non-residential building sector, heating systems with a higher performance class are mainly required. Pellet heaters have so far been used here as renewable heating technology. Significant technological development is also expected in this field in the com-

ing years, suggesting that costs will reduce significantly, especially in the case of large heat pumps. Due to the diversity of the building stock and the wide range of heating technologies that can be expected as a result, a cost forecast cannot be derived as mechanically as for residential buildings. Therefore, no revised figures from 2029 onwards are used for compliance costs.

Overall, the cost-effectiveness of heat pumps is already increasing today through the use of funding. Under the Federal funding for efficient buildings scheme, 35 per cent funding is currently provided for heat pumps (40 per cent if bonus is claimed for natural refrigerant). The impacts on investment costs outlined above for a 30 per cent cost degression can be transferred accordingly. For example, in the case of an existing single-family building, additional investment costs are reduced compared to gas heating from just under EUR 20 000 to around EUR 10 000. Alternatively, 20 per cent funding is possible through tax reduction for energy-related measures for existing buildings used for own residential purposes.

(1) Compliance costs for citizens

Determination of number of cases

Of the new buildings built in 2021, 79 753 residential buildings and approximately 2 478 heated non-residential buildings are attributable to citizens. Of these, approximately 7 975 residential buildings and approximately 248 non-residential buildings are relevant for determining the annual compliance costs (10 per cent).

Based on the split indicated above, approximately 18 624 000 existing residential buildings and approximately 19 800 existing non-residential buildings are attributable to citizens. At an average replacement rate of 3.5 per cent, approximately 693 heating system replacements would be carried out each year in non-residential buildings and approximately 651 840 heating system replacements in residential buildings. Of these, a total of 416 heating system installations in non-residential buildings and 391 104 heating system installations in residential buildings (60 per cent) must be taken into account for determining compliance costs.

This results in 399 079 cases for residential buildings and 664 cases for non-residential buildings. For residential buildings, it is assumed that 80 per cent are single-family buildings (319 263 cases) and 20 per cent are multi-family buildings(79 816 cases).

Determination of material costs, total costs and savings

Annual compliance costs for citizens		Investment costs	Savings over 18 years
Up to 2028	Single-family building	EUR 6 102 712 245	-EUR 7 022 508 948
	Multi-family building	EUR 3 014 384 267	-EUR 3 856 549 488
	Non-residential building	EUR 40 105 600	-EUR 135 300 624
Total		**EUR 9 157 202 112**	**-EUR 11 014 359 060**
From 2029 onwards	Single-family building	EUR 3 214 978 410	-EUR 7 482 247 668
	Multi-family building	EUR 1 783 488 520	-EUR 3 506 955 408
	Non-residential building	EUR 40 105 600	-EUR 135 300 624
Total		**EUR 5 038 572 530**	**-EUR 11 124 503 700**

Multiplied by the number of cases, citizens incur annual compliance costs of EUR 9.157 billion up to 2028. These additional costs are fully offset by savings of EUR 11.014 billion over a period of time.

From 2029 onwards, annual compliance costs for residential buildings will be reduced as a result of an expected reduction in heat pump costs. Annual fulfilment costs of EUR 5.038 billion are then offset by savings in operating costs of EUR 11.124 billion.

(2) Compliance costs for businesses

Determination of number of cases

Of the new buildings built in 2021, 22 286 residential buildings and 6 916 heated non-residential buildings are attributable to businesses. Of these, approximately 2 229 residential buildings and 692 non-residential buildings are relevant for determining the annual compliance costs (10 per cent in each case).

Based on the split indicated above, 388 000 existing residential buildings and 1 782 000 existing non-residential buildings are attributable to businesses. At an average replacement rate of 3.5 per cent, approximately 62 370 heating system replacements would be carried out each year in non-residential buildings and approximately 13 580 heating system replacements in residential buildings. Of these, a total of 37 422 heating system installations in non-residential buildings and 8 148 heating system installations in residential buildings (60 per cent in each case) must be taken into account for determining compliance costs.

This results in 10 377 cases for residential buildings and 38 114 cases for non-residential buildings.

Determination of material costs, total costs and savings

Annual compliance costs for businesses		Investment costs	Savings over 18 years
Up to 2028	Single-family building		
	Multi-family building	EUR 391 904 700	-EUR 501 395 886
	Non-residential building	EUR 2 302 085 600	-EUR 7 766 337 324
Total		**EUR 2 693 990 300**	**-EUR 8 267 733 210**
From 2029 onwards	Single-family building		
	Multi-family building	EUR 231 874 065	-EUR 455 944 626
	Non-residential building	EUR 2 302 085 600	-EUR 7 766 337 324
Total		**EUR 2 533 959 665**	**-EUR 8 222 281 950**

Multiplied by the number of cases, businesses incur annual compliance costs of EUR 2.693 billion up to 2028. These additional costs are fully offset by savings of EUR 8.267 billion over a period of time.

From 2029 onwards, annual compliance costs for residential buildings will be reduced as a result of an expected reduction in heat pump costs. Annual fulfilment costs of EUR 2.533 billion are then offset by savings in operating costs of EUR 8.222 billion.

(3) Compliance costs for the authorities

Determination of number of cases

Of the new buildings built in 2021, 616 residential buildings and 929 heated non-residential buildings are attributable to the authorities.

It is assumed that public authorities have to live up to their role model function and therefore it can be assumed that, in more cases than for businesses and citizens, a heating system would be installed that is compatible with the heating-with-renewables provision. For the forecast, it is therefore assumed here that, in the future, only 5 per cent of new builds and 50 per cent of existing buildings attributable to the authorities would still use heating systems based exclusively on fossil fuels if this were not prevented by the 'heating-with-renewables' provision in the future.

Therefore, only 31 residential buildings and 46 non-residential buildings are relevant for determining the annual compliance costs (5 per cent in each case). This gives a total of 77 cases.

Based on the split indicated above, 388 000 existing residential buildings and 178 200 existing non-residential buildings are attributable to the authorities. At an average heating system replacement rate of 3.5 per cent, approximately 6 237 heating system replacements would therefore be carried out each year in non-residential buildings and approximately 13 580 heating system replacements in residential buildings. Of these, a total of 9 909 heating system installations – 3 119 in residential buildings and 6 790 in residential buildings (50 per cent in each case) must be taken into account for determining compliance costs.

This results in 6 821 cases for residential buildings and 3 165 cases for non-residential buildings (new builds and existing buildings).

Determination of material costs, total costs and savings

Annual compliance costs for the authorities		Investment costs	Savings over 18 years
Up to 2028	Single-family building		
	Multi-family building	EUR 257 606 433	-EUR 329 577 078
	Non-residential building	EUR 191 166 000	-EUR 644 919 390
Total		EUR 448 772 433	-EUR 974 496 468
From 2029 onwards	Single-family building		
	Multi-family building	EUR 152 415 245	-EUR 299 701 098
	Non-residential building	EUR 191 166 000	-EUR 644 919 390
Total		EUR 343 581 245	-EUR 944 620 488

Multiplied by the number of cases, the authorities incur annual compliance costs of EUR 448 million up to 2028. These additional costs are fully offset by savings of EUR 974 million over a period of time.

From 2029 onwards, annual compliance costs for residential buildings will be reduced as a result of an expected reduction in heat pump costs. Annual fulfilment costs of EUR 343 million are then offset by savings in operating costs of EUR 944 million.

h. Requirements under § 71a for metering equipment for heating systems and building automation

§ 71a(1)-(4) GEG require newly-installed heating systems to have, as of 1 January 2025, an energy consumption and efficiency indicator which makes it possible to identify inefficient operation. Stipulations are also made as to how exactly the measured energy consumption and amounts of heat generated must be displayed and how long and in what format the measured values are to be kept. In addition, paragraph (5) stipulates that non-residential buildings in which the rated power of the heating system or the combined space heating and ventilation system is more than 290 kW, must be equipped by 2025 with building automation and control systems complying with the requirements referred to in paragraphs (6)-(8).

Paragraphs (1)-(3)

Determination of number of cases

With regard to the figures for heating system replacements, the reader is referred to the explanations on determining the number of cases for the heating-with-renewables provision. Based on the figures outlined at the beginning of the explanations concerning compliance costs, it is assumed for determining the number of cases that a total of 2 per cent of the buildings are attributable to the authorities, 10 per cent to businesses and 88 per cent to citizens.

Since the Federal funding scheme for efficient buildings already requires all energy consumption and all generated amounts of heat of an eligible heat generator to be metrologically recorded and all eligible heating systems must be equipped with an energy consumption and efficiency indicator by 1 January 2023 at the latest, many heat generators already comply with these requirements even before the provision in § 71a enters into force. At this point in time, mainly products that already meet the requirements are likely to be available on the market. Therefore, the provision in § 71a leads to a measurable change in behaviour only for those who, although they do not receive funding and there is little product choice on the market, would nevertheless have chosen a heating system without a corresponding energy consumption and efficiency indicator. For everyone else, these are costs that would have been incurred anyway.

It is therefore estimated that, on average, about 5 per cent per year would have chosen a product that does not have a corresponding energy consumption and efficiency indicator (approximately 42 764 cases per year), if the provision did not exist.

Determination of time expenditure

It is assumed that, in order to comply with the obligation arising from § 71a, heating systems that have the necessary metering equipment integrated into them will be bought and therefore separate retrofitting will no longer be necessary. No additional time expenditure is therefore incurred for installing the metering equipment.

Determination of material costs

The costs for purchasing a device with the metering technology integrated into it are lower than if retrofitting is done separately. It is assumed that there will be EUR 100 of additional costs per case (estimate). No installation costs are incurred.

Savings

Such equipment facilitates optimisation measures, for which potential savings in final energy used, on average, of 5 to 10 per cent have been demonstrated for multi-family buildings (cf. ECEEE-Paper Detective https://www.ifeu.de/publikation/evaluation-of-the-energy-

saving-potential-through-systematic-data-collection-of-the-electricity-consumption-and-heating-system-operation-in-the-building-sector/). The extent of average savings made possible by correcting the malfunctions identified using the metering equipment can also be applied to single-family buildings.

(1) Citizens

Of the new buildings built in 2021, 79 753 residential buildings and approximately 2 478 heated non-residential buildings are attributable to citizens. Of these, approximately 3 988 residential buildings and approximately 124 non-residential buildings are relevant for determining the annual compliance costs (5 per cent). This gives a total of 4 112 cases.

Based on the split indicated above, it can be assumed that a new heating system will be installed in approximately 652 960 existing buildings attributable to citizens per year (88 per cent of cases). Five per cent of these cases are relevant for compliance costs (32 648).

Where additional costs per case are assumed to be EUR 100, there are one-off total compliance costs for 33 760 cases of EUR 3.7 million in one year for citizens.

Number of cases	Total costs per year
36,760 cases	Approx. EUR 3.7 million

(2) Businesses

Of the new buildings built in 2021, 22 286 residential buildings and 6 916 heated non-residential buildings are attributable to businesses. Of these, approximately 1 114 residential buildings and 346 non-residential buildings are relevant for determining the annual compliance costs (5 per cent in each case). This gives a total of 1 460 cases

Based on the split indicated above, it can be assumed that a new heating system will be installed in approximately 74 200 existing buildings attributable to businesses per year (10 per cent of cases). Five per cent of these cases are relevant for compliance costs (3 710).

Where additional costs per case are assumed to be EUR 100, there are one-off total compliance costs for approx. 5 170 cases of EUR 517 000 in one year for businesses.

Number of cases	Total costs per year
5,170 cases	Approx. EUR 517 000

(3) Authorities

Of the new buildings built in 2021, 616 residential buildings and 929 heated non-residential buildings are attributable to the authorities. Of these, approximately 31 residential buildings and 46 non-residential buildings are relevant for determining the annual compliance costs (5 per cent in each case). This gives a total of 77 cases.

Based on the split indicated above, it can be assumed that a new heating system will be installed in approximately 14 840 existing buildings attributable to the authorities per year. Five per cent of these cases are relevant for compliance costs (742 cases).

For the metering equipment of heating systems, the authorities incur one-off compliance costs of around EUR 81 900 in one year.

Number of cases	Total costs per year
819 cases	Approx. EUR 81 900

Paragraph (4) in conjunction with paragraph (5): Technical monitoring and building energy management

Determination of number of cases

The starting point for determining the number of cases for existing non-residential buildings are figures from the Institut Wohnen und Umwelt GmbH (IWU) on the German non-residential building stock from 2021. According to these figures, the heated non-residential building stock in Germany amounts to 1.98 million buildings. It can be assumed that about 18 per cent of the non-residential building stock (based on system performance class, approximately 55 per cent of existing non-residential buildings fall under the provision and an estimated 66 per cent of these already have the required technology so no retrofitting is required) is affected by the provision in paragraph (4), i.e. about 360 000 existing buildings.

According to destatis figures, an additional 10 323 heated non-residential buildings were completed in 2021. It can be assumed that 18 per cent of the newly-completed non-residential buildings are affected by the provision in paragraph (4) (based on system performance class, approximately 55 per cent of existing non-residential buildings fall under the provision and an estimated 66 per cent of these already have the required technology so no retrofitting is required), i.e. approximately 1 875 non-residential buildings per year.

Due to the lack of data, it is not possible to make any statements on the split between owners (private citizens, authorities, businesses). Therefore, the split as derived previously has been applied (90 per cent attributable to businesses, 9 per cent to the authorities, 1 per cent to citizens).

Determination of material costs, time expenditure

Due to the inhomogeneity of the non-residential building stock and the lack of data, the material costs for all existing non-residential buildings concerned can only be estimated on the basis of an individual case and then extrapolated using the number of cases. According to ‘Technical Monitoring 2020’ by the AMEV working group (working group on mechanical and electrical engineering of state and municipal administrations), the cost of implementing technical monitoring amounts to 0.2 to 0.5 per cent of the total construction costs. Technical monitoring already includes the necessary technical requirements for building energy management. According to BKI (Baukosteninformationszentrum Deutscher Architektenkammern GmbH), total construction costs of a sample building (office + administration, 4 000 m² gross floor area, average finish) amount to around EUR 11 million in 2022. Based on an average cost of 0.35 per cent of total construction costs, the sample building gives rise to material costs of EUR 38 500. Multiplied by the number of cases, there are one-off material costs of approximately EUR 13.8 billion for existing buildings. For non-residential new builds, there are annual material costs of about EUR 72 million per year.

Implementation of technical monitoring generally reduces the amount of time and personnel required for building operations, as errors are detected early and by automated means, thus significantly reducing reaction times. It is therefore assumed that no additional time expenditure will be incurred.

Total costs and savings

One-off compliance costs for existing non-residential buildings amount to approximately EUR 13.8 billion in one year. For non-residential new builds, there are annual material costs of about EUR 72 million.

On average, about 10 per cent of the annual energy costs can be expected to be saved. For the sample building indicated, these savings are estimated at around EUR 7 333 per

year, meaning that when multiplied by the number of cases, annual savings for retrofitted existing non-residential buildings of EUR 2.64 billion are made and savings of EUR 13.7 million per year for non-residential new builds. Aggregated over the expected 15-year service life of the metering, control and regulation technology (see VDI 2067 Sheet 1), this results in savings of approximately EUR 40 billion.

(1) Citizens

One-off compliance costs of approximately EUR 138 million will be incurred by citizens for retrofitting existing non-residential buildings. For non-residential new builds, additionally there are annual material costs of about EUR 720 000. The one-off compliance costs for retrofitting existing buildings are offset by savings of EUR 26.4 million per year, or EUR 140 000 per year for new builds. Aggregated over the expected 15-year service life of the metering, control and regulation technology (see VDI 2067 Sheet 1), this results in savings of approximately EUR 400 million that offset the one-off compliance costs. Annual compliance costs are offset by aggregated savings over the service life of the technology of approx. EUR 2 million.

Total annual costs (new builds)	Savings (15-year service life)
Approx. EUR 720 000	Approx. EUR 2.1 million
Total cost of retrofitting existing non-residential buildings (one-off)	Savings (15-year service life)
Approx. EUR 138 million	Approx. EUR 396 million

(2) Businesses

One-off compliance costs of approximately EUR 12.4 billion will be incurred by businesses for retrofitting existing non-residential buildings. For non-residential new builds, additionally there are annual material costs of about EUR 65 million. The one-off compliance costs for retrofitting existing buildings are offset by savings of EUR 2.38 billion per year, or EUR 12 million per year for new builds. Aggregated over the expected 15-year service life of the metering, control and regulation technology (see VDI 2067 Sheet 1), this results in savings of approximately EUR 35.7 billion that offset the one-off compliance costs. Annual compliance costs are offset by aggregated savings over the service life of the technology of approx. EUR 180 million.

Total annual costs (new builds)	Savings (15-year service life)
Approx. EUR 65 million	Approx. EUR 180 million
Total cost of retrofitting existing non-residential buildings (one-off)	Savings (15-year service life)
Approximately EUR 12.4 billion	Approximately EUR 35.7 billion

(3) Authorities

One-off compliance costs of approximately EUR 1.24 billion will be incurred by the authorities for retrofitting existing non-residential buildings. For non-residential new builds, additionally there are annual material costs of about EUR 6.5 million. The one-off compliance costs for retrofitting existing buildings are offset by savings of EUR 238 million per year, or EUR 1.2 million per year for new builds. Aggregated over the expected 15-year service life of the metering, control and regulation technology (see VDI 2067 Sheet 1), this results in savings of approximately EUR 3.6 billion that offset the one-off compliance costs. Annual compliance costs are offset by aggregated savings over the service life of the technology of approx. EUR 18 million.

Total annual costs (new builds)	Savings (15-year service life)
EUR 6.5 million	EUR 18 million
Total cost of retrofitting existing non-residential build-	Savings (15-year service life)

ings (one-off)	
EUR 1.24 billion	Approx. EUR 3.57 billion

Paragraph (6): Building automation system meeting level of automation B in new builds and start-up management

Determination of number of cases

According to destatis figures, 10 323 heated non-residential buildings were completed in 2021. This figure will be used for the expected number of non-residential new builds. It can be assumed that 18 per cent (based on system performance class, approximately 55 per cent of existing non-residential buildings fall under the provision and an estimated 66 per cent of these already have the required technology so no additional costs are incurred) of the newly-completed non-residential buildings are affected by the provision in paragraph (6) , i.e. approximately 1 873 non-residential buildings per year.

Due to the lack of data, it is not possible to make any statements on the split between owners (private citizens, authorities, businesses). Therefore, the split as derived previously has been applied (90 per cent attributable to businesses, 9 per cent to the authorities, 1 per cent to citizens).

Determination of material costs and total number

Due to the inhomogeneity of the non-residential buildings concerned and the lack of data, the material costs for all existing non-residential buildings concerned can only be estimated on the basis of an individual case and then extrapolated using the number of cases.

According to BKI 2022, the cost of building automation for a sample building (office + administration, 4 000 m² gross floor area, average finish) is around EUR 136 000. Due to the stipulation regarding the level of automation, it can be assumed that approx. additional costs of 20 per cent will be incurred i.e. EUR 27 200 per non-residential building. The additional costs of start-up management are estimated at 1 per cent of the total construction costs, i.e. EUR 110 000 for the sample building indicated. When multiplied by the number of cases, this gives annual material costs of approximately EUR 257 million per year for the requirement concerning the level of building automation and start-up management.

As a result of implementing start-up management and the installation of a building automation system, the time and personnel required for building operation are generally reduced because errors have already been corrected during start-up or any errors that occur are detected early and by automated means. It is therefore assumed that no additional time expenditure will be incurred.

Total costs and savings

Total annual compliance costs amount to approximately EUR 257 million.

On average, about 15 per cent of the annual energy costs can be expected to be saved. For the sample building indicated, savings are estimated at around EUR 11 000 per year. When multiplied by the number of cases, this gives total annual savings of EUR 20.6 million per annum.

(1) Citizens

For citizens, there are annual compliance costs of approximately EUR 2.6 million. This is offset by annual savings of approximately EUR 207 000. Aggregated over the expected 15-year service life, there are savings of approximately EUR 3.1 million.

Annual compliance costs	Savings (15 years)
Approx. EUR 2.6 million	Approx. EUR 3.1 million

(2) Businesses

For businesses, there are annual compliance costs of approximately EUR 231 million. This is offset by annual savings of approximately EUR 18.5 million. Aggregated over the expected 15-year service life, there are savings of approximately EUR 277.5 million:

Annual compliance costs	Savings (15 years)
Approx. EUR 231 million	Approx. EUR 277.5 million

(3) Authorities

For the authorities, there are annual compliance costs of approximately EUR 23.1 million. This is offset by annual savings of approximately EUR 1.85 million. Aggregated over the expected 15-year service life of the metering, control and regulation technology (see VDI 2067 Sheet 1), this results in savings of approximately EUR 27.75 million.

Annual compliance costs	Savings (15 years)
Approx. EUR 23.1 million	Approx. EUR 27.75 million

Paragraph (7): Cross-manufacturer communication of technical building systems in existing non-residential buildings with class B building automation

Determination of number of cases

Due to the lack of data on equipping existing non-residential buildings with class B building automation systems, the number of cases is estimated on the basis of destatis data. It is assumed that heated non-residential buildings built in the last 10 years are equipped with class B building automation systems, as these systems correspond to the latest technology during this period. Over the period 2011-2021, approx. 120 000 heated non-residential buildings were built, of which approx. 18 per cent (based on system performance class approximately 55 per cent of non-residential buildings fall under the provision and an estimated 66 per cent of these already have the required technology so no retrofitting is required) are affected by the provision in paragraph (8), i.e. about 22 000 buildings. Therefore, the split as derived previously has been applied (90 per cent attributable to businesses, 9 per cent to the authorities, 1 per cent to citizens). Determination of material costs

Based on an estimated average cost of 0.35 per cent of the total construction costs as in technical monitoring (comparability is based on the assumption that individual retrofit components are similar to the implementation of technical monitoring (e.g. gateways, bus lines)), material costs of approx. EUR 38 500 are incurred for a sample building (office + administration, 4 000 m² gross floor area, average finish). Multiplied by the number of cases, this gives one-off material costs of approximately EUR 839 million.

Total costs and savings

One-off compliance costs amount to approximately EUR 839 million in one year.

As a result of the cross-manufacturer communication of the individual technical building systems, on average, about 5 per cent savings on annual energy costs can be expected. For the sample building indicated, savings are estimated at around EUR 3 667 per year. When multiplied by the number of cases, this gives total annual savings of EUR 80 million per annum.

(1) Citizens

One-off additional compliance costs of approximately EUR 8.4 million will be incurred by citizens in one year. This is offset by annual savings of approximately EUR 800 000. Aggregated over the expected 15-year service life, there are savings of approximately EUR 11.9 million.

Compliance costs	Savings (15 years)
Approx. EUR 8.4 million	Approx. EUR 11.9 million

(2) Businesses

One-off compliance costs of approximately EUR 756 million will be incurred by businesses in one year. This is offset by annual savings of approximately EUR 72 million. Aggregated over the expected 15-year service life, there are savings of approximately EUR 1.08 billion.

Compliance costs	Savings (15 years)
Approx. EUR 756 million	Approx. EUR 1.08 billion

(3) Authorities

One-off compliance costs of approximately EUR 75.6 million will be incurred by the authorities in one year. This is offset by annual savings of approximately EUR 7.2 million. Aggregated over the expected 15-year service life, there are savings of approximately EUR 108 million.

Compliance costs	Savings (15 years)
Approx. EUR 75.6 million	Approx. EUR 108 million

i. Amendment to the Heating Costs Ordinance (HeizkostenV)

Article 2 deletes the former provision allowing exemption from the obligation for heat pumps to record consumption and allocate costs on the basis of consumption (§ 11(1) subparagraph 3 of the Heating Costs Ordinance). Insofar as they relates to heat, the provisions of § 3 - § 7 of the Heating Costs Ordinance therefore now also apply to heat pumps. § 4 stipulates that proportional consumption of spaces supplied with heat or hot water is to be recorded, § 5 regulates how such recording is to take place and § 6 and § 6a HeizkostenV stipulate that consumption-based cost allocation must take place on the basis of the consumption recorded. Remotely readable results of such recording must be notified to the user on a monthly basis. § 7 governs the allocation of costs for supplying heat.

Determination of number of cases

In the future, building owners must collect the information stipulated in § 3 to § 7 on the heat consumption of users using heat meters or heating cost allocators and make it available to users (consumption recording, billing). This only affects cases in which heat

pumps are installed in buildings (new installation) or have been installed (existing heat pumps) in which users and building owners are not the same people.

There are no exact figures on how many heat pumps have been installed in buildings in which users and owners are not the same people (residential buildings and non-residential buildings). Therefore, only an approximation of the figures can be made based on the power of installed heat pumps. Large heat pumps are usually installed in multi-family buildings and non-residential buildings. Derived from the sales figures for large heat pumps (> 20 kW) which have been sold since 2009 until today (i.e. over about 14 years) and have been put into new or existing buildings, an existing stock of 60 000 such large heat pumps can be assumed (BWP estimate). At this power level, it can be assumed that the heat pumps were mostly installed in multi-family buildings or non-residential buildings. In multi-family buildings, a large part of the dwellings are usually rented out.

In order to determine the number of cases that fall under the Heating Costs Ordinance, it is also necessary to determine how many tenancies are affected by the provision. Again, only an approximation of the number of cases can be made. A typical multi-family building has about seven dwellings (cf. Study by statisticians at TU Dortmund and Ista, 2020, https://www.ista.com/fileadmin/twt_customer/countries/content/Germany/Images/Content_Hub/20200805_Content-hub_Studie_Mehrfamilienhaus_Web_final.pdf?utm_source=baulinks&utm_campaign=baulinks). In the case of non-residential buildings it can be assumed that the average is less than seven rented-out units per building (e.g. workshops and industrial production facilities, more units possible for office buildings), but in the absence of available data, seven rented-out units are also assumed here for determining compliance costs. There are thus approximately 30 002 cases per year where there are 7 assumed cases for each 1 installed heat pump. However, since considerably more heat pumps will be installed in buildings in the future, an additional approx. 30 000 cases per year are estimated in the coming years. This gives 60 000 cases per year. The cases in which consumption would have been recorded and users notified anyway need to be deducted, as users have an interest in the exact composition of consumption and demand this from the building owner. It is estimated that in 20 per cent of cases (especially in non-residential buildings and in dwellings rented out by large property companies), data recording, notification and consumption-based recording would have taken place anyway (costs that would have been incurred anyway), leaving about 48 000 cases per year.

In order to record the proportional heat consumption, heat meters or heating cost allocators must be installed (§ 5 HeizkostenV). These can be purchased or rented. For the classic heating cost allocators, one unit per radiator is installed in the dwelling. These are used more often because they are cheaper. However, in the case of new builds particularly where underfloor heating is combined with a heat pump, heat meters will be used in particular. In these cases, only one meter per residential unit is required (cf. Billing heating costs using heat meters, version of November 2022, https://www.fachanwalt.de/magazin/mietrecht/heizkostenabrechnung). For the determination of compliance costs, it is estimated that only one heat meter per property unit/residential unit is installed in about 20 per cent of the cases. This gives 9 600 cases, and in the other 80 per cent (38 400 cases) heating cost allocators are attached to each radiator in the property unit/residential unit. For the determination of compliance costs, 4.4 radiators per residential unit are assumed, based on the average living spaces in a dwelling in 2021 (cf. destatis, Living, 2021, https://www.destatis.de/DE/Themen/Gesellschaft-Umwelt/Wohnen/_inhalt.html). This results in 168 960 cases in which a new heating cost allocator has to be attached.

It is estimated that an additional EUR 60 of travel costs (assuming that in most cases this will not be done on the occasion of another appointment, access to tenant dwellings necessary) will be charged in 60 per cent of the cases (number of tenancies affected per year). This therefore affects appointments in 28 800 residential units/property units.

The costs of operating the central heating system are to be allocated among users according to the allocation formula specified therein. Operating costs also include the costs of renting or otherwise making available the use of consumption-recording equipment, as well as the costs of using consumption-recording equipment, including the costs of calibration as well as the costs of calculating, allocating and providing billing and consumption information in accordance with § 6 Heating Costs Ordinance. Users will consequently bear the following costs incurred as a result of the new provisions, unless the consumption-recording equipment has been purchased, then this is covered by the building owner's investment.

Determination of time expenditure

Installation of heating cost allocator or heat meter

Each appointment required (installation of heat meter) will take approximately one hour of the user's time to accommodate the visit of the service provider. For each heating cost allocator installed, time expenditure of about 3 minutes is assumed (estimate).

Monthly notification of remotely-read results of the recording

Landlords must ensure that data is recorded and transmitted on a monthly basis. In the case of devices that are required to be readable remotely, this task is often performed by a service provider and the data is then made available to the user on an online portal each month. For this service, the cost is about EUR 50-100 per year per dwelling (market prices). For the determination of compliance costs, costs of EUR 74 per year per case are assumed. This corresponds to time expenditure of approximately 2 hours, annual material costs of EUR 36.90 (Compliance Costs Guide, Wage cost table, Private sector, Average for land and housing), if the landlord does the reading and communication itself. These annual costs are ultimately borne by the user (§ 6 Heating Costs Ordinance). Different figure in the case of the authorities of EUR 34 (Compliance Costs Guide, Wage cost table, Public sector, Hourly wage, Medium, *mittlerer Dienst*). A total of 48 000 cases are affected (tenancies affected).

Consumption-based billing

Until now, buildings 'mainly' supplied with heat from heat pumps did not necessarily have to adopt billing in accordance with the Heating Costs Ordinance and thus did not have to bill on the basis of consumption. For calculating the split, time expenditure of 20 minutes per case is assumed (Compliance Costs Guide, Time value table for the private sector, Carrying out calculations, Average). For data verification, error correction, data preparation and transmission, there is an additional 7 minutes per case (Compliance Costs Guide, Time value table for the private sector, Verification of data and inputs, Error correction, Preparation of data, Data transmission and publication, Easy). This means that time expenditure of 27 minutes per case will be incurred in a total of 48 000 cases (number of tenancies affected) each year.

Determination of material costs

For heat meters, the material costs are about EUR 300 per unit (purchase price and installation). Where there are 9 600 cases per year, this results in one-off compliance costs of approximately EUR 2.9 million (material costs and installation costs) in one year.

The purchase price for a heating cost allocator is between approx. EUR 15 and EUR 40 per heating cost allocator and installation costs are between approx. EUR 3 to EUR 15 per device. For the determination of compliance costs, average costs of EUR 34 per case are assumed (estimate). For the approximately 168 960 cases per year, this results in one-off material costs of approximately EUR 5.7 million in one year.

The installer can also charge for travel costs and, if necessary, further work. Experts advise that users should not install heating cost allocators themselves. The devices have to be precisely positioned.

There are additional travel costs of approximately EUR 1.7 million for approximately 28 800 cases per year.

Total costs and savings

Consumption-based recording in the case of heat pumps is cost-efficient. As with fossil energies, savings of about 10 per cent (if applicable even 15 per cent) can be achieved here (estimate). These savings would benefit users. Savings can only be estimated for an example individual case, which are then extrapolated on the basis of the number of cases, since the actual saving potential depends very much on user behaviour and the circumstances of the individual case (e.g. state of renovation of the building).

If a specific heat consumption of 100 kWh/(m²a) and an area to be heated of 100 m2 is taken as an example for a partially renovated single-family building, an air heat pump (seasonal annual efficiency ratio of 3.0) would consume 3 333 kWh on average per year, a geothermal heat pump (seasonal annual efficiency ratio of 4.0) would consume 2 500 kWh on average and a water heat pump (seasonal annual efficiency ratio of 5.0) would consume 2 000 kWh on average. It can be assumed that an air heat pump is installed in 80 per cent of cases, a geothermal heat pump in 10 per cent of cases and a water heat pump in another 10 per cent of cases. For determining the savings, it is estimated that electricity savings of 10 per cent per year can be achieved (assumed electricity price: EUR 0.28 including VAT at 19 per cent).

(1) Compliance costs for citizens

88 per cent of cases are attributable to citizens. This gives 8 448 cases in which a heat meter is installed and 148 685 cases per year in which a heating cost allocator is installed (total number: 157 133). Approximately 42 240 tenancies are affected by the provisions. There are also additional travel costs in approx. 25 344 cases.

Determination of time expenditure

Installation of heating cost allocator or heat meter

For the approximately 8 448 heat meter installations per year, time expenditure of approximately 8 448 hours is incurred. One-off costs in this respect amount to approximately EUR 311 731 in one year.

For the one-off installation of approx. 148 685 heating cost allocators, time expenditure of approximately 7 434 hours is incurred in one year. This results in one-off material costs of approximately EUR 274 315 per year.

	Number of cases	Costs in one year
Heat meter installation	8,448 cases	Approx. EUR 311 731
Heating cost allocator installation	148,685 cases	Approx. EUR 274 315

Monthly notification of remotely-read results of the recording

For approximately 42 240 cases per year, time expenditure of 2 hours per case and costs per year of approximately EUR 3.1 million are incurred.

Number of cases	Costs per year
42,240 cases	Approx. EUR 3.1 million

Consumption-based billing

For approximately 42 240 cases per year, time expenditure of approx. 19 008 hours and costs of approximately EUR 701 395 are incurred.

Number of cases	Time expenditure	Costs
42,240 cases	Approx. 19 008 hours	Approx. EUR 701 395

The aforementioned items therefore give rise to costs of approximately EUR 4.4 million in one year.

Total material costs
Approx. EUR 4.4 million

Determination of material costs

For 8 448 cases per year, the one-off installation of heat meters gives rise to compliance costs of approximately EUR 2.5 million in one year. The one-off installation of approx. 148 685 heating cost allocators gives rise to material costs of approximately EUR 5 million in one year.

There are additional travel costs of approximately EUR 1.5 million for approximately 25 344 cases per year.

In total, compliance costs of approximately EUR 9 million are incurred in one year.

	Number of cases	Material costs
Heat meter	8,448 cases	Approx. EUR 2.5 million
Heating cost allocator	148,685 cases	Approx. EUR 5 million
Travel costs	25,344 cases	Approx. EUR 1.5 million
Total material costs		Approx. EUR 9 million

Total costs and savings

Total compliance costs of approximately EUR 13.4 million will be incurred.

In 38 400 cases per year where consumption can be recorded, savings of up to 10 per cent can be achieved.

In total, this results in savings of approximately EUR 3 327 173 per year. Aggregated over the expected 20-year service life, there are savings of approximately EUR 67 million.

Total compliance costs	Savings (20 years)
Approx. EUR 13.4 million	Approx. EUR 67 million

(2) Compliance costs for businesses

10 per cent of cases are attributable to businesses. This gives 960 cases in which a heat meter is installed and 16 896 cases per year in which a heating cost allocator is installed (total 17 856) About 4 800 tenancies are affected. There are additional travel costs in 2 880 cases.

Determination of time expenditure

Installation of heating cost allocator or heat meter

For the one-off installation of 960 heat meters, time expenditure of approximately 960 hours is incurred in one year. The costs for this amount to approximately EUR 35 424 in one year (material costs of EUR 36.90 per hour (Compliance Costs Guide, Wage cost table, Private sector, Average for land and housing)).

For the one-off installation of approx. 16 896 heating cost allocators, time expenditure of approximately 845 hours is incurred in one year. The costs for this amount to approximately EUR 31 181 in one year (material costs of EUR 36.90 per hour (Compliance Costs Guide, Wage cost table, Private sector, Average for land and housing)).

	Number of cases	Costs in one year
Heat meter installation	960 cases	Approx. EUR 35 424
Heating cost allocator installation	16,896 cases	Approx. EUR 31 181

Monthly notification of remotely-read results of the recording

Landlords must ensure that data is recorded and transmitted on a monthly basis. In this respect, time expenditure of approximately 2 hours per case per year is assumed. For 4 800 cases per year (tenancies concerned) there are costs of approximately EUR 355 200 per year.

Number of cases	Costs per year
4,800 cases	Approx. EUR 355 200

Consumption-based billing

Each case gives rise to time expenditure of 27 minutes. With a total of 4 800 cases per year, this results in time expenditure of approx. 2 160 hours per year. The annual costs here amount to approximately EUR 79 704.

Number of cases	Time expenditure	Costs
4,800 cases	Approx. 2 160 hours	Approx. EUR 79 704

The aforementioned items therefore give rise to total material costs of approx. EUR 501 509 in one year.

Total material costs (time)
Approx. EUR 501 509

Determination of material costs

For heat meters, the material costs are about EUR 300 per unit (purchase price and installation). Where there are 960 cases per year, this results in one-off compliance costs of approximately EUR 288 000 (material costs and installation costs) in one year.

The one-off installation of approx. 16 896 heating cost allocators gives rise to material costs of approximately EUR 574 464 in one year.

There are additional travel costs of approximately EUR 172 800 for approximately 2 880 cases per year.

This results in total material costs of approximately EUR 1 million in one year.

	Number of cases	Material costs
Heat meter	960 cases	Approx. EUR 288 000
Heating cost allocator	16,896 cases	Approx. EUR 574 464
Travel costs	2,880 cases	Approx. EUR 172 800
Total material costs		Approx. EUR 1 million

Total costs and savings

Total costs of approximately EUR 1.5 million will be incurred in one year.

In 4 800 cases per year in which consumption can be recorded, savings of up to 10 per cent can be achieved. In total, this results in savings of approximately EUR 418 522 per year. Aggregated over the expected 20-year service life, there are savings of approximately EUR 8.4 million.

Total compliance costs	Savings (20 years)
Approx. EUR 1.5 million	Approx. EUR 8.4 million

(3) Compliance costs for the authorities

Determination of number of cases

2 per cent of cases are attributable to the authorities. This gives 192 cases in which a heat meter is installed and 3 379 cases per year in which a heating cost allocator is installed (total 3 571) 960 tenancies are affected. In 576 cases (number of tenancies affected, not devices) there are additional travel costs.

Determination of time expenditure

Installation of heating cost allocator or heat meter

Each appointment required (installation of heat meter) will take approximately one hour of the user's time to accommodate the visit of the service provider. Heat meters are installed in a total of 192 cases, giving rise to total time expenditure of about 192 hours in one year. EUR 34 (Compliance Costs Guide, Wage cost table, Public sector, Hourly wage, Medium, *mittlerer Dienst*) is assumed for one hour in the authorities. This results in total costs of approximately EUR 6 528 in one year.

For each heating cost allocator installed, time expenditure of about 3 minutes is assumed. One-off total time expenditure for 3 379 cases amounts here to approximately EUR 169 hours in one year. This results in total costs of approximately EUR 5 746 in one year.

	Number of cases	Costs in one year
Heat meter installation	192 cases	Approx. EUR 6 528
Heating cost allocator installation	3,379 cases	Approx. EUR 5 746

Monthly notification of remotely-read results of the recording

Landlords must ensure that data is recorded and transmitted on a monthly basis. In this respect, time expenditure of approximately 2 hours per case per year is assumed. For 960 cases per year (tenancies concerned), this results in annual costs of approximately

EUR 65 280 (assumed wage rate of EUR 34 per hour for the authorities (Compliance Costs Guide, Wage cost table, Public sector, Hourly wage, Medium, *mittlerer Dienst*).

Number of cases	Costs per year
960 cases	Approx. EUR 65 280

Consumption-based billing

For each case of consumption-based recording, time expenditure of 27 minutes is incurred, with a total of 960 cases per year. This results in time expenditure of approximately 432 hours per year. This results in annual costs of approximately EUR 14 688 (assumed wage rate of EUR 34 per hour for the authorities (Compliance Costs Guide, Wage cost table, Public sector, Hourly wage, Medium, *mittlerer Dienst*)).

Number of cases	Time expenditure	Costs
960 cases	Approx. 432 hours	Approx. EUR 14 688

The aforementioned items therefore give rise to costs of approximately EUR 92 242 in one year

Total material costs (time)
Approx. EUR 92 242

Determination of material costs

The costs for the one-off installation of a heat meter in 192 cases are around EUR 57 600 in one year.

The costs for the one-off installation of heating cost allocators in 3 379 cases in one year are approximately EUR 114 886.

One-off travel costs for 576 cases total around EUR 34 560 in one year.

This results in total material costs of approximately EUR 206 506 in one year.

	Number of cases	Material costs
Heat meter	192 cases	Approx. EUR 57 600
Heating cost allocator	3,379 cases	Approx. EUR 114 886
Travel costs	567 cases	Approx. EUR 34 560
Total material costs		Approx. EUR 207 046

Total costs and savings

Total costs are approximately EUR 299 288 in one year.

In 960 cases per year for which consumption can be recorded, savings of up to 10 per cent can be achieved. This results in electricity cost savings of approximately EUR 83 704 per year and aggregated over the 20-year service life results in savings of approximately EUR 1.7 million.

Total compliance costs	Savings (20 years)
Approx. EUR 299 288	Approx. EUR 1.7 million

5. Other costs

As service providers will have new information, documentation and training obligations, it is conceivable that they will pass on costs to their customers and thus increase the prices for their services. These costs have been factored in when estimating material costs. In

addition, the costs arising from the amendment to the Heating Costs Ordinance may be passed on to users of dwellings or other property units. Chimney sweeps will also charge fees for their new tasks in accordance with the Schedule of Fees (Fees Row 1, not compliance costs, destatis).

6. Other consequences of the legislation

No impact on consumers beyond that outlined above is expected. In accordance with the Federal Government's equality principles, the Act has no effect on equality. In order to protect tenants, a limit is being introduced on the extent to which costs can be passed on for green gases and blue hydrogen, as well as an obligation on landlords to provide information. Furthermore, tenants are afforded protection when heat pumps are installed. A rent increase can only be applied under certain conditions. For authorised district chimney sweeps, new inspection obligations are created as part of the fireplace check, for which they will charge fees.

People in urban and rural areas will be affected by the Act to different extents and with varying frequency.

This is particularly evident against the background of the different settlement, building, income and asset structures.

Due to the spread-out settlement structures in many rural regions, a decentralised heat supply is the only supply option for many people and institutions. However, centralised solutions can be an alternative for towns or densely populated areas.

Due to structural and demographic change, the building structure is very heterogeneous in terms of age, size, use, ownership and tenancy, energy efficiency classes and need for renovation, building and collateral value. The current 2022 building census will provide up-to-date data here. Compared to in metropolitan areas, people in rural areas are more likely to live in older homes with lower energy efficiency classes in single and two-family buildings with more living space. The share of homeowners with income and assets that are too low for the necessary investments is significantly higher in rural areas than in metropolitan areas.

The Act addresses this diversity of settlement and building structure by allowing compliance options which are equally possible (technology-neutral). For existing buildings in rural areas, biomass heating systems based on sustainable biomass, in the case of solid biomass in combination with a solar thermal system or a photovoltaic system and a buffer storage system, are of particular note. There are also opportunities for increasing local heating networks in built-up areas, also due to the initiative of local citizens (e.g. through citizens' energy cooperatives). The Act recognises and supports this development by including biomethane in the compliance options for buildings and heating networks.

Overall, the heat transition is associated with a high need for investment, not only for heating systems but also for renovation measures, which will only pay off over the service life concerned. In addition to the required investment volume, the capacity of households and institutions to bear the investment costs of renewable energy heating and other energy efficiency improvement measures depends to a large extent on income and assets as well as creditworthiness. Accordingly, compensation and funding measures, which must be effective in time for the entry into force of the amended GEG, must be designed in order to limit social and spatial disparities.

VII. Time limit; evaluation

The Act applies for an indefinite period. By means of the 65 per cent renewable energy requirement and the associated measures, the Act amends the Buildings Energy Act, which applies for an indefinite period. In addition, the Act establishes, on a permanent basis, the measures on heating inspection, heating optimisation and hydronic balancing that have previously applied on a temporary basis under the Ordinance on Medium-term Energy Security Measures (EnSimiMaV). It serves to transform the building stock so as to be sustainable and greenhouse gas-neutral by 2045. This involves the most economical use of energy and the exclusive use of renewable energy or unavoidable waste heat for the energy supply of buildings. It thus contributes to the transition in the heating sector in order to achieve compliance with climate targets. A time limit would not be compatible with this objective. The absence of a time limit creates the necessary investment certainty and the conditions for the planned long-term improvement in the share of renewables in heat generation and energy efficiency.

This Draft Act shall be evaluated no later than five years after the date of entry into force. In doing so, the Federal Government will examine in a technically appropriate manner whether and to what extent the intended increase in the use of renewable energy and energy efficiency in the operation of heating systems have been achieved. The Federal Government will also examine how compliance costs have developed for citizens, businesses and the authorities, and whether the development is proportionate to the impacts of the legislation that have been identified. The evaluation will cover the issue of any unintended secondary effects as well as acceptance and practicability of the regulations.

B. Specific part

Article 1 (Amendments to Buildings Energy Act)

Point 1

The amendments to the **Table of contents** are consequential editorial changes due to provisions being moved, repealed, renamed and introduced.

Point 2

Letter a

The redrafting of the purpose in **§ 1(1)** is intended to enshrine, in the GEG, the Federal Government's objectives with regard to the goal of climate neutrality by 2045, thereby giving the GEG a significant role in the achievement of the national climate objectives under the Climate Protection Act. By means of the amendment to the Climate Protection Act made by Article 1 of the Act of 18 August 2021 (BGBl. I p. 3905), the German Bundestag strengthened the climate protection targets with effect from 31 August 2021 and enshrined the objective of greenhouse gas neutrality by 2045.

Letter b

The amendment in **§ 1(2)** is a consequential amendment resulting from the redrafting of paragraph (1). The goal of climate neutrality by 2045 seals the end of the use of fossil resources.

Letter c

The newly-inserted **§ 1(3)** sets out the overriding public interest in the use of renewable energy, in line with the Renewable Energy Act (EEG 2023). The provision also sets out that the operation of systems and associated ancillary systems for the production of heating, cooling and electricity from renewable energy and efficiency measures in buildings serve public security. The provision also applies to individual heating systems and efficiency measures.

Since these systems as well as associated ancillary systems for the production of heating, cooling and electricity from renewable energy and efficiency measures in buildings also contribute to the achievement of the energy policy objectives of this Act as well as the climate protection objectives of the Federal Government and the objectives of the European Union concerning energy and climate, the establishment and operation of such systems is, at the same time, in the overarching public interest.

The European Court of Justice (CJEU) has accordingly stated that 'the promotion of renewable energy sources, which is a high priority for the European Union, is justified in particular because the exploitation of those energy sources contributes to environmental protection and sustainable development, and can also contribute to security and diversification of energy supply and make it possible to meet more quickly the targets of the Kyoto Protocol, annexed to the United Nations Framework Convention on Climate Change'.[5)] Public authorities must take this overriding public interest into account when considering other legal interests. This applies to each individual system including associated ancillary systems, in particular in the case of environmental heat and systems for the production of electricity from solar radiation energy (photovoltaic systems) and solar thermal systems on

[5])CJEU judgement of 4 May 2016 – C-346/14, paragraph 73.

roofs and façades, because these are essential to the direct exploitation of renewable energy in the buildings sector.

In addition, the expansion of renewable energy also serves public security. Currently, the provision of heat from renewable energy accounts for only about 15 per cent of Germany's energy consumption in the heating sector. By 2024, only new heating systems that generate at least 65 per cent of the heat they provide from renewable energy will be installed in buildings. Under the provisions of the Climate Protection Act, the buildings sector must be completely decarbonised by 2045. Renewable energy and unavoidable waste heat will thus cover the vast majority of the heat supply in the future. At the same time, conventional heating systems will be gradually replaced to a significant extent. Without the addition of renewable energy systems under the EEG and the GEG, the provision of heat cannot be secured in the long term.

In the context of the free movement of goods, the CJEU has stated that energy products (petroleum products in that particular case), because of their exceptional importance as an energy source in the modern economy, are of fundamental importance for a country's existence since not only its economy but above all its institutions, its essential public services and even the survival of its inhabitants depend on them. An interruption of supplies, with the resultant dangers for the country's existence, could therefore seriously affect public security[6)] These considerations are transferable to the energy supply of buildings. The provision of heat in buildings is of fundamental importance for public administration, the health system and the housing of the population.

By defining renewable energy as serving the overriding public interest and public security, this must, when making considerations, lead to particular weight being given to renewable energy. Under § 2(1), renewable energy must therefore be afforded priority when weighing up assets requiring protection until greenhouse gas neutrality of the building stock is achieved.

Specifically, renewable energy should therefore only be overridden in exceptional cases when weighing-up decisions e.g. in relation to monument protection, or under emission control, construction or road law.

In this case, public interests can only oppose renewable energy as an essential part of climate protection if they are enshrined in law or protected by law with a constitutional ranking comparable to Article 22a GG or have an equivalent ranking.

Under the third sentence of § 1(3) GEG 2023, the second sentence does not apply to matters relating directly to national and Alliance defence.

6)See CJEU judgement of 10 July 1984, 72/83, paragraph 34.

Point 3

Letter a

Double letter aa

Subparagraph 4a

A definition of blue hydrogen is introduced in**§ 3(1) subparagraph 4a** which links directly to the definition from EU legislation (Taxonomy Regulation).

Double letter bb

The newly-inserted **subparagraph 8a** serves to implement requirements arising from the Energy Performance of Buildings Directive 2010/31/EU. Article 14(2) and Article 15(2) of the Energy Performance of Buildings Directive 2010/31/EU refer to 'energy performance contracting' as defined in Article 2(27) of the Energy Efficiency Directive 2012/27/EU. Subparagraph 8a transposes this definition into national law.

Double letter cc

Subparagraph 9a

§ 3(1) subparagraph 9a defines the term 'building network'. The term 'building network' is used, among other places, in § 71(1) – new – and serves to distinguish heating systems that fall under the provision laid down in § 71(1) (65 per cent renewable energy requirement) from heat generators that feed into a heating network within the meaning of § 71b and thus only fall under said provision. The building network definition is only to provide a differentiation from a heating network for the purpose of the 65 per cent renewable energy requirement and for § 60a, and shall have no effect on other regulatory areas of the Act; in particular, this does not imply any changes to the balancing procedures for heating networks.

The differentiation is in line with that made between the Federal funding scheme for efficient buildings (BEG) and the Federal funding scheme for efficient heating networks (BEW). Under the BEW's predecessor programme, 'Heating network systems 4.0', the limit of 100 connections to a heating network or a minimum purchase of 3 GWh per year was set as the minimum size criterion and exceptions for neighbourhood or district concepts were possible. This differentiation and the exception were deliberately changed when the BEG and BEW were created in order to allow a clear distinction between the funding programmes that was easy to handle in practice. In the context of the regulative requirement laid down in the first sentence of § 71(1), comparable difficulties concerning differentiation were apparent, but in this case with regard to the question of how circumvention of the 65 per cent renewable energy requirement through integration of a heating system in a network can be avoided. The clear distinction made by the definition of the building network addresses these differentiation difficulties and links to criteria already known in practice. Heating systems feeding heat into a network that serves to supply at least 2 to a maximum of 16 buildings and up to 100 residential units, either in each case or as a complete system, thus fall directly under the 65 per cent renewable energy requirement laid down in § 71(1). The limit of up to 100 residential units does not apply to a single building, as a network requires the connection of at least two buildings (see Article 2(19) Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (OJ L 153, 18.6.2010, p. 13)). In addition, the limit of 100 residential units is not transferable to commercial premises. Therefore, the limit of up to 16 buildings applies only to properties that are purely or predominantly commercial.

Double letter dd

Subparagraph 10a

The definition newly established in **§ 3(1) subparagraph 10a** of ‘technical building systems’ [German: ‘gebäudetechnische Systeme’] serves to transpose the requirements arising from the Energy Performance of Buildings Directive 2010/31/EU. The definition for ‘technical building systems’ newly introduced by amending Directive (EU) 2018/844 arising from Article 2(3) of the Directive is thus transposed into national law.

The definition does not include plug-in devices that are not permanently connected to the building.

Double letter ee

In **§ 3(1) subparagraph 13a***,* the term ‘major renovation’ is defined for the role model function of the public sector (§ 4) .

The term ‘major renovation’ is required in order to transpose European Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (OJ L 153, 18.6.2010, p. 13). The new version largely corresponds to the wording of Article 2(10)(b) of the current Directive 2010/31/EU. Instead of ‘surface of the building envelope’, however, the term ‘heat-transmitting envelope area’ [German: ‘wärmeübertragende Umfassungsfläche’], which is the term commonly used in the Buildings Energy Act, is used.

Until now, the derogating concept of ‘fundamental renovation’ has been used in § 52(2) for the role model function of the public sector in the Buildings Energy Act. Since § 52 is being deleted as part of the current amendment, it is necessary to transfer the definition to § 3(1). The editorial amendment described above has been made in order to do so. In terms of substance, the term matches the corresponding definition of ‘major renovation’ in § 2 subparagraph 5 of the Building Electric Mobility Infrastructure Act (GEIG).

In **§ 3(1) subparagraph 13b**, a definition of green hydrogen is introduced, which is directly linked to the definition of ‘green hydrogen’ already in § 3 subparagraph 27a EEG 2023. The definition is needed in the GEG since the exclusive use of green hydrogen or derivatives thereof under the newly-created § 71(3) subparagraph 1 is one compliance option for the provision of heat using renewable energy in the meaning of § 71(1). The reference to the EEG 2023 is intended to ensure uniform requirements for the production of green hydrogen under the legal system.

Double letter ff

The definition for ‘heating systems’ [German: ‘Heizungsanlagen’] newly established in **§ 3(1) subparagraph 14a** is particularly relevant for the 65 per cent renewable energy requirement laid down in §§ 71 et seq. The new definition serves to provide a distinction from the somewhat broader concept of a ‘technical heating system’ [German: ‘heizungstechnische Anlage’], as was used previously in the Buildings Energy Act. A heating system is therefore a system for the production of space heat, hot water or a combination thereof, with the exception of hand-fed single-room combustion plants within the meaning of § 2 subparagraph 3 and open fireplaces pursuant to § 2 subparagraph 12 of the first BImSchV The term includes heating systems for one or more buildings, building units, property units or rooms using energy, including storey heating systems and automatically fed single-room combustion plants, as well as direct electric heating. A transfer station is also to fall under the term ‘heating system’, as it generates space heat or hot water by transferring the heat supplied from the upstream heating network. In contrast to the term ‘heating system’, the term ‘technical heating system’ covers the entire system comprising generation, storage, distribution and transfer of heat.

Double letter gg

The previous **§ 3(1) subparagraph 16** is no longer required, since § 41 and § 52 are being repealed. As part of an editorial amendment, the definition of 'cooling from renewable energy' is now moved to paragraph (2) as this makes more sense structurally. Paragraph (2) now lists all renewable energy sources possible under the GEG for heating and cooling.

Double letter hh

In **§ 3(1) subparagraph 29** , it is being ensured by deleting the word 'solid' before the words 'storage units' in the definition of direct electric heating that direct electric heating using water reservoirs are also included. This definition therefore covers both direct electric heating systems and electric storage heaters.

Double letter ii

The definition newly established in § 3(1) subparagraph 29a of 'building automation and control system' serves to transpose the requirements arising from the Energy Performance of Buildings Directive 2010/31/EU. The definition for 'building automation and control system' newly introduced by amending Directive (EU) 2018/844 arising from Article 2(3a) of the Directive is thus transposed into national law.

Double letter jj

The definition newly established in **§ 3(1) subparagraph 30a** of 'unavoidable waste heat' ensures that, for the purpose of complying with the 65 per cent renewable energy requirement laid down in § 71, only waste heat is counted that is actually unavoidable, i.e., cannot be avoided technically and would otherwise simply have to be released to the environment. Useful heat from cogeneration processes in accordance with § 2 subparagraph 26 of the Combined Heat and Power Act (KWKG) is not unavoidable waste hear, while heat from the flue gas condensation of cogeneration plants is unavoidable waste heat. The tertiary sector means, for example, IT data centres. Waste heat released directly into the room in which the machinery or devices are established is not unavoidable waste heat. Non-process-related heat from exhaust air, room air or outgoing air can only be counted as unavoidable waste heat if it is made usable via a heat pump. In addition, waste heat from non-process-related exhaust air (e.g. via exhaust air or ventilation systems) does not count as unavoidable waste heat. In actuality, the definition is relevant outside existing heating networks, since when connected to an existing heating network, heat other than from renewable energy and unavoidable waste heat is also permitted. Heat from thermal waste treatment, which is not considered as renewable energy (biogenic proportion) and which is obtained from the energy recovery of waste in compliance with the provisions of the Act on the Promotion of the Circular Economy and Safeguarding the Environmentally Compatible Management of Waste (Circular Economy Act) in the current version, is also recognised as unavoidable waste heat.

Letter b

The amendment in **§ 3(2) subparagraph 5** is editorial in nature.

The new **§ 3(2) subparagraph 6** also includes heat produced from green hydrogen or derivatives thereof as renewable energy and is thus a consequential amendment resulting from the newly-created § 71(2) subparagraph 4 as a compliance option for heat supply with renewable energy within the meaning of § 71(1). The 'blue hydrogen' defined in § 3(1) subparagraph 4a is not renewable and is therefore not included in this definition of renewable energy.

The new **§ 3(2) subparagraph 7** is a structurally required amendment, which picks up the reference in subparagraph 6 to the definition of ‘cooling from renewable energy’ previously laid down in § 3(1) subparagraph 16. This does not entail any substantive amendment. Subparagraph 7 supplements the list in paragraph (2) in accordance with the regulatory content of the old § 3(1) subparagraph 16, so that now all renewable energy sources possible under the GEG for generating heating and cooling are listed here.

Letter c

The amendment in **§ 3(3) subparagraph 1** updates the reference to the Biomass Ordinance. Previously, the obsolete Biomass Ordinance that was in effect until 31 December 2011 was referenced. Referencing the current ordinance ensures that inconsistencies concerning the various uses of biomass are avoided and that the requirements of Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources (OJ L 328, 21.12.2018, p. 82) are implemented uniformly.

Point 4

Letter a

The amendment in **§ 4(2)** is a consequential editorial amendment. The definition of major renovation is now laid down in § 13(1) subparagraph 13a, as § 52 is being deleted.

Letter b

The provision in **§ 4(4)** enabling the Länder to enact deviating legislation for the public sector was previously found in § 56(1). Since § 52 to § 56 are being deleted as part of the current amendment, it is necessary to move this provision to § 4. Many Länder have now initiated their own targets and regulations for public buildings in their state, and they should be able to continue to expand their role model function. This is required due to the sovereignty of the Länder. Accordingly, the Länder may, with respect to public buildings, with the exception of public buildings belonging to the Federal Government, make their own regulations governing the fulfilment of the role model function and for this purpose may deviate from the provisions of this Act. The second sentence stipulates that this does not apply to the requirements concerning the calculation bases and methods referred to in Part 2 Section 3

Point 5

§ 6a reflects the change in name from the Federal Ministry for Economic Affairs and Energy (BMWi) to the Federal Ministry for Economic Affairs and Climate Action (BMWK) and the passing of responsibility for consumer protection from the Federal Ministry of Justice (BMJ) to the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV).

Point 6

§ 7 and § 9 reflect the change in name from the Federal Ministry for Economic Affairs and Energy (BMWi) to the Federal Ministry for Economic Affairs and Climate Action (BMWK) and the formation of the Federal Ministry of Housing, Urban Development and Building (BMWSB) to which responsibility for building has been passed from the now renamed Federal Ministry of the Interior, for Building and Community (BMI).

Point 8

§ 9a (Regulation at Land level)

The newly-inserted **§ 9a** absorbs the provision enabling the Länder to enact deviating legislation currently laid down in § 56 subparagraph 2 in the General Part, as the provisions of § 52 to § 56 will no longer apply in the future. As was the case under the previous § 56(2) and its predecessor provision, § 3 3(4) subparagraph EEWärmeG, the provision clarifies that the Federal Government, through the provisions of the GEG, has not made exhaustive use of its concurrent power to enact legislation in this respect, but has merely set a minimum nationwide standard, meaning that the Länder have the power to enact derogating legislation in that regard in accordance with Article 72(1) GG. Accordingly, the Länder may impose further requirements for the production and use of electricity or heating and cooling from renewable energy in spatial context with buildings. In addition, the Länder may also impose further requirements or restrictions on direct electric heating. The power of the Länder to lay down further obligations, as many Länder have already done with regard to solar roofs and direct electric heating, is therefore confirmed in declaratory terms.

Point 9

Letter a

The amendment in **§ 10(2) subparagraph 3** replaces the reference to renewable energy use under the now obsolete § 34 to § 45. In the case of new builds, the requirements for new heating systems under § 71 to § 71h must be met in the future.

Letter b

§ 10(5) is repealed, since the content has been included in the newly-drafted § 71(7).

Point 10

§ 22(5) reflects the change in name from the Federal Ministry for Economic Affairs and Energy (BMWi) to the Federal Ministry for Economic Affairs and Climate Action (BMWK) and the formation of the Federal Ministry of Housing, Urban Development and Building (BMWSB) to which responsibility for building has been passed from the now renamed Federal Ministry of the Interior, for Building and Community (BMI).

Point 11

Letter a

The amendment in **§ 31(1) and (2)** is a consequential amendment resulting from the deletion of § 34 to § 45 due to the introduction of the 65 per cent renewable energy requirement in the new § 71 et seq.

Letter b

§ 31(2) reflects the change in name from the Federal Ministry for Economic Affairs and Energy (BMWi) to the Federal Ministry for Economic Affairs and Climate Action (BMWK) and the formation of the Federal Ministry of Housing, Urban Development and Building (BMWSB) to which responsibility for building has been passed from the now renamed Federal Ministry of the Interior, for Building and Community (BMI).

Point 12

The introduction of the provisions laid down in § 71 et seq. establishes more extensive rules for the use of renewable energies, which exceed the requirements laid down in **Part 2 Section 4 (§ 34 to § 45)** both in terms of the extent of the requirements (share of 65 per cent renewable energy instead of 15 per cent renewable energy) and in terms of the subject matter covered (installation of new heating systems including automatically fed single-room combustion plants in existing buildings as well as in new builds). Deletion is therefore required.

Point 14

The redrafting of the **heading of Part 3** as 'Requirements for existing buildings' is a consequential amendment, reflecting the repealing of Part 3 Section 2 containing § 52 to § 56.

Point 15

The deletion of the **heading of Part 3 Section 1** is a consequential amendment, reflecting the repealing of Part 3 Section 2 containing § 52 to § 56

Point 16

In most cases, measures under § 47 are cost-effective. For example, the saved kilowatt-hour cost derived on the basis of a repayment assessment, even with an accessible top storey ceiling that does not meet the minimum thermal insulation requirements under DIN 4108-2: 2013-02, is usually well below EUR 0.05/kWh and thus lower than the energy supply costs per kilowatt hour. The previous exception laid down in **§ 47(4)** in the absence of cost-effectiveness already had very limited significant anyway. However, the ratio of roof area to living space which is worse compared to larger buildings gives grounds to continue the exception arising from paragraph (4) for owner-occupiers of buildings with no more than two dwellings. More often than with larger buildings, measures under § 47 may not be cost-effective in such cases. In the interest of legal harmonisation, however, an exemption can still be granted under § 102 upon request in rare cases involving larger buildings in the event of unreasonable hardship.

Point 17

§ 50(4) reflects the change in name from the Federal Ministry for Economic Affairs and Energy (BMWi) to the Federal Ministry for Economic Affairs and Climate Action (BMWK) and the formation of the Federal Ministry of Housing, Urban Development and Building (BMWSB) to which responsibility for building has been passed from the now-renamed Federal Ministry of the Interior, for Building and Community (BMI).

Point 18

The new **second sentence of § 51(1)** serves to close a gap in the regulation. The previous provision – even in the case of very large extensions – stipulated only the requirement of an average U-value of 1.9 W/m²K for new transparent components (windows) and 0.4 W/m²K for new opaque components. These requirements are at the level of the 1980s and 1990s, respectively. In the case of low-heated zones, the current provisions reduce the requirement for transparent components (windows) to an average U-value of 3.5 W/m²K (equivalent to double glazing from the 1970s) and for new opaque components to 0.6 W/m²K. Even compared to EnEV 2014, the 2020 version of the GEG relaxed the rules.

The requirement for the extension of buildings is being adapted in line with the requirements of new builds, where the newly-added usable area is more than 100 per cent of the usable area of the existing building, or a maximum of 250 square metres.

Point 19

The **repealing of Part 3 Section 2 (§ 52 to § 56)** is justified by the fact that the introduction of the provisions in § 71 et seq. establishes more extensive rules for the use of renewable energy in terms of the extent of the requirements (share of 65 per cent renewable energy instead of 15 per cent renewable energy) which exceed the requirements laid down in Part 3 Section 2. Deletion is therefore required. The previous clauses enabling the Länder to enact derogating legislation are being moved to § 4(4) and § 9a.

Point 21

§ 60a (Inspection and optimisation of heat pumps)

Paragraph (1)

The introduction of operational testing of heat pumps is necessary, as heat pumps have, to date, not been subject to regular operational testing; the case is different for heating systems with combustion processes, which are regularly checked as part of the exhaust gas measurements and fireplace checks. The scope of the provision is designed to reflect § 71(1) and therefore also covers heat pumps that feed into a building network. Heat pumps that feed into a heating network that is not a building network are therefore not covered.

The focus of this provision is to unlock the optimisation potential of heat pumps in buildings or buildings that are connected to building networks with at least six residential or property units, which potential arises after the heat pump is put into operation in the first heating season.

The obligation applies to a building size of at least six residential or property units, as the ratio of the costs of operational testing to the potential for savings improves as the size of the building increases and with it the need for heat. Introducing the operational testing obligation for larger buildings therefore unlocks considerable savings potential with a good cost-benefit ratio.

By readjusting key parameters of the system, by checking the real efficiency of the system during operation and by checking the installed components, considerable gains in efficiency can be achieved in many systems. Field tests carried out in the past have shown average improvements in the seasonal annual efficiency ratio of 0.2. The scope of services covers a range that can be carried out by a skilled person with training. Operational testing needs to be repeated if the heat pump is monitored remotely. Remote monitoring means continuous operational monitoring of the key operating parameters of the heat pump, for example as part of building control or a maintenance contract with continuous recording of the operating parameters.

Heat pumps newly installed after the entry into force of the Act (with the exception of those referred to in the second sentence) shall be subject to operational testing after one heating season, at the latest after two years.

Repetition of the operational testing referred to in the third sentence shall be carried out at regular but comparatively long intervals for systems that do not have remote monitoring. Unlike boilers with combustion processes, less pollution, sooting and other degenerative processes can be expected. On the other hand, heat pumps are also subject to wear. In order to ensure efficient heat pump operation in the long term, a check is therefore necessary at an interval of five years.

Regulation (EU) No 517/2014 on fluorinated greenhouse gases lays down, inter alia, obligations for checking leaks in heat pumps containing fluorinated greenhouse gases and for recording leak checks. These must be observed in addition to the obligations of § 60a

GEG. The same applies to the expertise requirements under the Chemicals Climate Protection Ordinance.

Paragraph (2)

The checks listed in paragraph (2) are well known in the professional community and have been carried out for years. When applying the process, the individual components of the heat pump system are assessed and, if necessary, optimisations and improvement steps are proposed. The process is designed to be simple and can be performed (mainly visually and based on existing parameters) without much metrological effort.

Point 1

Hydronic balancing performed in accordance with **subparagraph 1** is essential for the energy-efficient operation of heat pumps. The purpose of this check is to check whether hydronic balancing has actually been carried out. A practical method for checking hydronic balancing is described in DIN TS 15378.

Point 2

During the initial installation of a heat pump, some parameters, such as the heating curve, can only be determined on the basis of normative requirements. Often they are set with a certain margin of safety, because the real usage behaviour is not known and complaints are to be avoided. After one year of operational experience, the parameters can therefore be readjusted. By lowering the flow temperature, for example, the efficiency of the heat pump can be significantly increased. It is also to be checked whether the factory settings, for example, for switch-off and reduced-temperature times, have been adapted to the needs on site.

Point 3

By checking the maximum and month-average flow and return flow temperatures, it can be checked whether the heating system is running in a favourable temperature range and whether optimisation appears to be necessary for the purpose of lowering temperatures. Manufacturers must ensure that this information can be accessed. The inspection of the expansion vessel is used to determine damage and thus any impairments to the proper functioning of the heating system.

Point 4

The practical seasonal annual efficiency ratio determined in accordance with **subparagraph (4)** is to provide information on whether the heat pump is working as planned. The explicit aim of this check is to identify any potential for optimisation. It is not about a direct comparison with the seasonal annual efficiency ratio that has been calculated on a theoretical basis using the easy-to-use short method of VDI 4650 Sheet 1. Such a comparison is also not possible, because, for example, the relevant and diverse user behaviour cannot be reflected in the calculation under VDI 4650. Therefore, the seasonal annual efficiency ratio measured in practice may differ significantly from the calculated ratio. However, these deviations should be evaluated by the inspector and optimisation recommendations should be made.

Point 5

Checking the fill level of the refrigerant circuit in accordance with **subparagraph 5** is required because leaky refrigerant circuits that can be identified by means of an insufficient fill level have a significant impact on the efficiency of the heat pump. In addition, the release of environmentally-relevant refrigerants can be prevented. Procedures involving external inspection options are to be used for checking the level.

Subparagraphs 6 to 9

The checks mandated in **subparagraphs 6 to 9** together serve to ensure efficient operation of the heat pumps.

Paragraph (3)

The training of the qualified person shall lead to the acquisition of the skills required for the checks referred to in paragraph (1). This can be assumed, for example, if the person has attended training based on VDI 4645.

Paragraph (4)

Paragraph (4) lists the groups of people authorised to carry out the operational testing of heat pumps after appropriate training under paragraph (3). The list is not exhaustive, and therefore other groups of people with comparable expertise can be added. The list includes, in particular, chimney sweeps (subparagraph 1) within the meaning of § 2(1) of the Act on Professional Law and Supply in the Chimney Sweeping Trade. In addition, subparagraph 2 lists tradespeople working as fitters or heating engineers (in accordance with point 24 of Annex A to the Trades and Crafts Code), subparagraph 3 lists refrigeration plant engineers (in accordance with point 18 of Annex A No 18 to the Trades and Crafts Code), subparagraph 4 lists stove heating and air heating engineers (in accordance with point 2 of Annex A to the Trades and Crafts Code) and subparagraph 5 lists electrical technicians in accordance with point 25 of Annex A to the Trades and Crafts Code. As a third group, energy consultants (subparagraph 3) included in the list of energy efficiency experts for federal funding programmes and who have appropriate knowledge to carry out heating inspection and optimisation, are to be included as testers (available at: https://www.energie-effizienz-experten.de).

Paragraph (5)

Paragraph (5) stipulates that the result of the testing referred to in paragraph (1) shall be documented in writing. This primarily serves to provide evidence of the measure and to notify the person responsible (often the building owner) of any need for optimisation identified. Where need for optimisation is identified and an optimisation measure recommended, the optimisation referred to in the second sentence shall be carried out within one year of the operational testing referred to in paragraph (1). Under the third sentence, the result of the testing and evidence of optimisation measures carried out must be submitted to the tenant without delay upon request. This is intended to give the tenant the opportunity to gain an insight into the real efficiency of the heat pump that heats the rooms they rent, since it can have an impact on the additional costs they are to cover.

Point 22

§ 60b (Inspection and optimisation of older heating systems)

§ 60b requires the owners of buildings with at least six dwellings or other property units whose heating system uses water as the heat carrier and was put into operation 15 years or more before the entry into force of the Act to have the optimised operation of their heating system, in terms of energy efficiency, checked and confirmed. Furthermore, the subject of the inspection is the efficiency of the heating pumps. The legislation continues the provision from § 2 EnSimiMaV and transfers it to older heating systems using other fuels.

The obligation applies to a building size of at least six residential or property units, as it can be assumed that the ratio of the costs of operational testing to the potential for savings improves as the size of the building increases and with it the need for heat. Introducing the operational testing obligation for larger buildings therefore unlocks considerable

savings potential with a good cost-benefit ratio. Heat pumps are excluded from the provision. The inspection and optimisation of heat pumps is regulated in § 60a.

One goal of this inspection is to prepare older heating systems, which will in future be operated using renewable energy in connection under the 65 per cent renewable energy provision in § 70, for optimised operation. In contrast to fireplace checks that fall under the responsibility of the chimney sweep, the building owner can choose their own service provider for the heating inspection. The inspection and optimisation function have been deliberately separated in order to give owners the greatest possible flexibility in selecting the service providers. Building owners are fundamentally allowed to have the inspection carried out by an authorised person of their own choice and also to look for a supplier for the optimisation of the heating on the market. However, it is also the aim of the ordinance to make use of synergy effects and to enable as many services as possible to be implemented by a single source and as part of one work process on the occasion of already agreed work. The costs of inspection and optimisation are thus also fundamentally subject to competition under private law, but must be in line with normal market remuneration.

The correct setting of the heating system is a very cost-effective way to save energy, because many heating systems use too much unnecessary energy, for example because they are still running on factory settings or without reduced temperatures at night. It is necessary to mandate the optimal setting of the heating because this is usually not part of regular inspection or maintenance appointments. Maintenance and optimisation of the heating are therefore often omitted. There is no loss of comfort as a result of the measure. The heating inspection has its optimum effect when all non and low-investment measures come together (in particular hydronic balancing, pump replacement, possible lowering of heating system temperatures). Potential savings of up to 10 per cent can be assumed.

Paragraph (1)

The owner of a building with at least six dwellings or other self-contained property units is required to have the heating system optimised and to have a heating inspection carried out, the result of which must be documented in writing in accordance with paragraph (5). This obligation shall be fulfilled within one year for those heating systems that are in operation for 15 years or less at the date of entry into force of the Act. A gradual phasing-in for newer systems will be made possible in the coming years. For older systems which have already been in operation for more than 15 years, this obligation must be fulfilled by the end of 30 September 2027.

The inspection procedures described in the third sentence are well known in the professional community and have been carried out for years. When applying the process, the individual components of the heating system are assessed (mainly visually and based on existing parameters) and qualitatively classified in the inspection checklist. An average time frame of less than one hour is estimated for the inspection. The purpose of the inspection referred to in paragraph (1) third sentence subparagraph 1 is to check whether the heating system is running optimally. The inspection programme shall cover the measures described in paragraph (2). In accordance with subparagraph 2, it is also necessary to check whether a heating pump is to be replaced. If the building owner has transferred the operation of the heating system to a third party, for example under a heating contract, the obligations of the building owner under the second sentence shall be passed on to the contractor while the obligations of the building owner continue in parallel.

Paragraph (2)

Paragraph (2) lists the measures to be carried out regularly in order to optimise the heating system. If the inspection reveals there is potential for optimisation with regard to all or some of the measures referred to in paragraph (2), these shall be carried out. However, applicable health protection provisions must be observed in accordance with subpara-

graphs 3 and 5, in particular the requirements of the Drinking Water Ordinance for drinking water heating systems, in conjunction with the generally accepted rules of technology. The measures referred to in paragraph (2) do not have to be carried out if the measure has already been carried out or the heating system is already running optimally in view of the effect to be achieved by the measure. In any case, the building owner or user must be informed of possible further savings measures. When checking the need for optimisation measures and while carrying them out, consideration should be given of any negative effects on the fabric of the building that measures to reduce indoor temperatures may have.

Paragraph (3)

Paragraph (3) makes reference to § 60a(3) with regard to the persons who are entitled to carry out the heating inspection. According to the second sentence of paragraph (3), particularly the persons listed in § 60a(4) subparagraphs 1, 2 and 4 are deemed qualified to carry out heating inspections under § 60b.

Paragraph (4)

The first sentence of **paragraph (4)** serves to enable the performance of the heating inspection and optimisation on the occasion of other appointments, which have been scheduled, for example, for a fireplace check or for chimney sweeping or heating maintenance work. Lower prices can be expected on the market in which performance is combined with other work, because there are no additional travel costs. Through PR initiatives, the Federal Government will work to ensure that such synergy effects are exploited. The second sentence makes it clear that the heating inspection can also be demonstrated as part of hydronic balancing.

Paragraph (5)

The first sentence of **paragraph (5)** stipulates that the result of the inspection referred to in the third sentence of paragraph (1) shall be documented in writing. This primarily serves to provide evidence of compliance with the heating optimisation obligation. Where need for optimisation is identified and an optimisation measure is recommended, compliance with the optimisation obligation set out in paragraph (1) may be demonstrated to the authority that is competent under Land-level law by means of the inspection record and accompanying documentation showing implementation of the measure.

In addition, the third sentence requires the result of the inspection and the evidence of work carried out to be submitted to the tenant without delay upon request. This is intended to give the tenant the opportunity to gain an insight into the real efficiency of the heat system that heats the rooms they rent, since it can have an impact on the additional costs they are to cover.

Paragraph (6)

Paragraph (6) stipulates that repetition of the inspection is not required if no changes have been made after the inspection or if no changes have occurred in relation to the heating demand.

Paragraph (7)

Paragraph (7) excludes from the scope of the provision buildings with standardised building automation and buildings which are managed as part of a standardised energy management system, e.g. under DIN ISO 50001 or as part of an environmental management system under EMAS. Also excluded from the scope of the provision are heating systems whose inspection and any optimisation is carried out by a third party as part of a contractual arrangement (e.g. as part of energy performance contracting). The condition in this

respect is for a result to be obtained that is equivalent to a heating inspection in accordance with § 60b(1).

Paragraph (8)

Paragraph (8) stipulates that evidence of the existence of an exception referred to in paragraph (7) shall be provided by the submission of appropriate documentation.

§ 60c (Hydronic balancing and further heating optimisation measures)

The aim of **§ 60c** is to effectively exploit the optimisation potential for heating systems. The obligation to have hydronic balancing carried out applies to all buildings with at least six dwellings or other self-contained property units in which a heating system is newly installed or established for the purpose of being put into service.

The obligation applies to a building size of at least six residential or property units, as it can be assumed that the ratio of the costs of hydronic balancing to the potential for savings improves as the size of the building increases and with it, the need for heat. Introducing the hydronic balancing obligation for larger buildings therefore unlocks considerable savings potential with a good cost-benefit ratio.

The limited availability of skilled professionals is taken into account by limiting this obligation to new installations. It is assumed that hydronic balancing in conjunction with the other optimisation measures mentioned – in residential and non-residential buildings in equal measure – will lead to savings of up to 8 kWh/m². Extending the requirements to further heat generators will lead to additional savings in heating oil and wood.

Hydronic balancing is to be carried out anyway, in accordance with recognised rules of technology (VOB Part C), when heating systems are being installed. Cost-effectiveness studies in the past have shown that this is usually cost-effective.

Paragraph (1)

Paragraph (1) stipulates that hydronic balancing is to be carried out, which is required anyway for new systems, in order to ensure the efficient functioning of the heating system. This service, which has mainly been provided under contract up to now, becomes a statutory obligation when installing or establishing a heating system.

A significant reduction in heat demand can often be expected if at least 25 per cent of a building’s heat-transmitting envelope area is improved in terms of structural thermal insulation. As the hydronic conditions in a heating system change significantly as a result, hydronic balancing must only be carried out after the insulation improvements.

Paragraph (2)

Paragraph (2) lists the mandatory planning and implementation measures covered by hydronic balancing for the purpose of the Ordinance. Hydronic balancing must be documented after having been carried out, including all the technical parameters. The documentation is to be made available to the building owner in order to provide evidence of the measure and to provide a basis for future work on the heating system.

Paragraph (3)

Paragraph (3) specifies that hydronic balancing must be carried out in accordance with Method B under the ZVSHK-VdZ-VDMA technical rule ‘Optimisation of existing heating systems’. The addition of ‘equivalent methods’ is intended to ensure that hydronic balancing using other methods is also possible, provided that the quality of the equivalent

method is almost identical to that of the ZVSHK-VdZ-VDMA technical rule and that this has also been certified by a testing body. Digital methods, for example, are conceivable.

Paragraph (4)

The first sentence of **paragraph 4** stipulates that confirmation of the hydronic balancing, including the setting values (the building heat load, the heat generator output that has been set and the room heat load calculation, the design temperature, the control settings and the pressures in the expansion vessel) must be documented in writing and submitted to the person responsible (generally the owner of the building). This primarily serves to provide evidence of compliance with the heating optimisation obligation. Where need for optimisation is identified and an optimisation measure is recommended, compliance with the optimisation obligation set out in paragraph (1) may be demonstrated to the authority that is competent under Land-level law by means of the inspection record and accompanying documentation showing implementation of the measure.

Last but not least, the result of the inspection must be submitted to the tenant without delay upon request. This is intended to give the tenant the opportunity to gain an insight into the optimisation potential of the heat system that heats the rooms they rent, since this information can have an impact on the additional costs they are to cover.

Point 23

Letter a

The previous **§ 64(1)** stipulates that circulators must be equipped in such a way that the electrical power consumption is automatically adapted in at least three stages to the operational pumping needs. The provision is being repealed, as the European ecodesign requirements are now more extensive. These are laid down in Commission Regulation (EC) No 641/2009 of 22 July 2009 implementing Directive 2005/32/EC of the European Parliament and of the Council with regard to ecodesign requirements for glandless standalone circulators and glandless circulators integrated in products (OJ L 191, 23.7.2009, p. 35), as last amended by Commission Regulation (EU) 2019/1781 of 1 October 2019 laying down ecodesign requirements for electric motors and variable speed drives pursuant to Directive 2009/125/EC of the European Parliament and of the Council, amending Regulation (EC) No 641/2009 with regard to ecodesign requirements for glandless standalone circulators and glandless circulators integrated in products and repealing Regulation (EC) No 640/2009 (OJ L 272, 25.10.2019, p. 74).

Letter b

The previous paragraph (2) becomes paragraph (1).

Letter c

The aim of these provisions is to save gas and electricity as economically as possible. The replacement of inefficient, uncontrolled heating pumps becomes mandatory, as uncontrolled heating circuit pumps and circulation pumps consume a lot of energy. The replacement of heating pumps usually pays for itself within the pump’s service life, sometimes several times over. This measure reduces electricity consumption in the building, because new pumps use significantly less operating power and the heating circuits work more efficiently, thus saving gas.

In 2018, there were about 24 million inefficient heating circulators in Germany and about 2 million inefficient hot water circulation pumps. Since half of the stock of heating pumps are integrated in boilers, they cannot readily be replaced for efficient pumps. Currently, there are approximately 9.7 million standalone circulators and 1.2 million circulation pumps that

can be replaced. Around 50 per cent of buildings are heated with gas, so the effectively usable, gas-based potential is around 5.5 million pumps.

The total power savings due to the replacement of approximately 11 million standalone pumps in the heating circuit are just under 5.4 TWh. If only gas-based systems are included in the provision, the savings potential is around 2.7 TWh. There are, in addition, the savings from the more efficient operation of the heating distribution overall and thus gas savings.

Table 1: Estimated savings due to pump replacement

	Glandless pumps						**Hot water circulation pumps**		
Power of new pumps	≤ 30 W	< 50 W	< 100 W	< 200 W	< 500W	> 500 W	≤ 10 W	< 50W	> 50W
Total standalone pumps, 2018	12,000,000						2,000,000		
Total standalone pumps, today [1]	9,732,000						1,200,000		
of which gas-based systems [2]	4,866,000						600,000		
Distribution of existing pump sizes % [3]	45 per cent	37 per cent	7 per cent	5 per cent	4 per cent	2 per cent	65 per cent	30 per cent	5 per cent
Electricity saving per pump: Ecodesign compared to uncontrolled pumps [kWh/a] [4]	213.01	398.565	543.575	996.54	2,536.57	4,420	99.28	297.84	1,986
Standalone pumps today by power	4,379,400	3,600,840	681,240	486,600	389,280	194,640	780,000	360,000	60,000
Savings by pump power [TWh/a]	0.93	1.44	0.37	0.48	0.99	0.86	0.08	0.11	0.12
Total savings [TWh/a]	**5.1**						**0.3**		
Savings, gas-based systems [TWh/a] [2]	**2.5**						**0.2**		

1) Annual replacement of 567 000 glandless pumps and 200 000 hot water circulation pumps (source: HZO evaluation)

2) Assumption: 50 per cent of buildings are heated with gas

3) Assumption: The distribution of existing pump power corresponds to the distribution of applications for each pump power in the HZO (heating system optimisation) programme

4) Assumption: Ecodesign generates 15 per cent less savings than funding standard under HZO

Due to limited capacity of skilled tradespeople, such a measure must always be viewed in the context of feasibility. With a provision duration of up to two years and around 350 000 plumbing, heating and cooling tradespeople, one tradesperson would have to replace a pump about every 46 days in order for 5.5 million pumps to be replaced. This seems to be feasible on the market, given that the measure is usually carried out in combination with another task (heating inspection, optimisation, hydronic balancing, etc.).

Paragraph (2)

Paragraph (2) lays down the obligation to replace heating pumps that are not adequately efficient. The provision covers all standalone circulators in heating and cooling circuits that are not integrated in a heating or cooling generator. This includes glandless circulators, drinking water circulation pumps as well as glanded circulators and thus also solar and brine pumps, for example. Paragraphs (3) to (5) stipulate the efficiency for the heating

pumps that is deemed to be adequate. The pumps are to be replaced by 31 December 2026. The deadline extension granted in the second sentence aims to ensure that, where replacement of the heating system is already planned, the obligation arising from the first sentence applies only after the heating system has been replaced.

Paragraph (3)

Under paragraph (3), glandless circulators shall not exceed an energy efficiency index (EEI) of 0.23. They shall comply with the requirements of point 1.2 of Annex I to the current version of Commission Regulation (EC) No 641/2009 and shall have an energy efficiency index (EEI) ≤ 0.23. The wording of the first sentence, differing from that of the first sentence of paragraph (4) and stipulating that an energy efficiency index (EEI) of 0.23 may not be exceeded, is due to the fact that the ecodesign requirements are worded differently. For glandless circulators, the lower the EEI, the more efficient they are.

Paragraph (4)

Paragraph (4) stipulates that glanded circulators shall not fall below a minimum efficiency index (MEI) of 0.4. They shall comply with the requirements of the current version of Commission Regulation (EC) No 547/2012 and shall have a minimum efficiency index (MEI) ≥ 0.4. The wording of the first sentence, differing from that of the first sentence of paragraph (3) and stipulating that a minimum efficiency index (MEI) of 0.4 must be met, is due to the fact that the ecodesign requirements are worded differently. For glanded circulators, the higher the MEI, the more efficient they are.

Paragraph (5)

Paragraph (5) stipulates that drinking water circulation pumps must have an electronically-commutated motor. There is still no efficiency standard for drinking water circulation pumps under the Ecodesign Regulations. The main technical requirement for efficiency is therefore the presence of an electronically-commutated motor, as these have significantly lower power losses.

Paragraph (6)

Paragraphs (2) to (5) shall apply to buildings with at least six dwellings or other property units, as the ratio of pump replacement costs improves as the size of the building improves and with it the need for heat. Introducing the pump replacement obligation for larger buildings therefore unlocks considerable savings potential with a good cost-benefit ratio.

Point 24

The amendment in **§ 69** does not establish a new provision, but merely absorbs the previous provision from § 71 – old – into § 69 as a new paragraph (2).

Letter a

This is an editorial amendment brought about by the addition of the new paragraph (2).

Letter b

In keeping with the structure of the Act, the provision in § 71 – old – needs to be associated with § 69. The amendment to the wording is purely editorial in nature.

The new provision drops the substance of the previous § 71(2), which stipulated that the retrofitting of insulation could be omitted if it was not cost-effective. No practical effect of this amendment is expected, as the requirements in § 71(1) are already sufficiently limited

– retrofitting is required only for previously uninsulated and accessible pipes in unheated rooms. In these cases, the insulation was already cost-effective in the past, and cost-effectiveness has further improved due to the rise in energy prices. In addition, the previous provision led to problems in enforcement and legal uncertainty in practice, as retrofitting measures that were also cost-effective were omitted.

Point 25

The redrafting of the **heading of subsection 4** in Part 4 Section 2 adopts the new definition of ‘heating system’ from § 3(1) subparagraph 14a.

Point 26

§ 71 (Requirements for heating systems)

The new **§ 71** implements the regulative requirement arising from the coalition agreement that every new heating system installed from 2025 onwards – regardless of whether in an existing building or new build – should be operated on the basis of 65 per cent of renewable energy. Against the background of the Ukraine war, the provision has been afforded a new urgency, as the ambitious implementation of this requirement can quickly and effectively reduce dependence on natural gas. The coalition government has therefore agreed that it “should now be a statutory requirement for every newly-installed heating system, as far as is possible, to be operated using 65 per cent renewables by 1 January 2024”. In addition, the provision serves to ensure compliance with the requirements laid down in the Federal Climate Protection Act (KSG) for the buildings sector. There is urgent need for climate action. Both in 2020 and 2021, the buildings sector failed to meet its climate protection target from the KSG. In 2021, the value was 115 million tonnes of CO_2 equivalent (target: 113 million tonnes of CO_2 equivalent), accounting for around 15 per cent of total emissions that year. In order to meet the 2030 target (maximum 67 million tonnes CO_2 equivalent), a significant increase in the reduction rate is appropriate.

The provision establishes the regulatory framework for a switch from fossil-fuelled heating systems to a heat supply based on renewable energy and unavoidable waste heat. The Federal funding scheme for efficient buildings (BEG), which has been the primary funding scheme to date and supports the transition to heating systems powered by 100 per cent renewables through an attractive replacement premium, is being supplemented by a clear statutory provision. The installation of heating systems based exclusively on fossil fuels – especially gas and oil heating systems – will no longer be permitted from 2024 onwards. The stopping of funding for fossil-based heating systems, which is required for climate protection reasons, is therefore being laid down in regulation in order to set a clear incentive for investment towards renewable energy in the buildings sector.

Compensating measures are not permitted. Property CHP plants or fuel cells operated purely on fossil fuels are not permitted, nor is any compensating use of on-roof photovoltaics or other efficiency measures.

Hybrid solutions – including based on CHP plants and fuel cells – will only be possible if these are operated using at least 65 per cent green gases or if they are combined with renewable solutions to meet the 65 per cent renewable energy requirement.

This measure thus initiates the departure from fossil resources that is needed for climate reasons. The number of fossil-fuelled heating systems and therefore the consumption of fossil fuels for the supply of heat will significantly decrease in favour of renewable alternatives that are more environmentally sound. The new provision thus has the capacity to make a significant contribution to Germany’s climate protection and energy sovereignty.

The main substance of § 71 is that, when installing or establishing a heating system in a building for the purpose of being put into service, a heating system must be chosen which

is at least 65 per cent powered by renewable energy. The obligation laid down in § 71 therefore applies if the owner voluntarily decides to install a new heating system or if their heating system is irreparable and they have to replace the heating system. The owner has a variety of ways for complying with the requirement, e.g. by providing individual evidence in accordance with § 71(2) or by using the simplified verification procedure for the compliance options in paragraph (3). Leaving the means of implementation open also allows for district solutions.

The obligations under § 71 et seq. are addressed to the building or dwelling owner and relate to requirements concerning the nature of the heating systems or other requirements concerning the building or efficiency levels. This is in line with § 8(1), which fundamentally makes the builder or owner responsible for compliance with the rules. If the owner leaves the heating or hot water supply to a contractor, then in addition to the owner, the obligations with regard to the nature of the heating systems or other requirements for the building or efficiency levels also apply to the contractor in accordance with § 8(2), as a contractor acts on behalf of the owner.

Insofar as § 71 et seq. imposes requirements on the use of certain fuels in systems for the full or partial use of bioenergy, the operator of the heating system must fulfil these obligations. At the same time, the operator may also be the owner of the system (typically the case in an owner-occupied building or dwelling or in the case of rented-out dwellings with central heating); however, these two functions can also be separate, such as in the case of rented-out dwellings with gas storey heating and a direct supply contract between energy supplier and tenant.

The extent to which landlords can pass on the costs of replacing a heating system so as to comply with the 65 per cent requirement on to tenants as a modernisation surcharge depends on the applicable provisions of the Civil Code governing tenancies and the case law in this area. If a new heating system is replaced, for example, because of an irreparable breakdown of the old system or in the case of a heating system that is temporarily defective or repair-prone, this constitutes a structural maintenance measure within the meaning of § 555a BGB; accordingly, the costs cannot be passed on. Where a heating system, which was still (sufficiently) functional and (to date) did not have a defect to be rectified, but has already been used over a not insignificant period of its expected overall service life, undergoes ‘modernising refurbishment’, a corresponding deduction of the refurbishment portion of the costs expended can be made in accordance with § 559(2) BGB (see, in particular, Federal Court of Justice (BGH), judgement of 17 June 2020, VIII ZR 81/19, NZM 2020, 795 et seq.). This is because the provisions governing the modernisation surcharge are based – especially in the case of energy efficiency modernisations within the meaning of § 555b(1) BGB – on the principle that the landlord is to be given an incentive to undertake measures to improve the rented property (energy saving, permanent increase in the serviceability, improvement of the general housing conditions) and that the interests of the tenant are safeguarded by the fact that they benefit from an increase in serviceability (see BGH, judgement of 17 June 2020, VIII ZR 81/19 paragraph 44). Accordingly, the legal definition that is relevant here of energy efficiency modernisations within the meaning of § 555b(1) BGB, requires ‘final energy to be saved with lasting effect in relation to the rented property’. Modernisations are deemed to be in relation to the rented property, if the saving of final energy at least indirectly benefits the rented property and thus ultimately the tenant – for example by reducing its heating or electricity costs – (Münchener Kommentar BGB/Artz, 9th edition 2023, BGB § 555b paragraph 6 with further references; Schmidt-Futterer/Eisenschmid, Mietrecht, 15th edition 2021, § 559 BGB paragraph 27). Energy efficiency modernisation within the meaning of § 555b(1) BGB does not require a certain amount of savings to be made. However, in the context of considering hardship cases under § 559(4) BGB, the objective relationship between the rent increase and the benefits achieved by the measure must be taken into account – irrespective of the tenant’s economic capacity (cf. Bundestag document 17/10485, p. 24).

As with other owners, the question of which heat generator is chosen by the landlord is likely to depend, not least, on whether certain technologies, such as heat pumps, attract funding, as well as on estimated availability and cost trends for subsequent operating costs.

Enforcement of the provision is ensured, when a heating system is installed in a new build, through the compliance declaration referred to in § 92(1). When a new heating system is installed in an existing building, enforcement is via a contractor's declaration in accordance with a newly inserted provision in § 96(1), if the compliance option under § 71(3) is used. If individual evidence is required for the heating system being installed in accordance with § 71(2), only a person authorised under § 88 is entitled to provide such evidence; the evidence shall be kept and submitted to the competent [...] upon request.

Paragraph (1)

The **first sentence** of paragraph (1) lays down the core of the 65 per cent renewable energy requirement. Heating systems newly installed after the date the Act enters into force may only be installed or established in any new or existing residential and non-residential buildings, if they produce at least 65 per cent of the heat provided by the system using renewable energy or unavoidable waste heat. The term 'heating system' is newly introduced in § 3(1) subparagraph 14a and is defined as a system for the production of space heat, hot water or a combination thereof, with the exception of hand-fed single-room combustion plants within the meaning of § 2 subparagraph 3 and open fireplaces pursuant to § 2 subparagraph 12 of the Ordinance on Small and Medium Combustion Plants of 26 January 2010 (BGBl. I, p. 38), as amended. The aim here is also, in particular, to address the replacement of stoves powered by gas, oil or coal. Single-room combustion plants (fireplaces) and tiled stoves do not fall under the provision set out in the first sentence. They may be used in buildings under the applicable laws; offsetting is only possible in accordance with the exception in paragraph (6). The insertion of 'in accordance with paragraphs (4) to (6) and § 71b to § 71h' is intended to ensure that these provisions also apply to systems (and system combinations) that are not mentioned in paragraph (3). The above-mentioned requirements must therefore also be met in the context of the individual evidence referred to in paragraph (2).

The obligation arising under the first sentence of paragraph (1) is addressed to the person responsible under § 8. They shall ensure that at least 65 per cent of the heat provided by the system is produced using renewable energy or unavoidable waste heat.

The **second sentence** clarifies the scope of application of the 65 per cent renewable energy requirement. A distinction is made, using the term 'building network' newly defined in § 3(1) subparagraph 9a, between heating systems that are subject to the first sentence and heat supply systems that feed into a heating network and thus, in terms of the share of renewable energy, fall only under the provision of § 71b – new.

Paragraph (2)

In the case of heating systems that do not meet the standardised requirements laid down in paragraph (3) alone or in combination with each other or use systems other than those listed in paragraph (3), compliance with the 65 per cent renewable energy requirement in paragraph (1) shall also be possible on an individual basis using calculations in accordance with DIN V 18599, if this is done by a person authorised under § 88, i.e. a qualified person. The evidence must be kept both by the person responsible under § 71 and by the issuer of the evidence for at least 10 years and must be provided on request for the purpose of random sampling to the authorised district chimney sweep and the authority that is competent under Land-level law. The retention period is based on the deadlines that are usual elsewhere in the GEG.

Paragraph (3)

Paragraph (3) is intended to facilitate the implementation of the 65 per cent renewable energy requirement in practice by assuming compliance with the obligation in the cases listed. The responsible client or building owner may, unless they wish to provide individual evidence in accordance with paragraph (2), choose freely, when installing a heating system in a new build or replacing a heating system in an existing building, between connection to a heating grid (subparagraph 1), installation of an electrically-powered heat pump (subparagraph 2), installation of direct electric heating (subparagraph 3), installation of a solar thermal system (subparagraph 4), installation of a heating system for the use of green or blue hydrogen (subparagraph 5) and installation of hybrid heat pump heating (subparagraph 6). In accordance with the second sentence, installation of a heating system for the use of biomass in existing buildings is also possible, taking into account the requirements laid down in §§ 71f and § 71g. Restricting these compliance options to existing buildings is justified based on the assumption that new builds can be planned in such a way that the use of heat pumps or connection to a heating network is possible and cost-effective.

Insofar as the obligation laid down in the first sentence of paragraph (1) applies to the building or dwelling owner and they are not also the operator of the system at the same time, the operator of the heating system, in the case of compliance options 5 and 6, shall meet separate obligations with regard to the sourced biogenic fuels or green or blue hydrogen. The operator must ensure that the requirements laid down in § 71f and § 71 g concerning the operation of the system are met. These obligations encompass special requirements for the fuels in order to ensure the 65 per cent requirement is met, also with regard to the biomass used.

These obligations will regularly apply to the building or dwelling owner if they themselves occupy the dwelling and therefore the building or dwelling owner is also the operator of the heating system. Where properties are rented out, the landlord will also regularly be the operator of a central heating system if they source the energy supply. However, the two functions may be separate if a user of a building or dwelling concludes a direct energy supply contract, while the heating system is owned by the building or dwelling owner.

If the building owner has transferred the operation of the heating system to a third party, for example under a heat contracting arrangement, the contractor shall comply with the requirements set out in § 71f and § 71g.

For the individual compliance options, further conditions are laid down in § 71b to § 71h which, if these requirements are met, justify omission of the individual evidence under paragraph (3).

Paragraph (4)

Paragraph (4) breaks down the applicability of the 65 per cent renewable energy requirement across the application options for newly-installed or established systems. In this respect, it is irrelevant whether the installation of a new central heating system for room heating and hot water replaces a previously separate system or vice versa.

In accordance with subparagraph 1, in the case of newly-installed or established combined heating systems producing space heating and hot water together, the requirement refers to the space heat and heat provided for hot water overall. This case occurs, for example, in heating systems with combined hot water production in single-family buildings or in the case of heating systems with central hot water heating by the same heat generator.

Where the space heat and hot water are produced by new separate systems that produce space heat and hot water separately, the 65 per cent renewable energy requirement under subparagraph 2 shall apply only to the new heat generator concerned. If the hot water

is only produced decentrally in a separate system, the special rule laid down in paragraph (5) shall be observed.

Often, however, situations occur in which only one heat generator is replaced in the central heating system of a larger building which has several heat generators. In this situation, there is freedom of choice for the purpose of subparagraph 3. For example, if the central heating system consists of two heat generators operating on fossil fuels, the newly-installed generator must meet the 65 per cent renewable energy requirement when the first heat generator is replaced. However, if the second heat generator is replaced, the 65 per cent requirement can also be applied to the second heat generator in such a way that the heating centre as a whole is balanced. For example, if a heat pump has been installed as the first generator, the second generator may be a fossil-fuel boiler if the entire system meets the conditions for hybrid heat pump heating under § 71h. This provision therefore increases the flexibility in multi-boiler systems in particular.

Paragraph (5)

Where hot water is supplied separately from space heat in a decentralised system, paragraph (5) stipulates that new electrically-operated hot water heaters shall also be considered to comply with the obligation. Electronic instantaneous water heaters, domestic water heat pumps or hot water boilers are considered to be such heaters. The decarbonisation of German power plants makes electric water heating a forward-looking option. Depending on the building, distances to tap facilities, consumption profiles and frequency, and other parameters, different solutions can be optimally adapted. This extension shall not apply if the separate hot water heating takes place in a central system for the building.

Paragraph (6)

Paragraph (6) stipulates that unavoidable waste heat, which is made usable by a technical system, for example by means of a heat exchanger, shall be deemed compliant heat for the purposes of paragraph (1). Examples of such systems include systems that utilise waste heat from commercial furnaces or server installations and data centres by means of a heat exchanger in order to supply heat; waste heat recovered by means of heat exchangers from the exhaust gas of incineration plants or commercial production processes, insofar as such heat cannot be avoided by means of the latest technology; waste heat from waste water, which is brought to a usable temperature level by means of a heat pump.

Similarly, stoves may be counted at a maximum of 10 per cent when evidencing compliance with the obligation under paragraph (1). In this respect, the standard value of 0.10 in Tables 54 and 55 under DIN V 18599-5: 2018-09 shall apply.

Paragraph (7)

Paragraph (7) summarises the existing exceptions for buildings associated with national or Alliance defence under § 10(5) and § 55(3), with no change in substance here.

§ 71a (Metering equipment for heating systems, obligations to provide information, building automation)

The new **§ 71a** lays down the requirements for the metering equipment and the measured values for heating systems installed after 1 January 2025 (cf. paragraphs (1) to (3)). In addition, § 71a(4) imposes an obligation on the building owner to provide information to the users of the building about the efficiency of the heating system. Paragraphs (4) to (7) lay down requirements concerning building automation.

For the system-conducive integration of electric heat pumps and direct electric heating, however, the statutory provisions, in particular those laid down in energy industry law, as

well as the stipulations of the Federal Network Agency must be observed. The GEG does not lay down any rules of its own in this respect

Paragraph (1)

Paragraph (1) stipulates the necessary fitting of metering equipment for heating systems installed after 1 January 2025. In accordance with the first sentence of paragraph (1), all heating systems, before being put into service, must be equipped with metering equipment that can record energy consumption and the amount of heat generated. The energy consumption and efficiency indicator mandated by the first sentence of **paragraph (1)** is therefore necessary because it is hardly possible for the operator of a heating system to identify inefficient operation without it. Such an indicator enables the operator of the heating system to identify increased consumption or low efficiency and, if necessary, to take measures to reduce energy consumption or to increase the efficiency of the heating system.

Since the Federal funding scheme for efficient buildings already requires all energy consumption and all generated amounts of heat of an eligible heat generator to be metrologically recorded and all eligible heating systems must be equipped with an energy consumption and efficiency indicator by 1 January 2023 at the latest, many heat generators already comply with these requirements even before the provision enters into force.

The technical components used to measure the energy consumption and amounts of heat generated do not need to be calibrated unless stated otherwise in the Heating Costs Ordinance, the Act on Metering Point Operation or the Measurement and Calibration Act. Metering devices and measured values that are relevant to billing are subject to measurement and calibration law. In addition to external fuel, electricity and heat meters, device-integrated balancing via the control of a heat generator is also permitted. Heating systems that already meet the existing requirements under the Federal funding scheme for efficient buildings concerning the metering of energy and heat consumption, thus comply with the requirements laid down in § 71a(1).

The second sentence of paragraph (1) opens up different options for how the measured values can be displayed.

The third sentence of paragraph (1) requires the person responsible to ensure that the efficiency indicator is adequately protected against unauthorised access. It is left open how this technical standard can be achieved. The person responsible must ensure that no unauthorised persons have access to any personal data of third parties. Biomass heating systems within the meaning of § 71g and air-to-air heat pumps are not covered by the obligation to have metering equipment.

Paragraph (2)

Paragraph (2) lays down requirements concerning the measured values to be collected, their resolution and storage duration. Energy consumption and amounts of heat generated must be recorded metrologically for the energy consumption and efficiency indicator. Biomass heating systems within the meaning of § 71g and air-to-air heat pumps are not covered by the obligation to measure energy consumption. In the case of biomass heating systems, the measurement of input fuel, e.g. wood pieces, wood chips or pellets, is usually only possible with greater effort, so that no efficiency measurement can be carried out. In contrast, the measurement of the heat output in air-to-air heat pumps is technically complex due to the poor measurability of the air volume flow.

Keeping the measured values in monthly resolution in the system for a period of three years is a statutory obligation. The requirement for monthly recording is intended to enable the user of the heat to operate the heating system in a system-conducive and cost-efficient manner. The monthly recording is required in order to be able to record and com-

pare system-conducive operation. The storage of the measured values for three years makes it possible to compare energy consumption and efficiency in the year before and in the year after measures have been taken that affect energy consumption or efficiency. Storage for three years is required in order to be able to compare consecutive heating seasons. One heating season can cover more than one calendar year. Compliance with data protection regulations remains unaffected. Insofar as the measured values constitute personal data, the requirements arising from the General Data Protection Regulation and the Telecommunications and Telemedia Data Protection Act must be observed. The reading and keeping of a data in the system at a resolution more frequent than monthly may only be carried out with the consent of the data subject. In addition, remote reading and access by third parties are also only permitted with consent. This applies, in particular, in cases of where single-family and multi-family buildings are rented out and the landlord can access the usage data.

The third sentence of paragraph (2) clarifies that measured values with a higher resolution may only be retained with consent. Measured values with a higher resolution may allow deeper insights into the user's personal lifestyle.

Indicating the share of the heat supply from hybrid heat pump heating accounted for by individual heat generators informs the operator about the heat demand covered by the heat pump. This information makes it possible to check the success of measures to increase the coverage of the heat pump.

Indication of solar yields and deviations from yields of past periods helps the operator of solar thermal systems to detect malfunctions and, if necessary, to initiate maintenance.

Paragraph (3)

The first sentence of paragraph (3) clarifies that the transmission of collected data required to meet the requirements of paragraphs (1) and (2) may also take place via a smart meter gateway in accordance with § 2 first sentence subparagraph 19 of the Act on Metering Point Operation. In addition, the second sentence of paragraph (3) clarifies that the rules laid down in the Act on Metering Point Operation (MsbG) apply insofar as a metering point within the meaning of § 2 subparagraph 11 MsbG is operated when sourcing energy for the heating systems. This will particularly be the case if data on energy efficiency-relevant metering and control processes in accordance with § 19(2) MsbG are processed, because only a smart meter gateway may be used for this purpose.

The intended energy consumption and efficiency indicator as well as the technical equipment listed in paragraph (2) (a user interface, a higher-level energy management system, an external device or an external application) do not generally constitute a separate metering point under § 2 first sentence subparagraph 11 MsbG.

Paragraph (4)

Paragraph (4) transposes Articles 14(4) and 15(4) of Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (OJ L 153, 18.6.2010, p. 13). Said Articles stipulate that non-residential buildings with heating and air-conditioning systems or combined air-conditioning and ventilation systems from a rated output of 290 kW must be equipped with building automation and control systems, insofar as this is technically and economically feasible. The provision set out in paragraph (4) correspondingly transposes Directive 2010/31/EU into German law. For systems of this size, potential savings from equipping the building with a building automation and control system are expected to be significant, for example by adjusting operating times or by preventing simultaneous operation of heating and cooling.

Paragraph (5)

Paragraph (5) specifies the required minimum functionalities of energy monitoring technology in more detail. Subparagraph 1 of the first sentence refers to the necessary software or metering technology for monitoring energy flows and system technology. Software solutions for the implementation of an energy management system under DIN EN ISO 50001 and DIN EN 16247 Part 2 can be used for guidance. Subparagraph 2 is intended to ensure that the collected data can be evaluated in a company-neutral and vendor-neutral manner. The functions required under subparagraphs 3 to 5 are intended to transpose Article 14(4), second sentence, point (b) and Article 15(4), second sentence, point (b) of the Energy Performance of Buildings Directive. In accordance with the second sentence, it must also be ensured that responsible persons or companies, for example in the context of energy contracting, are appointed in accordance with the energy management process under DIN EN ISO 50001, who deal with the energy optimisation of building operation. Also in accordance with DIN EN ISO 50001, a continuous improvement process (PDCA cycle) is to be followed.

Paragraph (6)

Paragraph (6) subparagraph 1 stipulates that non-residential new builds with heating, cooling or ventilation systems exceeding 290 kW must be equipped with at least level B building automation under DIN V 18599-11: 2018-09 or better. The need for this arises from the functions set out in the second sentence of Article 14(4) and the second sentence of Article 15(4) of the Energy Performance of Buildings Directive that building automation systems must fulfil, provided that this is economic. Since the retrofitting of building automation systems in existing buildings can be very complex, the requirement is limited to new builds.

Paragraph (6) subparagraph 2 stipulates that the mentioned systems must undergo technical start-up management including initial setting. Start-up management over a longer period of time ensures that the systems achieve an optimal operating condition across all trades, which enables energy efficiency potential to be exploited cost-effectively.

The regulations in VDI 6039 as well as Booklet 19 in the AHO series can provide guidance on the implementation of start-up management.

Paragraph (7)

Paragraph (7) stipulates that, in existing non-residential buildings with heating, cooling or ventilation systems exceeding 290 kW that are already equipped with level B building automation under DIN V 18599-11: 2018-09 or better, it must be ensured that the different technical building systems can communicate with each other.

The aim here is to ensure that, in non-residential buildings, all data can be accessed at a central point despite a large number of technical building systems from different manufacturers or with different communication protocols. This is necessary for optimised system operation across all trades. The wording of Article 14(4), second sentence, point (c) and Article 15(4), second sentence, point (c) of the Energy Performance of Buildings Directive is followed here. The requirement is limited to non-residential buildings with already existing building automation, as retrofits in existing buildings that do not already have building automation can be technically very complex and involve high costs.

§ 71b (Requirements for connection to a heating network and obligations for heating network operators)

The new **§ 71b** lays down the requirements for heating networks and their operators, which must be met in order for a heating network connection to be regarded as fulfilling

the requirements of § 71(1). A distinction is made between new heating networks whose construction begins after the 31 December 2023 (paragraph (1)) and existing heating networks whose construction begins before 1 January 2024 (paragraph (2)). In the case of connection to a new heating network, at least 65 per cent of the annual useful heat output by generators must be from renewable energy, waste heat or a combination thereof. In the case of connection to an existing heating network, the requirement shall be deemed to be met, regardless of the percentage of renewable energy or waste heat in the network's generation mix. The background to this is that, in the case of connection to an existing heating network, it is assumed that the heating network will gradually supply at least 50 per cent climate-neutral heat by 2030 and 100 per cent climate-neutral heat by 2045 on the basis of the requirements set out in paragraph (2) and other incentives, such as the Federal funding scheme for efficient heating networks (BEW).

The reason for linking the distinction to the construction start date is that building permit applications are not always made for the construction of heating networks. For example, the laying of the pipes may require public roads to be dug up and this requires a roadwork permit under road law. The digging up of private land usually requires a private contract to be concluded.

In addition, § 71b is a successor provision to the former § 44, which ceases to apply as a result of the amendment. The tiered approach of the new provision pursues two objectives. First, a significant contribution to the decarbonisation of heating networks is to be made. Second, in heating network areas, as many buildings as possible should be connected to the heating network, if the transformation to a carbon-free supply has been initiated. This is because having a large number of subscribers ensures the economic viability of investments in the decarbonisation of heating networks. In accordance with the case law of the Federal Administrative Court of 8 September 2016 (ref. 10 CN 1.15), connection to a heating network is an appropriate means for promoting climate and resource protection, provided that the requirements of Annex VIII of the then Renewable Energy Heat Act (EEWärmeG) are complied with. In the future, this case law will apply to heating networks that meet the requirements of § 71b. This is because Annex VIII to the EEWärmeG was moved to § 44 by the Act on the Unification of the Energy Savings Law for Buildings and Amending Other Acts of 8 August 2020 (BGBl. I, p. 1728), the successor provision of which is now § 71b. It therefore remains the irrebuttable presumption that district heating investments on the basis of municipal law regulations in the Länder and under § 109 are appropriate means for promoting climate and resource protection.

Paragraph (1)

The first sentence of **§ 71b(1)** stipulates that a new heating network must cover at least 65 per cent of its heat demand from renewable energy or waste heat. This provision represents the general rule for heating networks in the future and corresponds to the requirement laid down in § 71(1). For a heating network to be considered a new heating network within the meaning of paragraph (1), its construction must have started after 31 December 2023 and it must not be a mere extension to an existing heating network. The second sentence sets out the distinction between new construction and extension to an existing heating network. The provision is based on the Guidelines for the Federal funding scheme for efficient heating networks (BEW) of 1 August 2022 (BAnz AT 18.08.2022 B1). A new heating network accordingly exists only when a network is constructed that has no thermal connection or only a minor thermal connection – whether by direct hydraulic connection or indirectly via heat exchangers – to an existing upstream heating network. This means that the extension of an existing heating network into new supply areas does not count as new construction, as long as significant proportions of the heat supply of the newly-developed supply area come from the existing heating network (annual average ≥ 20 per cent). The confirmation referred to in the third sentence serves as a starting point for demonstrating compliance with the requirements laid down in paragraph (1).

Paragraph (2)

Paragraph (2) is aimed at heating networks whose share of renewable energy or waste heat, in contrast to new heating networks, may also fall below 65 per cent on a transitional basis, if their construction starts before 1 January 2024. By allowing an exception to paragraph (1), the aim is to exclude from the 65 per cent renewable energy requirement, in view of the prolonged planning periods, those projects that might not have had sufficient time to adapt to the new requirements. In the case of an existing heating network, compliance with the 65 per cent renewable energy requirement is imaginary, i.e. in the case of connection to an existing heating network, no direct requirements are imposed regarding the percentage of the heat demand that needs to be met from renewable energy or waste heat, in the interest of legitimate expectations with respect to the heating network operator. The start of construction marks a clearly visible and documentable milestone in project implementation, which also lends greater weight to actual project progress rather than purely normative starting points that may not be handled uniformly throughout Germany anyway. Long-term compliance with the 65 per cent energy efficiency for existing networks is ensured by the additional requirement to have a transformation plan. Operators of existing networks must submit a transformation plan by 31 December 2026, which must be in line with the then applicable legal requirements that the legislator is yet to establish. The requirements concerning a transformation plan are set out in the second and third sentences. Under the third sentence, the transformation plan shall gradually envisage the complete decarbonisation of the heat supply through the transition to renewable heat or waste heat by the end of 2044. As a basic intermediate step, a share of at least 50 per cent renewable energy and waste heat in the heating network is to be worked towards for 2030, with deviations being possible if justified accordingly. A transformation plan meets the requirements of this paragraph if it meets the requirements of a transformation plan within the meaning of the Guidelines for the Federal funding scheme for efficient heating networks (BEW) of 1 August 2022 (BAnz AT 18.8.2022 B1). The provision in the second sentence is intended to ensure that, in the event of a future statutory obligation to draw up transformation plans, any specific requirements, including in this rule, must be observed. The confirmation required by the fourth sentence serves as a starting point for demonstrating compliance with the requirements for an existing heating network under paragraph (2) and thus also for demonstrating compliance with the obligation laid down in § 71(1).

Paragraph (3)

§ 71b(3) sets out how the person responsible under §71(1) can provide evidence that they meet the 65 per cent renewable energy requirement. In addition, the provision clarifies that incorrect or false information from the heat system operator regarding the requirements of § 71b are essentially harmless to the person responsible under § 71(1).

§ 71c (Requirements for the use of heat pumps)

The newly-inserted **§ 71c** stipulates that where one or more heat pumps are installed, the requirements of § 71(1) are met. The heat provided by an immersion heater that may be present in the heat pump is considered to be produced by the heat pump in this respect. In order to cover the heat demand, a monoenergetic, but not monovalent operation of the heat pump is required. Air-to-air heat pumps also fall within the scope of this provision.

Requirements for the combination of a heat pump with a second heat generator are laid down in § 71h. Requirements for the interaction with other systems are laid down in § 71(4).

§ 71d (Requirements for the use of direct electric heating)

The newly-inserted **§ 71d** stipulates that direct electric heating in accordance with § 3 subparagraph 29 may only be installed and operated in order to comply with the obligation

laid down in § 71(1) if a predetermined, more ambitious minimum level of structural thermal insulation in buildings is met. First, this is intended to prevent the need to provide electricity in very large quantities for building heating. Second, this is to ensure that heating costs remain at an acceptable cost level. Direct electric heating systems are connected to the building. Plug-in devices are not included.

Paragraph (1)

Paragraph (1) imposes particularly high requirements on structural thermal insulation for new builds, since better implementation of structural thermal insulation is technically feasible here and, at the same time, economically feasible due to the comparatively high heat generation costs of direct electric heating. There are no additional costs for providing evidence, as in the case of new builds, compliance with the structural requirements has to be demonstrated anyway.

Paragraph (2)

Paragraph (2) lays down additional restrictions for existing buildings with regard to improving structural thermal insulation. For existing buildings, implementation of structural thermal insulation is therefore required that is slightly lower than paragraph (1), yet still more ambitious than the statutory standard. If a heating system using water as a heat carrier is already present in an existing building, installation of new direct electric heat is only allowed as an exception, since more energy-efficient and more economical alternatives are available.

Paragraph (3)

Paragraph (3) ensures that individual defective direct electric heaters or night storage heaters can be replaced without renewing the entire heating system or improving the building’s structural thermal insulation. Instead, the replacement of existing night storage heaters is to be encouraged by financial incentives.

Paragraph (4)

Hall buildings with a room height greater than 4 m are often supplied with heat in the existing buildings and in new builds by decentralised heating systems. Because of the way in which such buildings are used, they are often heated for limited periods of time or in limited places. The foreseeable useful life of the buildings is sometimes significantly shorter than for other buildings. The installation of central heating systems would often involve considerable technical difficulties and unreasonably high costs. These specific conditions require additional compliance options compared to buildings that have storeys. Paragraph (4) subparagraph 1 therefore allows the use of direct electric heaters, including electric infrared heaters, regardless of the building’s structural thermal insulation. In new builds, however, the general requirements concerning primary energy needs (and structural thermal insulation) must always be complied with, so that no special requirements for structural thermal insulation have to be imposed in the case of direct electric heating.

In addition, paragraph (4) subparagraph 2 excludes residential buildings with no more than two dwellings, one of which being occupied by the owner, from the scope of the requirements of § 71d(1) and (2). This is because the provision is intended to limit heating costs to an acceptable cost level, especially for tenants. In contrast, where one or two-family buildings are owner-occupied, limiting the heating costs can be assumed to be in the overriding self-interest of the building owner, or the arrangements are placed at the discretion of the occupying building owner via a reasonable relationship between investment and operating costs.

§ 71e (Requirements for solar thermal systems)

The newly-inserted **§ 71e** absorbs the technical requirement for the use of solar thermal systems using liquids as heat carriers, previously laid down in § 35(3). These systems must be certified with the European Solar Keymark as long as and to the extent that the use of a CE marking is not mandatory in accordance with an implementing act on the basis of Directive 2009/125/EC. The technical requirement that the solar thermal system must be certified with the European Solar Keymark is equivalent to the previous provision of § 35(3), which can be traced back to point I.1.c) of the annex to the Renewable Energy Heat Act (EEWärmeG) which is no longer in force. It is being clarified that either the collectors contained in a system or the solar system must be certified. The clarification takes into account the fact that solar thermal systems are either factory-built systems or – as is often the case – individually-assembled solar systems.

The second sentence states that certification with the European Solar Keymark must be carried out in accordance with the accepted rules of the technology as before.

§ 71f (Requirements for biomass and hydrogen including derivatives thereof)

The newly-inserted **§ 71f** lays down the sustainability requirements for the biomass used as well as for green or blue hydrogen, including derivatives thereof. The operator of the heating system must ensure that the requirements set out in § 71f(1) to (4) are met.

Paragraph (1)

The operator of a heating system that uses solid, liquid or solid [sic.] biomass or green or blue hydrogen, including derivatives thereof, shall ensure that at least 65 per cent of the heat provided by the system is generated from those fuels. The provision complements the installation-related obligations in order to ensure that the heating systems installed or established in accordance with § 71 actually generate at least 65 per cent of the heat provided by the system using renewable energy or unavoidable waste heat.

Paragraph (2)

Paragraph (2) specifies that the liquid biomass used must comply with the requirements of the Biomass Energy Sustainability Ordinance to ensure that the cultivation, production and quality of biomass meets certain environmental and climate standards. This has been the key sustainability requirement in the buildings sector for liquid biomass since 2009 (Annex II to the Renewable Energy Heat Act; since 2020, § 39(3) GEG). As before, the dynamic reference to the applicable version of the Biomass Energy Sustainability Ordinance ensures that the sustainability requirements of the electricity sector and the buildings sector do not differ but apply uniformly. The obligation already existed in § 39(3) GEG and constitutes a continuation of existing law in that regard. The previous reference to § 10 of the Ordinance may be omitted, since this refers to the bonus for renewable raw material that has since been abolished. § 39 GEG therefore previously referred to a provision which ceased to apply on 7 December 2021.

Paragraph (3)

Paragraph (3) continues the requirements for methane losses and electricity consumption and the mass balance method for biomethane and biogenic liquefied petroleum gas, without changing the existing legal situation.

Until now, the requirement for biomethane has been identical in § 40(3) – old – (requirements concerning gaseous biomass for compliance with the obligation to use renewables) and § 22(1) first sentence subparagraph 2 letter c and d (primary energy factors). In the future, § 40 will no longer apply. Instead, the new § 71f(1) first sentence retains the previ-

ous requirements, making reference to the parallel statutory requirements for primary energy factors in § 22.

This applies, mutatis mutandis, to the second sentence: Until now, the requirement for biogenic liquefied petroleum gas has been identical in § 40(4) and § 22(1) first sentence letter c. The previous requirements for biogenic LPG are being retained, making reference to the parallel statutory requirements for primary energy factors.

The third and fourth sentences ensure that, when using green or blue hydrogen, both in the case of network-based supply and any other use without using a network, a heat equivalent exists between the extraction side and the feed-in or production side, and the application of mass balance methods is laid down.

Paragraph (4)

Under paragraph (4), only biomethane may be used to comply with the obligation if no more than 40 per cent by mass of maize (whole plant) and grain, including grain maize, have been used for biomethane production over a calendar year. This ensures consistent compliance with the requirements of the Renewable Energy Act. The aim of this requirement is to counteract the negative effects of widespread cultivation, in particular of maize as an energy plant, which has been observed in some regions in the past. In addition, an incentive is created for system operators to mobilise other feedstocks more intensively. The proportional energy contribution from maize and grain can be determined using the feedstock-related energy yield values set out in the Biomass Ordinance. Maize grain is also regarded as grain. The second sentence of paragraph (2) limits the scope of the obligation, to not use more than 40 per cent by mass of maize and grain, to fermentation plants which are put into operation after the entry into force of the Act.

The sourcing of biomethane is evidenced, as before, as in the obligation to use renewable energy in new builds and as in the Renewable Energy Act, via the mass balance system.

§ 71g (Requirements for heating systems when using solid biomass)

The newly-inserted **§ 71g** stipulates that systems for burning solid biomass (wood pieces, pellets or wood chips) must be equipped with buffer storage systems and a solar thermal system or photovoltaic system in order to improve the quality of the operation. The combination with solar systems suggests itself for several reasons. Heat demand in the summer is much lower than during the heating season, and the biomass boiler then works mainly in partial-load mode. Because of the amount of sunshine, on the other hand, a correspondingly dimensioned solar system can cover the heat demand for drinking water in the summer to a very large extent, thereby reducing the use of biomass. Installation costs for the solar system are also significantly lower if the buffer storage is already available.

Paragraph (1)

Paragraph (1) lays down requirements for the technology of the heating system and the necessary combination of the heating system with a solar thermal system or a photovoltaic system for generating heat.

Point 1

Paragraph (1) first sentence subparagraph 1 specifies that, when using solid biomass, the heating system must be equipped with a buffer storage tank, at least dimensioned in accordance with DIN V 18599-5: 2018-09. This means that the buffer tank must have at least the standard values of DIN V 18599-8: 2018-09 Chapter 6.4.3.1: The volume of a tank, which is operated in combination with a biomass heat generator, is therefore calculated with a storage volume in litres Vs = 50 *P*n (rated power in kW).

Point 2

Subparagraph 2 specifies that the heating system must also be combined with a solar thermal system or a photovoltaic system for producing heat. For example, in the second alternative, heat can be produced by a heat pump using the electricity generated by the photovoltaic system. This ensures that hot water needs outside the heating season are covered by solar radiation energy, and therefore the system for using solid biomass can be switched off. This makes an important contribution to ensuring that scarce biomass capacities are used conservatively. In accordance with the definition of renewable energy in § 3(2) subparagraph 3 and the existing provision in § 36, the electricity needs to be made from renewable energy in the vicinity of the building. This makes a clear distinction from the sourcing of renewable electricity from the network, which cannot meet the requirement for the use of renewable energy under § 10(2) subparagraph 3 of the Act. The second sentence specifies that the requirement set out in subparagraph 2 of the first sentence shall not apply to single-room combustion plants, hall heating systems and buildings without a central hot water supply. This is because, in these cases, either there is often no space for a solar thermal system or a photovoltaic system or there are other technical challenges in implementation.

Point 3

When using heating systems based on solid biomass (pellets, split logs, etc.), significantly increased particulate emissions are released compared to heating systems that use liquid or gaseous fuels. So as to protect humans and the environment, these biomass systems must therefore be built and operated in combination with a particulate reduction device. This can be done by installing an auxiliary device (electrostatic separator or similar). Systems that achieve 80 per cent reduction in particulate emissions by design (e.g. inherent exhaust gas purification or similar) are considered to be equivalent for compliance with the requirement set out in subparagraph 3.

Paragraph (2)

Paragraph (2) lays down further requirements concerning the technology of combined systems. The first sentence of paragraph (2) specifies that the solar thermal system shall be dimensioned at least in accordance with the standard values of DIN V 18599-8:2018-09.

The second sentence continues the provision in the previous § 35(2). Accordingly, the requirement concerning the solar thermal system is considered fulfilled under typical conditions. The provision stipulates that a solar thermal system must be installed and operated with the minimum collector area specified in the provision. In residential buildings with a maximum of two dwellings, the minimum area shall be 0.04 square metres of aperture area per square metre of usable area (subparagraph 1), and in residential buildings with more than two dwellings the minimum area shall be 0.03 square metres of aperture area per square metre of usable area (subparagraph 2). The provision on the aperture area makes complex calculation of the minimum coverage percentage unnecessary. The predetermined collector areas of 0.03 and 0.04 square metres are suitable to meet the typical hot water needs of residential buildings outside the heating season largely by solar thermal energy.

The third sentence specifies that an equivalent amount of heat must be generated in the case of a photovoltaic system. This provision is necessary because there are no standard values for the dimensioning of a photovoltaic system in DIN V 18599-8:2018-09.

The fourth sentence is for simplification purposes and lays down a corresponding provision for photovoltaic systems. Accordingly, the requirement concerning the photovoltaic system is considered fulfilled if the rated power in kilowatts is at least 0.03 times the usable area. The reference made to the number of storeys in the repealed § 36 has been

deliberately removed. Instead, the provision stipulates that, in cases in which this value exceeds the existing suitable roof surfaces of the building, it is sufficient if all the appropriate roof surfaces of the building are covered with photovoltaic modules.

Paragraph (3)

Paragraph (3) corresponds to the existing provision in § 38(2) – old – and develops it slightly further. Accordingly, the operator of the system must ensure, when using solid biomass in combustion plants within the meaning of 1st BImSchV, in order for this to count towards compliance with § 71, that such use is in an automatically fed biomass stove using water as the heat carrier or a biomass boiler. Open fireplaces within the meaning of § 2 subparagraph 12 of the 1st BImSchV and hand-fed single-room combustion plants within the meaning of § 2(3) of the 1st BImSchV are excluded from the scope of the provision. This is already apparent from the definition set out in § 3(1) subparagraph 14a.

As before under § 38 – old – only biomass pursuant to § 3(1) subparagraphs 4, 5, 5a, 8 or 13 of the 1st BImSchV may be used.

§ 71h (Requirements for hybrid heat pump heating)

Over and above the general wording on the combination of different heat generators in § 71, the newly-inserted **§ 71h** lays down the conditions under which a combination system with a heat pump meets the 65 per cent renewable energy requirement.

The first sentence stipulates that, in the case of bivalent parallel or bivalent partially parallel operation for the production of space heat or space heat and hot water, priority must be given to the heat pump. In the case of hybrid systems for space heat and hot water, the requirement for bivalent parallel or bivalent partially parallel operation applies to both the space heat and water heating. In addition, if the peak load boiler is operated with liquid or gaseous fuels, it must be a condensing boiler. The obligation to ensure bivalent or bivalent partially parallel operation applies to the person responsible in accordance with § 8, as this involves device-side adjustment.

Where the compliance option set out in § 71(3) subparagraph 6 is used, the second sentence specifies, for simplification purposes, that the thermal output of the heat pump must be at least 30 per cent of the heat load of the building or building unit supplied by the hybrid heat pump heating system. It is assumed in this case that this will result in at least 65 per cent coverage by the heat pump. Separate arithmetic or metrological proof of the amount of coverage achieved is not required when the output percentage is met.

The third sentence provides further simplification for heat pumps, which are tested according to DIN EN 14825. For these, the requirements shall be considered to be fulfilled if the thermal output of the heat pump at partial load point ‘A’ under average climatic conditions is at least 30 per cent of the output of the peak load generator. It is assumed here that the peak load generator is dimensioned in such a way that it is able to fully cover the heat load and, if necessary, other consumers (e.g. hot water supply).

§ 71i (Transitional periods in the event of heating system breakdowns)

All heating systems must be fully converted to renewable energy by 2045 at the latest. The introduction of the 65 per cent renewable energy requirement is an important step towards this. However, there will be cases in which the implementation of this requirement as early as 2024 can pose a particular challenge for technical, legal or economic reasons. Against this background, § 71i to § 71k set out special temporary conditions, which, where met, allow purely fossil-based heating systems to still be installed after 1 January 2024, whether they are new, used or borrowed, for a short transitional period. Such exemption is to apply indefinitely to owners over 80 years of age in the event of a heating breakdown.

Paragraph (1)

The first sentence of **paragraph (1)** stipulates that, in the event of a heating breakdown, the obligation to comply with the requirements of § 71(1) does not have to be fulfilled immediately when heating is installed, but only within three years of the heating being replaced. Heating breakdowns are cases in which the operation of the heaters is no longer possible, the system can no longer be repaired and needs to be replaced quickly.

During the transitional period, gas or oil heating (may be used or borrowed) can be installed and operated temporarily. Within three years, the temporarily-installed gas or oil heating shall be supplemented or replaced by heating that meets the requirements of § 71 et seq. The use of direct electric heating is also permitted as a transitional solution.

For existing buildings, gas or oil heating can also be installed and operated, which will be converted into hybrid heating within three years. After the conversion, the gas or oil boiler can then be used for the peak load, provided that the base load is covered by renewable heating in accordance with the 65 per cent renewable energy requirement.

The **second sentence of paragraph (1)** clarifies the date on which the period starts to run. The three-year period begins when work to replace the heating system starts, and not when installation of the new heating system starts. The date on which installation work to replace the heating system is first carried out is therefore decisive for the start of the period.

The **third sentence of paragraph (1)** clarifies that special provisions apply to gas storey heating systems (§ 71j(1)) and to single-room combustion plants (§ 71j(5)) as well as to hall heating systems (§ 71k(1) and (2)). The period referred to in the first sentence shall start from the date on which work to replace the heating system is first carried out.

Paragraph (2)

In the event of a heating breakdown in which a new heating system needs to be installed, paragraph (2) lays down an open-ended transitional period for owners of residential buildings with no more than six dwellings who themselves live in the building and are over 80 years of age. In the case of co-owners, all co-owners must be over 80 years old.

The transitional period is limited to owner-occupied buildings with no more than six residential units, since it can be assumed that private use by the building owner is at the forefront. The renting out of the other residential units may be part of financial security for old age, but does not constitute a commercial activity (a commercial building owner would be expected to convert the heating).

The age of 80 is specified because it is assumed that building owners who have reached the age of 80 will be very unlikely to be able to benefit from the amortisation of the additional costs of, for example, a heat pump compared to the investment costs of gas heating. This is because the average life expectancy for 80 year-olds today is statistically around 8 years (men) or just under 10 years (women) (destatis, average life expectancy (Mortality table), as of 2023). In contrast to this, the higher investment costs, for example, for a heat pump in an unrenovated single-family building pay off after almost 15 years; assuming a cost degression in heat pumps of 30 per cent over the next few years, the additional costs will pay off after just under 9 years (see explanations on compliance costs for § 71 in 4.). For younger building owners, the replacement of heating is therefore likely to be economically viable within the expected useful life of the building.

In addition, a significant number of people over the age of 80 are in need of care. The care rate increases sharply from the age of 80. In the 80-84 age group for men, it is close to a quarter, for women it is just under 35 per cent. In the 85 to 89 age group, the proportion of men in need of care is around 43 per cent and of women is just under 61 per cent

(destatis, care rate by age group 2021, as at 2023). Below the age of 80, however, the care rate is well below a quarter (between 75 and 79, 14.5 per cent for men and 18.5 per cent for women, between 70 and 74, 8.9 per cent for men and 9.7 per cent for women). It can therefore be assumed that from the age of 80, many building owners are likely to be overwhelmed in organisational terms by a change in heating technology.

For the aforementioned reasons, building owners who have reached the age of 80 are to be spared the official procedure for applying for an exemption under § 102 GEG.

Building owners must provide evidence of their age and their ownership of the building either to the authorised district chimney sweep as part of the fireplace check or by means of a written self-declaration to be submitted to the chimney sweep. Building owners must have reached the age of 80 either when the new heating system is established for the purpose of being put into service or at the time when the transitional period referred to in the first sentence of paragraph (1) [...]. This is because the purpose of the exception is to protect owners from the statutory requirement involving investment that will not pay off in their life time.

After a change of ownership, the new owner shall comply with the requirements laid down in § 71 to § 71m within two years if the heating system continues to be operated.

§ 71j (Transitional periods for new and expanded heating networks)

§ 71j allows heating systems that do not comply with the requirements of § 71(1) to be put into operation or to continue to be operated, if connection to a heating network is not yet possible but is foreseeable or probable at the time the system is put into service. This may be the case if a new heating network is planned but not yet completed, or if the expansion of an existing heating network is planned and the heating system is located in the area of the planned expansion but the expansion is not yet completed. Paragraph (1) sets out the conditions under which this transitional arrangement may be used. Paragraphs (2) and (3) set out the legal consequences in the event that the planned connection to a heating network does not actually take place.

Paragraph (1)

In accordance with **paragraph (1),** an exception from the obligation to comply with the 65 per cent renewable energy requirement should also be made, for a transitional period, in cases in which connection to a heating network is already specifically foreseeable. The purpose of the provision is to keep connection to a heating network open as a compliance option if the property is currently unable to be connected to a heating network because it is not yet located in a connection area, but such a connection is foreseeable or will likely take place at a later date.

Connection to a heating network is fundamentally a central compliance option, especially for buildings in densely developed areas, as this can result in cost-effective and large-scale decarbonisation of the heat supply utilising diverse potential from renewable energy or waste heat. Heat supply via heating networks is the more cost-effective and efficient, the higher the connection density.

The expansion and densification of existing heating networks and the construction of new heating networks are therefore of particular importance in the decarbonisation of the heat supply. Heating networks solve challenges, especially in the decarbonisation of buildings in densely-developed areas. For this reason, the expansion and decarbonisation of heating networks is being supported by the State and heating networks are to become an even more important pillar of the heating transition.

In many cases, connection to a heating network is not yet possible in the short term, because the heating network infrastructure has not yet been developed accordingly through-

out Germany. Therefore, for a temporary transitional period, a different heating system that does not yet meet the requirements of § 71 or the compliance options specified therein should be allowed to be installed in existing buildings.

The confirmation required by the second sentence serves as a starting point for demonstrating compliance with the requirements under subparagraphs 1 and 2 and thus also for demonstrating compliance with the obligation laid down in § 71(1). In addition, by reference to **§ 71b(3)** it is clarified that incorrect or false information from the heating network operator is fundamentally harmless for the person responsible under § 71(1).

Point 1

In accordance with subparagraph 1, the first condition for this is that the building owner demonstrates that, from the time their property is connected to a heating network, they will be supplied with heat via that heating network. The heat supplied must contain at least 65 per cent renewable energy or unavoidable waste heat from 1 January 2035 at the latest. In accordance with the definition of unavoidable waste heat in § 3(1) subparagraph 30a, waste heat is avoidable if it can be reduced or used internally by economically reasonable efficiency measures in the production process. In most cases, the company that supplies the heat is the same company that also operates the heating network. This is one of the main differences to the supply of gaseous energy sources or electricity. The provision in subparagraph 1 ensures that supply via expanded heating networks is also consistent with the requirements of the Act. The first sentence of **§ 71b(1)** already requires new heating networks to cover at least 65 per cent of their heat demand with renewable energy or waste heat. For compliance with the condition laid down in subparagraph 1, any type of agreement with the heat supplier is fundamentally sufficient, including pre-contractual agreements. The conditions for the future supply of heat do not yet have to be conclusively laid down therein, nor is this possible; an agreement on future connection and provision of heat is therefore sufficient. The parties should include appropriate succession arrangements and, as far as possible, exclude the ability to unilaterally withdraw from the contract.

Point 2

Furthermore, in order to make use of the transitional provision provided for in § 71j, subparagraph 2 requires the future heating network operator to submit an investment plan on the basis of which it intends to implement heat supply to the area in which the building in question is located, by 1 January 2035 at the latest.

The investment plan shall set out, in particular, the dates on which investments are required in the densification and the construction or expansion of the heating network. The heating network operator may fulfil its obligation by submitting the relevant investment plan once to the authority competent for all properties that are to be supplied via the heating network or may demonstrate same to their owners. The operator is required to notify the authority if there is more than a two-year delay in realising the investments. The investment plan can be part of the transformation plan. The detailed description of the measures necessary in the network as part of a transformation plan within the meaning of the Guidelines for the Federal funding scheme for efficient heating networks (BEW) of 1 August 2022 (BAnz AT 18.8.2022 B1) meets the requirements of subparagraph 2. The reference to the applicable statutory requirements is intended to ensure that, in the event of a future statutory obligation to draw up transformation and heating network expansion plans, any specific requirements, including in this rule, must be observed. The investment plan should take into account the thermal plan, if any, and be revised in parallel.

In the case of new heating networks under the first sentence of § 71b(1) and in the case of existing networks, compliance with the 65 per cent renewable energy requirement is

ensured by the need to submit a transformation plan under § 71b(2) and by the conditions laid down in subparagraph 1.

Point 3

Subparagraph 3 of the provision stipulates that the party extending the heating network must guarantee to the owner of the building that the building will be supplied via the heating network within 10 years, at the latest by 1 January 2035. This provision serves to protect the building owner and is intended to ensure that, under this Act, (future) connection to a heating network is equivalent to the other compliance options with a view to actual realisation.

Paragraph (2)

Paragraph (2) governs situations in which, in accordance with an official determination by the competent authority, the heating network operator is late realising the investments referred to in paragraph (1) subparagraph 2 by more than two years or the project has been discontinued. Building owners will be given a maximum of two years after such determination to choose an alternative compliance option. A building owner who newly installs a heating system within one year of the official decision taking effect or becoming incontestable may operate it for another year under the second sentence of paragraph (2) without complying with the requirements laid down in § 71(1). Any heating system, which is newly installed after one year of the official decision taking effect or becoming incontestable must comply with the requirements of § 71(1) without a further transitional period.

Paragraph (3)

Paragraph (3) governs situations in which, although the conditions laid down in paragraph (1) were met at the time the heating was replaced, the connection to the heating network does not take place. The reasons for this may be the responsibility of the heating network operator, the property owner, the municipality or third parties. In this case, paragraph (3) first stipulates that the operator of the heating system is required to implement an alternative compliance option in accordance with § 71 to § 71o.

Due to the fact that they may be required in the short term to implement an alternative compliance option under this Act, the operator of the heating system may incur additional costs. This would not typically be the full cost of investment in alternative heating systems; this is because the operator of the heating system would have had to invest in these anyway, even if they had not relied on connection to the heating network. It is more likely to be claims based on investment costs changing over time or reimbursement of higher operating costs for the provision of gaseous energy with a share of renewable energy in line with this Act.

Paragraph (4)

Paragraph (4) stipulates the penalty that occurs if the supply of 65 per cent of renewable energy or unavoidable waste heat does not take place or not before 1 January 2035. The costs incurred should therefore be reimbursed by the heating network operator, unless the heating network operator demonstrates that it is not at fault.

§ 71k (Transitional periods for heating systems capable of burning both gas and hydrogen)

§ 71k is a transitional provision for gas-fuelled heating systems that can also burn 100 per cent hydrogen. For these heating systems, § 71k establishes a transitional provision allowing the temporary operation of gas heating using fossil gas, if the gas network operator provides a transformation plan for converting the network, to which the heating is connected, to hydrogen. If the entire network is not converted at once, but instead this is done

in a staggered manner for conversion zones, connection of the heating system to a zone covered by the conversion is necessary. This special provision applies only to a switch to a hydrogen network, since the current networks can transport both natural gas and other green gases (gaseous biomass or green or blue hydrogen including derivatives thereof) without further modification and already do so in part. The use of green gases, e.g. biomethane, therefore already constitutes a permissible compliance option that can be fulfilled without a transitional provision. In contrast, the use of hydrogen is not yet possible. This switch requires the conversion of the existing natural gas network to hydrogen. This requires extensive modification and it is not clear whether such conversion of the existing infrastructure is even technically feasible in all gas distribution networks, taking into account economic viability. Therefore, irrespective of the availability of hydrogen, it cannot be assumed that all gas distribution networks will be converted to hydrogen. H2-ready heating as a compliance option is therefore only permitted on a transitional basis if the conversion of the gas network to hydrogen is actually realistic by 2035, is planned by the gas network operator to which the heating is connected and is underpinned by concrete investment steps in the plan.

Paragraph (1)

Paragraph (1) sets out the requirements concerning the heating system and transformation plan of the gas network operator to whose network the heating system is connected.

The transitional provision covers only heating systems that can use both 100 per cent hydrogen and also methane (natural gas or biomethane). In the future, evidence of this is to be provided as far as possible by corresponding certification.

Subparagraphs 1, 3 and 4 and paragraph (2) require a concrete, legally binding transformation plan from the gas network operator. This transformation plan is to contain concrete investment steps that are to be actually implemented in practice and monitored. The transformation plan is to specify exactly how the end devices are to be specifically switched from methane and hydrogen. It must be specified, in particular, how the gas network operator plans to deal with the gas heating systems connected to its gas network that are not H2-ready heaters, and how a changeover for these heating systems is to be financed in specific terms. Merely making reference to government funds that are not bindingly in place is not sufficient for such a plan. Costs can only be passed on as network charges if there is a legal basis for this. The transformation plan must also specify how the current technical problems of retrofitting are to be solved and a realistic robust financing plan with concrete milestones for the planned investments must be provided for the necessary investments. Taking into account Article 3 of the Energy Efficiency Directive, the transformation plan must also specify how sparing and efficient use of energy is ensured. The transformation plan should take into account the thermal plan, if any, and be revised in parallel.

In view of the fact that the legal framework for the conversion of natural gas to hydrogen has not yet been finalised, as it is still under negotiation at EU level (Directive of the European Parliament and of the Council on common rules for the internal markets in renewable and natural gas and in hydrogen, and Regulation of the European Parliament and of the Council on the internal markets for renewable and natural gases and hydrogen (recast)), subparagraph 3 imposes a restriction. The transformation plan may only be approved by the regulatory authority if it respects the regulatory framework that in force at that time and does not contradict it. It also needs to be adjusted if the regulatory framework changes and the transformation can no longer take place as originally planned.

The transformation plan does not have to include the ‘colour’ of the gases or of the hydrogen. Gas network operators, unlike heating network operators, are not responsible for the production or sale of the gas. These aspects are usually unbundled and therefore gas network operators are purely infrastructure companies that have to carry any gas produced,

regardless of the ‘colour’ and quality of the fed-in gas. In contrast, heating network operators are integrated companies that produce, transport and sell heat to customers. It is therefore only heating network operators that can provide a decarbonisation strategy, while a gas network operator cannot.

Therefore, subparagraph 2 requires the operator of the decentralised H2-ready heating system to purchase a green gas product. However, it does not have to do so until after a transitional period.

The operator of the H2-ready gas heating system is therefore not completely exempted from the renewable energy requirement that all other heating systems have to meet. It is only a temporary transitional provision, rather than an exemption from the obligation to use renewable energy. Therefore, the operator of the H_2-ready heating system must use at least 50 per cent green gases from 1 January 2030 onwards. If the network has already switched to hydrogen, the operator will have to use 50 per cent green or blue hydrogen from 1 January 2030; otherwise, it may also fulfil the obligation using biomethane or other green gases based on methane. From 1 January 2035 onwards, the network must then be switched to hydrogen and the heating operator must also use 65 per cent green or blue hydrogen, thus fulfilling the obligation like all other heating systems mentioned in the other compliance options.

Paragraph (2)

Paragraph (2) stipulates that the transformation plan must be accompanied by an investment plan. This must set out two- to three-year milestones that are to be specified for the implementation of the new construction or the conversion of the gas network to hydrogen.

Paragraph (3)

In accordance with paragraphs (3) and (4), the transitional provision may only be used if there is a plan that has been approved by the competent regulatory authority. The regulatory authority must check the plan and verify that it is technically feasible, that the economic descriptions are realistic and compatible with the existing regulatory frameworks, and that its actual implementation is realistic. The regulatory authority may only grant approval if there is a corresponding concrete and binding plan for the upstream transmission system, ensuring that the gas distribution network operator’s network is sufficiently supplied with hydrogen by 1 January 2035. This is because gas networks tend to be closely interconnected. Actual implementation of a transformation plan can only be considered realistic if the networks connected to this gas network have also switched to pure hydrogen by 1 January 2035. The only exceptions are genuine standalone networks, where the plan is for the hydrogen to be produced and stored locally and to be transported to local customers, without obtaining hydrogen from the upstream level.

If there are any doubts in this respect or if the plan appears to be unrealistic, approval may not be granted, because otherwise effective decarbonisation would not be guaranteed and the 65 per cent requirement would be devoid of purpose.

Paragraph (4)

Paragraph (4) lays down a penalty that takes effect if the conversion is not made or is not made by 1 January 2035. This is because the connected operator of the H_2-ready heating has relied on the gas network operator’s transformation plan being implemented, as guaranteed under paragraph (1) subparagraph 4. Any costs incurred shall therefore be reimbursed by the gas network operator, unless the gas network operator demonstrates that it is not at fault.

§ 71l (Transitional periods for storey heating and single-room combustion plants)

Many buildings do not have a central heating system or are not supplied exclusively by a central heating system for the production of space heat and/or hot water. A central system supplies several users from one place. It usually supplies the entire building by means of a central distribution network that goes to all dwellings of building units. For linguistic simplification, the wording of the legislation refers to a or the central heating system. However, the central heat supply of a building can be provided by several parallel central heating systems. In buildings that are not heated centrally, decentralised heaters (known as storey heating) in the individual dwellings or other self-contained property units (building units) supply only these units of the building with heat and/or hot water. Decentralised heating systems or 'storey heating' therefore supply each building user separately from the other users. Such storey heating can be operated with gas ('gas storey heating'), but also with other solid (e.g. coal or wood) or liquid fuels. The provisions concerning storey heating shall also apply, mutatis mutandis, to single-room combustion plants as defined in § 2 subparagraph 3 of the 1st BImSchV. In mixed-supply buildings, some of the dwellings or property units are supplied by a central heating system – several central heating systems in the same building are also conceivable – while others are supplied by storey heating.

In all three cases, a decision has to be made as to whether and to what extent the concept of a central, partially central or decentralised – per dwelling or per room – supply using new decentralised systems meeting the requirements of § 71(1) should be continued, whether and to what extent centralisation of the heating system is the better measure or whether some or all of the centrally supplied dwellings should be switched from a central to a decentralised supply. It can be assumed that efficient and sustainable conversion of systems to at least 65 per cent renewable energy is often only reasonably possible by centralising the entire heating system of the building; however, converting a building with a fully centralised heat supply to either a mixed supply or maintaining an existing mixed or partially centralised supply is also conceivable. It is also possible, in a building with a partially centralised heat supply, to increase the proportion of dwellings that are supplied centrally. Sufficient time is given in § 71l for this decision to be made, as otherwise the obligation to use 65 per cent renewable energy for the entire building would already apply when the first storey heating system or the first single stove in the building fails and must be renewed after the entry into force of the provisions. Therefore, a special transitional provision has been included in § 71l for these cases.

The obligation applies to the responsible building owner within the meaning of § 8. It is irrelevant in this respect whether the building owner is an individual person or a group of co-owners, or is a property owners' association under the Act on the Ownership of Dwellings; § 71n lays down special procedural rules for property owners' associations.

Paragraph (1)

Paragraph (1) gives the building owners (or, in the case of property owners' associations, the owners of the properties) more time to make the decision on centralisation of the heating system and the necessary implementation of the 65 per cent renewable energy requirement. If the building owner has not already made a decision on centralisation after the entry into force of the Act and before the new installation of a central heating system or storey heating that is necessary because of irreparable failure or, in mixed-supply buildings, a three-year transitional period starts on the date on which installation of the first new storey heating or central heating system in a building becomes necessary after the entry into force of the Act because of failure of the old system, within which period the owners must decide how to comply with the 65 per cent renewable energy requirement in the future. They can retain the previous configuration of central and/or decentralised heating systems or decide to change the previous configuration, i.e. to partially or completely centralise or decentralise it. It is also conceivable for the building owner to voluntarily re-

place storey heating or single-room combustion plants or have these replaced. Also in these cases, the three-year decision-making period begins with the start of the installation work.

Within the three-year period specified in paragraph (1), storey heating may still be installed temporarily without complying with the requirements of § 71(1).

Paragraph (2)

Paragraph (2) stipulates that the building owner – or the property owners in the case of a property owners' association – must have decided at the latest within the transitional period of three years granted pursuant to paragraph (1) whether to switch the entire building or some of the existing dwellings to a central heating supply. Starting from a fully decentralised supply, full or partial centralisation is possible. It is also conceivable in previously mixed-supply buildings to centralise all of the decentrally-supplied dwellings or to connect only some of these dwellings to the central heating supply (increased centralisation). In all these cases, a central heat supply also exists when the building is supplied by several central heating systems. If a central heating system is already in place that does not yet meet the requirements of § 71(1), it may continue to be operated until it fails.

If the owners, within this period, decide to go for partial or complete centralisation or to supply additional dwellings centrally in the future, a further 10 years is granted for implementation thereafter; for storey heating systems installed in the meantime, the 65 per cent renewable energy requirement does not have to be complied with. This means that storey heating systems that do not have to use 65 per cent renewable energy can be installed or established and operated during the entire interim period up to the completion of the central heating system (max. 13 years). Dwelling owners can therefore continue to use natural gas until the central heating system is completed and in the meantime, do not have to purchase biomethane or other green gases or install a storey heat pump in order to fulfil the obligation.

Owners affected by a centralisation decision are required, after completion of the new central heating system, to connect their storey heating to the central heating system at the latest when their system becomes irreparably defective and needs to be replaced. In cases in which the building is already partially supplied by a central heating system capable of supplying the entire building, completion already exists. If dwelling owners have installed, in the meantime and on a transitional basis, storey heating systems that do not comply with the 65 per cent renewable energy rule, their dwellings shall be connected to the central heating system by one year after the end of the transitional period referred to in the second sentence.

In the other dwellings or other self-contained property units which are not intended to be connected to the central heat supply according to the decision of the building or property owners, the requirements of § 71(1) must be complied with for each decentralised heating system newly installed or established after the end of the three-year period referred to in paragraph (1) and the 65 per cent renewable energy requirement must be met. This applies equally to dwellings and other self-contained property units that were connected to the central heating system until the breakdown, but are to be supplied by a storey heating system according to the decision of the building or property owners.

With respect to heating systems that have been installed or established within the period indicated in paragraph (1) for the purpose of being put into service, the requirements laid down in § 71(1) shall only apply after another year has passed.

For dwellings and other property units with storey heating systems connected to an existing central heating system, the provisions of § 71(1) shall be deemed to be fulfilled even if the existing central heating system itself does not meet the requirements of the 65 per cent renewable energy rule.

In dwellings whose owners have reached the age of 80 at the time the first storey heating or central heating system is replaced and a new heating system is installed or established for the purpose of being put into service in accordance with the first sentence, storey heating systems that need to be replaced may be replaced, on multiple occasions and without the time constraints specified in paragraph (1), with heating systems which do not meet the requirements of § 71(1). This creates a provision for dwelling owners parallel to § 71i(2). The relevant date for reaching the age of 80 is the date of installation or establishment of a storey heating system for the purpose of being put into service or after the period referred to in paragraph (1). In this regard, the three-year transitional period set out in paragraph (1) shall apply to owners of dwellings that are to continue operating storey heating. After reaching the age of 80, owners should not be burdened with an investment that cannot be expected to pay off within their lifetime.

The age of 80 is specified because it is assumed that building owners who have reached the age of 80 will be very unlikely to be able to benefit from the amortisation of the additional costs of, for example, a heat pump compared to the investment costs of gas heating. This is because the average life expectancy for 80 year-olds today is statistically around 8 years (men) or just under 10 years (women) (destatis, average life expectancy (Mortality table), as of 2023), whereas, the higher investment costs tend to pay off over a longer period of time.

In addition, a significant number of people over the age of 80 are in need of care. The care rate increases sharply from the age of 80. In the 80-84 age group for men, it is just under a quarter, for women it is just under 35 per cent. In the 85 to 89 age group, the proportion of men in need of care is around 43 per cent and of women is just under 61 per cent (destatis, care rate by age group 2021, as at 2023). Below the age of 80, however, the care rate is well below a quarter (between 75 and 79, 14.5 per cent for men and 18.5 per cent for women, between 70 and 74, 8.9 per cent for men and 9.7 per cent for women). It can therefore be assumed that from the age of 80, many building owners are likely to be overwhelmed in organisational terms by a change in heating technology.

For the aforementioned reasons, dwelling owners who have reached the age of 80 are to be spared the official procedure for applying for an exemption under § 102 GEG.

With reference to § 71i(2) second to fourth sentences,

it is the case that co-owners must all have reached the age of 80.

Dwelling owners must provide evidence of their age and their ownership of the dwelling either to the authorised district chimney sweep as part of the fireplace check or by means of a written self-declaration to be submitted to the chimney sweep.

After a change of ownership, the new owner of the dwelling shall comply with the requirements laid down in § 71 to § 71m within two years of the change of ownership if the heating system is still in operation or shall install a heating system that meets the requirements laid down in § 71 to § 71h.

Paragraph (3)

If the owner has decided, within the first three years after the new installation of the first storey heating system because of a failure, that the heat should continue to be produced decentrally in the building – in a single dwelling, in several or in all dwellings of the building or other self-contained property units – paragraph (3) stipulates that any decentralised heating systems newly installed or established after this period must comply with the requirements of § 71(1) and meet the 65 per cent renewable energy requirement. The same applies to dwellings or other self-contained property units that were previously supplied centrally and switched to a decentralised heat supply.

Systems which have been newly installed or established in the meantime for the purpose of being put into service do not have to comply with the requirements of § 71(1). This provision ensures equal treatment of the cases referred to in paragraph (3), as only the systems being newly installed have to comply with the requirements of § 71(1).

Paragraph (4)

If the building owner or the property owners' association does not make a decision within the three-year period referred to in paragraph (1) as to whether and to what extent the building or other self-contained property units is/are to be supplied centrally or decentrally with heat or with heat and hot water in the future, they must switch the heat supply to central heating in the future or they are obligated to retain the (partially) central heat supply. In both cases, they are obligated to use a heating system that meets the requirements of the 65 per cent renewable energy requirement. With regard to the implementation of the centralisation decision, the requirements of paragraph (2) shall apply; the building owner or the property owners' association shall be put in a position they would have been in had they decided upon centralisation.

Paragraph (5)

Paragraph (5) stipulates that the corresponding decisions referred to in paragraphs (2) and (3) must be submitted to the authorised district chimney sweep in text form without delay. If the building owner fails to submit a decision as referred to in paragraph (2) to the authorised district chimney sweep within the period referred to in paragraph (1), the obligation to centralise in accordance with paragraph (4) applies.

Paragraph (6)

Paragraph (6) stipulates that the provisions of paragraphs (1) to (5) shall apply, mutatis mutandis, to single-room combustion plants within the meaning of § 2 subparagraph 3 of the Ordinance on Small and Medium Combustion Plants ('single stoves'), insofar as they are used for the production of space heat, hot water or a combination thereof; this does not include combustion plants primarily used for cooking purposes.

This provision covers both hand-fed (e.g. with coal, wood or oil) and automatically fed (e.g. gas) single-room combustion plants. The replacement of direct electric heating in accordance with § 71d(3) is not covered.

Mutatis mutandis application shall lead to the necessary decision-making and implementation of the decided-upon variant in accordance with the provisions of paragraphs (1) to (5).

§ 71m (Transitional period for hall heating)

Existing hall buildings with a room height greater than 4 m are often supplied with heat by decentralised heating systems. Because of the way in which such buildings are used, they are often heated for limited periods of time or in limited places. The foreseeable useful life of the buildings is sometimes significantly shorter than for other buildings. The installation of central heating systems with the obligation to use at least 65 per cent renewable energy would often entail considerable technical difficulties and unreasonably high costs. These specific conditions require additional compliance options compared to buildings that have storeys.

§ 71d(4) applies to the use of direct electric heating in halls.

Paragraph (1)

Paragraph (1) grants a 10-year transition period from the date of the new installation in cases in which individual decentralised blower or radiant heaters need to be replaced and the total savings in final energy referred to in paragraph (2) are not achieved. For this purpose, the new systems must correspond to the best available technology. Best available technology means measures for which, when all environmental media are taken into account, the highest level of environmental protection is ensured, and at the same time are regarded as being technically advanced and generally economically reasonable by the EU Member States. Any additional individual decentralised blower or radiant heater installed, established, and operated before the end of the period referred to in the first sentence for the purpose of being put into service may still be operated with fossil fuels until the end of the period referred to in the second sentence. All decentralised blower or radiant heaters must comply with the requirements laid down in § 71(1) at the latest 11 years after the start of the period referred to in the first sentence. Otherwise, there could be a misdirected incentive to continue with decentralised heating systems and their increased installation in the initial years preceding the end of the period referred to in paragraph 1, which could still be operated using fossil fuels by 31 December 2044.

Paragraph (2)

Paragraph (2) allows the use of a new decentralised heating system for a transitional period of two years if the energy consumption of the new system is demonstrably reduced by at least 40 per cent compared to the condition prior to the renewal of the heating system. Energy savings can be achieved through various technical measures, such as the installation of equipment with higher radiation efficiency, the use of condensing technology, heat recovery from exhaust gases, the installation of solar collectors, improved regulation, monitoring of energy consumption or structural thermal insulation measures.

Evidence is to be provided by a one-year record of heating energy consumption after the heating is renewed. This is intended to ensure that, in the special case of decentralised hall heating systems, heating renewal is at least associated with a significant reduction in energy consumption. This option can only be implemented if an entire decentralised system is replaced. Paragraph (1) shall apply to the replacement of individual systems.

If a 40 per cent reduction in the final energy consumption cannot be achieved, but instead a reduction of at least 25 per cent, the ability to compensate using renewable energy is to be made possible under the third sentence of paragraph (2). To do so, the percentage missing from the 40 per cent saving is calculated (example: 30 per cent saving; the difference of 10 per cent with respect to 40 per cent corresponds to 25 per cent). This percentage is applied to the baseline value of 65 per cent renewable energy for heating systems; thus, in a hall heating system in which the final energy could only be reduced by 30 per cent, the use of 16.25 per cent renewable energy would be necessary. If, after the expiry of the two-year transition period, no reduction in the energy consumption of the new system by at least 40 per cent in accordance with the second sentence can be demonstrated or a reduction of at least 25 per cent, if the missing percentage with respect to a 40 per cent reduction in the final energy consumption can be compensated by the same percentage with regard to the use of 65 per cent renewable energy in accordance with the third sentence compared to the state before the renewal of the heating system, the system shall be operated using at least 65 per cent renewable energy.

§ 71n (Procedures for property owners' associations)

The newly-inserted **§ 71n** lays down the procedure for implementing the obligation under § 71(1) for property owners' associations. Those addressed by the 65 per cent renewable energy requirement, in particular in the case of gas storey heating, are faced with the very complex challenge that the administrator has the task of drawing up a concept for the im-

plementation of this obligation and presenting it for resolution at an owners' meeting. For this purpose, they require the necessary information concerning both joint ownership and individual held property. Relying on a fully prepared basis, the property owners' association must, for their part, decide whether to centralise the heating system or to continue decentralised, per-dwelling heating systems, the costs of which are then all to be shared. Given the urgency of the provision in § 71l, which in fact provides multi-year transitional periods both for the decision-making and for the centralisation measure, the decision cannot be made only once per year in the usual cycle of the owners' meeting. Therefore, special procedural arrangements are required, in particular for buildings that are supplied with heat or heat and hot water in a decentralised or mixed configuration, i.e. by gas storey heating or single combustion plants. The procedure for decentrally-supplied buildings is laid down in paragraphs (1) to (8).

Paragraph (1)

Paragraphs (1) to (3) require an inventory of all decentralised heat generation systems in a building. This must be carried out immediately after the entry into force of the Act and serves to prepare all necessary documents that are needed as a basis for drawing up a concept for the implementation of the obligation under § 71 by the property owners' association. The administrator organises and monitors the drawing up of the concept. The property owners' association then discusses the concept at its various stages of development and ultimately makes a decision on how to implement the obligation under § 71 in the respective building. The administrator then executes the decision. The concept always includes a decision as to whether to continue the concept of decentralised – per-dwelling or per-room – supply using new decentralised systems that meet the requirements of § 71(1) or whether centralisation of the heating system is the better measure. If only part of the building is heated decentrally, the concept must include a decision as to whether this part will be supplied via an (already existing) central heating system in the future.

Paragraph (1) requires the property owners' association to request necessary information on storey heating in the building from the authorised district chimney sweep. According to the first sentence, for buildings in which at least one storey heating system is installed or established for the purpose of being put into service, the property owners' association is required to request, within five months of the date of entry into force of the Act – by 31 May 2024 – disclosure of information on existing gas storey heating from the authorised district chimney sweep. This covers all information that may provide guidance on the future heat supply in light of the obligation laid down in § 71(1). The inventory also serves as a first step for the drawing up of the concept for implementing the obligation under § 71(1). The second sentence clarifies that all information that could be useful in planning centralisation of the heat supply is included.

The third sentence lists the information whose disclosure may be requested. In accordance with subparagraphs 1 to 3 of the third sentence, the type of system, its age and details about its proper functioning must be disclosed. Information on proper functioning includes an indication of whether the system can be operated as intended, and, where appropriate, additional information on known malfunctions, repair requirements and failures that may indicate an imminent breakdown. In accordance with the subparagraph 4 of the third sentence, information on the performance of system is also necessary. Information on the proper functioning and performance of the system may, but does not have to, come from the chimney sweep records; these records often contain the rated heat output of the system. The request for this information to be disclosed is mandatory; the district chimney sweep, however, is only obligated to provide the information in the chimney sweep records.

In accordance with the fourth sentence, the authorised district chimney sweep must, at the request of the administrator, provide the most recent form referred to in § 4(1) of the Chimney Sweep Trade Act, which is filed in the chimney sweep records. The authorised

district chimney sweep regularly conducts a fireplace check and then documents the necessary work in a fireplace notice; the building or dwelling owner demonstrates the performance of this work by means of a form that they send to the authorised district chimney sweep. This is filed in the chimney sweep records. The information to be entered in the form is laid down in § 5 of the Chimney Sweeping and Inspection Code in conjunction with Annex 2 to the Ordinance. The form contains the information required by the second sentence, i.e. type of system, date of installation, any defects, performance and condition of the system. Where the authorised district chimney sweeper does not have a form, they shall compile the information available to them, which is necessary under the second sentence, from information already available to them. It is not necessary for the authorised district chimney sweep to obtain the information on site, from the dwelling owners or other specialist companies.

The property owners' association shall compensate the district chimney sweep for sending the information. This includes, firstly, reimbursement of their expenses, such as postage or the cost of purchasing a USB stick if the information is sent in digital form. Secondly, the district chimney sweep may charge for the working time spent, using the second sentence of § 6(3) of the Chimney Sweeping and Inspection Code as a guide, which currently indicates a work value of EUR 1.20 per minute plus statutory VAT. The obligation to provide reimbursement covers the multifaceted situations that may arise. For example, the costs involved in different types of document transmission (on paper/digital) and the time required for different sizes of property owners' associations with a wide range of systems can vary greatly when compiling forms with respect to the production of information extracts.

Paragraph (2)

Paragraph (2) stipulates that the property owners' association shall request from the property owners the information available which may be useful for drawing up an implementation concept. The first sentence requires the administrator of the property owners' association to request, within five months of the date of entry into force of the Act – by 31 May 2024 – disclosure of information on the energy condition of all systems and equipment held as individual property, as well as all the facts known to the property owner, which may be useful for a preliminary assessment of the need for action in order to meet the requirements of § 71(1). This includes any information on the condition of the heating system that the property owner may have obtained from their own experience of using it or from tradespeople working in the dwelling. In addition to the heat generation system, the technical equipment includes all other components of the heating system that are held as individual property, such as pipes and radiators, as well as any modifications that the property owner has carried out or has had carried out. Also included are measures to increase efficiency, such as insulation measures, which are held as individual property. The obligation to disclose only covers information whose relevance the property owner can discern and assess, and information already available to the owner that does not have to be obtained only by involving a third party.

The second sentence requires the property owner to disclose the requested information to the administrator within two months of the request.

The third sentence specifies that property owners must notify the property owners' association of any failure of an old and installation of a new storey heating without delay. Furthermore, property owners are required to notify any changes concerning the information provided under the second sentence.

Paragraph (3)

Paragraph (3) stipulates that all property owners must be informed of the results of the inventory by the property owners' association.

The first sentence requires the property owners' association to compile the information received in accordance with paragraphs (1) and (2) in a consolidated version after the disclosure deadline specified in the first sentence of paragraph (2) has passed. This summarises the information clearly but in enough detail to serve the property owners as a basis for discussing the future heat supply of the building. In particular, however, the consolidated version serves as the initial basis for preparation of a procedure under paragraphs (5) and (6), in which the implementation concept for the obligation under § 71 is decided upon. In the event that an implementation period has started to run and a decision has to be taken within three years, the supporting documentation is necessary to speed up the decision-making process. The administrator shall make the consolidated version available to the property owners within one month of the end of the disclosure period for property owners referred to in the first sentence of paragraph (2). This can be done by post or email, by making it available electronically through an online portal or by making it available in paper form at an information event.

Paragraph (4)

The first sentence of paragraph (4) stipulates the initiation of the decision-making procedure for implementing the obligation under § 71. If the property owners' association has not made a decision on the implementation of the obligation under § 71 in advance – before the first gas storey heating fails – and, where applicable, has not implemented any decision, quick decisions are needed after old storey heating has been replaced and new storey heating installed. As soon as, after the entry into force of the Act, new gas storey heating is installed or established in an existing building for the purpose of being put into service after the failure of the old heating system and the administrator has been informed of this, the administrator must, without delay, convene a meeting of the property owners' association, i.e. invite property owners to the property owners' meeting giving a reasonable amount of time before the date of the meeting. The obligation to invite property owners without delay serves to get the decision-making process underway as soon as possible, as the three-year transitional period arising from the first sentence of § 71l(1) has started to run. If the next regular property owners' meeting takes place within the next four months, it is sufficient if this is used for the discussion of the heat supply.

In accordance with second sentence, the meeting is intended to inform the property owners of the requirements of § 71(1) and to make them aware of the need for a swift decision-making process. The property owners should also make a decision on the way forward, as far as possible on the entire decision-making and implementation process.

The third sentence requires the administrator to point out, at the first property owners' meeting as referred to in paragraph (3), the legal consequences under § 71l(4), according to which the property owners' association is required to switch to a central heating supply of the building or to retain a central heat supply, if they fail to make a decision in accordance with § 71l(2) or (4) within the prescribed period.

Paragraph (5)

Paragraph (5) lays down a number of requirements concerning the decision on the implementation of the obligation under § 71 and the timing of the decision-making process.

In accordance with the first sentence, the property owners' association shall make a decision on a concept for implementing the obligation under § 71 within the time period specified in § 71l(1).

The second sentence specifies the timeframe for the decision-making process; the property owners' association shall draw up, adopt and implement a concept within the meaning of the first sentence. Following the extraordinary property owners' meeting for initial discussions of the topic, a corresponding agenda item shall be placed on the agenda of the annually-occurring property owners' meetings. In order to push forward the drawing up

of the implementation concept, the property owners' association may appoint an expert. The concept should be kept up to date; to this end, disclosures of new information by property owners in accordance with the third sentence of paragraph (2) shall be taken into account accordingly.

The third sentence requires the property owners' association to discuss the state of implementation once a year until the concept is fully implemented.

Paragraph (6)

Paragraph (6) separately governs the decision of the property owners as to whether to retain a decentralised heat supply or to replace it with a central supply. If only some of the dwellings in a building are supplied using decentralised heating systems, the provisions in paragraph (6) apply as to whether these dwellings are to be connected to the central heating system.

The first sentence stipulates the quorum required for retaining at least one storey heating system. Such a decision is only possible with two thirds of the votes cast and half of all co-ownership shares. This tightened voting ratio favours centralisation of the heat supply.

The second sentence specifies that § 71l(4) and (5) shall apply, mutatis mutandis, to property owners' associations. They are obligated – through the applicability of § 71l(4) – to fully centralise the heat supply in the event that they do not make a decision on the implementation of the obligation under § 71l(1) within the time limit laid down in § 71l(1). In this case, the property owners' association may no longer properly decide to retain a decentralised heat supply. Instead, they only have to decide how centralisation is to be implemented. This legal consequence serves to encourage property owners to comply with the timeframe laid down in § 71l. In substance, it corresponds to the approach of the fourth sentence of paragraph (5), which does not order centralisation but favours it through the voting quorum. Corresponding application of § 71l(5) also obligates property owners' associations to notify the authorised district chimney sweep of decisions on the heat supply of the building in text form without delay.

Paragraph (7)

Paragraph (7) lays down how the costs for implementing the requirements of § 71(1) are to be covered within the property owners' association in buildings with a completely or partially decentralised heat supply. Since § 71(1) GEG lays down statutory requirements which must be implemented by property owners' associations, these are not structural modifications within the meaning of § 20(1) Act on the Ownership of Dwellings (with obligation to bear costs pursuant to § 21), but rather maintenance measures within the meaning of § 16 Act on the Ownership of Dwellings. Various situations are conceivable when it comes to bearing the costs for implementation of the requirements under § 71(1).

If a whole building has previously been supplied decentrally and the property owners' association decides to keep this arrangement, each property owner shall bear any conversion costs themselves. For these cases, there is no need for a separate cost allocation arrangement under the GEG.

If a whole building has previously been supplied decentrally and the property owners' association decides to fully centralise the supply, the property owners shall bear the costs of the conversion in line with their ratio of co-ownership shares, unless there are arrangements to the contrary in an individual case. However, in practice, different situations are conceivable as to whether radiators are individually-held property or jointly owned in individual cases. Since the installation of heat pumps will often require replacement of the radiators, it seems appropriate to be able to also consider the costs incurred in this respect as costs of the overall measure. The **second sentence** grants decision-making power to the property owners in this respect.

If a whole building has previously been supplied decentrally and if some of the dwellings are to be supplied centrally in the future, or if a building has been partially supplied centrally and additional dwellings are to be connected to the central supply, a separate arrangement is to be made for the costs incurred from centralisation. These costs shall be fundamentally borne by the property owners affected by the centralisation in accordance with the **first sentence** according to the ratio of their co-ownership shares. The first sentence refers only to costs incurred for changes to joint property. According to the general rules, costs for measures necessary concerning individually-held property are fundamentally borne by the respective owner of the dwelling. For these cases too, the **second sentence** grants decision-making power to the property owners.

The first sentence may be used in the following situations:

- Partial centralisation: A building supplied completely decentrally is to be partly supplied centrally in the future. For this purpose, a central heating system is installed and a distribution network created. The owners affected by the centralisation shall bear the costs according to the ratio of their co-ownership shares.

- Increased centralisation: In a building which is already partly supplied centrally, some or all of the remaining decentrally-supplied dwellings are connected to – an existing or newly built – central heating system. If necessary, an additional distribution network is also created for the affected dwellings. The owners affected shall bear the costs according to the ratio of their co-ownership shares.

If the property owners' association decides to maintain the ratio of centrally and decentrally-supplied dwellings in a mixed-supply building, the owners of the decentrally-supplied dwellings shall bear any conversion costs incurred for their individually-held property. Conversion costs incurred for the central heating system relating to joint property shall be borne by the property owners concerned according to the ratio of their co-ownership shares.

The **third sentence** stipulates a special compensatory obligation in cases where decentrally-supplied dwellings are connected to an existing infrastructure and benefit from the construction costs incurred by other property owners in the past. In these cases, the owners of the added dwellings are required to pay appropriate compensation. The provision in the third sentence is based on the existing provision for structural modifications in the first sentence of § 21(4) of the Act on the Ownership of Dwellings. The standard of appropriateness requires the property owner to share in the costs from the past, which, at least indirectly, also affect their future use. Current operating costs shall not be taken into account; when compensating for production costs, deterioration in the meantime must be taken into account. The point in time at which the dwelling is connected and from which the dwelling then benefits from the existing infrastructure is decisive here. Due to the wide variety of conceivable cases, the statutory provisions are not set out in further detail. The compensation must be paid to the property owners' association and, as part of the annual settlement, passed on to the property owners who initially bore the costs to be compensated.

The third sentence applies in the following situations:

- As part of increased centralisation (see above), dwellings are connected to an existing and sufficiently powerful central heating system.

- As part of increased centralisation, dwellings previously supplied decentrally are connected to a new central heating system, but in doing so benefit from an existing distribution network.

The fourth sentence stipulates the applicability of the second sentence of § 16(2) of the Act on the Ownership of Dwellings for all cases listed in paragraph (7) and thus allows de-

viation from costs being allocated according to the ratio of co-ownership shares. Thus, property owners are allowed to decide on allocations of individual costs or certain types of costs that differ from those laid down in the first to third sentences.

Paragraph (8)

Paragraph (8) extends the scope of paragraphs (1) to (7) to buildings and dwellings in which individual combustion plants in accordance with § 71i(7) are installed or established and operated for the per-room heating of the dwelling.

§ 71o (Provisions on the protection of tenants)

Paragraph (1)

§ 71o(1) limits the passing on of additional costs incurred in cases in which a landlord, as the operator of a central heating system, substitutes a fossil fuel – gaseous, solid or liquid – with hydrogen or a substitute fuel with a biogenic proportion. The provision covers the use of all gases and all solid and liquid fuels containing a biogenic proportion in the quantity of fuel supplied in accordance with the contract.

The aim of the provision is to stop high operating costs being passed on to tenants and to stop the price risk associated with the use of biogenic substitute fuels being transferred on to tenants. The purpose of the provision is to prevent situations in which owners choose the compliance options in § 71(3) subparagraphs 5 or 6, which, although they involve lower investment costs they are associated with foreseeably higher operating costs, and this risk of a high or volatile fuel price is shifted on to the tenant. Alongside the operation of a gas boiler using a 65 per cent share of substitute fuels, owners always have other compliance options open to them, for example, if there is a connection, connection to a heating network, or a hybrid solution. Another option for the owner or landlord is to install a heat pump. If this can only be operated inefficiently, the owner can either install hybrid heat pump heating or improve the building envelope or the heating distribution, e.g. by replacing radiators, etc., in order to reduce fuel costs.

§ 71m(1) therefore lays down a reference amount for limiting the ability to pass on fuel costs. The reference amount is the amount that would be required for the quantity of heat produced if it were produced using a sufficiently efficient heat pump. Costs can be compared by dividing the electricity price that the building owner would have to pay for the operation of a heat pump by the seasonal annual efficiency ratio of 2.5. The seasonal annual efficiency ratio of 2.5 represents the minimum ratio between supplied energy and actually generated heating heat, which protects tenants from excessive operating costs. At the same time, this value takes account of the fact that the installation of biomass heating systems under § 71(3) subparagraphs 5 or 6 is limited to existing buildings and use is therefore more likely in a poorly-insulated building.

The limit on the passing on of costs stipulated in paragraph (1) applies where the actual costs incurred by the landlord for the fuel consumed, including carbon dioxide costs that can be passed on, exceed the cost of the reference amount. This is likely to be the case – depending on price developments. If the landlord feeds the heating system with 35 per cent fossil fuel, in order to determine the actual fuel costs incurred, the costs that can be passed on in principle must first be determined in accordance with the Ordinance on Heating Costs and the Carbon Dioxide Cost Sharing Act. When using a mixture of biogenic and fossil fuels, the classification of the building that is required to determine the statutory sharing ratio follows the same rules as when only fossil fuel is used. Therefore, when using a mixture consisting of only 35 per cent fossil fuel, the building will only be classified on the basis of 35 per cent of its total consumption, so the sharing ratio will change in favour of the landlord. This is appropriate because the Carbon Dioxide Cost Sharing Act is linked to the carbon dioxide emissions of the building per square metre of living space per year, which decreases due to the application of the 65 renewable energy rule.

In detail, the limit for passing on costs is determined as follows:

Example: *Rented-out multi-family building with 600 m² living space. The heating system, a gas boiler, is supplied with 65 per cent biomethane (EUR 0.24/kWh) and 35 per cent natural gas (EUR 0.18/kWh). The total consumption for 2022 is 120 000 kWh. Operating costs are billed once a year. The billing period is the same as the calendar year.*

a) The calculation is based on an average electricity price for consumers, which is established for the entire billing period. The basis for this is the average electricity prices for households determined by the Federal Statistical Office for half a year. These can be found on the website of the Federal Statistical Office:

https://www.destatis.de/DE/Themen/Wirtschaft/Preise/Erdgas-Strom-DurchschnittsPreise/_inhalt.html.

The average electricity price for households (including taxes, levies and fees) that is allocated not to a consumption class, but to the 'Total' category, is decisive here.

Example: *The average electricity price for households in the 'Total' category for the first half of 2022 is: 0.3350 EUR/kWh, for the second half of the year EUR 2022 0.3496 EUR/kWh.*

b) For a billing period, the landlord calculates a uniform average electricity price from one or more half-yearly reports. If the billing period is the same as the calendar year, the average annual electricity price shall be calculated as the arithmetic mean over the two reporting periods of the calendar year. If the billing period is not the same as the calendar year, the average electricity price shall be calculated as the arithmetic mean of the average prices over all reporting periods that overlap with the billing period; there is no weighting of the three reporting periods. For billing periods ranging from six months to one year, two or three reporting periods may be taken into account. For billing periods shorter than six months, one or two reporting periods may be taken into account.

Example: *The billing period is the same as the calendar year 2022. The arithmetic mean is calculated from the average electricity prices for the first and second half of 2022:*

0.3350+ 0.3496 = 0.6846/2 = 0.3423 EUR/kWh.

The average electricity price to be adopted for the billing period is 0.3423 EUR/kWh.

c) The relevant average electricity price is calculated as part of the operating costs statement. The half-yearly reports of the Federal Statistical Office, which are necessary for the determination of the limit, are available three months after the end of the reporting period, e.g. for the second half of the calendar year, they are available on 31 March. Arrangements and adjustments to advance payments for operating costs shall be carried out on the basis of the data available from previous reporting periods; only in the context of the operating costs statement is the relevant average electricity price determined and used.

d) If the landlord has determined the relevant average electricity price, they shall divide it by the seasonal annual efficiency ratio of 2.5. This calculation gives the limit on the passing on of costs. The landlord multiplies the amount of energy for the fuel – fossil and/or biogenic – used during the billing period by the reference amount determined. The result of this calculation is the amount that the landlord can pass on to the tenant.

Example: *The average electricity price to be adopted for the billing period is 0.3423 EUR/kWh.*

a) *This is to be divided by the seasonal annual efficiency ratio 2.5.*

0.3423 / 2.5 = 0.137 EUR/kWh.

The reference amount for the passing-on limit is EUR 0.137/kWh.

***b)** The amount of fuel costs that can be passed on is calculated based on the amount of energy used. The landlord can take the amount of energy from their gas supplier's bills.*

*120 000 kWh * 0.137 EUR/kWh = EUR 16 440.*

***c)** The landlord's actual fuel costs are calculated as follows:*

78 000 kWh for biogas at 0.24 EUR/kWh = EUR 18 720

42 000 kWh for natural gas at 0.16 EUR/kWh = EUR 6 720

Landlord's actual fuel costs (total): EUR 25 440.

***d)** Result:*

The amount of fuel costs that can be passed on is EUR 16 440.

The landlord bears EUR 9 000.

The amount of energy used is determined by the landlord in different ways depending on the type of fuel. A number of fuels – such as biogas – are already billed to the landlord in the unit kWh, so that the quantity consumed only has to be read off the bill. For other fuels, which are billed by weight, for example, the amount of fuel consumed has to be multiplied by the energy content/calorific value. The energy content or calorific value reflects the amount of energy contained in a standard unit of the fuel – for example one kilogram. The tenant can find the energy content or calorific value of individual types of fuel in the 'Leaflet on determining total energy consumption' issued by the Federal Office for Economic Affairs and Export Control (BAFA). This is available on the Office's website:

https://www.bafa.de/SharedDocs/Downloads/DE/Energie/ea_ermittlung_gesamtenergieverbrauch.html.

***Example (modified):** The landlord did not use 120 000 kWh of (bio) gas, but 22 222 t of pellets for heating. The calorific value of 1 kilogram of pellets is 5.4 kWh.*

*22 222 kg * 5.4 kWh/kg = 119 998.8 kWh amount of energy used*

Insofar as the heating system is not operated by or on behalf of the landlord and the tenant operates the heating system themselves, they are legally entitled to reimbursement of the additional costs in accordance with the third sentence of paragraph (1). In this respect, it should be noted that, in its actions, the tenant is obligated as a matter of course to take into account the interests of the landlord (§ 241(2) of the German Civil Code) and this also includes the financial concerns of the landlord.

Paragraph (2)

Paragraph (2) aims to protect tenants and governs cases in which a heat pump that does not achieve efficient operation under the given circumstances is installed in an unrenovated or only partially renovated building. The first sentence of paragraph (3) stipulates that the landlord may take full account of the costs of installing a heat pump in the case of the modernisation rent increase pursuant to § 559(1) of the Civil Code only if they demonstrate that the seasonal annual efficiency ratio of the heat pump exceeds 2.5. In principle, this value is still achievable by monovalent heat pumps even in the poorly-insulated existing buildings. The building owner is also able to achieve a seasonal annual efficiency ratio

of 2.5 by installing a hybrid heating system. At low temperatures, especially in poorly insulated buildings, heat pumps work at lower efficiency, i.e. also with a low seasonal annual efficiency ratio, because the recovery of environmental heat at cold temperatures requires particularly high energy consumption. Hybrid solutions can address this weakness by adding a second heating technology at low temperatures to achieve higher efficiency and seasonal annual efficiency ratio overall. However, the Act aims to promote the use of monovalent heat pumps as far as possible. Thus, § 71h stipulates that in the case of hybrid heating systems, the heat pump is the main load generator and the combustion components are only switched on in peak load situations. The second sentence of paragraph (2) lists various situations in which evidence is not required. The question of whether the replacement of heating in order to comply with the requirements of the 65 per cent rule constitutes a maintenance or modernisation measure depends on the applicable provisions of the Civil Code governing tenancies and the case law in this area. The provisions of paragraphs (3) and (4) must therefore only be applied to modernisation measures that justify the passing on of costs pursuant to § 559 Civil Code.

Point 1

Evidence is not required if the building was built after 1996. The date on which the building permit was issued is decisive in this respect. Due to the insulation requirements after 1996, it can be assumed that the building envelope is insulated in such a way that a heat pump achieves the relevant seasonal annual efficiency ratio referred to in the first sentence of paragraph (2).

Point 2

The same can be assumed if the building was built in accordance with the requirements of the 3rd Thermal Insulation Ordinance.

Point 3

Similarly, achievement of the required seasonal annual efficiency ratio of 2.5 can be assumed if the building has been renovated to the standards of efficiency house level 115 or efficiency building 100.

Point 4

If heating of a building can be ensured with a max. flow temperature of up to 55 °C, compliance with the requirement set out in the first sentence shall also be assumed.

Paragraph (3)

Paragraph (3) governs the situation where the seasonal annual efficiency ratio referred to in the first sentence of paragraph (2) does not reach the value of 2.5. The landlord can continue to install a heat pump; however, they can assert only 50 per cent of the costs that can be passed on under § 559(1) of the Civil Code. As part of the simplified procedure for collecting additional modernisation costs under § 559c of the Civil Code, the landlord must first – as in the past – deduct a flat rate of 30 per cent from the costs to be asserted (second sentence of § 559c(1) Civil Code). Of these costs, they may then pass on 50 per cent in accordance with § 559(1) of the Civil Code.

Paragraph (4)

Paragraph (4) extends the scope of the protection provisions from paragraph (1) to other forms of providing buildings and dwellings for use in return for consideration. Users are in similar need of protection in the case of leases and other forms of provision.

§ 71p (Power to issue ordinances on the use of refrigerants in electric heat pumps and hybrid heat pump heating)

In accordance with Article 80(2) of the Basic Law, the Federal Government is empowered to enact an ordinance with the assent of the Bundesrat.

Currently, fluorinated gases (known as F-gases) that are harmful to the climate may still be used in heat pumps. F-gases are not naturally occurring. They are used in a variety of private, commercial and industrial applications. Fluorinated gases have a marked greenhouse gas effect, which can be significantly greater than that of carbon dioxide (CO2). This means they contribute significantly to climate change. Under the EU's new F-Gas Regulation, which is currently being negotiated at EU level, such heat pumps which are newly installed and use particularly climate-damaging F-gases, are expected to be banned after transitional periods.

The power to issue ordinances enables the Federal Government to further specify the requirements for the operation of electric heat pumps (§ 71c) and the operation of hybrid heat pump heating (§ 71h) and to establish requirements for choosing refrigerants in Germany that go beyond the requirements of future EU law. Envisaged is a requirement allowing only natural refrigerants, such as propane or CO2, which are friendly to the climate and environment, to be used in domestic heat pumps. At the same time, the Federal Government, as the issuer of the ordinance, is to be able to formulate exceptions where necessary, if safety requirements do not permit the use of flammable refrigerants such as propane. In such cases, certain climate-friendly F-gases would still be allowed.

Point 27

Paragraph (4)

Paragraphs (4) and (5) of the old version concerned the ban on installing new oil and coal boilers from 2026, including several exceptions. These provisions are being deleted as they no longer have standalone scope alongside the 65 per cent requirement.

In line with the objective of greenhouse gas neutrality by 2045, the new paragraph (4) imposes, linking to the objective set out in § 1(1), a general ban on the operation of boilers powered by fossil fuels after 31 December 2044. The words 'at the latest' ensure that no legitimate expectation is created by the provision to the effect that boilers fed with fossil fuels may actually be operated until December 2044.

Point 28

Letter a

This is an editorial adjustment, as § 71 of the old version has been moved to § 69(2).

Letter b

In line with the open-ended transitional period laid down in § 71i(2) in the case of heating breakdowns for building owners who have reached the age of 80, the new paragraph (2) also stipulates, in the case of the replacement obligation under § 72(1) or (2) for old heating boilers, deferral of the replacement obligation, since the replacement obligation also triggers a heating replacement with the obligations under § 71 et seq.

The new paragraph (4) in § 73 makes reference to § 72(4), which stipulates that heating systems may be operated using fossil fuels until 31 December 2044 at the latest.

Point 29

In view of the more specific requirements concerning building automation systems under § 71a(3) to (6), the requirements for exemptions concerning building automation systems under **§ 74(3)** must also be adapted. In line with the exemptions from the heating inspection obligation provided for in § 60b(1), the exemptions from the inspection obligation for air-conditioning systems are also being adapted. In the case of non-residential buildings, inspection of an air-conditioning system in accordance with § 74(1) is therefore not required if an equivalent result can be achieved by concluding a contract (e.g. energy performance contracting) with third parties.

Point 30

Letter a

The amendment to **§ 85(1) subparagraph 15** is required because of the new 65 per cent renewable energy requirement. To date, § 34 et seq. only imposed an obligation to use renewable energy for new builds. Accordingly, the type of renewable energy used had to be indicated in the energy certificate only for new builds. Since the requirements specific to new builds are being deleted, more general provisions are being established instead in § 71 et seq., which apply to new builds and existing buildings. Therefore, there is no longer any reason for the energy certificate to be treated differently. Accordingly, for all newly-created energy certificates, it is therefore necessary to specify the type of renewable energy used, in particular for compliance with the obligations under § 71 et seq.. Plans are in place to fundamentally revise the energy certification provisions at the earliest opportunity. In this respect, steps towards greater legal certainty concerning energy certificates are to be examined.

Letter b

§ 85(3) reflects the change in name from the Federal Ministry for Economic Affairs and Energy (BMWi) to the Federal Ministry for Economic Affairs and Climate Action (BMWK) and the formation of the Federal Ministry of Housing, Urban Development and Building (BMWSB) to which responsibility for building has been passed from the now-renamed Federal Ministry of the Interior, for Building and Community (BMI).

Letter c

§ 85(8) reflects the change in name from the Federal Ministry for Economic Affairs and Energy (BMWi) to the Federal Ministry for Economic Affairs and Climate Action (BMWK) and the formation of the Federal Ministry of Housing, Urban Development and Building (BMWSB) to which responsibility for building has been passed from the now-renamed Federal Ministry of the Interior, for Building and Community (BMI).

Point 31

The new § 88(5) ensures that people who have passed the BAFA Qualification Examination are also entitled to issue energy certificates. After completion of the BAFA Qualification Examination, these persons are entitled to provide advice and carry out individual measures within the framework of the Federal funding scheme for efficient buildings (BEG). Due to the wording of paragraph (1), these persons were previously not entitled to issue energy certificates despite having necessary expertise. Paragraph (5) addresses this gap.

Extending § 88(3) to include training courses under paragraph (5) ensures that, if the training content was limited to residential buildings, people who have passed the BAFA Qualification Examination may issue energy certificates for residential buildings only.

Letter b

Point 32

The third sentence reflects the change in name from Federal Ministry for Economic Affairs and Energy (BMWi) to Federal Ministry for Economic Affairs and Climate Action (BMWK).

Under the future funding regime, account shall be taken of the social consequences for households resulting from the application of this Act, as well as the increases in costs resulting from the application of this Act for social services and institutions, cultural and health facilities, services for the public, as well as women's shelters and other protection and refuge facilities for persons affected by violence.

Point 33

Letter a

The redrafting of **§ 90(2) subparagraph 2** is editorial in nature and necessary because of the repealing of § 52 to § 56 and the provisions in § 9a and § 71 newly created in this respect.

Letter b

§ 90(2) subparagraph 3 is being amended to reflect the change from Directive 2009/28/EC of 23 April 2009 on the promotion of the use of energy from renewable sources to Directive (EU) 2018/2001 of 11 December 2018 on the promotion of the use of energy from renewable sources.

Point 34

Letter a

In **§ 91(1)** is being amended to reflect the repealing of § 52 to § 56 and the creation of the new provisions in § 4(4), § 9a and § 71.

Letter b

Double letter aa

Triple letter aaa

§ 91(2) subparagraph 3 letter a is being amended to reflect the creation of the new provisions in § 71 et seq. and the corresponding repealing of § 35 to § 41.

Triple letter bbb

§ 91(2) subparagraph 3 letter a is being amended to reflect the repealing of § 56 and the corresponding creation of the new provisions in § 4(4) and § 9a.

Double letter bb

Triple letter aaa

§ 91(2) subparagraph 4 is being amended to clarify that the promotion of heating systems is to continue to be possible if they use more than 65 per cent renewable energy to provide heat.

Triple letter bbb

§ 91(2) subparagraph 4 letter a is being amended to reflect the repealing of § 56 and the corresponding creation of the new provisions in § 4(4) and § 9a.

Point 35

Letter a

In **§ 96(1)** the list of use cases for contractor declarations is being extended. These shall be submitted for examination upon request.

Double letter aa

The introductory sentence lists the newly-added subparagraphs for contractor declaration use cases.

Double letter bb

In **§ 96(1) subparagraph 6**, a consequential change is being made to the reference, brought about by the shifting of § 71(1) to § 69(2).

Double letter cc

Due to the extension of the list of use cases for contractor declarations, the ‘or’ is replaced by a comma.

Double letter dd

Due to the extension of the list of use cases, the full stop at the end is replaced by a comma.

Double letter ee

The list of use cases for contractor declarations is being extended to include the implementation of hydronic balancing and further heating optimisation measures under § 60c, the installation of metering equipment for heating systems, and of components of monitoring technology and building automation systems under § 71a. In addition, subparagraph 11 extends the list of use cases for contractor declarations to include the installation of any new heating systems in existing buildings for compliance with the obligation laid down in § 71(1) to (3). Compliance with the requirements of § 71(1) to (3) is ensured in new builds building via the declaration of compliance pursuant to § 92. In existing buildings, for the various compliance options under § 71(1) to (3), § 71i (heating breakdown), § 71k(1) first clause (H2-readiness of the heating) and § 71m, use is being made, with a view to evidence and enforcement, of the existing contractor declaration option that has already been introduced in practice, so as to avoid any new bureaucratic evidence procedures. The installation of a heating system that meets the requirements of § 71 must then be demonstrated by contractor declaration. Like all other contractor declarations, these must be kept for 10 years in accordance with § 96(2) and submitted to the authority upon request.

Double letter ff

The new second sentence extends the provision on contractor declarations in the first sentence, by means of mutatis mutandis application, to the results of the operational testing of heat pumps pursuant to the first sentence of § 60a(5) and of the heating inspections and heating optimisations pursuant to the first sentence of § 60b(5), including the evidence of the work carried out pursuant to the second sentence of § 60a(5) and the second

sentence of § 60b(5), the confirmation of the heating network operator pursuant to the third sentence of § 71b(1) and the fifth sentence of § 71b(2) and the evidence of the reduction of final energy consumption by at least 40 per cent pursuant to § 71m(2). These measures have not been included in the above list in the first sentence because they do not constitute ‘installation’; mutatis mutandis application is therefore adopted here.

Letter b

In **§ 96(4)**, by means of the redrafting and the deletion of subparagraphs 1 to 4, the new provision is editorially amended to reflect the requirements for the use of biomass or green or blue hydrogen in § 71f, § 71g and § 71k(1) subparagraph 2. In the future, the confirmation will also relate to compliance with the maize limit set out in § 71f(2). This declaration must also be provided upon request.

Letter c

Double letter aa

In **§ 96(5)**, by means of the redrafting and the deletion of subparagraphs 1 to 4, the new provision is amended to reflect the requirements for the use of biomass in § 71f and § 71g and is editorially simplified.

Double letter bb

This is a consequential editorial amendment.

Double letter cc

The bills and confirmations shall be submitted, upon request, to the authority that is competent under Land-level law. This more general wording specifies that this obligation applies not only to the owner, but also to the operator, if they are not also the owner of the heating system.

Point 36

Letter a

In **§ 97(1)** the provisions on the tasks of the authorised district chimney sweep are being adapted, with individual aspects being added.

Double letter aa

In **§ 97(1)**, the reference to the Chimney Sweep Trade Act is being updated and changed to dynamic referencing so that future updates are no longer required.

Double letter bb

§ 97(1) subparagraph 1 – new – creates a check to be performed by the chimney sweep as to whether the circulating pump is to be replaced in accordance with § 64(2) in conjunction with paragraphs (3) to (5). Since the energy efficiency index (EEI) and minimum efficiency index (MEI) efficiency standards are attached to standalone pumps so as to be clearly visible, these figures are easy to discern.

Double letter cc

§ 97(1) subparagraph 2 – new – reflects the amendment to § 72 and the fact that the check by the district chimney sweep also relates to boilers that may no longer be operated after the elapsing of the transitional periods in § 71i to § 71m.

Double letter dd

§ 97(1) subparagraph 3 –new – reflects the shifting of § 71 (old) to § 69(2).

Double letter ee

§ 97(1) subparagraph 4 – new – creates a check to be performed by the district chimney sweep as to whether the bills and confirmations under § 96(4) and (5) for biomass are available.

Letter b

Double letter aa

In **§ 97 paragraph 2**, the existing subparagraph 3 is replaced, as the previous § 64(1) no longer applies. A new task of the authorised district chimney sweep is to check whether a boiler fed with a liquid or gaseous fuel is installed contrary to § 71 to § 71m. In this respect, the scope is limited to verifying corresponding evidence.

Double letter bb

This is a consequential editorial amendment.

Double letter cc

The newly-inserted **subparagraphs 5 to 7** also transfer to the authorised district chimney sweep the checks as to whether the installed metering equipment complies with § 71a, whether the requirements for the installation of heating systems when using solid biomass in accordance with § 71 g are met and whether the requirements for the installation of hybrid heat pump heating in accordance with § 71h are met. The enforcement of these new requirements is therefore also linked to existing mechanisms, so that the district chimney sweep performs these tasks when they would be on site anyway.

Double letter dd

This addition extends subparagraphs 2 to 6, with the exception of subparagraph 1 which only applies to existing buildings, to also include new builds. Furthermore, the authorised district chimney sweep is provided with the legal basis, on which the building owner relies when installing a new heating system that is fed with liquid, solid or gaseous fuels, to make the necessary entry in the chimney sweep records.

Point 37

Letter a

The addition of the **second sentence of § 102(1)** and the subsequent sentences serves to clarify the provisions on hardship cases. When determining ‘unreasonable hardship’ in individual cases, it must also be borne in mind that the necessary investments are either proportionate to the yield or proportionate to the value of the building. When weighing this up, the circumstances of the individual case must be taken into account, including the ability to obtain financing, assistance and advice, and therefore the necessary expenses may be quite different if funding is available. The fourth sentence mentions expected price developments taking into account climate protection targets, which must be included in considerations when determining unreasonable hardship. State price components already had to be taken into account under the existing second sentence of paragraph (1). The clarification refers to possible price rise. § 102 shall also apply to legal persons. Unreasonable hardship therefore also exists for owners of buildings that are used for the purpose of operating a social, cultural or other institution for the public, such as a hospital, a

nursing care or rehabilitation facility, a daycare centre or another institution for child and youth welfare, as well as women's shelters or other protection and refuge centres for persons affected by violence or buildings used by the voluntary club and sports sector, the voluntary fire brigade, community centres or club houses, which are necessary for needs-based care, in particular if, in those cases, the investments necessary to meet the requirements of this Act would constitute a disproportionate burden, which may lead to restrictions on the provision of statutory services or jeopardise the continued operation of the institution concerned.

Letter b

The newly-added paragraph (5) is intended to exempt owners from the requirements of § 71 if they are recipients of income-related social benefits. This is the case for recipients of regular benefits under Book II of the Social Code (SGB), the third or fourth chapter of SGB XII, SGB XIV (or supplementary livelihood assistance under the Act on the Provision of Care for Victims of War (BVG)), the Asylum Seeker Benefits Act, the Housing Benefits Act (WoGG) and the child allowance under the Child Benefits Act (BKGG)).

Point 38

The amendment to **§ 107(1) second sentence subparagraph 2 and § 107(3)** is a consequential amendment resulting from the rewording of § 10(2) subparagraph 3 and the repealing of the previous § 35 to § 45 and their partial reformulation in § 71 et seq. The district provision is thus being brought in line with the newly created 65 per cent renewable energy requirement and therefore actors will continue to be able to use renewable energy in all their compliance options together in the district, if they make corresponding agreements.

Point 39

The amendment to **§ 108** extends the fines to include the newly introduced obligations.

Letter a

The amendment to **§ 108(1)** makes consequential editorial amendments to the existing situations that give rise to fines and adds new situations that give rise to fines for the newly-introduced obligations. These are based on situations that already exist.

Double letter aa

Four new situations that give rise to fines are included as **subparagraphs 4 to 7**, which penalise non-compliance with the new provisions in § 60a to § 60c for operational testing, heating inspection and hydronic balancing. Here, the structure of the previous § 108 (1) subparagraph 10 (energy efficiency inspection for air-conditioning systems) is mirrored.

Double letter bb

As a consequential editorial amendment, the previous subparagraphs 4 to 6 become **subparagraphs 8 to 10**.

Double letter cc

A new situation that gives rise to fines is also added as **subparagraph 11**, which penalises non-compliance with the obligation to replace pumps under § 64(2).

Double letter dd

The previous subparagraph 7 becomes **subparagraph 12**. A consequential editorial amendment is made due to the shifting of § 71 (old) to § 69(2).

Double letter ee

Ten new **subparagraphs 13 to 22** are inserted, which impose a fine on non-compliance with a number of obligations arising from the new heating-related requirements.

Point 13

The new **subparagraph 13** imposes a fine on non-compliance with the obligation laid down in the third sentence of § 71(2) to install or establish and operate the heating system in accordance with the specifications set out in evidence issued by a person authorised under § 88 on the basis of calculations in accordance with DIN V 18599: 2018-09.

Point 14

The new subparagraph 14 imposes a fine on non-compliance with the obligation laid down in the first sentence of § 71a(1) to equip a heating system with metering equipment for recording energy consumption and the amount of heat generated, as well as with an energy consumption and efficiency indicator by 31 December 2024

Point 15

Accordingly, **subparagraph 15** imposes a fine on non-compliance with the obligations laid down in the first and second sentences of § 71a(4) to equip non-residential buildings by 31 December 2024, in the cases mentioned in said provisions, with a building automation and control system in accordance with § 71a(5) to (7).

Point 16

Subparagraph 16 imposes a fine on non-compliance with the obligation of heating network operators laid down in the third sentence of § 71b(1) and the fifth sentence of § 71b(2) to confirm to the respective subscribers that the conditions set out in said provisions are met. The background to this is that the respective building owners and other subscribers in accordance with § 71b(3) should be able to rely on the fact that the respective data provided by heating network operators is complete and correct. Conversely, no fines are imposed on non-compliance with the 65 per cent requirement for building owners or other subscribers in the case of heating networks.

Point 17

The new **subparagraph 17** imposes a fine on non-compliance with the requirements laid down in § 71d(1) or the first or second sentences of § 71d(2) concerning direct electric heating. Especially in light of the high electricity consumption of direct electric heating and the associated significantly higher energy costs, this provision is afforded an important tenant-protecting role.

Point 18

Subparagraph 18 imposes a fine on non-compliance with the obligation under the first sentence of § 71f(1) to operate heating systems for liquid and gaseous fuels in such a way that at least 65 per cent of the heat provided by the system is produced from biomass or green or blue hydrogen, including derivatives thereof.

Point 19

The new **subparagraph 19** imposes a fine on non-compliance with the requirements laid down in the first sentence of § 71g(1) on heating systems for solid biomass.

Point 20

The new **subparagraph 20** addresses the obligations laid down in § 71g(3) on the use of solid biomass.

Point 21

Subparagraph 21 imposes a fine on non-compliance with the obligation laid down in the first sentence of § 71h to only install or establish and operate hybrid heat pump systems if the requirements set out in § 71h are met.

Point 22

Subparagraph 22 imposes a fine on non-compliance with the requirement laid down in § 71k(1) subparagraph to use less than 50 per cent green gases from 1 January 2030 until the end of the 31 December 2034.

Double letter ff

The previous subparagraph 8 becomes **subparagraph 23** and is editorially adapted to the new regulation.

Double letter gg

The previous subparagraph 9 can be deleted because the ban on the installation of oil boilers under the previous § 72(4) and (5) has been deleted. A corresponding installation ban has no standalone scope alongside the 65 per cent requirement.

Double letter hh

The previous subparagraphs 10 to 21 become subparagraphs 24 to 36 without amendment.

Double letter ii

The new subparagraph 32, with respect to the private evidence referred to in § 96, includes contractor declarations and confirmations on the fuel supplied in accordance with § 96(4). This fixes an editorial error, since compliance with the requirement for supplied biomass fuels in accordance with § 71f and § 71g(3) subparagraph 2 can only be guaranteed by someone who supplies buildings with biomass commercially. This is because building owners and other supplied persons must be able to rely on this information. In the future, this fine will also apply to someone who commercially supplies building owners with green or blue hydrogen or derivatives thereof.

Letter b

§ 108(2) already lays down the maximum fines under the Buildings Energy Act. This amendment to the legislation makes no change to this. To date, the fines have been EUR 50 000 in some cases, and EUR 10 000 and EUR 5 000 for others This range of fines was essentially in place even earlier in the previous provisions of the Energy Savings Ordinance (EnEV), the Energy Savings Act (EnEG) and the Renewable Energy Heat Act (EEWärmeG). As part of combining these provisions under the Buildings Energy Act, the average fine was lowered from EUR 15 000 to EUR 10 000.

The specific amount of the fine to be imposed is based on the extent of the wrong involved, i.e. the seriousness of the infringement of the respective obligation or ban. In addition, the fine should not only cancel out the benefit derived from the act, but should exceed the economic benefit of the act. This may also require a differentiation to be made between residential and non-residential buildings. According to the case law on regulatory offences, the assessment criteria include, for example, the value of the legal interest concerned, the degree and extent of the impairment, the severity of the consequences, the proximity of grounds for justification and excuses, and the financial capacity of the person concerned.

Paragraph (2)

Point 1

In the cases of the previous subparagraphs 1 to 9, the maximum fine is EUR 50 000. This fine framework shall continue to apply to the corresponding cases set out in subparagraphs 1 to 3, 8 to 10, 12 and 23 of the new numbering without amendment.

Point 2

In the cases set out in the previous subparagraphs 10 to 17, the maximum fine is EUR 10 000. This fine framework shall continue to apply to the corresponding cases set out in **subparagraphs 24 to and 31** of the new numbering without amendment.

Point 3

Letter a

For the new cases set out in **subparagraphs 4 to 7, 11** and 14 to 16 and 32 to 35, the maximum fine is EUR 5 000.

Letter b

In contrast, in the cases set out in paragraph (1) subparagraphs **13 and 17 to 22**, the maximum fine is EUR 5 000. However, in accordance with the second sentence, the amount of the fine shall be increased tenfold for legal persons in these cases.

The second sentence of paragraph (2) stipulates that § 30(2) of the Act on Regulatory Offences shall apply. Accordingly, the maximum amount of a fine referred to in the second sentence shall be increased tenfold for the cases referred to in the Act. The maximum amount of the fine for legal persons and associations of persons in accordance with § 30 of the Act on Regulatory Offences is therefore EUR 50 000 in the cases set out in paragraph (1) subparagraphs 13 and 17 to 22.

Point 40

The amendment of the wording in **§ 111(1) and (2)** from ‘fundamental’ renovation to ‘major’ renovation is a consequential editorial amendment resulting from the updated definition in §3(1) subparagraph 13a.

Point 41

§ 115 (Transitional provisions for fines)

§ 115 lays down a new transitional provision. The newly-inserted cases giving rise to fines set out in § 108(1) subparagraphs 13 and 17 to 22, which aim at enforcing the provisions of § 71(1), shall not apply to owners of residential buildings with no more than six dwellings, whose owner lives in the building, until the end of 31 December 2024. The pur-

pose of this transitional provision is to give occupying building owners enough time to adapt to the new legal requirements in the first year of the implementation of the heating-with-renewables requirement. Administration of the requirements laid down in § 71 to § 71m remains unaffected.

Point 42

The amendment of **Annex 8** implements, on the one hand, consequential editorial changes resulting from the moving of § 71 to § 69(2) and, on the other hand, specifies the provision in more detail – in particular for cooling distribution and cold water pipes and fittings.

Letter a

The amendment to the heading is a consequential editorial amendment.

Letter b

Double letter aa

The amendment is a consequential editorial amendment resulting from the moving of § 71 to § 69(2).

Double letter bb

This is a consequential editorial amendment.

Double letter cc

By including the reference temperature for thermal conductivity as an important parameter, the existing provision is clarified. This eliminates uncertainties in application. The thermal conductivity of the thermal insulation shall therefore be based on an average temperature of 40 degrees Celsius.

Letter c

The new provision for cooling distribution and cold water pipes as well as fittings of ventilation technology and air-conditioning systems increases the minimum thickness of the insulation layer from 6 millimetres to 9, for diameters up to 22 millimetres, and 19 millimetres with larger diameters. The background to the newly-formulated requirements are the changed framework conditions such as energy prices, which have changed significantly since the previous requirement level was set. In addition to the changed energy prices, the greater importance of climate protection also leads to the need to adapt the minimum insulation thicknesses and to improve protection from condensation.

Extensive planning calculations on the optimum insulation thicknesses from the perspective of greenhouse gas emissions and cost-effectiveness can be found in VDI 4610 Sheet 1:2018-01 ‘Energy efficiency of operational systems – high and low temperature insulation’. The new requirements in the GEG are based on energy efficiency class ‘C’ of the VDI 4610. This is also required in DIN 4140 (currently under revision) ‘Insulation work on operational systems in industry and in technical building equipment – Execution of high temperature and low temperature insulation’ (planned issue date March 2023).

The previously-required minimum thickness of the insulation layer of 6 millimetres does not, in many cases, ensure sufficient protection against surface condensation. In the example of a pipe with a diameter of 28 millimetres, condensation can form where the insulation is 6 millimetres thick from a relative humidity of about 57 per cent. The newly-required 19-millimetre insulation systems, on the other hand, in most cases protect against

condensation. In these cases, there is protection up to about 77 per cent relative humidity. This is sufficient in most cases for the ‘Germany’ climate zone.

By including the reference temperature for thermal conductivity as an important parameter, the existing provision is clarified. This eliminates uncertainties in application. The thermal conductivity for low temperature shall therefore be based on an average temperature of 10 degrees Celsius.

Article 2 (Amendment to the Ordinance on the Billing of Heat Costs)

Article 2 deletes the former provision allowing exemption from the obligation for heat pumps to record consumption and allocate costs on the basis of consumption (§ 11(1) subparagraph 3 of the Heating Costs Ordinance. § 4 and § 6 to § 9 of the Heating Costs Ordinance stipulates recording of heat consumption as well as a consumption-based billing and allocation of heating costs. However, in accordance with § 11(1) subparagraph 3 letter a, these requirements have not applied to heat pumps or solar systems to date.

The exemption for heat pumps now needs to be removed under EU law. Article 9b(1) of the Energy Efficiency Directive requires that individual consumption meters shall be installed in buildings with multiple dwellings and in multi-purpose buildings with a central heating/cooling source, to measure the consumption of heating and cooling in each building unit, where technically feasible and cost effective in terms of being proportionate in relation to the potential energy savings. This is now the case with heat pumps and therefore a blanket exception for heat pumps is prohibited under European law.

The technical complexity involved in recording consumption in the case of heat pumps in a hot water heating system is comparable to that in boilers. In addition, consumption-based recording in the case of heat pumps is cost-efficient. In the case of fossil-based energy, an energy saving of about 15 per cent is assumed as a result of consumption-based recording. Since energy costs of a supply from heat pumps are comparable to those from a fossil-based heat supply, recording of consumption and consumption-based cost allocation is fundamentally cost-efficient also for heat pumps. Therefore, the blanket exception that has applied to date is to be repealed. Furthermore, under § 11(1) subparagraph 1 letter b of the Heating Costs Ordinance, it remains possible to do without consumption-based recording of heat consumption if the costs involved are disproportionately high.

Article 3 (Amendment to the Chimney Sweeping and Inspection Code)

Point 1

The 1st BImSchV was amended in October 2021 with regard to the discharge conditions of combustion plants for solid fuels. References in the Chimney Sweeping and Inspection Code are therefore to be updated both in terms of its wording and referencing.

Point 2

The additions in § 97, which contain new tasks assigned to the district chimney sweep, prompt consequential changes in the Chimney Sweeping and Inspection Code. Accordingly, the new tasks for which fees may be charged must be included with the corresponding work values.

The new point 3.3. reflects the newly-added task of the authorised district chimney sweep under § 97(1) subparagraph 1 to check whether a circulator needs to be replaced in accordance with § 64 (2).

The previous points 3.3-3.6 of Annex 3 become the new points 3.4-3.7 as a result of an editorial amendment, with the following details:

The previous point 3.5, which to date related to the check as to whether a boiler fed with heating oil was installed contrary to the provisions of § 72(4) and (5) from 1 January 2026, is replaced by the work fee 3.6, which is incurred for checking whether bills and confirmations pursuant to § 96(5) are available. The chargeable task covered by the previous point 3.5 is no longer applicable, as the previous provision on the installation of boilers in § 72(4) and (5) is absent from the new § 72.

The previous point 3.8 (check as to whether a circulator in a central heating system is equipped with a specific device (§ 14(1) SchfHwG, § 97(2) subparagraph 3) is no longer applicable. The previous point 3.9 remains unchanged.

The new tasks added under § 97(2) in the inserted subparagraphs 4-6 are added to Annex 3 in points 3.10-3.12.

The previous points 3.10-3.12 become points 3.13-3.16 as a result of an editorial amendment.

Article 4 (Entry into force)

Article 4 stipulates entry into force.

Paragraph (1)

In accordance with **paragraph (1),** the Act enters into force on 1 January 2024. This ensures that building owners can adapt in time to the new framework conditions. In the case of installation of a heating system, the applicable law (before or after the entry into force of this amending Act) is determined in accordance with § 111(2). This is determined in the case of installation of a heating system in a new build in accordance with the first sentence of § 111(2). In contrast, the law applicable to the installation of a new heating system in an existing building is determined by the second sentence of §111(2); if the project is one that is not subject to approval, in particular it does not need a permit, does not need to be notified or undergo an authorisation procedure, the date on which construction starts is decisive.

Paragraph (2)

As an exception to the principle set out in paragraph (1), **paragraph (2)** stipulates that **§ 60b and § 60c (Heating inspection and optimisation)** and Article 2 shall not enter into force until 1 October 2024. This later date is justified by the fact that § 60b and § 60c are linked to the provisions of the **Ordinance on Medium-term Energy Security Measures (EnSimiMaV)** of 23 September 2022 (BGBl. I p. 1530). However, the EnSimiMaV will not cease to apply until 30 September 2024. Entry into force on 1 October 2024 ensures a consistent and seamless continuation of the provisions that are linked to the EnSimiMaV.