Plastic standard

Quick scan of economic effects

CE Delft
Committed to the Environment

TNO innovation for life

Contents

Reason and question

Reason

- The government has decided on a national obligation (standardisation) for the application of a minimum proportion of recyclate and biobased polymers in subproducts and end products. The plastic standard will enter into force in 2027 and gradually increase, aiming for the application of 25–30 % recyclate and biobased polymers in subproducts and end products by 2030.
- The obligation applies to all polymers processed into subproducts and end products in the Netherlands and for the Dutch market.
- The standard is laid down by parties that process polymers into subproducts and end products; this mainly concerns plastic producers (converters) in the Netherlands. Because foreign producers are not subject to a standard, competitive disadvantages may arise, resulting in production in the Netherlands being replaced by production abroad (leakage effects). At the same time, the standard can ensure that the Netherlands anticipates the transition to circular plastic and can effectively meet the growing demand — also in the European market — for circular plastic. This means the standard can also result in a competitive advantage.
- RVO and the Ministry of Infrastructure and Water Management have asked CE Delft

and TNO to estimate the average cost price increase due to the standard, the economic effects in 2030, and the impact of this on the CO_2 savings of the standard.

Central question

- What are the leakage effects and the corrected CO_2 savings of a mandatory proportion of recyclate and biobased materials for Dutch producers of plastic products in 2030?

Current market situation, cost price increase and leakage effects due to standard

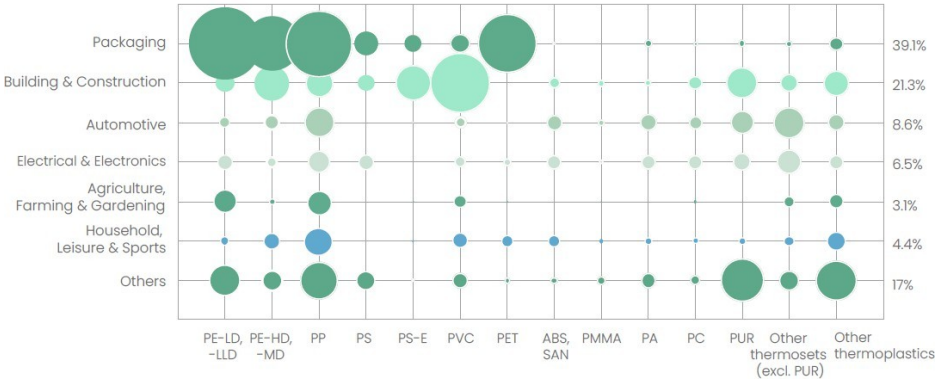
Current market situation

- According to Plastics Europe, Dutch converters purchased approximately 2.3 billion kg of polymers in 2020 for the production of plastics. Share of exports is unknown. Of more than 100 NRK members, exports accounted for 52 % of turnover in 2017.
- Producers create products for the packaging market, construction, automotive, electrical equipment, agriculture, domestic and other sectors. Many different types of plastics are used for this.
- The market in the Netherlands and Europe is highly heterogeneous, with substantial differences in the possibilities for using recyclate between converters. In 2020, the share of recyclate in new products was around 10 % (Plastics Europe, 2022). The vast majority of Dutch converters do not yet use recyclate or biobased plastics in their production processes.

Source: Plastics Europe (2022).

The definition of a polymer is based on REACH. For more information, see: Guidance for monomers

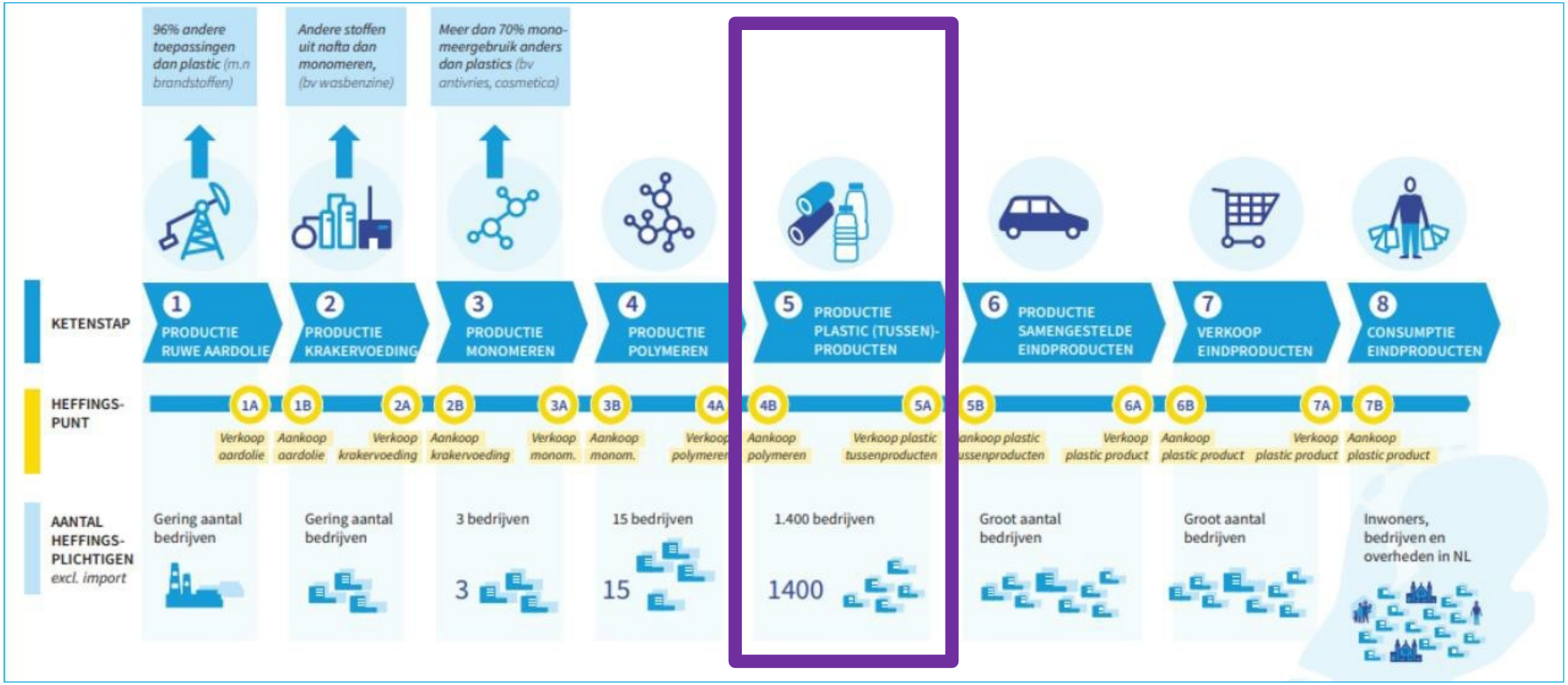
European plastics converters' demand by application and type



The standard is set for producers of plastic products

- The standard is laid down by parties that process polymers into subproducts and end products; this mainly concerns the producers of plastic products (converters) in the Netherlands.

The standard’s place in the plastics chain



96% andere toepassingen *dan plastic* (*m.n brandstoffen}*	*96 %* applications other *than plastic* (*notably fuels}*
Andere stoffen uit nafta dan monomeren, (bv wasbenzine)	Substances from naphtha other than monomers, (e.g. benzine)
Meer dan 70% monomeergebruik anders dan plastics (*bv ontwies, cosmetica)*	Over 70 % monomer-use other than plastics (*e.g. antifreeze, cosmetics)*
KETENSTAP	STEP IN CHAIN
HEFFINGSPUNT	TAX POINT
AANTAL HEFFINGSPLICHTIGEN *excl. import*	NUMBER OF TAXABLE PERSONS *excluding import*
PRODUCTIE RUWE AARDOLIE^	PRODUCTION OF CRUDE PETROLEUM
Verkoop aardolie	Petroleum sales
Gering aantal bedrijven	Low number of companies
PRODUCTIE KRAKERVOEDING	PRODUCTION OF CRACKER FEED
Aankoop aardolie	Purchase of petroleum
Verkoop krokervoeding	Sale of cracker feed
Gering aantal bedrijven	Low number of companies
PRODUCTIE MONOMEREN	PRODUCTION OF MONOMERS
Aankoop krakervoeding	Purchase of cracker feed
Verkoop monom.	Sale of monom.
3 bedrijven	3 farms
PRODUCTIE POLYMEREN	PRODUCTION OF POLYMERS
Aankoop monom.	Purchase of monom.
Verkoop polymeren	Sale of polymers
15 bedrijven	15 companies
PRODUCTIE PLASTIC (TUSSEN)- PRODUCTEN	PRODUCTION OF PLASTIC PRODUCTS/ INTERMEDIATES
Aankoop polymeren	Purchase of polymers
Verkoop plastic tussenproducten	Sale of plastic intermediates
1400 bedrijven	1 400 companies
PRODUCTIE SAMENGESTELDE EINDPRODUCTEN	PRODUCTION OF COMPOSITE END PRODUCTS
Aankoop plastic tussenproducten	Purchase of plastic intermediates

Venkoop plastic product	Sale of plastic product
Groot aantal bedrijven	Large number of companies
VERKOOP EINDPRODUCTEN	SALE OF END PRODUCTS
Aankoop plastic product	Purchase of plastic product
Groot aantal bedrijven	Large number of companies
CONSUMPTIE EINDPRODUCTEN	CONSUMPTION OF END PRODUCTS
Inwonen, bedrijven en overheden in NL	Residents, businesses and authorities in NL

Deployment of recyclate without national obligation dependent on EU product standards by 2030

- It is currently estimated that between 5 % and 10 % of producers use recyclate. This involves the application of cheaper recyclate in technically simple products (flower pots, trays, sleepers for rail and steel, inside of a sofa, pallets, etc.), but also higher-value recyclate, the additional costs of which are passed on to the customer. However, these are mainly niche markets, such as products with an Ecolabel. The majority of producers do not use recyclate and/or biobased polymers, because buyers are highly price-oriented.
- The use of recyclate and the possibility of passing on costs can increase if there is more demand for sustainable products from customers, for instance if customers are obliged to use recyclate and/or biobased materials.
- So far, however, only PET bottles are subject to a recyclate requirement (25 % in 2020, 30 % in 2030). In the European context, proposals have been made for a mandatory proportion of recyclate in packaging (10-35 %), construction products (still unknown) and the automotive sector (25 %). Standards for product groups are also

being developed under the Ecodesign Directive. However, this is not yet an established policy, meaning it is still uncertain whether the standards will arrive and how strict they will be.

The standard can be fulfilled in various ways

- The standard can be fulfilled with mechanical recyclate, chemical recyclate and biobased plastics:
  - Examples of applications for mechanical recyclate include non-food packaging, cable pipes, automotive and electronic equipment.
  - Not all converters can use mechanical recyclate. Producers of food packaging, for instance, can only use chemical recyclate and/or biobased plastics due to product standards.
    NB: the use of chemical recyclate in food packaging is also strictly regulated by product standards. This complicates the application of chemical recyclate in food packaging (see EFSA).
- The costs resulting from introducing the standard are mainly determined by the purchasing costs of the plastics. The price difference between recyclate/biobased and virgin plastics is the determining factor for the additional costs for converters. Other costs (monitoring, adjusting moulds) are much smaller and/or one-off.

Major uncertainties in cost price increase due to national standard

- There are major uncertainties in the cost of the standard, with the prices of recyclate, biobased and virgin plastics being highly volatile. In addition, there are many different types of plastics, many types of plastic products, and considerable differences in the cost of recyclate, depending on the quality. There is barely any market for chemical recyclate, meaning the range of costs is wide.
- It is also uncertain which types of recyclate will be used to comply with the standard, and how much additional recyclate/biobased should be used in 2030. If there are European standards for recyclate at product level, there will be less additional effort — and therefore costs — for Dutch converters than if the European standards do not arrive.

Deployment of recyclate in the Dutch market without a standard

In 2022, the use of post-consumer recyclate was around 13 % in the Netherlands. This share is expected to roughly double (20 %) in 2030 if European product standards for recyclate in packaging and the automotive sector are established (most concrete proposals at present).

2022	**Total**	**Post-consumer recyclate**	**Share of post-consumer recyclate**	
Production of converters 2022 (ktonne)	2 295	293	13 %	Conversio (2024)
of which packaging (ktonne)	944	94	10 %	Conversio (2024)
of which built environment (ktonne)	600	134	22 %	Conversio (2024)
of which automotive (ktonne)	130	7	5 %	Conversio (2024)
of which electronics (ktonne)	112	6	5 %	Conversio (2024)
of which domestic/leisure (ktonne)	80	6	8 %	Conversio (2024)
of which agriculture/horticulture (ktonne)	94	27	29 %	Conversio (2024)
of which other (ktonne)	335	19	6 %	Conversio (2024)
Growth 2022 - 2030	5 %			CE Delft
2030	**Total**	**Post-consumer recyclate**	**Share of post-consumer recyclate**	
Production of converters 2030	2 415	485	20 %	Calculation based on CE Delft & Conversio
of which packaging (ktonne)	994	248	25 %	Estimation based on PPWR*
of which automotive (ktonne)	137	34	25 %	Euric

of which remainder (ktonne)	1 285	202	16 %	Own assumption: same proportion as post-consumer recyclate

* PPWR requires a minimum proportion of recyclate in packaging: contact-sensitive packaging (30 % PET; 10 % non-PET), plastic bottles (30 %), other packaging (35 %).

Pre-consumer recyclate cannot be used to comply with the standard

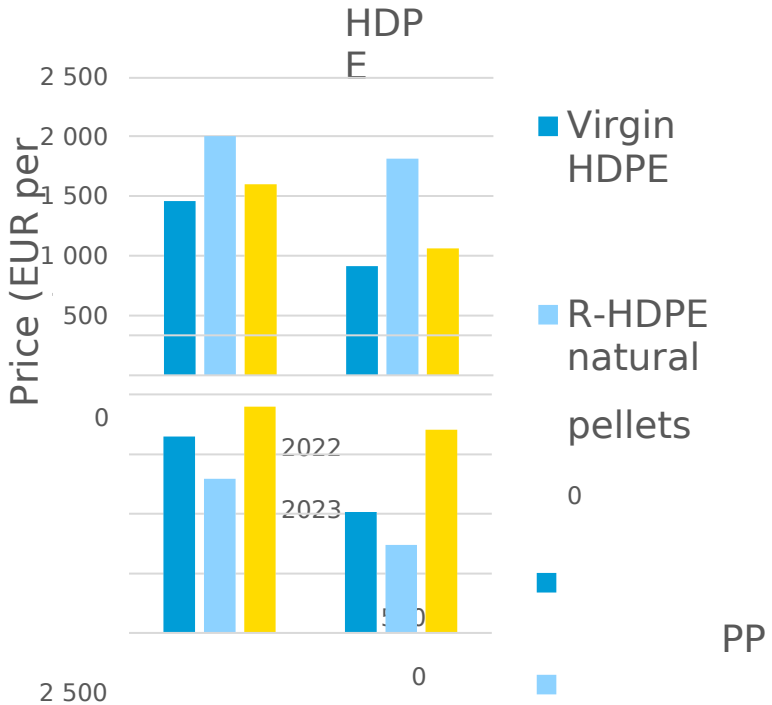
- Conversio has also provided insight into how much pre-consumer recyclate is used in the Dutch market. This concerns 154 kilotonnes of recyclate (6.7 % of total plastic production) in 2022.
- Pre-consumer recycling is the recovery of waste materials generated during the production or delivery process of goods, before these are delivered to the consumer.

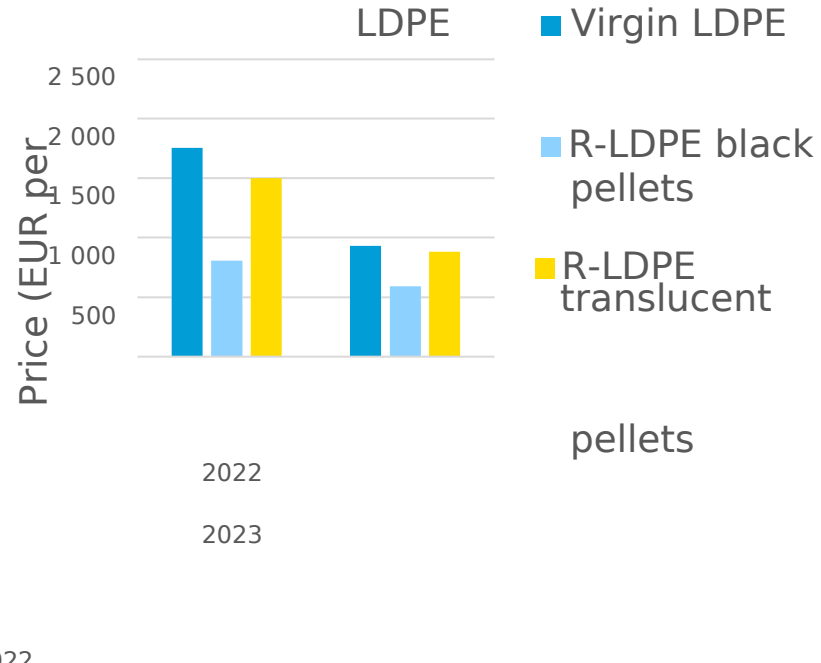
2022	**pre-consumer recyclate**
Production of converters 2022 (ktonne)	154
of which packaging (ktonne)	48
of which built environment (ktonne)	63
of which automotive (ktonne)	7
of which electronics (ktonne)	6
of which domestic/leisure (ktonne)	4
of which agriculture/horticulture (ktonne)	9
of which other (ktonne)	17

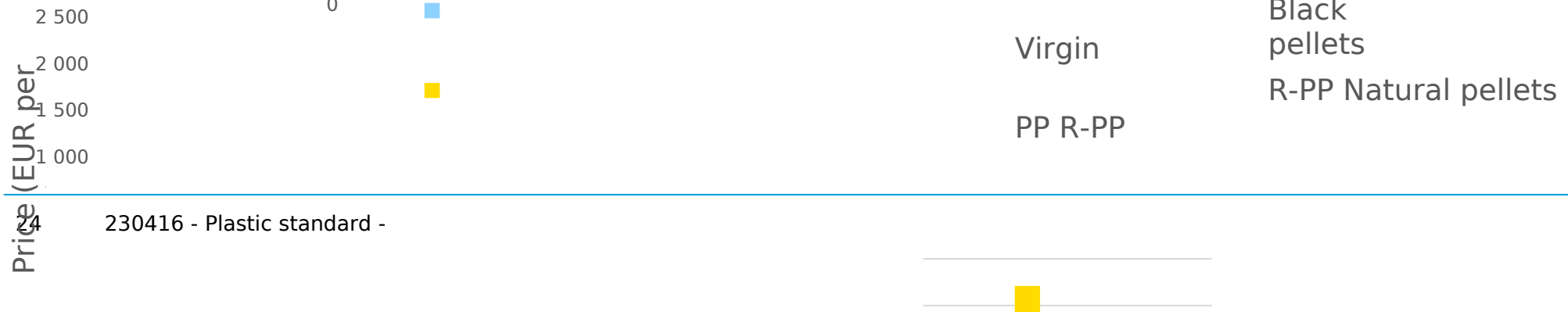
- The basic principle is that pre-consumer recyclate cannot be used to comply with the plastic standards. This choice has been made, because including pre-consumer recyclate

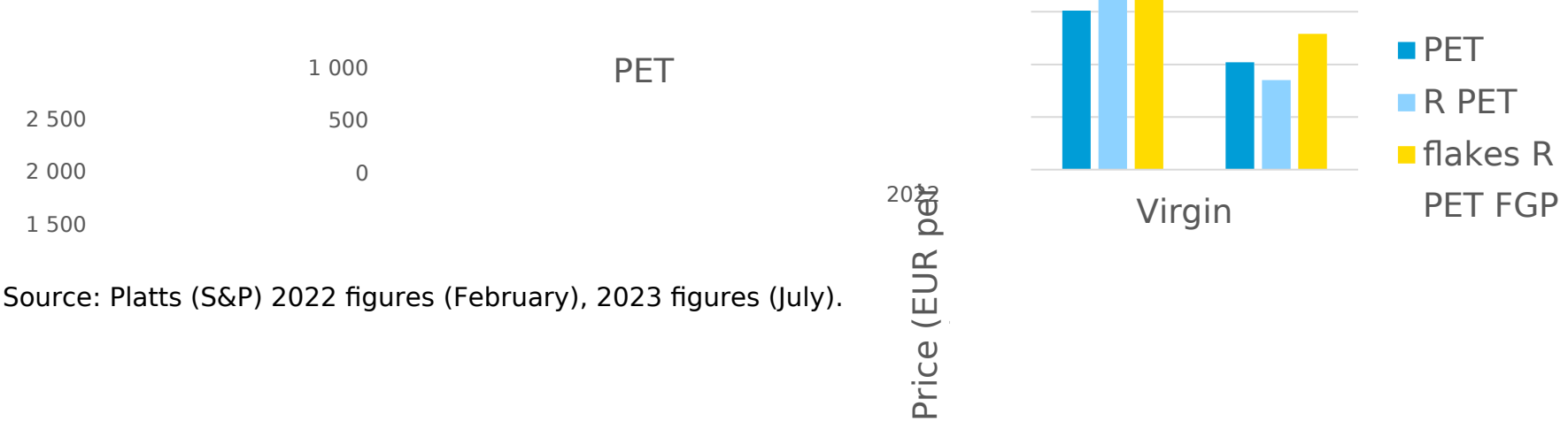
in the standard can stimulate the loss of plastic in the production processes (and therefore give an adverse incentive).

Prices of virgin and mechanical recyclate (Platts, S&P)









Source: Platts (S&P) 2022 figures (February), 2023 figures (July).

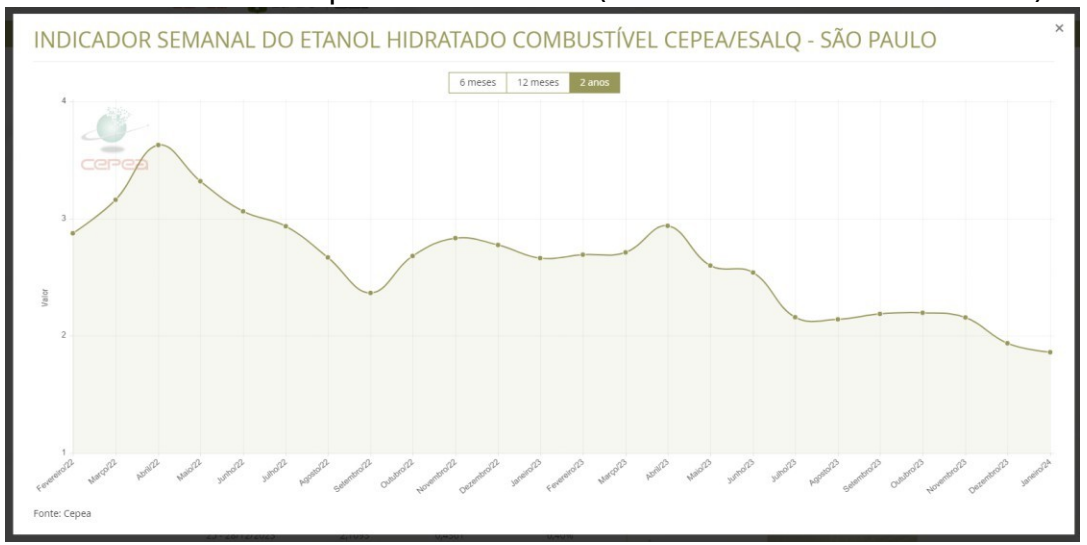
Biobased prices

- There are many different types of bioplastics. According to a biobased-plastics producer, the prices of biobased PE fluctuate between EUR 2 000 and EUR 3 000 per tonne, with the ethanol price being the most determining factor. Additional costs compared to virgin therefore vary roughly between EUR 500 per tonne (high virgin prices, low biobased prices) and EUR 2 000 per tonne (high biobased prices, low virgin prices).
- According to this producer, the technique for biobased PE production has already been considerably optimised.

The future price is mainly determined by the ethanol price (see graph).

Economia Aplicada - CEPEA-Esalq/USP

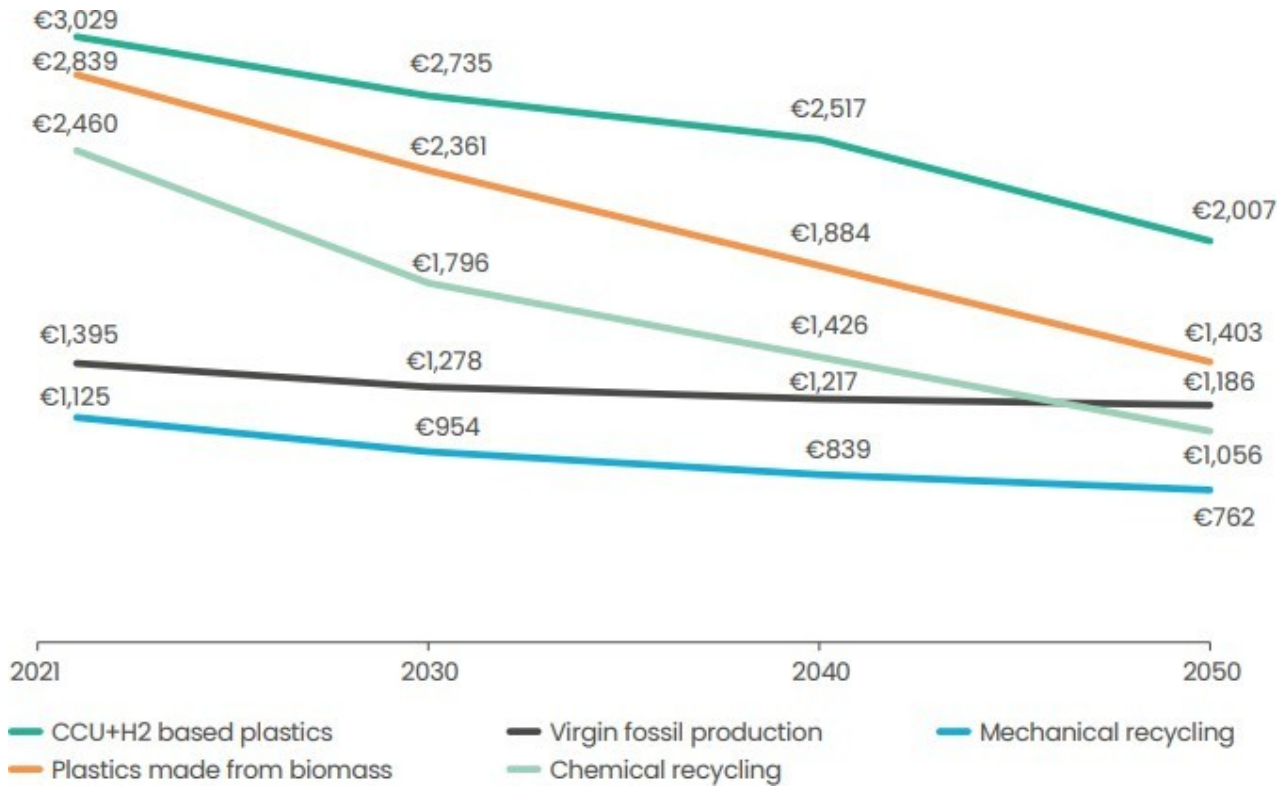
* On the Y-axis is the price of ethanol in Brazilian real per litre. One Brazilian real is equal to EUR 0.18 (conversion rate 23-1-2024).



Source: CEPEA (2023); INDICADOR MENSAL DO ETANOL HIDRATADO COMBUSTÍVEL - Etanol - Mensal SP - Centro de Estudos Avançados em

Future price developments (Deloitte)

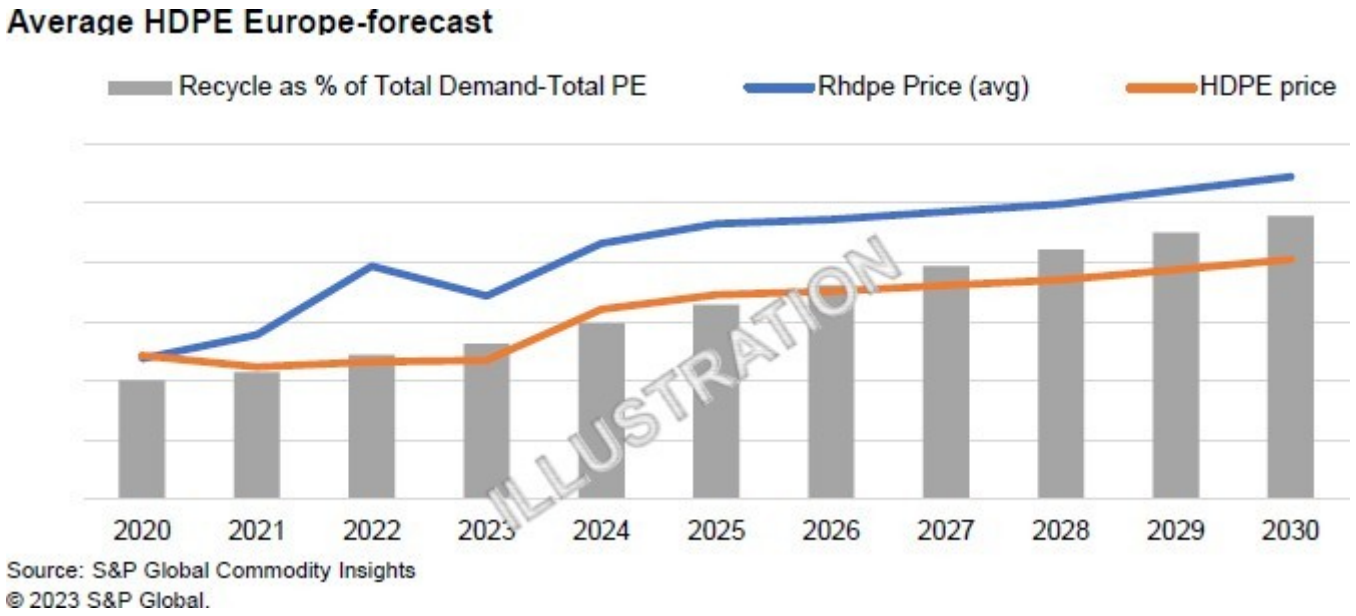
- Plastics Europe (2023) anticipates a significant reduction in costs, particularly for chemical recycling and biobased plastics.



Source: Plastics Europe (2023); The Plastics Transition.

Future price developments (S&P)

- For HDPE, Standard and Poor's expects prices of mechanical recyclate to remain higher than virgin prices at least until 2030.



Source: S&P Global (2023); Chemical Strategic Report - Brochure Plastics Circularity.

Costs of using mechanical recyclates are likely to determine the prices of tradable rights

- Because market parties are free to determine how the standard is fulfilled, and rights (hereinafter: circular plastic units) can be traded among themselves, we expect the standard to be fulfilled using the cheapest techniques to comply with the standard. This is probably mechanical recyclate. The cost of using mechanical recyclate can be limited if the market is able to meet the standard with low-grade recyclate that is cheaper than virgin. Producers using low-grade recyclate cheaply can sell circular plastic units to producers who are unable to use them.
- If the market for low-grade applications is saturated, higher-quality recyclate should be used. Sheet 15 showed that in February 2023, the additional costs were for PP natural pellets (EUR 700 per tonne) and HDPE natural pellets (EUR 900 per tonne). However, a year earlier (2022) these were
  EUR 250 (PP natural pellets) to EUR 500 (HDPE natural pellets). LDPE recyclate is cheaper than virgin.

Calculation of cost per tonne of circular plastic units

- We can therefore only estimate the additional costs compared to virgin materials with a very wide range. In a situation with high virgin prices and the use of cheaper recyclate to comply with the standard, the costs are limited. When using high-quality recyclate, additional costs of EUR 700 to EUR 900 per tonne compared to virgin material are likely an upper limit, as not everything will be covered by it (R-LDPE was cheaper than virgin material, for instance) and this was a period with low virgin prices.
  - Including costs for administration, transport, downtime (not all plastic waste can be used immediately) and investment costs, we calculate a maximum of EUR 1 000 per tonne for the maximum scenario.
- A market expert in the interviews estimated the average additional cost of recyclate compared to virgin at EUR 300 to EUR 400 per tonne. This estimate broadly corresponds to the price data from sheet 15, when we calculate the average additional costs for the use of recyclate. However, these are only the purchase costs.
  - Including administration, transport, downtime (not all plastic waste can be used immediately) and investment costs for process adjustments, we calculate EUR 500 per tonne of circular plastic units for this scenario.

Calculation of average cost per tonne of product (upper range)

- We calculated the cost per tonne of product by dividing the total cost for all Dutch converters by all products (in ktonnes) that are produced.
- The total costs are highly dependent on the amount of recyclate/biobased material that must be used in addition, compared to the autonomous situation. We estimate the share of recyclate in the autonomous situation in 2030 at 13-20 % (see sheet 13). This means that with a standard of 25-30 % (minus 13-20 % autonomous) in the entire market ≈ 5-20 % point additional recyclate and/or biobased should be deployed in 2030.
- We have calculated with 50 % sales of converters on the Dutch market (assumption, further investigation needed). At a maximum cost price of EUR 1 000 per tonne of circular plastic units, this involves a maximum cost of 50 % * 2 415 ktonnes * 5 % to 20 % * 1 000 (EUR per tonne of circular plastic units) = EUR 60 million to EUR 240 million per year. This is a maximum, as the additional costs are likely (much) lower than EUR 1 000 per tonne. Per tonne of product, this is thus the maximum

EUR 60 million to 240 million per year / (50 % * 2 415 ktonnes of products) = EUR 50 to 200 per tonne of product.

Calculation of minimum average cost per tonne of product (lower range)

- At a price of EUR 500 per tonne of circular plastic units, the range is EUR 25 to EUR 100 per tonne of
product.
- These are average costs. Depending on the possibilities for using recyclate/biobased materials, the costs will vary considerably between the converters. Converters able to use cheap recyclate (e.g. producers of flower pots) may start earning from the standard, while other producers (e.g. of food packaging) are much more expensive than the average.

Calculation of cost price increase per tonne of product

Calculation element	Description	Bottom estimate	Midpoint estimate	Top estimate
A	Additional costs compared to virgin material of using recyclate/biobased* (price of circular plastic unit, EUR per tonne)	Limited	500	1 000
B	Quantity of recyclate/biobased material to be additionally used in plastic products (ktonnes) (5-20 % extra)	60-240	60-240	60-240
C = (A*B)/1 000	Costs for converters in the Dutch market (EUR million)	Limited	30-120	60-240
D	Quantity of plastic products subject to the standard (ktonne)	1 200	1 200	1 200
E = (C/D)*1 000	Average cost per tonne of plastic product (EUR per tonne)	Limited	25-100	50-200

* Because mechanical recyclate is the cheapest, we expect that the standard will mainly be fulfilled with mechanical recyclate.

WorldScan model to estimate leakage

- Originally developed at CPB since 1990.
- Energy version co-developed by PBL since 2005.
- Application here of energy version CE Delft/TNO by sector structure and policy to be calibrated at CE Delft (2022):
  - current policy (Climate and Energy Outlook, KEV 2022).

Previous applications:

- Trade policy (EU accession, Brexit, Trump trade conflicts):
  - Bollen, J., G. Meijerink, and H. Rojas-Romagosa (2016);
  - Bollen, J., and Rojas-Romagosa, H. (2018);
  - Lejour A., and De Mooij, RA (2004).
- Climate policy and CO_2 leakage:
  - Hoogendoorn, S., Trinks, A., and Bollen (2021) see voxeu.org;
  - Boeters, S., and Bollen, J. (2012), in Energy Economics;
  - Bollen, J., Koutstaal, P., Veenendaal, P. (2011) for EU Commission, DG Trade.

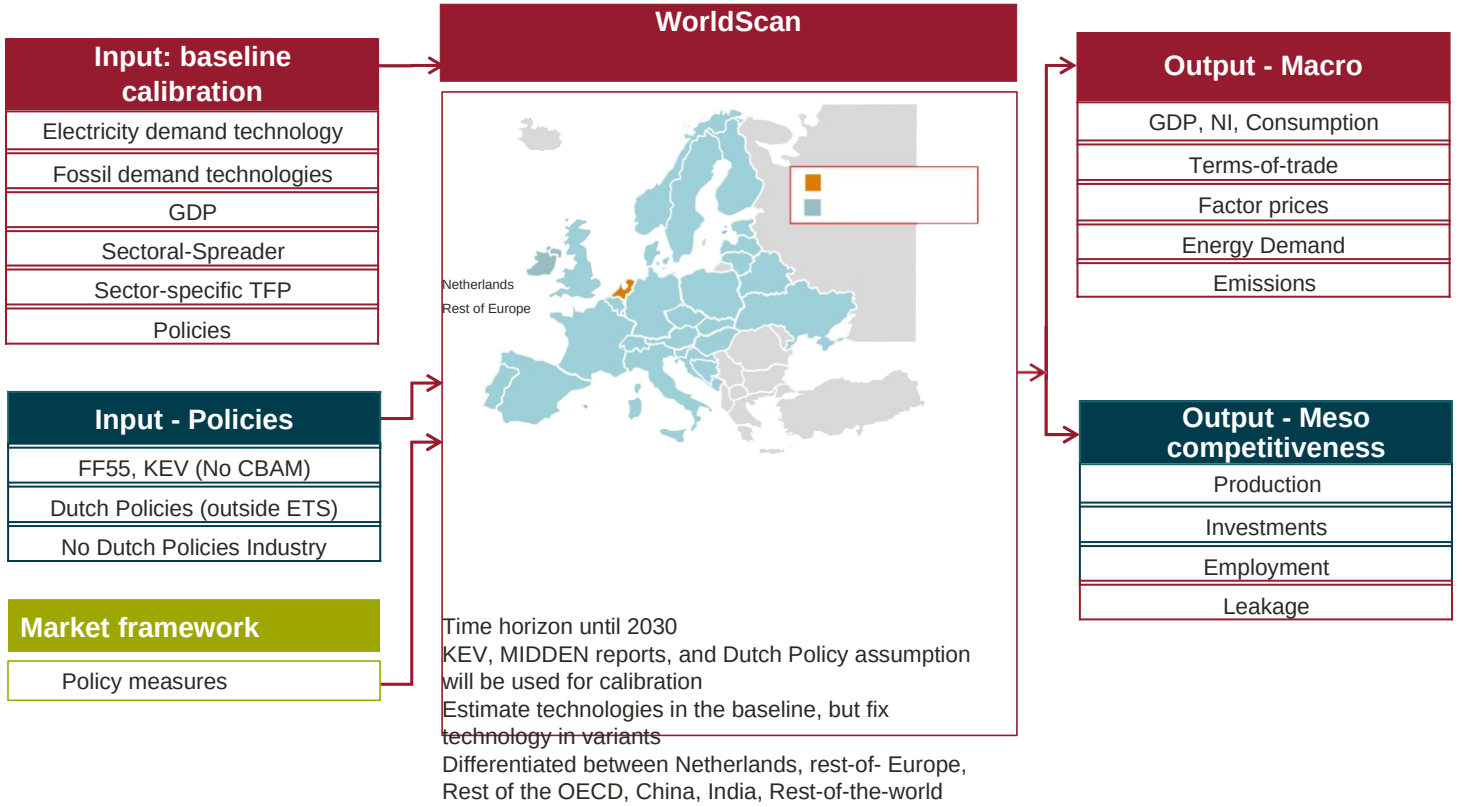
Model descriptions:

General:
Lejour, A., Veenendaal, P., Verweij, G., and van Leeuwen, N. (2006), WorldScan: a Model for International Economic Policy Analysis, CPB Document No 111, CPB.

Energy:
Bollen (2015), The value of air pollution co-benefits of climate policies: Analysis with a global sector-trade CGE model called WorldScan, Technological Forecasting and Social Change, Volume 90, Part A, 2015, Pages 178-191.

WorldScan: schematic helicopter view

- Computable General Equilibrium (CGE) model estimates economic impact for the entire economy of large industrial sectors switching to costly carbon-extensive production methods
- Simultaneous changes:
  - GDP, NI, output, domestic demand, prices, wages, competitiveness



Relevant WordScan assumptions here

- Industry sector breakdown: see also trade elasticity (Armington) on the right.
- Armington = the elasticity of substitution between the same products from different countries. The Armington elasticity of imports describes the extent to which imports increase as production costs in a country rise.
- (CPB & PBL, 2019).
  - This means that if the cost price of ‘paper’ were to increase by 1 % compared to the rest of the world, imports of foreign ‘paper’ would increase by 7 % in the Netherlands.
- Best available estimate of Armington elasticities in Lejour et al. (2006), but confirmed in CPB link (2020).
- Armington may vary for converters, hence sensitivity analysis:
  - Based on the method developed by CPB for calculating the Climate Agreement.
- Here is a rough calculation of leakage due to the short lead time of the project. Key limitations of WordScan:
  - model is by definition a simplification of reality;
  - rough sectors (preferably plastics separated, including trade flows, see GTAP-17);
  - analyses less suitable for the short term (e.g. no cost of short-term employment shifts in the labour market).

Sector	WorldScan[1]
Paper	7
Petroleum, coal products	5
Chemicals, rubber, plastics	8
Mineral products (non-metallic, sand, gravel, limestone, concrete, cement)	7
Other transport (water and air)	5
Agriculture – vegetables, fruit, etc.	5
Agriculture – Other (including fisheries)	6
Minerals and mineral products (metals)	3
Base metals	8
Consumer products – food	6
Consumer products – other	8
Capital goods and durable goods	9
Road and rail transport	5
Other services	5

Leakage effects in 2030 (%)

Cost per tonne of product	EUR 25/t	EUR 100/t	EUR 200/t
Leakage (%)	3 (2-5)	9 (5-18)	17 (9-36)

- Leakage in 2030 (%) is a decrease in domestic sales due to an increase in imports (% compared to the level of the baseline scenario).
- Method and range sensitivity analysis for given level costs per unit product based on CPB relocation link.
- Limitations of the analyses:
  - Focus on long-term structural effects.
  - Rough calculation by broad sector structure.
  - Employment shifts due to policy are taken into account, although not unemployment, see CPB relocation link. Short-term costs of work-to-work funds have been disregarded.

Positive effects of the plastic standard

Incentives for circular activity

- The standard-setting instrument obliges plastic producers to use recyclate and/or biobased polymers. This stimulates the sustainable plastic industry (mechanical, chemical recycling companies and biobased plastic producers) in the Netherlands.
- This also applies to the sorting and waste-processing sector. Consideration can be given to new activities of waste processors to separate used plastic, and process it into plastic recyclate. For instance, plastic can be sorted out from construction and electronic waste. This requires investments in new sorting lines (which are often not yet profitable at present).
- In the Netherlands, there is a relatively large amount of expertise in the field of waste treatment and plastic recycling. This is reflected in the analysis of Plastics Europe (2022), where the Netherlands is mentioned as one of the frontrunners within Europe, with a high sorting and recycling rate for plastics.

Even with cheap virgin prices, guarantee of sufficient sales for the circular industry

- However, the business case of the recycling chain is under pressure due to low prices for fossil-based plastics. This has already led to bankruptcy at Umincorp (a plastic recycling company) – Plasticrecycler Umincorp failliet • Recycling Magazine Benelux). Without an incentive policy (e.g. in the form of a standard with subsidies), there is a risk that several companies in the circular plastics chain will go bankrupt, as a result of which the Netherlands may lose the ‘first-mover advantage’. This may also apply to producers of bioplastics.
- An obligation ensures a guaranteed market for recycling companies with converters, even in times when fossil-based plastics are cheap. This ensures the maintenance of the circular plastic chain.

CO_2 effects

Corrected CO_2 savings

- Plastic producers will use 2 415 ktonnes of polymers in 2030.
- Assuming 50 % export, an estimated 1 200 ktonnes will be used for sales on the Dutch market.
- Additional recyclate is then 25 to 30 % (recyclate use at standard) - 13 to 20 % (recyclate use without
  standard) ≈ 5 to 20 % * 1 200 = 60 to 240 ktonnes of recyclate.
- Environmental benefit without leakage effects is 60 ktonnes to 240 ktonnes * 3.2 ktonnes CO_2 / ktonnes recyclate (mechanical recycling) = 190 to 770 ktonnes CO_2.
- Corrected for leakage effects, the CO_2 savings are 120 ktonnes (lower range, considerable leakage) up to 750 ktonnes (upper range, low leakage).
- In this calculation, we did not take into account potential circumvention possibilities for the standard by manufacturers of plastic products (see next sheet).

Plastic-standard circumvention possibilities for intermediaries

- In the market, obligations from the plastic standard can be circumvented through European intermediaries:
  - The standard only applies to the placing on the market of plastics in the domestic market. Foreign customers can therefore freely purchase fossil-based plastic products, such as plastics intermediaries.
  - European intermediaries (e.g. from Belgium) can then easily sell the plastics on the Dutch market, without additional use of recyclate/biobased materials and the resulting cost price increase.

CO_2 savings and adverse economic effects are higher when exports are also included in the plastic standard

- Including exports under the standard means the possibility to evade through intermediaries disappears. In a situation where exports are included in the standard, the base doubles (2 400 ktonnes instead of 1 200 ktonnes of polymers). While this roughly doubles the
  CO_2 savings, leakage effects are also twice as high.
- It is assumed that 50 % of the plastic products of Dutch converters are sold on the Dutch market, with this value being based on a survey among NRK members from 2017.
- In order to estimate the share of exports in Dutch plastic production, it is worth considering updating this data and conducting the survey with more companies.

Conclusions and recommendations

Conclusions

- There are considerable uncertainties in costs due to the standard. This is highly dependent on whether sufficiently cheap recyclate can be used at market level to comply with the standard, how much extra effort is needed compared to the European obligations, and how the prices of virgin plastics, recyclate and biobased will develop (volatile market).
- The costs and leakage effects will vary greatly for each converter. This is a highly heterogeneous market. Producers of food packaging will face greater competitive disadvantages than producers who are able to use low-grade recyclate.
- A preliminary rough median estimate indicates a production loss of 5-18 % of the sales of Dutch converters on the Dutch market, with a small chance that the leakage effects may also be lower, down to zero, but also a small chance that the leakage effects may rise to 36 %.
- Leakage effects may ultimately be lower due to the first-mover advantage, as Dutch producers gain experience with using recyclate/biobased in anticipation of European standards.

Recommendations (1)

- Use a model with more sector detail to determine leakage effects more precisely.
- Use a more detailed method to arrive at a more accurate cost price estimate.
- Identify more accurately and quantitatively the economic benefits of the standard.
- Identify more accurately which products and plastics are made by Dutch converters, the quantities of recyclate/biobased materials that are technically possible or necessary to use in the production of plastic products, and the prices for the use of biobased/recyclate.
- Identify more accurately how the leakage effects will impact the various market segments of plastic producers (converters).
- Conduct an analysis of the export volumes at Dutch converters.

Recommendations (2)

- Subsidise parties that have to comply with the plastic standard to prevent leakage effects. Particular attention should be paid to parties that find it difficult to use recyclate in their products, because these parties have the greatest leakage effects.
- Consideration can be given to a subsidy on the purchase of circular plastic units (the tradable rights), because these will often be purchased by parties that find it difficult to use recyclate. Additional research is needed into the functioning of such a toolbox (because it may remove part of the price incentive), and whether this is legally possible.
- Consider including exports under the standard to avoid shifting effects. This ensures that the environmental benefits, as well as the leakage effects, roughly double. Leakage effects can be reduced by subsidies (see bullets above).

Sources

Sources (1)

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- Plastics Europe (2022); Plastics – The Facts 2022
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Interviewees

- Matthijs Veerman (Morssinkhof Plastics).
- Theo Schilder, Rob Twelker, Evert Smit (all KIVO).
- Jeroen van Goor (Circular Polymer Solutions).
- Harold de Graaf (NRK), Martin van Dord (NRK), Rob Verhagen (Opack Group), Wietse Wissema (Alligator-Plastics).

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