

Summary

Background and goal

The Dutch government aims to achieve a fully circular economy by 2050. One measure that could potentially contribute to this is a tax on virgin fossil-based plastic. The tax is intended to discourage the production and use of virgin fossil-based plastic, while encouraging the proportion of plastic recyclate and bio-based plastics. The main goal of this study is to calculate the environmental and economic impact of a tax on virgin fossil-based plastics.

Variants

We have analysed the impact with regard to two variants:

1. A tax on polymers. These are plastic granules that plastic products are made from. The advantage of a tax on polymers is that it is the simplest to design due to the limited number of players (15 large companies and importers). It is also easier to tax all plastics on the market.
2. A tax on finished plastic products. This variant has many more players, making it more difficult to design and implement, but it has the least competitive disadvantages and leakage effects.

We determined the impact of three different tax rates with regard to both variants: 100 euros per tonne, 500 euros per tonne and 800 euros per tonne of plastics.

Results

The environmental and economic impact is shown in the table below.

Table 1 - Environmental and economic impact

Tax	Tax rates	CO ₂ reduction globally (ktonne)	Impact on litter	Impact on biodiversity	Loss of production of plastics sector (%)
Polymer	100	-160 to -130	Likely to be limited	Limited	-12
	500	-850 to -380	Likely to be limited	Limited	-40
	800	-1,600 to -420	Likely to be limited	Limited	-46
Product	100	-190 to -170	Likely to be limited	Limited	-5
	500	-760 to -440	Likely to be limited	Limited	-10
	800	-1,480 to -530	Likely to be limited	Limited	-13

Source: own calculations

The main findings of the study are:

Both variants could lead to a significant reduction in global CO₂ emissions.

The study reveals the significant potential of a net global CO₂ impact of a tax on plastics of up to 1,600 ktonnes per year in 2030, based on a tax on polymer of 800 euro per tonne. This involves reductions in emissions throughout the plastics chain, from production to incineration. These reductions could take place in the Netherlands and abroad if imports

are replaced by recycle or if the incineration of Dutch plastics in German waste incinerators is avoided. However, the ranges are wide. A tax of 100 euro per tonne is unlikely to be high enough to encourage investment in extra bio-based production and/or encourage the use of recycle. The extra CO₂ emissions from substituting plastics with other materials are likely to be limited.

The economic drawbacks¹ may be considerable

The potentially large CO₂ gains are offset by the drawbacks for Dutch industry. In the case of a polymer tax of 800 euro per tonne, it is not inconceivable that sales of plastic products produced in the Netherlands would fall by more than 45%. Much of the loss of plastic production would be replaced by imports of plastic products from abroad. This means that the plastics industry will shrink sharply in the Netherlands, especially in the case of a polymer tax of 800 euro per tonne. In general, the adverse economic impact of a tax on plastic products would be smaller than a tax on polymers.

The impact on litter is likely to be limited

For all variants and tax rate, the impact on the amount of litter is likely to be small. Although we have been unable to calculate the impact as part of this study, the substitution will have a limited effect on other materials and/or reduce the consumption of plastics (a maximum of 10%), making it unlikely that there would be a significant decrease in the amount of litter.

Impact on biodiversity depends on sustainability criteria being applied

There could be a significant potential increase in the production of bio-based materials. The total current area required for beet production would double (80,000 hectares extra) if a polymer tax of 800 euro per tonne is levied on 250 ktonnes of bio-based plastic produced in the Netherlands. An alternative option is to import bioplastics, for example from Brazil. Only sustainable bioplastics that meet sustainability criteria should be allowed, such as those already in place for biofuels and bioenergy.

A tax on plastics is likely to have much additional impact on a mandatory percentage of recycle

Efforts are currently being made at European level to introduce legislation requiring a mandatory proportion of recycle. This legislation focuses on specific product groups and currently already applies to bottles made of polyethylene terephthalate (PET). The reinforcing effect of a tax requiring a mandatory proportion of recycle is likely to be limited. If such a requirement is sufficiently ambitious, then it is already certain that the proportion of recycle in those product groups will increase. When a standardised/maximum proportion of recycle is reached for a product group, a tax on the remaining proportion of virgin fossil-based plastics only has the effect of driving up the price, either because the product only partially contains recycle or the supply of recycle is limited. However, it is anticipated that the EU will not impose a requirement regarding the proportion of recycle for many plastics product groups. A generic toolkit for all plastic products has wider effects on multiple plastics product groups. If the recycle requirement only applies to part of the plastics market, the impact of a non-mandatory tax on other plastics product groups could still be substantial.

¹ The economic drawbacks are mainly the production effects of the tax on the industry. It would have a smaller impact on Dutch consumers.

Channelling tax revenue back to industry to reduce adverse effects

In order to limit cost price increases for Dutch producers, revenue from the tax could be channelled back to industry, such as in the form of a subsidy for the purchase of recyclate and bio-based materials. The availability of sufficient recyclate is also important in this regard. Flanking policies, such as required collection targets in Extended Producer Responsibilities (UPVs), are useful.

Recommendations

– There has been little previous research into the impact of a tax on plastics. This study concerns a first approximation of the impact. In particular, more detailed research on the availability and additional costs of using extra recyclate would be useful. This study applies an outline cost curve with the average costs per application of plastics. A more detailed cost curve would provide a more precise understanding of the impact of a tax on the availability of extra recyclate. It would allow the economic impact to be modelled more accurately with more sector-specific data for the plastics sector. It would also allow bottom-up cost curve information to be integrated into the production function of the plastics sector.

– A tax on plastics should preferably be introduced at a European or global level. This particularly applies to a polymer tax due to competitive disadvantages and leakage effects. These are highly dependent on other individual countries' policies to make the chemical sector more sustainable. A broader-scale tax would also be much more effective in encouraging the use of biobased materials and recyclate, since only part of the output of plants is for the Dutch market. The Netherlands could follow the strategy of introducing the tax and hoping for a flywheel effect as a frontrunner, while continuing to push for a required proportion of recyclate and biobased for more product groups in the European context. Provided it is sufficiently ambitious, a good alternative or supplement to a tax is to require a certain proportion of recyclate, such as 30% recycled and 15% biobased content by 2030. The feasibility of harmonising an energy tax on fossil fuel use at European level could also be explored.

– The effects of a tax only materialise if the tax is stable and long term. Only then can a tax provide investment security for additional biobased production and waste sorting facilities. Companies indicate that there is no such certainty: a maximum of four years. A long-term pathway for the tax of five to ten years, where rates are not changed in the interim, could increase effectiveness.

– This study examined two tax variants. Other variants could also be explored further, such as a tax on crude oil at the very start of the supply chain.