How can the EU Emissions Trading System drive the plastics sector's zero-carbon transition?

This policy paper complements the briefing "A New Hope - recommendations for the EU Emissions Trading System review"

Introduction:

Plastic production is the largest part of the chemical sector, constituting about one third of chemicals production worldwide and about one fifth in Europe.[1] The petro-chemicals sector is the sector that uses the most energy in the world, more than the iron and steel, cement, pulp and paper, and aluminium industries, and is the third largest source of industrial CO_2.[2] The upcoming revision of the EU Emissions Trading System (EU ETS) is a crucial opportunity to set the sector on a more sustainable path in line with Europe's climate goals.

The petrochemical industry plays a major role in the production of plastic.

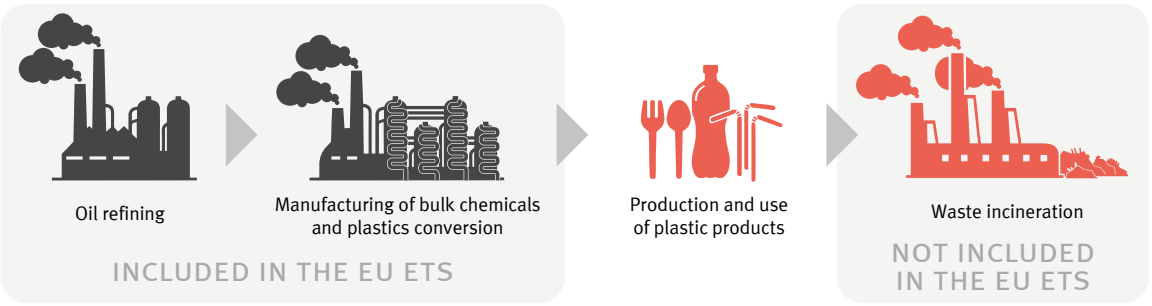
Plastic is produced primarily from fossil fuels, either natural gas liquids or naphtha from oil refineries. The first stages of plastic production are particularly energy and emission- intensive. They require the hydrocarbons (gas or naphtha) to be cracked to produce monomers. Monomers are then polymerized in the following stage to transform them into different types and ranges of plastics.

The complexity of this process and interlinked value chains make it very hard to identify the exact amount of CO_2 emitted in the production of plastic. This is, in particular, due to the fact that the production of virgin plastic is often located within petrochemical clusters and oil refineries to more efficiently use the different products coming from crackers and refineries.

Several studies identify three major sources of greenhouse gas pollution in the plastic life cycle: refineries and upstream transport/ extraction, the steam crackers that turn hydrocarbons into monomers, and incineration of plastics.[3]

Of these three sources of emissions, only two are so far covered under the Emission Trading System (ETS): oil refining (a segment of source 1) and manufacturing of bulk chemicals (source 2). Waste incineration is not currently included in the ETS directive.

Plastic life cycle:
where most CO_2 emissions occur and how pollution is priced



**The illustration is a simplification of a much more complex process*

The most energy and emission- intensive stages of the plastic production process are oil refining to produce naphtha and the use of steam crackers to produce monomers from it. According to the European Environment Agency, annual greenhouse gas emissions related to plastic production in the EU (i.e. the share of direct emissions from petroleum refineries and chemical manufacturing) amount to around 13.4 million tonnes (Mt) of CO_2, which is about 20 % of the chemicals industry's emissions EU-wide.[4]

Those two sectors combined are responsible for a sizeable share of GHG emissions in Europe. In the last seven years (2013 - 2020), emissions from oil refining ranged around 125 Mt CO_2 a year and the production of bulk chemicals accounted for 38 Mt CO_2 in the same period.[5]

However, because the EU policy framework does not provide enough incentives for the sectors to reduce their greenhouse gas pollution, plastic production has not seen much pressure to change.

In the EU ETS, free allocation of emissions allowances to refineries and petrochemicals plants generated massive windfall profits for the sectors between 2008 and 2015. In that period, refineries gained 4.6 billion EUR in windfall profits and petrochemicals 1.7 billion EUR.[6] Due to this, emissions from these sectors have not reduced much in the last 10 years. In fact, emissions from bulk chemicals grew between 2012 and 2013, to then settle at around 38 Mt CO_2 a year and have not decreased since.

A strong reform of the ETS Directive can help significantly reduce carbon pollution from the petrochemical sector. The following elements of the EU ETS reform are of particular importance:

1. Stronger CO_2 price signal

The increased 2030 emission target and the reform of the EU ETS would increase the price of pollution on the EU carbon market. This would provide petrochemical installations with a greater incentive to reduce their GHG emissions to reduce their exposure to the carbon price.

2. Cancellation of free allowances

A strong ETS reform would entail the immediate phase-out of freely allocated emissions allowances to all industrial sectors, including petrochemicals. This would dramatically limit industry's ability to generate windfall profits and would instead enforce the polluter-pays-principle, thereby making polluting production processes more expensive. In the case of plastic production, the increase in exposure to a high(er) carbon price could reduce the production of virgin plastic and push the industry to look for more climate and environmentally-friendly solutions. These include the deployment of more renewable energy, higher recycling rates and more ambitious demand-management strategies.

3. More revenues to invest in climate solutions

The cancellation of free allowances and the increase in carbon price would also lead to higher revenues from auctioned allowances. Some of these revenues could be recycled towards research and innovation in the petrochemical sector to fund more climate-friendly recycling solutions and move away from fossil-based primary production and disposal.

4. Bringing waste incineration under the EU ETS

Municipal Solid Waste (MSW) incinerators (with energy recovery) are used to burn waste, including plastic, that is then converted into usable heat, electricity or fuels through a variety of processes. According to an EEA report, 20-30 million tonnes of plastic waste is incinerated in Europe annually, leading to CO_2 emissions of around 50-80 million tonnes per year.[7] As outlined above, the EU ETS does not currently cover emissions from incinerators, although they are highly emitting plants and their emissions have doubled in 2018, reaching 52 Mt fossil CO_2. Including MSW in the EU ETS would make waste incineration subject to the carbon price signal and thus make this practice more expensive. This would in turn encourage other more sustainable and low-carbon waste treatment options, like material recovery and better waste management.

Recommended amendments to EU ETS Directive 2003/87/EC

Municipal Solid Waste incineration plants should be added to Annex I of the Directive

Conclusions

Plastic production accounts for 20% of the total greenhouse gas emissions of the chemical industry. It is therefore crucial to tackle emissions from this sector as early as possible. Reaching climate neutrality by 2050 at the latest will not be possible otherwise.

A strong revision of the EU Emission Trading System that increases the carbon price signal and addresses emissions from waste incineration will be crucial to drive down emissions from plastic production. An adequate carbon price will incentivise investments in cleaner or alternative production processes. The inclusion of waste gases will expand carbon pricing to an area so far left off the hook. This will make the highly polluting practice less attractive, and encourage more sustainable waste treatment options.

Recommendations:

- **Increase the CO_2 price signal for the petrochemical industry to reduce the production of virgin plastic and push the industry to look for more climate and environmentally-friendly solutions.**
- **Cancel freely allocated emissions allowances to petrochemicals industries to limit their ability to generate windfall profits and enforce the polluter-pays-principle.**
- **Increase revenues to invest in climate solutions to fund more climate-friendly recycling solutions and move away from fossil-based primary production and disposal.**
- **Include waste incineration under the EU ETS to encourage other more sustainable and low-carbon waste treatment options, like material recovery and better waste management.**

References

1 *EEA Report 2021 "Plastics, the circular economy and Europe's environment - A priority for action"*

2 *ibid*

3 *Reinvent: Climate innovations in the plastics industry: Prospects for decarbonisation*

4 *EEA Report 2021 "Plastics, the circular economy and Europe's environment - A priority for action"*

5 *EEA ETS data viewer*

6 *Carbon Market Watch: Industry windfall profits from Europe's carbon market 2008-2015*

7 *EEA Report 2021 "Plastics, the circular economy and Europe's environment - A priority for action"*

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