ASSESSING THE IMPACT OF A CO_2 TAX AT THE MARGIN, COMBINED WITH A SUBSIDY SCHEME FOR THE DUTCH INDUSTRY

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Overview

In the Dutch Climate Act (2019) a GHG emission reduction target is stated for 2050 and 2030 of 95% and 49% compared to 1990 levels, respectively. Approximately one third of the Dutch emissions are on the account of industry, requesting a significant effort from the Dutch industry to reduce emissions. In 2019, various stakeholders made plans and commitments to reduce their emissions as presented in the Dutch Climate Agreement. The most important measures for industry were the introduction of a Dutch CO_2 levy, as well as the expansion of the existing subsidy scheme for renewables to include additional CO_2 reducing options such as Carbon Capture & Storage (CCS). The CO_2 levy that became effective as of 2021, is set up as a minimum price for CO_2 where EU ETS companies only must pay the difference with the ETS price. The CO_2 levy begins at 30 €/ton in 2021 and increases up to 128 €/ton in 2030. Part of the emissions is exempted from the levy (dispensation rights), where the allocation of dispensation rights is in line with the EU ETS benchmarks but are reduced annually by a national reduction factor[1]. In case a company emits more than its allocated dispensation rights, it can either decide to pay the tariff, or it can acquire dispensation rights from companies with a surplus of rights.

To accommodate the industry, subsidies are available for CO_2 reduction options that fall under SDE++ categories in the SDE++ subsidy scheme (feed-in tariff). The SDE++ is a generic support instrument to cover the unprofitable margin for technology categories. The unprofitable margin is determined by the calculation of the long-run marginal costs for categories minus a 'correction amount' to account for the market value. For example, the market value for CCS is given by the EU ETS price, since the unused rights by reducing emissions can be sold on the ETS market. The subsidies allocated to industry are restricted by a 550-million-euro budget to be spend annually on non-renewable CO_2 reduction options, while the total amount of subsidized CCS is limited to 9,7 megatons of CO_2.[2] Whether or not the 550-million-euro limit is restrictive is depending on the correction amounts, and consequently on the EU ETS and gas market since ETS and gas prices are the main determinants for the correction amounts of options in industry.

At the request of the Dutch government, PBL re-assessed[3] which tariff for the CO_2 levy is required to meet the emission reduction target under adopted policies [1]. We also assessed the required tariff to meet the more stringent target for 2030 as stated in the Dutch Coalition Agreement of 2022 (proposed policy). For this purpose, we assessed the impact of (certain levels of) the CO_2 levy and ETS price on energy and emissions in the Dutch industry, where the dispensation rights are in line with the target under either adopted or proposed policies. In the standard runs we assume that the tariff and dispensation rights do not change after 2030 since there are no concrete policy decisions made. It is important to note that the uncertainties are significant, e.g., due to potential setbacks from the unavailability of infrastructure. In this study we highlight a few important uncertainties qualitatively or quantitatively.

Methods

The SAVE-Production model, a detailed[4] hybrid simulation and optimization model of the Dutch industry and the horticultural sector, is utilized to assess developments in energy and emissions. It takes a private investors perspective, minimizing the discounted net costs (investment costs, fixed costs, operational expenditures including CO_2 emission costs, and subsidies) while also considering limitations such as subsidy expenditure ceilings, energy demand and supply balances (thermal-, electric-, hydrogen), and available infrastructure. Also, we include a threshold (transaction cost) to reflect the assumed preference of companies to reduce their own emissions and not be dependent on others.

Multiple runs have been performed assuming different CO_2 levy tariffs (102, 128, 153 and 179 €/ton) and EU ETS prices (33, 63 and 100 €/ton) under the adopted and proposed reduction targets, assuming the fuel and electricity prices from [4]. Besides the standard runs, sensitivity runs with e.g., different fuel prices, are performed to assess robustness

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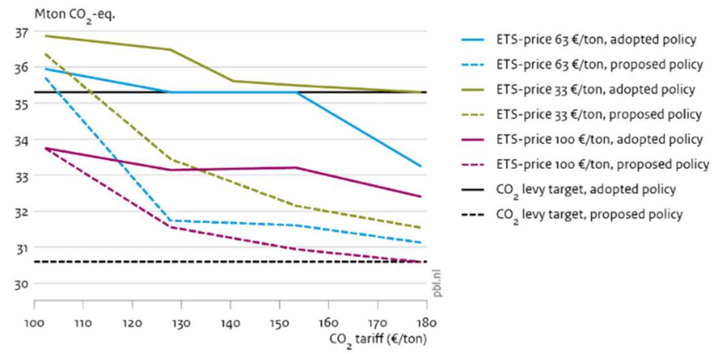
[1] In 2021 the reduction factor is 1.2.
[2] After the finalization of this study the CCS ceiling is abandoned under proposed policy.
[3] Follow-up study of [2] and [3].
[4] It covers 52 sectors, 5 regional clusters, and a wide range of unique (e.g., hydrogen plants) and generic (e.g., electric boilers) options.

of results that are discussed in [1]. We will not further elaborate on it here. It was outside the scope of this study to assess the full range of uncertainties.

Results

Figure 1 gives an overview of the remaining emissions in 2030 under adopted and proposed policies for the standard runs where the tariff is varied at 102, 128, 153 and 179 €/ton, assuming an EU ETS price of 33, 63 or 100 €/ton. When the remaining emissions are equal to, or lower than the corresponding target, the target is met. The figure shows that under adopted policies a tariff of 128 €/ton should be sufficient to meet the target when the EU ETS price is above 33 €/ton. To meet the more stringent target a significantly higher tariff of at least 178 €/ton would be required. In all the standard runs, except for the runs with an EU ETS price of 100 €/ton, the 550-million-euro subsidy ceiling is restrictive due to higher subsidy expenditures because of lower correction amounts. Increasing this ceiling might therefore result in further reductions. Another interesting observation is that for the same tariff a more stringent target results in a significant further reduction of emissions since positive investment decisions are made for the remainder of the potential to reduce emissions that was already profitable at the corresponding tariff.[5]

Figure 1. Remaining emissions in 2030 under the CO_2 levy, for adopted and proposed policies.



Source: PBL

The uncertainties are significant, and there is a multitude of factors that can either hamper or benefit industry to meet the CO_2 levy emission target. Factors that could hamper industry to meet the target are for example, unavailability of required infrastructure or permits (e.g., building permits) that are not available in time, delay in the uptake of investments due to technical issues, higher investment costs, or more restrictive policies (e.g., to acquire subsidies). Compared to today's situation with unprecedented prices, this study assumes relative low fuel and electricity prices, although the long-term effects of the current energy crisis are uncertain. Higher prices could either further stimulate investments or stall them, depending on the energy input and output. For the required tariff under proposed policy, it is important to note that part of the proposed supporting policies, such as the Dutch Fund for Climate and Development (FMO), was not sufficiently concrete to include in this study. In case these policies would be accounted for, the more stringent target might be met with a lower tariff. Also, the SDE++ is a generic instrument not meant to determine subsidies to exactly cover the unprofitable margin of all options. Hence, there is an uncertainty regarding the (mis)match between the SDE++ and individual projects, that can result in over- or under subsidization of emission reduction for a specific project.

Conclusions

To meet the target under adopted policies, a tariff of 128 €/ton is probably sufficient, while for the more stringent target under proposed polices, a tariff of at least 178 €/ton is required. The results show that with higher EU ETS prices and equal levels of the tariff, significant more emission reductions are realized since more budget can be allocated to more expensive options. A lower tariff might be required in case additional supporting policies are accounted for. However, the uncertainties that might either hamper or benefit industry to meet the CO_2 levy emission target (under adopted or proposed policies) in 2030 are significant.

References

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[5] The emission reduction is mostly driven by CCS (5-9 megatons) and electrification (3-6 megatons).