



Fact Sheet on the Impact Assessment and Evaluation of the CO₂ Levy on Thermal Fuels

Date

Monday, 19. February 2018

The FOEN has examined the impact to date of the CO₂ levy on thermal fuels introduced in 2008. To this end, three studies were conducted to assess the impact from different perspectives. This fact sheet describes the approaches used and summarises the key findings.

The CO₂ levy on thermal fuels was introduced in 2008. This market-based instrument provides an incentive to companies and households to reduce their CO₂ emissions. The levy rate was first set at CHF 12 per tonne CO₂ and has since been increased in four phases to its current amount of CHF 96 CHF per tonne CO₂, as the interim targets for fossil thermal fuels set by the Federal Council had not been reached. By contrast, the maximum rate of CHF 120 per tonne CO₂ required under the applicable CO₂ Act will no longer apply by the end of 2020. Greenhouse-gas-intensive companies may be exempted from the CO₂ levy in the sense of an accompanying measure, provided that they comply with the relevant legal requirements. In return, they must make a commitment to the federal government to reduce their emissions.¹

The CO₂ Act provides for the periodic evaluation of various climate policy instruments. In this context, the FOEN examined the impact to date of the CO₂ levy. The challenge posed by this undertaking was that the levy's impact cannot be measured directly. By making fossil energy sources more expensive, the levy creates an incentive to use fuels more economically and to choose more low-CO₂ or CO₂-free energy sources. It is up to households and companies to decide the extent to which they will respond to this incentive. That is why the impact must be assessed indirectly. To that end, three studies were conducted that consider the issue from different perspectives. First, the overall impact of the levy was estimated using a model-based analysis ("top-down view"). In addition, direct surveys were conducted at the company level ("bottom-up view"). With these two research approaches, a comprehensive overall view could be obtained.

¹ Large greenhouse-gas-intensive companies participate in the emissions trading scheme and are also exempted from the CO₂ levy on thermal fuels.

Investigation approach: two complementary perspectives on the impact evaluation

Model-based analysis (top-down perspective):

The studies by Ecoplan, EPFL and FHNW (2015, *study 1*) and Ecoplan (2017, *study 2*, Update of *study 1*) estimate the overall effect of the levy from a top-down perspective. To that end, two different, mutually complementary models were developed: an econometric model (time-series approach) and a general-equilibrium model. The two models set different priorities and deliver a range of possible effects. The general-equilibrium model focuses on the immediate, short-term effects of the CO₂ levy while the time-series approach also includes medium to longer-term effects. To estimate the effect of the levy, a hypothetical emission trend that maps the course without the CO₂ levy was calculated for the "household" and "economy" (industry and services) sectors in both models. The impact of the levy was derived from the difference between the hypothetical emissions and the actually observed emissions pathway, which includes the impact of climate-policy measures.

Direct surveys of companies (bottom-up perspective):

The study by TEP Energy and Rütter Soceco (2016, *study 3*) focuses on the impact at the company level and thus complements the findings on the overall impact in the "economy" sector from studies 1 and 2. By means of a direct survey of around 4,000 companies (levy-paying and exempted), which emission-reduction measures have been implemented since the imposition of the levy, how the levy has affected the companies' strategic decisions and why companies have opted for or against exemption from the CO₂ levy was investigated. In addition to in-depth insights into the decision-making processes of the companies concerned, this approach also provides guidance about which companies have made the biggest reduction efforts to date.

Findings: noticeable impact in households and the economy

All three studies show that the CO₂ levy on thermal fuels has led to noticeable emission reductions. According to the model-based analyses, the cumulative total impact for the period 2005-2015 is 4.1 to 8.6 million tonnes CO₂. The relatively large bandwidth stems from the different effects that the two models take into account. The reduction of 4.1 million tonnes CO₂ (according to the general-equilibrium model) can be understood as a lower limit if only the short-term, direct reactions to the price change as a result of the levy are taken into account. The levy, however, also has effects that can only be achieved over the long term. For example, it is to be expected that the possible future development of the levy imposed on households and the economy has already been anticipated and investment decisions will be influenced accordingly. The time-series approach includes these longer-term effects. It thus increases the cumulative effect to 8.6 million tonnes CO₂.

In 2015, the impact was 0.8 to 1.8 million tonnes CO₂. Measured by the levy-relevant CO₂ emissions from fossil thermal fuels, which amounted to around 17 million tonnes in 2015, this corresponds to a reduction of 4.3 to 9.6 percent. Around three quarters of the impacts are produced by households (buildings), and around one quarter by the economy (industry and services). This is primarily due to the fact that in the household sector, significantly more CO₂ emissions are subject to the levy than in the economy, where a high proportion is integrated

into the emissions trading system; the “levy base” is therefore higher in the household sector. The primary driver of emission reductions is the substitution of heating oil with less CO₂-intensive energy sources (natural gas and renewables) that are encouraged by the CO₂ levy. These substitutions are important, both at the household level, in particular in residential buildings (e.g., in replacing heating), as well as in the economic sector (in the conversion of production processes). The impacts increase in both sectors over time. A higher levy leads to the increased replacement of fossil energy sources and accordingly to higher emission savings. This trend is likely to continue in the future. The calculations still do not show any exhaustive reduction potential. Figure 1 summarizes these results of the time-series approach.

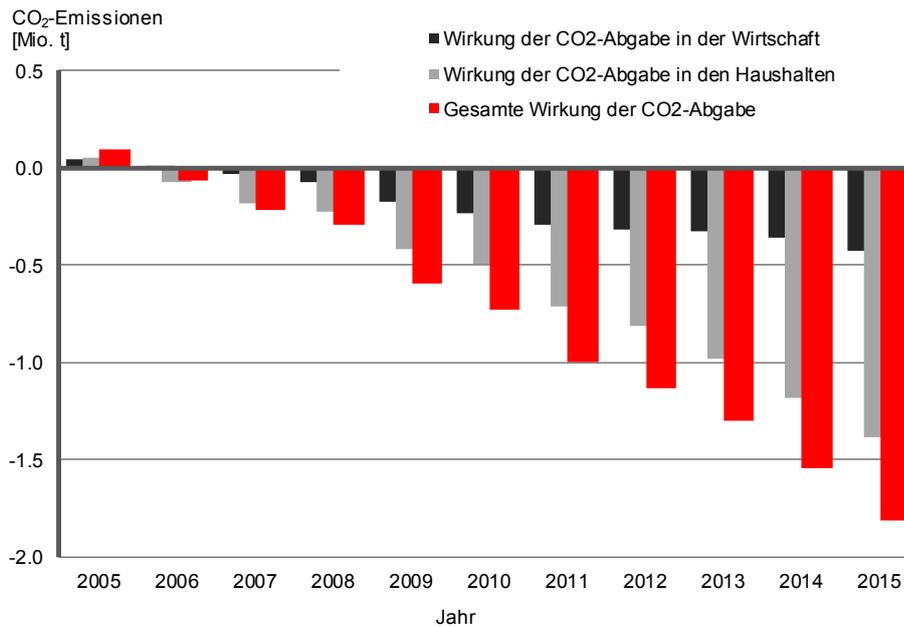


Figure 1: Impact of the CO₂ levy (Source: EcoPlan 2017, econometric model)

The company surveys improve knowledge of the impact on the economy. They make it clear that the CO₂ levy (and particularly its announcement) has triggered diverse reactions. The extent of the reactions varies depending on the extent to which the company is affected. Greenhouse-gas-intensive companies, for which the relatively low initial levy rates were already noticeably cost-effective, have – as intended by the accompanying measures – far more often concluded voluntary target agreements or binding agreements with the Confederation. Accordingly, these companies have also taken more measures to reduce emissions or introduce energy-efficient processes or production procedures. In that respect, there is no difference between the companies exempted from the levy and the companies that have entered into voluntary target agreements. The decisive factor is the systematic examination of emissions savings supported through both channels.

For smaller companies with low energy consumption, the CO₂ levy during the period under investigation was initially able to set low incentives for saving fossil fuels due to the low levy rate that was initially set. Several companies have nevertheless analysed their energy consumption or savings potential and are therefore prepared for further increases in the levy. The frequency of reactions by all companies has increased over time. Therefore, it can be assumed that unused reduction potentials can still be unlocked by future levy increases.

The CO₂ levy shows a greater impact than other instruments

The figures shown in Figure 1 include the effects of other measures aimed at reducing emissions from fossil thermal fuels. The reason for this is that the data set used does not allow for prior differentiation between instruments. The model underlying the numbers in Figure 1 therefore overestimates the impact.

Of particular importance is the building programme, which is financed by a part of the revenue from the CO₂ levy as well as the target agreements at the company level. The contributions of these instruments can be approximately determined so that a "net effect" of the levy can be deduced. Figure 2 shows the result for 2015.

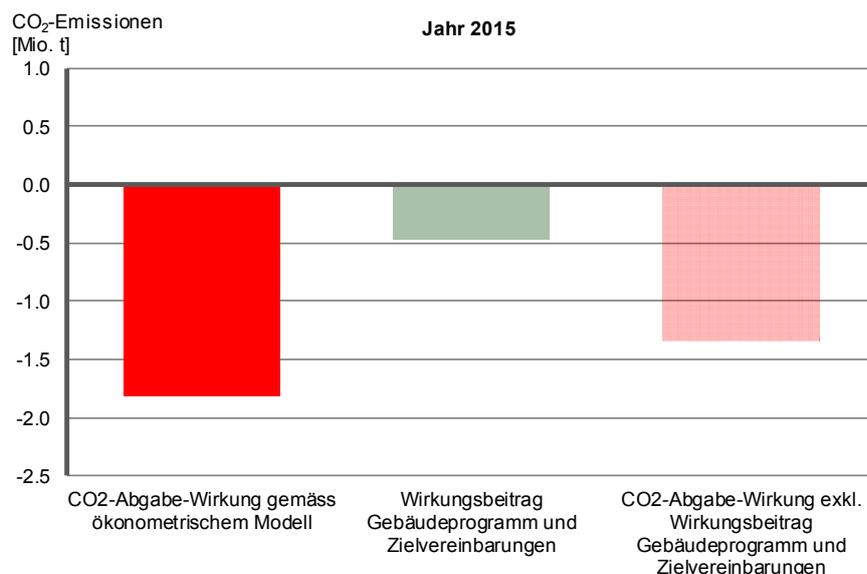


Figure 2: Impact of the CO₂ levy excl. contributions from other instruments (Source: Ecoplan 2017)

After deducting the contributing effects of the building programme and the target agreements, the "net effect" of the CO₂ levy in 2015 is still around 1.3 million tonnes CO₂. The cumulative "net effect" over the entire period 2005-2015 is 6.9 million tonnes CO₂. The largest portion of the estimated reduction can thus be effectively attributed to the CO₂ levy.

In Figure 2, reduction payments from reduction obligations are attributed to the CO₂ levy; only the effects of cantonal target agreements which do not entitle exemption from the CO₂ levy (e.g., for the implementation of the legislation governing large-scale consumers) are deducted. The reduction commitments can be considered as an accompanying measure to support the impact of the CO₂ levy. Exempt companies undertake to implement the economic measures. Without an exemption from the levy, a similar (or possibly even higher) impact thus would usually be achieved. In this respect, a credit to the CO₂ levy is justified.

Contact person

- Roger Ramer, Project leader Impact Assessment CO₂-levy, Climate policy section
Tel. +41 58 462 98 16, roger.ramer@bafu.admin.ch

Literature

- Study 1: Ecoplan, EPFL and FHNW, [Wirkungsabschätzung CO₂-Abgabe – Modellrechnungen](#), December 2015.
- Study 2: Ecoplan, [Wirkungsabschätzung CO₂-Abgabe – Aktualisierung bis 2015](#), June 2017.
- Study 3: TEP Energy GmbH and Rütter Soceco, [Wirkungsabschätzung CO₂-Abgabe – Direktbefragungen](#), April 2016.

Internet

- The studies mentioned above as well as further information on the CO₂ levy are available at: <http://www.bafu.admin.ch/co2-tax>