

CO₂ Taxation in Sweden

Experiences of the Past and Future Challenges

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*) The views expressed in the paper do not necessarily reflect those of the Swedish Ministry of Finance.

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1. Sweden has been a pioneer regarding CO₂ taxation. Can you remind how it concretely works?

Two different taxes on fuels form the base of the Swedish energy taxation system. An energy tax has been levied on petrol and diesel since around 1930 and fossil heating fuels started to be taxed during the 1950's. The CO₂ tax was in 1991 introduced on fossil fuels at rates equivalent to 27 €¹ per tonne fossil CO₂. At the same time the energy tax rates were reduced by 50 per cent, which still meant an increase for all fuels.

Average CO₂ emission and energy factors are used to calculate the tax rates. No measuring of actual emissions is necessary. In order to ensure a simple administration, the CO₂ tax rates are in the tax law expressed in weight or volume units for the different fuels. The CO₂ tax is collected in the same way as the energy tax, which gives low administrative costs for the tax authorities as well as for the operators.

The CO₂ tax, obviously, should aim at helping society to reach set climate targets. That is why it is logical to base it on the content of fossil carbon, as only fossil fuel consumption results in net increases of CO₂ to the atmosphere. To also apply it to biofuels would constitute illogic taxation in relation to the aim of the tax and would also, hence, make the tax less general and thereby less cost effective.

The rationale behind using a market based policy instrument such as a CO₂ tax is that the price signal created by the tax allows for numerous ways to avoid the tax. The cost effectiveness lies, hence, in that the society does not 'pick a winner' (e.g. a particular technology or a particular fuel) but rather allows households and firms to choose the measures that are best (which typically coincide with least cost) for them. Such measures can range from putting on an additional sweater to invest in a new technology with low or zero greenhouse gas (GHG) emissions.

The CO₂ tax rates have over the years been significantly increased, with the purpose of achieving cost effective emission reductions by way of applying the Polluter Pays Principle. The tax changes have been implemented stepwise to give households and firms time to adapt. The same CO₂ tax rate is applied for motor fuels and heating fuels, ensuring the same price signal and thus cost effective emission reductions by equalizing marginal costs for abatement.

2. In France ecological taxes are the subject of regular changes. The continuity of the Swedish CO₂ tax system is very impressive: can you explain how the political consensus has been built behind it, why in 1991, and which kind of contest it has faced ever since?

The introduction of CO₂ taxation in Sweden was part of a major tax reform that among other things implied dramatically lower marginal income taxes on capital and labour, the elimination of various tax shelters and base broadening of the value added tax. The political opportunity to introduce the CO₂ tax consisted of the confluence of two separate political processes. On the one hand, there was a demand for a drastic reduction in marginal income tax rates which had reached very high levels. At the same time there was an increasing interest in environmental issues politically and throughout the society.

¹ Exchange rate used in this article: 1 € = 9,0932 SEK.

There is a broad political consensus of the basic CO₂ tax structure and the use of the tax as the primary instrument to achieve GHG reductions. Sweden has had left-wing and right-wing governments, but this has not meant any major deviations from the chosen road forward. Business and other stakeholders are involved in the decision making process by the constitutional system of sending out Government proposals for general public consultation before presenting them to Parliament. The aim has been to implement tax raises and major changes of the tax structure in a step by step approach, preferably being announced well in advance giving households and firms time to adjust. The general CO₂ tax rate chosen when the tax was introduced in 1991 was reasonably low and it has taken us more than 20 years to reach the – what some may call exceptionally high – level of 123 € per tonne fossil carbon.

Typically, CO₂ tax increases for households and firms have been combined with general tax relief in other areas in order to avoid increases in the overall level of taxation, address undesirable distributional consequences and stimulate job growth. Such combination of measures creates a balance between different policy considerations. Also, one aspect of a general welfare state is that it alleviates severe distributional consequences.

Preserving the environment is an issue given high priority not only by the Government but also by most citizens. So while Swedes probably do not like to pay taxes any more than other people, there is a basic understanding and acceptance of the underlying rationale to introduce economic instruments, such as the CO₂ tax, to help reach climate targets. It has also been essential over the years to ensure that the households and firms have feasible options available to help in their transition to a low-carbon economy. While not earmarking CO₂ tax revenues for specific purposes, significant parts of the national budget have still over the years been allocated to various projects, such as better public transport, an increased use of bio-fuelled district heating and housing isolation.

3. Has CO₂ taxation in Sweden been detrimental to competitiveness and employment and how did you tackle those issues?

The Swedish experience shows that it is possible to combine reduced emissions with economic growth. A decoupling of the economic growth and reduced emissions could be seen already in 1996 and this development has continued ever since. During the 1990-2013 period GDP increased by +61 percent, while at the same time CO₂ equivalent emissions was reduced by 23 percent².

An essential aspect has been to strike a balance between fulfilling environmental objectives and accounting for the risks of carbon leakage (which in turn is related to securing the competitiveness of sectors that are subject to international competition). Industry has ever since the introduction of the CO₂ tax faced a lower tax level on heating fuels than the household and service sectors. When introducing the CO₂ tax at the general level of 27 € in 1991, the lower level for industry applied corresponded to 7 €. When the general level of the CO₂ tax was raised during following years, adjustments were also made of the lower level based on competitiveness assessments and other factors.

² 80 per cent of the CO₂ e emissions consists of CO₂ emissions.

Since it is essential to avoid disruptive effects on competitiveness, such a lower tax level has been a prerequisite for a high tax level for other sectors and has been instrumental in achieving major emission reductions in the household, transport and service sectors. This two-level system has in the past been the most important element in the design of a well-functioning system to curb CO₂ emissions in Sweden.

4. What have been the major changes in the Swedish CO₂ tax system since its creation? Especially, how did you integrate the European regulatory changes?

Sweden became a member of the EU in 1995 and adapted our existing legislation to the relevant Community law. The general CO₂ tax design was maintained, as it was in line with relevant EU rules.

As mentioned earlier, a general, lower CO₂ tax level was chosen for the industrial sector, when introducing the CO₂ tax. It has been an administratively simple approach to allow for significant increases of the levels of CO₂ taxation for other sectors. However, the development of Community law meanwhile resulted in the introduction of the EU Emissions Trading Scheme (EU ETS), a Community wide economic instrument covering GHG emissions from the major part of energy intensive industrial installations. In order to apply only one general economic instrument as an incentive to reduce GHG emissions, no CO₂ tax is from 2011 applied in Sweden on fuels used by industrial installations within the EU ETS.

On the other hand, industry outside the EU ETS is in general less energy intensive and, hence, has relatively low costs for energy. This implies that an increased CO₂ tax for industry outside EU ETS do not cause major disrupting effects on competitiveness. Further, many firms have relatively good opportunities to switch to non-fossil heating sources, which is why an increased CO₂ tax serve as an incentive to substitute to non-fossil energy. In a step-wise approach, Sweden has thus increased the lower level for this sector during 2011-2015 (from 21 to 30 per cent of the general CO₂ tax level in 2011 and from 30 to 60 per cent in 2015). The Government has announced its intention to abolish the lower CO₂ tax by 1 January 2016. However, it should be noted that a structural shift from fossil fuels in industry can imply severe effects for individual firms, which also can cause unwanted consequences on local/regional level. This risk is another reason for, if possible, applying a step-by-step approach in order to give firms time to adapt and thereby alleviate some of these problems.]

The CO₂ tax is levied on the content of fossil carbon in fuels, which meant that biofuels were not subject to the CO₂ tax from the start. Upon implementing the 2009 EU Renewables Directive, sustainability criteria for biofuels and bioliquids were introduced as a condition for not subjecting such biofuels to the non-CO₂ taxation. According to EU law, aid can only be granted to sustainable biofuels and bioliquids. The EU Commission has this far considered the Swedish CO₂ tax design as a state aid to biofuels.

5. The energy mix in Sweden has shifted from fossil fuels towards biofuels in particular. What kind of biofuels? Does the overall balance of Swedish CO₂ emissions integrate "imported emissions" (incl. possible deforestation in Amazonia linked with the development of soy, etc.)?

Over the last decades fossil heating fuels has to a large extent been phased out as a source for heating private homes and apartment buildings. Recent figures show that 92 per cent of all apartments are heated by district

heating, primarily fuelled by household waste and various wood residues. The district heating grids are continuously expanded to cover also small towns. However, Sweden is sparsely populated and single-family homes in more remote areas are not connected to district heating grids. The phasing out of fossil fuels has in those cases meant a transition to wood heat pumps, electricity³ and wood pellets burners. District heating is also an instrumental source of space heating for the service sector – the figure is 80 per cent.

As for industry the last decades have seen a steady decline in specific energy use; that is amount of energy used per monetary unit of value added. Technical innovation in Swedish industry has for a long time favoured electricity solutions, due to the fact that hydro-electricity has been available at reasonably low prices and that electricity used by industry is taxed with a considerably lower out-put energy tax than electricity used by households and service sector firms. The energy used by Swedish industry comes primarily from biofuels (40 percent) and electricity (36 percent). Wood scrap products and liquid residues from the paper and pulp industry account for the bulk part of the biofuels.

The balance of Swedish CO₂ emissions is calculated and reported according to procedures that the global community has agreed upon under the Kyoto Protocol. The annual reporting is based on emissions occurring from the combustion of fuels within Sweden and at the same time combustion from fuels elsewhere in the world is accounted for in the annual reports from those countries. Calculations have been made by the Swedish Environmental Protection Agency of the impact on CO₂ emissions from the consumption of Swedish individuals taking place abroad, either by visits to those countries or by importing products manufactured in other countries. However, it does not seem feasible in the foreseeable future to take account of such emissions when calculating a CO₂ tax in Sweden that is administratively simple to design and collect.

6. What are the next challenges ahead? Is there any risk that the CO₂ tax system be given up? Have other countries been convinced or interested enough by the Swedish experience to replicate it? If not, what kind of factors have prevented them to do so?

The major challenge ahead lies in the area of motor fuels. The steadily increased CO₂ tax on fossil motor fuels has played a major role also for an increased use of biofuels in the transport sector. Currently about 11 per cent of all propellants used in Sweden are biofuels. But major efforts are still needed in order for Sweden to be able to reach the political vision of a fossil-free vehicle fleet by 2030 and no net increase on greenhouse gas emissions by 2050.

The CO₂ tax has served us well in Sweden as a powerful tool to help reach reductions in GHG emissions during the past decades. Also for the future the Swedish Government sees the CO₂ tax as the major economic instrument to achieve emission reductions in sectors outside the EU ETS. The 2014 agreement in the European Council calls for at least a 40 per cent reduction of GHG emissions by 2030. Member States will be obliged to cut emissions substantially outside the EU ETS. To this end, the Member States need cost effective tools. A CO₂

³ Sweden's electricity production is to a large extent fossil free (figures for 2012: hydro 48 per cent, nuclear 38 per cent, combined heat and power, with basically biomass in-put 10 per cent, wind power 4 per cent; Swedish Energy Agency, Energy in Sweden 2014).

tax is a key instrument to help reduce the use of fossil fuels and reach set climate targets. An inherent challenge for the whole of the EU lies in the need to ensure that all parts of the Community legislation are consistently applied and not creating obstacles for Member States seeking to apply well-functioning taxes. One such example is the application of the EU state aid rules in relation to high ambitions in the climate area and the consequent need to be able to have cost-effective instruments, such as a CO₂ tax, available as tools in the EU tool-box.

Finland was the first country to introduce a CO₂ tax in 1990, closely followed by Sweden, Norway and Denmark. Within the EU we now also find CO₂ taxes in Slovenia (1997), Ireland (2010), France (2014) and in the next year Portugal. An overall introduction of a CO₂ tax in the EU was foreseen by mandatory provisions proposed by the Commission in 2011, by way of changing the existing EU Energy Taxation Directive. However, it has unfortunately proved impossible to agree among the Member States on these amendments and the Commission has in the end of 2014 announced its plans to withdraw the proposal. This is a major set-back in the EU work on establishing more cost-efficient and coordinated economic instruments in the climate and energy area.

Promising developments in the area of carbon pricing can also be seen outside the EU, where several countries have introduced a CO₂ tax, such as Switzerland (2008), Japan (2012), Mexico (2014), Chile (2014) and the Canadian provinces of Alberta and British Columbia (2007-2008). Also, South-Africa is in the process of finalizing a CO₂ tax with a planned date for introduction in 2016. The basic logic of taxation based on the content of fossil carbon is prevailing for all these countries, even if national conditions are taken into account for the more detailed design, for example derogations necessary to strike a balance between environment and competitiveness as well as addressing distributional consequences.