ehpa
european
heat pump association

ENERGY TAXATION IN HEATING

Give a tax break to renewable heat!

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Key Messages:

1

Heat pump technologies are best in class with regards to energy efficiency, renewable energy, air quality and CO_2 emission reduction.

2

Despite the significant energy savings, heat pump operating costs can still be higher compared to fossil energy - based solutions. This is the result of an imbalance in taxation levels and levies often favouring fossil energy and giving a disadvantage to electricity-based solutions.

3

Distorted energy prices are misleading consumers because the least sustainable heating technologies are perceived cheaper. The true cost of burning fossil energy is however not disappearing, it is instead, covered by society at large.

4

In the “fit for 55 package”, the EU should ensure that customers are guided towards the cleanest, greenest and most sustainable solution by making it the economically most attractive heat decarbonization option. The package should establish a CO_2 price signal for heating and cooling including by reviewing taxation levels of all energy carriers, the introduction of a CO_2 price and the phase out of fossil fuel subsidies.

Sustainability of the heating solution is not reflected in its costs

Heat pump technologies are the most efficient heating and cooling solution using renewable or excess energy, they contribute to indoor and outdoor environmental quality in buildings and cities and help stabilize the electric grid by providing demand side flexibility.

Their massive deployment is recognized essential to a successful energy transition. However, demand in the market is not growing fast enough, not least because the initial investment needed for heat pumps is higher than that for incumbent technologies. In theory, consumers would base their purchasing decision on a mix of cost and comfort criteria. They would calculate the total cost of ownership (TCO) over the expected life-cycle of each alternative and choose their heating system accordingly. In practice, the consumer responsiveness to heating price changes, called price elasticity of demand, plays an important role as well. In the residential sector for example price adaptations only lead to changes in demand only in the long-run.[1] Whether or not consumers switch heating systems also depend on many other factors such as other supporting policy measures and subsidy programmes.

When taking a TCO perspective, the higher initial investment in a system could, in most cases be overcompensated by lower operating costs. However, even if the total cost of ownership is lower, consumers are quite often not taking this into consideration and base their decision predominantly on the capital expense needed (CAPEX).

1 https://institut.intelliprosperite.ca/sites/default/files/likely-effect-carbon-pricing-energy-consumption-canada.pdf

Unfortunately, in most of the EU member states, operating costs are comparatively high (OPEX) which in turn make savings on the heating investments costs difficult if not impossible. This is namely caused by high taxation levels and levies on electricity and a comparatively lenient treatment of the fossil fuel alternatives, not least the lack of a carbon price signal.

The 'EU Strategy for Energy System Integration' identifies the main following barriers:

1. "In most Member States the CO_2 costs imposed on society by burning fossil energy are, either partially internalized or not internalized at all, depending on the sector (transport, space heating, industry)."[2]

2. "The most important barrier is the relatively higher level of taxes and levies applied to electricity, and the lower levels of taxation for fossil fuels (oil, gas and coal) used in the heating sector, leading to lack of level playing field."[3] "In many EU Member States, taxes and levies on electricity are higher than for coal, gas or heating oil, both in absolute value and as a share of total price." Over the past years, charges and levies on electricity have continued to increase, as:
   - The cost of the energy transition has been redistributed via electricity prices.
   - "The industry sector is sometimes exempt from energy taxes and levies that residential customers pay. This biased treatment increases the ratio between electricity and gas prices and the burden put on households."[4]

The most prominent example is probably Germany where the costs of feed-in tariffs have been added to electricity over the years and now make up about 20% of the average electricity price.[5]

At the same time, the generation component of "the final (retail) electricity price has reduced both in absolute and relative terms. This has widened the asymmetry in non-energy costs between electricity and gas: for retail household electricity prices, for instance, taxes and levies now add up to 40% of the final price, compared to 26% of gas or 32% for heating oil."[6]

2 EU Energy System Integration Strategy, p. 14
3 EU Energy System Integration Strategy, p. 8
4 https://www.euractiv.com/section/electricity/opinion/unlocking-electrification-through-rebalancing-levies-and-taxes/
5 https://www.euractiv.com/section/electricity/opinion/unlocking-electrification-through-rebalancing-levies-and-taxes/
6 EU Energy System Integration Strategy, p. 14

The above mentioned barriers together with fossil fuel subsidies, have created distorted energy prices that are misleading consumers because the least sustainable and least efficient heating technologies are perceived cheap creating a benchmark for what is considered acceptable. The true cost of burning fossil energy is however not disappearing. It is instead covered by society at large.

Fig. 1 Price ratio across Europe
Electricity - Gas[7]

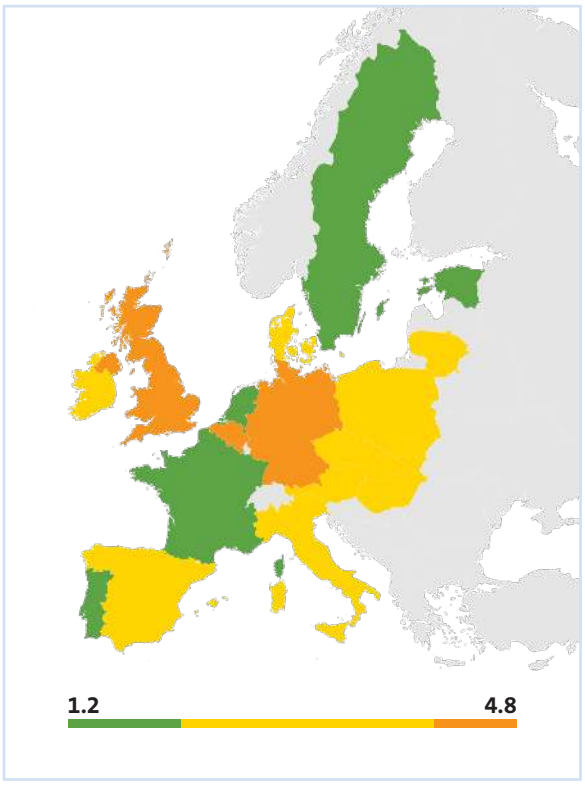


Figure 1 shows the differences in selected countries. the price distortion for electricity vs. gas in households is the largest in the UK, Belgium and Germany. Even though the situation is better in Portugal, France, the Netherlands, Sweden and Estonia, also in these countries, the electricity prices are higher than the gas prices.

7 Source: http://www.stats.ehpa.org/hp_sales/story_prices/

Fig 2. Price ratio across Europe
Electricity - Oil[8]

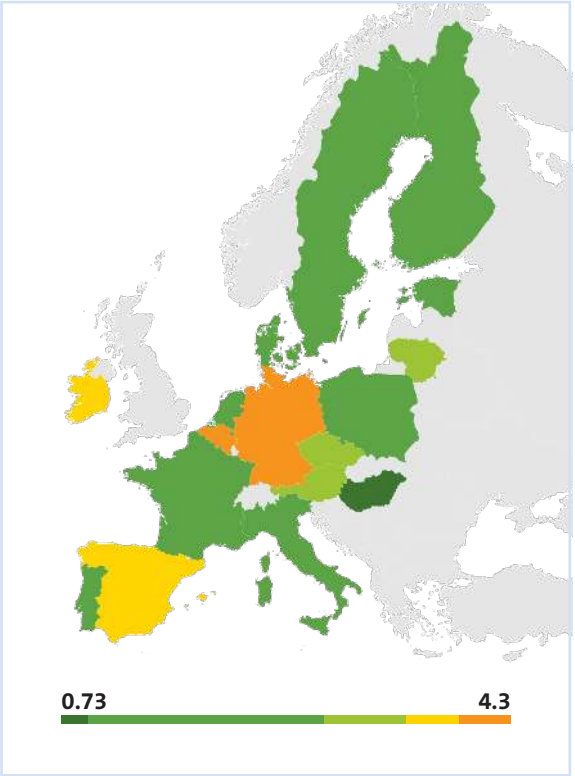
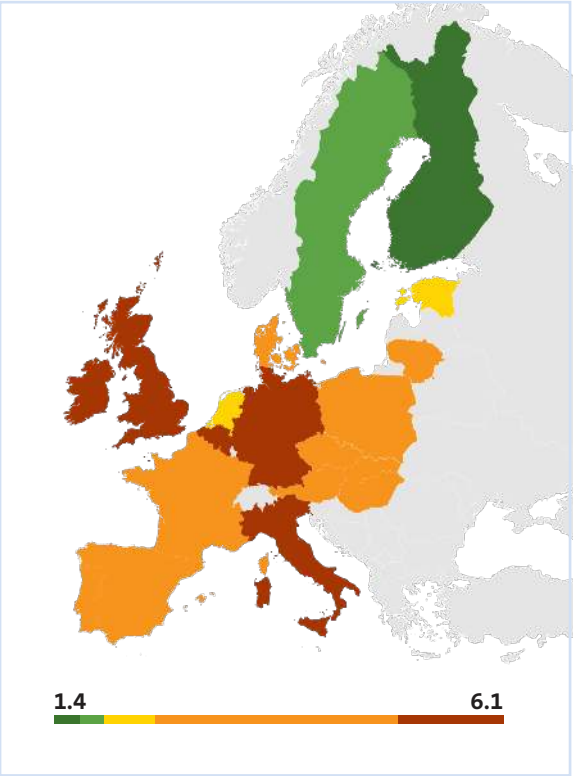


Figure 2 shows that the price distortion for electricity vs. oil is the largest in Belgium and Germany, followed by Ireland and Spain, while operating cost for heat pumps are competitive in all other countries.

Fig 3. Relative energy prices in industry for selected European countries
Electricity - Gas[9]



As shown in Figure 3, in all included EU Member States, the price per KWh of thermal energy derived from electricity via a heat pump is higher than the per 1 KWH_{th}. In the UK, Belgium, Germany and Italy, the price distortion for industry is remarkable, as the electricity price is six times the gas price.

8 Source: http://www.stats.ehpa.org/hp_sales/story_prices/
9 Source: http://stats.ehpa.org/hp_sales/story_prices_industry/

Options to readjust relative energy prices

Necessary steps to correct existing price distortions and to ensure that customers are guided towards the most energy-efficient and cheapest decarbonization option are known. Their implementation is a matter of political will and societal agreement.

A sustainable tax shift on electricity

As everybody needs to pay their electricity bill and failure to do so leads to being disconnected from electricity supply, some countries are usIng the bill to collect also fees and levies partially or completely unrelated to electricity consumptions. One prominent example is the redistribution of the cost of the energy transition on electricity users only. While all energy users in a country benefit from the transition, the consumption of fossil energy is tax exempt. As electricity is generated increasingly often CO_2 emission-free, it is commonly considered the energy carrier of the future whose use should be promoted and not discouraged. Putting the costs for the energy transition on the electricity bill only is, however, discouraging the use of electricity compared to fossil fuels. But with vastly increasing shares of green electricity, in some countries this problem is being recognised. Tax reforms are taking place to make a case for electrification, mainly by increasing taxation on fossil fuels and lowering taxation on electricity, sometimes complemented by the introduction of a CO_2 price. This is the case in the Netherlands and Denmark. In the UK and Belgium, debates about a tax reform are ongoing.

Introduction of a carbon price on fossil fuels

A carbon price can be introduced either via an Emission Trading System (ETS) or a carbon tax. A carbon tax and ETS are opposite sides of the same coin. A carbon tax sets the price of carbon dioxide emissions and allows the market to determine the quantity of emission

reductions. ETS sets the quantity of emissions reductions and lets the market determine the price. [10]

An ETS works on the 'cap and trade' principle. A cap is set on the total amount of certain greenhouse gases that can be emitted by installations covered by the system. The cap is reduced over time so that total emissions fall. Within the cap, companies receive or buy emission allowances, which they can trade with one another as needed. The limit on the total number of allowances available ensures that they have a value. Trading brings flexibility that ensures emissions are cut where it costs least to do so. The EU ETS system currently covers large scale electricity and heat generation, energy-intensive industry, and aviation. As part of the EU Green Deal and the fit for 55 package, the European Commission is proposing to revise and possibly expand the scope of the current EU ETS to transport and the building (heating) sector.[11] It should be noted that electric heat pumps are fully covered by the ETS, while the fossil technologies are not. This creates an uneven playing field.

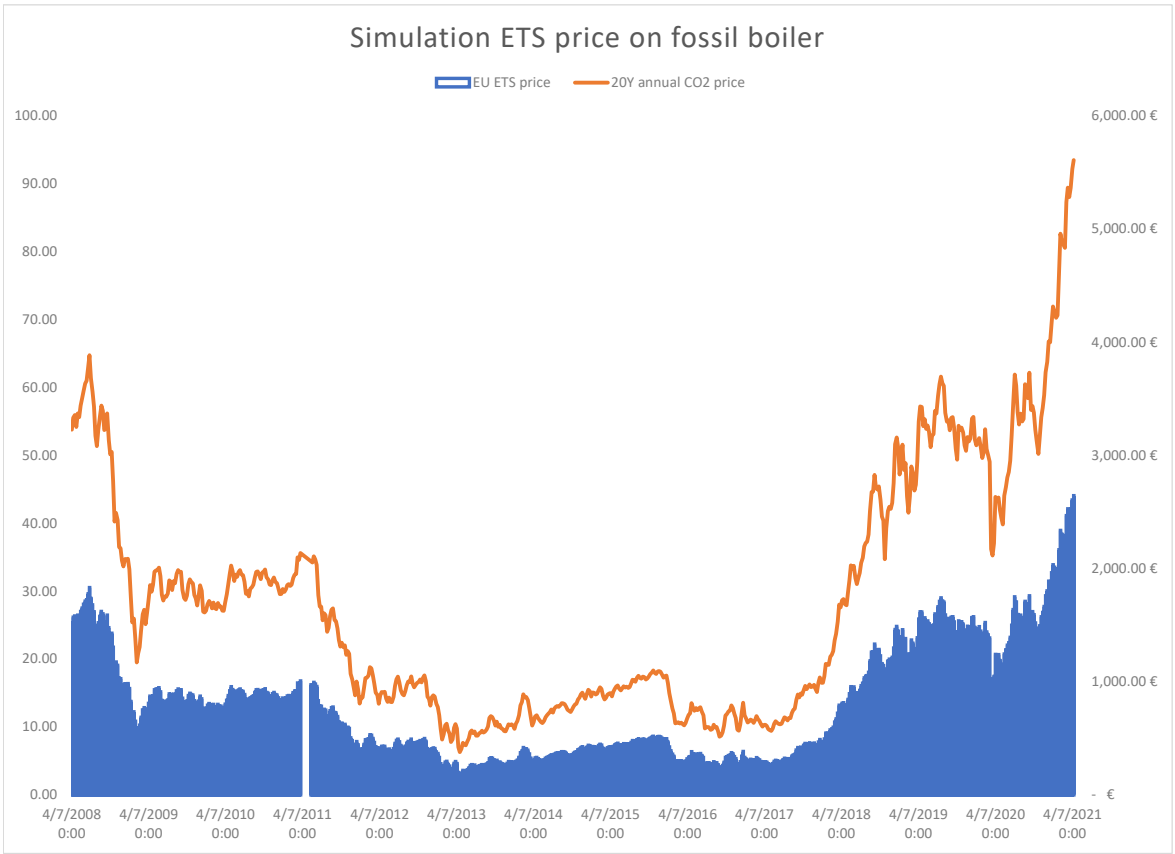


Fig.4

10 https://www.brookings.edu/blog/planetpolicy/2014/08/12/pricing-carbon-a-carbon-tax-or-cap-and-trade/
11 European Commission, 'EU Émission Trading System (EU ETS), https://ec.europa.eu/clima/policies/ets_en

A typical fossil boiler heating system in a single family house emits 6-8t of CO_2 emissions. Looking at figure 4 and apply the CO_2 price from the EU ETS. The CO_2 levy for said boiler would have been between 7000€ and 8000€ over 20 years. This amount would be enough to bridge the price gap currently existing between heat pumps and fossil boiler technologies. It would create a level playing field for heat pumps and fossil boilers. The effect of carbon pricing for buildings (heating) of course also depends on the specific design of the scheme, it's a link to other regulation and what the revenues from carbon pricing are used for. Any system should take the specific needs of low income and energy poor households into consideration and offer dedicated support tools and measures.

A carbon tax has been introduced in January 2021 in Germany and exists already since 1991 in Sweden, and since 1990 in Finland.[12] The map below (see Fig.5) gives an overview of all EU countries with a carbon tax. Also In Switzerland it is successfully applied since 2008. The legislator has the right to increase the fee to 110€/t CO_2 if emisssion is not going down.

Sweden is the country with the highest standard carbon tax rate, followed by Switzerland, Finland and Norway.[13]

12 https://www.econstor.eu/bitstream/10419/179311/1/wp_2018_557.pdf p. 3
13 Taxing Energy Use 2019: Using taxes for climate action, OECD 2019

In Sweden, residential and commercial heating has undergone a fundamental transformation since the introduction of the tax. Both fuels for heating and district heating have been decarbonized. As a result, biomass increased a lot as a heating fuel.[14] The Ecofys Report, analysing the results of the carbon tax in Sweden, identifies the following five trends that are plausibly or primarily driven by the carbon tax:

1. A decrease in household energy use by 2,1%.
2. Phase-out of fuel oil, instead it has been replaced to 75% by district heating and 25% by a rise of mainly heat pumps.
3. Decarbonisation of district heating through biofuels. This is not only caused by the tax but also by other factors such as subsidizing furnace switches.
4. Slight increase in electricity-based heating, from 30% to 35% between 1991 and 2014.
5. Changing[15] composition of electricity-based heating: from resistance heaters to heat pumps.

Finland was the first country in the world to introduce a carbon tax in 1990.[16] When looking at the effects on domestic heating in particular, the Finnish carbon taxation is driving a fuel shift according to the latest IEA review on the Finnish energy policies. This fuel shift is a rapid increase of biofuels that accounts for nearly a third of total domestic heating generation. However, fossil fuels still account for over half of the domestic heating generation, and only natural gas has declined significantly in recent years. The IEA concludes that Finland carbon-based energy taxation is an efficient policy mechanism to encourage fuel switching in the domestic heating sector, but tax exemptions hinder this development. The IEA also adds that the heat pump market in Finland, which is one of the largest per capita in the EU, is driven by increased domestic heating prices and fossil fuel taxation.[17]

14 https://www.euki.de/wp-content/uploads/2018/09/fact-sheet-carbontax-se.pdf
15 https://www.euki.de/wp-content/uploads/2018/09/fact-sheet-carbontax-se.pdf p. 11
16 https://www.un.org/esa/ffd/wp-content/uploads/2019/04/18STM_CRP4-Environmental-tax-issues.pdf p. 37
17 https://www.iea.org/reports/energy-policies-of-iea-countries-finland-2018-review

Different countries in the EU have introduced a carbon tax (see Fig.5). It is however important to note that there are many variables in the design of such a tax. These are the seven aspects that are relevant when designing a carbon tax:

1. **Subject of the tax:** direct emissions or the amount of fuels used.

2. **Point of regulation:** at which point in the supply chain are the actors responsible for paying the tax.

3. **Legal entity:** which legal entity will be responsible for paying the tax and which entity is collecting it.

4. **Sectors and activities:** which sectors and activities in the economy are subject for the tax.

5. **Exemptions and thresholds:** the creation of a general tax design without negative side effects, for instance in form of carbon leakage.

6. **Treatment of biomass:** the issue of how to treat emissions from biofuels."[18]

7. **Use of income:** how to use of distribute the income raised by the tax.

The design of these variables will logically also have a strong effect on the consequences of the carbon tax for the evolution of heating fuels and consumption levels in the country.

18 https://www.un.org/esa/ffd/wp-content/uploads/2019/04/18STM_CRP4-Environmental-tax-issues.pdf p. 38

In the map below, countries that have introduced a CO_2 tax in Europe are presented in green.

In Fig. 6 the CO_2 price per tonne for these countries is shown. All countries in orange are yet to introduce a CO_2 tax.

Fig.5 EU countries with CO_2 tax

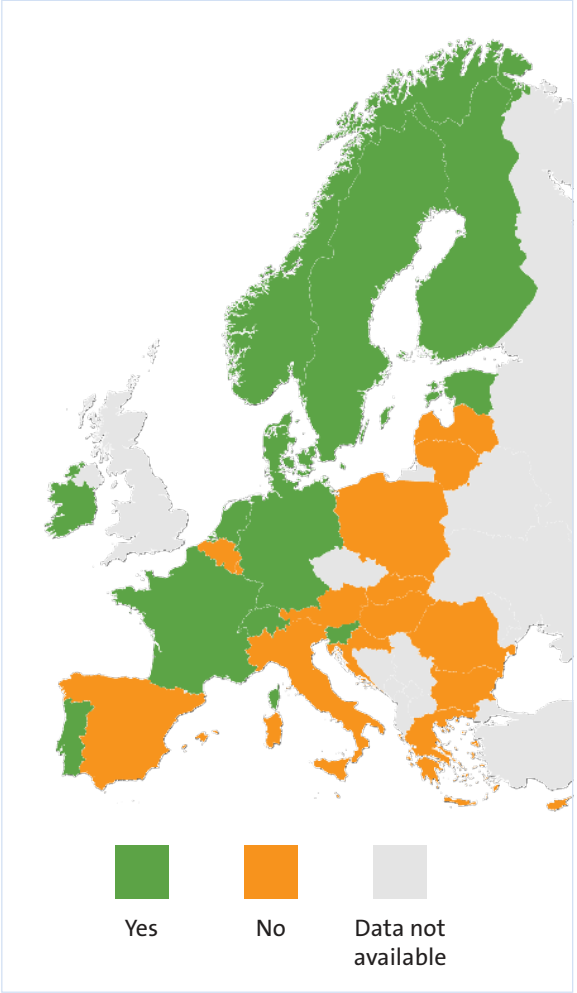
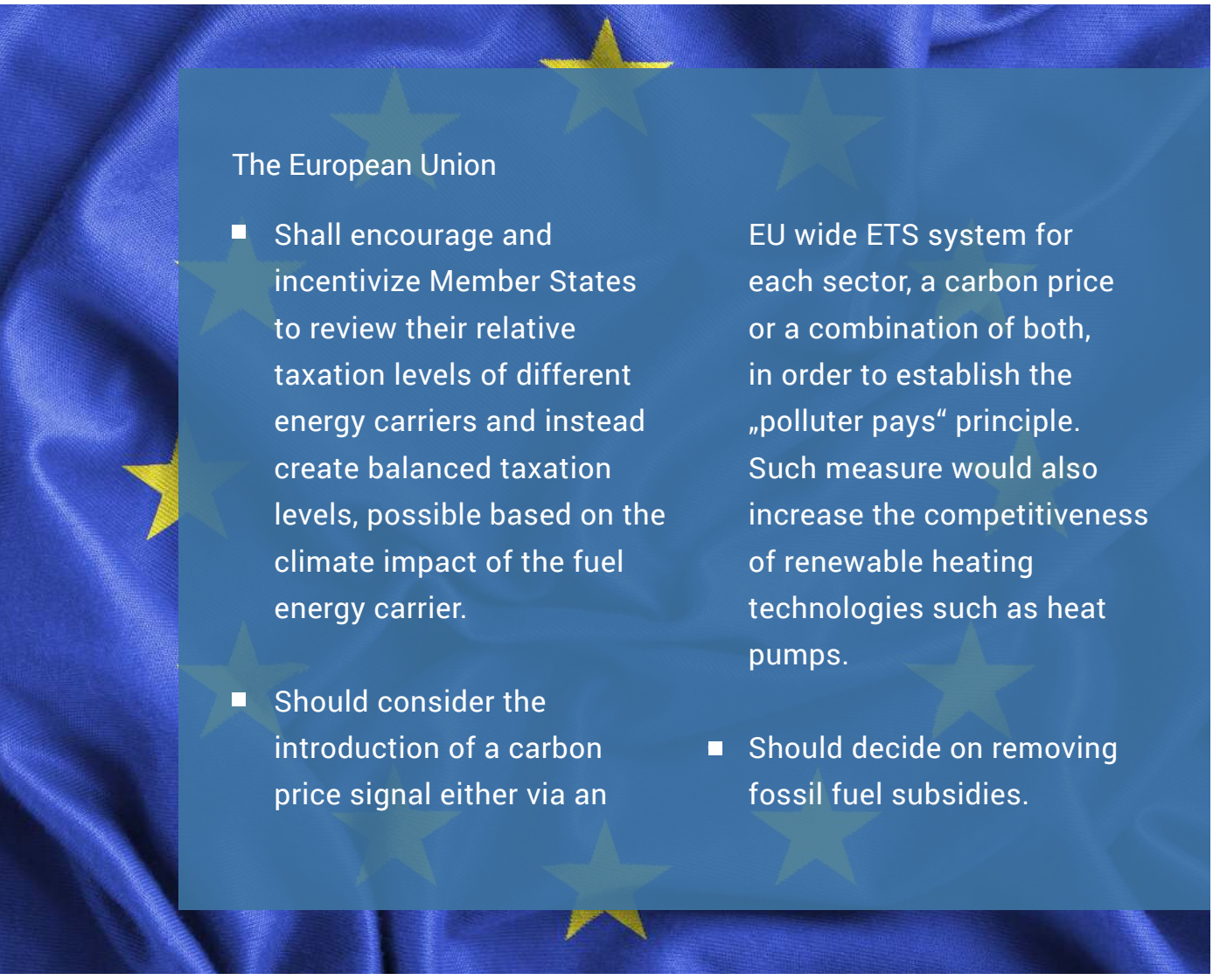


Fig.6 CO_2 tax per country

COUNTRY	CO_2 PRICE/TONNE
Sweden	€120 per tCO_2
Switzerland	€87 per tCO_2
Finland	€62 per tCO_2
Norway	€54 per tCO_2
France	€44.6 per tCO_2
The Netherlands	€30.48 per tCO_2
Germany	€25 per tCO_2
Denmark	€23 per tCO_2
Ireland	€20 per tCO_2
Slovenia	€17 per tCO_2
Portugal	€7 per tCO_2
Estonia	€2 per tCO_2

Conclusions & recommendations on the revision of the Energy Taxation Directive and the EU ETS

While heat pump-based heating and cooling systems are best in class when it comes to energy efficiency, renewable energy and air quality, variations in taxation levels on the electricity bill render them often more expensive when compared to fossil incumbents.



The European Union

- Shall encourage and incentivize Member States to review their relative taxation levels of different energy carriers and instead create balanced taxation levels, possible based on the climate impact of the fuel energy carrier.
- Should consider the introduction of a carbon price signal either via an EU wide ETS system for each sector, a carbon price or a combination of both, in order to establish the „polluter pays“ principle. Such measure would also increase the competitiveness of renewable heating technologies such as heat pumps.
- Should decide on removing fossil fuel subsidies.

These measures would also retain purchasing power in Europe that can be invested to accelerate the energy transition.

As stated in the EU Strategy for Energy System Integration the EC should start the proposed support action as soon as possible by:

- Issuing guidance to Member States to address the high charges and levies borne by electricity and to ensure the consistency of non-energy price components across energy carriers.
- Reviewing the Energy Taxation Directive.
- Providing more consistent carbon price signals across energy sectors and Member States, including through a possible proposal for the extension of the ETS to new sectors.

As European Heat Pump Association we are convinced that it requires a coherent market framework that makes efficient and renewable-based heating and cooling solutions economically attractive. Once the cleanest solutions are also the cheapest, they will receive a much stronger consumer interest, a development that we must monitor closely to be prepared for the consequential increase in production and installation capacity.

Against the huge challenge of the ongoing climate change, we can optimistically conclude that all necessary technologies are available. What we do not have is time. Hence a fast roll-out of clean solutions will make a clean, renewables based, efficient energy system possible, earlier than 2050.

About EHPA

The European Heat Pump Association promotes awareness and deployment of heat pump technology in Europe. All activities aim at creating a market environment that facilitates a faster deployment of heat pump technology to unleash its benefits on a European level: efficient heating and cooling using renewable energy. EHPA also coordinates the Heat Pump Keymark – a European certification scheme for all heat pumps, combination heat pumps and hot water heater.

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