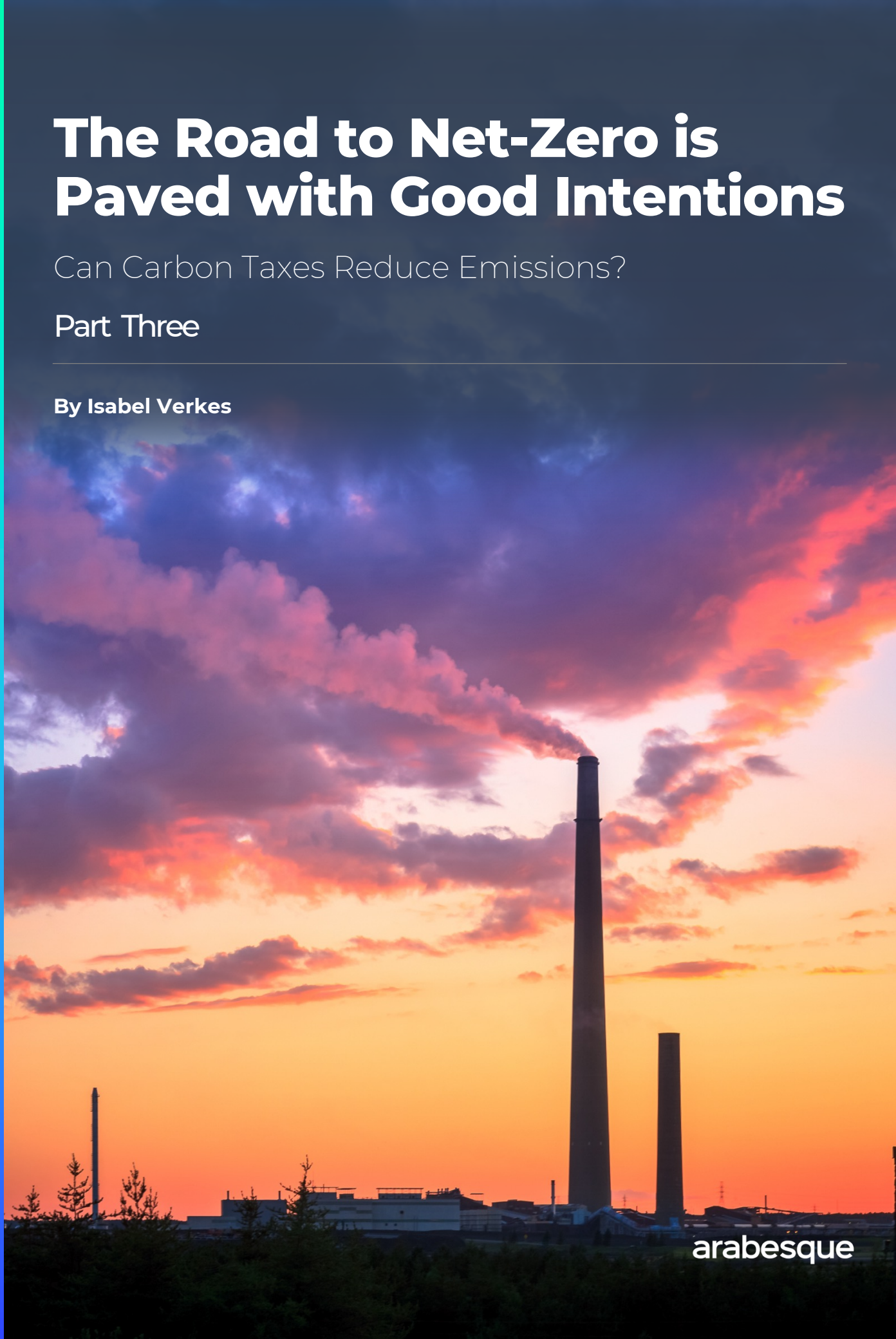
The Road to Net-Zero is Paved with Good Intentions

Can Carbon Taxes Reduce Emissions?

Part Three

By Isabel Verkes



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What is the socio-economic impact of carbon emissions? Carbon dioxide and other greenhouse emissions impose a burden on society and future generations, also financially. Most economic transactions today, however, are underestimating the impact of carbon emissions. Moreover, voluntary action is lagging as people often underrate the benefits of lower emissions[44] and overestimate drawbacks, such as job losses. Because the negative consequences of carbon emissions are diffused through space and time, the costs of carbon emissions fall beyond the emitters themselves - even more so than with air pollution.

As discussed in this research series, several policy mechanisms seek to address this negative externality by putting a price on carbon emissions; helping countries and companies finance their transition to a lower-carbon reality. The main carbon pricing mechanisms we explore are carbon markets and taxation schemes.

Putting a price on carbon

Markets include both government-driven ("mandatory") carbon markets and voluntary carbon markets (where "carbon offsets" can be bought). Mandatory carbon markets such as Emissions Trading Schemes (ETS) enable the exchange of pollution permits or "emissions allowances" for future emissions, as defined by regulators. Entities that are successful in reducing emissions under the emission caps are rewarded, and entities that lag need to purchase additional allowances. A voluntary carbon market is an exchange of offsets, or emission reduction units, representing already reduced carbon.

On a fundamental level, both ETS and offset markets incentivize the reduction of emissions but differ in terms of what is traded. ETS apply to future emissions, and offsets are about past emissions reductions. Carbon markets, in various forms, operate under the principle that it is the aggregate reduction across all actors that matters – not a reduction by a specific actor.

Another way to price carbon is to tax emissions. This works in the opposite direction of carbon markets. Carbon markets depart from an emissions threshold (the quantity) and let the price emerge from supply and demand. Instead of starting with the quantity, carbon taxes establish a cost (or price) for carbon first, from which emission reductions are supposed to follow[45].

In the words of Elon Musk: "The economy works great. Prices and money are just information. If the price is wrong, the economy doesn't do the right thing." A carbon tax would fix that. "If we just put a price on [carbon emissions], the market will react in a sensible way. But because we don't have a price on it, it is behaving badly." He is suggesting a consumption-level carbon tax, saying "This is obviously a thing that should happen".*

The idea is that carbon taxes will integrate the societal cost of carbon emissions into our economic activities. If the tax is effective, carbon emission reductions follow as a result where entities seek to reduce their tax burden, and low emitters have an advantage.

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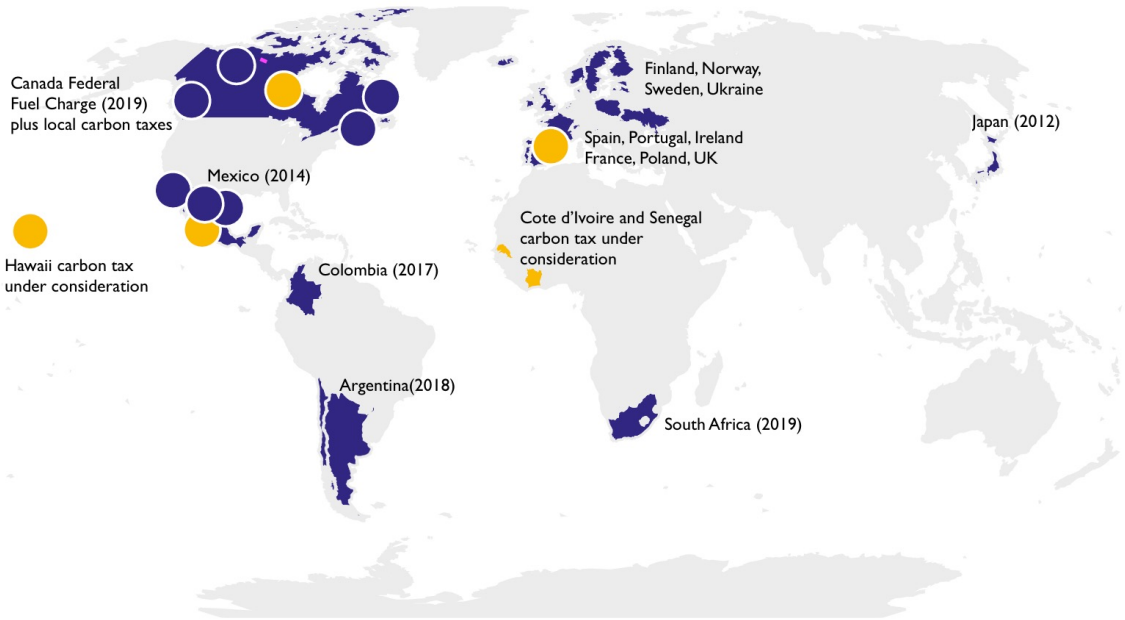

Figure 1: Carbon taxes worldwide (source: World Bank, last updated April 01 2021)

* Elon Musk in the Joe Rogan Podcast (February 11), https://open.spotify.com/episode/2aB2swgyXqbFA06AXPLfmr

Current carbon taxes

Different types of greenhouse gases, such as carbon dioxide, methane, nitrous oxide, and fluorinated gases can be taxed. About 27 countries and 8 subnational jurisdictions[46] have implemented some form of carbon tax already. The scope of each country's carbon tax differs, resulting in varying shares of greenhouse gas emissions covered by the tax. For example, Spain's carbon tax only applies to fluorinated gases, taxing only 3 percent of the country's total greenhouse gas emissions. Norway, by contrast, let go of most carbon tax exemptions and reduced rates. Norwegian carbon taxes now cover more than 60 percent of its greenhouse gas emissions.

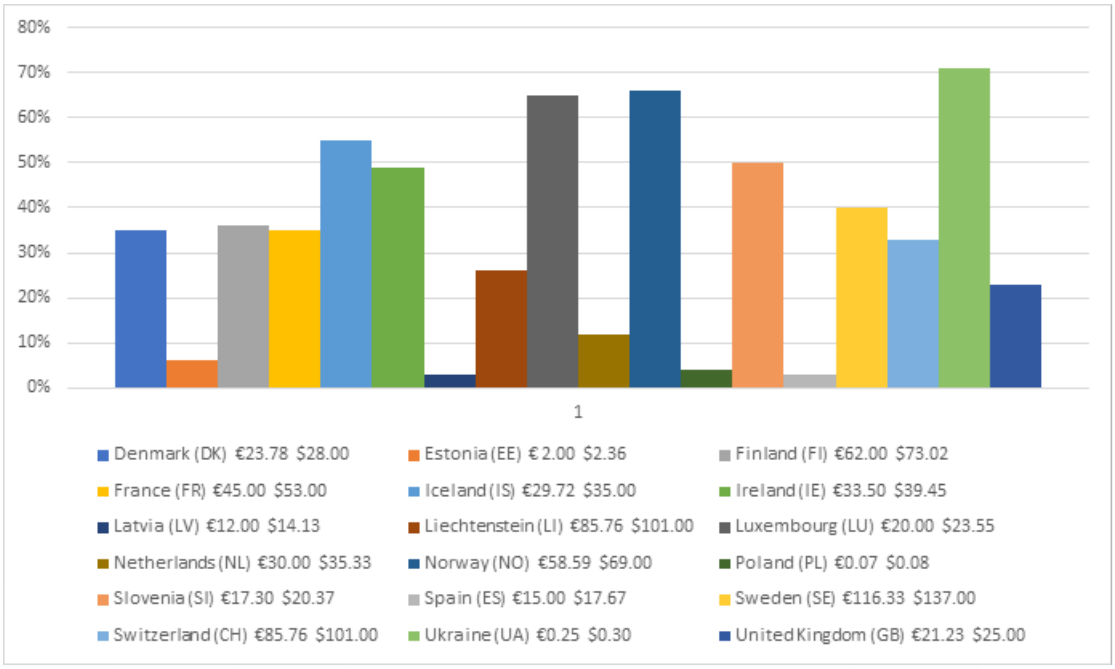

Figure 2: Europe's carbon taxes (source: World Bank, last updated April 01 2021)

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In 1990, Finland was the world's first country to introduce a carbon tax. Since then, 18 European countries have followed, with carbon taxes that range from less than €1 per metric tonne of carbon emissions in Poland and Ukraine, and more than €100 ($118) in Sweden[47].

Singapore was the first country in Southeast Asia to introduce a carbon tax in 2019, [48] with Indonesia currently proposing one[49].

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Figure 3: Carbon price, coverage and revenues generated by carbon taxes. (Source: World Bank. 2021. State and Trends of Carbon Pricing 2021, World Bank.)

Taxing carbon as a negative externality

Carbon taxes can be taxes, levies, tariffs, and excise duties that explicitly state a price on carbon[50]. The simplest form of a carbon tax is a Pigouvian market correction, whereby actors are forced to "internalize" negative externalities such as carbon emissions in their cost structure. By taxing polluting firms for the environmental cost of their activities, we force production prices to reflect the societal burden of the associated carbon emission. As a result, companies would strive to transfer their activities to operations that produce fewer emission gases. While this idea of a carbon tax is decades-old,[51] it is gaining traction again. Not only is climate change growing as a political priority, but carbon taxes could also help countries with additional funds to address the public deficits or societal issues that resulted from Covid-19.

Are carbon taxes feasible enough?

To state the obvious, tax increases tend to be unpopular. Even with some carbon tax already in place, public trust in the system remains a key issue, in particular the distributional and procedural aspects of carbon taxes. Research points out that people are concerned about price increases for individual consumers of energy and other products[52]. However, other research shows that, especially in lower-income countries, carbon taxes can be progressive as the tax is higher for wealthier people who consume more energy[53]. Another sticking point is where the additional tax revenue will be spent on. A survey by Nature with nearly 5,000 participants across Australia, India, South Africa, the U.S., and the UK, tested people's acceptance of hypothetical carbon tax mechanisms. The 'funding for climate change mitigation projects worldwide' received the highest support[54].

To make carbon taxes politically feasible and effective, governments must strategize on how to raise carbon taxes fairly with a minimal economic burden, and on how to best utilize the additional tax revenue. Options to increase acceptability include cutting other kinds of taxes, redistributing the tax income to lower-income communities,[55] increasing investment in sustainable projects, or using the carbon tax proceeds to give taxpayers a carbon dividend[56].

What if carbon tax revenues immediately go back to the public? In 2019, more than 3,500 economists signed a statement of the Climate Leadership Council, to advocate for a system of U.S. carbon taxes. The entirety of the revenue raised from carbon taxes would be redistributed equally to all households – like a "universal climate income[57]." It would be a progressive tax, working from the assumption that generally, richer people consume more high-carbon goods and pay more of the carbon tax while receiving the same as others in dividends. British Columbia, a province in Canada, implemented this approach, which became a national carbon tax policy[58].

Another approach would be to use the carbon tax revenues for addressing climate change impacts and assist the transition to a cleaner economy. For example, in the U.S., the hypothetical carbon tax of $25/tonne on all energy-related CO2 emissions is projected to raise about $1.1 trillion in tax revenue over 10 years[59].

However, instead of using carbon taxes to fund sustainable development, one could argue that direct government support (paid by existing taxation) might be more effective. Carbon taxes require significant political and legislative efforts, as well as administrative resources for enforcement after their implementation. And even if these practical issues can be addressed, will carbon taxes contribute towards reducing carbon emissions?

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Why carbon taxes (don't) work to price carbon

A "carbon tax makes sure Adam Smith's Invisible Hand has a green thumb," thinks economist Gilbert E. Metcalf.* Like. But could it really be that simple? In general, there is no conclusive answer that carbon pricing (through carbon markets or carbon taxes) is effective in reducing emissions. Empirical studies are scarce, and many factors are at play.

Many countries' carbon price is still below the actual societal cost of carbon[60]. On a corporate and individual level, carbon taxes might lead to emissions reductions only from those who can afford to pay them. It might be too early to tell what the positive effects of carbon pricing mechanisms are. To the extent that carbon prices (will) have some positive impact on transitioning towards a lower-carbon economy – some research suggests that taxes perform better than carbon markets[61].

* Professor of economics at Tufts University. See interview: https://www.cnbc.com/2021/02/12/elon-musk-reducing-greenhouse-gas-emissions-with-a-carbon-tax.html

Reasons why taxes can work as a carbon pricing mechanism:

- Simplicity: Taxes can be easier to administer than complex and technical carbon trading systems.
- Price control: Taxes allow for direct and immediate price adjustments based on what is considered the societal cost of carbon. One of the challenges of ETS systems is that pricing can be steered, but only indirectly. Rates are eventually a result of supply and demand. With studies pointing at the current downward bias of the societal cost of carbon, markets might continue to misprice (i.e. undervalue) carbon[62].
- Policy streamlining: Carbon taxes may replace the wild-grow of complex carbon-reducing policies. With an "all round" solution that just focusses on disadvantaging high emissions, some current and future carbon regulations across various layers of government, can be replaced with a "simple" carbon fee.

Assuming carbon taxes can work to incentivize reducing carbon, the question is whether the current rates are impactful enough. To reach net-zero emissions by 2050, the International Energy Agency estimates this year that advanced economies will have to pay an effective carbon price of about $75 per tonne by 2025, and up to $250 per tonne by mid-century[63]. Most existing carbon taxes are far below these levels. Also, the 2021 OECD Tax Energy Use report finds that current tax structures are not adequately aligned with the pollution profile of our energy sources, recommending higher taxes on coal[64].

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Carbon taxes do therefore come with challenges. Is it politically feasible to have high enough carbon taxes so that they are sufficiently effective? Some are worried that, because a carbon tax eventually affects all of society, it can increase costs for every energy consumer, without providing an immediate alternative. A $25/tonne carbon tax would increase production costs by 0.7% — with different impacts by industry.

Rise in production costs as a result of a carbon tax, in key U.S. industries

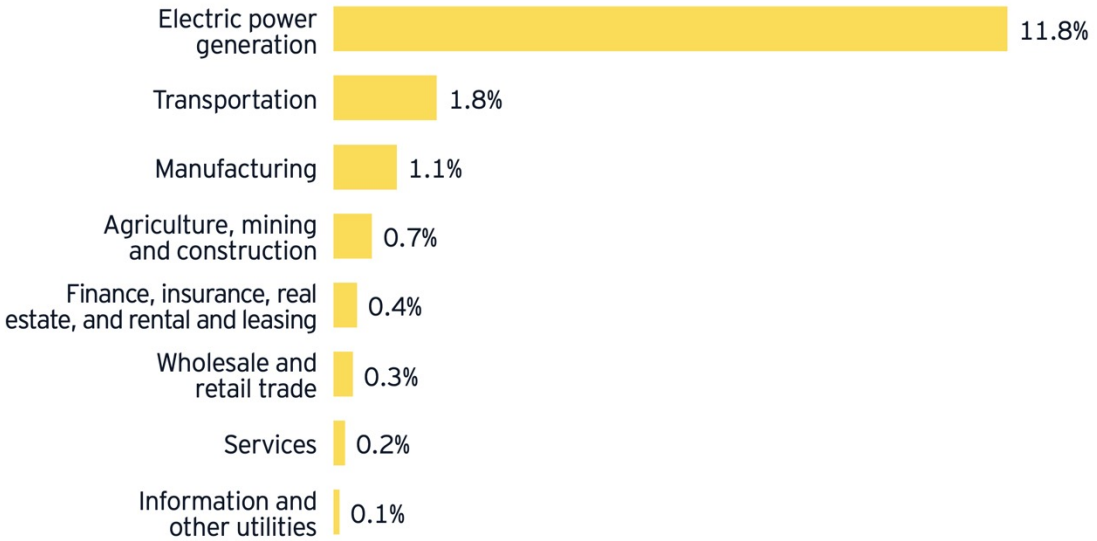

Figure 4: The impact of a carbon tax key on production costs across 8 key industries in the US economy. On average, production costs would increase by 0.7% — however, the impact varies widely by industry. (Source: EY. 2021. How key industries would fare under a carbon tax)

The IMF's proposal for a globally applicable $75/tonne carbon price by 2030 is not internationally supported. A direct carbon tax seems not feasible for the largest economies such as the U.S. and China. Introducing a new tax is often politically undesirable, and a carbon tax places a burden on specific industries or even groups within society.

The U.S. remains reluctant towards federal carbon taxes; since 2018 nine carbon tax bills have failed in Congress[65]. With the exception of Canada, countries that adopted carbon taxes have no major fossil-fuel industry. Moreover, carbon taxes raise the concern of tax fraud and avoidance – like any normal tax.

The answer to the effectiveness of carbon taxes will ultimately depend on the interplay with other policies. As law professor Michael Gerrard explains; a carbon tax "needs to be combined with additional regulations where needed, and with measures to counteract any regressive impacts on low-income people."*

* https://www.cnbc.com/2021/02/12/elon-musk-reducing-greenhouse-gas-emissions-with-a-carbon-tax.html

Carbon tariffs: where carbon markets are not enough

In the end, the right approach might be a mix of a carbon tax regime and carbon markets. Carbon trading – ETS or offsets markets – is most applicable to specific industries and companies. The EU ETS, the first and one of the largest cap-and-trade systems in the world, does not apply to industries such as transport and waste. By setting domestic carbon taxes on those industries, researchers point out that domestic carbon taxes might complement the ETS[66]. In this regard, Luxembourg and Austria consider introducing a carbon tax in 2021 for sectors not included in the EU ETS.

Carbon taxes in the form of import tariffs can also address the territorial limits of mandatory carbon markets and other carbon reduction policies. Carbon leakage occurs when companies move their activities to regions that have lower or no standards on carbon emissions[67]. Rather than reducing global emissions, this "waterbed effect" just shifts the problem to other regions, and might even incentivize some governments towards lower carbon standards to attract foreign businesses. Industries particularly prone to leakage are the high CO2 emitting industries such as iron, steel, cement, fertilizers/chemicals, aluminum, and electricity generation[68]. Because these are often intensely traded with countries outside of the EU, leakage is more likely.

In July 2021, the European Commission adopted a proposal for a Carbon Border Adjustment Mechanism (CBAM) that sets a carbon price on imports of specific products, as a key element of the European Green Deal[69]. Critics point out that the national oversight, and the companies' compliance under the CBAM, will lead to substantive administrative costs. This may become a trade issue – in response, Democratic lawmakers in the U.S. introduced legislation for a carbon tariff on certain imports like steel in July 2021[70]. The OECD is nervous about this "carbon tariff" as well, arguing for more international cooperation to set global prices5.

Towards International Carbon Taxes?

Even, if necessary, these cross-border carbon taxes exemplify a crucial challenge for addressing climate change. Jurisdictions with carbon pricing mechanisms, such as taxes, are mostly national or regional, while climate change is ultimately cross-border. Moreover, there is a disparity between local carbon pricing solutions and our globalized economies. Chicago economist and former Reserve Bank of India governor Raghuram Rajan raised the idea of creating a global carbon incentive fund[71], whereby high carbon-emitting countries should have to financially compensate those countries that produce emissions below certain thresholds – for example through the Green Climate Fund (GCF)[72]. Some suggest that the introduction of carbon taxes by big high-income economies will set the right precedent for better carbon pricing and climate policy overall[73].

A global carbon tax could be impactful in a positive way – but also comes with risks. Asset manager Van Kempen warns that global equity markets could fall by 20 percent if a $75 a tonne carbon price would hit companies. Globally coordinated carbon taxes are not likely to be introduced tomorrow, diplomacy is not the fastest sport. But looking forward, COP26 might be an opportunity to agree on a carbon pricing mechanism that includes both carbon taxes, as well as mandatory and voluntary emission trading schemes[74] – it continues to be on the table.

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