



Carbon Price

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I. Reminders

Understanding the concept of a "carbon price" requires some background on the theory.

A. Theoretical reminders

In his book "*The Economics of Welfare*", published in 1920, Arthur Pigou analyses non-optimal market situations. Introducing the concept of externality, he demonstrates that these can be compensated for by the introduction of a tax, charged to the agent causing the externality. This tax would raise the private cost of emissions - borne by money - to the level of the social cost - borne by society - in order to return to an optimal situation. In other words, this tax would make it possible **to internalise negative externalities**, i.e. to transfer the cost of the externality to the person generating it.

These principles, which have since been widely adopted, are still the foundations of environmental economics today. The concept of a "carbon price", also known as "carbon pricing", is the perfect application of this. It can be defined as "*an instrument that takes into account the external costs of GHG¹ emissions and links them to their sources through a price, usually in the form of a price on CO₂ emitted*"². Defined in different ways and used by both governments and companies, the price of carbon, or more precisely interest in decarbonising economies, seems to be increasingly the subject of a consensus. However, many questions remain, particularly about the level of the price.

B. Putting a price on carbon

When talking about carbon pricing mechanisms, i.e. mechanisms that put a price on carbon, it is important to distinguish between the so-called explicit and implicit price.

- An **explicit price** is a price that has been set directly on carbon emissions.
- Nevertheless, other instruments will introduce a price on the causes of emissions: this is known as an **implicit price**, insofar as the price is indirectly set on the emissions.

In the case of an explicit price, there are two main pricing mechanisms: the trading (or market) system and the tax system. Although their purpose is the same, these two instruments differ in their approach: the former introduces certainty on quantities but uncertainty on price, while the latter introduces certainty on price but not on quantities. The trading scheme refers to the carbon market where emitters trade emission allowances. The principle is as follows: a national or supranational entity defines a maximum quantity of emissions and distributes this budget in the form of allowances among the market participants. Each stakeholder, for example a company, is therefore allocated a certain number of allowances. Through the market, companies that have reached their emission quotas will have to buy allowances from companies with a surplus, and vice versa. **The law of supply and demand then creates an explicit price for carbon**, materialised by the market value of an allowance.

The tax system, a pure application of the **polluter-pays principle**, refers to the tax associated with the emission of one tCO₂e³ released. Here, it is the price that is initially set and not the quantities, unlike the trading system. This Pigouvian tax can be applied in two ways. Theoretically, it is applied *a posteriori* to the sale price of goods and services in proportion to the quantity of GHGs emitted during the production or use of these goods: in this case, the carbon price is said to be explicit. In practice, it

¹ Greenhouse gases

² Source: The World Bank

³ Tonne of CO₂ equivalent

is usually applied *a priori* to the consumption of fossil fuels necessary for the production of goods: the carbon price is then said to be implicit, as it is applied to the causes of emissions and not to the emissions themselves.

In addition to these instruments, which explicitly put a price on carbon, other mechanisms will implicitly put a price on emissions. Excise taxes, as mentioned, are a first example. Other mechanisms include subsidies for renewable energies - or, conversely, the cessation of funding for fossil fuels - as well as the introduction of emission standards and the development of low-carbon innovation.

C. Focussing on carbon markets

At the global level, the trading system is the most popular: according to the World Bank, allowance markets accounted for 16% of global GHG emissions in 2021, whereas taxes covered 5.5% of emissions.

The first emissions trading scheme appeared in the United States in the 1990s, designed to combat acid rain caused by SO₂⁴ emissions. In 1997, COP3 led to the signing of the Kyoto Protocol. For the first time, a GHG emission reduction target was formalised. Among the various mechanisms mentioned to achieve this objective, the carbon market is particularly highlighted. In 2001, the European Union proposed the creation of the European Union Emissions Trading Scheme, or "EU ETS". It was set up in 2005 and, until the beginning of 2021, was the world's largest market for trading allowances, now overtaken by the Chinese market.

Today, there are two main types: the regulated market and the voluntary market.

Regulated markets, also known as compliance markets, refer to the carbon offset mechanisms existing under the UNFCCC⁵. They therefore concern countries that have ratified the Kyoto Protocol, hence the main characteristic of these markets: the carbon credits used are certified by the United Nations. In parallel, voluntary markets have developed, such as the Montreal market or the *Chicago Climate Exchange*. Here, on the other hand, carbon credits do not necessarily have to be certified, although standards do exist (*Verified Carbon Standard* in particular).

Given the expiry of the Kyoto Protocol (initially in 2012, then extended to 2020 following COP18), the regulated markets will now be governed by the Paris Agreement and more specifically its Article 6, which provides for a transition from the old mechanisms to the new ones. Since the Agreement was signed, this article has been the subject of international debate: on the issue of double accounting, but also on the transfer of carbon credits from the old market. COP26, which has just ended, seems to have put an end to these debates. On the question of double accounting, it was indeed decided to apply an adjustment principle. On the transfer of old credits, the agreement provides that only credits generated since 2013 will be transferable.

II. Review of market practices

A. The internal carbon price

The internal carbon price corresponds to a "value that the company voluntarily sets for itself to internalise the economic cost of its greenhouse gas emissions"⁶. The Institut Montaigne identifies two

⁴ Sulphur dioxide

⁵ United Nations Framework Convention on Climate Change

⁶ Source: I4CE

factors that lead a company to set up an internal carbon price, namely **anticipating changes in external prices**, embodied by a regulated carbon market or a carbon tax, which corresponds to a **transition risk** according to the nomenclature proposed by the Taskforce of Climate-related Financial Disclosure (TCFD), or as a lever for the company's decarbonisation strategy. It is therefore above all a **risk management** tool.

Internal carbon pricing mechanisms tend to be democratised and the Institut Montaigne identifies 3 fundamental dimensions to it:

- **The price level or height:** This can reflect several elements, such as *the anticipation of a price change*, which varies according to the sector or geographical area, but also the *cost of the negative externality that an emission of one tCO₂e represents for society*, also known as the social cost of carbon, or the *carbon⁷ price* that should be attributed to carbon in order to comply with the commitments of the Paris Agreement.
- **The scope or width**, i.e. the different emission scopes.
- **Influence on decision making or depth.**

This can take several forms, including the following two:

- **A shadow price**, a value defined by the company to guide investment decisions by estimating the impact of a potential carbon tax. Applied to a company's emissions, or to the reduction of emissions linked to an investment (e.g. technology), it makes it possible to compare the gain associated with a reduction in emissions, or the cost associated with high emissions, as well as the effect on the company's financial performance. In a context of more restrictive regulatory changes and decarbonisation of the economy, this tool is a means of analysing and reducing exposure to transition risks.
- **An internal carbon tax**, which can be applied to all a company's emissions, including scope 3. The company uses the proceeds of this tax as it sees fit, to finance its research and development expenditure or investments associated with its low-carbon transition, or to purchase carbon credits.

The internal carbon price, mainly in these two forms, is a tool to support the company's **decarbonisation strategy** and a **risk management** instrument. It allows the company's overall strategy to be more resilient to restrictive regulations and favourable to emissions reduction. Indeed, it aims to enable the company to **internalise and/or quantify** several elements:

- **The impact of the implementation of a carbon tax**, which would have a clear and direct effect on a company's financial performance. This impact would also differ depending on the scope of application, i.e. scope 1, 2 or 3.
- Inflation resulting from the implementation of a carbon tax, which would have a direct effect on costs from the value chain, which would then pass on the carbon tax in the company's prices. This aspect reinforces the importance of quantifying upstream scope 3 emissions.
- Taking into account **decreasing demand for carbon products and services**, this would then lead to a decrease in associated revenues.

⁷ *The value of climate action*, 2019, France Stratégie

B. Carbon price determinant

In the case of the internal carbon price, the value is set by the company. A carbon price can then be established, taking into account different elements, which can be considered as the determinants of the carbon price:

- **The sector of activity:** Certain sectors, which are more emissive than others, are subject to greater regulatory pressure and higher expectations in terms of low-carbon transition. The sector of activity can therefore be considered as one of the most important determinants of a carbon price that reflects both the negative externalities generated and the level of regulatory pressure. As the price signal is a risk signal, some sectors present a higher level of risk.
- **Geographical location:** This is explained by the variability between the regulatory pressure in different countries and the existence (or not) of a regional carbon market, which then gives an indication of the anticipated market price of carbon, should there be a generalised tax system. Also, the geographical location is an indicator of the level of maturity of the market in relation to the low-carbon transition. It is easy to imagine that a more mature market will have a less difficult low-carbon transition than a less prepared market.
- **Time horizon:** The price of carbon tends to rise over time, as pressure to reduce global emissions increases as deadlines approach. Therefore, as Carbon Market Watch points out, carbon needs to have a sustained and rising price to reflect the damage caused by greenhouse gas emissions and the cost to society.

More academically, an internal carbon price can be seen as reflecting the anticipation of market prices or the cost of decarbonisation.

C. Carbon price trends and developments

Regulatory pressure, the climate-related urgency to reduce the global level of GHG emissions, and the market expectation for a low-carbon transition are all factors in favour of upward pressure or the anticipation of a rising market price.

The study published by the Institute for Climate Economics (I4CE) in October 2021⁸ highlights the heterogeneity of prices observed on the carbon market, which vary between \$1 and \$117 per tCO₂e. The report stresses that the incentive mechanism is reached when the price oscillates between \$40 and \$80, a rate closer to the conclusions of the Institut Montaigne, which observes an average internal carbon price of €60/tCO₂ in 2021, rising to €89 in 2030 and €152 in 2040. This internal price increase trajectory, and thus the anticipation of a possible carbon tax at this level, is perfectly consistent with the recommendations of the Carbon Pricing Leadership Coalition, which recommends an internal carbon price of \$40 to \$80 per tCO₂e in 2020 and \$50 to \$100 in 2030.

⁸ I4CE. *Global Carbon Accounts*. October 2021