



# White Paper – Carbon Interventions

## Overview of Global Interventions with Relevance to Carbon

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## 1 Introduction

### 1.1 Context Update

Five years after the adoption of the Paris Agreement<sup>1</sup>, many governments have progressed in the definition of their national plans to meet the Nationally Determined Contributions (NDC). Markets have reacted by directing an increasing share of total investment into technologies and sectors that are expected to play a pivotal role in the impending Energy Transition.

In a context where the amount of total GHG emissions are limited, it has become apparent that regions and businesses that embrace the Energy Transition as an opportunity to transform their economies and operations are best placed to benefit.

Worley's new purpose, '*Delivering a More Sustainable World*', is an unequivocal message to our partners. We are fully committed to help our clients succeed through this challenge and, to do so, we continue to develop innovative services such as the [Advisian Carbon Risk Index Service \(ACRIS\)](#).

### 1.2 Executive Summary

This report provides a global view of the main regulatory and market instruments for the management of carbon emissions. Most of these have been developed by regional / national and supra-national public authorities, although the participation of the private sector is increasingly relevant.

The tools described in this document can be summarised as follows:

- **Emission Trading Systems:** market mechanisms for the definition, allocation and exchange of carbon emission rights.
- **Carbon Taxes:** levies imposed on carbon emitting activities to disincentivise carbon emissions.
- **Carbon Leakage Mechanisms:** mechanisms to prevent the neutralization of carbon policies due to the relocation of carbon-intensive activities to less stringent jurisdictions.
- **Transport Emission Standards**
  - **Fuel Economy Standards:** dictate the efficiency of vehicles, measured as the amount of carbon emissions per distance travelled or the distance travelled per volume of fuel.
  - **Low Carbon Fuel Standards:** establish the carbon-intensity per volume of fuel, as well as their content of alternative fuels.

With world regions moving towards decarbonization at different rates, the carbon instruments are very fragmented in often overlapping jurisdictions. This document aims to guide the reader through this complex landscape and help them form a general yet consistent view of the subject.

Complementing this report, the [Advisian Carbon Intervention Database](#) is an updated register of carbon instruments across the world. Both support our Advisian Carbon Risk Index Service (ACRIS), which is available via subscription.

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<sup>1</sup> Sealed in 2015 and adopted in November 2016

## 2 Carbon interventions

### 2.1 Emission Trading Systems (ETS)

Emission Trading Systems are market-based instruments used to help manage emissions within a jurisdiction. ETS normally operate on a cap-and-trade basis, where a set amount of emission rights is first established, then allocated and finally traded.



Figure 1 – Typical ETS process map

#### Emission Cap

The total amount of emission rights can be established either top-down or bottom-up, although, in practice, caps are often established through a combination of both. Each approach has different motivations and drivers, as illustrated below:

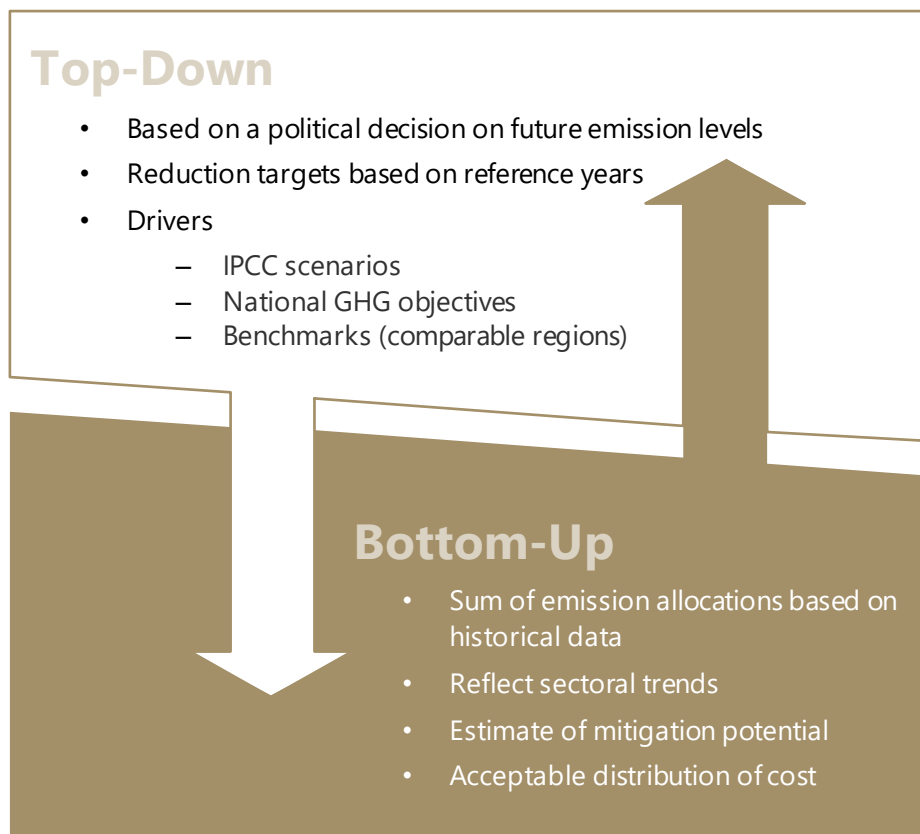


Figure 2 - Options for establishing an ETS emission cap

*Emission right allocation*

Emission rights are usually allocated through a combination of auctioning and free allowances, which are used to prevent carbon leakage in carbon-intensive sectors of the economy. Further details on carbon leakage mechanisms can be found in Section **Error! Reference source not found.**

Depending on the procedure to allocate free allowances, ETS can be broadly classified into the families depicted in the following diagram:

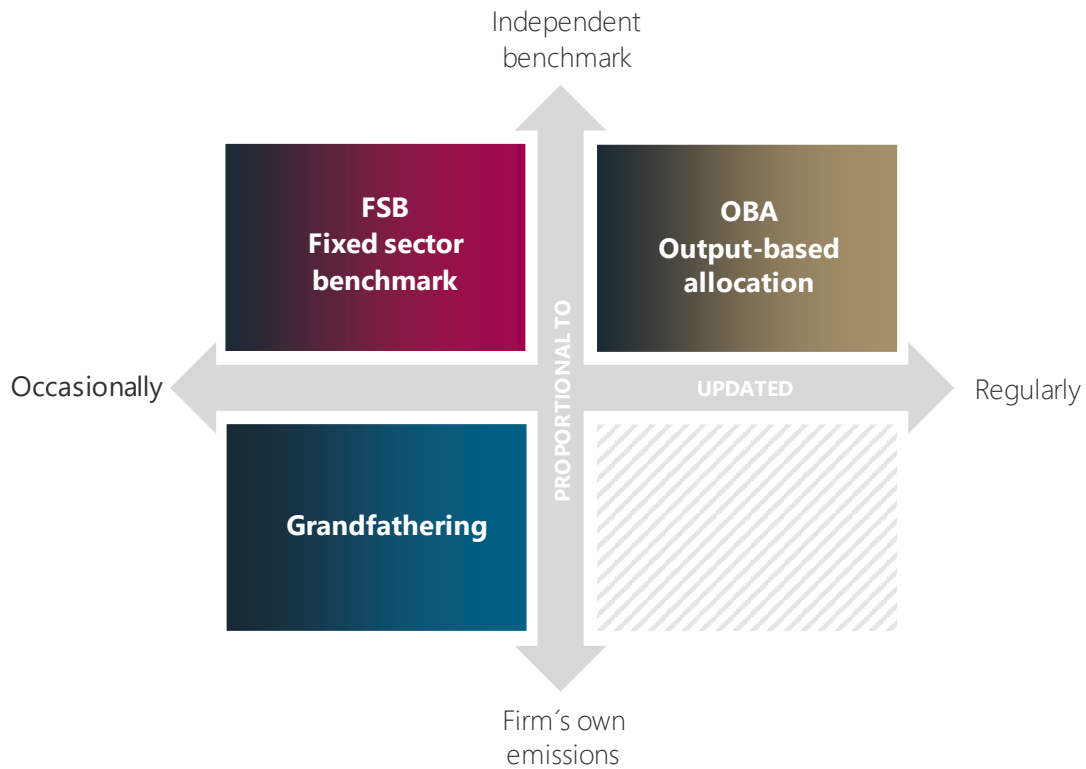


Figure 3 - Options for allocating ETS emission allowances

**Horizontal axis:** Frequency of Updates

Type	Advantages	Disadvantages
<b>Regularly updated</b>	Strong incentive to maintain or increase production.	Demand-side abatement incentives dulled. Higher administrative costs as output data must also be reported.
<b>Occasionally updated (only at phase changes)</b>	Demand-side abatement incentives preserved.	Risk of windfall profits & weak leakage prevention.

Table 1 - ETS Emission Allowance Allocation - Frequency of Updates

**Vertical axis:** Proportionality of allocation

Type	Advantages	Disadvantages
<b>Independent benchmark</b>	Emissions intensity incentives preserved.	Administrative complexity and risk of lobbying.
<b>Firm's own emissions</b>	Relatively easy to implement.	Dilutes incentives for emission intensity reductions.  Potential to penalize early adopters, who may have reduced their emissions before the baseline was set.

*Table 2 - ETS Emission Allowance Allocation - Proportionality of Allocation*

A comprehensive description of each ETS family, including detailed advantages & disadvantages and a list of real-world examples is available in the [Advisian Carbon Intervention Database](#).

There are a considerable number of ETS already in operation, covering most developed countries except for the US where, while there are regional schemes, no ETS has been implemented at federal level. The most notable ETS scheduled for implementation is the China National ETS, while other countries are also considering their own systems.



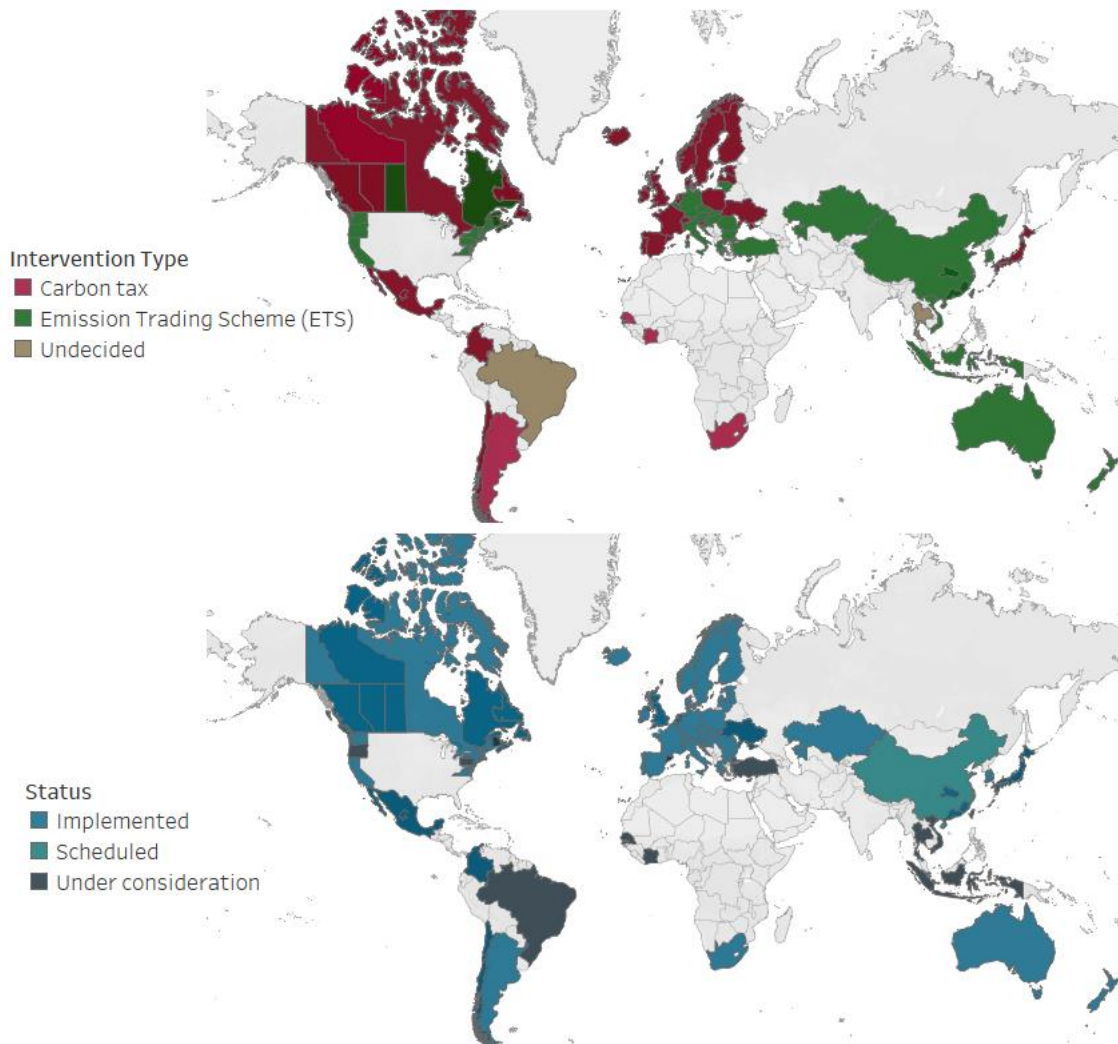


Figure 4 - Map of implemented and scheduled ETS in the world, by intervention type

In the following pages, an overview of the five largest, in term of volume of GHG covered, ETS is provided, accounting for approximately three quarters of the total of GHG emissions covered by all ETS currently implemented or scheduled in the world.

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