

CARBON PRICING : FROM A BURDEN TO AN OPPORTUNITY ?

Testimony and sharing of views by EDF, Europe's leading electric utility



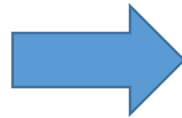
Research Institute of Economy, Trade, and Industry (RIETI)

BBL Webinar - June 23rd, 2022

KEYNOTE : sharing views about the merits of a well-functioning carbon pricing system to meet CO2 reduction objectives

New challenges for Japan

- ✓ **46% CO2 emissions reduction by 2030** and net zero objective by 2050
- ✓ **Surge in energy prices** in the context of the war in Ukraine
- ✓ In april 2022, for the first time, METI launched **Japan's first nationwide carbon exchange** which intends to serve as the go-to benchmark for domestic firms in their internal carbon price (ICP) calculations



EDF commitment to net zero

- ✓ Our new investments (nuclear + renewables) are **increasingly indexed to the evolution of carbon price**
- ✓ A virtuous process started for our Company more than a decade ago, when CO2 price became a **driver for our global strategy and influencing our major business decisions**



As a major player in energy transition, the EDF group is an integrated energy company active in all businesses: generation, transmission, distribution, energy trading, energy sales, and energy services. EDF group is a world leader in low-carbon energy, having developed a diverse production mix based mainly on nuclear and renewable energy (including hydropower). It is also investing in new technologies to support energy transition (storage, microgrids, hydrogen, etc.).

37.9

MILLION CUSTOMERS
WORLDWIDE ⁽¹⁾

501.9 TWh

ELECTRICITY PRODUCED
WORLDWIDE

90%

DECARBONISED
GENERATION ⁽²⁾

165,200

EMPLOYEES ⁽³⁾

Jean-Bernard Lévy

Chairman and Chief Executive Officer
of EDF



THE "RAISON D'ÊTRE" OF EDF

To build a net zero energy future with electricity and innovative solutions and services, to help save the planet and drive wellbeing and economic development.



This raison d'être is in line with the values of progress and sharing that have inspired EDF's actions since its creation, as well as with today's major issue of addressing climate change and preserving the planet.

> INTRODUCTION TO CARBON PRICING & EDF DECARBONISATION STRATEGY

REMINDER 1: a quick overview of the existing carbon pricing systems

MANDATORY markets setting a cap on emissions for large emitters (ETS)

- ✓ Represent around **15% of global CO2 emissions** (after the launch of Chinese ETS system)
- ✓ **23 emissions trading systems (ETS)** existing globally including **the EU, the UK, China** (limited to the power sector), New Zealand, Mexico and Republic of Korea.
- ✓ ETS is implemented in **countries emitting around 40% of GHG**.
- ✓ **Highly liquid** : US\$ 800 b traded in 2021
- ✓ Price range from **US\$ 13 => 100/tCO2**

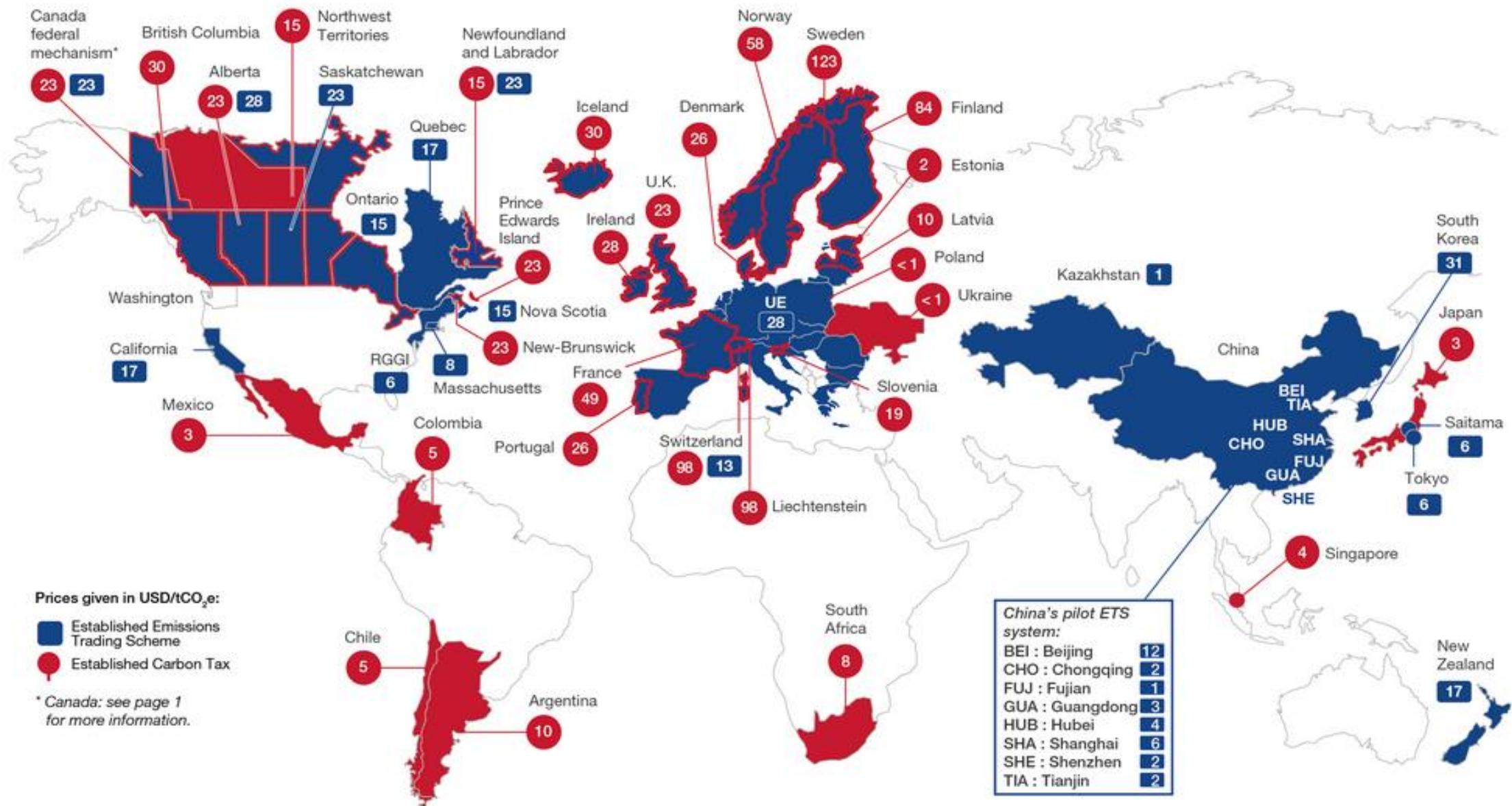
VOLUNTARILY markets for non-regulated entities engaged in reducing emissions (carbon offsets)

- ✓ **Smaller market**
- ✓ **Low liquid** : US\$1 b traded in 2021
- ✓ Price range from **US\$ 0,3 => \$70/tCO2**
- ✓ Emissions reduction transferred across countries



Some of them are coexisting with **national or regional CARBON TAXES** from US\$ 3 (Mexico) to US\$ 123 (Sweden)

Map of explicit carbon prices around the world 2020



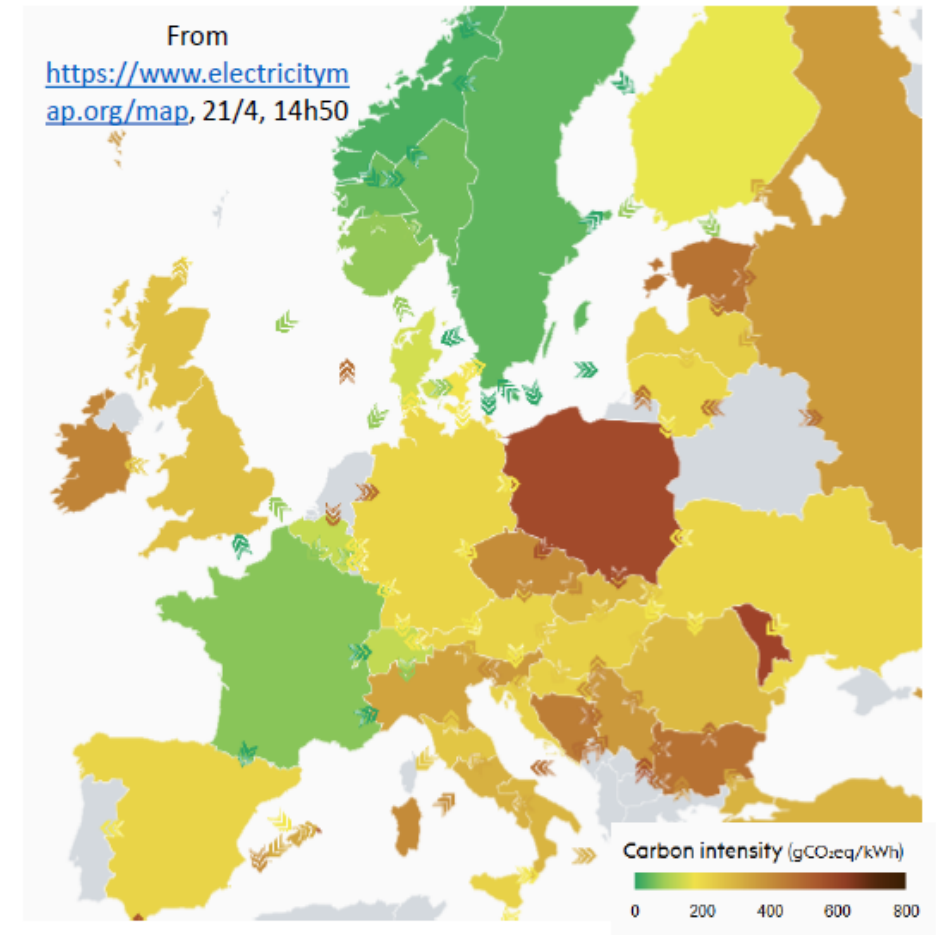
REMINDER 2: EDF is heavily contributing to the energy security in Europe and to the reduction of the European CO2 foot print

- France exports are 35 % of the total exports of electricity of MS, with 10 % of its generation exported.
- The French hydro and nuclear power plants are today a major support to the stability of the frequency of the ENTSO-E zone.
- EDF represents 28 % of the EU 27 low-carbon generation and n°1 in RES gen including hydro.

France is a low-carbon export country thanks to RES (Hydro,...) and nuclear

Our key priority: boosting the electrification of the EU economy

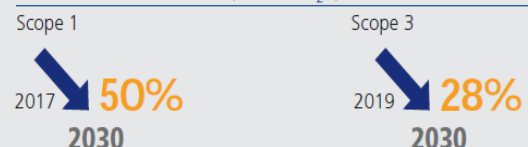
EDF believes that decarbonising power production, while at the same time electrifying our energy use, is essential for reaching climate objectives and creating a carbon-neutral and energy efficient economy in the EU.



REMINDER 3: EDF decarbonisation strategy is covering all kind of CO2 emissions : carbon pricing has a strong leveraging effect to align our efforts on scopes 1 + 2 + 3

An ambitious carbon trajectory

Emissions reduction (in MtCO₂e)

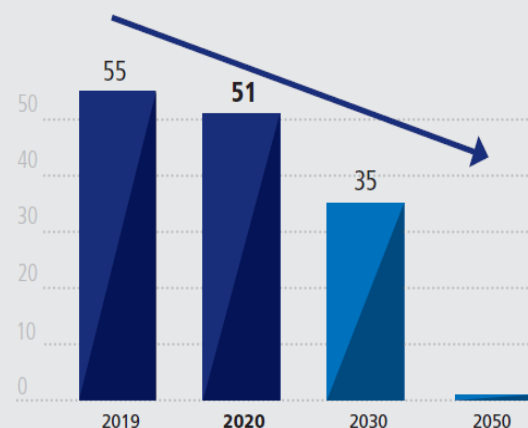


Carbon intensity trajectory

CO₂ intensity (g/kWh)



275⁽¹⁾ (European average in 2019)



(1) Average 2019 carbon intensity of power producers in Europe according to EEA.

Decarbonisation Strategy

The EDF Group is therefore committed to the following 2030 targets:

SBTi targets for 2030

50% reduction, compared to 2017, in Scope 1 and 2 emissions, including emissions from non-consolidated assets and emissions associated with electricity purchased (i.e. not produced) for sale to end customers.

28% reduction, compared to 2019, in emissions associated with the combustion of gas sold to end customers (scope 3).

In line with these objectives validated by SBTi, the EDF Group has set the following additional 2030 objectives:

Additional targets for 2030

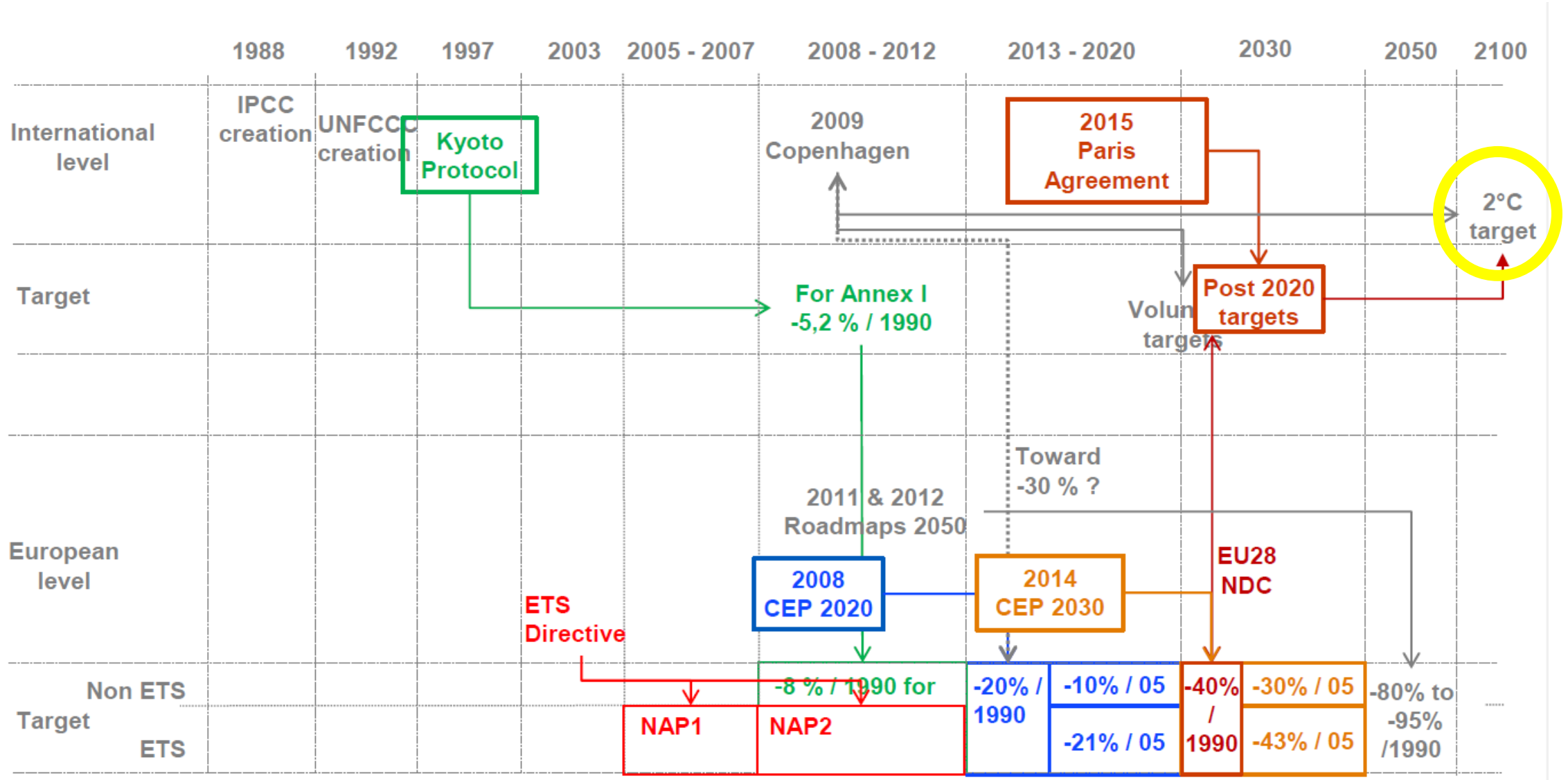
25 MtCO₂e for the Group's scope 1 emissions in 2030.

35 gCO₂/kWh for the carbon intensity of the electricity and heat produced by the Group in 2030.

28% reduction in scope 3 emissions by 2030 compared to 2019.

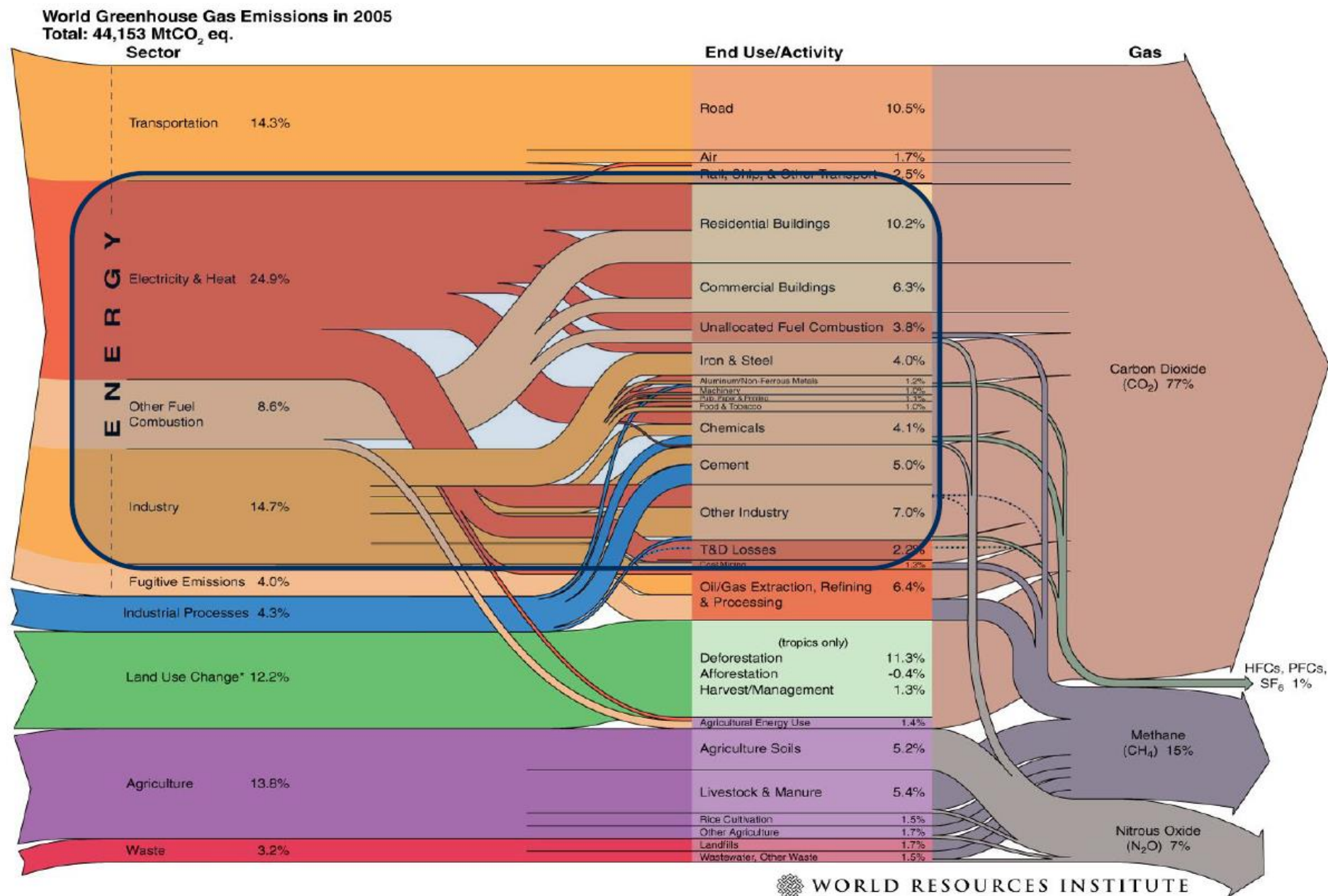
**> PUTTING A VALUE ON CO₂ :
A GRADUAL PROCESS, NOW GAINING MOMENTUM**

History of Climate Policy



Green House Gases Emissions : the power sector, first target of the EU ETS

General scope of
« ETS sectors »
emissions



Main characteristics of the EU ETS (European emission trading scheme)

Cap & Trade principle : take advantage of the differences in marginal emissions abatement costs to limit the global costs of compliance to the target

- Each tonne of emission has to be covered by an allowance
- Global emissions cap is defined before the allowance distribution
- Allowances can be traded between actors

Around 40 % of European Green House Gases (GHG) emissions (EU28 + Norway + Luxembourg + Island)

- Covered sectors
 - Industry : Steel, aluminium, Cement, Paper, Refining, large combustion plant ($> 20\text{MW}_{\text{th}}$)
 - Power : fossil fuel fired power plants
- Geographic extensions : EU25, Roumania+Bulgaria, +Norway+Island+Liechtenstein, +Switzerland
- GHG extensions : CO₂, +N₂O, +PFC

Different methods to determine the allocation and to distribute the allowances

- EU-ETS Allowances = EUA
- Free distribution : grand-fathering (phase 1 and 2) or benchmark (Industry)
- Paying distribution : auctioning (power sector)

Different phases

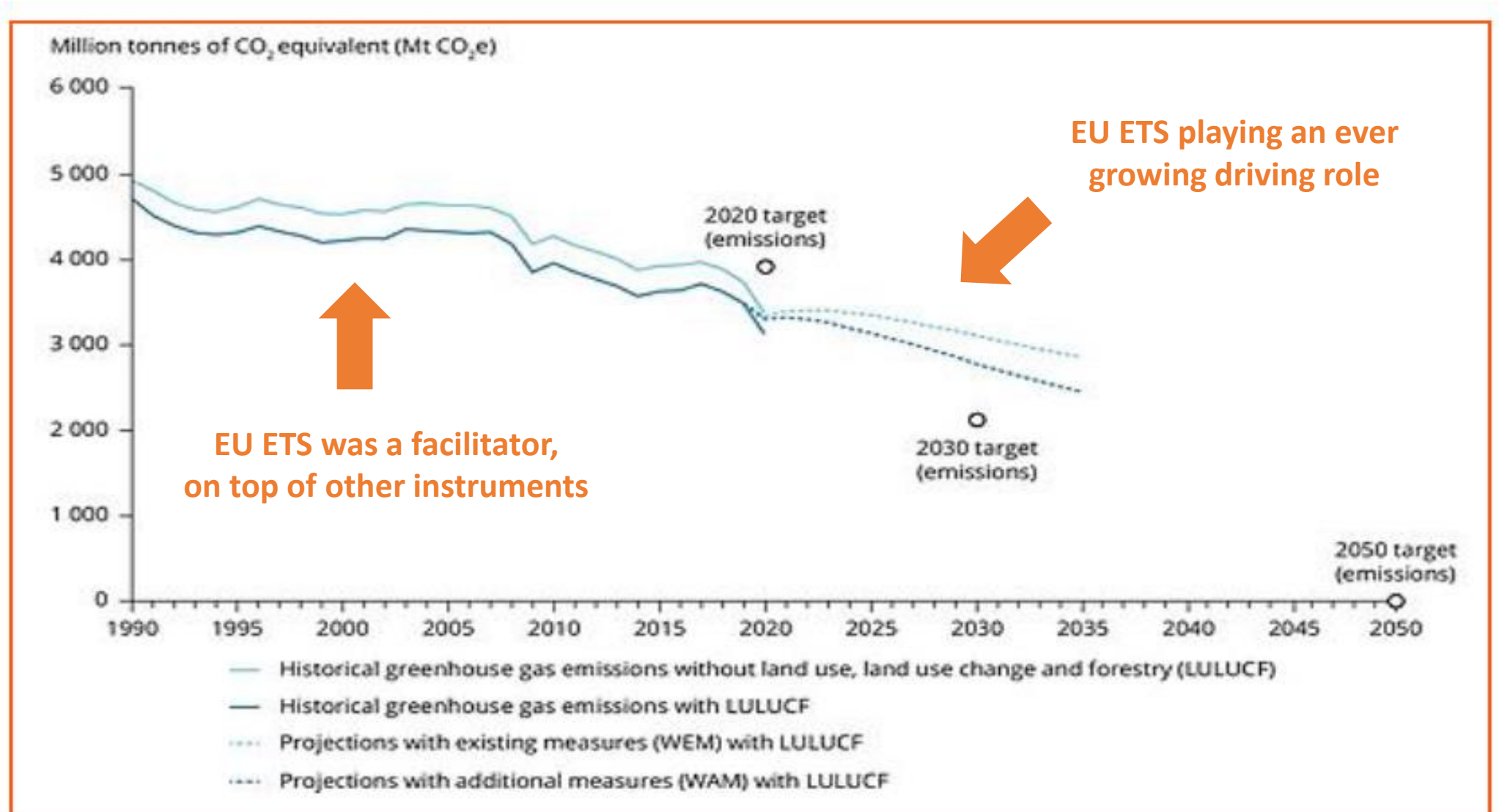
- Phase 1 : 2005 – 2007
- Phase 2 : 2008 – 2012
- Phase 3 : 2013 – 2020
- Phase 4 : 2021 – 2030

2 types de participants

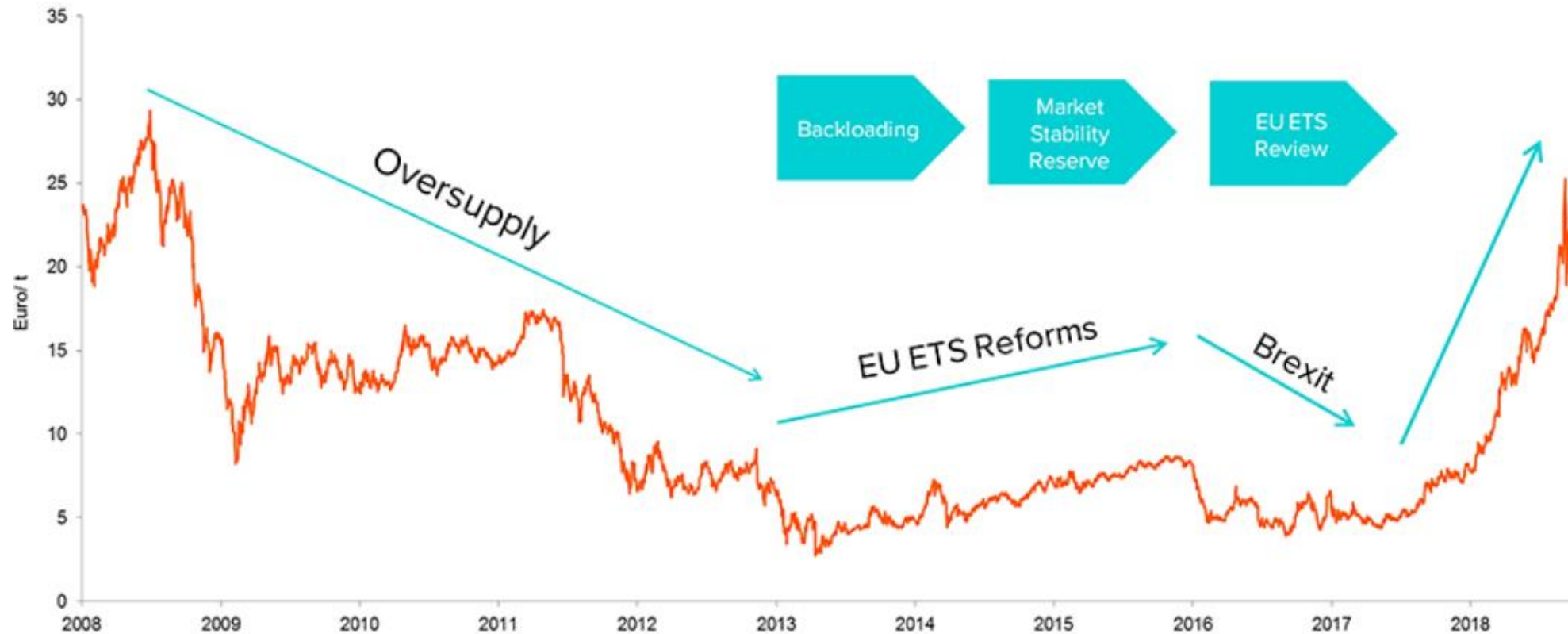
- Constrained actors
- Non constrained actors

More than 11.000 power stations and industrial plants included

Evolution of European GHG emissions since 1990 + new « fit for 55 » targets 2030-2050



The EU ETS « learning curve » : from a limited to a growing role in the decarbonization of the European economy



EU carbon price is gaining on importance despite the energy crisis

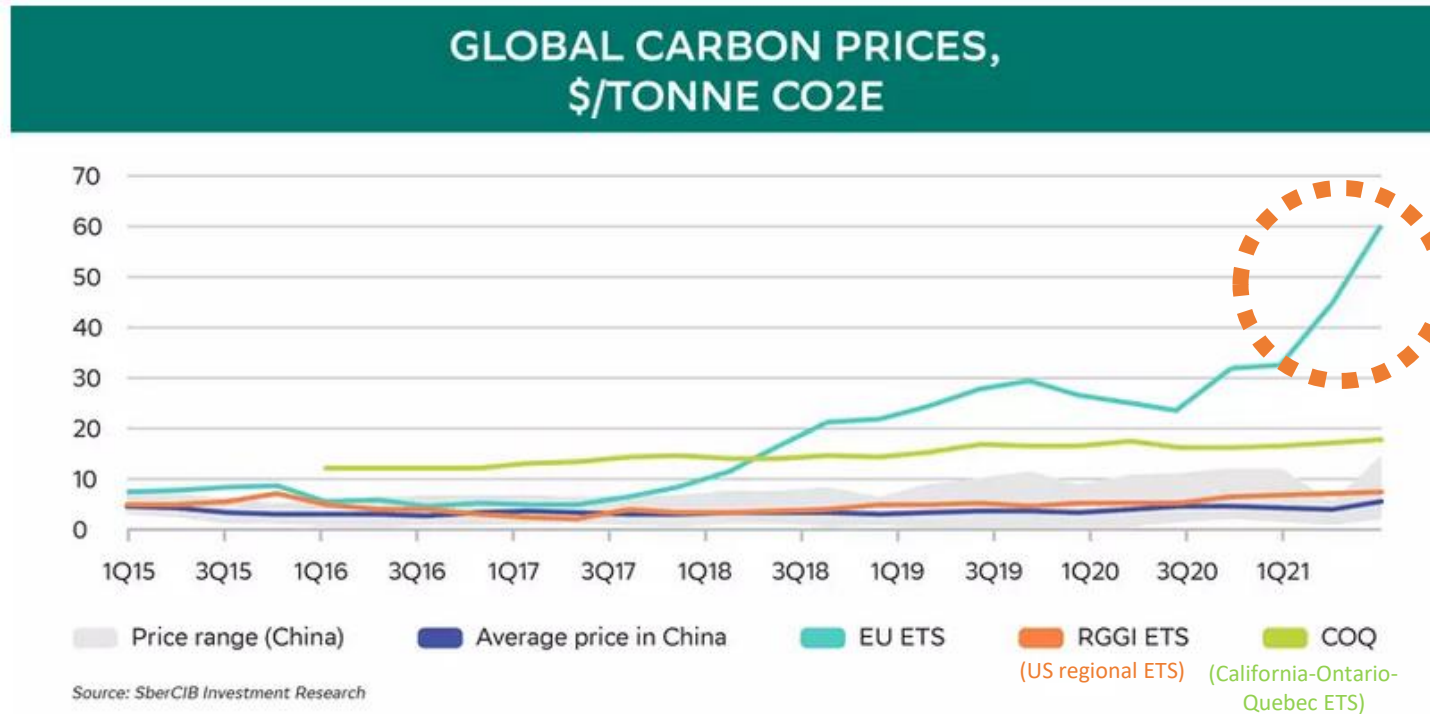


EU ETS Carbon price initial forecasts 2019 2030

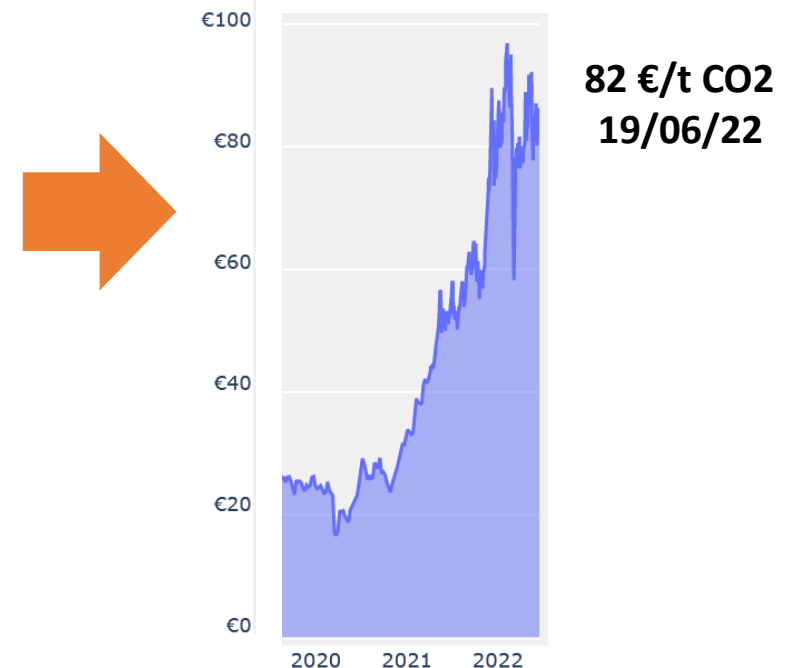
	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
EUA (€/t) Nominal prices	18	23	25	24	24	23	23	22	22	21	22	24	26



Real carbon price evolution : reaching 30€/t from 2019 and going up from 2020



EU ETS Carbon price +150% YoY (02/21- 02/22)



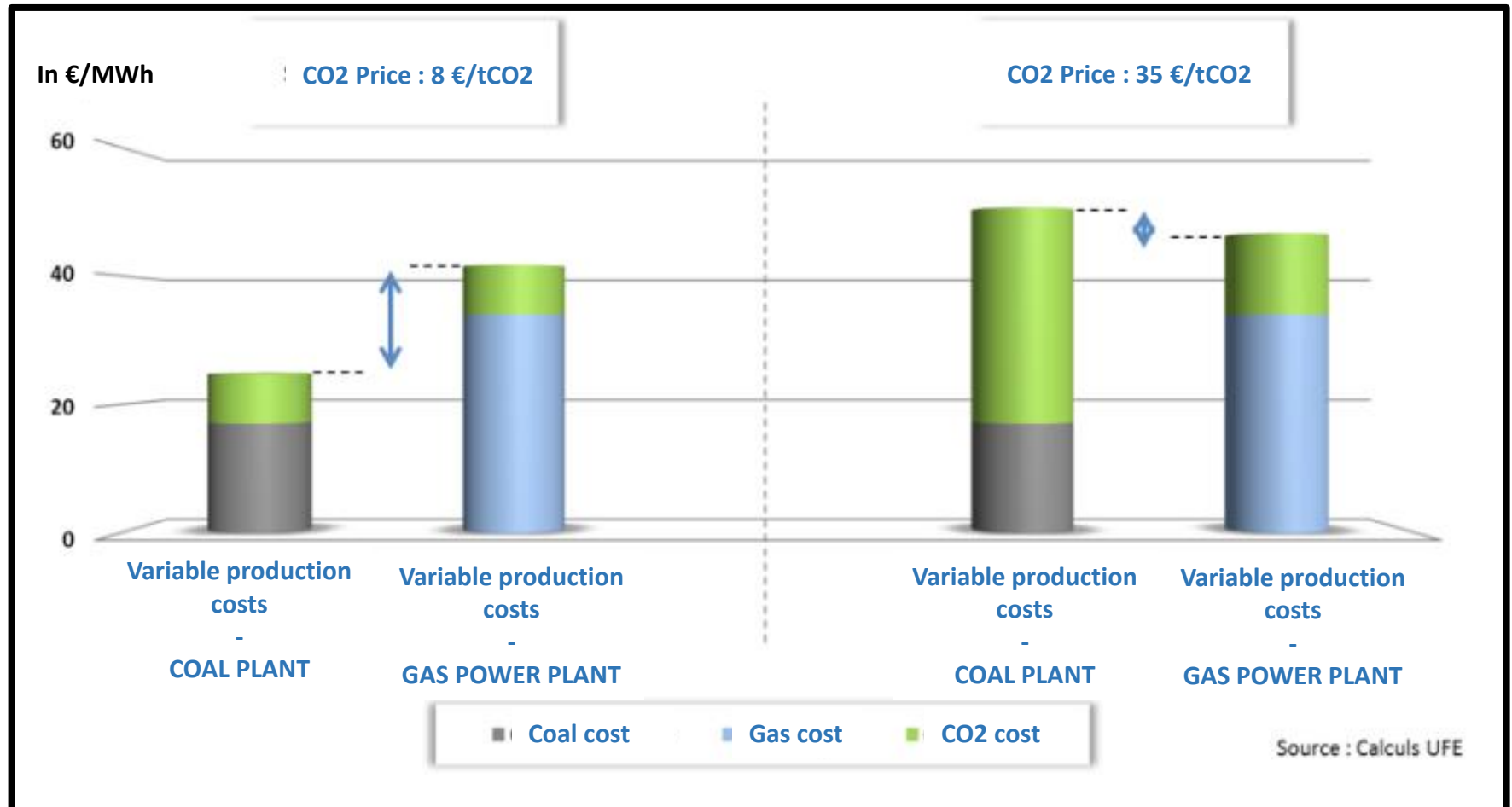


How EDF was impacted from the beginning and how it became a key instrument in our toolbox to decide on new investments ?

Power sector = main emitting sector, around 60% of ETS emissions
with EU 10 larger utilities accounting for 30% of ETS emissions still in 2015

Impact of the price of CO₂ on the production costs of gas and coal-fired power plants

For a CO₂ allowance price of 8€/t CO₂ (i.e. the CO₂ price in 2015), gas was not competitive but with a CO₂ price around 35€/tCO₂, gas became more competitive than coal



Advantages of a single carbon price serving as reference for the largest CO2 emitters : some lessons learnt in Europe

- ✓ Carbon pricing helps businesses to plan future reduction emissions and at the lowest cost to society until one ton of emissions has a **monetary value**
- ✓ ETS is market-based and better for companies than CO2 tax as it provides **environmental certainty** (less subject to change in legislation than CO2 tax)
- ✓ On the contrary, **without it, it could be hard to motivate business in a systematic manner**
- ✓ The **absence of a strong, clear signal could inhibit decarbonisation and the capacity to follow through on the climate friendly policies set out by the governments**, especially in the context of rising material prices.



- ⇒ The single most effective policy to make the energy transition a **profitable proposition for business and society at large**
- ⇒ Revenues of CO2 market can be reinvested to finance **decarbonised solutions**
- ⇒ The best way to maintain a strong decarbonisation trajectory **despite a growing tension / volatility on energy prices**

> CARBON PRICING : A NEW AREA OF COOPERATION FOR EU and JAPAN ?

EU is accelerating on the road to Carbon neutrality

- ✓ End 2019: **Green Deal**
- ✓ Mid July 2021: The "**Fit for 55**" package was unveiled by the EU Commission
- ✓ The central objective is to reduce net GHG emissions by at least 55% by 2030 (compared to 40% previously) compared to 1990, and to enable Europe to **become the first carbon neutral continent by 2050**



CBAM (Cross Border Adjustment Mechanism) will become effective from 2023

- ✓ It will expand the carbon-pricing structures of the EU beyond its borders.
- ✓ The carbon border tax should be progressively introduced for :
 - oil refineries,
 - the glass, paper and aluminium industries,
 - the power sector, and energy-intensive industrial sectors such as cement, steel, chemicals, and fertilizers



EU-Japan perspectives on CO₂ : CBAM could be a game changer



- ✓ It is all the more important that Japan can have a well-functioning and **single representative platform to be well connected to EU's** economies and access more easily to EU market and vice versa.
- ✓ The **role of banks and trading companies on both sides will be more important** to ease through carbon market services, including project origination and finance, and trading and brokerage of carbon credits

THANK YOU FOR YOUR ATTENTION

どうもありがとうございました



PHASE 1: 2005-2007	PHASE 2: 2008-2012
<ul style="list-style-type: none"> • Geography: EU27 • Cap: no reduction path • Allowances: free • Sectors: power and heat, oil refineries, coke ovens, iron and steel, production of cement, glass, lime, bricks, ceramics, pulp, paper and cardboard • Characterised by oversupply of allowances, with prices collapsing to zero at the end of the phase 	<ul style="list-style-type: none"> • Geography: EU27 + Norway, Iceland and Liechtenstein • Cap: no reduction path • Allowances: mainly free • Sectors: aviation added in 2012 • The financial crisis in 2008 reduced industrial activity and emissions from EU countries, leading to a demand-supply imbalance
PHASE 3: 2013-2020	PHASE 4: 2021-2030
<ul style="list-style-type: none"> • Geography: Croatia joined the EU ETS • Cap: EU-wide cap, reduced by 1.74% each year • Allowances: progressive shift toward auctions; free allowances distributed via harmonised benchmarks ("greener" companies obtain free allowances) • Sectors: carbon capture and storage installations, production of petrochemicals, ammonia, non-ferrous and ferrous metals, gypsum, aluminium, and nitric, adipic and glyoxylic acids (at various thresholds) included • Introduction of market mechanisms to correct for demand-supply imbalances (backloading of excess allowances until 2019-2020, unallocated allowances transferred to an MSR) • Revised EU ETS Directive for the fourth phase entered into force 	<p>In place:</p> <ul style="list-style-type: none"> • Geography: the United Kingdom left the EU ETS • Cap: annual reduction factor increased from 1.74% to 2.2% • Doubling of the intake for the MSR (from 12% to 24%) until 2023 • Starting in 2023, allowances held in the MSR are limited, excess volumes become invalid <p>Proposed under the "Fit for 55" package:</p> <ul style="list-style-type: none"> • Cap: reduction factor raised from 2.2% to 4.2% • Allowances: maintaining conditionality for free allowances based on decarbonisation efforts; gradual reduction in free allowances • Sectors: inclusion of maritime transport in the EU ETS • Introduction of a separate emissions trading system for building and transport emissions • Intake of the MSR maintained at 24%