European Compliance Framework:

- Energy and Climate Package 2020,
- Energy-climate Framework 2030,
- Roadmap for the transition to a low carbon economy in 2050.
- European Green Deal.

EU-Emission Trading Scheme: goals and key results.

Carbon Tax: schemes around the world

EU Climate and energy: key targets

https://ec.europa.eu/clima/policies/strategies_en

2020

- 20% cut in **greenhouse gas** emissions (from 1990 levels)
- 20% of EU energy from **renewables**
- 20% improvement in **energy efficiency**

https://ec.europa.eu/clima/policies/strategies/2020_en

2030

- 40% cut in **greenhouse gas** emissions (from 1990 levels)
- 32% of EU energy from **renewables**
- 32,5% improvement in **energy efficiency**

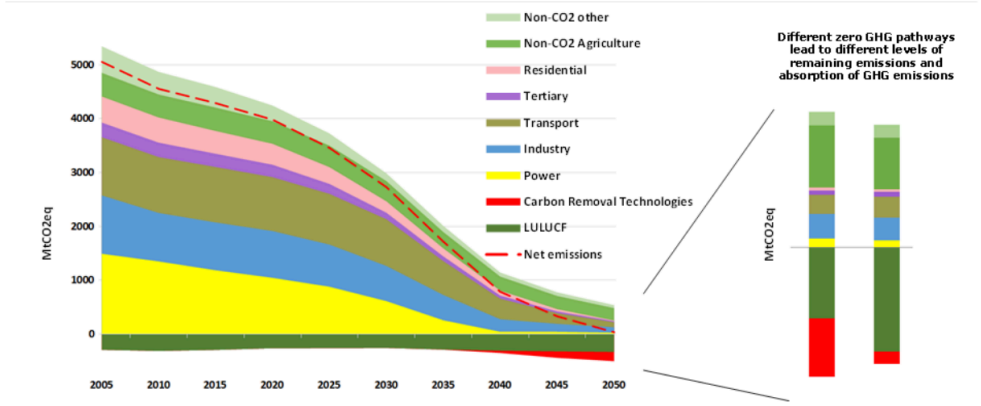
https://ec.europa.eu/clima/policies/strategies/2030_en

2050

The European Parliament endorsed the net-zero greenhouse gas emissions objective in its resolution on climate change in Mar 2019 and resolution on the European Green Deal in Jan 2020.

EU long term strategy submitted to UNFCCC (2019) aligned to Paris Agreement goal

Figure 4: GHG emissions under the scenario of a global temperature increase of 1.5°C[1]



https://ec.europa.eu/clima/policies/strategies/2050_en

EU Climate and energy: EU Green Deal

https://ec.europa.eu/info/sites/info/files/european-green-deal-communication_en.pdf

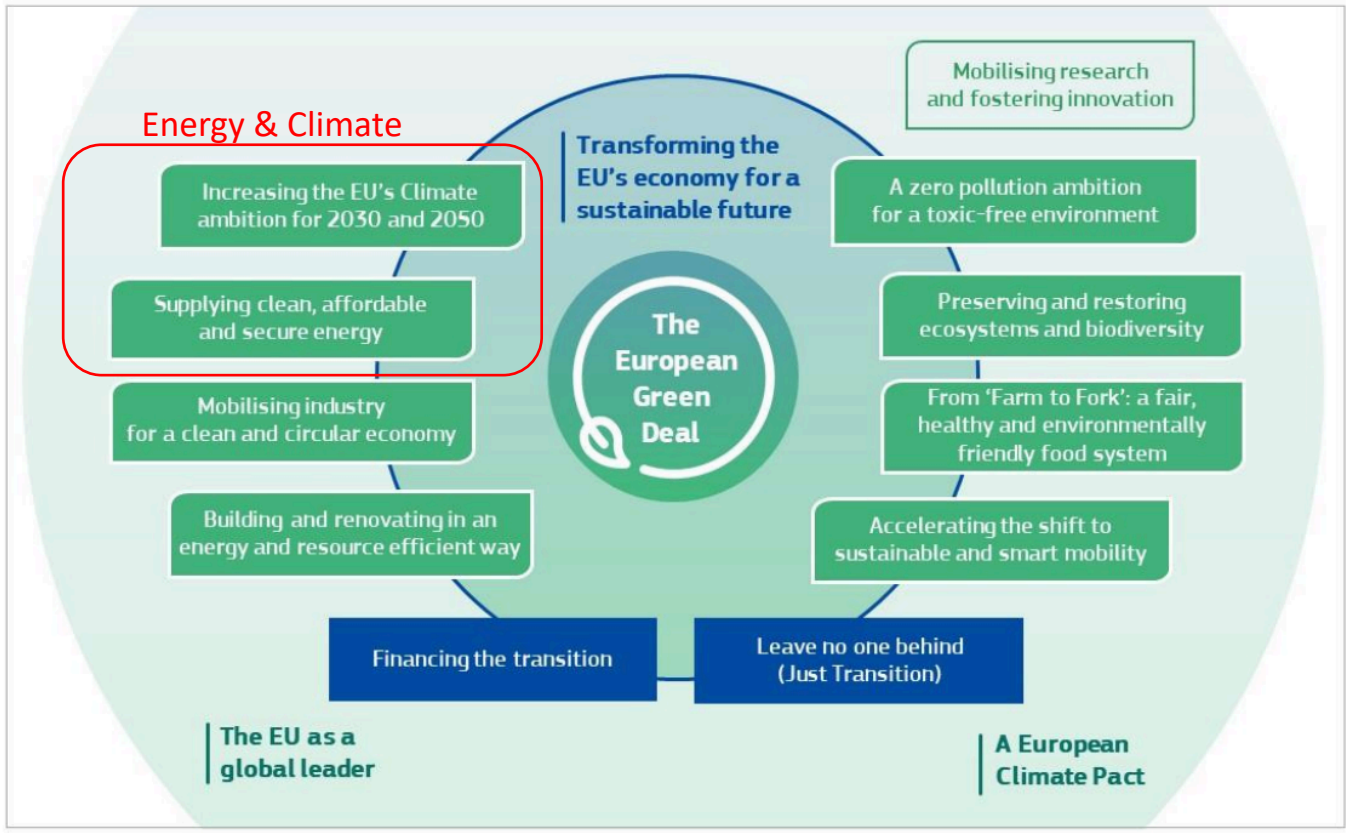


Figure 1: The European Green Deal

Between 1990 and 2018, EU reduced greenhouse gas emissions by 23%, while the economy grew by 61%. However, current policies will only reduce greenhouse gas emissions by 60% by 2050.

(…)

By summer 2020, the Commission will present an impact assessed plan to increase the EU's greenhouse gas emission reductions target for 2030 to at least 50% and towards 55% compared with 1990 levels in a responsible way.

3

EM 2016 A COMISSÃO EUROPEIA APRESENTOU UM PACOTE DE MEDIDAS COM O OBJETIVO DE FORNECER UMA ESTRUTURA LEGISLATIVA ESTÁVEL NECESSÁRIA PARA FACILITAR A TRANSIÇÃO ENERGÉTICA

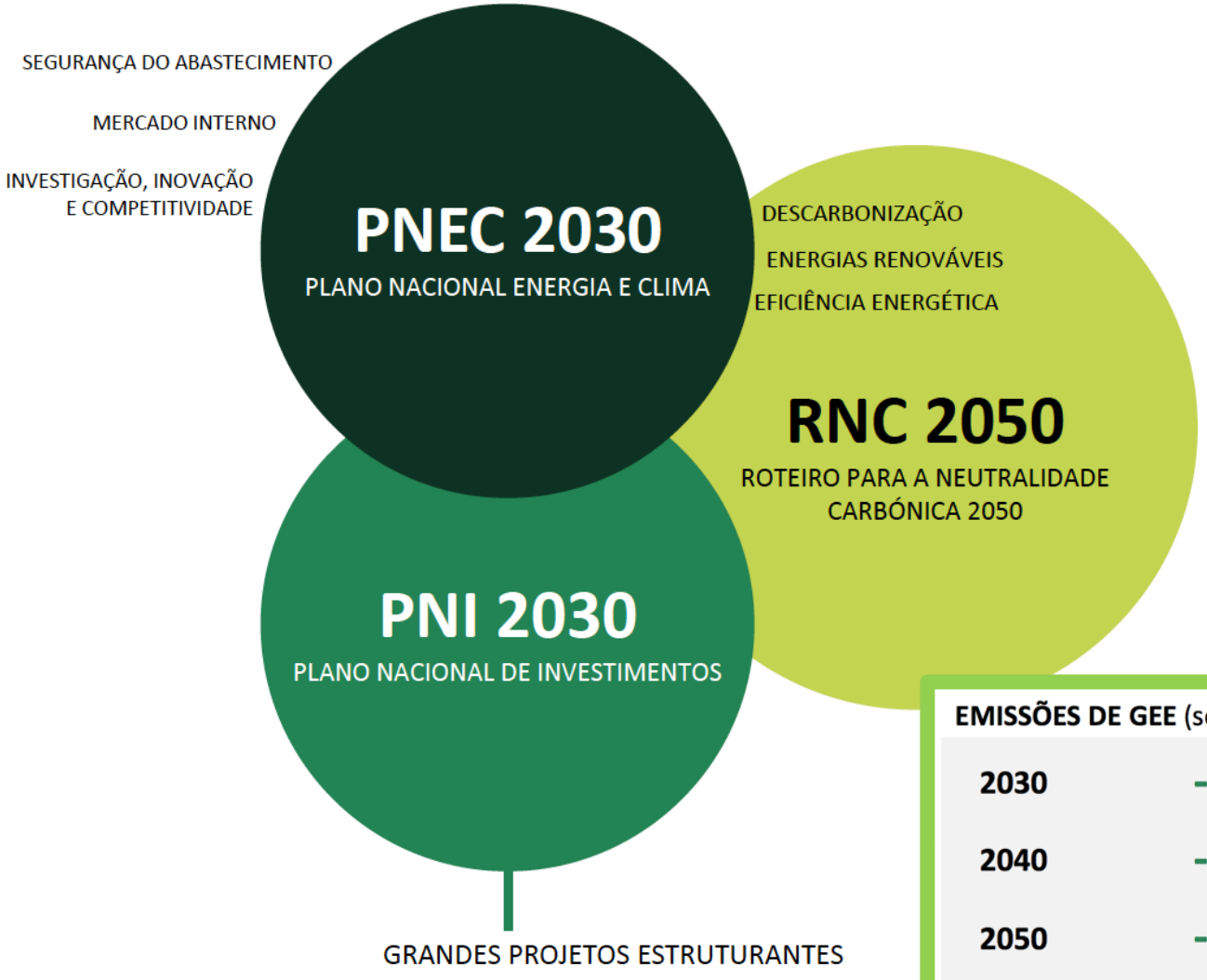
O Regulamento UE 2018/1999, relativo à **Governação da União da Energia e da Ação Climática:**

- Estabelece que **todos os Estados Membros devem elaborar a apresentar à Comissão Europeia um PNEC**, com uma perspetiva de médio prazo (horizonte 2021-2030).
- Prevê, ainda, estratégias de redução de emissões de longo prazo (horizonte 2050), coerentes com o Acordo de Paris.
- O PNEC **estabelece, entre outros, objetivos nacionais** de energias renováveis, eficiência energética e redução de emissões de GEE.
- **Substitui os diversos planos nacionais** após 2020 (PNAER, PNAEE, PNAC).

No PNEC, os objetivos, metas, políticas e medidas devem ser definidos de acordo com as 5 dimensões da Governação da União da Energia: Descarbonização (GEE e FER), Eficiência Energética, Segurança Energética, Mercado Interno da Energia e Investigação, Inovação e Competitividade.

PNEC: Plano Nacional Energia e Clima

O PNEC ESTÁ NECESSARIAMENTE ALINHADO COM OS PRINCIPAIS INSTRUMENTOS DE POLITICA NACIONAL PARA AS PRÓXIMAS DÉCADAS



O PNEC foi desenvolvido em coordenação e articulação com o Roteiro para a Neutralidade Carbónica 2050 e com o Plano Nacional de Investimentos 2030.

O CONTRIBUTO DO PNEC É DECISIVO PARA:

- **DEFINIÇÃO DAS LINHAS DE AÇÃO PARA A PRÓXIMA DÉCADA RUMO À NEUTRALIDADE CARBÓNICA**
- **DEFINIÇÃO DOS INVESTIMENTOS ESTRATÉGICOS PARA A PRÓXIMA DÉCADA NA ÁREA DA ENERGIA E CLIMA**

EMISSÕES DE GEE (sem sumidouros)

2030	**-45% a -55%**
2040	**-65% a -75%**
2050	**-85% a -90%**

RNC2050 (% face a 2005)

PNEC: Plano Nacional Energia e Clima

PARA ATINGIR OS OBJETIVOS EUROPEUS ENERGIA E CLIMA FOI ADOTADO UM CONJUNTO DE METAS PARA A UNIÃO EUROPEIA EM 2030

PACOTE ENERGIA LIMPA PARA TODOS OS EUROPEUS

OBJETIVOS:

- Prioridade à **EFICIÊNCIA ENERGÉTICA**
- Liderança mundial em **ENERGIA DE FONTES RENOVÁVEIS**
- Condições equitativas para os **CONSUMIDORES**

METAS ENERGIA UE 2030:

EFICIÊNCIA ENERGÉTICA[1]	**32,5%**
RENOVÁVEIS	**32%**
RENOVÁVEIS NOS TRANSPORTES[2]	**14%**
INTERLIGAÇÕES ELÉTRICAS	**15%**

PACOTE CLIMA

OBJETIVOS:

- **DESCARBONIZAÇÃO** da Economia
- **REDUÇÃO DAS EMISSÕES** pelos setores CELE e não-CELE
- Potenciar o contributo dos **SUMIDOUROS DE CARBONO**

METAS ENERGIA UE 2030:

EMISSÕES (em relação a 1990)	**-40%**
EMISSÕES CELE (em relação a 2005)	**-43%**
EMISSÕES NÃO-CELE (em relação a 2005)	**-30%**

(1) Redução no consumo de energia primária sem usos não energéticos; (2) Com multiplicadores

PNEC: Plano Nacional Energia e Clima

COM O OBJETIVO DE ALCANÇAR A NEUTRALIDADE CARBÓNICA EM 2050, E EM LINHA COM AS METAS EU, FORAM ESTABELECIDAS METAS E OBJETIVOS PARA PORTUGAL EM MATÉRIA DE ENERGIA E CLIMA PARA O HORIZONTE 2030

	2016	META 2020	META 2030
EMISSÕES GEE 2030[1]	-22%	-18% a -23%	-45% a -55%
EFICIÊNCIA ENERGÉTICA[2]	23%	25%	35%
RENOVÁVEIS	28,5%	31%	47%
RENOVÁVEIS NOS TRANSPORTES	7,5%	10%	20%
INTERLIGAÇÕES ELÉTRICAS	8%	10%	15%

(1) sem LULUCF; face a 2005; (2) Redução no consumo de energia primária sem usos não energéticos. Por comparação com as projeções do modelo PRIMES de 2007

PNEC: Plano Nacional Energia e Clima

A DESCARBONIZAÇÃO PRESSUPÕE UMA TRAJETÓRIA DE 45% A 55% DE REDUÇÃO DE EMISSÕES DE GASES COM EFEITO DE ESTUFA EM 2030 E UMA INCORPORAÇÃO DE 47% DE FER NO CONSUMO FINAL DE ENERGIA

DRIVERS PARA A DESCARBONIZAÇÃO (REDUÇÃO DE GEE E FPROMOÇÃO DE ER)

PRINCIPAIS DRIVERS - GEE

- **DESCARBONIZAÇÃO** do consumo e da produção de energia
- Forte impulso à **ELETRIFICAÇÃO DO CONSUMO**
- Aposta nas **ENERGIAS RENOVÁVEIS** e na **EFICIÊNCIA ENERGÉTICA**
- Transição para uma **ECONOMIA CIRCULAR**
- Redução da **INTENSIDADE CARBÓNICA** do parque de **EDIFÍCIOS**
- Aposta no **TRANSPORTE PÚBLICO, MOBILIDADE ELÉTRICA** e **SERVIÇOS DE PARTILHA**
- **DESCARBONIZAÇÃO** da **INDÚSTRIA** através da digitalização, da economia circular e da inovação tecnológica
- Melhoria do **ORDENAMENTO FLORESTAL** e da gestão dos espaços rurais
- Promoção de **PROJETOS I&D** para uma economia de baixo carbono

PRINCIPAIS DRIVERS - FER

- **ELETRIFICAÇÃO** da economia e dos consumos
- Evolução na capacidade instalada e produção de eletricidade de **BASE RENOVÁVEL**
- Grande impulso à **PRODUÇÃO DESCENTRALIZADA**
- Promoção do **ARMAZENAMENTO** (Baterias, Hidrogénio)
- Reforço e otimização das **REDES DE TRANSPORTE E DISTRIBUIÇÃO**
- Forte penetração do **VEÍCULO ELÉTRICO, BIOCOMBUSTÍVEIS AVANÇADOS E OUTRAS SOLUÇÕES DE MOBILIDADE SUSTENTÁVEL**
- Promoção de **renováveis no aquecimento e arrefecimento**
- **INVESTIGAÇÃO E INOVAÇÃO** em novas tecnologias

PORTUGAL DEVERÁ ATINGIR UM NÍVEL DE CONSUMO DE ENERGIA PRIMÁRIA ENTRE 21,5 – 15,6 Mtep em 2030 PARA GARANTIA DO CUMPRIMENTO DA META DE EFICIÊNCIA ENERGÉTICA

DRIVERS PARA A EFICIÊNCIA ENERGÉTICA NO HORIZONTE 2030

PRINCIPAIS DRIVERS

- Forte aposta na **REQUALIFICAÇÃO E RENOVAÇÃO DO EDIFICADO**
- Promoção de **EFICIÊNCIA NOS EQUIPAMENTOS, PRODUTOS E SERVIÇOS**
- Reforço da **EFICIÊNCIA ENERGÉTICA NO SETOR INDUSTRIAL** promovendo a competitividade das empresas
- Continuação da promoção da eficiência energética na **ADMINISTRAÇÃO PÚBLICA**
- Enfoque no **COMBATE À POBREZA ENERGÉTICA**
- Incentivar **I&D&I** no domínio da eficiência energética
- **Simplificar** os procedimentos e **reorientar** e reforçar os programas e **fundos de financiamento**
- **Revisão do quadro legal** e reforço dos **sistemas de monitorização**

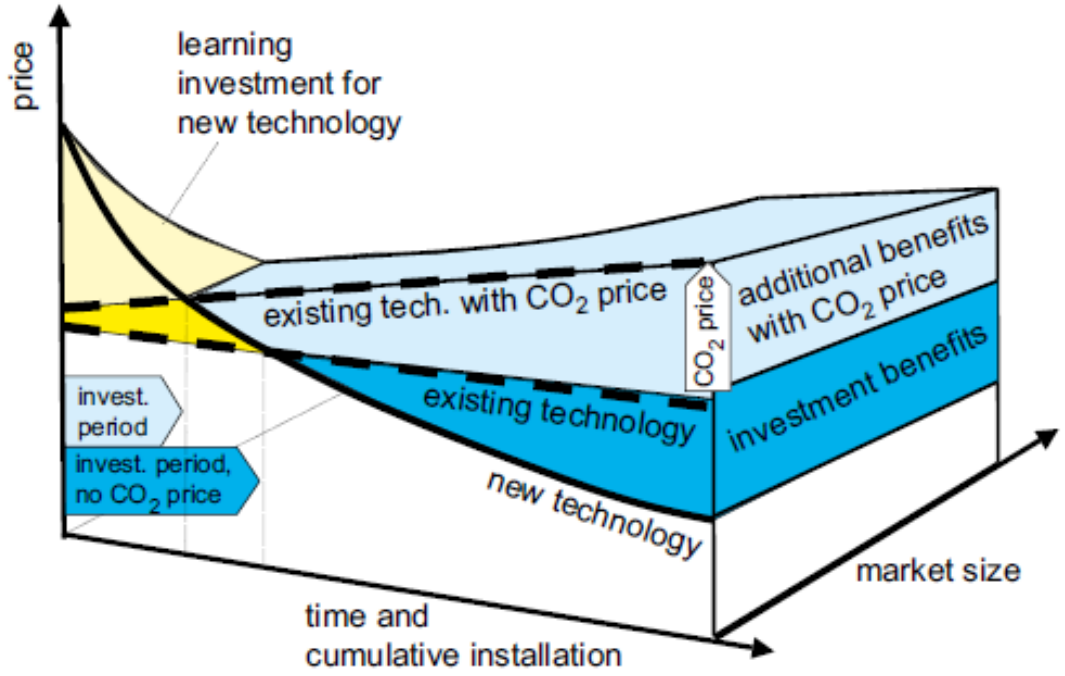
> **Climate change represents the greatest and widest-ranging market failure ever seen.**
>
> Sir Nicholas Stern, Head of the UK Government Economic Service and former World Bank Chief Economist, 2006

GREENHOUSE GAS EMISSION ▶ NEGATIVE EXTERNALITY OF ECONOMIC ACTIVITIES

External costs of carbon emissions: costs that the public pays in other ways, such as agricultural damage and losses due to droughts or floods, health costs due to heat waves, costs with damage and property losses due to floods, rural fires and rising sea level

> »There is a growing consensus that carbon pricing—charging for the carbon content of fossil fuels or their emissions—is the single most effective mitigation instrument.«
>
> *Christine Lagarde, Managing Director of the International Monetary Fund and Vitor Gaspar, Director of the International Monetary Fund's Fiscal Affairs Department*

What is the impact of a CO_2 price on the competitiveness of new technologies, when compared to existing ones?

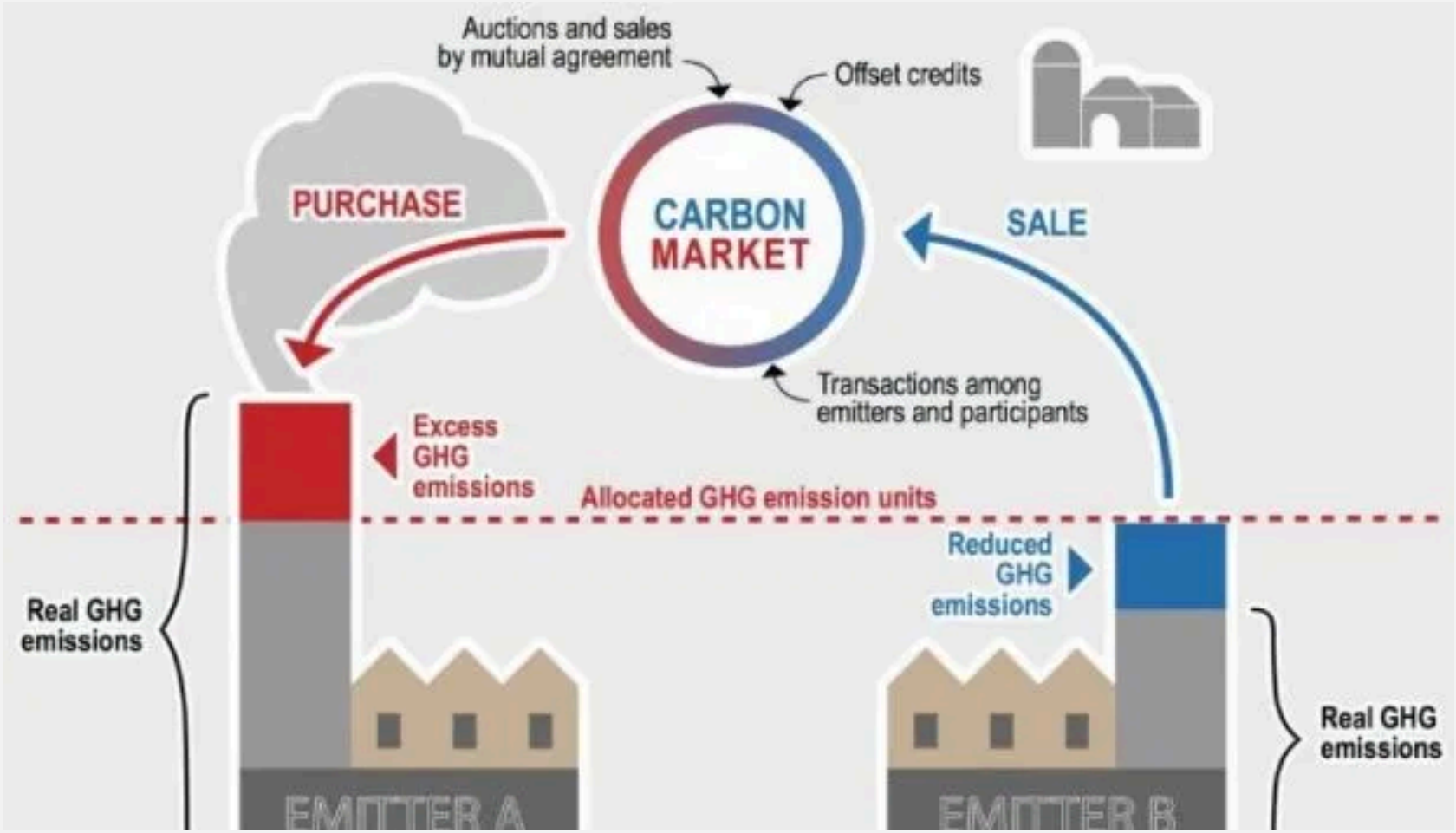


Fonte: IPCC, 2007 (adaptado de Neuhoff, 2004)

TRUE OR FALSE?

a) The cost of new technologies tends to approximate existing technologies as the scale of their production increases.
b) The existence of a price for CO_2 induces a delay in the competitiveness of new technologies compared to existing ones, i.e. new technologies tend to have a price convergent with existing ones in a more time-consuming period than if there is no price for the CO_2.
c) In an economy where CO_2 has a price, existing technologies lose competitiveness more quickly than in the absence of that price.

Emissions Trading Scheme



What factors will decid to buy or sell emmission units?

European Emissions Trading Scheme – EU-ETS

The EU emissions trading system (EU ETS) is a cornerstone of the EU's policy to combat climate change and its key tool for reducing greenhouse gas emissions cost-effectively. It is the world's first major carbon market and remains the biggest one.

Environmental certainty – A fixed declining cap gives environmental certainty, i.e. with a set Linear Reduction Factor (LRF) we know a certain level of reductions in emissions will take place over a fixed time period.

Flexibility – Companies can meet their emissions reduction commitments in a number of different ways.

Cost effective – allows targets to be met at least cost.

The EU ETS has proved that putting a price on carbon and trading in it can work. Emissions from installations in the system are falling as intended (see 2018 figures).
In **2020**, emissions from sectors covered by the system will be **21% lower than in 2005**. The EU is on track to surpass this target.
In **2030**, emissions from sectors covered by the EU ETS will be cut by **43%** from 2005 levels, as part of the EU's current 2030 climate and energy framework.
Under the European Green Deal, the Commission will present an impact-assessed plan to increase the EU's greenhouse gas emission reduction target in a responsible way, including for the EU ETS.

Comércio Europeu de Licenças de Emissão (CELE)
European Emissions Trading Scheme (ETS)

EU ETS: Key facts

- Operates in the 28 EU countries plus Iceland, Liechtenstein and Norway
- Limits greenhouse gas emissions from:
  - Approximately 11,000 energy intensive installations in power generation and manufacturing industry sectors
  - Operators of flights to and from EU Member States, Iceland, Liechtenstein and Norway (for the time being, only flights within these countries are covered)
- Covers around 45% of the EU's greenhouse gas emissions

Greenhouse gases and sectors covered

Carbon dioxide (CO_2) from:

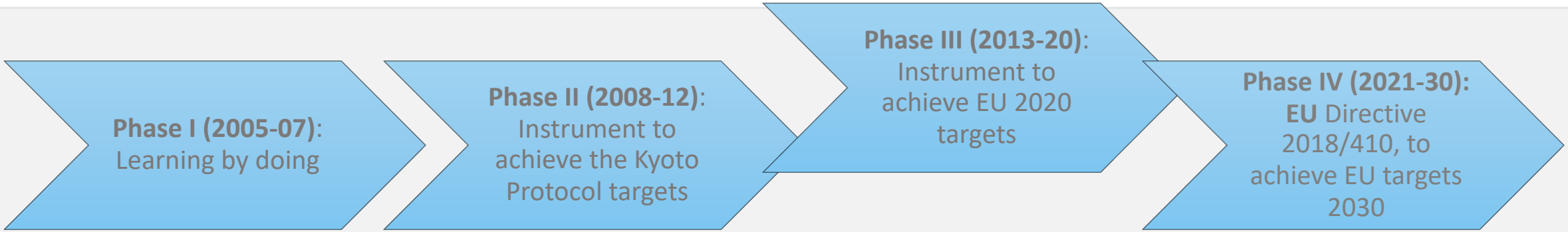
- Power and heat generation
- Energy-intensive industry sectors including oil refineries, steel works and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals
- Civil aviation

Nitrous oxide (N_2O) from production of nitric, adipic and glyoxylic acids and glyoxal

Perfluorocarbons (PFCs) from aluminium production

To know more on EU-ETS: https://ec.europa.eu/clima/policies/ets_en

European Emissions Trading Scheme



» **Licença de Emissão Europeias (LEE)**: ***direito*** de emitir 1 t CO_2e

» **European Emission Allowance (EUA)**: ***permit*** to emit 1 t CO_2e

1 LEE = 1 t CO_2

» **allocation of a cap** and the respective EUA for GHG emissions to the installations covered,

» **facility operators**: LEEi -> responsibility for controlling or reducing GHG emissions,

» EUA negotiation between any persons and / or legal entities in the EU territory,

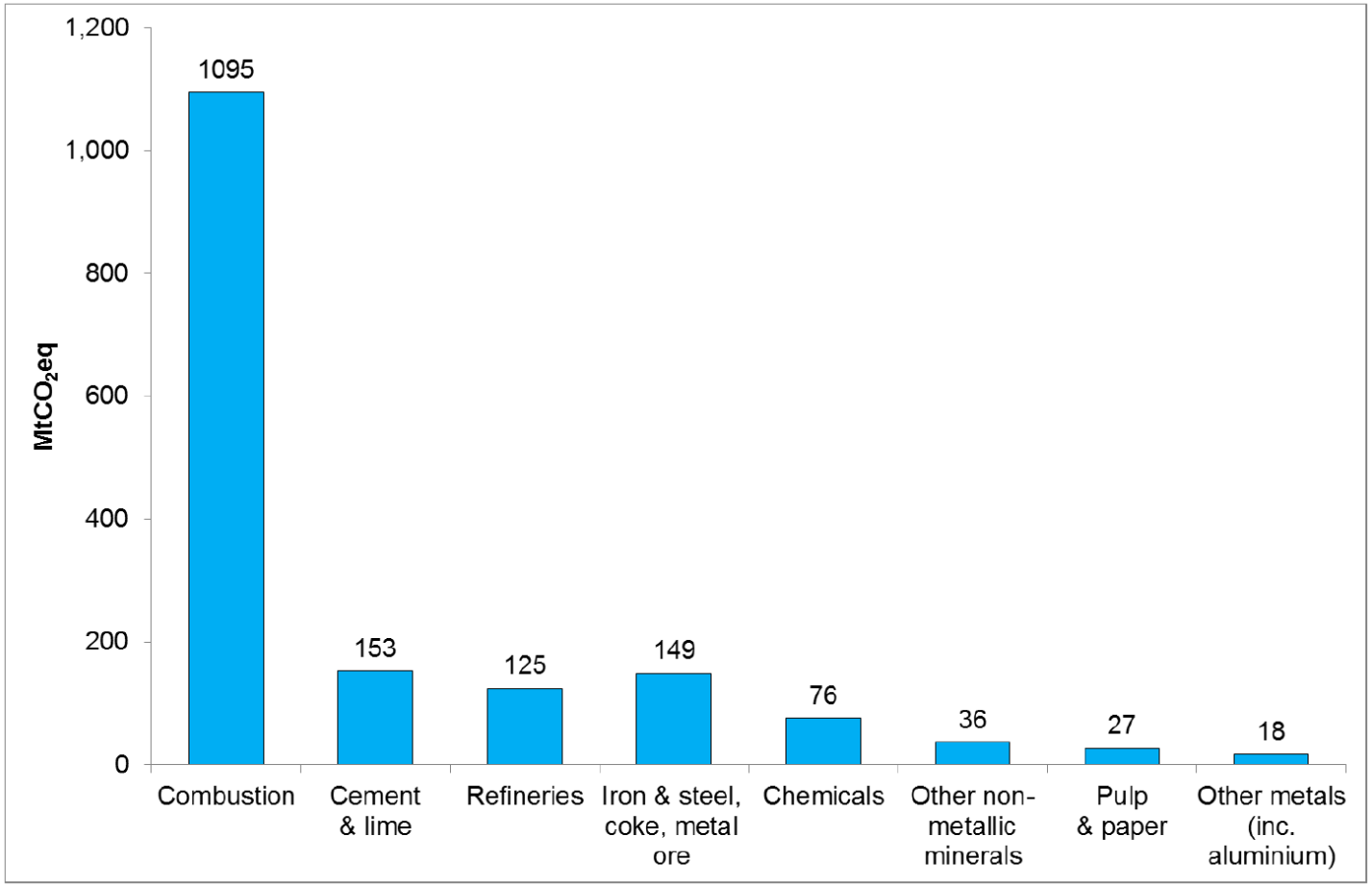
Cap & Trade

Annex I: Activities covered by the EU-ETS

1	Combustion of fuels in installations with a total rated thermal input exceeding 20 MW (except in installations for the incineration of hazardous or municipal waste)	CO2
2	Refining of mineral oil	CO2
3	Production of coke	CO2
4	Metal ore (including sulphide ore) roasting or sintering, including pelletisation	CO2
5	Production of pig iron or steel (primary or secondary fusion) including continuous casting, with a capacity exceeding 2,5 tonnes per hour	CO2
6	Production or processing of ferrous metals (including ferro-alloys) where combustion units with a total rated thermal input exceeding 20 MW are operated. Processing includes, inter alia, rolling mills, re-heaters, annealing furnaces, smitheries, foundries, coating and pickling	CO2
7	Production of primary aluminium	CO2 & PFCs
8	Production of secondary aluminium where combustion units with a total rated thermal input exceeding 20 MW are operated	CO2
9	Production or processing of non-ferrous metals, including production of alloys, refining, foundry casting, etc., where combustion units with a total rated thermal input (including fuels used as reducing agents) exceeding 20 MW are operated	CO2
10	Production of cement clinker in rotary kilns with a production capacity exceeding 500 tonnes per day or in other furnaces with a production capacity exceeding 50 tonnes per day	CO2
11	Production of lime or calcination of dolomite or magnesite in rotary kilns or in other furnaces with a production capacity exceeding 50 tonnes per day	CO2
12	Manufacture of glass including glass fibre with a melting capacity exceeding 20 tonnes per day	CO2
13	Manufacture of ceramic products by firing, in particular roofing tiles, bricks, refractory bricks, tiles, stoneware or porcelain, with a production capacity exceeding 75 tonnes per day	CO2
14	Manufacture of mineral wool insulation material using glass, rock or slag with a melting capacity exceeding 20 tonnes per day	CO2
15	Drying or calcination of gypsum or production of plaster boards and other gypsum products, where combustion units with a total rated thermal input exceeding 20 MW are operated	CO2
16	Production of pulp from timber or other fibrous materials	CO2
17	Production of paper or cardboard with a production capacity exceeding 20 tonnes per day	CO2
18	Production of carbon black involving the carbonisation of organic substances such as oils, tars, cracker and distillation residues, where combustion units with a total rated thermal input exceeding 20 MW are operated	CO2
19	Production of nitric acid	CO2 & N2O
20	Production of adipic acid	CO2 & N2O
21	Production of glyoxal and glyoxylic acid	CO2 & N2O
22	Production of ammonia	CO2
23	Production of bulk organic chemicals by cracking, reforming, partial or full oxidation or by similar processes, with a production capacity exceeding 100 tonnes per day	CO2
24	Production of hydrogen (H_2) and synthesis gas by reforming or partial oxidation with a production capacity exceeding 25 tonnes per day	CO2
25	Production of soda ash (Na_2CO_3) and sodium bicarbonate ($NaHCO_3$)	CO2
26	Capture of greenhouse gases from installations covered by this Directive for the purpose of transport and geological storage in a storage site permitted under Directive 2009/.../EC	CO2
27	Transport of greenhouse gases by pipelines for geological storage in a storage site permitted under Directive 2009/.../EC	CO2
28	Geological storage of greenhouse gases in a storage site permitted under Directive 2009/.../EC	CO2

COMBUSTION IN INSTALLATIONS WITH A TOTAL RATED THERMAL POWER> 20 MW

Figure 1.1 EU ETS emissions by main activity type in 2018

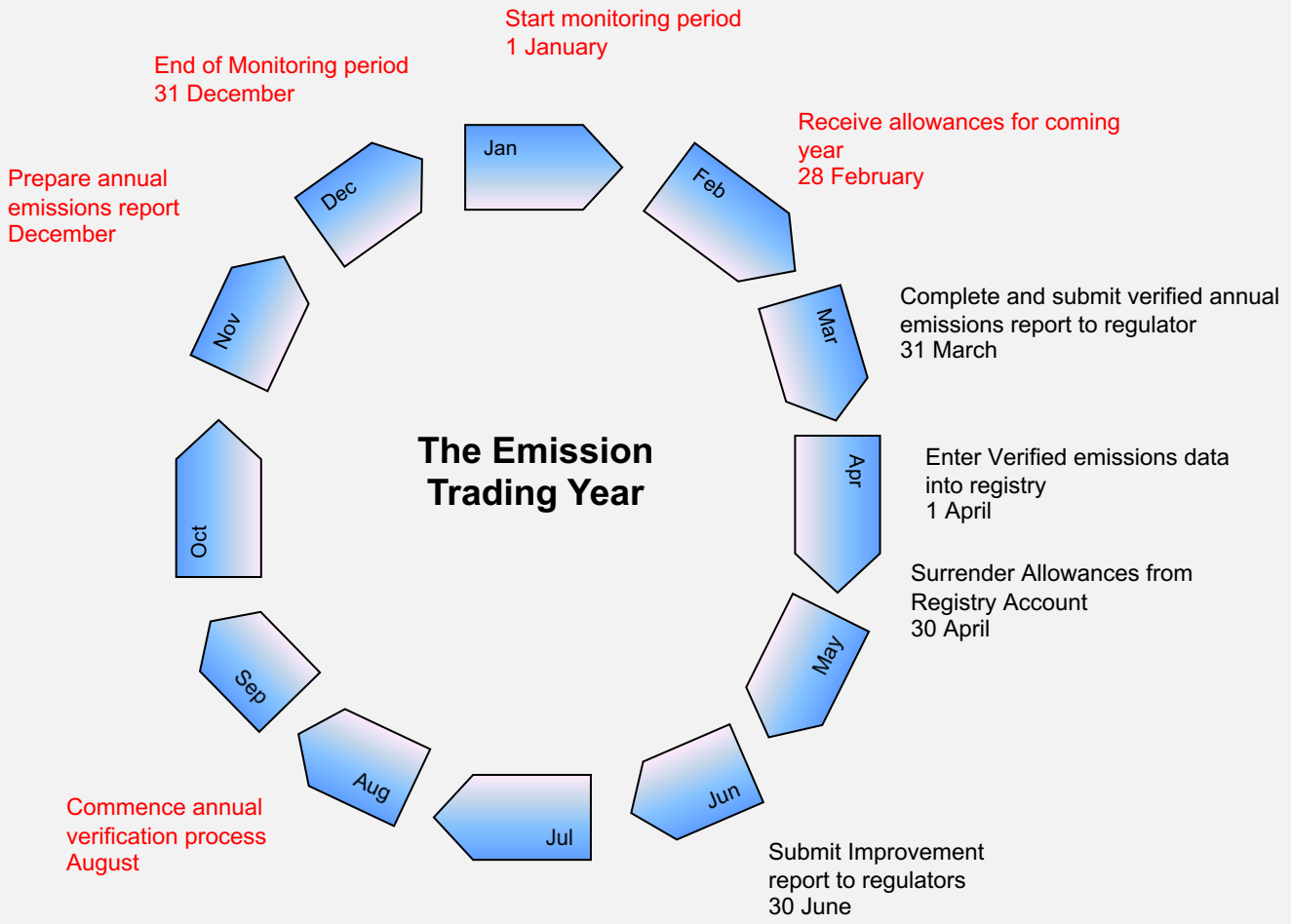


European Environment Agency (EEA), 2019.

- Any installation where the fuel (other than 97% or more of biomass) is burned in a combustion unit => 3MW for any purpose and which, when added, exceeds 20 MW.

- All types of boilers, burners, turbines, heaters, ovens, calciners, ovens and, in particular, ovens, fryers, dryers, engines, fuel cells, chemical loop combustion units, rockets, thermal post-combustion units or catalytic.

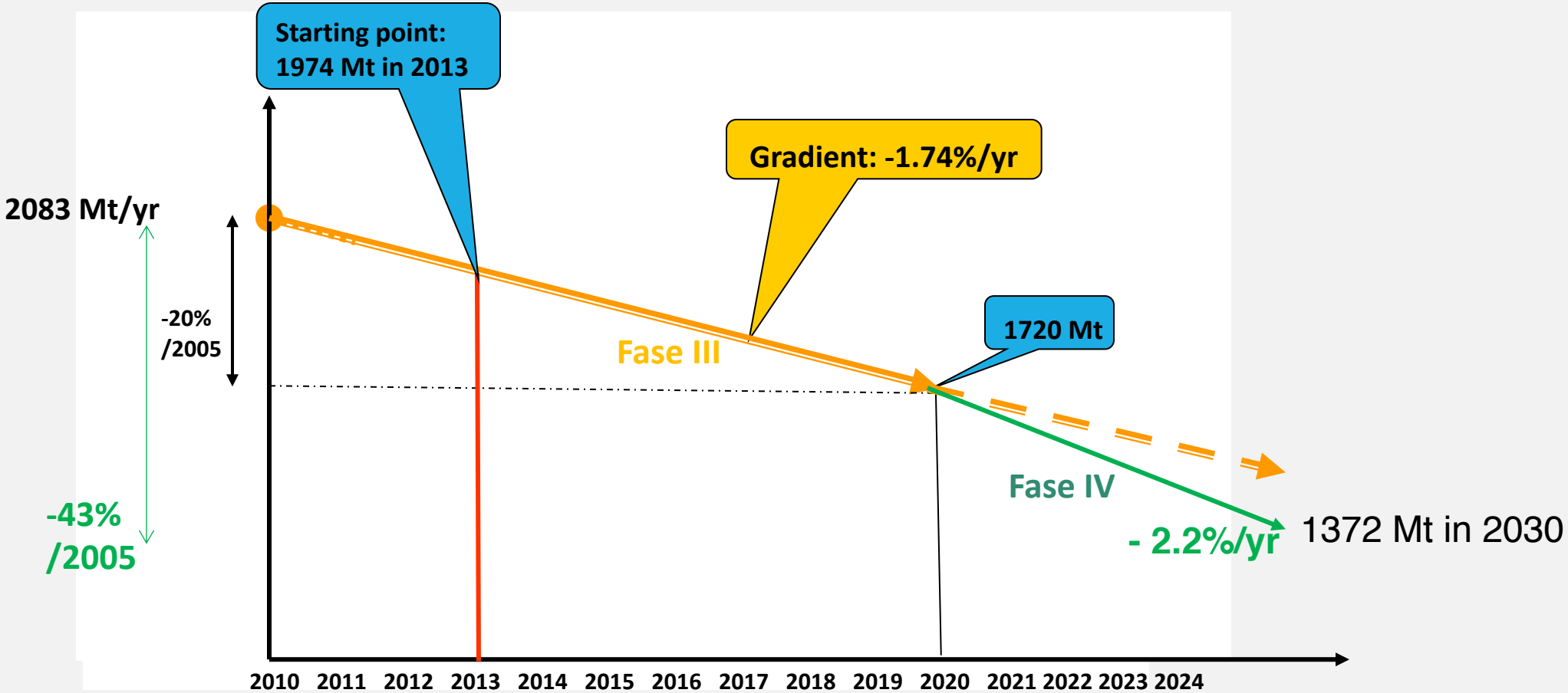
EUTS in practice: annual cycle of compliance



Portuguese Environment Agency:
PT Competent Authority

The facilities covered are registered in the Portuguese Registry of Emission Licenses integrated in the Union Registry

Allocation of the global emissions ceiling in the EU from 2013



➢Linear factor to be reviewed by 2025

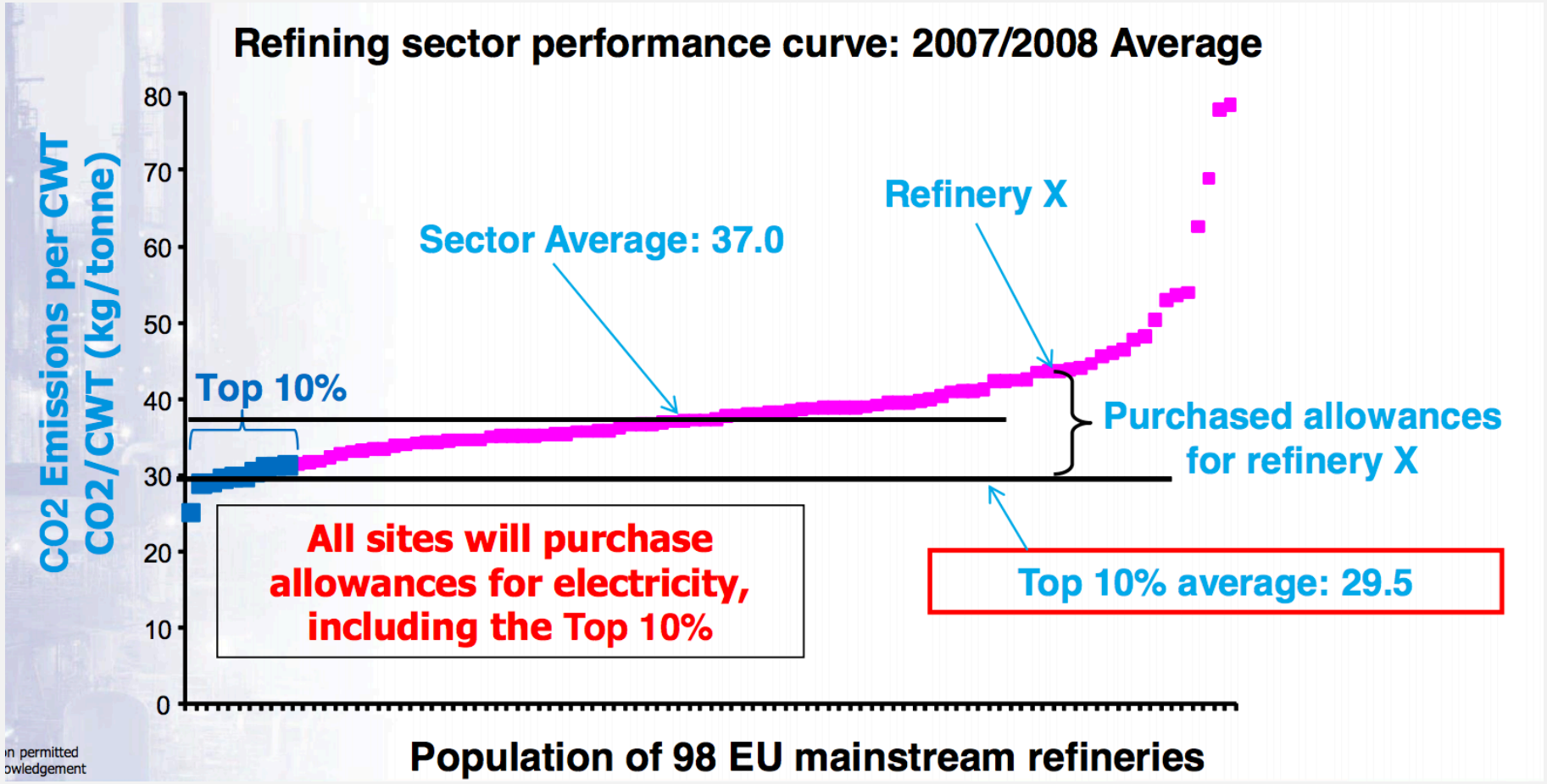
Free Allocation of Allowances to installations

- Harmonized methodologies for the definition of standardized emissions, for each industrial sector: "**benchmarking**" based on the 10% of most efficient installations in each sector at EU level.

- Installations (excluding electricity generation) receive 80% of free allowances in 2013, reducing annually by up to 30% in 2020:
  - Phase III: and 0% in 2027 (i.e. all allowances are purchased at auction).
  - Phase IV: 30% by 2026, decreasing linearly to 0% in 2030

Free Allocation of Allowances to installations

Harmonized methodologies for the definition of standardized emissions, for each industrial sector: "benchmarking" based on the 10% of most efficient installations in each sector at EU level.



Free Allocation of Allowances to installations

Preventing 'carbon leakage'

'Carbon leakage' refers to the situation that may occur if, for reasons of costs related to climate policies, businesses transfer production to other countries which have laxer constraints on greenhouse gas emissions. This could lead to an increase in their total emissions. The risk of carbon leakage may be higher in certain energy-intensive industries.

The sectors and sub-sectors deemed to be exposed to a significant risk of carbon leakage are placed on an official list. The current list includes around 170 sectors and subsectors, covering a very high share of industrial emissions.

The list is established for five years, on the basis of clearly defined criteria and after extensive consultation with stakeholders. The current list applies for the years 2015-2019.

Sectors at risk of carbon leakage receive 100% free allowances, beyond the benchmark:

the cost of participation in ETS in relation to the sector's GVA (VAB) at EU level is over 5%;

AND

the sum of exports and imports to and from non-EU countries and the total EU market (domestic volume + imports) is over 10%

OR

individually, each criterion exceeds 30%.

Free allocation of allowances

Communication of the Commission, Preliminary List of carbon leakage, 2021-2030 (2018/C 162/01)

Example:

1041	Produção de óleos e gorduras
1062	Fabricação de amidos, féculas e produtos afins
1081	Indústria do açúcar
1106	Fabricação de malte
1310	Preparação e fiação de fibras têxteis
1395	Fabricação de não tecidos e respetivos artigos, exceto vestuário
1411	Confeção de vestuário em couro
1621	Fabricação de folheados e painéis à base de madeira
1711	Fabricação de pasta
1712	Fabricação de papel e de cartão (exceto canelado)
1910	Fabricação de produtos de coqueria
1920	Fabricação de produtos petrolíferos refinados
2011	Fabricação de gases industriais
2012	Fabricação de corantes e pigmentos
2013	Fabricação de outros produtos químicos inorgânicos de base
2014	Fabricação de outros produtos químicos orgânicos de base
2015	Fabricação de adubos e de compostos azotados

PRIMARY MARKET: AUCTIONS OF EU UNIT ALLOWANCES

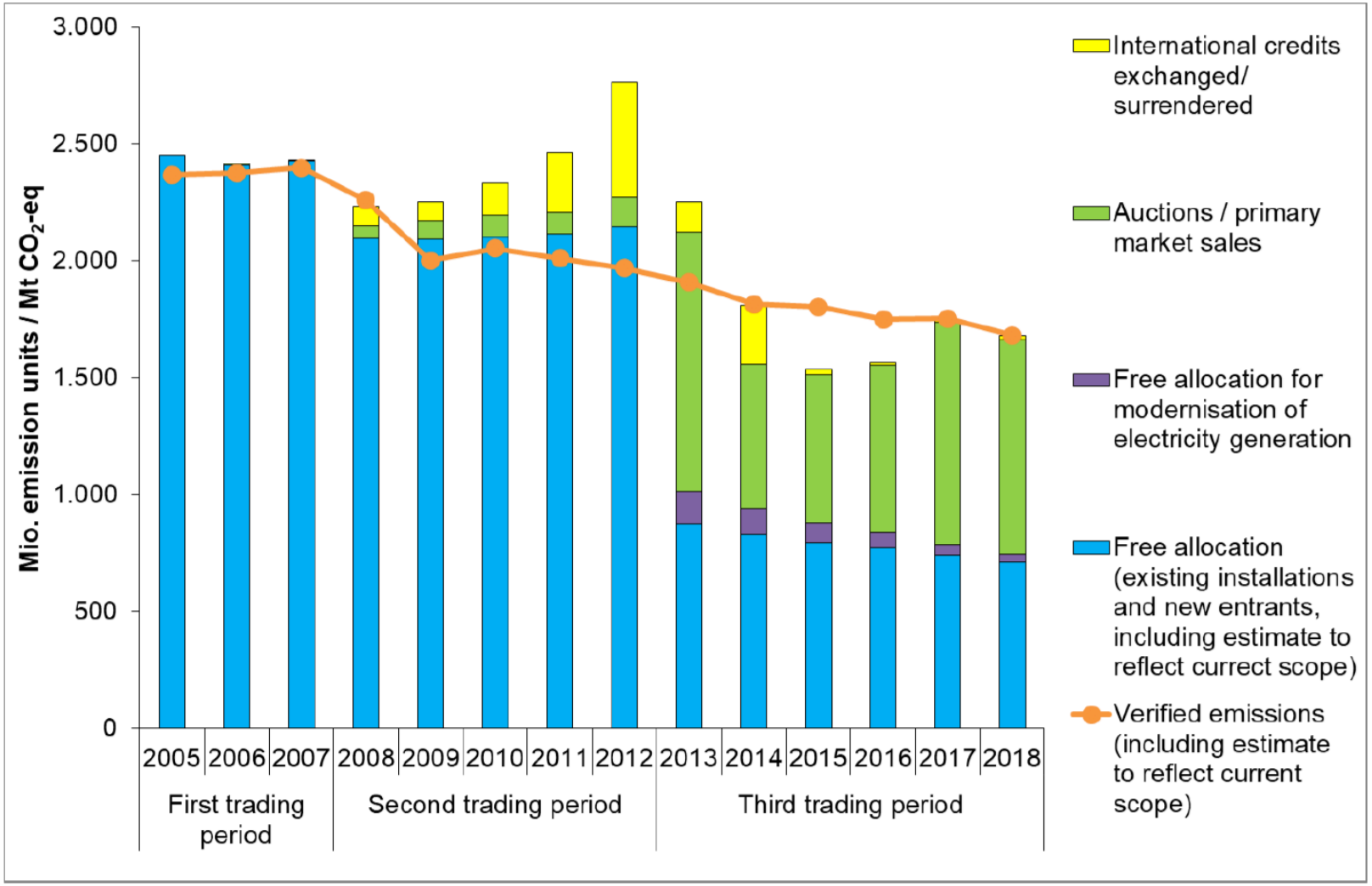
The European Commission has appointed EEX - European Energy Exchange- as the common platform for auctions. Only the United Kingdom and Germany put their licenses up for auction on their own platforms. 2 auctions are planned per week.

SECONDARY MARKET:

THE EU-ETS operator can also access the secondary carbon market to purchase EU licenses:

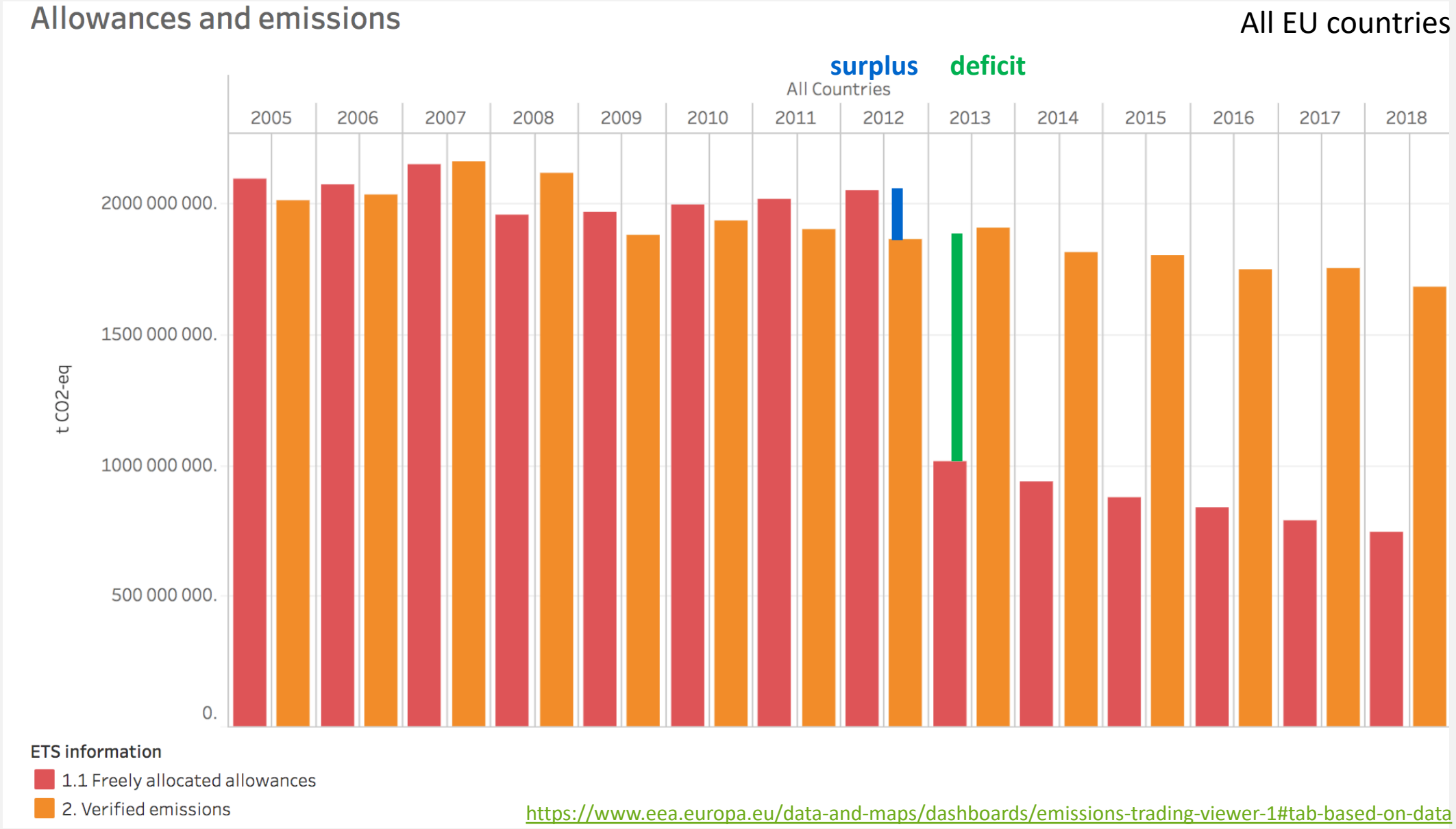
- negotiate directly with other companies covered
- buy or sell through intermediaries, e.g. banks and specialized services
- use the services of a broker (*corretor*)
- join one of several value exchanges (*bolsas*) that include carbon license products

Figure 2.5 Supply and demand balance for stationary installations, 2005-2018



Source: European Environment Agency (EEA) (2019).

European Emissions Trading Scheme

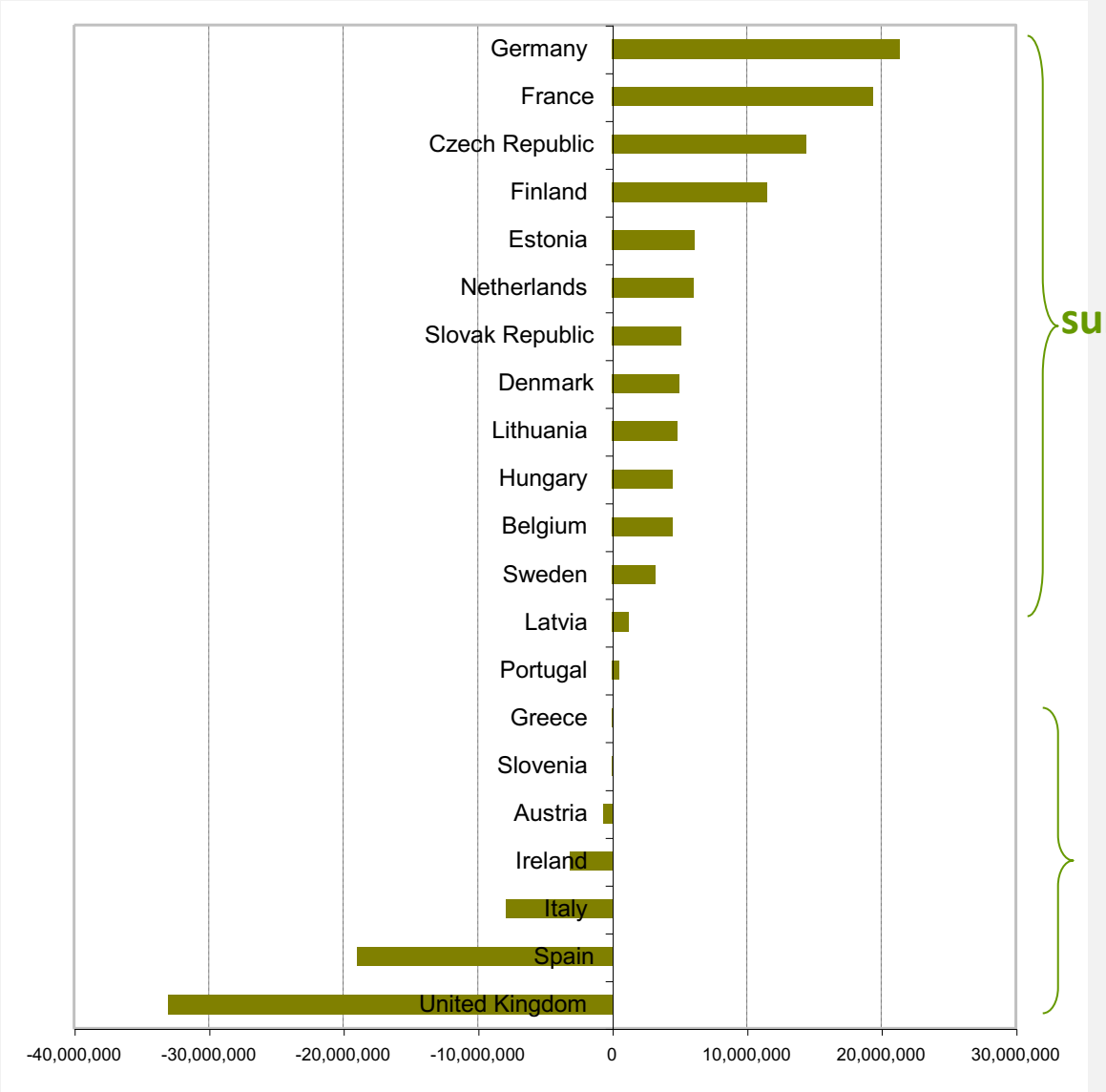


https://www.eea.europa.eu/data-and-maps/dashboards/emissions-trading-viewer-1#tab-based-on-data

EU ETS (EU25): lessons from phase I

[Annual average allocation in 2005 to 2007 in tonnes] – [CO2 emissions for 2005 in tonnes]

EU25:
44,138,196 tonnes



European Emissions Trading Scheme - Portugal

Emissões sectoriais de dióxido de carbono equivalente, em Portugal, em 2016

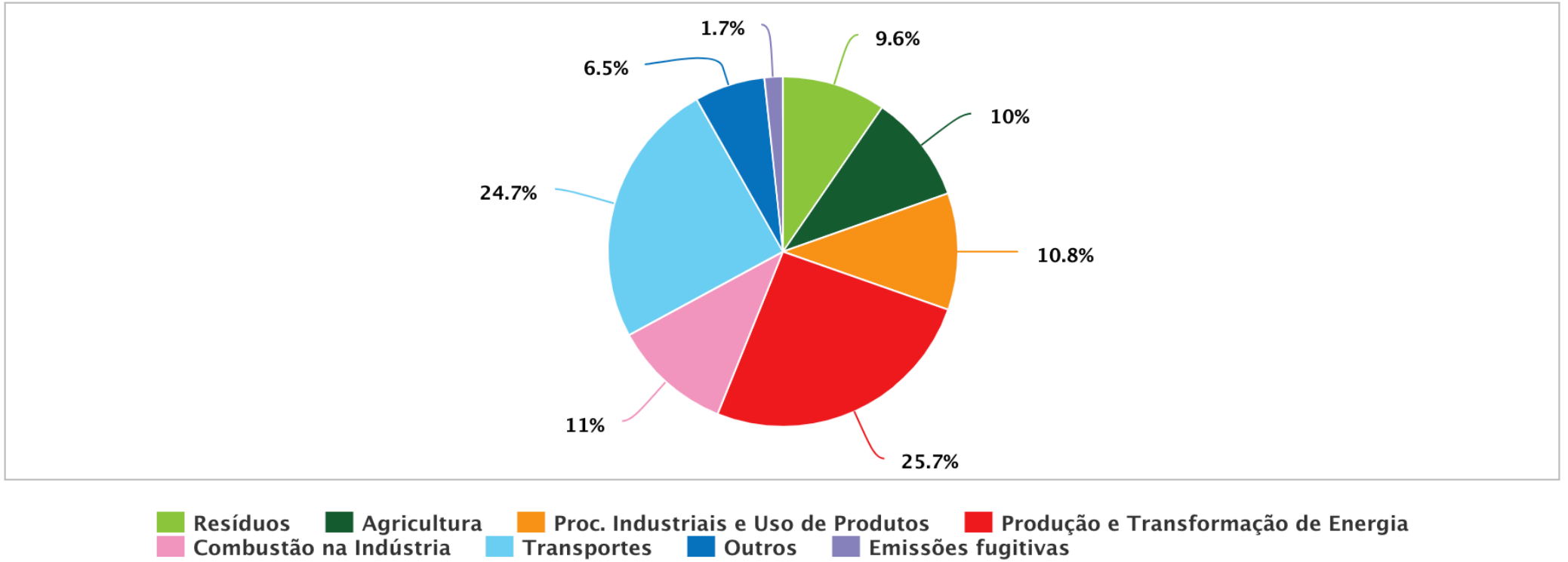
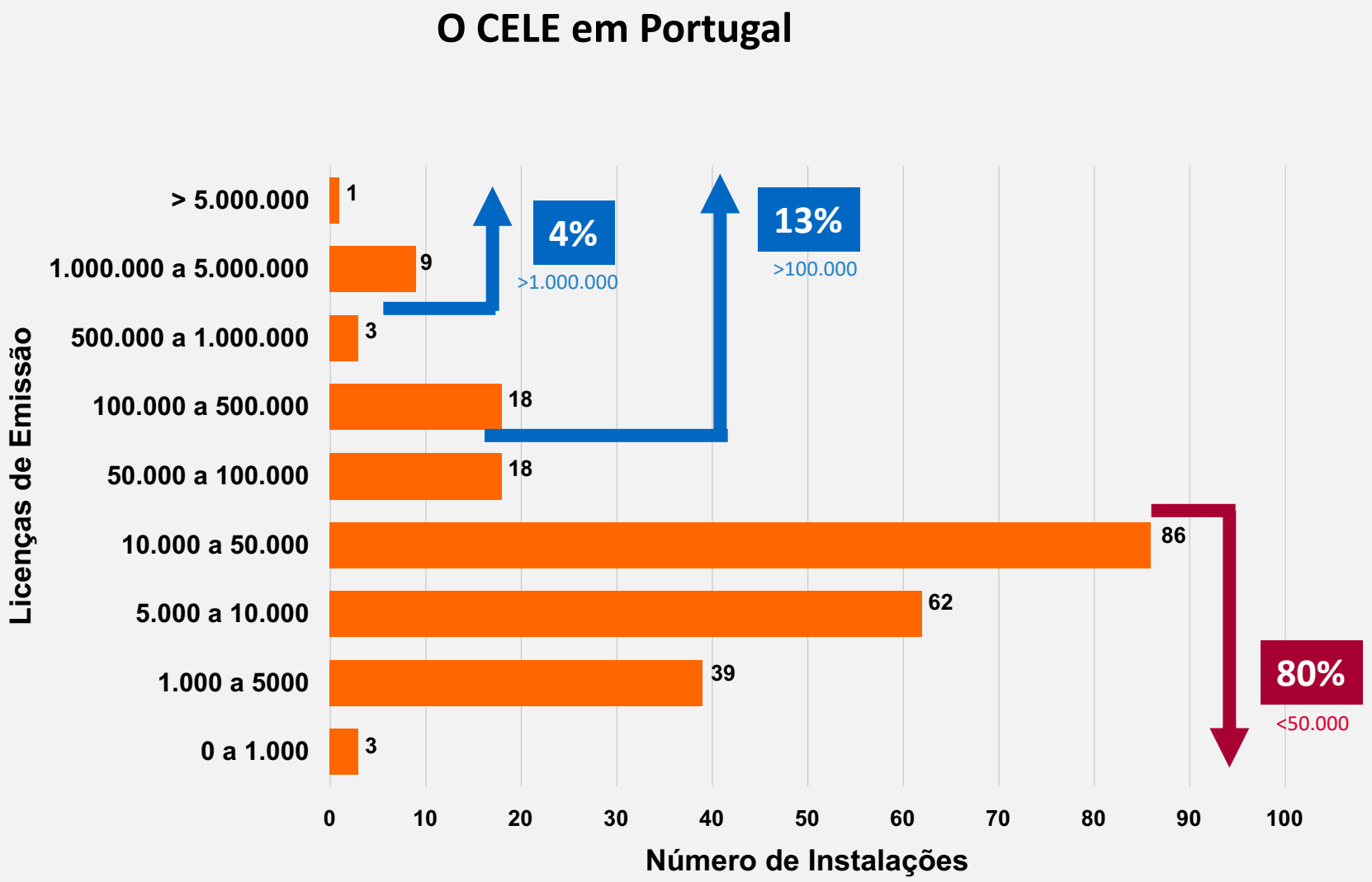


GRÁFICO INTERATIVO

Fonte: APA, submissão do inventário nacional realizada em março/abril de 2018 à União Europeia e à Convenção Quadro das Nações Unidas sobre Alterações Climáticas

ETS covers less than 50% of national CO_2 emissions



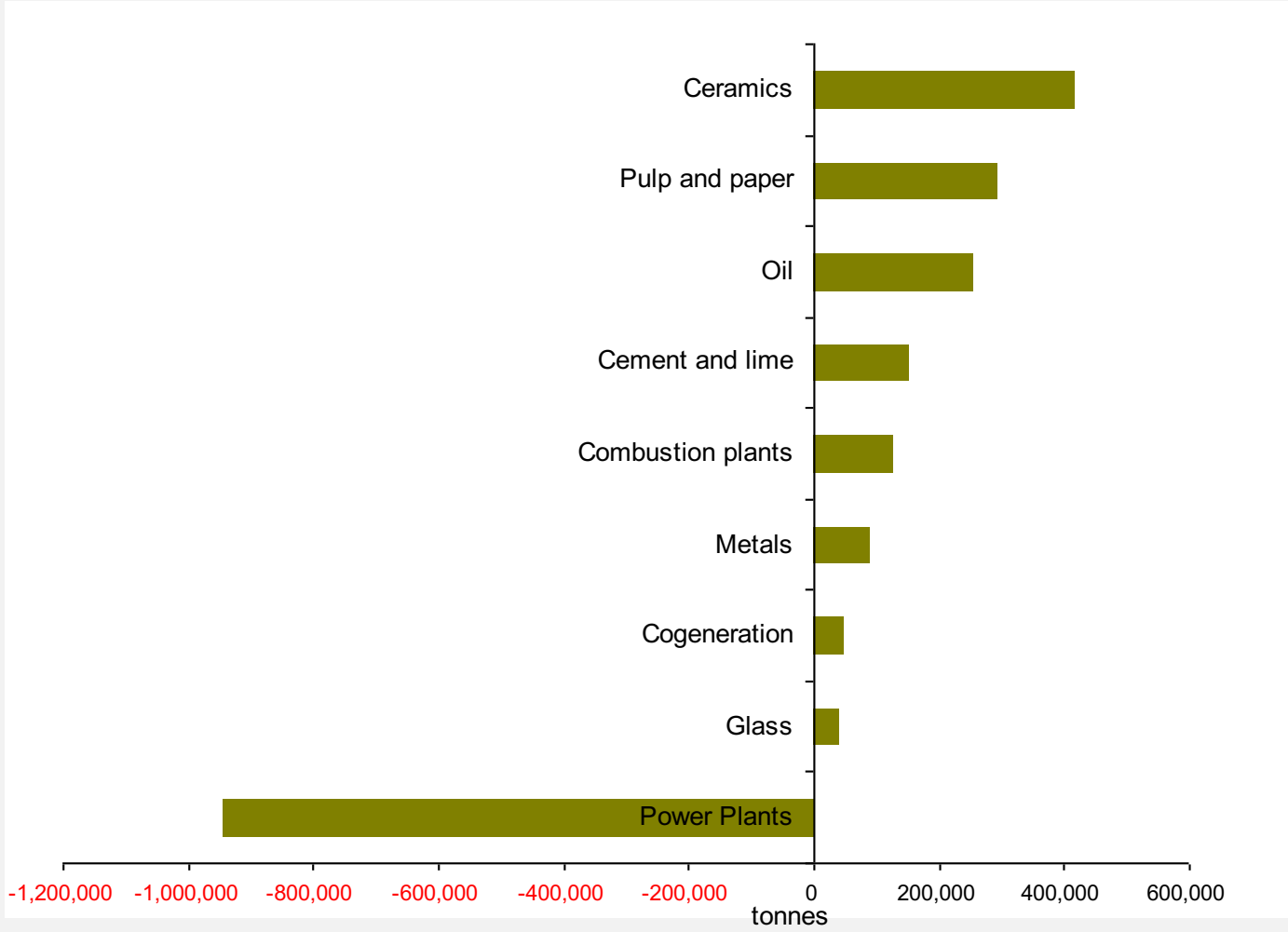
Lista complete das instalações abrangidas pelo CELE em Portugal:
http://apambiente.pt/_zdata/DPAAC/CELE/NIMsList%20XX_28_09_2012.pdf

EU ETS (PT): lessons from phase I

2005:

[Annual average allocation in 2005 to 2007 in tonnes] – [CO2 emissions for 2005 in tonnes]

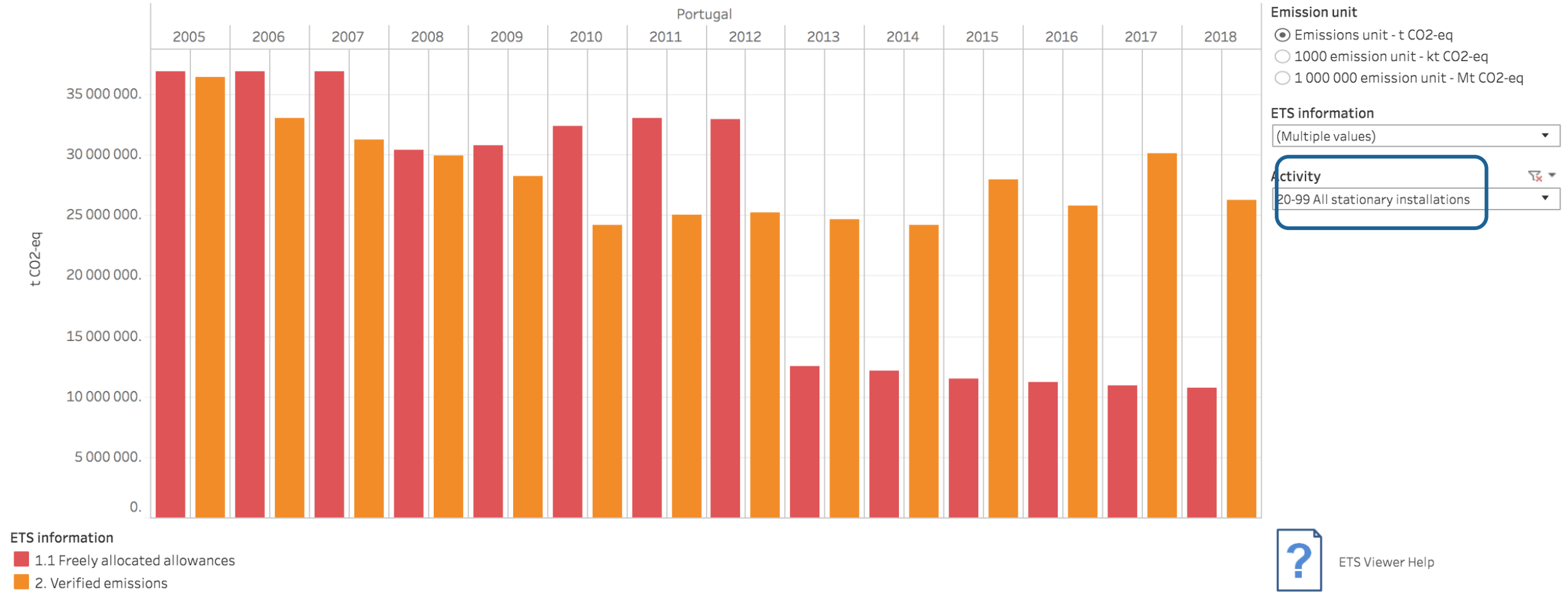
Total:
483,037 tonnes
1.3% (with power plants)
9.0% (without power plants)



[% of the difference referred to the allocated allowances]

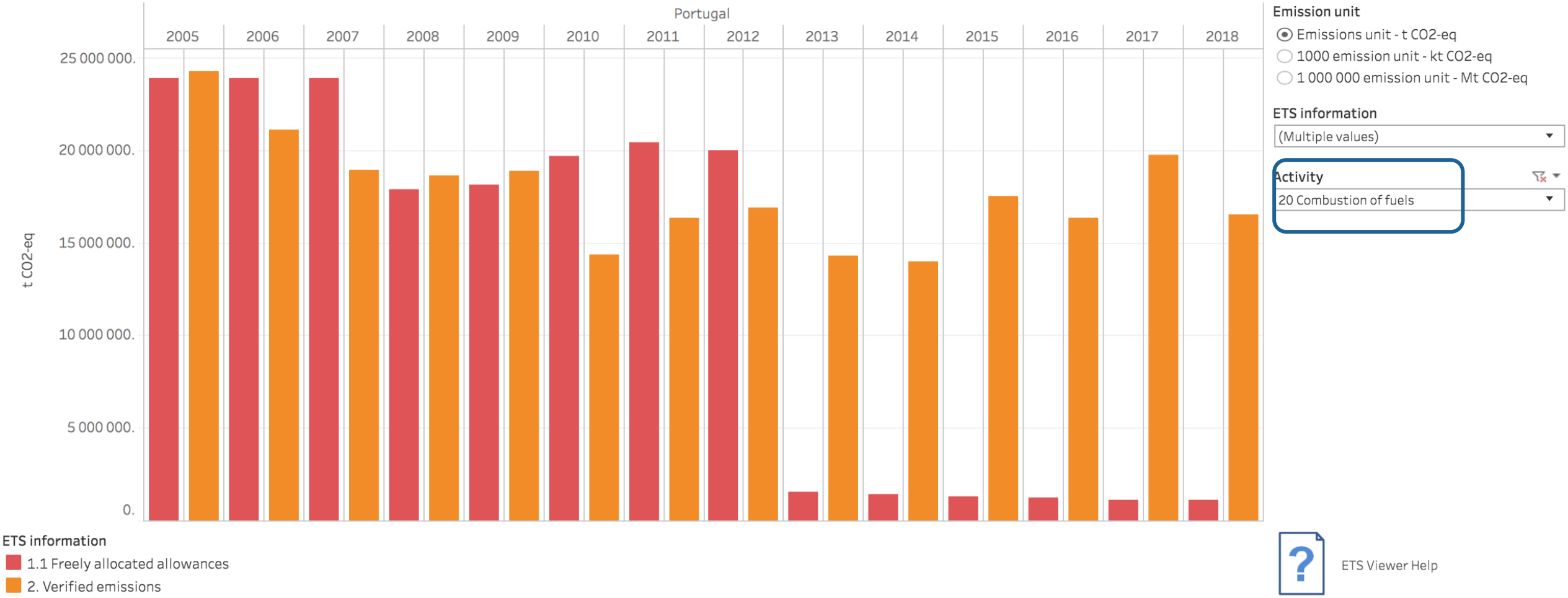
European Emissions Trading Scheme - Portugal

Portugal



https://www.eea.europa.eu/data-and-maps/dashboards/emissions-trading-viewer-1#tab-based-on-data

European Emissions Trading Scheme - Portugal

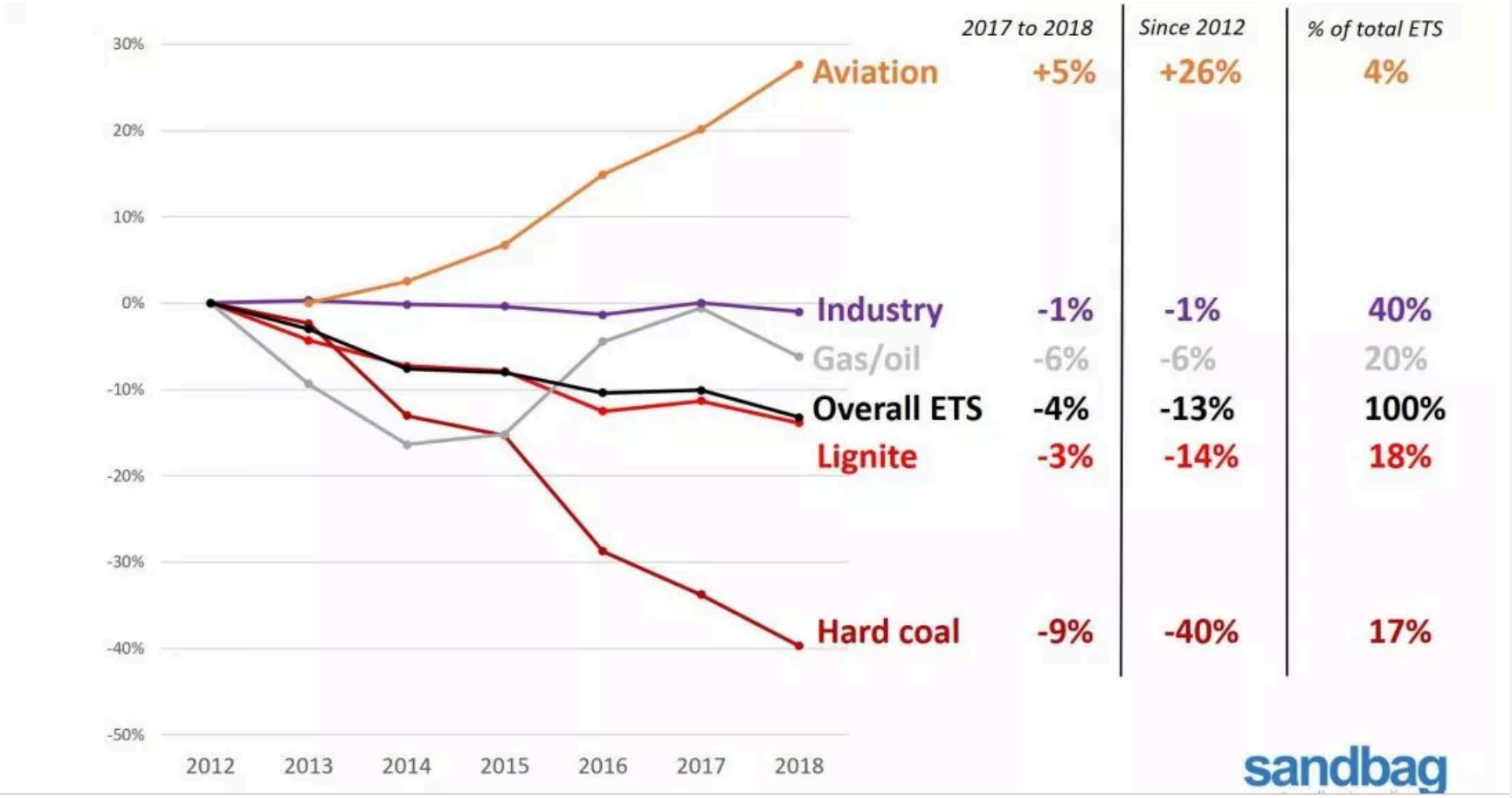


https://www.eea.europa.eu/data-and-maps/dashboards/emissions-trading-viewer-1#tab-based-on-data

Emissions Reduction during 2012-2018

sandbag
smarter climate policy

Emissions falls are almost single-handedly a result of reduced generation from hard coal power plants. Lignite power plant emissions remain stubbornly high, industrial emissions are almost unchanged since 2012, and aviation emissions continue to soar.



European Emissions Trading Scheme

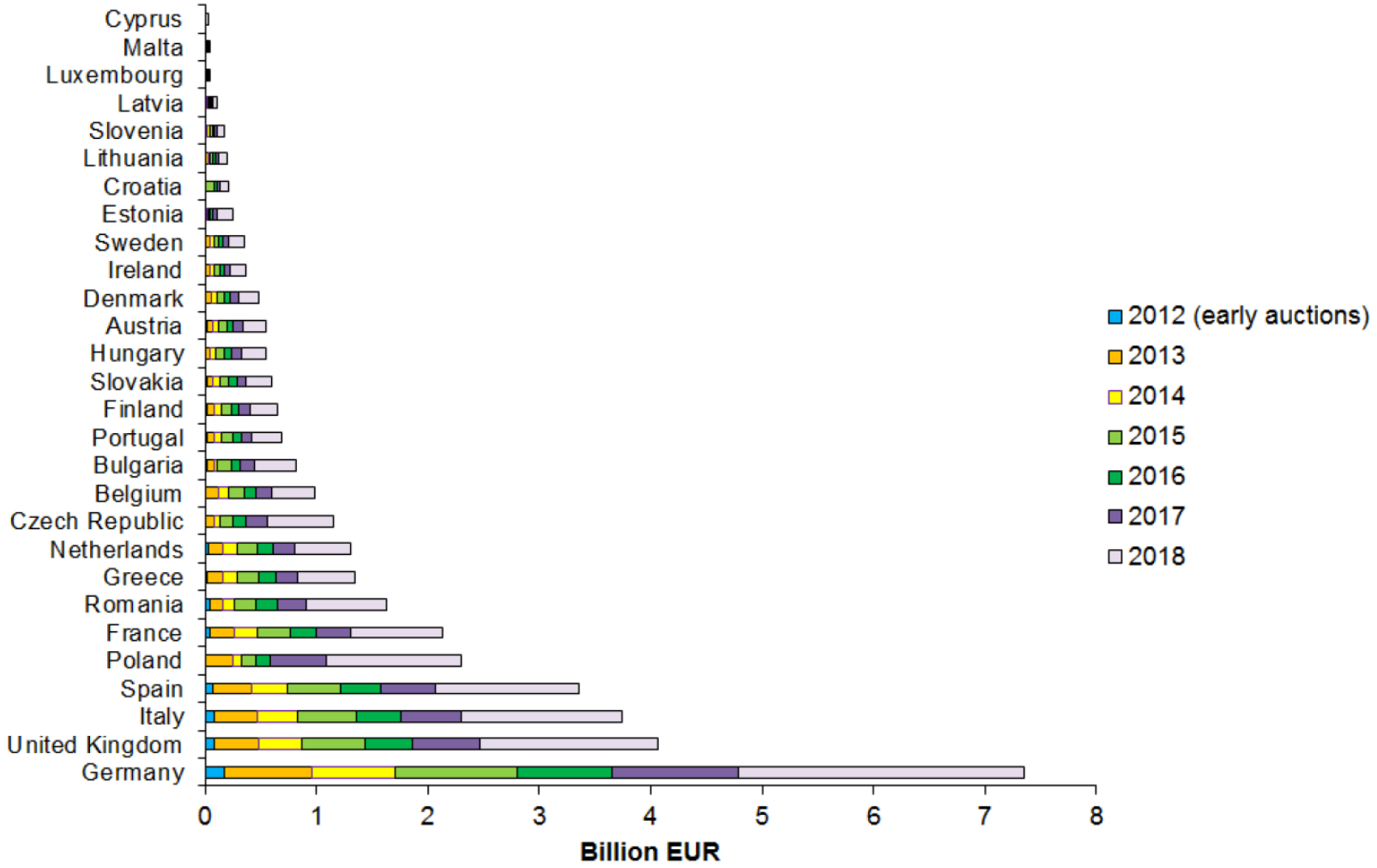
Pré-covid19

https://markets.businessinsider.com/commodities/co2-european-emission-allowances

European Emissions Trading Scheme

European Emissions Trading Scheme

Figure 2.7 **EUA auction revenues in the third trading period, by EU Member State, 2012-2018**



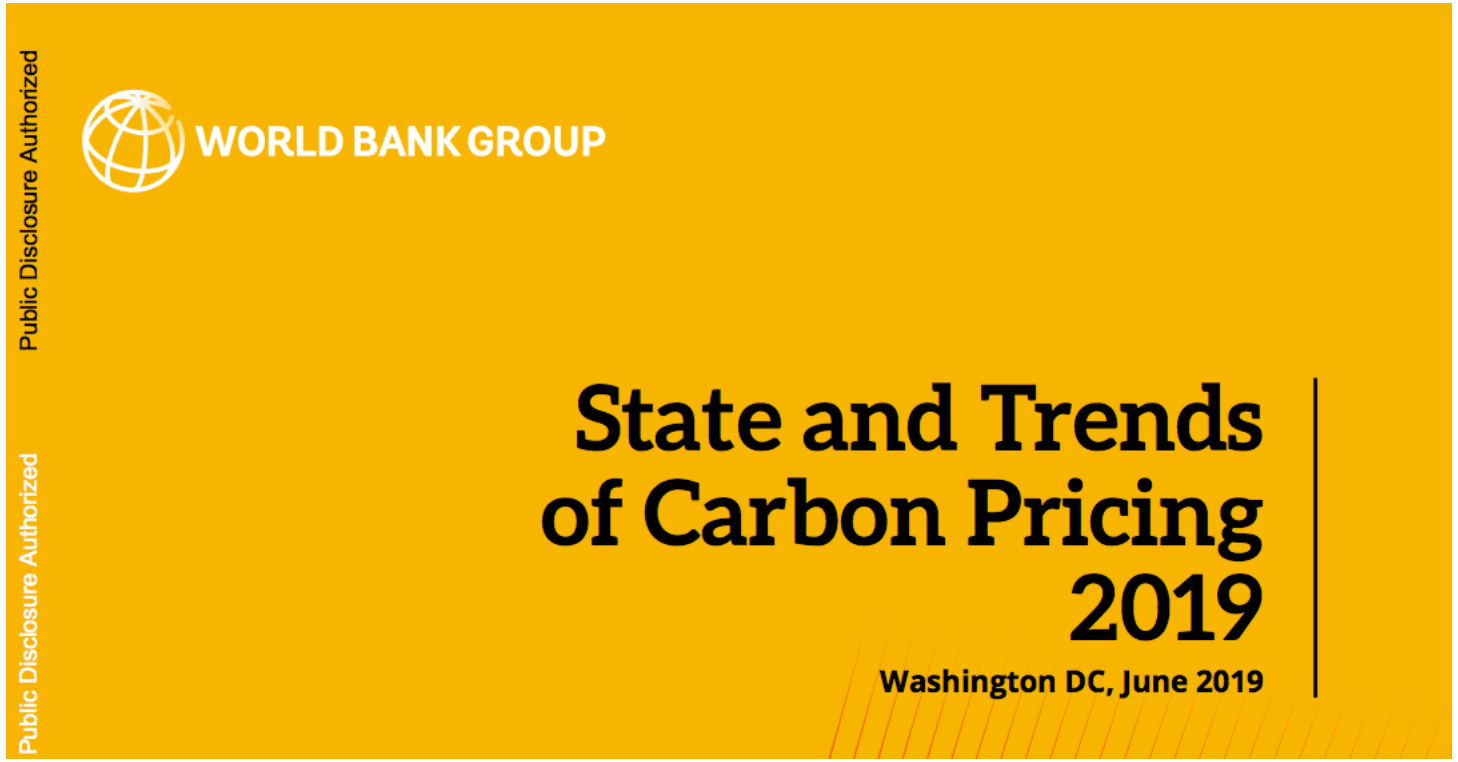
Note: 2012 (early auctions) refer to amounts that pertain to the year 2013, but had been auctioned a year earlier.

Source: EEX (2019); ICE (2019).

Em Portugal:
Decreto-Lei n.º 10/2019
estabelece novas regras relativas à alocação das receitas provenientes dos leilões de licenças de emissão

Fixa em 60% o valor das receitas geradas pelos leilões das licenças de emissão a transferir para o Sistema Elétrico Nacional (SEN), a fim de compensar parte do sobrecusto total da produção em regime especial a partir de fontes de energia renovável.

Em 2019: >360 M€

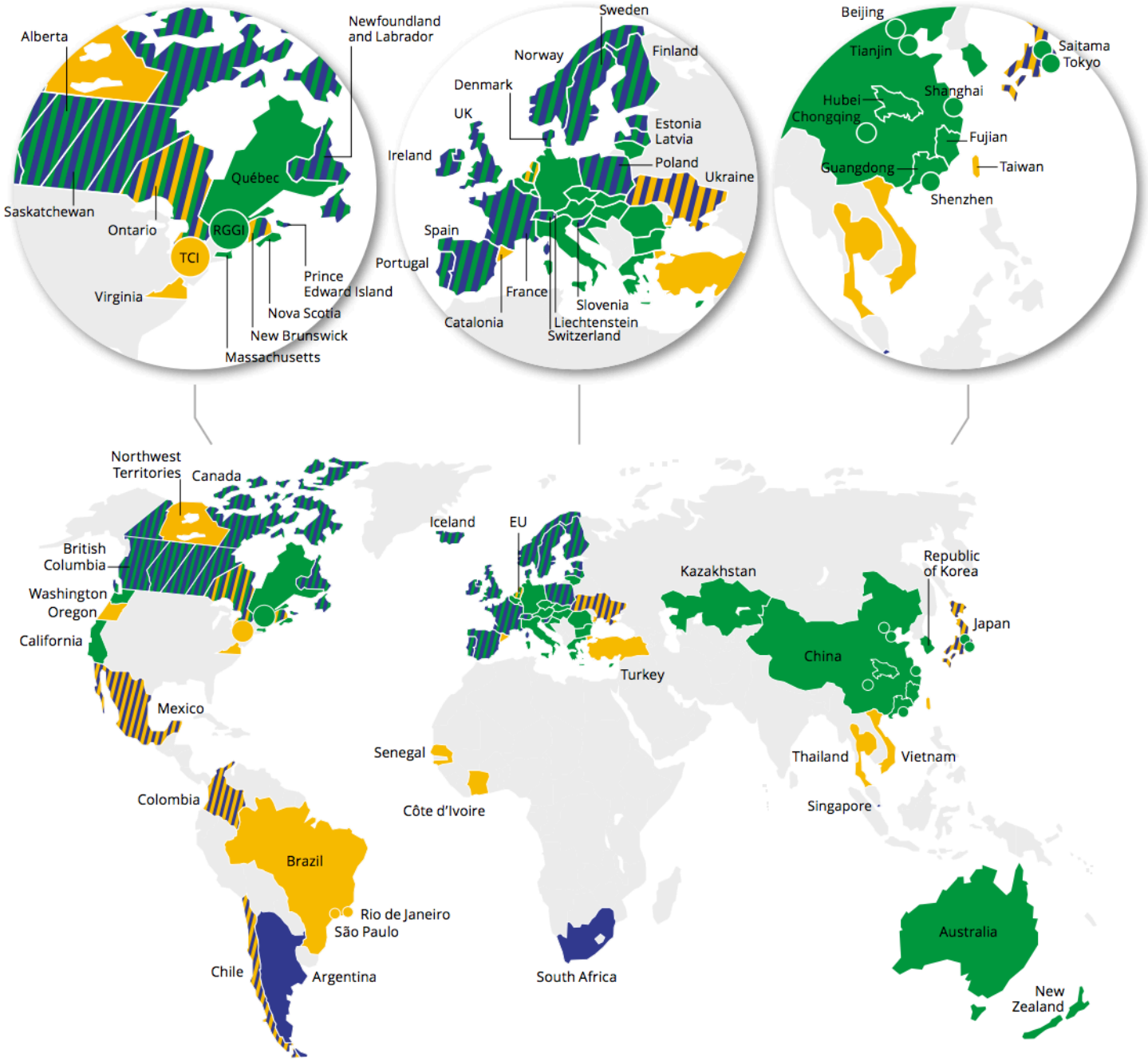


http://documents.worldbank.org/curated/en/191801559846379845/pdf/State-and-Trends-of-Carbon-Pricing-2019.pdf

In 2018 and 2019, the number of carbon pricing initiatives around the world increased and existing systems were strengthened as jurisdictions assessed their policies to better align with their climate objectives. But we are still very far from where we need to be to meet the Paris Agreement objectives. The coverage and price levels of carbon pricing initiatives is still insufficient. It is crucial that jurisdictions take action now to increase the breadth and the depth of carbon pricing. 2019 is also a critical year for clarifying the implementation of the international carbon pricing mechanisms stated in the Paris Agreement and unlock their potential for accelerating action and increasing ambition.

Carbon Pric

Figure 1 / Summary map of regional, national and subnational carbon pricing initiatives implemented, scheduled for implementation and under consideration (ETS and carbon tax)



The large circles represent cooperation initiatives on carbon pricing between subnational jurisdictions. The small circles represent carbon pricing initiatives in cities.

ETS: Emissions Trading Scheme
Tax: CO_2 tax

World Bank, 2019

Carbon Pricing

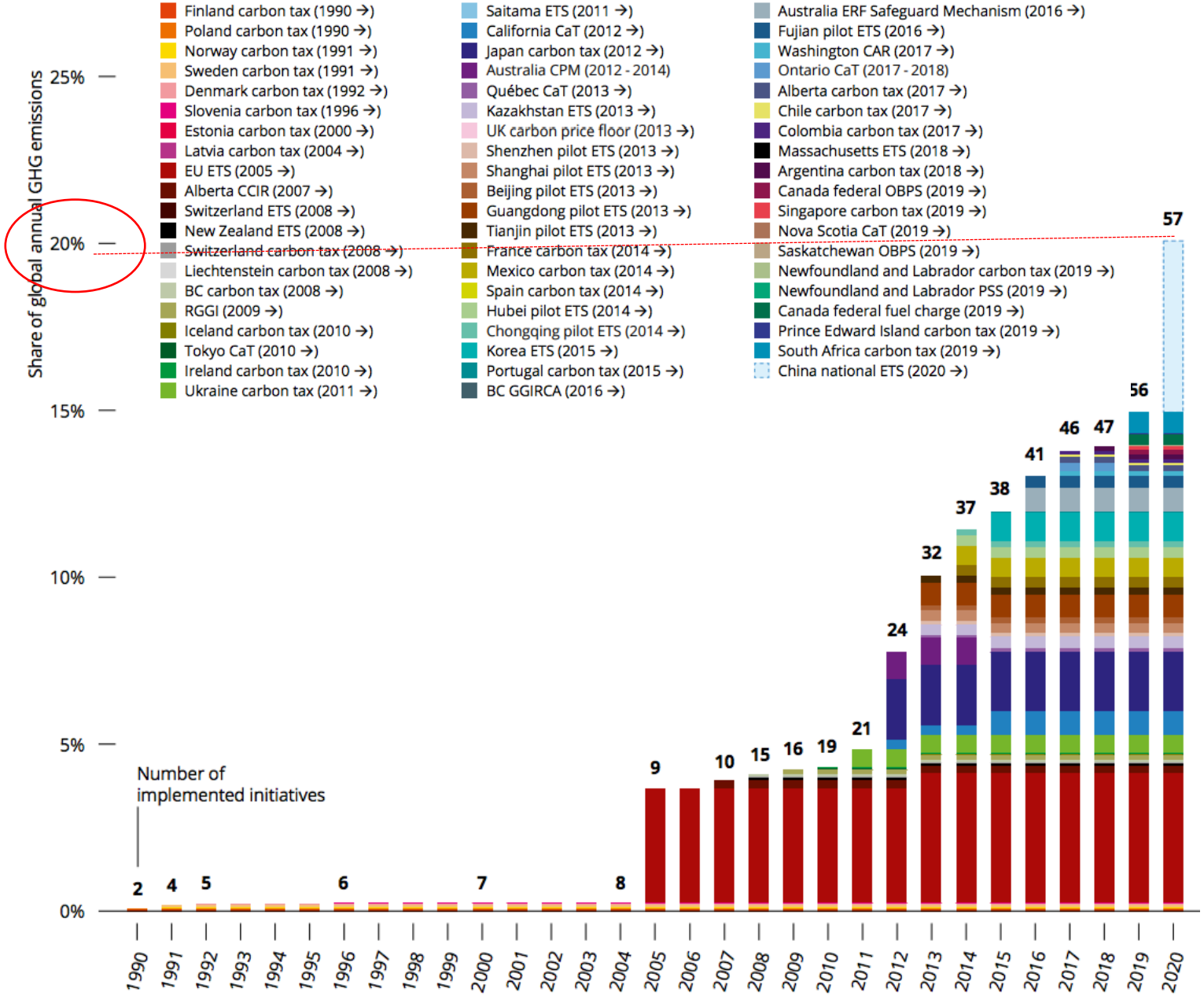
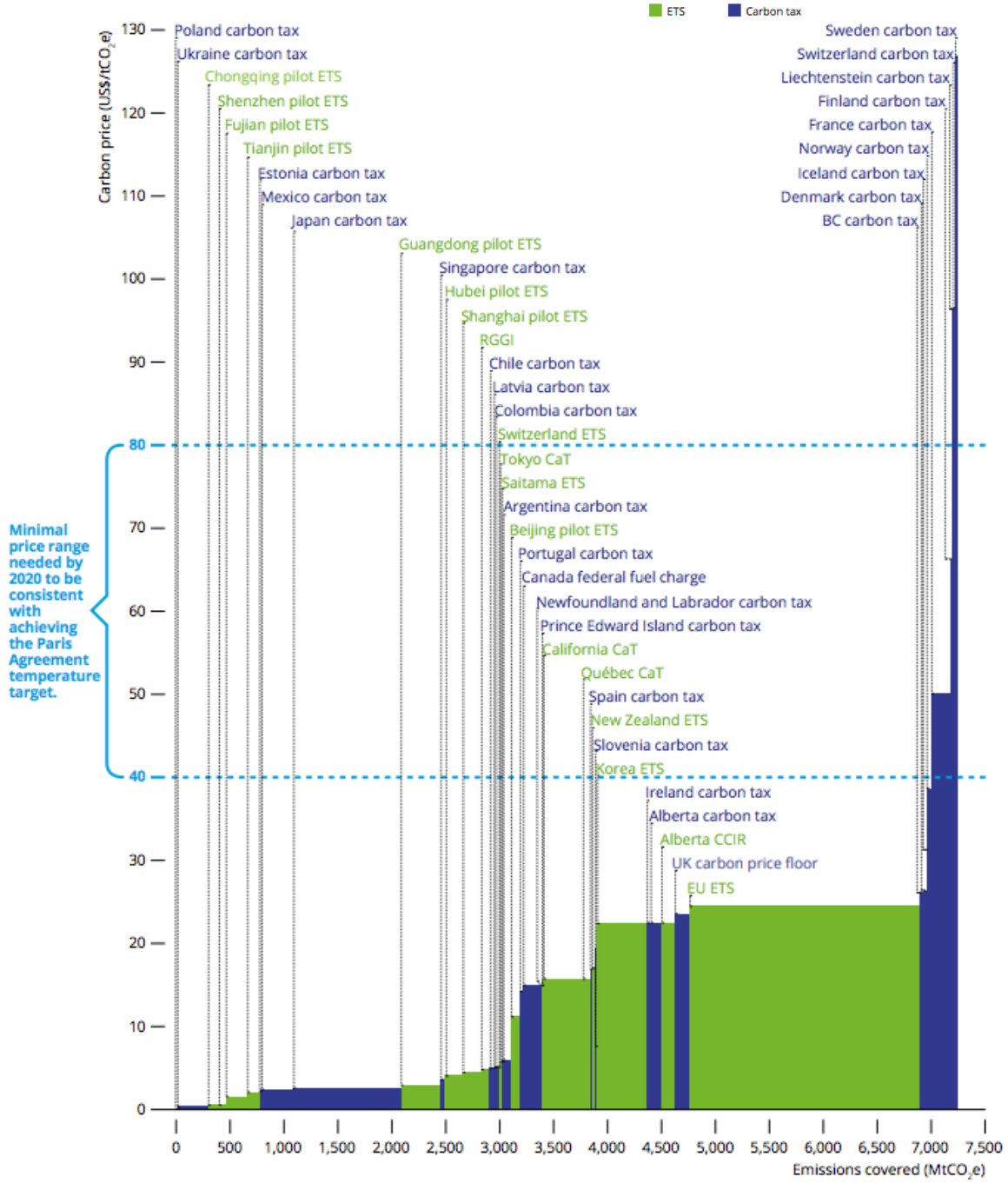


Figure 5 / Regional, national and subnational carbon pricing initiatives: share of global emissions covered

World Bank, 2019

Carbon Pricing

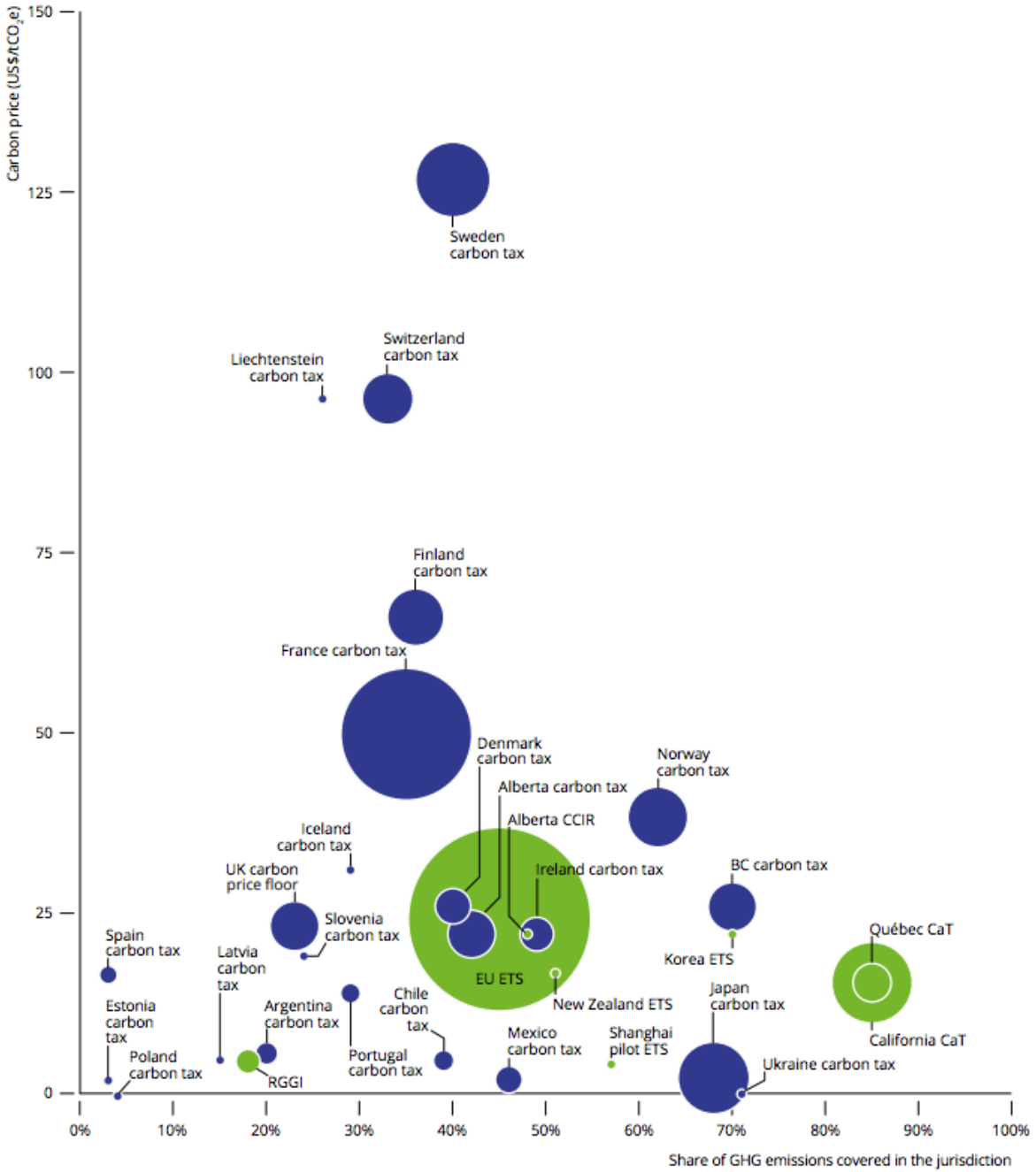
Figure 9 / Carbon price and emissions coverage of implemented carbon pricing initiatives



World Bank, 2019

Carbon Pricing

Figure 10 / Carbon price, share of emissions covered and carbon pricing revenues of implemented carbon pricing initiatives



Note: The size of the circles is proportional to the amount of government revenues except for initiatives with government revenues below US$100 million in 2018; the circles of these initiatives have an equal size. For illustrative purposes only, the nominal prices on April 1, 2019 and the coverages in 2019 are shown. The carbon tax rate applied in Argentina, Finland, Mexico and Norway varies with the fossil fuel type and use. The carbon tax rate applied in Denmark varies with the GHG type. The graph shows the average carbon tax rate weighted by the amount of emissions covered at the different tax rates in those jurisdictions. The middle point of each circle corresponds to the price and coverage of that initiative.

Governments raised approximately US$44 billion in carbon pricing revenues in 2018, from allowance auctions, direct payments to meet compliance obligations and carbon tax receipts. This represents an increase of nearly US$11 billion compared to the US$33 billion raised in 2017.

Carbon Pricing

CARBON PRICE IN PORTUGAL:

- **CELE (Comércio Europeu de Licenças de Emissão):** 317 instalations*

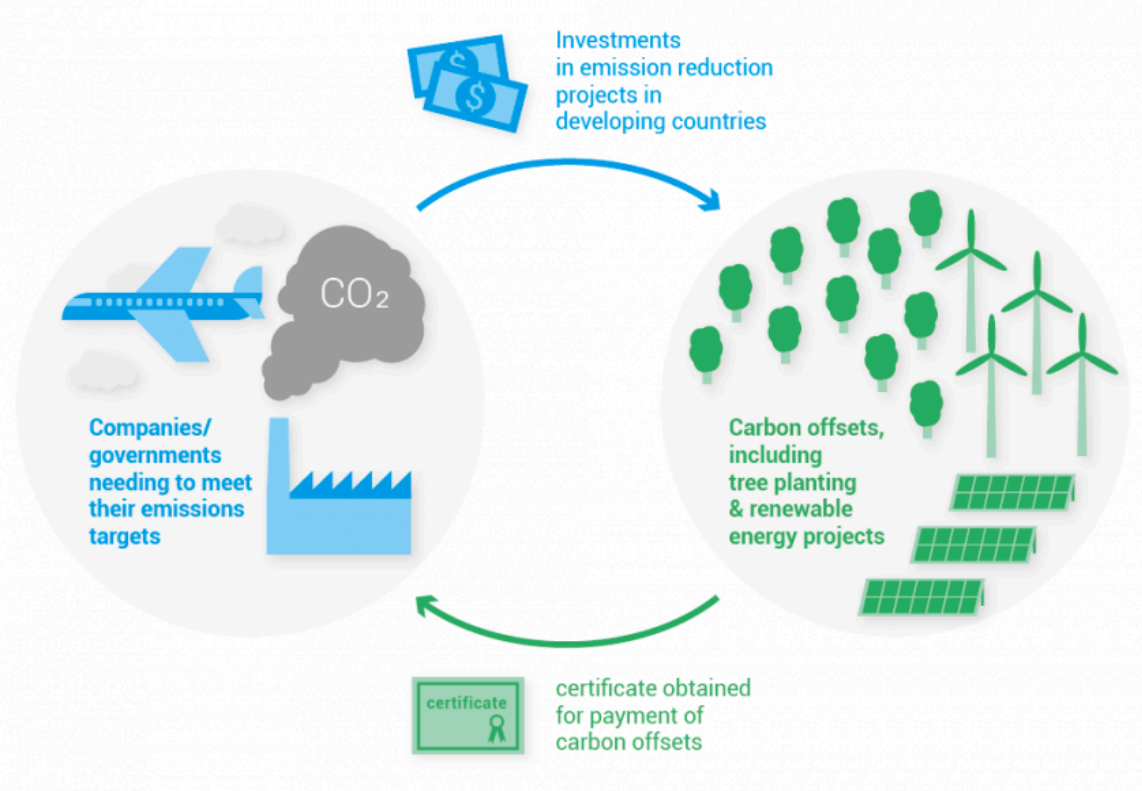
- **CO_2 tax**, under the Green Tax Reform (2014): 2019 - 23,619 euros/t CO_2 applied to all fuel consumers not covered by the EU-ETS (Portaria n.º 42/2020, of 2020-02-14).

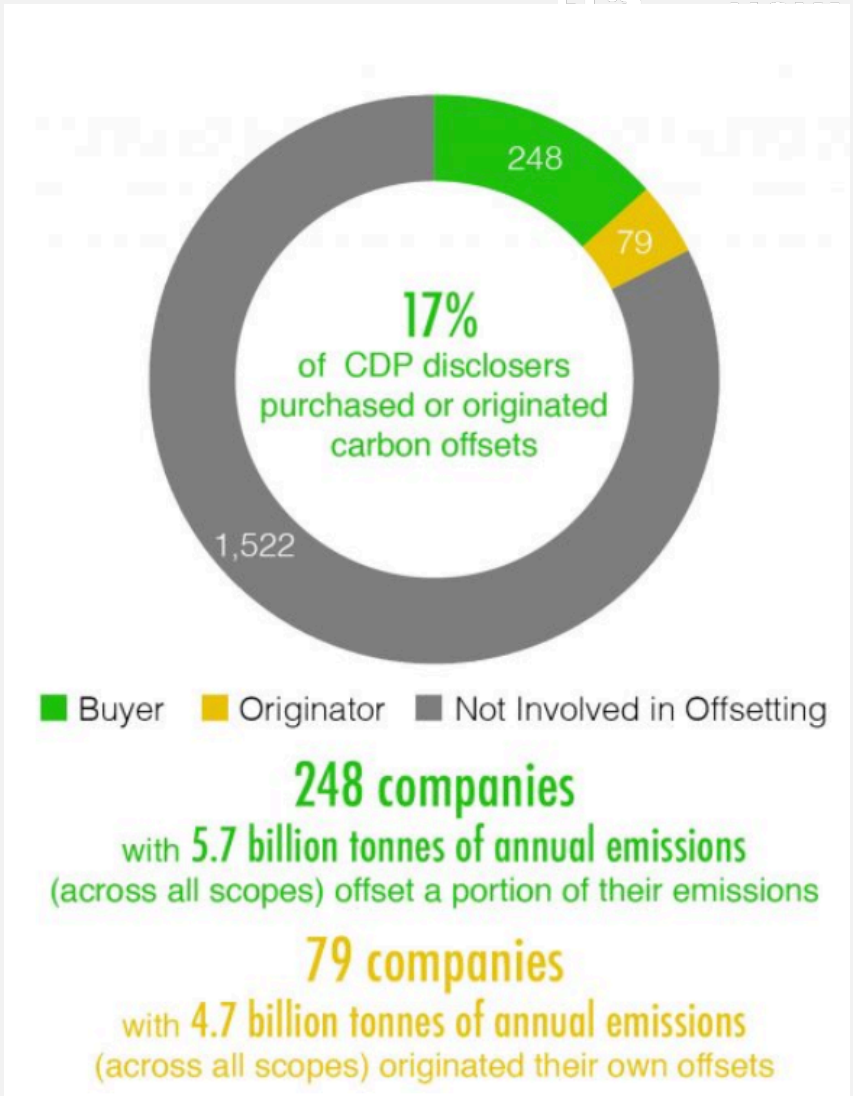
- **Tax exemptions** for coal-fired electricity and cogeneration facilities are gradually being abolished. The intention is to level the different sources of fuel for power generation, since oil and other fuels are already taxed. In 2018, those installations were taxed at 10% of the total value of € 6.9 / tCO2e; in 2019, by 25%, and the percentage exemption will continue to be reduced annually by 25% up to the total tax amount in 2022. The additional costs of raising the carbon tax should not be passed on to consumers. The additional revenue generated will be used to reduce the tariff deficit in the energy sector and for funds related to sustainability.

*Complete list here: https://www.apambiente.pt/_zdata/CELE/Instalacoes/Tabela_NET_instalaoes_abrangidas_CELE_2019_01_24.pdf

Voluntary Carbon Markets

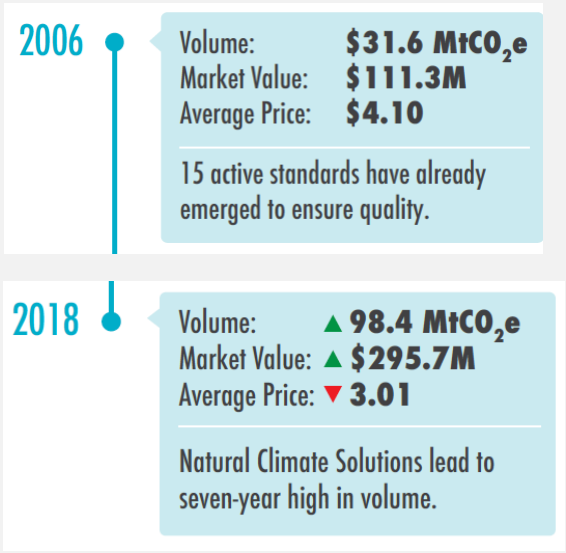
WHAT'S THE PURPOSE?





Ecosystem MarketPlace, 2019

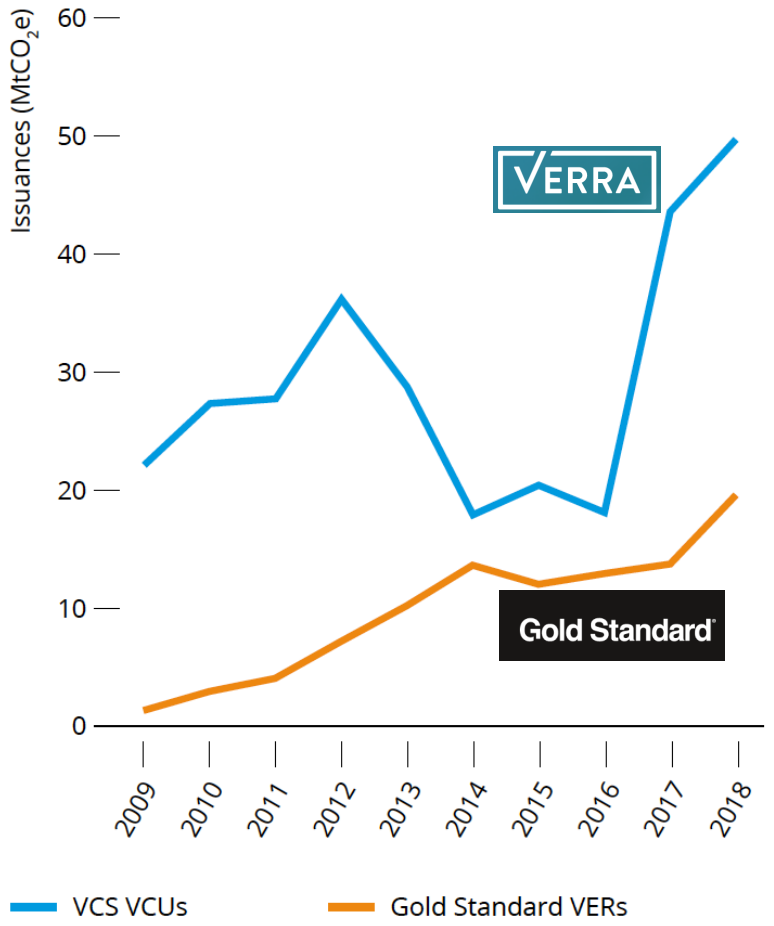
Voluntary Carbon Markets



Voluntary carbon market much smaller market than Compliance markets but growing

Ecosystem MarketPlace, 2019

Figure 16 / Historic annual issuance of VCS and Gold Standard credits[185]



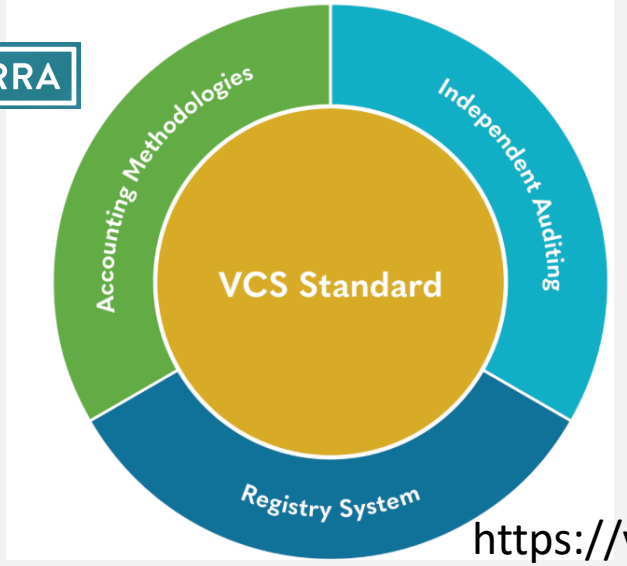
World Bank, 2019

2018:
> 2,000 projects emitted 430 $MtCO_2e$ of voluntary credits since 2005.

More than 75% of the credits are borne under the 2 major standards
—Verra's Voluntary Carbon Standard (VCS)
— Gold Standard.

Voluntary Carbon Markets

The Project cycle of VCS for the issuance of (VCUs – “Verified Carbon Units”)



https://verra.org/

1º PASSO: ESCOLHER UMA METODOLOGIA
Os criadores de projetos devem escolher uma metodologia pré-aprovada que se aplique a seus projetos ou criar uma nova metodologia com o uso do processo de aprovação de metodologia VCS.

2º PASSO: DESCREVER E LISTAR O PROJETO
Criadores de projetos têm que abrir uma conta em um registro VCS e apresentar um documento descritivo dos projetos para listar no banco de Projetos VCS.

3º PASSO: VALIDAR O DOCUMENTO DESCRITIVO DO PROJETO
Os desenvolvedores de projetos devem contratar um órgão de validação/verificação (VVB) para validar o documento descritivo de seus projetos.

4º PASSO: VERIFICAR AS REDUÇÕES DE EMISSÃO
Os desenvolvedores de projetos devem monitorar e registrar os dados de reduções de emissões em um relatório de monitoramento e contratar um VVB para verificar essas reduções de emissão.

5 PASSO: EMITIR VCUS – UNIDADES DE CARBONO VERIFICADAS
Os desenvolvedores de projetos devem solicitara emissão de VCUs. Os créditos depositados em suas contas podem ser mantidos, vendidos ou aposentados.

Voluntary Carbon Markets

	2017			2018		
	VOLUME $MtCO_2e$	AVERAGE PRICE	VALUE	VOLUME $MtCO_2e$	AVERAGE PRICE	VALUE
FORESTRY AND LAND USE	16.6	$3.4	$63.4M	50.7	$3.2	$171.9M
RENEWABLE ENERGY	16.8	$1.9	$31.5M	23.8	$1.7	$40.9M
WASTE DISPOSAL	3.7	$2.0	$7.4M	4.5	$2.2	$10.0M
HOUSEHOLD DEVICES	2.3	$5.0	$11.8M	6.1	$4.8	$29.5M
CHEMICAL PROCESSES/ INDUSTRIAL MANUFACTURING	2.6	$1.9	$4.9M	2.5	$3.1	$7.9M
ENERGY EFFICIENCY/ FUEL SWITCHING	1.1	$2.1	$3.3M	2.8	$2.8	$7.8M
TRANSPORTATION	0.1	$2.9	$0.2M	0.3	$1.7	$0.5M

Notes: 2017 figures are based on 1,041 transactions for a total volume of 43.2 $MtCO_2e$. 2018 figures are based on 1,568 transactions for a total of 90.7 $MtCO_2e$. These figures do not include responses that didn't provide price data.

Ecosystem MarketPlace, 2019

Asia's market share sliding from 48% in 2016 to 31% in 2018, and **Latin American and the Caribbean**'s market share ballooning from 13% in 2016 to 37% in 2018.

Funds for Climate Mitigation & Adaptation

Climate Funds Update | HEINRICH BÖLL STIFTUNG NORTH AMERICA | ODI

Fund (...)	Fund Type	Fund focus	Pledge (USD mn)	Deposit (USD mn)	Approval (USD mn)
Clean Technology Fund (CTF)	Multilateral	Mitigation - General	5,462	5,463	4,989
Congo Basin Forest Fund (CBFF)	Multi Donor Regional	Mitigation - REDD	186	165	83
Forest Carbon Partnership Facility - Carbon Fund (FCPF-C..	Multilateral	Mitigation - REDD	890	538	0
Forest Carbon Partnership Facility - Readiness Fund (FCP..	Multilateral	Mitigation - REDD	430	417	532
Forest Investment Program (FIP)	Multilateral	Mitigation - REDD	736	736	567
Global Climate Change Alliance (GCCA)	Multilateral	Multiple Foci	1,333	1,333	456
Global Energy Efficiency and Renewable Energy Fund (GE..	Multilateral	Mitigation - General	282	276	224
Global Environment Facility (GEF4)	Multilateral	Multiple Foci	1,083	1,083	967
Global Environment Facility (GEF5)	Multilateral	Multiple Foci	1,152	1,148	854
Global Environment Facility (GEF6)	Multilateral	Multiple Foci	1,117	1,109	895
Green Climate Fund (GCF)	Multilateral	Multiple Foci	10,302	7,234	4,605
Indonesia Climate Change Trust Fund (ICCTF)	Multi Donor National	Multiple Foci	26	17	14
Least Developed Countries Fund (LDCF)	Multilateral	Adaptation	1,372	1,317	1,220
MDG Achievement Fund	Multilateral	Adaptation	90	90	90
Partnership for Market Readiness	Multilateral	Mitigation - General	130	120	87
Pilot Program for Climate Resilience (PPCR)	Multilateral	Adaptation	1,155	1,155	960
Scaling Up Renewable Energy Program (SREP)	Multilateral	Mitigation - General	745	745	592
Special Climate Change Fund (SCCF)	Multilateral	Adaptation	371	366	286
UN-REDD Programme	Multilateral	Mitigation - REDD	320	308	317
Grand Total			30,417	26,112	19,373

Paris Agreement

https://climatefundsupdate.org/data-dashboard/

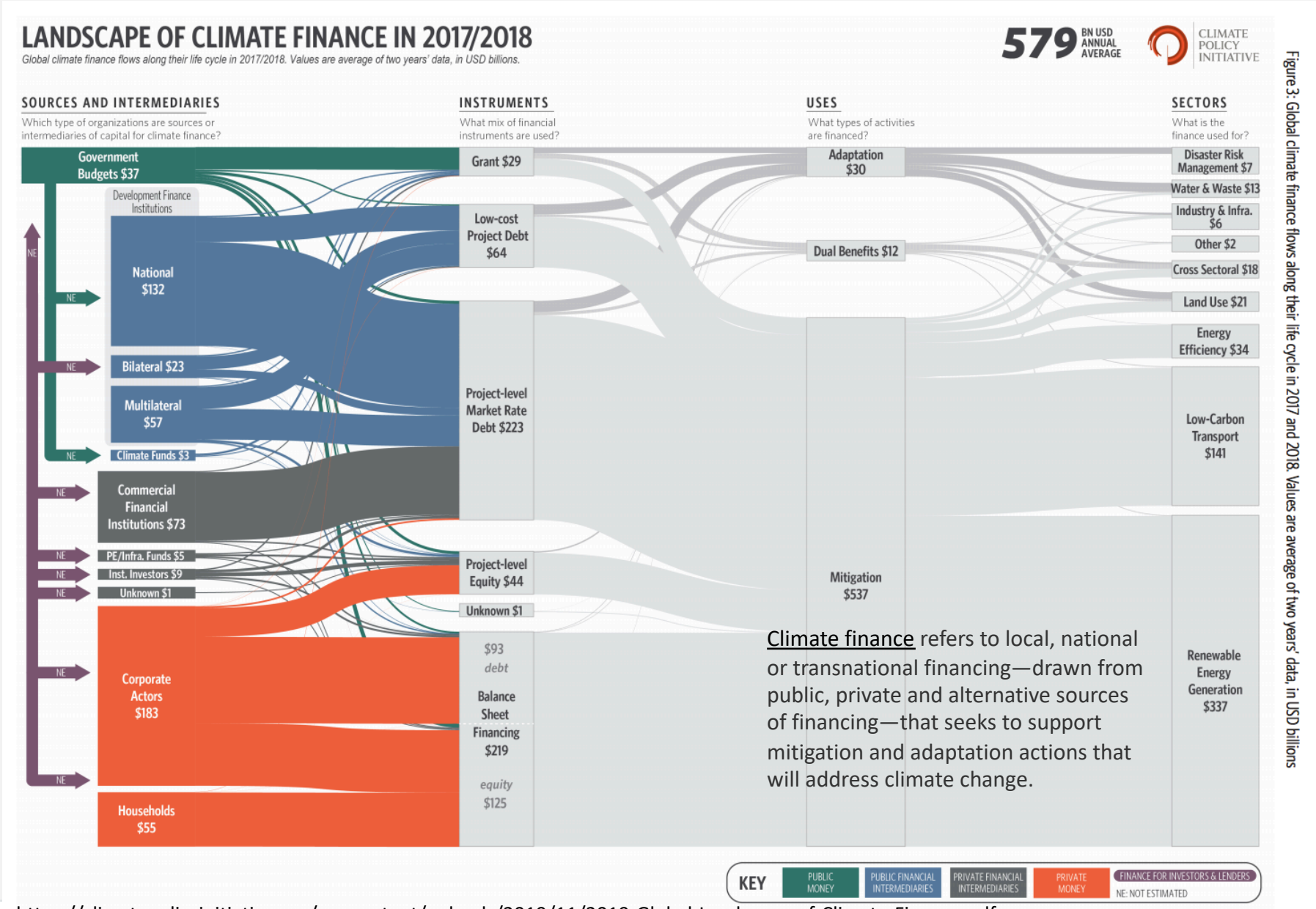


Figure 3: Global climate finance flows along their life cycle in 2017 and 2018. Values are average of two years' data, in USD billions

Climate finance refers to local, national or transnational financing—drawn from public, private and alternative sources of financing—that seeks to support mitigation and adaptation actions that will address climate change.

https://climatepolicyinitiative.org/wp-content/uploads/2019/11/2019-Global-Landscape-of-Climate-Finance.pdf