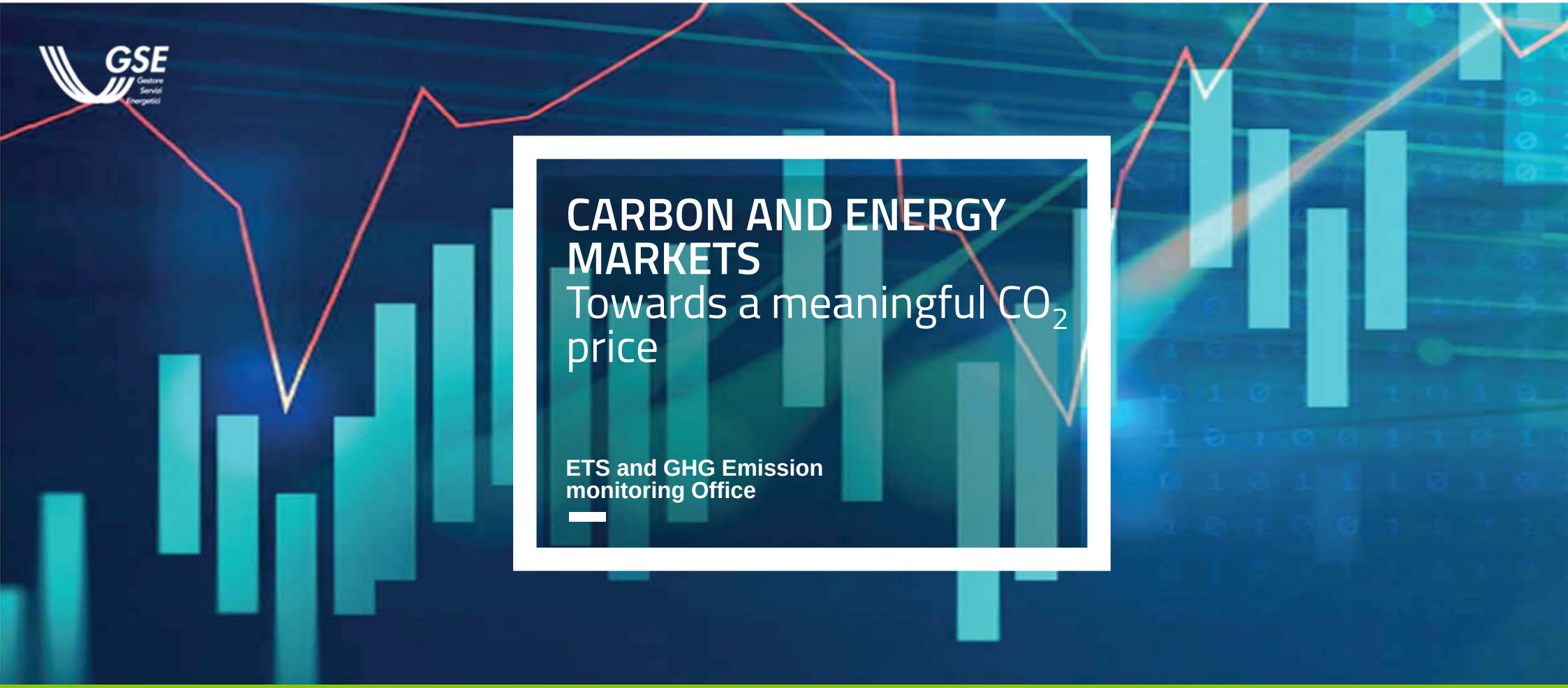

CARBON AND ENERGY MARKETS
Towards a meaningful CO_2 price

ETS and GHG Emission monitoring Office

GSE SUPPORTS THE SUSTAINABLE DEVELOPMENT OF ITALY THROUGH PROMOTION OF RENEWABLE SOURCES AND ENERGY EFFICIENCY
GSE is actively engaged for enabling Italian participation to EU Common Auction Platform (EU CAP-2) and supports Italian Competent Authority for ETS Directive implementation with a special focus on Small Emitters

ROME
MARCH, 4TH
2020

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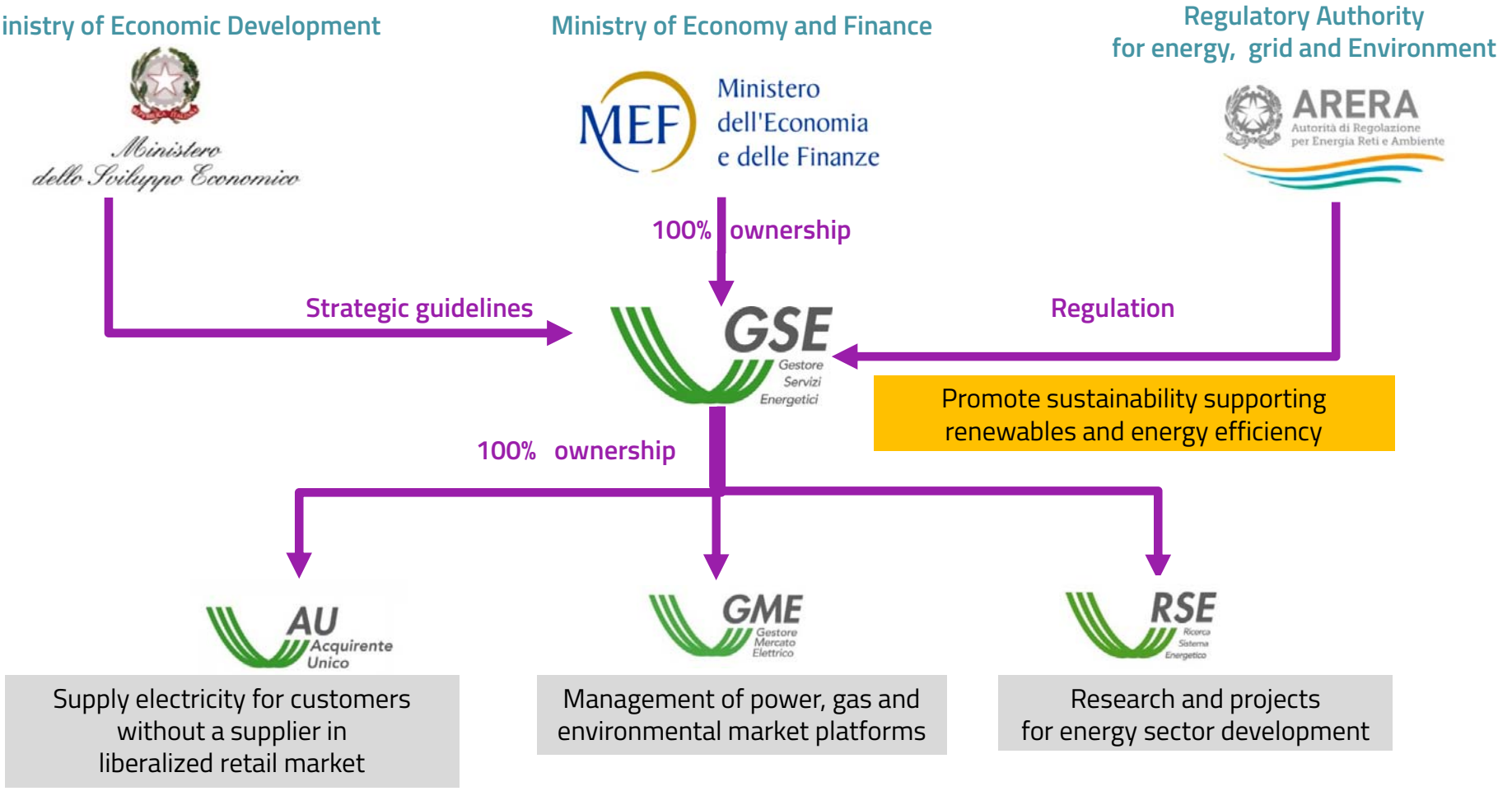
The GSE Group

GSE ROLE



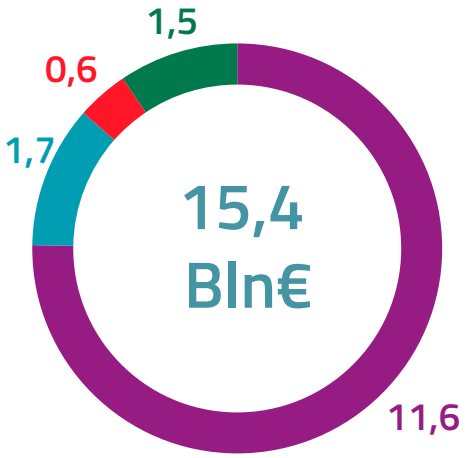
The GSE Group

GSE ACTIVITIES – A VIEW ON ITALIAN INCENTIVES

- In 2018, about **800,000 plants** managed, **1,300,000 public-private partnerships** and **15.4 € bln incentives**

Scope	Measures	Activities	Energy
RES-E 	MD 23/6/2016 MD 6/7/2012 Conto Energia FV Incentivo ex CV, TO CIP 6 Net billing Simplified purchase	1,300,000 Contracts 800,000 RES Plants	67 TWh RES electricity incentivized
RES-H Energy Efficiency 	Conto termico White Certificates High efficiency CHP	100,000 Requests	3 Mtep Primary energy saving
RES-T 	CIC Biometano	6,000 Biofuel certifications	11 mln Gcal Biofuels
Emission CO_2 	EU ETS Small Emitters	139 Auction session	93 $MtCO_2$ GHG Emission permits Auctioned

Incentives

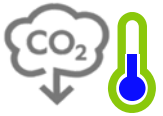


- RES – E
- RES – H&EE
- RES – T
- EU ETS

Benefits

2,6 bln€ green investments

45.000 jobs



- 45 $MtCO_{2eq}$
GHG in the atmosphere

- 117 million barrels
of oil in the national energy bill

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Italian Governance of the EU ETS

Italian National Competent Authority (i.e. Comitato ETS)

SINCE 2012

Italian AUCTIONEER

CO_2 Auctions

€

- At national level, **since 2006 Italian Competent Authority (i.e. Comitato ETS) is a public inter-ministirial body charged of EU ETS Directive implementation** as it involves Italian Public Institutions charged of GHG emissions control and focused on its main source (i.e. energy, manufacturing sector and transport)

- Pursuant to current and effective Italian legislation, **«Comitato ETS»** is organized **into two structures made up of officer and Managers expression of** 11 different Public Administrations (Legislative Decree No. 30/2013, interdir. Decree No. 179 of Min. of Env., Land and Sea and Ministry of Economic Development, 29/7/2016, «Comitato ETS regulation»):

  - A structure charged of administrative technical tasks: «**Technical Secretariat»** equipped with 22 Officers;

  - A structure charged of administrative decisional powers: «**Boarding Council»** equipped with 9/12 Officers/Managers + 2 with consultative functions

DIPARTIMENTO POLITICHE EUROPEE
PRESIDENZA DEL CONSIGLIO DEI MINISTRI

Farnesina
Ministero degli Affari Esteri e della Cooperazione Internazionale

Conferenza Permanente per i rapporti tra lo Stato, le Regioni e le Province Autonome di Trento e Bolzano

MINISTERO DELL'AMBIENTE E DELLA TUTELA DEL TERRITORIO E DEL MARE

Ministero dello Sviluppo Economico

MEF Ministero dell'Economia e delle Finanze

Ministero delle Infrastrutture e dei Trasporti

ISPRA
Istituto Superiore per la Protezione e la Ricerca Ambientale

ENEA

GSE Gestore Servizi Energetici

ENAC

AUTORITA' NAZIONALE COMPETENTE
COMITATO NAZIONALE PER LA GESTIONE DELLA DIRETTIVA 2003/87/CE E SUPPORTO GESTIONE DELLE ATTIVITÀ DI PROGETTO PROTOCOLLO DI KYOTO

Italian Governance of the EU ETS

GSE Role in the Italian Governance of the EU ETS

- Since 2008, **GSE has been supporting Italian National Competent Authority for EU ETS Directive implementation** in Italy (main focus on Small Emitters)
- Since 2012, **GSE has been serving as the Italian Auctioneer** pursuant to EU Reg. 1031/2010 (Legislative Decree No. 30/2013)
- Since 2012, GSE has been supporting Italian CA to manage «Opt-out» regime

GSE institutional activities on EU ETS are focalized in three main areas: technical support to NCA, Carbon Markets and OPT-OUT

SINCE 2008

Technical support to ITALIAN COMPETENT AUTHORITY

NCA Technical Secretariat (TS) activities

- Participation in NCA's TS activities
- Follow-up of NCA's Boarding Council directives

Opt-out Regime (Small Emitters)

- Administrative procedures
- Management of relations with Operators
- Representation of main results of admin. activities and Dialogue with EU Institutions

Impact Assessment and Analysis

- Impact assessment on «Opt-out» policy design and nat. implementation
- Periodic analysis of main admin. results

Carbon Market

- Quantification of yearly and quarterly CO_2 price for sanctions
- Analysis of EU Carbon Market and correlation with Energy markets

SINCE 2012

Italian AUCTIONEER

CO_2 Auctions

- Auction Italian EUA and EUA A on CAP-2;
- Receive auction proceeds for its MS;
- Disburse the auction proceeds to its appointing MS;
- Manages relations with Common Platform and participates to JPSC-CAP
- Provides quarterly Carbon market reports and analysis in correlation with other energy markets
- Favors knowledge sharing on Carbon Markets for Italian Operators

SINCE 2012

Management of Italian «OPT-OUT» SCHEME

Small Emitters

- Approval of Verified Emissions communications
- Monitoring Plan update
- Revision of Emission thresholds for installations
- Compliance check in relation to emission thresholds and verified emissions

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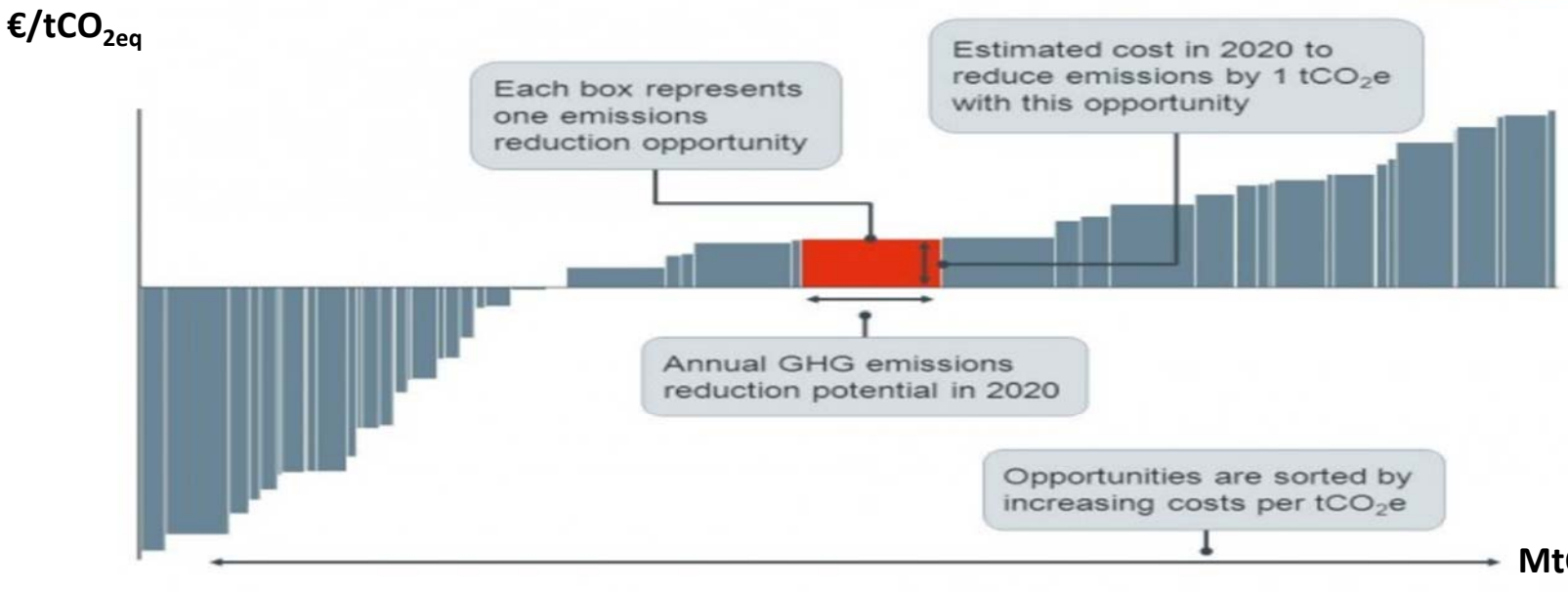
EU ETS

Market Mechanism vs Carbon Tax

CO_2 Price teorically is the result of inter-action between Marginal Abatement Cost Curve (*MACC*) and required (i.e. pre-defined) GHG emission reduction to meet the agreed CAP



- **EU ETS requires a fixed and pre-defined GHG emission reduction (environmental result is guaranteed):** Price is the result of Market forces (input = GHG emission reduction given, output = CO2 price)
- **Carbon Tax fixes a CO_2 price ex ante**: thus, GHG emission reduction could be somewhat higher or lower than strictly required. It is not a cost-efficient way to reach the environmental goal

EU ETS

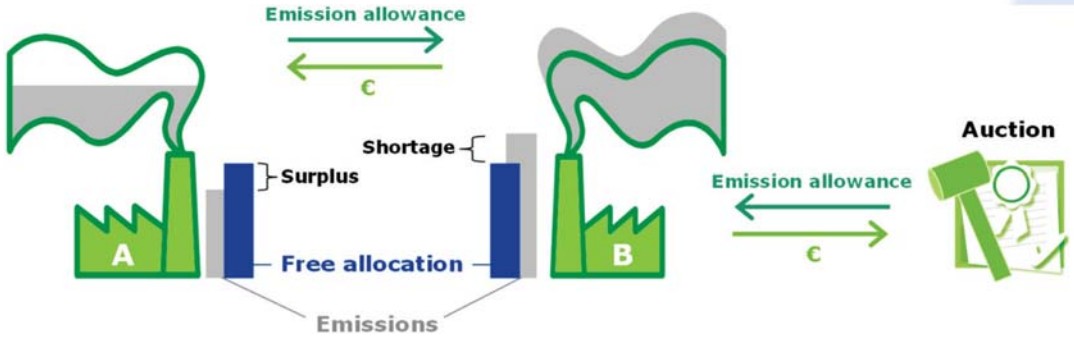
Rationale

PURPOSE of the EU ETS: to promote reductions of GHG emissions in a cost-effective and economically efficient manner.
Art. 1 EU ETS Dir. (2003/87): «*This Directive also provides for the reductions of greenhouse gas emissions to be increased so as to contribute to the levels of reductions that are considered scientifically necessary to avoid dangerous climate change*»

- How the EU ETS promote GHG reduction at a cost-effective and economically efficient way?
  - 1) it creats a EU common threshold for GHG emissions (***cap***);
  - 2) it allows trading (***trade***) of EU Allowances among participants.

CAP & TRADE: CO_2 price formation reflects the lowest cost for the entire System to reduce GHG emissions

THE TRADING FAVOURS LEAST-COST MEASURES TO BE TAKEN UP TO REDUCE EMISSIONS



GSE
ETS Auctioning
CO_2 €

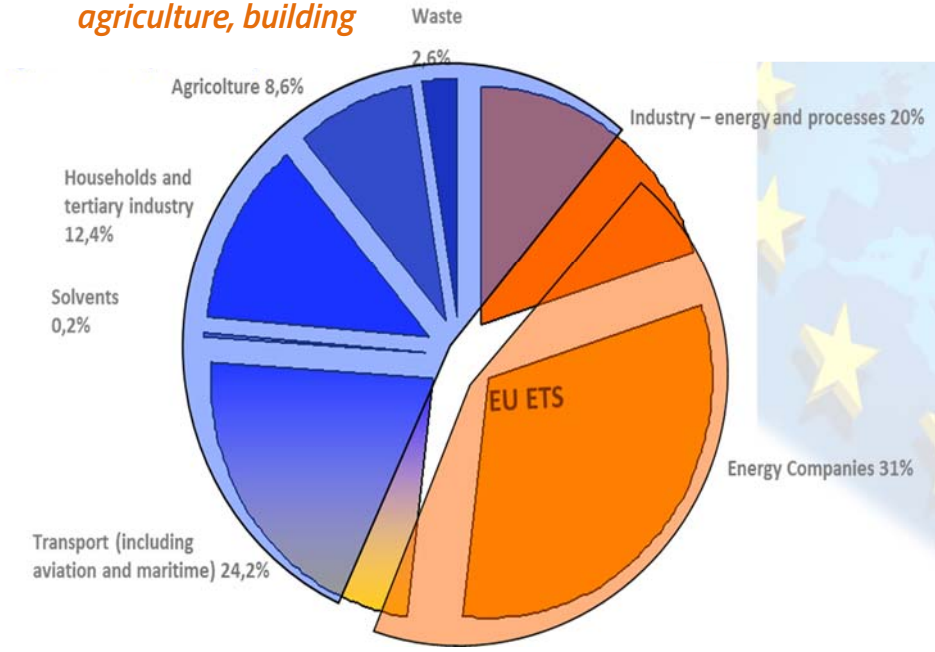
EU ETS

Actors and sectors covered

AIM: Regional System based on Kyoto Protocol aimed at reducing GHG emissions in UE **(-21% in 2020, -43% in 2030).** EU ETS directly charges private operators of industrial energive-intensive installations with the task of nearly halving GHG emission by 2040

EFFORT SHARING: transport, small energy-intensive installations, agriculture, building

EU ETS: big energy-intensive installations



Energy
- Combustion of fuels >20 MW (thermal rated imput)
- Refining of mineral oil
- Production of coke

CO_2 capture (CCS)

Minerals products
- Cement Clinker,
- Lime
- Glass
- Bricks, ceramic products
- mineral wool insulation material
- calcination of gypsum or production of plaster boards

Pulp, paper and board

Metals
- Pig Iron and steel
- Ferrous metals
- Aluminium
- Non-ferrous metals

Chemestry (production of)
- Carbon Black
- Nitric, Adipic, Glyoxal and Glyoxylic acid
- Ammonia
- Hydrogen
- Soda ash and sodium bicarbonate

Aviation

- ✓ *Around **11.000 installations** and **650 Av. Operators** involved*
- ✓ *In Italy, **around 1.100 installations** and **30 Av. Operators***
- ✓ *72% cat. A, 21% cat. B, 7% cat. C*

EU ETS

How EU ETS works: supply side (allocation methods) and demand side

MARKET SUPPLY-SIDE

- Allowances (EUA, EUA A) are allocated in two ways:
  - through **auctions** (main source ≈ 57% of the annual cap);
  - **for free**: to prevent carbon leakage and allow industry progressive improvement in energy efficiency

GSE
ETS Auctioning

AUTORITA' NAZIONALE COMPETENTE
COMITATO NAZIONALE PER LA GESTIONE DELLA DIRETTIVA 2003/87/CE E SUPPORTO GESTIONE DELLE ATTIVITÀ DI PROGETTO PROTOCOLLO DI KYOTO

MARKET SUPPLY IS FIXED

CAP is pre-defined and decreases annually

It is made up of EUA (A) auctioned and EUA (A) released for free

MARKET DEMAND-SIDE

- Each installation (Av. Op.) monitors its emission and has them certified yearly by a third party verifier;
- Each year installations (Av. Op.) must return an allowance for every ton of CO_2eq emitted

MARKET DEMAND IS a CHANGING DRIVER

- **VERIFIED EMISSIONS changes yearly** (-4,1% in 2018) as they depend on GDP growth, decarbonization, RES deployment and innovative low carbon solutions;

EU ETS

How EU ETS works: some figures

MARKET DEMAND IS a CHANGING DRIVER

Year	2011	2012	2013	2014	2015	2016	2017	2018
Verified total emissions	1904	1867	1908	1814	1803	1750	1755	1682
Change to year x-1	-1.8%	-2%	2.2%	-4.9%	-0.6%	-2.9%	0.2%	-4.1%
Verified emissions from electricity and heat production	1190	1184	1125	1037	1032	992	985	913
Change to year x-1		-0,5%	-5,0%	-7,8%	-0,5%	-3,8%	-0,7%	-7,3%
Verified emissions from industrial installations	715	683	783	777	771	758	769	769
Change to year x-1		-4,5%	14,7%	-0,9%	-0,7%	-1,7%	1,4%	-0,1%
Real GDPgrowth rate EU28	1.8%	-0.4%	0.3%	1.8%	2.3%	2.0%	2.5%	2.0%

Source: EUTL, GDP data as reported

MARKET DEMAND IS VARIABLE

- VERIFIED EMISSIONS from industrial installations and electricity/heat generators

MARKET SUPPLY IS FIXED

Phase III EUA (A) auction volume

Year	General allowances	Aviation allowances
2012	89 701 500	2 500 000
2013	808 146 500	0
2014	528 399 500	9 278 000
2015	632 725 500	16 390 500
2016	715 289 500	5 997 500
2017	951 195 500	4 730 500
2018	915 750 000	5 601 500
2019 (until 30 June 2019)[39]	292 975 500	2 032 500

Year	Annual cap (installations)	Annual aviation allowances put into circulation[16]
2013	2 084 301 856	32 455 296
2014	2 046 037 610	41 866 834
2015	2 007 773 364	50 669 024
2016	1 969 509 118	38 879 316
2017	1 931 244 873	38 711 651
2018	1 892 980 627	38.909.625
2019	1 854 716 381	35.172.897[17]
2020	1 816 452 135	

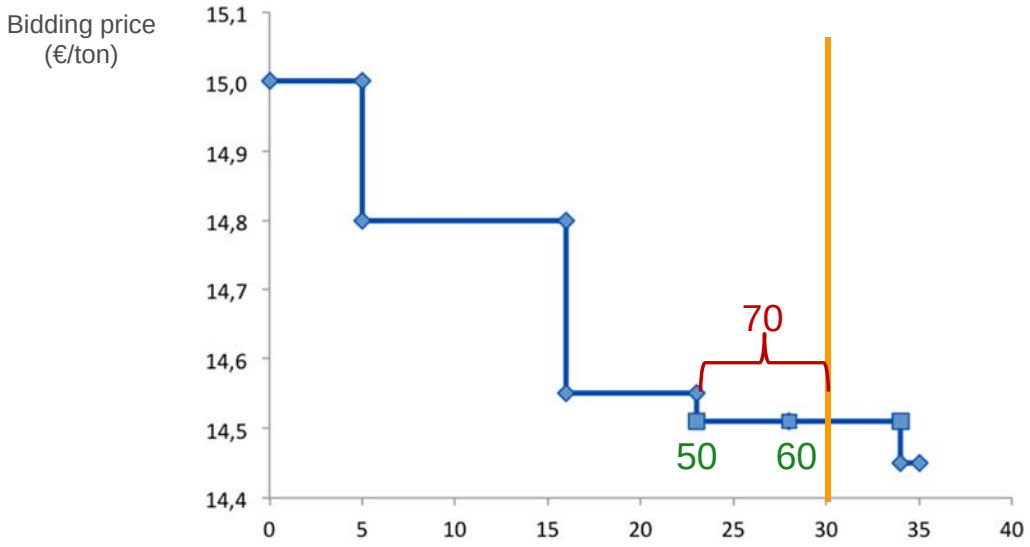
EUA (A) Cap

EU ETS

CO_2 Auctions: how the System work

ETS Auctioning

CO_2 Auction format: single-round, sealed bid, uniform price auction



- **single bidding window** of the auction (2 hours);
- **bidders can place any number of bids**, each specifying EUA they would like to buy at a given price;
- Auction platform orders bids by **decreasing price**;
- the **Auction platform determines** and publishes the **clearing price** at which demand for EUA (EUA-A) equals the EUA (EUA-A) offered by Member States (Auctioneers);
- If more than a bid is offered at the same marginal price, the successful bids are randomly selected.

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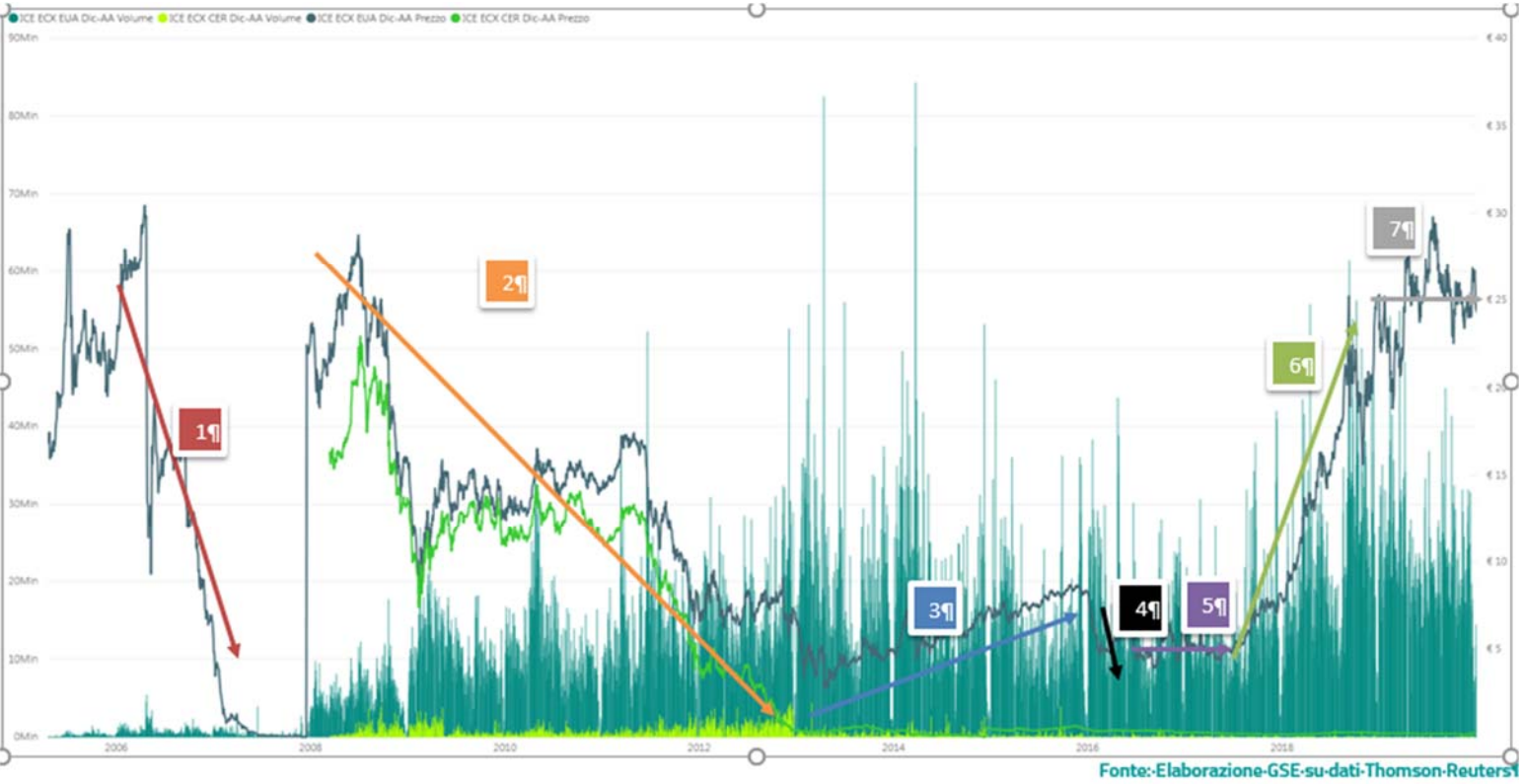
Carbon Market results

EU ETS and CO_2 price trend since 2005



1. Phase 1 (2005-07): **price collapsed** because EUA are not bankable;
2. Phase 2 (2008-12): **surplus progressively cumulates,** mainly due to **economic crisis** (2 bln EUA in 2012)
3. Beginning of Phase 3 (2013-20): **bullish** and speculative trends mainly **driven by regulatory debate and fixing EU measures in the short-term** (backloading in 2014);

ETS Auctioning

4. Phase III (2016-17): **bearish trends** due to the expiry of backloading mechanism;
5. Pending EU ETS reform discussions to increase CO2 price, MSR mechanism start still too far;
6. Since mid-2017, **EUA price has begun an upward trend.** Main factors (market anticipation and expectations linked to new directive):
   - Doubled MSR intake rate (sharper auction reduction from 2019);
   - long-term regulatory certainty;
   - more scarcity in free EUA allocation;
   - more bullish energy and economic trends.
7. **Price stabilization above 25 euro** mainly supported by effective MSR operation

Carbon Market results

CO_2 Auctions: volumes, prices and revenues

ETS Auctioning

According to Italian Legislation GSE is the Italian Auctioneer in the EU ETS

- From Sept. 2012 to 2019 Italy auctioned 547 million EUAs and collected € 5.015 billion of revenues;
- The average price in 2019 rose to a value of around 25€/tonCO_2 (+60% yoy, +4times 2017 value), due to cut in Auction supply (MSR starting from Jan. 2019), as a result of the new EU ETS directive approved in March 2018.

Carbon Market results

Carbon & Energy market correlation

ETS Auctioning

- **With respect to 2018 closing prices, EUA in 2019 stayed above 25€** while other energy commodity recorded a bearish path
- -40 and -35% for gas and coal respectively, +20% for oil, Power DE – 10%

	EUA	Brent Crude	Power (DE)	Coal (API2)	GAS (TTF)	STOXX50E
EUA	1,00	0,03	0,49	-0,44	-0,20	0,40
Brent Crude	0,03	1,00	0,03	0,07	0,22	0,16
Power (DE)	0,49	0,03	1,00	0,45	0,68	-0,39
Coal (API2)	-0,44	0,07	0,45	1,00	0,87	-0,79
GAS (TTF)	-0,20	0,22	0,68	0,87	1,00	-0,77
STOXX50E	0,40	0,16	-0,39	-0,79	-0,77	1,00

Fonte: Elaborazione GSE su dati Thomson Reuters

- As in 2018 **Power DE price** (EEX Phelix baseload future) **is** in 2019 **the energy commodity price more correlated with EUA price** (0,49) than other commodities
- Power prices were more correlated with gas price than with coal

Carbon Market results

Coal-Gas Fuel Switching: what the indicator stands for ?

ETS Auctioning

Methodology for Coal-to-Gas *Switching Price* calculation

- **In EU Power Markets energy bids are ordered from the lower price** requested to higher ones : i.e. ***MERIT ORDER***;
- If marginal cost for producing power from Natural Gas > marginal cost (for Coal), **the former replaces the latter in merit order**;
- **CO_2 price is one of the components of marginal cost** for fossil fuel power generation;
- Coal carbon intensity is 2,3 times higher than natural gas one -> this implies more than double EUA volume required per Mwh_{el} produced;
- If EUA price increases , coal power generation costs increase is higher than cost increase for gas generation;

Coal-to-Gas *Switching Price* (€/tCO_2) is the theorical EUA Price level that enables parity in coal and gas generation

$$Switching\ Price = \frac{gas\ cost\ \left[\frac{€}{MWh}\right] - coal\ cost\ \left[\frac{€}{MWh}\right]}{coal\ CO2\ intensity\ \left[\frac{tCO_2}{MWh}\right] - gas\ CO2\ intensity\ \left[\frac{tCO_2}{MWh}\right]} \quad \left[\frac{€}{tCO_2}\right]$$

In SP calculation, GSE choses the following parameters :

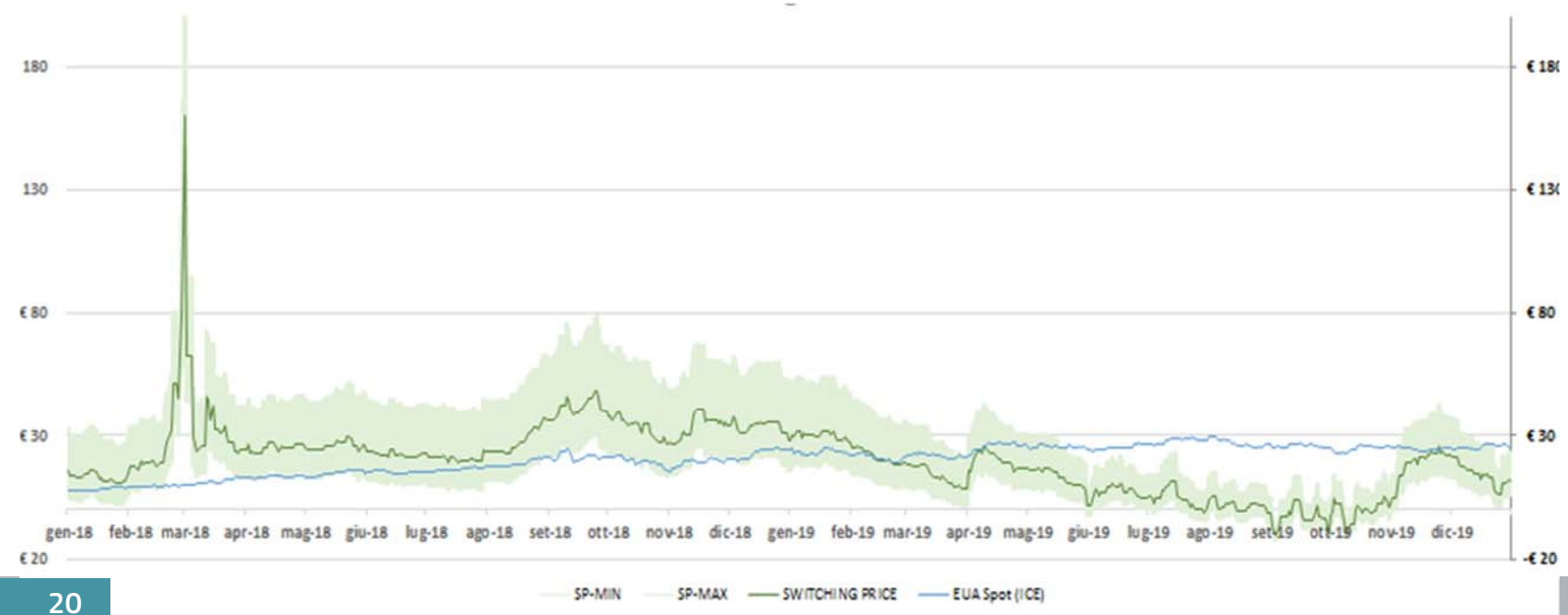
- *spot* natural gas prices recorded in 8 EU *hub* (NBP, ZEE, TTF, GSP, NCG, PegN, PSV, VTP);
- For coal, it is taken into consideration the front-month contract negotiated on ICE linked to API2 (the spot contract is not available, so it is the most close value to a teorically spot contract);
- Emission factors are those from IPCC – 2006;
- Average gross electrical efficiency are calculated starting from Eurostat 2016 Data (53% for natural gas, 39% for coal)

Carbon Market results

Coal-Gas Fuel Switching: is the CO2 price fit for purpose ?

ETS Auctioning

- *Switching Price* decreased in 2019 (from 28.7€/tCO2 eq. in 2018 to **11.8€** in 2019). A bearish trend for SP was recorded though in the last part of 2019 it increased its volatility
- The evident increase in EUA price (€24,6, +60% yoy) and a **corresponding decrease of gas price** gets less convenient for coal power producers to operate with respect to coal power generators
- 2019 estimates (Agora-Sandbag, on Eurostat Data) foresee a decrease in GHG emissions for power sector in EU by 12% (coal GHG emissions could reduce by 24%) because of RES and Gas contribution in EU power mix



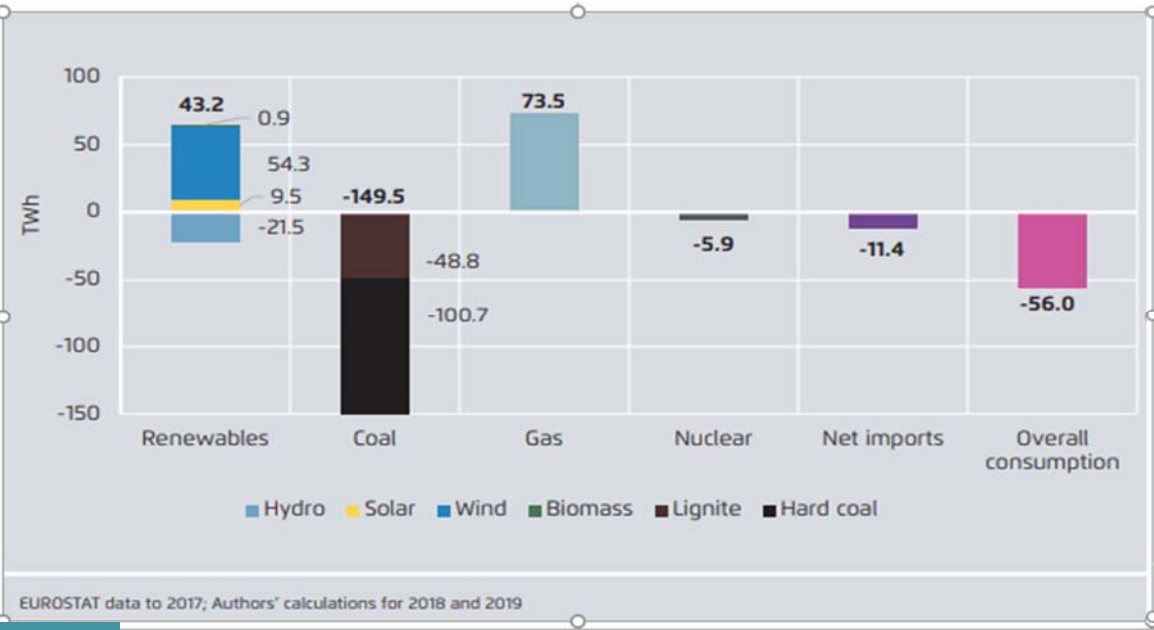
Carbon Market results

Coal-Gas Fuel Switching: is the CO_2 price fit for purpose ?

ETS Auctioning

Because of higher CO_2 prices (surpassing SP), Analysts (*Key Changes to Electricity mix in 2019*, Agora-Sandbag) expect **2019 power generation to be cleaner**:

- **Large decrease in GHG emissions for power sector** in EU by 12% which (if confirmed) will be the largest drop in 5 years
- **Coal power generation decreases its contribution in EU power generation by -32%** (hard coal) and –16% (lignite) while Gas power generation increases its contribution by +12%
- **RES contribution increases**: wind increases its contribution by 14% and PV by +7%



Carbon Market results

Lessons learned

- **Over 15 years, EU ETS delivered greater efforts of harmonisation** while providing at the same time a certain degree of flexibility for SME and specifically for Small Emitters
- As a direct effect of 3 EU ETS phases, **EU ETS provides the biggest and more liquid Carbon Market worldwide**
- **Around 8 years of debate in Europe resulted in stating the importance of restoring a balance between fundamentals in the Carbon Market**: addressing the «Surplus» was a key issue to provide a meaningful carbon price
- For the first time, **in 2019 EUA Price remarkably surpassed «Coal-to-Gas Switching Price» thus providing a real boost for transition in energy generation from Coal to Gas:** as a net effect EU Power mix get cleaner according to early estimates
  - *If confirmed, coal power generation could decrease its contribution to EU power generation by up -32% for hard coal and –16% for lignite while Gas power generation increases its contribution by +12%*
  - *RES contribution increases: wind increases its contribution by 14% and PV by +7%*
- If confirmed the preliminary estimates would however confirm a mismatch between the CAP and verified emissions thus opening up to chanches to review and strenghtening ambition of the System. This is particularly important because of National Plans of «Coal phase out»

THANK YOU

DO YOU HAVE ANY QUESTIONS?


THANK YOU FOR
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