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The European Emission Trading System

Insight into the characteristics of auctioning and CO2 price trends, including the new approach to climate change after a pandemic

by

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Abstract

In the last fifteen years, EU has launched various tools to address climate change. In particular, in order to reduce the level of greenhouse gases emissions, the European Emission Trading System was issued in 2005, rapidly becoming the world's first major carbon market. In the first part of the paper, all the main features of the EU ETS are described, mainly focusing on the auctioning system's evolution with time and its relationship with carbon price trends. In the second part of the paper, all possible effects that the new coming Brexit could have on the EU ETS are pointed out, considering the mayor role of UK in it. In order to continue its sustainable path to net-zero carbon emissions, U.K. will basically have to decide between two main choices, i.e. either setting a carbon tax or establish a national carbon trading system, which could be in turn a stand-alone one or related with the existing European system. Finally, the vision of the main market operators on the possible effects of the current COVID19 pandemic on energetic and climate related policies, both in the short and in the medium term, have been investigated. Different risks have been pointed out but, at the same time, a unique opportunity for a more safe and cleaner future has been identified. In this perspective, it will be crucial for all policy makers to identify different economic-climate stimulus packages and keep in mind that international cooperation is crucial to face global threatens, and it can be applied to COVID-19 pandemic as well as to global warming.

Keywords: Emission Trading System, climate change, COVID-19 pandemic, GHG emissions

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1 – Introduction

1.1 International contest (Kyoto Protocol)

The climate of our planet is increasingly more variable and characterized by extreme situations. The situation appears to worsen in the coming decades, as confirmed by the most recent research carried out by experts, including those conducted by the Intergovernmental Panel on Climate Change (IPCC), the body set up by the United Nations to monitor the evolution of climate change of human origin. The international community often dealt with issues related to the overheating of our planet and, in addition to promoting scientific studies on the subject, many international organizations, leaded by the United Nations, tried to raise awareness of the problem among States, especially the most industrialized, by seeking to involve them in a shared fight against global warming.

This process, coupled with a growing social interest about environmental issues, officially began in Rio de Janeiro in 1992, where the first World Conference of Heads of State on the Environment was held and attended by 172 governments. Later, in December 1997, 180 industrialised and developing countries signed a treaty that required them to reduce, in the period 2008-2012, not less than 8.65% of the GHG emissions measured in 1985. Overcoming for the first time the classic command and control approach, the Protocol provided the parties with considerable autonomy in how to achieve the set objectives, also indicating for the first time the emission trading system as the main tool to reach the goal, on which the following discussion will be focused.

The emission trading system regulates in particular the possibility of exchanging, among industrialized countries, the allowances (rights to emit) assigned to them. In this way, companies whose cost structure makes it economically viable to reduce polluting emissions have the opportunity to sell pollution permits to companies which, on the other hand, have higher abatement costs. Kyoto Protocol had two main merits: first of all, it consecrated the centrality of the environmental problem in the international schemes, and then introduced a new approach (the so-called “cap and trade”) laying down the basis for the creation of national and continental carbon markets.

1.2 European Union post-2020 climate policy goals

The 2020-Climate-Energy package is a set of binding rules to ensure that the EU meets its climate and energy targets by 2020, with the ultimate goal of limiting worldwide the rise in average temperature to no more than 2ºC levels of the pre-industrial period (as stated in the Paris Climate Conference - COP21 - which took place in December 2015).

In particular, the Climate-Energy package, also referred to as the “20-20-20" targets, set three ambitious targets for the European Union to be achieved by 2020:

- a reduction in EU greenhouse gas emissions of at least 20% below 1990 levels
- 20% of EU energy consumption to come from renewable resources
- a 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.

The 20-20-20 Package entered into force in June 2009, replacing the Kyoto Protocol which was going to expire at the end of 2012. The period of validity of the Package starts in January 2013 and ends in December 2020. The achievement of these targets by 2020 should contribute to strengthen energy security, while reducing dependence on imported energy, as well as increasing the number of jobs and boosting green growth.

The main points of the Package are the following:

• implementation of the GHG emission allowance trading scheme (ETS) (Directive 2009/29/EC) for large installations of energy, industry and aviation sectors,

• sharing among Member States the actions to be taken (legislation on “sharing efforts”) to reduce unilaterally GHG emissions in sectors not covered by the EU ET System, such as transport, construction, services, small industrial plants, agriculture and waste

• increase percentage of energy produced by renewable sources (Directive 2009/28/EC), leaving the possibility to Member States to adopt different solutions, with the aim to boost the use of renewable energy.

• Regulation on the capture and storage of CO_2 (Directive 2009/31/EC) which aims to establish harmonised standards for the safe storage of CO_2 in geological sinks (and thus reduce the stock emitted into the atmosphere).

1.3 Future energy and climate policies (2030 and 2050) in the EU

European leaders already agreed on an 80-95% greenhouse gas reduction target by 2050 compared to 1990 levels, aiming to become carbon neutral by that date and to keep climate change below 2°C.

With this goal in mind, the European Commission agreed and published a roadmap to achieve a low-carbon economy by 2050. A major milestone in this process of decarbonisation by 2050 is the document "*A policy framework for climate and energy in the period from 2020 to 2030*" proposed on 21 January 2014 and approved by the Commission in October of the same year, which aims to address a number of issues, such as high energy prices and the vulnerability of the European economy to future price increases (especially for oil and gas), its dependence on energy imports (often from politically unstable regions), the need to replace and upgrade energy infrastructure and provide a stable regulatory framework for potential investors.

On the practical side, the following objectives have been set by 2030:

- a binding EU-wide target of reducing GHG emissions by at least 40% compared to 1990 levels;
- a binding EU-wide renewable energy consumption target of at least 27% (then revised upwards to 32% in 2018),
- an indicative EU-wide target of improving energy efficiency by at least 27%, then revised upwards to 32.5% in 2018.

Concerning the European Emissions Trading Scheme (EU ETS), its goal is to play a key-role in promoting decarbonisation in different sectors, like energy production. This system already provided for a reduction of annual GHG emission of 1.74% after 2020, with an intermediate evaluation in 2025. The overall GHG emissions reduction target of 40% set in the proposal for 2030 provides for an overall reduction of emissions falling within the scope of the European Emission Trading System of 43% compared to 2005, which is equivalent to a linear yearly emission reduction of 2.2% after 2020 (for this reason the ETS has been revised for the period after 2020).

Climate and energy issues recently entered on top of the program of the new European Commission directed by Ursula Von der Leyen, the so-called "European Green New Deal": its main policies and measures are outlined in the EU Communication - *COM(2019) 640 final* - of 11 December 2019. With this Communication, the Commission makes its climate objectives more ambitious, as one of the basis for the development of deeply transformative policies for the implementation of the Green Deal, within the target of decarbonisation by 2050, and establishing by 2021 the implementation of a plan aiming to raise the target of reducing GHG emissions by 2030 from the current -40% to a much more ambitious level of -50/-55%.

2 – THE EUROPEAN EMISSION TRADING SYSTEM

2.1 The cap & trade system

As already mentioned, the Kyoto Protocol provided a set legally binding GHG reduction targets, or "caps", for the period 2008-2012, and this required the development of policy instruments suitable to meet these commitments. In March 2000, the European Commission presented a Green Paper on GHG emissions trading system within the European Union. It posed the basis for several stakeholder discussions, which helped to mould the EU ETS in its first stage. This led to the adoption of Directive 2003/87/EC (which entered into force on October 25, 2003) and to the introduction of the EU ETS 2005.

The EU ETS is the first, and still the largest, emissions trading system in the world, and is now operating in 31 countries (the 28 of EU plus Iceland, Liechtenstein and Norway). This system limits emissions produced by more than 11.000 energy-intensive plants and airlines operating in the European Economic Area (EEA), and covering approximately 39 % of total greenhouse gases emissions in the EU.

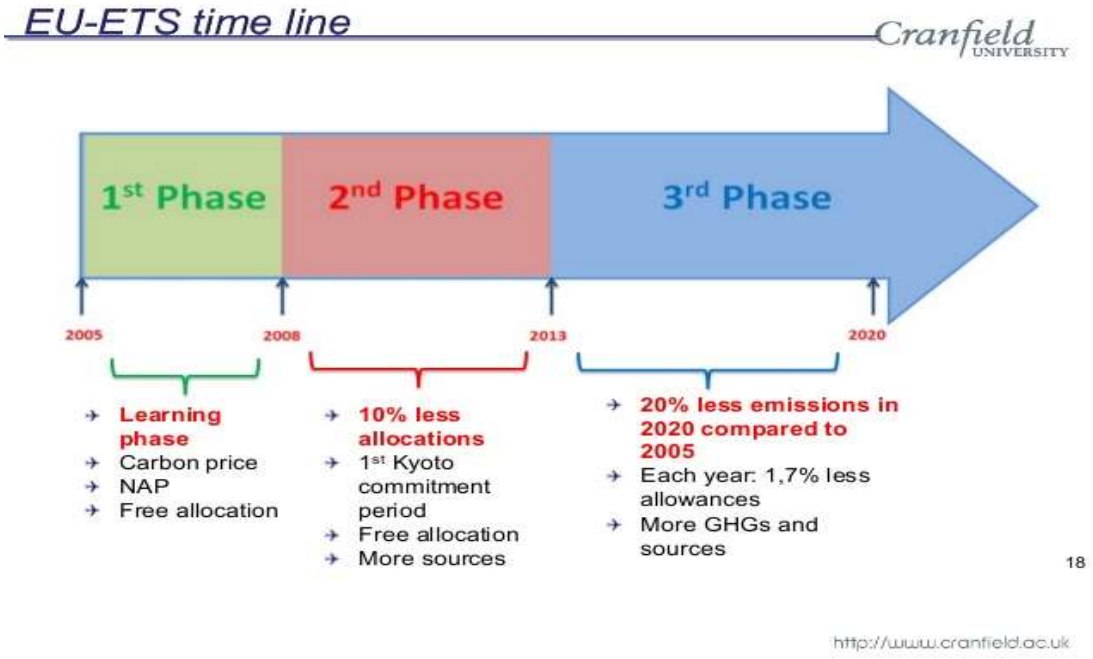
Four main benefits deriving from the use of this system have been identified:

1. Certainty of quantity: the ceiling ("cap") is assessed and defined ex-ante in order to ensure compliance with the relevant commitments;
2. Cost-effectiveness: all companies deal with the same carbon price, so that the system ensures that emissions are reduced where cost is lower;
3. Revenue: when GHG emissions allowances are auctioned, revenue is generated for the EU, in particular for individual Member States;
4. Minimize risk to Member States' budgets: as the EU ETS covers half of Community GHG emissions, the risk that Member States have to purchase additional international units to meet their commitments under the Kyoto Protocol is reduced.

The mechanism is based on an initial intervention of the public regulator, setting an adequate level of environmental quality and establishing the number of permits to be entered into the system.

Since its introduction, the EU ETS has undergone several changes and adjustments, so its implementation can be divided into distinct trading periods, known as "Phases".

Figure 1. EU ETS phases



SOURCE: http://www.cranfield.ac.uk

The first phase (2005-2007) was intended as a pilot phase, lasting three years, in which empirical steps were taken to prepare the next phase 2, when the EU ETS should have operated effectively to enable the EU to meet the Kyoto targets. It covered only CO_2 emissions deriving from energy production installations and energy-intensive industries, and almost all emission allowances were allocated to companies for free. Phase 1 managed to set a price for CO_2, introduced a free emission trading system throughout the EU and created all the infrastructure required to monitor, communicate and verify emissions from all the companies involved. Facing with the lack of reliable emissions data, in this first phase, emission caps were set on the basis of oversized estimates; this caused that the overall quantity of allowances exceeded the measured emissions and, consequently, the dramatic fall in price of allowances in 2007.

The second phase (2008-2012) corresponded with the first commitment period of the Kyoto Protocol, in which the EU countries involved in Emission Trading System had clear emission reduction targets to achieve. In this phase, Iceland, Liechtenstein and Norway joined the System, and the aviation sector was included as of January 1st, 2012. As verified annual emissions data of the previous pilot phase were available, the cap on emission allowances in phase 2 was reduced and based on actual emissions data. However, the economic downturn of 2008 resulted in a much higher emission reduction than expected. This led to a significant excess of allowances, which again affected CO_2 price throughout the whole phase 2.

2.2 Main features of Phase 3 (2013-2020)

The third phase of the EU ETS coincides with the second commitment period of the Kyoto Protocol, as agreed in Doha in December 2012, and has been significantly amended by Directive 2009/29/EC drawn up on the basis of the experiences of the two previous phases. At this phase, the scope was widened in terms of sectors and types of greenhouse gases involved in the system.

The key change, however, pertained to the harmonisation of the whole system, consisting of the provision of a single cap on emissions at EU level, replacing individual national ones, decreasing by 1.74% of the total per year until 2020, in order to reduce EU aggregate emissions by 20% from 1990 levels to that date.

A further modification, introduced to address the problems of previous phases, was the use of auctioning rather than free allocation of allowances. In addition, from this phase on, the possibility of banking (i.e. preservation of permits not used for the following phase) was provided, in order to avoid a sharp drop in the price of allowances at the end of each phase, as had previously occurred.

2.3 Phase 4 revision (2021-2030)

In July 2015, the European Commission submitted a legislative proposal to review the EU emissions trading system after 2020, and after long negotiations, the European Parliament and the Council formally supported the review in February 2018: the amended EU ETS Directive (2018/410/EC) came into force on April 8th, 2018. Within the framework of any global budget under the Paris Agreement, the provisions of the amended EU ETS Directive will be reviewed, the first appointment being set for 2023.

In order to meet the 2030 target of an overall reduction in greenhouse gas emissions, the sectors covered by the EU ETS will have to reduce their emissions by 43% compared to 2005 levels. The EU ETS Directive, as amended, which will operate during the period 2021-2030, will make it possible through a mix of interconnected measures, which I try to summarise hereafter.

First of all, the rate of emissions reduction has been expected to accelerate, with the overall amount of emission allowances decreasing from 2021 at an annual rate of 2.2% compared to the current 1.74%. Secondly, the Market Stability Reserve (MSR) - the mechanism established by the EU to reduce the surplus of emission allowances in the carbon market and to improve the EU ETS's resilience to future shocks – will be substantially reinforced: between 2019 and 2023, the amount of allowances put in the reserve will double to 24% of the allowances in circulation, and the regular feeding rate of 12% will be restored as of 2024.

With regard to the risk of CO_2 emissions transfer (known as “Carbon leakage”), the system of free allocation will be prolonged for another decade and has been revised to focus on sectors at the highest risk of relocating their production

outside of the EU, which will continue to receive 100% of their allowances for free. For less exposed sectors, free allocation is foreseen to be phased out after 2026 from a maximum of 30% to 0 at the end of phase 4 (2030). A considerable number of free allowances will be set aside for new and growing installations. Finally, several financing mechanisms aimed at reducing carbon emissions are planned to help industry and energy sectors overcome the challenges of innovation and investment in the transition to a low-carbon economy.

3 – FEATURES OF THE EUROPEAN EMISSION TRADING SYSTEM

3.1 Cap and emission allowances

As already mentioned, the European ETS is a "*cap-and-trade*" system, which operates by limiting the global greenhouse gas emissions of all participants in the system.

The European emissions trading system incorporates not only the theoretical principles of cap and trade systems, but also its procedural principles. In particular, EU ETS legislation created permits (the so-called EUA, European Union Allowance) that entitle to emit greenhouse gases equivalent to the potential global warming deriving from a ton of carbon dioxide (CO_2). The cap level determines the number of allowances available to the whole system, and is set to decline every year as of 2013, reducing the number of allowances available to companies covered by the system by 1.74% per year.

Figure 2 - Emissions cap set for the various phases of the EU ETS.

Source: EUROPEAN COMMISSION, ETS handbook, 2015

As mentioned above, this reduction rate is going to be further increased in Phase 4, at a rate of reduction of 2.2% per year until 2030.

3.2 Determining allowances allocation

Once the total coverage has been defined, allowances must be allocated to single companies falling within the scope of the system. The two main ways to allocate emission allowances in the EU ETS are the so-called "grandfathering" and "auctioning".

The grandfathering method consists of distributing allowances for free, based on historical emissions data of plants included in the program. This allocation system may pose several problems with incentive distortion. In fact, providing free allowances to plants only relying on the basis of their historical issuance, was rewarding for those plants with higher historical emissions. The EU ETS was based on the incorrect assumption that the most polluting companies were in this condition because of the size of their plants, of the sector they belong to and of other factors not related to companies themselves, regardless of their efficiency. But on closer inspection, two installations of the same sector could have different emissions, for example because of their investments in less polluting equipment, which is related to individual companies. This led to the conclusion that the grandfathering approach was likely to reward the same companies that the EU ETS wanted to penalise, i.e. inefficient ones (those polluting more than necessary), by awarding more allowances for free. Another inefficiency of grandfathering method was the perverse incentive it gave to companies; in fact, keeping in mind that the most polluting installations would receive more allowances, companies were encouraged to keep emissions at higher levels in order to obtain more allowances in the following period.

In a complementary way, and in accordance with the established maximum cap, an auction-based allocation system of allowances, known as auctioning, was implemented. Following this approach, each company makes purchase offers for tradable allowances and the regulator assigns them to the bidder auction that has put forward the highest purchase proposal. The main advantage of this approach is that, in a perfectly competitive auctioning system, the allocation of allowances is done efficiently with respect to cost and also allows to generate revenues that must be used by Member States for climate and energy-related purposes.

EU ETS Directive requires that allowances are allocated either by free or by auctioning.
In Phases 1 and 2 of the system, most of the allowances were awarded free of charge to participants, while as of Phase 3 auctioning became the default method of allocation, although free allowances are still distributed, mainly to the industry sector. For example, the energy production sector has been subject only to auction allowances as of 2013. In sectors other than energy production, the shift to auctioning takes place progressively.
A separate case, safeguarded by the Directive with 100% free allowances, is represented by sectors deemed to be exposed to the risk of relocation of CO_2 emissions (a situation in which companies transfer their production to third countries with less stringent constraints on GHG emissions, leading to a potential increase in their total emissions), the so-called "carbon leakage". This may lead to an increase in global emissions and less competitiveness for European companies; in addition, a tax that incentives affected companies to move outside the relevant jurisdiction, will bring lower tax revenues in the medium to long term and any benefit to the global environment. Finally, EU ETS legislation was also concerned with an equitable sharing among Member States of the total amount of allowances to be auctioned in the period 2013-2020, recognizing the possibility to less affluent states to place a greater amount of quotas (10% of the total) in order to provide them with an additional source of revenue and help them to invest directly in their economies and adapt to climate changes.

Under this system, and despite the aforementioned exceptions to the general rule, in 2013 more than 40% of the annual emission allowances had been auctioned, and this percentage has been increasing in the following years, as the volume of allowances allocated for free is decreasing faster than the overall emissions cap.

3.3 Auctioning and price trends

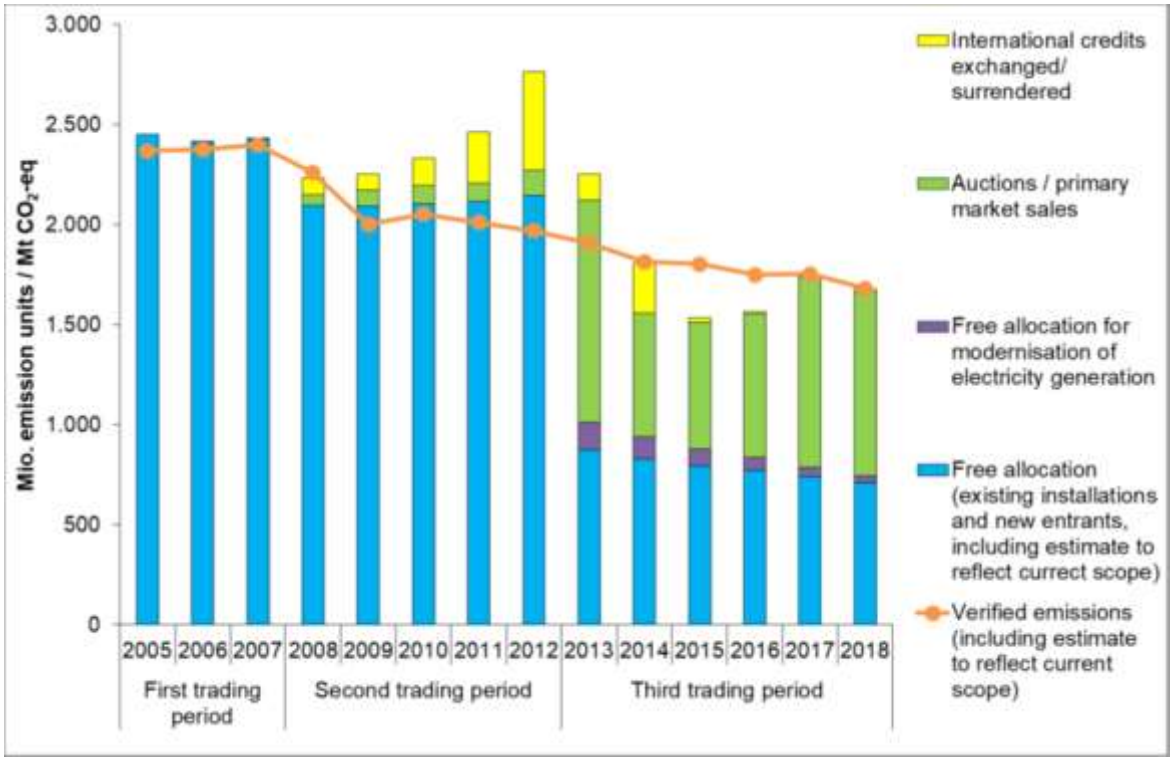
Auctioning of emission allowances is governed by the EU ETS Directive (and since 2013 also by EU Regulation 1031/2010) which covers timing, management and other aspects of allowances auctioning, in order to ensure predictability, cost-efficiency, fair access to auctions, simultaneous access to information for all operators, thus putting into practice the "polluter pays" principle.

Since Phase 3, the main deal of allowances takes place on a common platform, the European Energy Exchange AG (EEX) based in Leipzig, while Germany, Poland and the United Kingdom have chosen to have their own auction platforms. Today, the European Energy Exchange AG (EEX) is the transitional common auction platform for the 25 Member States (as well as Norway, Liechtenstein and Iceland, and provisionally for Poland) and is also, separately, the auction platform for Germany (EEX-DE). The UK operates on ICE Futures Europe (ICE UK) based in London, which has been inactive since the end of 2018 due to the evolution of Brexit.

3.4 Bid-ask of allowances and impact on clearing prices

During every year of Phase 1 (2005-2007), verified emissions were slightly less than the total amount of allowances allocated (mainly free of charge) by governments (Picture 3). The price of allowances reached a maximum of around €. 30 for European Union Allowances (EUA) (Picture 4), but this occurred before the publication of the data of verified emissions in April 2006, which made it clear that the number of allowances available to EU ETS operators was higher than necessary to cover verified emissions, and that this would last until the end of the first trading period. As a result, the price of the allowances fell sharply and remained close to zero until the end of 2007, due to the inability to use remaining permits in phase 2 (which would have started the following year).

Figure 3. - Balance between supply and demand for fixed plants, 2005-2018



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

Once stricter caps were set for Phase 2 of the system, verified emissions exceeded the availability of allowances in 2008, which brought the price back to around 20 €/EUA. However, after 2008, activities included in the EU ETS were severely affected by the economic downturn, with the result that the supply of allowances exceeded again verified emissions between 2009 and 2012. Considering that the system provided for the rigidity of allowances supply (as determined by a cap defined ex-ante with respect to the phase considered), it was not possible to adjust it to the demand shock, resulting in a surplus of accumulated allowances (the difference between the allowances issued and the verified emissions) and a consequent collapse in prices. This put further downward pressure on allowances prices, which fell to around 7 €/EUA at the end of the second trading period. In addition, the number of allowances available to operators was further increased with the use of international credits (units permits to pollute according to the international CDM and JI programs respectively), particularly between 2010 and 2012, as many of them could no longer be used in the third trading period. As a result, once again, international allowances were traded at less than 1 €/unit at the end of the second trading period (Picture 4).

Figure 4. - Price trends for allowances, years 2005-2018

Source: Eionet Report - ETC/CME 3/2019 December 2019 - Trends and projections in the EU ETS in 2019. Data: Point Carbon (2012); EEX (2019); ICE (2019).

At the beginning of the third trading period, the quantity of verified emissions continued to exceed the availability of allowances, as the system was characterised by a strong structural imbalance between demand and supply of emission allowances (about 2.1 billion allowances). The surplus decreased during the current trading period, remaining stable in 2014 and then fell significantly to 1.78 billion allowances in 2015, to 1.69 billion in 2016 and to 1.65 billion in 2017. In 2018, the surplus remained stable at 1.65 billion allowances. Because of that, between 2014 and 2016, the EU legislator "backloaded" quotas (a postponement of the total amount of allowances to be auctioned in a given year), resulting in an impact on the balance between demand and supply, reducing the number of quotas available to operators and, as a result, the price of allowances gradually began to rise. The sharp reduction in the use of international credits also helped to further reduce the supply of allowances, as emission reductions from the first commitment period of the Kyoto Protocol (2008-2012) could no longer be used as of 2015.

Following EU ETS Directive amendments for Phase 4, the price of quotas rose rapidly in 2018 and by the end of December 2018 had already exceeded 20 €/EUA. This price increase reflects in part the expectation that allowances supply will be reduced through:

- the expected increase in the linear reduction factor from 1.74% to 2.2% of the cap on the number of allowances issued as of 2021 and
- the Market Stability Reserve (MSR), created in 2015 but operating since 2019, will withdraw the excess allowances in circulation from 2019 onwards faster than initially proposed, and that, as of 2023, allowances held in the MRS exceeding the volume of auctions of the previous year will lose their validity.

Figure 5. - Price trends for allowances, from January 1st to July 1st, 2020.

Source: EEX

Over the past two years, allowances prices have stabilised at around 25 €/EUA, nearing the all-time-high of 30 €/EUA on July 25th, 2019. In early 2020 (Fig. 5), due to the present pandemic emergency and the following economic crisis, carbon price, after a sell-off in the first half of March with the price falling from about 25 to 15 €/EUA, have recovered to around 25 € in May and reached 28 €/EUA at the beginning of July (2020 year-high).

4 - EFFECTS OF THE LATEST EVENTS ON ETS AND THE NEW APPROACH TO CLIMATE CHANGE

4.1 Brexit: new perspectives for emission trading in Europe?

Currently, while the EU ETS is gearing up for the transition to Phase 4 (2021 to 2030), a new problem has just occurred, the UK's withdrawal from the EU, which inevitably will entail changes in how the emission market operates. The UK plays an essential role in the EU ETS, with a national register of about one thousand entries, and London has always been an important node in the allowance trading system in Europe along with Germany, Denmark, the Netherlands, and France. It is not still clear what the UK's post-Brexit climate policy will look like. The only thing London and Brussels have managed to coordinate to date is a decision on a transitional period: the UK and its emitters will remain committed to the EU ETS at least until December 31, 2020, which means that they will be included in the whole Phase 3 reporting period. Beyond that, the outlook is still rather obscure. The UK may choose to impose a national carbon tax or create an allowance trading system of its own, which will either remain independent or could be linked with the European emission market (or possibly with some other market, even if it seems rather unlikely). The first two cases would mean a total break with the EU, because an important new feature of Phase 4 is the end of offset allowances. This means that the emission allowances obtained outside of the ETS countries cannot be counted toward post-2020 emission reduction commitments.

Following a consultation period, which saw over 130 responses from a range of stakeholders comment on the proposal, the UK Government issued a first new proposal (published at the beginning of June this year) showing how a new UK-wide Emissions Trading System would work, i.e. putting a cost on carbon pollution to encourage polluters to reduce the amount of greenhouse gases emitted. The system, designed by the UK Government jointly with the Scottish, Welsh and Northern Ireland Governments, would be a crucial step towards achieving the UK's target for net zero carbon emissions by 2050. It includes plans to reduce the existing emissions cap by 5%, going further than the current EU system. UK intends to establish a UK Emissions Trading System with Phase I running from 2021-2030, which could operate as either a linked or standalone system, open to consider a link with the EU ETS (as Switzerland has done with its ETS), "if it suited both sides' interests". In the latter case, an auction reserve price of UK£.15 would be introduced to ensure a "minimum level of ambition and price continuity". Later this year the UK Government intends to publish a consultation on the design of a Carbon Emission Tax as an alternative to a UK ETS, to ensure that carbon price remains in place in all scenarios. An initial review of the UK ETS is planned to be conducted from 2023 to assess whole system performance during the first half of the phase (2021-2025) with any necessary changes to design features implemented by 2026; a full review from 2028 onwards to assess whole system performance across all of Phase I (2021-2030) with any update to the UK ETS rules implemented for 2031 (Phase II). These reviews are aligned with the EU ETS Phase 4 reviews and Paris Agreement.

As the United Kingdom has an environmental policy more restrictive than the average of the European countries, its exit from EU ETS could therefore weaken the European environmental policies. At the same time, however, European Union has established an automatic adjustment mechanism to address any imbalances in the emissions market between supply and demand, such as those that could result from the UK's exit: the system could cope with a possible hard Brexit without any major price shock and therefore without any loss of effectiveness. On the contrary, the system could even be more homogeneous, facilitating the decision-making process and increasing the centrality of other countries, with important possible socio-political impacts linked to the urgency of achieving the sustainability objectives set out in the Paris agreements. By all evidence, a hard Brexit is likely to increase UK spending on climate policy, but could positively influence the same indicator for the remaining EU members. It looks hard to predict the consequences in case UK should create its own emission market and link it to the European one. London is yet to make a final decision and so it is still premature to talk about the potential market's design. However, if things go right, the players may even fail to notice the effects of Brexit, with the linked EU and UK markets (if they are created on the ETS model) functioning as though the EU and the UK had never parted ways.

The allowances held in the UK right could now represent another problem. Lacking clarity regarding the future market system, UK companies that have no partner businesses in the EU may prefer to get rid of surplus allowances rather than keep them in the hope that they will be accepted in a national system, if one is ever created. This could inevitably affect supply and demand in the ETS that is already dealing with the problem of excessive allowances and the need to stabilise prices.

The present unfavorable international sanitary situation is not making things easier. However urgent the challenge of climate change, the international community has been consumed for months fighting against the COVID-19 pandemic.

The United Nations had to cancel or postpone several climate-related events, while EU climate policy lawmaking has slowed down, meetings are being postponed where possible. One thing is clear: it will still take time to address all the issues related to the future of the European emission market and the UK's role in it.

4.2 COVID-19 pandemic: possible effects on climate policy and carbon markets in the opinion of market operators

COVID-19 pandemic is having a dramatic impact on economic activities worldwide. This has in turn direct and indirect effects on greenhouse gas emissions and global warming, from a direct and immediate effect on emissions due to the fall in production and traffic volumes which drastically reduces emissions, to indirect effects on emissions which could run in the opposite direction, especially in the medium run.

As the uncertainty surrounding public health, the economy and then energy over the rest of 2020 is unprecedented, some important organisations, institutions and consulting companies are presently studying the economic situation to date, analysing available data, guessing a possible path for energy use and CO_2 emissions in 2020, as well as highlighting all the factors that could lead to differing outcomes, drawing key lessons on how to navigate this crisis. In the present section I investigate and report the opinion and related outlook on the evolution of the COVID-19 economic crisis related to energy and climate change issues, as expected by some important international players, such as the International Energy Agency (IEA), Deloitte and KPMG.

In response to the exceptional circumstances deriving from the coronavirus pandemic, the annual global energy review, published by IEA at the end of April 2020, expanded its coverage to include real-time analysis of developments and possible directions for the rest of the year. As a consequence of the efforts to slow the spread of the virus, it was observed that the share of energy use that was exposed to containment measures jumped at a global scale from 5% in mid-March to 50% in mid-April. In May several European countries and the U.S. have reopened parts of the economy, so April is likely to be the hardest hit month. Beyond the immediate impact on health, the current crisis has major implications for global economies, energy use and CO_2 emissions. Global CO_2 emissions are expected to decline by 8%, or almost 2.6 gigatonnes, to levels of 10 years ago. Such a year-on-year reduction would be the largest ever, six times larger than the previous record reduction of 0.4 Gt in 2009 – caused by the global financial crisis – and twice as large as the combined total of all previous reductions since the end of World War II (Pictures 8a and 8b).

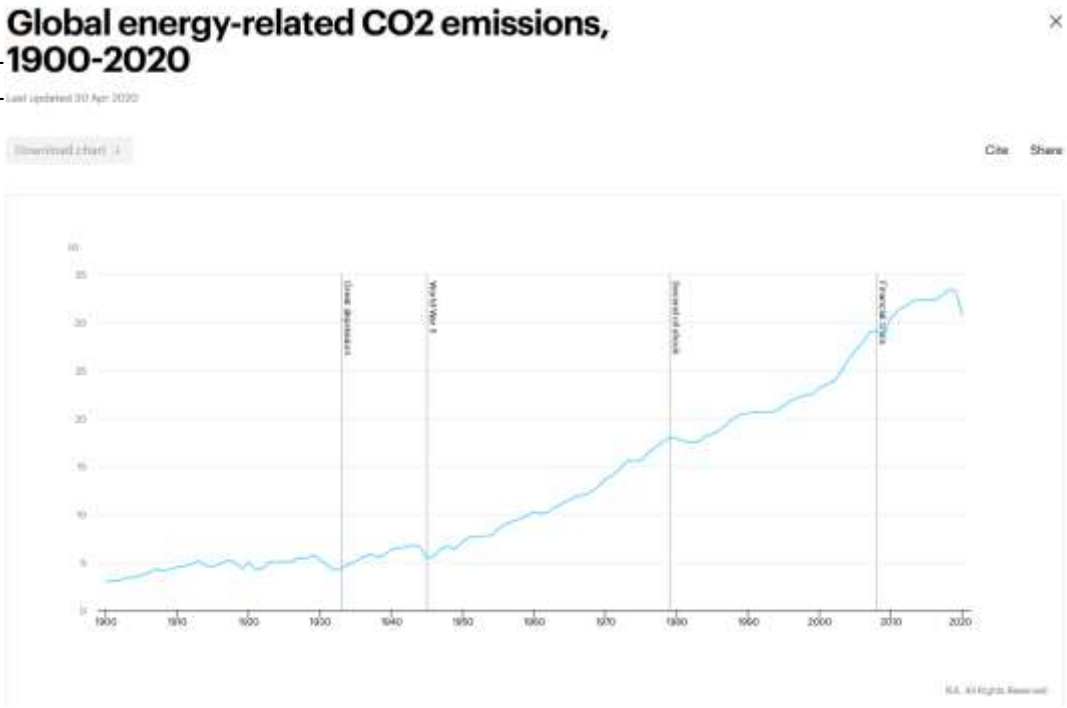
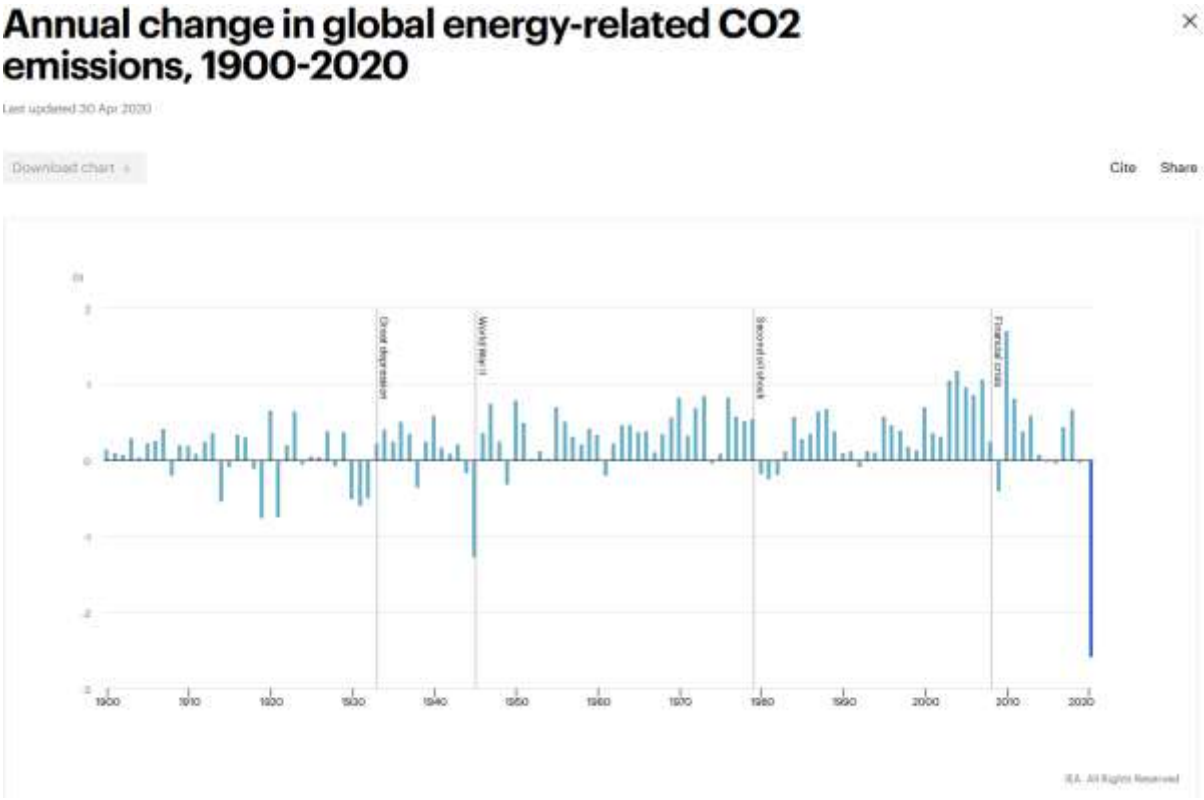


Figure 8A. Global energy-related CO_2 emissions, 1900-2020

Source: IEA Paris https://www.iea.org/data-and-statistics/charts/annual-change-in-global-energy-related-co2-emissions-1900-2020

Figure 8B. Annual change in global energy-related CO_2 emissions, 1900-2020



Source:
IEA, Paris https://www.iea.org/data-and-statistics/charts/global-energy-related-co2-emissions-1900-2020

The COVID-19 crisis and measures taken to slow its spread had a profound impact on energy demand. The full impact of the current situation, as yet unknown, will be determined by the duration of lockdown measures and the recovery paths taken around the world. This unprecedented situation and the stimulus packages that governments are putting and will put in place will impact the energy sector for the next years, with significant consequences for the energy industry, energy security and clean energy transitions.

The energy industry is feeling the financial impact throughout value chains: a combination of cheap energetic resources and weakening demand have also led to power prices declining by one-third to one-half in liberalised wholesale markets, with market prices for electricity dipping below zero in the United States and a number of countries in Europe. Low prices and low demand in all subsectors are likely to leave energy companies with weakened financial positions and often strained balance sheets, and the energy sector emerging after COVID-19 crisis may look significantly different from what it was before.

Moreover, the Report stresses the fact that COVID-19 crisis is likely to have a significant impact on investment, raising concern about energy security because investment is necessary even if global energy demand takes a long time to return to the pre-crisis trajectory. Electricity security's place at the heart of modern economies has been underscored by the COVID19 crisis, as a robust, uninterrupted electricity supply is a key precondition of both the functioning of the health care system and the maintenance of social welfare and online economic activity. Reliable power systems have enabled adaptations to the ongoing crisis, including a huge expansion of teleworking activities, particularly in advanced economies. In some parts of the world (Africa and South Asia), however, a reliable supply cannot be granted.

COVID-19 crisis is believed to have also accelerated the shift to renewable energy in the power mix, impulsing renewables (notably wind and solar) years ahead from pre-pandemic expectations, thus curbing CO_2 emissions and air pollution. Again, the expected rise of renewables has posed some problems for electricity security. In advanced economies, the main cause of blackouts is the inability of the system to manage sudden changes in power flows and various network problems. Lower electricity demand together with continued growth of renewables will require more flexibility to keep the lights on, with available flexibility limited because dispatchable power plants are idle because

power prices are extremely low. To date, electricity systems in major economies have maintained robust reliability, but continuous vigilance is believed to be needed from system operators, regulators and governments.

Finally, it is believed that COVID-19 crisis is likely to influence the path for clean energy transitions. Global CO_2 emissions are set for the largest year-to-year reduction to date, but a sustainable energy pathway requires continuous efforts and commitment. The unprecedented decline in emissions in 2020 could be only temporary without structural changes, and recoveries from past crises have caused immediate rebounds in CO_2 emissions, including the highest year-on-year increase on record in 2010. Governments are now going to play a major role in shaping the energy sector's recovery from the COVID-19 crisis. In particular, the design of economic stimulus packages presents a major opportunity for policy makers to link economic recovery efforts with clean energy transitions, steering the energy system into a more sustainable path. While the clean energy transitions and stimulus discussions are gathering momentum, a co-ordinated policy effort is now required to harvest its opportunities and lead to a more modern, cleaner and more resilient energy sector for all.

Within Deloitte website, several recent articles such as *"Climate in crisis. Will a pandemic change our approach to climate change?"* written by P. Kalbarczyk, K. Średzińska, R. Rudzki, and *"Navigating the energy transition from disruption to growth"* by S.E.Porter and K.Hardin concerning energetic and climatic consequences due to the present pandemic situation can be found, with the main results summarised as follows. It is interesting to note that Deloitte analysis is mainly and typically based upon its privileged view, provided by the opinion of executives and CEOs of private companies which are periodically surveyed.

Generally speaking, it is believed that to date policy has proven an effective tool in curbing carbon emissions, and this policy focus is expected to continue in both the short and longer term, particularly in areas such as Europe, China, and certain US states where policy has already laid a strong foundation for the energy transition. However, there are indicators to watch as to how policy tools will be deployed during and immediately after the COVID-19 crisis. First, priority may be given to economic stimulus and social safety nets, potentially delaying decarbonization initiatives. For example, the planned November Conference of Parties (COP 26) was canceled due to lack of time for participants to prepare, given their focus on near-term issues. Similarly, because emissions are declining due to the economic slowdown, this could induce policymakers to loosen emissions-related policies. The massive pressure to jumpstart economy may now cause that companies and countries will be tempted to disregard good practices, recommendations and laws on environmental protection. Low prices of raw materials may encourage market players to use fossil fuels and postpone investments in the energy sector, which in turn will trigger a risk that transition to more sustainable economies will be put aside for a time. The focus will be on getting the economy back on its feet, and climate and environmental issues are likely to be given a lower level of priority.

Long-term focus on reducing carbon emissions does not seem to have been reversed by the current economic downturn. The renewables market has experienced a short-term boost, as volatility in other commodity markets seems to have made renewables more attractive due to their comparatively low-risk and stable yield. So, while the economic downturn could potentially reduce funding for lower-carbon projects and investments, customer and shareholder focus on the energy transition as a way to address environmental issues are believed to continue.

As resulted from Deloitte survey results, detailing the scale of strategy plans in place of an important panel of worldwide corporates, energy transition is expected to remain a strategic priority for energy and industrial companies in the longer term. From a company perspective, decarbonisation efforts can deliver benefits such as reduced costs, enhanced customer loyalty, and increased competitiveness. The strong board-level support for the energy transition illustrates the commitment to these strategies. As meeting reduction targets affects board and/or executive compensation and the key benefit achieved from CEOs' plans for a lower-carbon future was to improve the environment, it suggests that company leaders are keenly aware of market sentiment toward addressing environmental issues through the energy transition. An important question is whether company executives will be able to maintain the momentum of their low-carbon plans in the short term, given the difficult questions facing management about immediate priorities. However, the longer-term commitment to addressing carbon emissions and expediting the energy transition is unlikely to be reversed, particularly in areas where substantial progress has already been made. For example, the power and utilities sector will likely continue to move toward decarbonisation as the costs for renewable energy further decline.

The economic recovery strategy that is suggested to be adopted once the COVID-19 crisis is over, is especially important. Programs such as the European Green Deal, announced in December 2019 by the President of the E.U. Commission

Ursula Von der Leyen, could provide a basis for sustainable economic recovery. Initiatives to promote the spread of clean technologies, a closed-loop economy, use of renewable energy sources, increased energy and material efficiency and green public procurement are favorable to the search for innovations that create added-value and new jobs. Moreover, the crisis may help to raise public awareness of the current consumption models, the restriction of which has strongly reduced pollutant emissions. If the basic environmental safety aspects are taken into account by consumers in their choices, it may have a long-term impact on the supply side. Consequently, the economy may undergo a positive qualitative change.

The opinion of the last international player investigated (KPMG), was found in an article written by Mike Hayes "*COVID-19: What does it mean for climate change*?", where a number of interesting similarities between COVID-19 pandemic and climate change issues are listed and discussed.

According to the author, there are already significant questions about what the pandemic may represent for the fight against climate change, once the immediate danger to public health will be (hopefully) over. An easy assumption is that COVID-19 may confine the climate agenda on the background for some years, mainly due to the resulting financial issues and the rapidly declining price of oil. In reality, the two issues of COVID-19 and climate change are much more complex and interrelated: each represents a massive global challenge requiring unprecedented coordination where economic considerations become secondary, in both cases a positive outcome requires very relevant capital investment by public and private sector, both are global public health issues, COVID-19 immediately and climate change ultimately leading to diseases that peak in the warmer months of the year (in this respect the World Health Organization estimates that between 2030 and 2050, climate change will cause approximately 250.000 additional deaths per year from malnutrition, malaria, and heat stress). Finally, both represent not just a physical risk, but a fundamental risk to the financial systems as well.

KPMG predicts and wishes that all levels of our society will be able to elevate their response to climate change, following on their experience and lessons learned from responding to the immediate threat of COVID-19. The main implications could include the following:

1 - Lower carbon emissions: as people are now accustoming to a new, more stationary working situation and technological solutions allowing easier work from home, this could lead to reduction of travel and less commuting, producing in turn a decrease in carbon emissions;

2 - Continued corporate decarbonization: corporates that recently embraced the climate change agenda may take a step back in the short term, given the impending economic slowdown and the need to cut back on any expenditure that is not business-critical. However, climate change continues to pose a long-term risk to shareholder value, and the issue is likely to resurface quickly;

3 - Greater government action: governments and institutions, such as the European Union and the United Nations, after having acted to mitigate the impact of COVID-19, may leverage their experience to better prepare for the impact of climate change. This is where KPMG sees the greatest opportunity for change. As governments are putting in place various forms of stimulus packages around the world to improve healthcare and address COVID-19-related job losses, consideration may be given to some spending on building infrastructure for climate resilience, such as strengthening electrical grids;

4 - Increased demand for renewable energy: the current situation is likely to cause significant short-term problems for many renewable developers, mainly because of the fall in energy demand and in oil prices. Moreover, access to capital could become much more challenging in the near term, and it is likely to see major utilities to looking to acquire smaller and cash-constrained developers. However, renewable energies are believed to become a greater part of the energy mix over the next 20 years, and ultimately a critical solution in delivering a net-zero future;

5 - Persistent public focus on climate change: once global citizens experience and understand the actions that they, their governments and organizations must take to protect public health, they may turn to demanding and expecting similar urgency and action to achieve a net-zero future. Moreover, the climate change agenda is nowadays more advanced and accepted globally than it was during the financial crisis of 2008.

In conclusion, Mike Hayes believes that, after short-term adverse economic consequences from the pandemic, the climate issue is likely to come back to the forefront, and possibly even join healthcare at the top of the global geopolitical agenda.

Despite the different approaches, the vision of the present and future situation about the evolution of policies concerning climate change and CO_2 emissions are quite similar. Different risks have been identified in the short and the medium term,

but a unique opportunity in acting to achieve a net-zero future is glimpsed at the same time. All the key-points can be finally summarised as follows.

The COVID-19 pandemic is having a dramatic impact on economic activities worldwide, and this lead both direct and indirect effects on greenhouse gas emissions and global warming. On the one hand, the current pandemic has a direct and immediate effect on emissions, drastically reduced because of the fall in production and traffic volumes. On the other hand, COVID-19 might have multiple indirect effects on emissions which could run in the opposite direction, especially in the medium run. In the first place, the deep economic recession which is already affecting the world economy could slow down the technological progress that is needed to progress along a low-carbon economic path. In the second place, the economic recession obviously has an important impact also on carbon markets: the fall in production brings a sharp decrease in the demand of emission allowances, which causes in turn a reduction in the allowance prices, and thus also in the incentive to invest in cleaner technologies. Finally, the health emergency is already hindering international negotiations on emissions reduction and on the rulebook for international emissions trading to be agreed under the climate pact. Moreover, climate issues can nowadays be considered well-structured within global corporates mission and in the environmental consciousness of a large number of consumers in developed countries, as well as renewable energy sources are showing to be much more resilient to external shocks compared to past years.

Conclusions

While all world's efforts are now reasonably devoted in finding a way out of the health emergency, it should then be important to start thinking about the future economic and climate policy packages that will be needed once the health crisis is over. Any crisis brings also an opportunity to re-consider the existing paradigm. As Kåberger and Sterner have pointed out, "*the present crisis brings the opportunity to carry out a Schumpeterian process of creative destruction that restructures our economies towards a more sustainable path*". In this perspective, all operators and stakeholders in the sector consider important and strategic to identify as soon as possible every kind of suitable economic-climate package which may relaunch clean investments and adequate climate policies.

As in any crisis, there are lessons to be learned. The main lesson, in this case, is that international cooperation is crucial to face global threatens, and it applies to COVID-19 as well as to global warming.

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