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The social value of mitigation activities

Key messages and recommendations

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APPROACH, FINDINGS, USES
KEY MESSAGES AND RECOMMENDATIONS

By the 2015 Paris Agreement, the Signatory States have set themselves the collective ambition of achieving carbon neutrality – which is to say, a balance between greenhouse gas emissions by sources and removals by carbon sinks. The Intergovernmental Panel on Climate Change (IPCC) has recently confirmed that this objective is necessary if we are to keep temperature rise to below 2°C.

To contribute to the global response this calls for, in its Climate Plan of July 2017 France has set itself the goal of "net zero greenhouse gas emissions" (Net-Zero) by 2050, with residual gross emissions to be absorbed by carbon sinks – which include forests, grasslands and, further down the road, carbon capture and storage technology. This is a more ambitious goal than the "factor 4" (75% fewer emissions) enshrined in French legislation back in 2005. Efforts to reduce greenhouse gas emissions must therefore be stepped up imminently, as we are not on the right track.

To select the relevant measures, they should be valued in socioeconomic terms, i.e. in terms of their worth to the community. Specifically, the social value of mitigation activities (which is known as the shadow price of carbon in socioeconomic jargon) is the value that the community attaches to measures aimed at avoiding the emission of one ton of CO_2e.

Valuation of measures for tackling climate change has traditionally been practiced for the socioeconomic assessment of public investments. But such assessment would be worth extending to encompass all possible measures for setting the right priorities, encouraging meaningful action and sequencing this over time.

In 2008, an initial commission had outlined a trajectory for the shadow price of carbon. Ten years later, this work now needs updating: the climate policy objectives have factored in the worldwide delay in reducing greenhouse gas emissions and the need to strengthen the response: the technological opportunities for addressing the climate challenge and way forward in terms of international cooperation have become clearer, even if there is still much to be done.

A SOCIAL VALUE OF MITIGATION ACTIVITIES GROUNDED IN THE PARIS AGREEMENT AND FRANCE'S PLEDGES

Several approaches may be harnessed in determining a social value of mitigation activities. The first, known as the cost-benefit approach, entails identifying the value of carbon which equalizes the marginal cost of damage linked to the emission of one ton of CO_2e and the marginal cost of reducing said damage. This approach, inspired by the landmark research by Arthur Pigou on externalities, was applied from William Nordhaus' initial work on the climate, and then adopted in the Stern report (2006) in particular. It leads to a calculation at global level of the damage that humanity will have to endure on account of the increasing concentrations in greenhouse gases – irrespective of the country producing the emission and the location of the damage.

This commission's so-called cost-effectiveness approach is complementary to that method. It involves identifying the value of one ton of CO_2e avoided, to be taken on board in all economic stakeholders' decisions and so ensure that France achieves carbon neutrality[1] by 2050. Compared with a cost-benefit approach, this method gets round the uncertainties over the assessment of damage – on the basis of a legitimate objective reflecting collective preferences. The shadow price thus defined represents the value for society of measures aimed at reducing greenhouse gas emissions in line with the neutrality goal.

To conduct this approach, the commission began by characterizing the scope of France's pledges with a view to charting a relevant shadow price trajectory.

First, the goal in terms of net emission flows

The climate externality is a stock externality, to do with the level of concentration of greenhouse gases in the atmosphere. This is why consideration of this externality is expressed in terms of the carbon budget, i.e. of a limit of cumulative CO_2e emissions over time that must not be exceeded if we are to avoid temperatures rising further. The fifth IPCC report published in 2013 and 2014 showed that without specific efforts to reduce emissions, the global carbon budget to keep global warming below 2°C would be spent by the middle of the century.

The rapid shrinking of global carbon budgets is now leading to the stock objectives – responsible management of a multi-year carbon budget – being rounded off with flow objectives: a "net-zero" objective regarding human-driven greenhouse gas emissions. This net emission flow approach is now the norm:

— it is the reference for the 2015 Paris Agreement, whose approach is grounded in the work of the IPCC;

— it is the reference for the IPCC's special report on the impacts of global warming of 1.5°C published in October 2018;

— it is the reference that France and several other – particularly European – countries have adopted (Norway, Sweden, Portugal and Spain among them). In France's case, the residual emissions emitted up to "net zero emissions" remain consistent with a carbon budget defined on the basis of our share in global emissions.[2]

Then, the time scale

France has set its sights on achieving carbon neutrality by 2050 – without waiting for the second half of the 21st century. This time scale is in line with the Paris Agreement, which urges the developed nations to take swift action. It factors in the need for early action to "phase out oil" and so as not to be caught off-guard should bad news come to pass. Finally, it addresses a concern for international fairness in the fight against climate change.

The "Net-Zero" goal for 2050 must obviously be interpreted as a goal to be upheld over the long-term – throughout the latter half of the century – which implies a sustainable decoupling of greenhouse gas emissions from GDP.

1. The commonly used term "carbon" neutrality refers to a neutrality aim as far as all greenhouse gas emissions are concerned.
2. Notwithstanding, therefore, the way in which the carbon budgets might be distributed between countries.

And finally, decoupling emissions from GDP

France is striving to map out a way forward where the move to carbon neutrality can be achieved without undermining growth. Aiming for a 2050 emissions target by restricting GDP would be costly – in terms of jobs and spending power – and ineffective on the climate front if this were to be associated with "carbon leakage", i.e. transferring production to countries with weaker climate ambitions, owing to losses in competitiveness.

The approach adopted thus meets two requirements: managing to decarbonize the economy by reducing greenhouse gas (GHG) emissions per unit of GDP; and investing to that end in energy efficiency and carbon-free technology.

This decoupling between emissions and GDP is already in progress: since 1990, GHG emissions in France have fallen by 16% while GDP has risen by nearly 50%. This is partly the result of efforts to make our electricity mix greener as well as energy saving efforts which are already beginning to pay off. The challenge now is to ramp up this decoupling over the next three decades, which calls for a considerable drive in terms of investment and changing our behavior.

VALUING MITIGATION ACTIVITIES BASED ON THE VERY BEST STATE-OF-THE-ART

The fact is that no "turnkey" simulation tool currently exists for automatically generating a social value of mitigation activities. The commission puts forward a reasonable estimation based on the very best state-of-the-art, hinging on three key ingredients.

Ingredient no. 1: economic literature addressing the central question of distributing decarbonization efforts over time

With respect to managing a "carbon budget", an emissions and shadow price of carbon trajectory is recommended that enables compliance with the upper emissions limit at the least economic and social cost. In this context, the value of the shadow price of carbon must make it possible to honor the national pledge: its growth rate must lead to an effective distribution of efforts over time. In its basic version, the Hotelling rule recommends that the carbon value grow at the public discount rate – so a discounted shadow price that remains constant over time: provided that, from a starting point that is high enough to guarantee adequate total effort, this uniform valuation of activities guarantees their effective distribution over time.

The commission considered the Hotelling rule to provide a pertinent long-term guide, but that not applying it at the start of the period could be justified to smooth out the revaluation of the shadow price of carbon.

Ingredient no. 2: use of model simulations

Models allow an objective analysis of the carbon value, based on the target set, a detailed description of the technologies, behaviors and interactions between the various sectors of the economy and between France and its international environment.

Predominantly technology models define a trajectory representing the cost of reduction of one additional ton of CO_2e, the assumption being that this marginal cost will increase over time as it becomes necessary to leverage more expensive technologies. Macroeconomic models, meanwhile, can shed light on the investments and changes in behavior that are necessary for achieving carbon neutrality.

The commission felt that models painted a pertinent picture of the carbon value required over the period up to 2030, and even 2040, or alternatively until the reduction in emissions has approached the "factor 4" (i.e. GHG emissions have fallen by 75% compared with 1990). But the projections become increasingly less reliable the further along the time scale we go, the further the emissions fall and the closer we get to the point where their reductions become increasingly difficult and call for fundamental, non-marginal, changes that models calibrated on the past are no longer capable of predicting.

Ingredient no. 3: technological or technico-economic forecasting

Technological forecasting, such as the technology roadmaps produced by the International Energy Agency (IEA), or the exercises performed in France in laying the groundwork for the National Low-Carbon Strategy (SNBC), is a way of assessing the decarbonization potential of different technologies, their speed of deployment and their possible costs. To achieve a radical level of decarbonization, the shadow price of carbon must take into account a portfolio of enabling technologies for decarbonizing concentrated uses residual emissions – even if these have not yet been sufficiently developed and therefore remain relatively expensive.

FAR-REACHING CHANGES TO ACHIEVE THE "NET ZERO EMISSIONS" GOAL

The modeling work to date shows that there is significant scope for decarbonization at relatively affordable costs. Optimizing public transport systems, electrifying certain applications, developing certain thermal renewables such as green gases, or renovating buildings, for example, combine, in a good many cases, good environmental efficiency with low costs per ton of CO_2e avoided.

But radically decarbonizing the economy calls for further-reaching changes, at a time when the structure of energy systems is not evolving at any great pace and when greenhouse gas emissions are still difficult to bring down below certain limits for certain applications.

The main constructive insights to come to light from our research are as follows:

— achieving the "net zero emissions" goal will require both energy savings and decarbonization of the energy used;

— decarbonization will be gradual and depend to a large extent on investments aimed at "greening" existing capital (housing, commercial infrastructure, vehicles, etc.) or at providing new infrastructure (district heating, networks of electric vehicle charging points, public transport and so on);

— there is significant potential for abatement at no or low cost to be gained from greater 'sobriety', greater energy efficiency, small efforts and small investments. Once this potential has been exhausted, and unless technological breakthroughs are forthcoming, the cost of measures per ton of CO_2e avoided will increase as we progress in the transition to a carbon-free way of life and are obliged to rely on less mature technologies;

— by the 2050 milestone, the energy sector (which is already considerably decarbonized by the nuclear-renewables mix) may well have become completely carbon-free. It may even become a source of negative emissions if the development of bio-CCS (carbon capture and storage in the final stages of biomass-fired power plants), or direct capture of CO_2e in the air, is deemed "socio-technically viable". Residual gross emissions, which CO_2e sinks should be able to absorb, will in this case stem mainly from agriculture and a handful of industrial sectors.

A TARGET VALUE RAISED TO €250 IN 2030, IN LINE WITH THE MOST RECENT INTERNATIONAL ESTIMATIONS

In the commission's view, the 2030 time scale is likely to provide the best anchorage for a multi-year trajectory of the social value of mitigation activities, for two key reasons:

— the 2030 time scale – which is just over a decade away – is decisive for "anchoring" planning and catalyzing a wave of "low-carbon" investments;

— at this time scale, modeling can be grounded in reasonably sound economic and technological forecasting – even if this naturally continues to contain an element of uncertainty.

Based on modeling efforts to date, the commission recommends – starting with the current shadow price of €54 in 2018 – adopting a social value of mitigation activities of $€_{2018}250$ in 2030.

This value is a great deal higher than the current baseline value outlined by the commission in 2008 ($€_{2008}100$, so €110 in today's value). This mainly reflects the fact that we are behind schedule and the correlative increase in the level of ambition beyond the "Factor 4", both of which incur high abatement costs across several sectors of the economy, not least agriculture, some industrial sectors (cement, chemical industry or steel), and long-distance freight transport (by road, air or sea). The abatement costs also reflect the current inadequacy of the coordinated global response and the lack of international flexibility mechanisms available to the 2008 commission.

Beyond 2030, the trajectory mapped out is the result of two complementary approaches:

— forecasting on the costs of the enabling technology portfolio for successful decarbonization. The commission cannot predict whether a miracle new "backstop" technology (i.e. a substitute technology that completely does away with the need for fossil fuels, at a stabilized cost) will emerge. Neither does it postulate the emergence of a potential for negative emissions – i.e. an increase in the size of carbon sinks such that the carbon budget would swell and allow us some slack in terms of our response. But it does consider that a varied portfolio of enabling technologies (making more extensive direct use of carbon-free electricity or indirect use through hydrogen, or development of green gas and biomass) would make it possible to achieve radical decarbonization in return for relatively high switching prices;

— gradual calibration on a Hotelling rule. Between 2030 and 2050, growth of the shadow price will slow considerably to gradually align with a Hotelling rule for a public discount rate of 4.5%. This guarantees that the value of climate gains is not "crushed" by the discounting.

Ultimately, the commission recommends adopting a €$_{2018}$500 value in 2040 and a €$_{2018}$775 value in 2050. These fall within the range of the most recent carbon values outlined in the IPCC's latest special report, dated October 2018.

THE VALUE OF THE GLOBAL RESPONSE

When defining a trajectory for the social value of mitigation activities, the uncertainties over the valuations must be factored in – and these are only going to grow the further in to the future we go and the greater the scope for technological and diplomatic options becomes.

Sensitivity analyses show that the trajectory mapped out is based upon reasonably reliable modeling work with a 2030 time scale. Post-2030, our sensitivity analyses indicate that the values set out could be revised downwards were international cooperation to speed up the pace at which innovation is produced and disseminated.

The sensitivity of the results to the cost of technology is closely tied in with the underlying hypotheses of international cooperation. At industrial level, research and innovation efforts geared more towards decarbonization solutions would help to drive down the cost of technologies – as can currently be observed for renewables. When a number of research institutions and companies across different countries embark on innovation programs, there are gains to be had for each country taken individually: for each country benefits from the emergence and global spread of innovations and the fall in the cost of technologies enabled by learning-by-doing and economies of scale.

At the end of the day, whilst a scenario where technological breakthroughs are enabled through stronger international cooperation would likely have little effect on the 2030 shadow price of carbon, it would, however, allow for a significant downward revision of this value between 2030 and 2050 to be considered. This could amount to around €450 by 2050 in this favorable scenario.

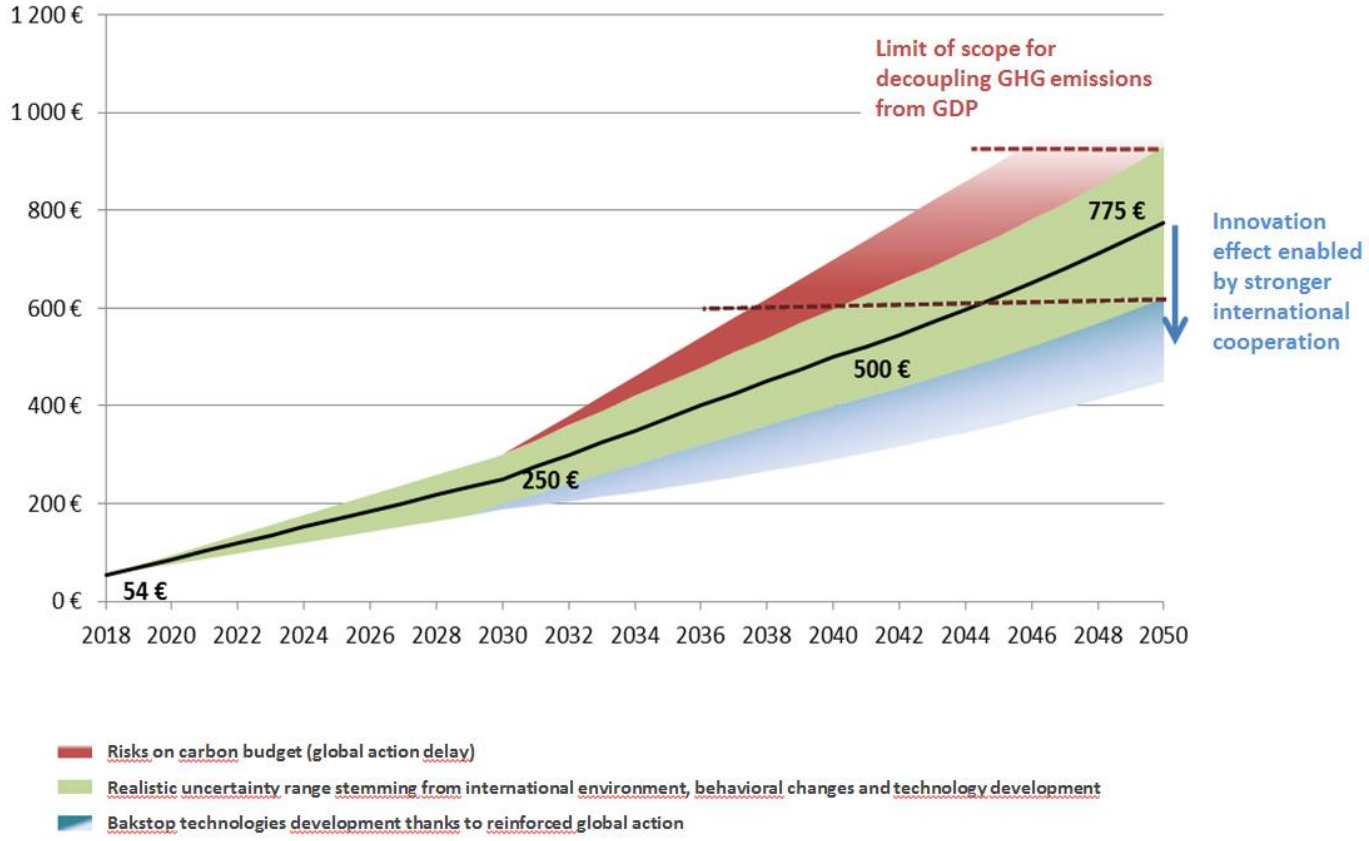
The uncertainty over the costs of mitigation technologies (and over the damage caused by climate change) makes a sequential approach even more necessary, whereby policies are gradually revised as more information comes to light. This has three consequences:

— it confirms the merits of a shadow price, ensuring consistency in the assessment of *all* potential mitigation options, without showing a preference for one over another;

— it requires uncertainty to be taken on board when determining the shadow price – which the trajectory and associated ranges endeavor to do, as illustrated in the chart below;

— it also implies that the shadow price is not set in stone, but revised at regular intervals (every five to ten years) based on new, game-changing information – not least about the true costs of mitigation.

Social value of mitigation activities



UNIVERSAL USE OF THE SOCIAL VALUE OF MITIGATION ACTIVITIES

Achieving far-reaching decarbonization calls for changes both in behavior and technology. Such changes are within our grasp, as long as we set a broad spectrum of measures in motion, including positive price signals, an investment program that widens the scope of carbon-free applications and innovation efforts at international level.

This concerns industry across the board today. Radically decarbonizing the economy requires a much broader "base" of public and private options for tackling climate change – even if abatement sources obviously vary considerably from one sector to the next, in terms of volume, unit price, potential for substitution and speed of decarbonization.

All greenhouse gases are concerned today – not just CO_2. This is because a quarter of greenhouse gas emissions concern other gases than CO_2. The challenge is not only to reduce energy-driven emissions but also emissions associated with industrial processes, waste processing, agriculture or land use.

A CLEAR MULTI-YEAR TRAJECTORY TO ENABLE INVESTMENT AND INNOVATION

The key to a successful energy transition lies in the establishment of a capital stock allowing for the creation of business without emitting greenhouse gases, i.e. enabling GDP to be decoupled from emissions. In line with a number of previous studies, chief among which those by the OECD, the New Climate Economy Project and the European Commission[3], our research clearly points to a need to redirect investment and funding towards low-carbon projects.

The additional net investment needed for a successful move to a low-carbon future is at least 1 GDP point per year over the 2030 time scale and 1.5 to 2 GDP points per year over the 2040 time scale – with part of existing investment flows having to be rechanneled towards the formation of "green" capital.

Our research brings two, more specific, facts to light:

— to enable investment and innovation, public and private stakeholders must have access to a clear and stable trajectory for the shadow price of carbon which guides their planning and allows for their coordination: each stakeholder must start making plans, as of now, for the phasing out of oil and the running out of carbon budgets;

— the necessary investments bear first and foremost on a host of individual choices, involving housing, mobility or decentralized energy generation for example. Steps must be taken to remove the various traditional barriers to investment (insufficient R&D, limited access to information and loans), redirect financial flows and organize a fair sharing-out of financing and technological risks between the public and private sectors.

A GUIDE FOR ACTION

The social value of mitigation activities lays bare the sheer distance we still have to cover (represented by the marginal abatement cost of greenhouse gas emissions) and reflects the value to be given to measures enabling us to go this distance – i.e. to close in on the "Net-Zero" goal.

A reference for determining the collective priorities

The primary purpose of the social value of mitigation activities is to provide a reference for an updated assessment framework addressing four key questions:

— is the country on the "right" track to decarbonization – i.e. on course to ultimately meet the "Net-Zero" goal? The answer to this question can be found in a quantitative monitoring of emission flows per sector and of carbon sinks;

— does the observed trajectory enable the goal to be achieved at the best cost? This is where the shadow price of carbon comes in as a useful guide, insofar as it enables a definition of the scope of relevant action for the community. A higher shadow price of carbon extends the scope of profitable action for the com-

3. OECD (2017), I*nvesting in Climate, Investing in Growth*, OECD Publishing, Paris; New Climate Economy Project (2018), *Unlocking The Inclusive Growth Story of the 21st Century*; European Commission (2018), *A European Strategic Long Term Vision for a Prosperous, Modern, Competitive and Climate Neutral Economy*.

munity: all of the initiatives – whether public or private – costing less than the shadow price of carbon (so they present a lower socioeconomic abatement cost than the shadow price) should be taken wherever possible. When this cannot be done, the barriers and obstacles to such action must be identified;

— are the initiatives ranked by merit order? All sorts of measures can be taken to achieve the target, but they must be undertaken in the right order. Low-cost drivers for reducing CO_2 emissions must be leveraged as a priority, before more costly measures are taken. This is where the merits of a multi-year trajectory for a shadow price of carbon that rises over time become clear, as it can guide the activation at the right time (so not too early and not too late) of effective action, with account taken of the required investment time-frames;

— do private stakeholders initiate measures of their own accord, or do these require public intervention? In some cases, measures are cost-free and sometimes even generate gains. This is often the case with "cutting down", i.e. 'sober', mentalities, equipment-sharing strategies and certain efforts to achieve greater energy efficiency. In other cases, the externality is not factored in and requires public intervention in the form of investment or incentives and regulatory measures.

A reference for assessing the effectiveness of sector-specific action and public investment projects

Within this general assessment framework, it would be well worth using the social value of mitigation activities systematically in socio-economic project assessments. The various measures being considered to tackle climate change present wide-ranging cost-effectiveness ratios, you see. To be more exact, two key indicators would enable use of this value to guide the allocation of rare resources for society.

- The first indicator is a general one, and concerns the socioeconomic abatement cost, i.e. the full cost (so purchase and use) of a measure undertaken to reduce one additional ton of CO_2e. The shadow value provides a benchmark to which the different abatement costs can be compared; measures which have a lower abatement cost than the shadow cost are profitable for the community. But abatement costs must be calculated according to stable, transparent rules, and this is still not the case. Efforts to standardize and harmonize such calculations are recommended.
- The second, more specific, indicator is the calculation of the socioeconomic profitability of public investment projects. In this respect, the shadow price can help to steer projects by attributing a monetary value to the emissions avoided. Socioeconomic assessments of public investment projects adhere to a set of clearly established rules, but their use must extend beyond the fields it has traditionally been applied in, primarily transport and public buildings.

Revaluation of the shadow price of carbon must form part of a complete picture of the "climate" impact of projects. Over and above revising the shadow price of carbon upwards, it will also be necessary to revise the whole of the assessment framework: the reference scenarios, consideration of the climate risk in the discount rate and of the climate impacts throughout projects' lifetimes. Reassessing projects must make it possible to rank them better with a view to redefining an investment program that is more compatible with the Net-Zero goal.

A reference for anticipating the necessary changes

A multi-annual price trajectory, running from now until 2050, maps out the course ahead for "phasing out oil" and should prompt us to anticipate this transition, to plan for it. Such planning should prove beneficial in the coordination of public and private policy: if we are to develop electric car use, we need to install a network of electric vehicle charging points and change the vehicle fleet.

In addition to guidance with the spadework, incentives or recommendations are often necessary to kick-start meaningful action when private stakeholders do not initiate this of their own accord. In the same vein as the approach taken by the OECD and Stern-Stiglitz Commission[4], this commission believes that it is important, well before any specific measures are taken, to ensure public policies square with the goal to tackle climate change – especially when it comes to land, urban planning and transport policies. For example, it is important not to make long commutes inevitable for workers on account of poor land regulation, "excessively" high property prices or a lack of infrastructure; instead, cities must be compact with sustainable travel networks.

In this realigned context, the road to a low-carbon future will be lined with a range of measures – carbon pricing, subsidies, measures for accessing credit, technological risk sharing and regulations – each one enabling the next milestone to be reached. It is not possible to settle for rolling out just one of these measures as each one comes with its relevant points and stumbling blocks. Carbon pricing is a way of supporting the profitability of "green" investments and steering innovation in the "right direction". And yet it is hampered by its redistributive effects and by the risks of lost industrial competitiveness. Whilst regulations can guarantee results, they can lead to high compliance costs for some stakeholders and hinder innovation. Subsidies, meanwhile, may generate free-riding and represent a cost for taxpayers.

The shadow price of carbon is not "earmarked" for a particular measure, and the commission does not claim to settle the issue of the right combination of measures. What it recommends is that it be possible to gauge – against the shadow price of carbon, on a use-by-use basis – whether the combination envisaged is appropriately sized. And this involves genuine assessment work, for the various measures are combined without it being possible to add them together strictly speaking. The clearer the State is on the abatement costs of CO_2 emissions per use, the better it will be able to calibrate its actions to help the switchover to carbon-free technologies.

TO HELP STAKEHOLDERS TO MAKE SENSE OF THE NEW SHADOW PRICE TRAJECTORY AND PUT IT INTO PRACTICE, WE RECOMMEND DOING THE FOLLOWING

1. Make the trajectory outlined for the social value of mitigation activities official, to get stakeholders preparing along the same lines and thus enable investments to "decarbonize" the economy.

4. OECD (2015), *Aligning Policies for a Low-carbon Economy*, OECD; Stern-Stiglitz (2017) Commission, *Report of the High-level Commission on Carbon Prices*.

2. Make this price the reference for a stronger framework for assessing decarbonization measures, so as to be able to determine the priorities of public policy.

- Under France Stratégie's leadership, standardize the rules for calculating socioeconomic abatement costs so as to be able to compare the various sector-specific measures for achieving decarbonization.
- In addition to decarbonization, take better account of the co-benefits associated with the fight against climate change: improvement in air quality, and therefore health, by reducing local pollution, preservation and enhancement of biodiversity; better diets; less sensitivity to oil price shocks – and even technological breakthroughs.
- Use the shadow price of carbon as a reference for assessing the most relevant sector-specific decarbonization measures, by thinking in terms of socioeconomic abatement costs, so as to provide a more solid basis for setting public priorities.
- Based upon the multi-year trajectory outlined, assess in what order these measures would best be rolled out for most effectively achieving the goal for carbon neutrality in 2050.

3. Revise the framework for the socioeconomic assessment of public investments and come up with a new series of projects accordingly.

Ask France Stratégie to update the framework for the socioeconomic assessment of public investments for the purposes of:

- clarifying the reference scenario(s) allowing the national carbon neutrality goal to be reached, and which should be used in project assessments;
- value public projects based on their contribution to the carbon neutrality goal and their "option value", i.e. the flexibility they allow in the strategy's delivery;
- specify the rate at which the costs and climate gains of projects are to be discounted, with particular account taken of the correlation between the benefits of decarbonization investments and future economic growth;
- take better account of the emissions generated and/or avoided during the development stages of projects during assessments – in addition to those already counted during their operation;
- be more systematic in performing socioeconomic assessments of all public investment projects (including those financed by the local authorities), bearing in mind the fact that achieving carbon neutrality will rely, in no small part, on a large series of small-scale projects;
- ask the General Secretariat for Investment (SGPI) to draw up, based on these updated assessments, a new program of R&D and public investment projects.

4. Explain and address the implications in terms of redistribution and competitiveness.

The value of a reduction in emissions of one ton of CO_2e is the same for society irrespective of the sector where such reduction has been achieved. It gives an idea of the distance we still have to go, but does not predetermine how we should go about covering this distance nor how efforts (particularly financially speaking) should be distributed between the various public and private stakeholders. This distribution would be worth clarifying, with two aims in mind in particular:

- assess on a use-by-use basis the implications of carrying out decarbonization measures, in terms of redistribution and competitiveness;
- factor these implications into public policy design, not least with a view firstly to helping stakeholders with no immediate alternative available to phase out solutions reliant on carbon, and secondly to avoiding "carbon leakage" in sectors exposed to international competition.

5. Calculate a European shadow price, in order to highlight the relevance of a carbon neutrality goal at European level.

A European shadow price could particularly serve a purpose in assessing projects financed by the EIB or European funds, for the assessment of European policies – including the ETS – and stronger European cooperation.

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