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## *A proposal to finance low carbon investment in Europe*

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This document commits its authors and not the institutions to which they belong. The purpose of this publication is to stimulate debate and call for comments and criticism.

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## Abstract

*This year, Europe is confronted with a critical double challenge: addressing the climate change issue and pulling itself out of a persistent low growth trap. Today these two challenges are addressed separately. On the one hand, climate negotiations must reach a historical agreement in the Paris conference in December 2015. On the other hand, the Juncker Plan of 315 billion euros of investment, and above all the ECB announcement of a massive purchase of assets for an amount of around 1100 billion euros, must help to avoid a deflationary spiral and stimulate a new flow of investments.*

*Regarding climate policies, public regulators have essentially focused on a carbon price, which remains today at an insufficient level to trigger spontaneously the investments - and their financing - necessary to achieve the low carbon transition. The potential of the banking and saving channels (targets of the asset purchase program of the ECB) to scale up climate finance is however neglected.*

*This "Etudes et documents" proposes to make private low-carbon assets eligible for the ECB asset purchase program. The carbon impact of these assets would benefit from a public guarantee that would value their carbon externality at a level sufficient to compensate the absence of an adequate carbon price. This mechanism would immediately impact the investment decisions of private actors with a positive effect on growth. It would also strongly incite governments to progressively implement carbon pricing tools to ensure that the public backing of the value of the carbon assets remains neutral with respect to public budgets.*



## Introduction: Europe in 2015, at the crossroads of the climate and growth recovery challenges

The European Central Bank announced a large quantitative easing program at the last Council of the Governors on January 22<sup>nd</sup>, 2015. Through a massive asset purchase on the secondary market, this long anticipated intervention aims at blocking the expected deflationary spiral. Questions still remain, however, about the concrete implementation and the expected impacts on the European economy.

2015 is also a critical year for Europe to take up the climate challenge. First, to align European policies with its own low-carbon transition objectives, given that the EU-ETS<sup>1</sup> on its own will not be sufficient to trigger such a transition. Second, at the international level, the European Union has built a real “soft power” by being at the forefront of the global climate agenda. This influence will be decisive in making the Paris conference at the end of this year a historical agreement.

This “Etudes et documents” presents a climate policy proposal at the crossroads of this double European challenge in 2015, between growth recovery and climate action. Indeed, built around the purchase of European climate bonds backed by certified CO<sub>2</sub> emission reductions, this proposal would implement a non-conventional monetary policy driven toward the necessary investments for the low-carbon transition. It would make it possible to immediately fund actual investments driving the transition toward a new low-carbon growth path.

First, we analyze the relative failure of traditional economic instruments to tackle the climate issue and its causes. Then, we stress the fact that those instruments need to be connected with funding instruments that reward low-carbon investments and only gradually penalize carbon intensive capital. This combination of instruments makes it possible to bring all economic agents into the low-carbon transition process. We then present our monetary proposal and conclude on the opportunity to implement it in 2015 at the European scale.

### I. On the difficulties of carbon pricing

#### I.1 The theoretical merits of a carbon price

Climate is a global public good that is inevitably jeopardized if the value of the carbon externality is not integrated into the decisions of economic agents. Theoretically, a carbon tax or an emission trading scheme are the best instruments to price carbon efficiently. Adjusted at their optimal level, they make it possible to minimize the cost of global abatement efforts by equalizing the marginal cost of abatement across sectors.

A carbon price is supposed to stimulate private and public investments in low-carbon R&D. It provides incentives to economic agents to undertake energy efficiency measures and shift new investments toward low-carbon options. The revenues of the carbon tax or allowance auctions can then be used to reduce other distortive taxes (in particular taxes on labor) or be redistributed in the form of lump-sum transfers<sup>2</sup>.

Historically, this type of instruments has inspired the Kyoto Protocol. A cap-and-trade mechanism, first only applied to Annex 1 countries, was supposed to be gradually expanded to the rest of the world<sup>3</sup>. The generalization of the mechanism relies, by necessity, on an agreement over the allocation of emission allowances among countries, and therefore on equitable rules to share the burden. This negotiation approach has led to a diplomatic impasse. The failure of the Copenhagen conference in 2009 has resulted in delaying international coordination on global climate policy.

#### I.2 The practical difficulties of putting a price on carbon

As the threat of climate change grows more severe, the long term benefits of CO<sub>2</sub> abatement will eventually outweigh short term costs<sup>4</sup>. Nonetheless, due to inertia of carbon-intensive installed capital, a coal power station cannot be replaced overnight by a wind power station. Likewise, because of persistent consumption patterns, inhabitants of a remote suburb are dependent on carbon intensive vehicles to commute so long as electric vehicles are not available on the market at a competitive price.

<sup>1</sup> European Union Emissions Trading System, [http://ec.europa.eu/clima/policies/ets/index\\_en.htm](http://ec.europa.eu/clima/policies/ets/index_en.htm).

<sup>2</sup> See Combet E. (2013), *Fiscalité carbone et progrès social*, École des Hautes Études en Sciences Sociales (EHESS). See also the contributions for the *Comité pour la fiscalité écologique* <http://www.comite-fiscalite-ecologique.gouv.fr>.

<sup>3</sup> An original initiative aims at connecting the regional carbon markets and more largely to transform all emission reduction into a fungible asset: <http://www.worldbank.org/en/topic/climatechange/brief/globally-networked-carbon-markets>.

<sup>4</sup> See Stern N.H. (2007), *The Economics of Climate Change: the Stern Review*, Cambridge University Press. Also Stern N.H. and Calderon F. (2014), *Better Growth, Better Climate – The New Climate Economy*, <http://newclimateeconomy.net>.

By affecting the returns of past and future investments, carbon pricing directly hurts installed capital and existing patterns of consumption. This is why the implementation of carbon pricing instruments results in a reduction of the value of carbon intensive capital as well as additional costs for households and businesses.

This generates a financial transfer from the owners of carbon intensive capital to those who own or invest in low-carbon capital. The “losers” can refuse to pay the microeconomic cost of the low-carbon transition.

These short term distributive effects partly explain the social opposition to carbon pricing instruments. Besides, compensation through lump-sum transfers seems barely feasible.

This is especially true at the global scale, where massive transfers from industrialized countries to the south would be required. Such transfers would be unrealistic in a context of strong budgetary constraints in the rich countries. The difficulties in allocating capital to the Green Climate Fund epitomize the reluctance of Northern countries to transfer financial means to the South<sup>5</sup>. The \$10 billion collected by the Lima conference (2014) still fall short of the \$ 100 billion pledge (especially if it has to come from public sources only)<sup>6</sup>.

At the domestic scale, lobbying groups from carbon intensive industries could be very effective at blocking any attempt to increase the constraint on CO<sub>2</sub> emissions. On the EU-ETS, the manufacturing sector has benefited from generous quantities of free allowances that result in structurally low prices on the European market. This clearly points to the difficulties public authorities have in fine tuning carbon constraints at a socially desirable level<sup>7</sup>. As for the implementation of a carbon tax in order to address diffuse emissions (transportation, housing), they raise the difficult question of equity in their effects on low-income households and vulnerable economic activities. Making it acceptable would require at least some compensation, and in an ideal world, a broad public consultation on the rebuilding of the domestic “fiscal compact”<sup>8</sup>.

A series of failures of international climate negotiations on a carbon price, as well as failed attempts to make the EU-ETS work and implement a domestic carbon tax have been less than encouraging. In 2014, carbon prices on the EU-ETS fluctuated around 6 euros/tCO<sub>2</sub>. The French carbon tax is set in 2015 at 14,5 euros/tCO<sub>2</sub>, well below the level recommended in the Quinet<sup>9</sup> report (a trajectory from 32 euros in 2010 to 100 euros in 2030). Upward evolution in 2016 (22 euros/tCO<sub>2</sub>) will have essentially no effect on this assessment. Low carbon prices incite investors to take the climate externality as negligible when weighing their investment decisions.

This does not mean that carbon pricing initiatives should be abandoned. On the contrary, innovative efforts to price carbon must be pursued further, until the political circumstances improve and these efforts can be scaled up<sup>10</sup>.

## II Building a climate friendly financial intermediation

### II.1 Solving the issue of access to funding

The impact of existing carbon prices on the returns of low-carbon projects is not large enough to meet the gap between private and social returns on such projects. The temporal profile of immediate expenses and future revenues thus increases the relative investment risk. In addition to technological risks, similar to those of any innovative enterprises, low-carbon projects incorporate ecological risks pertaining to their ability to deliver CO<sub>2</sub> abatement, and also to the future value of avoided emissions. They thus cumulate financial drawbacks in comparison to business-as-usual projects.

This extra-investment risk profile restricts their access to credit. Such a financial barrier justifies the use of specific tools to support low-carbon investments integrating the social value of CO<sub>2</sub> abatement when calculating their overall returns. The valuation of carbon has to be high enough to trigger new flows of low-carbon investments. But it also has to be applied to new

<sup>5</sup> [https://www.wmo.int/pages/publications/bulletin\\_fr/archives/61\\_1\\_fr/Fondsvertpourleclimat.html](https://www.wmo.int/pages/publications/bulletin_fr/archives/61_1_fr/Fondsvertpourleclimat.html)

<sup>6</sup> This \$100 billion pledge per year is itself considered as way below the required investments to accompany the developing countries in their low carbon transition: see for example IEA (2014), *World Energy Investment Outlook*, Special Report.

<sup>7</sup> See for example Branger F. and Quirion P. (2014), “Reaping the Carbon Rent: Abatement and Overallocation Profits in the European Cement Industry, Insights from an LMDI Decomposition Analysis”, *Energy Economics*, forthcoming. Branger F., Lecuyer O. and Quirion P. (2013), “The European Union Emissions Trading System: should we throw the flagship out with the bathwater ?”, *WIREs Climate Change*, forthcoming.

<sup>8</sup> The chapter « Green the Union » from the iAGS report 2015 (*An investment Strategy Towards a Sustainable European Union*) makes the same point about the need to bring support to declining industries during a transition period. High carbon prices are compensated through large lump-sum payments (including extra compensation at the beginning). Such a profound transformation of the fiscal compact may however prove to be politically infeasible in the short term.

<sup>9</sup> *La valeur tutélaire du carbone*, April 2009, <http://www.ladocumentationfrancaise.fr/rapports-publics/094000195>.

<sup>10</sup> The current dramatic decrease in oil prices may open an interesting window of opportunity to introduce « without any effort » a carbon tax.



investments only in order to not be confronted with the above-mentioned political opposition. In other terms, we need to build a financial intermediation better suited for low-carbon investments<sup>11</sup>.

## II.2 Smoothing the efforts of the low-carbon transition

Instead of relying solely on a “penalty” mechanism (carbon tax or emission quotas to pay), a mechanism rewarding low-carbon investment while gradually penalizing carbon intensive capital is more politically acceptable, since it curbs the cost of the low carbon transition. It combines pricing instruments such as tax/quotas, set at low levels during a transition period – but with a long term increasing trend - with funding instruments incorporating a public guarantee on a high value of the carbon externality (social cost of carbon – SCC).

This strategy provides a pragmatic combination between theoretically first-best instruments calibrated at (temporary) sub-optimal levels with financing instruments aimed at stimulating low-carbon investments. This makes it possible to secure a long term goal of carbon neutrality, which means an economy where carbon emissions are strictly compensated by an equivalent amount of absorptions into carbon sinks. However it gives a margin of freedom on the path toward carbon neutrality. This means that cumulated emissions during the transition period may overshoot the carbon budget to keep temperature increases below the 2°C target.

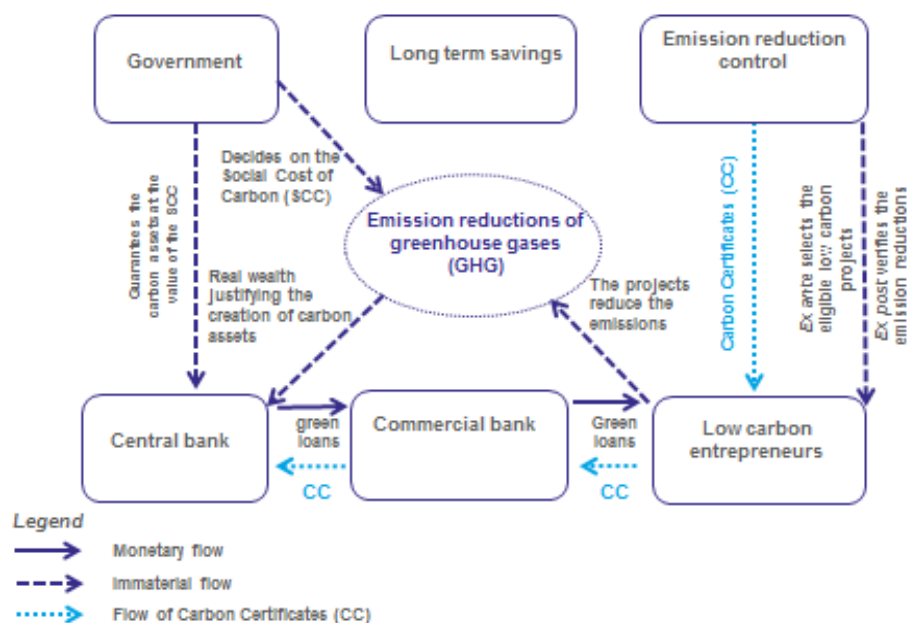
A carbon tax or emission quotas, fixed at optimal levels, theoretically allow for some degree of control over the decarbonisation path and therefore keep emission concentrations below a given cap (consistent with the 2°C target). But in practice, such advantages may vanish in the face of social opposition to the short term costs these instruments imply. This is why their implementation is, in practice, indefinitely postponed and emission controls are eventually abandoned<sup>12</sup>.

## III A monetary plan to fund the transition

### III.1 The main principles of carbon-based financial intermediation

In the absence of a high enough carbon price, our proposal makes it possible for the economy to shift from one steady state to another by triggering low-carbon investments. The proposal is based on five main principles:

#### Financial intermediation mechanism backed on a carbon value



<sup>11</sup> See Aglietta et al. (2014), Transition to a low-carbon society and sustainable economic recovery, a monetary-based financial device, [http://www.centre-cired.fr/IMG/pdf/concept\\_note.pdf](http://www.centre-cired.fr/IMG/pdf/concept_note.pdf).

<sup>12</sup> Perrissin Fabert B. et al. (2014), “Why are climate policies of the present decade so crucial for keeping the 2°C target credible?”, *Climatic Change*, 126 (3-4), p.337-349.

### III.1.1 Defining the social cost of carbon (SCC)

The SCC is neither a market price, nor the tax incorporated in the prices of goods. It is a notional price defined as the social value of avoided CO<sub>2</sub> emissions. Available estimates of the SCC cover a wide range of values, depending on assumptions made regarding key socio-economic parameters<sup>13</sup>. This is why the SCC ultimately rests on a broad societal agreement within an objective range.

Defined in monetary units, the SCC establishes a new class of assets, the carbon assets. These assets make plain the value of CO<sub>2</sub> emission reductions generated by low-carbon investments. In practice, a carbon asset is issued as soon as a unit of emission reduction is effectively realized and certified. The SCC provides a metric for piloting the low-carbon transition.

### III.1.2 Defining an amount of carbon assets benefiting from a public guarantee

Governments commit to guaranteeing the value of carbon assets at the level of the SCC for a given period and a given amount of carbon assets, consistent with their domestic contribution to the global climate policy. This value is renegotiated upwards (as forecasted by most models) at the end of the commitment period. The key element here lies in the predictability of the signal on the value of avoided CO<sub>2</sub> emissions.

Thanks to the monetary value of new carbon assets, low-carbon investments are paid for their role in reducing carbon emissions. The private portion of the returns on these projects benefits those who have taken the financial risks in the first place. The social part of the returns is realized by means of avoided climate damage. This helps eliminate the mismatch between private and social returns on projects that incorporate externalities.

### III.1.3 Certifying emission reduction

The reliability of the proposed mechanism depends on its ability to certify that low-carbon projects could make an actual contribution to development, economic growth and emission reduction. It does not rely on project by project additionality, but on the guarantee that the whole projects supported by the mechanism have realized a measured emission reduction in comparison to the baseline scenario.

An independent body would be in charge of monitoring low-carbon projects. It would define a typology of low-carbon projects and methodologies to appraise emission reduction according to the technologies, sectors, and time horizons of the projects. It will be essential to take stock of ten years of accumulated experience with the Clean Development Mechanism (CDM) to define acceptable reference scenarios, better identify eligible projects and reduce transaction costs related to project appraisals. This controlling entity will deliver carbon certificates (CC) to project developers in proportion to their effective emission reduction. CC are the material medium of carbon assets created by the proposal.

### III.1.4 Accepting the carbon certificates in the balance-sheet of the monetary institution

The monetary institution of the geographical entity considered (National central bank, European central bank, IMF, ...) announces that it is ready to refinance the low carbon loans delivered by commercial and development banks up to the value of effective emission reductions, that is the value of the carbon certificates<sup>14</sup>. It acts as if it paid a service of emission reduction and justifies the emission of corresponding liquidities by the value society gives to emission reductions, which is to say a better climate, better insulated buildings, a decarbonized energy system. A new class of eligible carbon assets thus enters its balance-sheet<sup>15</sup>.

For the borrower, the reimbursement of the loan is diminished by the amount of the guaranteed carbon certificates. For those who finance the projects, the climate risk is, in a way, socialized. The financial institutions which offer a loan to low carbon projects know that the "carbon certificates" are guaranteed in value and accepted as repayment by the central bank. They are

<sup>13</sup> Espagne É. et al. (2012), "Disentangling the Stern/Nordhaus controversy: Beyond the discounting clash", FEEM working paper; Pottier A. et al. (2014), "The comparative impact of integrated assessment models' structures on optimal mitigation policies", *Environmental Modelling and Assessment*, forthcoming.

<sup>14</sup> See CISL & UNEPFI (2014), *Stability and Sustainability in Banking Reform: Are Environmental Risks Missing in Basel III ?*, a report which analyzes the measures taken by central banks to modulate the prudential regulations which are applied to banks according to the environmental risk and the nature of the assets they finance.

<sup>15</sup> In that sense, this proposal belongs to the family of the SUMOs (for Smart Unconventional Monetary Policies), summarized by Ferron C. and Morel R. (2014) *Smart Unconventional Monetary (SUMO) Policies: Giving Impetus to Green Investment*, CDC Climat Research.

thus incited to re-equilibrate their entire loan portfolio in favor of this type of low carbon projects. Carbon certificates reduce the relative risk profile of the low carbon projects, making low-carbon loans more attractive to the financial system.

At any moment, the central bank can rely on the government guarantee on the carbon assets. The cost is nil or very low in the short run for the public budget because the carbon certificates are financed through climate bonds which allow for the temporal smoothing of earnings and expenses. This mechanism becomes a new form of public debt backed on the bet of a future low carbon growth. At the same time, the gradual increase of carbon pricing instruments is calibrated so as to be tolerable for carbon intensive capital as well as to generate sufficient revenue in the end to honor the public guarantee.

### III.1.5 Redirecting long-term savings

In addition to mobilizing the bank credit channel, this instrument also provides leverage to redirect the stock of savings towards lower carbon investments. The fact that the central bank accepts to « pay » for the emission reductions at their social value brings a sufficient guarantee to conceive, through specialized funds, a whole new range of highly rated financial products backed by carbon certificates. The Green Climate Fund's capital could be partly funded by such carbon certificates<sup>16</sup>, in proportion with the emission reductions achieved by the funded projects. This would allow the Governments to honor their financial commitment to the Fund without damaging the quality of the assets issued to attract private capital.

## III.2 Balance sheet illustration of the carbon certificate mechanism

Suppose a fictitious low carbon project which leads to 5 units of CO<sub>2</sub> emission reductions. The SCC is fixed at 2. It could be financed through a loan of 100 (in order to simplify the analysis, interest rates are not considered).

- Knowing that low-carbon loans can be refinanced by the central bank up to the value of effective emission reductions, the financial intermediary modifies the credit risk of the low carbon project and makes a loan of 100.

### Balance sheet at the beginning of the loan:

Government		Central Bank		Financial Intermediary		Low-carbon entrepreneur	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
				100	100	100	
							100

- At the end of the loan maturity, the entrepreneur has reimbursed 90 with cash and received 5 carbon certificates (CC) corresponding to the 5 units of avoided CO<sub>2</sub>. These 5CC allow him to cancel his remaining debt with the financial intermediary since the latter can refinance the value of the CC at the central bank.

### Balance sheet at the time the loan is reimbursed:

Government		Central Bank		Financial Intermediary		Low-carbon entrepreneur	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
				40	40	100 - 90	
		5CC	10	<del>40</del>	<del>40</del>	<del>5CC</del>	<del>40</del>

<sup>16</sup> For a close proposal using the Special Drawing Rights of the IMF, see Giraud G., « COP21 à Paris En 2015 : une proposition de financement international de la transition énergétique dans les pays émergents », forthcoming. Also Grandjean A. (2014), « La transition énergétique en France », *Études*, (4), p. 29-39, for a proposal re-using special financial tools used in France at the beginning of the 2008 crisis.

- The increase of the balance sheet of the central bank in order to buy carbon certificates is only temporary. The State (or the European Union) then issues climate bonds in order to buy back the CC.

Government		Central Bank		Financial Intermediary		Low-carbon entrepreneur	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
5CC -Fiscal revenues - Carbon tax EU -Quotas bidding ETS	Climate bonds	Climate bonds	10	<del>10</del>	<del>10</del>	100 - 90 <del>5CC</del>	<del>10</del>

- At the end of the operation, the balance sheet of the central bank has maintained its initial size, and the 5CC appear on the asset side of the government balance sheet.

Government		Central Bank		Financial Intermediary		Low-carbon entrepreneur	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
5CC <del>Fiscal revenues</del> <del>Carbon tax EU</del> <del>Quotas bidding</del> ETS	<del>Climate bonds</del>	<del>Climate bonds</del>	<del>10</del>	<del>10</del>	<del>10</del>	100 - 90 <del>5CC</del>	<del>10</del>

The public guarantee on the value of the CC bought by the central bank is not a substitute to a “real” carbon price. In a very pragmatic way, it spares the existing capital stock from too strong a depreciation, while at the same time sending a “price signal” to the new investments during the transition phase of the production system. This way, it considerably reduces the immediate redistributive effects of an optimal carbon price.

If the Government does not fulfill its commitment and the carbon price does not converge towards the SCC, then either the government makes a loss if the central bank calls the guarantee, or the central bank makes a loss if it does not call it. These outcomes are a strong incentive for the Government to develop low-carbon fiscal resources to commit to the European objective. But in any case, a certain amount of emissions will have been avoided, which represents a genuine creation of wealth in comparison to the baseline trajectory.

## Conclusion

2015 will be marked by the urgency of the climate issue (renewed alert of the IPCC in 2014; Paris Conference of the Parties in December 2015) and the absolute necessity of a European recovery. Europe is the only region in the world which has not caught up with its 2007 production level. Weak investment levels, which have now dropped by 20% since 2007, threaten to severely restrict potential growth.

The debates on these two subjects are today conducted separately:

- in the framework of the climate negotiation, the EU-ETS mechanism and national climate plans, for the climate change mitigation and adaptation agenda;
- in the framework of structural reforms, fiscal consolidations, the “Juncker” investment plan and a quantitative easing policy by the European central bank for the European recovery.

The asset purchase by the ECB aims at providing new leverage on the price level. Yet, by restraining itself to assets traded on the secondary markets, it limits its leverage to new investments, and limits the scope of the recovery of the Eurozone. QE under these conditions carries the risk of inconsiderate lack of consideration in the purchase of assets, without any link to a sustainable recovery.

The proposed instrument offers precisely the opposite, a form of controlled QE (through the carbon metric compensation for the loans given by the ECB), which improves growth quality while reinforcing European non price competitiveness<sup>17</sup>.

Compared with policies which only act on the implementation of a carbon price, with little success so far, the scheme we suggest allows for the direct mobilization of the resources offered by bank credit and savings at the service of an energy transition.

The European Union should initiate such a junction in 2015, promote a monetary policy at the service of European investment and climate in order to give a low carbon direction to future growth and thus reinforce its historical leadership on climate questions. The success of the Paris Conference in December 2015 will largely rest on EU capacity to prove that a sustainable prosperity and an ambitious climate goal go hand in hand.

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<sup>17</sup> The investments linked to the low carbon transition are mostly grid investments, which have a spill-over effect on the total factor productivity of all the sectors in the economy. Moreover, the new technologies developed thanks to the transition process represent new knowledge which can then be exported to the rest of the world. See Aglietta M. and Espagne É, “Financing Energy and Low-carbon investment, Public guarantees and the ECB”, *CEPII Policy Brief*, forthcoming, for a sectoral analysis of the potential non price productivity effects.



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