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Financing energy and low-carbon investment: public guarantees and the ECB

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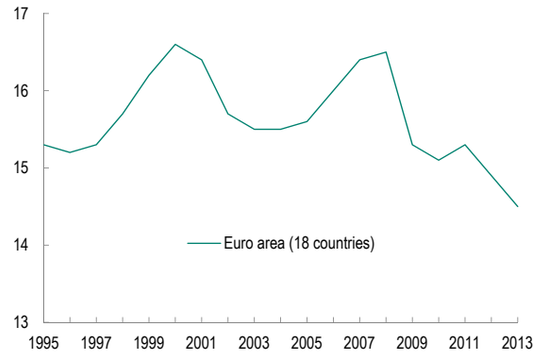
Summary

The eurozone has been said to have caught a disease called “secular stagnation”. Productive investment in the private sector fell by about 20% overall between 2007 and 2014, while private saving has surged, creating a huge gap between gross domestic savings and investment. The trajectory of actual GDP has decoupled from successive estimates of potential GDP, and there is no sign of a spontaneous short-term adjustment. The engineering of a powerful investment drive seems the only way out of this self-fulfilling low-growth trap.

The European Union has already set investment objectives in the Climate and Energy Package. These targets cover four areas: renewable energy supply capacity, electricity distribution networks, energy efficiency in building renovation and urban mobility. Several financing tools need to be combined to tailor risk-sharing devices for investments in each of these sectors. First and foremost, is the integration of a high carbon price. However, as any sudden sharp increase in the overall carbon price would have a major (and politically unsustainable) impact on the rest of the economy, a core issue is how to create a transitory distinction between the carbon price included/paid by the existing capital stock and the carbon price included/paid by new low carbon investments.

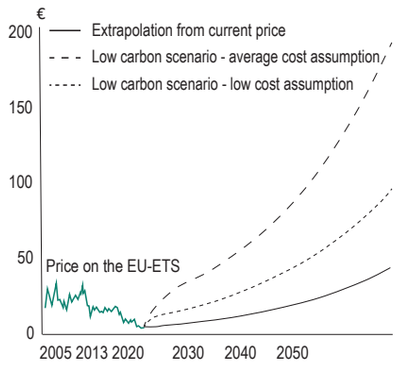
This can be achieved through a two-tier approach. First, for the four key sectors, a high notional carbon price is used to set an asset value on the carbon saved by new investments (“carbon asset”): these assets are accepted as repayment by central banks, and publically guaranteed. The ECB, by buying financial instruments issued by the low-carbon investors, creates a direct transmission channel to these areas of the economy. Second, fiscal measures ensure the carbon price catches up with the notional value, thus generating revenues that allow for the purchase of the carbon debt held by the central banks, guaranteeing the final budget neutrality of the process. By focusing on investments in these four sectors, the European output gap could be closed in the short run and a credible path opened to a low carbon economy.

Productive investment in the eurozone
(% of GDP)



Source: Eurostat.

The EU-ETS and future projections



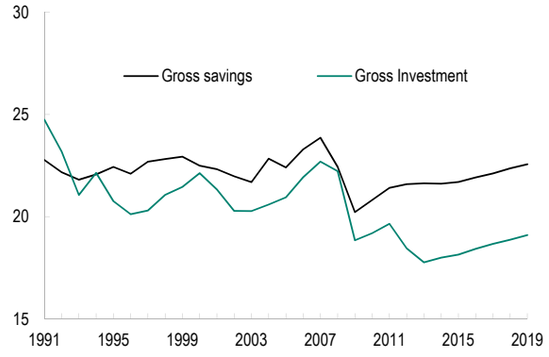
Source: 2nd investing initiative from CDC Climat Recherche (2013).

1 The curse of low growth in the eurozone

For the last seven years (2007-2014) GDP has stagnated in the eurozone. This dismal performance has been compounded by significant disparities between the largest countries: a deep slump in Spain followed by a modest recovery, persistent recession in Italy, a bumpy track in France with hopes of sustained recovery repeatedly disappointed, and moderate growth in Germany despite flat domestic demand, due entirely to its huge trade surplus (7.5% of GDP in 2013).

Broadly speaking, the euro zone can be said to have caught a disease called "secular stagnation", empirically defined [Teulings & Baldwin, 2014] as GDP per capita growth between 0% and 1% for a prolonged period of time. We see the primary cause of this disease as being the severe lack of willingness to invest. Productive investment in the private sector fell by about 20% overall in the euro zone between 2007 and 2014. Meanwhile, private saving surged, spurred by the desire to deleverage and the fear of an uncertain future increasing the preference for liquidity. The result is a huge gap between gross national savings and gross domestic investment (see Figure 1). The IMF does not foresee much improvement before the end of the decade [IMF, 2014].

Figure 1 – The widening gap between gross savings and investment in the eurozone
(% of GDP)



Source: IMF, World Economic Outlook, October 2014.

This gap means a large current account surplus, and a subsequent capital outflow, despite the reduction in public saving that occurred in the aftermath of the financial crisis. Had the adjustment to the slump in productive investment been reasonably distributed, every country would have improved its net foreign position. The eurozone would be sufficiently coordinated to safely consider a common stimulating policy. But the opposite has occurred.

The neo-mercantilism of Germany has notably led to such a high current account surplus that other countries have been *de facto* denied the ability to adjust. France has suffered a cumulative .a cumulative current account deficit with a persistent public deficit (-4,5% in 2014) despite slackening output. Italy and Spain have seen a dramatically high negative output gap that has prevented the public deficit from falling substantially (-3.0% in Italy and -5.0% in Spain for 2014). The asymmetrical macroeconomic pattern between Germany and its partners can be seen in the net international investment position of the four main countries (see Table 1). This fosters conflicting interests, making it a tough task to design and implement an ambitious common programme to boost domestic investment.

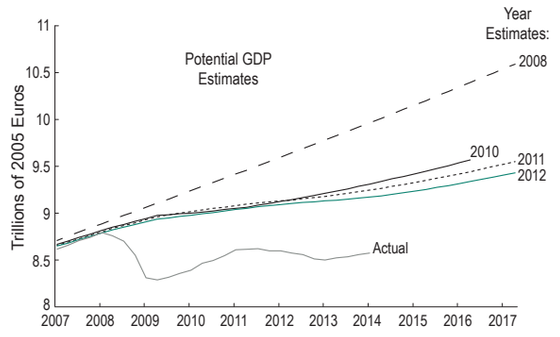
Since 2011, this asymmetrical adjustment process has smothered the incipient recovery of 2010 following the 2009 recession. It has curtailed GDP growth to quasi-stagnation, as clearly shown by IMF

Table 1 – The European external imbalances puzzle in 2013
(% of GDP)

Countries	Current account balance	Net international investment position	Estimated output gap
Germany	7.5	48	-0.6
France	-1.3	-17	-2.9
Italy	1.0	-30	-5.6
Spain	0.8	-98	-5.3

Source: IAGS, 3rd report, December 2014, table 1, chap.5, p.167.

Figure 2 – Actual and potential GDP in the eurozone



Source: IMF World Economic Outlook Databases, Bloomberg.

data in Figure 2. The trajectory of actual GDP has decoupled from successive estimates of potential GDP, without any hint that there might be a spontaneous short-term adjustment able to close the gaping output gap. This is the pattern of a self-fulfilling low-growth trap. Economic agents' expectations are that effective demand is going to stay quasi-stagnant for an indefinite period of time and thus they refrain from investing, regardless of any improvement in their financial position. This is reflected in prices: actual deflation or very low inflation, eroding inflation expectations at a 2 and 5-year horizon and ultra-low long-term interest rates.

Herein lies the dilemma. Those countries with surpluses, such as Germany, are insistent that their partners carry out unilateral adjustments, an approach that risks condemning the eurozone to an indefinite period of low growth. The reality is that to escape the low-growth trap the eurozone needs either a big and sustained positive foreign shock or the engineering of a powerful investment drive. Any foreign shock would have to be all the stronger as the eurozone is a large and therefore relatively closed economy. The hope that the slump in the price of oil alone will do the job is most probably an illusion, given international institutions are in the process of reviewing their forecasts downwards to about 3% world growth in 2015.

The "structural reforms" undertaken to improve price competitiveness are also unilaterally biased towards internal devaluation, i.e. a reduction in labour costs. Under the current macro conditions, in particular the huge demand gap, they have demonstrated recessionary and deflationary effects [Eggertsson, Ferrero & Raffo, 2014]. Timing and credibility matter, particularly when monetary policy has lost most of its lever [Fernández-Villaverde, Guerrón-Quintana & Rubio-Ramírez, 2014]. In a dynamic recovery, such structural reforms might be useful in the medium term in strengthening the competitiveness of countries with a labour cost handicap [Bouis et al., 2012]. In the contemporary European economic environment, they worsen the low-growth trap. A macro problem of insufficient demand cannot be solved with micro supply policies alone.

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In this specific context, an ambitious investment policy would improve both demand in the short run and supply in the medium run. To overcome the conflicting macroeconomic preferences among eurozone member states, there needs to be a common powerful motive behind the drive to invest, beyond the quantitative impact on output.

In the short term, a low-growth trap is propitious to a high demand multiplier. Therefore the investment programme should contain projects that could be started quickly but which are on hold under current policies and the currently pessimistic view of the future. In addition, however, governments should commit to sustaining policies on a medium-term horizon that encourages the private sector to invest; collectively these investments would then lead to the higher growth expectations being met.

In other words, the content of the investment programme must be such that it engineers an endogenous growth regime. Public and induced private investments should be complementary, innovative to raise non-price competitiveness and welfare-enhancing to improve the quality of growth. Evidence [Valla, Brand & Doisy, 2014] shows that investment in networks and in intangibles should take the lead since they raise the productivity of the production processes using them. This means setting a consistent industrial policy with definite priorities in areas where Europe can still acquire a technological lead. Furthermore, a substantial part of the new investments should be labour intensive in order to provide enough jobs for newly-trained workers.

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To sum up, an investment policy must be agreed at a European level. The need for these investments must be widely accepted. The opportunity to start them here and now must have Europe-wide appeal and must

cover potential innovations that can provide a technological lead to Europe. This all points to the areas of energy and low carbon transition.

2 Climate change and an investment strategy for sustainable growth

The European Union has already set objectives in the 2020 Climate and Energy Package: 20% emissions reduction, 20% increase in renewable energy and 20% increase in energy efficiency, all from 1990 levels. Like the Lisbon strategy set in 2000 to make Europe the most-advanced knowledge-economy by 2010, the "three 20%" objectives are supposed to achieve wonders: a low-carbon economy, numerous green jobs and a strengthening of Europe's competitiveness. They are however in jeopardy of experiencing the same fate as the Lisbon strategy, i.e. massive underachievement.

The targets cover four areas of investment: increasing renewable energy supply capacity, building electricity distribution networks (smart grids), improving energy efficiency in building renovation, and overhauling the means of urban mobility. According to the Energy Efficiency Plan [European Commission, 2011], investments in these areas are labour intensive. Achieving the emissions and energy efficiency targets by 2020 could boost net employment by 400,000 jobs. Likewise meeting the 20% renewable energy targets could create another around 417,000 jobs.

The investment drive is thus clearly defined. However, things are not that simple. To meet the target, investments in electricity networks would need to rise by 100% in the decade to 2020. While for renewable energy, despite a fair start, production capacity has fallen 41% over the last two years, so that €120bn of investment is now needed to achieve the 2020 target. In building renovation, the European Commission estimated in 2012 that at least €60bn would be needed annually to 2020. Alas, the European construction sector has been falling for the last six years, leading to a fall in output of 22% since 2007. Nonetheless, the renovation of building stock remains crucial, since buildings (public, commercial and residential) make up 40% of final energy consumption in Europe according to the International Energy Agency [IEA, 2014]. In transport infrastructure, the investment gap is huge, both for trans-European transport projects, with €500bn needed in the decade to 2020 in rail and port infrastructure, and for urban mobility.

To start the investment drive, several tools must be combined, assuming the political will to achieve the targets: a sufficiently high value for rewarding carbon abatement, certification mechanisms to measure volumes of abatement, risk-sharing devices and multiple modes of financing adapted to the different types of investment.

'To start the investment drive, several tools must be combined, assuming the political will to achieve the targets: a sufficiently high value for rewarding carbon abatement, certification mechanisms to measure volumes of abatement, risk-sharing devices and multiple modes of financing adapted to the different types of investment.'

3 A sufficiently high reward for carbon abatement

These four types of investments have in common a significant gap between their social and private returns in the absence of a sufficiently high value for the carbon externality. If the targets are to be met, this value has to be set at a higher level than the current existing prices, be it the EU-ETS carbon price of around €6/tCO2eq, or the French carbon tax of €14.5/tCO2eq. Setting a high value on carbon externality is key to the efficient transition of these sectors.

A "carbon shock", such as the one proposed by the iAGS 2015 report, with a sudden increase to around €100/tCO2eq, would fill the gap. Such a high carbon price would stimulate public and private investments in research and development and in low carbon technologies, as well as minimise the cost of emission reductions by equalising the marginal abatement costs in all sectors. More importantly, it would rightly incorporate the long-term climate risk, emphasised by the recent IPCC report [IPCC, 2014], into actual short-term investment decisions in all sectors of the economy, fostering a sustainable growth path.

But politically, the economic impact of such an increase would be too great in the short run to be acceptable: a severe reduction in consumption by households, loss of revenues on irreversible investments and existing capital, and a lack of competitiveness in the short run relative to the rest of the world. These three factors and the powerful lobbying they would generate are highly likely to stop any attempt to implement a "carbon shock" of this magnitude. If history is of any use here, the French carbon tax debate of 2010 shows the difficulties and uncertainties around such a "grand bargain".

A vital component of the iAGS proposal therefore is its overcompensation mechanism to smooth the transition. However, as this brings into the already tricky question of financing the transition to a low carbon economy, the huge debate about the fiscal pact, the political economy of the reform becomes even more complicated.

The idea of a smoothing mechanism for the transition period deserves our full attention though. In fact, core to the proposal in this paper is a mechanism for having a transitory differentiation between the carbon price

'Core to the proposal in this paper is a mechanism for having a transitory differentiation between the carbon price included/paid by the installed capital stock and the goods and services it produces and the carbon price included/paid by new investments'

Box 1 - How carbon certificates finance a low carbon project, a balance-sheet approach

Suppose there is a fictitious low carbon project which leads to 5 units of CO2 emission reduction. The Social Cost of Carbon (SCC) is fixed at 2. The project can 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.

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 CO2. 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.

Government		Central Bank		Financial intermediary		Low carbon entrepreneur	
Asset	Liability	Asset	Liability	Asset	Liability	Asset	Liability
						100	
						-90	
		5CC	10	~~10~~	~~10~~	~~5CC~~	~~10~~

- The increase in the balance sheet of the central bank in order to buy carbon certificates is only temporary. The government 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						100	
- Fiscal revenues - Carbon tax EU - Quotas bidding ETS	Climate bond	Climate bond	10	~~10~~	~~10~~	-90 ~~5CC~~	~~10~~

- At maturity of the climate bond, the balance sheet of the central bank is back to 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						100	
~~- Fiscal revenues~~ ~~- Carbon tax EU~~ ~~- Quotas bidding ETS~~	~~Climate bond~~	~~Climate bond~~	~~10~~	~~10~~	~~10~~	-90 ~~5CC~~	~~10~~

included/paid by the installed capital stock and the goods and services it produces and the carbon price included/paid by new investments, i.e. future capital to be produced. New investments would integrate a high valuation of carbon as soon as possible, while the existing stock would temporarily be spared in order to mitigate the political economy sources of lock-in. This can be achieved by applying a high notional carbon price to our four investment categories, all of which produce an abatement of GHGs and prepare the groundwork for a really sustainable recovery.

4 Certification mechanism to value volumes of abatement

We thus suggest that a high social cost of carbon (SCC) is used to evaluate returns from new investments in these four sectors, while the existing carbon prices continue to cover the capital stock as a whole: in time these should catch up with the SCC level. We propose to use the SCC to establish, in monetary terms, a new measurable space, that of "carbon assets", i.e. the value of CO2eq emissions saved by new investments. A carbon asset would be created when the quantity of avoided greenhouse gases (GHGs) is checked and certified by independent agencies, and would be accepted as a repayment by the public monetary authority, in this case the ECB (see Box 1 for the balance sheet approach to the whole process).

The public guarantee on the value of carbon asset bought by the central bank is not a substitute to the "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 new investments during the transition phase of production processes. This way, it considerably reduces the immediate redistributive effects of an optimal carbon price.

Over time, the real carbon price should converge with the SCC as there are strong incentives for governments to put in place the

necessary fiscal measures to ensure this. If they do not, either the central bank makes a loss if the government does not meet its guarantee, or the government makes a loss if extra revenues to redeem the carbon debt have not been generated.

5 The certification process

This certification process is necessary to keep track of reduced emissions compared with a baseline scenario. It is also necessary in order to compare the costs of mitigation and adaptation between the four identified sectors. Most of its characteristics can be derived from the Clean Development Mechanism set up by the Kyoto Protocol. The baseline setting must be standardised to avoid a project-by-project assessment. But it must also be careful to deliver with sufficiently high precision on the emission reduction constraint.

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Criteria could be set to classify certain types of small projects as automatically eligible for certification to ensure fast implementation, kick-starting investment decisions and boosting the short-run effect of the proposal; over time these criteria could be adjusted as experience dictates. This could be especially useful in the energy-efficient buildings and the smart grids sectors, where production processes involve small firms, but political decisions involve several agencies facing complex budgetary constraints.

Controls would need to be more stringent on bigger investment projects, such as those concerning urban mobility or energy supply, where the firms are bigger, and public money is often more directly involved. But the process for certification should still be as automated as possible, while still ensuring concrete emission reductions are met. The process should also be as open as possible so that conflicts of interests can be circumvented. The goal is to achieve the right equilibrium between the incentive to supply enough new low-carbon projects and the environmental integrity of the programme.

Stakeholders should agree on a trajectory for the carbon price meeting the SCC, which minimises the impact of transition costs while ensuring carbon neutrality can be achieved in the medium term. This should ensure there is no "free pass" for industries to keep on using carbon intensive technologies, nor for governments to "wait and see" if increasing pressure on traditional carbon intensive methods forces the issue. Rather it is a catalyst for a transition which may otherwise never get off the starting line if only "the best case" options are explored.

6 Tailor-made risk-sharing devices: the examples of construction and urban mobility

The carbon certificates produced by the process described above are a materialisation of the gap between the social and private returns from investments in the four sectors studied in this report. But the financing structure of investments in each of these sectors is very different, so we need to carefully analyse the potential effect of these certificates on the investment behaviour of each type of economic agent. How will this proposal change the investment behaviour in the short and long term? Will the incentive be great enough to encourage the much needed structural transformations in some sectors? Will it target the most efficient emission reductions?

We take as examples two very different sectors from the four already described: energy efficiency in buildings, and urban mobility. These differ widely in terms of the type and size of economic agents involved, their budgetary and credit constraints, and employment qualifications. We show how the general framework around the "carbon certificates" can fit into these different financing environments.

In the European Union, the potential for energy efficiency in building renovation has been estimated at around €300bn between 2015 and 2020; €180bn to reduce emissions by 20%, and €420bn to cut them by 40% [Ecofys, 2011]. The SFTE project final report [AFTER, 2014] underscores the crucial advantages of targeting this sector in the short run: projects are immediately available (especially public housing); job intensity is high and targeted on local medium-sized firms; and the impact on overall energy efficiency is remarkable, with a very small rebound effect. If the building sector is to be targeted as a crucial sector for energy and climate transition, then the incentives need to be great enough to convince these small and medium sized-firms to reorganise to incorporate the required skills. Carbon certificates, even valued at a high SCC level, will probably not be enough to achieve this, and should be accompanied by other public policies. David and Fabre (2007) suggested in the case of France a three-step roadmap to cut by a factor of four the energy consumption of the existing housing sector: first, create a market for energy efficiency through financial incentives, labelling, and training on the necessary skills and techniques; second, organise this market through regulations making the retrofitting of buildings mandatory; third, commit to upgrading the energy efficiency of all buildings in the public and private sectors

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Table 2 – Investment needs per sector and the role of the carbon certificate

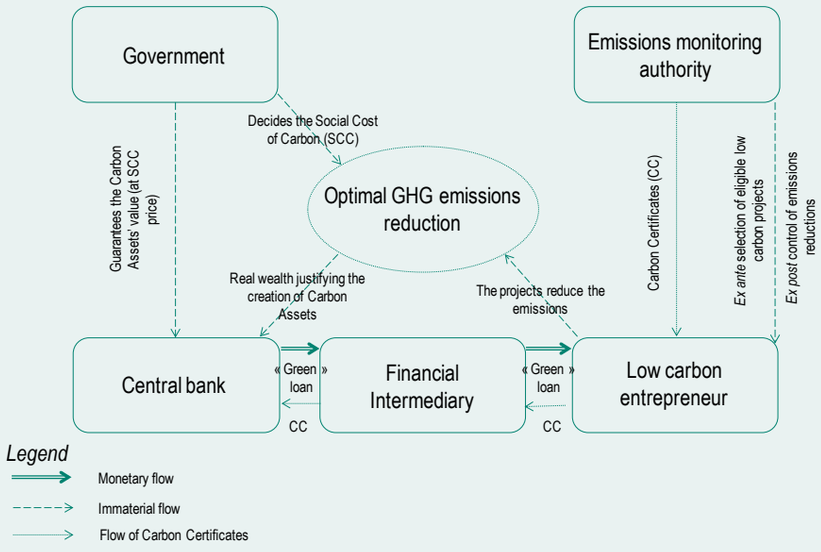
	Investment needs to 2020	Existing European financing instruments	Risks and potential problems	Implementation of the "carbon certificate" (CC) mechanism
Renewable energy supply capacity	€120bn in the decade to 2020	EIB: loans on favourable terms, guarantees, equity, grants (€6.4bn in 2013)	Perceived risks on the evolution of support policies, volatility on the energy market, administrative roadblocks	Enhance the link between local projects (financed by retail banks) and the financial market → concessional loans, securitization vehicles, guarantee funds, compatible with the CC mechanism
Electricity distribution networks	€120bn to 2020	CEF: technical assistance, coordination among member-states, co-financing (€5.85bn to 2020); EIB, CSF, CSFr, Partn. Contracts	Investment gap	Mostly public funds → maximum effect of the CC mechanism
Energy efficiency in building renovations	€60bn annually to 2020 (€300bn total)	JESSICA: structural funds to build a series of specific funds for revolving equity, loans and loan guarantees to local authorities; EEEF: provides loans, loan guarantees and equity through PPPs with local authorities or private authorities acting on their behalf (€265 million endowments, €146 million committed); ELENA: joint EIB-European Commission initiative for preparation costs, assistance to design eligible project proposals (€49mn in technical assistance for €1.6bn of investment)	Low levels of energy expenses in the buildings sector (ineffectiveness of the direct price signal), difficult access to capital, divergent incentives of owners and occupants, lack of awareness on energy efficiency potential benefits, need for training programmes	Easy investments in public buildings or large scale commercial buildings; → maximum effect of the CC mechanism. Much more difficult for residential renovation (third party financing is ideal in this case: an energy performance contract between the municipality and the energy company serves as collateral to the loan financing the renovation) → adaptation of the CC mechanism to the fragmented nature of the sector, additional policies on technical assistance required.
Urban mobility	€500bn in the decade to 2020 (rail and port infrastructure and urban mobility)	CEF: grants coupled with potential EIB loans (€26bn to 2020, essentially for rail), LGTT, Project Bond Initiative, Structural Funds, European Bank for Reconstruction and Development, JESSICA, JASPERS	Limited investment capacity of the public sector, lack of technical assistance for local government.	Big public or PPP projects → direct and easy use of the CC instrument

Note: Source: iAGS (2015); Connecting Europe facility (CEF); European Investment Bank (EIB); Cohesion and the Structural Funds (CSF); Common Strategic Framework (CSFr); Partnership Contracts (Partn. Contracts); Joint European Support for Sustainable Investment in City Areas (JESSICA); European Energy Efficiency Fund (EEEF); European Local Energy Assistance (ELENA); Loan Guarantee for trans-European transport (LGTT); Joint Assistance to Support Projects in European Regions (JASPERS).

each time ownership changes hand, and each time groundwork is implemented. The roadmap might have reached the early start of step 2 [Bullier & Milin, 2014], but it is uncertain that carbon certificates alone can boost the process.

To maximise their participation in low carbon investments, the risk to the traditionally reluctant members of this fragmented sector needs to be lowered. The renovation of public buildings could act as an immediate pipeline of projects, giving a short-term boost to the economy and the job market [Italian presidency of the council of the European Union, 2014], and increasing the private sector's confidence in following suit. Existing European financing tools could be used with minor changes to implement the carbon certificates mechanism [iAGS, 2014, p.140-141], especially for public and commercial buildings. The residential building sector would be better covered by a third (public) party taking on the investment risk together with quality controls and the benefit on future energy

Box 2 – The carbon certificate mechanism



efficiency gains. That way, buildings owned by credit-constrained households will not be excluded from the transition process[1].

The urban mobility sector has very different characteristics. While most of the financing in the housing sector comes from credit (70% to 80% according to McKinsey Global Institute 2013) and the rest from self-financing, urban mobility involves infrastructure investments, essentially financed through public funds (around 60%), with the rest coming from equity (around 10%), credit (20%) and bonds (10%). At the European level, the need for investment in projects with trans-European benefits stands at around €500bn for the current decade, with a financing gap, in particular for urban mobility at a time of very tight local budgets. The emergence of sustainable transport modes could increase the energy security of the Union [Dickel and alii, 2014], while reducing a negative externality which costs around €230bn a year [iAGS, 2014, p.143-144]. The boost to employment could be high, since job creation would be mostly within the civil engineering sector, which has been deeply affected by the economic downturn, and is relatively labour intensive.

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Instruments to finance these investments are already well structured [iAGS, 2014, p.145-146]. Since most of these investments will be made by public investors, it seems like a good place for the implementation of the simplest version of the carbon certificate mechanism, with the provision that control on efficiency is tightened up due to the large scale of the projects.

(1) Examples of such schemes are: loans subsidised by the KfW in Germany; energy performance contracts by the Berlin energy agency, and by French and Italian regions; the 'hot rent' system in Sweden; the Property Assessed Clean Energy scheme in the US; and the Green Deal in the UK.

The risk-sharing question is less of an issue here, since the sector is much more homogenized than the housing one.

7 Building a direct and short channel to transmit ECB policy to the economy

The political implications of the new eurozone "grand bargain" are just emerging after the announcement of the ECB's QE scheme, whereby the ECB will buy around €1100 billion of sovereign bonds (mostly) and private assets (at the margin) in exchange for the pursuit of structural reforms and fiscal consolidations. The central banks of the developed countries have already created 4 trillions of dollars since the autumn of 2008 in different programs of liquidity injections (such as the Long Term Refinancing Operations offered to commercial banks by the ECB at very low interest rates, and the large-scale and repeated government and mortgage bond-buying programs by the Federal Reserve, the Bank of England and the Bank of Japan). The effects on productive investment have been weak at best, except for the revival of the real estate market in the US and in the UK. The monetary creation process is, in our proposal, totally different.

In a quantitative easing policy, the central bank monetises existing assets through the large-scale purchase of (usually) long-term sovereign debt, with the aim of keeping interest rates as low as possible and reviving inflation. Under this mechanism, support for new investments comes indirectly as the result of portfolio

Box 3 – From the Kyoto Protocol to the next Paris Conference

The Kyoto protocol, signed in 1997 following the 1992 United Nations Framework Convention on Climate Change (UNFCCC), called for the 36 developed countries that signed up to reduce their GHG emissions by 4% from their 1990 level between 2008 and 2012. They actually reduced their emissions by 24%, mainly due to the so called "hot air" coming from the eastern economies in transition. However, this reduction was insufficient to combat the growth in global GHG emissions.

The Copenhagen Conference in 2009 was supposed to find a successor to the Kyoto Protocol. But it failed on the question of the "burden sharing" of mitigation efforts, dedicating most of the negotiation resources and time to debating the emissions reduction commitments of Annex 1 (developed) and non Annex 1 countries, and the setting of a global carbon price.

The following year, the Cancùn Conference of the Parties recognised the necessity of a paradigm change in the approach of the negotiations. Ensuring individual countries' actions are compatible with the global goal of containing climate change was highlighted as crucial as was the creation and financing of a green fund by developed countries to help cover the costs for developing countries.

The recent Lima Conference, in December 2014, emphasised climate finance as a key issue for the next Paris Conference of Parties. The ability of developed countries to build confidence on the question of long-term climate financing will be of the utmost importance. Europe, historically the leading figure in climate diplomacy, should take the lead in ensuring the right conditions for this confidence are created.

reallocation by financial institutions and a lower cost of capital for borrowers. In theory, by reducing the risk/rates on long-term public debt, holders of public debt will look to diversify into other more risky/higher return instruments, channelling the decrease in the interest rate into a larger spectrum of private assets. However, following a financial crisis, this impact can be muted by investors' preference for liquidity. Moreover, potential borrowers may have little appetite for investment, either because effective demand is insufficient, or because their priority is debt reduction.

With our proposal, the ECB would buy financial instruments issued by the low-carbon investors (i.e., certified carbon credits and project bonds). The monetisation of those instruments would generate new revenues by creating a direct transmission channel to fund investment in sustainable sectors of the economy. By focusing on the four sectors already described, it would help close the gaping output gap in the short run and create a credible route to a low carbon economy.

'With our proposal, the ECB would buy financial instruments issued by the low-carbon investors (i.e., certified carbon credits and project bonds). The monetisation of those instruments would generate new revenues by creating a direct transmission channel to fund investment in sustainable sectors of the economy.'

It should be noted that the ECB's current preference for market instruments, and among these sovereign debt, is not the result of any legal obligations or constitutional requirements under European treaties, nor owing to the high risks of private equity. According to Philippine Cour [2014], it is rather a deliberate choice to promote market liquid instruments over a broad spectrum of assets, a tendency that she deems reversible by looking at 20th century precedents.

8 Conclusion: 2015: a critical time for both European recovery and climate change

2015 will be marked by increased urgency on climate change (the IPCC issued a new warning on climate change in 2014, the Conference of Parties in Paris is to be held in December 2015), and by political demand for a European recovery. The European Union is the only region in the world which has not caught up with its 2007 production levels. Lack of investment, which has slowed by around 20% since 2007, has dangerously degraded the region's growth potential.

Debates on these two subjects are currently conducted separately: on the one hand under the framework of climate negotiation, the EU-ETS mechanism and national climate plans; on the other hand under the initiative of the Juncker investment plan and the announcement of the asset purchase programme by the ECB.

The asset purchase program by the ECB aims at providing new leverage on the price level. But, in the current environment, by restraining itself to assets traded on the secondary markets, the impact on encouraging investments is limited at best, reducing the scope of any recovery in the Eurozone. Moreover, QE under these conditions carries the risk of artificially inflating the price of financial assets without creating the foundations for a sustainable recovery.

The mechanism proposed in this paper offers precisely a new form of controlled QE (through the carbon metric) which could be the basis for coordinating the transition to a low-carbon economy, while reinforcing the non-price competitiveness of Europe against the rest of the world. As we have seen, it can accommodate the diverse nature of the various sectors linked to low carbon transition, from the numerous small firms coupled with budget-constrained public agencies of the energy efficient buildings sector, to the large public investments involved in urban transportation projects. The certification rules may need to differ between sectors to avoid either too high an administrative cost or too low a carbon impact. The program could focus on one or two specific sectors as part of an experimental phase, and then be progressively widened.

We believe the European Union should initiate such a programme in order to give a low-carbon direction to future growth and reinforce its historical leadership on climate matters.

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