OPTIMAL USE OF THE EU GRANT AND FINANCIAL INSTRUMENTS IN THE NEXT MULTIANNUAL FINANCIAL FRAMEWORK TO ADDRESS THE CLIMATE OBJECTIVE

Final Report

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Contents

GLOSSARY[1]

Bankable project	A bankable project is a project that is profitable so as to attract sufficient finance from investors to cover its costs.
Blending facility	The provision of grant finance into a financial package together with loans. The grant finance reduces the risk adjusted interest rates, making capital more accessible for beneficiaries.
Bond	A debt investment in which an investor loans money to an entity (corporate or governmental) that borrows the funds for a defined period of time at a fixed interest rate. Bonds are used by companies, municipalities and governments to finance a variety of projects and activities.
Climate proofing	Incorporating climate adaptation needs into projects from the design and planning stage.
Collateral	A borrower's pledge of specific property to a lender, to secure repayment of a loan.
Debt	An amount of money borrowed by one party from another. Many corporations/individuals use debt as a method for making large purchases that they could not afford under normal circumstances. A debt arrangement gives the borrowing party permission to borrow money under the condition that it is to be paid back at a later date, usually with interest. Bonds, loans and commercial paper are all examples of debt.
Discount rate	The interest rate used in discounted cash flow analysis to determine the present value of future cash flows. The discount rate takes into account the time value of money (the idea that money available now is worth more than the same amount of money available in the future because it could be earning interest) and the estimated risk or uncertainty of the anticipated future cash flows.
Economic rate of return (ERR)	It reflects the overall net benefits of a project, including private returns less private costs and wider social benefits less social costs. It also integrates any existing open or hidden subsidies (taxes) that increase social costs and private profitability, as these are social costs (benefits).
Equity	The provision of capital to a firm, invested directly or indirectly in return for total or partial ownership of that firm and where the equity investor may assume some management control of the firm and may share the firm's profits.

[1] This glossary follows Regulation (EU, EURATOM) No 966/2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, EURATOM) No. 1605/2002.

Financial instrument (under the EU budget)	Union measures of financial support provided on a complementary basis from the budget in order to address one or more specific policy objectives of the Union. Such instruments may take the form of equity or quasi-equity investments, loans or guarantees, or other risk-sharing instruments, and may, where appropriate, be combined with grants
'First loss' piece	A debt class with the lowest payment priority in a senior/subordinated debt structure. It is used to cover potential losses for a portfolio of loans provided to a specific target group, up to a defined percentage of losses ('first-loss' cushion).
Grant	Grants are direct financial contributions, by way of donation, from the budget in order to finance an action intended to help achieve a policy objective and/or the functioning of a body which pursues an aim of general public interest or has an objective forming part of, and supporting, a public policy ('operating grants' in the EU).
Guarantees	A written commitment to assume responsibility for all or part of a third party's debt or obligation or for the successful performance by that third party of its obligations if an event occurs which triggers such guarantee, such as a loan default.
Institutional investors	Usually pension funds and insurance companies, which pool large amounts of sums to invest in assets. Institutional investors are on average conservative on risk and may have statutes limiting their investment to a class of investments with high credit rating.
Internal rate of return (IRR)	The IRR is the interest rate (also known as the discount rate) that brings the net present value (NPV) of a series of cash flows (i.e. period-specific revenues less costs) to zero.
Leverage	In the context of EU financing instruments, the leverage effect is the mobilised global investment which exceeds the size of the Union contribution according to the indicators defined in advance.
Loan	An agreement which obliges the lender to make available to the borrower an agreed sum of money for an agreed period of time and under which the borrower is obliged to repay that amount within the agreed time
Mezzanine debt	Debt that incorporates equity-based options with a lower priority debt. In terms of seniority, it sits behind the 'senior debt' but before equity providers. See quasi-equity.
Quasi-equity	A type of financing that ranks between equity and debt, having a higher risk than senior debt and a lower risk than common equity. Quasi-equity investments can be structured as debt, typically unsecured and subordinated and in some cases convertible into equity, or as preferred equity.

Risk-sharing instrument	A financial instrument which allows for the sharing of a defined risk between two or more entities, where appropriate in exchange for an agreed remuneration.
Senior debt	Debt is categorised by seniority, and has to be repaid in the order of this seniority. Senior debt represents borrowed money that a company must repay first if it goes out of business. As such, senior debt is considered lower risk and carries a relatively low interest rate.
Technical assistance	Provisions of technical services and/or funds (usually grants) for technical services, e.g. feasibility studies of projects or capacity building for local partners.

EXECUTIVE SUMMARY

1. Why is it relevant to look at financial instruments under the EU budget?

According to the Commission's Low Carbon Economy Roadmap an additional €270 billion on average will be needed annually over the next four decades to achieve the transition to a low-carbon and climate-resilient economy. Meeting these investment needs will require the leveraging of substantial amounts of private finance.

Setting the right regulatory framework remains the main lever for the EU to mobilise private investment in climate-related projects. Yet, the EU budget offers important opportunities to support and incentivize market action, particularly through the use of financial instruments, such as debt and equity, or technical assistance. Building on the positive experiences gained under the 2007-2013 Multiannual Financial Framework (MFF) the Commission plans to simplify and expand the use of financial instruments under the 2014-2020 EU MFF. Climate mainstreaming is proposed as the key mechanism to help meet the objective that 20% of the next MFF should be targeting climate-relevant activities.

Looking at the existing set of Commission proposals for financial instruments in different policy areas of relevance key questions arise: to what extent are the current proposals fit for purpose? Is there a need to scale up action and should this happen via modifying the proposed instruments or creating new instruments? Which way forward appears to be most effective and efficient in terms of meeting the EU's climate policy objectives and making the best use of scarce public budget resources?

2. What action can help maximize the relevance of financial instruments for climate change mitigation and adaptation?

On the basis of an assessment of the needs, gaps and barriers, this report finds that additional action to complement or modify the Commission's proposals for financial instruments is warranted in order to better address the challenges of delivering an adequate level of investment in the low-carbon, climate-resilient economy. The main areas of action include:

- Better *mainstreaming of climate objectives in centrally managed instruments*, including introducing 'climate windows' under the Debt Facility of the Horizon 2020, the EU Framework Programme for Research and Innovation, and expanding the scope of the EU Project Bond Initiative;
- Better *mainstreaming of climate objectives in instruments under shared management*, including a loan and guarantee facility for energy efficiency; and
- Making use of resources from the 2014-2020 LIFE programme to provide *targeted technical assistance and knowledge transfer* for climate change adaptation and energy efficiency projects.

In the remainder of this summary we further specify these strands of actions.

3. Why do investment gaps and barriers justify additional action?

Tackling the climate change mitigation challenge requires cutting down the overall demand for energy through action focused on energy savings in critical sectors and decarbonising energy supply through the promotion of renewable energies.

At the same time, adaptation to climate change will depend on a mixture of technology-based (grey), environment-based (green) and informational (soft) policy options. Green options can also help to support the mitigation challenge. Many mitigation and adaptation options are currently not taken up as a result of reduced public spending and barriers to private investment that help to sustain major investment gaps in a number of key areas (see Box 1 for an overview).

Box 1: Examples of sector-specific investment needs and barriers

1) **Energy efficiency in buildings:** According to the Commission Roadmap for moving to a competitive low carbon economy in 2050, investment needs are forecasted to increase by up to €200 billion by 2020. Insufficient regulatory frameworks are a major barrier. Access to debt finance is a challenge particularly for small scale projects. Credit risks, perceived long payback times and split incentives between owner and tenants prevent private investment.
2) **Energy efficiency in industrial processes, particularly in SMEs**: Many SMEs have untapped energy savings potentials, but depend on external financing from banks. A lack of information can prevent SMEs from identifying their saving potentials. Banks often perceive lending for energy savings in SMEs as too risky or not interesting, given the oftentimes small scale of projects.
3) **Accelerating the uptake of emerging renewable energy technologies** and **mature renewable energy technologies:** The European Strategic Energy Technology (SET) Plan requires additional investment of €50 billion until 2020. An important problem concerns lack of financial support to the demonstration, pilot testing and replication phase of renewable technologies. Large-scale renewable energy projects can suffer from a lack of equity from the project sponsor. Perceptions of large commercial and political risks, high transaction costs and timing uncertainties along the development and implementation cycles often hold back private investment in renewable energy.
4) Developing **transmission** (cross-border) and **distribution** (national/regional) **grids**: The estimated additional annual grid investment costs range from €160 to €840bn by 2050. Insufficient public and private finance and insufficient access to long-term finance are among the most important obstacles, caused by, among other things, perceptions of technology and policy risks.
5) Support for **low carbon transport modes, advanced technologies and the supply infrastructure for clean transport fuels:** Estimates forecast that an additional €160 billion of annual investment will be needed by 2050. Broad scale system changes are hampered by regulatory failure, such as missing economic incentives or a lack of a long-term policy orientation. The lack of expertise with regard to private investments in infrastructure and the perception of high policy risk remain critical barriers.
6) Improving the ability of the **agricultural** sector to reduce GHG emissions and to adapt to climate change: this could require approximately €12 billion of annual funding in order to manage soil organic matter on all arable areas at risk, for example. The lack of interest in financing small scale projects as well as information constraints among financial actors are among the main problems in this area.
7) Improving **water efficiency** and **flood prevention:** Robust costs estimates are not available. It has been estimated that sea walls and flood prevention measures require between €1.5 billion and €3 billion of investment per year respectively. Adaptation to climate change however requires an integrated approach to planning and investment in water, energy and transport systems. Integrated actions at the **urban level** require new financial models, which represent a new avenue for action.

A look across these examples confirms the importance of regulatory and structural barriers as well as more specific barriers inherent to low-carbon, climate-resilient projects. These include the small scale of many projects in the area of energy efficiency, and the associated transaction costs, and the perception of high policy and technology risks attached to renewable technologies and low-carbon infrastructure.

Many projects in the adaptation area are not well understood in terms of their potential to generate revenue. Informational problems and a lack of expertise for project development are widespread. As a result, low-carbon and climate resilient projects are particularly prone to sub-optimal investment situations, where projects are not realised although they are in principal bankable. Low-carbon, climate resilient investments should therefore be a priority area for support through financial instruments under the EU budget.

4. In which areas is additional action useful?

A range of financial instruments exist to address barriers and help leverage additional private investment. Principally these include debt-instruments (loans and loan guarantees), equity and quasi equity, other risk sharing arrangements as well as the provisions of technical assistance which can be blended with financial instruments and grants.

Financial instruments appear particularly suitable in the area of energy efficiency in buildings, SME support, the demonstration, deployment and market uptake of emerging and mature renewable energy technologies at different scales, and for the development of low carbon and climate resilient energy transmission and distribution infrastructure. Technical assistance is a necessary advisory and capacity-building instrument to ensure the successful implementation of financial instruments. Grant finance will remain the main type of public financial support for many actions including a number of low carbon transport systems, agriculture land management and the majority of risk prevention and adaptation projects. In these areas, more experimentation and pilot-testing will be necessary before financial instruments are more widely used.

The EU has gained valuable experience with using financial instruments and technical assistance under the 2007-2013 MFF. The new Financial Regulation provides for the first time a coherent governance framework for financial instruments, which simplifies and streamlines their use. However, the proposals on the different 2014-2020 EU funding programmes/instruments set out fairly generic provisions for financial instruments. There are no provisions regarding the scale and scope of financial instruments in relation to low-carbon, climate resilient finance. The only straightforward case regards the future LIFE programme, which has a dedicated sub-programme for climate action. Unfortunately, the LIFE budget is small and only a limited amount can be allocated to financial instruments. This means that the future LIFE programme is not well-suited to create the critical mass needed and cover all relevant sectors.

Given the scale of the investment needs, more substantive support for climate action should be sourced from elsewhere. This is exactly the rationale of the climate mainstreaming approach in the next MFF. In terms of scale, the biggest opportunities exist under Cohesion Policy, Rural Development Policy, Horizon 2020 and the Connecting Europe Facility (CEF). Additional provisions should be further specified in the Fund-specific Regulations to better align the proposed financial instruments to the EU's climate policy objectives and allow better targeting of those areas that are characterised by the most acute investment needs.

Financial instruments have to be market-driven to be effective. This should not, however, prevent action being taken to ensure that instruments are better targeting policy objectives, as long as the action does not constrain the overall effectiveness and efficiency of the instruments and helps to yield considerable EU added value.

5. Which options to modify proposals for financial instruments are relevant?

The final list of options for improving the use of financial instruments for the purposes of climate change mitigation and adaptation was the result of discussions with relevant policy actors through interviews and an expert workshop, following a step-wise evaluation and selection process. The options concern both the modification of the financial instruments already proposed under the Horizon 2020, CEF, Cohesion and Rural Development Policy and the creation of new instruments under the future LIFE programme.

5.1 Mainstreaming across the proposed financial instruments under central management

The main focus should be on financial instruments under the Horizon 2020, CEF and LIFE. These offer great opportunities for mobilising investment in those areas identified as having acute investment needs and barriers to mobilising private finance, including particularly renewable energy technologies, low carbon and climate resilient energy infrastructure, energy efficiency and adaptation to climate change impacts.

Option: Introduce 'climate windows' under the Debt Facility of the Horizon 2020

Introducing a 'climate window' under the RSFF II (mid-caps and large companies) and the RSI II (SMEs) would help to ensure the better targeting and scaling up of finance for low carbon and climate resilient technologies along the entire innovation chain. Special focus should be placed on demonstration, deployment and replication, as it is a key financing gap. The option addresses a current gap in the market between the demand for and supply of loans and guarantees for risky R&I investments. The proposed Regulation on Horizon 2020 allows for the introduction of policy specific windows for financial instruments, in this case climate policy. The specific rules on how this can be operationalised shall be set out in an Implementing Act and the multiannual work programme adopted by the Commission.

Option: Expand the EU Project Bond Initiative (PBI) under CEF, to include renewable energy generation together with its connection to the grid

The EU PBI could support renewable energy generation infrastructure in cases where the support provides strong EU added value and is of relevance to cross-border energy supply. This would include projects on strengthening cross-border energy grids. Renewable energy generation requires substantial investment, but is currently not a priority of the CEF/PBI. The CEF/PBI lends itself to financing these projects, given their average size. Moreover, such projects generate long-term, stable revenue streams. Credit enhancement will improve the rating of the projects and make them attractive to institutional investors.

Option: Technical assistance dedicated to adaptation to climate change

This option aims to incentivise the private sector to mitigate risks and integrate adaptation measures into infrastructure development, management practices and supply chains across the EU. This instrument should be financed under the climate action sub-programme of the future LIFE. It can be implemented by the Commission or jointly with financial institutions such as the EIB. It would ensure a coherent technical assistance approach across the EU while at the same time it can be used alongside other instruments and allow for their blending.

Option: Technical assistance for capacity building and knowledge transfer for energy efficiency

Such assistance would provide support in the form of grants for capacity building and knowledge transfer under the sub-programme of the future LIFE. It would include project-specific technical assistance, e.g. for the preparation of planning and tendering procedures, but also broader technical

assistance to increase the knowledge and understanding of energy efficiency among all key players. Technical assistance could also support the aggregation of smaller projects to reduce transaction costs and reduce risks and hence increase the projects' bankability.

5.2 Mainstreaming across the proposed financial instruments under shared management

Financial instruments under Cohesion and Rural Development Policies could target smaller scale projects in the area of energy efficiency, renewable energy and integrated projects for mitigation and adaptation. A key priority is action at urban level. Respective managing and rural development authorities need clear incentives to include provisions in their expenditure programmes which will be adopted at the end of 2013 and in early 2014. Templates for 'off the shelf instruments' can offer specific models and products.

Option: Introduce a dedicated loan and guarantee facility for energy efficiency

The facility could be flexible and responsive to specific market needs thereby ensuring the effective implementation of projects according to national and regional circumstances. It could target a wider range of actors depending on their needs and specific barriers they face including commercial banks, owners of buildings, SMEs, ESCOs and public authorities.

5.3 Additional options that require further policy testing

Options listed here require further conceptualisation and testing. They cannot be easily put forward under or in addition to the current set of financial instruments, but have the potential to offer some advantages in the future:

- using *micro credit instruments* at the local level, particularly for small scale energy efficiency and micro-renewable energy generation, eco-innovation and the development of community business in rural areas;
- using *city project bonds* at the municipal level to target municipal or regional large-scale mitigation and adaptation projects using a similar concept to the EU Project Bond Initiative;
- testing a new dedicated '*Natural Capital Fund'* at the EU level which would focus on testing, experimenting and exchanging good practices in financing ecosystem-based adaptation to climate change. The aim would be to develop business models and possibilities for revenue streams which currently represent a challenge and for which there is low appetite among private investors.

'Green' securitization offers additional promising prospects but was not within the scope of the study. In addition it appears relevant to strengthen procedural requirements and efforts to build the information base for investment planning. These can be implemented alongside the use of financial instruments and grant financing in the future EU budget including in project selection criteria, ex-ante conditionality for mainstreaming climate change concerns into expenditure and investment programming, better ex-ante assessment and good monitoring systems. The creation of dedicated expert groups could add value, if these expert groups are focused on specific instruments or specific sub-sectors.

6. Final remarks

All of the options address relevant needs in a complementary manner. Instruments under central management offer a better opportunity than instruments under shared management where there is a need to coordinate with a much larger number of actors. However, the latter instruments offer the largest share of potential funding. Hence, it is important to pursue both strands of action. The ex-ante assessments required by Article 140, 2(f) of the Financial Regulation provide an important entry point. Detailed rules and provisions for the recommended options should be embedded in the relevant implementing acts and multi-annual work programmes adopted by the Commission.

1 INTRODUCTION

1.1 Financing climate action: needs and challenges

Climate change concerns have achieved considerable weight on the EU policy agenda, particularly with regard to mitigation, but increasingly also adaptation.[2] The long-term EU objective of stabilising the concentration of greenhouse gas emissions (GHG-emissions) in the atmosphere at a level to avoid an increase in global temperature beyond 2° Celsius has shaped international policy negotiations. The targets set forward by the EU's climate change and energy package for GHG emission reductions, energy savings and renewable energy promotion (so called 20-20-20 targets) have been included as one of five headline indicators in the Europe 2020 Strategy for smart, sustainable and inclusive growth, the EU's economic growth strategy for this decade.[3] The Strategy is implemented through seven 'Flagship Initiatives' which set out *inter alia* long-term policy roadmaps which aim to turn Europe's economy into a low-carbon, climate resilient and resource-efficient economy that operates within safe environmental thresholds.

A flurry of recent assessments have highlighted that the availability of technologies to address the climate challenge is not the key problem. Relevant technologies are already in place or in emerging status. Their effective deployment is often a governance and financial challenge. Creating the right support conditions is of strong relevance. The scale of investment required for the transition to a low-carbon, climate-resilient economy underlines the need for mobilising substantial financial resources through financial markets. The investment needs exceed the scope of public budgets by far. For example, only in the field of Trans-European infrastructure networks for transport, energy and ICT, the European Commission estimates that between €1.5 and €2 trillion are needed to meet the Europe 2020 goals.[4] Importantly, the call for increased investment comes against the backdrop of a sustained economic crisis, public debt crisis in many Member States and financial markets constraints[5,6] .

Potential sources of private finance exist for different types of low-carbon, climate-resilient projects. For example, institutional investors such as pension funds often seek new long-term, inflation-secure investments which can be guaranteed by low-carbon infrastructure, for example. But low-carbon, climate-resilient projects are often exposed to particular policy, technology, market or financial risks. Regulatory frameworks on the investment activity itself (e.g. Basel III rules[7]) and insufficient policy frameworks relating to the assets themselves (infrastructure, corporations, etc.) can provide major barriers for investors.[8]

Other barriers for private investors relate to *inter alia* a lack of information and skills, regulatory uncertainties, the scale of projects, organizational barriers, high upfront costs and longer time of

[2] Medarova-Bergstrom, K., Volkery, A., Schiellerup, P., Withana, S., Baldock, D. (2011) *Strategies and Instruments for Climate Proofing the EU Budget.* IEEP, Brussels.

[3] European Commission (EC) (2010) *Europe 2020 – a strategy for smart, sustainable and inclusive growth*, Communication from the Commission, COM(2010)2020, 3.3.2010, Brussels

[4] EC(2011), *Proposal for a Regulation establishing the Connecting Europe Facility*, COM (2011) 665, Brussels 19.10.2011

[5] International Transport Forum (2012), 'Statistics Brief, Infrastructure Investment, ITF at OECD, June 2012, http://www.internationaltransportforum.org/statistics/StatBrief/2012-06.pdf

[6] EEA (2011) *Transport infrastructure investments* (TERM 019) - Assessment published Jan 2011, http://www.eea.europa.eu/data-and-maps/indicators/infrastructure-investments/assessment

[7] "Basel III" is a comprehensive set of reform measures, developed by the Basel Committee on Banking Supervision, to strengthen the regulation, supervision and risk management of the banking sector. These measures aim to improve the banking sector's ability to absorb shocks arising from financial and economic stress, whatever the source; improve risk management and governance and strengthen banks' transparency and disclosures.

[8] Reviglio E. (2012), *Financing Future Infrastructure, EU 2020 and Long Term Financing, regulatory aspects, Global perspectives for project financing*, Joint EC-EIB/EPEC Private Sector Forum, Bruxelles, 6 June 2012, http://www.eib.org/epec/resources/presentations/psf-06062012-presentationnotes-cdp.pdf.

maturity or/ and the immaturity of technologies. Together they can create high risk to investment.[9] Returns on investment, on the other hand, are often not compensating for these risks. Bank loans for projects or products considered less commercially viable in the absence of full internalisation of external costs or associated with high risks are difficult to obtain particularly in the current economic and financial climate. If loans are granted, they often come with prohibitive high costs. This is a particular problem for SMEs. Both demand for finance and financial capital is often available, but information gaps, skill lacks, overall levels of risk perception or mismatch between expectations and real rates of return on investment prevent successful finance.[10] Public finance, and public banks in particular, hence play an important role in incentivising markets.

1.2 The role and relevance of the EU budget

EU public expenditure plays an important part in this overall context. Grants, technical assistance or financial instruments under the EU budget can help reduce uncertainties and better share risks in projects management. De-risking can help supporting substantial leverage of private investment into low-carbon, climate-resilient finance. Although the EU budget is small when compared to the national budgets, it can have an important leverage function.

Climate change is recognised as a priority by the Commission, as evidenced in the June 2011 proposals for the 2014-2020 EU Multi-annual Financial Framework (MFF)[11]. The European Council has underlined whit priority by confirming both the need of mainstreaming climate change concerns into a range of EU funds and requiring that the proportion of climate-relevant expenditure under the next MFF should account for at least 20%, with contributions from all the major EU funds.[12] Only a small proportion of this is anticipated to come from a new dedicated climate action programme in the future LIFE instrument.

Given the urgency to achieve GHG-emission reductions needed in line with conditions imposed by the long-term 2°C target, it is also evident that climate-related EU expenditure needs to focus on actions that achieve GHG-emission reductions to the best extent possible. The total EU budget expenditure should not be detrimental to EU's long-term climate objective.

EU budget expenditure operates in a multi-level and multi-stakeholder governance setting. It is in many direct and indirect ways linked to public expenditure at domestic levels as well as corporate/private expenditure. Hence, a key criterion for programming EU expenditure is that it generates an added value to other funding. Situations of 'crowding out' of other sources of funding (national, local, corporate/private) should not arise as they represent sub-optimal use of scarce public financial resources.

In fact the EU budget should be increasingly used to 'crowd in' private investment. Leveraging additional private capital is a key need. The EU has been developing a range of financial instruments other than grant finance in a number of policy areas, including debt and equity instruments and other risk-sharing instruments under both direct and shared management. For example, financial instruments in the area of development have proven to leverage often more than 20 times the EU's budget contribution.[13]

[9] Rezessy, S. and Bertoldi, P. (2010) *Financing energy efficiency: forging the link between financing and project implementation*.
[10] Ibid.
[11] EC (2011) *A budget for Europe 2020 – Parts I and II*, Communication from the Commission, COM(2011)500, 29.6.2011, Brussels
[12] European Council (2013) Conclusions (Multi-annual Financial Framework) EUCO 37/13, 08.02.2013, Brussels
[13] Núñez-Ferrer, J., Volkery, A., Withana S., Medarova K. (2012) *The implications for the EU and national budgets of the use of innovative financial instruments for the financing of EU policies and objectives*. Study for the European Parliaments Committee on the Budget. Directorate General for Internal Policies, Strasbourg.

Nonetheless, debt or equity instruments are still representing a niche activity in terms of the overall EU budget expenditure, covering for roughly 1.3%.[14] Due to their leverage effect, their actual economic relevance is much larger though. There are a number of methodological, economic and political conditions attached to the use of those financial instruments that oftentimes provide barriers. In quite a Member States there is a lack of experience and skills among public administration to handle those financial instruments. They are regarded as technically complex and difficult to align with policy objectives, especially for instruments under shared management.[15]

1.3 Rationale for enhancing the use of financial instruments under the EU budget

A rationale for public intervention and/or public investment stems from the existence of market failures or sub-optimal investment situations. Market failure occurs when the market does not produce optimal welfare, i.e. does not allocate goods and services efficiently. Important manifestations of market failures, studied in-depth and well documented in environmental economics[16], are as follows:

1) A shortfall in the supply of *public goods* – natural resources, global climate or the atmosphere are public goods which benefit everyone and therefore should be collectively preserved;
2) The degradation or depletion of collective resources (also known as the tragedy of the commons[17]);
3) *Externalities* – unintended side effects such as pollution or waste generation of economic activity;
4) *Asymmetric information*– limited access to information from business or households about the benefits from environmental interventions may deter the realisation of 'win-wins'; and
5) *Monopoly power* – monopoly buyers and sellers of certain goods or services can lead to loss in the opportunities to realise both economic and environmental benefits.

Market failures can relate to different investment situations. For example, projects cannot be realised because they do not attract funding. This kind of market failure is well-established in the field of the environment and climate action, where projects that are creating public goods do not find investors as the private sector cannot monetise the benefits (e.g. benefits to society).[18] There are also a number of cases where projects that have a broader public value and are financially viable still do not attract private finance because of high risks attached.[19]

Tailoring public support through financial instruments is one way to address investors' risks. For this to happen effectively and efficiently, financial instruments should meet a number of governance criteria. Importantly, financial instrument should be constrained to situations of market failure and sub-optimal investment conditions. If public expenditure support is utilised too broadly, instruments could be used to socialise private risks while privatising profits, a concern repeated often by analysts

[14] Spence, J. et al. (2012) *Overview of financial instruments used in the EU multiannual financial framework period 2007-2013 and the Commission's proposals for 2014-2020*. Study for the European Parliaments Committee on the Budget. Directorate General for Internal Policies, Strasbourg.

[15] Withana, S., Nunez Ferrer, J., Medarova-Bergstrom, K., Volkery, A., and Gantioler, S. (2011) *Mobilising private investment for climate change action in the EU: The role of new financial instruments*, IEEP, London/Brussels.

[16] Sterner, T. (2003) *Policy Instruments for Environmental and Natural Resource Management*. RFF: Washington D.C.

[17] The tragedy of the commons refers to the theory, that users of common resources do not feel individually responsible for their preservation, leading to overuse despite their knowledge that this behavour is detrimental for all (Hardin, G. (1968). "The Tragedy of the Commons". *Science* **162** (3859): 1243–1248).

[18] Jaffe, A., Newell, R., Stavinsc, R. (2005) A tale of two market failures: Technology and environmental policy. *Ecological Economics* (54), pp164–174.

[19] Martin, S., Scott, J. (2000) The nature of innovation market failure and the design of public support for private innovation. *Research Policy* (29), pp437–447.

for all public private partnership arrangements.[20] One of the key principles for financial instruments concerns additionality, i.e. they should not replace private investment that would have occurred anyway.

Financial instruments are considered to be particularly suitable to addressing sub-optimal investment situations in a broad range of policy areas, e.g. for business activities or infrastructures that are capable of being financially viable (in terms, for example, of revenue generating capacity), but do not (yet) attract sufficient funding from market sources.[21]

Enhancing the use of financial instruments alone and in combination with grants has been argued to bring a number of positive effects[22,23] including:

- Altering the overall cost-benefits ratio of projects deemed too risky in the first place, as a consequence of which projects and programmes can be carried out, which would not have been realised otherwise;
- Achieving better economies of scale and thereby improving the overall effectiveness, impact and replicability of funding;
- Increasing financial discipline in project implementation through broadening the number of project owners and related interests in an effective and efficient project implementation;
- Generating re-flow of revenues (due to the 'revolving' nature of some instruments), which can allow for the recycling of funds that can be re-invested to support the same/similar policy objective; and
- Better pooling of expertise and know-how on diverse financing models as well as improving institutional capacities through partnerships between the public, private and banking sectors, as a consequence of which more projects can be realised.

In view of these considerations and against the background of positive experiences made under the 2007-2013 MFF the European Commission had decided to expand the use of financial instruments under the 2014-2020 MFF. A new Financial Regulation (No966/2012) has been adopted in 2012 that provides for the first time for a coherent, streamlined framework for these instruments across the different areas of the EU budget.

1.4 Objective and scope of the report

Looking at the existing set of proposals for financial instruments in different areas of relevance and the importance attached to climate mainstreaming under the 2014-2020 MFF, some key questions arise: to what extent are the current proposals fit for purpose? Is there a need to scale up action and should this happen via existing or new instruments? Which way forward appears to be most relevant and promising in terms of meeting climate policy objectives and making best use of scarce resources?

This report is intended to explore answers to these questions. Better targeting the climate relevance of financial instruments under the EU budget presents in many ways unchartered territory. In this sense, it is a screening and scoping exercise, providing a review of lessons learnt from using financial

[20] Dewatripont, M., Legros, P. (2005) Public-private partnerships: contract design and risk transfer, in EIB (ed) *Innovative financing of infrastructure – the role of public-private partnerships: Infrastructure, economic growth, and the economics of PPPs*, pp120-145. EIB PAPERS Volume 10 N° 5.

[21] EC (2011) EC (2011) A framework for the next generation of innovative financial instruments – the EU debt and equity platforms. COM (2011)621final.

[22] Núñez-Ferrer, J., Volkery, A., Withana S., Medarova K. (2012) The implications for the EU and national budgets of the use of innovative financial instruments for the financing of EU policies and objectives. Study for the European Parliaments Committee on the Budget. Directorate General for Internal Policies, Strasbourg

[23] Spence, J. et al. (2012) Overview of financial instruments used in the EU multiannual financial framework period 2007-2013 and the Commission's proposals for 2014-2020. Study for the European Parliaments Committee on the Budget. Directorate General for Internal Policies, Strasbourg

instruments and where relevant grants for low-carbon, climate resilient projects under the 2007-2013 MFF as well as an examination of the prospects for enhancing the role and relevance of financial instruments for low-carbon, climate resilient projects under the 2014-2020 MFF. In this context, the report develops, discusses and evaluates options for action for DG CLIMA in view of modifying and complementing existing Commission proposals for financial instruments, looking both at better mainstreaming and using funds such as the LIFE programme for new dedicated instruments.

Any discussion of this kind needs to be based on an understanding of investment needs, gaps and barriers as well as the related principal suitability of financial instruments to help lifting some of the barriers. Information of this kind is quite fragmented and aggravates a coherent assessment that can feed into the kind of policy discussions described above. It is one key aim of this report to provide such a compact, yet comprehensive overview.

The main focus of the report is on financial instruments as defined in the Financial Regulation, including equity, loans and guarantees, other risk sharing instruments and combinations with grants. Hence, not all grant schemes in the EU MFF are discussed in detail, but are only covered to the extent necessary to provide an overview of what financing opportunities are available for the individual sectors and the possibility to blend grants with financial instruments.

The report looks at mitigation and adaptation activities separately. The two streams of action often address different activities and entities, though mitigation action can help adaptation and vice versa. There is considerably more experience and practice with regard to using financial instruments for mitigation action. This report has a stronger focus on mitigation activities also because of their higher potential to generate revenue which renders them more suitable for financial instruments compared to majority of adaptation projects.

Mitigation and adaption activity needs as well as the role and suitability of different financial instruments to address investment needs and barriers are discussed on the basis of six sectors - energy, transport, buildings, SMEs, agriculture and water – which are of key relevance for mitigating and adapting to climate change.

We also focus on financial instruments used inside the EU. Financial instruments for external action do not fall in the scope of this study.

1.5 Methodological approach

The approach is based on qualitative methods given certain information gaps and underlying uncertainties in this subject area. Where possible, a limited set of quantitative data was used and presented. Information was drawn from different sources:

- Commission policy documents related to the 2007-2013 financial instruments under the MFF as well as Commission proposals on the 2014-2020 grants and financial instruments provided a major source of information;
- An extensive literature review was conducted on academic and grey literature on climate finance, the use of innovative financial instruments in an international context, investment needs and market demand in the different sectors;
- 32 interviews were conducted to gather additional information and insights on the use of financial instruments and marker demand, develop the project types per sector as well as validate key findings and possible options; and
- An expert workshop with representatives from the European Commission, the EIB, other banks and NGOs was conducted in February 2013 to validate the analysis of options. Partial findings of the analysis were also presented at a meeting at the EIB in December 2012.

The policy uncertainties in the context of the preparation of the report need to be stressed. The new EU Financial Regulation and Rules of Application were adopted in the middle of the project, meaning that a significant part of the analysis needed to happen in the absence of this clear framework. At the same time, agreement on the overall 2014-2020 Multi-Annual Financial Framework and specifying regulations is still not final. A final agreement on the 2014-2020 MFF was reached in the European Council on 8 February 2013 only. It still awaits the consent of the European Parliament. The final budgets for several EU funding programmes are not determined yet and neither are the rules governing the funds, in particular for financial instruments. Their budget, not least the share which can target climate action, cannot be determined ex-ante. In the case of shared management funds, the amount allocated to financial instruments will be known only when the respective expenditure programmes are adopted by the national, regional and rural authorities, which is expected sometime at the end of 2013 or early 2014. These caveats put significant constraints to carrying out a quantitative assessment.

Additional note must be made regarding the review of data on investment needs per sectors. Estimates vary due to different methodologies and assumptions used, e.g. on technological innovation, different scale of spatial and time resolution, lack of data and information and general uncertainties about key economic and regulatory influencing factors.

To maintain coherence and relevance in view of on-going EU policy discussions, this report bases the relevant information on investments to the extent possible on official Commission documents such as the different long-term roadmaps under the 'Europe 2020-Strategy' process. Significant data gaps and uncertainties remain for all sectors. Data gaps on investment needs are particularly pertinent for adaptation measures in all the sectors. Many studies are mainly qualitative in scope. In particular for the agriculture sector estimates on investment needs have been mainly carried out at global scale and are hence lacking sufficient level of detail. However, for the sake of the analysis of this report it is important to understand the bigger picture, the trend in investment needs, the dimensions of investment gaps and relevant barriers, which can be meaningfully discussed on the basis of the Commission data.

1.6 Structure of this report

This report is structured as follows:

- Chapter 2 provides a short overview of the main determinants of low-carbon, climate-resilient finance and the potential role for financial instruments;
- Chapter 3 includes a compact description of key investment needs, market demand, gaps and barriers related to the six sectors analysed and outlines some principal insights into the role and suitability of financial instruments to help address gaps and barriers;
- Chapter 4 then looks at the expansion of the role and relevance of financial instruments under the 2007-2013 MFF and reviews the lessons learnt;
- Chapter 5 picks up this perspective and presents some interesting practice of other international and European financial institutions that provide relevant insights for policy debates under the 2014-2020 MFF;
- Chapter 6 combines these insights into an evaluation of the proposed financial instruments under the 2014-2020 MFF;
- on this basis Chapter 7 develops a longer list of options to modify or complement current proposals for financial instruments under the 2014-2020 MFF and evaluates them against a set of established criteria;

- Chapter 8 finally distils a limited set of options that appear to be most promising in terms of their effectiveness, efficiency and EU value added which should be pursued in the policy discussions over the months to come.

2 FINANCING CLIMATE ACTION: RISKS, BARRIERS AND THE ROLE OF FINANCIAL INSTRUMENTS

2.1 Types of risks

Risks and risk coverage are key factors that determine the willingness of investors to engage into projects that aim to promote climate mitigation and adaptation. While financing low-carbon, climate-resilient projects and activities does not fundamentally differ from financing other types of projects, it is still characterised by a unique setting of particularly pronounced risks[24]:

- ***Policy risks**:* many low-carbon, climate resilient technologies are strongly policy-driven and rely on public support schemes to be economically viable. Regulatory changes such as retro-active changes to subsidies or other support schemes can alter the economic viability of projects. Oftentimes investment time-spans cover more than a decade (if not several decades in case of infrastructure), whereas policy certainty is only available for a few years. For example, markets are currently lacking a stable policy perspective up to 2030 in the field of climate and energy policy at EU level. Furthermore, there is the risk of broader changes to policy context conditions, including societal instability, which are, however, not so relevant in the European Union. Nevertheless, regulatory risks are often important for both mature and emerging low-carbon, climate-resilient technologies. It is important to note that regulatory risks concern also the regulation on the investment activity itself. For example, Basel III rules will impact on the lending policies of commercial banks: liquidity requirements will constrain lending in less-favourable, riskier areas such as low-carbon finance.
- ***Technology and operating risks**:* These include construction risk, i.e. failure to complete the project on time or at all; risks caused by errors in the management of the projects; technical risks caused by unexpected complications due to the technology, particularly high in new innovative projects; and resource risk caused by mismatch, scarcity of skills or changes in personnel affecting the project. Those risks are important for climate projects. Quite a few low carbon technologies are still in an early market stage and face high technological risks as compared to conventional alternatives (for example off-shore wind at greater sea depth or marine power generation). Higher risk premiums for these projects and higher discount rates are a consequence. Mature low-carbon technologies can face operational risks with regard to lack of appropriate infrastructure support (network problems): scaling up these technologies requires a minimum size of capable infrastructure which is hampered by the slow pace of change in overall energy and transport infrastructures.
- ***Market risks and maturity**:* Low market demand can prevent or hamper take-up in the commercialisation phase, due to distorted market structure, fluctuations in economic conditions and overall price structures, unwillingness of energy users to invest etc. Energy costs, for example, are often only a minor part of the cost structure of businesses as prices do not represent the full costs of climate change. The overall maturity of a market in terms of investment opportunities, interest from individual and commercial investors and experience in funding models is an important framework condition. Many markets for low-carbon, climate resilient technologies and projects are rapidly growing, but still from a lower level, or are characterised by persistent gaps in information and awareness. For example, many house owners are often not knowledgeable about potential technology solutions, funding opportunities and related benefits.

[24] IIGCC et al (2011) *Investment-grade climate change policy: financing the transition to the low-carbon economy*. http://www.unepfi.org/fileadmin/documents/Investment-GradeClimateChangePolicy.pdf, World Economic Forum (2013)The Green Investment Report: The ways and means to unlock private finance for green growth

- ***Non-attractiveness concerns and financial risks**:* Many companies abstain from investing their own funds into energy-saving projects, because other investment options have higher priority. Difficulties with assessing the longer-term benefits, lack of skills and capacity problems can help explain reluctance. Upfront costs are often high. This concerns particularly renewable energy projects where upfront costs over the whole lifecycle of the investment normally exceed 80%. Moreover, investments into activities with greater energy savings, for example, often imply greater changes to equipment, process design or even business models. Risks of non-delivery are higher, and accordingly companies might look for greater return to investment to compensate for risks, which is not always given.[25] If companies want to invest, they often depend on external finance, particularly SMEs, which is difficult to access. Banks as the dominant intermediary of SME finance in the EU are often reluctant to provide loans to climate-relevant projects for a number of reasons. They are oftentimes not very familiar with the specific technologies or process innovation and consider them more complex and skill-demanding than they actually are. Average size of climate projects is often small, inducing high transaction costs which makes it less interesting for banks to consider as they fall below their minimum value threshold. Many energy savings projects in the residential area, for example, provide rather small and fragmented opportunities and provide on their own a relatively small saving on the energy bill, which only becomes attractive when being pooled. But aggregators are often lacking that could bundle opportunities and make them bankable. Moreover, savings of energy are not guaranteed. As a consequence there are problems with regarding them as collateral against a bank loan. Given the absence of widely agreed and probed mechanisms for verification and measurement, banks and other investors often remain sceptical towards estimated benefits. [26]

The relevance of each risk will differ along the stages of development of a technology or project. The overall risk level is generally considered to be highest in the early stages of research and development and is declining with successful pilot testing. While regulatory, policy and technical risk is relevant throughout the project cycle, the completion risk becomes important when the technology is deployed at larger scale and increases for large scale infrastructure projects.

2.2 Risks and financial markets actors

Financing climate projects does not appear to be too different from financing other types of investment. But their risk structure (vulnerability to policy change, lower scale of investment for saving projects, higher transaction costs, high upfront cost and lower or less secure return on investments compared to other types of investment) can make them more specific and less interesting for lending or investing. The willingness to take risks and approaches to risk management vary across financial market actors, but risk willingness has decreased in last years:

- **Banks** play an important role in the financial system, both in terms of direct lending to companies, longer-term investments and funding (both through securitisation and bonds), debt securities etc. Banks provide for roughly 80% of corporate finance in the Eurozone.[27] SMEs are close to totally dependent on bank intermediation. Banks have a considerable amount of project loan expertise in low-carbon, climate resilient finance, but remain reluctant for the reasons discussed above. For the past years, loans have actually fallen in the Europe as a consequence of different factors, including the need to deleverage but also reflecting more substantial changes in the banking sector such as strengthening of intra-

[25] IEA (2011) Joint Public-Private-Partnerships for Energy Efficiency Finance. Policies to scale up private investment. Paris: IEA.
[26] Ibid.
[27] see information from European Central Bank, http://www.ecb.int/press/pressconf/2013/html/is130404.en.html

financial business. [28] Going forward, Basel III rules on constraining creation of liquidity could result in reduced long-term lending. Re-pricing of risks after the process of deleveraging is concluded is likely to increase cost of capital. As a consequence, it is very likely that commercial banks will remain quite reluctant to provide loans to climate projects to the extent needed. Climate projects, particularly in the area of energy savings, are often perceived to be not-profitable, as the sums involved are not high enough and real banking costs cannot be covered. There is also great reservation to finance projects on the basis of cash flow resulting from energy savings. All of this points to the continued and increased relevance of public banks in stimulating financial markets.

- **Institutional investors** such as pension funds, insurance companies, mutual funds or sovereign wealth funds could theoretically help filling the gap, as they have become important sources of long-term capital. Their global assets are estimated to be worth USD 28 trillion of which only 1% is allocated to green investments.[29] Institutional investors look for long-term, inflation-protected returns, which are safe and stable and hence will not take on risks linked to the development and market-introduction of many low-carbon technologies, if no appropriate risk sharing structures exist. Pension funds are, for example, less interested in investing in the construction of infrastructure ('greenfield projects') but in projects that have been completed and commissioned ('brownfield project'). This ensures immediate return on their investments and provides safe long-term income with low risks (no construction and completion risk).[30] For example, the Danish pension fund PensionDanmark required a completion guarantee by DONG Energy before investing in the Danish offshore wind project Anholt before its construction.[31] The ambition of the European Commission to revive the bonds market through the Project Bond Initiative is exactly resulting from the insight that bonds are well-qualified to allow institutional investors to become more actively engaged in infrastructure finance.[32]

- **Equity markets**, in turn, are an important source for corporations to get access to capital for innovation and value creation, which implies taking much greater risks in exchange for greater returns to investment.[33] Principally, equity can be regarded a more suitable financing instrument for long-term, high risk financing than debt. Yet the EU continues to face a strong equity gap in the wake of the on-going macro-economic uncertainties and cost of equity remain high. [34] Profitability of climate projects (lower return on investment than needed to trigger interest) remains a key challenge for equity investment as well as information gaps and lack of skills to assess relevant investment areas.

The analysis underpins the relevance of barriers in form of risk perceptions that prevent investors from taking investment risks related to climate projects and engage on a broader scale needed. Consequentially there is a persistent need for public support mechanisms to de-risk investments into low-carbon, climate-resilient project activities and stimulate further action of financial market actors.

[28] See for a detailed account, OECD (2013) The role of banks, equity markets and institutional investors in long-term financing for growth and development, Report for G20 leaders, Paris: OECD.
[29] Della Croce, R., Kaminker, C., Stewart, F. (2011): The Role of Pension Funds in Financing Green Growth Initiatives, OECD Publishing, Paris.
[30] Personal communication
[31] EWEA (2012): The European offshore wind industry key 2011 trends and statistics, January 2012
[32] Damerow, F., Kidney, S. and S Clenaghan (2012) *How Covered Bond markets can be adapted for renewable energy finance and how this could catalyse innovation in low carbon capital markets – unlocking bank lending in an era of capital constraint and limited public budgets*, Climate Bonds Initiative Discussion Paper
[33] OECD (2013) The role of banks, equity markets and institutional investors in long-term financing for growth and development, Report for G-20 leaders, Paris: OECD.
[34] COM (2013) 150 final

2.3 Principles for using financial instruments

Public rules matter more that public expenditure for overcoming barriers to investment into climate-relevant activities. Clear and predictable target setting and corresponding policy instruments and measures are needed to provide markets and investors with the certainty needed. But financial instruments offer potential to help cushioning financial, technology or market uptake risks, both on their own and/or in combination with grants. Their objective is usually two-fold**:** to reduce the cost of capital and to improve the risk-reward profile of low carbon, climate-resilient projects.

The concrete relevance of financial instruments very much depends on the specific context and characteristic of the concrete project. Projects differ in terms of project size, beneficiaries, risk profiles and revenue generation. Hence it is difficult to ex-ante categorise the relevance of certain financing instruments / models for financing certain types of climate projects. But there are a number of generic criteria that financial instrument should comply with (see for a detailed discussion of the rules set out under the Financial Regulation and its Rules of Application chapter 6.1).

Financial instruments should be geared towards cases where markets are not interested in financing projects that are principally bankable due to their particular risk structure. Returns to the investment might not satisfy investment criteria for investors or might not be large enough to compensate for perceived risks. Market failures may arise because of a number of reasons (see Annex 1). Principally, financial instruments should not replace private investment or other public funding and should provide a clear leverage effect, i.e. the global investment through a financial instrument should exceed the contribution of the public contribution. Ideally, there is a need to ensure the common interest into the policy objectives defined for the instruments through means of co-investment, risk-sharing requirements or financial incentives, while avoiding situations of conflict of interest.

It is hence clear that financial instruments are bound to clear and restrictive conditions for their use. They also need to take into account the difference of climate change impacts across the territory of the EU which will affect assets in different ways and require different responses. The need for EU intervention on certain topics can differ quite markedly between regions as a result of different climate mitigation and adaptation level needs, based on different exposures to climate impacts and capacities to respond and resulting overall vulnerabilities.

Deciding on the profitability of a project is a key prerequisite for estimating the need of support through financial instruments. A critical benchmark for private financing decisions is the Internal Rate of Return (IRR) which is the discount rate that basically equates the present values of costs and benefits of the projects, both in terms of private cost and benefits and broader economic and social costs and benefits. This rate should not be exceeded for the project to make overall financial sense. While this helps to rule out non-eligible projects for funding, it does not offer sufficient guidance on deciding on eligible projects. Here, discounting the net present value (NPV) of project costs and benefits with the actual cost of capital and then look at the overall discounted net benefit (NPV benefits minus NPC costs) is rather used to determine the profitability of a project and the related need for support through a financial instrument.

2.4 Financing low-carbon, climate resilient projects and the role of financial instruments

2.4.1 Types of instruments for financing climate projects

There is a wide range of **instruments** used for financing climate projects. These can include: credit lines; guarantees; debt financing; private equity; venture capital; grants; loan softening; inducement

prizes; and technical assistance. These usually complement national policy instruments and are structured to act along the 'entire chain of financial intermediation'.[35]

Table 1 illustrates current mechanisms for using public budgets to leverage additional public and private investments for low carbon developments.[36]

Table 1. Public financing mechanisms: instruments and examples

Instruments and mechanisms		Examples
Public policy mechanisms	Policy and overarching policy support	Feed-in tariffs Tax credit programmes Renewable energy quotas Standards Repealing support for 'brown' sectors
	Project level assistance	Grants Subsidies Project aggregation
Public financing mechanisms	Lending (debt)	Project lending Debt funds Bonds Concessional / flexible loan terms
	Equity investment	Direct capital investment
	De-risking instruments	Loan guarantees Insurance Foreign exchange/liquidity facilities

Source: WEF

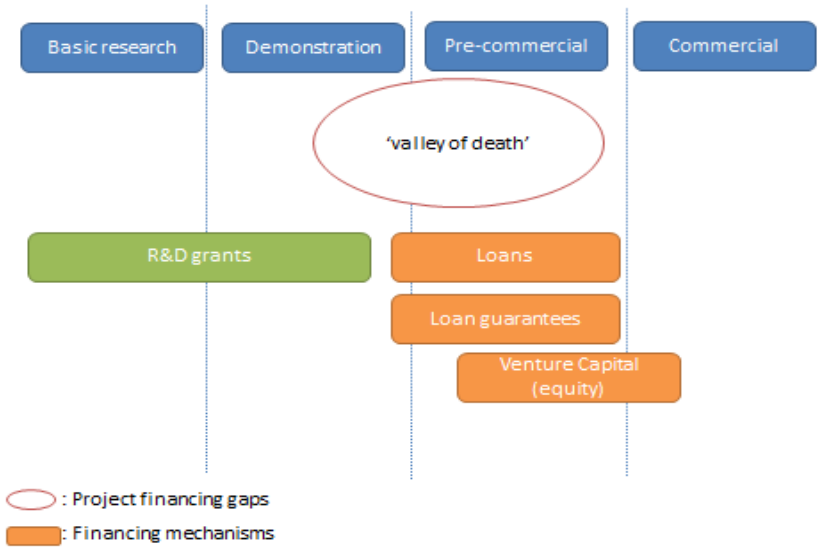
2.4.2 *Interplay of grants and financial instruments along the technology innovation cycle*

Low-carbon technologies go through the same innovation and deployment cycle as any other technology, i.e. from basic research to demonstration to pre-commercialisation and finally commercialisation. While potential low carbon technologies have a considerable market potential, some of them have long lead times before reaching commercialisation. The latter is particularly true for complex technologies in the energy sector. The level of technological maturity as a key risk for low carbon investments changes along the technology innovation cycle and hence the suitability of financial instrument to address this risk appropriately. Figure 2 illustrates how grants and financial instruments can support and address specific risks at specific stages of the cycle.

[35] UNEP and SEFI (2008) *Public Finance Mechanisms to mobilise investment in climate change mitigation: An overview of mechanisms being used today to help scale up the climate mitigation markets with a particular focus on the clean energy sector*

[36] WEF (2013) The Green Investment Report The ways and means to unlock private finance for green growth. A Report of the Green Growth Action Alliance, Published by World Economic Forum, Geneva.

Figure 1. Financing the low carbon technology innovation cycle



Source: UNEP and SEFI, 2005

For basic research and first demonstration tests, grants finance is the most appropriate financing mechanisms. Once the basic research period and pilot testing is over, there is generally a need for large scale testing and/or demonstration. At this stage of the innovation cycle considerable amount of finance is needed which is however often difficult to attract. This stage of the process is often described as the technology 'valley of death'.[37] Grant finance is often no longer available and revenue is not yet generated.

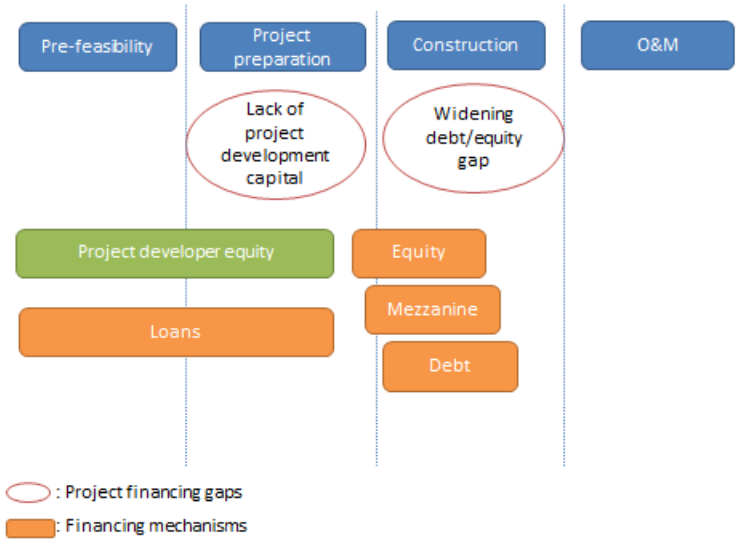
At the same time, the technical and operational risks (see section 2.1) are still rather high in addition to often long and uncertain periods to maturity and profitability.[38] In order to bridge the 'valley of death' public support can take the form of soft loans, equity or loan guarantees, which can attract private funding including private equity in the form of venture capital.

2.4.3 Project finance vs. corporate finance

Project finance offers benefits compared to corporate finance in terms of minimising net cost and managing risks when it comes to financing of larger-scale projects with complex risk structures. These projects are often facing a lack of project development capital during the preparatory stages and shortage in debt and equity during the construction phase.[39] Preparing a large-scale project can take longer than initially expected due to potential delays related to permitting (regulatory risk) or off-take agreements (market risk) which may lead to financing gap and endanger reaching the actual construction phase. Attracting sufficient financing in terms of debt and equity for construction, operation and maintenance may be hindered also due to technological risks (the technology may be costlier than expected or be less efficient), operational risks related to 'out of service' periods or policy/regulatory risks related to support schemes.

[37] Murphy, L., Edwards, P. (2003) Bridging the Valley of Death: Transitioning from Public to Private Sector Financing, National Renewable Energy Laboratory, Colorado.
[38] UNEP, SEFI (2005) Public finance mechanisms to catalyse sustainable energy sector growth.
[39] UNEP, SEFI (2005) Public finance mechanisms to catalyse sustainable energy sector growth.

Figure 2. Financing large-scale projects



Source: UNEP and SEFI, 2005 modified by authors

Project financing, also known as 'limited recourse' or 'non-recourse' financing, is often used as an approach to better control risks in the deployment of large-scale projects.

Box 2: Project finance

Project finance is different from other traditional forms of finance. Project financing normally takes the form of limited recourse lending to a specially created entity (special purpose vehicle or 'SPV'). The SPV is a firm or a legal entity established to perform narrowly defined or temporary tasks and facilitate off-balance sheet financing of projects. Typical for project financing is that it relies on the project's cash flow expectations and spreads the risk between different actors. It usually involves a complex financing structure where project debt and equity are used to finance a project, rather than the balance sheet of project sponsors (i.e. off-balance sheet financing). Non-recourse debt or a non-recourse loan is a secured loan that is secured by a pledge of collateral, typically real property, but for which the borrower is not personally liable. If the borrower defaults, the lender/issuer can seize the collateral, but the lender's recovery is limited to the collateral.[40]

In a no recourse or limited recourse project financing, the risks for a financier are perceived as greater than usual. This explains the bigger role of risk minimisation strategies in the case of project financing. Since the loan can only be repaid when the project is operational, if a major part of the project fails, the financiers are likely to lose a substantial amount of money. In some cases, the assets that remain may be of little residual value because highly specialised and possibly in a remote location, some assets may be immobile. In addition costs may be incurred for clearing up. Therefore, financiers make efforts to ensure that the risks associated with the project are reduced as far as possible, *e.g.* by using turn-key engineering, procurement and construction contracts (EPC).[41] In addition, the cost of such finance is generally likely to be higher and obtaining such finance could be more time consuming.

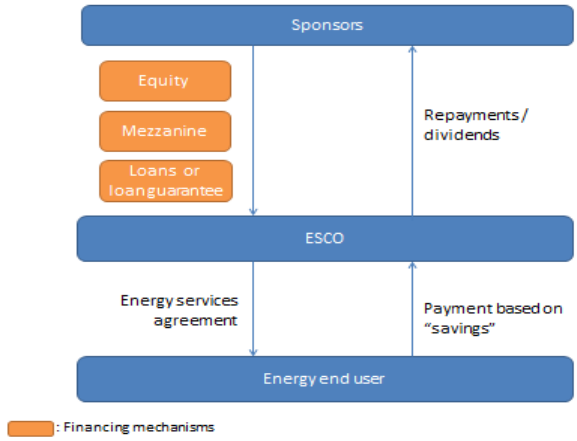
[40] Tan, W. (2007) *Principles of project and infrastructure finance*. Taylor and Francis: Abingdon.
[41] Gray, S., Tatrallyay, N. (2012) *The Green Climate Fund and private finance: Instruments to mobilise investment in climate change mitigation projects*, Climate Change Capital, London.

2.4.4 *Energy Performance Contracting for energy efficiency*

Barriers such as regulatory complexity and uncertainty, high-upfront investment, scale of projects, low consumer and investor awareness or scepticism about recovering investment costs from energy savings are key barriers to the uptake of well-proven energy efficiency measures, particularly in the buildings sector.

Financial instruments such as loan guarantees or senior or subordinated debts to banks to extend lending at low interest rates can promote the investments in energy efficiency in buildings. Funds can also be channelled through specialised funding bodies such as energy service companies (ESCOs) who then finance the investments and have the required specialised knowledge and expertise to implement such projects (see figure 4). Risk mitigation strategies include Energy Performance Contracting (EPC) where the ESCO takes the responsibility to achieve the agreed savings objectives and is directly or indirectly compensated through the savings achieved.

Figure 3. Structure of energy efficiency project



Source: Based on Rezessy and Bertoldi (2010); Gray and Tatrallyay (2012)[42]

2.5 Summary

Low-carbon, climate-resilient project activities present a distinct financing challenge. Their risk profile often differs from other, more conventional areas of investment in that they depend strongly on policy support (regulatory requirements, public support) and are hence vulnerable to policy changes and lack of long-term policy orientation. Policy support is required because of distorted price signals (e.g. lack of internalisation of external costs of fossil fuels, continued environmental harmful subsidies), distorted market structures (e.g. market oligopolies, constraints to market or infrastructure access), information asymmetries and particular technology, market and financial risks. Financial instruments can play an important role in this regard, both on their own and in combination with grants across all stages of the low-carbon technology innovation cycle. The use of financial instruments should be bound to certain conditions, however. They should be used primarily to address situations of sub-optimal investment and market failures and in the context of action under the EU budget need to fulfil a set of complementary principle criteria. They should act complementarily and crowd-in private investment. Project finance is an appropriate financing model for large-scale projects and different financial instruments can support project finance cycles. Grant finance will continue its relevance under public budget support schemes.

[42] Gray, S., Tatrallyay, N. (2012) *The Green Climate Fund and private finance: Instruments to mobilise investment in climate change mitigation projects*, Climate Change Capital, London.

3 INVESTMENT NEEDS, MARKET DEMAND AND BARRIERS TO LOW CARBON AND CLIMATE RESILIENT PROJECTS

Decarbonisation and climate-resilience represent major undertakings that span over decades. This study looks at six sectors that are critical to achieving a low-carbon, climate-resilient economy in the EU: energy, transport, buildings, support to SMEs, agriculture (including agro-forestry) and water (including flood and risk prevention. Energy, transport and household sectors are responsible for around two third of greenhouse gas emissions, followed by manufacturing/construction and agriculture.[43] Energy, transport and residential infrastructure as well as water and agriculture will also be strongly exposed to impacts of a changing climate.

We note the difficulties in estimating investment needs for climate mitigation and adaptation measures as per sector in a coherent and comparable manner. Different methodologies and assumptions are often used, e.g. on technological innovation or spatial and time resolution. Lack of data and information and general uncertainties about key economic and policy levers are approached in different ways. We note a number of issues with regard to investment needs relating to adaptation. These include the identification of capital and finance for relevant adaptation measures, the definition of market demand and the scope for private sector investment. There are relatively few data available to explicitly support adaptation investment needs estimates.[44]

Where cost estimates are available, it is difficult to distinguish between adaptation and mitigation investment needs, as often such investments will deliver benefits applicable to both areas. We base our overview analysis to the extent possible on analysis commissioned by the European Commission to remain coherent with the overall information underpinning policy debates at the EU level.

Recent studies that look into investment needs and trends with regard to a low-carbon, climate-resilient economy highlight that a majority of capital investment is likely to be concentrated in a few key areas. These include renewable energies and electricity infrastructure capable of higher shares of renewables (grids, transmission, storage); energy savings in the housing stock and industrial energy efficiency as well as low-carbon transport infrastructure.[45] These areas provide the greatest opportunities for achieving urgently needed mitigation of GHG emissions. Investment is also needed into adaption to climate change in key sectors, but there is considerable uncertainty with regard to investment needs given the great uncertainty related to future climate change impacts.

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[43] European Environment Agency (2010) Synthesis Report. 2010 State of the European Environment and Outlook Report, Copenhagen: EEA.

[44] For example, Parry, M, Arnell, N., Berry, P., Dodman, D., Fankhauser, S., Hope, C., Kovats, S., Nicholls, R., Satterthwaite, D., Tiffin, R., Wheeler, T. (2009) *Assessing the Costs of Adaptation to Climate Change: A Review of the UNFCCC and Other Recent Estimates*, International Institute for Environment and Development and Grantham Institute for Climate Change, London; Altvater, S., de Block, D., Bouwma, I., Dworak, T., Frelih-Larsen, A., Görlach, B. Hermeling, C., Klostermann, J., König, M., Leitner, M., Marinova, N., McCallum, S., Naumann, S., Osberghaus, D., Prutsch, A., Reif, C., van de Sandt, K., Swart, R. and J. Tröltzsch, (2012) Adaptation Measures in the EU: Policies, Costs, and Economic Assessment, report is a deliverable for the project "*Climate Proofing" of key EU policies – short term actions*, for the European Commission, DG Climate Action (contract CLIMA.C.3/SER/2010/0009); *Climate Change Risk Assessment* (2012), Business, Industry and Services, Department of Food and Rural Affairs, London

[45] See for example, Vellacott, Y. et al (2011) Transition to a low-carbon economy: the role of banks, Joint report by WWF and Credit Suisse, Zurich; Whitehouse, S. et al (n.a.) Carbon Capital: Financing the low carbon economy, report by Accenture, http://www.accenture.com/SiteCollectionDocuments/PDF/Accenture_Barclays_Carbon_Capital.pdf; Stoppard, M. et al (2013) The Energy Investment Imperative: Toward a Competitive and Consistent Policy Framework, IHS report, see http://press.ihs.com/press-release/energy-power-media/europe-needs-major-energy-investment-lacks-workable-policy-framewor

Our analysis broadly confirms these observations and places its emphasis in these sectors. The remainder of this subchapter presents a summary of the investment needs, investment trends and market demand as per sector. More information can be found in Annex 2.

3.1 Investment needs in key sectors

3.1.1 Energy

According to Commission estimates, the power sector should achieve emission reductions above 60% by 2030 and for decarbonisation to be practically complete by 2050, which will require a significant use of renewable energy sources to produce electricity.[46] Near complete decarbonisation of the power sector in the Commission scenarios is achieved through a combination of different low carbon technologies – renewables, nuclear and carbon capture and storage (CCS) technologies and overall improvements in energy efficiency. Energy efficiency and renewable energy are identified as key priorities.

The energy sector will be affected by climate change impacts both on the supply side, including distribution and transmission networks, and on the demand side. Extreme weather events such as floods can impact on critical energy infrastructures and can lead to disruptions in energy services, for example. Projections suggest a reduction in heating demand in northern Europe and an increase in demand for cooling in southern Europe.

Estimates of investment needs

Cost estimates for climate mitigation measures in the energy sector vary. The Commission in its Low-Carbon Economy Roadmap estimates that an increase of public and private investment of €270 billion annually on average over the next four decades is required[47]. The Commission's Energy 2050 Roadmap estimates additional grid investment costs of between 2011 and 2050 under various decarbonisation scenarios, compared to a current policy and initiatives (CPI) scenario, of between €160 and €840 billion.[48] According to the Commission's Strategic Energy Technologies Plan (SET-Plan) investment has to increase from current from €3 billion to an average of €8 billion per year between 2010 and 2020, representing additional public and private investment of €50 billion.[49]

An overview of other estimates of investment needs in the energy sector is provided in Annex 2. They all indicate considerable investment needs in the areas of renewables, energy efficiency and grid infrastructure amounting to between €50 and 200 billion annually until 2020. These figures need to be set in context with the substantial economic benefits expected from these investments.

Investment needs in the area of adaptation fall into supply and demand side measures. For example, the investment needs for the adaptation of electricity grids in EU26 (without Malta) range between €637 million and €654 million per year.[50] In addition the adaptation of thermal power plants by installing additional cooling systems includes annual investments of €637 million.

[46] EC (2011) A Roadmap for moving to a competitive low carbon economy 2050, Communication from the Commission, COM(2011)112, 8.3.2011, Brussels

[47] EC (2011) A Roadmap for moving to a competitive low carbon economy in 2050, COM(2011) 112, 8.3.2011, Brussels

[48] EC (2011) Commission Staff Working Paper - Impact Assessment Accompanying the Energy Roadmap 2050, SEC(2011) 1565, Part1/2, 15.12.2011, Brussels

[49] EC (2009) Communication from the Commission - Investing in the Development of Low Carbon Technologies (SET-Plan), COM(2009)519, 7.10.2009, Brussels

[50] Altvater, S., van de Sandt, K., Marinova, N., de Block, D., Klostermann, J., Swart, R., Bouwma, I., McCallum, S., Dworak, T., Osberghaus, D. (2011): Assessment of the most significant threats to the EU posed by the changing climate in the short, medium and long term – Task 1 report, Ecologic, Berlin, p. 33.

Estimates of financing gaps

R&D programmes should typically have a strong public investment component and demonstration programmes should have a strong industrial drive, accompanied by public support, from both the EU and national governments; market replication measures should have large participation from industry.[51]

It is unlikely that markets will deliver a full response due to vested interests, political, technological and regulatory uncertainties, the perceptions of high risks, low profit assumptions, information asymmetries and other barriers including the specificities of the energy sector. Financing gaps are apparent. For example, the Commission estimates that of the €142 billion of overall estimated investment needed for electricity networks to 2020,[52] about €90 billion could be commercially viable and hence delivered by the market. However, due to planning and regulatory delays and uncertainties only a 30% share (€45 billion) is estimated to be delivered under a business-as-usual scenario. The need for public support for the development of new clean energy technologies and deployment of renewable technologies has been recognised by various studies (see Annex 2).[53]

3.1.2 Transport

The Commission's 2050 Low Carbon Roadmap proposes that by 2050 GHG emissions in the transport sector should be between 54% and 67% lower than 1990 levels[54]. The 2011 Transport White Paper proposes that transport's GHG emissions be reduced by at least 60% by 2050 compared to 1990[55].

The development of a multi-modal trans-European transport network (TEN-T) core network by 2030 is a key cornerstone of a low-carbon economy transition. It includes investment in low carbon modes, advanced technologies and the supply infrastructure for clean transport fuels.[56] Other key cornerstones are fuel efficiency and better demand side management. From the perspective of adaptation, roads, railways, airports and ports are all potentially vulnerable to the impacts of climate change. Disruptions of the functioning of key transport infrastructure could be short-term, e.g. from flooding, or longer-term if infrastructure is significantly damaged and needs to be (even partially) closed for repair.

Estimates of investment needs

The Commission estimates an investment need of over €1.5 trillion in the period 2010 to 2030, with €550 billion needed by 2020 in order to complete the TEN-T, of which around €215 billion is needed to complete missing links and to remove bottlenecks[57,58]. Some of this investment, e.g. that on rail

[51] EC (2009) Commission Staff Working Document - Accompanying document to the Communication on Investing in the Development of Low Carbon Technologies (SET-Plan), SEC(2009)1295, 7.10.2009, Brussels

[52] EC (2010) Commission Staff Working Document – Impact Assessment Energy infrastructure priorities for 2020 and beyond - A Blueprint for an integrated European energy network COM(2010)1395, 17.11.2010, Brussels

[53] ECF (2011) Roadmap 2050 - Financing for a zero-carbon power sector in Europe - A financial sector's view on the decarbonisation of the European power sector, Olmos, L., Newbery, D., Ruester, S., Jen Liong, S., Glachant, J-M (2012) Public Support for the Financing of RD&D Activities in New Clean Energy Technologies, Final report of the THINK project - January 2011, European University Institute, http://www.eui.eu/Projects/THINK/Documents/Thinktopic/THINKTopic1.pdf [accessed 13/9/2012]; Ecofys, Fraunhofer ISI, TU Vienna EEG, Ernst &Young (2011) Financing Renewable Energy in the European Union Energy Market, http://ec.europa.eu/energy/renewables/studies/doc/renewables/2011_financing_renewable.pdf [accessed 13/9/2012

[54] European Commission (2011) A Roadmap for moving to a competitive low carbon economy in 2050. Communication from the Commission, COM(2011) 112, 8.3.2011, Brussels.

[55] European Commission (2011) Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system. Communication from the Commission, COM(2011) 144, 28.3.2011, Brussels.

[56] European Commission (2011) Proposal for a Regulation on Union guidelines for the development of the trans-European transport network. COM(2011) 650/2, Brussels.

[57] European Commission (2011) Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system. Communication from the Commission, COM(2011) 144, 28.3.2011, Brussels.

infrastructure, could be classified as investment in climate measures, whereas some of it, such as investment in road infrastructure, would not[59].

The Impact Assessment of the Commission's 2050 Low Carbon Economy Roadmap estimates that over €1,100 billion of investment are needed annually under various decarbonisation scenarios by 2050 compared to €830 billion annually in the reference scenario. Over the 40-year period, annual investment under the decarbonisation scenarios amounts to over €930 billion, which is around €160 billion more than under the reference scenario.

The Impact Assessment accompanying the Transport White Paper estimates the total costs of transport and considers additional total costs above the reference scenario to range between €640 billion and €1,193 billion by 2050. Savings in fuel costs amount to between €300 and €330 billion in 2050 relative to the reference scenario. The total investment required for electric road transport infrastructure is estimated to range between €80 billion and €140 billion under different policy options by 2050.

According to a study by a group of companies and organisations[60] total capital investment for a large-scale roll-out of hydrogen supply infrastructure in Europe is estimated at €100 billion over 40 years (see also Annex 2).

Investment needs in adaptation cover a range of actions to climate-proof roads, railways, airports and inland and maritime shipping. A 2010 study estimated that investment needs of transport infrastructure in the EU27 (plus CH and N) in 2050 to be between €3 and €6 billion[61] of which between €2.9 and €5.7 billion would have to be covered by public funding. A more recent study, carried out for the Commission, provides ranges of potential costs of selected adaptation options in transport sector. These range between €36 million and €182 million for retrofitting airports' infrastructure system to between €3 billion and €9 billion for adapting roads to higher temperatures[62].

Estimates of financing gaps

Insufficient public and private finance and insufficient access to long-term finance are among the most important obstacles to the development of transport infrastructure. The market introduction of innovative solutions in the transport sector is prevented by the lack of economic incentives for changes at 'systems-level', both for users and suppliers.[63]

An industry study estimates that fuel cell electric vehicles (FCEVs) face a cumulative economic gap (cars + infrastructure) of €25 billion (mainly due to a higher purchase price) and an additional €75 billion up to 2030; that the cumulative economic gap for battery electric vehicles (BEVs) by 2020 is

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[58] The proposal for the Connecting Europe Facility (COM(2011) 665/3) quotes different figures: the completion of the TEN-T requires €500 billion by 2020 of which €250 billion would be used to complete missing links and remove bottlenecks. The White Paper figures are used in the text, as these are also used in the IA of the MFF itself (i.e. in SEC(2011) 868).

[59] The Impact Assessment of the proposed Regulation for the TEN-T Guidelines (SEC(2011) 1212) notes that investment figures for the core network were discussed during bilateral meetings between DG MOVE and Member State representatives. They are based on estimates provided by Member States through the TENtec system and on data from the 2010 analysis of Priority Projects. No further information on how this figure is split between the modes is presented.

[60] McKinsey (2010), A portfolio of power-trains for Europe: a fact-based analysis; http://www.iphe.net/docs/Resources/Power_trains_for_Europe.pdf

[61] CEPS and ZEW (2010) The Fiscal Implications of Climate Change Adaptation, Final Report, Part I to European Commission, DG ECFIN.

[62] Altvater, S., de Block, D., Bouwma, I., Dworak, T., Frelih-Larsen, A., Görlach, B. Hermeling, C., Klostermann, J., König, M., Leitner, M., Marinova, N., McCallum, S., Naumann, S., Osberghaus, D., Prutsch, A., Reif, C., van de Sandt, K., Swart, R. and J. Tröltzsch, (2012) Adaptation Measures in the EU: Policies, Costs, and Economic Assessment, report is a deliverable for the project "*Climate Proofing" of key EU policies – short term actions*, for the European Commission, DG Climate Action (contract CLIMA.C.3/SER/2010/0009)

[63] EC (2012) Communication from the Commission - Research and innovation for Europe's future mobility - Developing a European transport-technology strategy, COM(2012)501, 13.9.2012, Brussels

€80 billion and €500 billion by 2050; while plug-in hybrids (PHEVs) are said to face an economic gap of €420 billion by 2050.[64]

3.1.3 Buildings

The buildings sector accounts for 40% of the EU's energy consumption and almost the same level of GHG emissions.[65] Above average contributions in the medium to long term are expected in the residential and service sectors (37-53% reduction by 2030 and 88-91% reduction by 2050) given significant reductions in required heating from improved insulation, greater use of electricity and renewables for building heating and the use of more energy efficient appliances.[66]

The buildings sector is also vulnerable to the impacts of climate change, in particular potential vulnerability to extreme events.

Estimates of investment needs

The Commission estimates investments to increase by around 30% in various decarbonisation scenarios compared to the reference scenario in the next 2 decades, reaching nearly €70 billion instead of nearly €50 billion of investments annually. It is estimated that over the next decade (to 2020) investments in energy-saving building components and equipment will need to be increased by up to €200 billion.[67] Average annual investments in energy related capital (e.g. boilers and electric appliances) by the residential and tertiary sectors are estimated to be between €126-138 billion to 2050 under various decarbonisation scenarios.

Investments into adaptation options vary. Costs for the implementation of green spaces and green roofs in urban areas, if implemented in all 323 European cities registered in the Urban Audit database[68], have been estimated at €5 billion annually (green spaces) and a one-time investment of €7 billion and annual maintenance costs of €100 million (green roofs).[69]

Estimates of financing gaps

There is a large untapped potential for emission reductions in the residential sector. Main barriers include the lack of funds and/or inability to secure finance on acceptable terms; payback expectations/investment horizons; competing purchase decisions and consumer price signals. While the investments are considered cost-effective over the lifetime of the building, there are undoubtedly high up-front expenditures and this is seen as an obstacle to consumer investment decisions.

There is little comparative information available on financing gaps. All 27 EU Member States have on-going programmes to support the energy performance of buildings, including conventional or

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[64] For example: McKinsey (2010), A portfolio of power-trains for Europe: a fact-based analysis; http://www.iphe.net/docs/Resources/Power_trains_for_Europe.pdf

[65] BPIE (2012) Energy efficiency policies in buildings – The use of financial instruments at Member State level, Buildings Performance Institute Europe (BPIE)

[66] EC (2011) Impact Assessment. A Roadmap for moving to a competitive low carbon economy 2050, Commission staff working document, SEC(2011)288, 8.3.2011, Brussels

[67] EC (2011) Communication from the Commission - A Roadmap for moving to a competitive low carbon economy in 2050, (COM(2011)112), 8.3.2011, Brussels

[68] The Urban Audit provides European urban statistics for 258 cities across 27 European countries. It contains almost 300 statistical indicators presenting information on matters such as demography, society, the economy, the environment, transport, the information society and leisure, www.urbanaudit.org

[69] Altvater, S., de Block, D., Bouwma, I., Dworak, T., Frelih-Larsen, A., Görlach, B. Hermeling, C., Klostermann, J., König, M., Leitner, M., Marinova, N., McCallum, S., Naumann, S., Osberghaus, D., Prutsch, A., Reif, C., van de Sandt, K., Swart, R. and J. Tröltzsch, (2012) Adaptation Measures in the EU: Policies, Costs, and Economic Assessment, report is a deliverable for the project "*Climate Proofing" of key EU policies – short term actions*, for the European Commission, DG Climate Action (contract CLIMA.C.3/SER/2010/0009)

innovative financing or through external funding. Some Member States are entirely dependent on EU Structural Funds.

3.1.4 Support to SMEs

Small and medium-sized enterprises (SMEs) make up a large part of Europe's economy, representing 99.8% of all enterprises.[70] The environment / climate impacts of SMEs vary by sector, by country and by the underlying structure and size of the companies. A 2010 study[71] for DG ENTR found that SMEs have an impact on the environment and account for about 64% of industrial pollution in Europe and that up to 24% of SMEs actively engage in actions to reduce their environmental impact (mainly relating to reduction of energy consumption).

Climate change is both a critical challenge and a business opportunity for SMEs. Particularly small firms are stronger on new regulation-driven markets, such as eco-construction and renewable energy.[72] According to the Carbon Trust, SMEs would have the highest savings opportunity across all sectors of the economy with an average saving opportunity of 20%.[73]

At the same time, SMEs are also sensitive to future climate change impacts**.** SMEs are vulnerable to rising energy prices as recognised in a recent survey of managers of SMEs in the EU on eco-innovation.[74] SMEs may also have more difficulties than larger companies to assess the risks and consequences of climate change for their business, due to less advanced capacities.[75]

Estimates of investment needs

There are no quantitative estimates identifying climate change related investment needs in SMEs from an EU perspective. The SET Plan identifies the need for additional public/private funding (€50bn by 2020) for low carbon technologies. SMEs are expected to play a significant role.

In terms of adaptation, investment needs differ by Member State, sector and structure and size of the organisation. Coherent evidence for the EU is not available. There is some evidence outlining adaptation costs for SMEs in certain Member States. For example in the UK, the cost of flooding based on insurance claims made in 2007, is said to total £200-300 million. [76]

Estimates of financing gaps

SMEs are in strong demand for public funding of their eco-innovation activities, due to the overall lack of risk finance and support for demonstration projects. Available financing models are often not tailored to the needs of small companies, and lack of finance in view of high upfront costs is perceived as a high barrier. Further barriers include uncertain demand from the market, existing regulations and structures, technical and technological lock-ins or a market dominated by

[70] Ecorys (2011) Are EU SMEs recovering from the crisis? Annual Report on EU Small and Medium sized Enterprises 2010/2011, Report for DG Enterprise

[71] Calogirou Constantinos, Stig Yding Sørensen, Peter Bjørn Larsen, Stella Alexopoulou et al. (2010) SMEs and the environment in the European Union, PLANET SA and Danish Technological Institute, Published by European Commission, DG Enterprise and Industry, http://ec.europa.eu/enterprise/policies/sme/business-environment/files/main_report_en.pdf

[72] EC (2011) Commission Communication - Innovation for a sustainable Future - The Eco-innovation Action Plan (Eco-AP), COM(2011)899, 15.12.2011, Brussels

[73] Wood, F., Caro, D., (2010) Making Sense of Going Green - Small Businesses and the Low Carbon Economy, UK Federation of Small Businesses, http://www.fsb.org.uk/frontpage/assets/fsb0029_environment_report_web.pdf [accessed 2/10/2012]

[74] Flash Eurobarometer, (2011) Attitudes of European entrepreneurs towards eco-innovation, Flash Eurobarometer 315 – The Gallup Organization, http://ec.europa.eu/public_opinion/flash/fl_315_sum_en.pdf [accessed 14/9/2012]

[75] EC (2009) Impact Assessment, accompanying the White Paper on Adapting to climate change: Towards a European framework for action, SEC(2009)387, 1.4.2009, Brussels

[76] Climate Change Risk Assessment (2012), Business, Industry and Services, Department of Food and Rural Affairs, London

established companies, and a lack of qualified personnel.[77] There is, however, no quantitative estimate of overall financing needs for SMEs, as their needs differ substantially.

Market demand for adaptation measures among SMEs is likely to vary significantly according to the relevant economic sector, level of awareness, and regional context. Over the course of the next MFF, it is estimated that roughly €1.8 billion would be required to fund climate change awareness raising programmes for SMEs throughout the EU.[78]

3.1.5 Agriculture (including agro-forestry)

In 2005, non-CO_2 emissions represented 17% of the total GHG emissions in the EU; agriculture accounted for around 9% of these emissions.[79] While reducing its emissions in absolute terms, agriculture is projected to represent a third of total EU GHG emissions by 2050.[80]

The agricultural sector also has a high exposure to climate change impacts. There have already been changes in the growing season and the timing of the cycle of agricultural crops in different parts of Europe.

Estimates of investment needs

There are only a limited number of studies available that quantify investments needs from climate mitigation.[81] One quantitative example available at EU level provides a cost estimate for one element of climate change mitigation, indicating annual funding needed of approximately €12 billion to manage soil organic matter on all arable areas at risk (see Annex 2 for further information). [82] Another study for DG Environment in 2010[83] calculated that the costs of undertaking environmentally beneficial land management on agricultural and forested land in 2020 via the CAP (Pillar 2) would be in the region of €34 billion/year, with about €30 billion of this needed for agriculture to reduce GHG emissions.

There is very little evidence on the sorts of investment costs related to adaptation measures. There have been efforts at a global scale to estimate the cost of climate change adaptation in agriculture which are useful to demonstrate the scale of uncertainty: over a twenty year period, the estimates vary from US$5 billion to over US$100 billion[84] (€4 billion to over €81 billion)[85]. Additional irrigation systems for EU27 are estimated to cost €331 million per year and capacity building in terms of advice to farmers is estimated to cost between €53 million and €198 million per year, the latter in the case of compulsory farm advice to all farms receiving direct payments.[86]

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[77] Flash Eurobarometer, (2011) Attitudes of European entrepreneurs towards eco-innovation, Flash Eurobarometer 315 – The Gallup Organization, http://ec.europa.eu/public_opinion/flash/fl_315_sum_en.pdf [accessed 14/9/2012]

[78] Ibid.

[79] EC (2011) Impact Assessment. A Roadmap for moving to a competitive low carbon economy 2050, Commission staff working document, SEC(2011)288, 8.3.2011, Brussels

[80] EC (2011) Communication from the Commission - A Roadmap for moving to a competitive low carbon economy in 2050, (COM(2011)112), 8.3.2011, Brussels

[81] We have taken 'investments' to mean 'expenditure' more generally, to include area payments for environmental management, rather than purely 'physical' investments in grey infrastructure, which is often how this term in used in relation to agriculture.

[82] Kuhlman, T., Reinhard, S. and Gaaff, A. (2010) Estimating the costs and benefits of soil conservation in Europe. *Land Use Policy* 27, 22–32

[83] Hart K, Baldock D, Tucker G, Allen B, Calatrava J, Black H, Newman S, Baulcomb C, McCracken D, Gantioler S (2011) *Costing the Environmental Needs Related to Rural Land Management, Report Prepared for DG Environment*, Contract No ENV.F.1/ETU/2010/0019r. Institute for European Environmental Policy, London.

[84] Downing, T. and Chambwera, M., Cabot Venton, C., Dyszynski, J., Crawford, V., 2011. *Planning and costing agriculture's adaptation to climate change: Policy Perspectives.* International Institute for Environment and Development (IIED), London, UK. http://pubs.iied.org/pdfs/G03175.pdf

[85] Exchange rate of USD1 = EUR0.81, http://ec.europa.eu/budget/contracts_grants/info_contracts/inforeuro/inforeuro_en.cfm

[86] Altvater, S., de Block, D., Bouwma, I., Dworak, T., Frelih-Larsen, A., Görlach, B. Hermeling, C., Klostermann, J., König, M., Leitner, M., Marinova, N., McCallum, S., Naumann, S., Osberghaus, D., Prutsch, A., Reif, C., van de Sandt, K., Swart, R. and J. Tröltzsch, (2012)

Estimates of financing gaps

While farmers are used to autonomous adaptation, expected climate change impacts require action exceeding current capabilities. A couple of barriers prevent uptake of climate adaptation measures, including farm structures, access to information, technology, skills or diversified income structures. Insurance, pricing systems and public private partnerships are discussed as instruments that can build on existing practice. A clear quantitative estimate on financing gaps is, however, not possible on the basis of the available information.

3.1.6 Water – including flood and risk prevention activities

The water sector consumes a considerable amount of energy for drinking water supply and wastewater treatment. Greater use of desalination in the future is likely to increase energy demand. In the absence of a reduction in water demand total energy use from desalination and transport is estimated to range between 3 and 7% of total power production in 2030, according to one study.[87]

Climate change is also expected to lead to major changes in water availability across Europe with increasing water scarcity mainly in southern Europe and increasing risk of floods throughout most of the continent, with consequences for water-dependent economic sectors such as fisheries, aquaculture, and coastal tourism, and social and economic impacts resulting from the loss of provision of water, including shortage of cooling water in the energy sector.

Estimates of investment needs

Quantitative investment needs relating to mitigation in the water sector could not be identified. One study estimates adaptation costs for sea level rise and inland to amount to €1.5 billion per year and €3 billion per year respectively.[88] This include sea walls for coastal flooding including dykes, floodplain management for inland flooding, and measures applicable to buildings and municipal water infrastructure. Additional investments will be needed for measures such as additional storm water retention reservoirs.

Estimates of financing gaps

Given the impact of flooding on commercial and residential buildings, there is likely to be a significant degree of autonomous adaptation in these areas by the private sector. Yet, flood protection measures such as sea walls or more extensive floodplain management will require greater engagement and financing of public authorities. A quantitative estimate of a gap is, however, not possible.

3.2 Assessment of market demand and barriers

Over the recent years there has been a steady growth of investment into renewable energies, energy savings or low-carbon infrastructure. In spite of this growth, major investment gaps remain. Financing gaps are apparent, as discussed above. It is unlikely that financial markets will be able to address the gaps alone. Important constraints include high upfront capital intensity of many technologies, strong risk perceptions related to recent changes in public support structures, continuation of subsidies for fossil fuels in many Member States, information asymmetries as well as general technological, market and operational barriers.

Adaptation Measures in the EU: Policies, Costs, and Economic Assessment, report is a deliverable for the project "*Climate Proofing" of key EU policies – short term actions*, for the European Commission, DG Climate Action (contract CLIMA.C.3/SER/2010/0009), p. 204

[87] Anderson, J., Bassi, S., Dworak, T., Fergusson, M., Laaser, C., Le Mat, O., Matteiβ, V., Strosser, P. (2008): Potential impacts of desalination development on energy consumption. DG Environment Study Contract #07037/2007/486641/EUT/D2

[88] Climate Cost (2011). Sea-Level Rise. Final report for DG Research under the Seventh Framework Programme, Brussels.

In the remainder of this subchapter, we assess investment trends with regard to clusters of low-carbon, climate resilience finance that cut across the six sectors analysed in this report with a view to point to the respective potential of financial instruments to help address problems.

3.2.1 Renewable energies

The subsequent analysis of market demand, trends and barriers for renewable energies distinguishes between the implementation of mature renewable energy technologies and the development of new renewable energy technologies.

Implementation of mature renewable energy projects

Barriers for the implementation of renewable energy projects include a lack of project sponsor equity, a lack of instruments to manage commercial and political risks, as well as high transaction costs and timing uncertainties along the project development and implementation cycle[89].

There is a market trend towards large-scale projects in particular in the offshore wind sector, but also in the solar sector. Big utilities are less and less able to finance these investments on their balance sheet. This has resulted in higher demand for project financing which plays therefore an increasingly important role in the renewable energy sector. Project financing on a non-recourse basis has been used for onshore wind and solar and has also started for offshore projects.[90] In 2011, non-recourse debt financing for offshore wind farms increased by 40% to reach over € 2 billion.[91]

Utilities used to be rather reluctant to project financing because it was perceived as more complex and costly since it gives lending banks influence in project implementation. On the other hand, access to cheaper capital as well as improved risk management approaches may make utilities accept these limitations.[92] However, there remains uncertainty if debt financing may negatively affect the credit ratings of utilities if project financing is not classified as off balance sheet financing.[93]

Since renewable energy projects are very capital intensive and often 80 to 90% of project costs arise in the early phase of the life-cycle the cost of financing for these projects is crucial. This cost will be strongly determined by the debt/equity ratio of these projects. Equity is more expensive than debt, whereas public debt is cheapest. While public funding is not considered crucial for these projects to go ahead, it is considered as a very effective way in supporting the implementation of these projects as banking risks are reduced.[94] For example, of the three offshore wind transactions that were closed in 2011 in Europe, all included involvement of public lending from KfW and/or EIB. For example, the Meerwind project, the first offshore wind project fully financed by private investors, had total investment costs of €1.3 billion and involved €822 million of debt financing, half of which was provided to the private investors by KfW. The financial investor Blackstone put equity in the project due to a return profile similar to comparable private equity investments.[95] The higher costs that come with equity financing may however result in significant additional funding requirement.[96]

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[89] UNEP and SEFI (2008) *Public Finance Mechanisms to mobilise investment in climate change mitigation: An overview of mechanisms being used today to help scale up the climate mitigation markets with a particular focus on the clean energy sector*

[90] Personal communication

[91] EWEA (2012): The European offshore wind industry key 2011 trends and statistics, January 2012

[92] Matthiessen, S.; Guillet J. (2012): Project Finance in Offshore Wind. Windtech International, 3/2012

[93] PWC (2012): Offshore wind cost reduction pathways study, Finance work stream, April 2012, http://www.thecrownestate.co.uk/media/305102/PwC%20OWCRP%20project%20finance%20work%20stream.pdf

[94] Personal communication

[95] Schäfer, D., Clark, P. (2011): Blackstone to invest €2.5bn in wind farms, Financial Times, 5 August 2011

[96] PWC (2012): Offshore wind cost reduction pathways study, Finance work stream, April 2012, http://www.thecrownestate.co.uk/media/305102/PwC%20OWCRP%20project%20finance%20work%20stream.pdf

The impact of Basel III on banks' lending capacity and willingness to provide loans has also reduced access to finance for renewable energy project. This is of particular concern for small developers who often have difficulties in getting access to finance. Most of them do not reach the necessary rate of return to make them attractive for private equity and hence rely mostly on traditional financing instruments, i.e. loans, loan guarantees, and subsidised loans.[97]

There is a demand for specific support for small developers by providing access to loans, e.g. through credit lines via local banks.[98] Loan guarantees can also help small developers to access debt financing in case they do not have the necessary collateral to secure a loan. Direct loan guarantees can cover up to 80% of the loan value. In addition to loan guarantees, guarantees can also be provided for other financial products such as leasing contracts or risk credits. Guarantees can also help to address negative consequences of the Basel III provisions on long-term lending.[99]

The need for aggregation vehicles is highlighted in some studies. These can be used to target institutional investors and would have the additional advantages that they would take assets off bank balance sheets, lower the costs of capital and enable the recycling of funds into new investments.[100] One way of achieving this may be a certification scheme to establish trust for potential investors. Standardisation is also important to have a common framework for monitoring and verifying energy savings. This is important to investors, as it would provide more certainty about the financial returns.[101]

Bonds constitute an additional or alternative source of financing in the mid-term. There apply however some restrictions in terms of the potential scope. Bonds are mostly suitable for large-scale renewable energy projects such as offshore wind with an investment volume of more than around EUR 100 million and hence do not cover decentralised renewable energy projects.[102] Moreover, construction and completion risk combined with planning risks remain too high for institutional investors.[103] They are currently mainly active in the area of refinancing during the operational phase, where there is no construction risk involved which is currently still high for offshore projects. [104]

In principle there is willingness among institutional investors to invest in the sector, but there remain regulatory barriers. The rules on unbundling in the EU energy market constitute a major barrier for pension funds to undertake investments in the renewable energy sector. For instance, one UK pension fund had considered investing in a major wind energy project in the UK, but could not go ahead after it decided to focus on transmission projects.[105]

A regulatory and policy framework that provides sufficient certainty to investors and hence an acceptable risk profile is crucial for investments in renewable energy projects.

Development of new renewable energy technologies

The development of new renewable energy technologies is critical and requires substantial investments. Large companies play an increasingly important role in R&D for renewable energy technologies which reflects both the size and development stage of certain technologies such as

[97] Personal communication

[98] Personal communication

[99] Personal communication. Under the Capital Requirements Directive 2006/48/EC, transposing Basel II in the EU, publicly guaranteed or counter-guaranteed loan amounts receive a zero risk weighting and hence increase banks' ability to provide loans. This seems to be continued in the new legislative framework which is currently in the decision-making processes and will transpose Basel III in the EU.

[100] HSBC (2012) Bond and climate change.

[101] Personal communication

[102] Personal communication

[103] Personal communication

[104] Personal communication

[105] Personal communication

wind turbines and the presence of big players in the market. But SMEs are also still active in the field. Both large companies and SMEs look for public support for innovative R&D projects in form of grants and loans. Most important financing gaps persist for demonstration, pilot testing and market penetration. Venture capital is of particular interest for the research and developments stage of renewable energy technologies. Since venture capital financing transfers ownership risk from the entrepreneur to the investor it requires high returns. Due to the extremely large variation in returns only a small number of start-ups are likely to attract venture capital and less so at the early stage of development.

It is therefore important to have grants available for high-risk innovative project during the start-up and development phase when financial market barriers are high.[106] In 2011, venture capital and private equity for clean energy technologies went mostly into Energy Smart Technologies[107] including energy efficiency, energy storage, advanced transportation, digital energy, and solar energy. By contrast less venture capital and private equity is going to the wind energy sector which reflects the technology maturity and the presence of leading publicly-traded companies investing in the further development of their technologies.[108]

3.2.2 Energy efficiency in buildings and SMEs

As opposed to the renewable energy sector where the need for additional risk capital plays an important role to finance RD&D, in the energy efficiency sector there is a predominant need for better access to capital for the deployment of mature technologies. Various barriers to investments in energy efficiency in buildings and industry persist. While many energy efficiency measures have short technical payback periods, starting from as low as two years for electrical equipment to eight years for space and water heating, these become considerable higher if non-technical barriers are accounted for.[109]

In particular high transaction costs (e.g. the search for reliable, relevant information) can increase payback periods significantly. 'Hidden costs' such as overhead costs for management or disruptions to production have been identified as a primary explanation for the 'efficiency gap' in the industrial sector and most importantly for SMEs.[110]

Despite the often rather short payback periods in a public consultation on the financial support for energy efficiency in buildings carried out by the European Commission in spring 2012, respondents identified the following barriers as the most important ones:[111]

- High upfront investment costs and limited access to credit;
- Too long payback times and credit risks;
- Split incentives between owners and tenant and problems in multi-apartment buildings.

This shows that even short technical payback periods may be perceived by individuals or organisations as too long and investment costs as too high. This can be explained by lack of sufficient

[106] Veuglerer, R. (2011): Mind Europe's early-stage equity gap. Bruegel Policy Contribution, issue 2011/18, December 2011

[107] Defined by Bloomberg New Energy Finance as 'a range of non renewable clean energy technologies including digital energy and smart grids, power storage, hydrogen and advanced transportation and energy efficiency on both the demand and supply side' (DB Climate Change Advisors (2012): Investing in Climate Change 2012,p37)

[108] DB Climate Change Advisors (2012): Investing in Climate Change 2012.

[109] IEA (2012): World Energy Outlook, OECD/IEA, Paris.

[110] Sorrel, S., Mallett, A., Nye, S. (2011): Barriers to industrial energy efficiency: A literature review, UNIDO DEVELOPMENT POLICY, STATISTICS AND RESEARCH BRANCH WORKING PAPER 10/2011

[111] European Commission (no date): Public consultation "Financial Support for Energy Efficiency in Buildings", Consultation Report, http://ec.europa.eu/energy/efficiency/consultations/doc/2012_05_18_eeb/20120912_financial_support_for_energy_efficiency_in_buildings_consultation_report.pdf

information and understanding on the part of consumers to make rational consumption and investment decisions. The scale of projects constitutes another important barrier. Energy efficiency projects are often small-scale and are hence linked to relatively high transaction costs.

Additional barriers include fiscal and regulatory policies which distort investment choices and the lack of internalisation of external costs in energy pricing, resulting in relatively low energy prices and hence insufficient price signals to invest in energy efficiency. Certain energy tariffs, such as declining block prices, can further discourage energy efficiency investments.[112]

In the EU, an important factor for investment trends and market demand is the fact that Member States have developed different national energy efficiency and/or savings policy frameworks[113]. This is also reflected in the status of ESCO markets in EU Member States which are at different stages of development but considered as important potential drivers for the take-up of energy efficiency markets. Whereas some Member States such as Germany, Italy and France have a large number of ESCOs, most countries have only a limited number of them. Although there was strong market growth between 2007 and 2010 in Denmark, Sweden and Romania, the most common feature is slow market growth partly due to the financial and economic crisis. In most new Member States there were no major developments between 2007 and 2010, mainly due to difficulties in getting access to finance, subsidised energy prices and lack of availability of energy consumption data to determine baselines.[114]

Overall the financial and economic crisis has affected banks' willingness to provide finance for investments in energy efficiency. Moreover, banks are usually not used to assessing the risk of energy efficiency investments, which may reinforce the lack of willingness to provide financing in this sector, also due to the required lending with longer maturities. There is a perceived risk linked to the forecast of the expected energy savings, in particular in the context of deep renovation projects. On the other hand, returns on investment are usually secure which would make financing more suitable for equity funds rather than traditional bank lending. However, due to the scale of the projects these actors are often not interested.[115]

While it is important to note that only a balanced mix of appropriate policies including regulatory requirements will be able to address the various barriers in the energy efficiency market, access to finance combined with the necessary technical assistance can make an important contribution to overcome some of the key barriers.

The suitability of financial instruments to stimulate energy efficiency investments also depends on the potential recipient implementing energy efficiency measures. Barriers in the SME sector may be best addressed by providing access to capital via credit lines combined with technical assistance to reduce transaction or 'hidden' costs. Commercial banks may be best supported by increasing their lending capacity via credit lines combined with technical assistance to build-up the technical expertise for assessing energy efficiency projects. Energy efficiency investments in the public sector may be best stimulated by addressing the constraints on public budgets in particular at the local and regional level where there is a strong potential in semi-public buildings such as schools and hospitals. There remain however regulatory uncertainties, for example, as to whether an ESCO would be considered on or off public authorities' balance sheets. Only if it is off the balance sheet, is it possible to access additional finance without adding to public authorities' deficits.

[112] IEA (2010): Energy Efficiency Governance, OECD/IEA.

[113] Egger, C. (2012): SURVEY REPORT Progress in energy efficiency policies in the EU Member States - the experts perspective: Findings from the Energy Efficiency Watch Project 2012, O.Ö. Energiesparverband

[114] Marino, A.; Bertoldi, P.; Rezessy, S.; Boza-Kiss, B. (2010): Energy Service Companies Market in Europe - Status Report 2010, European Commission, Luxembourg.

[115] Copenhagen Economics (2012): Multiple benefits of investing in energy efficient renovation of buildings: Impact on Public Finances, commissioned by Renovate Europe, 5 October 2012

Public funding is considered as essential to trigger investments and bridge the limited access to finance. Besides funding for capacity building, direct grants and cost-sharing incentives as well as risk-mitigation mechanisms can unlock investments from energy efficiency providers, end-users or institutional investors. More specifically public funds can be used to reduce risks, lowering interest rates, guaranteeing returns and reducing upfront capital costs.[116]

Concessional loans play an important role in the buildings sector and should continue to be supported by public budgets at national and EU level.[117] There is also a need for more reliable information to all parties concerned, i.e. including the domestic and non-domestic sector.

Energy efficiency investments can also be triggered through appropriate risk-sharing arrangements, where governments or public institutions such as the EIB take first risk shares, in order to overcome the perceived high risks in the market.[118] Risk sharing mechanisms can be implemented in the form of Energy Service Companies (ESCO) and Energy Performance Contracts (EPC) which can be tailored to achieve a risk sharing that allows for energy efficiency projects to go ahead. Almost all ESCOs in Europe provide financing services, 89% are prepared to bear technical and financial risk by offering guarantee of performance, and around 58% offer insurance coverage. ESCO projects are usually undertaken in the industry (50%) or public sector (38%) covering heating systems, heating ventilation and air conditioning. So far ESCO projects do not include deep renovation projects. [119]

Major growth stimuli in the ESCO market include improvements in the legislative framework, increased activity in the refurbishment of public buildings, financial incentives for refurbishment and modernisation of private real estate, and a stronger environmental awareness. Several success factors that can help to stimulate ESCO markets have been identified including bundling of small scale projects to achieve sufficient scale of interest to financial institutions. In addition the following financial products have been identified as suitable to stimulate ESCO markets: [120]

- Credit lines and/or revolving funds in case of liquidity constraints in the banking sector;
- A guarantee scheme or other risk mitigating tools in case the financing sector perceives the risk of ESCO projects as too high; and
- Subordinated debt in case of insufficient equity for ESCOs to comply with minimum equity requirements.

Given the diversity in national energy efficiency markets it is important that the type of financial instrument is tailored to national circumstances.

3.2.3 Low carbon infrastructure

The OECD has identified many barriers that prevent private investors, particularly pension funds, from investing in infrastructure. These include the lack of long-term political commitments, regulatory instability and barriers, a lack of clarity about investment opportunities, high bidding costs, the perception that infrastructure investment opportunities are too risky, a lack of investor expertise in infrastructure, the scale of some pension funds, negative perception of infrastructure

[116] The Coalition for Energy Savings (2011): The Coalition Portfolio: Financial Issues for Energy Efficiency, Position Paper, 7 April 2011

[117] Maio, J, Zinetti, S., Janssen, R. (2012): Energy efficiency policies in buildings – the use of financial instruments at member state level. BPIE

[118] Personal communication

[119] Copenhagen Economics (2012): Multiple benefits of investing in energy efficient renovation of buildings: Impact on Public Finances, commissioned by Renovate Europe, 5 October 2012

[120] Marino, A.; Bertoldi, P.; Rezessy, S.; Boza-Kiss, B. (2010): Energy Service Companies Market in Europe - Status Report 2010, European Commission, Luxembourg.

value, a lack of transparency in the infrastructure sector and a shortage of data on the financial performance of infrastructure projects and therefore the lack of a benchmark.[121] Some of the barriers contribute to the mispricing of low carbon investment compared to more polluting or resource-intensive investment. Additionally, other barriers include a lack of collective investment vehicles of a suitable scale and a lack of instruments with suitable risk-return profiles.

Interviews undertaken for this project also suggested barriers for some pension funds with respect to investing in low carbon energy and transport infrastructure. In Germany, for example, there are regulatory barriers that prevent pension funds from investing in renewable energy projects, whereas in the UK pension funds prefer to invest equity in existing infrastructure rather than investing in new infrastructure, as they consider the development and construction risks associated with new infrastructure to be too high. In addition, the EU unbundling legislation was considered to be a barrier, as it meant that pension funds were unable to invest in both renewable electricity generation capacity and transmission lines. Pension funds operate within tighter structures than commercial banks, and so investments need to be packaged better to meet their needs. Additionally, liquidity plays an important role for these investors[122].

The OECD advocates a number of options and instruments including the strengthening of data collection on infrastructure investments by pension funds; the provision of infrastructure road maps by government; the development of appropriate financing vehicles, e.g. issuing or supporting green bonds; investigating and addressing regulatory barriers; fostering collaborative mechanisms between investors to increase capacity and provide the necessary scale to enable smaller funds to participate; promoting a public-private dialogue on green investments; providing consistent environmental policies and support; and developing evidence-based international approaches. Another OECD report argues that reforming the regulatory framework with institutional investors in mind is important, as is encouraging these investors to be active shareholders. Government support for long-term investments was also needed, along with appropriate financial education and consumer protection regulation [123].

An organisation representing pension funds argues that an 'investment grade' policy framework needs to ensure that relevant policy exists (including policies supporting investment in renewable energy generation and financial incentives that shift the risk reward balance in favour of low carbon assets), that these policies are well designed, including that they provide appropriate incentives to invest; and that the institutions charged with implementing these policies are effective[124].

3.2.4 SMEs access to finance

The financial crisis highly affected the SMEs as they struggle to access financing. Currently 17% of Euro area SMEs state that access to finance is their biggest problem[125] and 76% of European SMEs state that some sort of external financing is needed for their business[126]. With 30% of EU SMEs using bank loans in 2011, this type of financial instrument has been declared as the most important external financing instrument. Therefore, the availability of credit and loan guarantees is crucial for SMEs.[127]

[121] Della Croce, R., C. Kaminker and F. Stewart (2011). "The Role of Pension Funds in Financing Green Growth Initiatives", OECD Publishing, Paris.
[122] Personal communication
[123] Della Croce, R., C. Kaminker and F. Stewart (2011). "The Role of Pension Funds in Financing Green Growth Initiatives", OECD Publishing, Paris.
[124] IIGCC, INCR, IGCC and UNEP FI (2011) *Investment-grade climate change policy: Financing the transition to the low C economy*.
[125] ECB, Survey on the access to finance of small and medium-sized enterprises in the euro area, October 2011 to March 2012
[126] EC (2011) SMEs' Access to Finance Survey, Analytical Report
[127] UEAPME (n.d.) Position paper on the next generation of European SME Finance Programmes

Commission figures also showed that SMEs most often rely on local credit providers who are familiar with the local market.[128] Nevertheless, as there is a great diversity among SMEs in Europe a combination of financial instruments, such as micro-credits, loan guarantees, crowd funding is required[129]. On the contrary, equity financing is not applicable to the majority of EU SMEs, as only 7% of European SMEs use equity as a source of external financing.[130] Although for start-ups and innovative companies equity and quasi-equity financial instruments can be an option. Finally, highly innovative and fast-growing enterprises need better access to venture capital and bond markets, which are currently missing from the European market.[131]

Access to finance is considered critical for rural economies. The constraints that rural actors (including SMEs) face however are not solely related to scarce supply of finance but also to other factors including information asymmetry in the market, the tightening of credit standards, the increasing cost of borrowing and specific factors linked to rural economies.[132] Options for optimising access to finance therefore should address both supply and demand and the linkages between the two.[133] In practice, this means stimulating the demand and the flow of information between financial institutions and SMEs.

3.2.5 Adaptation to climate change

Discussing investment trends in climate change adaptation starts with revisiting what is meant by 'adaptation' and what a climate 'adaptation project' is. In contrast to mitigation, addressing climate change risks and adaptation to climate change impacts is a process. It requires the systematic consideration of climate variability and projected impacts in planning and management processes, including investment planning. The adjustments needed to adapt to the impacts of climate change are often an integral part of the asset itself, thus they can be financed as part of the asset. In this sense, adapting to climate change is about reflecting risks and options in management practices and investment planning, project design and monitoring systems. It is therefore considered that the private sector will bear the costs of adapting their businesses, operations and assets to climate change impacts or extreme weather events.

For example, the rate of return expected by private investors depends on the risk associated with climate change impacts. An adaptation measure can increase the cost of the investment required, but it could also reduce the risk. Larger culverts, for example, may reduce the risk associated with a loan to a toll road because the risk of washouts and associated loss of revenue is lower and the prospects for repayment of the loan are higher than with smaller culverts. A bank can be incentivised to lend some or all of the additional cost due to the larger culverts given the reduced risk of revenue losses.[134]

Adaptation to climate change has clear territorial aspects. The city and urban level of intervention, particularly in relation to improving the climate resilience of buildings and infrastructures, has been of increasing importance. Urban areas are characterised by the concentration of population, physical assets and economic activities and hence are particularly vulnerable to climate change impacts and extreme weather events. The role of public authorities at lower level of governance to address climate change adaptation and resilience of systems is essential. An integrated and synergetic

[128] ESBA (n.d.) Urgency and Smart Allocation: SMEs in dire needs of funds
[129] ESBA (n.d.) Access to Finance for SMEs: creating growth and jobs in Europe
[130] EC (2011) SMEs' Access to Finance Survey, Analytical Report
[131] UEAPME (n.d.) Position paper on the next generation of European SME Finance Programmes
[132] Banks often require high collateral and private equity firms are rarely interested in investing in smaller companies
[133] ENRD (2012) Final report on the ENRD rural entrepreneurship thematic initiative: rural finance. Final version, March 2012, Compiled by the ENRD Contact Point
[134] GEF and UNEP (n.d.) Accessing international funding for climate change adaptation – a guidebook for developing countries. Prepared by UNEP RISO Centre and Stratus Consulting.

approach to planning and investment at urban level is necessary. This includes issues such as energy systems, insulation of buildings, water efficiency and public transport.

In practice, however, there are a number of barriers for private companies and public authorities to invest in climate change adaptation. These are to a large extent related to the underlying uncertainty about the occurrence and magnitude of extreme weather events as well as long-term impacts from a changing climate. There is also considerable lack of data about the cost and benefits of risk mitigation and adaptation options. A range of studies suggest that well-targeted investments in climate risk reduction may generate substantial long-term returns, often worth upwards of three times the value of the initial cost[135]. Yet, managers tend to discount uncertain future savings benefits, especially long-term ones, which are likely to come from adaptation. Similarly, they are dis-incentivised to capture long term opportunities for their businesses.[136]

It has also been argued that while private capital could be incentivised to incorporate adaptation considerations in investment decisions, market-driven financial flows will not necessarily respond to the impacts of climate change in ways that achieve policy goals. For example, private infrastructure investors might avoid projects in countries at high risk from climate-related impacts, rather than choose to make their projects more climate-resistant.

Adapting to climate change also requires the development of specific projects in the environmental and water domains, which need dedicated investments. They can be financed through both public and private sources. The practice shows that the role of public finance, or a mix of public and private finance, in such projects is predominant. The reason for this is that such investments are perceived as delivering public goods and hence inherent to the public domain. The private sector often finds it difficult or impossible to collect payments for the value provided.[137] There are examples of successful public private partnerships for environmental programmes/infrastructure projects where private capital has been mobilised but the role of public finance remains essential.

In order to attract private sector investment, an adaptation project should provide reasonable, predictable, and usually relatively quick market rate of return on investment in the short run or high returns over a longer time frame. For example, private capital may be preferable for projects that have a fixed asset component that can be captured through ownership, either as a revenue stream or through increasing ownership value (typical in the water sector).

In the agriculture sector, insurance and agricultural development projects that could offer a return on investment could attract private sector finance. Some adaptation sectors, however, such as flood prevention and disaster planning, are less attractive to private capital because the economic benefits are difficult to capture.[138] Life insurance companies, pension funds, sovereign wealth funds, and endowments are among other potential sources of private sector climate adaptation but there is not much experience gained so far. Currently, there are discussions for using instruments to mobilise the participation of private capital in adaptation issues. This includes a menu of instruments for transferring capital and risk including local currency bonds, catastrophe bonds, reinsurance products as well as Climate Adaptation Securities (CAS)[139] and even Adaptation Investment Market Mechanism[140].

[135] See Hochrainer-Stigler et al 2012, Mechler 2005

[136] DNK KEMA. Private investment, market mechanisms and climate change adaptation: options for closing the adaptation financing gap

[137] DNK KEMA. Private investment, market mechanisms and climate change adaptation: options for closing the adaptation financing gap

[138] SEI (2010) Private sector finance and climate change adaptation. Stockholm Environment Institute

[139] These will be issued by climate-vulnerable countries and purchased by long-term investors, potentially with some guarantees from IFIs, and offering coupons potentially subsidized by the one of these institutions

[140] Such a mechanism is proposed to attribute value through “Adaptation Units” (AU) to be issued for actions providing demonstrable climate resilience benefits

The role of public budget to leverage private investment in adaptation is essential. Grants and concessional loans - among the others - can be used to enable the private finance to earn a market return commensurate with the risk. Most typical forms of support from public budgets for adaptation projects include technical assistance, investment grants and various debt products (e.g. concessional long-term loans, guarantees and interest rates subsidies). Additionally, public budgets can be used to support the creation of climate risk and resilience markets through guarantees or partial risk insurance. Technical assistance appears to be crucial for public financing. Technical assistance support can entail both the provision of climate modelling data, vulnerability maps, risk frameworks for pricing insurance to actual project development and design. The sub-sectors which currently appear to offer the most promise for private finance for adaptation measures are agriculture (agri-business and agri-processing); water and sanitation; energy and energy access; and tourism.

3.3 Summary

Investment needs for climate change mitigation and adaptation actions exceed the sum of available public funding, often considerably. In order to meet investment needs a substantial amount of additional private investment will need to be raised. Engagement of private investment is currently hampered by different barriers. The combination and interplay of these barriers to private investment is quite unique for low-carbon, climate-resilient finance in general when compared to other areas of investment. Moreover, the relevance of financial, technical, informational and policy barriers differ between the priority areas of low-carbon, climate-resilient finance, i.e. energy savings, renewables implementation and development, low-carbon transport infrastructure and adaptation to climate change. Figure 5 provides a synthesis assessment of the analysis that has been carried out in this chapter.

Figure 4. Summary of main barriers

Type of barrier	Barriers	Energy efficiency	Renewable energy technologies		Low carbon infrastructure	Adaptation and climate resilience
			Emerging	Mature		
Financial	High upfront costs					
	Risk					
	Long maturity					
Technical	Small scale projects and high transaction costs					
	Technology risks					
Information / skills	Awareness					
	Institutional capacity and skills					
Regulatory / structural	Regulatory uncertainty					
	Agency problems					

Legend:

	High relevance
	Medium relevance
	Low relevance

Main barriers to a greater deployment of energy efficiency in the housing stock or industrial processes are both structural and financial. They relate to information gaps, wrong incentive structures due to institutional arrangements (landlord-tenant dilemma) or insufficient price signals,

lack of interest among financial markets actors, high transaction costs of small scale projects, lack of expertise as well as lack of longer-term policy requirements. But financial barriers such as (real or perceived) long payback times or difficult access to capital, particularly in case of small projects, remain relevant. While financial instruments have a core support role, regulatory action is needed to create the right policy conditions and establish the right information base. In addition, the lack of capacity and knowledge within commercial banks' lending departments constitute a major barrier for energy efficiency financing.

Greater implementation of mature renewable energy technologies is more of a financial challenge, given high upfront costs and constraints under the current credit crunch in financial markets. This is of particular concern for small developers who often have difficulties in getting access to finance. Most projects do not reach the necessary rate of return to make them attractive for private equity and hence depend mostly on traditional financing instruments, i.e. loans, loan guarantees, and subsidised loans. There is a demand for specific support for small developers by providing access to loans. At the same time important financing gaps persist for demonstration, pilot testing and market penetration of renewable energy technologies. Since only a small number of start-ups are likely to attract venture capital due to the extremely large variation in returns, even more so at the early stage of development, there is also a need for grants for high-risk innovative project.

Low-carbon infrastructure development requires huge investments, but face considerable barriers in terms of accessing suitable sources of finance. Bonds offer opportunities to create a secure investment opportunity that can help bring institutional investors on board and lift capital constraints. Lack of long-term political commitments and a lack of clarity about investment opportunities as well as high bidding costs and risk perceptions are pertinent barriers, however. Climate adaptation finance is challenged by a combination of informational and regulatory/structural barriers, mainly in terms of overall awareness, institutional capacity and skills and regulatory unclarity. Long maturity also poses a key problem.

4 THE EXPANDING MIX OF FINANCIAL INSTRUMENTS UNDER THE 2007-2013 MULTI-ANNUAL FINANCIAL FRAMEWORK

4.1 Background

The EU budget provides the bulk of its financial support in the form of grants**.** [141]Grants under the EU budget can take various forms, depending on the purpose they are supposed to serve. Grants can co-finance investments, both at the start and the end of a project or to cover for specific parts of a project. Grants can take the form of technical assistance, which entails support and capacity-building activities necessary for the implementation of a programme or an action in particular preparatory, management, monitoring, evaluation, audit and control activities. Under the CAP's Pillar Two grants can also be in the form of multi-annual area payments for environmental management. Grants can fulfil the function of a loan guarantee, which can also be combined with investment grants. When the grant is formally combined with an equity or debt instrument the grant becomes part of a 'financial instrument'.

The use of financial instruments[142] increased its relevance under the 2000-2007 MFF period. These include debt and equity financing, blending of EU grants with loans from other financial institutions, risk sharing instruments, as well as the provision of basic training and technical assistance.[143]

Financial instruments are implemented directly by the Commission or indirectly through financial institutions (e.g. the EIB Group, the EBRD, other IFIs, national public financial institutions). When implemented directly, financial instruments can be implemented through:

- **Loans, guarantees, equity participations and other risk-sharing instruments**, provided directly to final recipients or through financial intermediaries.
- a **dedicated investment vehicle** in which the Commission participates together with other public or private investors with a view to increasing the leverage effect of the Union contributions;[144]

Financial instrument absorb a relatively small portion of the EU budget in the magnitude of 1.3%. The reason why they are becoming increasingly relevant is the fact that they have demonstrated in many places their ability to attract substantial additional public and private funding, i.e. their leverage effect is more important than the initial sum allocated under the EU budget.[145]

[141] According to the new Financial Regulation, the definition of a grant is: *'Direct financial contributions, by way of donation, from the budget in order to finance any of the following: (a) an action intended to help achieve a Union policy objective; (b)the functioning of a body which pursues an aim of general Union interest or has an objective forming part of, and supporting, a Union policy ('operating grants').'*[141] The EU sets out the scope of grants, the procedure for awarding them and the arrangements for payment and controls.

[142] Financial instruments are often termed 'innovative' or 'new' when they differ from financing mechanisms traditionally used in a policy area (e.g. grants, public procurement)

[143] EC (2011) A framework for the next generation of innovative financial instruments – the EU debt and equity platforms. COM (2011)621final.

[144] REGULATION (EU, EURATOM) No 966/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 25 October 2012 on the financial rules applicable to the general budget of the Union and repealing Council Regulation (EC, Euratom) No 1605/2002

[145] The new Financial Regulation establishes that the ability of a FI to catalyse additional financial resources should be measured by its 'leverage effect'. In the past however two terms were generally used: leverage effect and multiplier effect. Leverage effect was expressed by the ratio between the additional public finance mobilised by the EU contribution and 'multiplier effect' which was usually expressed by all additional finance mobilised (including both public and private) compared to the original EU contribution. However, the two terms were not commonly defined and were often used interchangeably, which have created certain confusions on what was actually considered – the additional public finance mobilised or the total finance. According to the new Financial Regulation, leverage effect is the ratio of total funding ('global investment' including the EU contribution) divided by the EU contribution, whereby the Union contribution may consist of a grant or a financial instrument.

4.2 Overview of 2007-2013 EU grant and financial instruments

Different instruments are used under the 2007-2013 MFF, depending on the specific circumstances of the area of spending (see also Table 2). These include:

a) *Direct investment grants:* Direct investment grants typically co-finance projects where market demand is low because projects either generate insufficient revenue or are considered too risky. Co-financing has to come from beneficiaries/final recipients.[146] In some cases, grants from the EU budget have been combined with loans from International Financial Institutions such as the EIB for example. Direct investment grants are available across different policy areas/programmes including *inter alia* FP7, CIP/IEE, EU Structural and Cohesion Funds, the EAFRD, TEN-T and LIFE+.

b) *Technical assistance* is a type of advisory service provided through a grant from the EU budget. In some cases grants for technical assistance are '*blended*' with other financial instruments in order to increase the leverage effect of a project. It does not provide direct funding to the actual project, although it may be combined with project specific funding.

c) *Debt*: Debt financing usually involves different instruments including loans, guarantees, risk sharing (e.g. the Risk Sharing Finance Facility (RSFF), Loan Guarantee Instrument for Trans-European Transport Network Projects (LGTT), SME Guarantee Facility (SMEG) and EU Project Bonds pilot phase). In all case, funds are disbursed through financial intermediaries.

d) *Equity*: Equity finance is used for SMEs start up, early stages of development and expansion (e.g. the High Growth and Innovation SME Facility (GIF) and for transport, energy and climate change projects under the Marguerite fund.

e) *Dedicate investment vehicle*: Special finance/investment vehicles can provide a range of different financial products to beneficiaries, including *inter alia* loans, equity, guarantees and technical assistance. An example of this, which is outside of the MFF, using unspent money from the European Economic Recovery Plan is the European Energy Efficiency Fund (EEE F)[147].

f) *Special support instruments*: Special support instruments are used under EU Cohesion Policy and Rural Development where contributions from Operational/Rural Development Programmes are used directly to equity funds, loan funds and guarantee fund mechanisms or indirectly through holding funds. They have a revolving nature and revenues generated through the operation can be reinvested in similar projects.

[146] There are cases where grants can be 100% reimbursed and no co-financing is required such as grants under FP7 for certain types of activities, e.g. consortium management, networking, training, coordination, dissemination or research conducted by the European Research Council.

[147] The EEEF was launched on 1 July 2011 with a global volume of EUR 265 million, providing both debt and equity instruments to local, regional and (if justified) national public authorities or public or private entities acting on their behalf. EEE F aims at financing projects in EE (70%), RES (20%) and clean transport (10%) through innovative instruments and in particular promoting the use of the Energy Performance Contracting. A technical assistance grant support (EUR 20 million) is available for project development services (technical, financial, legal) linked to subsequent investments approved by the Fund. See www.eeef.eu or http://ec.europa.eu/energy/eepr/eeef/eeef_en.htm

Table 2. Overview of 2007-2013 EU grant and financial instruments[148]

EU assistance	EU instrument	Description	Manage-ment	Climate change relevance
Grant finance	FP7	Co-financing projects for research and technological development activities as well as demonstration. Main target group includes public bodies, SMEs, research organisations, higher education establishments.	Direct	✓
	CIP/IEE	Co-financing projects for improving climate governance, bridging the gap between demonstration and market take up of new technologies and removing non-technological barriers in the field of clean and efficient energy and sustainable transport. Main target group includes public bodies such as municipalities and private entities such as SMEs.	Direct	✓
	ERDF, CF	Co-financing regional development projects which include *inter alia* the deployment of low carbon and efficient energy systems in regions. Main target group includes public and private entities at national and regional levels including municipalities and SMEs.	Direct	✓
	EAFRD	Co-financing rural development, agricultural and forestry projects	Shared	✓
	LIFE+	Co-financing projects that contribute to the development, implementation, monitoring and evaluation of environmental policy and legislation. Main target group is public authorities and private entities.	Direct	✓
	TEN	Co-financing large scale cross border infrastructure projects in the field of transport and energy.	Direct	✓
	ELENA	Technical assistance: It helps cities and regions implement viable investment projects in the areas of energy efficiency, renewable energy and sustainable urban transport. The main target group is local or regional authorities, including members of the Covenant of Mayors Initiative.	Joint[149]	✓
	JASPERS	Technical assistance: It help EU12 to prepare high quality infrastructure projects through studies and analyses that could later be financed under the ERDF and/or CF.	Shared	
Debt finance	RSFF	Under the FP7: Loans and guarantees for riskier projects in the field of research, technological development and demonstration, as well as innovation, in particular in the private sector. Main target group includes SMEs, Special Purpose Companies, Joint Ventures, Research Institutes, Universities, Science and Technology Parks.	Joint	✓
	SMEG	Under CIP: Guarantees to improve SMEs' access to finance through a range of financial products including debt, equity and quasi-equity, microcredit and securitisation.	Joint	✓
	LGTT	Under TEN, for transport only: Loan guarantee which, if used, would become junior debt, thus helping a project developer to meet senior debt servicing obligations in the first five to seven years of operation to make up for any revenue shortfalls.	Joint	

[148] It should be noted that in majority of cases the grant finance and FI were implemented under the same EU funding instrument or funding programmes, e.g. RSFF is implemented under FP7, the SMEG under CIP, etc.

[149] EIB-ELENA Facility

	EU Project bonds (pilot phase)	Under TEN: Risk-sharing financial instrument that aims to enhance credit rating of large scale transport and energy projects and create debt capital markets as a new source of financing in the area of infrastructure.	Joint	
Equity finance	GIF	Under CIP: Early stage (seed and start-up) investments other investment vehicles which in turn provide risk capital to innovative SMEs or expansion stage investments for SMEs with high growth potential.	Joint	✓
	Marguerite	A special investment vehicle that seeks to provide funding for capital-intensive infrastructure projects of public interest and bridge a funding gap.	Joint	✓
Hybrid	EEEF	EEEF contributes with a layered risk/return structure in the form of a targeted private public partnership, primarily through the provision of dedicated financing and partnering with financial institutions. The main target group is local and regional authorities and public and private entities (e.g. utilities, energy service companies (ESCOs), social housing associations etc.)	Joint	✓
Special support instruments	JESSICA JEREMIE Guarantee, Loan and Venture Capital Funds	Under **Cohesion Policy**: Schemes are set up either through direct contributions to equity funds, loan funds and guarantee fund mechanisms or indirectly through holding funds to promote urban development (JESSICA) and improve SMEs' access to finance; they are arranged by Managing authorities in Member Stares. Under **Rural Development Policy**: Financial engineering schemes (including Venture capital funds, guarantee funds and loan funds) are permitted under the EAFRD; they are arranged by Managing authorities in Member Stares[150]	Shared	✓

Source: own compilation

[150] Similar financial engineering schemes (including Venture capital funds, guarantee funds and loan funds) are permitted under the EAFRD but they are arranged by Managing authorities in Member Stares. So far, 6 Member States have provisions within their RDPs to set up financial instruments using funds from EAFRD (BG, RO, LT, LV, IT (not all regions), GR) and of these all but Greece has put some form of financial instrument in place in the form of loan or guarantee funds. No venture capital funds have been put in place (see Annex 3 for further details)

4.3 Climate relevance of financing instruments under the EU budget

The majority of EU instruments are of relevance for financing different climate change related actions. Climate activities are promoted under all grant schemes with majority of investments secured through the EU Structural and Cohesion Funds, EAFRD, CIP, FP7 and LIFE+. The majority of schemes have targeted climate change mitigation activities especially in the field of energy and transport. Activities related to adaptation to climate change are generally of low priority within the envelope of climate-related spending.

The different grant schemes appear to focus on different stages of the development of technologies and seek to tackle different barriers for financing climate action. For example, FP7 focuses on research and development of new technologies, the Intelligent Energy Europe under CIP aims to bridge financing gaps between demonstration and market take up, the ERDF enhances the deployment of mature technologies while LIFE+ aims at better implementation, awareness raising and exchange of good practices. Within FP7 (and FP6) the Commission initiative CONCERTO is funded and aims to demonstrate that the optimisation of the buildings sector of whole communities is more efficient and cheaper than optimisation of each building individually.[151] While there are no measures within the EAFRD designed for the sole purpose of delivering climate change objectives, a wide range of multi-objective measures have the potential to contribute to climate change adaptation and mitigation among other objectives.

Financial instruments are primarily used to support generic activities in the field of research/technological development, improving access to finance for SMEs and sharing the risks associated with the financing of large scale cross border infrastructure projects. In this sense, they are not designed to address climate change objectives *per se*. However, a number of SMEs received support under the CIP through financial instruments for activities related to energy savings and the reduction of GHG emissions (mainly as part of eco-innovation actions but not only). Eco-innovation support is said to have led to a reduction in energy savings according to 44% of beneficiaries and a reduction in carbon emissions according to 23% of beneficiaries of the financial instruments (GIF and SMEG).[152] Under JESSICA, out of 23 operations, 10 have an energy efficiency component amounting to over €1 billion of possible investment in energy efficiency measures and renewable energy infrastructure in cities.[153]

Under the European Economic Recovery Plan (EERP)[154] two new financial instruments were set up. The Marguerite Fund (2020 European Fund for Energy, Climate Change and Infrastructure) aims to provide investments in the development of renewable energy among other things. In 2011, with the unspent money under the EERP, the EEE F was created to provide various financial products and services specifically targeting energy efficiency investments. In addition, the following three Public-Private Partnerships (PPPs) were established as part of the EERP and co-funded by the European Commission under FP7 aiming at promoting low carbon R&D in key economic sectors:

- 'Factories of the Future' initiative for the manufacturing sector (€1.2 billion for R&D),
- 'Energy-efficient Buildings' initiative for the construction sector (€1 billion for R&D), and

[151] www.concerto.eu

[152] CSES, EIM (2011) Final Evaluation of the Entrepreneurship and Innovation Programme – Final report April 2011, Framework Service Contract for the Procurement of Studies and other Supporting Services on Commission Impact Assessments and Evaluations Interim, final and ex-post evaluations of policies, programmes and other activities

[153] European Union DG Regional Policy (2011) JESSICA implementation in the EU Member States – State of Play. December 2011, Brussels

[154] Under the EAFRD, climate change has become a "new challenge" following the EERP and the Health-Check of the CAP. This has led to some amendments to the EAFRD regulations with additional emphasis placed on climate change adaptation and mitigation objectives. Of particular relevance to climate change, the amendments referred to the challenges of climate change, renewable energy and water management.

- 'Green Cars' initiative for the automotive sector worth a total of €5 billion, majority of which include loans by the EIB. €1 billion is for research activities.[155]

The ELENA facility, financed under the Intelligent Energy – Europe Programme (IEE), also focuses on clean and efficient energy and transport actions. It provides grants for project development services associated with the development and launch of sustainable energy investments by local and regional authorities or entities acting on their behalf. Thus it supports the development of feasibility and market studies, programme structuring, energy audits and tendering procedures preparation, thereby helping to attract funding from private banks and other sources, including the EIB and Structural funds (Jessica).[156] The Facility is being implemented by the EIB, KfW, CEB and soon the EBRD. Further, in order to target smaller scale investments, MLEI (Mobilising local energy investments) Priority has been opened recently under the 'Integrated projects' of the IEE.

Table 3 provides an overview of EU assistance through grants and FI. It indicates the availability and size of funding for climate change actions. The exact share of funding dedicated to specific climate change related activities however is often very difficult to establish (e.g. under the CIP or the EAFRD where measures are multi-objective).

[155] http://ec.europa.eu/research/index.cfm?lg=en&pg=newsalert&year=2009&na=ppp-310309
[156] EIB. ELENA web page: http://www.eib.org/products/elena/index.htm

Table 3. Climate relevance of EU instruments

MFF heading and sub-headings	Programme	Instruments for EU assistance	Total EU contribution	Climate relevance
HEADING 1				
A. Competitiveness for growth and employment	FP7	All programmes	€50,521 million	€2,350 million - Energy €1,900 million - Environment/Climate change, although the exact share of climate compared to environment cannot be determined
		of which RSFF	€1,000 million	It cannot be established the share of climate relevant activities
	CIP	IEE	€730 million	Entire funding under the IEE contributes to climate objectives
		of which ELENA	€97 million	The total budget of ELENA contributes to climate objectives, however it is covered under the budget of IEE II
		GIF	€623 million	€228 million is allocated to eco-innovation, which includes activities related to energy savings and GHG emission reduction but the precise share is difficult to establish
		SMEG	€506 million	
	TEN	TEN-T	€8,013 million	The share of climate relevant activities is difficult to establish, although the majority of the resources have been spent on rail and water modes.
		of which LGTT	€500 million	Most investment to date has been on road, but infrastructure for rail and water modes can be supported.
		TEN-E	€155 million	Mostly gas and electricity networks, the share spending targeting RES relevant electricity infrastructure is difficult to establish

		EU Project Bonds - Pilot Phase	€230 million	EU contributions are secured through the LGTT, CIP and TEN-E budgets; The share of climate relevant activities is difficult to establish, as no projects have yet been supported.
B. Cohesion for growth and employment	Cohesion Policy	ERDF + Cohesion Fund	€271,000 million	Approximately, €56 billion have been allocated to a wide range of activities including on risk prevention, climate change, energy efficiency, renewables and the biggest share is sustainable transport including rail, clean urban transport, multimodal and cycling paths. Out of this, €9.5 billion have been allocated to sustainable energy.
		JESSICA JEREMIE (ERDF only)	€22,000 million	According to EC figures, around 5% of the ERDF has been committed to financial instruments. 10 JESSICA operations of the total amount of €1 billion target energy efficiency measures and renewable energy.
HEADING 2				
Preservation and management of natural resources	Common Agricultural Policy	EAFRD	€96,000 million	The share of total budget earmarked specifically for climate change type of activities is not available for the 2007-2013 programming period, neither for the EAFRD as a whole or for the financial instruments. However, following the 2009 amendments to the EAFRD regulations, Member States have indicated the allocation of additional resources for the 2010-2013 period as follows: €704 million for climate change, €275 for renewable energy and €1,332 million for water management.
		LIFE+	€2,143 million	The share of climate relevant activities is difficult to establish
Outside of the MFF		EEEF	€265 million	All financing under the EEEF contributes to climate objectives; €20 million will be used for TA
		Marguerite	€80 million	The share of climate relevant activities is difficult to establish

4.4 Lessons learnt

Evaluations of the effectiveness of financial instruments are relatively limited.[157] However, a number of studies have been conducted by the European Commission, European Investment Bank and external consultants. These evaluations have been helpful in identifying success factors and critical issues related to the use of such instruments. Some lessons can also be learnt with regard to the common challenges and barriers to their effective use, which can be differentiated between centrally managed instruments and instruments under shared management. More detailed information for each of the different EU grants and financial instruments can be found the instrument fiches as presented in Annex 3. An analysis of the suitability of EU instruments for project types can be found in Annex 4.

4.4.1 General lessons learnt

With regard to support for SMEs, financial instruments in the 2007-2013 MFF period have been generally successful in providing access to finance in cases where beneficiaries did not have any other option for obtaining the funds and/or have encouraged financial intermediaries to develop and offer new financial products at the local level.

The interim evaluation of the Competitiveness and Innovation Programme (CIP) for example notes that financial instruments under the Entrepreneurship and Innovation Programme (EIP)[158] cater to a range of financing needs of SMEs at different stages of their development and for different levels of financing (small to large). They offer a mix of pro-cyclical (venture capital) and counter-cyclical (guarantees) instruments which allows for responsiveness to changing market conditions. The flexible design of the financial instruments allows adaptability to local conditions while a global budget (with the possibility to transfer resources easily between different instruments) facilitates absorption and the maximum utilisation of available funds. It was also found that financial instruments delivered highly positive economic outcomes (e.g. job creation and financial leverage) and developing SMEs capacity. The evaluation concluded that the underlying intervention strategy of the financial instruments remains valid and highlights the need for EIP to place greater emphasis on risk-capital and hybrid instruments (as compared to purely debt based instruments) to support the financing needs of innovative SMEs with high growth potential.[159]

With regards to R&D investment, the RSFF under the FP7, is found to have been an important source of financing during the financial crisis. The financial crisis resulted in a substantial decline in the availability of finance for private investment in the EU so that access to finance for RDI investments became an even more urgent need. During this period the RSFF scheme disbursed its resources ahead of time - outlays reached 65% of the total targets at the mid-point of the scheme (i.e. by the end of 2009) as against an anticipated target of 50%.[160] Evaluations conclude that the RSFF loan was a catalyst for opening up the private loan market leveraging contributions from private financiers

[157] Robinson, N. and Bain, R. (2011) The implications of the EIB and EBRD co-financing for the EU budget. Study for the European Parliament, Department for Budgetary Affairs. Brussels.

[158] The Entrepreneurship and Innovation Programme (EIP) aims to improve the competitiveness and innovativeness of European enterprises and particularly, small and medium sized enterprises (SMEs). Measures funded through the EIP include financial instruments designed to facilitate access to SME financing and investment for innovation activities; the Enterprise Europe Network which provides information and advice to SMEs on common market opportunities and Community issues; support for innovation; and support for policy making

[159] GHK, Technopolis (2009) Interim Evaluation of the Competitiveness and Innovation Framework Programme (2007 – 2013), Specific Contract No ENTR/A4/04/093/1/09/22 Implementing Framework Contract No ENTR/04/093-Lot 1

[160] Mann, E., et al. (2010) Mid-Term Evaluation of the Risk-Sharing Finance Facility (RSFF): Final Draft of the Group of Independent Experts.

and government grant financiers that would otherwise not have been there.[161] There is less evidence to support such arguments regarding the role of CIP instruments during the crisis.[162]

In cases where the implementation of EU programmes has been delegated to other financial institutions (such as the EIB), additional benefits have included the provision of expert skills on how to implement such instruments and the promotion of best practice. The participation of the private sector brought additional financial expertise and knowhow. At the same time however it should be noted that the participation of intermediaries is sometimes associated with increasing transaction costs and possible decision-making delays. A major effort to increase the technical assistance and training for intermediary banks where such skills are missing would be important. To ensure that the EIB's resources are best used in countries with the greatest difficulties, the possibility to use more effectively existing national public banks where available could be considered. Some examples exist, such as the close collaboration of the KfW and the EIB. Other avenues should be explored while ensuring that the levels of monitoring, reporting and efficiency are maintained or even improved.

It is also considered that the revolving nature of funds (under Cohesion Policy for example) created incentives for better performance of projects on the side of the final recipient, for example, better quality of projects and greater financial discipline. [163]

At the same time, evaluations stress a number of underlying issues with the way financial instruments were designed in the 2007-2013 period. Some instruments were not responsive to the actual needs to SMEs. Two evaluations of the RSFF underlined its ability to mobilise private finance, but argued that the present form of the RSFF largely failed to address the needs of SMEs, with particular issues raised in terms of the bureaucratic nature of the application process and the fact that the offered provisioning is too large in scale for most SMEs.[164] This, however, has been addressed by creating a risk sharing instruments (RSI) which targets only SMEs.

In some cases the potential for synergy between EU and national instruments has not been optimised. In the case of GIF synergies with national instruments were not really an issue, even though some national governments have similar financial instruments in place, given the large demand for venture capital. In fact, no detrimental spill-over effects were identified as a result of these overlaps.[165] There are more mixed results regarding the additionality of the SME loan guarantee (SMEG) though. [166] A survey under the CIP evaluation revealed that while 43% of respondents reported that loans supported by SMEG was the only source of finance available to them, 34% revealed that they could have received the full amount of the loan from elsewhere but preferred the loan guarantee instrument. Still, the evaluation concludes that two out of three companies would not have undertaken the project without the SMEG, or would have done less'.[167]

Many financial instruments in the 2007-2013 MFF were designed in isolation from each other. This created some overlap in the scope of actions or the type of target beneficiaries. One area of needed improvement is said to include finding a better balance between push and pull facilities especially in

[161] European Investment Bank (2010) The EIB Risk Sharing Finance Facility (RSFF): Additional Debt Capacity to Support European Innovation, Information Note, EIB, November 2010 (Luxembourg: EIB).

[162] Robinson, N. and Bain, R. (2011) The implications of the EIB and EBRD co-financing for the EU budget. Study for the European Parliament, Department for Budgetary Affairs. Brussels.

[163] EC (2012) Financial instruments in Cohesion Policy. Commission Staff Working Document, SWD(2012)36, 27.2.2012, Brussels

[164] See Mann, E., et al. (2010) and EIB (2010)

[165] CSES, EIM (2011) Final Evaluation of the Entrepreneurship and Innovation Programme – Final report April 2011, Framework Service Contract for the Procurement of Studies and other Supporting Services on Commission Impact Assessments and Evaluations Interim, final and ex-post evaluations of policies, programmes and other activities

[166] EC (2011) A framework for the next generation of innovative financial instruments - the EU equity and debt platforms, Communication from the Commission, (COM(2011)662), 19.10.2011, Brussels

[167] GHK, Technopolis (2009) Interim Evaluation of the Competitiveness and Innovation Framework Programme (2007 – 2013), Specific Contract No ENTR/A4/04/093/1/09/22 Implementing Framework Contract No ENTR/04/093-Lot 1

relation to research and technological developments. The supply side of financial instruments is covered by a risk sharing facility such as GIF. Demand side measures could be interesting to overcome the valley of death for companies, loans or other debt oriented instruments could be used to help eco-innovators overcome the 'valley of death' and help their customers finance investments.

There are mixed results reported with regard to the coordination between the CIP instruments and the JEREMIE initiative. While JEREMIE is managed under shared management at national levels and the CIP is a centrally managed instrument, the schemes appear to have overlapping competences: both instruments are administrated by the European Investment Fund (EIF), they both provide financial products such as loan guarantees and venture capital and both target the SME sector.[168] The complementarity between the two instruments has not been always been optimised.

Another area of improvement needed particularly in relation to financial instruments under shared management is to strengthen the visibility of EU financial instruments and ensure more transparent information and better communication to intermediaries.[169] For example, the JEREMIE and JESSICA networking platforms were launched in 2009 to support the exchange of know-how and good practice. A number of procedure manuals, handbooks, and guidance notes have been developed and several technical seminars have been held in order to improve the take up of financial instruments. The JESSICA Networking Platform (JNP) and JEREMIE Network Platforms were launched in March 2009 by DG Regional Policy in collaboration with the EIB and CEB to provide a forum for exchange of experience and good practice, and to accelerate the implementation of instruments. The interest in JNP events for example was growing continuously - from 80 participants in the 1st meeting to 160 in the latest. During 2011, the added-value of the JNP was further enhanced through the establishment of dedicated thematic working groups on 'JESSICA lessons learned' and 'Housing in JESSICA'.[170]

4.4.2 Lessons learnt with regard to financial instruments and climate action

There are fewer evaluations which analyse the use of financial instruments for climate action. In fact these are usually limited to the instruments dedicated entirely to the promotion of activities contributing to climate change objectives. We will provide an overview of the experiences gained through the use of the RSFF, ELENA technical facility and the JESSICA funds for energy efficiency in the period 2007-2013.

Risk sharing finance facility (RSFF)

The RSFF is supported by the EU budget by €1 billion to provide for sufficiently high capital cushion to cover potential losses incurred for the financing of loans or guarantees. The RSFF can provide direct and indirect lending in different forms as is illustrated in Figure 5. Direct lending can range between €7.5m up to €300m per transaction and cover 50% of project costs while the remainder of the project costs need to be financed from other sources. The loans have long maturities of up to 10 years. Under the indirect financing approach, the EIB/EIF guarantees up to 50% of loans from local house-banks to innovative SMEs and Mid Caps (up to 3,000 employees) with loan amounts of between €25,000 and €7.5m and loan maturities between 2 years and 7 years.[171] The RSI facility providing indirect lending and financing may help smaller projects by SMEs.

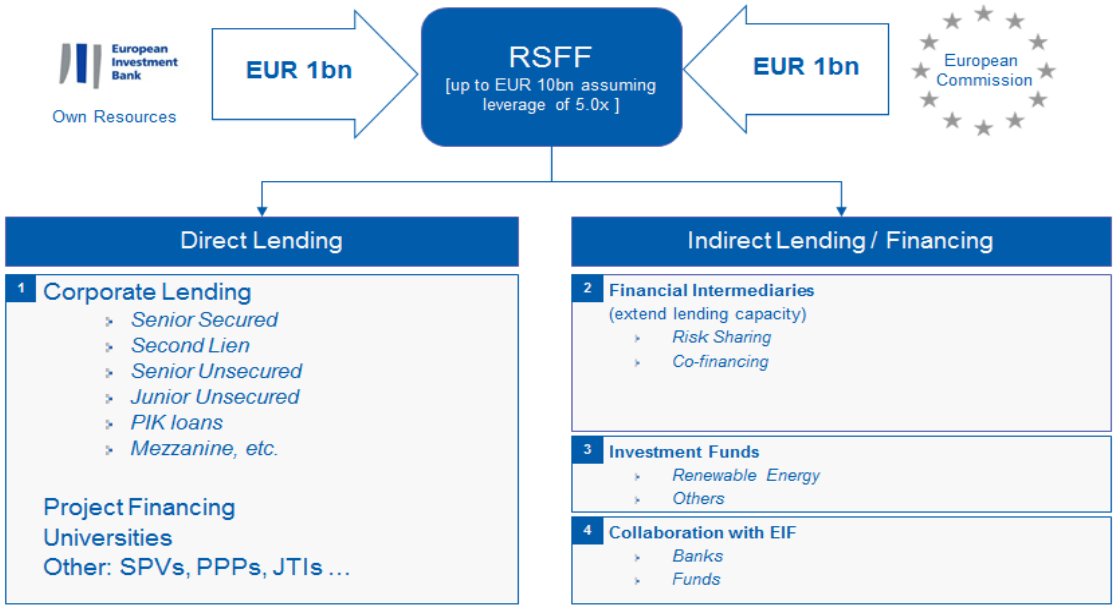
[168] Robinson, N. and Bain, R. (2011) The implications of the EIB and EBRD co-financing for the EU budget. Study for the European Parliament, Department for Budgetary Affairs. Brussels.

[169] EC (2011) A framework for the next generation of innovative financial instruments - the EU equity and debt platforms, Communication from the Commission, (COM(2011)662), 19.10.2011, Brussels

[170] EC (2010) JESSICA implementation in the EU Member States – State of play, November 2010

[171] EIB presentation "EIB Workshop on financial instruments supporting climate action", Luxemburg, 6 November 2012.

Figure 5. Structure of the RSFF



The RSFF is considered a successful instrument, including for the promotion of climate change projects even though these have not been an explicit priority for the instrument. By an RSFF loan, the first large-scale commercial solar thermal power plant in Europe - Andasol-1, was constructed and came online in the Spanish province of Granada in December 2008. This new power plant uses innovative parabolic trough technology which concentrates the sun's rays to produce heat that is converted to electricity. Andasol-1 is one of the flagship projects of the RSFF. Incorporating European innovations into solar power generation, the RSFF helped the industrialisation of a new European technology, which involved many other EU companies in its development and construction. The success of the RSFF-supported Andasol-1 demonstrator led directly to plans for expansion. Andasol-2 has been built and commissioned and the EIB has since financed other innovative CSP projects, such as Abengoa's PS 10 and PS 20, Solnova 1 and 3, Gemasolar and a number of additional operations in this sector which are under preparation. Significantly, much of this expansion is funded by private sector sources of finance – demonstrating the leverage effect of the original RSFF investment.

ELENA

A particular strength of the ELENA facilities is that it brings together different sectors at an urban and/ or regional scale and hence supports a systemic approach to energy efficiency and renewable energy investments. By doing so it can lead to synergies (especially with EU Structural Funds) and increase the contribution of public expenditure to climate policy objectives. The major lesson learned is that the provision of both project and programme based Technical Assistance with a conditional target in terms of investment to be achieved is a powerful tool to unlock the investment potential and empower the market actors with necessary knowledge and confidence.

The number of actual projects has been relatively low in the beginning, due to the nature and pilot role of the Facility and the fact that supported projects take 2-3 years to materialize. Possible barriers include also[172]:

[172] Deloitte (2011): Ex-ante evaluation of a successor of the "Intelligent Energy – Europe II" (2007-2013). Final report, European Commission, DG Energy, June 8, 2011

- A lack of capacity of local and regional actors and financiers for the preparation and financing of large scale projects.
- The low level of communication between different sectors inside the administration of beneficiaries.
- Reluctance from public bodies to commit to large investment programmes in short period of time.
- Capped capacity of public bodies to borrow and finance projects via on-balance sheet structures.
- Very limited knowledge on alternative financing opportunities (in particular off-balance sheet financing).

A number of actors involved in the implementation of ELENA suggested that greater conditionality could be built into the ELENA facility, for example, conditions and plans for applying for regional funds. Moreover it was suggested that ELENA facilities should possibly not be implemented only by IFIs as it would be preferable to involve more national and local financial institutions with project development services performed as independently of downstream financing as possible to allow maximum flexibility in support to local mobilisation of financial resources.[173]

JESSICA

Financial instruments under JESSICA have been used to support energy efficiency and renewable energy projects in urban areas. Energy savings and related cost savings serve as a revenue-basis. Specific lessons learnt that can be drawn from the use of financial instruments under JESSICA include[174]:

- The combination of financial instruments and grants is essential;
- The provisions of additional financial incentives, such interest rate subsidies or grants to cover the self-financing share of final recipients, have been beneficial;
- The provisions of performance incentives, such as incremental capital rebates or interest rates related to energy efficiency gains / categories reached, have been beneficial;
- The combination of technical assistance & project preparation, such as energy audits, planning documents, etc., have been beneficial;
- Awareness-raising and promotion is important;
- Stakeholder co-operation & integration of existing programmes or actors is important;
- There is a need to ensure and make available the relevant expertise in the market (easy access; sufficient capacities);
- Combining technical project preparation & access to finance in one package have been a successful approach ('One-stop shop'); and
- Introducing energy efficiency measures as part of holistic / multi-thematic development approach has been important.

Box 3: JESSICA instrument in Lithuania

In 2009, the Lithuania government established a €227m JESSICA holding fund, managed by the EIB, as a way to mobilise funds from the ERDF (with €127m), national funding (approximately €100m) and commercial banks (expected contribution €20-40m) to promote energy efficiency measures in multi-apartment buildings. In

[173] Deloitte (2011): Ex-ante evaluation of a successor of the "Intelligent Energy – Europe II" (2007-2013). Final report, European Commission, DG Energy, June 8, 2011

[174] Gabriel, B. (2012) Financial instruments for energy efficiency in housing, Cohesion Policy experiences & outlook 2014-2020.

2010, the first loan agreement was signed between the EIB and Šiaulių bankas, in which the latter commits to provide 20 year, low interest loans (3% for the entire loan period) for the total amount of €6 million to homeowners. The goal is to support the renovation of 1000 buildings between 2010 and 2015. By April 2011, approximately 100 projects and five project loan agreements (amounting to more than €1m) had been approved. These projects are expected to positively contribute to achieving the EU's 20% target for energy efficiency as well as national refurbishment plans for 2020. After the refurbishment, it is estimated that the average energy savings for a single house will be approximately 50% or 125 MWh a year. Some success factors behind the Lithuanian experience include: political support, huge demand for renovation of the existing housing stock and the inability of national financial schemes to adequately respond to this issue, as well as the use of established national institutions such as the housing and urban development agency (HUDA).[175]

At the same time, certain overall, cross-cutting barriers have been identified. These include: the lack of a detailed regulatory framework, issues of institutional capacity, availability of data, determining the allocation of public funds to financial instruments, missing financial gap analysis and not reaching optimal level of leverage effect.

The need for a change in culture has been largely underestimated when it comes to financial instruments under shared management. Managing authorities had to get used to the differences between grant financing and other forms of financing. They often lacked expertise in relation to investment know-how and/or struggled to accommodate the objectives/principles of Cohesion Policy and the market reality.[176] Financial instruments took time to become operational and these are still not adopted in some regions. This was compounded by the limited experience in setting up related processes. Member States' administrative capacity issues also led to delays in launching and delivering funds to final recipients.[177]

Financial instruments require monitoring and reporting, which is aggravated by gaps in the availability of data and reporting mechanisms. Another issue identified was linked to the over allocation of resources to financial instruments, which remained unused at the end. For instance, the European Court of Auditors (ECA) report found a number of compliance errors in relation to ERDF payments to funds implementing financial instruments, most of which related to non-respect of regulatory requirements for making contributions from the Operational Programme to the fund[178].

In the past, funding under the Cohesion Policy was available for energy efficiency investments only in non-residential (public and commercial) buildings. In 2009 the ERDF Regulation was changed and allowed for the use of up to 4% of national ERDF allocation for energy improvements and renewable energy investments in existing buildings provided that they support social cohesion. In recent years, Member States have made increasing use of funding from the Cohesion Policy for energy efficiency, especially buildings, also by using financial instruments, e.g. under JESSICA. [179]

[175] Withana, S., Nunez Ferrer, J., Medarova-Bergstrom, K., Volkery, A., and Gantioler, S. (2011) Mobilising private investment for climate change action in the EU: The role of new financial instruments, IEEP, London/Brussels.

[176] EC (2012) Financial instruments in Cohesion Policy. Commission Staff Working Document, SWD(2012)36, 27.2.2012, Brussels

[177] ECA (2012) Innovative Financial Instruments for SMEs co-financed by the European Regional Development Fund, Special report No 2, 2012

[178] ECA (2012) Innovative Financial Instruments for SMEs co-financed by the European Regional Development Fund, Special report No 2, 2012

[179] Personal communication from representative of DG ENER.

5 USING FINANCIAL INSTRUMENTS - LEARNING FROM OTHER PUBLIC AND PRIVATE SECTOR PRACTICE

There is a growing experience with using innovative forms of financing for low carbon projects. IFIs as well as national public and private banks have set up various programmes that make use of one or a mix of financial products and services. It is helpful to look at the practice and experiences gained with using financial instruments in other contexts than the EU budget. This helps to identify both promising practices and to learn from success factors with a view to strengthen and complement the set of financial instruments currently in use and planned for future use at EU level.

This chapter hence synthesises the findings from a broader review of selected examples of the current practices and experiences of IFIs and public banks with financing projects addressing climate change mitigation and adaptation objectives. The sample of IFIs covered includes among others the EIB, the EBRD, the KfW, the UK Green Investment Bank as well as regional facilities of the EU.

The instruments majorly focus on projects for energy efficiency, renewable energy and to some extent low carbon transport infrastructure. The full analysis is presented in Annex 5.

5.1 What is interesting from IFIs practice with regard to climate mitigation

5.1.1 Debt

Local banks are very important actors, particularly since their operational models can be better aligned to the functioning of SMEs and provide for lower interest rates. Green credit lines provide funding and dedicated technical support to development banks and local commercial banks in countries. Credit lines are sometimes combined with technical assistance to local banks and prospective recipients. Their aim is to build capacity and overcome financial and technical barriers to scaled-up investment. The Sustainable Energy Initiative (SEI) and Sustainable Energy Financing Facilities (SEFFs) of the EBRD is one example. Green credit lines provide funding and dedicated technical support to development banks and local commercial banks in countries. Their aim is to build capacity and overcome financial and technical barriers to scaled-up investment. They help the recipient banks to develop their 'climate' strategy and climate finance portfolio and mitigate credit risk – and in turn promote the financing of private green investments that comply with climate friendly eligibility criteria and support private companies and households in elaborating their green investments.[180] KfW has developed partnerships with financial institutions in different countries to provide green credit lines. In addition, KfW provides grants for consultancy services to support the implementation of energy efficiency and renewable energy (EE/RE) loan products and the institutionalisation of EE/RE within the partner lending institutions. This enables them to introduce a new innovative loan product, to gain access to new client groups, and to have an early entry into a growing green market.[181] There are also examples of banks that are fully dedicated to low-carbon, climate resilient finance. The Green Investment Bank in the UK can only invest in UK-based projects and operates at the investable end of the spectrum, so it supports commercially viable projects, but not project development (see Annex 5).

Box 4: DEEP Green Platform, EIB

In addition to these existing programmes and initiatives, the EIB is currently developing a new strategy in support of energy efficiency projects. The so-called Debt for Energy Efficiency Projects Strategy, or 'DEEP Green Strategy', aims to incentivise commercial banks to address the energy efficiency sector as a distinct

[180] EBRD (2012): Sustainable Energy Initiative: Scaling up finance to address climate change

[181] UNEP (2011) Innovative climate finance – examples from the Bilateral finance institutions climate change group.

financing segment, to facilitate access to public sector counterparts to long-term funding, to develop the ESCO financing market and to provide access to refinancing for utilities investing in energy efficiency with their clients. This may have a similar structure as the RSFF.[182]

The EIB estimates that €60-80bn/year is needed to meet the EU 2020 energy savings target – compared to the current €30 bn/year.[183] Reasons for this financing gap include that EE is not considered as distinct lending segment by commercial bank and lending is provided to companies rather than to specific projects. Given the small size of energy efficiency projects and low credit worthiness EIB itself cannot bridge this gap via direct lending. In order to fill this gap DEEP would provide EU-wide financing of small energy efficiency projects taking account of the needs of different Member States and participants. It could comprise four different lines of products ('compartments') to cover the diverse financing needs of the key players in the energy efficiency market: commercial banks, the public sector, ESCOs and utilities.

The underlying idea is to develop lending capacity that is focused on key players in the energy efficiency market. Banks should receive dedicated long-term credit lines as well as risk-sharing mechanisms and technical assistance. The public sector would also receive dedicated long-term credit lines, with the financing vehicles remaining under public ownership but potentially allowing for 'off balance sheet' debt classification. ESCOs would receive senior or subordinated long-term financing with ESCOs being required to contribute equity or quasi-equity to the financing vehicles and the Commission to support EIB's credit exposure in case of falling below a certain credit category. To support utilities' activities in energy efficiency EE market DEEP would allow the EIB buying securities, backed by the Commission.

Pooling grants with loans from finance institutions and development banks is a common practice in financial support schemes outside of the EU, including the EU Regional Investment Facilities. A number of EU regional investment facilities have been set up to provide collaboration platforms in order to leverage additional investment in projects in various sectors such as transport (around 40% of all investments), energy, environment and SMEs[184] (see Annex 5).

These platforms have been used to test another tool for strengthening low-carbon, climate-resilient finance, namely to integrate a Climate Change Window (CCW) into each of the existing regional facilities.[185] The main aim of 'climate change window' is to increase the leverage of credits and the volume of investment projects related to climate change.[186] Specifically, its purpose is to establish a transparent way of tracking and reporting the climate relevance of projects (using the Rio markers) in the different sectors (e.g. clean energy, renewable energy, energy efficiency, transport, private sector, forest conservation etc.).

5.1.2 Equity

Public-private partnerships in the form of a Fund-of-Funds providing equity finance to SMEs are commonly used. One example is the Global Energy Efficiency and Renewable Energy Fund of Funds (GEEREF) (see Annex 5). The EIB currently has €1 billion invested in infrastructure in the form of equity through various funds. These are separate legal entities managed by fund managers on the basis of pre-agreed investment criteria. To date the leverage multiplier associated with these funds

[182] EIB presentation "EIB Workshop on financial instruments supporting climate action", Luxemburg, 6 November 2012.
[183] The following information on DEEP is based on EIB (2012): DEEP GREEN PLATFORM: a potential new initiative to develop the European energy efficiency financing market, Summary presentation for DG CLIMA, Brussels, 21 June 2012
[184] UNEP (2011) Innovative climate finance – examples from the Bilateral finance institutions climate change group.
[185] Nunez-Ferrer, J. and Behrens, A. (2011) Innovative Approaches to EU Blending Mechanisms for Development Finance. CEPS Special report. May 2011, Brussels, http://www.dev-practitioners.eu/fileadmin/user_upload/EU_Blending_Mechanisms.pdf
[186] European Commission (2010) Q&A on climate change windows. http://europa.eu/rapid/press-release_MEMO-10-628_en.htm?locale=en#PR_metaPressRelease_bottom

has been over 12. An additional option that the EIB offers, and will continue to offer, are co-investments, where an investor is given the opportunity to invest alongside other investors[187].

5.1.3 Risk sharing instruments

Layered funds can offer a wide range of financial products including medium to long-term senior loans, syndicated loans, letters of credit, guarantees, mezzanine debt instruments, local debt securities etc. These help to attract commercial capital from multilateral and institutional investors by allowing for better sharing of risk. One example is the Green for Growth Fund (GGF) launched by EIB together with KfW; other examples are the Renewable Energy Performance Programme (REPP) which is currently under development at the EIB and the Global Climate Partnership Fund (GCPF) initiated by the German government (see Annex 5).

Reviving the bonds market for the purposes of investing in climate action is one of the most promising areas for future action under the EU budget. Bonds can be well suited for long-term investments that have stable revenue streams and can attract institutional investors. There are a range of different types of bonds that are already used to invest in infrastructure, some of which is climate-related[188]. A recent study identified $174 billion of climate-themed bonds outstanding, of which $119 billion were in the transport sector (mainly in rail) (see Annex 5)

The EIB already issues climate awareness bonds whose proceeds are earmarked for renewable energy (e.g. wind, hydro, solar, geothermal) and energy efficiency projects[189] (see Annex 5). The Commission's proposal for project bonds under the next MFF is trying to activate new sources of finance for dedicated investment into infrastructure (energy, transport, communication) for the trans-European networks.

Another example of an asset-linked bond that has been proposed for climate purposes are covered bonds as these could provide a stepping stone to a renewable energy bond market. These have two main advantages: i) they enable banks to access cheap and long-dated funds which can in turn lend to designated energy projects and ii) they enable bond investors to gain exposure to renewable energy assets with minimal changes to existing approaches, as a result of the high level of security offered by covered bonds[190].

The bond market has remained largely untapped for climate finance, e.g. with respect to renewable energy and infrastructure. Institutional investors can invest in low carbon and climate resilient infrastructure in two ways: indirectly through intermediaries (e.g. via green bonds); or directly, which is currently limited.[191] While railways infrastructure appears to be a promising candidate, there is limited experience and use so far (see Annex 5).

A current barrier to the development of a bond market in the EU is the diverse approach within the EU, as each Member State has a different approach. Legislation in many Member States does not allow the use of covered bonds for renewable energy projects, for example [192].This limits the scope for liquidity[193]. Mobilisation of bonds markets could be furthered by commonly agreed climate

[187] Sinner, K (2012) "Equity for infrastructure" presentation at the Irish Presidency Workshop on Financial Inistruments, Brussels, 24 January 2012

[188] Personal communications; Sierra, K (2011) *"The Green Climate Funds: Options for Mobilising the private sector"*, report for the Climate and Development Knowledge Network.

[189] EIB (2012) EIB Climate Bond Awareness Bonds – 2012 update

[190] Damerow, F., Kidney, S. and S Clenaghan (2012) *How Covered Bond markets can be adapted for renewable energy finance and how this could catalyse innovation in low carbon capital markets – unlocking bank lending in an era of capital constraint and limited public budgets*, Climate Bonds Initiative Discussion Paper

[191] OECD (2012b) *G20/OECD Policy Note on Pension Fund Financing for Green Infrastructure and Initiatives*

[192] Personal communication

[193] Personal communication

bonds standards and certification scheme, which is one of the main objectives of the Climate Bonds Initiative, an NGO that works together with investors, agencies and other NGOs. Common standards should come together with better aggregation of smaller projects in larger offerings for the bond market and government ensuring investment grade offerings.

Guarantees are one of the most common risk management instruments used in climate finance.[194] Loan guarantees and partial risk/credit guarantees are commonly provided by IFIs and have also proven useful in cases of 'on-lending' where governments underwrite loans provided through intermediaries, such as commercial banks or state utility companies (see Annex 5). Guarantees alone are insufficient to improve the commercial viability of all investments. Thus, a mix of de-risking instruments is often needed to reduce investment risk.[195] Other de-risking instruments can include political and regulatory risks guarantees and insurance as well as currency, liquidity and subsidy rate facilities. Majority of the latter instruments are mostly applied in developing countries.[196]

5.2 What is interesting in terms of IFIs practice with regard to climate adaptation?

Compared to mitigation, the current trends and experiences with investments in climate change adaptation are fewer and less well documented. One major issue is the lack of a clear and commonly shared definition of what 'adaptation' project is. In fact, there is a lot of experience with financing for projects in the water sector but these have not necessary been considered as adaptation.[197] In the international context, adaptation to climate change is predominately financed through grants and loans, though the discussion about the broader use of financial instruments is emerging.[198]

5.2.1 Loans

There is an increasing orientation towards adopting an integrated approach to climate adaptation that aims to link together different sectors, infrastructures and the broader environment. The EIB has identified integrated water resource management as a key objective of its lending operations in relation to climate change adaptation (see Annex 5).[199] Integrated approaches to coastal and port infrastructure lending are a high priority area in climate change adaptation mainstreaming at EBRD.

Mixing financial instruments is another important area. KfW's mixes, for example, financial instruments, such as grants, low-interest loans with long maturities (for instance development loans, promotional loans and credit lines) or equity participations depending on the characteristic of the project (see Annex 5) [200].

5.2.2 Insurance and microfinance

Insurance products play a role in helping both individual investors address climate risk and vulnerable countries hedge against some of the impacts of long-term climate change. Novel insurance instruments are emerging to address problems of food insecurity, even for high frequency, slower onset disasters, such as droughts (see Annex 5).[201]

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[194] CPI (2011) The landscape of climate finance. A CPI Report: Venice

[195] WEF (2013) The Green Investment Report The ways and means to unlock private finance for green growth. A Report of the Green Growth Action Alliance, Published by World Economic Forum, Geneva.

[196] Climate Policy Initiative (2013) *"Risk Gaps: Policy Risk Instruments"*

[197] Personal communication

[198] Kennedy, Ch. And Corfee-Morlot, J. (2012) Mobilising Investment in Low Carbon, Climate Resilient Infrastructure. OECD: Paris.

[199] http://www.eib.org/attachments/strategies/water_and_climate_change_adaptation_en.pdf

[200] KfW, Instruments to Finance Climate Protection and Adaptation Investments in Developing and Transition Countries, October 2010

[201] http://www.uibk.ac.at/fakultaeten/volkswirtschaft_und_statistik/forschung/natcatrisk/natcatrisk_linnerooth2.pdf

Insurance is particularly relevant for agriculture, where different insurance models exist, including for example the 'Weather Index Insurance for Agriculture'. Under such schemes, insurance claims are paid according to the number of days when the temperature falls either above or below certain agreed levels. Actual damage to crops need not be measured and verified, allowing rapid pay-out and low transactions costs. A probable incentive for farmers to take insurance against natural hazards could be the establishment of a partnership with the government in which the government would pay proportional payments of the insurance premium (see Annex 5).[202]

Microfinance provides access to basic financial services to communities through small loans, savings, insurance and money transfer. Additionally, education and training, health and nutrition workshops and advice on agricultural practices can be also provided by Microfinance Institutions (MFIs). Microfinance institutions aim to fill the market gaps left open by traditional banks and state-run development programmes, which have been unwilling or unable to effectively provide financing for the low income groups. Microfinance is being increasingly used in OECD countries[203] but it is not as developed as in developing countries. It can play a greater role in disaster preparedness, early warning systems, promotion of crop varieties, technical training and education on community level adaptation (see Annex 5).[204]

5.2.3 Risk management instruments

Better integrating climate risk and resilience into development planning and investments is a key prerequisite for risk management. One example for a support mechanism is the Pilot Programme for Climate Resilience, implemented by a range of IFIs. It is designed to deliver additional finance to countries for integrating climate risk and resilience into development planning and investments. The experience with the programme has showed that both conventional and more innovative use of financial instruments help mobilise additional finance.[205] Conventional instruments include: g*rants for knowledge services***,** which provide the analytical underpinnings that inform government strategy and identify potential investments; *grant and lending operations*, including investment and development policy lending; and f*inancial risk-mitigation instruments*, including political risk insurance and guarantees, to help facilitate the flow of investment to sectors and countries considered risky by the private sector. More innovative forms of support include: g*rant facilities and concessional lending instruments targeting climate change adaptation* by reducing barriers to, and buying down the cost of, climate investment; c*limate-specific risk management instruments* to transfer risk and provide emergency liquidity; and r*esults-based payment schemes* which pay for environmental services (see Annex 5).[206]

5.2.4 Crowd equity

Crowd Equity is an entirely new funding model designed for smaller businesses in rural areas.[207] A public limited company, Local Investment Company (LIC), is formed in a geographical area (e.g. municipality). The owners consist primarily of experienced local business community but may include banks and other partners. The model offers several advantages to the different stakeholders. From the public finance perspective, the model allows the public sector the opportunity to move away from a subsidy-based business support to a more market-driven local (risk) capital system. Using the model, the public sector can transform loans to equity without becoming a shareholder (see Annex 5).

[202] CEPS, ZEW, The Fiscal Implications of Climate Change Adaptation, 2010, report commissioned by the European Commission, DG ECFIN.
[203] For example, in the US (promoting entrepreneurship), Korea (low income households) and Mexico (micro insurance for subsistence farmers, help to recover from catastrophic weather events)
[204] OECD: Assessing the role of microfinance in fostering adaptation to climate change (2010)
[205] Climate Investment Funds (2011) The use of concessional finance under the PPCR.
[206] Climate Investment Funds (2010) Pilot Programme for Climate Resilience: Financing modalities
[207] Crowd Equity. "A new funding model for local entrepreneurs and other market operators", Information note by the Swedish Rural Network

5.3 What kinds of instruments are used to integrate climate risks into investment planning?

Long term climate change risks and impacts need to be taken into account when developing and financing projects in different sectors. There is a growing experience and practice among IFIs and governmental development agencies with establishing risk prevention and management tools. Some of the most prominent ones are reviewed.[208]

The EIB's approach to adaptation finance assessment and tracking requires that the project promoters identify and apply adaptation measures to ensure the sustainability of their projects.[209] Climate change considerations are being progressively mainstreamed into sectoral policies and operational activities and systematically included in all EIB project appraisals.[210] EIB has an in-house guide that outlines general principles and methodologies that can be followed to build resilience to current climate risks, build adaptive capacity and planning and take action to address future climate risks. It builds on 5 key principles: [211]

1. Identifying critical assets and interdependencies
2. Assessing direct and indirect risks and vulnerabilities to climate impacts
3. Identifying and assessing adaptation measures
4. Implementing adaptation measures.
5. Monitoring and performance evaluation[212]

In 2010, the EBRD developed a 'toolkit' for identifying and managing climate change risks to investments. This includes guidelines for climate change screening and risk-profiling, as well as guidance on integrating risk assessment and adaptation into project feasibility studies, environmental and social impact assessments (ESIAs), environmental action plans and water audits. This toolkit is used to screen all potential investments for sensitivity to climate change.[213] Using a simple arithmetic calculation, the three risk scores are used to categorise projects:

- *Red project*: likely to be under significant climate risks – the project will require further investigation (project development and feasibility studies etc. will need a lot of work to assess the climate risks)
- *Amber project*: possible climate risks
- *Green project*: no climate risks – these will be let through.[214]

The World Bank has developed 'climate screening' methodologies and tools for the main climate sensitive sectors. Climate vulnerability and risk management is integrated into the bank's operations, especially in key sectors affected by climate change, such as agriculture, energy, transport and water supply. Examples include Mainstreaming Adaptation to Climate Change in Agriculture and Natural Resources Management Projects and Urban Risk Assessments. A new online

[208] For a more detailed overview of different instruments and safeguards for climate smart investments by IFIs and international organisation, you can consult the study Ricardo-AEA, Adelphi and ODI (2013) European and International Financial Institutions: Climate related standards and measures for assessing investments in infrastructure projects. Final Report to the European Commission.

[209] EIB Statement of Environmental and Social Principles and Standards, 2009

[210] EIB Promoting Climate Action, April 2012

[211] EIB External Adaptation Guidance II, July 2012

[212] Further information on EIB's work on climate mainstreaming can be obtained at: http://www.eib.org/projects/topics/environment/climate-action/index.htm

[213] EBRD

[214] For more information on screening tools and safeguards for climate proofing investments please see the study by Ricardo-AEA, ODI and ADELPHI (2013) Mainstreaming climate change in infrastructure investment decisions. Final Report for the European Commission, March 2013

screening tool, the ADAPT - Assessment & Design for Adaptation to Climate Change: A Prototype Tool provides details on climate related vulnerabilities and risks for particular regions**.** The software based tool helps assessing development projects for potential sensitivities to climate change. Further work is also being done on sector specific guidance and tools. Climate change adaptation considerations are also integrated into Country Assistance Strategies, from which in 2009 overall more than 60%of the strategies addressed climate-related issues. It is envisaged that in the near future, screening of projects to reduce their vulnerability to climate change impacts will become part of doing business for the World Bank.[215]

The Asian Development Bank (ADB) has introduced guidelines for climate proofing all projects in the transport sector, agriculture, rural development and food security. The guidelines aim to present a step-by-step methodology to help project teams incorporate climate change adaptation into investment projects in the specific sectors.[216] These guidelines are applied at the same time as the safeguards review / Environmental Impact Assessment (EIA) completion, and influence the classification of the project in the context of the Safeguards Categories.

Although in most development projects climate change adaptation is not the main objective, KfW aims to integrate adaptation measures into the projects through its two-stage climate change assessment. This assessment guarantees that the outcome of the project is not endangered by climate change and the possible opportunities are fully exploited. The first screening step examines whether the planned project depends on climate parameters and there is any potential to increase the adaptive capacity of people or ecosystems. If the initial assessment shows that there is no significant impact on the project and there are no significant opportunities to increase resilience, the assessment ends. However, close attention is paid to the precautionary principle in the remaining steps. If the results show that the project might be relevant to climate change adaptation, the assessment proceeds to the second step. These include the analysis of climate development, the examination of potential impacts on the project, the analysis of climate risk and climate potential, the identification of adaptation options and the prioritisation and selection of adaptation opportunities in the project.[217]

[215] Further information on the ADAPT can be found at: http://sdwebx.worldbank.org/climateportal/index.cfm

[216] ADB Guidelines for Climate Proofing Investment in the Transport Sector, August 2011 (http://www.adb.org/sites/default/files/guidelines-climate-proofing-roads.pdf) and Guidelines for Climate Proofing Investments in Agriculture, Rural Development and Food Security, November 2012 (http://www.adb.org/sites/default/files/guidelines-climate-proofing-investment.pdf)

[217] KfW Adaptation to climate change – Cooperation with developing countries, June 2011

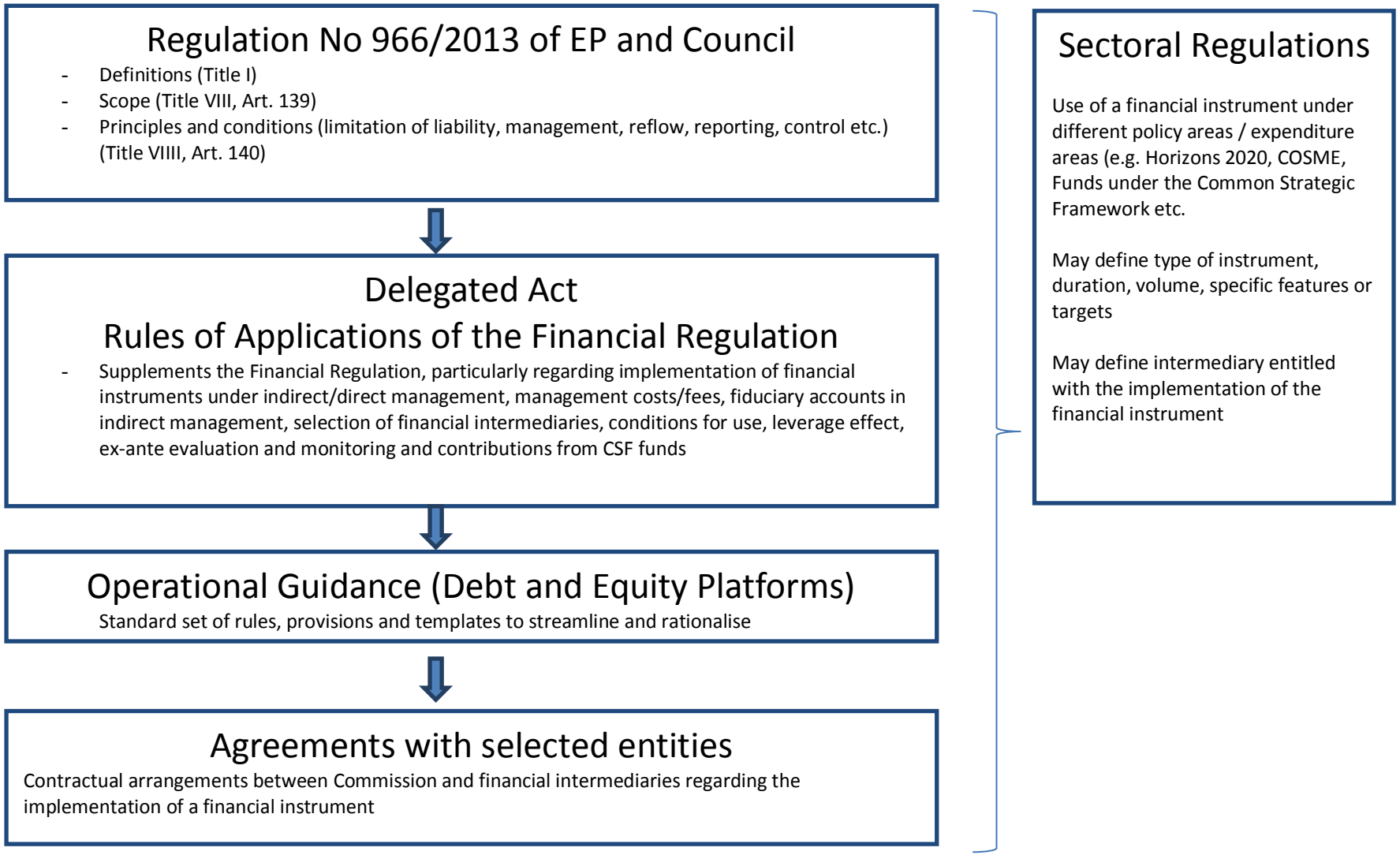
6 OVERVIEW OF PROPOSED FINANCIAL INSTRUMENTS AND COMBINATIONS WITH GRANTS UNDER THE 2014-2020 MFF

6.1 Background: governance framework for financial instruments

In 2011, the European Commission put forward a proposal for the 2014-2020 EU MFF. It was accompanied by around 70 sector specific proposals in specific policy areas including *inter alia* research, innovation, Cohesion Policy, agriculture and the environment. EU funding through grants remains the main instrument to support a wide range of activities and beneficiaries in different policy areas. The role and significance of financial instruments however shall also increase, according to the intentions of the Commission.

In order to facilitate a better uptake of financial instruments, the Commission has put forward a new management structure for implementing financial instruments that for the first time has a streamlined, coherent governance framework applying to all areas under the EU budget (figure 7).

Figure 6*:* The new governance framework for financial instruments under the 2014-2020 MFF



Source: Own compilation

The Financial Regulation presents a major novel step forward. It presents a coherent framework for all financial instruments. It defines the principal conditions that financial instruments need to fulfil and proposes a set of streamlined and simplified rules for their implementation. According to the Financial Regulation (Art. 140 (2 a-f) shall comply with a set of principles:

- **They shall address situations of market failure or suboptimal investment situations**, i.e. in cases where the market is not interested in financing projects that are principally bankable due to their particular risk structure. Returns to the investment might not satisfy investment criteria for investors or might not be large enough to compensate for perceived risks. Market failures may arise because of a number of reasons (see Annex 1). One typical example for the need of EU assistance is the case of excessive transaction costs afflicting cross border infrastructures. Grants, guarantees or technical assistance can address those barriers. Another case is the lack of credit to small enterprises because the volume of each individual loan is not attractive to the banks;
- **They shall provide additionality of funding,** i.e. they should not replace (crowd-out) financial interventions by Member States or other Union interventions or replace private funding.
- **They shall remain non-distortive** in vie of the internal market and be consistent with EU state aid rules;
- **They shall provide a leverage effect,** i.e. the global investment through a financial instrument should exceed the contribution of the Union contribution;
- **They shall provide for the alignment of interest;** i.e. there is a need to ensure the common interest into the policy objectives defined for the instruments through means of co-investment, risk-sharing requirements or financial incentives, while avoiding situations of conflict of interest.
- **They shall be established on the basis of an ex-ante evaluation**, including the potential reuse of revenue. The evaluation needs to demonstrate that the identified market need (in terms of imperfections and failures) cannot be met by intervention other than funding and that no other financial instruments at national or regional level are more applicable.

The ex-ante evaluation should identify market imperfections or failure, or sub-optimal investment situations and assess investment and market needs in view of achieving policy objectives. In addition, it should assess the proportionate response to the size of the funding gaps, the expected leverage effect and also the additional qualitative effects, e.g. diffusion of best practices, promotion of the Union's objectives and providing access to specific expertise.

The ex-ante evaluation should also set performance indicators. These are important in view of the requirements for annual performance reporting (Art. 140 (8 a-l)). Annual reporting by the Commission to the Parliament and the Council shall include information on the instrument's performance, the use of revenues/repayments, the value of equity investment, target leverage effect and the contribution to achieving the objectives of the EU programme/instrument. Another important condition concerns revenue and repayments (Art. 140 (6)). While revenues (dividends, capital gains, guarantee fees, interests on loans etc.) will be entered into the budget, annual repayments shall be used for the same instrument for the period for the commitment of appropriations plus two years (unless other specified). This should help a longer-term stability of the instrument.

The Application Rules and the so called 'equity' and 'debt' platforms provide operational requirements and guidance to complement the principles set out in the Financial Regulation and the delegated act, covering non-policy specific issues such as the financial and technical parameters of

the instruments. Policy objectives, eligibility criteria, targets, etc. are to be addressed in the sector-specific proposals for the different EU instruments which are currently still under discussion.

Financial instruments are to form part of EU budget interventions in various policy areas and are to be financed through budget lines from the specific policy areas. The general objectives to be pursued by these instruments are to:

- Develop private sector capacity to promote growth, jobs and innovation;
- Build infrastructures by making use of PPPs in areas such as the transport, energy, ICT; and
- Mobilise private investments to deliver public goods, such as climate and environment protection.[218]

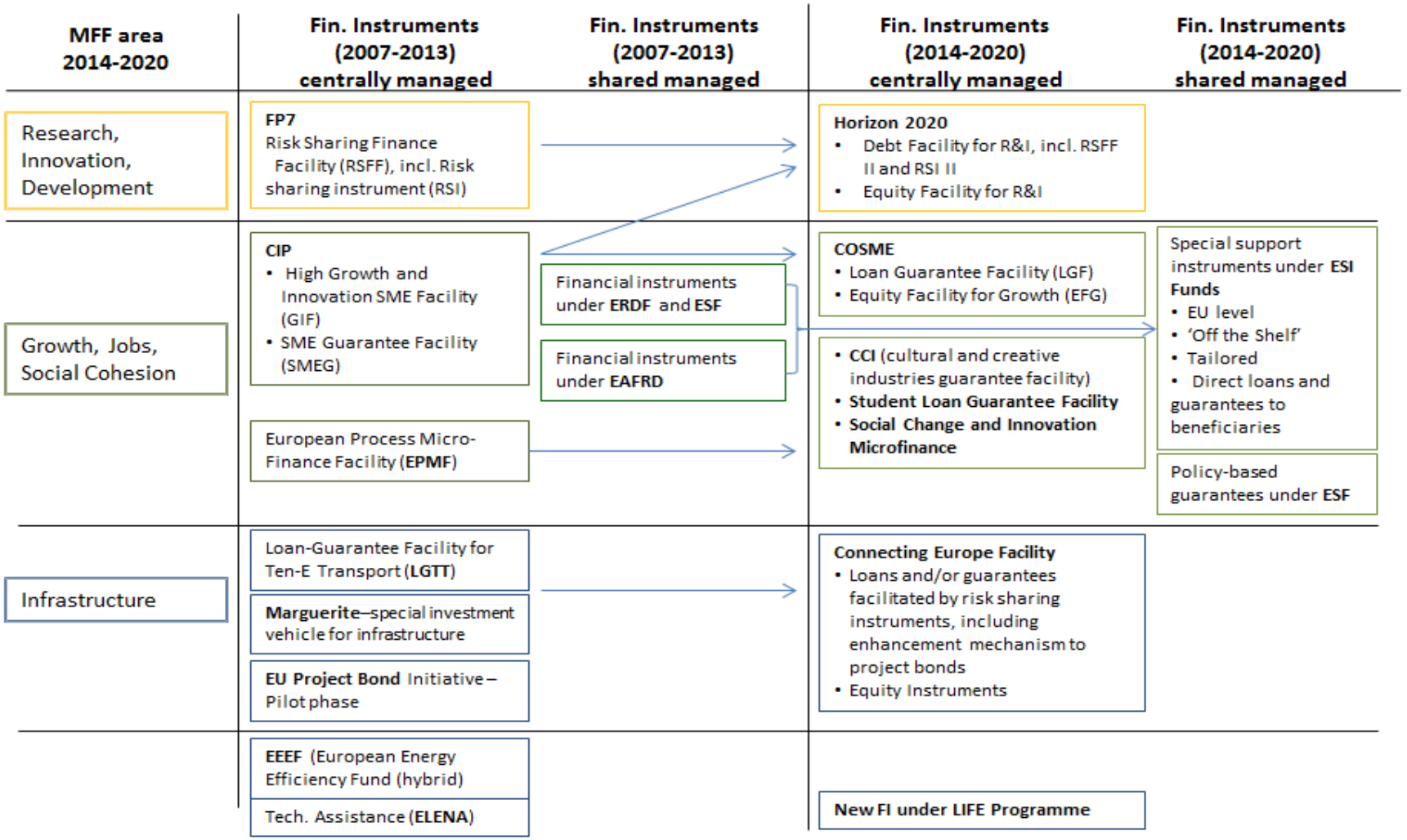
Drawing on lessons learnt from the 2007-2013 period, the Commission intends to improve the coherence and complementarity of financial instruments. The intention is to improve the visibility of these instruments for actors, help them achieve critical mass and improve the way the risk associated with these instruments is spread and diversified, on the basis of a portfolio approach.

6.2 Financial instruments under the different policy areas

The proposals for financial instruments under the 2014-2020 MFF foresee an evolution of the current approach in the EU budget, not a revolution. Streamlining and coherence of their use are the main principal drivers. Figure 7 provides an overview of the main lines of development between the 2007-2013 MFF and the 2014-2020 MFF. A detailed description of Commission proposals on the different financial instruments can be found in Annex 6.

[218] EC (2011), A Budget for Europe 2020 – Part II, Communication from the Commission, (COM(2011)500), 29.06.2011, Brussels

Figure 7: Evolution of main financial instruments from 2007-2013 to 2014-2020



Source: Own compilation

Table 4 presents an overview of the available grants and financial instruments under the different policy areas.[219] Grants are available under all policy areas/programmes including the Horizon 2020, COSME, EU Cohesion Policy, the Connecting Europe Facility (CEF), Rural Development and LIFE. Co-financing is required. Financial instruments are discussed afterwards.

Table 4. Overview of proposed 2014-2020 EU financial instruments

Programme	Financial instrument	Type of financial product
HEADING 1: Smart and inclusive growth		
Horizon 2020	Debt facility for R&I	The facility will improve access to debt financing -loans, guarantees, counter-guarantees and other forms of debt and risk finance. Specifically, it will provide: -**Loans** and **guarantees** of €150 000 or more for SMEs & Small Midcaps Guarantee Facility (RSI - II) -**Loans** and **guarantees** to R&I (non-SMEs) activities of mid-caps and large firms, universities, research institutes, research infrastructure, etc.
	Equity facility for R&I -Early stage SMEs	The facility will focus on early-stage **venture capital funds** providing venture capital and quasi-equity (including mezzanine capital) to individual portfolio enterprises. The facility will also have the possibility to make expansion and growth-stage investments in conjunction with the Equity Facility for Growth under the COSME, to ensure a continuum of support during the start up and development of companies.
COSME	Loan guarantee facility (LGF)	The LGF will provide debt financing via **loans**, including **subordinated** and **participating loans**, or **leasing**; as well as **securitisation** of SME debt finance portfolios, shall mobilise additional debt financing for SMEs under appropriate **risk-sharing** arrangements with the targeted institutions. The LGF shall, except for loans in the securitised portfolio, cover loans up to €150.000 and with a minimum maturity of 12 months.
	Equity facility for growth (EFG)	The EFG shall focus on funds that provide **venture capital** and **mezzanine finance**, such as subordinated and participating loans, while having the possibility to make investments in early stage enterprises in conjunction with the equity facility for RDI under Horizon 2020
Economic, social and territorial cohesion		
Cohesion Policy	Special support instruments under the ERDF and CF	The schemes could provide different financial products including loans, guarantees, equity and risk-sharing mechanisms**.** The type of instrument, type of product and the potential procedure is to be set out by the managing authorities in their OPs

[219] It should be noted that grants and financial instruments under HEADINGS 3 and 4 do not fall in the scope of this study and therefore are not presented in the overview Table.

	Policy based guarantees under the ESF	These can be either **collateral** (allocations are placed in a fiduciary account of a financial institutions (i.e. the Treasury) and serve wither full or partial collateral) or a **risk sharing instrument** (by sharing credit risk with a national or international financial institutions), through which managing authorities can mobilise funding either through a private commercial loan or issuing a bond on the capital market
CEF	Equity instruments	Investment funds focusing on the provision of **risk capital** (the details of this are not known yet)
	Loans and/or guarantees facilitated by risk sharing instruments, including enhancement mechanism to project bonds	A **credit enhancement mechanism** that will help to improve a project's credit-rating through the provision of subordinated facility.
HEADING 2: Sustainable growth: natural resources		
CAP Pillar Two	Special support instruments under the EAFRD	Support provided through financial instruments can include loans, guarantees, equity and risk-sharing mechanisms. The type of instrument, type of product and the potential procedure is to be set out by the Rural development authorities in their RDP
Environment and climate change	Financial instruments	The details of FI under the future LIFE are not determined yet.

Source: own compilation

The main financial instruments as proposed in the 2014-2020 MFF can be summarised as follows:

1) Debt instruments

Debt instruments are retained under the Horizon 2020 and COSME programmes by building on the experiences of the RSFF and SMEG respectively. These instruments have been slightly redesigned to better address coordination needs and complementarity in terms of better targeting and the scope of activities (for more details please see Annex 6: Instrument fiches and also the chapter on the coherence analysis). Debt instruments shall be used under the future CEF, including a credit enhancement mechanism for the Project Bond Initiative. Financial instruments, including debt, may further be used under the future LIFE programme, but the details of this are yet to be established.

2) Equity instruments

Equity instruments targeting start up and expansion of SMEs shall be used under the Horizon 2020 and COSME respectively (for more details please see Annex 6 and also the chapter dedicated to the coherence analysis). Equity instruments should also be operating under the future CEF. They should complement the toolbox of infrastructure instruments with the objective of further developing EU-wide risk capital markets. Financial instruments, including equity, could be used under the future LIFE programme, but the details of this are yet to be established.

3) Special support instruments

The Commission has also streamlined the rules and principles for the use of special support instruments in all funds under shared management and has introduced important changes to the way they will be implemented.[220] All funds could be implemented through financial instruments including equity, loans, loan guarantees and other forms of revolving finance. The type of instrument, type of product and the potential procedure is to be set out by the respective authorities in their Operational / Rural Development Programmes. The Commission's proposals remove the current provision that a project cannot be financed by more than one source and set out rules to enable the combination of financial instruments with other forms of support, in particular with grants. More details on special support instruments, including the newly proposed three implementation options[221] can be found in Annex 6).

6.3 Assessing the coherence of proposed financial instruments

Improving the coordination between the different financial instruments is a key objective for the 2014-2020 MFF period. Improving the coordination and complementary of future funding streams is also increasingly seen as a way to strengthen the efficiency and EU added value of spending. This orientation also responds to criticisms that financial instruments have been developed in isolation from each other in the past, leading to overlaps in activities and / or inappropriate eligibility rules for their target group.

6.3.1 Research, innovation and growth

The Commission has proposed a considerable improvement in the way SMEs will be supported through debt and equity instruments under the Horizon 2020 and COSME programmes. Horizon 2020 mainly focuses on financing Research and Innovation. COSME provides support to SMEs, particularly in their growth and internationalisation phase. The new approach developed by the Commission aims to increase the synergies between the financial instruments for SMEs available in COSME and Horizon 2020, in order to ensure complementarity and continuity of the funding process during the innovation life cycle. To this end, two financial instruments for SMEs growth and R&I are foreseen in the two programmes (Table 5). In order to help gain access to finance throughout the various stages of the innovation lifecycle, equity under Horizon 2020 will provide SMEs with venture capital in their start-up phase, while COSME will provide both venture and mezzanine capital for the expansion and growth phase. All facilities are complementary and can work together to provide access to risk capital and develop a venture capital industry in EU.

At the early stage of R&I, the Horizon 2020 debt instrument can provide guarantees for loans above the €150 000 threshold; whereas COSME can only provide counter and direct guarantees for loans (including subordinated loans) up to this threshold to SMEs during their expansion and growth stage. The threshold has been set to avoid any overlap between these two instruments and to ensure funding is as efficient as possible. The rationale behind the €150 000 threshold is that this amount corresponds to 94% of the loans provided under the existing SME Guarantee Facility in the CIP programme.[222]

[220] EC (2011) Proposal for a Regulation laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund covered by the Common Strategic Framework and laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1083/2006, COM(2011)615, 6.10.2011, Brussels

[221] EC (2012) *Financial instruments in Cohesion Policy*. Commission Staff Working Document, SWD(2012)36, 27.2.2012, Brussels

[222] European Parliament (2012) Financial instruments in COSME and Horizon 2020. Workshop proceedings. 11 April 2012, Brussels

Table 5. Coordination between equity and debt instruments under Horizon 2020 and COSME

	2014-2020 EU instruments	Programme	2007-2013 equivalent
EU Equity Financial Instrument for EU Enterprises' Growth and RDI	*Equity Facility for R&D* -early stage (venture capital)	Horizon 2020	GIF 1
	Equity Facility for growth -expansion stage (venture and mezzanine capital)	COSME	GIF 2
Debt Instrument for EU Enterprises' RDI and Growth	*SMEs & Small Midcaps Guarantee Facility (RSI - II)* -guarantees for loans over €150 000 for R&I activities	Horizon 2020	RSI -I
	Loan Guarantee Facility -guarantees for loans to SME up to €150 000 -securitisation of SME debt finance portfolios	COSME	SMEG
Loan and Guarantee Service for Research and Innovation	Loans and guarantees to R&I (non-SMEs) activities of mid-caps and large firms, universities, research institutes, research infrastructure, etc.	Horizon 2020	RSFF

Source: own compilation based on EC information

The analysis of the proposed COSME regulation suggests that some of the weaknesses of the existing GIF and SMEG facilities have been addressed, in particular by linking the GIF1 for start-up SMEs with the RSI programme for Horizon 2020. On the other hand, such potential overlaps do not seem to be sufficiently addressed yet when it comes to similar programmes under the Structural Funds, and their inter-linkages with Horizon 2020 and COSME.[223]

6.3.2 European structural and investment funds (ESI)

The Commission has also proposed common provisions for all funds under shared management including the ERDF, CF, ESF, EAFRD and the EMFF, which are now to be called European Structural and Investment (ESI) Funds. Their objective is to to maximise the contribution of the five Funds and to provide clear strategic direction to the programming process at the level of Member States, regions and rural areas. They set out the means to achieve coherence and consistency with the economic policies of Member States and the Union, coordination mechanisms among the Funds and with other relevant Union policies and instruments, horizontal principles and cross-cutting policy objectives as well as indicative priority actions of high European added value and corresponding principles for delivery.[224]

Coordination among the five funds themselves is to be ensured throughout the preparation of the Partmership Agreements, which are intended to set out *inter alia* an an integrated approach to

[223] Núñez Ferrer, J. et al. (2012) : The implications for the EU and national budgets of the use of innovative financial instruments for the financing of EU policies and objectives, EP: PE 453.236

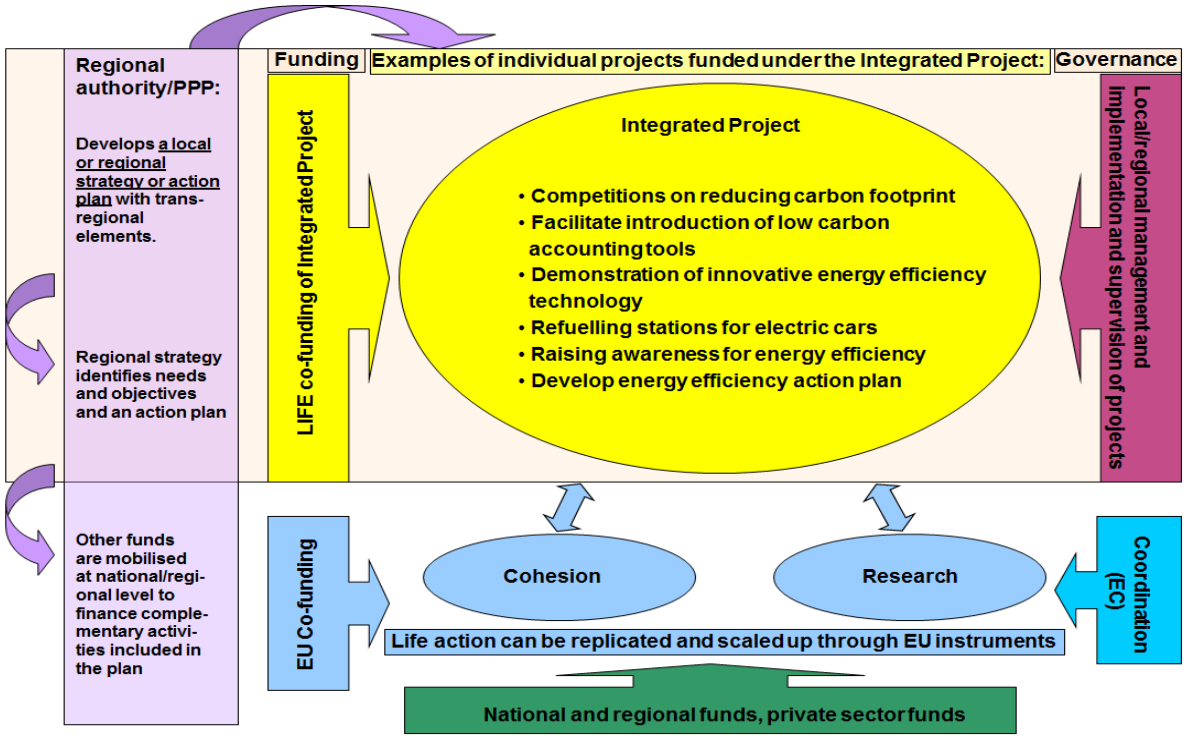
[224] EC (2012) Amended proposal for a Regulation laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund covered by the Common Strategic Framework and laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Council Regulation (EC) No 1083/2006, Communication from the Commission, (COM(2012)496), 11.9.2012, Brussels

territorial development including mechanisms at national and regional level that ensure coordination between the five Funds and other Union and national funding instruments in urban, rural, coastal and fisheries areas and areas with particular territorial features. However, the success of this coordination approach depends on Member State action as the policies are applied under a shared management. A clearer picture on the prospects for coherence will emerge only after the the Operational and Rural Development programmes have been adopted. This also regards the arrangements for setting out financial instruments and their potential contribution to climate change objectives.

6.3.3 LIFE and Cohesion Policy

LIFE programme focuses on piloting and testing innovative approaches to climate and environmental actions as well as disseminating good pracice examples which could be then replicated at a larger scale under Coheison Policy. The Commission proposals for the post 2013 period aim to improve even further the coordination and compelemntarity of activities under LIFE and Cohesion Policy in order to avoid any ovelaps. One way of doing this could be through the new approach of developing Integrated Projects in the areas of nature, water, waste, air, climate change mitigation and climate change adaptation under LIFE. This means promoting solutions, methods and approaches tested and demonistrated under the LIFE Programme and then replicated at a larged scale under Cohesion Policy (see Figure 9).

Figure 8. Possible coordination between LIFE and Cohesion Policy in the context of Integrated Projects in the field of energy



Source: provided by the European Commission

6.3.4 Connecting Europe Facility and Cohesion Policy

In order to avoid overlaps in promoting infrastructure, including low carbon projects, under CEF and Cohesion Policy, there is a demarcation line according to which CEF should promote mainly cross

border actions in line with TEN Guidelines[225] whereas Cohesion Policy should focus on building national and regional links to TEN. The Commission has therefore established that Member States and the Commission shall ensure that ERDF and Cohesion Fund interventions are planned in close cooperation with the support provided from the CEF .

In conclusion, compared to the previous budgetary period, Commission proposals on the 2014-2020 EU funding programmes make a considerable step towards improving the synergies and avoiding duplications in terms of priority actions (including climate change actions) and better targeting the final beneficiary / final target group. Still, in many cases it remains to be seen how these synergies will be ensured in the implementation programmes of the centrally managed instruments and the programming of expenditure programmes at regional and local levels.

6.4 Climate relevance of proposed financial instruments

The European Council has agreed that 20% of the €960bn 2014-2020 MFF should target climate change related activities.[226] This should be achieved through mainstreaming climate change objectives and concerns across different EU funding programmes and instruments. Implementing this commitment would lead to approximately €190 billion that should be spent on climate related activities over the seven year budgetary period. EU Cohesion Policy, Rural Development, Horizon 2020, CEF and LIFE are of central relevance to accomplishing this target. Table 6 provides an overview of the different EU programmes/instruments and their total budget based on the latest data from the European Council conclusions on 8 February 2013 and the Commission's updated figures from March 2013.[227] It should be noted however that the negotiations on the MFF and the legislative packages of the different EU programmes/instruments are still on-going which means that further changes to the budget allocations can be expected.

The Commission has also proposed that minimum shares of spending are quantitatively earmarked for climate relevant activities under the different EU programmes and instruments (see Table 6). The proposed earmarking under Horizon 2020, ERDF, EAFRD together with the dedicated climate action sub-programme of the future LIFE can deliver approximately €60 billion for climate change activities over the seven year programming period. This is indicative and should be treated with caution as the overall mainstreaming of climate change objectives and expenditure across the different funding programmes is expected to result in higher allocations for climate action. Still, it is far below the commitment to dedicate €190bn (see above) which points to the need for additional action and clear provisions to ensure that the proposed EU funding programmes/instruments are better targeting climate change objectives and are able to contribute adequately to this commitment.

The figure for the LIFE programme takes into account the introduction of a separate sub-programme for climate change mitigation, adaptation and governance activities, which has a total budget of €800 million in commitment appropriations. The earmarking under Cohesion Policy concerns mainly energy efficiency and renewable energy spending under the ERDF's thematic objective for low carbon development and can deliver some €16bn for the sever year period. A final agreement on the Cohesion Policy package, including on thematic concentration and earmarking, is not yet reached between the Parliament and the Council, which means that changes to the expected earmarking for climate action could still be expected. Actions to support sustainable transport, low carbon

[225] SEC (2011) 1262 Impact Assessment accompanying the Proposal for a Regulation establishing the Connecting Europe Facility, Commission Staff Working Document

[226] European Council (2013) Conclusions (Multi-annual Financial Framework) EUCO 37/13, 08.02.2013, Brussels

[227] European Commission (2013) MFF 2014-2020: EC conclusions (proportional cuts + partial adjustment to DG requests). Version – March 2013

technologies and climate adaptation can also be supported under the Cohesion Fund. The final allocations will be known only after national and regional Operational Programmes have been adopted at the end of 2013. Similarly, the final allocations under the EAFRD will be known only after the adoption of the Rural Development programmes. A 25% earmarking indicates that some €21bn will target both climate and environmental actions. Climate change related activities can also be promoted through Pillar One of the CAP, where 30% of spending is supposed to be linked to 'green' activities. Yet the precise share of climate change relevant spending is difficult to establish.

It is expected that a large proportion of the CEF portfolio of projects will focus on more climate friendly modes of transport such as railways and waterways. Although the proposed Regulation includes an indicative pipeline of projects, the exact amount is difficult to establish ex-ante and hence it is not included in Table 6. Further to this, there is no ex-ante earmarking for COSME. While COSME will fund a certain share of climate relevant activities, this share cannot be estimated ex-ante, and thus is not included in the provided estimation.

Climate actions will also be promoted under development cooperation programmes, which are not in the scope of this study and hence are not included in the estimate.

Table 6. 2014-2020 EU budget allocations per programme and climate earmarking

MFF Headings		Total per (sub)-heading*	Sub-total per programme**	Proposed climate earmarking %	Climate spending in € million	Description / Comment
HEADING 1A: Competitiveness for growth and jobs		€125 614m				
	Horizon 2020		€70 200m	35%	€24 570m	More specifically, contributions include: • Secure, clean and efficient energy with a proposed budget of €6.5 billion • Smart, green and integrated transport with a proposed budget of €7.7 billion • Climate action, resource efficiency and raw materials with a proposed budget of €3.6 billion
	COSME		€2 030m	N/A	-	No ex-ante earmarking for climate action but climate change related activities are eligible. It can be assumed that some activities will be related to climate change mitigation and adaptation.
HEADING 1B: Economic, social and territorial cohesion		€325 149m				
	Cohesion Policy, including ERDF, ESF and CF		€325 149m	20% of national ERDF allocations in developed / transition regions 6% of national ERDF allocations in less developed regions	~€16 000m	The earmarked funds regard mainly energy efficiency and renewable energy activities as proposed by the EC. Other climate related activities in the transport sector or in relation to adaptation to climate change could also be financed outside of the earmarking exercise. Additionally, 5% of national ERDF allocations are earmarked for sustainable urban development activities, which could include activities related to climate change. Climate actions can be also financed under the Cohesion Fund, but their share cannot be

					determined ex-ante.
	CEF - Transport, energy and ICT	€19 300m	N/A	-	No ex-ante earmarking but a lot of infrastructure projects of common interest could be considered to contribute to climate objectives are listed in the Annex of the CEF Regulation.
HEADING 2: Sustainable growth: natural resources	€373 179m				
	CAP: Pillar 2 RD	€84 936m	25%	€21 235m	The proposed 25% earmarking is not legally binding and actually concerns both climate and environmental activities. Climate related activities could also be pursued under Pillar 1 in relation to the Commission proposals to use at least 30% of Pillar one of 'green' measures. Pillar 1 is not the focus of this study but due opportunities should be noted.
	LIFE	€3 057m		€800m	The new climate action sub-programme of the LIFE programme can be used to promote both mitigation and adaptation activities, related to seed capital, testing and pilot projects, exchange of good practice and improving governance.
TOTAL				**€62 605m**	

Source: own compilation

**2011 prices apply*

***Where available the budget figures are updated in view of the European Council agreement reached on 8 February 2013 and Commission's updates on budget allocation reflecting proportional cuts and partial adjustments to DG requests as of March 2013*

Compared to the 2007-2013 MFF, the Commission proposals exhibit a more explicit attempt to embed climate change objectives into other spending policies, define priority activities and in some cases even earmarking of funds to climate-related activities. The different EU funding programmes lend themselves to different types of climate-related activities, in line with the original purpose of the programmes themselves. For example:

- Horizon 2020 promotes research and innovation types of projects that can contribute to climate change objectives;
- COSME promotes support for SMEs in relation to innovation and growth strategies, including more energy efficient processes, products and services;
- CEF invests in cross-border projects, as well as in other low carbon transport infrastructures and the integration of renewable technologies in electricity networks;
- Cohesion Policy promotes investment in the implementation of low carbon and climate resilience developments in urban areas and regions;
- Rural Development policy promote investment in the implementation of low carbon and climate resilience developments in rural areas;
- LIFE promotes pilot projects, testing, implementation and exchange of good practices for climate change mitigation, adaptation and governance.

However, there are no explicit instructions how financial instruments should contribute to achieving the overall climate change spending objective. At the same time, financial instruments could be expected to contribute to climate related objectives which are embedded in the overall programme objectives and priority activities. For example, the Debt Facility of the Horizon2020 is set to be both demand-driven but also targeted to contribute to the key societal challenges, climate change being one of them. In the case of the climate action sub-programme under the future LIFE, financial instruments will be exclusively used for climate change activities as this is the only dedicated programme with a separate component for climate action (Table 7).

Table 7. Climate relevance of 2014-2020 EU grant and financial instruments

Programme	Financial instrument	Objectives and types of activities	Target / Beneficiary	Climate relevance
HEADING 1: Smart and inclusive growth				
Horizon 2020		The programme is designed to address market failures in that R&I and market uptake funding supports high risk and long-term R&I that would not necessarily pursued otherwise. The focus of activities includes inter alia **secure, clean and efficient energy** (including the successor to the IEE II); **smart, green, integrated transport and climate action**.	Any public or private entity. Particular attention shall be paid to SMEs.	✓
	Debt facility	The debt facility aims to address a current gap in the market between the demand for and supply of loans and guarantees for risky R&I investments, building on the RSFF. **While climate action is not a primary objective, it can be assumed that some of the activities will be related to climate change mitigation and adaptation**, as part of the societal challenges the programme is envisioned to address.	Legal entities of all sizes, SMEs with the potential to carry out innovation and grow rapidly; mid-caps and large firms; universities and research institutes; research infrastructures and innovation infrastructures; public-private partnerships; and special-purpose vehicles or projects	✓
	Equity facility	The equity facility aims to help improve the availability of equity finance for early and growth-stage investments and to boost the development of the Union venture capital market. This should in particular help the technology transfer and start-up phase, when new companies face a 'valley of death' where public research grants stop and it is not possible to attract private finance. **While climate action is not a primary objective, it can be assumed that some of the activities will be related to climate change mitigation and adaptation**.	Enterprises of all sizes undertaking or embarking on innovation activities, with a particular focus on innovative SMEs and mid-caps	✓

COSME		The programme will target actions to improve and strengthen the competitiveness and sustainability of Union enterprises, particularly SMEs; actions intended to develop new competitiveness strategies including inter alia design, implementation and evaluation of policies affecting the competitiveness and **sustainability of enterprises, including disaster resilience and the development of sustainable products, services and processes**; initiatives accelerating the emergence of competitive industries including initiatives to enhance productivity, **resource efficiency, sustainability and corporate social responsibility**.	Existing entrepreneurs (small businesses in particular); Future entrepreneurs (including young people) and national, regional and local authorities.	✓
	Loan guarantee facility (LGF)	**While climate action is not a primary objective, it can be assumed that some of the activities will be related to climate change mitigation and adaptation.**	Expansion and growth-stage enterprises, in particular those operating across borders, while having the possibility to make investments in early stage enterprises in conjunction with the equity facility for RDI under Horizon 2020	✓
	Equity facility for growth (EFG)			✓
Sub-heading: Economic, social and territorial cohesion				
Cohesion Policy, including ERDF, ESF and CF	Grants	Financing through both grants and FI can target all types of projects pursuant to one of the 11 thematic objectives, among which activities supporting the **transition to a low carbon economy, adaptation to climate change and risk prevention, sustainable and low carbon transport, eco-innovation in SMEs**. These can include: productive investment, particularly job creation and SMEs support; investments in infrastructure in the areas of energy, environment, transport, and ICT; social, health and educational infrastructure; development of endogenous potential by supporting regional and local development and research and innovation; and technical assistance.	Managing authorities who determine the specific target group / beneficiary for different priority axes across the Operational Programmes, could be any public or private legal entity, SMEs, citizens NGOs, etc. governmental agencies/utility providers in cases of public infrastructure	✓
	Loans, guarantees, equity and risk-sharing mechanisms			✓
CEF	Grants	Projects of common interest in the area of transport, energy and ICT	Project developers (which could be	✓

	Equity, loans and/or guarantees facilitated by risk sharing instruments, including enhancement mechanism to project bonds	Projects of common interest in the area of transport and energy	governmental bodies or private operators)	
HEADING 2: Sustainable growth: natural resources				
European Fund for Agriculture and Rural Development	Grants	Financing through both grants and FI can target all types of project pursuant to one of the **6 priorities (and 18 sub-priorities, know as 'focus areas', among which activities supporting the transition to a low carbon economy and adaptation to climate change and risk prevention**. Examples of funding could cover physical investments for rural infrastructure (such as investments for the installation of biogas plants, building insulation, modern machinery, etc.), area based payments for land management (such as reduced tillage, establishing and maintaining agro-forestry systems, etc.) and development of human capacity (such as training and the provision of advice).	The EAFRD targets farmers, forestry and other land managers as well as communities, businesses and individuals in rural areas.	✓
	Loans, guarantees, equity and risk-sharing mechanisms			✓
Environment and climate change (LIFE)	Grants	The new 'Climate change' sub-programme of LIFE can be used to promote **mitigation, adaptation and governance activities**. The focus is pilot projects, demonstration projects; best practice projects; integrated projects, technical assistance, preparatory projects; and information, awareness and dissemination projects.	Private (e.g. SMEs) and public bodies.	✓
	Financial Instruments			✓

Source: own compilation

6.5 Gap analysis for proposed financial instruments

The gap analysis assesses the scope and eligibility of different projects types in the relevant sectors against the Commission proposals for 2014-2020 EU financial instruments. Quantitative gaps are difficult to identify given that the scale of the majority of financial instruments is not determined at this point, not least the share which could target climate change related activities. The analysis therefore identifies the main opportunities and gaps are in terms of scope rather than scale.

6.5.1 Renewable energies

Financial instruments under Cohesion Policy have the broadest scope to support different renewable energy projects. Comparatively fewer opportunities exist under the CEF and under the Horizon 2020. While the scope is broad, the scale of action is difficult to establish ex-ante in the different financial instruments.

The development stage of a project strongly influences the availability of funding. Most funding opportunities are available for projects in the R&D and early demonstration phase; apart from projects involving commercially available technologies, the pre-commercial phase appears to have potentially most difficulties in terms of eligibility for funding under the proposed financial instruments. This will however depend on how the term 'innovation' is applied in the financial instruments under Horizon 2020. If a 'broad and seamless approach to innovation', as is mentioned in the Horizon 2020 proposal, is applied, it should include pilot testing of new technologies and hence help to bridge the 'valley of death' many technologies are facing.

The project size will ultimately affect the size of the project sponsor/ beneficiary as well as the financial needs. For instance, most SMEs are unlikely to be in a position to realise medium to large scale projects with investment needs of well above €5 million. This is the case for medium to large scale projects in the area of early commercialisation and acceleration of commercially available technologies and even more so for large scale infrastructure projects. If certain project types cannot be implemented by SMEs due to the required resources, COSME which is tailored to SMEs cannot provide funding in these cases. Moreover funding under the COSME debt facility is limited to €150,000 which appears too low for medium to large scale projects.

6.5.2 Energy efficiency

The financial instruments under Cohesion Policy and LIFE have the broadest scope to support all project types in the buildings sector, while the scope for action under financial instruments in the Horizon 2020 and the COSME is more limited. Financial instruments under Horizon 2020 are available for projects that are in the R&D and demonstration phase – similar to the energy sector. The scale of action is difficult to establish ex-ante in the different financial instruments.

There remain significant uncertainties on the role of COSME financial instruments in this sector. While all project types are of small to medium size and hence appear amenable to SMEs, these SMEs would act as an intermediary either in the form of an Energy Service Company (ESCO) to provide 'deep renovation' services or a construction company delivering new zero/Energy+ houses. Although the individual projects are small to medium, providing the actual financing over several years or decades would require some major financial backing which may be difficult to achieve for a SME.

6.5.3 Low carbon energy and transport infrastructure

Horizon 2020, ERDF/CF and LIFE could be used to support most types of low carbon energy transport projects, other than large infrastructure, which is supported by CEF and cross-cutting (non R&D) measures, which are supported by the ESF. COSME could be used to support any SMEs working in most of the potential low carbon transport areas. While the scope is broad, the scale of action is difficult to establish in most financial instruments.

The European Council agreed to allocate a budget of €5.1 billion to energy infrastructure projects. According to the original Commission proposal out of this €1 billion will be dedicated to new financial instruments. This amount can change now due to the agreed cuts by the European Council. Grants of around € 4 billion may trigger additional €4 billion of private investments if the co-financing rate is assumed to be at least 50%. The financial instruments could trigger a total investment of up to €20 billion assuming a leverage effect of up to 20. However, four out of eight identified priority corridors in the Annex to the CEF proposal relate to gas infrastructure. Hence the total amount available for (mostly large-scale) electricity infrastructure will be considerably lower. This compares to additional grid investment costs identified under the Roadmap decarbonisation scenarios of between €40 and 50 billion (under a High Energy Efficiency scenario the need for additional grid investments is considerably lower). At the same time it is worth noting that most of the identified investment needs relate to the distribution grid (around €40 billion) which plays however only a minor role under CEF.

For transport, it is difficult to identify what the investment gap might be, as the aggregate investment needs identified in the various documents are often not comparable. For example, the Low Carbon roadmap contains estimates of the investment needs for transport. According to the Impact Assessment of this Communication, the average annual investment needed for transport in the 2011-20 period under reference scenario is €669 million, while under the various decarbonisation scenarios (which included the electrification of transport) the equivalent figure ranges from €690 billion to €693 billion[228]. Hence, it might be concluded that the annual additional investment in transport to put it on the path to decarbonisation needed in each year between 2011 and 2020 was around €20 billion.

Other than the CEF, most funds do not have an ex ante allocation for transport. However, it is clear that €23[229] billion of the CEF should be spent on transport infrastructure, although clearly not all of this will be on transport infrastructure that might be considered to be climate projects. However, at least 80% of the CEF – or €18.4 billion – should be spent on projects that might be considered to be climate projects (i.e. rail, waterways or traffic management projects). Consequently it could be concluded that a minimum of between €7.36 and €18.4 billion of CEF funding would be spent on climate projects[230], which could leverage an additional amount of between €42 and €108 billion from grants for "climate" transport projects over the next programming period[231].

Additionally, if it is assumed that half of the €2 billion of CEF funds to be allocated to financial instruments for transport is used for climate projects[232], this might leverage an additional €15 billion of additional finance for "climate" transport projects[233].

[228] Table 37 of SEC (2011) 289

[229] This figure includes a €10bn transfer from the Cohesion Fund.

[230] The €7.36 billion assumes that only 40% of rail, water and traffic management projects could be considered to be climate projects, while the €18.4 billion assumes that 100% of these projects could be considered to be climate projects.

[231] Assuming a leverage of 6 times, which was the experience under the existing TEN-T budget

[232] This figure is relatively arbitrary, but might be considered to be an upper limit, as financial instruments are probably as (if not more) likely to be used for road projects than for rail or water projects. The figure is based on the fact that of the 6 projects funded by the LGTT at the time if its mid-term assessment, the one rail project benefited from as much LGTT support as the road projects combined.

[233] Assuming a leverage of 15 times, as was the (minimum) experience from the LGTT

The estimates put forward in the IA of the Low Carbon Roadmap includes the electrification of transport – including of road transport – whereas the CEF does foresee the financing of such projects. Instead, the latter includes the costs associated with major rail, water and traffic management projects, some of which might well be included in the baseline or even a decarbonisation scenario of the Low Carbon Roadmap[234]. Hence, it is difficult to identify whether the CEF funding for low carbon transport is sufficient, particularly as Member States will also contribute to such financing and probably to a much greater extent than the MFF.

6.5.4 Adaptation to climate change

Financial instruments under Horizon 2020, COSME, Cohesion Policy, Rural Development Policy and LIFE programme have the broadest scope to support various adaptation project types. While the scope is broad, the scale of action is difficult to establish ex-ante in the different financial instruments.

Research and development projects under the Debt Facility of Horizon 2020 shall be 'demand-driven' but also 'targeted', focusing on actions that help address one of the programme's priority on 'societal challenges' among which is 'food security, sustainable agriculture, marine and maritime research and the bio-economy'. The proposed Regulation sets out 'broad lines of activities', which suggest that any type of project focusing on improving the efficiency and resilience of agriculture and forestry systems can be eligible for support through financial instruments. The precise scope and scale of support through financial instruments however cannot be determined as the instruments shall be demand-driven.

Investments in physical capital development (e.g. fuel efficiency, development of RES, energy efficiency in buildings and the introduction of agro-forestry) can be supported through FI set up under the respective RDP and OP under the EAFRD and the ERDF. The precise scale and scope of funds that can be made available for such measures through financial instruments will only be known when RDP and OPs are approved.

Water projects including water treatments for the reuse of water, water efficiency and irrigation systems can be supported under LIFE as pilot and demonstration projects which could then be replicated at a larger scale through financial instruments under the EAFRD (Priority 4) and the ERDF (Investment priority 6(b)).

Demand for financing instruments to improve access to finance of SMEs and enterprises from both EU Structural and Rural Development Funds in rural areas, has been steadily increasing. At the same time, a considerable information gap about the available options still exists. It is also stressed that there is a clear `rural financing gap' in rural parts of some Member states, where SMEs tend to be excluded from financial support from lending institutions. [235]

Investment needs in the agriculture and water sector to contribute to climate change mitigation and adaptation across the EU are considerably high. However, not all actions to mitigate risks or respond to climate change need support from EU public funds. Many actions to adapt to climate impacts will

[234] It would be difficult to know for sure without understanding the details of the baseline and decarbonisation scenarios of the Low Carbon Roadmap, which is outside the scope of this project. However, it is probably worth noting that the annual investment that might be generated by the CEF for all transport (ie the same calculation and assumptions presented in the text but for the full €31.7 billion from the CEF) would only be €34 billion, which is only 5% of the annual investments needs for transport in Low Carbon Roadmap baseline.

[235] ENRD (2012) Final report on the ENRD rural entrepreneurship thematic initiative: rural finance. Final version, March 2012, Compiled by the ENRD Contact Point

be taken by private entities and land managers themselves as part of their normal business decision processes (autonomous adaptation). Support may be needed to assist/advise private entities, public authorities and land managers how to adapt sustainably and also how to support actions needed for eco-system based adaptation approaches.

Here it should also be noted the provision in the EAFRD for risk management instruments such as contributions to insurance premia and mutual funds to reduce the risk of economic losses caused by adverse climatic events and animal or plant diseases or pest infestations. While this can be seen as an innovative instrument to help farmers hedge climate change related risks and associated negotiate impacts, it should be designed in a way that it does not disincentivise land managers from taking proactive steps to make their activities more resilient to climate change impacts on the longer term. A mix of instruments is needed in this regard.

6.6 Summary

A robust gap analysis of the proposed financial instruments is quite challenging in an ex-ante modus. The provisions governing the proposed 2014-2020 financial instruments are fairly generic, which indicate a broad scope for action. This means that different climate mitigation and adaptation projects across the different sectors are in principle eligible for support. Yet, to ensure that financial instruments under the 2014-2020 MFF are more targeted towards low-carbon, climate-resilient objectives, concrete priorities and implementation provisions need to be specified more clearly in the respective Regulations, Implementing Acts and expenditure programmes of the different EU funding programmes and instruments.

The budget of the majority of proposed financial instruments (Cohesion and Rural Development Policy, COSME) is not defined yet. The budget of other financial instruments, for example under the CEF, is likely to change in view of the agreed cuts to the overall MFF budget by the European Council in February. The intention of many of these instruments is also to be as flexible and demand-driven as possible. This means that while a broad scope for climate action is possible in principle, the magnitude of funding that can be allocated to climate actions under the future financial instruments remains uncertain.

7 OPTIONS FOR IMPROVING THE USE OF FINANCIAL INSTRUMENTS FOR CLIMATE MAINSTREAMING UNDER THE NEXT MFF

The preceding chapters have shown that a range of financial instruments already exist under the EU budget to address existing barriers and through better public-private risk-sharing help leverage additional private investment in the area of low-carbon and climate-resilient finance. Proposals for financial instruments under the 2014-2020 MFF offer considerable opportunities for better mainstreaming of low-carbon, climate-resilient finance compared to the current MFF. However, preceding chapters also concluded that considerable gaps in finance remain and that additional action is warranted given the central challenge of mitigation and adaptation to climate change across key sectors of economic relevance to the EU.

The remainder of this chapter discusses a longer list of options that can principally help with improving the use of financial instruments for climate mainstreaming under the next MFF. Two basic modes of operation need to be distinguished, namely:

- Modifying existing and/or proposed financial instruments; and
- Complementing existing and/or proposed instruments by creating new financial instruments.

Not all options are complimentary. Some options are alternative. This concerns particularly the use of financial instruments in the future LIFE programme. It is assumed that a fairly small share of LIFE funding can be mobilised through financial instruments, thus alternative options are presented and discussed in terms of their relevance, effectiveness and efficiency. Choosing one option for using LIFE funding has implications for other options.

Each option is described in more detail in this chapter. We present the rationale in terms of how the options address specific barriers, gaps and needs in the identified priority areas of action for climate change mitigation and adaptation. We also discuss different ways of taking forward the proposed options in the 2014-2020 EU MFF. This is followed by a summary assessment which presents pros and cons of the proposed options in terms of three criteria: effectiveness, efficiency and EU added value. A description of the assessment methodology can be found in Annex 7.

7.1 Options for modifying and complementing existing proposals for financial instruments

7.1.1 Option 1: Introduce 'climate windows' under the Debt Facility of Horizon 2020

Against the backdrop of the agreed commitment to spend at least 20% of the MFF on climate related activities, mainstreaming of climate objectives should be the main way forward. In order to operationalise this mainstreaming approach, it needs to go beyond generic objectives and set up more detailed requirements under the proposed financial instruments under Horizon 2020. Most relevant would be to introduce a 'climate window' under the RSI II and RSFF II linked to the implementation of the EU SET Plan, as it would ensure targeting and scaling up finance for low carbon and climate resilient technologies along the entire innovation chain. Special focus should be placed on demonstration, deployment and replication, which is identified as a key financing gap. The option aims to address a current gap in the market between the demand for and supply of loans and guarantees for risky R&I investments. The proposed regulation for Horizon 2020 allows for the introduction of policy specific windows for the financial instruments under Horizon 2020.

Description of the option

The proposed Regulation on Horizon 2020 stipulates that the Debt Facility shall have two main components: 1) demand-driven, providing loans and guarantees on a first-come, first-serve basis and 2) targeted, focusing on policies and key sectors crucial for tackling societal challenges *inter alia* sustainable and low carbon growth.[236]

This option therefore proposes the introduction of a 'climate window' which would ensure that the Debt Facility is better targeting climate change objectives and hence better contributing to achieving the objectives of the Horizon 2020 programmes and Europe 2020 Strategy. This can be implemented through ring-fencing a minimum share of funds for climate action either from the budget of the Debt Facility or elsewhere in Horizon 2020 (e.g. the budget lines for societal challenges where, according to the Commission proposal some €6.5bn will be allocated to secure, clean and efficient energy, €7.7bn to smart, green and integrated transport and €3.5bn to climate action, resource efficiency and raw materials).[237] The specific rules on how this can be operationalised shall be set out in an Implementing Act and the multiannual work programme adopted by the Commission.

A 'climate window' for SMEs under SMEs & Small Midcaps Guarantees Facility (RSI II) would be targeted to R&I-driven SMEs and small mid-caps investing in climate relevant projects. In line with the proposed RSI II, loans would be higher than €150,000. Funding under RSI II could be pooled with resources from Member States and regions as well as other MFF sources. This option would address barriers to access to finance SMEs and small mid-caps are facing when developing small to medium sized technology projects with medium to high risk profile (e.g. test (pilot testing) new supply and storage technologies).

This option would also support mid-caps and large companies mainly implementing medium to large pre-commercial stage technologies with medium to high risk profile, e.g. early commercial-scale deployment of new supply and storage technologies. It would need to be implemented under the Loans and Guarantees to R&I (non-SMEs) activities of mid-caps and large firms (RSFF II under Horizon 2020). It is relevant because it would reduce risks for demonstration, deployment and replication in mid-caps and large firms. It would therefore address the growing demand of large companies for finance for the implementation of medium to large pre-commercial stage technologies with medium to high risk profile.

Assessment of the option

The main challenge of this option is to strike the right balance between ensuring that the financial instrument is sufficiently flexible and demand driven while at the same time targeted and deliver clear benefits in relation to climate policy objectives. While introducing a climate window would ensure that at least a certain amount is allocated to climate policy objectives, it will at the same time reduce flexibility and reduce competition among potential beneficiaries which may affect the quality of project proposals and hence the outputs of the funding programme.

However, given the huge investment needs and the difficulties companies are facing in getting access to finance for technology development over the entire innovation chain, such a climate window seems warranted. In terms of EU added value, co-benefits for climate and innovation policy can be realised.

The expected leverage of this option on the mid-caps and large firms is between 5 and 20, based on the experience of the RSFF. The scale of the instrument depends on the final instrument design and

[236] European Commission (2011) Proposal for a regulation establishing Horizon 2020 – the framework programme for research and innovation (2014-2020), Annex, page 56, COM(2011)809, 30.11.2011, Brussels.

[237] Page 85 of COM(2011)809

the size of the 'window' but it is expected to be medium to high[238] (~ €2 to 7.6bn)[239] for a window worth €380 million for both options 1 and 2.

In order to improve the performance and result orientation of this financial instrument, it is essential to incorporate monitoring indicators and reporting requirements in relation to the EU funding contribution, achieved leverage, GHG emissions reduced, energy saved and renewable energy generated through the supported projects.

7.1.2 Option 2: Ring fence a share of the LIFE programme and transfer it under proposed COSME programme

The rationale for this option is to improve the targeting and capitalisation of the proposed financial instruments under COSME in relation to climate change objectives. In line with COSME's overall objective the approach would address barriers to access to finance for SMEs in the low carbon and climate resilient sectors, by ensuring that a guaranteed amount of money is being made available and implemented by a well established financial intermediary hence achieving good outcomes.

Description of the option

A ring-fenced share of the LIFE programme would be transferred to the financial instruments, the Equity Facility for Growth (EFG) and the Loan Guarantee Facility (LGF), as proposed under the COSME programme. The proposed COSME regulation foresees that the allocation of funds under COSME is purely demand driven and not policy driven. It is therefore not envisaged to ring-fence shares of the programme to specific policies. The only way to ensure that a certain level of funding is dedicated to climate specific objectives is therefore to provide additional budget which would be ring-fenced for climate projects.

The EFG would target expansion and growth-stage SMEs, in particular those operating across borders, while having the possibility to make investments in early stage enterprises in conjunction with the equity facility for RDI under Horizon 2020. The LGF would target SMEs and financial intermediaries providing direct guarantees and other risk sharing arrangements. Each instrument would address specific barriers, the EFG would provide venture capital and the LGF debt financing via loans, including subordinated and participating loans. It would also include securitisation of SME debt finance portfolios which could mobilise additional debt financing for SMEs.

Assessment of this option

In our assessment, we assume that 75% of financial instruments under LIFE will be transferred to the LGF and 25% to the EFG because the LGF is considered more relevant to SMEs. Other options are also possible. In our assessment we assume that ~€50-200m under LIFE can be transferred to COSME. The expected leverage for EFG is 30 and for the LGF 6.8. Therefore, for funds mobilised under the EFG, a medium to high volume can be expected, i.e. ~1.5 to 6bn[240] . For funds delivered under the LGF, a lower volume of mobilised funds can be expected, i.e. ~85-340m[241].

[238] High >5bn, medium 1-5bn, low <1bn

[239] for example, we assume based on the H2020 proposals that the total amount for debt instruments is approximately 1,900m out of which 20% could be dedicated to the 'climate window', multiplied by a factor of 5 to 20 (assuming similar leverage factor to the RSFF), gives a range of approximately 2 to 7.6bn

[240] Assuming that ~50-200m under LIFE can be transferred to COSME, the expected total leverage is estimated to be 30 times and reach between 1500

[241] 12.5-50 x 6.8 = 85-340

The advantage of this option is to make use of financial instruments with proven and experienced intermediary channels. Transaction costs can be expected to be low as funds will be delivered under an existing/planned financial instrument with well-understood and known procedures. Important synergetic effects can be expected in relation to competitiveness, SMEs growth and climate action.

However, the issue of capitalisation is crucial – in the current format of LIFE, it does not seem plausible that adding small contributions on top of the main allocations under the proposed instruments could achieve critical mass. This option would be limited to SMEs and not cover midcaps and large companies which play an increasingly important role in R&D in the renewable energy sector. Provisions improving the coordination with and complementarity of instruments targeting SMEs managed under Structural Funds should also to be established.

Another way of ensuring better integration of climate activities in all activities supported by financial instruments in the COSME programme is by introducing a horizontal project selection criterion which would require that the eligibility for support is conditional to the integration of energy savings or renewable energy measures in SMEs' operations. This can be verified through the introduction of appropriate monitoring indicators and reporting requirements in relation to GHG emission, energy saved and renewable energy generated. National and local intermediaries should be required to transmit information about climate spending and results achieved to the EIB and the European Commission.

7.1.3 Option 3: Expand EU Project Bond Initiative under CEF to include renewable energy generation that has demonstrable EU added value and is of cross-border importance, together with its connection to the grid

Meeting EU's 20% renewable energy target, as well as the longer term targets for the virtual decarbonisation of the energy sector, will require extensive investment in renewable energy production. However, this is currently not one of the priorities of the CEF/PBI, as the energy elements of the CEF focus on the transmission of energy products across borders and not on renewable energy generation projects that would bring cross-border benefits, such as some proposed offshore wind developments.

Description of this option

The fourth option is to explicitly allow the PBI to support renewable energy generation infrastructure, as long as this is of EU added value and of relevance to cross-border energy supply. This option also includes ensuring that such generation infrastructure is connected to the pan-European energy grids.

The conditions relating to EU added value and cross border relevance are important so that the PBI does not support local renewable energy generation projects and they also ensure that the option is consistent with the objectives of the CEF itself, which would support projects of common interest that contribute to the EU's climate targets, including raising the share of renewable energy to 20% by 2020.

The CEF/PBI is a suitable means of implementing the option as the nature of such projects is consistent with the use of project bonds. Additionally, the fact that such projects generate long-term, stable revenue streams means that they are also suitable for institutional investors. Indeed, there is interest amongst institutional investors for such credit enhancement instruments in order to increase the credit ratings of such projects and bring them to investment grade level.

Assessment of this option

The lack of inclusion of renewable energy generation infrastructure as a priority under the CEF is arguably inconsistent with the EU's climate targets for 2020 and its inclusion as a priority would address this gap. It will be important to address this gap as soon as possible in order that the necessary investment happens in time for the 2020 targets to be met.

Otherwise, there will be a risk that, towards the end of the next programming period if it becomes evident that the targets are not being met, it will only be possible to support these investments in a sub-optimal fashion. In order to avoid such a risk, consideration should be given to implementing Option 4 as soon as possible, e.g. in the course of the finalisation of the CEF, or if not in the mid-term review.

The leverage can be expected to 15 to 20. The expected maximum total funding with financial instruments and in particular projects bonds in the CEF is €15-20 billion (if we assume €1 billion can be earmarked only for RES generation and connection to the grid).

In terms of risk allocation, in principle, compared to pure grant finance, the risk allocation between the private and public sector is expected to be better. Determining the level of the guarantee and ensuring optimal risk allocation is, however, complex. Attention has to be given towards avoiding an excessive risk coverage for the private sector, as well as supporting projects which may not be the best option compared to alternatives which are not directly linked to the trans-European networks.

One of the potential challenges with this option is whether it would be financially and politically feasible to include renewable energy generation infrastructure as a separate priority under the CEF. A new priority would need a dedicated budget line and it is not clear whether this would be possible within the CEF as it stands, particularly as the overall budget for the CEF has been cut. The CEF budget for energy, which currently focuses on transmission lines, has been nearly halved as a result of the European Council's agreement on the budget in February 2013. Hence, spreading this budget even more thinly to include renewable generation would be difficult. The CEF budgets for transport and ICT are earmarked and so could also not be used for renewable energy generation infrastructure. Instead of implementing this option through the CEF, it might be possible to implement it through LIFE or the ERDF/CF.

In the case of LIFE, this would again require that a relatively small budget be spread even more thinly and would result in fewer resources being available for other LIFE priorities. Implementation of the option through the ERDF/CF would rely on the cooperation of national management authorities. In this respect, it is worth noting that renewable energy generation projects can already be supported under these funds, but these are likely to favour national projects rather than the projects of European added value and of cross-border relevance that Option 3 proposes under the CEF.

7.1.4 Option 4: City project bonds

Many European cities have difficulties to access funding. One form of raising funds is through municipal bonds, a more frequent practice in the US. But high indebtedness and a low credit rating of cities, makes this expensive or impossible. JESSICA provides some relief through its flexible set of instruments offering financial solutions (such as loan guarantees) for urban projects and thus alleviating this bottleneck. However, local authorities will have to recourse more to the capital market rather than limit themselves to bank financing, due to the size of investment needs and the limitations imposed by their debt and credit rating. Bonds would have to be linked to large revenue generating projects, as they would be linked to the project company and not to the municipal budget.

Description of this option

This option is to expand finance for cities by helping them tap in to the capital markets using bond issuance, but without damaging the city debt levels and avoiding high interest rates. The instrument would be based on a similar structure as the EU Project Bond Initiative, but using regional funding as guarantee. The finance would be used for large city projects for grids, energy efficiency and transport.

EU regional funding, for example through the JESSICA instrument, could be used to (partially) guarantee specialised bonds allocated to very large integrated revenue generating projects (€250 m or above). The management of the bond issue could be done through the EIB or also in collaboration with national public banks.

The option would focus mainly mitigation projects for smart grids, low carbon transport and housing (e.g. District Heating), which have a revenue generating capacity, and could integrate adaptation aspects, for example insulation of the housing stock.

Assessment of this option

Due to the concentration of 70% of the European population in urban areas, cities consume 70% of energy and account for 75% of greenhouse gas emissions directly and indirectly. Cities are essential to reduce emissions. There is a need to mobilise cities to embark in a transformation of the way cities operate, moving them to a more sustainable use of resources and altering the way transport is designed. This means the rapid transformation of cities into smart cities, i.e. cities that reduce their ecological imprint to a minimum by increasing their resource and energy efficiency. Energy is essential for modern cities, supporting economic activities, allowing transport and other infrastructure to function, and provides heat, cooling and electricity for people to live comfortably. How energy is used defines the city's economic and social development. The change to a Smart City should also bring large benefits to the population in terms of quality of life, better transport and a reduction of pollution related illnesses.

The leverage of city project bonds can be expected to 15 to 20, similar to the EU Project Bond Initiative. The amount leveraged will depend on the funding set aside by national and regional authorities for the EU structural funds, thus the leverage is very difficult to estimate ex ante.

In terms of risk allocation, much will depend on the design of the programme, the kind of investment and the quality of the private public partnerships established. In principle, risk should be manageable; the need for external financiers and the lack of full guarantees by the municipal budgets should ensure a high level of quality based on solid business models. Institutional lenders will not easily invest in doubtful projects. In this sense in terms of risk it should be lower than with grant allocations. Determining the level of the guarantee and ensuring optimal risk allocation is, however, complex. The quality of the projects will require solid public procurement mechanisms including life-cycle costing, as well as the overview of the selection of projects by specialists.

The challenges to set up such a bond scheme are large, and require the development of a clear project pipeline for the next MFF, thus decisions need to be taken quickly and programming would need to integrate those. For this, time is of the essence and is unfortunately running short.

7.1.5 Option 5: Introduce a dedicated loan and guarantee facility and other risk sharing arrangements for energy efficiency

Access to finance constitutes a major challenge for implementing energy efficiency measures in the buildings sector and for SMEs. This is linked to the fact that commercial banks, also as a result of the financial and economic crisis, are often not willing to provide finance in this often new market area due to lower lending capacity. Risks are often perceived as too high and energy savings are not sufficiently recognised as secure income streams to pay back loans. The absence of the necessary collateral, in particular among SMEs, reinforces the difficulty to access finance. ESCOs can be an important driver in energy efficiency markets, but ESCO markets remain underdeveloped in many EU Member States. Also the public sector has difficulties in implementing energy efficiency measures due to constraints in public finances. Guarantees can help in particular SMEs with no collateral to improve access to finance and leverage substantially more private investments.

Description of this option

The facility would provide loans and guarantees for the implementation of small to medium scale energy efficiency projects.

The facility could address the financing needs of key players in the following way:

- *Commercial banks*: increase lending capacity of commercial banks by providing credit lines and guarantees;
- *Owners of buildings*: provide concessional loans via intermediaries;
- *SME*: provide loans via intermediaries and guarantees to banks for lending to SMEs;
- *ESCOs*: loans, including senior and subordinated loans; and
- *Public authorities*: loans, including senior and subordinated loans.

Guarantee schemes are effective public finance mechanisms to reduce risks related to such projects and help access to debt finance. To avoid excessive returns for intermediary banks, this should be priced and interest rates regulated.

Assessment of this option

This option can be implemented both at EU and national/regional levels. Under the 2014-2020 EU MFF, this option could be implemented by transferring LIFE funds to the EIB's DEEP Green Platform and/or ring-fencing funds under Cohesion and Rural Development Policies through 'off the shelf' or tailor made financial instruments. At EU level, about €50-200 million under the future LIFE programme, which can be used for financial instruments, can be used to capitalise activities under the new initiative of the EIB – the DEEP Green Platform. The advantage of this option is that the EIB has developed this initiative based on several years of experience with energy efficiency financing and have identified specific needs, keeping in mind the diverse situation of Member States and regions, in relation to 4 target groups including commercial banks, ESCOs, SMEs and utilities..

Hence, transferring funds to the DEEP Green Platform will ensure that the facility is established faster, it will build on the expertise of the EIB and it will use already established intermediaries in Member States. However, the available LIFE funds are likely to be too limited to capitalise a meaningful portfolio under the DEEP Green Platform. Setting up and rolling out a new financial instrument under LIFE may have long lead times and could jeopardise the timely and effective uptake of the available funds. Possible overlaps with the EEEF should be avoided.

A more sensible way to implement this policy option is to ring fence funds under Cohesion and Rural Development Policy using 'off the shelf' or tailor made instruments. This would allow addressing specific needs and adjusting the implementation of projects to national and regional circumstances. Hence, it will be more flexible and responsive to specific market needs. The drawback of this option

is that many Member States/regions, especially those with little experience with using financial instruments, are unlikely to take action and set up tailor made instruments. Here, there is scope for the European Commission to prepare sample template for an 'off the shelf' instrument, i.e. dedicated loan and guarantee facility for energy efficiency, which would provide guidelines to managing and rural authorities on how to set up such a facility. This option should be subject to a robust ex-ante assessment as required by the Common Provisions Regulation laying down rules and provisions on the use of financial instruments under shared management. The ex-ante assessments should assess the specific market demand and local circumstances which will determine the most appropriate design of the facility.

The expected leverage will depend on the specific context and how the different Member States choose to set up such a facility. If we can assume a slightly lower leverage effect compared to the LGF under COSME (6.8), for example e leverage of 5, and we take a contribution of €50-200m under Cohesion / Rural Development Policy / LIFE, the total funds mobilised could reach some €250 – 1,000m.

7.1.6 Option 6: Technical assistance for capacity building and knowledge transfer for energy efficiency projects

This option would provide technical assistance for capacity building and knowledge transfer in the area of energy efficiency. The potential, costs, benefits and risks of energy efficiency projects are often poorly understood among key players including owners of buildings, SMEs, public authorities and banks. Commercial banks often do not recognise the energy efficiency sector as a potential market and do not have the necessary risk assessment tools. Technical assistance would help to address knowledge gaps and build the required technical and financial capacities. Technical assistance could also support the aggregation of smaller projects to reduce transaction costs and reduce risks and hence increase their bankability.

Description of this option

The technical assistance facility would provide support in the form of grants for capacity building and knowledge transfer. It would include project specific technical assistance, e.g. for the preparation of planning and tendering procedures, but also broader advisory services to increase the knowledge and understanding of energy efficiency among all key players.

This option could be implemented in two ways:

- Through existing instruments such as ELENA; or
- Transfer LIFE funds to EIB's DEEP Green Platform

Assessment of this option

The existing ELENA facilities provide technical assistance for capacity building to identify and help developing local energy projects[242]. The option could build on this experience and continue these types of activities. Their scope however does not include capacity building among commercial banks, e.g. to help them dealing with new financial instruments. Moreover, it is not clear if and how ELENA may continue.

The on-going discussion on a future EIB instrument, the DEEP Green Platform, foresees technical assistance funds for commercial banks and would include the aggregation of different projects via financing vehicles for ESCOs and the public sector or via a securitisation vehicle for utilities. The DEEP Green Platform's focus is to create dedicated lending capacity. The creation of a new instrument for technical assistance using LIFE funds through the DEEP Green Platform appears

[242] ELENA also provides technical assistance for renewable energy, grid, and transport projects.

therefore as appropriate. However, the available LIFE funds are likely to be too limited to set up a meaningful portfolio under the proposed DEEP Green Platform. In order to ensure that this option results in projects actually being implemented on the ground, it may be necessary to include a conditionality that technical assistance is only provided if funds are secured for the actual project implementation(e.g. under compartments of the DEEP Green Platform or Cohesion and Rural Development Policy). Hence options 5 and 6 should be seen as complementary. The expected leverage could be high if based on the experience with ELENA (minimum leverage required of 20).

7.1.7 Option 7: Allocate funds for technical assistance dedicated to adaptation to climate change

Adaptation to climate change requires the systematic consideration of climate variability and projected impacts in investment planning and management processes. The adjustments needed to adapt to the impacts of climate change are often an integral part of the asset or the management practice itself, thus they can be financed as part of the asset. It is therefore thought that the private sector will bear the costs of adapting their businesses, operations and assets to climate change impacts or extreme weather events. In practice, however, there are a number of barriers for private companies to invest in climate change adaptation. These are, among other things, related to the underlying uncertainty about the occurrence and magnitude of extreme weather events as well as long-term impacts from a changing climate. There is also considerable lack of data about the cost and benefits of risk mitigation and adaptation options. There is a case for using public financing for technical assistance with the aim to raise awareness and equip the private sector with data and tools to adapt their operations and make their projects more resilient to climate change impacts.

Adapting to climate change also requires the development of specific projects, particularly in the environmental and water domains, which need dedicated investments. The practice shows that the role of public finance (in the form of technical assistance) in such projects is essential. There is less understanding and expertise in developing green options for adaptation projects that are based on biodiversity and ecosystem services. These types of projects are arguably more cost-effective but authorities and project promoters tend to support grey solutions as they are better 'known'. Given the objective of the future LIFE programme to act as a 'gap filler' and pilot test more innovative solutions, the focus of this technical assistance can be slightly more favourable to developing, testing and demonstrating green options (e.g. wetland restoration, green spaces and green roofs in urban areas).

Description of this option

This option aims to incentivize the public and private sector to mitigate risks and integrate adaptation measures in project development, management practices and supply chains across the EU. The technical assistance should have three strands:

- ***Support to building the information and knowledge base***. These can include climate modelling data, forecasts, damage costs, cost-benefit analysis, vulnerability maps, indicator and monitoring systems, mapping water quantity (including resource availability and flooding), but also awareness-raising and information sources, cooperation and exchange of good practice;
- ***Project development*** – building a pipeline of 'adaptation' projects. The focus should be on risk prevention, water efficiency and integrated urban solutions that address multiple sectoral needs related to energy, water and transport. Projects can include both grey and green options for adaptation, although innovative green options could be favoured. Potential project types could include:

    - Improving the water and energy efficiency of water treatment (waste water and drinking water);
    - Reducing leaks in water distribution infrastructures;
    - Improving drainage/ storm-water systems;
    - Cooperation (e.g. on a river basin or regional level) and community engagement in water resource management;
    - Building/ improving infrastructure for and access to water supply and sanitation;
    - Construction of flood gates (with impacts for several policy fields);
    - Dike reinforcement and heightening;
    - Soft coastal defences;
    - Conserving or restoring wetlands/ natural floodplains (e.g. to act as flood buffer zones);
    - Developing early warning and/or risk prevention systems (floods/drought);
- ***Advisory services*** to project developers and public authorities to systematically mainstream climate change risks in investment planning and project design.

There are two possibilities to implement this option:

- Under the future LIFE' sub-programme on climate action
- Under the post-2013 JASPERS instrument

Assessment of this option

The provision of technical assistance for climate change adaptation as part of the mandate of the future JASPERS instrument, if retained under the 2014-2020 EU Cohesion Policy, is sensible as it will build on its existing experience of providing project preparation support and advisory services to public authorities and project promoters. Its future development however is not yet known. Also, it has a limited geographical scope (EU12).

Therefore, it is recommended that this option is implemented by allocating funds under the climate action sub-programme of the future LIFE. Given that the emphasis of the 2014-2020 LIFE programme is on better governance and effective implementation of EU climate policies, the provision of technical assistance will greatly enhance the preparatory process of better projects that can be swiftly implemented on the ground. This will ensure a coherent technical assistance approach across the EU while at the same time it can be used alongside other instruments and allow for their blending. For example, the provision of technical assistance under LIFE can be coupled with support for the implementation of the actual projects under EU Cohesion Policy and Rural Development Policy in the context of Integrated Projects. The provision of technical assistance can also increase the efficiency of projects as well as reduce their cost and the risks / potential damage costs associated with long term climate change impacts and extreme weather events.

The proposed technical assistance is in support of priority area 'climate change adaptation' (article 13 of the proposed LIFE Regulation) and more specifically the objective laid down in article 15 (b) which stipulates that activities shall 'improve the knowledge base for the development, assessment, monitoring, evaluation and implementation of effective adaptation actions and measures and to enhance the capacity to apply that knowledge in practice'. It is in line with articles 17 and 18 (e), (f) and (g) which indicate that action grants can be provided for technical assistance projects, preparatory projects as well as information, awareness, and dissemination projects.

We propose that the provision of technical assistance targets public authorities at national, regional and local levels and SMEs in correspondence to the identified needs of these actors. The support can be implemented directly by the Commission or jointly with other European financial institutions.

Further details operationalising this option, including the allocation of funds, types of projects, selection and award criteria, qualitative and quantitative outcomes, indicators ad targets, should be laid down in an Implementing Act adopted by the Commission setting out a multiannual work programme of the future LIFE.

The expected leverage effect is difficult to establish ex-ante because it will depend on the nature of projects supported, e.g. project development or awareness rising. Based on the experience of ELENA (leverage of 20), the expected leverage for project development could be relatively high. However, it should be noted that as it might take some time to establish the instrument and that the focus is on adaptation, thus the expected leverage effect could be lower.

7.1.8 Option 8: Create a dedicated EU 'Natural Capital Fund'

Eco-system based solutions to climate change adaptation appear to be particularly unappealing to lending institutions and private investors. Some of the reasons for this include a lack of understanding and knowledge about the underlying business models, financing models and how to create revenue streams. Innovative solutions to climate change adaptation are therefore needed, including the testing and piloting of innovative financing and business models.

At the same time, ecosystem based adaptation to climate change is considered to be more cost-effective compared to 'grey' infrastructure solutions which often tend to be large scale and technology based. These green options could also realise important spill over effects beyond climate change adaptation including benefits for biodiversity, water and resource efficiency. Yet, public authorities and private entities often opt for traditional grey solutions as they are better known and are perceived to include lower transaction costs due to their larger size. There is a need for more innovation for ecosystem based solutions for climate change adaptation, which also include innovative financing models.

Description of this option

The aim of this new Fund will be to test, experiment and stimulate the exchange of good practices in financing natural capital and ecosystem based adaptation to climate change. The aim is to develop business models and possibilities for revenue generation which can make an attractive case for mobilising private capital to such projects. The fund will be demand driven and cover a wide range of project types in three main directions:

- The preservation and restoration of ecosystems and their services
- Green infrastructure
- Eco-innovation and green business

The aim is to identify financing models and good practices which can then be replicated at a larger scale. The Fund can be structured in various ways. One way to structure it is a fund of funds where contributions are sourced from the EU budget, the EIB and other financing institutions as well as development agencies in Member States. The contributions from the EU budget can act as a first loss piece thereby reducing the risk to other institutions willing to allocate resources to the Fund. The fund can be managed jointly with European financial institutions, including the EIB.

This option could be implemented through contributions from the future LIFE programme.

Assessment of this option

As one of the objectives of LIFE is to test new solutions, we recommend that a possible new dedicated Natural Capital Fund is created through contributions from its climate action sub-

programme. This will first of a kind instrument at EU level, which can pool the expertise and leverage capital from other financial institutions to target projects for ecosystem based adaptation.

A similar Fund is being discussed between DG Environment and the EIB the focus of which is resource efficiency, with some aspect related to biodiversity and natural capital. The idea is to source funding under the nature and biodiversity sub-programme of the future LIFE in order to establish a new financial instrument. However, it is not clear if this idea will be taken forward. If it is further developed by DG Environment, it is less meaningful for DG Climate Action to pursue a separate Fund focusing on ecosystem based adaptation. Instead, synergies between the two sub-programmes should be pursued. A combination of funds sourced from both sub-programme of LIFE can guarantee better capitalization of the future fund. If DG Environment however does not proceed with this idea, there is a stronger rational for DG Climate Action to consider the introduction of such a fund with a focus on projects for ecosystem based adaptation.

At the same time, establishing a new financial instrument is usually time consuming and can obstruct the effective uptake of funds. DG CLIMA should undertake a comprehensive ex-ante assessment of the possible new financial instrument as required by the Financial Regulation which should analyse the market needs for such instrument in order to further develop its main objectives, possible structure, target group, types of projects and the allocation of funds. This preparatory work would require some time, which means that this options could be considered to be included in the multiannual work programme of the LIFE programme in the mid term (or some time 2017-2018).

This option is fully compliant with the proposed LIFE Regulation as it complies with the objectives of the LIFE programme (article 3 and article 15). It is pursuant to article 17 (c) which stipulates that contributions from LIFE can be allocated to financial instruments and requires that more operational requirements should be set out in an Union's act.

7.2 Prioritising options

Based on the assessment of the long list of proposed options to modify or complement existing proposals for financial instruments, table 8 presents an overview of the most relevant options in terms of overall effectiveness, efficiency and EU added value.

Table 8. Selection of final options

Programme	Financial instrument	Options
Modifying proposals under central management		
Horizon 2020	Debt facility: RSI – II (SMEs)	**Option 1:** Introduce a demand-driven 'climate window' for SMEs
	Debt facility: RSFF II (non-SMEs)	**Option 1**: Introduce a demand-driven 'climate window' for mid-caps and large companies
CEF	Loans and/or guarantees facilitated by risk sharing instruments, including enhancement mechanism to project bonds	**Option 3**: Expand EU Project Bond Initiative under CEF to renewable energy generation together with connection to the grid

Modifying proposals under shared management		
Cohesion and Rural Development Policy	Off the shelf instruments Tailored instruments Ring fencing to EU level instruments	**Option 5:** Introduce a dedicated loan and guarantee facility for energy efficiency
Establishing new instruments		
LIFE	Financial instrument	**Option 6:** Technical assistance for capacity building and knowledge transfer for energy efficiency projects **Option 7:** Allocate funds for technical assistance dedicated to adaptation to climate change

It appears relevant to pursue options for modifying proposals for financial instruments under both direct and shared management.

Continuing efforts to better mainstream climate change concerns into financial instruments under central management is a top priority. The options targeting Horizon 2020 offer greater prospects for effectiveness and efficiency than the options targeting COSME. Adding small LIFE contributions on top of the main allocations under the proposed instruments for COSME could help better achieve critical mass, but will not have a significant impact. Dedicated climate windows under Horizon 2020, however, can better ensure that sufficient expenditure is mobilised to leverage additional private finance for low-carbon, climate-resilient finance through the Debt Facility. It also helps saving the small financial resources under LIFE for other purposes.

Reviving the bonds market is a critical challenge as discussed in previous chapters of this report. Expanding the focus of the EU Project Bond Initiative to the extent possible to include the generation of renewable energy and their grid connection addresses a key issue of strong European added value, as financial barrier and needs are pertinent in this context.

Fostering technical assistance for climate adaptation as well as energy efficiency projects scores strongly on effectiveness and EU value added. Knowledge gaps and capacity constraints are relevant barriers, and funds for technical assistance under LIFE can help addressing these barriers. A dedicated Natural Capital Fund offers important prospects in a longer-term perspective. However technical assistance needs appear to be more relevant in a short-term perspective.

Financial instruments under shared management require a greater coordination effort given the involvement of soon 28 Member States. However, they also represent the largest share of climate relevant expenditure. It is hence highly recommendable to continue efforts to mainstream climate change concerns in those funds. A dedicated loan and guarantee facility for energy efficiency stands out as responding best to the needed uptake of energy efficiency measures, particularly in the housing stock and industrial processes. This should be complemented by targeted assistance for capacity building and knowledge transfer. While the introduction of city project bonds has a promising potential it appears difficult to implement within the present policy framework.

7.3 Supportive action: Procedural recommendations and building the right information base

Climate change is a cross-cutting issue which needs to be horizontally and procedurally integrated into all expenditure programmes and investment projects. EU budget's contributing to climate change mitigation and adaptation objectives could be significantly strengthened through procedural and institutional tools and mechanisms which will require considerations and actions related to GHG emission reductions, energy savings and the mitigating climate change risks to be systematically incorporated across all spending programmes. Such tools include:

- Introduce a **project selection criterion**, to incentivise all beneficiaries and project promoters to integrate horizontally GHG emissions reduction, energy savings and the use of renewable energy i.e. investments must achieve at least 20% primary energy savings for energy efficiency projects (for projects in the building sector, a higher percentage is required) and 20% reduction of CO_2 emissions for renewables and transport projects. Rules and requirements for setting out 'climate change criteria can be embedded in the development of the multi-annual implementation programmes of directly and shared managed financial instruments. Interesting examples of such criteria can be found in the EEEF and NER300.

- **Introduce ex-ante conditionality** to systematically mainstream climate change in investment planning. Risk assessment tools should be incorporated in the respective procedures for investment programmes/projects planning (e.g. feasibility studies, cost-benefits analyses, ex-ante evaluations, strategic environmental and environmental impact assessments). Such conditionality could be integrated in the multiannual implementation programmes and in project application forms, making the receipt of EU co-financing conditional to their fulfilment.

- **Introduce monitoring indicators and reporting/verification mechanisms for financial instruments related to climate action:** In order to improve the transparency, accountability and result orientation of the way funds delivered through financial instruments are used in relation to GHG emissions, energy saved and renewable energy generated, an effective and user friendly indicators and reporting systems should be introduced for the future financial instruments. Requirements for these should be set out in the respective Implementing acts, multiannual work programmes and regional and rural development programmes. At minimum, monitoring and reporting rules should require that following is reported against output and outcome indicators including: the volume of funds spent on climate related activities through financial instruments, the achieved leverage effect, the reduced GHG emissions, energy saved and renewable energy generated.

- **Improve absorption rates and effectiveness of Cohesion Policy funding**: The share of funding spent in the Cohesion Policy funding for renewable and energy efficiency needs to be improved. There is evidence suggesting that allocations in the 2007-2013 programming period are absorbed slower than expected which can impede actions to scale up and use effectively funds under Cohesion Policy. This is a negative trend given that Cohesion and Rural Development Policy constitute the biggest pots of money available for a broad spectrum of mitigation projects. In addition, energy efficiency investments under the structural, cohesion and rural development funds should be subject to a proper needs assessment at programme level, regular monitoring in terms of cost per unit of energy saved, the payback period planned and achieved as well as the contribution to the 2020 targets.

- **Create dedicated expert groups on selected aspects of private financing for climate:** While it is important that financial instruments for climate projects are used as widely as possible, simply enabling and encouraging this within the context of the EU MFF will not necessarily be sufficient to optimise the use of financial instruments for the purposes of climate projects. However, work is being taken forward by other organisations, such as the OECD and Climate Bonds Initiative, and groups, such as the Institutional Investors Group on Climate Change (IIGCC), that aim to overcome the existing barriers in order to increase the use of private finance for climate investments. These groups are also contributing to a dialogue with the Commission and other stakeholders, such as the international financial institutions, on the increased use of private investment for climate projects. It will be important to ensure that the work of these groups is not duplicated by any additional, EU expert groups. However, there is a case for dedicated expert groups on specific issues, e.g. the securitisation of climate lending or covered bonds, or on specific sub-sectors. In relation to the latter, the need for increased levels of finance in the rail sector and the lack of clarity about the potential role of private investment suggests that an expert group on the potential use of private finance would be useful. The respective groups should bring together relevant experts from Member States, financial institutions and the respective trade associations (associated with infrastructure, resources and finance) with a view to sharing expertise, building confidence and finding solutions to the barriers identified. The groups should be focused and time-limited in order to ensure that they address the concerns that they were formed to address. The active involvement of private investors in this group would play an important role in engaging with these investors, which in turn should help to increase mutual confidence and overcome less tangible barriers to the involvement of private finance in infrastructure projects.

- **Single focal point to provide support for project promoters in working with different types of private investors:** The importance of having a single focal point for the provision of support to project promoters is based on a number of insights:

    - Financial instruments, such as those that might be used in the 2014-2020 programming period in the context of the EU funds (e.g. the CEF, CF, and ERDF) are relatively new. Experience with these is developing, e.g. under the LGTT and the PBI pilot phase. It will be important to learn the lessons of these experiences and ensure that these are made available to other potential promoters in accessible way.

    - Given the investment needs for low carbon transport and energy infrastructure, and the declining potential of the public sector to provide the necessary finance, it will be important to bring as much private sector investment into the low carbon transport and energy sectors, as quickly as possible. A single focal point in the EU to facilitate the involvement of the private sector in the EU's infrastructure could facilitate this process.

    - Various funds under the MFF, such as the CEF, ERDF and CF, could potentially fund projects that contribute to the development of low carbon transport and energy in the EU. As the experience with financial instruments develops within funds – not to mention at different levels of governance – it risks not being used to inform wider practice, unless there is a single focal point in which knowledge can be collated and from which it can be distributed.

    - Different types of investors – e.g. banks or institutional investors, such as pension funds – require projects to be set up and presented differently, as each

has different needs. Understanding these requirements, and structuring projects and contracts accordingly, requires specialist knowledge, which could be brought together for ease of access in a single focal point. In addition the Adaptation Clearing House in development could provide an information backbone to adaptation strategies.

Having a central focal point for expertise and support for private finance would be more efficient than having such expertise and support distributed between the individual funds and the different Member States. The single focal point might be achieved by broadening the remit of European PPP Expertise Centre (EPEC) beyond PPPs to include strengthening the ability of the public sector to work with private finance more generally**.** In this respect an expanded EPEC, or an alternative organisation, could undertake the following:

- Act as a focal point for expertise for the involvement of private finance more generally in EU low carbon transport and energy projects. This would include bringing together experience gained from other initiatives, such those involving the OECD and the World Bank.

- Actively engage with institutional investors, including smaller institutional investors, in order to increase their interest and confidence in supporting the development of EU low carbon transport and energy projects. This might be undertaken through existing groups, such as the IIGCC.

- Collate examples of experience and practice (while respecting commercial sensitivities) on the involvement in infrastructure investments by private investors, including pension funds, which could be used to inform good practice.

- Explore the conditions under which various types of projects might generate revenues (through, for example, user charges, access charges, availability payments or guaranteed prices) into which private investors, including pension funds, might invest. There is a need for some innovative thinking in this respect, which could include the consideration of aggregation vehicles into which smaller projects could be aggregated in order to attract private investment.

- Develop templates that might be used for the use of financial instruments.

One of the advantages of choosing EPEC in this respect is that both DG MOVE and DG REGIO – both of whose funds might be used to provide low carbon transport and energy infrastructure – already sponsor EPEC.

8 CONCLUSIONS AND RECOMMENDATIONS

8.1 Financial instruments are relevant tools to foster low-carbon, climate resilient finance

The analysis carried out for this study reiterates the relevance of mobilising private capital to finance the investments needed for Europe's transition to a low-carbon, climate-resilient economy. Estimates from the Commission as well as other institutions underline that there are large investment needs that cannot be met by existing, and likely future, levels of public spending. There are, however, considerable gaps and uncertainties in the available information base that prevents a robust, comparable assessment at the level of sectors analysed for this report.

In many cases EU rules will matter more than EU expenditure in terms of stimulating private investors' action. The relevance of a clear, predictable long-term policy framework with corresponding targets and measures has been repeatedly stressed in the interviews carried out for this study. Setting the right regulatory framework remains the main lever for the EU to mobilize private investment. Yet, the EU budget offers important opportunities to support and incentivise market action, particularly through the use of financial instruments such as debt and equity instruments, or technical assistance.

Building on positive experiences gained under the 2007-2013 Multiannual Financial Framework (MFF) the Commission plans to simplify and expand the use of financial instruments under the post 2013 EU MFF. At the same time, climate mainstreaming is proposed as the key mechanism to help meet the objective that 20% of the next MFF budget should target climate-relevant activities. Given the scale of investment needed, more substantive support for climate action should be sourced from elsewhere, which is exactly the rationale of the climate mainstreaming approach in the next MFF.

There is considerable expertise with regard to using financial instruments under the EU budget. Financial instruments can help address barriers relevant to financing climate action and, through better public-private risk-sharing, help to leverage additional private investment. They appear particularly suitable in the area of energy efficiency in buildings and SMEs, the demonstration, deployment and market uptake of emerging and mature renewable energy technologies at different scales and to the development of low carbon and climate resilient energy transmission and distribution infrastructure.

8.2 Modifying and complementing existing proposals for financial instruments can help improve climate mainstreaming

The EU has put in place a suite of relevant financial instruments, both for debt, equity, other risk sharing instruments and technical assistance. Our analysis indicates that the proposals for the 2014-2020 Multi-Annual Financial Framework improve the coherence and compatibility of the financial instruments, particularly with regard to the interplay of instruments under the COSME and Horizon 2020 programmes.

At the same time, it is difficult to estimate exactly to what extent and how these financial instruments will contribute to mobilising private capital to low-carbon and climate-resilient projects. The provisions setting out financial instruments in the proposed EU Regulations on the 2014-2020 EU funding instruments and programmes are rather vague and maintain that instruments should be market-driven, which renders the ex-ante analysis of the instruments quite difficult. Furthermore, there is still considerable uncertainty with regard to the overall EU MFF negotiations and final conclusions for the different areas of EU expenditure.

With that caveat in mind, the analysis carried out for this report shows that the current proposals for using financial instruments in the 2014-2020 MFF fall short in terms of addressing all pertinent areas of financing the transition to a low-carbon, climate-resilient economy. Areas which are not well covered include investments in renewable energy infrastructure, an insufficiently coherent approach to enabling smaller scale projects in the realm of energy efficiency, as well as insufficiently targeted technical assistance for both mitigation and adaptation. Stepping up technical assistance for adaptation to climate change is particularly relevant, given the knowledge gaps and capacity constraints among public administrations and financial market actors such as commercial banks.

Additional action to complement or modify the Commission's proposals for financial instruments hence is warranted to help better address the challenges of financing the transition to a low-carbon, climate-resilient economy, which is a key European policy objective.

8.3 Prioritised options for modifying and complementing existing proposals for financial instruments

Our analysis identified a set of options that can be used to modify existing or planned financial instruments or complement them by introducing new financial instruments. The greatest contribution to mitigating and adapting to climate change will not come from inventing new financial instruments, but rather from modifying those that are already proposed by better targeting and up-scaling funding allocation to them. Still, options to complement existing financial instruments offer considerable potential.

The focus of future policy efforts should be on financial instruments under both direct and shared management. The following four options appear to be the most promising and relevant in terms of their effectiveness, efficiency and EU added value:

1) *Introduce 'climate windows' under the Debt Facility of Horizon 2020 (i.e. RSFF II and RSI II) (central management)*. This option addresses the biggest gap in the current set up of instruments, namely a lack of financial support to the demonstration, deployment and market uptake of emerging renewable energy technologies. This option should be used for stepping up financial support for the implementation of the SET Plan;
2) *Expand the EU Project Bond Initiative under CEF to include renewable energy generation together with its connection to the grid (central management)*: this option is a priority since it helps to attract institutional investors' interest into an area with large, pertinent investment needs;
3) *Allocate funds for technical assistance for climate adaptation and energy efficiency under LIFE* (central management)*:* this option offers the best approach to tackle information and knowledge barriers and address capacity needs for project preparation; and
4) *Loan and guarantees facility for energy efficiency projects* (shared management)*:* this option will help most effectively to support investments in energy savings at the most appropriate level in a way that is consistent to regional and local needs and circumstances.

All of the options address relevant needs in a complementary manner. Instruments under central management offer better opportunity structures than instruments under shared management where there is a need for a tailored made approach and a much larger number of actors should be coordinated. However, the latter instruments have the largest share of potential funding. Hence, it is important to pursue both strands of action. The ex-ante assessments required by Article 140 of the EU Financial Regulation provide an important entry point for strengthening the climate-relevance of the future financial instruments discussed in this report. Detailed rules and provisions for the

recommended options should be embedded in the relevant implementing acts and multi-annual work programmes adopted by the Commission or the operational and rural development programmes adopted by the respective national/local authorities.

8.4 Additional options for modifying and complementing existing proposals for financial instruments

There is considerable scope for proposing new instruments under the LIFE programme. Other opportunities exist under EU Cohesion and Rural Development Policy, especially by using 'off the shelf' instruments, albeit the final decision is with the respective managing and rural development authorities. Options listed here require further conceptualisation and testing. They cannot be easily put forward under, or in addition to, the current set of financial instruments, but offer some particular advantages:

- Testing a new dedicated '*Natural Capital Fund'* at the EU level which could focus on testing, experimenting and exchanging good practices in financing ecosystem-based adaptation to climate change. The aim would be to develop business models and possibilities for revenue streams which currently represent a challenge and hence there is a low appetite among private investors for such projects;
- Using *micro credit instruments* at the local level, particularly for small scale energy efficiency and micro-renewable energy generation, eco-innovation and the development of community business in rural areas; and
- Using *city project bonds and green securitisation structures* at a regional or municipal level to target large scale mitigation and adaptation projects.

8.5 Getting expectations right

In many cases, low carbon and climate resilient projects generate benefits that are public goods and cannot generate revenue streams, making the risk-return profile of a project less attractive to private capital. Such projects will require continued and concerted support from grants. For many priority actions including basic research, certain elements of low carbon transport systems, agriculture land management and the majority of risk prevention and adaptation projects, grant support will remain the main EU financing instrument. In these areas, more experimentation and testing of financing and business models will be necessary, e.g.:

- **R&D**: Grants remain a key funding instrument for low carbon and climate resilient early R&D. Priority should be given to the implementation of the EU SET Plan but also for innovative technologies, products and services related to risk prevention and adaptation to climate change;

- **Risk prevention and adaptation to climate change**: Grants remain essential for various types of adaptation projects where revenue streams cannot be generated and benefits are predominantly of a public nature, e.g. early warning systems, etc. This is particularly important for piloting, demonstrating and disseminating 'good practices' of innovative approaches to climate change adaptation (including eco-system based adaptation);

- **Rail and urban transport:** grants seem likely to remain essential for the development of rail and urban transport infrastructure. In principle, more innovative forms of financing could be used (project finance and bonds) but for various reasons, these are not yet widely used in practice. There could a role for the future LIFE programme, to explore and pilot projects

which aim to identify and disseminate good practice examples related to business plans and options for financial innovations in the low carbon transport sectors.