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Report from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions

on the mid-term evaluation of the Connecting Europe Facility (CEF)

{COM(2018) 66 final/2}

Contents

Glossary

ACER – Agency for the Cooperation of Energy Regulators
AP – Annual Work Programme
BEMIP – Baltic Energy Market Integration Plan
BRIS – Business Registers Interconnection System
CAES – Compressed air energy storage
CAPEX – Capital expenditure
CBA – Cost–Benefit Analysis
CBCA – Cross–Border Cost Allocation
CCI – Connected Communities Initiative
CEBF – Connecting Europe Broadband Fund
CEF – Connecting Europe Facility
CEF DI – CEF Debt Instrument
CEF EI – CEF Equity Instrument
CIP–PSP – Competitive and Innovation Programme – Policy Support Programme
CNC – Core Network Corridors
CTF – Cleaner Transport Facility
DG CNECT – Directorate General for Communications Networks, Content & Technology
DG ENER – Directorate General for Energy
DG MOVE – Directorate General for Mobility and Transport
DSI – Digital Service Infrastructures
DSM – Digital Single Market
eCODE – electronic communications
eCODEX – e–Justice Communication via Online Data Exchange
EEPR – European Energy Programme for Recovery
EESSI – Electronic Exchange of Social Security Information
EFSI – European Fund for Strategic Investments
eHDSI – eHealth Digital Service Infrastructure
EIB – European Investment Bank
ERDF – European Regional Development Fund
ERTMS – European Rail Traffic Management System
eSENS - Electronic Simple European Networked Services
ESIF – European Structural and Investment Funds
ESPD – European Single Procurement Document
epSOS – Smart Open Services for European Patients
FIs – Financial instruments
GHG – Greenhouse gas
GIPL – Gas Interconnector Poland–Lithuania
GSG – Green Shipping Guarantee
HPC – High Performance Computing
IA – Impact Assessment
ICT PSP – ICT Policy Support Programme
INEA – Innovation and Networks Executive Agency
IPE – Investment Plan for Europe
ITS – Intelligent Transport Systems
KPIs – Key Performance Indicators
LGTT – Loan Guarantee for TEN–T
LNG – Liquefied natural gas
LSPs – Large scale pilots
MAP – Multiannual Work Programme

MFF – Multiannual Financial Framework
ODR – Online Dispute Resolution
OPC – Open Public Consultation
PBCE – Project Bonds Credit Enhancement
PBI – Project Bond Initiative
PCI – Projects of Common Interest
PEPPOL – Pan–European Public Procurement Online
PSA – Programme Support Action
R&I – Research and Innovation
SDCE – Senior Debt Credit Enhancement
SESAR – Single European Sky ATM Research
SPOCS – Simple Procedures Online for Cross–border Services
STORK – Secure identiTy acrOss boRders linKed
TEN – Trans–European Network
TEN–E – Trans–European Energy Network
TEN–T – Trans–European Transport Network
TFEU – Treaty on the Functioning of the European Union
TOOP – The "Once–Only" Principle Project
TSO – Transmission System Operator

1. Introduction

The Connecting Europe Facility[1] (CEF) is a common, centrally-managed funding programme for transport, energy and telecommunications infrastructures, with an available budget of EUR 30.4 billion for the years 2014 to 2020. This mid-term evaluation responds to the legal requirement laid down in Article 27 of the Regulation:

> *"No later than 31 December 2017, the Commission, in cooperation with the Member States and beneficiaries concerned, shall prepare an evaluation report to be presented to the European Parliament and the Council by the Commission on the achievement of the objectives of all the measures (at the level of results and impacts), the efficiency of the use of resources and the European added value of the CEF, with a view to deciding on the renewal, modification or suspension of the measures The evaluation shall also address the scope for simplification, the internal and external coherence of the measures, the continued relevance of all objectives and their contribution to the Union priorities of smart, sustainable and inclusive growth, including their impact on economic, social and territorial cohesion. The evaluation report shall include an assessment of the economies of scale made by the Commission at a financial, technical and human level when managing the CEF and, where applicable, of the total number of projects harnessing the synergies between the sectors. That assessment shall also examine how to make financial instruments more effective. The evaluation report shall take into account evaluation results concerning the long-term impact of the predecessor measures."*

The evaluation addresses all forms of financial assistance under the CEF (grants, financial instruments (FIs) and procurement), as well as accompanying measures such as Programme Support Actions (PSAs). The evaluation also takes into account the independent full scale evaluation of the pilot phase of Europe 2020 Project Bonds Initiative[2] established in 2013, also known as the pilot phase of the Project Bonds Credit Enhancement (PBCE), aimed at helping finance projects of EU added value and facilitating greater private sector involvement in the long term capital market financing of projects in the trans-European Transport Network (TEN-T), trans-European Energy Network (TEN-E) and in telecommunications.

The evaluation addresses the general performance of CEF (horizontal sub-sections within each criterion) as well as the achievements within the sectors of transport, energy and telecommunications (respective sectoral sub-sections). This is neither an evaluation of the TEN policy for each sector (undertaken in the context of the respective policy areas) nor an evaluation of the performance of the Innovation and Networks Executive Agency (INEA) which is in charge of implementing the CEF grants. There is a separate legal obligation for an evaluation of the Executive Agency[3] (responsible for the implementation of CEF, parts of Horizon 2020 and transport legacy programmes), which has to be carried out 3 years after INEA's establishment. This evaluation of INEA has commenced. The present evaluation covers parts of INEA's processes and workflows as related to CEF management only – those related to the common grant management cycle and simplification measures. Moreover, this evaluation makes use of Key Performance Indicators (KPIs) specific to CEF management as reported in the Annual Activity Reports of INEA.

As it is the case for a mid-term evaluation, it takes place when the programme has been implemented only over a short period of time (3 and a half years, and 2 years in the case of the CEF Debt Instrument), which means that most projects supported have not yet delivered their results. This is particularly the case for large infrastructure works projects for which the pathway to impact is neither immediate nor linear. This report relies on official monitoring

[1] Regulation (EU) No 1316/2013 of the European Parliament and of the Council of 11 December 2013.
[2] http://ec.europa.eu/dgs/economy_finance/evaluation/pdf/eval_pbi_pilot_phase_en.pdf.
[3] Council Regulation 58/2003 laying down the statute for executive agencies to be entrusted with certain tasks in the management of Community programmes, OJ L 11/2003 of 16.01.2003.

data of projects supported by CEF, which indicates their state of implementation and degree of advancement.

The period covered by this evaluation is from 1 January 2014 to 31 December 2016. Where available, implementation data covering up until end August 2017 was also taken into account. The findings presented in this Staff Working Document serve as a basis to decide on the renewal, suspension or modification of the measures and aim at feeding into the preparation of the post-2020 Multiannual Financial Framework (MFF). Further detail on the process to prepare the evaluation is provided in Annex 1.

2. Background to the intervention

CEF was established as part of the **Europe 2020** strategy for a smart, sustainable and inclusive growth and of the **European Union (EU)'s "20-20-20" objectives** in the area of energy and climate policy. The programme supports the development of the TEN **in the transport, energy and telecommunications sectors in line with Article 170-174 of the Treaty on the Functioning of the European Union (TFEU)** and the better integration of their respective infrastructure across EU Member States to improve cohesion in the internal market as well as competitiveness in the global market. CEF was a new integrated instrument for the 2014-2020 MFF, aimed to invest in EU infrastructure priorities in the three sectors (projects of common interest (PCIs)).

As outlined in the Communication on the budget for 2020[4], the Commission considered that "*while the market can and should deliver the bulk of the necessary investments, there is a need to **address market failure** – to fill persistent gaps, remove bottlenecks and ensure adequate cross-border connections. However, experience shows that **national budgets will never give sufficiently high priority to multi-country, cross-border investments** to equip the Single Market with the infrastructure it needs. This is one more example of the added value of the EU budget. It can secure funding for the pan-European projects that connect the centre and the periphery to the benefit of all. Therefore, the Commission has decided to propose the creation of a Connecting Europe Facility to accelerate the infrastructure development that the EU needs." In this context, the CEF was set up to offer "opportunities for **using innovative financing tools** to speed up and secure greater investment than could be achieved only through public funding*."

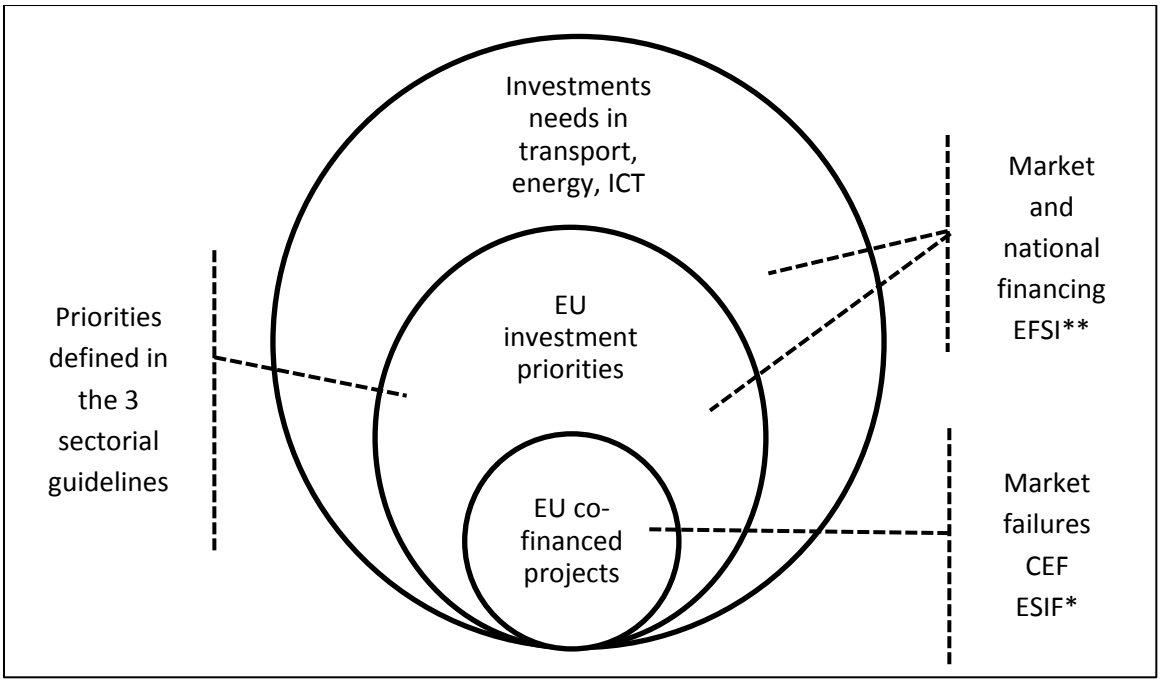
Recital (2) of the CEF Regulation highlights that the "***aim of the creation of the Connecting Europe Facility (CEF)** […] is to accelerate investment in the field of trans-European networks and to leverage funding from both the public and the private sectors, while increasing legal certainty and respecting the principle of technological neutrality. The CEF should enable **synergies** between the transport, telecommunications and energy sectors to be harnessed to the full, thus enhancing the effectiveness of Union action and enabling implementing costs to be optimised.*"

Article 5 of the CEF Regulation set out the **general objectives of the CEF**, which include "*contributing to smart, sustainable and inclusive growth, in line with the Europe 2020 Strategy, by developing modern and high-performing trans-European networks*", *inter alia* by "*creating an environment more conducive to private, public or public- private investment through a **combination of financial instruments and Union direct support** where projects*

[4] Communication from the Commission to the European Parliament, the Council, the European economic and social Committee and the Committee of the regions: A Budget for Europe 2020, European Commission, 29 June 2011.

could benefit from such a combination of instruments and by appropriately exploiting ***synergies across the sectors*****".**

Figure 1: Needs, priorities and CEF support



* ESIF: European Structural and Investment Funds - ** EFSI: European Fund for Strategic Investments

Figure 1 above illustrates where CEF support is targeted in the investment sphere. CEF established **specific objectives** for each of the three sectors that support the respective **sectoral guidelines**, on development of the TEN-T[5], the TEN-E[6] and trans-European networks in the area of telecommunications infrastructure[7]. For **transport** these objectives include removing bottlenecks, improving cross-border connections and interoperability of transport as well as enabling a sustainable and safe transport system. For **energy**, these objectives relate to promoting the integration and interoperability of the internal energy market, enhancing Union security of energy supply and sustainability (inter alia by integrating renewable energy and by developing smart energy networks and carbon dioxide networks). For **telecoms,** the objectives are the completion and functioning of the internal market in support of the competitiveness of the European economy, including SMEs, promoting trans-European digital service infrastructures and connectivity, interoperability, and efficient flow of private and public investments to stimulate the deployment and modernisation of broadband networks[8]. The main component of a digital service infrastructure is the core service platform which is a central hub at EU level to which national infrastructures link up and thus create a link between different national infrastructures.

CEF and the sectoral guidelines together make up **a coherent set of measures** aimed at boosting infrastructure investment across the EU, in line with wider EU policies objectives. In

[5] Regulation (EU) No 13152013 of the European Parliament and of the Council of 11 December 2013 on Union guidelines for the development of trans-European transport network and repealing Decision No 661/2010/EU

[6] Regulation (EU) 347/2013 of the European Parliament and of the Council of 17 April 2013 on guidelines for trans-European energy infrastructure and repealing Decision No 1364/2006/EC and amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009.

[7] Regulation (EU) No 283/2014 of the European Parliament and of the Council of 11 March 2014 on guidelines for trans-European networks in the area of telecommunications infrastructure and repealing Decision No 1336/97/EC.

[8] Article 3 of Regulation (EU) No 283/2014.

this respect, CEF is **directly linked to the respective sectoral guidelines**, on the basis of which projects are selected to be eligible for CEF support, notably through their pre-identification. This framework aims to smooth the process of project planning and construction in Member States, thus improving the overall viability of such projects and reducing the need for financial support.

The CEF Regulation defines the **actions eligible for financial assistance** for the different sectors[9]. For **transport**, works and studies that implement the Core and Comprehensive networks as well as horizontal priorities, which are listed in Annex I to the CEF Regulation, such as the Motorways of the Sea, new technologies for the decarbonisation of transport, Single European Sky and the European Rail Traffic Management System are eligible for grants and/or financial instruments. For **energy**, actions that support the PCIs and meet the criteria defined in the TEN-E Regulation are eligible for financial assistance in the form of grants for works and studies, procurement and, financial instruments. For the **telecommunications** sector, CEF support takes the form of procurement for the core service platforms, or grants to help link national infrastructures to core service platforms[10]; while actions in the field of broadband networks can be financed by financial instruments.

In view of supporting the preparation and implementation of CEF projects, at the level of the Member States, through the delivery of policy-specific studies or the enhancement of knowledge including capacity building of specific beneficiaries, PSAs in three sectors have been included in the sector-specific Work Programmes.

The CEF Regulation, in line with the objectives of the sectoral guidelines sets out the **Key Performance Indicators** (thereafter the KPIs, or indicators) against which the defined sectoral objectives are measured. The table of indicators is reported in Annex 4.

While the Commission had proposed a total amount of EUR 50 billion in 2011, the CEF budget was set by the co-legislator at EUR 33 billion in 2013, which included a transfer of EUR 11.3 billion from the Cohesion Fund to the cohesion envelope of the transport pillar of CEF. The CEF budget was later reduced to **30.4 billion**[11], following the reallocation of funds to finance the guarantee for the European Fund for Strategic Investments (EFSI[12]) in 2015 (see table 1). The majority of the CEF budget is being implemented through grants to co-finance eligible projects, while the rest is set aside for use in the form of financial instruments (FIs), public procurement and PSAs.

CEF is implemented via **Multiannual and Annual Work Programmes (MAP and AP)** which are adopted by the Commission following the vote of the Member States under the examination procedure ('comitology'). They specify the priority areas for funding, the form of assistance to be used, as well as the related budget breakdown. For grants, the co-funding rates for studies amount to 50% of eligible costs while grants for works are allocated according to specific criteria depending on the sector (between 10% and, in exceptional

[9] Article 7 of Regulation (EU) No 1316/2013 establishing the Connecting Europe Facility.
[10] The Guidelines identify upfront in Article 6 specific criteria for prioritising funding for DSIs. Top priority is given to building blocks essential for, and with demonstrable prospects of being used in, the development, deployment and operation of other DSIs (eID & eSignature, eDelivery, Automated Translation, Cybersecurity and eIvoicing); Second priority is given to other DSIs in support of Union law, policies and programmes and, where possible, be based on existing building blocks. These are eProcurement, eHealth, Business Registry, Other interoperable cross border online services such as eJustice, Online Dispute Resolution (ODR), Electronic Exchange of Social Security Information (EESSI), Business Mobility and Open Data; Support to core service platforms takes priority over generic services; Well-established DSIs, Europeana and Safer Internet for Children have priority for funding.
[11] Not including assigned revenue (i.e. recovery orders)
[12] https://ec.europa.eu/commission/priorities/jobs-growth-and-investment/investment-plan_en

circumstances, 75%, while under the Cohesion envelope in the transport sector, these can go up to 85%).

Operational and programme management tasks related to evaluations of the calls for proposals as well as grant management are externalised to INEA[13], while the European Investment Bank (EIB), as the EU reference investment bank, acts as the legal entrusted entity for implementing the FIs. The **intervention logic** in Annex 5 summarises the investment needs, objectives and inputs leading to the impacts and the eventual contribution of the programme to smart, sustainable and inclusive growth.

Predecessor Programmes under the MFF 2007-2013[14]

Predecessor programmes to CEF under the previous MFF (2007-2013) differed from one sector to another as well as in their comparison to CEF regarding budget, objectives, intervention logic as well as implementation mode[15]. The highest degree of continuity in terms of relative size, implementation mode and project pipeline can be found in the transport sector: the actual size of the CEF-Transport budget (cohesion envelope excluded) represents a 51% increase of the budget allocated under TEN-T Programme and Marco Polo Programme in the 2007-2013 period and the execution of the programme was delegated to an Executive Agency (TEN-T Executive Agency, the forerunner of INEA). Multi-annual and annual work programmes also already coexisted under the TEN-T Programme. Out of 604 actions supported under CEF-Transport, 179 actions (29,6%) stem from projects (both studies and works) which have been supported under the previous TEN-T Programme . This includes important cross-border projects, a typical example being the Brenner Basis Tunnel, whose studies and preparatory activities started with TEN-T Programme support while the main works are supported by CEF.

The situation in the energy sector is different: The budgetary allocation for CEF-Energy represents a step change compared to the one for the TEN-E Programme (35 times larger, not taking into account the budget allocated to trans-European infrastructure projects by the European Energy Programme for Recovery (EEPR), an ad-hoc instrument under the previous MFF). This increase in budget allowed for co-financing works under CEF, whereas the overwhelming majority of actions funded under the TEN-E programme were studies. In addition, the execution of the TEN-E Programme was managed directly by Commission services via annual work programmes. The TEN-E guidelines adopted in 2013 also represented a complete overhaul of the former TEN-E policy by introducing prioritisation via a unique list of projects of common interest (PCI), resulting in limited continuity regarding the number of projects: Out of the 111 projects funded under TEN-E only a third (37) became PCIs of which 15 have received grant support under CEF following the calls for proposals 2014-2016. A good example regarding continuity in funding related to the implementation of a single project is the Gas Interconnector Poland-Lithuania (GIPL) which twice received funding under TEN-E (in 2010 for feasibility studies and in 2013 for Environmental Impact Assessment documentation) and then was granted co-financing under CEF in 2014 (for preparatory works and construction- see box in section 6.3.1.1).

In the telecommunications sector, the Competitive and Innovation Programme – Policy Support Programme (CIP-PSP) provided the means to launch large scale pilots (LSPs) which

[13] The role of INEA is set out in Annex 8
[14] Details on the predecessor programmes are provided in Annexes 9-11.
[15] See also the section "Limitations – robustness of findings" on page 14

developed and validated solutions with Member State Governments. Several LSPs supported through CIP PSP have been integrated afterwards in CEF as Digital Service Infrastructures. However, CIP PSP only covered the pilot phase of a number of initiatives, deployment remaining outside its remit. CEF is the first funding programme targeting the full deployment, operation and take up in Member States of cross border DSIs (see figure on page 44). Therefore, in the telecom sector, although CIP-PSP funded services are currently supported through CEF, it cannot be considered its predecessor since it covered a different phase in the development of the services.

Compared to its predecessors, CEF introduced a series of improvements albeit at a varying degree for the three sectors: a common management structure based on delegation to an executive Agency (INEA), a common coordination committee of Member State Representatives, grant agreements instead of grant decisions, common online tools for submission of applications and grant management, better monitoring, diversified funding rates closer to the investment needs as well as dedicated financial instruments with a common portfolio sharing the risk across transport, energy and telecommunications projects.

Baseline

For the purpose of this evaluation, the baseline as set out in the **2011 Impact Assessment** (IA) which accompanied the Commission's proposal for the Regulation establishing the CEF[16] will be used. An Interim Evaluation of the TEN-E funding programme 2007-2013 was conducted in 2010 while a Mid-term evaluation of the TEN-T Programme (2007-2013) was conducted in 2011. Both evaluations were used as inputs to the IA. The IA baseline describes a situation in which the predecessor programmes TEN-Transport and TEN-Energy, their features (e.g. lower co-funding rates and in TEN-E grants mainly for studies) and their significantly lower budgets for the two sectors (notably for TEN-E) would have continued running throughout 2014-2020. It was found that the predecessor programmes insufficiently catered for the specific needs and the heightened risks attached to projects with significant cross-border dimension, category for which also significant delays were observed.

Table 1: Budget appropriations and other features for CEF and predecessor programmes

	Pre CEF (2007-2013) situation[17]	**CEF proposal as in 2011 Impact Assessment (IA)**	**CEF as it entered into force in 2014**	**CEF finally available, in current prices**[18]
Available budget	EUR 8 billion for the TEN-T Programme EUR 43 billion in the Cohesion Fund and ERDF EUR 450 million for the Marco Polo Programme	EUR 31.7 billion for transport Including EUR 10 billion as the amount ring-fenced in the Cohesion Fund for transport infrastructures	EUR 26. 25 billion for transport Including EUR 11.3 billion as the amount ring-fenced in the Cohesion Fund for transport infrastructures	EUR 24. 05 billion for transport Including EUR 11.3 billion as the amount ring-fenced in the Cohesion Fund for transport infrastructures (Another EUR 34 billion is available

[16] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011SC1262&from=EN
[17] This list comprises the main EU funding instruments - A more detailed breakdown of EU funding of infrastructures in the 2007-2013 Multiannual Financial Framework is provided in Annex 7.
[18] Includes adjustments in final legal proposal and EFSI transfers.

				from Cohesion Fund and ERDF)
	EUR 155 million for the TEN-E programme EUR 2.365 billion - EEPR programme (eligibility restricted to some TEN-E projects as per EEPR regulation) EUR 1.6 billion in the Cohesion Fund and ERDF (broader eligibility scope)[19]	EUR 9.1 billion for energy	EUR 5.85 billion for energy	EUR 5.35 billion for energy (Another EUR 2.3 billion is available from Cohesion Fund and ERDF)
	(Although not considered predecessor programmes) EUR 730 million from CIP ICT PSP for pilot projects; EUR 2.7 billion from Cohesion Fund and ERDF for telephone infrastructures (including broadband networks)	EUR 9.2 billion for telecommunications	EUR 1.14 billion for telecommunications	EUR 1.04 billion for telecommunications
Total CEF		EUR 50 billion	EUR 33.24 billion	EUR 30.44 billion
Co-funding rates for grants	TEN-T Programme: - studies: up to 50% - works: up to 30%; Cohesion Fund and ERDF: -works: up to 85%	For CEF Transport: - studies, up to 50% - works, up to 40% (85% for projects selected under the Cohesion envelope)	For CEF Transport: - studies, up to 50% - works, up to 40% (85% for projects selected under the Cohesion envelope)	
	TEN-E Programme: - studies: up to 50% - works: up to 10%; EEPR - works and project preparation: up to 50% Cohesion Fund and ERDF: -works: up to 85%(reduced in case of projects generating revenues)	For CEF Energy: - studies and works, up to 50% (exceptionally up to 75% for works)	For CEF Energy: - studies and works: up to 50% (exceptionally up to 75% for works)	
		For CEF telecommunications: - broadband networks actions: 20% of	For CEF telecommunications: - actions in the field of generic services: up to75 %; - horizontal actions incl. infrastructure mapping,	

[19] Priority on improving security of supply (not only transmission level); gas and electricity interconnections only in case of identified market failure)

		eligible costs; - generic services Actions: up to 75% rate of eligible costs; - actions in the field of applications: 50% of the eligible costs.	twinning and technical assistance: 75 %. - core service platforms (typically funded by procurement); in exceptional cases, they may be funded by a grant covering up to 100 % of eligible costs. All sectors can be topped up by 10% when addressing the synergies between the sectors.

Table 1 lists funding available for telecommunications in the period 2007-2013; however, the CEF Telecommunications programme substantially differs from previous programmes, therefore they can't be considered as predecessor programmes. Cohesion spending was available for broadband and digital service infrastructures in the MFF period 2007-2013, an estimated EUR 2.7 billion funding was allocated to broadband infrastructure[20]. CEF DSIs builds on solutions for digital service infrastructures developed within the CIP ICT PSP, supporting their scale-up and deployment[21]. The CIP has supported broadband policy initiatives through the funding of several studies and other measures[22] as well as a transfer of EUR 20 million to the from the CIP 2013 budget to the European Investment Bank (EIB) for the Europe 2020 Project Bonds Initiative, to fund projects for broadband infrastructure[23]. The latter has resulted in the financing of the Axione project in France[24]. The level of support under CIP for broadband deployments was therefore very limited, providing only direct support to one project under the Project Bonds Initiative. The final available budget for CEF was significantly lower (e.g. around 30%) than the values estimated in the Impact Assessment.

In fact, the 2011 IA concluded that the predecessor instruments were overall insufficient to "deliver on time complex cross-border transport infrastructure projects". In particular it was noted that (a) the programmes in place were not delivering sufficient EU added value. The funding did not help to remove bottlenecks and enable cross-border links to develop in a satisfactory manner as these projects were not sufficiently prioritised; (b) The co-funding rates were insufficient to catalyse the investment needed in projects of EU added value due to the complexity and enhanced risk of such projects and; (c) The programmes in place were unable to leverage sufficient private sector interest in the projects and did not sufficiently focus on creating a conducive environment for such investors[25].

Investment needs and market failures

In its 2011 IA, the Commission estimated the investment needs by 2020 as follows:

- in the **transport sector**, EUR 500 billion was estimated to be needed for the works planned until 2020 on the trans-European transport networks, including EUR 215 billion for the removal of the main bottlenecks on the transport "Core Network", and taking into account the specific needs in Member States eligible for the Cohesion Fund;

[20] Pending figures on actual funding (currently not available).
[21] CEF differs therefore from CIP as it goes beyond R&I and is the first funding instrument to support the deployment, operation and take up in MS of cross border DSIs.
[22] For example, CIP ICT WP 2013: study on the Analysis of Broadband speed, other measures: Broadband coverage measurement, Broadband retail prices, Follow up of Broadband mapping and portal.
[23] See also CIP ICT WP 2013: transfer of EUR 20 Million from the CIP 2013 budget to the European Investment Bank (EIB) for the Europe 2020 Project Bonds Initiative.
[24] See also: Ad-hoc Audit of the pilot phase of the Europe 2020 Project Bond Initiative, December 2015. http://ec.europa.eu/dgs/economy_finance/evaluation/pdf/eval_pbi_pilot_phase_en.pdf
[25] The risks linked to such cross border projects were still listed among the top 3 challenges in the 2016 technical survey.

- in the **energy sector**, the investment needs to modernise and expand Europe's energy infrastructure was estimated at EUR 200 billion until 2020 in electricity and gas transmission and storage infrastructure (including for electricity interconnectors, internal bottlenecks, electricity storage, market grids, gas interconnectors and CO2 transportation);
- in the **telecoms sector**, a gap of between EUR 82 billion and EUR 168 billion was identified.

The 2011 IA did not provide an overall estimate of how many projects would be at risk of not being fully funded nor did it provide a quantification of the expected socio-economic impacts, but it did describe in a qualitative way that many of the projects with EU added value lacked a business case and that, without CEF to bring in new investment, bridging the financing gap would be very challenging.[26] The estimations of the investment needs for the three sectors were revised upwards when the CEF Regulation was adopted in 2013 (EUR 970 billion[27]).

While the bulk of this investment was expected to be delivered by the private sector, by public investments at national level or via regulatory measures in the energy sector, the 2011 IA identified "a need to address market failure – to fill persistent gaps, remove bottlenecks and ensure adequate cross-border connections".

The most common market failures for infrastructure projects in the three sectors are:

- costs occur at national/local level while benefits are realised at European scale ;
- costs and benefits of projects involving several Member States are asymmetrically distributed among them;
- benefits are dependent on other investments in the network or entail a high first mover risk;
- socio-economic benefits cannot be (sufficiently) internalised (for instance security of supply, contribution to modal shift);
- public and private investors as an alternative to incumbent operators are perceived as higher risk by private banks, which then charge higher interest, thus setting capital constraints linked to the long-term nature of infrastructure projects (broadband);
- uncertainty about the build-up of demand and, subsequently, revenue generation (broadband);
- lack of interoperability in cross-border public services (DSIs);
- market size: some countries lack sufficient scale to be attractive to private operators, and others are so large that regional fragmentation becomes an issue (DSIs); and
- the value of some services is proportional to the number of users, thus it is necessary to achieve a critical mass before having the possibility to attract private operators (DSIs).

The CEF rationale

Within the investment priorities defined for the three sectors in their respective guidelines, the general objective of CEF is to foster the implementation of projects contributing to the completion of the TEN. It addresses the market failures, focuses on the projects of high European added-value and helps leverage further investment from the private sector.

[26] For the energy sector, the Impact Assessment of the revised TEN E Guidelines and the Impact Assessment on the Communication " Energy Infrastructure priorities for 2020 and beyond" (COM (2010 677 final) identified an amount of EUR 100 billion being at risk, including electricity interconnectors, off-shore grids, electricity storage and smart grids, gas interconnectors and CO2 transportation

[27] See recital 3 of Regulation (EU) No 1316/2013.

Moreover, the 2011 IA highlighted the potential added value of a common funding framework for the three sectors, which would be fourfold:

- A common framework would lead to the simplification of the EU legal framework concerning TEN infrastructures funding. It would also ensure a coherent approach to EU project financing across the three sectors.
- At the same time, a common EU infrastructure fund and financial framework for infrastructure would provide a coherent and transparent approach to EU funding that would offer certainty and would thus have a huge potential to attract more private sector financing. FIs would be available in a centralised and coordinated manner, attracting and improving the effectiveness of the relationship with the private investors and the partner financial institutions.
- In addition, the increasing interdependency between economic infrastructure projects, networks and sectors would enable the realisation of economies of scale. An integrated EU infrastructure funding framework would allow exploiting cross-sector synergies at project development and implementation level, enabling cost savings and/or more efficient exploitation and higher returns.
- A common framework would help draw on lessons learned and best practice sharing across sectors, enabling thus an enhanced effectiveness and efficiency of EU financing in all sectors.

3. Evaluation Questions

In accordance with the Commission's Better Regulation Guidelines, this mid-term evaluation of CEF addresses a series of several evaluation questions, which are structured around five evaluation criteria:

- **Relevance**: To what extent have the objectives and activities of CEF proved consistent with the needs of the EU market to date, as set out in the Europe 2020 strategy and relevant EU policy documents and market analysis in the 3 sectors, as well as with the beneficiaries' needs? How can such consistency be improved?
- **Coherence**: How well does CEF fit with other EU/national policy objectives/ interventions?
- **Effectiveness**: What is the main outcome of CEF so far? To what extent do the outputs and results of CEF correspond to the objectives? How effective has the use of financial instruments been so far and how could the use of CEF financial instruments be made more effective? To what extent has it been possible to leverage funding from the national public and private sectors?
- **Efficiency**: Are the costs resulting from the implementation of CEF proportional to the results to be achieved? How could the administration and management of the programme be improved to enhance its efficiency? To what extent are the available budget, instruments and governance model contributing to the achievement of the objectives?
- **EU added value**: What is the EU added-value of CEF compared to what was or could be achieved by the private sector or by Member States at national and/or regional levels, and how could it be maximised? Is there still a need to continue CEF funding at EU level? If so, why?

4. Methodology

The three Commission DGs responsible for CEF (Directorate General for Mobility and Transport - DG MOVE, Directorate General for Energy - DG ENER and Directorate General for Communications Networks, Content & Technology – DG CNECT) set out an evaluation scope (presented in the introduction), timeline and methodology, as defined in the roadmap adopted in 2016.

The evaluation started in December 2015 and was foreseen to be finalised by 31 December 2017. An inter-service group was established to oversee the evaluation. In November 2016, the three DGs decided to shorten the general timetable by three months to ensure that the conclusions of the evaluation can feed into the preparation of the next MFF-related proposals. The Commission signed a contract with an external consultant to prepare a study providing input for the present evaluation. Data sources used for this external study and for the analysis undertaken by the Commission services include:

- A review of relevant legislative documents and reports;
- Monitoring data provided by INEA, EIB, and ACER[28] (for energy);
- An Open Public Consultation (OPC), with two distinct surveys, a technical one and a general one, accessible online for a period of 13 weeks between November 2016 and February 2017, with 332 complete responses (out of which 24% were not from beneficiaries of CEF);
- A Targeted Stakeholder Consultation (128 detailed interviews);
- Case studies.

Results of the stakeholder consultation can be found in Annex 2. Further detail on the methodology is provided in Annex 3.

Limitations – robustness of findings

During the evaluation, the following limitations were identified:

- CEF is a funding framework which supplements the sectoral policy guidelines, therefore contributing to the TEN policy alongside other policy tools at EU and national level (other support is provided at EU or national level for related infrastructures, regulatory measures, compliance or non-compliance of the projects with the market and technical rules, etc.). Therefore it is clear that other factors also play a role in the full attainment of the general and sectoral objectives as defined in Articles 3 and 4 of the CEF Regulation. A clear attribution of the extent to which an individual factor contributed to a certain objective cannot be made.
- Progress towards policy objectives could often not be quantified given the limited availability of data owing to the early stage of programme implementation, as well as to limitations concerning the lack of relevant, well-defined and robust key indicators relating to policy aspects (see also 'Effectiveness' section). While the evaluation could show that the money committed so far has been directed to priority areas for connectivity at EU level, results will not be available until after the completion of actions supported by the programme. Given the limited quantitative information, the evaluation also relies on qualitative evidence stemming from stakeholders' inputs.
- Beneficiaries of CEF accounted for the majority of stakeholder inputs received during this evaluation. It could be argued that responses from at least some of these beneficiaries may be biased (e.g. in portraying CEF in a good light) due to them having a vested interest in the continuation of the programme. Given the nature of the Programme, it has to be taken

[28] Agency for the Cooperation of Energy Regulators

into account however that those capable of responding to technical questions are for the majority stakeholders involved in the programme.

- As discussed previously, due to its innovative features, comparability between CEF and predecessor programmes is different for the three sectors. The most comparable predecessor programme regards the transport programme (TEN-T 2007-2013), whose implementation is running until end 2017. It is expected that all actions supported under TEN-T 2007-2013 will be closed by end 2017, allowing for the launch of the *ex post* evaluation[29] with a view to completion in 2018. Consequently, it was not possible to take into account comprehensive evaluation results concerning the long term impact of comparable predecessor measures.

The evaluation used a sample of completed and ongoing projects in the three sectors' portfolios, which provided a basis for observing progress against general and specific objectives; the EU funding awarded; the extent to which the new instrument ensured that money went to the projects with the biggest need of a public intervention; whether adequate co-funding rates were chosen; whether more non-public funding was enabled and whether the allocation of EU money was more efficient than previously. This was complemented by the results of a highly relevant and knowledgeable set of stakeholder responses, although a rather small and not fully representative sample. Even though only a small share of the respondents to the targeted and open public consultations did not belong to either project promoters/beneficiaries or project managers (national or regional authorities), their input is useful for assessing the effectiveness of the procedural arrangements set up by the CEF Regulation[30]. The stakeholder input received for the present evaluation might on its own not be representative enough in order to justify policy changes such as the decision to change or not the eligibility or spending priorities due to the lack of representativeness. Also, given that the vast majority of respondents have a vested interest in the programme as they benefit financially from it their assessment of the effectiveness and usefulness of CEF might not be completely neutral and has to be put in context. Nevertheless their input should be seen and interpreted in light of the limitation mentioned above. Such information was complemented with desk research covering the legal basis, relevant grant agreements for specific projects, interviews with stakeholders, expert groups, the Commission and Member States, as well as by taking into account the findings of the Open Public Consultation (OPC). Furthermore, the main focus of the evaluation is on the programme's implementation progress and delivery methods, i.e. on whether the conditions to fulfil its objectives are met, rather than on measuring the achievements of the projects.

To conclude, the abovementioned limitations lead to a certain level of uncertainty in some findings e.g. limited data does not allow for a straightforward assessment of effectiveness; some of the findings based on stakeholder inputs may need to be put into perspective given potential bias. It is estimated however that such limitations do not significantly undermine the overall reliability of the analysis presented in this mid-term evaluation.

5. Implementation state of play

The CEF Programme has **three forms of assistance** that can be used to achieve its objectives: grants, FIs, and public procurement. In addition, CEF supports PSAs, which are implemented

[29]

[30] On the other hand, the stakeholder input received for the present evaluation might on its own not be representative enough in order to justify bigger policy decisions such as the decision to change or not the eligibility or spending priorities due to the lack of representativeness. Also, given that the vast majority of respondents have a vested interest in the programme as they benefit financially from it their assessment of the effectiveness and usefulness of CEF might not be completely neutral and has to be put in context.

by either grants or procurement with an objective of facilitating the implementation of CEF either directly in the administrations of the Member States, or, when addressed to specific groups of stakeholders, facilitating the implementation of specific policy fields, through better stakeholders' coordination, exchanges of best practices, communication, sharing of information and data.

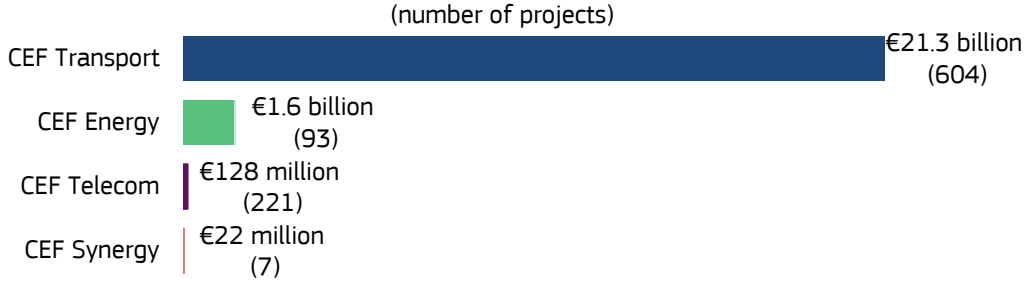
Grants

Following the first three years of Calls, the CEF action portfolio has resulted in the selection of 925 actions [31] and a corresponding actual CEF funding allocation total of EUR 23.1 billion:

- EUR 21.3 billion in transport (out of which EUR 11.3 is under the cohesion envelope)
- EUR 1.6 billion in energy
- EUR 128 million in telecom
- EUR 22 million in transport and energy synergy actions

This is expected to leverage up to EUR 45.3 billion[32] of total investment in the European economy. Figure 2 provides a breakdown of CEF funding per sector. A breakdown of the CEF allocation per country (both Member States and third Countries) per sector (including general and cohesion envelopes in the transport sector) is provided in Annex 13.

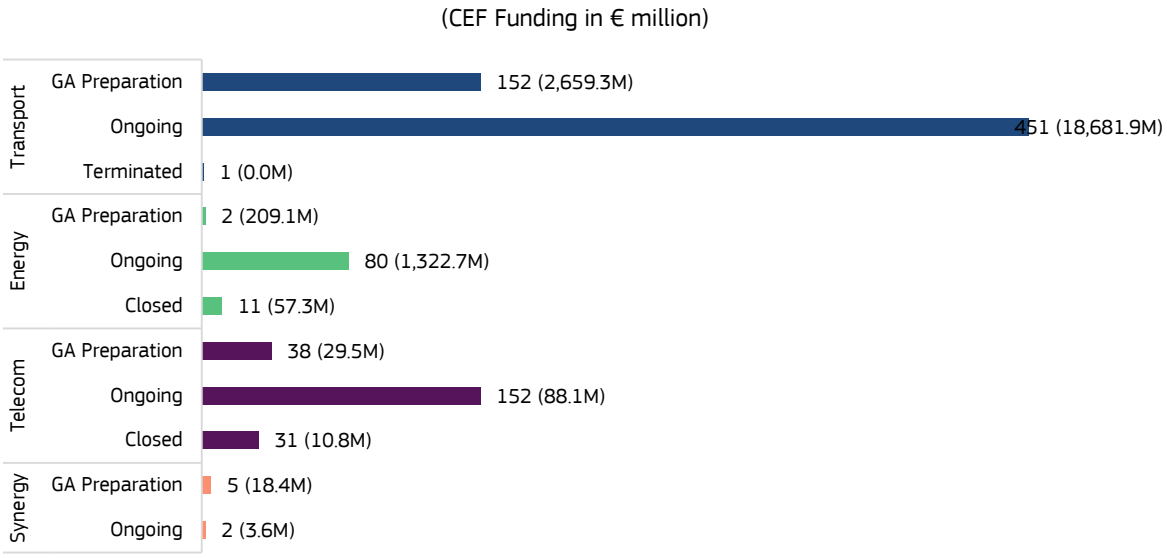
Figure 2: Funding per sector



These results indicate that **the awarding of CEF funding is very much on track**, strongly influenced by the status of CEF Transport which accounts for approximately 80% of the total CEF envelope. Most of the initial allocated funding to signed actions refers to work-related actions or mixed actions (which combines works and studies) (93% in Transport, 83% in Energy[33]) rather than only studies. The figure below illustrates the states of all actions to date.

Figure 3: Projects by Sector and Status

[31] State-of-play by the end of August 2017: Actions under preparation have been included with the information of the Selection Decision
32 Calculated on the basis of the total costs of the supported actions
[33] None in Telecom as no such distinction exists for the funded actions in that sector, considering its specificities compared to the two others.



The grants selected under the Multi-annual Work Programmes for CEF Transport and CEF Energy are managed through annual instalments over the period 2014-2020. The legal commitment is broken down into one or several budgetary commitments depending on the progress of the action. The total budgetary commitment is therefore lower than the total amount allocated via grant agreements (i.e. the total of the budgetary commitment represents 35% of the total amount of the grants allocated). So far, 14% of the total amount allocated to the selected grants has been paid through pre-financings and interim payment accounts. This information is broken down per sector in the table below.

Table 2: Summary financial information (EUR million)[34]

Sector	CEF budget	Actual CEF Funding (% of budget)	Effective budgetary commitment (% of Actual Funding)	Effective payment (% of Actual Funding)
CEF Transport	24,050	21,341 (89%)	6,924 (32%)	3,037 (14%)
CEF Energy	5,350	1,589 (30%)	993 (63%)	231 (15%)
CEF Telecom	1,041	128 (12%)	103 (80%)	42 (33%)
CEF Synergy	*	22	8.1 (37%)	1.5 (7%)
Total		**23,081**	**8,028.2 (35%)**	**3,312.4 (14%)**

At sectoral level, there is a clear distinction between the budgetary front-loading approach adopted by the transport sector in comparison to the budgetary back-loading approach in the

[34] Information as of end August 2017.
* The funding of the CEF synergy call came from both the Transport and Energy budgets.

energy and telecoms sectors. This is notably explained by the fact that most of the projects funded in the transport sector in the first two years of CEF were based on a solid project pipeline stemming from the continuity of projects and studies formerly supported via the TEN-T programme or by Cohesion Policy instruments and therefore ready to be implemented during the initial period of the programme. For energy, the back loading approach is due to the fact that the majority of PCIs, particularly in the electricity sector, are due to mature only towards the end of the programming period, and only a limited number of gas projects were mature at the start as they came about in response to the 2009 security of supply crisis. For telecommunications, the back loading approach responded to the timeline needed to establish the financial instruments for the broadband investment. As for the DSIs, the lower budget allocation in the first two years of the programme suited the need to set-up the Core Service Platforms.

Financial instruments (FIs)

The CEF Regulation[35] allows for implementing projects with FIs, using up to 8.4% of the total CEF budget envelope. CEF FIs refer to the **CEF Debt Instrument** (CEF DI) and the **CEF Equity Instrument** (CEF EI). The management of the CEF DI was entrusted to the EIB, on the basis of a Delegation Agreement effective from 22 July 2015.

The CEF DI portfolio also includes projects supported under legacy instruments: the Loan Guarantee for TEN-T (LGTT) and the pilot phase of the Europe 2020 Project Bond Initiative (PBI). In order to optimise the use of the EU budget contribution allocated to CEF, the first-loss provisioning provided under the pilot phase of the PBI and the LGTT were merged with CEF DI. Thus the portfolios of actions signed under PBI and LGTT effectively merged in January 2016 into a single CEF DI portfolio, thereby providing the benefits of economies of scale and diversification over the three CEF sectors.

With regard to the budget of the CEF dedicated to the implementation of the CEF DI, transport committed EUR 140 million in 2014-2015, energy committed EUR 89.2 million in 2014-2015 and telecommunications committed EUR 17.5 million in 2014-2015. Under the legacy FIs the Commission has contributed EUR 205 million to the LGTT; EUR 200 million to the pilot phase of the PBI in the transport sector, EUR 10 million in the energy sector and EUR 20 million in the information and communications technology sector.

The CEF DI has mainly been used in the transport sector to date (see box below). One telecommunication[36] and one energy project[37] have also been supported under the predecessor Project Bond Initiative and are part of the current CEF DI portfolio.

Portfolio of the **CEF DI in the transport sector**[38]

- **Potential CEF DI projects close to signature:**
  - Projects to be supported under the pilot phase of the Green Shipping Guarantee (GSG) Programme with an estimated total investment of EUR 3 billion; and

[35] As amended by the Regulation (EU) No 2015/1017 establishing EFSI (decrease from 10% to 8.4%).
[36] The Axione Infrastructure S.A.S's project to deliver broadband network services in rural France. EUR 189.1million of total project costs have been supported under the PBI.
[37] The portfolio of projects in the energy sector supported by the EU contribution currently consists of one legacy project, transferred to CEF DI, for operating and maintaining the transmission assets connecting the Greater Gabbard offshore wind farm to the UK grid. EUR 424.9 million of projects costs have been supported by the EU-EIB contribution.
[38] Further detail provided in Annex 6

- Project for port development.

- **Legacy projects (transferred to CEF DI portfolio post-merger):**
  - LGTT: 2 road projects: EIX Transversal C-25 PPP in Spain and A5 highway in Germany, and a high speed rail-link between Tours and Bordeaux in France (LGV Sud operational July 2017);
  - One road project from the LGTT portfolio has been refinanced and supported by the CEF DI specific Senior Debt Credit Enhancement product: A8 Augsburg Ulm PPP in Germany for an total amount of capital costs of EUR 505 million;
  - the Port of Calais in France;
  - road projects: N25 PPP in Ireland, Passante di Mestre in Italy, A11 highway in Belgium, A7 PPP in Germany

The **CEF EI** is not yet in use by any of the sectors. However, the preparation of the CEF EI in the broadband sector is close to completion and the instrument is foreseen to be operational by the end of 2017. The Commission committed EUR 100 million to the CEF EI in 2016 aimed to provide a First Loss piece to an Equity Fund that will support Broadband investments in under-served areas.

Public procurement

Besides grants and FIs, a public procurement instrument is also included and is managed by the Commission. With a very limited budget (estimated as less than 1% of the total CEF budget), procurement has been mainly used in the Telecom sector for the operation and evolutive maintenance of the core service platforms (EUR 115 million allocated for 2014-2016).

Transport

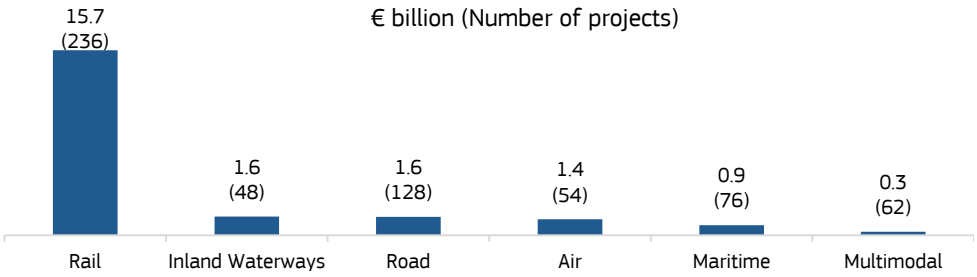
The initial distribution of the CEF-Transport envelope between the three forms of assistance reserved a maximum of 89% for grants, a maximum of 1% for PSAs and a maximum of 10% for FIs. Following the adoption of EFSI and the slower than expected uptake of the CEF DI, in addition to the adoption of the Multi-Annual Work Programme for the Blending of financial instruments with grants in early 2017, the bulk of the financial assistance is planned to be implemented through grants, amounting to 97%, with the operational PSAs at 1.3% and the FIs at 1.7%.

The total budget available under CEF Transport for **grants** in the 2014-2020 period is EUR 23.4 billion[39] (net of FIs and PSAs)[40]. 91% of this amount was already awarded following three sets of calls for proposals. The split across transport modes and the amounts awarded are illustrated in the figure below. In addition, EUR 1 billion has been allocated for the ongoing call for proposals for grants to be blended with financial instruments ('Blending' Call). The remaining budget (available for future calls in 2018-2020) is EUR 1 billion.

Figure 4: Projects by transport mode

[39] Includes additional EUR 185 million revenues from predecessor programmes

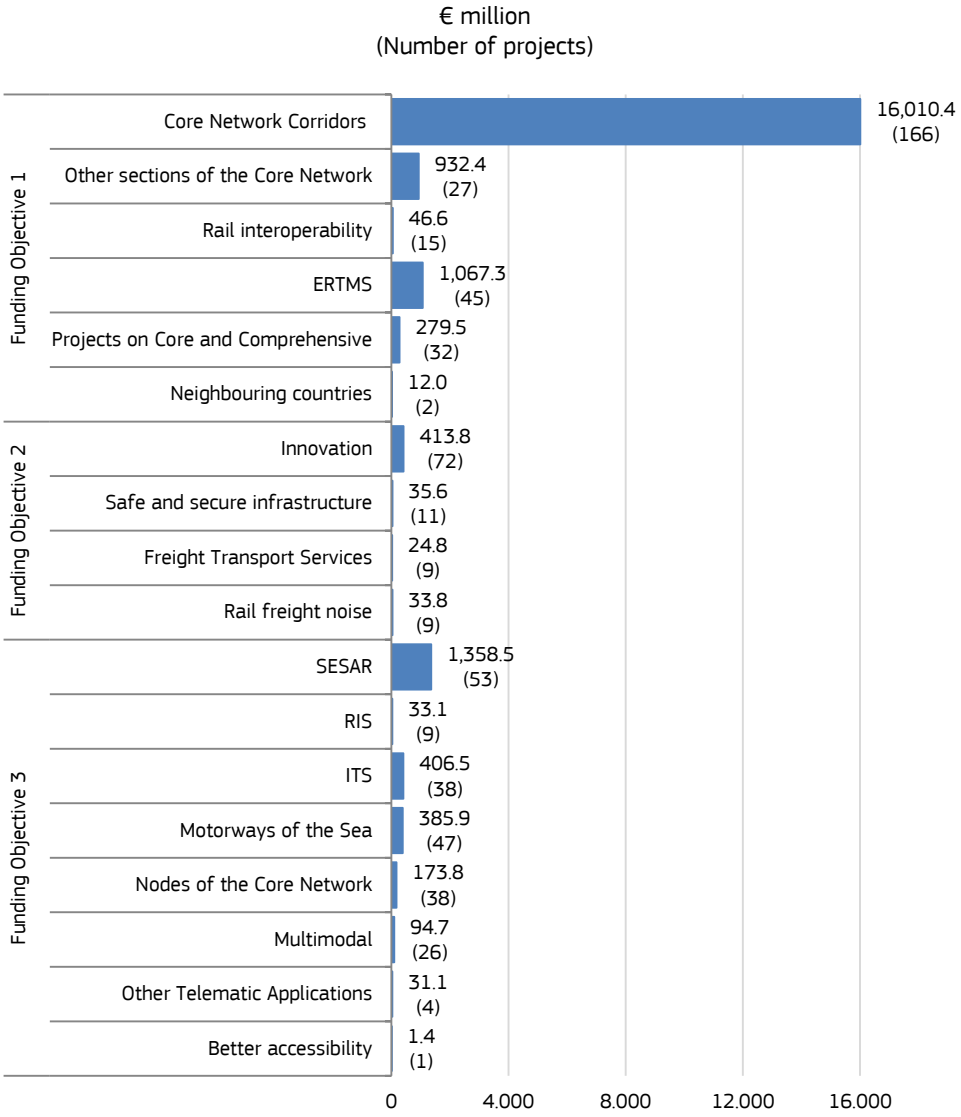
[40] As part of the MFF mid-term review, the Commission has proposed to top up the CEF Transport budget with EUR 400 million. A commitment of EUR 50 million has been made for 2017.



It is important to note that the majority of CEF Transport funding was allocated to **sustainable modes of transport** such as railways and inland waterways (81%).The biggest share of the co-funding is allocated to actions located on the **Core Network Corridors (CNC)** or to other Core Network sections priorities, accounting together for EUR 16.9 billion or 79.4%[41] of total co-funding from CEF in the transport sector as illustrated in the figure below. Additionally, EUR 279.5 million is allocated to projects on the Core and Comprehensive networks. With its remaining funding share, CEF-Transport has also supported **SESAR and ERTMS**, with both receiving 6.4% and 5% respectively of the total funding.

[41] This amount refers to the call priorities: Corridors of the Core Network and Other Sections of the Core Network. However, other priorities from funding objective 1 (ERTMS for instance) and from other funding objectives (Multimodal, Motorways of the Sea) may also contribute to the Core Network.

Figure 5: CEF Funding per Transport Priority



Compared to the TEN-T programme, CEF-Transport has dedicated significant efforts to **Cohesion Member States** (over 50% of the budget available under CEF Transport)[42], in particular through the amount transferred from the Cohesion Fund, discharged through national envelopes and dedicated calls for proposals. Cohesion Member States were allocated through the 2014, 2015 and 2016 CEF Transport[43] calls a total of EUR 11.3 billion in funding under the Cohesion envelope. This represents 100% of the cohesion envelope, which focuses especially on cross-border rail (road projects being limited to 10% of the national envelope amounts). Around EUR 350 million under the General Envelope has been allocated to Cohesion Member States.

Finally, it should be noted that EUR 9.8 billion from the total CEF Transport budget is allocated to 20 particularly important projects from an EU value added perspective, among which 79% are rail projects, 55% are works projects and 62% are under the general envelope.

[42] For TEN-T 2007-2013, the actual funding allocated to Cohesion Member States is €279 million in contrast to €11.6 billion under CEF Transport.
[43] The CEF Transport MS Committee approving the results of the 2016 Call will take place of 6/7/2017.

The top six cross-border projects, which concern both works and studies, are Seine-Escaut (enhancing inland waterways between Belgium and France), the Brenner Base Tunnel (rail project involving Austria and Italy), the Fehmarn Belt (multimodal tunnel between Denmark and Germany), Lyon-Torino (rail project involving France and Italy), Evora-Merida (rail project involving Portugal and Spain) and Rail Baltica which improves East-West connections between several cohesion countries (rail projects between Poland, Lithuania, Latvia and Estonia)[44].

In the period 2014-2020, the Commission has funded **PSAs** for an amount of **EUR 239 million** on a multi-annual basis, divided across the General envelope, and the Cohesion envelope on the three CEF Transport Funding Objectives. PSAs were funded for an amount of EUR 85 million under the first objective[45], 12 million under the second objective[46] and 125 under the third objective[47], while 17 million was reserved for Cohesion Member States where the Commission has supported the administrations of the Member States or bodies under their responsibility such as the railway infrastructure managers, who are in charge of preparing the projects pipelines by enhancing their administrative capacity in terms of human and technical capital to better prepare, manage and implement CEF projects particularly in Cohesion Member States.

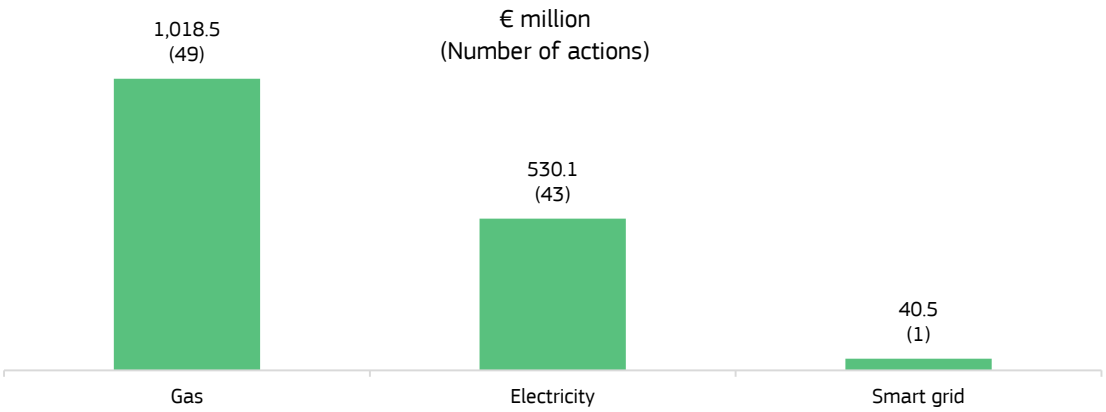
Energy

All actions have been awarded through **grants**, since no action has been supported by the CEF DI (one project close to approval). The sections below therefore focus exclusively on grant funding.

As stated, the total budget for CEF Energy from 2014 to 2020 is EUR 5.35 billion. In the period under evaluation (2014-2016), EUR 1.6 billion of EU contribution is allocated to 93 CEF Energy actions through five calls for proposals, from a possible maximum allocated budget of 2.2 billion. The split of these actions across energy sector and the relevant amounts is displayed in the figure below. The total allocated amount following the first three years of the programme represents 34% of the total CEF Energy envelope. Out of this, EUR 1 billion has already been committed through the signature of grant agreements, and EUR 0.2 billion has been paid. In the energy sector, 11 actions have already been completed, 80 are ongoing and 2 are under preparation[48].

Figure 6: Actions by energy sector

[44] COM(2013)940 final.
[45] 'Removing bottlenecks and bridging missing links, enhancing rail interoperability, and, in particular, improving cross-border sections.'
[46] 'Ensuring sustainable and efficient transport systems in the long run, with a view to preparing for expected future transport flows, as well as enabling all modes of transport to be decarbonised through transition to innovative low-carbon and energy-efficient transport technologies, while optimising safety.'
[47] 'Optimising the integration and interconnection of transport modes and enhancing the interoperability of transport services, while ensuring the accessibility of transport infrastructures.'
[48] Stage of preparation of grant agreement between beneficiaries and INEA- situation as of end of August 2017



Works have attracted the most significant funding, totalling EUR 1.3 billion, or 83% of funds across 17 actions. However, a **higher number of projects providing for studies was supported**; 76 actions for studies were allocated EUR 0.3 billion. A variety of actions have been supported for works and studies. For example, studies have varied from environmental impact assessments to support the permitting process and seabed surveys for cables to the technical specifications for the Baltic synchronous operation study. Works have varied from new gas pipelines and reverse flow engineering to new electricity lines and hydro-pumped electricity storage.

Not all CEF energy project proposals have been successful. Some 160 have been submitted so far and of these, 150 (94%) were deemed eligible for funding. However, only 96 (60%) were selected for funding. The rejection of funding proposals has been due to a variety of factors (which are assessed at the proposal evaluation stage in accordance with the CEF energy award criteria), including insufficient maturity of the proposed action, proposals that do not demonstrate the need for EU financial assistance as they were deemed to be commercially viable. Given the available budget and the flexibility to move resources across the different calls over a budgetary year, budget restrictions were not a limiting factor.

CEF Energy has allocated funds to electricity, smart-grid and gas projects. **Gas projects have so far received the major share of funding**, with EUR 1.02 billion or 64% of the currently allocated funding, via 49 actions. The electricity sub-sector has had nearly as many actions selected (43) although with a lower value of allocated funds, EUR 0.5 billion or 33% of the total. In the 2016 second call, one action was selected for funding in the smart-grid thematic area, and another action was selected, and later cancelled, in the 2014 CEF Energy call, with a total of EUR 0.04 billion (3%) currently allocated. However, looking at the 74 PCIs supported by CEF so far, 37 projects related to electricity have been supported (35 electricity lines, 1 storage project and 1 smart grids project) and 37 in gas[49]. Of these PCIs, 40 concern physical cross-border infrastructure, while the rest concern infrastructure physically located in one Member State but with a significant cross-border impact, in line with the policy requirements of the TEN-E Regulation[50].

A breakdown of the funding allocation by corridor shows that the Baltic Energy Market Interconnection Plan in gas has been allocated the largest share of funds, with EUR 0.51 billion or 32% of the total. This result is dominated by two multi-Member States works actions, the Poland-Lithuania interconnection "GIPL" and the Estonia-Finland

[49] There are no PCIs in the thematic area of CO_2 networks; as eligible projects are under preparation.
[50] See Article 4 (c) of Regulation (EU) No 347/2013 on guidelines for trans-European energy infrastructure

"Balticconnector". The Southern gas corridor, the NSI East (gas) corridor and the BEMIP Electricity corridors also feature prominently for funding, with the North Seas Offshore Grid corridor not far behind. Concerning the number of actions (including studies), NSI East (gas) corridor comes on top with 21 actions, followed by NSI East (electricity) and the North Seas Offshore Grid corridors.

In the energy sector, programme support actions of a total amount of EUR 4.2 million have been used to support studies commissioned via public procurement on the development of TEN-E corridors.

Telecommunications

CEF Telecom was implemented in compliance with the methods of intervention set out by the CEF Telecom Guidelines. Specifically, for the DSIs area, **grants** have been mainly used **to support the deployment of generic services**, while the **implementation and/or maintenance** of the **core service platforms** has been funded **through procurement**. The only exception is represented by the core service platform of Europeana, which was supported with grants in 2014 and 2015 and through procurement in 2016.

A total envelope of about **EUR 370 million**, corresponding to 37% of the total budget, has been allocated within CEF Telecom over the 2014-2016 period: EUR 251 million in the DSIs area (EUR 115 million for the core service platforms and EUR 136 million for the generic services) and EUR 120 million in the broadband area.

Regarding the broadband area, the forms of financial support used to date include:

- FI, specifically, Axione action has been supported under the Project Bond Initiative; and EUR 100 million is foreseen to be invested in the Connecting Europe Broadband Fund[51];
- Grants, which have been used to set up a technical assistance facility in cooperation with the World Bank.

EUR 40 million is intended to be redeployed for the WiFi4EU initiative, which has recently reached political agreement by the co-legislators.

As regards the horizontal actions related to the DSIs area, these consist mainly of studies on the deployment of CEF Telecom.

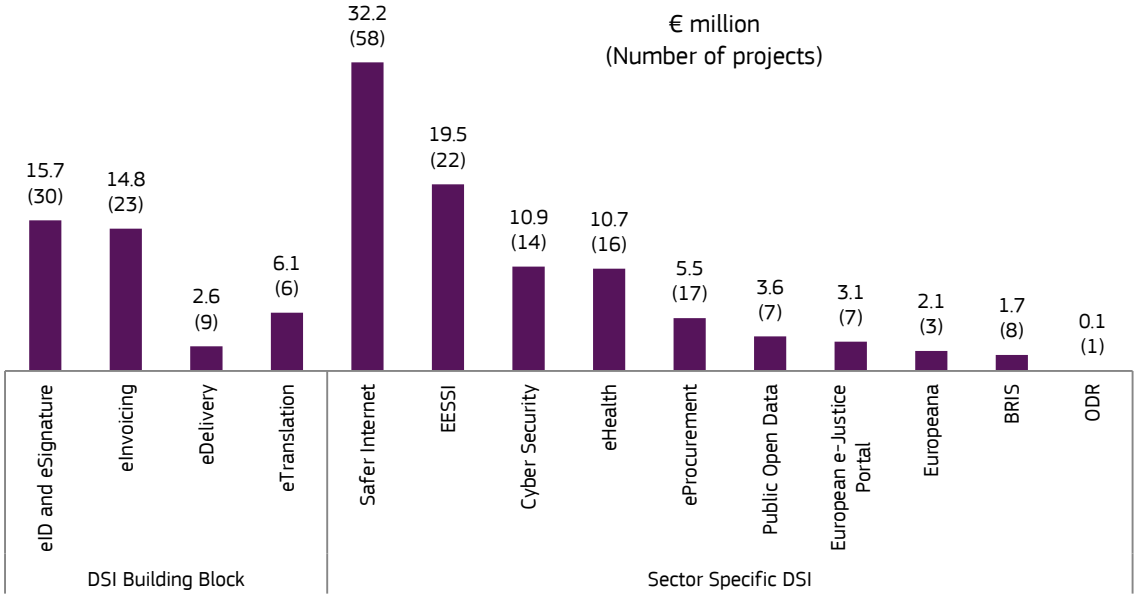
Through the 2014-2016 work programmes, CEF Telecom has provided funding for the deployment of core service platforms and generic services of **15 DSIs**[52]: EUR 115 million have been allocated to the deployment of 14 core service platforms (eID, eSignature, eInvoicing, eTranslation, Public Open Data, Europeana, Safer Internet, Cybersecurity, eHealth, eProcurement, Business Registers Interconnection System (BRIS), Electronic Exchange of Social Security Information (EESSI), Online Dispute Resolution (ODR) and

[51] The Connecting Europe Broadband Fund (CEBF) is expected to generate significant investments (from EUR 1 – 1.7 billion (thereby generating considerable leverage)) in 7 to 12 broadband projects each year from 2018 to 2021, with the aim aims to have invested in 20 countries by 2021 (See: http://europa.eu/rapid/press-release_IP-16-4351_en.htm). CEF support for other broadband initiatives (studies and support measures) provide continuation for the broadband policy initiatives as well as targeted technical assistance for up to 15 projects in collaboration with the World Bank under the Connected Communities Initiative (CCI) with the aim to establish a solid business case to attract required funding.

[52] The only exception is represented by the eJustice DSI, which is currently financed by CEF only for what concerns generic services and by the Justice Programme for what is related to the core service platform.

eDelivery[53]) and EUR 128.6 million have been awarded for 221 actions for generic services[54]. A detailed breakdown is provided in the following figure.

Figure 7 : Projects by DSI building block and sector specific DSI



About 50% of the resources assigned to actions (including generic services and core service platforms) have been allocated to Safer Internet, Europeana, EESSI, eIdentification and eSignature. This is related to the approach adopted for the 2014 and 2015 work programmes, which paid particular attention to the technical and operational maturity of the DSIs. Indeed, Safer Internet and Europeana are classified by the Guidelines as "well-established" DSIs, since they were in operation before the beginning of CEF Telecom.

6. Answers to the evaluation questions

6.1. Relevance

This section aims at addressing whether the original objectives and structure of the intervention are still relevant for the current EU priorities and objectives, as well as how they meet the sectors' and stakeholders' needs. It also addresses whether the forms of financial and technical assistance are the most appropriate to address the objectives.

Main findings

- The CEF general and specific objectives contribute to **EU policy objectives, including its developments under the current Commission and the new EU international commitments concerning climate change** (Paris Climate Agreement). In the telecommunication sector, however, the telecommunications guidelines limit the ability of the programme to take full advantage of the latest technological developments (e.g. High Performance Computing) and address the new priorities in the political agenda that have subsequently emerged.

[53]As regards eJustice DSI, CEF programme only provides support for the deployment of the generic services.
[54] As regards the generic services, only results of the first call for proposals issued in 2016 are included.

- Overall, the **common programme approach** can be considered relevant, notably in light of the goals and challenges that are common to the three sectors.

- T**he investment needs remain significant in all three sectors.** Given the **continued existence of market failures** which has led to underinvestment in key infrastructure projects, CEF remains relevant as an essential element of the EU investment strategy. The size of CEF currently makes it possible to address only some of the identified market failures in all three sectors. Therefore, potential exists for unlocking further public and private investment if additional EU budget was made available to address more market failures.

- Considering the specific needs of the targeted sectors and the low bankability of related projects, a **programme mainly based on well targeted grants** is appropriate.

- In addition, alternative sources of capital, such as those that can be accessed through **FIs** (CEF DI) and blending, remain relevant, especially for revenue-generating projects. Their degree of relevance, however, varies across sectors.

- In the telecommunication sector, the important budget cuts during the final stages of CEF negotiations implied a reduction in the scope of the programme for the DSIs, resulting for the programme in only being able to partly address the needs of those Member States with developed DSIs at national level. As far as broadband is concerned, given resource limitations, support has been so far focused on technical assistance activities that can help projects with a difficult business case to materialise, as well as on the development of financial instruments.

6.1.1. Relevance for EU priorities and sectoral needs

CEF was proposed by the Commission in 2011 and adopted at the end of 2013, in the context of the Europe 2020 Strategy[55], the EU's ten-year jobs and growth strategy. In 2014 the new European Commission came into office and its 10 priorities[56] provided an update and focus to these goals. Of particular relevance to CEF and its sectors are the four priorities "A new boost for jobs, growth and investment" a "Connected digital single market", "A resilient Energy Union with a forward-looking climate change policy" and "Internal Market". The Commission also proposed in 2014 an Investment Plan for Europe, one of whose three Pillars is the European Fund for Strategic Investments (EFSI), which was launched in July 2015.

In 2015, the adoption of the Paris Agreement by the 21st session of the Conference of the Parties (COP21) to the UN Framework Convention on Climate Change committed the EU and its Member States to a reduction in domestic greenhouse gas (GHG) emissions of at least 40% by 2030 and by 80% to 95% by 2050 compared with 1990 levels. The Commission is currently assessing what this new more ambitious agreement implies for EU policies.

The CEF objectives as defined in Article 4 and 5 of the CEF Regulation continue to be in line with the most recent EU policy orientations, in particular its internal market dimension. For most respondents of the technical survey of the open consultation, CEF is fully or to a large extent aligned with other EU policy objectives and initiatives in the fields of transport (73% of respondents), energy (78%) and telecommunications (68%).

[55] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:2020:FIN:EN:PDF
[56] https://ec.europa.eu/priorities/publications/president-junckers-political-guidelines_en

For **Transport,** the CEF objectives and priorities were based on the objectives set by the **TEN-T Regulation** and wider transport policy objectives as defined in the **2011 White Paper** "Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system"[57]. The programme is also aligned with the objectives set in the **European Strategy for low-emission mobility**[58] adopted by the Commission in July 2016. Indeed, connectivity within the EU and the transition to low emission mobility still depends on the ability to swiftly deliver main infrastructure missing links and to remove important bottlenecks for the most sustainable transport modes (rail, inland waterways, shorts sea shipping) and alternative fuels.

Using a pan-European planning methodology, the TEN-T Regulation identifies a Europe-wide 'Core Network', which includes nine Core Network Corridors and serves the completion of the internal market. The ambition behind the Core Network, to be achieved by 2030, is to carry freight and passenger traffic with high efficiency and low emissions, facilitating transport flows and therefore boosting competitiveness, jobs and growth in the EU. By allocating the bulk of its envelope on the completion of missing links and removal of bottlenecks on the Core Network (either through the creation of new infrastructure or the substantial upgrading and rehabilitating of existing infrastructure), CEF represents a crucial tool to achieve the TEN-T policy objectives. This is also confirmed by the fact that it encourages more efficient and sustainable mobility services in multimodal combinations and through the use of telematics applications such as SESAR and ERTMS.

The 2011 White Paper on transport has set the following targets to the TEN-T policy: 30% of road freight carried over distances of more than 300km should shift to other modes by 2030, and more than 50% by 2050; the length of existing high-speed rail network should triple by 2030 and by 2050 the majority of medium-distance passenger journeys should be undertaken by rail; by 2050, all major Core Network airports should be connected to the rail network and all seaports to the rail freight and where possible to the inland waterways system. By allocating the bulk of its envelope to rail projects (75%) and by promoting intermodal connections, CEF Transport is strongly contributing to these targets.

More recently, the Commission published a communication on A European Strategy for Low-Emission Mobility, which notably aims to make the transport system more efficient, by stimulating the use of digital technologies and further encouraging the shift to lower emission transport modes, and to speed up the deployment of low-emission alternative energy for transport, such as advanced biofuels, electricity, hydrogen and renewable synthetic fuels. Being a programme that supports the development of telematics applications encouraging a seamless and efficient mobility throughout Europe and new technologies aimed at decarbonising transport, CEF remains very relevant to such a strategy.

For **Energy,** the CEF objectives and priorities were based on the objectives set by the **TEN-E guidelines** and are strongly in line with at least three of the Priorities of the Juncker Commission: "Energy Union and Climate", thanks to CEF Energy's emphasis on security of supply, integration of renewable energies into the EU transmission networks and support on the uptake of innovative technologies; "Internal Market", by fostering the integration of national energy markets by strengthening their physical interconnections; and "Jobs, Growth

[57] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52011DC0144:EN:NOT
[58] http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52016DC0501&from=en

and Investment", contributing to capital intensive investments through EU public funding, activating public and private sector resources.

CEF Energy, supporting the TEN-E objectives to increase market integration and competitiveness, to enhance security of supply and to contribute to sustainable energy goals remain entirely relevant to the evolving EU policy framework as developed through the Energy Union strategy and more broadly, the priorities for the 2014-2019 Commission[59].

CEF Energy, supporting the TEN-E objectives directly mirror three of the five dimensions of the Energy Union[60] and are furthermore supportive of the remaining two[61]. The second State of the Energy Union report[62] noted that 'a resilient infrastructure is the backbone of the Energy Union' and that important interconnection projects had been put into operation. However, as stated, bottlenecks still exist and further interconnections are still needed to fully integrate the market, ensure security of supply and to enable to EU to make optimal use of its renewable resources.

Proposals from the Commission under the Energy Union in support of its objectives have also embedded an appreciation for the role of infrastructure. For example, the LNG and gas storage strategy highlighted the remaining gaps in internal market infrastructure and urged that EU funds can help to make up for the weak commercial viability of liquefied natural gas (LNG) terminals that are particularly important for security of supply.

The ambition that underpins the Clean Energy Package proposals[63] (in particular the target for at least 27% renewable energy and 30% energy savings by 2030), which was further reinforced by the EU's commitments under the Paris Climate Agreement, indicate that a step change is needed in the transition to a low carbon economy. Much evidence, also in terms of number of funded projects in the electricity and smart grids under CEF Energy (as discussed under effectiveness), points to the requirement for a reinforced electricity grid in order to absorb more variable power generation from renewable energy. This supports that due consideration should be given to electricity projects as set out in recital 57 of the CEF regulation. With regard to the expert interviews, 17 out of 30 energy experts that were asked on how CEF is in line with the climate objectives felt that adjustments might be still needed in CEF with a view to the 2030 targets. (Including a position paper from NGOs stating that CEF should "*strictly refuse to finance fossil fuel based infrastructure and therefore only support renewable based energy infrastructure"*)

The new Market Design legislative proposals[64] under the Clean Energy Package furthermore highlight that without the ability to rely on increased flexibility and generation or demand resources from other Member States, the costs of the energy transition for consumers would increase significantly. In this respect the second horizontal objective of enabling the Union to meet its sustainable development targets also remains very relevant as well as the flexibility options included already in the specific objective of security of supply (storage).

59 Three of the 10 Juncker Commission priorities relate to the CEF objectives: energy union and climate; internal market; jobs, growth and investment

[60] Energy security, solidarity and trust; the internal energy market; decarbonisation of the economy.

[61] Supporting energy efficiency via its sustainable energy focus and research, innovation and competitiveness through its availability of support to innovative projects and funding diverse infrastructure studies.

[62]Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank, second report on the state of the energy union (COM(2017)53 final).

[63] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee, the Committee of the Regions and the European Investment Bank clean energy for all Europeans, com/2016/0860 final/2

[64] Proposal for a directive of the European Parliament and of the Council on common rules for the internal market in electricity (recast), COM/2016/0864 final/2 - 2016/0380 (COD)

An important objective of CEF energy is to support innovation externalities, addressing the limitations of the market to support projects of common interest that take on more technology risk, in line with the fifth Energy Union dimension of 'Research, innovation and competitiveness'. CEF Energy recognises the additional cost of deploying new technologies in line with the TEN-E rules that incorporate innovation as a positive externality for (first of a kind of) commercial application, thus it can lower the risk of private investments in promising clean energy technologies, particularly in electricity transmission and innovative storage projects. Its relevance to innovation policy and to new initiatives such as the Communication on Accelerating Clean Energy Innovation[65] in the energy sector remains therefore confirmed.

For **Telecommunications,** the CEF objectives and priorities were based on the objectives set by the **Telecommunications guidelines**. They aim at supporting economic growth through improvements in the broadband and digital infrastructures and access to cross-border online services for citizens and businesses. The objectives are consistent with evolving EU priorities in the sector, particularly the **Digital Single Market** (DSM) and its related Strategy launched in 2015[66]. The DSM Strategy identifies the need to increase efforts to modernise the public administration and achieve cross-border interoperability. Areas of intervention and sectors to achieve the DSM covered by the CEF DSIs include e-Government[67], cybersecurity and eHealth as well as an initiative to build up the interconnection of business registers (BRIS). Consistency with the DSM Strategy can also be observed for other DSIs like Safer Internet, that contributes to improve online access for kids by enhancing safety, and also to create a more inclusive society. The relevance of CEF in achieving an effective DSM is confirmed by all of the interviewed stakeholders and by the large majority of the respondents to the technical survey: 88% of them believe that CEF Telecommunications is fully or to a large extent relevant to the achievement of the DSM.

The recently adopted DSM strategy mid-term review, among others, has highlighted the role of CEF in supporting solutions like eHealth, cyber-security[68], or the preparation of the European Data Infrastructure to put in place an adequate High Performance Computing (HPC) environment[69]. With respect to the new political priorities stemming from technological developments identified by the DSM Strategy, CEF Telecommunications has shown however a **limited degree of flexibility**, as it allows the inclusion of new DSIs only if compliant with the criteria set by the Telecommunications Guidelines[70], and of new activities only if in support of the DSIs[71]. To this purpose, it is worth mentioning: rigidity in the architecture of DSIs (art. 2.2.b), d) and e) of the Guidelines), the scope of the intervention in the area of DSIs that does not include Data Infrastructures (arts. 4.1.a) and 6.1), limitation to annual work programmes (art. 6.2), restrictions on the method of intervention (art 5). This

[65] Communication from the Commission to the European parliament, the council, the European economic and social committee, the committee of the regions, and the European investment bank- accelerating clean energy innovation (COM(2016)763 final).

66 COM (2015)192 Communication from the Commission of 6 May 2015 on A Digital Single Market for Europe.

[67] The 2016 – 2020 e-Government Action Plan includes interoperability and cross-border connectivity among its underlying principles as well as the use of the CEF DSIs among its actions (COM(2016) 179 final – Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – EU eGovernment Action Plan 2016-2020- Accelerating the digital transformation of government).

[68] Member States are encouraged to make the most of the cooperation mechanisms set-up under the NIS Directive and supported by CEF to improve the way in which they work together to prepare for a large-scale cyber-incident (Communication on Strengthening Europe's Cyber Resilience System and Fostering a Competitive and Innovative Cybersecurity Industry).

[69] In line with the European Cloud Initiative.

[70] Article 6 sets out criteria for eligibility criteria and priorities for funding.

[71] High Performance Computing (HPC) is considered essential on of the fundamental contributors to the Digital Single Market and a driver for the digital economy. In 2012, the Commission adopted its HPC Strategy and, in 2016, within the European Cloud Initiative, launched the HPC Initiative, aiming to create a European HPC and Big Data eco-system by 2023. It has been possible to include funding for supporting the use of HPC within the CEF Telecommunications 2017 work programme, only because a strong link with the Public Open Data DSI has been identified, otherwise it would not have been possible to support this activity. See section 6.3.1 of PWC report.

lack of flexibility limits the potential of the programme to take full advantage of the latest technological developments (e.g. High Performance Computing) and address the new priorities in the political agenda that emerged after the adoption of the guidelines (e.g. cybersecurity-related challenges, infrastructure and technology needs for the data economy). There is an untapped potential of new technologies, which with a more flexible formulation of the guidelines could be fully harnessed. These limits in reflecting technological change are recognised by about 44% of respondents to the technical survey, whereas the need to update the Guidelines to increase their flexibility has also been highlighted by over 55% of the strategic stakeholders interviewed.

All the interviewed stakeholders and the large majority of participants (89%) in the technical survey considered CEF Telecommunications relevant to achieve **improvements in daily life for citizens, businesses and public administrations**. Indeed, although the Commission has been supporting programmes to develop and promote interoperability between public administrations since 1999, cross-border interoperability has not been fully achieved yet[72]. As a result, cross-border online services are lagging behind services offered to country nationals[73]. For instance, an estimated 2% of entrepreneurs starting a business in their own countries face issues when trying to access the necessary online services (because these services are not available), whereas one-quarter of foreign entrepreneurs encounter this problem. Similarly, foreign start-ups suffer from lower availability/access to information on services compared to their domestic counterparts (33% compared to 39% for national start-ups); and using services cross-border is possible in 27% of cases compared to 46%.

As regards CEF Broadband, the recent Commission Communication on the European Gigabit Society Strategy acknowledges the importance of Internet connectivity for a successful DSM and for Europe's digital future. The continued focus on the deployment of very high capacity broadband networks[74] remains a key priority. Despite the various funding instruments available on the market, the Commission has identified a remaining investment gap of EUR 155 billion to reach the connectivity targets set in the Gigabit Society Strategy. Very high capacity networks are currently underfunded while they are critical for the digital economy and for many cross-sector innovations.

In view of the very limited budget remaining for CEF broadband, it was essential to maximise leverage and to support projects able to deliver gigabit connectivity. No substantial demand has been demonstrated for CEF DI for broadband, possibly in the context of the emergence of EFSI. The addendum to the ex-ante assessment (see section 6.1.4) identified a clear lack of equity for relatively small projects in broadband across EU Member States. In addition, the WiFi4EU initiative, which has only recently reached political agreement by the European Parliament, the Council and the Commission, aims to promote the benefits of the Gigabit Society and stimulate demand for very high capacity networks. Finally, the technical assistance for broadband projects has proven highly relevant, as shown by the Connected

[72] Communication from the Commission to the European Parliament, the Council, the European Economic and social Committee and the Committee of the Regions - European Interoperability Framework – Implementation Strategy COM(2017)134.
[73] eGovernment Benchmark 2016. A turning point for eGovernment development in Europe?, Capgemini, IDC, Sogeti, and Politecnico di Milano, 2016.
[74] As defined in Article 2.2 of the Proposed Directive establishing the European Electronic Communications Code (COM(2016) 590 final/2 of 12.10.2016): " 'very high capacity network' *means an electronic communications network which either consists wholly of optical fibre elements at least up to the distribution point at the serving location or which is capable of delivering under usual peak-time conditions similar network performance in terms of available down- and uplink bandwidth, resilience, error-related parameters, and latency and its variation. Network performance can be considered similar regardless of whether the end-user experience varies due to the inherently different characteristics of the medium by which the network ultimately connects with the network termination point.*"

Communities Initiative[75] , ran in cooperation with the World Bank and complementary to similar support provided under the European Investment Advisory Hub.

The relevance of a common programme

The TFEU sets the basis for a common programme for transport, energy and telecommunications networks by grouping the three in the same title ("Title XVI - Trans-European Networks") with a clear mission of "setting-up of an area without internal frontiers"[76]. The CEF Regulation together with the sectoral guidelines have built on this approach and fulfilled the mandate of the Treaty by putting in place a common programme for the three TENs. The rationale for such approach was based on the observation that the three sectors are regulated by three different sectoral guidelines even though they face common challenges.

The idea of a common programme is supported by a vast majority of respondents, both in the general and technical survey (where respectively 78% and 65% of respondents agree or strongly agree). In the general survey, the focus on multi-sectoral (transport, energy and telecommunications) projects and potential synergies was considered either important or very important for 79% of respondents. However, in both the technical and general surveys, opinions are split on whether having one funding instrument for the three sectors is the most appropriate approach. Also, most of the comments to this question suggest that respondents considered it as "forward looking", rather than on the current set-up, as they expressed the preference to keep e.g. separate calls and budget appropriations, which is currently the case.

This might be partly explained by the fact that most respondents from each sector have no interaction with actions supported in the two other sectors and by the fact that the financing of actions involving more than one sector has been very limited to date (critical factors limiting the possibility for synergies in the current legal/budgetary framework are explained in section 6.3.2.2). On the other hand, the common programme approach allows for economies of scale and simplification, mainly as regards the management of the programme (the grant element) by a single executive agency (INEA) (see also section 6.4.2.). As stated previously, a separate mid-term evaluation of INEA (incorporating its other functions such as those relating to Horizon2020) is being undertaken.

[75] 120 broadband projects were submitted from 24 Member States. See: https://ec.europa.eu/digital-single-market/en/news/connected-communities-initiative.
[76] Art. 170 TFEU

Common challenges in transport, energy and telecommunications – Stakeholders' views
Stakeholders in their replies to the general survey pointed to the following common challenges experienced by the three sectors:

- "*With a view toward a single European transport, energy, or telecoms market, the challenge in all of these sectors is the complexity arising from different national systems in place and their interconnection, and from the interoperability needed to establish*";
- "*They have inherently common features that distinguish infrastructure from services that can operate across that infrastructure. The common challenge is to avoid the service providers owning or funding the development of that infrastructure to further their own gains, and to ensure that infrastructure is developed to meet the needs of citizens and businesses. And to ensure competitive supply of world class services*";
- *"Similar challenges are related to the need of coping with an EU-wide effective, competitive and sustainable network development. On top of that, relevant synergies can be found in practical terms (e.g. supplying the transport network with energy as well as IT infrastructure")";"With the trend in technology and market development these three components are very linked";*
- *"The three of them are core sectors for European economy and society. They make a key contribution to economic development and social welfare at European level, even when they show large differences entailing a differentiated treatment for each. Challenges are innovation, security and sustainability";*
- *"Language barriers are significant inhibitors to successful international trading, co-operation and information exchange".*

6.1.2. Resources vs. objectives and potential EU impact

The investment needs in TEN exceed the resources available at national level and the structural market failures indicated previously in the 'Background to the initiative' section still exist. Therefore, even with a EUR 30.4 billion budget, the EU budget can only cover part of those market failures.

In the **transport sector**, oversubscription rates for the calls show a very high demand for EU grant support, with the budget available constantly falling short of the sector needs. More recent estimations by the Commission, confirmed in the Core Network Corridor Coordinators work plans, reveal that investments needs in the TEN-T Core Network amount to EUR 740 billion by 2030. As public budgets are still under considerable fiscal consolidation, the implementation of CEF/TEN-T in 2014-2016 shows that financing support from Member States and private sector continues to be crucial but insufficient, for projects with a European dimension.[77]

As regards **energy**, the 2011 IA foresaw that some EUR 200 billion of investments would be required by 2020 in electricity and gas transmission infrastructure as well as smart grids, electricity storage and CO_2 transport infrastructure by 2020 and of this, EUR 100 billion would not be covered by the private sector and was at risk.

So far EUR 1.6 billion is allocated to projects, compared to EUR 2.2 billion available under the multi-annual work programmes 2014-16. This represents around 34% of the total budget across half of the MFF period. The total capital expenditure (CAPEX) leveraged by CEF so far (EUR 3.5 billion) is a fraction of the EUR 100 billion estimated by the Impact Assessment of the TEN-E Guidelines. As already indicated, CEF Energy spending has been back-loaded to the second half of the MFF period due to the need to step change the pipeline of projects, especially in the electricity sector, through the bi-annual adoption of the Union list of PCIs. Current expectations by ACER in 2016[78] are for a 'project commissioning peak' of PCIs

[77] Progress report on the implementation of the TEN-T in 2014 and 2015.
[78] ACER, Consolidated report on the progress of electricity and gas projects of common interest for the year 2015 – rev 5/7/2016

between 2018 and 2020 with, for example, 22 gas PCIs being commissioned in 2020 alone ; furthermore, 89 PCIs out of the current 108 in the second PCI list are expected to be commissioned for electricity by 2023. These figures currently do not take into account the updates of the PCI Union List of 2017 and 2019 and do not count for additional projects in smart grids or cross-border carbon dioxide networks which could become PCIs in these lists. ACER estimates a total CAPEX of EUR 82 billion of investment for the list of PCIs by 2020, for which CEF Energy support would clearly not be sufficient. It is therefore too early to conclude on the amounts which CEF might cover as funding gap of regulatory mechanisms until the end of the programme[79].

57% of the 30 respondents to the technical survey reported that they considered budget appropriations to be "fully relevant" or "very relevant" with respect to sectoral objectives, and 13% considered budget appropriations as "moderately relevant".

Despite the difficulty to link together coherently different assessments, it can be concluded that the remaining CEF energy budget remains relevant to the potential mature demand and the remaining budget will not be sufficient to cover all the investment needs foreseen by means of potential CBCAs decisions; particularly, it will not be able to meet the increasing demand in funding for electricity and smart grids projects.

Furthermore according to current analysis based on the latest TYNDPs[80], EUR **125 to 148 billion** is required for electricity TEN-E infrastructure and, EUR **90 billion** is required in gas TEN-E infrastructure until 2030, in line with the increasing trend of investments needs in the sector.

During the negotiation of the programme, the CEF **Telecommunications** budget was reduced from the requested EUR 9.2 billion to EUR 1.14 billion. The cuts amounted to about 98% and 50% of the initial budget for broadband and DSIs respectively. Furthermore, in 2015 EUR 100 million were redeployed for the establishment of EFSI. These budget cuts resulted in important changes in the logic of intervention and triggered reductions in the scope of the Programme. Specifically, for the DSIs the reduction affected not only their number, but also a layer of activities related to the deployment of digital infrastructures at Member State level[81]. This is reflected in the geographic participation patterns of some DSIs, i.e. it is essentially those Member States where deployment at national level had already taken place that are able to apply for funding for generic services, as these typically cover only the connection of existing infrastructures to a core service platform.

In the first years of implementation, this reduction in scope combined with the possibility to shift budget from undersubscribed DSIs to other DSIs (for generic services), allowed the available budget to partly address the needs of the Member States that had the capacity in place. However, considering the increasing subscription rates in recent calls, further cuts in budget would substantially hinder the capacity of the programme to deliver on its objectives. For example, in the case of eHealth, the available budget has not been sufficient to fund all

[79] Sources: CBCA: cross border cost allocation decision, see relevant ACER document entitled Overview of cross-border cost allocation decisions - Status update as of January 2017. The investment needs of projects that have received CBCA decisions (cross border cost allocation decision, see box..) between 2014 and 2016 amount to approximately EUR 6 billion of CAPEX.

[80] Ten Year Network Development Plans (for gas and electricity)

[81] In the original proposal for the CEF Telecommunications Guidelines, as well as within the sectorial impact assessment, the following definition of generic services was included "*Generic services provide the functionality and content of digital service infrastructures. They may be interconnected through a core service platform".* Thus, the deployment of generic services could include support to the deployment of digital infrastructures at national level, which enables MS to connect to the core service platform. After the negotiation phase, the definition of generic services was changed, excluding the possibility to provide support for the deployment of DSI at MS level (i.e. the current definition only relates to the connection of national infrastructures to core service platforms).

the proposals above threshold[82]. Furthermore, strategic stakeholders have pointed out that the envelope should be reconsidered in case the scope of CEF Telecommunications in the digital sector was to be broadened. As to the budget allocated to the broadband area, its current size is far from being proportionate to the existing challenge. Given resource limitations, support has been so far focused on technical assistance activities that can help projects with a difficult business case to materialise, as well as on the development of financial instruments (see 6.1.1). On the whole, resources available under CEF Telecommunications may most likely not be commensurate to challenges in this area.

6.1.3. Using the adequate support schemes to respond to market failures and policy challenges

As indicated in the previous sections, the purpose of CEF is to enable investments with high EU socio-economic benefits but not being financially viable for the market due to market failures. It thus addresses a specific investment situation with a gradation in term of type of instrument and co-financing rate and in complementarity with other EU instruments.

Grants

As the large majority of CEF projects relate to cross-border projects with wider regional and EU benefits but insufficient national funding or market-based financing, **grants** represent the dominant support scheme.

This is the case in **transport**, for most of the cross-border projects on the trans-European network and the horizontal priorities (notably ERTMS, SESAR, ITS and alternative fuels). **These investments will not be realised without grant support, in particular where the costs are national/local and the benefits are tangible at European scale.** This is also the case where the benefits cannot yet be internalised, notably through carbon-pricing. Moreover, important categories of project promoters (such as many railway infrastructure managers) have no possibility to raise debt and/or to generate revenues from single investment projects, which does not allow them to benefit from financial instrument and make them dependent on public support to invest. CEF has demonstrated the possibility to enable these investments and to modulate the EU support in relation with the needs. Support ranged from 85% co-funding grants for the cohesion envelope, to a modulation of co-funding grants (50-20%) depending on the priority and the nature of the action. The analysis provided for by the Work Plans of the Core Network Corridors[83] shows that, due to the results of CEF and in the case of a continuation of the grant component of the programme, a very large majority of cross-border projects can be finalised within the next decade.

Similarly, **energy** grants are needed for large scale infrastructure projects, notably for strategic priorities such as for security of supply for which the underlying actions are not considered as being bankable. In energy, **the allocated co-funding rates have been sufficient to enable projects to move forward,** this being a clear improvement compared to the predecessor programme where low co-funding rates had proven not to be effective as to the advancement of projects. 90% of projects that received grants for works have now taken a

[82] The 2015 work programme recognizes that indicative budget was substantially lower than the amount required by Member States in the eHealth Network (i.e. EUR 7.5 million vs EUR 28.6 million). The interest of Member States has been confirmed in the calls for proposals which was significantly oversubscribed and under which 140% of the available funds (EUR 10.6 million) was awarded. In the 2017 work programme, the indicative budget for the deployment of generic services has been increased to EUR 9 million.

[83] In line with Article 47 of the TEN-T Guidelines, https://ec.europa.eu/transport/themes/infrastructure_en

final investment decision or are under construction, while two projects have been already completed. Stakeholders support that CEF has been crucial in covering the funding gaps identified during the Cross-Border Cost Allocation (CBCA) process.

In **telecommunications,** the forms of financial assistance currently provided to support the deployment of the DSIs can be considered adequate to respond to the market failures identified in the digital sector. The private sector will not replace public investment for the deployment of either the core-service platforms or generic services; additionally, Member States have little incentive in investing in cross-border interoperability. The relevance of the use of grants for supporting actions for generic services has been confirmed by about 80% of the participants in the technical stakeholder survey and 90% of the interviewed stakeholders. The need for financial support is confirmed by the preliminary results of the ongoing study to assess the long-term sustainability of the **DSIs**[84]. Potential for revenue generation has not been identified for a number of DSIs (i.e. Europeana, Safer Internet, Public Open Data, ODR, EESSI, eProcurement, Cybersecurity, eSignature) due to the nature of the services provided (public service) and in some cases due to the limits set out by the relevant Regulations (e.g. the ODR Regulation specifies the access to the ODR platform shall be free of charge[85]). Similarly, for other DSIs it is difficult to extract revenues, either because they offer solutions that are to be open source and publicly available (e.g. eDelivery) or because this is not considered a realistic or desirable option (e.g. Health). Forms of financial assistance other than funding, such as financial instruments, are not suitable for projects that do not generate revenue.

Financial instruments

Despite being developed in different years and responding to different market needs, all **financial instruments established under CEF share the same purpose: increasing the level of private investment in the CEF priorities**. To this extent, they are complementary to the more common grant-type of support. Indeed, CEF grants mainly aim at supporting projects where no business case exists for investors.[86] The CEF DI uses EU budget to provide a guarantee to primarily EIB financing, through loans, guarantees, as well as support for project bonds. This in turn allows the EIB to provide financing to riskier projects), thus crowding in other sources of private investment. As it will be explained in more detail in the Effectiveness section below, EFSI has to a certain extent substituted itself to the CEF DI. However, **there remains a niche for the CEF DI to target**, in particular by providing specific financing products or tools, or aiming at the development of specific markets such as alternative fuel.

In the **transport sector**, in relation to projects that have positive expected socio-economic values, there exists a full spectrum of financing needs (in terms of the financial viability of the investment): from financially viable projects based on the income stream generated by users (e.g. bus leasing) to projects not generating revenues to cover investment and therefore being highly dependent on public sector/government support (e.g. non-PPP rail infrastructure). CEF DI support and legacy instruments are targeted at projects potentially suitable for private finance e.g. maintenance of existing infrastructure, increase of capacity at ports and airports, roads, the deployment of the most readily available alternative fuels.

[84] Long-Term Sustainability of Digital Service Infrastructures, DG CNECT, in progress.
[85] Article 5(2) of the Regulation (EU) No 524/2013 of the European Parliament and of the Council of 21 May 2013 on online dispute resolution for consumer disputes and amending Regulation (EC) No 2006/2004 and Directive 2009/22/EC (Regulation on consumer ODR).
[86] A peculiar case is represented by the blending of grants and EFSI/FIs or private finance, where grants are used to overcome financial market deficiencies, supporting the use of more efficient instruments.

The provision of grants to privately financed projects e.g. through the CEF Blending Call of 2017 (and a proportion of grants made under previous CEF calls) extends EU support to privately financed projects. It is an appropriate support mechanism because many transport projects are on the margins of financial viability, and support solely through EU-budget financial instruments (as well as EFSI) would not be sufficient to deliver financial viability. The blending approach still allows the bulk of the finance to be provided privately, minimising overall public sector contribution, in line with the goals of the Investment Plan for Europe (IPE). Further the use of the CEF budget contributes to the fulfilment of the TEN-T priorities. Such an approach seems especially interesting for investment in shipping and port industries, rail connections to airports, ERTMS and retrofitting of vehicle fleets for alternative fuels. The CEF blending approach illustrates the flexibility and responsiveness of the CEF programme to supporting private finance investment

In contrast to CEF grants, it is clear that the CEF DI in **energy** has not delivered so far and evidence indicates that project promoters do not consider this form of support when looking at the financing options available. This is likely less related to the amount of resources available under that investment and more related to its ease of use or the competitiveness of the debt market, and the impact of EFSI (which is explored in the sections on effectiveness and coherence). For the above reasons, the Commission has decided not to commit budget for CEF FI in the year 2016 for energy.

With regard to the **CEF EI**, a telecom-specific Connecting Europe Broadband Fund was only recently put in place, and is foreseen to be operational at the end of 2017 (see section 6.1.4.).

For CEF Broadband both FIs and grants are relevant in covering the investment needs in very high capacity networks, provided that the necessary flexibility is built into the programme. By combining both forms of public financing in areas with overall commercial potential for very high capacity networks – grants can be limited to the minimum necessary to build a business case in unprofitable sub-areas, while maximising private sector involvement across wider areas.

Procurement

With a very limited budget (estimated to less than 1% of the total CEF budget), **procurement** has been used so far to set-up and run the core service platforms of the DSIs in the Telecom sector; for Energy and Transport, a small fraction of the total funding is channelled through public procurement to fund programme support actions such as studies managed directly by DG ENER and DG MOVE respectively.

Programme support actions (PSAs)

The use of PSAs has been quite limited given the scarce budget allocated in comparison to grants and FIs. However, **PSAs have proven to be very helpful in smoothing the implementation of the programme and helping it achieve its objectives.** In transport, PSAs have helped to accelerate several administrative processes at Member State level and/or lessen the burden through capacity building in Member States, while at the same representing a crucial development tool in the framework of horizontal priorities. Further detail on PSAs is provided in Section 5 Implementation state of play.

6.1.4. Specific equity instruments (EIs) for sectoral needs

An ex-ante assessment on the potential use of an equity instrument under CEF was conducted in November 2015 as an addendum to the 2014 ex-ante assessment on the potential use of FIs. This *ex ante* assessment identified a clear market failure in the lack of available equity financing, especially smaller infrastructure deployment actions or for operations involving innovative technological solutions.

A **CEF EI for broadband** was developed under the Connecting Europe Broadband Fund (CEBF), given that a lack of equity funds for relatively small projects had been identified across Member States. The additional ex-ante assessment and the accompanying market study, as well as the project portfolios presented by the companies which bid to become fund managers, demonstrated a clear gap in the existing possibilities to fund broadband projects. In particular, access to finance can be difficult for promoters of relatively small projects and/or in Member States which are not beneficiaries of large ESIF support. The Fund is expected to become operational in the first half of 2018 and an important portfolio pipeline has already been demonstrated.

In the transport sector, while equity support needs in the **transport** market have been identified in smaller markets, it was estimated that these were not sufficiently relevant to put in place an EI at that stage. These needs relate to projects characterised by a strong new-technology component, as the risk associated to such projects indeed hinders the possibility for promoters to access alternative sources of financing such as banks or private investors. The use of the EI in subsequent years of CEF implementation may therefore be considered for riskier projects or for projects in immature markets.

A CEF **energy** EI is not relevant to the needs of the sector at this time. The specific objective of the EI is to have the capacity to engage in equity finance as a last resort when the progress of a PCI is at risk, e.g. due to construction delays. However, this instrument has not yet been set up and according to the stakeholders' feedback gathered (around a 60% of targeted interviewees who referred to the CEF EI specifically), a CEF EI is not considered relevant and necessary at the moment. The order of preference, in this case, is retained earnings, loans from banks and IFIs and only then the bond markets. Equity is only used by a minority of TSOs as many are restricted in their access to equity by the country's regulatory framework. Even when it is permitted by the framework, there is often not a need for equity within TSOs. The Marguerite Fund[87], an independent European fund for energy, climate change and infrastructure, is available to energy infrastructure projects throughout the period of CEF implementation. Hence an additional CEF energy equity instrument would potentially overlap with the function of the Marguerite Fund. Considering the complexity of putting the instrument in place and the time for uptake by the market, there is no space for the EI in this programming period.

6. 2. Coherence

This section aims at assessing the external complementarities between CEF and other EU/national policies and interventions.

Main findings

[87] http://www.marguerite.com/

- CEF is generally complementary with **other EU financial interventions**, with CEF having a clear stand-alone characteristic of promoting cross-border action and EU infrastructure priorities, but some adjustments have been implemented over time at operational level.

- CEF and the **European Structural and Investment Funds (ESIF)** are both contributing to the TEN objectives. While CEF has strongly focused on EU integration, particularly through cross-border connections and interconnections, ESIF focuses on internal sections less covered by CEF but essential for the development of the corridors in the Cohesion countries (transport sector).

- CEF is a catalyst for the **European Fund for Strategic Investments (EFSI)** as several projects initiated in the context of the CEF DI fed into the EFSI pipeline. Moreover, projects prepared with CEF support or supported in part with CEF grants for works start benefitting from EFSI. However, the partial overlap between the scope of the CEF DI and EFSI called for specific guidance by the CEF DI Steering Committee to ensure effective complementarity between the two initiatives. The Blending Call for CEF Transport launched in 2017 aims also at reinforcing this complementarity.

- There is complementarity with **Horizon 2020,** which supports the early stages of the innovation chain while CEF enables the technological deployment throughout the infrastructure.

- CEF intervention is also generally coherent with **actions undertaken by Member States**, which is ensured by programme design features and by a strong and continuous cooperation between the Commission and national competent authorities.

Overall, CEF can be considered as coherent with other **EU interventions**, notably the ESIF, Horizon 2020 and EFSI, as these financial support schemes have been designed to ensure complementarity. The CEF proposal in 2011 aimed at bridging the gap between existing programmes (predecessors of ESIF and Horizon 2020), which were unable to fulfil the integration objectives alone.

Coherence with the European Structural and Investment Funds (ESIF)

Both CEF and ESIF contribute to achieving the TEN objectives. While ESIF focuses financial support on the less-developed regions and the 15 Member States which are eligible for Cohesion Fund support, CEF focuses on EU integration through cross-border connections and interconnections, bottleneck removal and interoperability projects.

In **transport**, the CEF does not only support-cross border sections but also bottlenecks on other sections of the Core Network. Such projects can be financed by the CEF and ESIF and, in certain cases: different sections of the same project can be support by either instrument. Coherence between CEF and ESIF, in particular for the Cohesion envelope, is ensured through the Core Network corridor work plans and the ex-ante conditionality process, which requires in particular that each Member State and/or region receiving cohesion policy support under the Thematic Objective (Sustainable Transport) has a comprehensive transport plan in place, which covers all modes of transport and both TEN-T and other transport infrastructure. The Partnership Agreements, which the European Commission signs with Member States, further help avoiding overlaps at national level. Internally, a Memorandum of Understanding

was signed by DG MOVE and DG REGIO. This led to a close cooperation with joint missions to cohesion countries, joint monitoring of implementation, close involvement of DG REGIO in the selection of project proposals under the CEF Transport calls, coordination of the project portfolio between CEF and ESIF.

As indicated before, most of the projects funded in the transport sector in the first two years of CEF were based on a solid project pipeline stemming from the continuity of projects and studies formerly supported via the TEN-T programme or by Cohesion Policy instruments and therefore ready to be implemented during the initial period of the programme. As regards the CEF Cohesion envelope, it should however be noted that the acceleration in the delivery of funding, provoked by the 31 December 2016 deadline[88] for the national allocations as well as by the use of dedicated technical assistance and calls, has encouraged Cohesion Member States to speed up the preparation for mature (mainly rail) projects, in order to fully use their allocations. It appears that such mechanism has led to the result that was targeted, focusing on the most difficult cross-border projects and removal of bottlenecks in the rail transport and inland waterways. This mechanism is now paving the way for a coordinated deployment of CEF and ESIF along the national sections of the Core Network Corridors and the rest of the TEN-T network.

In addition, over EUR 34 billion has been allocated in the period 2014-2020 under the Cohesion Fund and ERDF for transport infrastructure and this investment has in many cases supported the TEN-T Comprehensive network which aims to develop multimodal regional accessibility for all EU regions. This helps to ensure the territorial cohesion of the EU and the regions' access to the internal market while also benefitting from the cross border connectivity and interoperability supported under CEF. ESIF also complements the Core Network, in particular for non cross-border projects and for road projects.

Example box: complementarity of CEF transport and ESIF – three railway projects

Rail Baltica

In direct cooperation between CEF and ESIF, the projects along the E75 railway line between Warsaw and the Lithuanian border are tackled in sequence with works close to completion from Warsaw to Sadowne with ESIF support and with further works launched for the two subsequent sections from Sadowne to Bialystok to Elk with support from CEF. Studies are ongoing from Elk to the Lithuanian border in coordination with the section Lithuanian border to Kaunas, both to be launched for works towards the end of this MFF. Completion of the entire Rail Baltica project is thereby foreseen for end 2025.

Dolnośląskie Voivodeship and Czempiń

The project, located on the Baltic-Adriatic Core Network Corridor in Poland, covers the modernisation works on a 71 km section of an existing railway line from the Dolnośląskie Voivodeship to Czempiń. It is a part of a larger project on the modernisation of this Corridor between Wrocław and Poznań to adjust its characteristics to TEN-T requirements. The project receives EUR 226.5 million in CEF Transport funding under the 2014 calls.

Poznań and Piła

The regional project will consist of an upgrade of the 92 km of regional railway connecting Poznań with Piła, a town located in the north of Wielkopolska (Greater Poland region). It will be co-funded from ERDF under the 2014-2020 Regional Operational Programme for Wielkopolska and will enable regional trains to run at 120 km/h. Signalling, safety and accessibility for people with reduced mobility will be improved as well. This project is co-funded from the ERDF with approximately EUR 120 million.

[88] Article 11 § 2 of the CEF Regulation ("Until 31December 2016, the selection of projects eligible for financing shall respect the national allocation sunder the Cohesion Fund).

The funding allocated, to these 2 projects, through ESIF will allow the population of the northern part of Greater Poland (Wielkopolska) to gain a high quality connection with trans-European corridors crossing in Poznań. Further benefits will derive from funding allocated through CEF Transport, namely that the connections from Poznań to Wrocław (2014-PL-TMC-0180-W, mentioned above), Szczecin (2014-PL-TMC-0198-W) and Warsaw (2014-PL-TMC-0185-W) will be upgraded thanks to CEF support.

In **energy**, CEF is the main EU instrument for energy infrastructure investments, and only funds projects lying on the priority corridors identified in the TEN E Regulation, while ESIF do not have the same legal basis constraints and have a strong focus on energy efficiency, renewable energy, smart distribution grids and energy research and innovation. By design, CEF energy supports cross-border infrastructure. In addition, the European Regional Development Fund (ERDF), one of the ESIF, also supports investments in infrastructure for smart gas and electricity storage and transmission systems, mainly in less developed regions, in complementarity with CEF. The planned ERDF allocations differ between Member States, reflecting differences in terms of total volume of funds available, national needs and priorities. In the current MFF, EUR 3.4 billion is allocated under Cohesion policy for "smart energy infrastructure", including EUR 1.1 billion for smart distribution grids and EUR 2.3 billion for infrastructure for smart electricity and gas distribution, storage and transmission systems, the latter mainly in less developed regions (the "TEN-E" sector falls under the smart energy infrastructure). Of those, the amount allocated to projects relevant for the "TEN- E sector" is EUR 105 million in TEN-E electricity storage and transmission and EUR 468 million to TEN-E natural gas, thus representing only 16 % of the total allocation for smart energy infrastructure, showing that a large share of the funds is allocated to infrastructure investments at distribution level, while CEF is focusing on transmission level infrastructure. At this stage, six Member States (BG, CZ, EL, LT, PL and RO) plan to use ERDF support for large energy infrastructures. By comparison, under Cohesion policy, funds allocated to renewable energy investments represent EUR 4.8 billion and for energy efficiency investments represent EUR 16.7 billion. However, a full comparison of the "TEN-E sector" projects supported by CEF and by the ERDF is at this stage not possible as a complete overview is not available on the TEN –E projects supported by the ERDF in the current MFF.

Across the EU as a whole, cohesion policy investments in large energy infrastructures represent only about 0.5% of the total cohesion policy allocations (the ERDF, the Cohesion Fund and the European Social Fund) both in the MFF periods of 2007-2013 and 2014-2020. Nevertheless, the share is higher in some Member States, around 2 %, reflecting national needs and priorities. The ex-ante conditionality related to ERDF investments in large energy infrastructures entails that comprehensive plans describing the national energy infrastructure priorities, which fulfil certain criteria, must be in place – thus ensuring consistency with relevant parts of internal energy market legislation and the PCI framework. Member States and the Commission also need to ensure that ESIF support is planned in close cooperation with the support provided from CEF, so as to ensure complementarity, avoid duplication and provide for optimal linkage of different types of infrastructure at local, regional, national and macro-regional levels, and across the Union. Furthermore CEF supports projects (which are cross-border or have a significant cross-border impact) that lack commercial viability, but are nonetheless important for security of supply and European integration. The geographical spread of funding allocated via CEF is evidence of the good complementarity between the ESIF and CEF Energy.

Similarly CEF energy takes into account benefits offered in other policy areas, such as exemptions from certain market rules awarded to projects (e.g. exemptions on third party

access); such projects are then not eligible for CEF funding in order to prevent over-compensation.

Concerning the wider policy framework, CEF Energy is intrinsically coherent with other measures of the TEN-E policy which streamlines the administrative process of bringing PCI projects forward, providing an additional financial incentive to project promoters and Member States to engage with and better harmonise the PCI process.

Example box: complementarity of CEF energy and ESIF – the LitPol Link project

Litpol link is a new 400 kV double-circuit AC electricity interconnection between Lithuania (Alytus, 51 Km) and Poland (Elk 112 km) that connects for the first time - in an asynchronous mode - the Baltic States to Poland and thus to the electricity network of continental Europe, creating preconditions for electricity trade and increase of competition on energy prices, enhancing at the same time the security of electricity supply in LT and in the northern part of PL. The project was identified then as a priority project in the Baltic Energy Market Integration Plan (BEMIP) launched by President Barroso in 2008. In a first phase its **transmission capacity** is of 500 MW, while a 2nd phase is planned to be commissioned by 2020, doubling the capacity to a total of 1000MW. The **overall investment cost** for the 1st stage of implementation was of approximately EUR 550 million.

The Commission contributed circa EUR 4.31 million under **TEN-E** programme to the performance of feasibility and design **studies** on both sides of the border. Meanwhile, works on the PL side were granted a financial assistance of approximately EUR 203.5 million under the **EU structural funds** (ERDF). In 2013, **the Lithuanian part of LitPol Link** received a label of a Project of Common Interest. The project was finally achieved once works on the LT side benefitted from a **CEF grant** of circa EUR 27.376 million and an **EIB loan** of EUR 55 million. Without the CEF intervention, the impact of the investment would have significantly increased Lithuanian tariffs for network access. After the CEF grant, the project finished the construction phase and went into operation in December 2015.

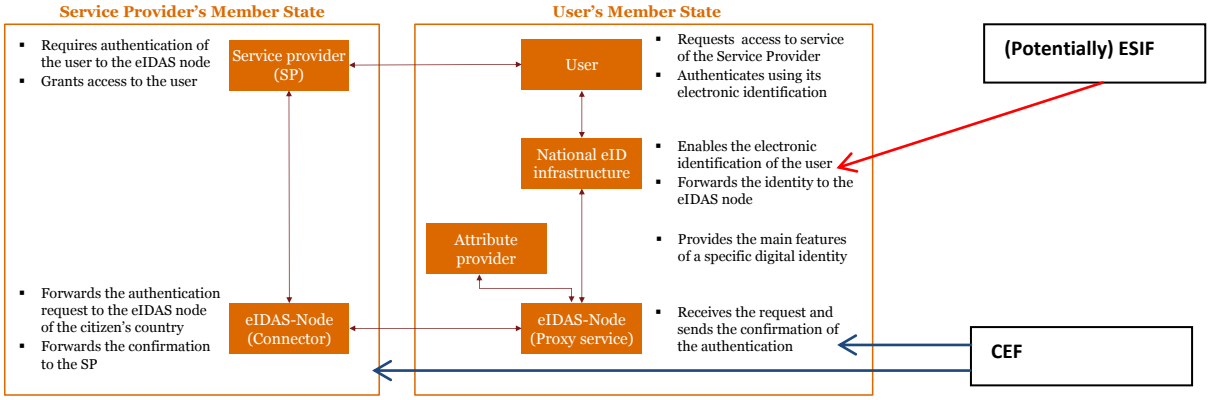
Concerning **CEF Telecommunications**, the possibility to create synergies between CEF and ESIF in the DSIs area has been identified within the guidance document for enabling synergies between ESIF, Horizon 2020 and other research, innovation and competitiveness-related programmes of the EU.[89]
Potential synergies identified include the opportunity to fund via ESIF the development by the public sector of IT solutions that reuse CEF building block DSIs and that can become interoperable with the rest of CEF DSIs. There is no overlap of activities between ESIF and CEF Telecom in the adopted version of the programme. Member States and regional authorities are responsible for the specific design and implementation of Operational Programmes. CEF focuses on providing operational services which are ready to be deployed. In particular, it finances services in the core layer of the DSIs, and the services for Member States to connect to such core layers. Initially, CEF telecom was foreseen to cover also the development of national infrastructures; however, this layer of the programme was dropped during the negotiation phase. The available funds under ESIF Thematic Objective 2 (Enhancing access to, and use and quality of information and communication technologies) and Thematic Objective 11 (Enhancing institutional capacity of public authorities and stakeholders and efficient public administration) could be in theory allocated to the development of national infrastructures in the poorer regions; nevertheless, it is not clear whether the Ex Ante Conditionality on Digital Growth[90] and the related National strategic frameworks for Digital Growth that underpin the investments in this area target the deployment of Digital Service Infrastructures at national/regional level as identified in the

[89] Enabling synergies between European Structural and Investment Funds, Horizon 2020 and other research, innovation and competitiveness related Union programmes. Guidance for policy-makers and implementing bodies, Commission - DG REGIO, 2014.
[90] Digital growth ExAC is requesting a strategic policy framework for digital growth to stimulate affordable, good quality and interoperable ICT-enabled private and public services and increase uptake by citizens, including vulnerable groups, businesses and public administrations. The framework should be based on evidence and set objectives that make possible to measure them against the DSM scoreboard indicators.

CEF telecom guidelines. Therefore, in the current set-up of the programme there is potential for complementarity between CEF and ESIF, but exploiting this potential is not straightforward. Fully doing so may require an extended approach providing stronger support to those Member States lagging behind in the development of their digital solutions at national level, as well as conditionality measures requiring the use of CEF core service platforms for national DSIs co-funded via ESIF so as to promote a more synergetic approach across funding sources.

Taking as example the case of eIDAS, the figure below depicts the functioning of the eIDAS solution in two Member States, indicating what is supported under CEF and what could be possibly funded under ESIF.

Figure 8: eIDAS example



40% of respondents to the technical survey recognise a good level of complementarity between the ERDF and CEF Telecommunications. However, interviews with strategic stakeholders and Member States' representatives highlighted that, so far, coordination has not been sought following a structured approach and is hindered by the fact that ESIF is managed by different Managing Authorities at national and regional level. This set-up also renders monitoring complementarity between interventions supported by ESIF and CEF in telecommunications difficult.

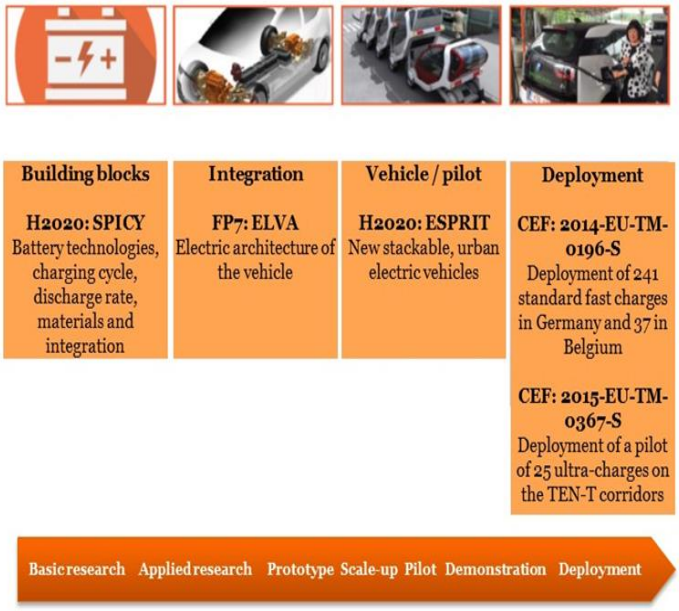
As regards CEF Broadband, in the current programming period (2014-2020) the European Structural and Investment Funds (ESIF) foresees about EUR 6 billion for investment in broadband deployment (about EUR 5.1 billion under ERDF and about EUR 900.000 under EAFRD). ESIF typically contributes to mainly public driven deployments in the form of grants (and are less suitable to cover (cross-) border areas and the most remote and isolated areas). Whereas ESIF typically support public driven deployments with no commercial viability, even in the long run, the Connecting Europe Broadband Fund mainly targets market driven initiatives (for promoters which due to the size or location of the projects do not have access to private funding),. The WiFi4EU initiative is foreseen to finance WIFI access points, while ESIF funding will be used to invest in backhaul networks linking the local authorities to the wider broadband networks

Coherence with Horizon 2020

Horizon 2020 is dedicated to cutting-edge and innovative actions, whereas CEF's eligible actions include the technological development throughout the network. With its deep research and development shape, Horizon 2020 can be seen as an instrument for providing financial support to studies, assessments and preliminary tests and pilot projects, which can be then tested and deployed in the framework of CEF. The fact that for transport and energy, both

programmes – CEF and Horizon 2020 – are managed by the same Executive Agency – INEA – ensures further coherence.

Example box: Alternative fuels and the innovation project



In the area of alternative fuel-powered and electric vehicles, funding possibilities have been significantly enhanced under CEF, therefore a closer cooperation with Horizon 2020 is beneficial. Indeed, synergies between the Horizon 2020 and the CEF Transport programmes imply a wider range of R&I and infrastructure development projects covering the whole innovation line from idea to the market.

The synergy between the Horizon 2020 (and the previous FP7, as in the case) and CEF are very strong in the case of new technologies, in particular with regards to alternative fuels – are applied to transport. The example below shows a project financed as basic research under the Horizon 2020 and deployed under CEF through the 2014 and 2015 calls.

In **transport** for example, the role played by Horizon 2020 can be interpreted as preparatory for the kind of investments financed by CEF in alternative fuels along the infrastructure. Both programmes are consistent with the EU ambition of promoting a greener mobility system.

CEF Energy is in clear coherence and is complementary with Horizon 2020. CEF Energy is focused on financing actions supporting the implementation of individual PCIs which, by design, have a cross-border scope and wide EU added value, **Horizon 2020 is more focused on innovative projects in energy research.** This is identified as a clear and positive synergy between two programmes in the sense that projects funded by CEF Energy could benefit from latest innovations in energy developed by projects funded with Horizon 2020 funds (e.g. in storage technologies, for example).[91] Results of the general survey show that most respondents described the complementarity between CEF and Horizon 2020 (the most selected option was “fair” with 41%, for 20% it is "good", for 3% "excellent", whereas 28% of respondents do not know). It should be recalled that innovation, as described in the previous sections, is one of the three externalities that CEF can support, i.e. in the uptake of a new technology, which must however always be considered in the remits of the implementation of a specific PCI.

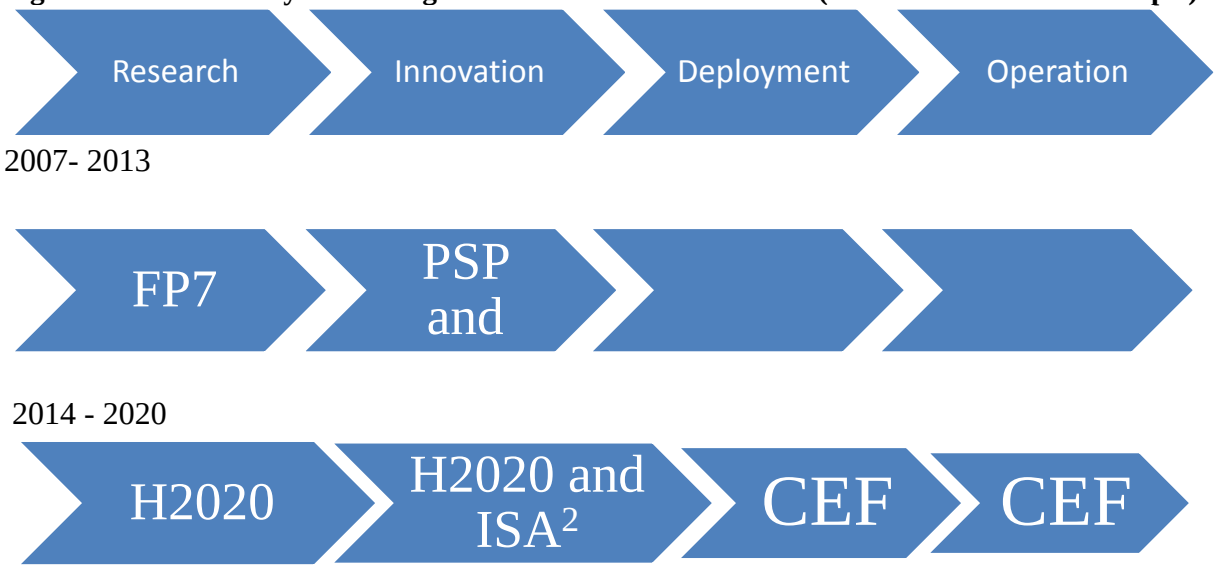
In the **telecommunications** sector, there is complementarity between the two programmes, as Horizon 2020 supports research and innovation (R&I) activities, including pilot lines and testing, that precede the deployment stage funded by CEF, whereas CEF provides support only for deployment of mature solutions, and not for testing/piloting. The CEF Telecom guidelines (recital 7) target CEF support to "sufficiently mature (projects) for deployment, technically as well as operationally, as proven in particular through successful piloting". While the technical maturity can be achieved through large scale pilots, the operational maturity can be achieved through large scale full deployment pilots currently not funded by any other EU programme in the digital sector. Horizon 2020 can be used to bring digital

[91] Innovation is one of the three externalities taken into account in the selection process.

solutions to Large Scale Pilot level as is e.g. the case in pilots in the IoT area (IoT Focus Area) or in the planned Digitization Focus Area.

An example of such large scale pilots supported by H2020 is the TOOP project (see example box). Most of the DSIs supported by CEF have clear connections with the Large Scale Pilots (LSP) funded under CIP-PSP Innovation Programme in 2007-2013[92]. R&I activities in H2020 relevant for CEF are those funded in Societal Challenge 6 (Open government and ICT-enabled public sector innovation[93]), as well as in LEIT ICT (Connected and Automated Driving), Excellent Science and Research Infrastructures (HPC). The figure below represents the different stages of development and adoption of solutions for DSIs, showing the coverage of such phases in the previous and in the current programming period (pre-CEF and since the launch of CEF).

Figure 9: Innovation cycle coverage for selected EU-level actions (telecommunications example)



Example box: H2020 TOOP project

The "Once-Only" Principle Project (TOOP) is an initiative of 50 organisations from the EU and Associated Countries aiming to demonstrate the "once-only" principle on a cross-border scale reducing unnecessary burden for businesses and public administrations.
TOOP aims to develop a GENeric Federated OOP architecture in line with the existing interoperability frameworks (EIRA[94] and EIF) based on the **CEF DSIs, the building blocks consolidated by the e-Sens project** and possibly **new building blocks**.
Three pilot areas are implemented:

1) Cross-border eServices for business mobility;
2) Updating Connected Company Data;
3) Online Ship and Crew Certificates.

In 2016 CEF programme also started cooperation with FIWARE (funded under FP7 and continuing to be funded under Horizon 2020) with the aim for eDelivery to become integrated

[92] Pan-European Public Procurement Online (PEPPOL), Se-cure identiTy acrOss borders linked (STORK), Smart Open Services for European Patients (epSOS), e-Justice Communication via Online Data Exchange (eCODEX), Simple Procedures Online for Cross-border Services (SPOCS), Electronic Simple European Networked Services (eSENS).
[93] https://ec.europa.eu/digital-single-market/en/ict-enabled-public-sector-innovation-horizon-2020
[94] European Interoperability Reference Architecture aiming to support public administrations in their work to provide interoperable European public services to other public administrations, businesses and citizens.

among the Generic Enablers of the FIWARE Platform[95] and also with the possibility of integrating some of the Generic Enablers of FIWARE into the Building Blocks ecosystem.

In line with these results, technical survey results show that most respondents described positively the relation between CEF and Horizon 2020 (full complementarity for 9%, complementarity to a large extent for 34% and to some extent for 26% while 25% do not know).

Coherence with the European Fund for Strategic Investments (EFSI)

EFSI is one of the three pillars of the Investment Plan for Europe that aims to relaunch investment in Europe, including in the transport, energy and telecommunication sectors. It has a wider scope than CEF FIs (and arguably less emphasis on projects of highest EU added value) as it does not specifically focus on the TEN network or on infrastructure (for instance several operations relate to the purchase of aircraft, trains, buses or on energy efficiency programmes which cannot be supported by the CEF FIs). However, most operations eligible under the CEF DI are also eligible under EFSI and several important energy and transport projects initially envisaged for the CEF DI were eventually financed through EFSI[96]. The approach taken for EFSI, whereby EU budget is used to provide a guarantee to the EIB or other financial institutions financing is the same approach as was taken by the CEF transport legacy financial instruments and the CEF FIs.

In transport, CEF DI and EFSI have mobilised a comparable volume of investment so far (as detailed in the Effectiveness section) but have addressed different market failures. The fact that the CEF DI is delivered via products which were tested under the previous instruments (LGTT and PBI – now part of the CEF DI portfolio) has meant that the CEF DI support took the form of subordinated products in the case of a high proportion of projects. The successful cooperation between the EIB and the Commission to design instruments addressing specific market failures is illustrated for example in the case of the Green Shipping Guarantee (GSG) Programme in transport. It should also be noted that thanks to its wide applicability, EFSI can not only complement CEF FIs in their respective scope, but it can further increase the range of support provided to transport promoters beyond the CEF priorities.

Example box: The Green Shipping Guarantee programme

One recent illustration of the complementarity between CEF and EFSI support is the Green Shipping Guarantee (GSG) programme by which the Commission aims at supporting the shipping industry in meeting its EU legal obligations in terms of sulphur emission limits. The GSG finances in particular the retrofitting of engines and new constructions of environmentally clean vessels. To date, the Commission has approved the pilot phase of the GSG using up to EUR 250 million of the CEF DI transport budget. The pilot phase, if successfully implemented, can be deployed through the EFSI in a second stage and can lead to up to EUR 3 billion of final estimated investments. The EIB has in turn signed banking guarantee agreements with commercial banks. To date, there are no final recipients yet of such guarantees, however individual transactions are expected to be signed in 2017.

In **energy**, the overlap between the CEF DI and EFSI, which is delivered via similar debt products for energy infrastructure, has led to a preferential use of EFSI. EFSI is for instance supporting the Nordlink HVDC Project, as well as the Italy-France electricity interconnector. PCIs that are commercially viable and not eligible for CEF grants for works can apply for EFSI financing, increasing the support provided to promoters. Regular tripartite meetings are

[96] Grand Contournement Ouest de Strasbourg (A355), A6 Wiesloch in transport and the Transgaz "BRUA" Gas Interconnection Project, Italian-France electricity interconnector in energy.

organised with project promoters, Commission services and EIB services. Moreover, complementarities between CEF grants and EFSI could be further developed. For example, a project that has received CEF grants could benefit from EFSI support via debt finance to overcome the remaining investment gap.

In **telecommunications**, the European Fund for Strategic Investments (EFSI) has approved EUR 1 billion for broadband related projects, triggering around EUR 3.2 billion of total EFSI related investments to these broadband projects.[97] While EFSI supports commercially-driven deployments with a clear business case (based principally on financial instruments in the form of debt), the Connecting Europe Broadband Fund is designed to reach smaller scale (but ambitious and replicable) projects in the broadband sector. Under the CEBF such projects can benefit from funding (inter alia from EFSI and the CEF EI) they would otherwise not have had access to (i.e. from other existing instruments, EIB or traditional private market investors). Moreover, the funding available for networks investment is maximised by the higher leverage created. Both ESIF and EFSI are necessary and complementary. In spite of an improved regulatory environment and of the currently available funding instruments, "*an additional EUR 155 billion over and above a simple continuation of the trend of current network investment and modernisation efforts of the connectivity providers*"[98] is required to reach the EU's connectivity targets in 2025. CEF therefore complements the existing EU instruments. Beyond direct support to broadband deployment projects in the form of grants and/or financial instruments, CEF also supports projects by providing Technical Assistance, which is crucial to help project promoters establish a solid business case and attract the required sources of financing.

In September 2015, the CEF DI Steering Committee adopted a set of Principles for CEF-EFSI Relationship to ensure a better complementarity between the two instruments. It has thus been agreed that:

- The financing of infrastructure projects which fall within CEF eligibility criteria and are also eligible under EFSI are discussed periodically by the CEF DI Steering Committee;
- The CEF DI and possible future financial instruments under CEF concentrate on innovative, demonstrator (for example using the CEF DI for the first time in a sector, or mode, in a Member State) and pilot products and initiatives (equity/hybrid/new products), taking into account the overall portfolio risk of such an approach;
- The Steering Committee should discuss potential projects or schemes which would use both funding sources (CEF and EFSI) for credit enhancement.

Furthermore, in July 2017, the CEF DI Steering Committee adopted a "Revised policy guidance regarding complementarity of the CEF DI with EFSI" which complements the above principles. It indicates that the CEF DI should target:

- For the energy, transport and broadband sectors, projects not eligible under EFSI, in particular because of their geographical location outside the EU;
- For the transport sector:
  (a) Projects falling under the Cleaner Transport Facility (CTF) umbrella, notably:
  (i) cleaner public transport projects;
  (ii) projects consisting of the deployment of alternative fuels infrastructure along the Trans-European Networks-transport (TEN-T) corridors, such as electric charging

[97] See also: Commission Staff Working Document on the Mid-Term Review on the implementation of the Digital Single Market Strategy (COM(2017) 115 final)

[98] Connectivity for a Competitive Digital Single Market - Towards a European Gigabit Society (COM(2016) 587)

infrastructure, including through the use of high risk debt / pre-bankable risk financing helping project promoters to overcome the high uncertainty faced during the ramp-up phase for the demand in electric charging;

(b) Projects supporting TEN-T horizontal priorities such as SESAR and ERTMS deployment and on ERTMS in particular, the retrofitting or upgrading of On-Board Units; and

(c) Operations in support of projects or innovative companies pursuing projects fostering the decarbonisation of transport, energy efficiency, or digital and technological innovation in the transport sector.

In addition, for the 2017 Transport Blending Call a reallocation within CEF of EUR 1 billion from the financial instruments budget lines to grants budget lines to be blended with EFSI or other relevant instruments has been made.

The CEF FI budget has therefore been flexibly deployed to maintain support of privately financed projects, aiming at (a) a better complementarity with EFSI and (b) increased grant support in view of blending grants and financial instruments, as well as EFSI.

Coherence with other programmes

This section only concerns the telecommunications sector, for which coherence can be assessed also with regard to ISA[99] programme, running from 2010 to 2015 (aimed at developing cross-border and cross-sector digital solutions for public services). Actions included in ISA's 2015 Work Programme are relevant to 7 CEF DSIs, (i.e. eID and eSignature, eDelivery, eInvoicing, Open Data, Automated Translation, eHealth and eProcurement) and some of the ISA solutions were taken over by CEF.[100]

Regarding the 2014-2020 programming period, CEF telecommunications can be considered coherent also with ISA^2. the two programmes, together with Horizon 2020, cover different phases of the project development, i.e. Horizon 2020 covers the research & development phase, ISA^2 supports the development and piloting phase, while CEF provide support in the deployment and operation phase.[101] Strategic stakeholders interviewed also consider the three programmes as complementary.

The analysis of the solutions developed under the ISA^2 programme highlights the complementarity with CEF Telecommunications. Actions funded under the ISA^2 programme contribute to develop interoperable solutions and specifications that can be reused within the CEF DSIs. This is the case of eProcurement. ISA^2 programme currently supports the development of eCertis and the European Single Procurement Document (ESPD). Generic services related to these components have been funded under CEF Telecommunications in 2015 and 2016.

CEF telecommunications is also complemented by other European programmes that contribute to support specific DSIs. Some DSIs such as eJustice and eProcurement receive

[99] Interoperability solutions for public administrations, businesses and citizens.
[100] Commission Staff Working Document SWD (2016) 279 - Final evaluation of the ISA programme Accompanying the document "Report from the Commission to the European Parliament and Council on the results of the final evaluation of the ISA programme".
[101] https://ec.europa.eu/isa2/sites/isa/files/isa-2-conference/9-novaretti.pdf

funding for the CSP from different budget lines (Justice Programme[102] and ISA[2]), thus leaving CEF support only for the GS. In other cases like EESSI, BRIS and ODR DSIs, additional support is provided from other budget lines (i.e. EaSI, Justice Programme and Consumer Programme[103] respectively) for both GS and CSP, but targeting different activities as eligible for funding.

Coherence with national interventions

Coherence with national interventions is ensured at several levels.

Firstly, the projects eligible under CEF correspond to those defined as priorities in the TEN sectoral legal basis or through implementing acts (such as the list of Projects of Common Interest for energy[104]). Member States and national stakeholders are fully involved in the definition of these priorities through experts groups, committees and Council formations. This allows for a bottom-up (starting from the operators level) and long-term planning of the European infrastructure consistent with the national planning processes. As for the Telecommunications sector, the Guidelines identify upfront the DSIs eligible for funding, however without enabling a mechanism to revise them regularly.

Secondly, the possibility to provide significant EU support in the form of grants with relatively high co-funding rates for cross-border projects enables to leverage resources which would otherwise not have been invested in these projects. The implementation of CEF in conjunction with clear EU priorities defined in the TEN-T regulation ensures the necessary convergence of both EU and national resources on priorities delivering EU added value.

Thirdly, at project level, coherence is ensured by the involvement of Member States in the implementation of the programme. Responsibilities of Member States include the approval of the list of selected Actions via the examination procedure, the approval[105] of grant applications and the certification[106] of reporting documents including cost statements.

The technical survey provides that for the three sectors covered by CEF, respondents very positively rate such complementarity. For the transport sector, 92% of respondents consider CEF is at least to some extent complementary with national interventions (fully for a 13% and to a large extent for a 54%). For the energy sector, this percentage amounts to 89% (fully for 21% and to a large extent for 40%). For the telecommunications sector, this percentage amount to 93% (fully for a 14% and to a large extent for a 30%). As the development of trans-

[102] The Justice Programme, running from 2014 to 2020, aims to contribute to the development of a European area of justice, based on mutual recognition and trust, in particular promoting judicial cooperation in civil and criminal matters (art. 3 of Regulation (EU) No 1382/2013 of the European Parliament and of the Council of 17 December 2013 establishing a Justice Programme for the period 2014 to 2020.

[103] The Consumer Programme 2014-2040 supports EU consumer policy. Particularly, it aims to ensure consumer protection, empower consumers and give consumers a central role in the internal market (art. 2 of the Regulation (EU) No 254/2014 of the European Parliament and of the Council of 26 February 2014 on a multiannual consumer programme for the years 2014-20 and repealing Decision No 1926/2006/EC).

[104] The TEN E Regulation identifies twelve priority corridors and thematic areas in the field of cross border energy infrastructure that must be implemented in the current coming decade to help the EU meet its short and longer term energy and climate objectives. To become a PCI, a project must have a significant impact on energy markets and market integration in at least two EU countries, boost competition on energy markets and help the EU's energy security by diversifying sources, increase competition on energy markets by offering alternatives to consumers, and contribute to the EU's climate and energy goals by integrating renewables. The projects are assessed by so-called Regional Groups that include representatives from EU Member States the Commission, transmission system operators and their European networks organizations', regulatory authorities, as well as the Agency for the Cooperation of Energy Regulators (ACER). The first list of PCIs was published in 2013 and the second in 2015. The list is updated every two years, and the next update will take place at the end of 2017.The current list comprises 195 projects, of which 108 electricity, 77 gas, 7 oil and 3 smart grids projects.

[105] Article 9 of CEF Regulation

[106] Article 22 of CEF Regulation

European networks in transport, energy, telecommunications is a shared competence between the EU and its Member States, this is a positive observation.

As a tool to support the TEN-E policy, CEF Energy is coherent with actions taken by the national administrations, national regulators to implement PCIs. By design, the allocation of CEF Energy funding for projects of common interest is coherent with national and cross-border cost allocation decisions of energy regulators.

BOX: the CBCA tool in the TEN-E Guidelines

The TEN-E Regulation introduced cross-border cost allocation (CBCA) as an improved regulatory tool to facilitate the implementation of PCIs taking into account the distribution of costs and benefits across borders. For PCIs, an assessment of market demand or of the expected effects on tariffs can indicate that the costs cannot be expected to be recovered by the tariffs paid by the infrastructure users. The basis for the appropriate allocation of costs is the analysis of costs and benefits of an infrastructure on the basis of a harmonised CBA methodology. As a pre-condition on eligibility of CEF funding for grants for works, a CBCA decision from the national regulators is needed. CEF funding can intervene when the project provides significant degrees of externalities in security of supply, innovation, or solidarity or, which cannot be covered by market or tariffs, in line with the CBCA decision So far, 24 CBCA have been adopted for a total investment amount of approximately EUR 5 billion between 2014 and the end of 2016. Of those CBCAs, indicatively, the overall investment costs of the projects amount to 5.4 billion Euros in gas, while it is less than 650 million Euros in electricity. There is an increasing in the number of CBCAs in electricity projects from 2014 to 2016 indicating the growing maturity of projects in the sector[107].

In the DSI area, CEF is enhancing the impact and efficiency of the solutions developed at Member State level by supporting cross-border interoperability.

CEF Broadband is a direct support to Member States' efforts to reach the 2025 strategic connectivity objectives for a European Gigabit Society. In addition, it indirectly supports all digital and digitally-related policies, such as the digitisation of industry, smart energy, smart mobility, etc. which are essential components in the Digital Single Market Strategy of the Commission. The Connecting Europe Broadband Fund makes funding available for deployment, and the Wifi4EU initiative offers a foretaste of the European Gigabit Society vision by providing citizens high speed connectivity and innovative e-services (e-government, e-health, e-tourism etc.…) in the period ramping up at 2025.

6.3. Effectiveness

This section aims at assessing the progress in achieving CEF general and sectoral objectives, both at policy and operational level, in terms of accelerating investment and exploiting synergies between sectors. The analysis also looks at the level of information and participation in the programme, as well as at the system in place to monitor its performance.

6.3.1. CEF's effectiveness in achieving policy objectives

Main findings

- CEF contributes to the Europe 2020 Strategy and to the **Juncker Commission's priorities,** notably on its internal market dimension, by helping develop modern and high-performing networks throughout the EU in transport, energy and telecommunications.

[107]Sources: ACER document entitled Overview of cross-border cost allocation decisions - Status update as of January 2017.

- Based on current trends, CEF funding in projects in the transport and energy sectors are expected to contribute to meeting the EU target of allocating **20% of the EU budget to climate actions**.

- In **transport**, CEF is supporting projects aimed at completing the Core and Comprehensive networks, while promoting a safe, smart and decarbonised mobility system.

- In **energy**, CEF is effectively contributing to enhancing security of supply, ending energy isolation, eliminating energy bottlenecks, completing the internal energy market and meeting climate and energy targets.

- In **telecommunications**, CEF is helping to deploy the DSIs, allowing public administrations, citizens and businesses to benefit from more comprehensive and efficient cross-border online services. During the initial phase of implementation, effectiveness has been hampered by the limited awareness of the new programme resulting in relatively low participation. Communication activities have been improved since; however there is still need to increase awareness of the programme. Although the budget for broadband was limited, it has served to finance technical assistance activities in support of broadband projects with difficult underlying business cases.

6.3.1.1. Progress towards the development of modern and high-performing trans-European networks and more interconnected markets

By improving the infrastructure in all three sectors covered by the programme, CEF as a whole brings a key contribution to the first four priorities of the Juncker Commission: 'Jobs, Growth and Investment'; 'Digital Single Market'; 'Energy Union and Climate' as well as 'Internal Market'.

The vast majority of respondents to the technical survey agreed, at least to some extent, that CEF will effectively achieve the development of modern and high performing trans-European networks in the areas of transport (99% of respondents), energy (97%) and telecommunications (96%). Respectively, 33%, 38% and 21% of respondents fully agreed.

Transport

The first CEF Transport funding objective relating to **cross-border transport infrastructure** represents 86% of the funds currently allocated for transport (EUR 18.35 billion).

Within this first funding objective, the main focus is the **Core Network and its nine corridors** (87% of total funding currently allocated in this objective), which must be completed by 2030. This includes 20 key projects of particularly relevant EU dimension for the completion of the TEN-T, such as Lyon-Torino (FR/IT), Seine-Escaut (FR/BE/NL) and the Brenner Base Tunnel (IT/AT) as well as the Rail Baltica (FI/EE/LV/LT/PL).

Furthermore, under its third funding objective for transport, CEF contributes to fostering **smart solutions** across Europe as well as to an optimal **combination of transport modes**. Under the third funding objective, EUR 2.5 billion in CEF funding resulted in a total investment of EUR 5.9 billion in 2014-2016, with Single European Sky ATM Research

(SESAR), Motorways of the Sea and Intelligent Transport Systems (ITS) for road being the main priority areas.
Based on projects selected during the 2014 and 2016 calls, it is expected that by 2020 transport modes will be better integrated by connecting 5 inland ports, 9 maritime ports and by improving 7 rail-road terminals. This will be achieved through a total investment of EUR 287 million, of which CEF funding corresponding to EUR 91 million is currently allocated to 16 projects, roughly half of which are in Cohesion countries.

CEF has been particularly successful in supporting the development of the TEN-T in Cohesion Member States through dedicated envelope, calls and financial assistance, as it will be detailed in the Efficiency section.

Example box: European Railway Traffic Management System (ERTMS)

CEF grants have been crucial in supporting the development of ERTMS across the EU. EUR 1.1 billion are currently allocated to 45 projects.

Through subsequent calls, the prioritisation of projects has been more focussed on supporting:
- cross-border infrastructure projects, which are crucial in order to catalyse implementation across Core Network Corridors and facilitate operational implementation through Member States working together. CEF funding is crucial here given that cross border sections are not necessarily a priority from a national perspective (e.g. Design and equipment of ERTMS for six border crossing corridor sections as well as two gap closings on German TEN Core Network Corridors - 2015-DE-TM-0363-W)
- retrofitting and upgrading of trains on board units: a key bottleneck to deployment is the fitting of the fleet to use ERTMS. Some Railway Undertakings, in particular, international freight are particularly impacted by ERTMS deployment and CEF support is crucial to support operation across several Member States

Example box: The Seine-Escaut Canal

This project was selected under the 2014 Call for Proposals and receives an EU grant contribution of EUR 980 million, out of a total cost of EUR 2.323 billion Its objective is to remove the waterway bottlenecks between France and Belgium and to complete the missing links between the Seine and the Scheldt, within the 'Canal Seine Nord; Seine Escaut' and 'Le Havre-Paris pre-identified sections of the North-Sea Mediterranean and Atlantic Corridors. The project includes 9 studies and work activities to be implemented in France and Belgium.

Energy

Consistently with the original objectives set in the 2011 IA, CEF Energy is showing its ability to overcome the problems highlighted in the predecessor programme (notably the limited co-funding rate of TEN-E, and the impossibility to cover the externalities).

Portfolio analysis carried out on projects funded by CEF confirms that CEF Energy has been acting to cover the gaps to a more integrated EU energy market through strengthening cross-border connections, specifically aiming at ending energy isolation, eliminating energy bottlenecks and completing the internal energy market.
It emerged from several interviews with project promoters that grants are necessary as "*there is no consumer underwriting for the (higher than usual) risks associated with the development phase of such cross border projects; if a project was unable to make a positive final investment decision, then costs incurred up to that point would not be met by consumers through transmission tariffs. This could be a deterrent to investment and therefore access to CEF Study Grant co-funding has been particularly important in stimulating development*." [108]
Several representatives of national authorities emphasised in the interviews also the fact that

[108] Quote by a project promoter in the gas sector.

small countries with dispersed population and/or more isolated location cannot build a business case or recuperate via tariffs some of the investments necessary. Here grants for works and/or agreements between neighbouring countries on the sharing of costs are necessary in order to make them happen at all[109].

In 2014 and 2015 the two Work programmes have given priorities to two out of three of the sector specific objectives, namely the completion of the internal market and increasing Security of Supply in line with Article 17 of the CEF Regulation. Consistent with its objectives, CEF Energy has been operating to support projects carrying significant externalities. It has contributed to increasing security of supply in Member States where this issue is more pressing and to enhancing solidarity among Member States, notably in those Member States that typically rely only on one supplier, by building energy networks where missing links are more critical.

Taking into account the actions selected under the calls for proposals of the years 2014-2016 it can be said that CEF Energy, at least so far, is expected to have major relevance to the two dimensions above, due to the combination of a need for secure hand and financial resource scarcity at the other hand especially in Member States located along the EU Eastern borders, from North to South. This is in line with the fact that gas projects have had more weight so far in terms of funding with respect to electricity projects, in view of the fact that a number of gas projects were more mature in the pipeline. Nevertheless, of the 37 electricity PCIs financed by CEF, 34 contribute to the integration of renewable energy into the grid[110], thereby showing in the contribution to sustainability objectives.

It should also be underlined that intrinsically all projects contribute to improving the internal energy market as PCIs once implemented will reinforce the networks and enhance cross border capacity between Member States. Likewise a well interconnected internal market is necessary to achieve a high level of security of supply and an effective integration of renewables.

Overall, it is almost unanimously confirmed by the technical stakeholder consultation that CEF Energy intervention is correctly addressing the three main objectives and providing the needed resources to accelerate cross-border projects design and construction[111].

Focus on security of supply is demonstrated by the geographical pattern of the funded projects which are mostly coming from the EU Eastern borders, from North to South. Here, both gas and electricity interconnection projects have been funded, showing the need for stronger links with neighbouring Member States' energy markets.

So far, CEF Energy has been committing a lower amount of budget to electricity actions, although it is contributing to relevant initiatives and projects, among others the Northern Sea offshore grid (both in the study and work phase), the studies for a new electrical

[109] In this respect the grants can be considered relevant in order to promote also the objective of social cohesion (besides market integration) which is one of the objectives enshrined in the treaty base of Trans-European networks).
[110] Source: projects description as in ENTSO-E TYNDP 2016
[111] With regards first sectorial objectives, to the question if CEF ENERGY is contributing increasing competitiveness by promoting the further integration of the internal energy market and the interoperability of electricity and gas networks across borders and another question, 93% of respondents (out of 30 respondents) considered that CEF ENERGY is contributing to "a large extent" or "fully"; with respect to the question whether that CEF ENERGY is contributing to the second sectorial objective, by enhancing the security of the Union's energy supply, 83% of respondents (out of 30 respondents) considered to "a large extent" or "fully"; with respect to the third sectorial objective, contribution to sustainable development and protection of the environment A 73% of respondents (out of 30 respondents) considered that CEF ENERGY is contributing, to "a large extent" or "fully.

interconnection between Spain and France and for the HVDC German underground power line "Suedlink" (see box).

Example box: Gas Interconnection Poland-Lithuania (GIPL)

One example from the gas sector in the Baltic region is the construction of the GIPL. GIPL is to be a first gas pipeline connecting Lithuania and Poland and the first gas interconnector between the Eastern Baltic Sea region and the Continental Europe. The project will integrate the gas systems of the Baltic Sea region into the internal EU gas markets as part of the European Commission's efforts to ensure that no region in Europe remains isolated. **It will thus end the long-lasting isolation of the Baltic States from the European internal gas market, contributing to ending energy isolation; further diversifying gas sources, routes and counterparts in a delicate political scenario**. It will have starting capacity from Poland to Lithuania: 2.4 billion cubic meters a year and from Lithuania to Poland: 1.0 billion cubic meters a year. The total construction costs of the project are EUR 464 million. GIPL currently receives co-financing under the Connecting Europe Facility (CEF) in the form of: a grant for studies around EUR 10 million; a grant for works – around EUR 266 million. Without the CEF grant for works, the countries would have incurred a disproportionate tariff increase for end-users. In addition, in 2014 the three Baltic States, i.e. Estonia, Latvia and Lithuania, which are net beneficiaries of the construction of the pipeline, agreed to financially support the construction of GIPL and to pay to Poland, net cost –bearer, lump-sum payments of in total around EUR 85 million.

Example box: Balticconnector – the first gas interconnector between Finland and Estonia

Currently, Finland is largely dependent on gas flows from a single supplier. When completed, the Balticconnector and the gas pipeline between Poland and Lithuania will allow Finland and the Baltic States **to diversify their gas sources and routes, safeguarding them against possible supply disruptions in the future**. The Balticconnector pipeline will enable the transport of 7.2 million cubic metres of gas per day with flows running in both directions. The project is expected to be completed in 2020. The CEF contribution of EUR 187 million, filling the commercial viability of the project both in Finland and in Estonia by helping to control a disproportionate tariff increase for consumers, covers 75% of the construction costs.

Innovation, as the third sector in which market can fail due to relevant learning costs, has had a minor weight in the project portfolio so far but it is catching up. By financing innovative projects in electricity transmission and storage, it is expected that CEF Energy contributes to the implementation of energy efficient solutions, although a tracking indicator for energy efficiency is not included among the CEF sectoral indicators. Interesting projects are reported below:

Example box: CEF as an instrument for innovation for renewable energies and electricity storage

Compressed air energy storage (CAES) Larne (UK) project: CEF awarded EUR 6.5 million (50% co-funding) for preparatory studies including an Environmental Impact Assessment and Front-End Engineering Design, for the project which aims to build a first of a kind compressed air electricity storage facility of 330 MW by creating air storage caverns in bedded salt deposits.

The Suedlink project, (Germany, (CEF support EUR 40.3 million) is the first project of this kind on such a large scale: 700 kilometres of high voltage cables due to be laid fully underground. The power line will create an urgently needed link between the wind power generated in the north and the consumer centres in the south of Germany.

The Sincro.Grid project (Slovenia and Croatia): CEF support EUR 40 million for works to enhance links between the electricity grids of Slovenia and Croatia and boost the use of decentralised renewable energy in the region, without building new overhead lines. The project will incorporate innovative elements such as the construction of electricity storage systems and a virtual cross-border control centre for energy system operators to manage the deployment of renewable energy. The project has been highlighted as a 'technologically advanced smart grid project' in the World Energy Council's World Energy Trilemma Index 2016.

Innovation can be an element also in the gas sector, as an example, the TENP project related to the construction of an innovative industrial-scale deodorisation facility in order to remove gas odorant, allowing imports to flow from Italy and France via Switzerland (CEF awarded support for studies and EUR 17.3 million (50% co-funding) for works).

Finally, as presented in the previous section, it can be observed that CEF Energy is awarding funds according to the PCIs pattern, in terms of project maturity and capital intensity. The number of PCIs supported by CEF in the electricity sector (37) equals the number of gas-related PCIs which have benefited from CEF Energy). As discussed in the relevance section, evidence points out, and notably according to PCI monitoring exercises notably undertaken by the Agency for the Cooperation of Energy Regulators (ACER)[112], that the CEF budget in the second half of the programme will be allocated to a large extent to electricity projects.

Example box: Black Sea Corridor – funding of electricity transmission line– cluster Bulgaria-Romania

In 2016 CEF funding of approx. EUR 29.9 million (50% of the construction costs) has been allocated to the construction of a new 140 km electricity transmission line between Dobrudja and Burgas in Bulgaria, belongs to the so-called 'Black Sea Corridor' project cluster: three electricity lines between Bulgaria and Romania, which will reinforce the electricity transmission corridor along the Romanian and Bulgarian coast, **to integrate renewables in the electricity market in view of the expected wind power from Greece and photovoltaic energy from South Bulgaria**. In 2014 ESO EAD became the owner of the Bulgarian transmission grid as it was unbundled from the National Electricity Company. The unbundling process and financial difficulties have been reported as the major barriers which led to a delay of five years, putting on hold the project because of organisational changes. Several factors caused the financial issues of the project. Firstly, the high cost of construction led to a low rate of return. Secondly, in Bulgaria, half of the electricity market prices are still regulated and an increase of infrastructure investment costs can not completely be forwarded to society. Moreover the delay increased the costs and the financial gap. However, the financial barrier could be solved with the granting of CEF funding first in 2014 for the study and in July 2016 for the construction. As an effect, the expected year of commissioning has been anticipated from 2022 to 2021[113].

Telecommunications[114]

Available evidence suggests that CEF Telecommunications is **contributing to the deployment of DSIs** that allow public administrations, citizens and businesses to benefit from more comprehensive and efficient cross-border online services.
However, during the initial phase of implementation, effectiveness has been hampered by the limited awareness of the programme (which was new and with no predecessors) resulting in relatively low participation[115] and low absorption of the indicative Call budget in 2 calls[116] (out of 23). Communication activities have been improved since; however awareness of the programme needs to be further increased. The recently approved communication strategy for the CEF DSIs aims to address these issues. Other specific reasons affecting effectiveness have been identified for some DSIs (see section 6.2.1.4 of PWC report):

- Technical standards for the DSIs not being ready when the call for proposals were launched (e.g. for eInvoicing and the first call for proposals for generic services for eID);

[112] See ACER's Consolidated Report on the progress of electricity and gas projects of Common Interest for the year 2016
113 Case study presented in the STUDY ON ELECTRICITY INFRASTRUCTURE DEVELOPMENTS IN CENTRAL AND SOUTH EASTERN EUROPE", https://ec.europa.eu/energy/en/studies
[114] NB: The results achieved by the CEF Telecommunications programme cannot be compared with the general targets set within the Programme Statement. Indeed, the latter is based on the original intervention logic of the CEF Telecommunications programme and its original envelope, which have subsequently been modified. An analysis of the progress of the CEF Telecommunications programme towards the achievement of its sectorial objectives has however been carried out wherever possible. Regarding DSIs, given that most of the actions for the deployment of generic services have been funded in 2015 and 2016, there is limited evidence regarding the achievement of intended results.
[115] 80% of interviewed stakeholders mentioned low awareness among the main causes of the low participation in the calls for proposals.
[116] As of 31/12/2016, award rates for ODR and Public Open Data were of 10% and 21% respectively. Source: PwC analysis on the CEF INEA's portfolio.

- MS not being ready for the calls for proposals (e.g. for ODR).

In line with article 6 of the Telecommunications Guidelines[117], **priority** has been given to the **deployment of the core service platforms**, which are *"*a precondition for the establishment of a digital service infrastructure*"*[118].

Over the 2014-2016 period, the programme has supported all the DSIs included as PCIs in Annex I of the Guidelines except for the service enabling the use of single contact points to carry out administrative procedures across borders due to the lack of maturity. About EUR 95 million have been awarded to the deployment of 14 core service platforms (eID, eSignature, eInvoicing, eTranslation, Public Open Data, Europeana, Safer Internet, Cybersecurity, eHealth, eProcurement, BRIS, EESSI, ODR and eDelivery[119]) and about EUR 128.3 million are currently allocated to 221 actions to deploy generic services[120].

Thanks to these services, for instance, companies will have easier access to national procurement procedures in other EU Member States. Moreover, citizens, patients and healthcare professionals across the EU will benefit from improvements in prevention, diagnosis and treatment enabled by digital technologies.

Example Box: eHealth Digital Service Infrastructure (eHDSI)

The eHealth Digital Service Infrastructure (eHDSI), facilitates continuity of care and patient safety for citizens seeking cross-border healthcare, allowing health data to be exchanged across national borders, namely:

1. Patient Summaries: digital summaries of patients' medical status to make care abroad better and more efficient, especially helpful in an emergency situation.
2. ePrescriptions: a digital drug prescription, which allows a patient to pick up medication in any of the participating pharmacies abroad.

To date, 16 actions for generic services have been supported in 16 Member States. These have a common goal of setting up the necessary infrastructure for the cross-border exchange of health data, in particular setting up a dedicated national contact point for eHealth starting the provision of cross-border ePrescription/eDispensation and/or Patient Summary services. The eHDSI enables the Member States to comply with the provisions of Directive 2011/24/EU on the application of patients' rights in cross-border healthcare. Interoperable and interlinked eHealth services are key elements in the DSM Strategy, in order to boost competiveness and support an inclusive digital society.

Evidence of effective implementation so far varies across DSIs. For example, whereas implementation of the eDelivery core service platform is on schedule (minor delays have been observed regarding the plan for Intellectual Property Right Management and some component description documents)[121] and has so far achieved a good quality level[122], implementation progress and quality of services have so far been less satisfactory[123] in the case of core service platforms for eID and eInvoicing. The most reused building blocks are eDelivery, eID and eTranslation[124].

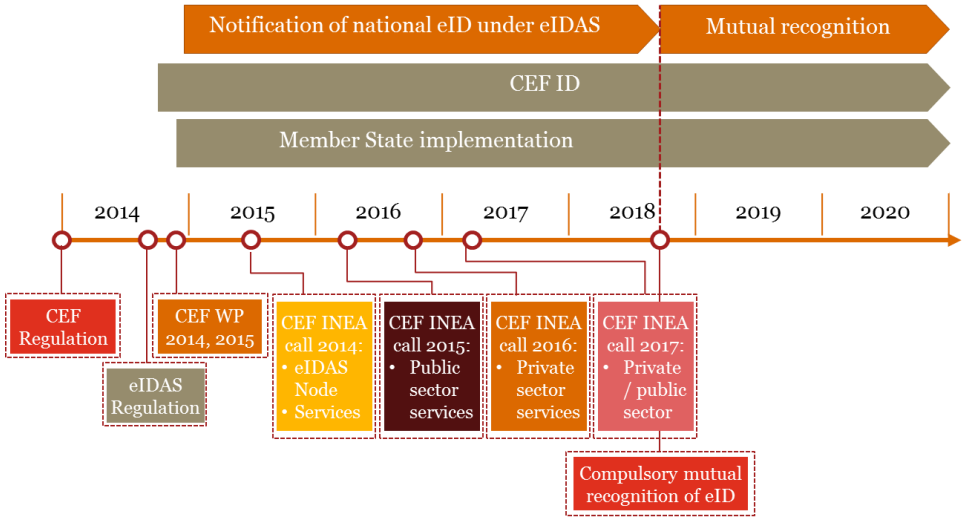
Regarding generic services, an analysis of the countries where actions have been selected for funding over the 2014-2016 period suggests that CEF Telecommunications has significantly contributed to the availability of Safer Internet, eInvoicing, EESSI, eID and eSignature,

[117] Article 6 of the CEF Telecommunications Guidelines specifies the eligibility criteria and priorities for funding.
[118] Annex of the CEF Telecommunications Guidelines.
[119] As regards eJustice DSI, CEF programme only provides support for the deployment of the generic services.
[120] As regards the generic services, only results of the first call for proposals issued in 2016 are included.
[121] Information about the progress of the DSIs reported on the CEF dashboard in the area Milestones of the eDelivery DSI.
[122] Quality of the core service platform assessed in the CEF dashboard (the score for eDelivery is 77 out of 100). The assessment considers the completeness, availability and understandibility of the descriptions of the services of the core service platform.
[123] Data reported in the CEF dashboard are taken into consideration.
[124] Data from CEF Dashboard.

eProcurement, eTranslation, eHealth, eJustice and Cyber Security – which are to become available in more than 15 Member States.

CEF Telecommunications is also helping increase the availability of building blocks[125] for other DSIs and other European projects that do not receive CEF funding (e.g. EU-CEG[126], SIMSTAT[127])[128]. Examples include cross-border recognition and validation of eIdentification and eSignature. CEF Telecommunications has also provided an essential incentive for speeding up the implementation process and ensuring compliance with the Regulations and Directives (see table below). As an example, the figure below shows CEF support to eIDAS implementation.

Figure 10: CEF support to eIDAS implementation



Source: PwC (support study), adapted from Deloitte's report for EU Commission: Connecting Europe Facility 2014-2020 – long term sustainability of digital service infrastructures – D4 Third Interim Report

Table 3: Link between policy initiatives and DSIs

DSI	Legal basis
eID - eSignature	eIDAS Regulation (910/2014)
eDelivery	eIDAS Regulation
Electronic Exchange of Social Security Information (EESSI)	Regulations 883/2004 and 987/2009
Online Dispute Resolution (ODR)	ODR Regulation (524/2013)
eInvoicing	Directive 2014/55/EU on electronic invoicing in public procurement
Cyber Security	The Network and Information Security (NIS) Directive (2016/1148)
eHealth	Directive on patients' rights in cross-border healthcare (2011/24/EU)
eProcurement	New Public Procurement Directives 2014/25/EU, 2014/24/EU and 2014/23/EU

[125] Specifically, the reuse of building blocks in European projects not supported under the CEF Telecommunications programme is a proof of the effectiveness of the solutions developed, which are indeed implemented in projects even if no funding is provided.
[126] EU Common Entry Gate (EU-CEG) is an IT tool that can be used by manufacturers and importers of tobacco products, e-cigarettes and refills containers for providing information on their products to the authorities in the MS. The Commission, in cooperation with the MS and the industry stakeholders, developed the project.
[127] Single Market STATistics (SIMSTAT) is a project to facilitate the exchange of micro-data (at enterprise level) on intra-EU exports of goods between EU MS.
[128] CEF dashboard.

DSI	Legal basis
Business Registers Interconnection System	Directive 2012/17/EU
eTranslation	n. a.
Public Open Data	Commission communication on Open Data of December 2011
Europeana	Commission's recommendation of 27 October 2011
Safer Internet	European Strategy for a Better Internet for Children (BIK)

Preliminary results from the portfolio analysis appear to be consistent with stakeholder views. 64% of respondents to the technical survey from the telecommunications sector acknowledged the contribution of CEF Telecommunications to increasing DSI availability, this view is shared by infrastructure managers, National Ministries and Regional/Local Authorities, and other organisations (including one civil society organisation). In the same vein, nearly three-quarters of respondents to the technical survey expected that CEF Telecommunications will effectively contribute to increasing the availability of building blocks.

Example box: eIDAS 2018[129]

More and more Europeans are using electronic identification to access public and private online services in their home country. But what happens when someone travels or moves to another European country? The eIDAS regulation addresses the challenge of cross-border recognition of nationally issued eIDs, enabling Europeans to access online public services across Europe seamlessly. By 29 September 2018, online public services requiring electronic identification will have to accept the eID schemes which other European countries have 'notified' for cross-border use.

CEF-funded eID DSI supports Member States and service providers in recognising foreign eIDs in a secure, reliable and trusted way. The eIDAS 2018 Municipalities Project is an example of implementation of the mutual recognition principle of European eIDs to access public services introduced by the eIDAS regulation. The project empowers citizens from EU Member States and EEA countries to electronically prove their identity with their nationally issued eID when seeking access to around 300 services in 81 municipalities across the Netherlands. The solution is currently available for Austrian, German and Belgian eID holders, and should progressively be extended to other countries connecting to the eIDAS network. Upgrades in software and infrastructure are underway to connect 200 additional municipalities and more than 1500 services. By using the eID solution, the project is contributing to the achievement of the Digital Single Market. Cross-border recognition of eID helps create a predictable regulatory environment to enable secure and seamless electronic interactions between businesses, citizens and public authorities. The action is at an advanced stage of implementation. Moreover, CEF funding enables the Netherlands and the associated solution provider (which is a private company) to become frontrunners in the field of electronic identification.

As regards CEF Broadband, and more in general the connectivity area, several actions are worth mentioning. The WiFi4EU initiative is expected help in promoting and demonstrating the benefits of the gigabit society to both citizens and local authorities. As the initiative has only recently received political agreement by the co-legislators, it is too early to assess its effectiveness. However, it is expected to serve 6,000-8,000 local authorities by 2020. The Connecting Europe Broadband Fund, in turn, will promote and demonstrate investments in innovative state-of-the-art technologies and business models, such as FTTH wholesale-only networks in line with the proposed revised regulatory framework for electronic communications (eCode). It is expected that between 7 and 20 projects will be financed every year from 2017 to 2021 in up to 20 Member States. The Connected Communities Initiative (CCI), launched in cooperation with the World Bank, aims to support cities and local operators seeking advice for introducing fast broadband in their communities. At this stage it

[129] Source: https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/2017/07/11/eIDAS+2018+Municipalities+Project

can already be stated that the CCI has resulted in significant improvements to the conception of the selected projects including in terms of their objectives and underlying business model (against a background of a large demand for support[130]). Several of these projects have subsequently already found investors.

In addition to these findings, the technical survey also shows that a very large majority of respondents in the transport, energy and telecommunication sectors (94%, 97% and 86% respectively) expect that CEF will improve the EU's competitiveness on global markets at least to some extent. Finally, 88% of respondents consider that economic, social and territorial cohesion will be strengthened as a result of CEF intervention at least to some extent (14% fully and 38% to a large extent).

6.3.1.2. Progress towards the achievement of the sustainable developments targets by 2020

One of the CEF general objectives is to support the Union's sustainable development targets, including the reduction of greenhouse gas (GHG) emissions, increases in energy efficiency, and raising the share of renewable energy. Overall, the Commission has committed to directing 20% of the EU budget spending on climate-related actions.

While the contribution of CEF-supported actions to the specific targets is not possible to measure at this mid-term evaluation stage, the 2015 Programme Statement does lay out a methodology for estimating the contribution of different categories of spending against this goal. An analysis of such contribution was performed under the mid-term review of the 2014-2020 MFF[131], showing that CEF effectively and significantly contributed to it, with a share of commitment appropriations estimated at an average of more than 5% of the Total Climate Change finance in the EU Budget for the three last years. This average rises to 35% when considering the CEF contribution into the Competitiveness for Growth and Jobs heading of the EU Budget.

This seems to be backed by the results of the technical survey, where 85% of respondents agree at least to some extent that CEF will effectively reduce greenhouse gas emissions and increase energy efficiency and renewable energy use.

At the sectoral level, transport and energy are the two sectors whose contribution to climate action objectives can be estimated at present.

In **transport**, CEF contributes to the decarbonisation of the European economy by enabling the modal shift to environment-friendly transport modes, in particular rail and inland waterways (roughly 81% of the total amount of funding currently allocated). At the same time, EUR 414 million is currently allocated to innovation and new technologies projects for sustainable transport. This includes in particular about 2,800 additional alternative fuel supply points for road transport by 2020. EUR 140 million has been earmarked for such priorities in the 2017 Blending Call.

Example box: The LNG Motion project

[130] The call for expression of interest to the Member States resulted in the identification of 120 projects that seek to invest in broadband from 24 Member States.
[131] http://ec.europa.eu/budget/mff/figures/index_en.cfm#com_2016_603

This project was selected under the 2015 Call for Proposals and receives an EU grant contribution of EUR 27.8 million out of a total cost of EUR 55.5 million (50% co-funding rate). Its first objective is to increase the Liquefied Natural Gas (LNG) availability along the TEN-T Core Network covering France, Belgium, the Netherlands, Germany, Poland, Spain, Italy, Hungary and Romania, mainly for road transport. Its second objective is to study the commercial, operational, technical and environmental aspects of LNG for trucks, in a real-life trial, and to share parts of these data amongst stakeholders. Finally, the project will support the minimisation of CHG, CO_2, NOX and PM emissions.

In **energy**, evidences contribute to express a positive judgement on CEF's contribution to climate actions on climate spending, according to the Commission[132] the 40% of the CEF allocations to the energy sector are assumed to contribute to mainstreaming of the climate action at programme level. Electricity projects, contribute to CO_2 emissions reduction by increasing grid capacity to integrate energy produced from renewable sources (34 out of 37 electricity PCIs having received co-financing under CEF do so, see p.52). Gas infrastructure projects shall contribute through increasing gas shares in the energy mix of the involved countries, potentially lowering provisions costs and making electricity production from gas-powered plants and space heating more competitive, compared to coal or oil. Also in the stakeholder interviews it was stated clearly that contribution to CO2 emission reduction is of an indirect nature, as it depends on other factors. Therefore, even though for CO_2 reductions the transmission grid is an important enabling factor, the emissions are in the end determined by the energy mix, which depends among other factors such as on the prices of the ETS' emission allowances, national support schemes, effective energy measures, etc.

Even though the CO_2 emissions indicator can only be an ex-post indicator, an estimation of the CO2 emissions prevented by the completion of electricity project of common interest can be done. On the basis of network models performed in the context of the ENTSO-E TYNDP 2016, the estimated contribution of electricity projects funded by CEF Energy is a CO_2 emission reduction of 5000 kt/year, which represents around 47% of expected total CO_2 emissions prevented if all projects of common interest of the second Union list were to be implemented.

Although a specific earmarking to projects supporting sustainability objectives has not been done in the first years of CEF programme, so far, the electricity and smart grids sector has been allocated approx. 30% of the total CEF budget, with evidence pointing out that more projects in the electricity sector will come to maturity in the second half of the programme, as discussed in the previous sections (the 30% figure does not cover the gas sector as outlined below). As discussed in section 6.3.1.1, of the 37 electricity PCIs financed by CEF, 34 contribute to the integration of renewable energy into the grid[133], thereby demonstrating the contribution to sustainability objectives. Therefore, evidence shows that CEF budget is contributing to support actions with a potential strong impact towards mitigation of climate change.

Concerning **telecommunications**, although contributions to the reduction of the CO_2 emissions can be expected from projects implementing digital solutions, no methodology is currently applied in the context of CEF to estimate such reductions. An ex-ante estimation of the share of the investment contributing to climate-related policy goals is carried out for projects funded by ESIF[134]. However this framework is tailored to ESIF-specific categories of

[132] DB2018 PS CEF BB 20170213a.
[133] Source: projects description as in ENTSO-E TYNDP 2016
[134] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014R0215.

intervention and is not adapted to the specific features of projects covered under CEF Telecommunications.

6.3.2. CEF's effectiveness in achieving operational objectives

Main findings

- CEF is demonstrating its ability to **trigger additional investments** in projects that under normal conditions would not have been sufficiently supported at Member State level or by the market.

- The **grant** component provided funding commitment in a clear legal context, securing additional sources of financing and contributing to the coordinated deployment of European programmes.

- The **CEF DI**, building on the experience gained with the LGTT and the pilot phase of the PBI, pioneered the use of **FIs**, but there has been a substitution effect when EFSI was created.

- There is **potential for further developing FIs** and making them more effective. In addition, an equity instrument is currently being developed under CEF broadband for which significant demand is expected.

- Blending of EU grants and private sector finance has been used successfully in a few cases and is now being tested at a larger scale through the transport 2017 Blending Call.

- The objective of CEF to promote **synergies at project level** has not been achieved so far mainly due to the rigidity of the legal/budgetary framework as regards the eligibility of projects and the eligibility of costs. It is also important to note that opportunities to exploit potential synergies and address common challenges among the three sectors is expected to increase in the future in light of technological developments.

6.3.2.1. Ensuring and accelerating investment

Grants

The EU funding has had a clear acceleration effect on many of the projects supported in the transport, energy and telecommunications sectors by **providing funding commitments in a clear legal context**, which is specifically important for the complex cross-border projects requiring cooperation of several Member States and their implementing entities, coordination of funding commitments, permitting and building procedures and of preparatory activities such as public hearings, or environmental impact assessments (the last three specifically applying to transport and energy sectors). This is also almost unanimously supported by the respondents to the technical survey: CEF is considered to stimulate the acceleration of investment at least to some extent, with 78% of respondents considering that this is fully or to a large extent the case in the transport sector, 85% in energy and 63% in telecommunications.

As presented in the Implementation section, CEF currently allocates to **transport** projects EUR 21.3 billion resulting from the calls for proposals launched in 2014-2016 and dedicated to priorities defined in both the Annual and Multi Annual Work Programmes, which has

triggered total investments of EUR 41.6 billion. The funding has served to support key European transport infrastructures, in terms of cross-border transport connections contributing to building an effective Single Market, increasing the sustainability of transport infrastructures by focusing on rail infrastructure and environmentally friendly modes of transport and finally supporting the digitalisation and the new generation of technologies.

Public investments in infrastructures, which typically have lifecycles spanning 30-50 years and beyond (e.g. railways and ports) could not have been kicked off without national and European public funding being secured. In that respect, EU funding commitments have been crucial in securing additional sources of financing, including from the banking and private investors sides. The capacity of CEF to foster development of cross-border projects was confirmed by the stakeholders in the technical survey, a large majority of which (88-94%) responded that this is the case fully or to a large extent, for the three sectors. The example below illustrates that some cross-border projects would not have been realised without a major EU contribution.

Example box: The Brenner Base Tunnel

The Brenner Base Tunnel forms the heart of the Scandinavian-Mediterranean corridor, connecting the regions and ports in the Scandinavian countries, Benelux and Germany with their counterparts in the Mediterranean. The Brenner Base Tunnel will remove one of the key rail bottlenecks in the EU. Passenger and freight transport will benefit from reduced travel times and more efficient connections. The Brenner Base Tunnel is expected to shift 50% of the heavy traffic from road to rail. In the long run, it is expected to change the modal share from today's 30% transport of goods by rail and 70 % by road to 70% by rail and 30 % by road. The slope of the railway line will be reduced from 27 ‰ to 6.7 ‰ in Austria and 4 ‰ in Italy. The length of the rail stretch between Innsbruck (Austria) and Fortezza (Italy) will be reduced from 75 km to 55 km. The project received EU grants for feasibility studies under the TEN-T programme. In-depth analysis in cooperation with the Member States concerned, the EIB and the private sector in 2006-2007 demonstrated the difficulties for realising the project with private financing due to the duration of the works and the financing required. It received a CEF grant of 1.2 billion for works during the period 2014-2019.

The EU grant funding has contributed to the coordinated deployment of the key European flagship programmes. Examples include the SESAR or ERTMS, clearly require a coordinated implementation of investments across countries and across stakeholders to bring the systemic benefits of performance, safety, interoperability. Had such Programmes been financed without a coordinated European approach, they would result in either no economies of scale from investments and no system-wide benefits, or no investments at all, as the stakeholders would have preferred to wait for others to make the first move.

In **energy**, evidence of the accelerating effect of CEF support can be found analysing the progress of implementation of PCIs which received CEF support. Following the call 2014, 28 actions for grants for studies on 27 PCIs were funded; of those PCIs, 20 are being implemented on time[135], in most instances by entering the permit granting process after completing earlier project development stages while on average over the same period of time in the electricity sector two thirds of PCIs and almost all gas PCIs (except for 5) are reported to be behind, being either delayed or rescheduled. During the two-year period from February 2015 to January 2017, approximately only one-third of the PCIs managed to maintain their

[135] Source: ACER Consolidated report for PCI progress, 2016 and ACER report update for PCI progress in 2017. . It should be noted that, according to ACER assessment, rescheduling occurs mostly in planning phase (thus relevant for studies) and results in general postponement of project implementation by around 2-4 years on average. Other reasons than financing delays affect the PCI implementation, however, notably permitting issues, public consultation and public opposition
2) Difficulties related to the EIA, 3) Public consultation and opposition and, 4) Financial difficulties

original time schedule. The remaining two-thirds of the projects were delayed or rescheduled at least once during this two-year period.

Only a third of the 111 projects from the previous programme received PCI status in the current TEN-E and only 15 of those PCI received CEF funding in the period 2014-2016. With the above numbers, the predecessor programme is considered to have catalysed the results achieved by the CEF programme by financing, albeit with overall limited funding volumes, studies actions for PCIs which were generally at early stages of maturity during the previous programming period. This shows that support of CEF helped to keep the project at the expected pace, which is especially important in the study phases of the projects with long maturity period. A case study on the Spain-France electricity interconnection project[136] shows that CEF contribution is providing the needed resources to accelerate cross-border projects design. Other findings also support evidence that access to CEF grants for works and for studies is indeed perceived as main benefit by project promoters[137]

The acceleration effect is tangible also for grants for works: on a total of 11 projects which received grants for works in the calls 2014-2015, following the grant decision 2 projects are already completed and 7 went for final investment decision and are under construction, with construction to be completed between 2017 and 2019. One interviewed gas promoter pointed to the fact that whilst CEF could accelerate projects inter alia through better visibility on national priority lists, the administrative burden from other aspects such as CBCA might outweigh this accelerating effect (this is discussed under section efficiency). Another project promoter that is privately financed and not via tariffs states that CEF grants can allow such companies to build a business case when tariffs are not an option.

Grants for blending

In order to leverage additional private sector investment, DG MOVE and INEA launched a CEF Blending Call in February 2017 based on the redeployment of EUR 1 billion of CEF budget reserved for FIs towards grants for the purpose of blending with private financing. This was the first occasion where grant support available in a CEF transport call was conditional on the use of private financing (be it EIB including EFSI, national promotional banks or private lenders). Support through FIs alone has not always proved to be sufficient for the projects needed to complete the TEN-T. A targeted grant in these cases has enabled the financial case to be established and it is expected that, by doing so, the delivery of financing by the EIB or the private sector will be made easier. In practice, the beneficiaries will receive the grants they applied for only if combined with EIB financing (including EFSI) and/or national promotional bank and private financing.

While not explicitly foreseen in the objectives and forms of financing of the programme, the blending approach had already been spontaneously applied in the case of Port de Calais, Port of Dublin and the Green Shipping Guarantee Programme reflecting a certain programme flexibility/capacity to evolve. The concept of blending, in the case of Port of Calais project, is different from that of the blending call.[138] It however demonstrates how grants and financial instruments can join supporting projects being developed.

[136] Studies for a new Atlantic electrical interconnection between Spain and France, source PwC

[137] Survey conducted in the NSI East Electricity corridor project promoters in the NSI East region indeed confirming that CEF is addressing the financial barrier for PCIs (STUDY ON ELECTRICITY INFRASTRUCTURE DEVELOPMENTS IN CENTRAL AND SOUTH EASTERN EUROPE", https://ec.europa.eu/energy/en/studies)

[138] E.g. the awarding of CEF grants was not subordinated to conditions like the submission of a letter of support for one or several public or private financial institution.

Example box: the Port of Calais and the blending approach
The Port of Calais is located on the North Sea-Mediterranean Core Network Corridor. The existent infrastructure cannot cope with the traffic growth on the Dover-Calais route and the increased size of vessels. The project includes the construction of new infrastructure and equipment to improve the port's long-term capacity. While this project is economically viable, a grant supports the project to be financially viable. Out of a total investment cost of EUR 862.5 million, CEF provided funding support for approximately EUR 82 million in grant form. A EUR 50.6 million CEF DI support through the Project Bond Credit Enhancement enabled EUR 504 million 40 year-bond being issued by the Port of Calais to finance the project.

Financial instruments

The CEF predecessor FIs, the LGTT and the PBI, were structured in such a way as to enhance the risk absorption capacity of the EIB, by providing a buffer in the form of a first loss piece from the EU budget. As also confirmed by the findings of the respective evaluations[139], among the key achievements of these two instruments in terms of leveraging the EU budget contribution are the following: securing the overall financial commitments to projects via the EU-EIB support, and attracting additional financing of commercial banks.

With regard to the three CEF sectors, the pilot phase of the PBI has achieved the following results:
- 5 projects in Transport sector supporting project costs of EUR 3.5 billion were signed between 2014 and 2016,
- 1 project in energy sector (EUR 424.9 million project costs),
- 1 ICT project (EUR 189.1 million project costs).

Overall, the Project Bond Initiative was useful in facilitating the development of the project bond market and raised the interest of institutional investors in the financing of EU infrastructure projects[140]. With regard to projects additional to the ones initially part of LGTT and Project Bond portfolios, and which have been signed under the CEF DI, the achievements cannot be yet fully measured at the time of this evaluation.

In line with the findings of the evaluation of the Europe 2020 Project Bond Initiative, it should be noted that the LGTT and PBI were specific tools designed in particular for use following the financial crisis. As the financial markets have improved, their applicability today is to an extent diminished. However, this does not mean that they have lost their utility. Were there to be another tightening of credit or other stresses on private finance, such tools would again be more relevant and would likely be in significant demand.

The CEF DI represents an evolution of the LGTT and PBI. It shares the same aim (i.e. to tackle capital market deficiencies fostering private investment in transport infrastructure, as well as energy and broadband). It however provides the scope for wider support, compared to the legacy instruments (which are incorporated into the CEF DI) for example via financing solutions such as the Senior Debt Credit Enhancement (SDCE), a product initially developed under the LGTT to cover more project risks and for a longer period.

Further, a major upgrade, compared to the legacy instruments, is represented by the CEF DI portfolio approach, which enabled pooling together transport, energy and telecommunication

[139] Ex-post evaluation of the loan guarantee instrument for. Trans-European Transport Network projects (LGTT) and Ex-post evaluation report on the pilot phase of the Europe 2020 Project Bond Initiative (PBI)
[140] As indicated in COM SWD (2016) 60 final

projects into one portfolio. Risk diversification is thus increased, enabling increased support compared to what a sector-specific instrument could provide.

Among respondents to the technical survey, 87% agree that CEF will effectively create an environment that attracts private financing to infrastructure projects at least to some extent (while 27% agree it will happen to a large extent and 10% fully). Respondents consider that the CEF DI contributes at least to some extent to overcoming deficiencies of the European debt capital markets (40% while 54% do not know), create additional risk capacity in the entrusted entities (42% while 53% do not know) and to facilitate financing for project companies (48% while 47% do not know). For the role that the EI has had on overcoming the deficiencies of European capital markets, a 38% of respondents agree this had happened at least to some extent (while 54% do not know).

Following the launch of EFSI in 2015, as mentioned earlier, there has been a substitution effect with the CEF DI. This situation can be explained by the combination of several factors: the overlap in eligibility between EFSI and CEF, the greater flexibility given to EFSI compared to CEF regarding the terms and conditions of financing that can be offered, and the high political priority to deliver tangible results for the EFSI.

Leverage of the CEF Debt Financial Instruments

Leverage triggered by the CEF DI in the CEF Regulation is expected to be in the range from 6 to 15. The achieved leverage is quantified as the aggregate of the amounts raised to finance the projects supported by the CEF DI, divided by the aggregate amount of the EU Contribution committed to the instrument to date. As at 31 December 2016, the achieved leverage[141] effect amounted to approximately 20.1 (Total project costs EUR 13.9 billion/ EU Contribution committed EUR 688.6 million). This high leverage is reflective of the subordinated nature of many of the projects in the CEF DI portfolio.

Transport

In total, the amount of investment mobilized by CEF-DI including the legacy instruments amounts at EUR 13.3 billion, out of which the project costs supported by the projects signed from 2014 to 2016 amount at 4.5 billion. While EFSI has broader eligibility and therefore also invested in mobile equipment (e.g. rolling stock) and equity funds, which explains the larger amount of investment mobilized, one can draw the conclusion that CEF-DI (and legacy instruments) were performing rather similarly than EFSI once comparing projects within the same scope of TEN-T.

Energy

The CEF DI to be managed by the EIB was set up for the period 2014-2015 with a total allocation of EUR 89.2 million. However, to date no actions have been concluded by the instrument. No subsequent commitment to the CEF FIs has been foreseen for the years 2016-2020.

[141] The calculation of the leverage achieved excludes the amount of the project costs that are expected to be supported under the framework agreement signed in November 2016 as part of the Green Shipping Guarantee programme. This is because at end 2016 there was no individual transaction signed by the partner financial institution with a final beneficiary. Furthermore, the leverage is calculated on the basis of the total amounts committed from the EU budget to the instrument (including EU contribution committed to PBI and LGTT instruments), which is higher than the EU budget contribution actually paid to the EIB upon signature of projects under the CEF DI.

A number of factors have contributed to the underutilisation of CEF DI, including: the short pipeline of bankable CEF eligible projects available at the time CEF DI went into operation, the terms and conditions of financing laid out by the CEF Regulation[1]; and the subsequent creation, political priority for, and better terms and conditions offered by the EFSI instrument, which led to the shift of the CEF Energy pipeline to EFSI. More than 60% of project promoters in the targeted survey reported that they had not considered the CEF DI when pursuing debt to finance their projects. This was largely due to the competitive range of debt and equity options already available to them (including from banks and funds with which they have well established relationships) due to their sound Regulated Asset Base model for project finance[142].

Given the lack of uptake of CEF DI and the subsequent establishment of the EFSI instrument and the preparation for the extension of EFSI (EFSI 2.0) no further funds were allocated to the CEF DI in 2016. A number of projects that had been pre-selected for the CEF DI pipeline were transferred to the EFSI. The BRUA - "Development on Romanian territory of the National Gas Transmission System on the Bulgaria-Romania-Hungary-Austria direction", which received CEF grants for works of EUR 179 million on the basis of significant externalities on security of supply, was added to this pipeline and has since accessed EFSI financing of EUR 100 million.

The case of BRUA demonstrates the important potential of blending different funding instruments. Blended financing structures are foreseen for Projects of Common Interest such as CAES, BRUA, Krk LNG, Klaipeda-Kursenai pipeline at the initiative of the project promoters, showing that CEF grants can play the role of enabler and attract other private investors and furthermore that CEF's objectives can be pursued obtaining higher leverage effects through such blended financial solutions. At least two projects (CAES and KrK LNG) funded by CEF Energy attracted equity investment. In total, 17 PCIs in energy have received EIB loans [143] (including three EFSI products), of which 6 have combined loans with grants for studies and or grants for works.

These examples show that for projects with a limited funding gap in particular, bankability conditions can be reached by a limited contribution from grants with financial instruments to help project cash flows to remunerate both equity and loan requirements. A combination of CEF grants plus EFSI can be envisaged at different phases of project implementation (e.g. studies to accelerate project implementation, and works).

Telecommunications

EFSI can support projects in the digital-related areas. However, given that FIs cannot be used to support the deployment of the DSIs, notably due to the methods of intervention set out under Article 5 of the CEF Telecommunications Guidelines as well as to the limited potential for revenue generation (see section 6.1.3), the establishment of EFSI did not increase available funding for DSIs. Conversely, EUR 100 million (8.8% of the overall CEF Telecommunications budget) were transferred from the budget available for DSIs to EFSI. Strategic stakeholders highlighted that, as this transfer of resources had an impact on the

[142] Several representatives of project promoters and national authorities stated in the interviews that there was so far a preference to use long standing lending arrangements with the EIB or other financial institutions rather than the new CEF offer as "*borrowing at company level" or "arrangements through the parent company" were "more attractive than seeking funding at project level*". Other experts interviewed also emphasised the fact that using a financial instrument instead of a grant results in capital costs implying a higher tariff – which is obviously more difficult to impose in countries with smaller population size.

[143] Reference: status monitoring of PCIs , internal DG ENER table, status October 2016.

budget of CEF Telecommunications in the DSIs area for 2016-2017, it accentuated the back-loading profile of the programme. In the broadband area, EFSI did replace the CEF DI in the sense that EFSI financed broadband-related actions that CEF Telecommunications was not able to finance anymore as most of its budget planned for the CEF DI was already committed. Regarding the CEF EI, EFSI enabled the creation of the Connecting Europe Broadband Fund (CEBF). Under the CEBF, a contribution of EUR 100 million, combined with a EUR 100 million support from EFSI, is expected to generate investments between 1 and 1.7 billion EUR in high capacity networks in under-served areas. The fund is expected to become operational in the first half of 2018 and to respond to a clearly identified gap in the financial markets. It should be noted that in the case of the CEBF, the use of CEF and EFSI funding have been mutually reinforcing in creating a first investment platform under the IPE: EFSI will significantly expand the leverage of the fund and thus the number of broadband projects that can be supported, while CEF will help EFSI funding reach smaller, local operators, which encounter difficulties to find financing on the market.

Overall leverage

Overall, as presented in the Background section, the leverage effect triggered by CEF was expected to be as high as 26.5[144], a factor based on the observed LGTT performance, which would have triggered investment of EUR 192 billion in the three sectors, an amount much closer to the EUR 1,000 billion needed. Based on the observed results to date, it is unlikely that CEF will trigger the forecasted EUR 191.92 billion in infrastructure investment.

This estimate did not, however, take into account that the main share of CEF was not handed out via FIs but via grants for works and studies – for which leverage effects tend to be much lower. Annex III of the 2011 IA in fact gives 5-10 as the target for leverage for both equity and debt instruments. Leverage as defined for the CEF instrument included leverage through all funding sources, not only private funding.

In addition, what could not be anticipated at the time of drafting of the IA was the setting up of the Investment Plan for Europe in 2014, including the EFSI initiative launched in 2015, which altered the original assumptions of the IA not only with regard to available EU funding for infrastructure projects (EUR 2.8 billion transferred from CEF to EFSI guarantee fund), but also had an effect on the leverage estimations as the products delivered via EFSI support were set up faster and Concretely, this meant that some of the estimated impacts occurred rather under the heading of EFSI than under CEF. However, both financing mechanisms suffer from a relatively weak project pipeline.

How to increase effectiveness of Financial Instruments?

Successful use of Financial Instruments depends on a clear strategy and on a set of criteria to determine which tools are most appropriate for market needs, beneficiaries and the desired objectives. It also requires time for the development of specific tools and for the market to adopt them. Based on the experience to date, there is **potential for further developing financial instruments under CEF and making them more effective. This** includes:

On the "supply" side

[144] Annex II of the 2011 IA.

- a comprehensive identification of the sector specific needs, which according to the analysis presented above vary substantially due to the wide range of beneficiaries;
- the further development and marketing of specific products to address market failures, which can lead to proposing highly customised products to enable bankability of infrastructure projects at competitive and predictable costs;
- adapt existing instruments to changing market conditions, as it has been done with the LGTT which evolved into the SDCE (see page 65);
- avoid overlaps between instruments through policy guidance on the complementarity of financial instruments focussing on eligibility criteria (this will be necessary when it comes to ensuring the complementarity between an extended EFSI and CEF DI);
- create a blending facility (as proposed by the European Commission in its 'Omnibus' proposal[145] and currently under negotiation), making access to financial instruments easier for promoters by de-risking project finance and attracting investors.

On the "demand" side

- Make available – by respecting the different needs of companies/procuring authorities in accordance with their investment portfolio – advisory services/technical assistance either as (short-term) financial engineering support or in the form of (long-term) capacity building for financial engineering[146].

6.3.2.2. Exploiting sectoral synergies

The CEF Regulation defines "synergies between sectors" as the "*existence, across at least two of the transport, telecommunications and energy sectors, of similar or complementary actions that may enable costs or results to be optimised through the pooling of financial, technical or human resources".*

Examples of potential project level synergies between the transport, energy and telecommunications sectors, as listed in the Regulation, include smart energy grids, electric mobility, intelligent and sustainable transport systems, and joint rights of way or infrastructure coupling. Given technological advances, it is assumed that synergies among the sectors to address common challenges and policy goals (e.g. decarbonisation) will increase in the future (for instance as regards Cooperative, Connected and Automated Mobility, alternative fuels and "smartening of the grid").

The CEF Regulation defines two modalities to co-finance actions covering several sectors (grants):

- the adoption of multi-sectoral call for proposals ("*with the financial amounts allocated for each sector being weighted according to each sector's relative involvement in the eligible costs of the actions selected for financing")*[147]*;*

- the possibility to increase the funding rates defined for each sector by up to 10 percentage points for actions with synergies between at least two of the sectors (with the corresponding additional financial amount being covered by the main sector concerned).

[145] http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52016PC0605
[146] According to findings of the study "Cost-Effective Financing Structures for Mature Projects of Common Interest (PCIs) in Energy" Roland Berger, 2017
[147] Article 17(7) of the Regulation No 1316/2013 establishing the Connecting Europe Facility

However, the provisions on synergy do not affect the provisions regarding eligibility of cost in each of the three sectors, notably as regards the geographical location of the action and the type of assets eligible, which have to be met cumulatively. This has appeared to be a very severe limitation to effectively co-finance actions covering several sectors. For instance, in the case of electric mobility, the energy components are relating to distribution networks (not eligible under CEF Energy) and most actions are not geographically located both on the TEN-T Network and on an energy Project of Common Interest.

There is thus a clear inconsistency in the legal framework between the objectives defined for promoting synergies among sectors and the possibility to implement them in practice through multi-sectoral calls. This largely explained why only one synergy call (transport-energy) was launched to date with very modest results (only 7 actions[148] were selected for a grant amount of EUR 22 million while the available budget was EUR 40 million).

As regards the possibility to increase the funding rate by up to 10 percentage points for actions with synergies, it has only been used in one case of a transport action with energy elements[149]. The reasons for this provision not being significantly used mainly lies with the budgetary constraints of the programme. In fact, in a situation of large call oversubscription (transport) or limited budget over the period (telecom), sectoral policy objectives have been given priority. Looking to the future, it seems important to promote synergies in a manner that does not lead to a budgetary trade-off with sectoral policy objectives.

This analysis was confirmed by many stakeholders who acknowledge the strong untapped potential for project-level synergies but indicate that the obstacles in exploiting synergies between sectors hamper the implementation of CEF at least to some extent (69%). This suggests that the exploitation of synergies needs to be improved, especially since they are perceived as important for addressing CEF objectives by 83% of respondents. Other interviewees also made the point that the pre-identified areas in transport and energy naturally limit the range of synergies that are possible and that more synergies could be achieved if investment at distribution level or hybrid projects (combining generation and transmission) were eligible.

6.3.3. Information, participation and monitoring

Main findings

- The relevant participants according to policy objectives are being reached by the programme, notably thanks to an effective communication strategy. However, more improvements could be made, for example, in engagement with the wider public.

- Although a number of KPIs exist at sectoral level, they do not allow to systematically monitor and evaluate CEF's contribution to the policy objectives, particularly to the overarching policy objectives.

6.3.3.1. Information about the programme

[148] Detailed in Annex 12
[149] HEKLA – Helsingborg & Klaipeda LNG Infrastructure Facility Deployment

The open consultation demonstrated that the majority of stakeholders felt that communication of CEF and dissemination of programme results has been effective with 74% having a positive view on the activities undertaken concerning awareness raising and promotion of the programme (although it should be said that there is a certain bias in this result, as obviously only those who were informed about CEF at some stage were also the ones that contributed to the consultation). The parent DGs and INEA in particular have played a decisive role in this regard.

INEA organises a dedicated Information Day for each CEF call. For example, for the 2016 CEF Transport Call, an Info Day took place on 25 October 2016 in Brussels. The event addressed the priorities of the call and practical application aspects. Besides press releases, INEA also promotes the benefits and key results of the CEF programme through publications which are made available on its website, together with details on the various work programme and calls.

The Commission also undertakes many actions to disseminate information to stakeholders. In transport, DG MOVE organises Core Network Corridor Fora, which are biannual meetings providing an opportunity for the European Coordinators to inform stakeholders as to the latest developments on the Work Plan. TEN-T Days conferences are also organised each year to inform about the funding opportunities available under CEF, together with Regional Investment Conferences, which target Cohesion Member States. The last was organised in Sofia in March 2017 and gathered around 500 participants. In addition, workshops and information days are held locally for national administrations and potential project promoters in Member States. Dedicated workshops are also designed to accompany project promoters in the implementation phase and address issues related to the regulatory framework (permitting, public procurement, public consultations etc.)

The communication activities at the Commission side on CEF energy relate primarily to the TEN-E policy and CEF is therefore part of a broader communication strategy and exercise. Actions to disseminate information on CEF include therefore relevant stakeholders meetings of the TEN-E regional groups, (with further distribution of CEF-related information in the institutional TEN-E Transparency Platform), and a high level "Energy Infrastructure Forum" which is annually held in Copenhagen, where progress in European energy infrastructure policy is discussed with stakeholders. CEF information days at the opening of calls for proposals are regularly held.

In telecommunications, information days and webinars, such as those dedicated to eDelivery and eID, are organised periodically. Stakeholder engagement activities are carried out at the DSI level, including stakeholder days and stakeholder platforms. A dedicated Stakeholder Management Office has also been set up for the building blocks. Dedicated information days have been organised in those Member States who have requested it (e.g. Portugal).

Initiatives such as the 'EUInvest Campaign' which have been launched across the European Commission and the EIB have also given further visibility to CEF projects.

There is also a contractual obligation for beneficiaries to make the fact that the project has received EU funding visible e.g. with signage displays.

The stakeholder consultation found that further improvements could be made in the communication of CEF in the following areas:

- Some stakeholders stated that they did not receive sufficient feedback regarding proposals which failed during the selection process and sought more information about how proposals are evaluated in order to be able to improve their proposals.
- According to some stakeholders, smaller project promoters and stakeholders were not sufficiently aware of the existence of CEF and it was felt that the promotion of CEF towards the general public has not been effective enough to raise a wider awareness about CEF across the EU. CEF has significant potential to demonstrate the added value of the EU at large to the general public, although it is important to note the role of Member States and beneficiaries in this regard.
- It was felt that further efforts to promote the role of CEF in climate policy could also be undertaken. Stakeholders from several sectors spoke to the need to improve communication among institutions in order to share best practices and promote synergies.
- In telecommunications, stakeholders point to the need to improve communication with potential beneficiaries at local level and the general public (notably about the programme's objectives and potential benefits) as well as communication between operational stakeholders (e.g. beneficiaries of the generic services for eID reported difficulties in knowing the level of implementation of eIDAS nodes) including dissemination of results and best practices. The latter could help create synergies among the DSIs and promote the reuse the building blocks. More effective actions to reach out to targeted stakeholders are all the more crucial since lack of awareness has been identified as one of the causes for low participation. A number of the stakeholders consulted highlighted that it would be beneficial to increase communication activities at local level, with the support of Member States. The Commission has recently adopted a communication strategy in this domain[150].

6.3.3.2. Participation in the programme

The results of the stakeholder consultation and the portfolio analysis demonstrate that CEF has reached relevant participants according to CEF policy objectives in all three sectors. Nonetheless geographical patterns can be found across the projects selected and funded under CEF. These are discussed next.

Transport

CEF Transport reached most of the relevant participants it was supposed to reach according with its general and specific objectives: infrastructure manager of rail networks, IWW, seaports, inland ports and airports; public promoter for the development of cross-borders projects; and public authorities and private operators (although the more consistent share of funding aims at overcoming the market failures of the public sector, in particular the infrastructure managers given the characteristics of the funded projects).

Nevertheless, CEF Transport is primarily intended to give support to those ambits of the transport sector more in need of the intervention of a centrally managed fund, i.e. where the market fails to finance the necessary infrastructures. In particular, interventions in the rail sector represent the most relevant category.

According to the technical survey results, which include responses from a various set of private and public actors involved in the transport sector, the vast majority of the respondents

[150] Communication activities for CEF Digital Service Infrastructures - Communications Strategy.

felt involved in the programme. Out of a total pool of 75 respondents, 27 stated to be fully involved, 29 to a large extent and only 19 to a lower extent.

In this sector, a geographically balanced coverage of beneficiaries has been ensured. The first three sets of CEF transport calls allocated EUR 16 billion to the corridors of the Core Network priority. Between 2014 and the first half of 2017, over EUR 15.7 billion has been allocated to rail projects. These examples highlight three key features of the distribution of CEF funding for transport.

- A network approach - the Core Network, to be implemented through the Core Network Corridors, has been defined according to the concentration of trans-national traffic flows for both freight and passengers, focussing on its core nodes and socioeconomic centres.
- A focus on Cohesion countries – the Cohesion envelope amounts to over 50% of total CEF transport funding with higher funding rates reflecting both the higher need of the Cohesion Member States for transport infrastructure and their lower capacity of tackling the issue with their own resources.
- An emphasis on rail - interventions in the rail sector promote a more sustainable transport network.

However, participation of third countries, which CEF transport tries to improve, did not increase significantly from predecessor programmes. A reason for this situation may be that the co-funding rates are not attractive enough, as third countries often cannot fund the rest of the project cost.

Energy

Relevant participants, who are in a position to implement PCI projects, have benefitted from CEF Energy. From the project portfolio analysis and interviews with relevant stakeholders, it can be stated that a diverse range of actors typically involved in energy transmission and storage infrastructures design and construction have been reached by CEF Energy. Analyses show responses to calls for proposals have come from Transmission System Operators (TSOs) and other infrastructures operators (Joint Ventures; Special Purpose Vehicles created by a single TSO; Storage project companies; Public authorities[151]).

The major beneficiaries have been established TSOs, with 30 out of 87 TSOs in Europe having benefitted from CEF. However evidence show cases of private endeavours now mostly asking for resources for studies and, in two cases, for works. Promoters of merchant lines and private operators interested in investing in electricity or storage facility are also in the list of CEF beneficiaries, similarly for gas transmission pipeline operators.

In line with the expectations set out in the TEN-E impact assessment, geographically speaking, the bulk of funding awarded to date for grants for works has gone to Cohesion countries, showing their need for funding cross-border interconnections. **CEF funding allocation for eligible gas projects is consistent with the security of supply objectives of the programme, having allocated significant funding to Member States and regions that have been identified as vulnerable.** This focus on peripheral areas indicates that security of supply and integration of the market have featured strongly in CEF funding allocations so far. The geographical spread of CEF grant awards for works is certainly relevant to the achievement of these objectives.

[151] The analysis has been carried out based on PwC's reclassification of the beneficiaries included in the INEA's database.

Telecommunications

The analysis of the CEF Telecommunications portfolio[152] shows that, if taken together, public national and local authorities, universities and research institutes account for almost 70% of the total number of funding recipients for actions aimed at deploying generic services, and NGOs account for 12%. Private sector companies (including SMEs), in turn, represent about 19% of the beneficiaries. This pattern owes to the nature of the DSIs, which foresee the systematic involvement of public authorities (e.g. beneficiaries of generic services for EESSI are national social security institutions; for Cybersecurity, national and governmental computer security teams -CERTs/CSIRTs-; for eProcurement, contracting authorities)[153]. Private sector participation has so far been higher in DSIs targeting private companies as solution providers, (e.g. eInvoicing). According to some of the stakeholders consulted, however, other DSIs such as eID and eDelivery would benefit from more extensive private sector involvement, notably in the form of quicker deployment and market uptake. In the same vein, half of participants in the technical consultation identified lack of private sector involvement as hindering implementation.

Beneficiaries from all EU Member States (together with Iceland and Norway) have received funding from CEF Telecommunications. About 50% of awarded funding so far has gone to beneficiaries located in eight Member States (United Kingdom, Germany, Italy, the Netherlands, Denmark, France, Greece and Finland). This is partly explained by the fact that many of these were more heavily involved in projects which piloted the solutions used to implement the DSIs, also known as Large Scale Pilots (LSPs[154]). Indeed, stakeholder interviews indicate that LSPs and the CIP–PSP programme had enabled the creation of a community of practice that has subsisted under CEF Telecommunications (about 20% of LSPs participants have been subsequently involved in CEF Telecommunications[155]). The strong participation rates in calls for proposals for Safer Internet generic services from the very first year of the programme likewise suggests the existence of a well-established community of practice in this area.

6.3.3.3. Monitoring performance (indicators)

It has become apparent during this mid-term evaluation that the CEF Regulation lacks relevant, well-defined and robust key performance indicators (KPIs) that would allow the proper *ex post* monitoring of the performance of the programme against set policy objectives (targets), which are also missing.

The CEF monitoring system appears to be a mere mirroring of the programme's main objectives into indicators that does not necessarily take into consideration their usefulness, applicability and the cost or relevance of collecting complex impact indicators. Although some differences exist between sectors, common shortcomings can be found, which risk hampering the monitoring of the progress made and therefore the improvement of the delivery mechanism.

[152] The analysis has been carried out based on PwC's reclassification of the beneficiaries included in the INEA's database. Indeed, the level of details presented in the database was not sufficient for the analysis. Additionally, within the database, beneficiaries were classified based on the eligibility criteria of the calls for proposals, not mapping the correspondence with the categories of stakeholders targeted for each DSI.
[153] The complete list of category of beneficiaries per each DSI is reported in Appendix 7.
[154] Large Scale Pilots funded under the ICT Policy Support Programme (ICT PSP) of the Competitiveness and Innovations Framework Programme (CIP), running in the 2007- 2013 programming period.
[155] The analysis has been performed by verifying whether the beneficiaries of the LSPs were included among the beneficiaries of the CEF Telecommunications programme of the calls for proposals issued from 2014 to early 2016.

Moreover, as CEF-funded infrastructure projects are often of a large scale and take years to get off the ground, their impact is usually not immediately measurable by the indicators. For some KPIs (e.g. number of new or improved cross-border connections), only projections are available at the time grant agreements are signed, and the data can only be confirmed after successful closure of the actions, which can take several years.

The set of indicators **focuses on these longer-term effects**, which are by nature more difficult to monitor and document, since a certain amount of time is necessary for them to be realised. As such, they do not provide useful information in a timely manner to improve and correct the implementation of CEF if necessary.

In **transport**, many of the CEF article 4 indicators refer to the entire TEN-T network, to the financing of which CEF only contributes (along with various other actors, including Member States, structural funds and the private sector). Therefore, these indicators (and targets) should not be considered a good measurement of the success of CEF as it gives the impression that CEF is underperforming. These indicators aim at measuring progress in developing the TEN-T with a longer term perspective. Moreover, some KPIs, such as reduction in road accidents, are only indirectly and partially linked to CEF-funded projects. The indicators should therefore be better aligned with the scope of CEF. It should also be noted that the CEF indicators are less specific than the very precise TEN-T indicators. Some alignment is most likely needed.

Regarding the **climate-related indicators**, the limitations of the indicators related to the monitoring of the programme in terms of CO2 contribution reduction (in line with what discussed in the previous section) must be taken into account, as a CO2 reductions are based on planning-related information on projects but can be verified only ex-post (ex-ante assessment for instance). In addition, **those indicators are not always measurable**.

The indicators set out for CEF **Energy** are mainly *ex post* ones, focussed on the final impacts of the programme. CEF progress towards objectives can be measured, however, by some of the KPIs provided by the CEF Regulation in Article 4 for specific sectoral objectives which, in aggregation, can help accounting on general objectives. Out of the 15 sectoral indicators, 7 are considered suitable to be used as monitoring indicators, as indicated by the Commission in the budgetary Programme Statements. These are linked to objective 4.3 (a)-(i), (ii), (iii); increasing competitiveness by promoting the further integration of the internal energy market and interoperability of electricity and gas networks across borders, 4.3 (b) (i), (ii), (v), (b) enhancing Union security of energy supply;) contributing to sustainable development and protection of the environment, 4.3.(c) (iv). In some cases the link between the CEF KPIs and the programme results is straightforward. For example, thanks to the commissioning of the strategic Klaipeda-Kursenai Gas Transmission Pipeline which got CEF funding for works in the order of EUR 27.6 million, since 2015 Lithuania fulfils since 2015 the N-1 standard in supply with natural gas providing access to an additional source of natural gas (LNG) (indicator 4.3 b (v).

Other indicators cannot be easily applied to monitor the programme, as they ask for more in-depth analysis and data series to appreciate the real impact of a given cross-border connection (either gas or electricity) on energy markets, which does not only depend on the additional link established between two or more countries and also not solely on the CEF support, but

rather is a result of additional regulatory and non-regulatory instruments working in conjunction.

To have proper monitoring tools in hand, a more suitable set of KPIs for CEF Energy could be developed. For this reason, physical and technical indicators, in particular showing additional transmission capacity (e.g. the grid transfer capacity of the project at the border of that Member State with one or several other Member States) could be elaborated.

The indicators against which the achievement of the specific objectives of the **Telecommunications** Guidelines is to be measured are considered useful to monitor the deployment of the DSIs across Europe, but they don't provide a target value.

The progress towards the achievement of the objectives of CEF Telecommunications and the performance of the DSIs are currently tracked within the CEF Dashboard[156]. However, data only covers the core service platform of almost all of DSIs (except for Europeana and Safer Internet).

The percentage of citizens and businesses using DSIs and the availability of the DSIs cross-border are not monitored. Data collection should rely on Member States, however this is hindered by the lack of obligation falling on the Member States to provide this information and the fact that not all Member States are willing to share it. As reported by implementing stakeholders, DIGIT is analysing the best tools to collect and present the information. The analysis of the case studies revealed that specific indicators on the use of DSIs have been defined at action level (e.g. as regards eID the number of public and private service providers linked to the node and the number of citizens using the node in & out), however they are not currently publicly presented.

6.4. Efficiency

This section aims to consider the outputs and impacts of CEF in relation to the inputs of the programme such as budget and resources. There are two main aspects to the analysis, firstly whether the realisation of the CEF goals is being undertaken in an efficient manner and secondly examining whether the processes in place for implementing and managing CEF are operating efficiently

Main findings

- In the transport and energy sectors, the mechanism for selecting grants efficiently discards projects unable to demonstrate the need for financial assistance. In energy, the cross border cross allocation decision provides a sound rationale to establish the need for public funding in grants for works. While for transport the assessment of the funding gap based on CBA methodologies has improved over the period, it could still be reinforced. Efficient budget planning goes in line with the increasing amount of mature PCIs in the energy PCI list.

- In the telecommunications sector, the budget cuts resulted in important changes in the logic of intervention and triggered reductions in the scope of the Programme. In the first years of the implementation, this reduction in scope combined with the possibility to shift budget from undersubscribed DSIs to other DSIs (for generic services), allowed the available budget to

[156] https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/Monitoring+dashboard.

partly address the needs of the Member States that had the capacity in place. Given the limited envelope allocated to the broadband area vis-à-vis the size of the challenge, it was necessary to implement it in an innovative way, generating an important leverage effect, in order to make an impact on the market.

- The CEF provision of more suitable co-funding rates in comparison with predecessor programmes allows for CEF's progress in achieving its objectives.

- The flexible nature of budget programming over time has allowed for efficient expenditure in each sector. In the Telecommunication sector, however, the adoption of annual work programmes does not enable the planning of long-term financing for the actions and creates administrative burden as regards the management of the programme.

- The management and governance of CEF is proving to be efficient and well-functioning with INEA playing a key role in this regard. Moreover, the delegation of the management of grants to INEA allows for economies of scale and limits administrative costs for the Commission and Member States. Simplifications have been implemented to INEA processes compared to its forerunner, the TEN-T Executive Agency. In the Telecommunication sector, there is room for improving coordination among the DSIs, given the number of bodies taking part in the management and implementation of the programme. A separate comprehensive evaluation of INEA is currently being undertaken.

- From the beneficiaries' point of view, administrative costs related to the application and grant agreement requirements, are not imposing a burden on project promoters and are deemed to be overall proportionate to the financial support provided. However, legal and administrative requirements for approval and implementation of actions were found to impose disproportionate costs on smaller actions for which simplified forms of support could be better adapted (this was particularly true for the Telecom sector where the average grant size was just EUR 1 million)

- Cooperation between Commission Services and Member State authorities is positive, going beyond the formal legal requirements of the CEF Committee.

- For a policy-driven instrument with specific sectoral objectives and considering that CEF addresses complex projects with a cross-border or an EU-wide interoperability dimension, direct management has ensured high absorption and sound budgetary execution.

- In the transport sector, the possibility to quickly re-use credits not consumed by certain actions for the benefit of other actions is critical to encouraging efficient implementation amongst beneficiaries.

6.4.1. Contributing to the achievement of the CEF objectives in an efficient manner

During the first 3 years of CEF implementation, EUR 23.1 billion of grants were directed to projects. The main share of funding is currently allocated to transport actions under Funding Objective 1 addressing bottlenecks and cross-border missing links either on the TEN-T Core Network Corridors or along TEN-T Core Network sections (around 79% or EUR 16.9

billion[157]). In the case of energy, EUR 1.6 billion funding has concentrated on security of supply, ending energy isolation, elimination of bottlenecks, with an increasing commitment in supporting PCIs having technological innovation. In telecommunications, funding focused on deployment of DSIs and technical assistance activities in support of broadband projects in the order of EUR 0.3 billion.

Almost all of the survey respondents (95%) expressed the opinion that the limited EU budget poses a challenge to the implementation of the CEF Programme. As discussed previously, CEF calls have been significantly oversubscribed and therefore illustrate that the available budget is limiting the achievement of the CEF's objectives. Nevertheless, CEF has been efficient in providing funding for tackling bottlenecks, ensuring cross-border connectivity and enhancing interoperability. 71 % of respondents to the general survey were generally positive about the efficiency of the allocation of funds in Work Programmes and per priority.

The efficient implementation of CEF is aided by the capacity to give more appropriate co-funding rates when compared to its predecessor programmes. Different co-funding rates for different priorities allow for more intensive EU support to projects with the highest EU added value such as cross-border projects. At the same time the co-funding rates have been designed and applied in a flexible manner, in order to prevent overfunding in the programme.

The front-loading approach for budgetary spending in Transport was designed to provide for continuity with the former TEN-T programme which included some of the same infrastructure projects. The approach also responded to the economic downturn, by contributing to job creation. The back-loading approach for spending in Energy is due to the maturity of projects to be reached in the second phase of the programme.

All energy projects and the vast majority of transport projects are multi-annual by nature and the calls are designed accordingly. This approach was initiated under the previous financing period 2007 – 2013 and along with the pre-identified list of projects provides legal certainty to project promoters. For a small number of transport projects, an annual programme is more appropriate.
In the telecom area, unlike the two other sectors, the programme has been implemented exclusively through annual work programmes. While this has helped ensure flexibility, annual programming can also be considered a source of uncertainty for potential beneficiaries as well as of administrative burden from a management standpoint.

Transport

Heavy calls oversubscription has enabled a very competitive process based on the relevance, maturity and quality of applications. Only the best proposals demonstrating the highest EU added-value are retained, while the importance and quality of the Cost-Benefit-Analysis (CBA) submitted by applicants has improved call after call. This strict selection also allows not to dilute the EU support and to keep co-financing rates sufficiently high to have a real impact and to reflect better the policy priorities[158].

[157] This amount refers to the call priorities: Corridors of the Core Network and Other Sections of the Core Network. However, other priorities from funding objective 1 (ERTMS for instance) and from other funding objectives (Multimodal, Motorways of the Sea) may also contribute to the Core Network.
[158] During the 2007-2013 period, the co-financing rates did not trigger the investment needed in TEN-T as they did not reflect the risk and complexity of projects as well as their embedded financing gap. For example, the 2011 IA stated that in case of cross-border projects "which have proven most complex to implement, the long duration of projects, spanning several financial frameworks, renders an initial co-financing rate of 30% to be reduced, in actual terms, in average to 21%, and in some cases to even 5% to 10%; while projects alleviating bottlenecks have not been given any special rate, benefitting of the general co-funding level of 20%".

The co-funding rate of the Cohesion envelope is that of the Cohesion Fund, i.e. up to 85%. This reflects the lower financial capacity of Cohesion Member States to invest in their transport infrastructure. The approach consisting of reserved national allocations per Cohesion Member States in the first 3 years of the programme has worked well in accelerating investment in such Member States, in coordination with ESIF funds

As previously mentioned, programme support actions have been instrumental in achieving the transport policy aims, especially those aimed at providing technical assistance to Cohesion Member State administrations.

Efficiency was reinforced by the ability to quickly re-use money underspent by certain actions for financing other actions through the direct management of the programme. In practice, the monitoring done by INEA allows to identify delays and/or cost reduction (for instance resulting from the tendering processes) and to amend the grant agreements in a very responsive manner in order to free the corresponding budgetary commitments and re-inject them into new calls. In 2016, more than EUR 600 million were re-injected thanks to this pro-active grant management or "use it or lose" principle.

Energy

Consistently with the 2011 IA, CEF Energy has overcome a number of problems that had been previously identified, such as the inadequacy of co-funding rates of the TEN-E Programme. The funding gap rule is extensively applied by the European Commission in its selection decision with a sound rationale, (i.e. on the basis of the individual cost benefit analysis, business plans and cross border cost allocation decision for each project application for grants for works), what makes the process of funding allocation efficient. The funding rates applied so far in the programme for grants for works vary between 20% and 75% (the maximum funding rate), with an average funding rate of 47.1%, compared to an average funding rate of 10% in the predecessor programme.

In relative terms, a comparison of CEF's funding rates with ESIF's could be carried out as a benchmarking exercise[159]. In this case, comparing the CEF's average funding rate with the Cohesion Fund (84%-85%) and ESIF's maximum ones (75%), CEF's support can be considered adequate to its objectives.

Moreover, the programme's ability to discard projects which do not show evidence of commercial non-viability has already been mentioned. Consequently not all the project applications for CEF grants for works were successful. Across 3 years of CEF Calls, 14 out of 33 CEF applications for grants for works were rejected as the project application didn't show the need for CEF financial assistance or need for public funding. This discretion of CEF is important in ensuring value for money and shows that CEF co-financing is only awarded when there is a proven need of financial assistance.

[159] Source: PwC report.

Telecommunications

In contrast with the other two sectors, the programme has been implemented exclusively through **annual work programmes** articulated in different calls for proposals and tender. Their adoption presents some advantages in terms of flexibility, however it does not facilitate long-term planning and creates burden at central level. The document has to be revised and approved by the different DSI owners, and the whole process, which has to be repeated annually, requires almost one year. Additionally, strategic stakeholders highlighted that annual work programmes create political and legal uncertainties; i.e. it is not possible to know in advance whether the DSIs will be supported in the following year and if the budget will be adequate to the activities planned. The necessity of long-term financing is particularly important regarding the core service platforms. A possible solution to address the shortcoming stemming from the exclusive use of annual work programmes could be to have multi annual work programmes that would allow yearly amendments if further adjustments are needed.

Overall the application process is deemed efficient by the beneficiaries: over 75% of respondents to the technical survey confirmed this statement as well as most of the operational stakeholders interviewed. Specifically, about 60% of interviewed stakeholders reported no issues during the preparation of the application form. This may be explained by the fact that the actions are related to deployment of existing DSIs and the process is thus not particularly complex. However evidence stemming from the case studies suggests that the timing of some calls was not always optimal[160].

Regarding the co-funding rates currently applied (i.e. from 50% up to 75%[161]) they have been deemed adequate to the actions supported by a vast majority of stakeholders (80%). Moreover, they can be considered overall in line with the co-financing granted for similar projects across EU. A comparison between the co-financing rates applied under CEF Telecommunications and those applied by the Structural funds under TO 2 "Enhancing access to and use and quality of information and communication technologies" reveals that almost 85%[162] of Operational Programmes across Europe granted to the Thematic objective 2 a co-financing rate higher than 50% (which is the minimum applied in calls for proposals for the CEF Telecommunications programme), thus confirming the adequacy of the current co-financing rates[163].

As regards the relationship between the budget dedicated to broadband projects under CEF and the results achieved so far, it can be argued that the limited funds available are being used very efficiently, namely for project preparation, demand stimulation and for demonstration projects, which are all expected to generate more deployment on the medium term. More importantly, a significant leverage effect is expected under the CEBF, maximising the impact of the CEF funding on actual broadband deployments as well as creating the confidence of the financial markets in future proof connectivity projects.

6.4.2. Implementing and Managing CEF efficiently

[160] Calls for proposals for specific DSIs were launched when technical standards were not ready (e.g. for eInvoicing and the first call for proposals for generic services for eID).
[161] As established under Article 10 of the CEF Regulation.
[162] PwC elaboration on data provided by Dg REGIO http://ec.europa.eu/regional_policy/en/policy/evaluations/data-for-research/
[163] The limits of this comparison have to be considered. The Thematic objective covers many different activities from the deployment of broadband networks to the improvement of accessibility, use and quality of ICT through digital literacy, e-learning, e-inclusion, e-skills and entrepreneurial skills. Additionally, the co-financing rate of the Operational Programmes depends also on the category of the regions (e.g. more or less developed regions).

The targeted delivery of CEF under direct management by the parent DGs and their executive agency INEA has proved efficient for the implementation of the programme. While DG MOVE worked with INEA's forerunner, the TEN-T Executive Agency on TEN-T grants during the 2007-2013 period, INEA now manages the grant component for all sectors[164]. The three parent DGs of CEF work together cooperatively and are all members of the INEA Steering Committee. As stated previously, a mid-term evaluation of INEA is being undertaken separately.

The advantages of direct management for CEF

- As CEF is an instrument with specific sectoral objectives relating to the development of the Trans-European networks, direct management allows for a stronger policy steering as regards the priorities, the selection of projects and their implementation;

- As most CEF supported projects have a cross-border or an EU-wide interoperability dimension, direct management allows for exerting an independent coordination at EU level. Such coordination is exerted by the Commission (CEF DGs and INEA interacting directly with the project promoters);

- For transport and energy, large infrastructure projects entail complex planning, permitting, environmental and procurement procedures with recurrent issues across the EU. Direct management has allowed project management expertise at INEA to be built up allowing for the monitoring of projects and the handling of these matters in an efficient and consistent manner while ensuring a close control as regards compliance with EU standards;

- For telecommunications, most supported actions should demonstrate their connectivity and interoperability with the Digital Service Infrastructure platforms set at EU level. Direct management allows for coordination and consistent technical validation procedures.

- For the three sectors, direct management allows for a fast delivery of EU support (see INEA's KPIs below). As an example, in transport, the EUR 11 billion Cohesion envelope under direct management through CEF was entirely allocated by mid-2017 and all corresponding grant agreements are expected to be signed before end 2017.

- The "use it or lose it" principal, a key feature of direct management, helps Member States prioritise as well as to adhere to commitments. Nevertheless, the possibility to recycle the commitments in cases where projects are not performing as foreseen increases the efficiency of CEF.

Project promoters and Member States are positively engaged with INEA with the application and selection process managed by INEA generally perceived as efficient with 76% of respondents to the technical survey agreeing so. INEA is also considered to be very responsive to the needs of Member States and project promoters. Of all submitted proposals between 2014 and 2016, 97% were deemed admissible, and 94% were deemed eligible for funding, demonstrating a high level of understanding for the application process amongst project promoters.

164 A cost benefit analysis of INEA's new additional tasks was undertaken in 2013: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52013SC0493%2801%29

There are many benefits to using an Executive Agency for the implementation of CEF. Gains in efficiency have been introduced through the externalised management of the grant cycle via a unified system (discussed further in Annex 8). In addition, annual Action Status Reports from beneficiaries allow for closer monitoring of grants. Furthermore, there is increased cost effectiveness given the ratio between human resources employed and the amounts granted. INEA also acts as a central contact point for beneficiaries.

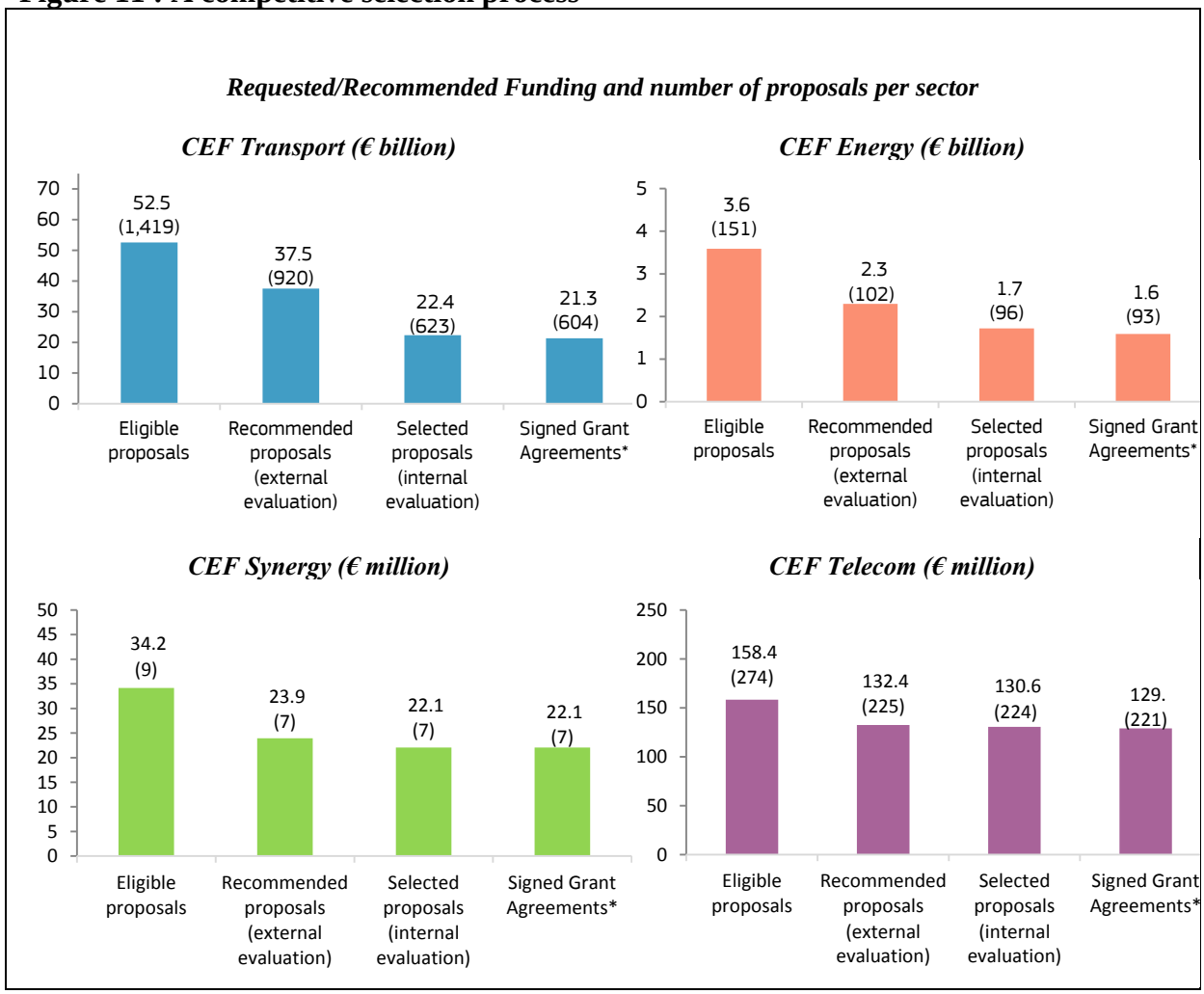
INEA has built up a strong team of project managers able to follow technically and financially the actions supported by CEF. As illustrated in the table below, in 2016, INEA's Key Performance Indicators were at an outstanding level, continuing the positive trends from previous years.

Table 4: Key Performance Indicators for INEA

Indicator	2016 Result
Rate of execution of payment appropriation	100%
Time to inform applicants after call closure	141 days (better than target of 184 days)
Time to grant after call closure	249 days (better than target of 276 days)
Net time to pay for pre-financing	11 days (limit 30 days)
Net time to pay for interim/final payments	51 days (limit 90 days)

The quality of projects – completeness and clarity of the proposal, description of the planned activities, coherence between objectives, activities and planned resources, soundness of the project management process – is one of the main criteria for selecting the projects under CEF and is a key to the success of the programme, with additional sector-specific criteria, and notably referring to an assessment of the need for public funding. The competitive selection, process of projects run by INEA and illustrated in the figure below has proved effective and has been crucial for the successful implementation of the programme. With the competitive bidding through calls for proposals, maximum incentives are created for project promoters to prepare and implement effectively high quality projects.

Figure 11 : A competitive selection process



*Includes grant agreements under preparation

Stakeholders have generally found the frequency and timing of CEF calls for proposals to be efficient with 71% of respondents to the technical survey in agreement. Furthermore, the majority of stakeholders (67% replied that this is at least to some extent the case, with 22% stating they did not know) also agreed that the **common management of the three sectors under CEF is conducive to economies of scale for the Commission** (in terms of project appraisal and management), although frequently pointed out in the answers that it is important to cover each sector specific needs. As highlighted in the 2011 IA, promoting synergies among sectors was another reason of creating one-single programme approach for the three sectors. From interviews, it was generally recognised that at implementing level potential synergies have been addressed as a result of combining three different sectors managed by one single structure, this is perceived as a factor that has led to reduce the managing costs of the programme for the Commission and Member States.

A recent report for the European Parliament[165] demonstrated that the cost of the administration of CEF by INEA, which covers 90% of the aggregate spending plan of the programme, is low when compared with other EU programmes. While comparison with the

[165] "The cost of each euro from the EU budget to implement EU policies in different Member States: Mastering implementation costs of European grants", European Parliament, Oct. 2016.

other programmes is difficult, this study highlighted that the cost to create EUR 100 of value is estimated to be just EUR 0.05. Furthermore, the administrative costs of CEF are obliged by the Art.5 point 2(b) of the CEF Regulation (EU) 1316/2013 to be capped up to 1% of the whole financial envelope.

INEA has implemented various administrative **simplification** measures largely based on the TEN-T Executive Agency's experiences during the 2007 and 2013 programming period. These measures include the introduction of electronic communication tools for beneficiaries as well as the replacement of grant decisions by grant agreements which require less involvement from the Commission and the Member States. The use of e-communication tools to manage the current programme goes that far that, as one interviewed project promoter in the field of energy put it – "*the only paper-based procedure is the grant agreement*". Even though it was not possible to arrive at a meaningful quantification of the cost savings for the involved authorities in Member States, statements from experts (several national authorities and one TSO representative) confirmed that the new procedural set up for CEF as of 2013 reduced the regulatory burden for Member States.

Article 22 of the CEF Regulation stipulates that Member States shall undertake the technical monitoring and financial control of the actions in close cooperation with the Commission and shall certify the expenditures incurred in the projects. This is efficiently implemented in the context of the reporting exercise for CEF beneficiaries to INEA. A good example is the reporting of energy project promoters to ACER and to authorities competent for permit granting which in turn report to the TEN-E Regional Groups.

Project promoters are obliged to submit a considerable amount of information as part of the proposal evaluation process. Mixed views were received during the consultation (technical survey) on the administrative burden with 48% finding it efficient, but 37% considering it to be somewhat to completely inefficient. This is most likely for smaller projects where this amount of information can be perceived as onerous but interviewed stakeholders generally viewed the process as fair and proportional to the level of support on offer.

There is evidence that CEF properly supported the main project promoters through technical assistance in order to manage and implement projects as best as possible. This feedback can be linked to the response received in the general survey about the technical assistance which was judged “very important” by 44% of respondents and “important” by 29%.

Finally, the CEF Committee as set out in Article 25 meets regularly and contributes positively to the implementation of the programme by providing valuable input to the Work Programmes and by endorsing the selected proposals.

Transport

DG MOVE has engaged significantly with Member States and project promoters in order to secure the efficient implementation of CEF in the transport sector. The majority of stakeholders interviewed highlighted the proactive approach of DG MOVE in organising a series of practical workshops in Member States for the various calls as a very positive initiative.

Cohesion Member States have in particular benefited from the technical assistance provided through CEF Programme Support Actions in the transport sector, as well as technical

assistance support from Cohesion policy programmes. Given the complexity of large infrastructure projects, technical assistance including in the form of the expertise of JASPERS has permitted Member States to develop and strengthen their administrative capacity in the form of support for developing a pipeline of quality and mature projects. This assistance has improved the technical capabilities of promoters in those Member States and led to proposals being submitted to INEA of sufficient quality.

The step-by-step approach whereby there have been several multiannual work programmes and related calls in order to leave time to Member States to prepare the most difficult projects has ensured that Member States have been able to have a sufficient number of mature and high quality projects eligible for selection. Additionally, the Commission together with the EIB (more recently through their EIAH) have promoted the use of financial instruments with transport representing 15.9% of the 270 project-specific requests to the EIAH by the end of January 2017.

Some stakeholders called for additional evaluation criteria to more clearly identify the added value of projects, to be used as selection criteria. These criteria could be identified on the base of the key findings analysis of "wider elements" that the European Coordinators are currently performing for the drafting of the next Work Plans of the CNCs. They also will serve as a basis for identifying the new pre-identified sections and mainly refer to:

- Impact on jobs and growth composed of (a) total direct, indirect and induced jobs, and (b) induced growth (total value in M EUR);
- Mitigation of climate change (curbing GHG emissions), this impact should be included in the cost benefit analysis;
- Adaptation to Climate change.[166]

As an additional point, some stakeholders claimed that indirect costs should be taken into consideration as well, as they represent a relevant share of the total cost. The former 7% quota of reimbursement foreseen in TEN-T 2007 2013 was not entirely sufficient. Nonetheless having removed it represents a major backwards step in the view of some stakeholders.

Energy

There is appreciation of CEF Energy's operations, about INEA's efficiency and the capacity of the entire governance mechanism (including the Commission DG) to create awareness of the available opportunities. Besides, the technical survey also provides evidence that the application and selection process managed by INEA is well handled, with a 23% of respondents agreeing to "very efficiently" and 50% respond "somewhat efficiently" (out of 30 respondents).

A distinction should be made between applications for grants for studies, and applications for grants for works. In order to be considered for grants for works, applications for CEF funding must submit a project specific cost benefit analysis (CBA) showing proof of significant externalities, proof of not being commercially viable (according to business plans and other investors' assessment) and a valid CBCA decision[167].

[166] A proper methodology has been developed by the Commission (http://ec.europa.eu/clima/publications/docs/major_projects_en.pdf)
[167] This latter is not applicable for smart-grids PCIs applying for CEF

Some stakeholders[168] referred to the CBCA process itself as burdensome and/or prolonging the application process (e.g. ENTSO-E in their position paper). However it is very interesting to add that out of the eleven experts that discussed this question in greater detail only two felt that the CBCA requirements are disproportionate. All the others argued along the line that "*while the CBCA requirements are burdensome, the CBCA is also the best tool in the PCI process to oblige Member States to go beyond national thinking*" (a national authority). Around a quarter of those interviewed on the issue also felt that there are no concerns as regards the administrative burden for project promoters. Whilst the present evaluation does not contain a quantitative assessment of the costs of complying with the CBCA criterion[169], the issue can be discussed on a qualitative basis. The requirement to have a decision on CBCA when applying for CEF can lead to long application times, and to costs related to the provision of proof and documents; however there is an element of proportionality in that a CBCA is only necessary for applications for grants for work, not for grants for studies where the amounts at stake are generally significantly smaller and the implementation times shorter. Secondly, grants for works have ranged so far from approximately EUR 30 to 295 million so that the costs of the process for the promoter can be considered proportionate if one factors in that the CBCA decision is the main element of the CEF selection and approval process for grants for works, and that this process ensures that only projects delivering high European added value which cannot be financed by the market or where regulatory measures are insufficient are selected (by obliging first all actors concerned to agree on investment costs and benefits). To conclude, as CBCA is one of the pre-conditions to ensure that CEF funding is well spent on projects which are not commercially viable but which provide significant societal benefits, these costs can be considered justified.

The alignment of CBA approaches for gas and electricity sectors at a European level, (as by the TEN-E Regulation art. 11), is a novelty applicable to CEF with respect to the predecessor programme, and it is seen by stakeholders as key to facilitate CBCA decisions, bilateral agreements and applications for CEF support, although stakeholders also pointed out some shortcomings and the need to improve the CBA and CBCA process[170]. This is currently being assessed in the update and improvement of the CBA methodology as envisaged by the TEN-E Regulation.

Telecommunications

The implementation and management of CEF Telecommunications differs from the other sectors, as it is sustained by a very complex network of bodies[171]. For instance, five different DGs have been identified as DSI owners and are involved, *inter alia*, in the co-management of the budget and in the implementation of the programme. This fragmentation together with a sharing of responsibilities within DG CNECT makes coordination a challenging task. This role falls over a currently undersized programme management office. Efforts to enhance

[168] 5 submissions to the technical survey out of the 7 that rated the administrative cost performance of CEF energy as very poor and that submitted free comments on this issue).

[169] The evidence that was collected as part of the underlying study did not allow for a full quantification of CBCA costs.

[170] Prior to the adoption of the TEN-E Regulation 347/2013, different methodological issues and different analytical approaches in cross border projects, potentially leading to divergent socio-economic evaluation, slowed down bilateral agreements in cross border project. The TEN-E Regulation establishes for the first time a harmonised EU wide methodology for the treatment of cost benefit analysis for the gas and electricity projects. The ongoing process of update and improvement of CBA methodology by ENTSO-E and ENTSOg as per Article 11 of the TEN E Regulation is expected to further improve procedural aspects linked to CBA and CBCAs (as highlighted by ACER in an official communication) as well as to improve issues such as assessment of projects benefits (as highlighted by ENTSOe in their response to the public consultation), in both gas and electricity sectors

[171] DG CNECT, DSI owners in different EC services, CEF Telecommunications Committee, CEF Telecommunications Expert Group, National Contact Points, INEA, operational boards for each DSI, expert group per DSI, Architecture Management Board, CEF Project & Architecture Office, Stakeholders Management Office).

cooperation and alignment among the different DSIs are put in place, like for instance organisation of workshops involving the different DSIs. However, many strategic stakeholders highlighted the need for enhancing coordination among DSIs.

All the Member States' representatives consulted considered the envisaged governance structure as effective in facilitating the cooperation among the Commission and Member States, and positive feedback has been received by the majority of operational stakeholders interviewed regarding the relationship with INEA during the application and evaluation process. The DSI expert groups are effectively providing relevant support in the implementation of the programme. The effectiveness of the governance structure in the building blocks is demonstrated by the positive results achieved in their reuse. Coordination among the building blocks is ensured by the CEF Project Architecture Office.

A vast majority of stakeholders (80%), beneficiaries and operational stakeholders in particular, have highlighted the significant burden related to the requirement to have the actions and costs approved by Member States[172]. These requirements represent a disproportionate burden for actions in the DSIs area, which are usually characterised by a limited size compared to the other CEF sectors. Furthermore, operational stakeholders (60%) consider that a simplification of bureaucracy would facilitate private sector and SMEs' participation in the programme. The lump-sum mechanism, used in the first year of implementation to support actions for generic services for eID and eSignature, has enabled to reduce the administrative burden, as reported by interviewed beneficiaries.

Due to the early implementation phase of CEF Broadband, at this stage it is not possible to quantify the administrative costs of the programme versus the results achieved.

6.5. EU Added Value

This section aims to evaluate the additional impact that CEF has achieved compared to the impact of interventions which could be undertaken by Member States alone.

Main findings

- Considering the sectors' extensive needs for funding and the results achieved so far, CEF is bringing a significant **EU added-value**, as compared to what could be achieved by Member States alone.

- In terms of **design**, the added value resides in the fact that CEF focuses on EU integration projects, notably through their pre-identification.

- CEF contributes to **accelerate the funding and realisation of cross-border connections and interoperable services** that may not have been financed without it.

- EU level action (including regulatory cooperation) allows CEF to **overcome limitations in information and cooperation** among Member States which can hamper such complex but crucial projects.

[172] In line with the requirements of articles 9 and 22 of the CEF Regulation, national contact points are involved in the approval of proposals to be submitted (art. 9) and in the technical monitoring and financial control of actions (art. 22).

The Reflection Paper on the Future of EU Finances[173] of 28 June 2017 provides reference criteria to assess the added-value of EU programmes. Of these criteria, it is clear from the analysis throughout this evaluation that CEF is particularly relevant for the 'Treaty objectives and obligations', 'public goods with a European dimension' and 'benefits of EU integration'.

Furthermore, the Reflection paper specifies that:
"There is […] a clear value added when action at European level goes further than national efforts could. This includes […], transnational infrastructure, such as energy interconnectors (e.g. between Malta and Italy), digital networks, research infrastructure or tunnels (e.g. the Brenner Base railway tunnel in the Alps between Austria and Italy) benefit citizens and companies across the EU."

The CEF 2011 IA highlighted that, while the market can and should deliver the bulk of the necessary investments, there is a need to address some imperfections in the market in order to remove bottlenecks and ensure adequate cross-border connections. Cross-border projects typically face the following issues: multiple decision makers, misalignment of objectives, as well as technical, administrative and regulatory barriers – and as a result of this - carry higher financial risks. These issues relate to projects on which private investors are not willing to focus due to their lower direct economic effect compared to purely national projects, and therefore not likely to be implemented without being driven forward by means of EU level action.

The interviews provided in all sectors and the portfolio analysis, complemented by the analysis of other EU and Member States programmes, confirm that CEF is providing EU added value by addressing the identified market failures in the three sectors, and that in many cases the projects would have not been able to secure other forms of public and private funding or financing. In the technical survey, 74% of respondents find the overall EU added value of the CEF programme somewhat or substantially higher than what could be achieved by Member States alone or by the market (51% in the general survey).

Transport

CEF provides significant EU added value by funding projects (particularly cross-border projects) that might otherwise not have been completed. The scale of the problems being tackled specifically require EU action since they are by nature EU-dimensional, and can be more efficiently resolved at Union level, leading to overall greater benefits, more accelerated implementation and reduction of costs if Member States act together. CEF Transport has made a strategic view on infrastructure planning at European level possible. The programme stimulates cooperation between project promoters on both sides of the border, assisting in setting up common implementation schedules and common technical aspects. CEF brings visibility to local or regional projects which are also showcases of the EU on the ground and demonstrate a clear tangible benefit of EU policy in action.

One study[174] shows that the cost of non-completion of the TEN-T Core Network to the full, range between EUR 2,940-3,380 billion losses of accumulated GDP, and between EUR 10.4-11.9 million job-years not created. Public budgets are still under considerable fiscal consolidation, while the implementation of CEF/TEN-T in 2014-2016 show that financing

[173] Reflection Paper on the Future of EU Finances (COM(2017) 358 of 28 June 2017)
[174] https://ec.europa.eu/transport/sites/transport/files/themes/infrastructure/studies/doc/2015-06-fraunhofer-cost-of-non-completion-of-the-ten-t.pdf

support from Member States and private sector continues to be crucial but insufficient for projects with European dimension.

Furthermore, the European Coordinators, appointed specifically to animate the Core Network Corridor, closely work with Member States and all relevant stakeholders to identify the most critical issues and the most relevant projects for the completion of the corridors. They produce a work plan for each corridor which includes an analysis and a list of the most important projects, sufficiently mature and delivering added value. This work to develop the TEN-T project pipeline directly feeds in the CEF calls for proposals and encourages the selection of high quality projects.

CEF has encouraged the building of a transparent, credible and stable pipeline of projects, which is important for the broadening the sources of funding (private and public investors) and for concentrating resources on projects where investment is most needed. The annex I of the CEF Regulation which comprises pre-identified priorities and projects resulting from the EU co-decision process provides legal certainty, and allows for planning at EU level, while promoting the horizontal priorities and specific sections of the network/projects. In addition, CEF complements and supports priorities at regional or national level.

CEF has been identified as having a significant EU added value by stakeholders in the transport sector. It is appreciated for its capacity to facilitate the development of cross-border infrastructure and cooperation, in particular by infrastructure operators in the general survey. Representatives of national authorities welcomed that CEF enables strategic infrastructure planning at a European level. CEF is seen as promoting transnational cooperation and enabling large investment decisions, which would have otherwise not been feasible, by bringing together project promoters, national regulatory authorities, governments etc. Furthermore, representatives of both the private and public sector appreciated CEF as a more efficient financial instrument compared to national or regional programmes, and as bringing greater visibility to smaller projects.

Energy

CEF Energy is seen by the stakeholders as a key instrument supporting transnational cooperation and generating economies of scale and playing a key role in supporting cross-border energy infrastructure. Nearly a 70% of interviewees recognised the added-value of CEF Energy. Besides, according to the perception of 40% of stakeholders interviewed, CEF Energy is seen as an important instrument supporting transnational cooperation (this extends beyond the CEF Regulation and also includes the provisions in the TEN-E Regulation), recognizing that grants are the key advantage compared with other support schemes, especially in filling the market failure (projects not commercially viable) and accelerating the implementation of interconnection projects, thus solving the most commonly challenges for energy infrastructure development, namely obstacles and risks of delays with cross-border projects.

Several experts stated that CEF – with its unique focus on supranational priorities - provides funding for which there would otherwise not necessarily be alternatives in national budgets. Interview partners in particular from Eastern Member States also often described the projects funded under security of supply as a common EU effort where all Member States share in solidarity the costs, for example on the Baltic States resulting from the synchronization with the Western grid.

In addition most of the targeted stakeholders (24 out of 30 or 80%) rated the overall added-value of CEF as a somewhat higher or substantially higher because is:

- A faster and more efficient instrument compared to the national/regional programmes for trans-European infrastructure networks and Smart and sustainable Economic growth;
- A strong catalyst to bring together project promoters, National Regulatory Authorities and Government ministry representatives to solve issues to enable cross-border infrastructure projects to be realised;
- A support for cross-border projects whose commercial viability is not immediately perceived or demonstrated.

There is unanimous emphasis on grants as making the difference in promoting the cooperation between countries to develop energy interconnection projects of common interest that otherwise would not happen. Several stakeholders interviewed (project promoters and national authorities) also explained the usefulness of EU grants in order to make cross-border projects happen that are located in countries with smaller population sizes or more remote location where tariffs would not be able to cover the investment needs. The case of Balticconnector is a key example of one project that would not have been funded in a national context. In contrast, for the CEF DI, the analysis provided in the effectiveness section shows that other financing sources are available to project promoters where they can rely on either suitable regulated remuneration mechanisms or project revenues.

Telecommunications

CEF Telecommunications has facilitated and helped coordinate efforts at Member State level for the development of standards, and the deployment and use of interoperable, cross-border DSIs. In the case of some DSIs, like EESSI or ODR, their deployment is required by EU Regulations and Directives, and CEF Telecommunications provided an essential incentive for speeding up this process and ensure compliance. Other CEF-supported DSIs like Cybersecurity enable mechanisms to be used by Member States on a voluntary basis, by promoting actions that without CEF would have not been carried out. DSIs like eDelivery allow public administrations to exchange electronic data and documents with other public administrations, businesses and citizens, in an interoperable, secure, reliable and trusted way. Doing so helps save taxpayers' money and reduce administrative burden. 63% and 84% of respondents to the technical survey declared that they expect the programme to contribute fully or to a large extent to, respectively, mobilising investments in TEN for telecommunications and bridging interconnection gaps in the telecommunications sector compared to what could have been achieved without CEF. Regarding the funding provided under CEF, interviewed stakeholders largely agreed that the actions would have not been carried out without CEF contribution. In the same vein, stakeholder consultation results suggest that, notably due to budget constraints at Member State level, DSI deployment would have been either significantly delayed or abandoned in the absence of CEF funding.

Example Box: Core Service Platform for Online Dispute Resolution Digital Service Infrastructure (ODR)

ODR DSI aims to enable European citizens and business to resolve online disputes related to cross-border purchases. The CSP was launched at the beginning of 2016.
This DSI responds to Regulation No 524/2013 on consumer ODR that sets the rules for the establishment of an EU-wide ODR platform for out-of-court disputes between consumers and traders. ODR is also supporting the compliance with Directive 2013/11/EU on consumer Alternative Dispute Resolution. The solution is based on an online platform at EU level that enables consumers to fill in the online complaint form in any EU official

language and submit it. The complaint is then forwarded to the relevant trader who proposes a national alternative dispute resolution (ADR) entity to the consumer. Once both parties agreed on the ADR to handle the dispute, the platform transfers automatically the complaint to the ADR that will reach an outcome in 90 days. The ODR platform is currently using the eID (for identification and registration procedures) and eTranslation (for multilingual services to all users) building blocks and is committed to analyse the reuse of eDelivery and eSignature building blocks respectively. The activities funded under CEF played a crucial role in ensuring the deployment of the platform. Overall, since February 2016, approximately 27,000 complaints have been registered on the platform.

All interviewed stakeholders and over 96% of respondents to the technical survey agreed that CEF Telecommunications has fostered transnational cooperation. Interviews with operational stakeholders also suggest that the programme was successful in promoting interoperability and cooperation, including at national level (as stated by 20% of operational stakeholders). In some Member States, different, non-interoperable solutions are in place (e.g. eProcurement in Italy). In these cases, the deployment of interoperable solutions compliant with European standards enables to overcome also regional borders. Furthermore, the availability of standard solutions brought about by CEF Telecommunications has been reported by a number of interviewed stakeholders as having significantly contributed to the implementation of the actions.

An additional valuable contribution of CEF Telecommunications has to do with the availability of reusable building blocks. First of all, building blocks are reused within the DSIs funded under CEF and the related generic services. This can be considered a positive result of the coordination among the DSIs assembled under the same programme. Furthermore, CEF building blocks are reused in projects beyond CEF Telecommunications and in different domains, including agriculture, justice, employment and social rights, science and technology, transport and environment, education, external relations and investors[175]. The possibility of reusing these solutions can be considered to favour the creation of economies of scale and minimise implementation delays for complex projects. However, these benefits have not been quantified yet.

7. Conclusions

Relevance

CEF is stimulating the development of modern and high-performing trans-European networks (TENs) throughout the European Union in transport, energy and telecommunications, contributing to the Europe 2020 Strategy. It is also promoting the Commission's priorities relating to 'Jobs, growth and investment', 'internal market', 'Energy Union and climate', and 'Digital single market', thereby strengthening the three sectors' global competitiveness. In addition, CEF provides a substantial share of EU funding in the area of transport and energy projects with a strong component of de-carbonisation of the European economy, thereby contributing to the EU's emission reduction targets under the scope of Paris Climate Agreement.

Given the common goals and challenges amongst the three sectors, the common programme approach is relevant. More specifically, the programme steers both public and private financing towards EU policy objectives, thereby enabling key investments to take place where market failures exist, such as where the costs of the action are borne at national/local level

[175] Information available on the CEF Telecommunications dashboard: https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/Reuse+by+domains

while the benefits of the action are tangible at European scale. CEF therefore is an essential element of the EU investment strategy.

Investment needs remain significant in all three sectors. The size of CEF currently makes it possible to address only some of the identified market failures in all three sectors. Therefore, potential exists for unlocking further public and private investment if additional EU budget was made available to address more market failures. Grants are necessary to support a significant number of projects which provide EU added value, either because the projects are not bankable, not commercially viable and/or because they are promoted by public or semi-public entities for which the use FIs is not an option. The relevance of alternative sources of capital varies across sectors. FIs or indeed the blending of grants with other forms of financing (notably private sector and public banks) remains relevant in some cases, in particular for revenue generating projects.

The original Commission proposal for CEF in 2011 contained a total budget of EUR 50 billion (31.7 for transport, 9.1 for energy and 9.2 for telecom). The cuts that followed during the negotiation phase reduced the total funding to 33.24 billion; with the telecom sector experiencing the most severe reduction (8 billion, with final allocated funding of 1.04 billion). For telecommunications, this implied a reduction in the scope of the programme for the DSIs and for broadband to focus the support on technical assistance activities for projects with a difficult business case and on the development of financial instruments. Moreover, the limited degree of flexibility set by the Programme restrains its ability to address new political priorities induced by technological developments in transport and telecommunications (e.g. High Performance Computing).

Coherence

Transport, energy and telecommunications infrastructure is supported to various degrees by a number of EU financing instruments, including CEF, ESIF, Horizon 2020 and EFSI. As CEF's prime focus is on investment in cross-border infrastructure, the European-wide interconnected systems and the deployment of innovative technologies, CEF is for the most part complementary with other EU financial interventions

CEF and the ESIF both contribute to the TEN objectives with ESIF concentrating on internal sections less covered by CEF but for instance in the transport sector essential for the development of the corridors in the Cohesion countries. For the first time, a share of the cohesion budget (EUR 11.3 billion - transport) was executed under direct management within the CEF framework. This has proved successful as 100% of the envelope was allocated during the first half of the programme period, almost exclusively on sustainable transport modes.

While some projects which were prepared or facilitated in their early stages with CEF support then receiving EFSI support showed some complementarity of the programmes, for a large part of projects substitution of CEF by EFSI was observed. Therefore, the complementarity of the CEF DI with EFSI needs to be further reinforced, on the basis of the 'Revised policy guidance regarding complementarity of the CEF DI with EFSI' adopted in July 2017 by the CEF DI Steering Committee. The 2017 CEF Transport Blending Call has also been designed to strengthen the complementarity.

CEF and Horizon 2020 work in complementarity with each other, with Horizon 2020 focusing on the research and development phase and CEF supporting the deployment of the technology in the TENs. Finally, good cooperation between the European Commission and the Member States as well as the design of the CEF programme ensures coherence with actions carried out by Member States and national competent authorities.

Effectiveness

In its first 3 years, the programme is on track, although it is much too early to measure results given that the programme is at the early stage of implementation. The assessment of effectiveness thus focusses on an assessment of implementation with a view of steering funding to the most relevant projects that are expected to deliver tangible results in the future.

In its first three years, CEF has already allocated over 80% of its grant budget, with focus on projects with high EU added value. In the transport sector, during the first 3 years of the programme EUR 21.3 billion worth of grants were allocated to projects. The main share of funding was awarded to transport actions addressing bottlenecks and cross-border missing links either on the TEN-T Core Network Corridors or along TEN-T Core Network sections (around 79% or EUR 16.9 billion[176]). In the case of energy, EUR 1.6 billion funding was concentrated on security of supply, ending energy isolation, elimination of bottlenecks, with an increasing commitment in projects in the electricity sector contributing to the integration of renewable energies into the grid and showing innovation as an externality. In telecommunications, EUR 251 million have been allocated in the Work Programmes to date to the deployment of 15 DSIs allowing public administrations, citizens and businesses to benefit from more comprehensive and efficient cross-border online services. EUR 121 million have been committed to broadband-related projects.

CEF is funding actions in all Member States supporting almost exclusively projects with a cross border dimension. Most funding is awarded to projects bridging missing links and removing bottlenecks to ensure the good functioning of the EU internal market in transport, energy and telecommunication. CEF is also instrumental for the deployment of EU-wide new systems in the field of traffic management and safety (e.g. SESAR for aviation, ERTMS for railways), of innovative electricity lines and cross-border smart grids in energy and for the roll-out of interconnected Digital Services (e-Health, e-Procurement, e-Identification and e-Signature, etc.…). Many of these projects will see realisation under the current programme; others could be completed under the next MFF, allowing to see a real TENs grid emerge in the three sectors, contributing to the Europe 2020 Strategy as well as to the Juncker Commission's priorities. Furthermore, CEF allocations in the sectors of transport and energy significantly contribute towards the EU's target of 20% of the total EU budget to be dedicated to climate action related spending.

The completion of the TEN defined in the EU policy priorities require massive investments, part of which depend on continued EU support as under normal conditions they would not be sufficiently supported at Member State level or by the market.

[176] This amount refers to the call priorities: Corridors of the Core Network and Other Sections of the Core Network. However, other priorities from funding objective 1 (ERTMS for instance) and from other funding objectives (Multimodal, Motorways of the Sea) may also contribute to the Core Network.

CEF has continued to use and develop innovative financial instruments. However, their deployment has been limited and below the expectations raised in the CEF Regulation[177]. In some cases this has been due to the new possibilities offered by EFSI. There is potential for further developing financial instruments under CEF and making them more effective. A better developed transport, broadband and energy project pipeline and further emphasis on blending grants with financial instruments, as has been encouraged in the 2017 Transport Blending Call, could help to use them at a larger scale.

A greater flexibility of the instrument would prove advantageous, both as regards the sectors and the priorities within each sector. The objective of CEF to promote synergies at project level has not been achieved so far mainly due to the rigidity of the legal/budgetary framework as regards eligibility rules for both projects and costs. In light of technological developments synergies among the three sectors, e.g. Connected Cooperative and Automated Mobility, alternative fuels, "smartening" of the grid are expected to increase in the future.

The relevant participants are being reached by the programme, however communication to the wider public on CEF activities could be improved. Even though a number of KPIs exist at sectoral level, most projects are not at a mature enough state of development for the KPIs to be applicable. Furthermore, performance indicators relating to overarching policy objectives are not sufficiently developed to measure the impacts of CEF.

Efficiency

The direct management of CEF has proven efficient, with a competitive selection process of projects, paving the way for result-driven and coordinated implementation of CEF as a whole. Direct management of CEF has ensured fast allocation of support and sound budgetary execution. Cooperation between the Commission, INEA and the Member State authorities is positive and forward-looking. Furthermore, more suitable co-funding rates in comparison with predecessor programmes as well as the flexible nature of budget programming has assisted CEF's progress in achieving its objectives while allowing for efficient expenditure.

While a separate evaluation will be completed in 2018, stakeholders agreed that the executive agency INEA has been successful in the financial management of CEF and budget optimisation. As a result of INEA, economies of scale have been produced in addition to simplifications and consequently administrative costs for the Commission and Member States have been limited. Administrative costs for beneficiaries related to the application and grant agreement requirements have been deemed to be overall proportionate to the financial support provided. A key strength of CEF relates to the ability to quickly re-use money underspent by certain actions for financing other actions and this has already been successfully implemented by INEA.

In the telecommunication sector, there is room for improving coordination among the DSIs while legal and administrative requirements for approval and implementation of actions may impose disproportionate costs for smaller actions for which simplified forms of support could be better adapted. Additionally, for the telecommunications sector, whilst annual Work Programmes present advantages in terms of flexibility, they hamper long-term planning of actions and are inefficient from an operational perspective, given the long adoption cycle and related effort.

[177] Recitals 41-47

EU added value

Given the significant investment needs, CEF allows for the provision of high EU added-value to infrastructure development in the transport, energy and telecommunications sectors, targeting public goods of European dimension that would not be realised at national, regional or local level without EU support.

Achieving well-interconnected, interoperable and efficiently managed transport, energy and digital infrastructures in Europe requires strong governance. This ability to plan and invest in a coordinated long-term approach at EU level strengthens the EU added value of CEF. In addition, pre-identification of projects, a key feature of the programme design, significantly increased the EU added value of CEF.

In the telecommunications sector, CEF has facilitated coordination among Member States to develop standards and enable cross-border services. Member States have developed solutions that make public services available online, however their benefits are confined by national borders. CEF has played a key role in enhancing their outcome by making such solutions interoperable for the benefit of citizens, businesses and public administration across Europe. In some cases CEF has also played an important role in supporting Member States to speed up compliance with the legal obligation to ensure cross border communication or it has enabled voluntary cooperation where cross border interoperability is not an obligation (e.g. in cybersecurity). Moreover, basic solutions supported by CEF funding (the so-called building blocks) are creating economies of scale by being extensively reused in more complex digital services, including beyond the remit of CEF, in areas such as agriculture environment and education.

CEF is steering investments where the EU added-value is highest: on cross-border projects and European-wide interoperable systems and services. In addition, EU level action has assisted in overcoming obstacles that are normally associated with such complex projects that are vital for Europe's sustainable growth and competitiveness which depends on efficient connectivity both within and to the rest of the world.