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Special Report

Demonstrating carbon capture and storage and innovative renewables at commercial scale in the EU: intended progress not achieved in the past decade

(pursuant to Article 287(4), second subparagraph, TFEU)

CURIA RATIONUM

EUROPEAN
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OF AUDITORS

AUDIT TEAM

The ECA's special reports set out the results of its audits of EU policies and programmes, or of management-related topics from specific budgetary areas. The ECA selects and designs these audit tasks to be of maximum impact by considering the risks to performance or compliance, the level of income or spending involved, forthcoming developments and political and public interest.

This performance audit was carried out by Audit Chamber I Sustainable use of natural resources, headed by ECA Member Nikolaos Milionis. The audit was led by ECA Member Samo Jereb, supported by Jerneja Vrabič, Private Office Attaché; Helder Faria Viegas, Principal Manager; Stefan Den Engelsen, Head of Task, Oana Dumitrescu, Joachim Otto, Ernesto Roessing, Juan Antonio Vazquez Rivera and Anna Zalega, Auditors. Zuzanna Filipski provided linguistic support.

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GLOSSARY

Bankability: The bankability of a project is generally a criterion applied by a bank: A project needs to demonstrate that it will generate sufficient revenues to become bankable.

CCUS: Carbon capture, use and storage. EU Research programmes now fund CCUS research. Using captured carbon as a feedstock for industrial or chemical processes may turn carbon into a commodity that can be traded and generate a revenue stream.

Climate Change Committee: See 'Comitology'.

Comitology: The term 'comitology' refers to the set of procedures through which the European Commission exercises the implementing powers conferred on it by the EU legislator, with the assistance of committees of representatives from EU countries. Such comitology committees are chaired by a Commission official and give an opinion on implementing acts proposed by the Commission[1]. For NER300, this is the Climate Change Committee.

Due diligence assessment: In the context of this report it refers to EIB's assessment of the technical and financial viability of a project's application for NER300 grant funding.

Final investment decision (FID): The board of a company takes a FID for an energy project after it has conducted a front-end engineering and design (FEED) study, obtained all necessary permits and confirmed the funding sources for the entire investment. When the board takes the FID, the project's engineering, procurement and construction works can start.

Financial instrument: Financial instruments are a delivery tool to provide financial support from the EU budget through loans, guarantees and equity (or quasi-equity) investments for the implementation of projects[2]. According to International Accounting Standard 32,

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[1] https://eur-lex.europa.eu/summary/glossary/comitology.html.

[2] See ECA Special Report No 19/2016 "Implementing the EU budget through financial instruments - lessons to be learnt from the 2007-2013 programme period".

a financial instrument is “[…] any contract that gives rise to a financial asset of one entity and a financial liability or equity instrument of another entity”.

New entrants’ reserve: The new entrants reserve is a community-wide reserve of 780 million emission allowances established under the EU emissions trading scheme (EU ETS) for the 2013-2020 period. During this time, new EU ETS operators can apply for an allocation of allowances from this reserve. The reserve supplies allowances on a first-come-first-served basis. 300 million allowances from this reserve were set aside in 2012 to fund NER300.

ABBREVIATIONS

CCC	Climate Change Committee
CCS	Carbon capture and storage
CCUS	Carbon capture, utilisation and storage
CEF	Connecting Europe Facility
CfD	Contract-for-difference
CPUP	Cost-per-unit-performance
EEA	European Environment Agency
EEPR	European Energy Programme for Recovery
EFSI	European Fund for Strategic Investments (i.e. Juncker-plan)
EIB	European Investment Bank
ESIF	European Structural and Investment Funds
ETIP	European Technology and Innovation Platform
EU ETS	European Union Emissions Trading Scheme
EUA	EU Emission Allowances
FEED	Front-end engineering design
FI	Financial instrument
FID	Final investment decision
FP6/FP7/FP9	Research Framework Programme 6/7/9
H2020	Horizon2020 (i.e. FP8)
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
JRC	Joint Research Centre
NCP	National Contact Point (i.e. for NER300)

NER300	New Entrants' Reserve 300
RES	Renewable energy sources
RSFF	Risk-sharing finance facility

EXECUTIVE SUMMARY

I. In 2007, the EU presented its climate and energy package for 2020, which required an increased use and development of renewable energy sources and low carbon technologies. The EU and its Member States have taken action to support innovative renewable energy and the construction and operation of power generation and industrial facilities which capture and store carbon to accelerate the demonstration of the first commercial facilities.

II. In 2009, the EU launched the European Energy Programme for Recovery (EEPR) with a budget of €1.6 billion to support carbon capture and storage (CCS) and offshore wind projects. At the same time, the EU created the New Entrants' Reserve 300 (NER300) funded by the sale of 300 million emission allowances (€2.1 billion) to support CCS and innovative renewable energy projects.

III. The EU also funded energy demonstration activities and contributed to EIB-managed financial instruments through research programmes in the same period. The EU sought increased alignment of energy innovation priorities and funding through the Strategic Energy Technology-plan (SET-plan) launched in 2008 and updated in 2015 to match Energy Union priorities.

IV. The EU is likely to achieve its renewable energy targets for 2020. However, the European Environment Agency (EEA) reports that the EU needs to intensify considerably its efforts to reach its overall low carbon economy ambitions for 2050.

V. Our main objective was to assess whether EU action to support the commercial-scale demonstration of CCS and innovative renewable energy technologies between 2008 and 2017 through EEPR and NER300 was well designed, managed and coordinated, and whether NER300 and EEPR made the expected progress in helping CCS and innovative renewables advance towards commercial deployment.

VI. We conclude that neither of the programmes succeeded to deploy CCS in the EU. EEPR contributed to the development of the offshore wind sector, but NER300 did not achieve the

intended progress in supporting the demonstration of a wider range of innovative renewable energy technologies.

VII. Adverse investment conditions, including uncertainty in regulatory frameworks and policies hampered the progress of many innovative renewable energy and CCS projects. A key factor in the failure of CCS deployment has been the low carbon market price after 2011.

VIII. We further found that the design of NER300 limited the Commission and Member States' ability to respond effectively to changing circumstances. In particular, the chosen funding model lacked justification when the NER300 legal basis was inserted in the Emission Trading Scheme directive and did not effectively reduce the risk for demonstration projects. Project selection and decision-making processes were complex, and other design features constrained the programme's flexibility.

IX. Lastly, we found that coordination and accountability arrangements require improvement. Despite slower than intended progress, the SET-plan provides a basis for better aligning public and private priorities and resources. Relevant Commission departments need to improve their coordination to enhance the coherence of EU support to low carbon demonstration projects. The accountability arrangements for the entities managing NER300 are also not clear enough.

X. The EU is preparing to launch the Innovation Fund to replace NER300 and intends to accelerate the transition to a low-carbon economy. In view of this, we make recommendations to the Commission to:

- increase the potential for effective EU support to such projects;
- improve the project selection and decision-making procedures for the Innovation Fund as compared to NER300 and ensure its flexibility to respond to external developments;
- enhance its internal coordination for more coherent targeting of EU support;
- ensure accountability for the Innovation Fund and NER300 funds.

INTRODUCTION

EU support for demonstration projects in the low carbon energy sector

1. In 2007 and 2008, the EU developed its 2020 climate and energy package. This package was a set of binding legislation enacted in 2009 to ensure that the EU meets its climate and energy targets for 2020. It set three targets: a 20 % cut in greenhouse gas emissions (compared to 1990), 20 % of EU energy generated from renewable energy sources and 20 % increase in energy efficiency.

2. In this context, European Council Presidency Conclusions called[3] on the Commission in June 2008 to propose a mechanism to ensure the construction and operation by 2015 of up to 12 demonstration (see ***Box 1***) plants of commercial power generation with carbon capture and storage (CCS - ***Figure 1*** provides a description).

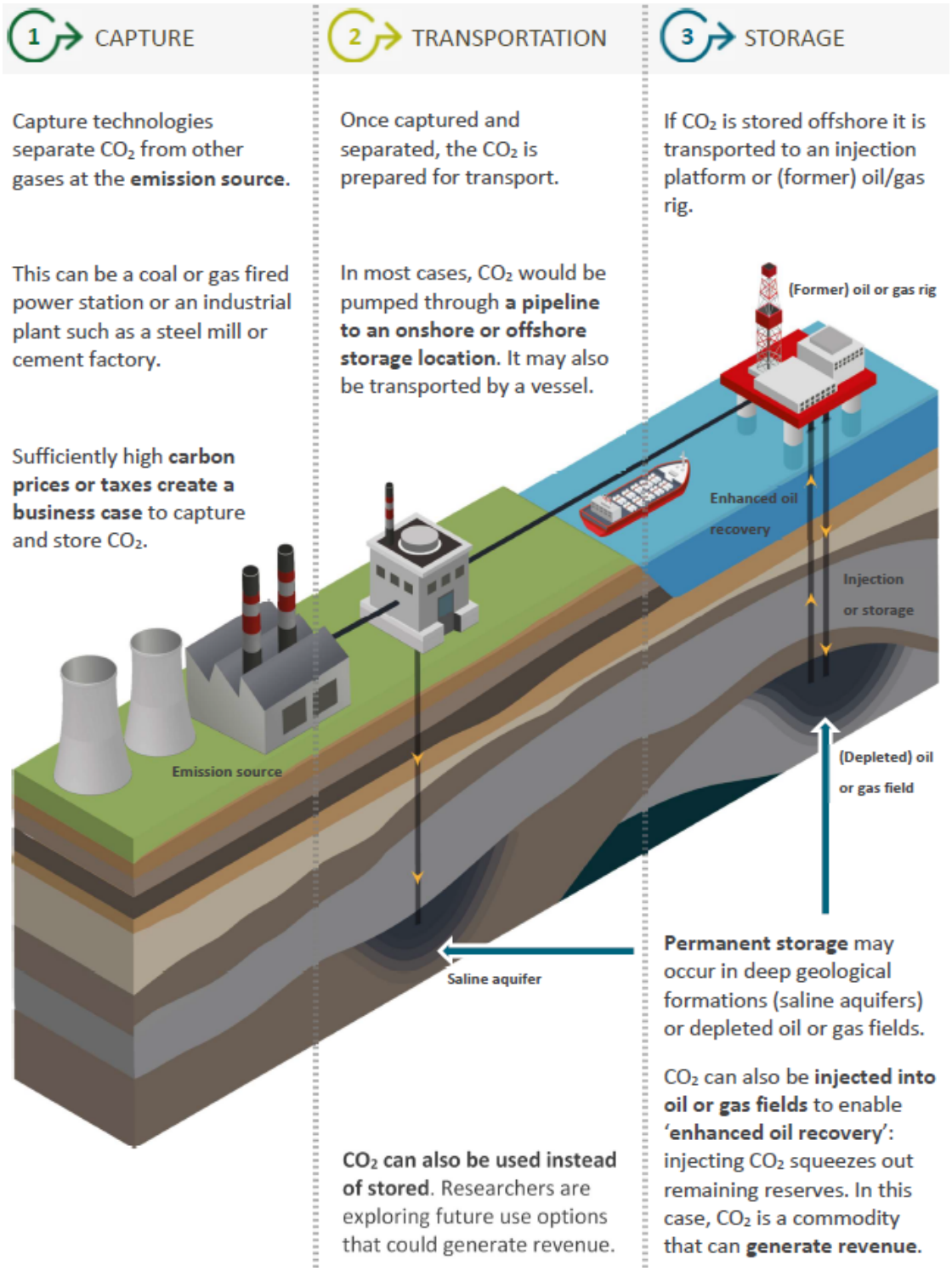
Box 1 – Demonstration of innovative technologies at commercial scale

When new technologies develop from research towards market uptake, they go through different stages. Demonstration is the stage where a new technology is sufficiently tested and mature enough to scale it up to commercial size. If successful, the market will invest and enable full uptake of the technology. Successful demonstration projects thus help equip society with affordable technologies for clean, secure and competitive energy supply.

Demonstration projects often have difficulty to progress beyond this stage. Their challenges involve high capital investments due to their scale while they also carry high technology risks and uncertainty about outputs and potential revenues. They are generally too risky to attract enough private investment, and require various forms of government support to push the technology ahead. When technologies fail to progress beyond this stage, they are stuck in what is called the commercial 'valley of death'.

[3] Paragraph 45, Brussels European Council of 19/20 June 2008, Presidency Conclusions, 11018/1/08 of 17 July 2008.

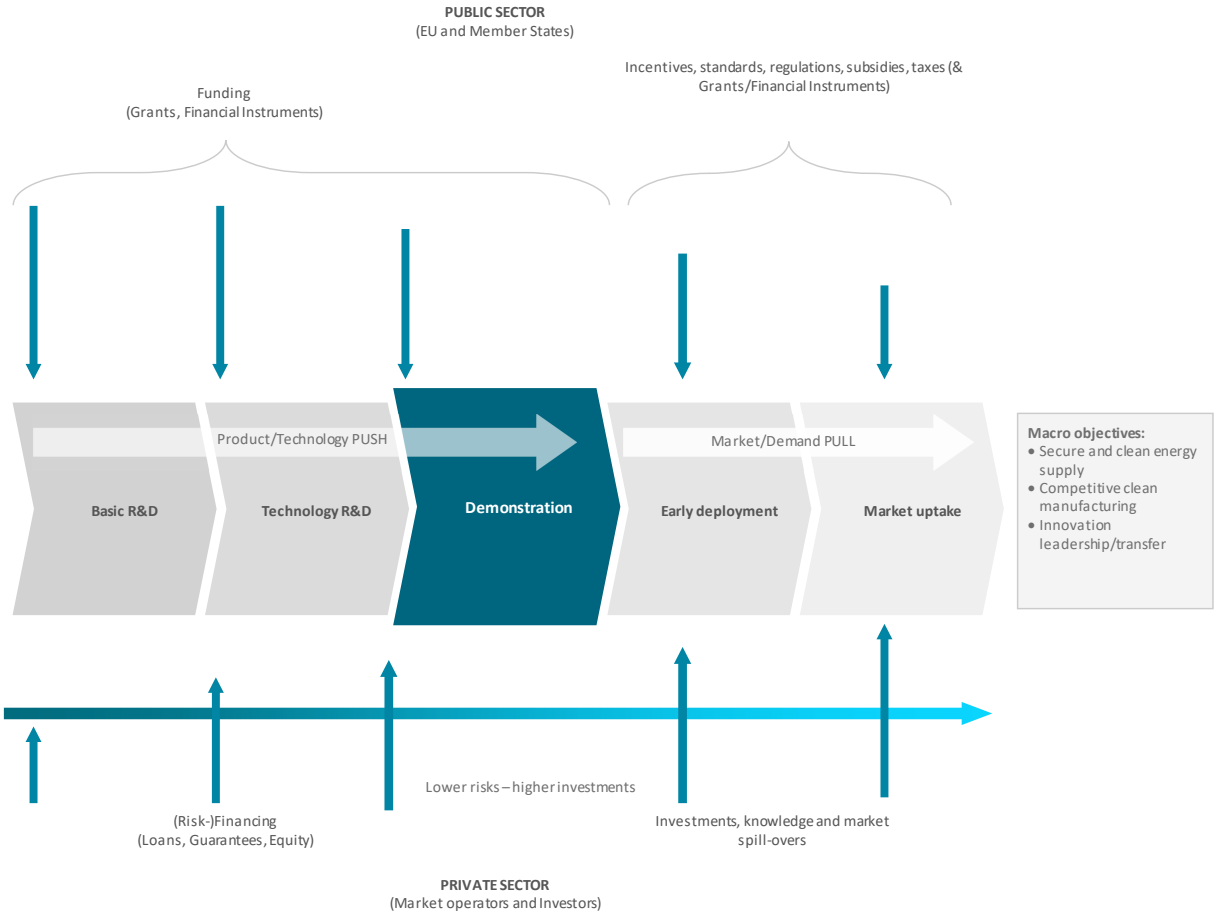
Figure 1 – Carbon capture and storage



Source: ECA.

3. The EU launched two major programmes after 2008 aiming to support commercial-scale demonstration (see ***Figure 2***) of CCS as well as innovative renewables.

Figure 2 – Supporting the demonstration stage of the innovation cycle



Source: ECA adaptation of IPCC and Commission models and documents.

European Energy Programme for Recovery (EEPR)

4. The first major EU programme supporting commercial demonstration of CCS as well as offshore wind was the **European Energy Programme for Recovery (EEPR), launched in 2009**[4]. EEPR was part of a larger economic recovery package[5]. EEPR itself had a total budget of four billion euro to provide grants to projects. This included one billion euro for the CCS demonstration programme and €565 million for offshore wind. EEPR grants would typically contribute towards capital expenditure for planning, development and construction.

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[4] Regulation (EC) No 663/2009 of the European Parliament and of the Council of 13 July 2009 establishing a programme to aid economic recovery by granting community financial assistance to projects in the field of energy (OJ L 200, 31.7.2009, p. 31).

[5] COM(2008) 800 final of 26 November 2008 'A European recovery plan'.

NER300

5. The EU created the New Entrants' Reserve 300 (NER300) in 2009 under the EU Emissions Trading Scheme (EU ETS) to support commercial demonstration projects for CCS and innovative renewables[6]. ***Figure 3*** lists the renewable energy technologies it aims to support.

Figure 3 – Innovative renewable energy sources supported by NER300

Source: ECA.

6. Demonstration projects supported by NER300 would capture and store CO_2 or produce clean renewable energy and may thus contribute to 2020 emission reduction targets if they enter into operation before then. Yet, their main objective is to demonstrate the commercial potential of the chosen technologies and make a larger and long-term low carbon economy

[6] See Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community (OJ L 140, 5.6.2009, p. 63).

contribution beyond 2020 if these are applied elsewhere in Europe and the world[7]. Supporting 'first movers' was expected to contribute to the EU's ambition to be a global leader in the development of renewable energy technologies[8].

7. The EU ETS Directive set aside 300 million allowances from the community-wide EU ETS new entrants' reserve. The EIB sold these and generated €2.1 billion to fund the programme. The Commission handles the general programme coordination. Member States assign national contact points (NCPs) and have a range of responsibilities[9]. The Commission awarded funding to 39[10] projects in 2012 and 2014 under the two calls for proposals foreseen by the legislation. The EIB manages the funds granted but not yet paid out[11].

8. Both additional investment costs and additional operational costs (for five years in case of renewable energy and ten years in case of CCS projects) to deliver and operate the innovative projects were eligible for NER300 funding of up to 50 % of expected costs. NER300 disburses the awarded grants in annual instalments after a project has entered into operation, i.e. when it captures and stores CO_2 or produces renewable energy and incurs operational expenditure, unless the Member States request and guarantee upfront funding for part or all of the grant awarded. ***Figure 4*** describes the challenges and different stages of funding an energy demonstration project.

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[7] Recital 10 of Commission Decision 2010/670/EU of 3 November 2010 laying down criteria and measures for the financing of commercial demonstration projects that aim at the environmentally safe capture and geological storage of CO2 as well as demonstration projects of innovative renewable energy technologies under the scheme for greenhouse gas emission allowance trading within the Community established by Directive 2003/87/EC of the European Parliament and of the Council ('NER300 Decision') (OJ L 290, 6.11.2010, p. 39).

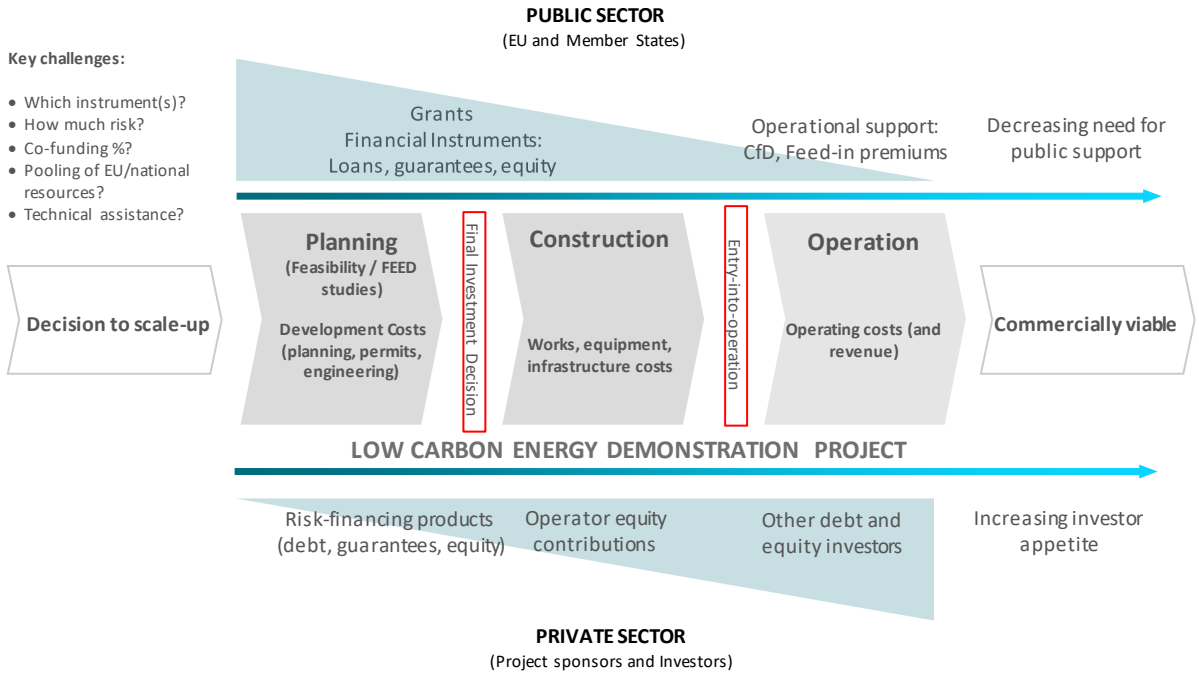
[8] COM(2009) 519/4 "Investing in the development of low-carbon technologies (SET-plan)".

[9] These include the identification of eligible projects, the signing and management of legally binding instruments (contracts) with the projects, the monitoring of projects, reporting to the Commission and forwarding payments from EIB to projects. See ***Figure 10*** in the main text for an overview.

[10] 38 renewable energy projects and one carbon capture and storage project.

[11] This asset management yielded approximately €70 million of extra revenue to date. At the end of 2017, the Commission had released €39 million of NER300 assets for fees payable to the EIB for the tasks entrusted to it. The total fees cannot exceed €45 million, representing 2.1 % of total revenues of €2.1 billion.

Figure 4 – Funding an energy demonstration project



Source: ECA.

Other EU initiatives to support low carbon energy demonstration projects

9. In the same timeframe, the energy strands of the EU Research Framework Programmes **FP7** (2007-2013) and **Horizon2020** (2014-2020) supported demonstration projects across a range of energy technologies. These programmes also contribute(d) funds from the EU budget to EIB-managed financial instruments such as the **Risk-sharing finance facility** (RSFF, 2007-2013) and **InnovFin** (2014-2020), which include(d) energy demonstration objectives.

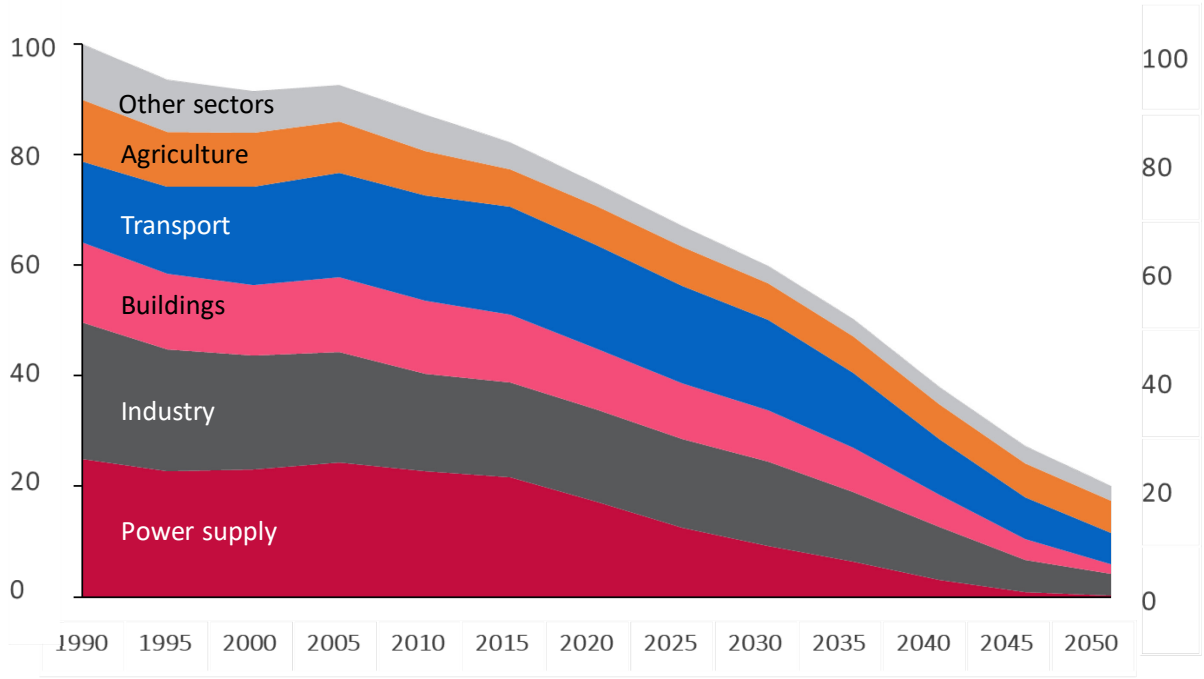
10. In parallel with the deployment of these funding mechanisms, the EU has sought to increase alignment of energy innovation priorities and funding through the Strategic Energy Technology-plan (**SET-plan**), endorsed by the Council in 2008[12]. In 2015, the plan was updated (**Integrated SET-plan**) to align it with the research and innovation (R&I) priorities of the Energy Union. All funding mechanisms described above support SET-plan priorities.

[12] Council Conclusions on the Strategic Energy Technology Plan, 2854th Council Meeting Transport Telecommunications and Energy of 28 February 2008.

The ongoing need for clean energy innovation

11. In 2015, the EU signed the Paris Agreement. The agreement aims to strengthen the global response to the threat of climate change and keep global temperature rise this century well below 2 degrees Celsius above pre-industrial levels. The EU committed itself to at least a 40 % greenhouse gas emissions reduction by 2030, complementing its existing ambition to achieve a low carbon economy by 2050[13]. This implies that all sectors of the economy need to drastically reduce emissions. For example, the Commission's 2011 roadmap projected that the power supply sector should reduce emissions to zero by 2050. ***Figure 5*** shows the projected reduction in all EU greenhouse gas (GHG) emissions.

Figure 5 – Projection of EU greenhouse gas emissions towards an 80 % domestic reduction (compared to 1990)

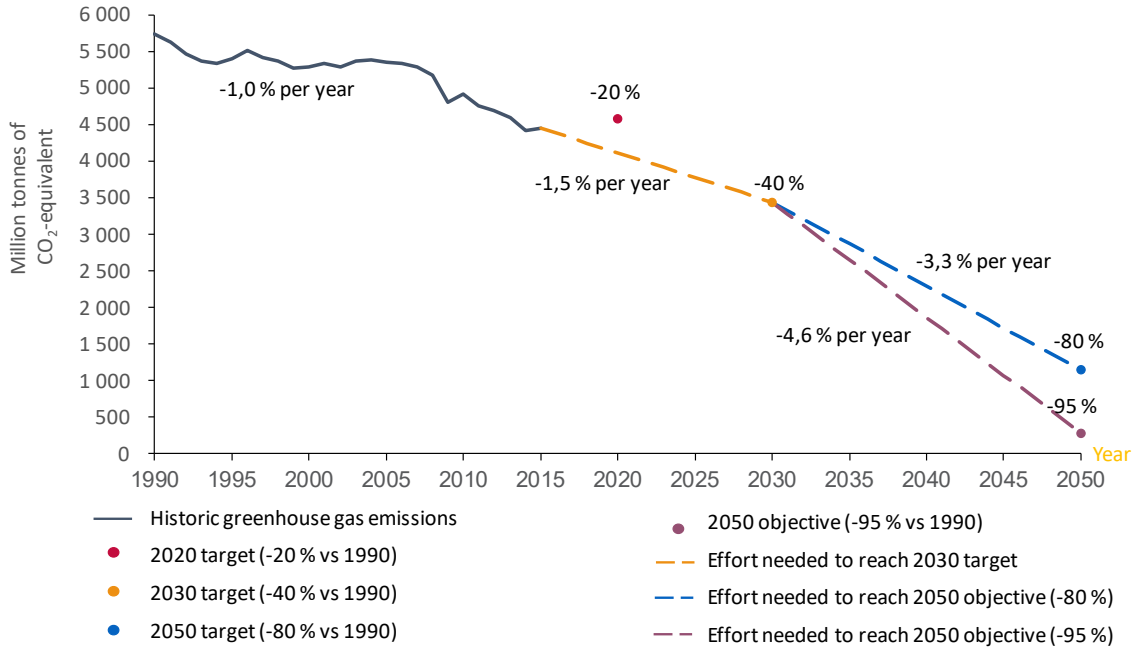


Source: European Commission "Roadmap for moving into a competitive low-carbon economy in 2050", 2011.

[13] COM(2011) 112 final of 8 March 2011 'A roadmap for moving to a competitive low-carbon economy in 2050': "In order to keep climate change below 2ºC, the European Council reconfirmed in February 2011 the EU objective of reducing greenhouse gas emissions by 80-95 % by 2050 compared to 1990".

12. The EU is currently on track to meet its 2020 objective to generate 20 % of its energy consumption from renewable sources, and costs of in particular onshore wind and solar power (photovoltaics) have decreased considerably. Yet the longer-term outlook remains challenging. According to the European Environment Agency (EEA)[14], the EU needs to intensify considerably its efforts after 2020 to reach its overall low carbon economy ambitions for 2050 (see ***Figure 6***).

Figure 6 – Greenhouse gas emissions trends, projections and targets in the EU



Source: European Environmental Agency, European Environmental Agency, Trends and projections in Europe 2016 – Tracking progress towards Europe's climate and energy targets, 2016.

Source: Trends and projections in Europe 2017: Tracking progress towards Europe's climate and energy targets, EEA Report 17/2017.

13. In its 2016 communication[15] on accelerating energy innovation, the Commission emphasised the challenges involved in supporting demonstration projects for low carbon energy and underlined the EU ambition to be the global leader in renewables.

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[14] Trends and projections in Europe 2017: Tracking progress towards Europe's climate and energy targets, EEA Report 17/2017. See heading 'Outlook for greenhouse gas trends in 2050'.

[15] COM(2016) 763 final of 30 November 2016 'Accelerating Clean Energy Innovation'.

14. In 2018, the amended EU ETS Directive[16] provided the legal basis for a new Innovation Fund that will absorb any unspent funds from NER300 and provide funding to innovative low carbon industrial and energy technologies in the period until 2030. Technologies receiving Innovation Fund support should represent breakthrough solutions or be sufficiently mature to be ready for demonstration at pre-commercial scale.

AUDIT SCOPE AND APPROACH

15. Our performance audit assessed whether:

EU support to the commercial-scale demonstration of CCS and innovative renewable energy technologies through EEPR and NER300 was well-designed, managed and coordinated to enable their effective contributions to long-term climate and energy goals.

16. In particular we examined whether:

- **NER300 and EEPR made the expected progress in helping** CCS and innovative renewables advance towards commercial deployment;
- the **design and management of NER300** supported effective decision-making;
- **robust coordination mechanisms** within the Commission and between it and national authorities support the clean energy innovation process.

17. Our audit covered the period from the start of NER300, EEPR and SET-plan activities in 2008 until the end of 2017[17]. The audit did not seek to verify the eligibility, legality or regularity of expenditure. It also did not directly examine policies, funds or instruments

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[16] Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments and Decision (EU) 2015/1814 (OJ L 76, 19.3.2018, p. 3).

[17] ***Annex I*** provides a timeline mapping the launch of these mechanisms and the SET-plan against major policy and economic events.

supporting the deployment of mature renewable energy technologies[18]. The audit did not assess the EIB's monetisation and asset management activities for NER300 funds.

18. We performed the audit work in 2017 at the European Commission (DG Climate Action, DG Energy and DG Research and Innovation). We also visited the EIB and the Commission's Joint Research Centre (JRC) for information purposes. Our work included interviews and document reviews, including 26 EIB project evaluation reports and 36 annual reports for NER300 projects from five[19] Member States, project files for all nine offshore wind and six CCS projects under EEPR. We visited these Member States to interview national contact points (NCPs) for NER300 and national representatives to the SET-plan Steering Group. We reviewed and visited five CCS projects to assess what they had achieved using the available funding. Additionally we surveyed the Energy Technology and Innovation Platforms (ETIPs)[20], the European solar thermal electricity association and KIC-InnoEnergy[21]. The ETIPs are part of the SET-plan architecture and include Member State, academic and industry stakeholders.

OBSERVATIONS

Both EEPR and NER300 set ambitious targets for the delivery of carbon capture and storage and innovative renewables

19. We examined whether EEPR and NER300 made effective progress towards meeting their objectives to support the commercial demonstration of CCS and innovative renewables. We also assessed whether the Commission ensured that projects receiving EU funding spend this money well and contribute to the objectives of the programme.

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[18] We refer in particular to our other Special Report on the deployment of renewable energy in rural areas (SR 5/2018) and our Background Paper "Electricity production from wind and solar photovoltaic power in the EU" of 20 February 2018.

[19] Germany, Spain, the Netherlands, Poland and the United Kingdom. We based our selection on their significant shares in EU ETS emissions and their interest in CCS under EEPR and NER300.

[20] We sent our survey questions to the ETIPs for Wind, Solar Photovoltaics, Ocean Energy, CCS, Bioenergy, Deep Geothermal, and Smart Grids.

[21] www.innoenergy.com.

EEPR fell short of its ambitions for carbon capture and storage …

20. In June 2008, the European Council Presidency Conclusions called on the Commission to propose a mechanism to ensure the construction and operation of 12 commercial-scale CCS demonstration plants in the EU by 2015. CCS demonstration projects were to achieve significant emissions reductions from power generation while at the same time providing the technological and commercial basis for replication of the technology elsewhere. The EEPR was to contribute to this objective[22].

21. The Commission granted one billion euro to six projects. At the end of 2017, the Commission had paid out €424 million (see ***Table 1***). Four out of these six co-funded projects had ended after the grant agreement was terminated, and one project ended without being completed. The only completed project did not represent a commercial size CCS demonstration project, but smaller pilot facilities for capture, transport and storage.

Table 1 – Status overview of EEPR CCS programme at end of 2017

Project location	Status of EEPR Action as at October 2017	Category	Expected contribution to low carbon transition objective*	EEPR Action total eligible cost (as per grant agreement) mln euro	EC grant mln euro	Action Co-funding % (grant agreement)	Net EC grant paid out (after recoveries - October 2017)
DE	Terminated	CCS	10	305	180	59%	15
PL	Terminated	CCS	9	610	180	29%	21
IT	Terminated	CCS	5	143	100	70%	35
NL	Terminated	CCS	6	371	180	48%	67
UK	Ended without completion	CCS	17	274	180	66%	120
ES	Pilot facilities - limited use - no full-scale CCS demonstration	CCS	5	263	180	69%	166
* Anticipated amount of CO2 captured and stored in first five years as per grant application (mln tonnes).				**Total EU funding awarded:**	1 000	**Total EU funding paid:**	424

NB: Further corrections may occur for UK and NL projects subject to winding up procedures.

Source: ECA based on Commission data[23].

22. The EEPR CCS sub-programme thus has not contributed to the construction and entry-into-operation of any CCS demonstration project. ***Box 2*** provides examples of how the projects spent the EU money. While some failures generally occur in innovation

[22] 12 eligible projects were listed in the annex of the EEPR Regulation (EC) No 663/2009.

[23] SWD(2018) 48 final of 5 March 2018 'Data on the budgetary and technical implementation of the European Energy Programme for Recovery'.

programmes, the results achieved through the EU investment on incomplete projects falls far below the level originally expected. These projects also did not achieve their intended emission reductions[24] for the concerned Member States.

Box 2 – Examples from EEPR CCS projects

All projects started ground preparation works early. No tangible results from these activities are in use today, except at the project in Spain. The project in the Netherlands constructed a CCS tie-in at the base of the flue gas chimney in the coal-fired power plant that entered into operation in 2013. This project was the only EEPR CCS project to obtain a carbon storage permit under the CCS Directive[25] for its anticipated offshore storage location, but it does not currently capture and store any carbon.The largest expenditure item of the project in the United Kingdom included technology licenses acquired at €17 million and now fully depreciated. Despite €60 million of EU contributions to the capture work, the project delivered no results on this work. The project sponsors never started the construction of the base power plant to which the CCS facilities would be applied. Similar issues existed for the projects In Italy, Germany and Poland, but they were cancelled earlier.

… but made a positive contribution to the - fast developing - offshore wind sector

23. The EEPR Offshore Wind sub-programme aimed to fund offshore wind energy projects with innovative features between 2009 and 2015. This involved for example projects deploying innovative turbines and foundation structures to allow building the first large scale (400 MWh) windfarms far out into sea (> 100 KM) and at large depths (> 40 M) to produce clean electricity. The programme also sought to increase grid connections between offshore windfarms and various Member States, in particular in the North and Baltic Seas. This included using innovative grid connector technologies at commercial scale.

24. At the end of 2017, the Commission had paid out €255 million of the €565 million it had granted to nine offshore wind projects. Four projects had reached full completion. For two

[24] In the case of the project in the UK, the associated new power plant was not built and therefore never emitted any CO_2.

[25] The 2009 CCS Directive provides a legal framework for the environmentally safe geological storage of CO2 during its full lifetime and sets the criteria for storage permits. See https://ec.europa.eu/clima/policies/lowcarbon/ccs/directive_en.

projects, the grant agreements were terminated early after the Commission had paid out €7.4 million. Three projects are still on going in 2018. ***Table 2*** summarises these results.

Table 2 – Status overview of EEPR offshore wind programme at end of 2017

Project location	Status of EEPR Action as at October 2017	Category	Expected contribution to low carbon transition objective*	EEPR Action total eligible cost (as per grant agreement) mln euro	EC grant mln euro	Action Co-funding % (grant agreement)	Net EC grant paid out (after recoveries - October 2017)
UK	Terminated	OWE GRID	N.A. (Grid)	149	74	50%	3
DE	Terminated	OWE TURBINES & STRUCTURES	No data	205	59	29%	4
DK/NL	Ongoing (delayed)	OWE GRID	N.A. (Grid)	173	87	50%	5
DE/DK	Ongoing (delayed)	OWE GRID	N.A. (Grid)	507	150	30%	58
UK	Ongoing (delayed)	OWE TURBINES & STRUCTURES	> 80 MWh	190	40	21%	28
DE	Completed	OWE TURBINES & STRUCTURES	> 400 MWh	118	53	45%	53
DE	Completed	OWE TURBINES & STRUCTURES	> 295 MWh	488	50	10%	50
DE	Completed	OWE TURBINES & STRUCTURES	> 400 MWh	220	43	19%	43
BE	Completed	OWE TURBINES & STRUCTURES	> 270 MWh	24	10	42%	10
* Anticipated annual clean electricity generation capacity.			> 1445 MWh	**Total EU funding awarded:**	565	**Total EU funding paid:**	255

Source: ECA based on Commission data[26].

25. Four projects achieved the successful deployment of large and clean electricity generation capacity while the three delayed projects are still in a position to contribute to the same objective or to better integration of the EU energy grid. The EU funding to offshore wind projects from 2009 onwards gave a positive signal to what is now a fast developing sector[27].

26. Due to the rapid development of the sector (which led to some supply bottlenecks), the three delayed projects in particular required frequent adjustment. The Commission showed significant flexibility in accepting amendments to grant agreements.

<u>These EEPR programmes did not achieve the objective to quickly stimulate economic growth</u>

27. Against the backdrop of the economic crisis, a major objective for the EEPR programme was to stimulate economic growth by boosting investments and creating jobs. This required

[26] SWD(2018) 48 final.

[27] According to a 2017 report from IEA-Renewable Energy Technology Deployment, "a cost reduction of 60 % from 2010 to 2017 indicates that industry targets for 2025 have been exceeded 8 years ahead of schedule, suggesting that offshore wind could potentially be fully integrated into the market on a competitive basis in some European countries within the next decade". The EU is now the global leader in offshore wind deployment.

spending a large portion of the available funds by the end of 2010[28]. While spending money is not an objective in itself, the EEPR CCS and offshore wind programmes did not meet this recovery objective. Payment rates stood around 10 % at the end of 2010, and were still below 50 % for both programmes at the end of 2017.

NER300 has delivered no successful carbon capture and storage project …

28. NER300 aimed to award funding to eight projects which would demonstrate the commercial viability of CCS. This funding could be awarded to projects already funded under EEPR, or to other projects demonstrating CCS. After the first NER300 call for proposals of 2011, ten CCS demonstration projects were eligible and had successfully passed the EIB's due diligence appraisal (see ***paragraphs 66 to 75***). The Commission ranked eight projects to consider for grant funding and kept two on a reserve list[29].

29. Based on this ranking, the Commission asked Member States to confirm their support to these projects. Three Member States confirmed five of these ten projects. Yet, the Commission found that these confirmations were not in line with NER300 legal requirements (***Box 3*** gives examples) and did not award any grants to CCS projects for the first call for proposals.

Box 3 – Examples of rejections by the Commission of CCS projects confirmed by Member States

The Commission rejected the Member State confirmation of an industrial CCS project in the Netherlands due to a disagreement between the Commission and the Member State about the financing figures. EIB adjustments had revealed a funding gap of €40 million that no party was willing to bridge.

The Commission found that the United Kingdom's confirmation of three projects was not in line with NER300 rules because it made its support conditional upon the ultimate success of these projects in

[28] In accordance with the award criteria for CCS and Offshore Wind projects (e.g. Article 14(2)a) of the EEPR Regulation), grants should be awarded to projects "reaching the investment stage and incurring substantial capital expenditure by the end of 2010".

[29] SWD(2012) 225 final of 12 July 2012" NER300 – Moving towards a low carbon economy and boosting innovation, growth and employment across the EU".

a national funding competition which was underway at that time. This left the total public funding contribution unconfirmed and the Commission did not award the NER300 support to these projects.

30. Under the second call for proposals in 2014, only the United Kingdom submitted a CCS project. The Commission awarded a €300 million grant to the project that was also included in the United Kingdom national CCS support scheme. This project planned to capture and store almost 18 million tonnes of CO_2 over a ten year demonstration period. However, in November 2015, the UK cancelled its support scheme following a spending review. This left a significant funding gap and the consortium disbanded. At the time of the audit, withdrawal of the project from NER300 was under preparation, meaning that the €300 million grant awarded but yet to be paid, would not be spent on the NER300 CCS objective[30].

… and is not on track to achieve its intended impact for innovative renewables

31. In addition to CCS, NER300 aimed[31] to support at least one project in every renewable energy project sub-category to demonstrate the viability of a range of innovative renewables not yet commercially available[32].

32. The Commission awarded €1.8 billion of NER300 funds to 38 innovative renewable energy projects in 2012 and 2014[33]. Based on the expected output figures established before the award decisions, the renewable energy projects expected to generate almost 85 TWh of clean energy in their first five years of operation. ***Figure 7*** provides a status overview of these NER300 projects as at February 2018. ***Annex II*** provides the data.

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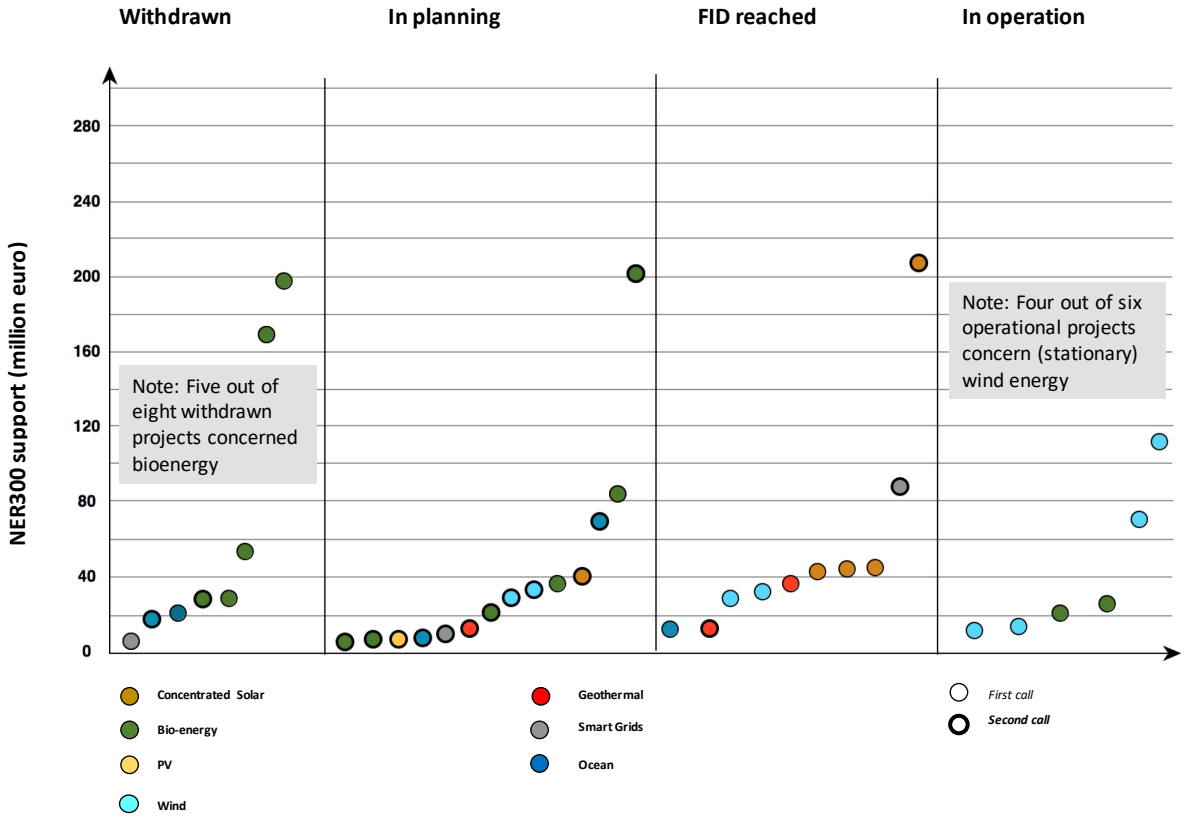
[30] Unspent NER300 funds may still be used under other programmes supporting CCS or carried over to the future Innovation Fund, which will also support CCS.

[31] Article 8(1) and Annex I of Commission Decision 2010/670/EU.

[32] At the launch of NER300 in 2010, these included wind energy, ocean energy, bioenergy, photovoltaics, concentrated solar power, hydropower, geothermal energy and smart grids.

[33] Award Decision C(2012) 9432 final of 18 December 2012 awarded grants to 20 renewable energy projects and Award Decision C(2014) 4493 final of 8 July 2014 awarded grants to 18 renewable energy and 1 CCS projects.

Figure 7 – Status overview of innovative renewable energy projects under NER300



Source: ECA based on analysis of NER300 data.

33. Under the original NER300 legislation, projects would have to reach final investment decision within two years (i.e. in 2014 and 2016) and enter into operation no later than four years (i.e. in 2016 and 2018) after the award decisions.

34. In February 2015, the Commission amended the NER300 Decision, putting back the deadlines for final investment decision and entry into operation by two years[34]. The amending Decision mentioned that the economic crisis was the main reason why a significant number of projects awarded NER300 funds were unable to reach final investment decision within the original deadlines. Despite these deadline extensions, seven projects (with total grants awarded exceeding half a billion euro) had withdrawn from NER300 by early 2018. One further project was likely to withdraw in 2018, representing another

[34] Commission Decision (EU) 2015/191 of 5 February 2015 amending Decision 2010/670/EU as regards the extension of certain time limits laid down in Article 9 and Article 11(1) of that Decision (OJ L 31, 7.2.2015, p. 31).

31 million euro. Fourteen projects awarded grants in 2014 should still reach final investment decision in 2018.

35. A project should meet 75 % of the expected amount of energy produced within five years of operation to obtain 100 % of the grant. At the end of 2017, three operational renewables projects had received annual disbursements based on their energy output. Two bioenergy projects that entered into operation as planned were producing much lower outputs than anticipated. These were thus not on track to meet the required 75 % output threshold for claiming their full grants. The wind energy project receiving disbursements since 2014 was on track.

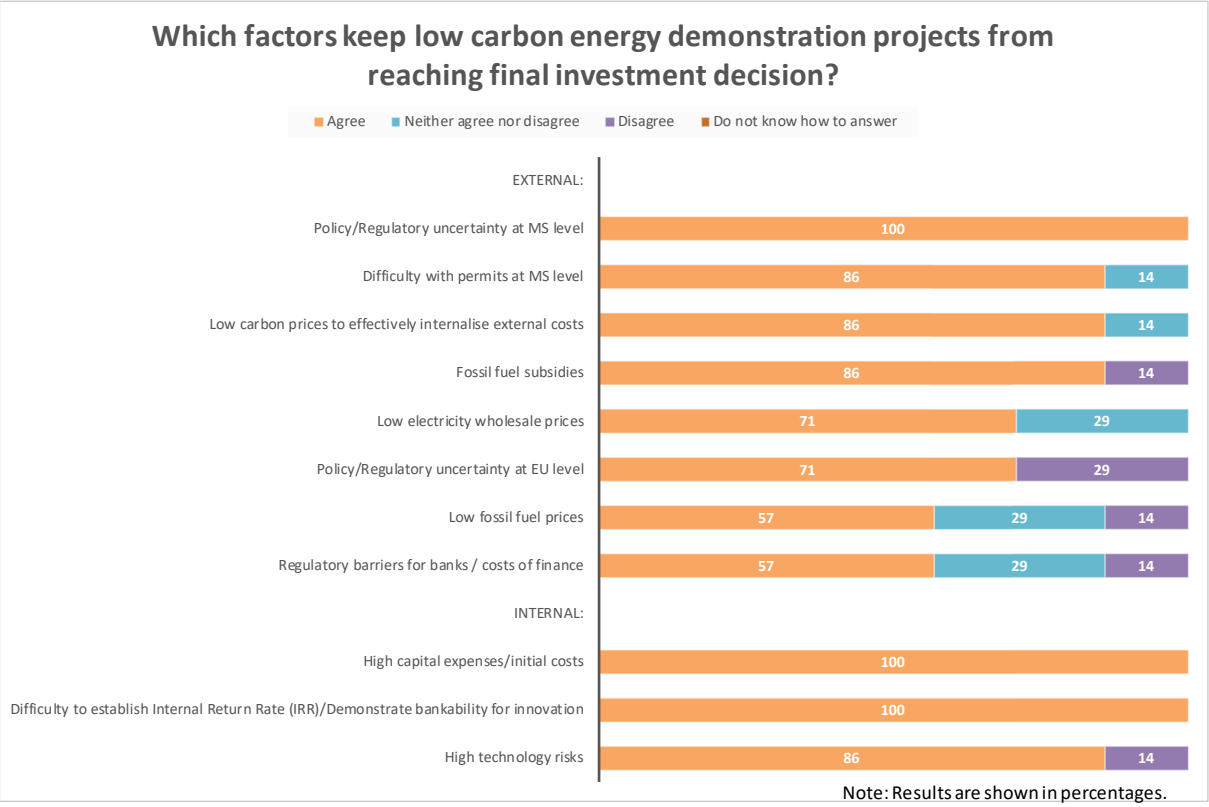
36. Due to project withdrawals, delays and lower than expected project outputs, NER300 is not on track to achieve the intended impact across a broad range of renewable energy technologies and enable their first commercial demonstration.

EEPR and NER300 projects were affected by adverse investment conditions

37. Low carbon energy demonstration projects carry high technological and financial risk and thus face many challenges on their way to reaching market deployment. Wider economic and regulatory issues affect their access to finance. In this section, we explore how such factors have affected the performance of EEPR and NER300.

38. We surveyed the Energy Technology Innovation Platforms associated to the SET-plan architecture and two other organisations (see ***paragraph 18***) to determine the main barriers to finding finance for commercial demonstration projects in the EU. The results presented in ***Figure 8*** show consensus among the stakeholders consulted regarding the relevance of a number of key barriers.

Figure 8 – Survey results on barriers for financing demonstration projects



Source: ECA.

39. When programmes like EEPR and NER300 were conceived in 2008, oil, coal, gas and wholesale electricity prices were at very high historical levels. They all sharply decreased going into 2009, just before the launch of the programmes. While oil prices recovered until another drop in 2014, these factors are important drivers for investment in low carbon technologies. The drop and volatility in prices of fossil fuels made the investments in new low carbon energy technologies less attractive compared to the fossil fuel energy sources.

40. The next paragraphs describe how other key barriers affect the financing conditions of NER300 and EEPR projects (***Annex III*** links these barriers to the performance figures of these programmes).

The investment climate for demonstration projects was affected by uncertainty in regulatory frameworks and policies

41. In view of the challenge of financing high-risk demonstration projects, the ETS Directive and NER300 Decision had raised the expectations of potential projects that Member States would contribute national public funding to those projects selected under NER300. The Commission asked Member States to confirm this for the projects selected before granting NER300 funds to them.

42. Member State support could consist of capital grants towards the development and construction of infrastructure. It could also include additional benefits such as feed-in tariffs (see ***Box 4***) or premiums to support the operation of the newly built installations. NER300 rules also allowed Member States to issue a guarantee to let the EIB release part of the awarded funds to projects before they became operational. We found at the time of our audit that only four projects in four Member States had actually benefited from such a guarantee and received upfront payments from the EIB.

Box 4 – Feed-in-tariffs and premiums for renewable energy

A feed-in-tariff is a support scheme under which fixed electricity prices are paid to renewable energy producers for each unit of energy produced and injected into the electricity grid. The payment of the tariff is guaranteed for a certain period of time that is often related to the economic lifetime of the respective renewable energy project (usually between 10-25 years).

A feed-in-premium is a support scheme under which electricity from renewable energy sources is typically sold on the electricity market and producers receive a premium on top of the market price of their electricity production. The premium can either be fixed (i.e. at a constant level independent of market prices) or sliding (i.e. with variable levels depending on the evolution of market prices)[35].

43. In 2012, before the first award decision, the EIB had informed the Commission that the viability of the submitted financing plans strongly depended on support Member States might provide in the form of feed-in-tariffs, grants or other mechanisms. In some cases,

[35] Special Report No 5/2018 "Renewable energy for sustainable rural development: significant potential synergies, but mostly unrealised".

projects had assumed that extra grants and subsidies from Member States would fully complement the NER300 grant to fund the relevant costs. The EIB had noted that in most cases Member States had not yet clearly defined or agreed these support mechanisms at the closing of the project evaluation process.

44. From 2014[36], the Commission required Member States to use competitive bidding procedures for determining the support levels paid to renewable energy promoters. Before, Member States often used fixed feed-in-tariffs agreed with energy suppliers for long periods (e.g. 25 years). From 2017, competitive auctioning procedures should be the only subsidy model for operational support. The new approach for providing such support to renewable energies would not have prevented Member States from continuing to support innovative demonstration projects. The Commission guidelines provided the possibility to seek a derogation from the bidding process for new technologies with higher costs per unit of energy produced. While national schemes for operational support were changing across the EU, NER300 projects conceived at the time of feed-in-tariffs were still trying to reach final investment decision. They therefore faced uncertainty about the availability of future operational support.

45. ***Box 5*** provides an example of a project that ultimately withdrew because of changes in the regulatory and financial support environment.

Box 5 – Example of a NER300 project that could not reach final investment decision

An ocean energy project in the United Kingdom had relied on access to the national support mechanism that was in place for renewable energy when it applied for NER300 funding. At that time in 2012, the Member State had a support mechanism in place that would have provided funding for this ocean energy project. The Member State had confirmed the Commission's NER300 award proposal on that basis.

[36] Communication from the Commission, Guidelines on State Aid for environmental protection and energy 2014-2020 (2014/C 200/01) of 28 June 2014. Also see the 2013 recommendations: Commission Staff Working Document, European Commission guidance for the design of renewables support schemes, accompanying the document 'Communication from the Commission – Delivering the internal market in electricity and making the most of public intervention', SWD(2013) 439 final of 5 November 2013.

Yet the Member State's energy policy changed during the lifetime of the NER300 scheme. In 2016, the project reported that under a new competitive auctioning scheme, it had failed to secure revenue support because the Member State had removed the ring fencing for the ocean sector from that scheme. In absence of alternative funding sources to cover the ensuing funding gap, the project was not able to reach FID by 31 December 2016 and withdrew.

46. For CCS projects under EEPR, Member State support also did not materialise as expected. ***Box 6*** provides examples.

Box 6 – EEPR CCS projects and regulatory uncertainty

The EEPR project in Germany started works early after it had already successfully deployed a pilot plant and associated onshore storage facility. Despite initial commitment from the Member State to this technology and project, delays in the transposition of the CCS Directive and the final design of the national CCS legislation made the project sponsor decide that the project was unviable. It thus cancelled the project in 2013 while the Commission had already paid out 15 million euro.

The EEPR project in the UK had submitted a bid in the country's second CCS competition (2012-2015)[37]: a national scheme to support two full-chain CCS demonstration projects. In October 2012, the government did not select this project for support, even if it had endorsed its inclusion in the original list of pre-selected projects for EEPR in 2009. The project then also failed to get a NER300 grant in 2012. However, the Commission paid a total of €120 million to this project since 2009 under EEPR. Not getting the expected public support from other sources and prolonged discussions between the Member State and the Commission on how the project might be supported through other mechanisms at later stages compromised the viability of the project and the value obtained for the paid EU funds.

47. Regulatory regimes and financial support mechanisms for innovative renewables aim to contribute to achieving Member State and EU climate and energy objectives. These ought to be aligned with international climate agreements and long-term emission reduction

[37] See 'Carbon capture and storage: the second competition for government support', Report by the Comptroller and Auditor General, National Audit Office, 20 January 2017. The programme would spend 100 million pound to fund 75 % of two bidders' design and engineering costs (FEED studies). Up to 900 million pound would be available towards capital support for the two projects. Eight projects had made bids, while some had also applied for NER300 grants.

objectives (i.e. towards 2050 and beyond). However, when such climate and energy objectives are not clearly established (e.g. enacted in law) and do not have a stable long term outlook, this creates further uncertainty harming the investment conditions for this type of innovative and risky projects. ***Box 7*** describes briefly how there is still much work to be done on this matter.

Box 7 – Low carbon development strategies and their impact on energy innovation

Under the 2013 EU Monitoring Mechanism Regulation (MMR), Member States were required to submit to the European Environment Agency by 2015 their 'Low-Carbon Development Strategies' for 2050, and report progress in March 2017.

According to a recent study[38], by 2017, only thirteen out of twenty-eight Member States had strategies that qualified as low carbon development strategies under criteria developed by the project. The study reported that the quality of the strategies submitted varies a lot and that not all strategies and policies included in these documents are enacted in law.

The proposed Energy Union Regulation of November 2016 requires Member States to produce national energy and climate plans (NCEPs) for the period from 2021 to 2030 and later decades on a rolling basis. Member States will also have to prepare and report to the Commission by January 2020 and every ten years their long-term low emission strategies with a 50 years perspective.

48. Uncertainty around policies, regulations and public financial support affects the financial viability and progress of innovative low carbon energy demonstration projects under NER300 and EEPR. As delays occurred, the likelihood that new, more innovative projects emerged outside of NER300 increased.

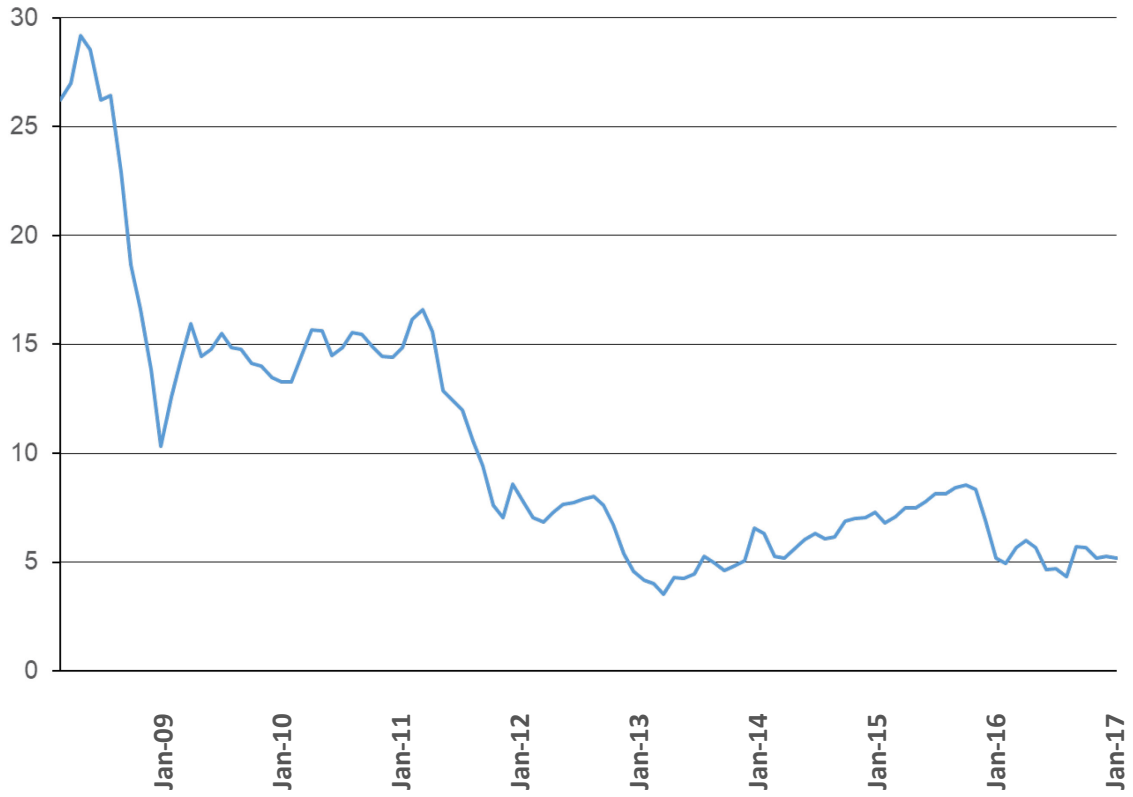
For CCS projects, decreasing carbon market prices and a lack of other support and revenues were key barriers

49. The six CCS projects supported by EEPR should have reached their final investment decisions in 2011 or 2012 and been operational by 2015. Besides many other significant

[38] 'A climate for the future: assessing the Member States' low-carbon development strategies and lessons for Energy Union Governance – an update – the outlook in October 2017', WWF Maximiser project.

challenges, a key factor keeping them from doing so was the lower than expected carbon market price under EU ETS. ***Figure 9*** shows the evolution.

Figure 9 – Historical price of EU ETS allowances (euros/ tonne of CO2e) 2008-2017[39]



Source: ECA, based on monthly average of seven EUA futures contracts (Quandl).

50. We found that CCS projects when they had applied in 2009 for an EEPR grant had relied on high and increasing carbon prices to underpin their financial plans. A review of the EEPR grant applications submitted in 2009 by the six promotors that were later awarded grants showed that they expected the carbon price to range between 20 and 40 euro per tonne of CO_2 during the construction and demonstration phases. One project showed how the viability of its financial plan also depended on electricity prices. It estimated that only a carbon price ranging between 65 and 90 euro per tonne of CO_2 would actually enable the CCS demonstration project to run without losses.

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[39] From mid-2017, the EU ETS carbon market price started to increase, peaking at 16 euro per tonne of CO_2 in May.

51. In their financing plans, these projects frequently expected to receive significant funding from NER300 in the future, even though at that time (in 2009) the final design of NER300 was not known. ***Box 8*** describes how the carbon market price also determined the maximum size of NER300 grants[40]. The Commission accepted these highly uncertain financial plans, signed the grant agreements and paid 43 % of the awarded funds under the EEPR.

Box 8 – The fall in the value of ETS allowances led to smaller NER300 grants

Based on Member State confirmation letters and EIB due diligence reports we calculated for eight CCS power sector projects, that the costs[41] under NER300 to deploy and operate their CCS infrastructure on average amounted to 1.4 billion euro. The ETS Directive capped the size of a NER300 grant at 15 % of the 300 million available allowances (i.e. equal to 45 million allowances). When the carbon market price dropped from €15 per allowance in 2010 to approximately €7.5 in 2011, this also reduced the expected largest possible size of a NER300 grant from €675 million to €337 million. The Commission finally set it at €300 million. For capital-intensive CCS projects that expected to receive much higher support from NER300, this was a major setback. It happened as project sponsors submitted and awaited the evaluation of their proposals in 2011-2012.

When the Commission had ranked the CCS projects and sought Member State confirmation, it announced to these Member States that it assumed that they would make up for the resulting gap between the largest expected NER300 grant of €337 million and the total public funding needed for these projects. This gap could amount to hundreds of millions of euros, which Member States were not willing to plug.

52. The EEPR CCS projects in the United Kingdom and the Netherlands (the only ones to continue after 2013) were never able to (re-)establish their financial viability in light of the

[40] See the relevant NER300 sections of the evaluation of the EU ETS Directive carried out within the project "Support for the review of the EU Emissions Trading System" of November 2015, prepared by the Austrian Umweltbundesamt in cooperation with Ecologic and SQ Consult in November 2015 under a service contract with the European Commission.

[41] Article 3(2) of the NER300 Decision defines as follows for CCS: "The relevant costs of CCS demonstration projects shall be those investment costs which are borne by the project due to the application of CCS net of the net present value of the best estimate of operating benefits and costs arising due to the application of CCS during the first 10 years of operation".

decreasing prices. The expected financial benefits of capturing and storing CO_2 and thereby avoiding high costs under the EU ETS would not materialise as expected.

53. In 2012, the Commission made an internal assessment[42] of the impact of the decreasing carbon market price. It noted that it had become very difficult for these projects to take a final investment decision. It nevertheless maintained EEPR financial support and allowed some work on transport and storage packages in the UK and the Netherlands to continue. The Commission applied the rationale that those projects could potentially benefit other emitters in the same areas if they would enable the construction of infrastructure for shared use.

54. The Commission and the project sponsor had decided in 2011 to slow down the work of the project in the Netherlands in view of the low carbon market prices. The Commission made significant efforts in 2015-2017 to identify extra funding sources to cover the gaps. It organised various roundtable meetings with key industry and Member State stakeholders in Brussels and sought common interests to continue the project. The goal was to at least construct the required infrastructure and operate it for a short demonstration period. The project sponsor finally withdrew its support from the project in 2017.

55. The lack of financial viability is the main blocking factor for CCS deployment in the EU. The sharp decrease of the carbon market price and the failure of any EEPR project to secure an adequate amount of extra public funding through NER300 or national programmes by 2012 or other revenues, compromised their viability. The Commission did not suspend or terminate its financial support to the demonstration of CCS under EEPR at that time and continued after 2013 to make payments to two projects that ultimately failed.

The design of NER300 limited the Commission and Member States' ability to respond to changing circumstances

56. We examined whether the general design of the NER300 programme matched identified needs and whether the project selection procedures ensured that it would award

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[42] Internal exchanges between DG ENER and DG BUDG about the much lower than expected payment rates in the first years of EEPR.

grants to the best available projects. We further examined whether the NER300 governance arrangements allowed for an effective and flexible performance of tasks by the entities managing this innovation programme.

The chosen NER300 funding model did not effectively de-risk demonstration projects

57. The Commission is required to perform an impact assessment for its most important initiatives and for those that will have the most far-reaching impacts. This applies to the 2009 amendment of the ETS Directive (which would later become the legal basis for the creation of NER300) as well as to the 2010 Commission decision laying down NER300 implementing provisions.

58. When reviewing the impact assessments for the NER300 legal basis prepared by the Commission, we found that the initial proposal[43] from the Commission for the EU ETS review did not include a mechanism to incentivise CCS demonstration projects. The accompanying Commission impact assessment[44] thus also did not include any relevant needs assessment for the legal basis for NER300. Such an assessment would, for example, have mapped the funding needs of demonstration projects in all technology categories envisaged to receive support. It would have also identified available national support mechanisms and justified why an EU-level programme was required to supplement these.

59. The idea for the mechanism first appeared during the legislative process for the ETS review. In its 2008 policy options paper '*Financing large scale demonstration of emerging energy technologies (e.g. CCS Demonstration Plants)*' the Commission had noted that only a limited group of Member States was likely to support a mechanism for CCS.

60. The final design of NER300 included both CCS and innovative renewables. The European Parliament and Council had inserted the article establishing the legal basis for NER300 in the revised ETS Directive and extended its scope to cover renewable energy.

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[43] COM(2008) 16 final of 23 January 2008.

[44] Commission Staff Working Document, Accompanying document to the proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC so as to improve and extend the EU greenhouse gas emissions allowance trading scheme, Impact Assessment, SEC(2008) 52 of 23 January 2008.

61. We found that insufficient evidence was available justifying the need for an additional funding mechanism of this type at EU level. No satisfactory assessment was available to underpin the legal basis of NER300 explaining what type of support early demonstration projects of a wide range of renewable energy technologies and CCS would need and why delivering support after entry into operation would meet the de-risking needs of projects from all categories.

62. We also verified whether the provisions of the new NER300 article in the 2009 update of the ETS Directive prevented the possibility of paying funds at early projects stages. The Directive determined that grant allocation should occur based on verified avoided CO_2 emissions. The Commission's legal interpretation was that this could be a pre-condition for disbursement but also a condition for repayment in case of project failure.

63. In its published impact assessment[45], the Commission stated that recovering money from failing projects would be difficult because Member States would have to do it. The Commission thus favoured the option of disbursing funds after entry-into-operation. The final NER300 implementing act reflects this choice. It most likely affected the take up of funds by demonstration projects, but has protected the NER300 endowment.

64. Our document reviews, interviews held as part of our audit work and the replies to our survey confirmed that the design of NER300 as a programme that would deliver financial support to projects after their entry-into-operation did not work very well to de-risk projects.

65. In absence of clear and convincing needs assessments to underpin this key design feature in the legal basis of NER300, its funding approach insufficiently met the de-risking and financing needs of demonstration projects of a wide range of innovative technologies. The revised EU ETS Directive for the 2021-2030 period[46] attempts to remedy this issue and

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[45] Impact Assessment, SEC(2010) 1320 final of 3 November 2010.

[46] Directive (EU) 2018/410 of the European Parliament and of the Council of 14 March 2018 amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments and Decision (EU) 2015/1814 (OJ L 76, 19.3.2018, p. 3).

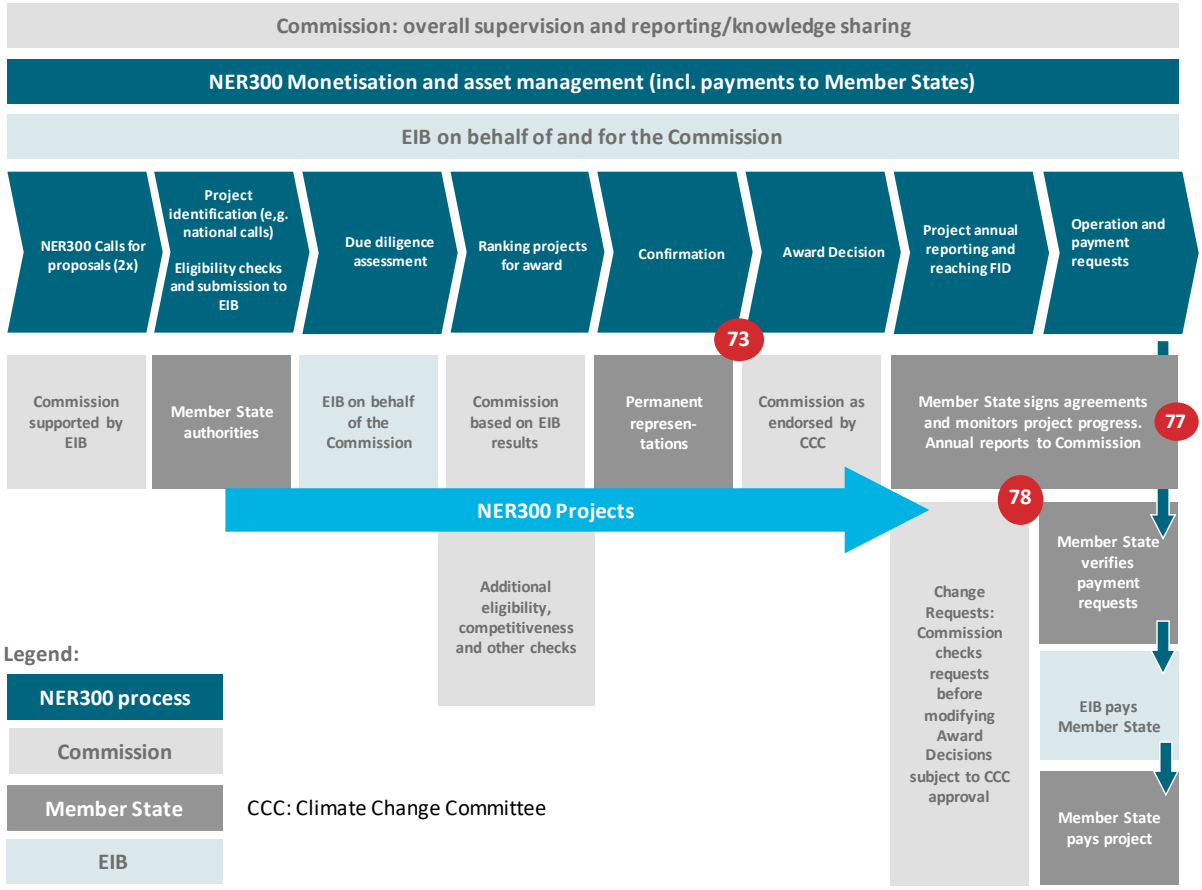
introduces the option to provide 40 % of the grant amount at earlier project stages subject to the achievement of certain milestones.

The NER300 project selection and decision-making processes were complex

66. According to the NER300 Decision, the programme's aim was to select and support the best possible projects of a wide range of technologies in geographically balanced locations.

67. Member States, the EIB and the Commission all had roles in the project submission, selection and award process. ***Figure 10*** gives an overview of all roles attributed to the entities involved in the management of NER300.

Figure 10 – Key steps in the NER300 process and assigned roles and responsibilities



Note: the red dots refer to paragraph numbers in the text.
Source: ECA.

68. The Commission and EIB developed a Procedures Manual based on which EIB should perform the due diligence (i.e. technical and financial viability) assessment. The EIB should

rank the projects with a positive assessment in order of cost-per-unit performance (CPUP)[47]. Before taking award decisions based on this ranking, the Commission, in line with NER300 rules[48], should re-consult with the Member States to confirm their support. We consider that the Commission should ensure a compliant and efficient implementation of these procedures.

EIB due diligence assessment

69. EIB carried out the due diligence assessment on behalf of the Commission and following the procedures manual. It was thorough and documented in detailed reports for each project submitted. However, the assessment did not score or rate the extent to which the applications met the sub-criteria of the due diligence assessment. The EIB provided a 'yes' or 'no' conclusion on the result of the due diligence assessment[49].

70. The due diligence procedures, developed under the supervision of the Commission did not require the EIB to assess projects' economic viability. This is a key element of what banks normally assess as projects' bankability: i.e. their ability to demonstrate a clear revenue stream allowing them to service their debts and generate a return on investments. Because of this difference, a positive EIB due diligence assessment for a NER300 project did not imply that the project would also qualify for EIB financing (e.g. a loan).

71. In its evaluation of the first call for proposals, the EIB flagged significant financial viability issues. The EIB advised the Commission to pay attention to the financial risks associated with some projects, mainly because of large amounts of debt finance sought and little evidence of its availability. Despite these general concerns, the EIB found 88 % of the

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[47] Article 8(2) of the NER300 Decision provides the definition of the CPUP. The CPUP is obtained by dividing the total requested public funding for the innovative element of a project by the projected amount of CO_2 stored (over ten years) for CCS projects, or, the projected amount of energy produced (over five years) for renewable energy projects. The Commission considered that a low CPUP was a good indicator of the potential for reducing a technology's cost and the most suitable parameter for ranking projects within their sub-categories.

[48] Article 5(5) of Commission Decision 2010/670/EU.

[49] The EIB due diligence conclusion could be positive without comments, positive with recommendations to be considered by the Commission, or negative.

projects to be (technically and financially) viable[50] and the Commission considered these for award.

Ranking of the available projects

72. After the due diligence assessment, the Commission ranked the eligible and viable projects within their project subcategories based on the CPUP indicator[51]. The EIB had informed the Commission that there was a significant uncertainty factor for these CPUPs. The submitted projects were generally at an early planning stage. The cost and expected performance data used to calculate this parameter as well as the required public funding were still very uncertain.

Addressing risks and recommendations before awarding funds

73. We reviewed a sample of 26 EIB reports from the five selected Member States. For seven projects to which the Commission awarded funding, the EIB had explicitly raised important risks for the Commission to consider before taking the award decisions. Four of them are now withdrawn. The annual reports of the same projects show that key risks flagged by the EIB in the relevant due diligence reports actually materialised. ***Box 9*** provides examples.

Box 9 – Examples of key risks flagged by the EIB and affecting projects' progress

For the financial planning it had submitted with the grant application, a floating wind project in Spain had expected to get access to a feed-in-tariff. The EIB had recommended the Commission to confirm a number of elements before taking the award decision, including the project's access to a feed-in-tariff. The Commission requested the Member State to confirm the project on that basis. While the Member State confirmed support for the project, it stated that a feed-in-tariff would not be available and did not specify alternative funding. The Commission then awarded the grant. After the

[50] In total, Member States submitted 111 NER300 grant applications to the EIB under two calls for proposals. The Commission confirmed the eligibility of 94 projects and the EIB gave positive due diligence conclusions for 83 (or 88 %) of these projects.

[51] ***Annex IV*** provides two examples of Member State programmes that in addition to a quantitative cost-of-funding parameter, applied multiple scored criteria for ranking innovative low carbon energy projects.

award decision, the project reported delays in its annual report on reaching final investment decision and entry into operation as it was unable to secure any feed-in-tariff or alternative sources of funding (also see ***paragraphs 42 to 48*** on the issue of regulatory uncertainty). According to the latest available report, the situation was critical in 2016, even if some technical and permitting work continued.

For a bioenergy project in Poland, the EIB raised many issues on the technical and financial viability while concluding that there was a material risk that the reaching of the final investment decision within 24 months of the award decision would not take place should the current market conditions and investors' appetite not improve. It also made a range of other recommendations for the Commission to consider before awarding the grant. The Member State confirmed the project and national support, and the Commission awarded the grant. However, at the time of the audit, the project was withdrawing because it was not financially viable.

74. In this context, we examined how the Commission and the Member States addressed EIB recommendations before the award decisions. We found no evidence that Member States had accessed the EIB due diligence reports when the Commission asked them to reconfirm their support for projects. Most Member States requested the confidential EIB files after the award decision.

75. The NER300 project selection and award process was complex and lengthy but failed to address the key issue of economic viability. The design of the process also placed insufficient emphasis on the comparative quality, innovation levels and financial viability of projects. It is also important that the awarding authorities (i.e. Commission and Member States/Climate Change Committee) are fully aware of the project risks as identified during the due diligence assessments before taking their award decisions and signing agreements with these projects. Together, these factors may have reduced assurance about whether these projects could meet the intended objectives within the constraints of the programme.

<u>NER300 decision-making involves many parties</u>

76. In the NER300 governance model, the Commission has the overall responsibility for the programme and leads discussions with Member States and the Climate Change Committee.

77. While the Commission has this overall coordination role, it does not necessarily receive complete and timely information on the progress of projects. Member States send confidential annual progress reports to the Commission. The template of the annual report does not require reporting any information on national funding contributions or the financial plan of the project. Such information is thus only available to the Commission if the Member States voluntarily include it.

78. Member States cannot directly respond to essential project change requests as the Commission has a role in reviewing and approving them[52]. The Commission's role here is a consequence of the fact that essential changes affecting the award decision (e.g. project size, scope, milestone deadlines) need approval through comitology. Before Member States can apply changes to the agreements they signed with the projects, the Commission needs to adopt implementing decisions amending the relevant award decision. This is a heavy procedure involving the Commission, permanent representations of the Member States and project sponsors.

79. Innovative projects need quick responses and decision-making from managing authorities in view of rapidly evolving technologies and markets. The NER300 governance model insufficiently meets these needs and is overly complex. The Commission also confirmed this in its impact assessment for the EU ETS phase IV review (2021-2030)[53].

Other NER300 design features slowed down the response to a changing environment

80. Low carbon energy demonstration projects involve many risks. Thus, there is an increased likelihood of changes or failure (i.e. to attract financing or achieve the expected energy outputs) as compared to projects of mature technologies. The design of public funding programmes addressing this type of investments should therefore enable managing

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[52] Section 5 of Annex II to the first (C(2012) 9432 final of 18 December 2012) and second (C2014) 4493 final of 8 July 2014) Award Decision specifies that changes to projects need to be agreed by the Commission.

[53] Impact Assessment accompanying the proposal for a directive of the European Parliament and of the Council amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments, SWD(2015) 135 final of 15 July 2015.

authorities to find flexible and timely solutions for keeping the programmes on track to meeting their objectives.

Pre-established technology criteria constrained flexibility at programme level

81. The Commission awarded NER300 grants to projects based on a pre-established list of technology categories and thresholds. This 2009 list was the basis for both calls for proposals, to be organised within a two-year period. The legal framework thus did not foresee any future reviews or adjustments of this list.

82. However, projects that were classified as first movers in their categories when approved in 2012 and 2014 have often been overtaken by developments in markets and technology sectors before they come on stream. In some cases, this happens rapidly. ***Box 10*** provides an example.

Box 10 – Example of offshore wind projects supported by NER300

Two large NER300 offshore wind projects in Germany were ready to become operational at the start of 2018. Even if successful and carrying innovative features, these do not represent a first demonstration of a new technology (i.e. 6 MW turbine) not yet commercially available. The offshore wind sector has developed rapidly in the past decade and 6 MW turbines were first installed in Europe in 2012[54]. Had the projects been deployed to meet the initial NER300 deadlines (i.e. by 2016), they could have made a clearer contribution to the NER300 objective of 'first commercial deployment' of an innovative technology.

83. Fixing very specific technology criteria of a support programme in advance thus has limitations. Rapid changes in markets and technologies may render projects selected under those criteria less disruptive than intended, in particular when delays occur.

[54] Chapter 3.2 of JRC Wind Energy Status Report 2016 Edition, Joint Research Centre 2017.

Solutions were needed to ensure that unspent funds from withdrawing projects would be spent well on urgent EU priorities

84. The NER300 rules stipulated that after 31 December 2015, any remaining funds would accrue to the Member States. Despite the earlier amendment of the NER300 Decision to put back deadlines by two years, projects continued to withdraw from NER300 in 2016 due to their inability to meet the deadline for reaching final investment decision. The absence of an adequate reserve list of relevant projects after the second call for proposals made it impossible for the Commission to replace them by projects already scrutinised by the EIB. The NER300 legal framework also did not include any option for launching an extra call for proposals. Project withdrawals are likely to result in at least €840 million of unspent funds by mid-2018 (40 % of the awarded €2.1 billion)[55].

85. In this context, the Commission, in accordance with the opinion of the Climate Change Committee, decided[56] to make unspent funds from the first call for proposals (at least €436 million) available to top up EIB-managed financial instruments[57]. This will enable the use of unspent NER300 funds for related activities until the start of the Innovation Fund. However, the nature and objectives of these instruments are not identical to those of NER300[58]. The concerns we raise on the accountability for the spending of NER300 funds in the next section also apply when these funds are potentially channelled towards financial instruments.

Coordination and accountability arrangements require improvement

86. There are many EU instruments and programmes with similar objectives to NER300 (see ***Annex V***). In view of this complex landscape, we examined whether the Commission

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[55] ***Annex I*** provides an overview of all awarded NER300 projects.

[56] Commission Decision (EU) 2017/2172 of 20 November 2017 amending Decision 2010/670/EU as regards the deployment of non-disbursed revenues from the first round of calls for proposals (OJ L 306, 22.11.2017, p. 24).

[57] With priority for InnovFin EDP and the Connecting Europe Facility for transport (i.e. CEF debt instrument).

[58] E.g. financial instruments cannot achieve a geographical spread of the funds as was the objective of NER300; NER300 should address EU ETS sectors (i.e. power generation and industries, not transport); and, according to the Commission's interpretation of EU ETS and NER300 rules, NER300 funds should be allocated based on verified avoided CO_2 while financial instruments generally finance earlier stages of projects (i.e. before they effectively emit/avoid CO_2).

and the Member States made progress on aligning European public and private action for low-carbon energy innovation. We also examined whether Commission services responsible for programmes in relation to accelerating clean energy innovation work together effectively to coordinate their management of on-going programmes such as NER300, H2020 and InnovFin EDP, and exploit their combined expertise to develop coherent funding packages and solutions. We further assessed how Member States and the Commission are accountable for the management and results of the NER300 programme.

Despite slower than intended progress, the SET-plan provides a basis for improving coordination in Europe

87. Good coordination is achieved when the Commission and the Member States work together to achieve effective vertical (between the Commission and relevant national authorities) and horizontal (between relevant Commission services and between relevant national services as well as with external stakeholders) coordination[59]. A key initiative to achieve this type of coordination in the EU is the (Integrated) SET-plan, endorsed by the Council in 2008 and maintained by the Commission and the Member States on a voluntary basis. The SET-plan also seeks interaction with industry and academic stakeholders through dedicated platforms that evolved over the years.

88. The SET-plan is not a funding vehicle, but aims to coordinate and align relevant EU, national and private sector financial resources. Member States take part in the Steering Group chaired by the Commission and working groups. Within the Commission, DG RTD, DG ENER and the Joint Research Centre have been involved in the SET-plan. The Commission and Member States revised the SET-plan in 2015 to align it with the Energy Union R&I priorities.

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[59] In its 2015 "Renewable Energy Technology Innovation Policy [RETIP]: a process development guide", the International Renewable Energy Agency (IRENA) explained how governance is critically important to the implementation of RETIP instruments. IRENA underlined that collaboration amongst stakeholders is important for innovation, and achieving collaboration at the horizontal level is vital to create coherence and avoid contradiction between policies.

89. Member State representatives consulted during our visits gave a positive appreciation of their experience under the SET-plan[60]. They noted however that the initial ambition to achieve joint programming and funding of relevant energy innovation actions still pose serious challenges today.

90. Under the Integrated SET-plan since 2015, the Steering Group assigned 14 temporary working groups to develop Implementation Plans for its endorsement by November 2017. At the end of 2017, the Steering Group had endorsed and released five Implementation Plans[61]. It had not yet decided how it would report on their achievement.

91. The Commission asked the Member States to take forward the ambition of joint programming and funding. Member States did not agree to commit national resources to these implementation plans. Private sector stakeholders represented in the Energy Technology and Innovation Platforms (ETIPs) have also not committed any financial contributions towards SET-plan Implementation Plans.

92. Despite its coordinating role in the largest energy demonstration programme in Europe and its relevance for SET-plan objectives, DG CLIMA only joined the SET-plan Steering Group in October 2016. It did not take part in the temporary working groups relevant to the scope of NER300 or the future Innovation Fund. DG CLIMA organised separate comprehensive stakeholder roundtables with representatives from the renewable energy, energy intensive industry and CCS sectors in 2017 to discuss the future design of the Innovation Fund.

93. The 2015 Integrated SET-plan aligned its objectives with the Energy Union priorities and acknowledged a lack of progress on some of its key ambitions since its launch in 2008. In the absence of structured and regular progress reporting on clearly measurable results, it is difficult to identify the benefits stemming directly from SET-plan cooperation.

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[60] 19 EU Member States participate in at least one temporary working group under the SET-plan, as Turkey, Iceland, Norway and Switzerland do.

[61] For Energy Intensive Industries, CCUS, Photovoltaics, Concentrated Solar Power and Batteries.

Commission services need to improve internal coordination and the coherence of EU support to low carbon demonstration projects

94. In 2009, the Commission published "Investing in the development of low-carbon technologies (SET-plan)"[62] which built on the SET-plan objectives formulated in 2008. The Commission wanted to look for new ways to combine resources from different actors and instruments, such as grants, loans and loan guarantees in order to mobilise more finance for large-scale demonstrations. It noted that the EIB could play a pivotal role in improving the coordination and continuity of available funding, referring in particular to the Risk-sharing finance facility (RSFF) supported by FP7.

Complementarity between NER300 and other EU grant programmes

95. In its 2010 NER300 Impact Assessment[63], the Commission noted that NER300 had to be complementary to the research framework programme (i.e. FP7 in 2007-2013) and address more mature projects.

96. FP7 (and later H2020 in 2014-2020) ran in parallel with NER300 and EEPR from 2009/2010. The role of research programmes in terms of funding energy demonstration activities was not so well established when the Commission launched NER300 in 2010. Between FP7 and H2020 we found that the number of large energy demonstration projects receiving grants has increased, as well as the size of the individual grants. The highest single grant to such a project under H2020 is just below 40 million euro[64] whereas the average grant size under NER300 was 54 million euro. H2020 specifically aims to fund bigger projects than FP7 to make a bigger impact. It is thus important to monitor how H2020 (and its successor after 2020) and NER300 (and its successor from 2021) are complementary or meet different needs, and how they interact.

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[62] COM(2009) 519/4.

[63] SEC(2010) 1320 final of 3 November 2010.

[64] FP7 funded 31 large-scale energy demonstration projects with a highest grant amount of €35.5 million. Under H2020, 47 of such grants have been signed (or are under preparation) with the highest grant amounting to €39.3 million. 16 NER300 projects received higher grant amounts but five of those were or would be withdrawn at the time of the audit.

NER300 and financial instruments

97. The NER300 Decision also referred to the possibility of combining NER300 funding with loan financing under the Risk-sharing finance facility[65]. This facility indeed supported a number of renewable energy demonstration projects. While this is an illustration of the Commission working with the EIB to develop other financing solutions, these did not include any NER300 projects. Combinations of the products provided by these two programmes therefore did not occur.

98. In the current programming period (2014-2020), InnovFin succeeded the Risk-sharing finance facility. One thematic area of InnovFin intervention concerns energy demonstration projects (EDP)[66]. The Commission launched this new financial instrument to support projects such as those supported by NER300, which at that time had delays in their financial planning.

99. Despite these attempts to provide demonstration projects with a wider range of financial products and additional Commission contributions (see ***Box 11***), none of the ten NER300 projects that had applied for InnovFin loans by the end of 2017 had signed any loan agreement at the completion of this audit. The specific nature of NER300 demonstration projects (e.g. higher technology and financial risks than mature technology projects, uncertainty about expected output performance and revenues) is such that they struggle to meet the bank's standard due diligence requirements.

Box 11 – InnovFin Energy Demo Projects

In the H2020 Work Programme for Secure, Clean and Efficient Energy for 2018-2020[67], the Commission noted that demand for InnovFin EDP was strong and that it would double the H2020 financial support from €150 to €300 million while allocating a further €100 million in 2019 and 2020. The scope of the instrument was also extended to cover all SET-plan priorities except energy

[65] Recital 5 of Commission Decision 2010/670/EU.

[66] The EIB and the Commission launched InnovFin EDP in 2015. The initial EU contribution to InnovFin EDP from the H2020 programme was €150 million. It provides loans, loan guarantees or equity-type investments of between €7.5 and €75 million to innovative first-of-a-kind commercial-scale demonstration projects in the fields of renewable energy and hydrogen. The EU contribution serves to cover 100 % of any losses incurred by the EIB if a project could not reimburse its loan.

[67] Commission Decision C (2017)7124 of 27 October 2017.

efficiency and nuclear, but including CCUS. DG RTD also intends to develop a H2020 grants window to complement InnovFin EDP products[68].

The Innovation Fund and ensuring complementarity beyond 2020

100. In 2017, DG CLIMA organised stakeholder roundtables to draw lessons from NER300 and prepare the design of the new Innovation Fund. Stakeholders also called to create a blending programme including support to financial instruments, while also providing investment grants for the earlier stages of project-development.

101. The final report[69] recommended that the Innovation Fund should mainly offer grants, complemented with partial grants and/or de-risked loans or equity with higher levels of grant intensity for early stage projects. The report further underlined that the new fund should complement and not overlap with existing EU and national funding programmes; specific examples included H2020, InnovFin, CEF, and venture capital from the European Investment Fund and EFSI.

102. Thus, both DG CLIMA and DG RTD are assessing how to better design their primary support mechanisms (i.e. Innovation Fund and InnovFin EDP combined with H2020 grant) for low carbon energy demonstration projects. Funding under H2020 for more advanced energy demonstration projects (including by its contributions to InnovFin EDP) has also increased since the launch of NER300. It is not clear whether NER300 (and the Innovation Fund) on one side and H2020/FP9 (including their contributions to financial instruments) on the other will be sufficiently complementary to justify the existence of parallel public funding programmes with different (Commission) managing entities and oversight bodies.

103. Overall, the Commission has not yet achieved the ambition it stated in 2009 and repeated in 2016[70] to enable a coherent and better targeting of resources and financial

[68] H2020 ends in 2020, and therefore will not overlap with the new Innovation Fund to be launched in 2021. The blueprint for FP9 and associated financial instruments is defined now.

[69] See the summary report presented during a closing conference hosted by DG CLIMA: Finance for Innovation: towards the ETS innovation fund, Climate Strategy & Partners, 12 June 2017.

[70] COM(2016) 763 final.

products, including EU grants, loan products and equity addressing the distinct development stages of large-scale demonstration projects.

NER300 accountability arrangements are not clear enough

104. NER300 funds are not part of the general budget of the European Union and the EU Financial Regulation thus does not apply to their management. They are Member State funds generated from an EU policy instrument (i.e. EU ETS). The NER300 legal basis (i.e. the ETS Directive and NER300 Decision) does not include explicit references to financial control (e.g. for payments) or (internal or external) auditing.

105. National contact points we consulted during the audit generally perceived NER300 funds as EU funds[71]. There is no legal requirement for annual reporting by the Commission on the operational or financial performance of the programme to ensure full public accountability. There is no discharge procedure for the Commission's stewardship of these funds. The EIB issues to the Commission confidential financial statements on its NER300 asset management activities and reports the funds as an off-balance sheet item held on behalf of a third party[72]. The Commission does not report NER300 funds on the EU balance sheet.

106. Overall, the financial control and accountability arrangements for the NER300 programme are not clear enough. Such arrangements are necessary to provide robust assurance of the sound financial management of these public funds by the entities involved in the management of the programme.

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[71] See the reference to NER300 funds as EU funds on page 21 of 'Carbon capture and storage: the second competition for government support', Report by the Comptroller and Auditor General, National Audit Office, 20 January 2017.

[72] Also see 'Off balance sheet as at 31 December 2016' of EIB Financial Report 2016, and Note Z: "EIB supports the EC as an agent in the implementation of the NER 300 initiative – […]. EIB prepares separate financial statements for NER300".

107. In 2016, the High Level Group on Own Resources noted that one option for new own resources would be the inclusion of the proceeds from the European Union emissions trading scheme (EU ETS)[73].

CONCLUSIONS AND RECOMMENDATIONS

108. While acknowledging the challenging market conditions for this type of activity after 2008, our overall conclusion is that EEPR and NER300 did not support the intended progress to demonstrate the commercial viability of CCS and a range of innovative renewables.

109. EEPR fell short of its ambitious carbon capture and storage objectives as none of the projects receiving EU funding demonstrated the technology at commercial scale (see ***paragraphs 20 to 22***). Five out of six co-funded projects were not completed.

110. The EEPR support to offshore wind aimed to deliver innovative turbine and foundation structures while increasing grid connections between Member States. This programme made a positive contribution to a fast developing sector, despite several delays and two terminated projects (see ***paragraphs 23 to 26***).

111. We further found that NER300 also does not deliver any successful CCS demonstration projects (see ***paragraphs 28 to 30***). The only CCS project to which the Commission awarded funding in 2014 stopped its activities after the Member State withdrew its national support in 2015. The project could therefore not reach final investment decision and is likely to withdraw from NER300 in 2018.

112. NER300 is also not on track to achieve its intended impact for innovative renewables that were not yet commercially available when the Commission selected projects (see ***paragraphs 31 to 36***). Despite a decision in 2015 to put back all deadlines by two years, seven projects had withdrawn by early 2018. These projects do not use the awarded grants and do not deliver their expected clean energy outputs.

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[73] Future Financing of the EU, Final report and recommendations of the High Level Group on Own Resources, December 2016, recommendation 4 b).

113. As regards the reasons for failures and delays, we found that innovative low carbon energy projects supported by EEPR and NER300 were affected by adverse investment conditions (see ***paragraphs 37 to 55***). While some of the investment conditions are determined by wider economic developments, others can be set or influenced by policy makers. Uncertainty around long-term climate and energy strategies and the underpinning policies, regulations and public financial support affected projects' ability to attract private investments and reach final investment decision on time (see ***paragraphs 41 to 48***).

114. In addition to the economic and other factors referred to above, the falling market price for carbon emissions under EU ETS since 2011 was a key barrier for CCS demonstration projects in the EU (see ***paragraphs 49 to 55***). This affected the already risky business cases of CCS demonstration projects, based on which the Commission had awarded EEPR grants in 2009. The low prices also caused smaller than expected available grant amounts under NER300, leaving further financing gaps.

115. In addition, the failure of any EEPR project to secure an adequate amount of public funding through NER300 or national programmes by 2012 compromised the viability of these projects. The Commission made efforts to enable continued work on CCS demonstration but did not at that time suspend or terminate its financial support to projects that ultimately failed.

116. Innovative energy projects that contribute to the EU's low carbon energy transition require a better investment climate. In this context, the proposed Energy Union governance Regulation, foresees that Member States will prepare and submit to the Commission National Climate and Energy Plans that describe their long-term low carbon development strategies (see ***Box 7***), underpinned by stable policies and regulations to promote and support the use of renewable energy and further reduce emissions[74]. The Commission will

[74] In 2014, the Court already recommended that the Commission should promote the establishment by Member States of stable and predictable regulatory frameworks for renewable energy sources. See Recommendation 1 of Special Report No 6/2014, Cohesion Policy funds support to renewable energy generation – has it achieved good results?, European Court of Auditors, 2014.

have a role in scrutinising the Member State plans and reporting to establish whether they contain all required elements. It should use this information when it awards EU funding.

Recommendation 1 – Increasing the potential for effective EU support to low carbon energy innovations
To increase the effectiveness of Union financial support to innovative low carbon energy demonstration projects, **the Commission** should where large, capital intensive projects needing a combination of national **and** EU support are put forward for funding under the proposed Innovation Fund and other relevant centrally-managed EU programmes, assess their consistency with national climate and energy plans and ensure firm and transparent commitments are obtained from Member States before awarding EU funds. Target implementation date: by the end of 2021.

117. We further found that design aspects of NER300 limited the Commission and Member States' ability to respond effectively to the changing circumstances (see ***paragraphs 56 to 85***).

118. The chosen NER300 model to provide public money to projects only after their entry-into operation lacked adequate justification by needs assessments and put most of the risk on project promoters. Before the creation of NER300 in the ETS Directive, no clear assessment was made showing what type of support early demonstration projects of a wide range of innovative renewables and CCS technologies facing many different investment and regulatory challenges across the EU, would need. The legal basis adopted in 2018 for the new Innovation Fund aims to remedy the de-risking issue (see ***paragraphs 57 to 65***).

119. The NER300 project selection and decision-making processes were complex (see ***paragraphs 66 to 75***). The selection and grant award process applied by the Commission and Member States placed insufficient emphasis on the comparative quality and financial and economic viability risks of projects. We could also not ascertain that Member States were sufficiently aware of the risks and recommendations identified by the EIB before endorsing the ranked projects for the Commission award decision. These factors reduced assurance about whether these projects could meet their objectives within the constraints of the programme. There is also scope to enhance the NER300 decision-making,

in particular for major change requests to projects that now require changes to the legislation.

Recommendation 2 – Improving project selection and decision-making procedures for the future Innovation Fund

In view of the planned launch of the new Innovation Fund in 2021, **the Commission** should improve critical elements of the project selection and decision-making process as compared to NER300. In particular it should:

(a) establish criteria for withdrawing funding in cases where projects do not meet agreed milestones;

(b) assess aspects of projects' economic viability ('bankability'), including those referred to under Recommendation 1;

(c) define precise and measurable thresholds for each of the due diligence/award criteria;

(d) make available in confidence the results of the due diligence assessment to concerned Member State authorities prior to the award decision;

(e) support projects for which the selection procedure showed that they are likely to contribute the most towards meeting EU priorities;

(f) simplify the procedure for project change requests so that it does not require changes to Commission legal acts.

Target implementation date: by the end of 2020.

120. Other NER300 design features also slowed down the programme's response to a changing environment (see ***paragraphs 80 to 85***). The use of specific technology criteria established in advance in 2009 limited the programme's ability to respond to market and technology developments. Projects selected under those criteria may become less disruptive than intended when delays occur.

121. As projects withdrew because they could not meet the (extended) programme deadlines, the Commission sought solutions to re-assign large sums of unspent funds to other programmes and ensure that they would be available to increase investment in innovative projects. The nature and objectives of those programmes are not identical to those of NER300, and accountability needs to be ensured for how these funds are spent.

Recommendation 3 – Ensuring flexibility of the Innovation Fund to respond to market and technology developments

The Commission should ensure that the Innovation Fund design allows for more flexible responses to technology developments and project withdrawals than the NER300 design did.

These may include:

(a) a flexible approach for defining and updating eligible technologies and thresholds;

(b) organising rolling calls for proposals and award decisions;

Target implementation date: by the end of 2021.

122. There are many funding mechanisms supporting energy innovation in the EU. Against this background, we found that coordination and accountability weaknesses require improvement (see ***paragraphs 86 to 107***).

123. Despite slower than intended progress, the SET-plan provides a basis for better aligning European public and private action for low-carbon energy innovation. The overhaul of the SET-plan in 2015 was important to align the original SET-plan with the Energy Union Research & Innovation priorities and recognised the lack of progress in reaching some of its key ambitions. It remains difficult however to clearly identify and measure the benefits stemming directly from SET-plan cooperation (see ***paragraphs 87 to 93***).

124. We also found that coordination between the Commission's own departments dealing with clean energy innovation showed weaknesses that may keep it from enabling a more coherent and efficient combination of public resources and financial products, targeting the distinct stages of large-scale demonstration projects (see ***paragraphs 94 to 103***).

125. By the end of 2017, no NER300 projects had obtained any loans under the EIB managed financial instruments that support energy demonstration projects. The specific nature of these projects is such that they struggle to meet the bank's standard due diligence requirements. Different Commission services are assessing how to better design their primary funding mechanisms. Increasing Horizon2020 support for more mature energy demonstration projects raises the question whether NER300 (and the future Innovation Fund) and H2020/FP9 (including their contributions to financial instruments) are sufficiently

complementary to justify the potential future existence of parallel programmes with different managing entities and oversight bodies.

126. Negotiations on the new multi-annual financial framework, simplification of H2020 and discussions on the future of EU finances are ongoing. These provide an opportunity to clarify which programmes are most suitable to support (the different stages of) low-carbon energy demonstration projects and how to achieve synergies to address their funding challenges.

Recommendation 4 – Better Commission coordination for more coherent targeting of EU support

To enhance the coherent and effective targeting of EU support to low carbon energy innovation the concerned **Commission services (in particular DGs RTD, ENER, CLIMA, GROW and ECFIN)** should:

(a) perform cross-service assessments to demonstrate that the Innovation Fund, H2020 and InnovFin EDP (and their successors after 2020) are complementary and coherently targeting low carbon energy demonstration projects;

(b) streamline project selection processes[75] between programmes to reduce inefficiencies and overlaps.

Target implementation date: by the end of 2021.

127. Lastly, accountability and financial control arrangements for NER300 are not clear enough to demonstrate that the entities managing the programme ensure the application of sound financial management principles (see ***paragraphs 104 to 107***).

Recommendation 5 – Ensuring accountability

In view of the launch of the new Innovation Fund in 2021, **the Commission** should improve critical elements of the governance and accountability as compared to NER300, in particular:

(a) clarify the ownership and accountability provisions for the Innovation Fund and unspent NER300 funds;

(b) ensure that all such funds for which the Commission exercises stewardship are recorded in the budget and balance sheet and subject to annual audit and discharge by Parliament and Council;

[75] See Proposal 5 of our Briefing Paper "A contribution to simplification of EU research programmes beyond Horizon2020 of March 2018".

(c) include in the legal framework provisions on regular progress reporting to budgetary authorities.

Target implementation date: by the end of 2021.

This Report was adopted by Chamber I, headed by Mr Nikolaos Milionis, Member of the Court of Auditors, in Luxembourg at its meeting of 5 September 2018.

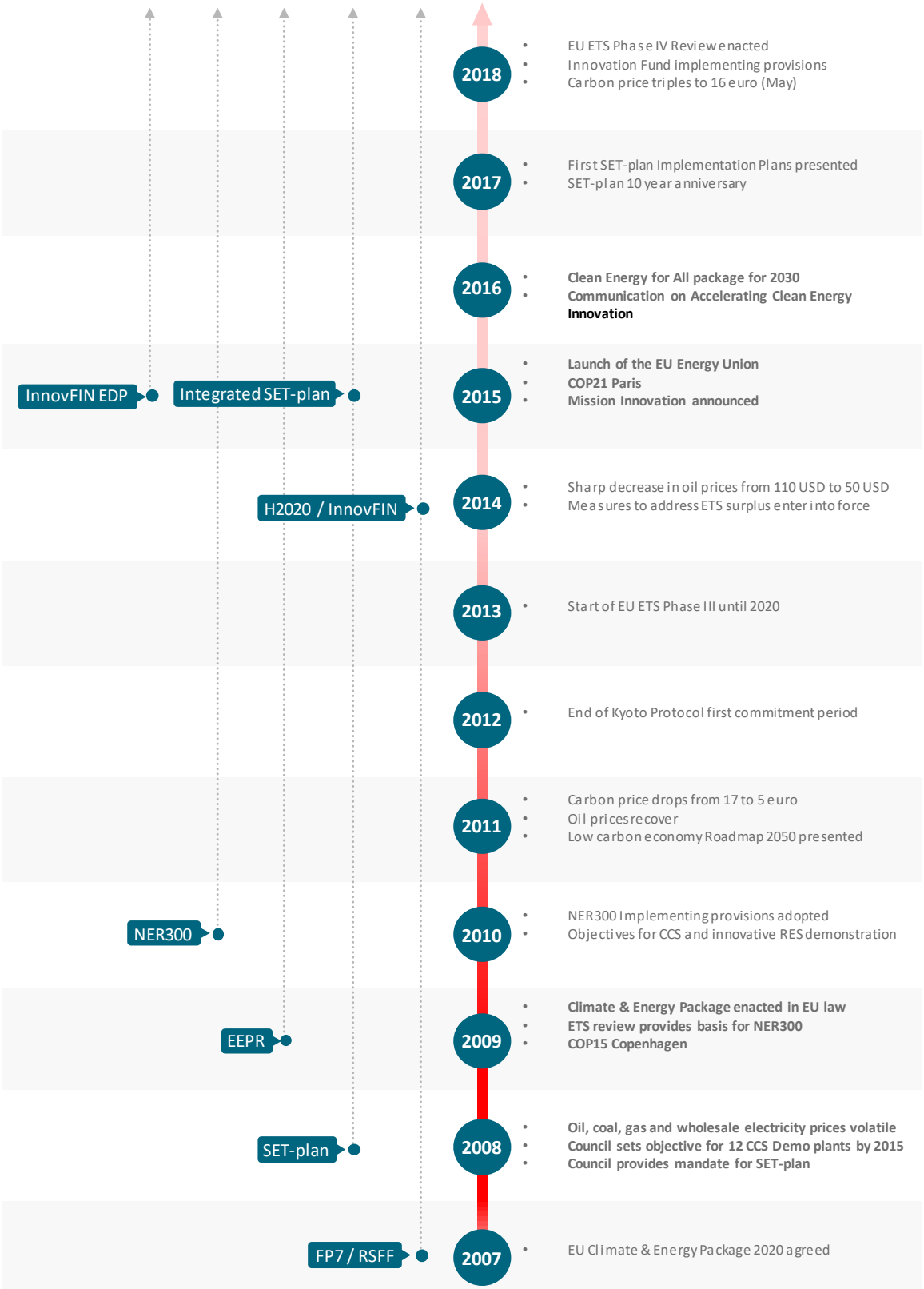
For the Court of Auditors

Klaus-Heiner LEHNE

President

ANNEX I

Timeline of key policy and economic events mapped against elements of audit scope



Note: The red ribbon shows the intensity of the financial crisis as a background to the referenced events.

Source: ECA.

ANNEX II

NER300 status overview per March 2018

Call	Year	MS	Category	Max, awarded NER 300 funding (mln euro)	Expected energy output in first 5 years (1000 MWh)	Entry into operation	FID	Status	Unspent funds from withdrawn projects
First	2012	IT	Bioenergy	28	1 415	01/06/2013	2011	In operation	
		DE	Bioenergy	22	502	03/01/2014	19/08/2011	In operation	
		SE	Wind energy	15	3 462	01/01/2015	06/02/2014	In operation	
		DE	Wind energy	113	3 569	01/07/2017	29/06/2015	In operation	
		DE	Wind energy	70	6 060	31/12/2017	18/12/2014	In operation	
		AT	Wind energy	11	363	03/10/2017	04/12/2014	In operation	
		FI	Bioenergy	89	6 785	31/12/2018	31/12/2016	FID reached	
		UK	Ocean energy	17	100	31/12/2018	14/12/2016	FID reached	
		CY	Concentrated solar power	47	578	31/12/2018	28/12/2016	FID reached	
		EL	Concentrated solar power	45	595	31/12/2018	12/12/2016	FID reached	
		EL	Concentrated solar power	42	488	31/12/2018	14/12/2016	FID reached	
		HU	Geothermal energy	39	370	31/12/2018	14/12/2016	FID reached	
		PT	Wind energy	30	365	31/12/2018	17/12/2016	FID reached	
		FR	Wind energy	34	412	31/12/2018	11/07/2016	FID reached	
		PL	Bioenergy	31	1 400	31/12/2016		Withdrawal underway	31
		BE	Smart grids	8	890	-	-	Withdrawn	8
		FR	Bioenergy	170	6 144	-	-	Withdrawn	170
		NL	Bioenergy	199	6 346	-	-	Withdrawn	199
		SE	Bioenergy	59	3 850	-	-	Withdrawn	59
		UK	Ocean energy	21	148	-	-	Withdrawn	21
Second (RES)	2014	CY	Concentrated solar power	60	552	30/06/2020		FID reached	
		CY	Smart grids	11	621	30/06/2020	Deadline 30/06/2018		
		DK	Bioenergy	39	1730	30/06/2020	Deadline 30/06/2018		
		EE	Bioenergy	7	851	30/06/2020	Deadline 30/06/2018		
		EE	Bioenergy	25	3200	31/12/2020	Deadline 30/06/2018		
		ES	Bioenergy	29	824	30/06/2020	Deadline 30/06/2018	Withdrawn	29
		ES	Wind energy	33	427	30/06/2020	Deadline 30/06/2018		
		ES	Wind energy	34	500	30/06/2020	Deadline 30/06/2018		
		FR	Geothermal energy	17	1051	30/06/2020	Deadline 30/06/2018		
		FR	Ocean energy	72	369	30/06/2020	Deadline 30/06/2018		
		HR	Geothermal energy	15	258	30/06/2019	17/03/2015		
		IE	Ocean energy	23	58	30/06/2020	Deadline 30/06/2018	Withdrawn	23
		IT	Concentrated solar power	40	488	31/12/2018	Deadline 30/06/2018		
		IT	Smart grids	85	19277	30/06/2018	18/02/2015	FID reached	
		LV	Bioenergy	4	833	30/06/2020	Deadline 30/06/2018		
		PT	Ocean energy	9	57	01/01/2020	Deadline 30/06/2018		
		PT	Photovoltaics	8	203	01/07/2019	Deadline 30/06/2018		
		SE	Bioenergy	204	7360	30/06/2020	Deadline 30/06/2018		
				Sub-total RES:	**82501**				
					Expected CO2 captured and stored in first 10 years (mln tonnes)				
Second (CCS)	2014	UK	CCS	300	17 734	43 281	Deadline 30/06/2018	Withdrawal underway	300
				2 106				**Total:**	840

Source: ECA, based on Commission data.

ANNEX III

Main economic and regulatory factors affecting the progress of NER300 and EEPR

Technology Group	CCS		Renewables	
Programme	NER300	EEPR	NER300	EEPR
Awarded funds (mln euro)	300	1 000	1 800	565
Projects	1	6	38	9
Average per project (mln euro)	300	167	47	63
External factors delaying progress of demonstration projects:				
Adverse investment climate for low carbon energy[1]	X	X	X	X
Limited access to / high cost of private capital (see Figure below)	X	X	X	X
Low carbon market price	X	X	X	
EU / national regulatory uncertainty	X	X	X[2]	
Lower than expected national public support (e.g. due to budgetary constraints / economic crisis)	X	X	X[3]	
Long timelines for obtaining permits at national level	X	X	X	X
Public acceptance	X	X		
Paid per end 2017 (mln euro)	0	432[4]	13	255
Withdrawn (unspent - mln euro)	300		540	
Decommitted end of 2017 (mln euro)		568		130[5]
% of awarded funds not spent under programme objectives	100%	57%	30%	23%

[1] Low fossil fuel prices, low electricity wholesale prices

[2] In particular for NER300 biofuels projects

[3] In particular for biofuels, concentrated solar power, ocean energy

[4] With significant performance issues / final amount subject to future corrections

[5] Three EEPR Offshore Wind projects are still on-going

Source: ECA.

ANNEX IV

Examples of selection procedures in low carbon energy innovation programmes using multiple (qualitative and quantitative) ranking criteria

United Kingdom – CCS commercialisation programme

The rules for project selection under the second UK CCS competition were laid down in the document "Carbon capture and storage commercialisation programme – Invitation to discussions" developed by the UK Department of Energy and Climate Change.

Part 3 of this document describes the Eligibility and Evaluation rules. The selection process consists of three distinct stages, the first one being 'Project Selection'. This stage involves the project due diligence assessment based on four main criteria. Each criterion has sub-criteria. Rating and scoring of bids is done by using qualitative, traffic-light based appraisal system and a scoring scale. The system is summarised as follows:

Area	Criteria	Assessment Basis		Assessment outputs	
PROJECT SUBMISSION DUE DILIGENCE		Subcriteria	Criteria	AREA Assessment	Commentary
TECHNICAL	Technical robustness and viability	Qualitative traffic lights	Rate R/A/G		
	Process integration and development	Qualitative traffic lights	Rate R/A/G		
	Transport robustness	Qualitative traffic lights	Rate R/A/G		Key issues, risks and uncertainties
	Storage robustness	Qualitative traffic lights	Rate R/A/G		
	Operational impact of CCS	Qualitative traffic lights	Rate R/A/G		
	Technical validation of costing assumptions	Qualitative traffic lights	Rate R/A/G	Score 1-5	
DELIVERABILITY	Robustness of project programme	Qualitative traffic lights	Rate R/A/G		
	Asset availability and access	Qualitative traffic lights	Rate R/A/G		
	Project team experience and capability	Qualitative traffic lights	Rate R/A/G		
	Project governance	Qualitative traffic lights	Rate R/A/G		Key issues, risks and uncertainties
	Strength of risk management	Qualitative traffic lights	Rate R/A/G		
	Robustness of permitting & consultation	Qualitative traffic lights	Rate R/A/G		
	Robustness of full chain integration	Qualitative traffic lights	Rate R/A/G		
	Project risk assessment	Qualitative traffic lights	Rate R/A/G	Score 1-5	
COMMERCIAL	Adequacy of commercial case	Qualitative traffic lights	Rate R/A/G		
	Acceptance of risk allocations and contracts principles	Qualitative traffic lights	Rate R/A/G		Key issues, risks and uncertainties
	Commercial risk	Qualitative traffic lights	Rate R/A/G	Score 1-5	
FINANCIAL	Financial standing of bidder	Quantitative		Score 1-5	
	Financing arrangements	Quantitative		Score 1-5	
	Levelised cost of electricity to government and electricity consumers	Quantitative		£/MWh	
	Levelised cost of CO2 stored to government and electricity consumers	Quantitative		£/T CO2 stored	Key issues, risks and uncertainties

Note: The Red/Amber/Green scores are: 'Basic', 'Good', 'Excellent'. The 1-5 scores are 'very poor', 'poor', 'acceptable', 'good' and 'excellent'.

Netherlands – Advanced biofuels

From 2006 to 2009, the Netherlands had a national grant scheme for CO_2 reduction through innovative biofuels for transport[76]. It aimed to support second generation biofuels and projects that were new for the country. In addition to four main eligibility criteria, the scheme had five ranking criteria to enable a distribution of the available funds to the most desirable projects:

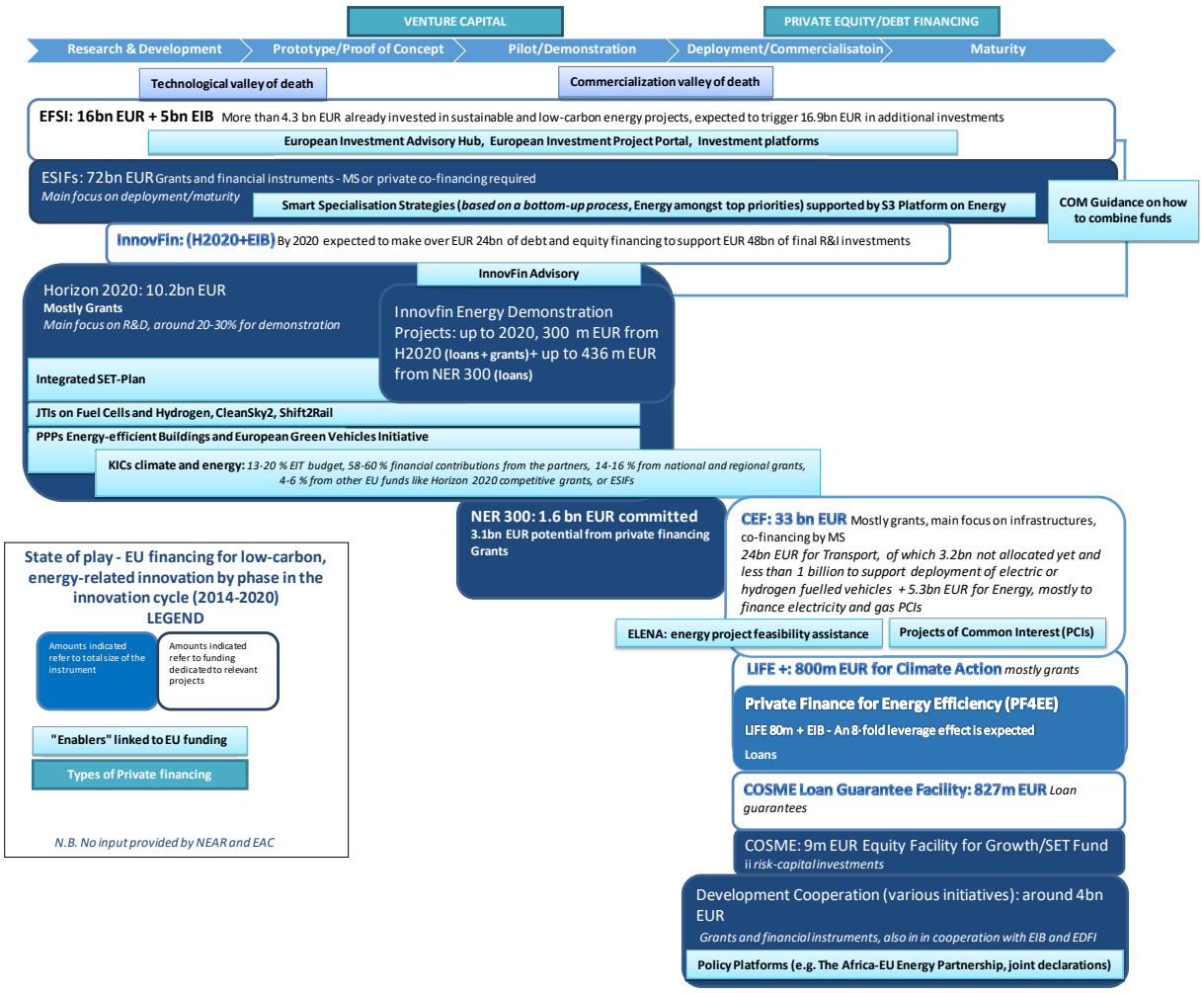
- volume of anticipated CO_2 emission reductions as compared to fossil fuels;
- size of demonstrated reduced land use as compared to existing biofuel production processes;
- short- and long-term market potential (fuel quantity to be produced, CO_2 emission gains, potential for replication) and (technical, organisational and financial) feasibility based on a risk assessment and likelihood of achieving expected results;
- grant funding rate (a lower rate leads to a higher score);
- sustainability as regards food supply, biodiversity and environment.

The degree to which the project was expected to contribute to these criteria determined the scores and thus the ranking. The criteria were listed in order of decreasing weight.

[76] Besluit Vaststelling Subsidieprogramma CO2-reductie Innovatieve Biobrandstoffen voor transport, http://wetten.overheid.nl/BWBR0020703/2006-12-21.

ANNEX V

Complexity of the landscape of EU programmes financing low carbon energy innovation



Source: European Commission.

REPLIES OF THE COMMISSION TO THE SPECIAL REPORT OF THE EUROPEAN COURT OF AUDITORS

"DEMONSTRATING CARBON CAPTURE AND STORAGE AND INNOVATIVE RENEWABLES AT COMMERCIAL SCALE IN THE EU: INTENDED PROGRESS NOT ACHIEVED IN THE PAST DECADE"

EXECUTIVE SUMMARY

IV. In line with the request from the European Council and European Parliament, the Commission is working on the Strategy for long-term EU greenhouse gas emissions reduction in accordance with the Paris Agreement, taking into account the national plans.

Raising the support to innovation and commercialisation of low-carbon technologies is an important element in this context and is already on-going.

In the Commission's proposal for the next Multiannual Financial Framework 2021-2027, the Commission proposed to set a more ambitious goal for climate mainstreaming, including clean energy transition, across all EU programmes, with a target of 25% of EU expenditure contributing to this objective. The proposal for the future research programme Horizon Europe contains a climate, including clean energy transition, mainstreaming objective of 35%.

On the basis of the Commission proposals included in the Clean Energy for all Europeans package, the EU has already reached preliminary political agreements on EU energy efficiency and renewables ambition level by 2030 and relevant regulatory framework.

VIII. The Commission agrees with the ECA's observations on the limitations in the New Entrants' Reserve 300 (NER 300) design brought by the co-decision legislators, as well as complexity of its implementation.

IX. The Commission highlights that the NER 300 definitions, call documents and guidance were developed with collegial coordination of Commission services. Further, Commission departments are coordinating on a regular basis common issues in support of innovative low-carbon technologies.

INTRODUCTION

7. The Commission is in charge of overall programme coordination. Management of contracts (based on the legally binding instruments) is the responsibility of Member States.

12 In line with the request from the European Council and European Parliament, the Commission is working on the Strategy for long-term EU greenhouse gas emissions reduction in accordance with the Paris Agreement, taking into account the national plans.

Raising the support to innovation and commercialisation of low-carbon technologies is an important element in this context and is already on-going.

In the Commission's proposal for the next Multiannual Financial Framework 2021-2027, the Commission proposed to set a more ambitious goal for climate mainstreaming, including clean energy transition, across all EU programmes, with a target of 25% of EU expenditure contributing to this objective. The proposal for the future research programme Horizon Europe contains a climate, including clean energy transition, mainstreaming objective of 35%.

On the basis of the Commission proposals included in the Clean Energy for all Europeans package, the EU has already reached preliminary political agreements on EU energy efficiency and renewables ambition level by 2030 and relevant regulatory framework.

OBSERVATIONS

20. Having assessed the projects submitted by the Member States after the call for proposals, the Commission took a decision to support only six Carbon capture and storage (CCS) demonstration projects meeting the eligibility and selection criteria (Commission Decision C(2009) 9943 final of 9.12.2009).

21. The Commission considers that the outcome of this segment of the European Energy Programme for Recovery (EEPR) results from the combination of the challenges inherent to the nature of CCS with occurrence of the financial and banking crisis and the prevalence of low carbon prices. The objective of the EEPR, and the underlying political choice, was to encourage the development of CCS, and a tangible level of risk is a constant feature in the development and demonstration of innovative solutions.

22. While the objective of full-scale CCS demonstration was not achieved, the Commission considers that significant knowledge and experience were gained by the realisation of the initial project stages, including on barriers to implementing CCS demonstrators. The Commission and Member States keep drawing on this knowledge (for example, in the context of the Strategic Energy Technology Plan action 9 on Carbon capture, utilisation and storage).

Box 2

The contribution from the EU was paid to the projects due to preparatory works foreseen in the grant agreements and performed by the consortia. The experience gained from the projects and the difficulties encountered are valuable. The Commission notes, for example, that for the project in the Netherlands, preparatory works on the depleting offshore gas field P18 and the offshore pipeline was already advanced, and will now benefit the CCS efforts undertaken by the Port of Rotterdam.

26. The technological evolution is a constant feature of innovative projects. The Commission considers that it showed the flexibility necessary to account for market and regulatory conditions as well as technological developments.

Common reply to paragraph 29 and Box 3:

The Commission followed the procedure laid down in the NER 300 Decision for selection, ranking and award, which did not foresee conditional confirmation of projects by Member States or awarding projects with a later date of entry into operation than the one stipulated in the NER 300 Decision or accepting projects with a funding gap by the stipulated deadline. Therefore, the CCS projects from the UK, Italy and the Netherlands could not be put forward for the NER 300 award, as these issues were not closed by the deadline for taking the award decision.

35. Demonstration bioenergy projects need longer testing phase before ramping up to 100% capacity because of variable quality of the feedstock and long period of adaptation of the fermentation processes to changes. Furthermore, one of the bioenergy projects had to start with unfinished plant (5 out of 9 modules) to comply with the agreed date of entry into operation. As the time to enter into operation was extended in 2015 by two years for all projects, the project requested to move the date of entry into operation from 2014 to 2016 to be able to cover the long commissioning period. This would allow the project to reach over 75% of performance proving the viability of the technology.

41. The Commission takes the view that the investment climate was primarily affected by uncertainty in national regulatory frameworks.

The Commission notes that the NER 300 Programme was co-developed by the Member States, and was based on strong commitment of Member States to support the projects pre-selected and confirmed by them.

44. The 2014 Guidelines on State aid for Environmental Protection and Energy contained several provisions to ensure that projects already in the pipeline would not be impacted by the new competitive bidding requirement for operating aid entering into force in 2017. In addition, the 2014 Guidelines also contained a specific protection for demonstration (and for small and medium-sized) projects providing that they were not subject to competitive bidding even if they start after 2017. Member States could thus have kept support for NER 300 projects unchanged.

Between 2014-2015, many Member States tried to make their support schemes more efficient in order to avoid overcompensation issues and to mitigate the financial burden for electricity consumers as an implication of the support of renewables through feed-in tariffs. The 2014 Guidelines gave the Member States some of the tools to introduce more efficient support schemes but many Member States chose to go beyond the requirements of the 2014 Guidelines.

Box 5

The Commission notes that the United Kingdom engaged into a vast reform of its energy sector. To support renewables the UK wanted to grant funding through competitive bidding processes much earlier than required by the State aid Guidelines as the UK wanted to reduce support costs.

Box 6

As regards the regulatory situation in Germany, the Commission could not foresee the important change in the position of national authorities and the delay in the transposition of the CCS Directive. The payments made to support planning work were in line with applicable eligibility rules as defined in the grant agreement.

The UK EEPR project (Don Valley) was deselected from the UK CCS Commercialisation Competition. While the Commission requested the project not to enter into major financial commitments without guaranteed funding from the UK national authorities, it did allow the project to advance on those work packages, which had been developed jointly with the NER 300 White Rose project of the National Grid (i.e. the transport and storage work packages). With the completely unexpected cancellation of the CCS Commercialisation Competition on the 25 November 2015, the formerly ambitious UK CCS policy was suspended and disabled the continuation of the Don Valley project. As a result, and despite the coordinator's request for extension, the EC had to terminate this Grant Agreement (31 December 2015).

48. Where delays are due to market and regulatory uncertainty, it is likely that all innovative projects delivering the same product are slowed down.

53. The Commission considers that other emitters in the areas of the projects could potentially have benefited from transport and storage infrastructure parts of the supported CCS projects. Especially in the case of the Don Valley project, the development of CCS infrastructure was never intended to only benefit a single capture project, but was designed with a "shared user" concept since the beginning.

55. Three out of the six EEPR projects were terminated relatively early when the project partners realised that either regulatory or financial difficulties prevented the project from progressing. One project built a pilot installation. For the two remaining projects the Commission made significant efforts to identify additional funding sources to cover the funding gaps. The Member States involved remained supportive to the projects and there was a reliable plan for their implementation. Therefore, the Commission considers that at the time there was still reasonable expectation that the projects would be realised.

Common reply to paragraph 57 and 58.

Since the legislative proposal for the Emission Trading Scheme (ETS) Directive did not include the NER 300 programme, its features/impacts could not be included in the ETS Directive impact assessment. The paragraphs establishing NER 300 programme were added by the co-legislators during the co-decision process.

As regards the NER 300 Decision, a proportionate Impact Assessment was produced, based on the legal framework provided for by the ETS Directive Amendment. However, the scope of this analysis was restricted by legal provisions laid down in the basic act.

Common reply to paragraph 61 and 62:

The NER 300 was created by the Council and the Parliament in the framework of legislative process on the ETS Directive. The ETS Directive required to give support based on verified emissions reductions.

The Commission conducted stakeholder consultation and developed a proportionate impact assessment on the implementation options of the NER 300 programme within the legal limits provided to it by the ETS Directive.

63. The decision on payment structure was part of the NER 300 Decision, proposed by the Commission and voted by the Member States in the Climate Change Committee.

The Decision nevertheless allowed for the up-front funding, should project promoters and Member States request it and provide the required guarantee.

65. The Commission notes that the payment-upon-delivery design feature was determined by the co-legislators in the text of the ETS Directive. However, Member States were able to provide upfront funding, support the construction phase and share the risks with the project developers.

70. Bankability assessment can only be relevant for projects that are economically viable, have clear and secured revenues, clear financing structure, and secured business case. These features are not the characteristics of first of a kind projects whose main purpose is to demonstrate technological viability. Therefore, the due diligence did not include the bankability assessment. It can be assumed that few of the projects submitted or selected would have scored positively, as is a normal case for pre-commercial demonstration investments, at the early stage of project development/application. Bankability becomes relevant at the stage of the financial close, after technological demonstration leads to full visibility of the business case.

71. The Commission considered for award only the projects that were confirmed to be supported by the Member States.

72. The rule, set in the legal basis (NER 300 Decision) was to rank the projects based on Cost-per-unit performance (CPUP) – there was no other choice than to follow the adopted implementing act provisions.

This uncertainty in costs is a common feature for all projects at similar technological readiness levels (TRL) and project preparedness. The NER 300 decision and award decisions foresee adjusting of the relevant costs and maximum award when the final investment decision is taken and the uncertainty of costs diminishes.

73. The Commission considered the information received from European Investment Bank (EIB). Nevertheless, the final award decision followed direct confirmation of support from the Member States for all projects.

Box 9

The Member State confirmed the support to all selected projects. Other support mechanisms than Feed-in-tariffs were possible to be used.

74. The Commission notes that Member States were able to request the Due Diligence reports after the competitive process was concluded. The Commission did not have the mandate to provide the reports, unless Member States asked for them.

75. The design of the selection and award process was set in the related Implementing act (NER 300 Decision), and was based on a single CPUP indicator. It was therefore not possible to set another methodology for selection and award of projects.

Eligibility criteria included the innovativeness indicator, which was a pre-requisite for entry into the competition for funding.

82. All NER 300 selected projects fulfilled provisions of innovativeness, as at the time of award, none of the technologies were commercially available.

That fact that markets change, some technologies progress faster than others, and some can be slowed down by the economic or regulatory framework is a natural characteristics of market economy.

Box 10

The first NER 300 call was launched in 2011. All selected projects were evaluated as innovative and represented projects not commercially tested or implemented at the time. This was an eligibility criterion checked by both the Member States and the Commission. The two offshore wind projects in question were innovative at the time of the application. They contributed to the aim of the SET-Plan (Strategic Energy Technology Plan) programme in wind at the time, which was presented in the Wind European Industrial Initiative Team 2010-2012 Implementation Plan of May 2010.

85. The objectives, criteria and monitoring requirements of selected Financial Instruments used to channel the NER 300 unspent funds from the first call, have been aligned with the NER 300 legal basis requirements, through amendments of specific Delegation Agreements with the EIB. Common eligibility check will be performed, ensuring the objectives of the NER 300 are attained.

87. Although voluntary in character, the Integrated SET-plan remains one of the main 'soft' policy tools available to align and coordinate efforts (national and EU level) on clean energy technology innovation. The platforms for interaction with stakeholders have evolved over the years. The establishment of implementing structures that will take forward the delivery of the activities under each Implementation Plan will strive to be as inclusive as possible.

89. The Commission considers that joint programming already exists in several areas. ERA-Net (European Research Area) actions are an important joint funding instrument used for the coordination of the SET-Plan.

90. By June 2018, the process of finalisation and endorsement of the Implementation Plans has progressed and 11 of the 14 plans have been endorsed. A new SET-Plan agenda 2018-2023 has been endorsed including the guidelines for reporting on progress and achievements.

Reporting to the SET-Plan steering group meetings on the achievements of each Implementation Plan will come from the relevant implementing bodies to be set up.

91. The new SET-Plan agenda 2018-2023 has identified the need for strengthening the engagement of national funding bodies in the SET-Plan implementation.

92. The Commission wants to stress that SET-Plan Roadmaps, product of the SET-Plan temporary working groups, are part of the evidence base for the development of the Innovation Fund.

The Commission has organised comprehensive workshops with all sectors eligible under the Innovation Fund, followed by the open public consultation, where Commission services cooperated on including the SET-Plan community. As well, the Commission established an expert group

composed of the representatives of industry and Member States, which will assist with the development of the Innovation Fund Delegated Act.

93. The SET-Plan Steering Group has adopted a new SET-Plan Agenda 2018-2023 identifying the activities over the next 5 years to optimise its impact and delivery. Special emphasis has been set on the operational framework for the execution of the 14 Implementation Plans.

To assess progress towards the objectives of the 2015 Commission Communication 'Towards an Integrated Strategic Energy Technology Plan' and the realization of the agenda 2018-2023, an independent assessment will be performed in 2020. Additionally, Member States will also report from 2020 on, as part of their new Integrated Energy and Climate Plans.

The execution of the SET-Plan Implementation Plans will be also monitored using Strategic Energy Technologies Information system (SETIS). SETIS provides information on the significant results achieved over the years, since 2007, and offers a useful insight into its benefits.

Finally, the InnovFin Energy Demo Projects (InnovFin EDP), developed under Horizon 2020 to address the needs of the SET-Plan stakeholders, is a measurable result.

99. The Commission would like to point out the fact that there are a number of NER 300 projects being actively screened or developed under the InnovFin EDP pipeline. Some projects are progressing with receiving additional support from the InnovFin EDP.Projects can be supported through financial instruments when they reach certain maturity and bankability. To get there, projects must secure revenues to be able to service their debt or ensure equity returns. This takes time, as first the technological viability must be demonstrated.

102. The Commission notes that Horizon 2020 and Innovation Fund have different objectives set up by their legal basis, which cannot be served with one single joined programme. Therefore, they will remain complementary although it may require enhancing the possible synergies.

103. The Commission has recently adopted a proposal for the Invest EU Programme, which will streamline and consolidate the EU Financial Instruments. Article 6 of InvestEU Regulation proposal includes provisions for blending grants with financial instruments, as a key measure enabling effective offer of specific products fit for various sectors and risk profiles.

Connecting Europe Facility (CEF) Debt Instruments also includes a blending call. A blending facility connecting H2020 with InnovFin EDP is under development.

104. The Commission notes that the Delegation Agreement with the EIB provides for rigorous monitoring and reporting obligations to ensure sound financial management.

The Commission will address the financial control issues in the relevant Delegation Agreements with the EIB, and in the Innovation Fund delegated act.

105. NER 300 revenues and assets under EIB management are not part of the EU budget and are not under the Commission control. Projects are selected and contracted by the Member States, remaining revenues accrue to them. Therefore they cannot be integrated with the EU Budget and reported on the EU balance sheet under the applicable EU accounting rule 2 (‘Consolidation and Accounting for Joint Arrangements and Associates’).

The Commission reports annually on the NER 300 implementation in its Management Plan and Annual Activity Reports.

106. Please see Commission reply to paragraph 104.

CONCLUSIONS AND RECOMMENDATIONS

109. The Commission stresses the particularly adverse conditions that prevailed from 2012 onwards. Although the Commission deployed significant efforts in respect of these six projects, it could not go against the industrial trend or the more general market demand and neither could it go against changing political priorities of Member State governments.

112. The Commission wants to stress that withdrawal of innovative projects is a normal market feature. 50% withdrawal rate is a normal situation, and is also globally exhibited in other programmes supporting innovation. It is clear that projects that withdraw cannot deliver, as they prove not feasible in the marketplace. The fact that these projects did not draw the NER 300 resources provides for prudent assurance that resources were not wasted, and allows for supporting new projects (under InnovFin Energy Demonstration Projects or Connecting Europe Facility Debt Instrument). Any unused resources from the second call will be channelled to the Innovation Fund, hence supporting new projects. The Commissions however acknowledges that "frozen resources" are not an effective outcome of the programme.

113. The Commission would like to highlight the globally adverse effect of low oil prices to bioenergy projects. According to investors, innovative bioenergy market collapsed after oil price crash and abundant oil reserves were supplied to the market.

115. The decision to support innovation is a political risk assumed by the Commission, the Council and the European Parliament. The Commission was encouraged to support this innovation by the Member States and stakeholders as well as by the consideration of the great potential of the CCS in contributing to the Union's Energy and Climate targets.

Grant agreements with three out of six EEPR CCS projects were terminated relatively early and one resulted in a pilot installation. For the two remaining projects the Commission made significant efforts to identify extra funding sources to cover the funding gaps. The Member States involved remained supportive to the projects and the Commission considers that there was a reliable plan for their implementation. Therefore, at the time it was still expected that the projects would be realised.

The significant knowledge acquired in this process continues to be used at EU level, especially in the context of the Strategic Energy Technology Plan as well as in the European CCS Demonstration Project Network which is a platform to share the knowledge gained in such projects.

116. The Commission will have a role in scrutinising the Member State plans and reporting to establish whether they contain all required elements. It should consider the national integrated energy and climate plans when it awards EU funding.

However, for centrally managed EU programmes, where the primary beneficiary of the Funds is not the Member State itself, the completeness of the Member States' integrated energy and climate plans should not be used as a criterion to assess the merit of or make a final funding decision on a project. This could otherwise have the adverse effect of compromising projects that could have been beneficial for energy and climate policies. In centrally managed programmes it will be up to the Commission to ensure that projects are aligned with the EU's energy and climate policy objectives.

Recommendation 1 – Increasing the potential for effective EU support to low carbon energy innovations

The Commission accepts the recommendation.

Under the Innovation Fund, clear commitment from Member States, where relevant, will be sought. The recommendation will be taken on board for selection criteria.

Concerning Horizon 2020/Horizon Europe, national co-funding could potentially be part of the financing of a project (up to certain limits) but this is not frequently the case. The availability of the remaining financing, other than the grant, be it public or private, is considered during the evaluation

of the proposals and influences the assessment on the merits of the projects. Nevertheless, experience shows that financing which seems to be secured during the evaluation of the proposals, can be at risk at a later stage.

Consistency with National Climate and Energy Plans could be a factor for consideration in the selection criteria of some EU programmes, for instance, when addressing relevant Projects of Common European Interest[1].

118. The NER 300 programme was created in the co-decision process to support innovative renewable energy projects and CCS projects through the EU ETS Directive. The Commission developed an impact assessment on the implementation options of the NER 300 programme within the limits given by the ETS Directive. The ETS Directive required that support was given based on verified emissions reductions. Therefore, the default option was to give the award against proven performance, with the option of upfront funding by Member States which would enable projects de-risking.

119. The NER 300 project selection and award procedures were set in its legal basis, ETS Directive and NER 300 Decision. The only selection criterion set by the NER 300 legal basis was the CPUP. Other criteria were not part of the provisions for the implementation of the NER 300 Programme, hence they could not be used in the selection process.

Recommendation 2 – Improving project selection and decision-making procedures for the future Innovation Fund

(a) The Commission accepts the recommendation.

The Innovation Fund foresees to disburse funding against clear milestones. If milestones are not reached, funds will be liberated and redirected to either reserve list projects or subsequent calls.

(b) The Commission accepts the recommendation.

Projects' economic viability and risks will be evaluated along with other criteria for effectiveness, efficiency and impact in order to select the best portfolio of projects to meet the defined objectives for the Innovation Fund in the EU ETS Directive.

Further, robust commitment from co-financing parties in selected projects will be required.

(c) The Commission accepts the recommendation.

The Innovation Fund foresees a multi-criteria assessment, which will be a combination of qualitative and quantitative criteria in order to be able to consider all aspects of the innovative projects. This will ensure that at the time of award, most prospective and viable projects will be selected.

(d) The Commission accepts the recommendation.

Member States will be involved in governance of the Innovation Fund. All information, which is not confidential and will help projects to go ahead will be shared with Member States, ensuring all involved parties possess transparent information necessary to identify and mitigate important project risks.

(e) The Commission accepts the recommendation.

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[1] For example, the proposed Regulation for establishing the Connecting Europe Facility (COM(2018)438 final) foresees "consistency with Union and national energy and climate plans" as one of the award criteria.

The selection procedure will ensure that the Innovation Fund selects a wide portfolio of projects in terms of sectors and Member States, which contribute most towards meeting EU decarbonisation objectives. Greenhouse gas avoidance/reduction potential of projects will be among key selection criteria.

(f) The Commission accepts the recommendation.

The Innovation Fund Delegated Act will aim for higher flexibility to reflect changing dynamics of innovation, while ensuring the delivery of programme's objectives.

Project changes, which do not alter the scope of the projects nor the selection procedure, will be managed by the implementing body with higher efficiency.

121. The alignment of objectives and accountability provisions for Financial Instruments channelling the NER 300 support are addressed in the relevant amendments to the Delegation Agreements with the EIB.

Recommendation 3 – Ensuring flexibility of the Innovation Fund to respond to market and technology developments

(a) The Commission accepts the recommendation.

The eligibility of the projects stems directly from the EU ETS Directive. The projects will be evaluated against contribution to the policy objectives rather than against reaching specific technology or product parameters, which are hard to determine in advance and with certainty.

(b) The Commission accepts the recommendation.

The Innovation fund foresees regular calls. The financial instruments support, if used, would be available on first come first served basis.

122. It is a key objective for the next programming period to increase synergies between EU programmes.

For Horizon Europe, a strategic programming process will be established, involving all relevant Commission services in the co-creation of priorities and calls for proposals. The aim is to establish a common innovation framework so that all programmes are implemented in a coherent and complementary manner.

The provisions on accountability will be set up by their corresponding legal basis in the next programming period.

123. The Strategic Energy Technology Plan (SET Plan) Steering Group has endorsed the new Implementation Plan which compared to the past activities of the SET Plan provides a new, clear and measureable set of objectives.

Additionally, this Steering Group has adopted a new SET Plan Agenda 2018-2023 identifying the activities over the next 5 years to optimise its impact and delivery. Therefore, the above provides a better framework for a further assessment in the future.

As referred above (see paragraph 93), the independent assessment to be performed in 2020, the Member States' reports and the reports from the Implementation Plans will allow for an overall measurement of the progress to reach the objectives already set.

124. The new multi-annual financial framework (MFF) proposal includes the Regulation establishing the InvestEU Programme. The new InvestEU Fund will consolidate all EU Financial instruments and streamline the products offered, to address with higher efficiency, the various risk profiles in various economic sectors. Its Research and innovation window will consolidate the instruments addressing research and innovation. Article 6 of the proposed Regulation includes

provisions for blending with other EU programmes, including the Innovation Fund. This will ensure reduction of overlaps and provision of products addressing specific investment situations.

125. The Commission notes that the scope, scale and ambition of Horizon 2020 and NER 300/Innovation Fund are now different. In the next programming period, the Commission will work out an effective and complementary approach for both programmes' activities in the strategic programme phase of Horizon Europe and the Delegated Act for the Innovation Fund.

As regards the operations of the EIB, there are some NER 300 projects subject to the screening of the EIB for the InnovFin EDP. Financial instruments funding require projects which have a certain degree of maturity. In this context, the first operation is expected shortly.

126. For Horizon Europe, a strategic programming process for the first years of Horizon Europe will begin in July 2018 and should lead to a common Strategic Research and Innovation Plan by the end of 2018, which will then be consulted with stakeholders.

The aim is to establish a research and innovation priority framework agreed between all relevant Commission services which can then be the reference for all EU programmes, so that the different programmes contribute to the same objectives in a coherent and complementary manner, while respecting the specific legal bases of EU Programmes.

Recommendation 4 – Better Commission coordination for more coherent targeting of EU support

(a) The Commission accepts the recommendation.

Cross-service assessment is already the case, as part of the development of the next MFF architecture and the Innovation Fund.

(b) The Commission accepts the recommendation.

Ensuring synergies is among the main aims outlined in the Horizon Europe, InvestEU Programme proposals and Innovation Fund. InvestEU Programme, among other measures, is a way to simplify and streamline the offer of financial products in support of climate action. This also includes the possibility of blending opportunities with other EU programmes and ETS Innovation Fund, if relevant and needed.

The Commission will improve the coordination efforts in preparation of the respective grant calls or financial instruments.

However, specific legal bases setting the selection criteria will need to be respected, to ensure adherence to specific policy objectives.

Recommendation 5 – Ensuring accountability

(a) The Commission accepts the recommendation.

Accountability provisions will be clearly spelled out in the Innovation Fund regulation and are being improved in the Cooperation Agreements with the EIB for the unspent NER 300 funds.

(b) The Commission partially accepts the recommendation.

The inclusion of funds on the EU balance sheet must follow the requirements of the relevant accounting standards, International Public Sector Accounting Standards , and in particular the EU accounting rule 2 ('Consolidation and Accounting for Joint Arrangements and Associates'). The EU programmes that are financed from the EU budget are recorded on its balance sheet and subject to budgetary discharge. EU programmes that are not part of the EU budget and over which the EU Institutions do not have exclusive control (e.g. funds managed by the Commission on behalf of third parties) cannot be recorded on the EU balance sheet unless they are integrated into the budget (e.g. as assigned revenues), in line with the MFF legal basis.

The Innovation Fund is not part of the MFF proposal, as it is financed under the ETS, and not by EU budget, and its lifecycle goes beyond MFF budgetary cycle. Further, the revenues are not decided or known up-front, as they depend on the carbon price at the moment of monetisation of allowances. However, measures to ensure sound financial management, including auditing and reporting will be implemented.

(c) The Commission accepts the recommendation.

Regular progress reporting to relevant budgetary authorities will be foreseen in the Innovation Fund delegated act, subject to chosen governance model.

Event	Date
Adoption of Audit Planning Memorandum (APM) / Start of audit	17.5.2017
Official sending of draft report to Commission (or other auditee)	8.6.2018
Adoption of the final report after the adversarial procedure	5.9.2018
Commission's (or other auditee's) official replies received in all languages	5.10.2018

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To help achieve its 2020 and longer term climate and energy objectives, the EU launched two large funding programmes in 2009 to support carbon capture and storage (CCS) and innovative renewables: the European Energy Programme for Recovery (EEPR) and the NER300 programme. While the EU is likely to meet its 2020 targets, we found that neither of the programmes succeeded with the deployment of CCS in the EU. The EEPR contributed positively to the development of the offshore wind sector, but the NER300 programme did not achieve the progress intended in supporting the demonstration of a wider range of innovative renewable energy technologies.
The EU is now preparing to launch the Innovation Fund to replace NER300 from 2021 and is designing the new multi-annual financial framework (2021-2027). An acceleration of the transition to a low-carbon economy is necessary to meet its climate and energy objectives for 2030 and the longer term. In this context, we make recommendations to the European Commission to address the weaknesses identified during our audit and strengthen the design of future programmes.

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