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Support to the ex-post evaluation of the Nuclear Decommissioning Assistance Programme – Energy Window 2007-2013

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In association with:

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Disclaimer: The views expressed in this report are purely those of the writers and may not in any circumstances be regarded as stating an official position of the European Commission.

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List of acronyms and units

Table 1: List of acronyms

AAU	Assigned Amount Units
BIDSF	Bohunice International Decommissioning Support Fund
CCGT	Combined cycle gas turbine
CEF	Connecting Europe Facility
CHP	Combined Heat and Power
CPMA	Central Project Management Agency
CPO	Central Procurement Organisation
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EE	Energy efficiency
EEA	European Economic Area
EERSF	Energy Efficiency and Renewable Energy Fund (Bulgaria)
EIB	European Investment Bank
ERDF	European Regional Development Fund
ESIF	European Structural and Investment Funds
ETS	Emission Trading System
EU	European Union
GA	Grant agreement
GDP	Gross Domestic Product
GHG	Greenhouse gases
GIPL	Gas Interconnection Poland – Lithuania
HUDA	Lithuania's Housing and Urban Development Agency
IAEA	International Atomic Energy Agency
IEA	International Energy Agency
IDSF	International Decommissioning Support Fund
IED	Industrial emissions directive - Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
IIDSF	Ignalina International Decommissioning Support Fund
INEA	Innovation and Networks Executive Agency
INPP	Ignalina nuclear power plant
Jess	*Jadrová energetická spoločnosť Slovenska a.s.*, Slovak Nuclear JV
KfW	*Kreditanstalt für Wiederaufbau*, the German reconstruction credit institute
KIDSF	Kozloduy International Decommissioning Support Fund
LNG	Liquefied natural gas
LPP	Lithuania Power Plant
MH SR	*Ministerstvo hospodárstva Slovenskej republiky*, Ministry of Economy of the Slovak Republic
NEEAP	National Energy Efficiency Action Plan
NEK	National Electricity Company (Bulgaria)
NDAP	Nuclear Decommissioning Assistance Programme
NES	National Energy Strategy
NEIS	National Energy Independence Strategy
NPP	Nuclear Power Plant
NTEF	National Trust Eco Fund (Bulgaria)
OP	Operational Programme
PCI	Projects of Common Interest
PHARE	Poland Hungary Aid for Reconstruction of the Economy
PIU	Project Implementation Unit
RES	Renewable energy sources
SE	*Slovenske Elektrarne* (Slovak Electric)
SEFF	Sustainable Energy Financing Facility
SEPS	*Slovenská elektrizačná prenosová sústava*, the Slovak electricity transmission system company
SIEA	Slovak Innovation and Energy Agency
SlovSEFF	Slovak Sustainable Energy Financing Facility
SME	Small and medium enterprise
TACIS	Technical Assistance to the Commonwealth of Independent States
TPP	Thermal power plant
TSO	Transmission System Operator
VNPP	Visaginas Nuclear Power Plant
VVER	*Vodo-Vodyanoi Energetichesky Reaktor*, Water-Water Power Reactor

Table 2: List of units

CO_2e	CO_2 equivalent
GWh	Gigawatt-hour
kgoe	Kilograms of oil equivalent
kV	Kilovolt
kW	Kilowatt
kWe	Electrical kilowatt
kWh	Kilowatt-hour
Mtoe	Million tonnes of oil equivalent
MW	Megawatt
MWe	Electrical megawatt
MWh	Megawatt-hour
$MtCO_2e$	Million tonnes of CO_2 equivalent
tCO_2e	Tonnes of CO_2 equivalent
toe	Tonnes of oil equivalent
TWh	Terawatt-hour

Executive summary

In the wake of the 1986 Chernobyl disaster, a prerequisite for the accession of Bulgaria, Lithuania and Slovakia to the European Union was a commitment to prematurely close and subsequently dismantle their early Soviet-designed reactors. Three nuclear power plants with a total of eight reactors were concerned: Kozloduy Units 1-4 in Bulgaria, Ignalina in Lithuania, and Bohunice V1 in Slovakia.

From the early 1990s, the EU began to provide financial and technical assistance to partner countries in Eastern Europe and Central Asia via the TACIS and PHARE programmes. In 1999, the EU launched three Nuclear Decommissioning Assistance Programmes (NDAP) to help Bulgaria, Lithuania, and Slovakia with the closure and dismantling of the eight nuclear reactors, and the significant social, financial and economic burden this caused. Without covering the full cost of decommissioning nor the compensation of all economic consequences, the Nuclear Decommissioning Assistance Programme aimed to provide financial assistance to several types of projects, for a total EU NDAP support, estimated at €3.8bn for the three countries between 1999 and 2020 (European Parliament, 2017). The NDAP covered two elements: a 'decommissioning window' and an 'energy window'.

This report is the final report produced under the framework of the ex-post evaluation of the nuclear decommissioning assistance programme – Energy Window 2007-2013.

Objectives and the methodology of the evaluation

The objective of the study was to provide the Commission with an independent evaluation of the energy-related projects funded by the NDAP in Bulgaria, Slovakia and Lithuania in the period 2007-2013 ('Energy Window').

The evaluation notably considered and assessed:

- The results and impacts of the funded projects;
- The efficiency and effectiveness of resource use;
- The European Union added-value, with a focus on leverage to maximise impacts and support development in the energy sector (either at Union level or within the three MS).

The evaluation adopted primarily a retrospective approach, including an assessment of supported projects to verify whether their objectives and expected results were met. This led to the formulation of findings, conclusions and lessons learnt presented in this report.

The evaluation covered projects and initiatives funded through implementing bodies (European Bank for Reconstruction and Development, Central Project Management Agency) between 2007-2013 in Bulgaria, Lithuania and Slovakia to implement mitigation measures in the energy sector.

The evaluation covered 17 key questions under the areas of relevance, coherence, EU added-value, effectiveness, efficiency, sustainability and communications (see Table 3 in report).

The evaluation was launched in mid-April 2018 and concluded in November 2018.

The 'Energy Window' of the Nuclear Decommissioning Assistance Programme

- Until 2013, a portion of the assistance programme was allocated to the 'Energy window'. More than **€947m**[1] had been committed to support **58 energy-related projects**[2] seeking to achieve various

[1] Funds originates mostly, but not only, from the European Union. Other contributors and donors participated to the ISDF funds managed by the EBRD.

[2] For this evaluation, "project" corresponds to a grant agreement. In some cases, grants agreements were regrouped as they concerned different phases of a project. A "project" can include several sub-projects. The list of projects is in Appendix A.

objectives in Bulgaria, Lithuania and Slovakia, as stated in the legal base (accession treaties):Environmental upgrading in line with the EU environmental acquis (including energy efficiency);

- Modernisation of the conventional energy production;
- Contribution to necessary restructuring, upgrading of the environment and modernisation of the energy production, transmission and distribution sectors;
- Enhancement of the security of supply;
- Enhancement of the use of renewable energy sources (in Bulgaria only).

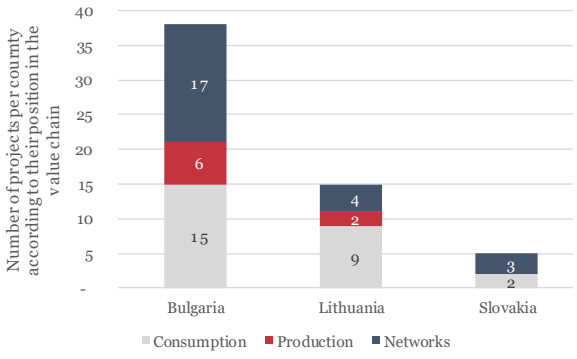
Some projects were fully funded, while others were partially funded, depending on the relation between the project and the premature closure of the NPP, the type of project and the public or private status of the grant holder. The overall amount committed to grants represents more than €947m, with an overall level of NDAP committed financing of 50.4% compared to the overall budgets of projects. A portion (about 20%) of the funds committed before 2014 is still being spent on 18 ongoing projects in the three countries. All projects are included in the scope of the evaluation.

Bulgaria represents the highest proportion of committed budget and the highest number of projects (€401m and 38 projects). For Lithuania (€364m, 15 projects) and Slovakia (€182m, 5 projects), there are fewer projects, but with a higher average budget. 18 projects are still ongoing, in the three countries.

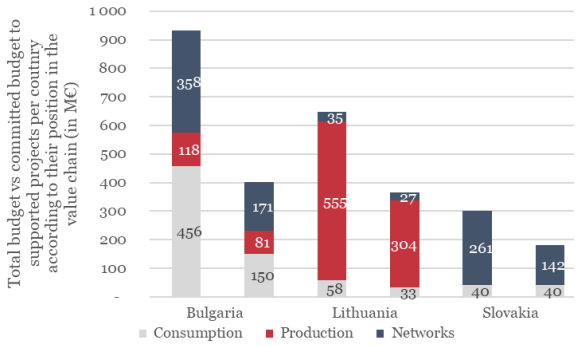
As projects can have multiple objectives projects were grouped according to their position in the energy-value chain: production, networks (electricity and gas) or consumption (including energy efficiency). The highest share of budget was committed to the production category (41%), followed by networks (36%) and consumption (23%), although the number of projects is more important in the consumption category.

Projects in Bulgaria have targeted the whole value chain, with a stronger emphasis downstream the value chain (networks and consumption). In Lithuania, efforts were principally oriented towards upstream (production), notably with the upgrading and modernisation of the Lithuania Power Plant to replace capacities and partially to comply with the EU acquis. In Slovakia, networks, notably transmission, took the larger share with the objective of improving the security of supply.

Number of supported projects according to their position in the value chain per country



Total budget (left) vs. committed budget (right) to supported projects according to their position in the value chain per country



A survey of grant holders was undertaken. The response rate was deemed to be good, with 55 people answering out of 65 contacted. The results yielded additional information across all criteria of the evaluation. A survey of end beneficiaries, on the other hand, had a lower response rate, with 19 responses for more than one hundred people invited to participate. This was expected given the difficulties to collect up-to-date contact details.

Country Studies

Bulgaria

In Bulgaria, the removal of capacity production represented 20-25% of the national production capacity. Thus, the overall relevance of the NDAP funding is high. The projects funded by the Kozloduy International Decommissioning Support Fund (KIDSF), established at the EBRD in June 2001, responded to the priorities outlined in the National Energy Strategy and addressed both the supply (through production and transport) and the demand side. Currently, projects supported under the subsequent Financing Agreement of 2006 on the PHARE Special Programme, are in line with Bulgaria's third National Energy Efficiency Action Plan (NEEAP) 2014-2020. The investments supported by NDAP have contributed to the necessary improvements of the energy sector. Most of the interviewed stakeholders shared that the projects funded by KIDSF would not have happened if the NDAP funding had not been available.

Lithuania

One of the most important impacts of the shutdown of Ignalina Nuclear Power Plant (INPP) was that Lithuania switched from being a net exporter of electricity until 2009 to being a strong net importer starting in 2010. A main result of the NDAP was increased security of electricity supply through the installation of a CCGT power plant within the Lithuanian Power Plant at Elektrėnai to guarantee sufficient reliable generation capacity, and through the power interconnection with Poland (complementing the interconnection to Sweden). The other major result was an increase in the energy efficiency of public and private residential buildings, both through the direct effects of funded projects, and subsequently through a transfer of the funding, financing and project implementation methodology to a national programme. Indeed the main long-lasting effect of the NDAP energy window programme is the establishment of energy efficiency in residential and public buildings as a mainstream concept in Lithuania. Supported projects have had significant impacts and most would not have been carried out without NDAP funding or would have been significantly delayed. Critical elements were however noted concerning the decision-making process for the selection of technology, with respect to three major projects representing a large share of the overall funding.

Slovakia

The general objective of the 'Energy window' in Slovakia was to assist the country in the safe shutdown and decommissioning of the Bohunice V1 NPP and to mitigate the economic and energy consequences of this shutdown. The shutdown of V1 NPP caused Slovakia to go from being a net electricity exporter in the early 2000s to being a net importer, after an estimated loss of capacity of around 10% of energy production and around 20% of electricity consumption. Slovakia has 5 NDAP projects, 3 of which were managed by SEPS, one by the Slovak Innovation and Energy Agency (SIEA) and one by EBRD. The two main results of the programme were increased security of supply through the upgrading of the power transmission network, increased energy efficiency and support to small-scale renewable energy technologies, although the latter was not an initial NDAP objective. In all projects, there was high or very high satisfaction with regard to the programme management. There is undoubtedly EU added-value, both in financial and non-financial terms. The programme was perceived as effective and efficient in Slovakia, the degree varying per project. In general, all completed projects achieved their expected objectives within the budgets foreseen and amended.

Evaluation of the 'Energy window'

Relevance

The closure of the nuclear power plants in these three countries induced major changes in the energy sector. It generated local and national resistance, and in some cases, engendered discussions at the parliament level to restart the plants, up to 2015. In this sense, the implementation of an energy window within the Nuclear Decommissioning Assistance Programme contributed in sending a positive signal to the new Member States, partially offsetting the negative impacts of the nuclear power plant closure. It was a crucial enabler to accept the premature closure of the plants.

In the three countries, the 'energy window' provided adequate responses to support the necessary measures to adapt the energy sectors to face the adverse effects linked to the early closures of the nuclear power plants. A considerable majority of the supported projects are deemed very relevant to address the consequences of the early closure.

Coherence

Overall, the programme supported various projects, focusing on different sub-sectors of the energy value chain, from production to consumption. In the three countries, the disparity of the support provided arose from distinct contexts, diverse needs and starting points, and hence various national proposals of projects to be supported. At the programme and the country level, the precise amount to be devoted to each objective was, initially, not set. On the one hand, it enabled the flexibility needed to support various kind of projects, but on the other hand, it generated concerns about financing the decommissioning.

Due to the lack of quantitative monitoring for several consumption projects and to the nature of the supported projects, it would be difficult to estimate whether the results of the projects were commensurate to the capacities that were removed in the three countries. On the production side, besides the modernisation of production capacities, the programme did however support the implementation of new conventional and renewable energy sources capacities of 333 MW, representing about 6% of the overall removed nuclear capacity.

EU added-value

There is a clear EU added-value from the programme. Financially, there was (and still there is) no similar supporting programme. Most of the projects would not have been launched without NDAP support, or would have been significantly altered (e.g. delays, scope reduction) or generating undesirable effects (e.g. energy price increases due to investment deferment on end-users). The EU intervention allowed both to support the implementation of projects that would most certainly not have been (as quickly) implemented and to mitigate the economic consequences of the nuclear power plant closure for the general public. For a majority of the supported projects, the EU-added value was assessed as high.

Overall, the EU funding did allow projects to be implemented more quickly and with a greater level of ambition than it would have otherwise occurred. It enabled the development of new capacities, facilitating subsequent investments. Finally, by supporting local projects, it contributed to give a sense of inclusion in the European Union to new Member States.

Effectiveness

NDAP's 'energy window' was a successful programme. Although the objectives were not set at the programme level, the majority of the supported projects achieved their initial energy objectives. A small share, about 15%, even consider that results are above expectations. However, the projects often lacked a detailed monitoring framework, and there are some uncertainties regarding the quantitative results achieved.

Only few projects did not achieve their objectives, for various reasons: technological choices, contractual issues, lack of capacity or commitment, insufficient support, lack of potential, lack of perspectives.

Qualitatively, NDAP had strong effects in the energy sector. It contributed to triggering subsequent investments at all three stages of the value chain of the sector, to raising awareness on energy efficiency and to replicating some of the supported initiatives at the national or European level.

Regarding challenges, it was necessary to ensure the complementarity with other EU programmes, notably those of DG REGIO, to avoid double-financing of the project.

Efficiency

Projects were efficient, with about half of them rated as highly-efficient and another half rated as moderately efficient. No noticeable evidence was found regarding potential variations according to the type of project or its country. Some differences are noted according to the position of the project in the

energy value chain, with consumption, and notably energy efficiency projects, scoring lower, which is quite common.

Factors positively supporting the efficiency of the projects include the management structure, the intervention of the implementing body, the use of new procurement rules, its design, the role of the project manager and the assistance of external consultants. On the contrary, questionable technological choices, low use of the equipment, technical issues, poor performance of contractors or difficulties with the implementation of procurement rules are among the factors that impeded efficiency. Cost-effectiveness was assessed as low for three projects, including the largest project supported by NDAP's energy window, in Lithuania. However, in comparison with similar programmes, including EU-funded ones, no significant differences stand out.

Slightly less than one-half the projects faced challenges during their implementation. Barriers identified included (by order of importance): poor performance of contractors/subcontractors, administrative delays, the lack of technical capacities (internally or externally), difficulties linked to the implementation of procurement rules, contractual issues between contractors and subcontractors, compliance with evolving legislations, political shifts and lack of political support, and public resistance to the NPP closure.

Sustainability

The programme had some lasting effects on the energy sector in the three countries, including triggering subsequent projects in the energy sector, sometimes funded through private or national funds. Capacity-building benefits included new skills acquired within all types of organisations, from beneficiaries to ministries through implementing bodies. Development of SMEs through subcontracting was often a side benefit. Their involvement allowed them to develop new skills, notably in building refurbishment, that could improve their development. There were also positive, though short-lived, effects on the local economy, including employment. In terms of social inclusion, the programme provided social benefits and improvements in the local communities, notably in Bulgaria and Lithuania. The refurbishment of public and residential buildings, together with street lighting, has improved living and working conditions, has reduced the budget associated with the energy bills, and has lessened the sensibility to fluctuating energy prices. For private owners, the programme contributed to increase the market value of the renovated apartments.

Communications

Most of the supported projects included some communication activities, generally of a diverse nature, depending on the respective needs. These activities have included information boards of outdoor display panels, articles in the newspapers, organisation of or participation to local events, broadcast in TV programmes, organisation of or participation to national events and display on the website.

For some projects, communications activities were quoted a key success factor, for instance where public acceptance was identified as a major barrier. However, there are also a few cases in which almost no communication activities were undertaken, mostly because of limited project scope and budget.

Conclusions

NDAP intervention was judged to be both instrumental and timely in the three countries, as no other programmes could finance the scope and the volume of projects covered in the energy sector. The 'energy window' supported a different number and kind of projects in the three countries, representing different contexts, various needs and starting points, but also diverse demands from the new Member States and organisational preferences.

The programme contributed to effectively supporting mitigation measures along the energy value chain, according to national needs. It supported the modernisation of production capacities and the development of renewable energy sources. The programme contributed to building and modernising

energy networks, facilitating interconnexions and diversifying the energy mix. On the consumption side, it supported the refurbishment of hundreds of public and private buildings and thousands of households, the modernisation of district heating networks, the improvement of energy efficiency in the industry and the improvement of street lighting in 35 cities.

In terms of lasting effects, the programme contributed to improve the security of supply following the loss of nuclear capacities, to ensure reliable electricity distribution, to foster integration into the European energy market, to enhance energy diversification, and to improve energy intensity. It had other indirect effects, such as enhancing the reliability of power supply, the mitigation of the energy price increase[3] and the reduction of energy intensity, contributing to the competitiveness of local businesses. The programme also contributed to develop capacities in the three countries, leading to subsequent investments, including from private financing.

Lessons learnt and recommendations

Several lessons were learnt during the implementation of the Nuclear Decommissioning Assistance Programme (NDAP), and notably its 'energy window':

- The programme would have benefited from a well described definition of specific objectives, in collaboration with each Member States
- Projects would have benefited from a detailed monitoring framework
- The reliance on implementing bodies has been positive and contributed to capacity building

[3] In the energy sector, investments are generally reported to the end-consumer through price increases. Subsidies for energy generation and supply projects reduce energy prices for consumers, as it reduces the capital costs compared to financing using commercial loans from banks.

1 Introduction

In the wake of the 1986 Chernobyl disaster, a prerequisite for the accession of Bulgaria, Lithuania and Slovakia to the European Union was a commitment to prematurely close and subsequently dismantle their early Soviet-designed reactors. Three nuclear power plants with a total of eight reactors were concerned: Kozloduy (KNPP) units 1 to 4 in Bulgaria, Ignalina (INPP) units 1 and 2 in Lithuania, and Bohunice V1 (V1 NPP) units 1 and 2 in Slovakia.

From the early 1990s, the EU began to provide financial and technical assistance to partner countries in Eastern Europe and Central Asia via the TACIS[4] and PHARE[5] programmes. In 1999, the EU more specifically launched three Nuclear Decommissioning Assistance Programmes (NDAP) to help Bulgaria, Lithuania, and Slovakia with the closure and dismantling of the 8 nuclear reactors. Indeed, the early shutdown of these reactors, before the end of their design lifetime, represented a significant social, financial and economic burden for the three future Member States. Without covering the full cost of decommissioning nor the compensation of all economic consequences, the Nuclear Decommissioning Assistance Programme aimed to provide financial assistance to several types of projects, for a total EU NDAP support estimated at €3.8bn for the three countries between 1999 and 2020 (European Parliament, 2017):

- Decommissioning, dismantling and waste management projects;
- Energy-sector projects aimed at mitigating the consequences of reactor shutdowns (restructuring, modernisation and environmental upgrading of the conventional energy production, transmission and distribution sectors; enhancing the security of energy supply; improving energy efficiency, and developing renewable energies);
- Projects addressing the socio-economic consequences of decommissioning.

The NDAP covered two elements:

- The 'Decommissioning window', to support the safe decommissioning of the reactors subject to early closure;
- The 'Energy window', to support the implementation of mitigation measures in the energy sector such as replacement capacity, environmental upgrading, modernisation and energy efficiency.

This report is the final report produced under the framework of the ex-post evaluation of the nuclear decommissioning assistance programme – Energy Window 2007-2013. The evaluation was launched in mid-April 2018 and concluded in November 2018. The final report presents the methodology of the evaluation, as well as its results and findings. The report is structured as follows:

- A presentation of the objectives and the methodology of the evaluation. We present the overall intervention logic behind the programme when it was drafted;
- A detailed presentation of the 'Energy Window' of the Nuclear Decommissioning Assistance Programme;
- A section with country studies, where we present findings per country;

[4] Technical Assistance to the Commonwealth of Independent States, 1991 to 2006. This technical assistance programme was implemented by the European Commission to help members of the Commonwealth of Independent States (as well as Mongolia), in their transition to democratic market-oriented economies. TACIS included a component dealing with nuclear safety, which was replaced after 2006 by the Instrument for Nuclear Safety Cooperation.

[5] Poland Hungary Aid for Reconstruction of the Economy, 1990 to 2006. This programme was one of the three pre-accession instruments financed by the European Union to assist the applicant countries of Central and Eastern Europe in their preparations for joining the European Union. Two national programmes included projects related to nuclear safety (Czechoslovakia and Poland).

- A section on evaluation questions, where we present answers to each of the evaluation questions. The information collected is categorised under groups of questions (relevance, coherence, EU added value, effectiveness, efficiency, sustainability, communication) and sub-questions. For each answer, the source of our finding is indicated (literature review, stakeholder inputs);
- A section on conclusions, where key points and answers to the evaluative questions are provided;
- A section on lessons learnt and recommendations.

The report is supported by several appendixes (List of the supported projects, Evaluation matrix, Bibliography, List of interviewed stakeholders, Additional elements on the presentation of the energy window of the Nuclear Decommissioning Assistance Programme, Localisation of the supported projects in the three countries, Results of the survey with grant holders, Results of the survey with end-beneficiaries, Individual evaluation fiches of each supported project).

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2 Objectives and the methodology of the evaluation

2.1 Purpose of the evaluation

The objective of the study was to provide the Commission with an independent evaluation of the energy-related projects funded by the NDAP in Bulgaria, Slovakia and Lithuania in the period 2007-2013 ('Energy Window').

The evaluation notably considered and assessed:

- The results and impacts of the funded projects (e.g. new production capacity, modernisation of energy production, transmission and distribution, security of energy supply and diversification of supply, energy efficiency improvements);
- The efficiency and effectiveness of resource use;
- The European Union added value, with a focus on leverage to maximise impacts and support development in the energy sector (either at Union level or within the three MS).

The evaluation was undertaken in line with Article 34 of the Financial Regulation of the Commission, whereby evaluations must be performed in the case of significant expenditure.

The evaluation principally adopted a retrospective approach, including an assessment of supported projects to verify whether their objectives and expected results were or are met. This led to the formulation of findings, conclusions and lessons learnt presented in this report.

2.2 Scope of the evaluation

The evaluation of NDAP's Energy Window 2007-2013 covered projects and initiatives[6] funded through implementing bodies (European Bank for Reconstruction and Development, Central Project Management Agency) between 2007-2013 in Bulgaria, Lithuania and Slovakia to implement mitigation measures in the energy sector, such as replacement capacity, environmental upgrading, modernisation and energy efficiency. Two additional Lithuanian projects were added on top of the list of the Terms of Reference. One project occurred outside the given timeframe, and the other was a set of four sub-projects included in a wider decommissioning window project.

All projects are included in the scope of the evaluation, with a stronger focus on projects that terminated by the end of June 2018. The amounts presented in this report correspond to figures as of the end of June 2018. Indeed, although the funds were all committed before 2014, the implementation of the projects has been occurring over a larger period. A portion (about 20%) of the funds committed before 2014 is still being spent on ongoing projects.

The list of supported projects is enclosed in Appendix A.

2.3 Evaluative questions

The Terms of Reference (ToRs) of the evaluation listed 17 key questions (Table 3).

[6] For this evaluation, "project" corresponds to a grant agreement. In some cases, grants agreements were regrouped as they concerned different phases of a project. A "project" can include several sub-projects. The list of projects is in Appendix A.

Table 3: List of key evaluative questions

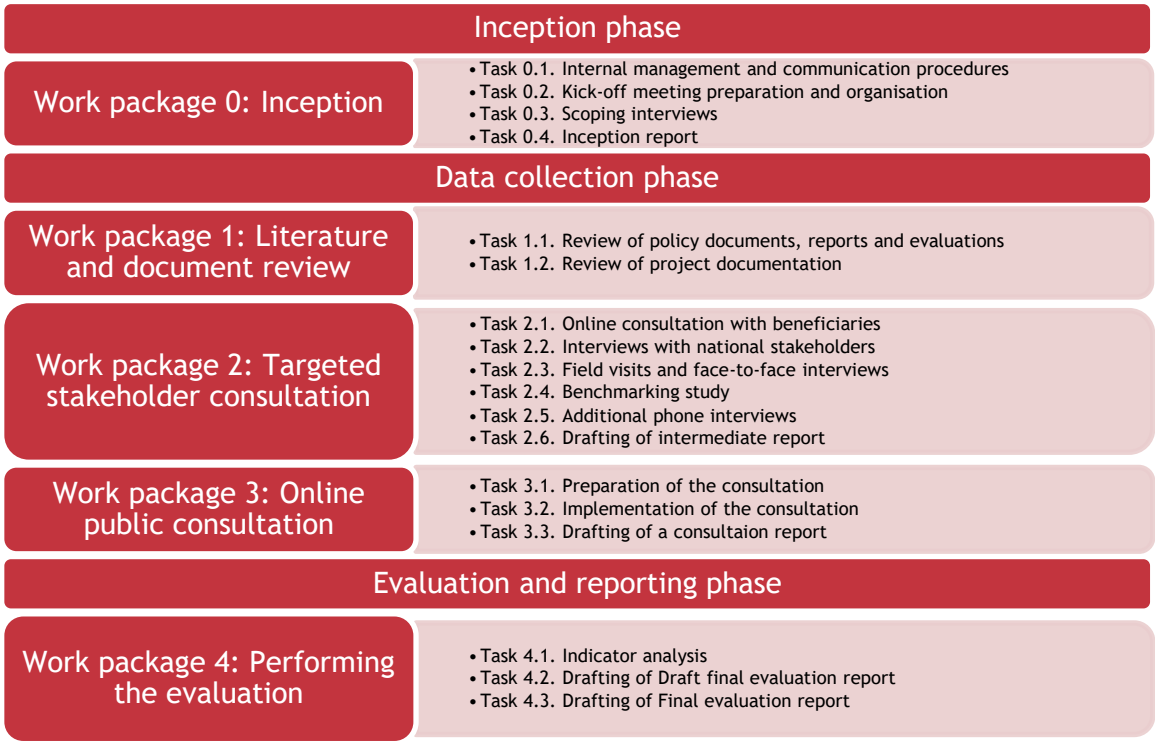
Area	Questions
Relevance	• KQ1: Building on the original objectives - i.e., – enhancing energy efficiency – enhancing security of supply – environmental upgrading in line with the acquis – modernising conventional production capacity – other measures which contribute to the necessary restructuring, environmental upgrading and modernisation of the energy production, transmission and distribution sectors – enhancing the use of renewable energy sources – was the intervention relevant? • KQ2: As the intervention is ongoing, are the original objectives still relevant?
Coherence	• KQ3: To what extent are the funded 'Energy window' projects coherent with the objectives set out in the Accession Treaties and subsequent regulations? • KQ4: To what extent are the funded 'Energy window' projects coherent with the EU acquis (energy policy of the EU), in particular in the areas of energy and environment?
EU Added-value	• KQ5: What identifiable added value has resulted from the Union assistance through this specific instrument?
Effectiveness	• KQ6: To what extent have the 'Energy window' objectives been achieved? What have been the quantitative and qualitative results of the intervention? • KQ7: How effective is the governance system? In particular does it allow to effectively, – a) prioritise measures with reference to the objectives for the 'Energy window'? – b) mitigate or avoid risk? – c) minimise or recover from delays? – d) overcome administrative bottlenecks? • KQ8: What factors influenced (positively and negatively) the progress of the 'Energy window' projects?
Efficiency	• KQ9: To what extent have the 'Energy window' projects been cost effective? In comparison with relevant industrial/infrastructural sectors and international experience, has this programme been efficient? • KQ10: With reference to the method of implementation, using the indirect management mode through the implementing bodies, is the management of the 'Energy window' efficient, i.e. – able to minimise external management costs? – able to ensure best value for money? – able to minimise administrative delays? • KQ11: What factors influenced (positively and negatively) the cost-effectiveness of the 'Energy window' projects? • KQ12: Is there evidence that the current co-financing arrangements have had a positive impact on the cost effectiveness of project management?
Sustainability	• KQ13: Has the intervention caused permanent changes/improvements in the national management systems related to the energy sector? • KQ14: Has the intervention supported development of SMEs either locally or at Union level? • KQ15: Has the intervention supported growth locally or mitigated negative economic conditions? • KQ16: How has the intervention impacted employment and social inclusion locally?
Communication	• KQ17: Are the communication actions addressed to the stakeholders and the public effective, adequate and accurate?

The evaluation matrix developed during the course of the evaluation is enclosed in Appendix B. This matrix elaborated on the key questions to define the indicators and the methods to be used to evaluate the programme.

2.4 Overview of the methodology

The evaluation was undertaken in three main phases and five work packages, as illustrated by Figure 1 below.

Figure 1: Overview of the methodological approach



The inception phase set the stage for the evaluation, with the analysis of the documentation and the development of the evaluation tools and templates. Scoping interviews were undertaken with officers from the European Commission and implementing bodies. A strategy for data collection, including on-site visits, was agreed during the inception phase.

During the data collection phase, the team performed a literature and document review. A repository of the projects was created in order to compile the data. Two online consultations were implemented, one with project managers in English, and one with end-beneficiaries in the three national languages. Indeed, in some cases, project managers were not the direct beneficiaries of the grant (e.g. credit line facilities). Interviews with national and regional stakeholders, implementing bodies, project managers and end-beneficiaries were conducted, partly on-site and partly by telephone, in accordance with the agreed selection of projects during the inception phase. To analyse the added-value of the programme and compare it to other financing mechanisms, benchmarks based on literature review and interviews were conducted. For each project, an evaluation fiche was drafted, to compile the data collected (Appendix C). A draft questionnaire for the online public consultation was also drafted.

The data collected to perform the evaluation thus originated from a range of sources, encompassing a critical reading of the available programme and project documents, consultation with officers from the EC and implementing bodies, surveys and interviews with key stakeholders (Appendix D). It involved

site visits to Bulgaria, Lithuania and Slovakia to evaluate a selection of the projects supported by the programme.

The last phase concluded the evaluation, with the drafting of the answers to the evaluative questions and the final report.

3 The 'Energy Window' of the Nuclear Decommissioning Assistance Programme

A thorough review of the different documents provided was conducted, in order to analyse the energy window in-depth. A repository of the projects was created to compile the information collected.

Until 2013, a portion of the assistance programme financing was allocated to the 'Energy window'. More than **€947m** had been committed to support **58 energy-related projects** (projects listed in Appendix A) seeking to achieve various objectives in Bulgaria, Lithuania and Slovakia, as stated in the Accession Treaties and associated regulation[7]:

- Environmental upgrading in line with the EU environmental acquis;
- Modernisation of conventional energy production;
- Contribution to necessary restructuring, upgrading of the environment and modernisation of the energy production, transmission and distribution sectors;
- Improvement of energy efficiency;
- Enhancement of the security of supply;
- Enhancement of the use of renewable energy sources (in Bulgaria only).

The funds were and, to some extent, still are, channelled through the European Bank for Reconstruction and Development (EBRD), for €902m in the three countries, and through the Central Project Management Agency (CMPA), for €45m in Lithuania only. Although no further project has been supported since 2014, there are still disbursements, as some projects selected during the 2007-2013 are still ongoing.

Relationship between the Nuclear Decommissioning Assistance Programme and the funds managed by the European Bank for Reconstruction and Development

The European Union and other contributors and donors established three funds at the EBRD in 2001: Bohunice International Decommissioning Support Fund (BIDSF)[8], the Ignalina International Decommissioning Support Fund (IIDSF)[9] and Kozloduy International Decommissioning Support Fund (KIDSF) [10]. The three funds cover both the decommissioning and the energy windows, and no clear distinction between the windows was made at set-up. For practical reasons, the need for distinguishing between the two windows grew in importance over time. It was decided that from 2014, only the decommissioning window would get additional funding.

Since 2008[11], only the EU continued to contribute to the IDSFs; as such, today, EU funds represent by far the largest share of total contributions. As at December 2017, the share of the European Commission in the three funds is:

- BIDSF: 98 % of the grand total, with a contribution of €642.3m;
- IIDSF: 96 % of the grand total, with a contribution of €745.8m;
- KIDSF: 99 % of the grand total, with a contribution of €1,030.06m.

[7] Treaty of Accession of the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia (2003). *Official Journal L 236, 23/09/2003 P. 0017 – 0930*. Protocols No4 and No9 concerned respectively the support to be provided to face the consequences of the early closure of the Ignalina nuclear power plant in Lithuania and of units 1 and 2 of the Bohunice V1 plant in Slovakia. For Lithuania, the objectives that could be addressed through the energy window were specified, while for Slovakia, they were specified in Council Regulation (EURATOM) No 549/2007 of 14 May 2007.

Treaty of Accession of the Republic of Bulgaria and Romania (2005). *OJ L 157, 21.6.2005, p. 11–395*. The article 5 indicates that support will be provided for the early decommissioning of the Kozloduy NPP, including the specification of the objectives that could be supported through the energy window.

[8] Besides the European Union, the other contributors and donors are (by alphabetical order): Austria, Denmark, France, Ireland, The Netherlands, Spain, Switzerland, United Kingdom.

[9] Besides the European Union, the other contributors and donors are (by alphabetical order): Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Luxembourg, The Netherlands, Norway, Poland, Spain, Sweden, Switzerland, United Kingdom.

[10] Besides the European Union, the other contributors and donors are (by alphabetical order): Austria, Belgium, Denmark, France, Greece, Ireland, The Netherlands, Spain, Switzerland, United Kingdom.

[11] Latest contributions: IIDSF – Poland and Luxembourg (2008), BIDSF - Ireland and France (2005), KIDSF - Belgium (2006)

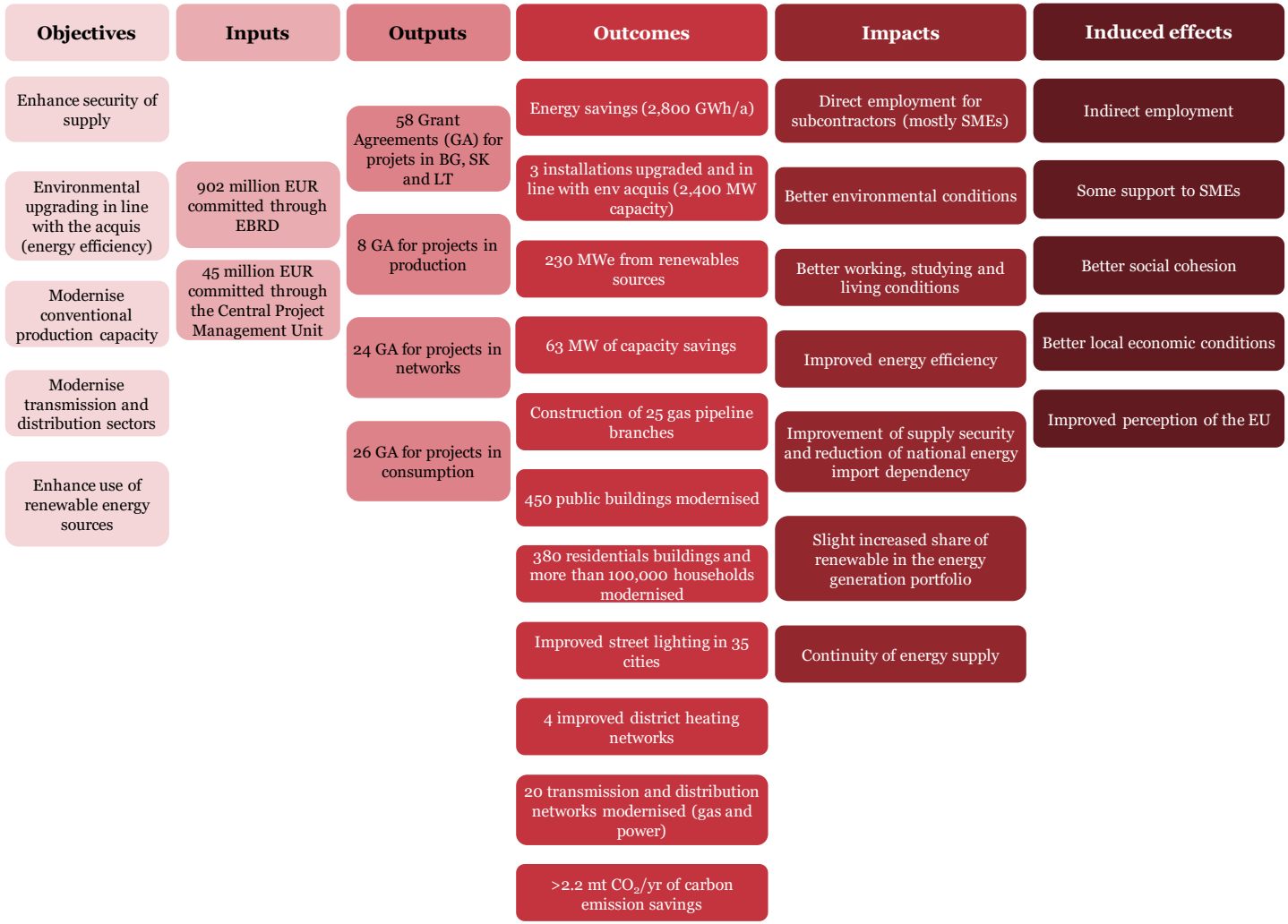
As the funds are granted by EBRD through BIDSF, IIDSF and KIDSF, it is not possible to identify the EU direct contribution to the supported projects.

Based on the documents available, intervention logics were drafted. Below is the intervention logic for the energy window of the NDAP programme, completed according to the investigations performed during the course of the evaluation. It is to be noted that the figures presented are to be used cautiously: some projects did not have a quantified monitoring of their results (and thus are not included) and they are uncertainties about the figures provided, as projects are still ongoing (real vs expected, assumptions and calculations used). The figures provide however an order of magnitude of the outcomes of the programme.

In addition, national intervention logics were also produced and are presented in section 4 of this report.

Figure 2: Intervention logic of the energy window of the NDAP programme

External factors: closure and decommissioning of eight Soviet–designed first generation nuclear reactors in three power plants: Kozloduy in Bulgaria (units 1 to 4), Ignalina in Lithuania (units 1-2, and Bohunice V1 in Slovakia (units 1-2)
Accession of BG, LT and SK to the European Union
National energy strategies



3.1 Analysis of the programme

3.1.1 Summary of key findings

The section below presents an overview of the programme, with more details in the four following sub-chapters. Further details are presented in Appendix E.

Number of projects

The energy window of the Nuclear Decommissioning Assistance Programme contributed to the funding of 58 projects (some fully funded, others partially funded).

Bulgaria represents the highest proportion of committed budget and the highest number of projects. For Lithuania and Slovakia, there are fewer projects, but with a more substantial average budget.

Sectors supported

The variance in the supported projects can be explained by the differences in the starting point and needs of the three countries. These differences were reflected by the type of projects supported by NDAP in each country. This support to various types of projects was allowed by the broad programme objectives. The energy window aimed at totally or partially fund the necessary energy investments due to the early closure, to enable the acceptance of the nuclear plant closures. As initial objectives and topics can overlap (e.g.: modernisation of a transmission line could account both for the modernisation of the transmission sector and for the security of supply), it was decided to characterise projects according to their position in the energy value chain: production / network / consumption.

In terms of budget allocation, production is the major category of the energy value chain supported by the programme, with €380m (40.6% of the committed budget). A single production project in Lithuania accounts for 67% of this share. The second category is networks, with 35.9% of the committed budget. The third category, consumption, accounts for 23.5% of the committed budget.

It is to be noted that some countries may have used other funds, including European funds, to implement projects in one or several categories of the energy value chain in addition to those of IDSF or CPMA. Further details are provided in the country studies (section 4 of the report).

Project duration and current status

On average, the project duration is five years, with projects ranging from less than a year to almost 13 years[12]. Most of the projects last either fewer than three years or for more than seven years.

Of the 58 energy-related projects supported by NDAP, 40 (69%) are completed and 18 are still ongoing. There is a risk that certain projects may not completed before 31 December 2019 as initially scheduled.

The completed projects represent 75% of the amount committed to grant by the programme. For these completed projects, the amounts eventually disbursed are 7% lower than the amounts committed (e.g. due to cheaper procurement than originally envisaged, cancelled projects etc.). The difference was returned to the country fund, to support other projects on the energy (EBRD, CPMA) or decommissioning (EBRD) windows.

The ongoing projects represent 25% of the amount committed to grants, of which 22% has already been disbursed. At the time of the evaluation, the maximum amount remaining to be disbursed is €188m,

[12] GA 005E in Lithuania - Lithuania Power Plant Environmental and Related Technical Upgrading

representing 20% of the overall NDAP commitment for energy related projects. It is likely that most of this budget will be spent.

Level of financing

Financing is channelled through implementing bodies. For each country, a specific fund was established, dealing both with the decommissioning and energy windows. These funds are largely funded by the European Commission (up to 98%), but also by other European donors. The amounts presented are those of the funds, and not solely of the European Commission.

The overall amount committed to grants represents more than €947m, with an overall level of NDAP committed financing of 50.4% compared to the overall budgets of projects. The level of financing differs from one project to another, from 13% to 100%. For completed projects, the final level of NDAP financing is 46% based on the disbursed amounts.

Overall, Lithuanian and Slovakian projects benefited from a higher level of financing from NDAP than Bulgarian projects.

For the three countries, the level of financing tends to decrease for larger projects. There is no clear correlation between the level of financing and the category of the project.

The average level of financing differs according to the type of organisation, with private stakeholders receiving a financing level which is far lower than public entities.

Grant consumption level

For completed projects, the level of consumption is high, with 86% in Bulgaria, 96% in Lithuania and 98% in Slovakia. Compared to the amount committed, the difference with disbursed amounts for completed projects represents 7% (€51m). The sums that were not disbursed were returned to the funds, to support other projects on the energy or decommissioning windows.

The level of grant consumption is lower in Bulgaria. It can be explained by the number of ongoing projects, and, in few cases, lower success than expected for various reasons (e.g.: delays, procurement, lack of capacities, regulatory barriers) or project abandonment (e.g.: GA 033A, a small hydro power plant).

Typologies of grant holders

The programme was geared towards public entities. Out of the 58 projects supported by NDAP, 53 projects (91%) are managed by public stakeholders: municipalities, ministries, national agencies, municipal and state-owned companies, although the beneficiaries can be private (e.g. apartment owners). These public sector-managed projects make up 99% of the total project budget and 99% of the budget committed to grants (€947m). The remaining projects are managed by private companies.

Grant amendments

About one-half of the grants were modified in Bulgaria, Lithuania and Slovakia. Most amendments were made to reflect minor changes in scope, timeline or budget, but some were made to reflect more significant structural adjustments. These amendments seem to have been made to adapt to the project cycle rather than correcting initial design issues.

Table 4 presents a concise overview of the programme.

Table 4: Synthesis per country of the total budget, the overall IDSF and CPMA financing level and the grant consumption for completed project

	Bulgaria	Lithuania	Slovakia	Total
Total number of projects	38	15	5	**58**
Of which on-going projects	*9*	*8*	*1*	***18***
Total budget for projects supported by NDAP	€932,097,794	€648,083,808	€300,522,293	**€1,880,703,895**
Total IDSF and CPMA budget committed to grant[13]	€401,439,510	€364,195,000	€182,035,127	**€947,669,637**
Of which on-going projects (% to budget committed to grant)	*€140,305,000 (35%)*	*€23,593,000 (6.5%)*	*€76,000,000 (41.8%)*	**€239,898,000 (25.3%)**
Of which amount already disbursed (% to budget committed to on-going projects)	*€39,356,550 (28.1%)*	*€10,874,236 (46.1%)*	*€1,677,703 (2.2%)*	**€51,908,489 (21.6%)**
Overall NDAP financing level	43%	56%	61%	**50.4%**

3.1.2 A programme nearing its end, but still ongoing

Although no funds were committed under NDAP's 'energy window' after 2013, a portion of the funds committed is still being spent on ongoing projects.

The table below presents the projects supported by the programme, according to their location, their status of completion and the amounts committed to grants and the amounts disbursed.

Table 5: Overview of the Nuclear Decommissioning Assistance Programme: number of projects in each country, NDAP committed and disbursed budget

Country	Number of projects	Budget (latest amount committed to grant by EBRD or CPMA, in € as at December 2017)	Disbursed budget (in €)[14]	Difference between amount committed and disbursed
Finalised projects				
Bulgaria	29	261,134,510	224,819,147	13.9%
Lithuania	7	340,602,000	328,162,318	3.7%
Slovakia	4	106,035,127	103,861,579	2.0%
Ongoing projects				
Bulgaria	9	140,305,000	39,356,550	71.9%
Lithuania	8	23,593,000	10,874,236	53.9%
Slovakia	1	76,000,000	1,677,703	97.8%
Total	**58**	**947,669,637**	**708,751,534**	**25.2%**

[13] According to latest communicated grant agreements. Details for each project can be found in Appendix I.

[14] According to latest communicated work programmes. Details for each project can be found in Appendix I.

Of the 58 projects, 69% were finalised at the time of the evaluation. For these 40 completed projects, the committed budget represented €708m (75% of the total amount committed to grants as of December 2017), of which €657m was eventually disbursed. Compared to the committed amount, it represents a difference of 7% (€51m split into €48.1m for EBRD projects and €2.9m for CPMA projects). This difference can be explained by several factors, including cheaper procurement than envisaged, or cancelled projects. The sums that were not disbursed were returned to the funds, to support other projects on the energy (CPMA, EBRD) or decommissioning (EBRD) windows.

18 projects are still ongoing, mostly in Bulgaria and Lithuania, for a committed amount of €240m. For these ongoing projects, €52m (22%) has already been disbursed. The remaining balance, representing the maximum amount remaining to be disbursed, is €188m. The target completion date is 31 December 2020. However, there is a possibility that certain projects may run beyond this date, notably in Bulgaria. Several factors lie behind these delays (e.g. GA 047: difficulty to implement the project during the Bulgarian presidency of the EU as the project requires extensive street excavation works; GA 049: complexity of rehabilitation; GA 057: duration of the environmental impact assessments).

3.1.3 The supported projects dealing with various topics according to national needs

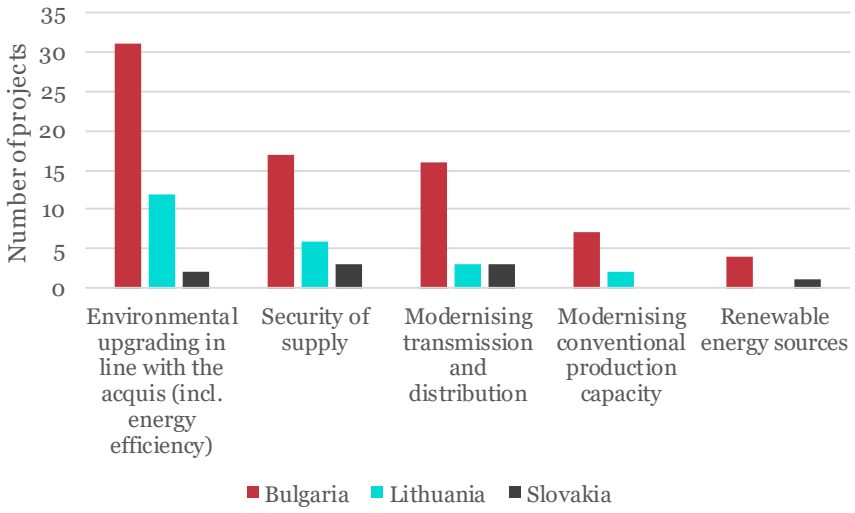
The figure below presents, for each country, a comparison of the NDAP budget (latest amount committed to grant) with the number of projects. The projects are classified according to five topics mentioned in the accession treaties:

- Environmental upgrading in line with the acquis (including energy efficiency);
- Modernisation of conventional production capacities;
- Modernisation of transmission and distribution sectors;
- Renewable energy sources;
- Security of supply.

It should be noted that some of these topics overlap. For instance, the modernisation of a transmission line could account both for the modernisation of the transmission sector and for the security of supply. Similarly, the upgrading of generation capacity could account for either environmental upgrading or modernisation of capacities. For the analyses conducted, we chose not to label each project in only one category, but to report all topics listed in the grant agreement. Some projects can thus belong to several topics, inducing multiple counting.

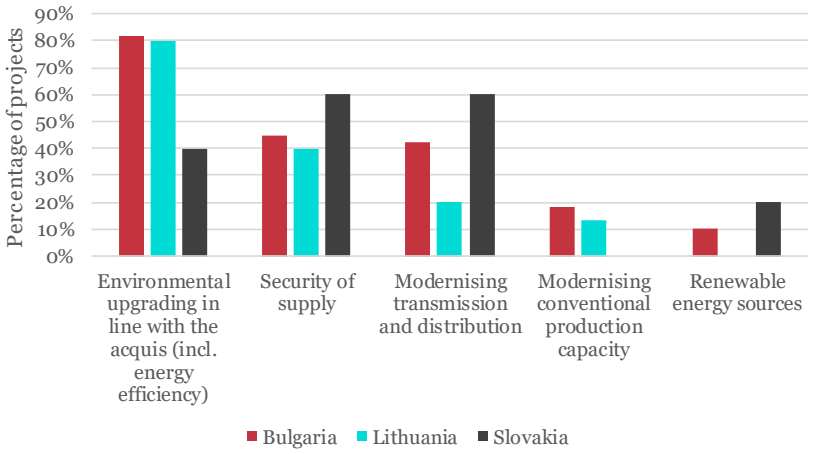
Figure 3 and Figure 4 present the distribution of projects supported per country according to the topics listed in the grant agreement. 78% of the supported projects list environmental upgrading (including energy efficiency) as an objective of the project. It is the most cited objective and is particularly important in Bulgaria and Lithuania. Security of supply is the second topic, with 45% of the projects listing it as an objective. In the three countries, the level ranges from 40 to 60%. With 38% of the projects, the third topic concerns the modernisation of transmission and distribution. Production, either through conventional or renewable capacities, is less prominent. Conventional capacities are more predominant than renewable capacities. Indeed, there are only two projects in the field of renewable energy in Bulgaria (primary objective for GA 033A and secondary objective for GA 049), as only the Bulgarian treaty of accession mentioned renewable energy sources. Nevertheless, two credit lines/facilities in Bulgaria and one in Slovakia also encompassed renewable energies.

Figure 3: Number of projects per topic, according the grant agreement



Note: projects can belong to several topics

Figure 4: National percentage of projects per topic



Note: projects can belong to several topics

Given that projects can be counted several times and thus to avoid overlapping, it was decided with DG ENER to represent the division of the budget according to the position of the project in the energy value chain: production, networks (electricity and gas) or consumption (including energy efficiency). The represented budgets refer to the International Decommissioning Support Funds (BIDSF, IIDSF and KIDSF) and CPMA contributions, originating largely but not only from the European Commission (see precision at the beginning of section 3).

Figure 5: Number of supported projects according to their position in the value chain

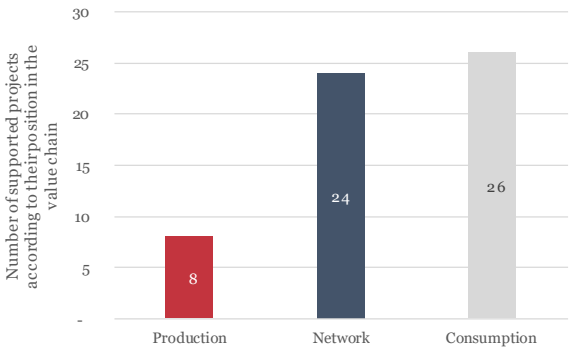


Figure 6: Total budget (left) vs committed budget (right) to supported projects according to their position in the value chain

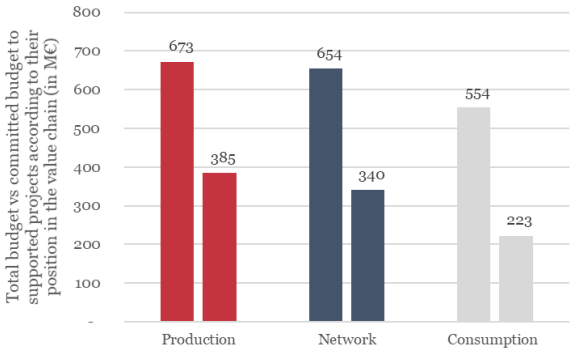


Figure 6 shows that the highest share of budget was committed to the production category (41%), followed by networks (36%) and consumption (23%). With €257m, one project in Lithuania (GA 005) accounts for two-thirds of the committed amount on production, and for more than one-quarter of the overall committed budget of the NDAP.

The two figures above clearly show that that there is no correlation between the number of projects and the associated committed budget. Indeed, the number of supported projects in the production category is the lowest compared to the two other categories, but the committed budget is the highest. It should also be noted that some of the supported projects mobilised a limited budget (e.g. some CPMA energy efficiency projects) or with a low level of financing by CPMA or ISDF (e.g. credit lines and energy efficiency facilities in Bulgaria).

The highest share of the committed budget was granted to production projects, with only 8 projects. On the other end, consumption accounted for 23.5% of the budget but 45% of the projects. The size of the projects explains the differences, with large projects in production (plant modernisations) and relatively small projects in consumption (notably energy efficiency). For networks, there are variations, as some projects are quite large, for example in Slovakia, while some others are more limited in size, in Bulgaria for instance.

Bulgaria represents the highest volume of committed budget and the highest number of projects. For Lithuania and Slovakia, there are fewer projects, but with a higher average budget (Figure 7, Figure 8).

Figure 7: Number of supported projects according to their position in the value chain per country

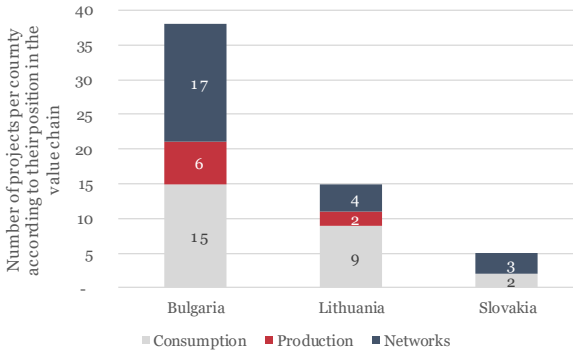
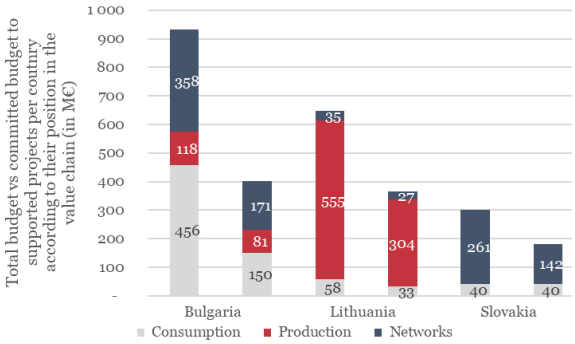


Figure 8: Total budget (left) vs committed budget (right) to supported projects according to their position in the value chain per country



It can be noted that supported projects have been focusing on different national priorities, according to various starting points and needs. In the three countries, these priorities are coherent and reflect the objectives of the accession treaties. Projects in Bulgaria target the whole value chain, with a stronger emphasis on the downstream part of the value chain (networks and consumption). In Lithuania, the

efforts were more oriented towards upstream (production), notably with the Lithuania power plant upgrading and modernisation (GA 005). In Slovakia, networks, notably transmission, took the largest share. In Slovakia, NDAP supported projects relating to energy transmission infrastructures (grid restructuring) with the objective to enhance security of supply. There had been discussions about the upgrading of two coal-fired power plants, but a cost-benefit analysis concluded that it would be more efficient to mobilise funds on energy efficiency projects.

The differences in terms of starting points and national needs were reflected by the type of projects supported by NDAP in each country. Indeed, the strategy of the programme was to provide incentives to support the necessary energy investment in the countries due to the earlier closure of nuclear plants, in order to enable the acceptance of these closures.

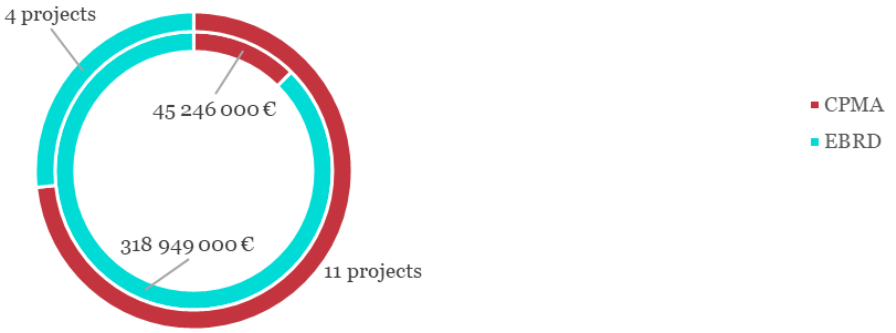
Renewable energies represent only €3m of the overall committed budget of €948m. This amount was eventually not disbursed, for technical reasons. This therefore means that no renewable energy project was directly funded through NDAP, as a specific grant agreement. Indirect financing occurred through the financial facilities, as some of them were initially designed to support both energy efficiency and small renewable energy projects (e.g. GA 006, GA 010 in Bulgaria, GA 011 in Slovakia). It is, however, to be noted that the rehabilitation of the hydro power plants (GA 049 in Bulgaria) had a secondary objective of facilitating the integration of renewable energy sources.

The case of Lithuania

In contrast to Bulgaria and Slovakia, where the EBRD has been the only implementing body for the energy window[15], the Lithuanian case was different as the Central Project Management Agency (CPMA) also participated in the implementation of the energy window.

Both CPMA and EBRD could address all topics covered by the programme. Although there was no written agreement for the distribution of topics, CPMA focused on energy efficiency, while EBRD covered other topics (modernisation of capacities, security of supply). As described in Figure 9, EBRD co-financed 4 projects for an NDAP budget of €319m, whereas CPMA co-financed 11 projects for €45m[16]. The average levels of financing were quite similar, with respectively 55 and 62%.

Figure 9: Distribution of projects and NDAP budget (latest amount committed to grant) per implementing body in Lithuania



[15] In Slovakia, the Slovak Innovation and Energy Agency (SIEA) is also an implementing body on the decommissioning window since 2016.

[16] Some of the projects were regrouped, as they were at different stages of the same project type (e.g. energy efficiency in public building in the three municipalities)

3.1.4 *Duration and completeness of projects*

On average, completed projects ran for five years, with projects ranging from less than a year to almost 13 years (Figure 11). Generally, for the whole programme, projects last fewer than 3 years or more than seven years. In Slovakia, projects duration is less than 6 years.

A comparison between the duration initially foreseen and the most up-to-date duration (figures below) shows that, other than for only six projects, the initial duration does not correspond to the final duration. However, this is quite normal, given the size and scope of the supported projects. The reasons for the delays in the project implementation are varied (e.g. procurement, lack of capacity). Details are provided in the individual fiches (Appendix I).

For larger projects, there is a correlation between the size of the project and its duration. Logically, larger projects tend to spread over longer periods.

Figure 10: Initial supported project duration as a function of the overall project budget

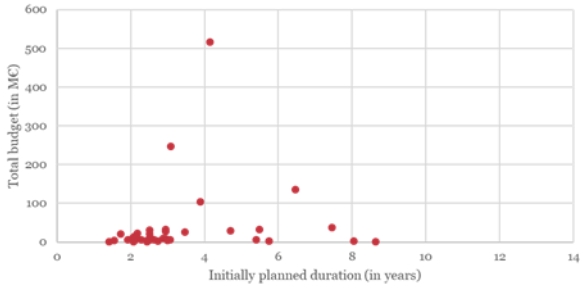
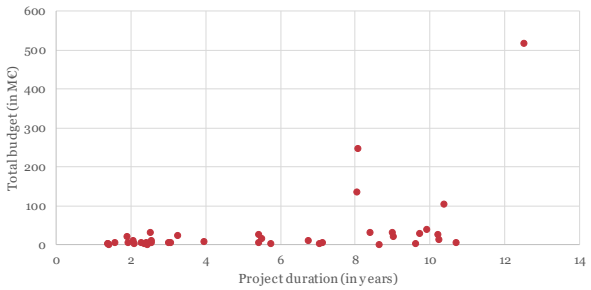


Figure 11: Latest supported project duration as a function of the overall project budget



For some projects (GA 020, 021, 022, 023, 024, 025 and 206 in Bulgaria and PI.06.02.01 in Lithuania), the initial duration is unknown. It was chosen to only report the final duration.

Details for projects under €50m are provided in Appendix E.

An analysis of the projects as a function of their status, position in the value chain and country was performed. To distinguish between finalised and ongoing projects, the hatched surfaces represent ongoing projects (showing the overall commitments, without taking into consideration the already disbursed amounts).

Figure 12: Number of supported projects according to their position in the value chain and to their status per country

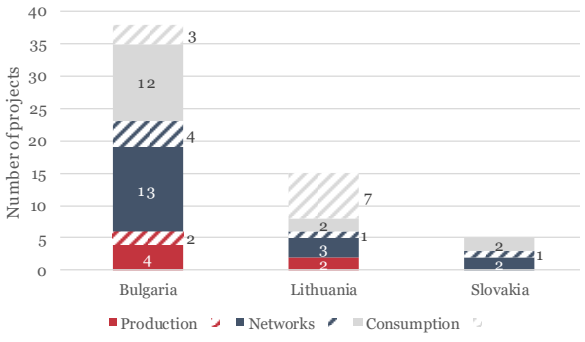
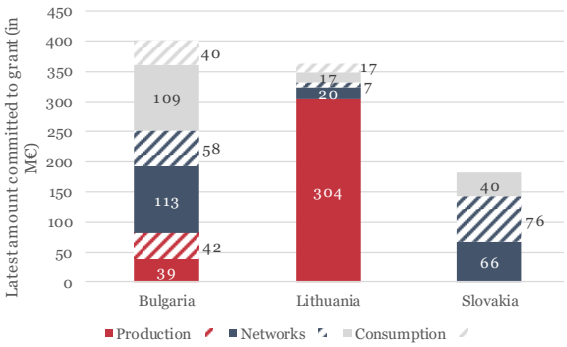


Figure 13: Committed budget to supported projects according to their position in the value chain and to their status per country



Appendix F presents the geographical location of the projects, according to their status and position in the value chain.

It can be noted that most of the ongoing projects focus on consumption (including energy efficiency). In terms of budget, the networks represent the highest share of ongoing projects, partially because of a Slovakian project.

40 out of the 58 projects are considered finalised. The completed projects represent 75% of the amounts committed to grant by the programme. For these completed projects, the amounts eventually disbursed are 7% lower than the amounts committed. The difference was returned to the different funds, to support other projects on the energy (before 2013) or decommissioning side.

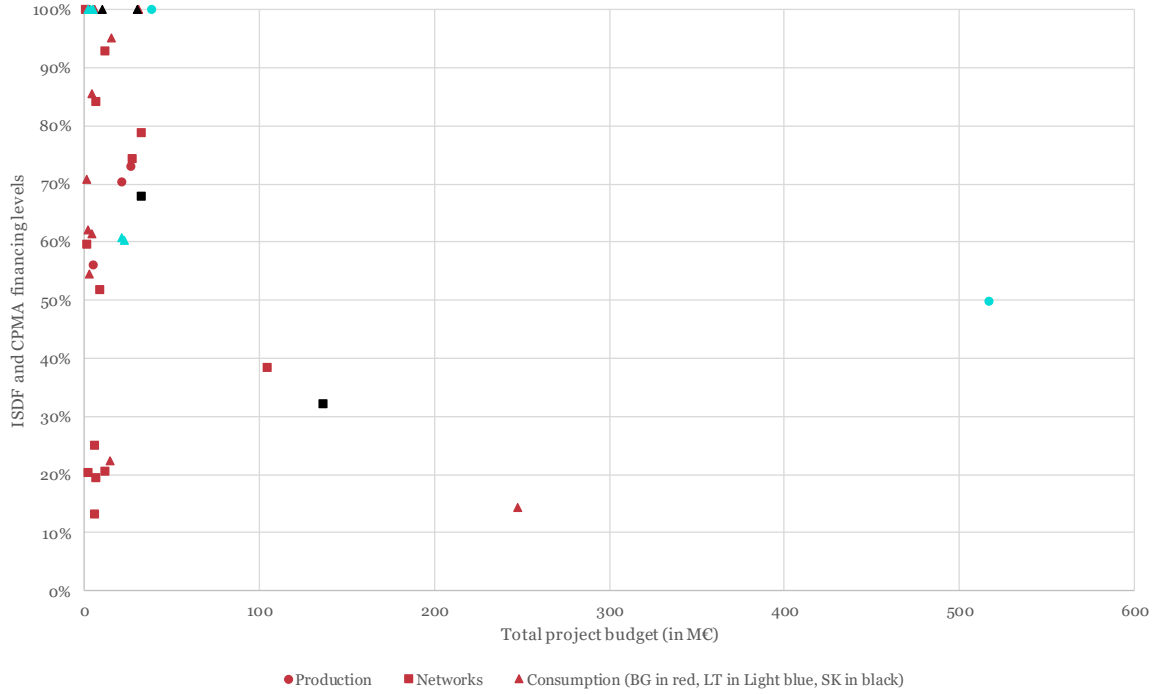
The ongoing projects represent 25% of the amount committed to grants, of which 22% has already been disbursed. At the time of the evaluation, the maximum amount to be still disbursed is €188m, representing 20% of the overall programme commitment. Bulgaria is the country which has the highest number of projects and highest committed budgets for ongoing projects.

3.1.5 *A programme providing a relatively high-level of financing, with a high level of grant consumption*

Overall, the energy window of the Nuclear Decommissioning Assistance Programme provided a level of (disbursed) financing of 46% for completed projects[17].

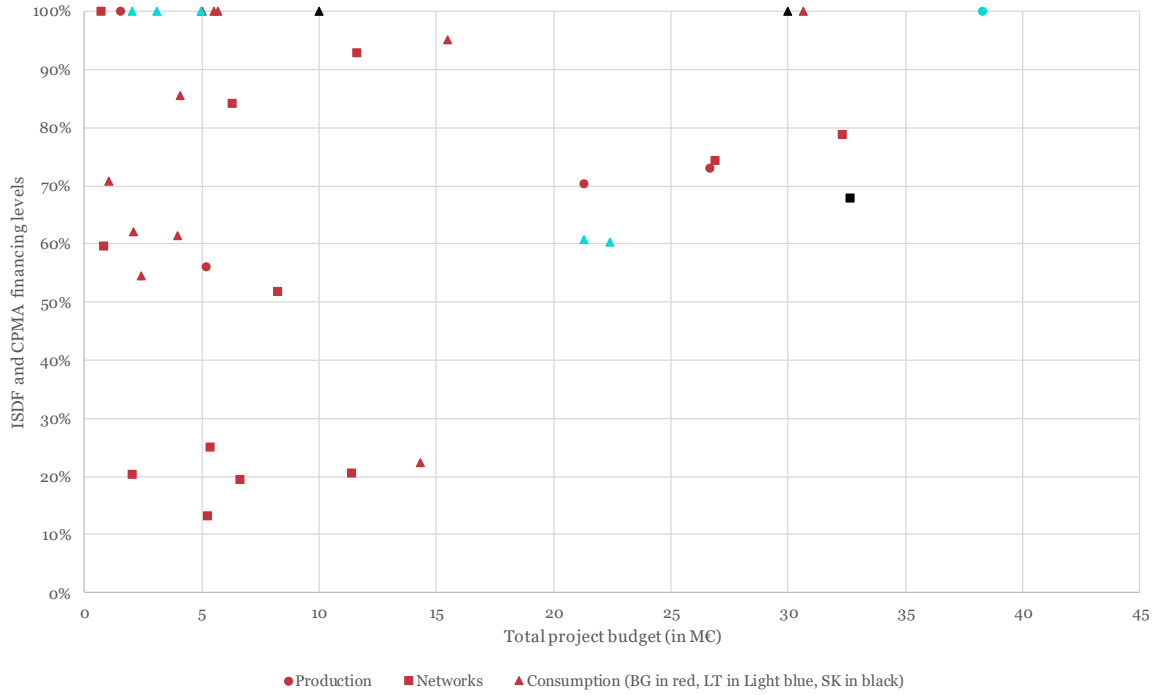
The figures below present the initial level of financing (from ISDF and CPMA) per completed project according to the overall budget, the position in the value chain and the location (Bulgaria is represented in red, Lithuania in blue and Slovakia in black). It does not consider the final level of financing, as the final budget is not always available.

Figure 14: Level of financing for completed projects in function of the project total budget, its position in the value chain and its location (BG in red, LT in light blue, SK in black)



[17] The analysis was only undertaken for completed projects as the final levels of both the budget and the co-financing are still unknown for ongoing projects.

Figure 15: Level of financing for completed projects of a total budget under 100 M€ in function of the project total budget, its position in the value chain and its location (BG in red, LT in light blue, SK in black)



The analysis shows that bigger projects (above €100m) have a lower level of financing by the programme, with a 50% rate at most. There is no clear correlation between the level of financing and the category of the project. Overall, Lithuanian and Slovakian projects benefited from a higher level of financing than Bulgarian projects.

Table 6 presents a comparison between the total budget for completed projects supported by the energy window, the overall level of financing by IDSF and CPMA and the level of grant consumption.

Table 6: Synthesis per country of the total budget, the overall IDSF and CPMA financing level and the grant consumption for completed project

	Bulgaria	**Lithuania**	**Slovakia**
Total project budget	€613m	€609m	€209m
Overall IDSF and CPMA financing level	43%	56%	51%
Grant consumption	86%	96%	98%

The comparison confirms that the overall level of financing is higher in Lithuania than in Slovakia and Bulgaria. This can partially be explained by a lower level of financing for certain types of projects supported in Bulgaria (e.g. credit lines, energy efficiency facility)

It can also be noted that the level of grant consumption is lower in Bulgaria. One explanation is that one project was eventually abandoned for feasibility issues (GA 033A, small hydro power plant), but the reasons behind a limited grant consumption level for a gas pipeline project (GA 014) are still under investigation.

Further details are presented in Appendix E.

3.2 Summary of the results of the surveys

This section presents the results of the surveys that were implemented during the evaluation. The full results are presented in Appendix G and in Appendix H.

3.2.1 Survey with grant holders

A survey with grant holders was undertaken. For each grant, one responsible person was invited. In total, about 65 people were contacted. A total of 55 people answered partially or completely (44 answers) to the survey. For a few cases, people from different organisations provided answers for the same project (e.g. financing facilities, with responses both from the Ministry and the Bank managing the facility). The response rate is very good, and the results can be considered reliable and representative.

The main findings of this survey are:

On relevance

- Projects contributed to several goals simultaneously;
- Two-thirds of the projects allowed for improved energy efficiency. For one-third of the respondents, the projects enabled the enhancement of security of supply and the upgrade of facilities in line with the EU energy and/or environmental acquis;
- For eight respondents (14.5%), the project aimed to modernise conventional production capacity and only 6 (11%) say that the project aimed to develop renewable energy sources;
- About one-third of the projects did not aim to enhance the security of supply, to upgrade facilities or to develop renewable energy sources.

On effectiveness and impacts

- The (expected) results are in line with the expectations, with 40% of the respondents indicating that the energy results are entirely in line with the expected objectives. In some cases, they are a bit lower (16%), but in other cases, results exceeded expectations (11%, in Bulgaria and Lithuania). Results are lower than expected mostly for projects related to consumption (e.g. energy efficiency), which could be due to an increased level of comfort compared to the initial situation. One respondent indicated that a project did not achieve the results due to contractual difficulties;
- About one-half of the respondents indicated that the objectives of the projects were quantified, but one-third indicated that they were not;
- More than one-third of the projects encountered challenges. Most of the challenges were met in Slovakia and Lithuania. The main problem cited is "technical issues" – 45% of the respondents who cite challenges refer to this. In almost all those cases, technical issues were paired with another type of challenge. The challenges differ depending on the country (e.g. social contestation in Lithuania, other delays than procurement in Bulgaria). The challenges encountered have generally been solved efficiently and satisfactorily;
- An experienced implementing body[18], good management structure, good project design and an experienced project manager were quoted as success factors across the panel of respondents, independent of country or type of project, with about one-half to two-thirds of respondents citing them. The four success factors seem to be the shared among countries. In addition, in Lithuania, the use of the procurement rules of the implementing body is often quoted, while public acceptance was key in Slovakia for the transmission projects;

[18] It appeared during interviews that this term was misunderstood by some grant holders, who confused it with the grant holder (=themselves). The number of identified cases remain however low.

- The governance system of the project clearly supported the projects in identifying risks and managing them, with 71% of answers being positive.

Efficiency

- According to a large majority of grant holders, the costs of the projects are commensurate with both the benefits (for 48% it is totally commensurate and for 34% to a certain extent) and with the costs of similar projects (for 44% totally and for 28% to a certain extent). Network and consumption projects rate the efficiency higher than production projects;
- In general, the efficiency factors mentioned in the survey (starting point, governance, project design, internal technical capacity, external technical support) seem to make the project more efficient. This is especially true for the external technical support for 76% of the respondents. Results are more balanced for the starting point, with 35% of the respondents considering it made the project more efficient, and 25% less;
- In general, the management structure of the programme is considered to be efficient, especially by respondents from Bulgaria. The majority of the respondents say the management structure makes it more efficient. The majority of respondents from Lithuania consider that the management structure of the programme was only efficient to a certain extent. Half the respondents from Slovakia consider the management structure of the programme (through the implementing bodies) has not been efficient;
- The majority of the respondents indicates that the management structure of the NDAP programme makes it more efficient. In descending order, the major factors are: the experience of the implementing bodies with similar projects (83%), value added of implementing bodies (69%), using different procurements (68%) and national coordination (60%). At the same time, the procurement makes the management structure of the NDAP programme less efficient according to eight respondents, as it generated some difficulties and delays.

EU added-value

- The respondents claimed that most projects would not have been implemented without NDAP support (40%), whilst 44% do not know if the project would have been implemented. The high level of uncertainty may originate from the non-decision-making position of the respondents;
- The majority of respondents indicated that if the project had not been funded by NDAP, there would have been impacts on the projects including: implementation delays, implementation being phased out over several stages, and a decrease of the project lifespan;
- Some respondents indicated that it would not have endangered the implementation of the project, with the use of alternative funding, mostly European or national public funding;
- The level of co-financing was appropriate, according to 80% of the respondents;
- When comparing NDAP to alternative financial mechanisms for similar energy projects, respondents considered overall that NDAP support was comparable to other programmes in the energy sector. NDAP performed better with regard to the level of co-financing (60%), but not so differently in all other aspects (flexibility, results, project implementation).

Sustainability

- Half of the respondents do not know if the project supported the development of SMEs locally. A third considered that the response is positive, and 16% considered that this was not the case;
- The projects seem to have had positive impacts on local employment, notably in Bulgaria and Lithuania. 46% considered it had a positive impact on employment, while 16% considered it had a negative impact. One in three who answered the question did not provide an opinion;

- Regarding impact on local social cohesion, two-thirds of the respondents did not provide an answer. 30% considered it had a positive impact, and 18% that it had a negative impact.

Communications

- The projects and their results have been actively communicated to stakeholders, with 82% of positive answers. There is no significant difference between the countries;
- The projects have mostly been communicated via newspapers and local events (respectively 88% and 76%). TV and national events have both been used by a bit more than one-third of the respondents. In Lithuania, social media was also a popular medium.

3.2.2 Survey with end-beneficiaries

As expected, given the difficulties to collect up-to-date contact details, the response rate to the survey is quite low, with 19 responses for more than a hundred persons invited to respond.

The findings are the following:

On relevance

- Projects funded by NDAP are globally relevant to the needs of end-beneficiaries. These projects, which are related only to energy efficiency, are defined as construction projects and financial facilities;
- For end-beneficiaries, the projects had a positive impact on energy efficiency, the costs of their energy bills and to increase their overall comfort.

On effectiveness

- All respondents indicated that the projects have achieved their objectives, with a vast majority stating the energy results are totally in line with the objectives or above. Only few indicated that the results are lower than expected, but none indicated that the project has not achieved its energy objectives;
- Most end-beneficiaries have been involved during selection and implementation processes, which has reduced redefining costs and delays. Some of the projects have faced technical issues, which were managed effectively;
- The degree of satisfaction is relatively high. End-beneficiaries are satisfied with the works and renovations realised by these projects.

On sustainability

- Local impacts are hard to define for end-beneficiaries. They considered that projects funded by NDAP have not particularly fostered local employment nor social cohesion.

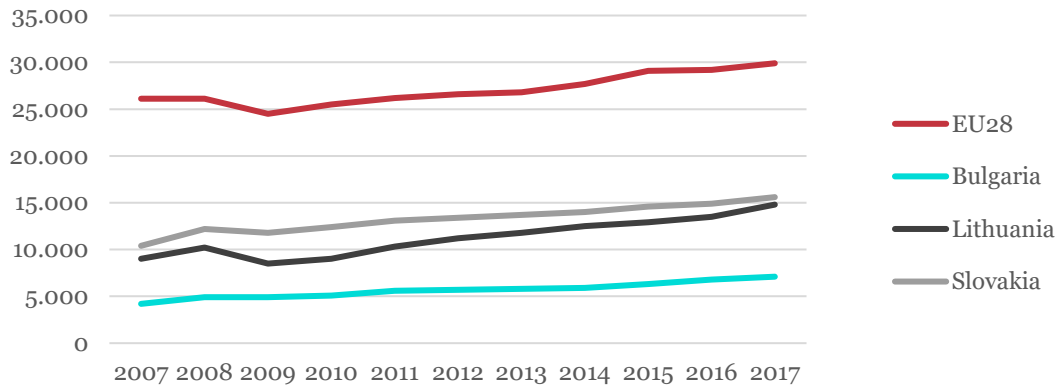
On communication

- End-beneficiaries are satisfied with the communication efforts surrounding these projects.

4 Country studies

At the time of accession to the EU (in 2004 for Lithuania and Slovakia and 2007 for Bulgaria), there were substantial differences in terms of growth between EU Member States and the three countries supported by NDAP. The three countries' GDP per capita has been well below the EU28 average. Figure 16 presents the evolution of the GDP per capita in Bulgaria, Lithuania and Slovakia in comparison to the EU28.

Figure 16 GDP per capita, €/cap



Source: Eurostat

4.1 Bulgaria

4.1.1 Context of the NDAP intervention

After the significant political changes which occurred in 1989, Bulgaria had to catch up economically in terms of decades of sluggish economic development, indebtedness and an outdated industrial economic infrastructure. Ever since, the Bulgarian economy has been growing at a steady pace, growth which was further fuelled by EU membership and associated funds. Nevertheless, because of the delay in privatisation reforms and due to its geographical position, Bulgaria has never become an industrial powerhouse. Currently, the Bulgarian economy is growing steadily (3.7% in 2017).

The population of Bulgaria was 7.13 million in 2016, dropping to 7.05 million in 2017. This is a significant drop from 1985 when Bulgaria reached 9 million inhabitants. Since 1989, the population has been falling at a fast pace painting a bleak demographic picture and impacting all sectors within the country. The massive emigration post-1989 (to Western Europe, the US, Canada and Australia), the low birth rate during the 1990s and the high mortality rate are the main reasons explaining this decline. The demographic trends have had a very negative impact on the economy (diminishing consumption, labour force shortage at times of economic uptake). The process of population ageing is also significant: at the end of 2017, the number of people aged 65 and over was 1,481,908, or 21% of the country's population (National Statistical Institute).

In terms of surface area, Bulgaria is a relatively big country by European standards with a surface of 110,994 km². With a population of barely over 7 million, almost 2 million of whom are concentrated in Sofia, the total population density of Bulgaria is rather low. Some regions, such as the North-West, are largely depopulated.

Energy sector

A recent analysis carried out by the European Commission[19] concluded that 'investments in the energy sector had been subdued' falling from 4.1% (as a share of the national GDP) in 2012 to 0.4% in 2015 and 2.6% in 2016. This is due to the poor performance and general shortcomings of state-owned enterprises which still account for 60% of the output of the energy sector (European Semester). The sector contributed 4% of the GDP and only 1% of employment. The drawbacks of state-owned enterprises in terms of governance are reflected by negative feedback from electricity and gas market consumers. Nevertheless, the EC report underlined the improved security of supply of the gas system through reinforcement of the internal grid, among others. Some of these improvements are directly due to the NDAP-funded projects. However, reforms are still necessary to improve security of supply and there is a huge potential for additional energy efficiency measures.

After the closure of Bulgaria's Kozloduy units (units 1 and 2 closed in 2002; units 3 and 4 in 2006), the share of nuclear energy in the electricity production fell from 47% in 2002 to 34% in 2007, from units 5 and 6 (Eurostat). Bulgaria is a net exporter of electricity (see figure below), and the concerned nuclear units were used mostly for export. The fact that Bulgaria is and should remain an important player in the Balkan energy market has been taken for granted by the country's political leaders because of long years of dominant position in the regional market. In this sense, the Kozloduy closures were not easy to face, with discussions in the parliament about reopening the plant up to 2015. Certain political parties consider that Bulgaria has been deprived of a part of its nuclear energy because of geopolitical reasons. Therefore, the construction of a second NPP (Belene) is still on the political agenda despite its significant cost relative to GDP.

Figure 17 Electricity balance of Bulgaria (in GWh)

Source: Bulgarian Statistical Institute

Energy intensity

Despite improvements, Bulgaria remains one of the most energy-intensive economies in the European Union. In 2016, the Bulgarian economy was almost four times more energy intensive than the Euro area countries (114.7 kilogram of oil equivalent per 1,000 EUR) and more than 50% more intensive than other Eastern European countries such as Czech Republic and Hungary. One of the main reasons for the

[19] SWD(2018) 201 final, Country Report Bulgaria 2018 including an in-depth review on the prevention and correction of macroeconomic imbalances

high energy intensity, especially in 1999, was the relatively high consumption of electricity by Bulgarian households for heating purposes because of delayed gasification and cheap electricity[20].

Figure 18 Bulgarian energy intensity (calculated as the ratio of the gross inland consumption of energy over GDP: kgoe/1,000 EUR)

Source: Eurostat

Another reason for the high energy intensity of the Bulgarian economy (associated with high GHG emission intensity), is the energy mix, whereby coal accounts for more than one-third of the primary energy mix. Some 70% of its energy demands are covered by imports of crude oil and gas from Russia, increasing the country's political vulnerability.

Although Bulgaria is well on track to reach its 2020 targets for GHG emissions reductions and increasing the share of renewable energy sources in its energy mix, the energy saving potential of the economy remains largely untapped (European Semester). As the construction of a second NPP is still on the political agenda, there is a risk that the abundance of relatively cheap energy (often inexact due to the lack of accounting for decommissioning costs) would negatively impact the efforts to improve energy efficiency and to better develop renewable energy sources.

Table 7 provides an overview of the evolution of some relevant energy indicators for Bulgaria between 2002 and 2016. In 2002, the total primary energy production in Bulgaria was 10.55 Mtoe, out of which nuclear electricity production constituted 1.7 Mtoe. In that year, nuclear electricity generation represented a share of 47% of gross electricity generation in Bulgaria, dropping slightly to 41% in 2003 (the year after decommissioning of KNPP units 1 and 2), and decreasing again to 34 % in 2007 after the decommissioning of KNPP units 3 and 4.

Despite the energy dependence of Bulgaria being relatively high, it is lower than the EU average (37.8% versus 53.2%). Lignite coal and nuclear energy are considered a local source, although nuclear fuel is imported. Energy dependence has decreased, from 45.1% in 2009 to 37.8% in 2013, mainly due to increases in renewable energy sources (Eurostat).

[20] National Energy Strategy, 1999

Table 7: Overview of relevant energy indicators in Bulgaria

Indicator/ year (thousands TOE)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Primary production[21]	10,559	10,141	10,227	10,599	10,983	9,867	10,178	9,716	10,477	12,256	11,679	10,548	11,263	11,986	11,218
Total gross production electricity	3,670	3,663	3,579	3,815	3,948	3,723	3,872	3,694	4,011	4,368	4,070	3,765	4,083	4,233	3,893
Gross elec. generation plants - Nuclear	1,739	1,486	1,446	1,604	1,676	1,259	1,355	1,319	1,311	1,403	1,357	1,218	1,364	1,323	1,356
% share elec. generation nuclear	47%	41%	40%	42%	42%	34%	35%	36%	33%	32%	33%	32%	33%	31%	35%
Gross inland consumption[22]	18,695	19,296	18,940	197,754	20,399	20,037	19,926	17,504	17,774	19,095	18,233	16,756	17,744	18,511	18,128
Final energy consumption	9,085	9,764	9,700	10,186	10,501	10,341	9,982	8,598	8,843	9,262	9,240	8,778	9,012	9,508	9,663
Final Energy Consumption electricity	2,071	2,161	2,145	2,211	2,3617	2,366	2,467	2,314	2,337	2,446	2,397	2367	2,385	2,437	2,488

Source: Eurostat, 2018

4.1.2 Overall NDAP intervention

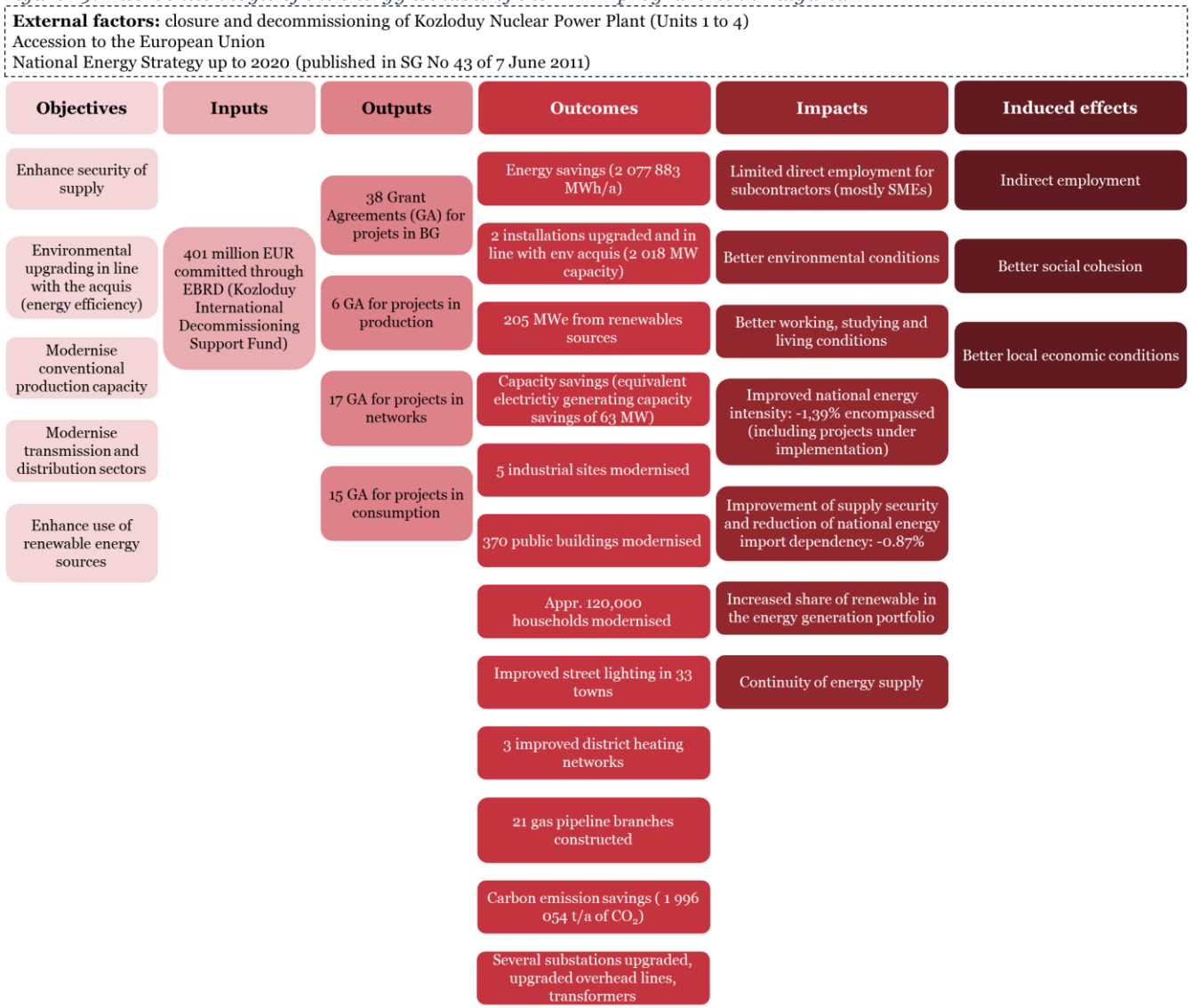
The figure below shows the intervention logic of the NDAP in Bulgaria.

Outcomes are partly estimated as data are not available in all detail, which can explain differences with the Adelphi report (in terms in carbon emission savings in particular). Monitoring of quantitative indicators was not set for all projects. Some of the indicated results originate from the national evaluation report.

[21] Primary production is any kind of extraction of energy products from natural sources to a usable form. It takes place when the natural sources are exploited, for example in coal mines, crude oil fields, hydro power plants or fabrication of biofuels.

[22] The gross inland consumption of energy is calculated as the sum of the gross inland consumption of five energy types: coal, electricity, oil, natural gas and renewable energy sources.

Figure 19: Intervention logic of the energy window of the NDAP programme in Bulgaria



4.1.3 Relevance of NDAP

The Bulgarian Nuclear Power Plant followed Soviet designs, with six VVER-type reactors. In the years prior to the closure, a conclusion was made by international experts from the Western European Nuclear Regulatory Association that units 1-4 could not reach appropriate safety levels. Against the background of the approaching accession of Bulgaria to the EU, the government agreed to close units 1-4. In November 1999, the Bulgarian Government and the European Commission signed a Memorandum of understanding in which the Bulgarian Government undertook a firm commitment to close and decommission Units 1 – 4.

In exchange for the closure and the loss of 1750 MW of energy widely perceived as relatively cheap (often inexact due to the lack of accounting for decommissioning costs), in addition to the associated energy price increase, the Bulgarian government negotiated an assistance programme to compensate the closure of the units and mitigate the negative impact on the energy system in terms of energy price and available capacity.

The support fund KIDSF was established at the EBRD in June 2001. The Framework Agreement between Bulgaria and the EBRD was ratified by the Bulgarian Parliament and about €1bn has been contributed to the fund, largely by the European Commission, as well as by Austria, Belgium, Denmark, France, Greece, Ireland, the Netherlands, Spain, Switzerland and the United Kingdom. A subsequent Financing Agreement was signed on 25 September 2006 on the PHARE Special Programme to support the decommissioning of nuclear power plants and consequential measures in the energy sector in Bulgaria.

Relevance to country needs and National Energy Strategy priorities

With the removal of capacity production representing 20-25% of the national production capacity, the overall relevance of the NDAP funding in the energy sector is high. The supported energy projects were in line with the National Energy Strategy (1999) which acknowledged the limited investment capacity of the Bulgarian government and included the following lines of reform[23]:

- Reduction of dependence on imported fuel from Russia;
- Reduction of the energy intensity of the economy through investments in energy efficiency;
- Support for demand-side management projects with a significant social effect;
- Use of local renewable energy sources (RES);
- Improvement of the security of supply through "investments in the reduction of transmission, distribution and end losses of electricity and heat, as well as for better efficiency and extended life cycle of the key power plants and thermal power plants".

It is also recognised in the Strategy that "efforts to ensure security of supply can be successful only if they are accompanied by an energy-saving policy".

The projects funded by KIDSF responded to the priorities outlined in the National Energy Strategy and addressed both the supply (through production and transport) and the demand side. Both types of interventions were very much needed at the time of the signature of the agreement in 2001 and have continued to be relevant ever since despite the positive impact of the NDAP.

Currently, the supported projects are in line with Bulgaria's third National Energy Efficiency Action Plan (NEEAP) 2014-2020 adopted following the EU Climate and Energy package, whose main objectives are to increase energy efficiency by 25% and to reduce energy intensity by 41%. They are also in line with the Bulgarian National Energy Strategy running until 2020. Its main goals are very similar to those of 1999, including guaranteeing the security of energy supply; attaining the targets for renewable energy;

[23] National Strategy for Energy Sector and Energy Efficiency Development till 2010,

increasing energy efficiency; developing a competitive energy market and policy to meet energy needs; and protecting the interests of consumers.

The investments supported by NDAP have contributed to the needed improvements of the energy sector, by targeting different topics. The main replacement of **generating capacities** were lignite-fired Maritza Iztok-2 and hydropower complex Belmeken-Sestrimo-Chaira securing the peak-hour load. In terms of **power transmission,** the impact of the Kozloduy NPP closure was a shifting of the power generation centre from north to south-east, hence the necessity to reinforce power distribution infrastructure in the region. The rationale of the increase of **natural gas transmission and generation** was straightforward as it acted as a mitigation measure following the unit 1-4 closure. This is a mitigation measure as the assumption was (and it held true) that many consumers which used electricity previously would switch to natural gas. On the demand side, NDAP supported projects to improve **energy efficiency in public buildings** (including monitoring), in **street lighting** and in **district heating** (adelphi).

Alignment with other strategies, action plans and laws

The types of interventions and the projects were in line with the National Energy Strategy, the National Long-term Energy Efficiency Programme for the period 2005-2015 (2005), the National EE Short-term Programme (2005), the Energy Efficiency Act (1999) but also in line with Bulgaria's Kyoto commitments and the Emission Trading System (ETS). In 2004, the Bulgarian Government approved a strategy document "Implementation of the Strategy in the Energy Sector for mitigating the negative economical, ecological and social consequences of the early closure of VVER-440 units of Kozloduy NPP in the non-nuclear sector". Several areas in the energy sector have been identified for KIDSF support[24]. According to the national Energy Efficiency Law, there is also the obligation for public authorities to renovate public buildings based on the findings of the energy audits.

The construction of Plovdiv-Maritsa Iztok high-voltage electricity line within project 036B (Energien Sistemen Operator) was of European interest and in line with the EU energy distribution architecture (included in lists 204, 16, 18). This is the reason why the project had access to the Connecting Europe Facility (CEF), as it was included in national and EU plans.

All projects are assessed by the evaluators' team as relevant.

4.1.4 Functioning of NDAP (governance, decision process, national strategies)

KIDSF was established in June 2000 through a financial memorandum signed by the European Commission and the Bulgarian government. KIDSF is governed by an Assembly of Contributors, providing strategic guidance. Currently, NDAP is implemented through an indirect management mode with an implementing body (EBRD). The EBRD has been appointed as a manager of the fund and has several tasks in line with KIDSF rules. The rules stipulate that the Assembly of Contributors keeps control over the selection of the projects proposed by the country and receives regular progress reports from the management of the Fund. The EBRD prepares reports and technical documentation, including an Annual Report on the operation of the Fund providing an overview of the implementation of the Fund's work programme[25]. The European Commission retains control with regard to the selection of projects and receives regular progress reports from the Fund's management through its participation in the governing body of the Fund.

Within the 'Energy window', KIDSF supports renewable energy and energy efficiency projects in Bulgaria in three forms:

[24] https://www.me.government.bg/en/themes/kozloduy-international-decommissioning-support-fund-kidsf-905-348.html

[25] Financial Memorandum between Bulgaria and the European Commission from 25.01.2001

- Pure grant financing: mainly assistance in pilot, demonstration projects such as energy efficiency in public buildings;
- Co-financing: assistance in large rehabilitation projects which would not have taken place without the KIDSF (Sofia district heating, Pernik district heating);
- Blended financing (EBRD energy efficiency credit line facility; EBRD residential energy efficiency credit line facility).

In line with the rules, the Fund applies EBRD's Procurement Policies and Rules. The governing bodies of the fund and the fund manager must maintain close links with national entities engaged in pre-accession assistance and the implementation of the National Energy Strategy. These include the Council of Ministers of Bulgaria, the State Agency for Energy and Energy Resources, the Committee for Peaceful Use of Nuclear Power, the State Energy Regulation Commission, the State Energy Efficiency Agency and the National Electricity Company (NEK).

The Ministry of Energy[26] has been the Bulgarian government counterpart of the EBRD. In 12 of the projects, the Ministry of Energy has been the official grant holder. For the others, they have had a role described by the ministry as an 'unofficial monitoring role'. Several experts have been in charge of the projects on behalf of the Ministry of Energy, of whom only two are still working in the Ministry. With regards to governance, an expert from the Ministry of Energy shared, with hindsight, that the fact that a Project Implementation Unit (PIU) was not established was a mistake. A PIU would have made responsibilities much clearer.

External consultants have been assigned by the Ministry of Energy in evaluation of offers and preparation of tendering documents which has proved a highly efficient approach.

With regards to project selection, three-fifths of the survey respondents were satisfied or very satisfied with the process, while five respondents were only moderately satisfied and three had no opinion.

4.1.5 Articulation of NDAP with other funding schemes (EU and national)

The following sources of funding for similar types of activities have been identified through interviews and desk research.

EEA grants are provided by Norway, Switzerland and Liechtenstein and amount to €13.3m for the 2014-2021 period. For Bulgaria, the EEA grants support the promotion of energy efficiency and renewable energy measures in municipal and state buildings and local district heating (e.g. changing of fuel and boilers, replacement of heating installations and systems), as well as increasing the administrative capacity on energy efficiency and renewable energy[27]. The particularity of EEA funding is that it has built upon NDAP-funded renovations and is therefore complementary to NDAP. For example, after the NDAP-funded renovation of schools in Burgas, the replacement of the oil boiler with a pellet boiler was funded by EEA grants. For Plovdiv municipality, solar panels were installed at kindergartens already renovated with NDAP funds. For Sofia Municipality, heating pipes and radiators were replaced with EEA support, but one clear pre-condition was that the buildings had been previously renovated and insulated within the NDAP-funded projects.

The **European Structural and Investment Funds (ESIF)** have been available in Bulgaria since its accession to the European Union in 2007. Between 1989 and 2007, these had been preceded by PHARE which was the Instrument for Pre-Accession (IPA). Since that time, there have been two programming periods – 2007-2013 and 2014-2020. Energy efficiency measures in public buildings and SMEs have been included within the ESIF Operational Programmes in both programming periods. For the 2007-2013 period, this happened under the OP Regional Development and OP Competitiveness. For the 2014-2020 period, energy efficiency measures for SMEs are funded within OP Innovation, whilst

[26] The name of the ministry has changed under the different governments.

[27] https://eeagrants.org/programme/view/BG04/PA06

Competitiveness managed by the Ministry of Economy and energy efficiency of buildings are funded within OP Regions in Growth managed by the Ministry of Regional Development.

When comparing ESIF financing with NDAP financing, we observe that for bigger municipalities (i.e. Burgas), NDAP provided 50% of co-financing versus 95% of co-financing for ESIF funds. Whilst in a certain sense NDAP complicated the situation for these municipalities as it obliged them to seek additional funding, NDAP nevertheless had its advantages and was highly appreciated. NDAP funding arrived earlier and, in a way, initiated the activities related to the energy efficient renovation of public buildings. The administrative burden associated with the NDAP programme was lower. For smaller municipalities, NDAP provided 100% financing which makes it more favourable than ESIF in financial terms. Additionally, the overall ESIF envelope for energy efficiency renovations in public building has been assessed as insufficient by municipal stakeholders, although the exact numbers are not readily available.

Energy Efficiency and Renewable Energy Fund was established in 2004 through the Energy Efficiency Act. Its initial capital came through grant funds from major donors. It provides loans to municipalities, corporate clients and individuals with an interest rate varying between 4% and 7% and a maximum tenor of 7 years. The beneficiaries' minimal participation is 10%. The financing for municipalities varies between 27,000 and 800,000 BGN (€13,700 to €410,000) while financing for corporate clients and individuals vary between 800,000 and 2.7 million BGN (€410,000 to €1.38m)[28].

National Trust Eco Fund (NTEF) was established in 1995. It manages funds from the State budget as well as funds from Assigned Amount Units (AAU) international trade deals, the sale of GHG emissions quotas for aviation activities, as well as funds provided by other environmental protection agreements between Bulgaria and international or local financing sources[29].

According to one municipality, the energy efficiency renovations funded by the NTEF are addressed at smaller sites: smaller schools and kindergartens. The waiting list can also be particularly long. However, stakeholders at another municipality shared that the NTEF-funded renovations in 8 big schools namely projects in gasification and then insulation. The co-financing share (85%) was bigger than that of NDAP, however the implementation was more bureaucratic, and they had to change the categories of the sites to comply with NTEF rules. Implementation took longer, and projects started before KIDSF projects and ended after them. The conclusion is that the NTEF intervention is, on the one hand, targeting sites of different sizes and, on the other hand, more bureaucratic than NDAP.

The **National Programme for Energy Efficiency in Residential Buildings** is not relevant in this case as only energy efficiency in residential buildings is funded. During the evaluation, a lack of organisation at the level of buildings was reported, as the existence of a home owner association is not compulsory by regulation. The supported-projects initially focused on individual housings.

In terms of comparison to other sources of funding, KIDSF is targeted on the longer term, more comprehensive and covers the whole energy system. The Ministry of Energy expressed regret at the prospect of stopping the programme, as "there is nothing to replace it and this is the only fund they are managing". The only funding source left would be the EEA grants for energy efficiency of buildings. Similar regrets have been expressed by interviewees within municipalities. There are only a few options left for municipalities, especially smaller ones whose scarce budgets limit their investment capacities:

- ESIF funds: the available funds have been estimated as insufficient by municipal stakeholders and the administrative burden has been estimated as being higher;
- National Trust Eco-Fund: there is a big backlog of projects which are waiting to be financed;
- Loans: many of the municipalities have already reached their level of indebtedness.

[28] https://www.bgeef.com/en/financial-products/loans/

[29] http://ecofund-bg.org/en/about-us/

It is also worth mentioning that within project 036B Construction of a new 400 kV power line TPP Maritsa Iztok 2 (s/s M1) – s/s Plovdiv with Energien Systemen Operator as beneficiary some additional funding was negotiated with Connecting Europe Facility (CEF) as the project is of common European interest (more details on the CEF is provided in the national report for Slovakia). According to the beneficiaries, the two types of funding are complementary.

4.1.6 EU added-value (both financial and non-financial)

Most of the interviewed stakeholders shared that the projects funded by KIDSF would not have happened if the NDAP funding had not been available. The projects would have been realised but over a much longer timeframe and would have led to unintended consequences, such as further increases in electricity prices (e.g. Energien Sistemen Operator, Sofia district heating network). Prices would have increased as the investments would have come from their own funds which would have inevitably been reflected in prices for the end-consumer.

The NDAP funding also came at a time in 2001 when energy efficiency was not high on donors' agenda and the Structural and Cohesion Funds were not yet available.

Project 036 B Plovdiv-Maritsa Iztok high-voltage electricity line would have happened even without NDAP, but over a much longer timeframe. It was also calculated that if the investment had been made with own funds, electricity prices would have increased by 18%. The project also had social benefits for Greece leading to a 10-12% decrease of electricity prices.

The energy efficiency and renewable energy facilities projects would not have occurred without NDAP support. These were initiated exactly at the point when the market needed additional incentives. The technical assistance which accompanied the projects was of particular value.

4.1.7 Results of the programme

Effectiveness

Overall, the programme has been positively assessed as having a comprehensive coverage. The programme has brought very significant and noticeable improvements within the energy sector.

The NDAP has had notable impacts on the following sectors:

- Production, through the modernisation of power generation and alignment of the Maritsa 2 Thermal Power Plant (TPP) (1,465 MW) with the EU acquis;
- Networks, through the construction and modernisation of both power and natural gas transmission and distribution networks;
- Consumption, through improved energy efficiency in district heating, public and private buildings and street lighting.

Two-thirds of the Bulgarian respondents to the survey replied that the results of the projects were in line with the expected objectives while one-third thought the results exceeded the initial objectives.

The main issue related to measuring the specific quantitative impact of the project is the lack of monitoring framework. Only in a few rare cases could end-beneficiaries communicate to the evaluators the specific impacts of the projects in terms of energy efficiency improvements, savings and GHG emissions reductions. It is worth noting that more than one-half of the respondents of the survey answered that the project objectives were quantified. However, an overwhelming majority of the interviewees could not quantify the results as this was not requested by the EBRD nor the Ministry of Energy. Further, post-project energy audits have not been conducted for most sites. To mitigate this shortcoming, a corrective measure was however taken, with a national evaluation (adelphi/BGC 2018).

Efficiency

NDAP efficiency has been assessed as high by all interviewed stakeholders, an assessment concurred by the evaluators. 16 out of the 28 respondents to the survey assessed the costs of the projects as commensurate with the benefits achieved, while 6 thought that this was the case only to a certain extent. Most of the respondents considered the costs of the projects to be commensurate with the costs of similar projects. Communication and coordination with the EBRD have been very efficient and smooth. EBRD is regarded as a very good and understanding partner by all interviewed stakeholders in terms of response time, flexibility and adaptability. The majority of the survey respondents shared this opinion. For instance, feedback from EBRD has been much quicker than feedback from the Bulgarian Managing Authorities. Reports to the EBRD have been approved faster than reports to ESIF Managing Authorities and other donors which meant a lower administrative burden for the beneficiaries.

The use of the EBRD Procurement Rules has been singled out by all interviewees and by one-fifth of the interviewees as one of the main factors of success. They have been assessed as being more flexible than the Bulgarian Procurement Rules, leading to a better choice of contractor. Additionally, the complaint solving procedures are simpler and do not lead to the suspension of projects and associated delays, in contrast to when the Bulgarian Procurement Rules are applied.

The human resource investment on behalf of the beneficiaries was usually a staff of several people (depending on the size and complexity of the project). However, given the fact that these experts acquired useful project management experience, the human resource investment was largely worth it. Interviewees elaborated that their staff benefited enormously from being exposed to project management and collaboration with the EBRD for subsequent project management.

In the case of project 010B (Establishment and Operation of an EE Facility in BG) but also of projects 009B and 006F, a big part of the efficiency of the project implementation depended on the consultant and the intermediary banks. While the consultant performed very well and was highly efficient, the capacities of the intermediary banks were not sufficient and impacted the project negatively. The efficiency of these projects was also increased through the adoption and updating of a list of eligible technologies as well as other standard formats (i.e. format for websites). The adoption of more centralised monitoring tools and a dedicated management transformation system led to efficiency gains especially in the case of thousands of individual residential borrowers. Hence, we can conclude that the efficiency of these projects was not optimal in the beginning but has been improving over the course of the project, as intermediaries improved their capacities and as standard tools have been implemented by the EBRD.

Other factors also contributed to improve the projects' efficiency:

- For some projects, the governance set-up of the project with direct payments to the suppliers eliminated conditions for corruption;
- For other projects, the arrangement according to which the Ministry of Energy was dealing with public procurement centrally decreased the administrative burden for the municipalities.

4.1.8 Overall NDAP impacts

Overall, the programme helped to improve the security of supply, to reduce the risk of blackouts and to improve the capacity to meet energy demand from the private sector.

Skills and educational effects

Additional positive results to those listed above include the skills accumulated by the project beneficiaries, including end-beneficiaries, in project management and procurement. These have been reported to be useful at later stages. As many of the projects' sites are in fact educational institutions (schools and kindergartens), the educational effects on young people have been emphasised, despite the fact that these were not measured.

The programme has had a positive impact on local subcontractors and value chains. This was one of the first international programmes providing contracts to Bulgarian companies. The availability of local companies capable of performing energy efficiency renovations is a pre-requisite for implementing large-scale renovations on a national scale, and NDAP contributed to develop the necessary skills.

Within project 010B, the intermediary banks went through a very steep learning curve during the project implementation. Their capacities in technical and financial structuring of energy efficiency and renewable energy projects significantly increased. Additionally, these projects helped bridge the information gap in terms of technologies and technical solutions. The increased capacity is demonstrated by the fact that follow up projects with their own funds were launched by some of the intermediary banks.

Quality of life, well-being and aesthetic effect

Project on energy efficiency in public buildings (007D, 029A, 030A and 040A) and projects on Energy Efficiency in street lighting (015A and 045A) led to improved quality of life (i.e. in schools, kindergartens and hospitals). They also triggered additional refurbishment and renovation works within these institutions with own funds or with funds from other donors. Energy Efficiency renovations have had a very positive aesthetic effect as well. Renovated public buildings (i.e. schools) have a pleasant surface painted in bright colours compared to the grey, cement-covered building surfaces before the renovation. The Energy Efficiency renovations also triggered additional renovations of other aspects of schools and kindergartens following a desire of the directors to make them even more attractive.

In the case of Toploficacia Sofia, the possibility of regulating the heat supply individually helped stop the trend of consumers switching off their heat supply because of the high price of the service compared to the local standard and purchasing capacity.

In the case of the street lighting projects for small municipalities, the level of comfort increased significantly either by increased luminosity or through lighting some streets which had not previously been lit.

Environmental impacts

The programme has helped to speed up the gasification of the energy sector and has had a positive impact on the GHG emissions and air quality and fine particle issues (i.e. Plovdiv). It is worth noting here that some of the environmental and economic effects of the energy efficiency projects have been lost due to rebound effects, i.e. improved comfort and quality of life and associated increases in energy use.

Because of the nuclear power plant closure, some of the production shifted to the lignite. The programme supported the mitigation of the associated negative environmental effects by improving the energy efficiency of the coal operations, from the mines to the electricity generation and by assisting in upgrading the facilities.

Improved safety of the energy system

According to interviewed stakeholders, NDAP investments have led to improvement of the safety of energy distribution and lower risks of power outage.

Better quality of service and fewer accidents

According to project beneficiaries, in case of projects in Sofia and Plovdiv municipal heating systems, the investments in replacement of pipelines and pump stations and the regulation of heating supply led to an increased quality of service. The replaced pipelines also mean fewer accidents over the year and hence maintaining a high quality of service and avoiding nuisances for the people over the winter months.

Economic effect

For several projects (e.g. heating system in Plovdiv and Sofia), it has been reported that the NDAP subsidies helped control the prices of the service. Without support, investments would have been made with own funds, but would have been covered these through price increase for the heat.

Unintended effects

One unintended result shared by the Ministry of Energy was the fact that KIDSF triggered a modification on Energy Laws facilitating procedures of real rights acquisitions for overhead power lines whereby this is done now in a more efficient manner due to this case.

Visibility

Ministry employees acknowledged that most projects have had high visibility in society.

Negative impacts

According to the Ministry of Energy, in the case of energy efficiency projects in small municipalities, where the co-financing rate was of 100%, there was a negative impact of 'spoiling' the municipalities. However, in some cases this was probably the only option if the project was to be implemented. In the view of the evaluator, given their low starting point, these projects did however achieve impressive results with a limited amount of money and contributed to mitigate negative effects on the EU's reputation regarding newly integrated citizens.

Improvement of Sustainable Energy Financing Facility (SEFF)

It has been shared by EBRD that the two facilities on energy efficiency and renewable energy (009B and 006F) were the first of their kind in Eastern Europe. Therefore, they helped EBRD improve the subsequent facilities through adjusting the incentive payments (grants), starting to constantly record lessons learned; and provide an evaluation. The need to work with loan officers of intermediary banks to increase their capacity was also another lesson learned which was incorporated in the following SEFFs. It is worth noting that other financial institutions like EIB and KfW launched their own SEFF projects.

4.2 Lithuania

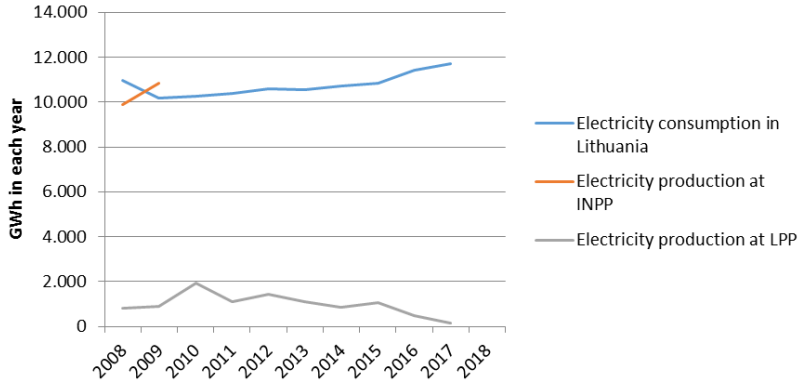
4.2.1 Context of the NDAP intervention

One of the conditions for the Lithuanian accession to the EU was the commitment to closing the Ignalina Nuclear Power Plant (INPP; units 1 and 2)[30]. The reasons for this were safety related, based on concerns about safety deficiencies in the early reactor models, notably the absence of a containment building. The NDAP (running period between 2007-2013) was aimed at assisting Lithuania in this task.

Lithuania, with a population of around 2.8 million, has had a slow but steady increase in GDP per capita over time after the economic crisis in 2009/10, like Bulgaria and Slovakia (Figure 16).

Regarding the Lithuanian electricity markets, Lithuania heavily depended on electricity from the Ignalina NPP before its decommissioning in 2004 (unit 1) and 2009 (unit 2) (Figure 20).

Figure 20: Evolution of electricity production at INPP and LPP and consumption in Lithuania



Sources: Litgrid, Lietuvos Energijos Gamyba, National Commission for Energy Control and Prices, Lithuanian Energy Institute

The loss of generation capacity from these units was compensated by electricity imports from Belarus, Russia and Latvia. The largest Lithuanian fossil-based power plant, the Lithuania Power Plant (LPP) at Elektrėnai, was upgraded and extended in the framework of the NDAP in order to allow for national electricity generation and to provide sufficient reliable generating capacity (see project fiche 005E).

Table 8 provides an overview of the evolution of some relevant energy indicators for Lithuania between 2003 and 2016. Back in 2003, the total primary energy production in Lithuania was 5.2 Mtoe; of this total, nuclear electricity production constituted 1.3 Mtoe. In that year, nuclear electricity generation represented a share of 79 % of gross electricity generation in Lithuania, going down slightly to 70% in 2005, the year after shutdown of INPP unit 1, and going down to zero in 2010 after the decommissioning of INPP unit 2.

One of the most important impacts of the shutdown of INPP was that Lithuania switched from a net exporter of electricity until 2009 to a strong net importer, starting in 2010 (see project fiche 005E). Electricity interconnections to Sweden (without NDAP funding) and Poland (see project fiche 011A) commissioned in 2015 allowed Lithuania to switch towards electricity imports from these EU Member States and thus enabled integration into the European electricity market away from imports from Belarus and Russia. Synchronisation with the European electricity system in technical terms away from the Russian system is a major current project in Lithuania and is scheduled for completion by 2025. The related feasibility study[31] and a study on the dynamic behaviour of synchronously interconnected Baltic

[30] Construction of unit 3 was already suspended in the late 1980's, and construction of unit 4 was never started.

[31] Identification of technical requirements and costs for integration of large-scale generating unit into the Baltic states' Power System Operating synchronously with the Continental Europe Networks, CEF Energy, 4.3-0002-LT-S-M-14.

States and the Continental European electricity network[32] have been co-funded by the Connecting Europe Facility; the project is part of the Project of Common Interest No 4.8.9[33].

[32] Study on Dynamic behavior of synchronously interconnected Baltic States and Continental European electricity network, CEF Energy, 4.9-0020-LTLV-S-M-17.

[33] See Commission Delegated Regulation (EU) 2018/540 of 23 November 2017 amending Regulation (EU) No 347/2013 of the European Parliament and of the Council as regards the Union list of projects of common interest.

Table 8: Overview of relevant energy indicators in Lithuania

Indicator/ year (thousands TOE)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Primary production[34]	5,239	5,113	3,851	3,434	3,720	3,800	4,148	1,310	1,290	1,319	1,414	1,487	1,585	1,620
Total gross production electricity	1,676	1,657	1,271	1,073	1,204	1,196	1,321	494	415	434	409	378	424	367
Gross elec. generation CHP plants - Nuclear	1,331	1,298	889	744	845	851	933	0	0	0	0	0	0	0
% share elec. generation nuclear	79%	78%	70%	69%	70%	71%	71%	0%	0%	0%	0%	0%	0%	0%
Gross inland consumption[35]	9,043	9,232	8,711	8,542	9,303	9,278	8,474	6,787	7,008	7,095	6,687	6,695	6,913	7,034
Final energy consumption	4,214	4,401	4,671	4,933	5,217	5,138	4,650	4,814	4,793	4,913	4,794	4,888	4,869	5,108
Final Energy Consumption electricity	617	658	686	725	762	778	720	716	738	767	770	794	803	838

Source: Eurostat, 2018

4.2.2 Overall NDAP intervention

The figure below shows the intervention logic of the NDAP in Lithuania.

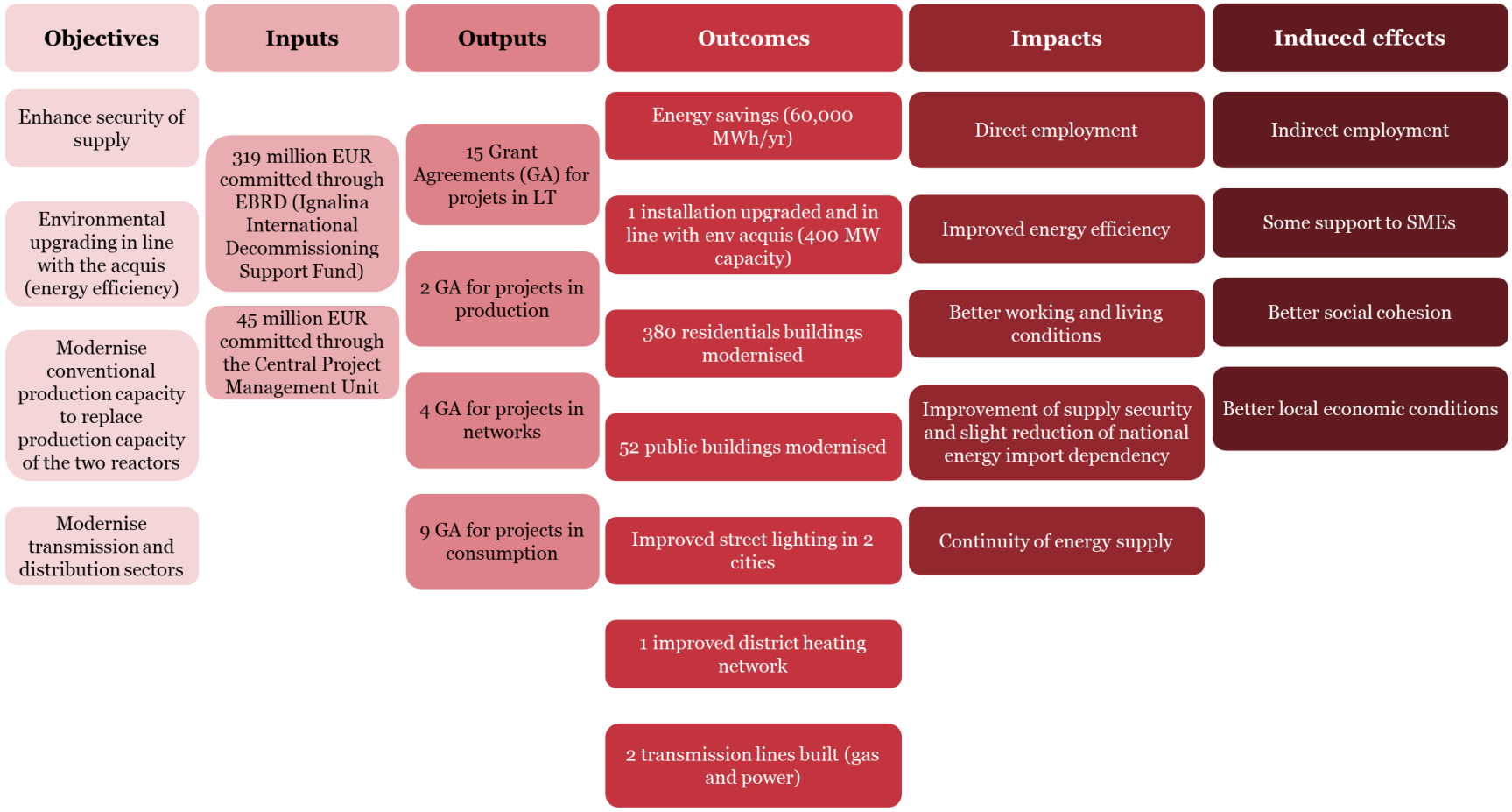
Outcomes are partly estimated as data are not available in all detail. Notably energy savings data are not available for all buildings, therefore average savings have been used to extrapolate to all buildings. The number of residential buildings modernised includes buildings under construction and a limited number of buildings to be refurbished until the end of the programme.

[34] Primary production is any kind of extraction of energy products from natural sources to a usable form. It takes place when the natural sources are exploited, for example in coal mines, crude oil fields, hydro power plants or fabrication of biofuels.

[35] The gross inland consumption of energy is calculated as the sum of the gross inland consumption of five energy types: coal, electricity, oil, natural gas and renewable energy sources.

Figure 21: Intervention logic of the energy window of the NDAP programme in Lithuania

External factors: closure and decommissioning of Ignalina nuclear power plant (Units 1 and 2)
Accession to the European Union
National energy strategy (resolution 18 January 2007 No X-1046 Vilnius)



4.2.3 Relevance of NDAP

The general objective of the NDAP 'Energy window' in Lithuania was to assist the country in the safe shutdown and decommissioning of the Ignalina Nuclear Power Plant (INPP), units 1 and 2, and to mitigate the economic and energy consequences of this shutdown. The Programme was concerned with the provision of technical assistance and/or goods, works and services necessary to support the shutdown (and subsequent decommissioning) of the INPP. It was also concerned with assisting the necessary restructuring, upgrading and modernisation of the energy production, transmission and distribution sectors in relation to mitigating and replacing the energy previously generated by unit 1 (shut down in 2004) and unit 2 (shut down end of 2009) of the INPP. Foci of the energy window were the security of electricity supply through ensuring sufficient reliable power plant capacity (existing and new), the modernisation and environmental upgrading of existing conventional electricity generation capacity to comply with the European environmental acquis related to power plant emissions from operation with heavy fuel oil, and energy efficiency in heat production, distribution and use in buildings (see Figure 3).

Overall, 15 projects have been carried out in Lithuania as part of the NDAP; they broadly fall into two categories:

- **Energy efficiency (EE) projects in the three Municipalities** in the INPP Region[36]: Ignalina, Visaginas, Zarasai: energetic renovation of public buildings and of residential multi-apartment buildings as well as efficient street lighting (small budget only); these projects have been managed by CPMA, some are still ongoing.
- **Energy sector projects of national relevance**: Consultancy Services for the Initial Phase of the LitPolLink electricity interconnection to Poland; upgrading of the Lithuanian Power Plant (LPP) in Elektrėnai; construction of a gas pipeline to Visaginas (including the INPP premises); installation of heat supply infrastructure in Visaginas; these projects were managed by EBRD, all projects are finalised.

4.2.4 Functioning of NDAP (governance, decision process, national strategies)

For NDAP projects in Lithuania, two implementing bodies have been in charge of managing the programme: the EBRD for the "Ignalina International Decommissioning Support Fund" (IIDSF), to which the European Commission was by far the largest contributor (see chapter 3 for more details); and the CPMA, a national Lithuanian agency managing European and bilateral funds in Lithuania. EBRD has managed the projects on new and upgraded generating capacity (electricity and heat) as well as transport infrastructure (electricity and gas), while CPMA has managed the energy efficiency projects. EBRD has managed four projects in Lithuania with a total funding (disbursed) of €380m; CPMA has managed 11 projects with a total funding (disbursed) of €30m[37].

For both implementing bodies, the Ministry of Energy (earlier: Ministry of Economy) has been the national counterpart for programme coordination, while the Ministry of Finance has been the financial coordinator. Based on the funding decision by the Commission which allocates annual funding, strategic programming was carried out by the Ministry of Energy (earlier: Economy) with the help of annual Combined Programming Documents approved annually by the Commission, of which the underlying document is the Accession Treaty. Routine programming was carried out by the implementing bodies EBRD and CPMA ensuring projects fulfilled the objectives of the Combined Programming Documents. Individual projects proposed by beneficiaries were pre-selected by the implementing bodies and submitted to the national NDAP Committee and the Commission, which assessed them based on the Combined Programming Documents. CPMA projects were directly approved by the Commission, whilst EBRD projects were approved by the Assembly of Contributors including the Commission in unanimity.

[36] Plus one national project in the early years.

[37] Please note that disbursed funding is lower than committed funding indicated in **Error! Reference source not found.** as not all projects have been finalised yet.

The national energy strategies of Lithuania were a major basis for the Lithuanian government in the NDAP. Enhancing energy security and increasing energy efficiency are the main strategic objectives of the energy sector in Lithuania pointed out in the National Energy Strategies (NES) of 2002 and 2007, as well as in the National Energy Independence Strategies (NEIS) of 2012 and 2018.

A lot of effort in the Lithuanian energy sector was made so far to fulfil these objectives. New power links Lithuania – Poland (LitPol Link; see project fiche 011A) and Lithuania – Sweden (NordBalt) were commissioned in late 2015/early 2016 in order to eliminate the isolation of the Lithuanian power sector and to integrate it into the European electricity market.

Following the completion of the liquefied natural gas (LNG) terminal in Klaipėda on the western coast and the EU Third Energy Package in late 2014, and the second gas pipeline Klaipėda-Kuršėnai[38] in 2015, the situation in the natural gas market has been substantially improved by enabling acquisition of natural gas in international markets, eliminating the decades-old Russian Gazprom monopoly in the natural gas sector and creating competition.

After the shutdown of Units 1 and 2 of the Ignalina NPP in 2004 and 2009 respectively, the NESs of 2007 and 2012 foresaw the construction of a new nuclear power plant in Lithuania. However, in the 2018 NEIS, a "freeze" of the Visaginas Nuclear Power Plant (VNPP) project is foreseen until it becomes cost effective in the market or it becomes necessary to secure energy supply.

The largest potential for increasing energy efficiency exists in the building sector. Despite significant efforts, more than 70% of multi-apartment residential buildings and a large portion of public buildings are still energy-inefficient and supporting their modernisation remains as one of the main NEIS objectives.

Further integration of the energy system in the EU energy market (i.e. synchronisation of the Lithuanian power system with continental Europe, construction of the Gas Interconnection Poland – Lithuania (GIPL)), improvement of energy efficiency, balanced and sustainable development of renewable energies, optimisation and modernisation of energy infrastructure, smooth transition from fossil-based energy sources to renewable energy sources, generation of non-polluting (zero emission of greenhouse gases and air pollutants) energy and 100% of local electricity production in the country's gross electricity consumption remain the main objectives of the Lithuanian energy sector in the future.

4.2.5 Articulation of NDAP with other funding schemes (EU and national)

Heat production and distribution projects at the INPP (see project fiche 002D) as well as for the town of Visaginas (see project fiche VDH) received 100% funding from NDAP.

Energy infrastructure projects

NDAP support to the LitPolLink (project 011A) electricity interconnector to Poland was limited to consultancy services for the initial phase of the project, financed with a €2m budget. This was carried out successfully, leading to successful construction of the interconnection to Poland and commissioning in late 2015 receiving funding from the Connecting Europe Facility (CEF). NDAP support was a strategically important funding, although very small compared to the overall budget for implementing the full project.

A gas pipeline was constructed from Pabradė to Visaginas (see project fiche 004A) with connections to the heat boiler of the district heating of Visaginas municipality and the INPP. 66 % of the total actual budget spent was contributed from the NDAP energy window (€11.9m). 30 % (€5.3m) were contributed by the State Enterprise Ignalina NPP Decommissioning Fund, and 4 % (€0.8m) by the recipient Lietuvos

[38] The 110 km long second gas pipeline along this route provides additional transport capacity to customers in Lithuania and other Baltic States matching the import capacity of the LNG terminal in Klaipėda.

Dujos. NDAP funding was essential to realising the project as the natural gas volume anticipated for transport was very low, it required a combination of commercial and grant funding.

Electricity generation project

The project related to the Lithuanian Power Plant (see project fiche 005E) had a total budget of €517m, of which 50% were grants from the NDAP energy window, 14% were loans by the EBRD, 4% from the State Enterprise Ignalina NPP Decommissioning Fund, 22% commercial loans, and 10% own funds of the recipient Lietuvos Energija. The probability of the project happening without funding is rather low as a funding level of 70% (originally), or 50% (after cost increases in the tendering process) was deemed necessary for economic viability.

Energy efficiency projects

In an early phase, the HUDA mechanism managed by the Housing and Urban Development Agency received co-funding from the NDAP energy window (see project fiche HUD). The national programme only had limited success, and consequently the NDAP co-funding budget was reduced compared to original planning. In reverse, the energy efficiency projects funded by the NDAP energy window received national and partly municipal co-funding.

4.2.6 EU added-value (both financial and non-financial)

Most of the projects would not have been carried out without NDAP funding or would have been significantly delayed. Supported projects have had significant impacts.

The EnerVizija projects of the NDAP energy window managed by the CPMA (see project fiches IEV, VEV and ZEV) included the development of a new funding, financing and project implementation mechanism, which has become very successful in the three municipalities, although at different speeds. This mechanism was subsequently successfully transferred to the national BETA agency managing a national programme on energy efficiency upgrading of residential buildings, rolling out the mechanism nation-wide[39]. The major EU added value in these projects is both in the development of a successful mechanism through the NDAP energy window, which built on the lessons learnt from the early national programme having limited success, and in the national roll-out of the mechanism based on national funding. In this sense, the EnerVizija projects were catalysts for additional actions at national level thus clearly demonstrating EU added value.

After the final shutdown of the INPP (2009), a new heat generation and transport system for the INPP as well as for the town of Visaginas had to be established as the nuclear heat supply source was eliminated (see project fiche 002D). In this sense, the new heat system mitigated a direct effect of the INPP decommissioning decision. Furthermore, heating prices rose sharply after INPP decommissioning in the town of Visaginas, which was mitigated through energy efficiency projects for public and for (private) residential buildings (see project fiches VEE and VEV), as well as through an upgrading of the district heating system (see project fiche VDH).

Another clear EU added value is related to the electricity grid interconnection to Poland, an initial planning stage of which was funded through the NDAP energy window (see project fiche 011A). With the interconnection in place since 2015 (and the further interconnection to Sweden), Lithuania is now integrated into the European electricity market, and has started the multi-annual project of technical electricity system synchronisation with the European electricity system.

[39] See http://www.betalt.lt/en

4.2.7 Results of the programme

A main result of the programme was increased security of electricity supply through the upgrading of the Lithuanian Power Plant (see project fiche 005E) to guarantee sufficient reliable generation capacity, and through the power interconnection with Poland (see project fiche 011A; complementing the interconnection to Sweden not funded through the NDAP energy window). The other major result was an increase in the energy efficiency of public and private residential buildings, both through the direct effects of funded projects, and through a transfer of the funding, financing and project implementation methodology to a national programme managing the nationwide roll-out. Energy efficiency upgrading in residential buildings is now mainstream in Lithuania. The strong commitment of the Ignalina municipality, and in its wake of the Zarasai municipality, were an additional key success factor to the energy efficiency projects. In contrast, insufficient technical and administrative capacity of the Visaginas municipality in combination with the very specific situation in Visaginas, which was strongly affected economically by the closure of the INPP, led to major delays in successfully carrying out projects.

All projects led to capacity-building both in municipalities and grant holder companies in (public) procurement, international collaboration, and project management. The implementing bodies were instrumental in ensuring this success.

Companies receiving grants from the NDAP energy window have gained experiences in international procurement through the projects (see most notably project fiches 004A, 005E, 011A), and the three municipalities have become acquainted with European public procurement rules and procedures.

However, there are critical elements related to three major projects representing a large share of the overall funding:

- Upgrading of the Lithuanian Power Plant (see project fiche 005E): operation with heavy fuel oil has been very limited and is entirely abandoned now, so the investment in the flue gas desulphurisation seems stranded; furthermore, the newly built CCGT power plant has only provided strategic reserve capacity but has produced very much less electricity than originally planned. Other options, most of which had been considered originally and had been analysed to be equally economical, would have had additional benefits (reducing natural gas imports, increasing renewable energies, higher overall efficiency), and would have had pilot character to actual developments (e.g. biomass-based CHP);
- Building a gas pipeline to Visaginas (see project fiche 004A): transported gas volumes are very much lower than anticipated with capacity utilisation below 10% of maximum capacity making the pipeline even more uneconomical than originally anticipated; and
- Constructing two separate natural gas-based heat boilers in Visaginas connected by an over-dimensioned heat pipeline (see project fiche 002D): separate systems based on bioenergy (wood chips) may have been a much cheaper and more climate friendly solution as demonstrated by similar solutions established early in Ignalina, and lately in Visaginas by an independent party. Also, CHP instead of heat only was originally analysed to be more economical.

These critical elements all relate to the decision-making process leading to the selection of technologies for implementation. The criteria having led to the three decisions are not fully transparent. The decision for the upgrading of the Lithuanian Power Plant was rather hurried after the original concept of using "Orimulsion" fuel had to be abandoned, since this fuel was supplied from the international market by Venezuela. A quick decision was taken to carry out the project based on heavy fuel oil instead. Furthermore, the decision for the CCGT plant seems to have been built on optimistic natural gas price assumptions. Similarly, natural gas consumption projections relevant to the gas pipeline seem to have been overly optimistic. The third decision for two separate natural gas-based boilers in Visaginas was taken in spite of a more economical option identified before the decision. Economic, security of supply and environmental criteria may have led to more optimal choices being made. Despite the fact that the decisions were taken a long time ago, and details have been difficult to identify during this evaluation, it seems that the decision-making process by the Lithuanian government and the Assembly of Contributors including the Commission did not favour a sufficiently critical appraisal of studies made

to support the decisions, and did not ensure a fully rigorous application of available information and criteria.

4.2.8 Overall NDAP impacts

The main long-lasting effect of the NDAP energy window programme is the establishment of energy efficiency in residential and public buildings as a mainstream concept in Lithuania. Energy efficiency refurbishment of buildings has become an established element of the construction industry in Lithuania, with related job creation effects[40]. Energy efficiency in buildings not only reduces heating costs, but also reduces indoor temperatures in summer, increasing the comfort of residential and public buildings and thus improving living and working conditions. In addition, energy efficiency reduces the energy import dependency of Lithuania, notably in terms of natural gas imports.

Security of electricity supply is established through the NDAP energy window funding the installation of a CCGT power plant within the Lithuanian Power Plant at Elektrėnai (see project fiche 005E), although other options may have been cheaper. Also, the power interconnection to Poland (see project fiche 011A) strongly enhances the security of Lithuanian electricity supply. On the other hand, the electricity interconnections to Poland and Sweden increase the electricity import dependency compared to national generation. However, the integration into the European electricity market enabled by the interconnectors ensures low electricity prices and avoids the dependency on electricity imports from Russia and Belarus.

Contracts have both been awarded to Lithuanian and other European companies for the hardware, for construction works and for consultancy services providing commercial opportunities to companies all over Europe. Also, non-Lithuanian companies have often subcontracted local companies (see e.g. project fiche 004A) so that commercial cross-border partnerships were established, strengthening European cooperation.

[40] Based on a very rough estimate, some 10,000 jobs may be secured in the construction industry by energy efficiengy building refurbishments co-funded by the national programme managed by the BETA agency.

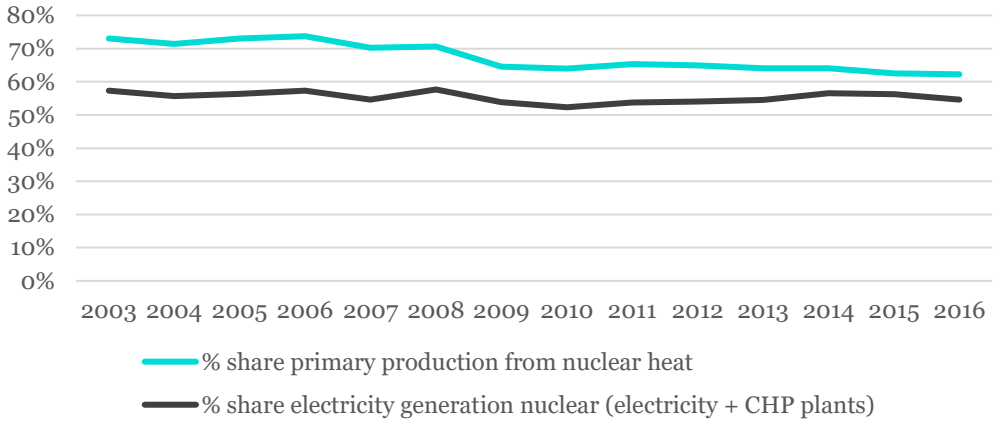
4.3 Slovakia

4.3.1 Context of the NDAP intervention

One of the preconditions for the Slovak accession into the EU was the commitment to closing the Bohunice V1 Nuclear Power Plant (NPP) units 1 and 2[41]. The reasons for this were safety related, based on concerns about safety deficiencies in the early reactor models. The Nuclear Decommission Assistance Programme (NDAP) (running period between 2007-2013) was meant to assist Slovakia in this task while maintaining the highest safety standards. Slovakia, with a population of around 5.5 million, has had a slow but steady increase in GDP per capita over time, similar to Bulgaria and Lithuania (Figure 16).

Regarding Slovak energy markets, Slovakia heavily depends on its nuclear power (Figure 22). The Slovak reactors which are currently operating are listed in Table 9. Currently, Slovakia has four nuclear reactors generating one-half of its electricity, however, the Bohunice V2 reactors unit 1 and 2 are expected to close in 2024 and 2025 respectively. The loss of generation capacity from these reactors will be, at least partially, compensated by the construction of new power reactors[42] (Table 10).

Figure 22: Evolution of nuclear energy in Slovakia



Source: Eurostat

Table 9: Operating Slovak power reactors (currently, 2018)

Reactor	*Model*	*Net MWe*	*First power*	*Expected Closure*
Bohunice V2-1	V-213	472	1984	2024
Bohunice V2-2	V-213	472	1985	2025
Mochovce 1	V-213	436	1998	
Mochovce 2	V-213	436	1999	
Total (4)		1,816 MWe		

Source: World Nuclear association (updated 2018), "Nuclear Power in Slovakia"

[41] Protocol No 9 annexed to the Accession Treaty, Official Journal L 236 , 23/09/2003 P. 0954 - 0954

[42] World Nuclear association (updated 2018), "Nuclear Power in Slovakia"

Table 10: Slovak power reactors under construction, planned and proposed

Reactor	*Model*	*gross MWe*	*Construction start*	*First power*	*Operator*
Mochovce 3	*V-213+*	*471*	*6/09*	*2019*	*SE*
Mochovce 4	*V-213+*	*471*	*6/09*	*2020*	*SE*
Bohunice New Block	VVER?	1,200	2021?	2025?	Jess[k]
Kecerovce	?	1,200		After 2025	?
Total under construction (2)		**942** (440 net each)			

Source: World Nuclear association (updated 2018), "Nuclear Power in Slovakia"

Table 11 provides an overview of the evolution of some relevant energy indicators between 2003 and 2016. In 2003, the total production of energy in Slovakia was equal to 6.40Mtoe, out of this the nuclear energy production constituted 4.7 Mtoe[43]. During this year the electricity generation output shares from Nuclear energy constituted 58 %. As can be seen from this table and Figure 22, the share of primary production from nuclear heat and the share of electricity generated from nuclear power went slightly down over the years, however, not significantly. This is most likely due to additional nuclear capacity generated from the existing nuclear reactors. In 2009 (one year after the closure of the second unit of the Bohunice V1 NPP), the total production was 5.9 Mtoe and the production from nuclear sources decreased to 3.7 Mtoe[44]. Despite the overall decrease in nuclear production, nuclear power supplied 54% of all electricity generation in the country in 2009.

One of the most important impacts of the premature shutdown of V1 NPP was that Slovakia has gone from being a net exporter of electricity in the early 2000s to being a net importer following the shutdown of the Bohunice V1 reactors[45]. The effective lost capacity due to shutdown of the two reactors is estimated at 764 Mwe, corresponding to around 10% of energy production and covering around 20% of electricity consumption.[46] According to the World Nuclear Association, Unit 1 of the Bohunice V1 plant eliminated about 9% of Slovakia's electricity supply[47]. In addition, the Association reports that these units (1 and 2) were producing electricity at half the average cost compared to all other Slovak sources. It should be noted that the electricity price at that time was already high at top of EU range.[48]

[43] OECD/IEA (2006), "Slovak Republic, Energy Policy Review 2005"

[44] OECD/IEA (2012), "Slovak Republic, Energy Policy Review 2012"

[45] Interviews; World Nuclear association (updated 2018), "Nuclear Power in Slovakia"

[46] SEC(2011) 1387 final, COMMISSION STAFF WORKING PAPER Impact assessment Accompanying document to the Proposal for a Council Regulation on Union support for the nuclear decommissioning assistance programmes in Bulgaria, Lithuania and Slovakia

[47] World Nuclear association (updated 2018), "Nuclear Power in Slovakia"

[48] SEC(2011) 1387 final, COMMISSION STAFF WORKING PAPER Impact assessment Accompanying document to the Proposal for a Council Regulation on Union support for the nuclear decommissioning assistance programmes in Bulgaria, Lithuania and Slovakia

Table 11: Overview of relevant energy indicators in Slovakia

Indicator/ year (thousands TOE)	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Primary production[49]	6,374	6,230	6,336	6,377	5,697	6,164	5,713	5,974	6,171	6,233	6,408	6,307	6,320	6,198
Primary production nuclear heat	4,656	4,446	4,626	4,702	4,004	4,356	3,686	3,819	4,028	4,047	4,106	4,041	3,954	3,858
% share primary production from nuclear heat	73%	71%	73%	74%	70%	71%	65%	64%	65%	65%	64%	64%	63%	62%
Total gross production electricity	2,681	2,628	2,705	2,701	2,412	2,490	2,249	2,395	2,464	2,465	2,471	2,356	2,313	2,327
Gross elec. generation electricity only - Nuclear	fo	0	0	0	256	305	366	385	367	368	374	373	365	356
Gross elec. generation CHP plants - Nuclear	1,536	1,464	1,524	1,549	1,063	1,131	844	868	959	964	978	959	938	915
% share elec. generation nuclear (electricity + CHP plants)	57%	56%	56%	57%	55%	58%	54%	52%	54%	54%	55%	57%	56%	55%
Gross inland consumption[50]	18,778	18,502	19,029	18,870	17,855	18,298	16,770	17,855	17,392	16,692	16,996	16,181	16,426	16,511
Final energy consumption	11,221	11,069	11,561	11,378	11,182	11,485	10,632	11,546	10,772	10,347	10,608	9,983	10,077	10,418
Final Energy Consumption electricity	1,976	2,066	1,965	2,034	2,113	2,129	1,986	2,075	2,133	2,058	2,157	2,077	2,095	2,148

Source: Eurostat, 2018

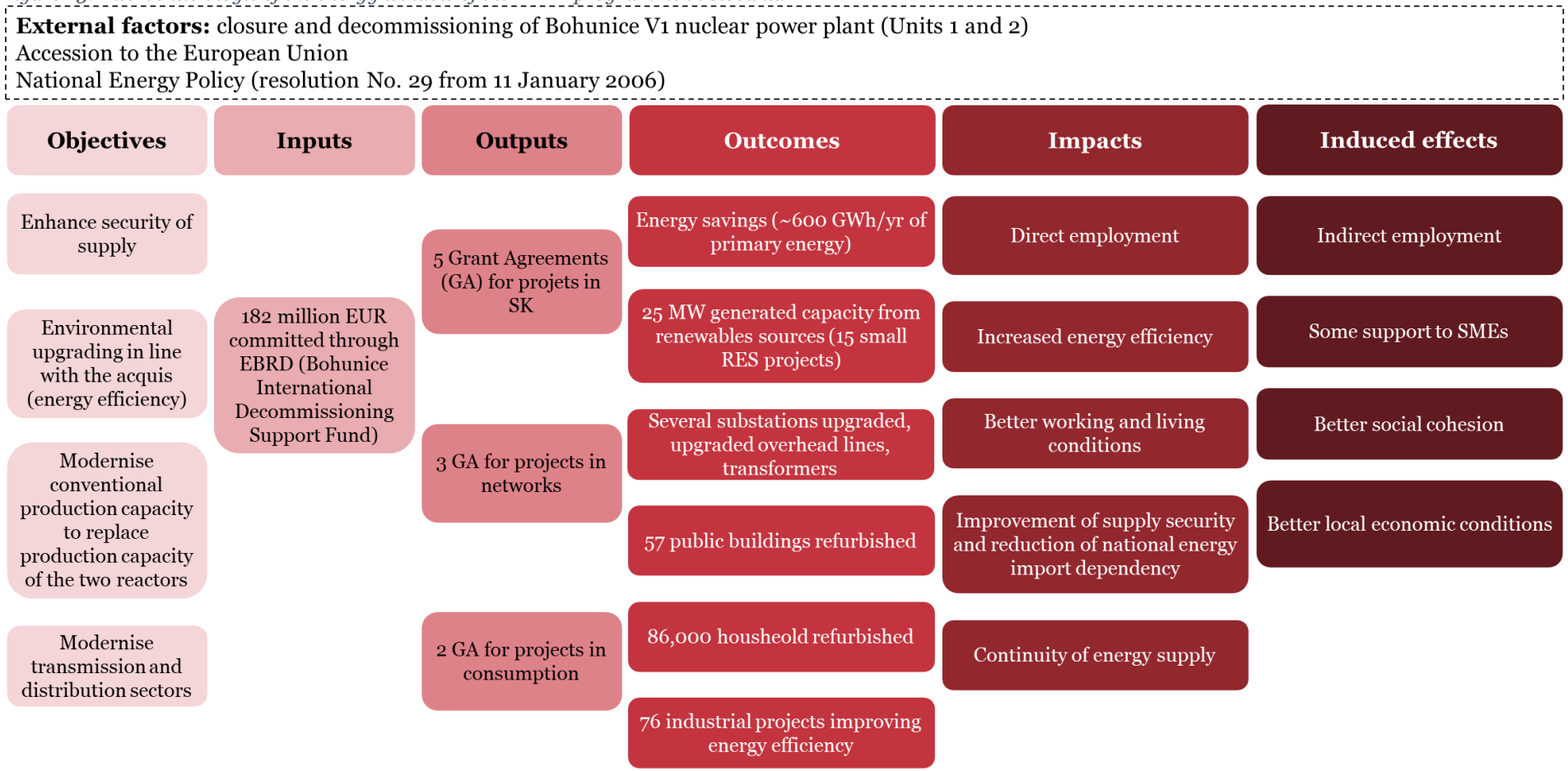
[49] Primary production is any kind of extraction of energy products from natural sources to a usable form is called primary production. It takes place when the natural sources are exploited, for example in coal mines, crude oil fields, hydro power plants or fabrication of biofuels.

[50] The gross inland consumption of energy is calculated as the sum of the gross inland consumption of five energy types: coal, electricity, oil, natural gas and renewable energy sources.

4.3.2 *Overall NDAP intervention*

The figure below shows the intervention logic of the NDAP in Slovakia.

Figure 23: Intervention logic of the energy window of the NDAP programme in Slovakia



4.3.3 Relevance of NDAP

The general objective of the NDAP 'Energy window' in Slovakia was to assist the country in the safe shutdown and decommissioning of the Bohunice V1 Nuclear Power Plant (NPP) and to mitigate the economic and energy consequences of this shutdown. The Programme provides technical assistance and/or goods, works and services necessary to support the shutdown (and subsequent decommissioning) of the Bohunice V1 NPP. It also assists the necessary restructuring, upgrading and modernisation of the energy production, transmission and distribution sectors in relation to mitigating and replacing the energy previously generated by unit 1 (shut down in 2006) and unit 2 (shut down in 2008) of the Bohunice V1 NPP.[51] Improved energy efficiency of the Slovak energy production system was also taken into consideration. Based on the general objectives of NDAP, eligible projects were expected to provide necessary measures to adapt the Slovak transmission grid to the conditions after final shutdown of Bohunice V1 NPP, as well as improve energy efficiency. Overall, 5 projects were carried out as part of the NDAP, three of those were related to improvements of infrastructure and two others focused on energy efficiency measures.

The three projects related to improvements of infrastructure were managed by the Slovak electricity transmission system company (SEPS)[52]. Their objectives were to ensure security of supply through the replacement/modernisation of the Slovak power transmission and distribution system.[53] The rationale behind selecting these projects was the need to adapt the Slovak transmission system to the new situation resulting from the final shutdown of two units of V1 NPP in 2006 and 2008. As a result of the final shutdown of V1 NPP, the main source of power input to the 220 kV network has been lost and reinforcement of the 400 kV transmission grid was necessary. The configuration of the Slovak Power System after V1 NPP shut down in 2006 and 2008 corresponded to a case where almost no additional generation was considered in Slovakia to replace Bohunice V1 NPP or to cover the growth of the load. Due to the insufficient generation into the 220 kV network and insufficiency of reasonable import capacities from abroad at 220 kV level, the replacement of the 220 kV system by a new 400 kV system was necessary. The reinforcement was focused on transformation from 400/110 kV and replacement of 220 kV lines by new 400 kV lines, which also allowed international interconnection with neighbouring countries.[54] These projects were part of the SEPS's 10-year development plan and were deemed necessary measures to adapt the Slovak transmission grid to the conditions after final shutdown of Bohunice V1 NPP.

Two energy efficiency (EE) projects were deemed to have a clear link between the NDAP energy window objectives since improved energy efficiency was one of the proposed energy sector measures as stipulated in Council Regulation (EURATOM) No 549/2007. The Pilot Project on energy efficiency in public buildings supported investments in energy efficiency in public buildings in the Trnava and Nitra Region within the context of the first Slovak National Energy Efficiency Action Plan from 2007.[55] The SlovSEFF project was a sustainable financing facility offering loans for residential and industrial energy efficiency projects and small renewable energy projects. Projects to improve the energy efficiency and reduce energy consumption were deemed desirable in an attempt to reduce energy losses. Based on the interviews with the Ministry of Economy of the Slovak Republic and the SIEA, both projects were highly relevant and linked to the national (and EU) energy efficiency strategy at that time. In 2007, this

[51] SEC(2011) 1387 final, COMMISSION STAFF WORKING PAPER Impact assessment Accompanying document to the Proposal for a Council Regulation on Union support for the nuclear decommissioning assistance programmes in Bulgaria, Lithuania and Slovakia; Grant Agreements

[52] SEPS website, https://www.sepsas.sk/en_index.asp

[53] Information provided in the Grant Agreements concerning these three projects

[54] Information from the Project Completion reports of the three SEPS projects and from the interviews with SEPS

[55] Information from the interviews with the Ministry of Economy of the Slovak Republic

corresponded to the first national energy efficiency strategy (Návrh Koncepcie energetickej efektívnosti Slovenskej republiky[56]) and the first National Energy Efficiency Action Plan (the 1st NEEAP[57]).

4.3.4 Functioning of NDAP (governance, decision process, national strategies…)

NDAP in Slovakia is implemented through BIDSF, which is managed by EBRD (and since 2016, the second implementation agency for the decommissioning window is SIEA). The EBRD manages the public funds allocated to the programme and monitors the financial management so as to optimise the use of public money[58]. This role includes providing an ongoing review of the procurement and contract implementation process that focuses on critical steps that are necessary to ensure eligibility of the contract for Grant financing. The recipient is responsible for administering contracts with due diligence, monitoring the project against the contract requirements and periodically reporting to the Bank regarding the performance of the contract. The role of EBRD during implementation of the project is to provide non-objection to the proposed modification, waiver or extension, change or variation – in accordance with the terms and conditions of the contract, to be reviewed by the Bank before a no objection is given or disbursement is made. According to the contract, procurement of a contractor is done according to EBRD rules and the recipient is responsible for the procurement process and the administration and implementation of contracts. The implementation of contracts is done according to the rules of the national legislation, in this case the Slovak legislation.

The NDAP governance system consists of multiple platforms. At the international level, there is the Assembly of Contributors, which approves the Grant Agreements and regularly monitors the programme. At the national level, Slovakia and EBRD set up a national Joint Committee and a special committee to select, approve and monitor projects in Slovakia.

The responsible national counterpart to the EU and EBRD for NDAP is the Ministry of Economy (MH SR) which acts as the programme and finance coordinator and as a key actor in setting the rules between Slovakia and EBRD[59]. A Framework Agreement between the Slovak Republic and EBRD relating to the activities of the BIDSF in Slovakia was signed in November 2001. It specifies the roles of the EBRD and the Slovak Republic. According to the Framework Agreement, the Joint Committee discussed:

- Progress achieved in the implementation of the Projects;
- Obstacles and problems encountered;
- The timeliness and adequacy of Slovak contributions provided for the implementation of the Projects; and
- Other matters relevant to the implementation of Projects.

According to this Framework Agreement, the EBRD acts as the sole administrator of funds, while the Slovak Republic together with the project manager (i.e. the entity designated as the operator for each project) is responsible for decisions related to the implementation of the projects. In the actual implementation of projects funded by NDAP, MH SR was seen by project managers to play an 'observer' role, i.e. it did not interfere to a large extent with project management, but MH SR has been continuously involved in biannual meetings to discuss monitoring and progress made on the funded projects, and continues to participate in Assembly of Contributors and Joint Committee meetings.

The role of the EU in NDAP governance in Slovakia is to control and audit. It approves annual work programmes and financing decisions submitted by MH SR and, as the main (currently the only) donor to the BIDSF Fund, it participates in the biannual meetings of the Assembly of Contributors, and

[56] http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=8637

[57] http://www.rokovania.sk/Rokovanie.aspx/BodRokovaniaDetail?idMaterial=10646

[58] Council Regulation (EURATOM) No 549/2007

[59] BIDSF Framework Agreement 2001

performs monitoring visits of the projects. It also has to perform regular audits and evaluations of the NDAP programme.

Based on the analysis and consultation related to the Slovak projects, the governance of NDAP is effective and efficient. Slovakia has only 5 projects, 3 of which were managed by SEPS, one by the Slovak Innovation and Energy Agency (SIEA) and one by EBRD. In all projects, there was high or very high satisfaction with regard to the process of project selection, project monitoring and follow up and with the governance system supporting identification of risks and managing them[60]. According to MH SR, the governance system consisting of multiple governance platforms (the Joint Committee and international, i.e. the Assembly of Contributors) to select projects was appreciated. The monitoring and follow up biannually was also greatly appreciated.

For the 3 SEPS projects, the feedback from SEPS was that there have at times been difficulties with the application of EBRD procurement rules, which support global competition, as they had a direct negative impact on project implementation in terms of causing delays. Since such projects (transmission networks) form part of a Slovak national network of projects and are highly integrated between each other, every delay in one project has a direct impact on another. According to SEPS, it questions the effectiveness of procuring such projects (transmission networks) under EBRD open public procurement rules, as funding one project of a larger programme through one set of procurement rules and the rest through another can create additional implementation difficulties. This is especially the case if the selected contractor is located outside of the EU as additional permits and certificates have to be obtained in order for the foreign contractor to comply with Slovak legislation during the implementation stage. The evaluator agrees that there was a room for efficiency improvements with regard to administrative burden related to project management. On the other hand, without NDAP grants, the three projects would have been implemented at a much slower pace.

With regard to the two energy efficiency projects, the NDAP governance has been perceived as effective and efficient. The pilot project on public buildings employed Slovak contractors and the SlovSEFF used Slovak banks as financial intermediaries. From the available documentation and stakeholder consultations, the evaluator agrees that the governance worked very well for these two projects.

4.3.5 Articulation of NDAP with other funding schemes (EU and national)

According to the stakeholders interviewed, the EU added value of the programme is medium to high, depending on the project.

Energy infrastructure projects

The probability of the three SEPS energy infrastructure projects happening without NDAP support was deemed as high, as they were indispensable to adapt the power transmission system to the new situation after the closure of units 1 and 2 of Bohunice V1 NPP. The added value of NDAP financial support was that this could happen relatively quickly as the Slovak Government or SEPS would need a bit more time to put together the required funding.[61] Getting these additional funds from the Government would probably cause delays in implementation, and implementation would most likely happen in multiple stages, as SEPS would not be able to pay all project costs in such a short period of time. These projects were needed to fulfil the reliability and security criteria of the grid. Part of the second (014) and third (020) SEPS project were not directly related to the decommissioning and as such were financed by SEPS. These projects were part of a larger project portfolio and the third project was only partly related to the closure. This has been evident from the projects' Due Diligence reports commissioned by EBRD before the projects were awarded.[62] It can be concluded that the energy consequences of the closure have been

[60] Survey and interviews with Grant holders (project managers)

[61] Information provided in interviews with SEPS and MH SR

[62] EBRD (2007) Technical Consultancy services for project Due Diligence: Measures in the electric transmission system, final report; EBRD (2009) Due Diligence of the Bystricany Project/ SEPS final report

dealt with, and that further funding would not have supported project with a significant direct link to the early closure of the nuclear units.

The alternate funding for these types of projects is the Slovak Government and own funding of SEPS through loans. With regard to EU programmes, energy infrastructure projects similar to those funded under NDAP (e.g. replacement of overhead lines) could potentially be eligible for funding under the Connecting Europe Facility (CEF) if they have a significant impact on neighbouring countries. SEPS used such funding in the past, in particular to establish an interconnection with Hungary and to fund some preparatory works rather than implementation[63]. However, the use of this fund is seemingly less applicable for them than NDAP as energy infrastructure projects with a strongly national scope, such as those funded under NDAP, are not eligible under CEF. Further information is available below on CEF and its eligibility criteria.

Connecting Europe Facility (CEF)
The Connecting Europe Facility (CEF) EU funding programme offers support to projects of common European interest in the fields of transport, energy and digital services. In addition to providing grants, the CEF also provides financial support to projects through financial instruments such as guarantees and project bonds. Since 2014, the Innovation and Networks Executive Agency (INEA) is the body responsible for implementing most of the CEF programme budget. The total budget of the programme is €30.4 billion, out of which INEA implements €27.4 billion. More specifically, CEF Energy focuses on supporting projects related to EU's energy infrastructure. In order to be eligible for funding, the projects must be identified as Projects of Common Interest (PCI).

The five main criteria for PCI eligibility are:

- Having a significant impact on at least two countries;
- Enhancing market integration and the integration of EU countries' networks;
- Increasing competition of energy markets;
- Increasing security of supply;
- Contributing to the EU's energy and climate goals by, for example, facilitating further RE uptake.

It is important to note that the first criterion does not mean that all projects must necessarily involve two or more transnational partners. National projects with transnational impact are potentially eligible.

Some examples of CEF funded projects in relation to Slovakia include:

- Construction works for the Poland – Slovakia Gas Interconnection (6.2.1-0019-SKPL-W-M-16)
- Design documentation and activities related to permit granting process and final building approval process (3.17-0032-SK-S-M-15). This project supports building an electricity interconnector between Slovakia and Hungary.

Energy efficiency projects

With regard to the two energy efficiency projects (011) (015), there has been no equivalent funding available in Slovakia at that time. According to the beneficiaries of the Pilot project (011), similar projects through EU funds (structural funds) are perceived as more expensive due to the need to involve more capacity, having a higher administrative complexity as well as stricter requirements required by the rules to obtain financing from EU funds. One of the reasons for this perceived higher cost is due to the increase of energy efficiency requirements compared to the 2009-2011 period during which the Pilot Project was implemented.[64] The consequences of NDAP terminating is that municipalities know how to apply for funding through EU structural funds or self-finance refurbishment.

Regarding SlovSEFF, similar programmes did not exist at that time in Slovakia. The probability of the project happening without EU funding was perceived as low according to MH SR and EBRD as the grant financed through BIDSF provided incentive payments to end-beneficiaries, paid fees to the participating

[63] Information provided by SEPS

[64] Information provided by SIEA

banks and funded technical cooperation. These were seen as indispensable to start off the programme. Currently, there are a couple of national programmes supporting similar investments.

4.3.6 EU added-value (both financial and non-financial)

Based on the analysis of the five Slovak projects, there is undoubtedly an EU added value, both in financial and non-financial terms. According to the stakeholders interviewed, the EU added value of the programme is medium to high, depending on the project.

Regarding the financial added value, in particular for the Energy Efficiency projects, NDAP allowed these to take place and to have significant positive impacts, as there were no comparable support programmes in Slovakia at that time. Regarding SEPS' projects, the NDAP grant allowed these projects to be implemented in a shorter timeframe than if financial support was not available.

There has also been non-financial value added in terms of capacity-building at the national level to administer such funds.[65] Since 2016, SIEA became an implementing body besides EBRD for the nuclear projects under NDAP. These projects and NDAP programme further helped to develop capacity at the national level through exposure to international platforms and fora, as well as exposure to EBRD as a multilateral development bank. The pilot project on energy efficiency in public buildings and the SlovSEFF were very novel projects at that time in Slovakia, contributing directly to the national energy efficiency policy and legislation.

4.3.7 Results of the programme

The two main results of the programme were increased security of supply through the upgrading of the power transmission network, increased energy efficiency and support to small-scale renewable energy technologies, although the latter was not indicated as one the objectives of the accession treaty. Based on the collected information from project materials and views of stakeholders, the programme is assessed as effective and efficient in Slovakia, the degree varying by project.

The two energy efficiency projects implemented by EBRD and SIEA are evaluated as highly effective and efficient. With regard to SlovSEFF (11A), a project managed by EBRD themselves, the project was evaluated as very successful in reaching its objectives and highly efficient in managing the grant. This success can be seen from the fact that there is currently a third follow-up SlovSEFF project. SlovSEFF I performed slightly worse than SlovSEFF II due to the inexperience of having such a project in Slovakia before. SlovSEFF II already learnt from the experience of SlovSEFF I and ran very smoothly. According to the stakeholders, the success can be attributed to the experience EBRD has of working with such credit lines, the role of the Consultant supporting the national intermediary banks and project beneficiaries, and to the effective and efficient allocation of the grant funds to beneficiaries which worked as incentive payments to initiate the project. The evaluator agrees with these views.

Similarly, the pilot project on energy efficiency in public buildings (15A) was perceived by all stakeholders consulted as highly effective and efficient, mainly due to the critical role played by SIEA, the project manager, who has been closely involved in project implementation and monitoring. The evaluator agrees with these views.

The three SEPS infrastructure projects are evaluated to date as effective in reaching their objectives (with the exception of the ongoing project 20A, whose objectives have not yet been reached, but are likely to be reached within the extended timeline). However, the evaluator can conclude that there are some areas for improvement with regard to efficiency, in particularly regarding the administrative costs related to project management. In particular, unlike in Bulgaria, the project manager, SEPS, had difficulties implementing the projects according to Slovak legislation while observing the EBRD

[65] Information provided by MH SR

procurement rules, as the EBRD procurement rules were seen as more flexible than the national procurement rules. This increased flexibility in terms of the choice of contractor sometimes led to project delays caused by the need to obtain Slovak permits within a certain timeframe and certificates for workers of foreign contractors. The underlying reason for such lowered administrative and management efficiency seems to be mainly due to the complexity and interlinkages of such projects with other interconnected Slovak power grid infrastructure projects, administered and financed by SEPS alone. The complexity of these interlinkages makes different project components depend on each other, where a delay in one can cause delays in another.

Overall, in the five projects, the main bottlenecks occurring were mostly due to the poor performance of the contractors.

In general, all completed projects achieved their expected objectives within the budgets foreseen and amended (there is one ongoing project 20A, for which this is not yet known), and the costs were perceived as commensurate with the benefits achieved by stakeholders. The benefits were difficult to measure as projects did not always have quantified targets, this proving difficult in particular for the three infrastructure projects where the main benefit was the security of supply in Slovakia. Given this, NDAP in Slovakia overall is assessed as a positive programme.

4.3.8 Overall NDAP impacts

There are no specific long-lasting effects, except of SlovSEFF, which is currently in its third phase (SlovSEFF III), which shows increasing market maturity for energy efficiency. The SEPS projects, which were completed are followed up by other projects using own or national funds, and currently there is no specific follow up for the Pilot Project, besides the use of EU structural funds. The aim of the SEPS' projects was not to have a considerable impact on local economy and value chains but to ensure a reliable and universal access to energy supply. In other words, the aim was to avoid power cuts and outages, and to increase efficiency, reliability and safety of supply. This objective was achieved, also indirectly benefitting the local economy and value chains.

5 Evaluation of the 'Energy window'

This section presents the findings related to the evaluation of the 'energy window' for each evaluative question. The analysis builds on a triangulation of the different sources of information (interviews, surveys, documentary analysis, individual project evaluation). When relevant, a distinction by countries is indicated, as it is not always possible to answer the questions globally.

In this section, references are made to figures that are presented earlier in the report or in the annexes.

5.1 Relevance

5.1.1 KQ1: Were the interventions relevant to the original objectives of the programme?

5.1.1.1 Are the projects relevant to the original objectives of enhancing and energy efficiency?

Answer: The supported projects are relevant to the original objective of enhancing energy efficiency. Energy efficiency projects have been carried out in the three countries.

Improved energy efficiency was one of the proposed energy sector measures as stipulated in the Accession treaties for Bulgaria and Lithuania and Council Regulation for Slovakia[66] and as a measure to mitigate the impacts of a premature shutdown of nuclear power plants in question in the three countries. Energy efficiency became also one of the national strategic priorities at that time in Slovakia, Lithuania and Bulgaria with first National Energy Efficiency Action Plans being developed in the 2000s, that could be partially linked to the European energy efficiency acquis.

Overall, the projects in the NDAP Energy window programme are clearly relevant to the original objectives of enhancing energy efficiency. Out of the 58 projects, a total of 36 identify energy efficiency as their primary objective in their grant agreements. Of these 36 projects, 23 are finalised and 13 are still ongoing. These projects focused on energy efficiency in public and residential buildings, street lighting but also on industrial energy efficiency. A further six projects (four of which are finalised) identify energy efficiency as a secondary objective.

According to the survey with grant holders (Figure 33), close to 80% of the supported projects list environmental upgrading (which includes energy efficiency) as an objective of the project. It is the most cited objective, and particularly significant in Bulgaria and Lithuania. Most of this originates from the energy efficiency rather than plant upgrading.

5.1.1.2 Are the projects relevant to the original objectives of enhancing the security of supply?

Answer: The supported projects are relevant to the original objective of enhancing the security of supply. Security of supply projects have been carried out in the three countries.

The Accession Treaties and Council Regulation No 549/2007 identify enhancing the security of supply as one of the key NDAP Energy window objectives, which is directly linked to the premature shutdown of the nuclear power plants. Indeed, the loss of nuclear production capacities directly impacted the capacity of the countries to supply enough energy and required not only the adaptation of their transmission and distribution systems to the new situation, but also a certain degree of energy diversification.

[66] Council Regulation (EURATOM) No 549/2007

In their grant agreement, ten projects identify security of supply as their primary objective (Figure 3): nine of these are finalised. These projects include installation, modernisation, replacement and enactment of substations, transformers and distribution and transmission lines both for gas and electricity. Another nine projects (seven finalised) identify security of supply as a secondary objective (e.g. modernisation of a conventional thermal plant).

When asked about the objectives of the project, security of supply is the second most cited objective in the survey with grant holders, with nearly half of the projects listing it as an objective (Figure 33). Supported projects have focused on (and are coherent with) different national priorities, according to the various starting points and country needs (Figure 37).

5.1.1.3 Are the projects relevant to the objective of enhancing the use of renewable energy sources?

Answer: There were no projects with a significant renewable energy component or focus directly funded or supported through NDAP. A project with an indirect scope was supported. Renewable energy projects were further financed through facilities.

Compared to the other objectives of the programme, the objective of enhancing the use of renewable energy sources was a relatively low-priority objective. In the legal base, it was only stated for Bulgaria.

This limited priority is reflected by the number of projects in the field of renewable energy, as stated in the grant agreements. Overall, there is only one Bulgarian project mentioning renewable energy as a primary objective, for only €3m of committed budget (which was eventually not disbursed). In addition, another project in Bulgaria has a secondary objective of facilitating the integration of renewable energy sources (GA 049).

However, indirect financing occurred through the financial facilities, as some of them were initially designed to support both energy efficiency and small renewable energy projects (e.g. GA 006 and GA 010 in Bulgaria, Figure 3). In Slovakia, the SlovSEFF project, which is an EBRD financing facility for sustainable energy, had as one of its three objectives 'support to small scale renewable energy projects'. However, in the two phases of the programme (SlovSEFF I and II), which received support from NDAP in form of a grant, only 15 RES projects were supported. The vast majority of supported projects were energy efficiency projects in residential buildings and some industrial energy efficiency projects. In Bulgaria, 11 of the 20 sub-projects allocated under the KIDSF through the energy efficiency facility (GA 010) concerned renewable energy. In total, the development of 230 MW of renewable energy capacities were supported by NDAP.

The survey with grant holders corroborates this lack of intervention of the NDAP in the field of renewable energy: only three respondents out of 42 mention renewable energy as one of the objectives of the project (Figure 33, Figure 40).

5.1.1.4 Did the projects include environmental upgrading in line with the EU environmental and energy acquis?

Answer: a minority of supported projects include environmental upgrading in line with the EU environmental and energy acquis, unless energy efficiency is included in the environmental upgrading, in which case it becomes a large majority.

Environmental upgrading in line with the EU environmental and energy acquis is listed as a key objective of the 'energy window' in the legal base for the three countries.

Environmental upgrading is identified as a priority in three of the power-plant upgrading projects. One of these projects represents a total budget of €517m (€257.5m coming from NDAP)[67], with about one-

[67] GA 005 Lithuanian Power Plant Environmental and Related Technical Upgrading

third that could be attributed to environmental upgrading. Another similar project identifies environmental upgrading as a secondary objective. The upgrades concern notably the compliance with EU directives on the reduction of emissions (e.g. ETS scheme, IED).

When including energy efficiency as part of environmental upgrading in line with the acquis, the number of concerned projects rises significantly (Figure 3). Indeed, a higher level of energy efficiency enables GHG emissions reductions, and thus to lower environmental impacts. The supported projects were relevant to the national energy efficiency strategies and national legislation that were developed in the mid-2000s.

The inclusion (or not) of energy efficiency within the environmental upgrading objective explains why in the survey with grant holders, almost one in three respondents claim that their project enables the upgrade of facilities in line with the EU energy and/or environmental acquis (Figure 36). About as many respondents answered that their project did not aim to upgrade facilities.

Few projects supporting environmental upgrading of production capacities occurred, in Bulgaria and Lithuania, reflecting national priorities. They however represent a significant share of the overall NDAP budget. When including energy efficiency as part of the environmental upgrading, then a significant number of projects occurred in the three countries (Figure 39, Figure 41).

5.1.1.5 Did the intervention lead to modernising conventional production capacity?

Answer: The programme supported the modernisation of conventional production capacities for a minority of projects in Bulgaria and Lithuania. None occurred in Slovakia, as national priorities were centred on other objectives.

The modernisation of the conventional production capacity was a key objective identified in the legal base in the three countries. Indeed, countries could need to upgrade existing plants to compensate some of the lost capacities resulting from the closure of the nuclear power plants.

Ten of the 58 projects identify modernising conventional production capacity as a priority (Figure 3): six of these are finalised and four are still ongoing (e.g. rehabilitation of a hydro power plant complex, replacement of bucket-wheel excavators). Another five projects identify modernising convention production capacity as a secondary objective. In line with this, the survey reveals that eight respondents (15%) answered that the project aimed to modernise conventional production capacity (Figure 33, Figure 38): six of these are finalised and four are still ongoing.

5.1.1.6 Did the projects include other measures which contribute to the necessary restructuring, upgrading of the environment and modernisation of the energy production, transmission and distribution sectors?

Answer: There were set up objectives for all three countries for the modernisation of the transmission and distribution sectors and relevant projects were carried out in the three. Different approaches were however undertaken in each country. Network projects focused on interconnections in Lithuania and Slovakia, and for Slovakia, on the replacement of the 220kV network fed by the NPP by a 400kV network. In Bulgaria, network projects dealt more with the displacement of the national power generation centre from north to south-east and the switch from gas to electricity.

The NDAP Energy Window projects funded in the three countries are clearly relevant to the necessary restructuring, upgrading of the environment and modernisation of the energy production, transmission and distribution sectors (as per the accession treaties). By addressing all facets of the energy sector, the energy window adapted to various contexts to respond to the different needs of each country. It provided adequate responses to the necessary measures to adapt the energy sectors in the three countries to face the adverse effects of the early closure of the nuclear power plants.

A considerable majority of the supported projects are deemed very relevant to address the consequences of the premature closure. The funding covered projects and initiatives to implement mitigation measures in the energy sector, such as replacement capacity, environmental upgrading, modernisation and energy efficiency. According to the objectives listed in the grant agreement, all projects covered at least one of the targeted objectives. Environmental upgrading (including energy efficiency) is the most represented objectives, followed by security of supply and modernisation of transmission and distribution sectors (Figure 3).

5.1.2 KQ2: As the intervention is on-going, are the original objectives still relevant?

5.1.2.1 Are the countries still in need of energy efficiency improvements, energy supply security, environmental upgrading, modernisation of conventional energy production plants and development of renewables? How pressing is the need? And is there still catching up to do?

Answer: In all the EU Member States, energy intensity decreased between 2005 and 2015. The largest decreases were observed in central and eastern European countries (including Bulgaria, Lithuania and Slovakia) because of changes in their economic structure. All three countries are however still in need of energy efficiency improvements, energy supply security, environmental upgrading, modernisation of conventional energy production plants and development of renewables, although they are not linked anymore to the closure of the nuclear power plants. The ongoing projects contribute in achieving the original objectives which are still highly relevant.

Bulgaria is the most energy intensive of the three countries (and, indeed, the most energy intensive of EU28), but it should be observed that Bulgaria has improved its energy intensity figures radically in the last decade (from 543 to 423 kgoe/k€, Figure 18, Eurostat). In 2016, Bulgaria was already below the target set for 2020. The Bulgaria National Action Plan for Energy Efficiency 2014-2020 prescribes that in order to meet the national targets by 2020, primary energy intensity will be reduced by 41 % compared to the level in 2005. Both Slovakia and Lithuania have also reduced their energy intensity numbers significantly in the period 2007-2016 (source: Eurostat). In pure numbers of kgoe/k€, the increased efficiency might seem less dramatic (starting from significantly lower numbers than Bulgaria did). In 2016, their energy intensity stood between 200-210 kgoe/k€. In relative terms, however, the decrease in energy intensity from 2007 to 2016 in Lithuania is 31% and in Slovakia 25% - in Bulgaria, the decrease amounts to 22% in the same period.

According to the EU report *Towards an Energy Union*, Slovakia is on track to meet its 2020 energy efficiency target. The country still has the fifth highest energy intensity of the economy in the EU, however, with large potential for improvement in the industry sector. Slovakia imports all of its gas from Russia and remains one of the most vulnerable EU countries for possible gas disruptions. Slovakia also became a net electricity importer rather than exporter after the premature shutdown of Bohunice NPP V1. Energy security, thus, is a pressing issue. However, in terms of mitigating the direct and indirect consequences of a premature shutdown of Bohunice NPP V1, these impacts have been to a large extent addressed by the five 'Energy window' projects, including the one currently ongoing.

An OECD Policy Brief (March 2016) observed that lowering Lithuania's energy intensity will make it less dependent on energy imports, while at the same time contributing to a reduction in emissions of greenhouse gases and other pollutants. Improvements in energy efficiency, especially in the heating and transport sectors, will be crucial in order to lower energy intensity. Ongoing projects dealing with energy efficiency are thus still relevant.

In Bulgaria, ongoing projects concern the production, the networks and the consumption sectors. Given the lateness of Bulgaria with regards to energy intensity, the ongoing supported projects are still relevant.

In Lithuania, ongoing projects concern the consumption sector, notably with energy efficiency projects. As Lithuania still has some catch-up to do in terms of energy-intensity compared to the EU average, the projects are still relevant.

In Slovakia, the ongoing network project is only partially linked to the closure of the nuclear power plants. It is part of the investment portfolio of the network operator.

5.1.2.2 Are the objectives of the programme relevant to the national strategic objectives of the three countries?

Answer: The programme supported projects dealing with different topics, in function of national needs. The objectives of the programme are clearly relevant to the national strategic objectives of the three countries. The NDAP projects are well aligned with national plans and strategies and have been so also for those plans and strategies that have been developed after the initiation of the NDAP projects. Two projects in Bulgaria, and another two in Lithuania are considered to be of medium relevance, and the remainder in all three countries are of high relevance.

In the three countries, the Ministry of Energy (Bulgaria and Lithuania) or the Ministry of Economy (Slovakia) was involved in selecting the projects (see section 4 Country studies). Hence, they contributed to ensure relevance with national objectives.

In **Bulgaria**, the overall relevance of the NDAP funding is high, and all projects score high on relevance.; no projects were deemed to be of medium or low relevance. The overall portfolio of projects funded was clearly in line with the 1999 National Energy Strategy which acknowledged the limited investment capacity of the Bulgarian government and included reforms concerning reduced dependence on imported fuel from Russia, reduction of the energy intensity of the economy through investments in energy efficiency, support for demand-side management projects with a significant social effect, use of local renewable energy sources and improvement of the security of supply.

The funded projects are also well aligned with Bulgaria's third NEEAP 2014-2020 (adopted following the EU Climate and Energy package), the National EE Short-term Programme (2005), the Energy Efficiency Act (1999) but also with Bulgaria's Kyoto commitments and the ETS. The investments supported by NDAP have contributed to the needed improvements of the Bulgarian energy sectors, by targeting different topics.

The NDAP projects in Bulgaria are mainly focused on energy efficiency in public buildings, followed by power transmission and distribution (Figure 7). According to survey results, nearly all the projects allowed for improved energy efficiency (Figure 41). Whilst several survey respondents agreed that their project aimed to enhance the security of supply, most of the respondents in Bulgaria considered that this was not an aim of the project (Figure 37). Meanwhile, only five respondents agreed that their project aimed to develop renewable energy sources (Figure 40).

The general objective of the NDAP in **Lithuania** was to assist the country in the safe shutdown and decommissioning of the INPP, units 1 and 2, and to mitigate the economic and energy consequences of this shutdown[68]. The projects funded through the energy window initiative focused on security of electricity supply through ensuring sufficient reliable power plant capacity (existing and new),

[68] "The Ignalina Programme shall, inter alia, cover: measures in support of the decommissioning of the Ignalina Nuclear Power Plant; measures for the environmental upgrading in line with the acquis and modernisation measures of conventional production capacity to replace the production capacity of the two Ignalina Nuclear Power Plant reactors; and other measures which are consequential to the decision to close and decommission this plant and which contribute to the necessary restructuring, environmental upgrading and modernisation of the energy production, transmission and distribution sectors in Lithuania as well as to enhancing the security of energy supply and improving energy efficiency in Lithuania" - Protocol No 4 on the Ignalina nuclear power plant in Lithuania

modernisation and environmental upgrading of existing conventional electricity generation capacity to comply with the European environmental acquis related to power plant emissions from operation with heavy fuel oil, and energy efficiency in heat production, distribution and use in buildings (Figure 7). Energy efficiency, although mentioned separately, is considered also to contribute to security of supply by the reduction in consumption of primary energy resources –irrespective of whether these are imported.

This fitted well with the national energy strategies of Lithuania and was indeed a major basis for the Lithuanian government in the NDAP. The main strategic objectives of the energy sector in Lithuania in the National Energy Strategies of 2002 and 2007, as well as in the National Energy Independence Strategies of 2012 and 2018, concern enhancing energy security and increasing energy efficiency. A lot of effort in the Lithuanian energy sector has been made so far to fulfil these objectives. Encouraging the modernisation of energy-inefficient public buildings remains one of the main NEIS objectives. Energy efficiency and security of supply were the main objectives; today, renewable energy goals are in the focus in order to reduce electricity imports and comply with EU renewable goals and Paris agreement.

The largest potential for increasing energy efficiency in Lithuania exists, thus, in the building sector, and a significant number of the projects financed through NDAP are indeed focused on energy efficiency in public buildings. According to survey results, only a few of the projects aimed to enhance the security of supply (Figure 37) whereas about one-half of them allowed to upgrade the facilities in line with the EU energy and/or environmental acquis (Figure 39).

The overall relevance of NDAP funding is high, and 14 of the 15 projects in Lithuania score high on relevance. The only project that is considered of medium relevance concerns networks (natural gas transmission and distribution)[69]. No projects were deemed to be of low relevance.

In **Slovakia**, the NDAP support aimed to assist the country in the shutdown and decommissioning of the Bohunice V1 Nuclear Power Plant (NPP) and to mitigate the economic and energy consequences of this shutdown. The programme provisioned technical assistance and/or goods, works and services necessary to support this shutdown. The NDAP 'Energy window' also covered assisting the necessary restructuring, upgrading and modernisation of the energy production, transmission and distribution sectors in relation to mitigating and replacing the energy previously generated by the Bohunice V1 NPP. Although not a primary driver, improved energy efficiency of the Slovak energy production system was also taken into consideration.

Three of the five projects carried out as part of the NDAP were concerned with improvements of infrastructure, and two focused on energy efficiency measures. The objective of the three projects concerned with improvements of infrastructure was to ensure security of supply through replacement/ modernisation of the Slovak power transmission and distribution system. The configuration of the Slovak Power System after V1 NPP shutdown made the replacement of 220 kV system by new 400 kV system necessary. These projects were part of the 10-year development plan of the Slovak electricity transmission system company (SEPS) and seen as necessary measures to adapt the Slovak transmission grid to the conditions after final shutdown of Bohunice V1 NPP. It is however to be noted that the ongoing network project is only partially linked to the closure of the nuclear power plants.

The two energy efficiency projects were linked to the NDAP energy window objectives since improved energy efficiency was one of the proposed energy sector measures as stipulated in Council Regulation (EURATOM) No 549/2007. Projects to improve the energy efficiency and reduce the energy use were deemed desirable in order to reduce energy losses. Both projects were highly relevant to the national (and EU) energy efficiency strategy at that time. In 2007, there was the first national energy efficiency strategy and the first NEEAP.

The evaluation also confirms that all five projects in Slovakia were of high relevance. Survey responses from Slovakia clearly indicate that the projects allowed to enhance the security of supply as well as to

[69] GA 004A - Gas pipeline from Pabrade to Visaginas and Ignalina NPP

upgrade the facilities in line with the EU energy and/or environmental acquis and for improved energy efficiency.

5.1.3 Conclusions for the relevance criterion

In Bulgaria, Lithuania and Slovakia, a commitment for the premature closure and subsequent dismantling of several nuclear power plants' units was a prerequisite for their accession to the European Union. These closures had important impacts, although different, in the field of energy in the three countries, implying necessary investments to adapt the energy sector:

- Overall, it removed a "cheap" source of energy[70], generating concerns over an increase of the energy price. The share of the nuclear energy in the electricity production fell, from 47% in 2002 to 34% in 2007 in Bulgaria, from about 80% in 2003 to 0% in 2010 in Lithuania and from 57% in 2003 to 52% in 2010 in Slovakia;
- In certain cases, it endangered the security of supply, with Lithuania and Slovakia switching from being net energy exporters to net energy importers;
- It generated the needs to build new or to upgrade existing production capacities, to partially compensate for the loss of nuclear production capacities and reduce the energy dependency resulting from the closure;
- It triggered the needs for investments to create or modernise infrastructures for the transport of energy, either to import energy, to address the geographical relocation of production capacities in the country or to substitute electricity by another source of energy;
- It contributed to raise awareness over the needs to reduce the energy intensity and to improve energy efficiency, in order to lessen the global need for energy (including imports) and to mitigate the adverse effects of rising energy prices.

The closures induced major changes of the energy sector in the three countries. It generated local and national resistance, and in some cases, engendered discussions at the parliament level to restart the plants, up to 2015. In this sense, the implementation of an energy window within the Nuclear Decommissioning Assistance Programme contributed to send a positive signal to the new Member States, partially offsetting the negative impacts of the nuclear power plant closure. It was a crucial enabler to accept the premature closure of the plants.

The approach of the programme was not to fund the full effects of the power plant closure, but only those linked to the early closure. Indeed, the closure of the power plant was inevitable, and the programme was not designed to face the consequences of the eventual closure. It aimed at providing incentives to support the energy investments associated with the early closures and to complement their limited investment capacities. In the different countries, projects were selected and proposed to receive support from NDAP by the national authorities. Projects were thus aligned with national priorities.

Overall, more than **€947m** had been committed by NDAP to support **58 energy related projects**, addressing the supply, the transport and the demand sides of the energy sector to mitigate the effects of the early closures. 18 projects are still on-going, mostly in Bulgaria and Lithuania, for a committed amount of €240m, of which 22% have already been disbursed. The target completion date is 31st of December 2020, but there are risks that some projects go beyond this date, notably in Bulgaria.

Bulgaria represents the highest volume of committed budget and the highest number of projects. There is however no correlation between the number of projects and the associated committed budget. For Lithuania and Slovakia, there are fewer projects, but with a more important average budget (Figure 7, Figure 8).

By addressing all facets of the energy sector, the energy window adapted to various contexts to respond to the different needs of the three countries. In the three countries, the evaluators' team considers that

[70] Decommissioning costs were not always taken into consideration

it provided adequate responses to support the necessary measures to adapt the energy sectors to face the adverse effects linked to the early closures of the NPP. A considerable majority of the supported projects are deemed very relevant to address the consequences of the early closure.

5.2 Coherence

5.2.1 *KQ3: To what extent are the funded 'Energy window' projects coherent with the objectives set out in the Accession Treaties and subsequent regulations?*

Answer: Considered individually, supported projects are highly coherent with the objectives set out in the Accession Treaties and subsequent regulations. More than 4 projects out of 5 (83%) were judged to have high coherence, and the remaining, medium coherence (Appendix I).

Under the treaty related to the accession of Lithuania and Slovakia, Protocol No4 concerned the consequences of the early closure of the Ignalina nuclear power plant in Lithuania and Protocol 9, the early closure of units 1 and 2 of the Bohunice V1 plant in Slovakia. With respect to the Ignalina NPP, Protocol 4, Article 2 indicated that the NDAP shall cover the measures supporting the following objectives, while these were subsequently specified for Bohunice V1 in Slovakia in Council Regulation (EC, Euratom) No 549/2007 of 14 May 2007:

- Environmental upgrading in line with the EU environmental acquis (including energy efficiency);
- Modernisation of the conventional energy production;
- Contribution to necessary restructuring, upgrading of the environment and modernisation of the energy production, transmission and distribution sectors; and
- Enhancement of the security of supply.

For Bulgaria, the Accession Treaty (Article 5) indicates that support will be provided for the early decommissioning of the Kozloduy NPP for the same objectives as those above. However, one additional objective was included: enhancement of the use of renewable energy sources.

The difference in objectives between the treaties is possibly explained by the fact that DG ENER did not negotiate the treaties, as this was dealt by other DG of the Commission.

At the outset of the NDAP, the scope of the projects was not set, in particular the relative amounts to be devoted to decommissioning, the initial purpose, versus other objectives listed above. The countries could therefore propose how to spend the funds. For instance, in Bulgaria, a larger share of the funds was allocated initially to energy objectives, than to decommissioning. Indeed, the EC was concerned that funds would not initially be used as much for decommissioning, which is a long-term process. A greater degree of coherence might have been obtained if the scope and budget allocations for type of projects had been identified upstream in the decision-making and negotiation. There was, for instance, no real requirement for the member states to undertake an ex ante study to identify the most suitable projects. In the three countries, the difference of the support provided arose from different contexts, various needs and starting points, but also diverse demands from the new Member States.

According to the objectives listed in the grant agreement, all projects covered at least one of the targeted objectives. Environmental upgrading (including energy efficiency) is the most represented objectives (78% of the supported projects), followed by security of supply (45%) and modernisation of transmission and distribution sectors (38%). A majority of projects cover more than one of the targeted objectives.

In Bulgaria, projects targeted mainly four out of the five objectives (Figure 4). The development of renewable energy sources was less addressed.

All of the funded projects in Lithuania can be seen as contributing to these objectives, and thus highly coherent with the objectives set out in the Accession Treaties (Figure 4). None of the project interventions appear to contradict the objectives of the Accession Treaties. It is difficult to say whether there are objectives that were not met, given that foreseen measures were intended to contribute to upgrading and modernising the energy sector. Thus, further measures could be justified to contribute to these objectives.

All five of the NDAP projects in Slovakia contributed directly to these objectives (Figure 4). Besides necessary networks projects, there had been discussions about the upgrading of two coal-fired power plants, but a cost benefit analysis concluded that it would be more efficient to mobilise funds on energy efficiency projects. The two other projects focused on energy efficiency. One project (SlovSEFF) also included renewable energy investments, which were not included in the original objectives, but could be seen as ensuring reliable supply as a consequence of the NPP closure.

5.2.2 KQ4: To what extent are the funded 'Energy window' projects coherent with the EU acquis (energy policy of the EU), in particular in the areas of energy and environment?

Answer: The funded projects show a mixed degree of coherence with the EU acquis in the areas of energy and environment. For all supported projects, there were however no cases of direct conflict with the EU acquis.

Both of the two production projects in Lithuania[71] were relevant to the energy acquis[72] and one in Bulgaria[73]. At the networks stage, all three (100%) of the projects in each of Lithuania and Slovakia were relevant, being aligned with the market integration objective of EU energy policy. In Bulgaria, given their local scope, most of the network projects were not implemented in relation to the energy acquis.

In contrast, for consumption projects, almost all (87%) were coherent with the energy acquis in Bulgaria, along with 100% in both Lithuania and Slovakia. This reflects the large number of funded projects on energy efficiency contributed to implementation of Directive (2010/31) on the energy performance of buildings.

Most of the projects are not relevant for acquis in the area of the environment. The principal exceptions are a few production and transmission projects. In the former case, the intervention mostly concerns the compliance upgrade with regards to air emissions (e.g. thermal power plant in Maritsa and LPP in Lithuania). For the latter, the compliance with the acquis is mostly linked to protected areas, implying the question of coherence with EU Birds and Habitats Directives. Such issues concerned two projects in Slovakia, one in Lithuania and one in Bulgaria.

5.2.3 Conclusion for the coherence criterion

To address the consequences of the early closure of the nuclear power plants, the legal base[74] indicated various objectives that the 'Energy window' of the Nuclear Decommissioning Assistance Programme should seek to achieve:

- Environmental upgrading in line with the EU environmental acquis (including energy efficiency);
- Modernisation of the conventional energy production;
- Contribution to necessary restructuring, upgrading of the environment and modernisation of the energy production, transmission and distribution sectors;
- Enhancement of the security of supply;

[71] GA 002D - Ignalina NPP Decommission Support Investment Packages – B5 heat and steam upgrading and GA 005 - Lithuanian Power Plant Environmental and Related Technical Upgrading and

[72] Details on the relevant legislation are detailed in the individual fiches (Appendix I)

[73] GA 012A - For the contribution in the MARITSA EAST-2 (Thermal Power Plant) REHABILITATION PROGRAMME - Installation of Gypsum Dewatering System and Rehabilitation of the Cooling Pump Station

[74] For Bulgaria: Treaty of Accession of the Republic of Bulgaria and Romania (2005)

For Lithuania: Protocol No4 of the Treaty of Accession of the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia (2003)

For Slovakia: Protocol 9 of the Treaty of Accession of the Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia (2003) and Council Regulation (EC, Euratom) No 549/2007 of 14 May 2007

- Enhancement of the use of renewable energy sources (in Bulgaria only).

Overall, the programme supported various projects, focusing on different sub-sectors of the energy value chain, from production to consumption or networks. In the three countries, the disparity of the support provided arose from distinct contexts, diverse needs and starting points, and hence various national proposals of projects to be supported. At the programme and the country level, the precise amount to be devoted to each objective was not initially set. On the one hand, it enabled the flexibility needed to support various kind of projects, but on the other hand, it contributed to generate concerns about decommissioning financing.

According to the objectives listed in the grant agreement, all projects covered at least one of the targeted objectives. Environmental upgrading (including energy efficiency) is the most represented objectives, followed by security of supply and modernisation of transmission and distribution sectors. Production, either through conventional or renewable capacities, is less preeminent, with a smaller number of projects but of larger value. It concerns mostly conventional capacities, with one single project weighting more than 25% of the total programme budget.

Looking at the position of the project in the value chain, differences of approaches between the countries are noticeable. Projects in Bulgaria target the whole value chain, with a stronger emphasis downstream the value chain (networks and consumption). In Lithuania, efforts were further oriented towards upstream (production), notably with the Lithuania power plant upgrading and modernisation, partially to comply with the EU acquis. In Slovakia, networks, notably transmission, took the larger share with the objective to enhance security of supply. Overall, the upgraded production capacities represent 43% of the removed nuclear capacity, and the new conventional and renewable energy sources capacities represent 333 MW, accounting for about 6% of the removed nuclear capacity[75].

In the three countries, the evaluators' team considers that these priorities are coherent and reflected within the objectives of the accession treaties. A large majority of the supported projects are deemed very coherent with the objectives set out in the Accession Treaties and subsequent regulations. For the remaining 10% of the supported projects, the coherence is judged medium.

[75] 1,750 MW in Bulgaria, 3,000 MW in Lithuania and 816 MW in Slovakia

5.3 EU added-value

5.3.1 KQ5: What identifiable added value has resulted from the Union assistance through this specific instrument?

5.3.1.1 Would these projects have been implemented with the same level of ambition without the support from the NDAP?

Answer: Overall, the EU funding did allow projects to be implemented more quickly and with a greater level of ambition than it would have otherwise occurred.

It is probable that only few of the projects would have been implemented with the same level of ambition without NDAP support (individual fiches in Appendix I and Figure 63). Three of four of the production-related projects in Bulgaria are unlikely to have been implemented with the same level of ambition or timeliness. In Lithuania, the heat and steam upgrading to the Ignalina NPP needed to be carried out and would have been implemented without support. Similarly, projects at the consumption stage, including all those in Lithuania, might have gone ahead. However, all these projects would have had lower levels of ambition or would have been launched at a later stage.

Two of the network projects in Bulgaria were likely to have been implemented on a smaller scale or at a later time. Two of the three network projects in Slovakia are likely to have been implemented, as they were required to secure the reliability and security of the grid following the closure of the nuclear units.

5.3.1.2 To which extent the NDAP has been a catalyst for doing projects and leveraging additional funding sources? Would these projects have been financed by different funding sources (i.e. ESIF) in the absence of the NDAP?

Answer: The Nuclear Decommissioning Assistance Programme has been instrumental for the realisation of a large majority of projects. Without this support, a significant number of projects would not have been implemented, implemented later, implemented in several stages or implemented with a reduced scope. In some cases, their implementation - without NDAP financing - would have generated significant energy price increases for end-consumers, while subsidies allowed to reduce the capital costs and hence the deferment on end-consumers. In most cases, there was some co-financing additional to NDAP financing (Figure 14), originating from public or private sources in function of the project.

The difference of implementation without NDAP support is particularly the case for projects at the consumption end of the value chain. Many of these projects, focusing for the most part on energy efficiency in buildings, lacked a viable economic rationale without NDAP financing, especially in Bulgaria and Slovakia. Other projects at the consumption stage, including all those in Lithuania, might have gone ahead, but with lower levels of ambition and at a later stage.

With respect to projects at the network and production stages, the situation appears more mixed. Most of the network projects in Bulgaria were unlikely to have been implemented without NDAP support. Only two (on 17) were likely to be implemented, one on a smaller scale and another one at a later time. Two of the three network projects in Lithuania were judged as having little chance of being implemented if they had not received support from the energy window. In contrast, two of the three network projects in Slovakia are likely to have been implemented, using national funds.

In Lithuania, the upgrading of the LPP is not likely to have been implemented without NDAP financing. The heat and steam upgrading to the Ignalina NPP needed to be carried out and would have been implemented. Other funding might have been found for one of the three projects at the network stage, though this concerned consultancy services for the LitPol Link (for which construction was funded through other EU programmes). In Bulgaria, one of the four production stage projects, the combined cycle power plant in Sofia, would likely have been funded by other means.

For completed project, the level of disbursed budget from the 'energy window' of the NDAP accounts to 46% of the total budget. There are however disparities in the level of financing, which ranges from 14 to 100%. Bigger projects (above €100m) tend to have a lower level of financing by the 'energy window', with a 50% rate at most. There is however no clear correlation between the level of financing and the position in the energy value chain of the project. Overall, Lithuanian and Slovakian projects benefited from a higher level of financing than Bulgarian projects. There is no evidence to explain these differences.

Overall, about one third of the projects benefited from NDAP full financing. Such projects occur in the three countries and they represent a commitment of 193 M€ (20% of NDAP total committed budget) of which 147 are already disbursed. It appears from investigations that some projects would most probably not have implemented without a full support from the NDAP. Indeed, due to limited investments capacities, some of the targeted beneficiaries would not have been able to co-finance the projects, even to a limited extent. This is notably the case of energy efficiency projects in small municipalities in Bulgaria. This full financing however led to the achievement of significant results with a relatively limited amount of money and to improve the EU reputation for newly integrated citizens.

According to the survey with grant holders, the level of financing of the programme was very appropriate, with 80% of positive answers (Figure 65).

Regarding the use of alternative sources of funding, there was no other programme as big as the NDAP in terms of scope and available budget. A few projects could have been funded through alternative sources, as indicated by survey respondents: European public or national public sources (5 respondents each) or alternative private funding (2 respondents). This limited number of projects that could have benefited from alternative funding indicate a limited windfall effect. For European funding sources, the complementarity of NDAP with other EU programmes was systematically verified, to avoid double-financing of the projects.

5.3.2 Conclusions for the EU added-value criterion

The EU added-value of the programme is clear and include several aspects.

First, from an economic and financial standpoint, most of the projects would not have been launched without NDAP support, or would have been significantly altered (e.g. delays, scope reduction) or generating undesirable effects (e.g. energy price increases[76]). The EU intervention allowed both to support the implementation of projects that would most certainly not have been implemented as quickly otherwise and to mitigate the economic consequences of the nuclear power plant closure for the general public. Only few projects indicated that the absence of NDAP funding would have had no impacts. For these projects, alternative funding could have been mobilised, originating most probably from European or national public sources. It is important to note that at the time of selection of the projects to be implemented, there was no similar supporting programme in the countries able to equal the range of topics and the level of ambition of the energy window. The level of financial volume provided through NDAP is unrivalled.

Second, the support provided through NDAP also contributed to develop capacity in the three countries. The 'energy window' has been a catalyst for further projects in the countries following its initial support. At the national level, the exposure to national platforms and to international organisations contributed to reinforce the capacity to administer such programme. In 2016, following the implementation of a project for the energy window, SIEA became an implementing body in Slovakia for the decommissioning window. At project level, the direct or indirect technical assistance proved useful for subsequent projects, not necessarily benefiting from EU funding. For instance, in Lithuania, the three EnerVizija projects enabled the successful development of a new mechanism that was later transferred to a national

[76] In the energy sector, investments are generally reported to the end-consumer through price increases. Subsidies for energy generation and supply projects reduce energy prices for consumers, as it reduces the capital costs compared to financing using commercial loans from banks.

agency for a programme funded nationally. Similarly, in Bulgaria, intermediary banks involved in a facility increased their technical and financial structuring capacities, to become able afterward to launch their own independent products. Besides, the implementation of international-level procurement rules generally contributed to the success of the projects.

Third, some projects supported through NDAP supported a better integration of the new Member States into the European energy market. Some NDAP-funded projects contributed to support grid interconnections with other EU countries. The energy window has been a catalyst for the subsequent development of further integration (e.g. synchronization with the European electricity system in Lithuania).

Last, the financing of different projects in several areas of the countries contributed to give a sense of inclusion in the European Union for the new Member States. The financing of local actions showed concretely the effects of pertaining to the European Union and the improvements it could have in the daily life of its citizens. In addition, a few of the NDAP-supported projects were followed by further investments, on own funds or using other public funding sources.

For a majority of supported projects, the EU-added value was assessed as high. For a bit more than a third of the projects, the added-value was assessed as medium. For one Lithuanian project, the EU-added value was assessed as low, as the project would have been carried out similarly without EU funding even though it resulted directly from the closure of the nuclear units.

5.4 Effectiveness

5.4.1 KQ6: To what extent have the 'Energy window' objectives been achieved? What have been the quantitative and qualitative results of the intervention?

5.4.1.1 What have been the quantitative results of the intervention on a project level and on an aggregated sectoral and national level?

Answer: The programme awarded 58 grants in three countries, with eighteen of them still ongoing. Due to an insufficient monitoring, the quantitative figures are to be used cautiously. Tremendous results have however been achieved.

It is to be noted that the figures presented in this section are to be used cautiously: some projects did not have a quantified monitoring of their results[77] (and thus, are not included) and they are uncertainties about the figures provided (real vs expected for ongoing or recently finished projects, low visibility on assumptions and calculations used). The quantitative results summed below provide however an order of magnitude of the outcomes of the programme, according to their position in the energy value chain.

- On the production side:
  - Upgrade 3 production plants in line with the EU acquis, for more than 2,400 MW of capacity, including 103 MW of additional capacities
  - Support the development of renewable energy projects for a total capacity of 230 MW
- On the network side:
  - Build 3 transmission lines
  - Construct 21 gas pipeline branches
  - Upgrade several substations (at least 19) and transformers
  - Upgrade 5 overhead lines (1 in Bulgaria[78], 4 in Slovakia[79])
  - Pave the way for several international interconnections
- On the consumption side:
  - Refurbish 480 public buildings
  - Refurbish at least 380 residential building
  - Refurbish tens of thousands of households (at least 200,000)
  - Realise savings equivalent to more than 60MW of electricity generation capacity
  - Modernise 5 industrial sites and undertake more than 70 industrial energy efficiency projects
  - Achieved energy savings in the range of 2,800 GWh/yr. Most of the savings will occur in Bulgaria
  - Improve street lighting in more than 35 cities
  - Modernise 4 district heating networks
  - Generate annual energy savings representing more than 2,800 GWh/yr and GHG emissions savings of at least 2,2 mtCO_2/yr.

[77] Only half of the respondents of the survey answered that the objectives of the projects were quantified, and a third answered that they were not (the rest did not know, Figure 34). In project completion reports, there are sometimes no mention of the energy achievements.

[78] GA 036B - For Refurbishment and Extension of the National Electricity Transmission System (construction of a new 400kV power line from TPP Maritsa Iztok 2 (s/s MI) to s/s Bourgas and Construction of a new 400kV power line from TPP Maritsa Iztok 2 (s/s MI) to s/s Plovdiv)

[79] GA 014A - Measures in transmission sector consequential final shutdown of Bohunica V1 and GA 020A - Complex ES Bystricany - Transformation 400/110 kV

The energy results were in line with the expected objectives. The results vary widely per grant, which is due to the scope and size of the grant. In a few cases, the results exceeded the expectations (Figure 35, Figure 78). High energy savings mostly occur on projects with an inefficient starting position. The calculation method used also played a role here, e.g. whether indirect savings are included or not. In a similar number of cases, the results were lower than expected. Lower than expected results are mostly for consumption projects. It should however be noted that for energy efficiency projects, the achievement of lower results than initially expected is quite common as results are difficult to compare (e.g. increased consumption linked to changes of habits).

In general, low energy saving results are often seen in projects with a different focus of the grant (e.g. reliability of supply), street light projects or unfinished projects. For example, in some Lithuanian cases, the projects were successfully implemented, but only a small part of its capacity is used: e.g. the gas pipeline from Pabrade to Visaginas and Ignalina has a capacity utilisation of only 5% of its maximum capacity and the Lithuania Power Plant did not even reach one-third of its total capacity.

Overall, the effectiveness of the program is good, with about half the projects being assessed as having high effectiveness, 37% of the projects are medium effective and a small number (11%) of the projects have a low effectiveness (Appendix I). It should be noted that most projects with a low score on effectiveness are from Lithuania.

For the impact on energy import dependency not enough data is available to make a quantification. Most projects do contribute to reducing energy import dependency, either by lowering the energy use or by energy production, but their contribution has not measured or monitored.

5.4.1.2 What have been the qualitative results of the intervention?

Answer: The highest qualitative impacts are on the improved security of supply, the improvement of the national energy intensity, the enhancement of working and living conditions, and direct employment. The highest induced effects of the projects are on better social conditions and better local economic conditions.

About half of the projects achieved better working and living conditions as a result. Most of these are due to the refurbishments of buildings, where the main objective was energy saving, but a significant other advantage included a higher comfort level. As a consequence of NDAP intervention, the buildings are warmer in the winter and less hot in the summer. For some buildings, like schools and hospitals, an indirect effect of the higher comfort has been an additional positive effect on health and better learning. Also, some projects report a positive aesthetic effect from the renovation.

In the fields of employment and local economic conditions, there are several different ways in which positive impacts have been achieved. The most obvious one is the direct employment following from the work carried out by local companies. Generally, non-local companies carried out the work, but sometimes they did hire local workers or subcontracted local companies. Almost no project could provide data on direct or indirect employments as this was not monitored. Rough estimates however indicate that, in Lithuania, the national programme managed by the BETA agency as a follow-up of NDAP-supported projects could contribute to securing some 10,000 jobs in the construction industry, and in Slovakia, the SlovSEFF has helped create more than 20,000 jobs.

Next to jobs, several projects also capitalised on the skills learned during the implementation of the projects. For example, the experience in international procurement, experience with large construction projects, new technical knowledge, increased project management capacity, and improved planning and management skills are among the advantages brought by NDAP-supported projects. These skills can be reused in other projects and it was reported that local SMEs involved in the projects are now able to compete internationally, notably for energy efficiency refurbishments. Even at the level of the implementing body, the energy efficiency financing facility model used during NDAP was implemented in other countries by EBRD.

Regarding security of supply, its improvement was mostly mentioned as a result by about one third of the projects in the different countries (Figure 37). This result was achieved by both production and networks projects. Consumption projects often do not consider that they have an impact on the security of supply. Although indirectly, they however contributed to improve the security of supply.

Finally, other qualitative impacts include:

- lower energy bills, due to a higher energy efficiency, both for occupants (Figure 77) and for companies. Due to a lack of monitoring and comparability, this impact could not be measured quantitatively;
- spilling-effect, through the demonstrator effect of the supported projects. For instance, following a NDAP-supported project in Bulgaria, intermediary banks involved in a facility launched their own products, independently of public funding. For energy efficiency projects, raising awareness and generating investments can be a long process, and the supported projects contributed to demonstrate the existence of local markets;
- positive effects on local SMEs with a decreased frequency of power outage (no one indicated power outages consecutive to the closure of the power plant), and hence on regional economic development;
- availability of electricity in areas where it was not available before, thus fostering regional development;
- increased safety, for examples through pipeline replacements or street lights causing more safety for pedestrians and drivers of motor vehicles during night time.

5.4.2 KQ7: How effective is the governance system?

Answer: The support of both EBRD and CPMA was in general considered to be very good.

The EU funds granted to the NDAP were, and, to some extent, still are, channelled through implementing bodies. For the 'energy window', the two implementing bodies were EBRD, for €902m in the three countries, and CMPA, for €45m in Lithuania only.

There was ample communication with the EBRD and their support was considered very good and constructive. An example is that EBRD was required to publish the names of the companies who registered to the tendering process in order to allow them to form collaborations. This turned out well, as tenders' results were good and favourable procurement conditions were achieved. CPMA had fewer projects to assist, but findings suggest that CPMA was also very supportive and problems were solved effectively and efficiently. None of the project leaders mentioned that EBRD or CPMA were not effective as implementing bodies.

However, there were also some struggles with the governance system. In Slovakia there was a push to have a local implementation body, but it only came into place in 2015 and only for the decommissioning window. Also, in Slovakia, there were fewer projects in the energy sector, as the government wanted to optimise the use of money for the decommissioning. An ex ante quantification of the goals might have helped this discussion.

At project level, it also appeared that there was a high satisfaction with the process of project monitoring and follow-up (Figure 47). There is no notable difference per country. Monitoring of the selected projects was done both at the national level and the implementing body level. Monitoring Committees bringing together relevant stakeholders were organised every six months to monitor the projects in the three countries and have been initiated by the Commission. The European Commission retains control of the selection of projects, receives regular progress reports from the Fund's management through its participation in the governing body of the Fund, and, in the case of Lithuania, directly approved the projects to be implemented by CPMA.

5.4.2.1 Does the governance system enable the effective prioritisation of measures with reference to the objectives for the 'Energy window'?

Answer: The governance system enables the effective prioritisation of measures with reference to the objectives for the 'Energy window'.

In the three countries, prioritisation of the projects was undertaken by the Ministry of Energy (Bulgaria and Lithuania) or the Ministry of Economy (Slovakia). In some cases, a national selection committee involving several stakeholders existed to identify the projects to be proposed for funding. Informal consultations with the implementing body could occur and could lead to the evolution of the project, before it was submitted to the Assembly of Contributors for approval. There was no requirement for the countries to identify the best projects or to perform an *ex ante* study, which would have helped in effectively prioritizing measures.

The national variations in terms of number of projects does not originate from the organisation of the programme, but rather from the type of projects supported and the organisational preferences of the programme managers (both at the national and implementing body levels).

5.4.2.2 Does the governance system enable the effective management of risk?

Answer: The governance system of the project clearly supported the projects in identifying risks and managing them, as proved by the results of the survey, with 71% of positive answered and only 4% negative (Figure 49).

There were regular updates and communication between the parties concerned, that helped in identifying and managing risks.

5.4.2.3 Does the governance system support the minimisation and recovery from delays?

Answer: It is not clear to what extent the governance systems allowed to minimise or recover from delays.

However, the research did find that delays occurred in some projects and that, in the perception of the project leaders, problems were often solved effectively and that support from the implementing bodies was useful. In a few cases, the governance contributed to generate delays, notably in relation with the lack of internal capacities for the implementation of different procurement rules.

5.4.2.4 Does the governance system enable the contractor to effectively overcome administrative bottlenecks?

Answer: From the evidence collected, it is not clear to what extent the governance systems allowed to effectively overcome administrative bottlenecks.

For a few projects, the implementation of the implementing body rules allowed to reduce administrative burdens, while a lower number of projects report additional burden linked notably to the implementation of procurement rules.

Another administrative obstacle was at the EU level, to ensure the complementarity with other EU programmes, notably those of DG REGIO, in order to avoid double-financing of the projects.

Overall, it however appears that the administrative burdens linked to the programme were and are however reduced compared to other financing mechanisms.

5.4.3 *KQ8: What factors influenced (positively and negatively) the progress of the 'Energy window' projects?*

Answer: The main success factors influencing positively the progress of the energy window projects were 1) an experienced implementing body, 2) a good management structure, 3) a good project design and 4) an experienced project manager (independent of country or type of project).

The four success factors seem to be the shared among countries. In addition, in Lithuania, the use of procurement rules by the national implementing body CPMA stood out, while public acceptance was key in Slovakia (Figure 44, Figure 79).

Regarding the procurement rules, the opinions are mitigated: many people considered it was an asset for their projects, while about 20% considered it led to less efficiency as there was internal difficulties to implement them (Figure 62). Overall, the reliability and experience of the suppliers and contractors was however underlined.

A joint commitment by all stakeholders can be a success factor in all projects though and is mentioned several times by different projects. Public acceptance and cooperation with the public were particularly important for a project where transmission lines were running across several landowners, as well as national parks and protected areas.

More than a third of the projects mentioned that they faced challenges during its implementation (Figure 42, Figure 80). Most of the challenges were met in Slovakia and Lithuania. "Technical issues" appeared to be the most common challenge, for about half the projects, and was often paired with some other challenge (Figure 43). The challenge faced differed by country: e.g. Lithuania had more problems with social contestation and a lack of capacity was only mentioned by project leaders from Lithuania and Bulgaria. In general, respondents state that the challenges encountered have been solved efficiently and satisfactorily.

5.4.4 *Conclusions for the effectiveness criterion*

The evaluators' team considers that NDAP's 'energy window' has been a successful programme. Although objectives have not been initially set at the programme level, the majority of the supported projects achieved their initial energy objectives. A small share, about 15%, even consider that results are above expectations.

In total, it supported 58 projects in the three countries. 18 projects are still ongoing. Although there are some uncertainties about the quantitative results as some projects lack a monitoring framework, the order of magnitude of the programme outcomes for both real and expected results should be at least of:

- On the production side:
  - Upgrade 3 production plants in line with the EU acquis, for more than 2,400 MW of capacity, including 103 MW of additional capacities
  - Support the development of renewable energy projects for a total capacity of 230 MW
- On the network side:
  - Build 3 transmission lines
  - Construct 21 gas pipeline branches
  - Upgrade several substations (at least 19) and transformers
  - Upgrade 5 overhead lines
  - Pave the way for several international interconnections

- On the consumption side:
  - Refurbish 480 public buildings
  - Refurbish at least 380 residential building
  - Refurbish tens of thousands of households (at least 200,000)
  - Realise savings equivalent to more than 60MW of electricity generation capacity
  - Modernise 5 industrial sites and undertake more than 70 industrial energy efficiency projects
  - Achieved energy savings in the range of 2,800 GWh/yr. Most of the savings will occur in Bulgaria
  - Improve street lighting in more than 35 cities
  - Modernise 4 district heating networks
  - Generate annual energy savings representing more than 2,800 GWh/yr and GHG emissions savings of at least 2,2 $mtCO_2$/yr.

Only few projects did not achieve their objectives, for various reasons: technological choices, contractual issues, lack of capacity or commitment, insufficient support, lack of potential, lack of perspectives.

Qualitatively, NDAP has had strong effects in the energy sector. It contributed to triggered subsequent investments on all value chains of the sector, to raise awareness on energy efficiency and to replicate some of the supported initiatives at the national or European level.

In terms of governance, the EU funds granted to the NDAP were, and, to some extent, still are, channelled through implementing bodies (EBRD in the three countries and CPMA in Lithuania). For EBRD, the final selection of the projects to support was done by the Assembly of Contributors, upon proposals by the countries. Countries used NDAP to finance high-priorities projects in line with their national strategies and plans. Overall, the governance of the programme was positively assessed, with a high degree of satisfaction and without notable differences per country.

Overall, the experience of the implementing bodies with similar projects, the value added of the implementing bodies, the use of different procurement rules and the national coordination contributed to make the programme more efficient. However, the programme also faced some challenges. Administratively, it was necessary to ensure the complementarity with other EU programmes, notably those of DG REGIO, to avoid double-financing of the project. Although generally positive, in some cases, there were some difficulties for the implementation of procurement rules.

5.5 Efficiency

Overall, the efficiency of the projects is high or medium for most projects and was only low for three projects (Appendix I). All projects with a low efficiency were Lithuanian projects. There is no substantial difference between Bulgarian and Slovakian projects or between different types of projects.

5.5.1 KQ9: To what extent have the 'Energy window' projects been cost effective? In comparison with relevant industrial/infrastructural sectors and international experience, has this programme been efficient?

Answer: The costs of the projects supported by NDAP were commensurate to the benefits achieved (as illustrated by beneficiaries in Figure 50, Figure 51). It appears that the costs of the projects were also commensurate to the costs of similar projects financed by other mechanisms (Figure 53, Figure 54).

The evaluators' team considers that NDAP is about as efficient as other EU funded projects under different financing mechanisms. The NDAP intervention was both instrumental and timely in the three countries, as no other programmes could finance the scope and the volume of projects covered through the 'energy window'.

Interviewees with knowledge of other programmes do not note significant differences between NDAP and other financing mechanisms (Figure 67). In terms of level of co-financing and administrative burden, NDAP performed better than other financial mechanisms. In terms of project implementation, opinions are divided, with some respondents indicating a better performance and some a worse performance of NDAP.

As the NDAP has multiple objectives and the design and calculation methods used differ per project, the quantitative results on efficiency (for instance via an indicator such as the kWh saved/ euro invested or the increased capacity) cannot be compared to quantitative results of other financial mechanisms. Within the NDAP, the efficiency of different projects varies widely, with projects between €0.02 kWh/y and €10.89 kWh/y. For most of the NDAP projects the cost per benefit on energy efficiency is below €2 kWh/y, which is fine.

It is to be noted that Energy Efficiency Financing Facilities have a high leverage and low costs for the benefits achieved, with an average efficiency of €0.8 kWh/y.

Higher costs per kWh are mostly seen in projects that not only had energy efficiency as a goal but also security of supply, where the impact on the increased level of security of supply was not measured. The higher costs per kWh are therefore totally justifiable.

5.5.2 KQ10: With reference to the method of implementation, using the indirect management mode through the implementing bodies, is the management of the 'Energy window' efficient?

Answer: The use of the implementing bodies appeared to be positive and efficient for the programme (Figure 61).

It is unlikely that the programme would have been as effective and efficient if funds had been managed directly by the Member States themselves from the start of the programme.

Given previous involvement in prior programmes, such as PHARE, the EBRD could capitalise on its experience and running working structure (Figure 62). It is unsure that the same projects would have been implemented if funds had been directly delegated to the Member States, especially as the closure of the nuclear units generated local resistance and political discussions. The method of implementation contributed to ensure that the funds were dedicated to projects in line with the legal bases.

Overall, the management structure of the programme made the projects more efficient. The experience of the implementing bodies with similar projects and the value added of the implementing bodies are the most important success factors (Figure 62). Their methods and experience were recognised by many

as source of efficiency. Overall, the management structure of the programme is considered efficient, with only few projects (mostly in Slovakia) indicating that efficiency would have been greater with another implementation method (section 4 Country studies, Appendix I).

In a significant number of cases, the tendering procedure helped in receiving the best value for money[80], and projects achieved competitive prices of materials and labour (Figure 62). In some cases, it has allowed to select international competitors with better-for-value proposals than national competitors (that were sometimes subcontracted by the winning companies). In addition, in several cases, projects were finalised ahead of schedule and below budget. For the completed projects, the amounts eventually disbursed are 7% lower than the amounts committed. The difference was returned to the different funds, to support other projects on the energy (before 2013) or the decommissioning side. Feelings are however mixed regarding the implementation of the procurement rules: in several cases, it was one of the key success factors, but in fewer cases, it generated difficulties due to a lack of internal capacities and engendered delays. This is notably the case for projects in Slovakia.

For three projects[81], missed opportunities for a higher value for money however appeared during the evaluation (Appendix I). Ex post, choices unveiled inadequate, either because not enough options were considered or because of the non-selection of the technology with the most economical solution. It notably concerned the largest project supported by the energy window, in Lithuania.

It appears that administrative burdens for NDAP were generally low, improving the efficiency of the projects compared to other financing mechanisms. One of the reasons of the low administrative burden was the centralisation of procurement procedures, decreasing the administrative burden for municipalities. Also, EBRD was quick in giving feedback, and reports to the EBRD were approved relatively fast, which led to a lower administrative burden for beneficiaries. However, there were also some administrative obstacles leading to extra work and less efficiency. At the project level, difficulties with the implementation of procurement rules negatively impacted the efficiency in a few cases. At the EU level, ensuring the complementarity with other EU programmes contributed to generate delays and administrative burdens.

Furthermore, the programme implementation contributed to capacity-building, not only at the project level but also at the national level. It enabled the uptake of local implementing bodies (e.g. CPMA in Lithuania for both windows, SIEA in Slovakia for the decommissioning window). Once sufficient capacities are available nationally, project implementation by national bodies was perceived less cumbersome for national projects than implementation by international donors such as EBRD.

5.5.3 *KQ11: What factors influenced (positively and negatively) the cost-effectiveness of the 'Energy window' projects?*

Answer: Several factors had a positive effect on the cost-effectiveness of the 'Energy window' projects. The external technical support, the internal technical capacity, the governance and the project design made the projects more efficient in many cases (Figure 56, Figure 57, Figure 58, Figure 59, Figure 60). In some cases, it is however to be noted that the internal technical capacity and the project design contributed to make the project less efficient.

Beside the management structure, the national coordination and the use of different procurement rules also appeared as positive factors for the cost-effectiveness (Figure 62). Results are more balanced regarding the effect of the starting point, with about as many cases of positive impacts as negative ones (Figure 56).

[80] Based on stakeholders' assessments concurred by consultants' experjence with similar projects

[81] GA 005E - Lithuania Power Plant Environmental and Related Technical Upgrading and HUD.01 – HUDA Mechanism in Lithunia and GA 033A - Construction Of A Small Hydro Power Plant On The Iliina River For The Safe And Reliable Energy Supply And For The Energy Efficiency Improvements Of The Area in Bulgaria

The efficiency of projects was also improved by the experience gained from other similar projects, positive contexts, the direct payments to the suppliers which eliminated conditions for corruption, the adoption of more centralised monitoring tools and a dedicated management transformation system.

Other factors that affected the efficiency of the projects were contractual issues, contractor governance, focus of the project on a sector needing more resources (rendering the project less efficient, see 5.5.1), the lack of external resources and organisational and regulatory issues (Appendix I). For instance, in Bulgaria, the impossibility to negotiate directly with the residential owner associations impacted the efficiency of the energy efficiency facilities compared to Slovakia.

5.5.4 KQ12: Is there evidence that the current co-financing arrangements have positively affected obtaining better value for money in managing projects?

Answer: Most projects were co-financed by NDAP and another party. The evaluation shows that overall, by instituting co-financing in most projects, NDAP financing arrangements positively affected value for money. In a few cases, it was however not possible to set up co-financing, due to a project's scope or the limited investment capacities of the tenant. For these projects, it generally appears that the level of NDAP financing was higher for analogous results. Compared to other financing mechanisms, it appears that NDAP had often a higher level of financing for similar results.

The level of financing under NDAP differed for each grant. NDAP intervention often helped either in the implementation of a project or by speeding up its execution. Overall, including ongoing projects, the expected NDAP financing level of the programme is 50%, with some variations between countries: in Bulgaria, this level stands at 43%, 56% in Lithuania and 61% in Slovakia. These differences can be explained by the link between the project and the premature closure of the NPP, the type of projects and the public or private status of the grant holder.

For production and network projects, 100% funding was often not necessary, but NDAP financing contributed by supporting projects of strategic importance. For example, the project related to the Lithuanian Power Plant (project 005) and the gas pipeline in Lithuania (project 004) were not economically viable without NDAP funding and would probably not have been carried out in its absence. In Slovakia, the probability of the network projects occurring without NDAP support was deemed as high, although NDAP financing accelerated their inception.

For consumption projects, co-financing by both NDAP and another party (other public or private funds) turned out to be efficient (notably for energy-efficiency projects). As seen in part 5.5.1.. the highest levels of efficiency were obtained by Energy Efficiency Financing Facilities, which often financed 10-20% of energy-efficiency projects and occasionally allocated a loan for another part of the project.

In some cases, NDAP did fund 100% of a project. This was the case for approximately one-third of the projects, covering all sectors of the value chain, although more on the consumption side for smaller consumption projects (e.g. street lighting, refurbishment of public buildings; See Figure 14 and Figure 15). However, for some projects, full financing was needed, given the impacts of the NPP closure, the limited investment capacities and the administrative burden linked to the mobilisation of several financing mechanisms. The probability of these projects taking place without EU funding was perceived as low. Furthermore, such projects sometimes acted as a catalyst for additional actions. For instance, in Lithuania, the NDAP-supported EnerVizija projects developed a funding, financing and project implementation mechanism that was subsequently transferred to the national BETA agency who rolled it out nationwide.

When comparing projects with different levels of NDAP financing, there are no major differences in terms of results. It can therefore be said that, when possible, the co-financing arrangements have helped in obtaining a better value for money by mobilising additional public or private sources of financing.

For example, in Slovakia, a different level of NDAP financing was set for each project. For each SEPS projects (and subsequent subprojects), the EBRD conducted a due diligence study for each of the projects to assess the proposed options, their costs and the level of co-financing. Subprojects which were deemed as being directly consequential to the premature shutdown of the NPP were financed 100% from BIDSF, subprojects which were not directly consequential to the premature shutdown had to be financed from other sources. Subprojects where one part was directly consequential to the premature shutdown were partly financed by NDAP, which led to the variations in co-financing rates overall. In SlovSEFF (GA 011) – the level of the grant was negotiated between the EBRD and the Ministry of Economy and was aimed only to provide a small economic incentive to applicants for loans provided by the facility. In total, €30m worth of grants was provided for a facility offering €150m worth of loans. In the Pilot EE project for energy efficiency in public buildings (GA 015), the BIDSF financing rate was 100%, as the two regions were directly impacted by the shutdown of the nearby Bohunice NPP.

Compared to other financing mechanisms, it appears that in some cases NDAP had a higher level of financing for similar results (Figure 67). This makes the case that a higher level of co-financing by other sources than NDAP could have allowed for a better value for money. However, it appears that in certain cases in Bulgaria, the level of NDAP financing was lower than the level of other financing mechanisms, such as NTEF (National Trust Eco Fund) or ESIF (European Structural and Investment Funds). The lower administrative burden, the availability of early financing and the selection process all represent success factors of NDAP compared to other financing mechanisms (section 4).

5.5.5 Conclusions for the efficiency criterion

Overall, the evaluators' team considers that the 'Energy window' projects are efficient, with about one-half rated as highly efficient and the other half rated as moderately efficient. There is no substantial difference depending on the country or the position of the project within the energy-value chain. The sole exception is for three Lithuanian projects for which cost-effectiveness was assessed as low.

For most projects, the costs of the project were wholly commensurate to the benefits achieved. Results are mostly positive in Bulgaria, while they are more balanced in Lithuania and Slovakia. No project was found to have costs that are not commensurate to the benefits achieved. Looking at the position of the project in the energy value chain, networks projects and consumption projects score higher than production projects. It should however be noted that for energy-efficiency projects, the achievement of lower results than initially expected is quite common as results are difficult to compare (e.g. increased consumption linked to changes of habits).

The use of procurements rules has been particularly noteworthy in explaining the efficiency of projects. On the other hand, the low efficiency seen in some projects can be explained by questionable choices in terms of technologies and low use of the implemented equipment.

In comparison with other programmes implementing comparable projects, including EU-funded programmes, no significant differences stand out. When differences are noted, these tend to favour NDAP. The level of financing is in particular underlined as more attractive in the case of NDAP. The level of administrative burden also appears to be better in the case of NDAP. Importantly, NDAP intervention was both instrumental and timely in the three countries, as no other programmes could finance the scope and the volume of projects covered through the 'energy window'.

The identified enabling factors for the cost-effectiveness of the projects include the management structure, the experience and the use of the implementing body rules (including procurement), the project design, the experience and the leadership of the project manager, the assistance of external consultants, the relations with the implementing body (including flexibility to modify the project), and in some cases, the public acceptance.

On the other hand, slightly less than one-half of the projects faced challenges during their implementation. Certain barriers identified, by order of importance, were: the poor performances of certain contractors/subcontractors, administrative delays, the lack of technical capacities (internally or

externally), difficulties linked to the implementation of procurement rules, contractual issues between contractors and subcontractors, compliance with evolving legislations, political shifts and lack of political support and public resistance to the NPP closure.

5.6 Sustainability

5.6.1 KQ13: Has the intervention caused permanent changes/improvements in the national management systems related to the energy sector?

Answer: The NDAP programme had some lasting effects on the energy sector in the three countries, most notably on the security of supply.

This can be detailed in different ways for the countries:

- In Bulgaria, the NDAP programme has ensured flexibility of the network, reliable electricity distribution, security in electricity distribution, security in electricity supply, energy diversification and improved reliability of electricity supply. The increased safety leads to fewer planned repairs and emergency operations, and the quality of the services offered is enhanced. The programme has had significant positive impact on some local energy distribution networks because of new infrastructures (e.g. gas pipeline) and energy savings, although the impact on the energy system has in these cases been relatively small.
- In Lithuania, the NDAP programme has ensured reliable electricity production capacity after the closure of INPP in 2009 through ensuring operation of units 7 and 8 of the Lithuanian Power Plant with heavy fuel oil (and alternatively natural gas) beyond 2008, and through commissioning of the CCGT plant in the autumn of 2012. This allowed the national energy strategy to focus on further challenges. Today, Lithuania is almost self-sufficient in terms of capacity.
- The main impact of the programme in Slovakia has been on the security of supply. The projects certainly contributed to reaching Slovakia's energy efficiency and renewable energy goals, although this effect was indirect and not very substantial.

In both Bulgaria and Lithuania, some projects within the NDAP programme have adopted new types of management systems that did not exist before. For example, in Lithuania, the "EnerVizija" methodology was handed over in 2013 to the newly created national BETA agency. The methodology, now scaled up to national level, has greatly accelerated the upgrading of multi-apartment buildings, with some 500 residential buildings renovated annually. A previous NDAP-supported project with a national scope was unsuccessful.

There is some evidence that new capacities have been acquired within the ministries, implementing bodies and end-beneficiaries in Bulgaria and Lithuania:

- Capacity building among these players are mentioned by some interviewees and survey answers from Bulgaria.
- In Lithuania, the NDAP programme has been instrumental in building knowledge and capacity. For example, the national electricity grid operator became an electricity producer rather than a reserve operator, although, it has become a reserve operator again in 2016. The programme also allowed the state enterprise INPP to gather experience in carrying out such projects, including procurement. The successful project has contributed to continued efforts at national level to advance energy efficiency in public buildings. Ignalina Municipality was an early adopter of energy efficiency measures in public buildings, and thus was a certain role model for Lithuania. Limited but elaborated technical specifications for street lighting projects gained from some projects can serve as models for implementation across the country.

- In the case of Slovakia, there is little evidence of the intervention having caused changes / improvements in the national management systems or capacity building. The programme is said to have increased the awareness of energy efficiency and fostered more competition nationally, although the impact of this has not been quantified.

5.6.2 *KQ14: Has the intervention supported the development of SMEs either locally or at Union level?*

Answer: The focus of the projects and the procurement rules were quoted as features that impeded the participation of SMEs. However, there are some examples of how the projects have supported development of SMEs locally.

In the survey to stakeholders, one third of the respondents claim that the project supported the development of SMEs locally (Figure 68, Figure 86). Roughly half of the respondents do not know if this was the case, as this was not monitored at the project and programme levels. Development of local SMEs seems to have been relatively more successful in Lithuania, followed by Bulgaria and, to a lesser extent, Slovakia. It should be noted that in Slovakia the programme did not aim specifically on the development of SMEs (but given its eligibility and small-scale investments, most of the beneficiaries were indeed SMEs). The development of SMEs was here just a side benefit.

In a few cases the project was directly implemented by small businesses. Nevertheless, the most common is that local SMEs were subcontracted by main contractors. In addition, local SMEs provided temporary services, linked to the construction period: renting living apartments for the operators, lunches in cafes and some work on the actual construction objects (see details in Appendix I).

It is to be noted that involved SMEs developed capacities and gained experience during the projects that they were able to utilise in other later projects, nationally and internationally. This is particularly true for energy efficiency and building refurbishment. There has however not been any monitoring of these developments.

5.6.3 *KQ15: Has the intervention fostered growth locally or mitigated negative economic conditions?*

Answer: The main intervention of the programme to foster growth locally or to mitigate negative economic conditions has been through the hiring of local companies as sub-contractors to perform construction activities.

This is a recurring feature especially in Bulgaria, and to some extent also in Lithuania. In most cases, it was however not monitored.

In **Bulgaria**, the effects of NDAP on the economy are twofold. On the one hand, NDAP contributed to directly support local companies. One estimate is that about 60% of the construction installation activities were performed by Bulgarian companies. This has had a positive impact on local economy as most of the companies and workforce were local. In one case it is also stressed that local consultants have been hired, thus stimulating the local consulting market. Construction materials and tools used on the construction sites were obtained locally thus generating turnover for the local market. On the other hand, NDAP interventions allowed to mitigate energy prices' increases consequential to the nuclear plant closures. The financial support provided resulted in lower investments from companies, and thus a lower offset on both individuals and the private sector. The impact has been positive on SMEs in some regions: reduced fuel prices are a prerequisite for reduced prices of the finished product and hence a factor of competitiveness for the company. Reliability in power delivery also has a positive, but indirect, impact on local businesses. It has not been possible to determine the number of companies or people benefitting directly or indirectly from this.

In **Lithuania**, both local companies and local workers have benefited from the programme, although not exclusively; non-local companies also carried out works in the framework of some projects. Local companies were hired as sub-contractors and local workers employed during the implementation of projects. Direct job creation took place during the construction phase since this was typically carried out by local companies: construction works, metering and regulation station and electrical works. The amount of this, however, is difficult to verify in detail.

The Ignalina Municipality and the construction companies carrying out the works have developed capacities and competences in building renovations. The spin-off to the EnerVizija ensures some 500 building renovations per year, making this a stable factor in the economy. Some respondents claim that the impact on local SMEs has been limited, partly because of public procurement over CPO where local SME experience difficulties related to qualification requirements for contractors (experience, contracted amounts).

In **Slovakia**, the aim of the project was to ensure a reliable supply of energy to everyone: to have no power cuts, no outage. Impact on local economy and value chains was a subsequent motive. At the same time, it could be argued that increased efficiency, better reliability and safety of supply indirectly benefits local economies and value chains. Neither did the programme aim at development of SMEs, local employment and skills – although, as a result of the above, it did contribute to these aspects.

5.6.4 KQ16: How has the intervention impacted employment and social inclusion locally?

Answer: The NDAP projects seem to have had positive impacts on local employment, notably in Bulgaria and Lithuania. There are examples of impact on social inclusion and cohesion locally.

The survey answers (Figure 72, Figure 87) indicate that this impact on local employment is mostly found in consumption projects, where more than half of the respondents claimed there has been such an impact. This is hardly surprising, as less technical skills are needed to refurbish a building than to build a new high-tech power plant. Consumption projects are to a larger extent than other types of projects believed to have had an effect. Temporary jobs were created during building renovation for low-skilled workers (see 5.4.1 and 5.6.2

With regard to the question of whether the project has impacted social inclusion and cohesion locally, there are several examples (in particular in Bulgaria and Lithuania) pointing to the projects' impacts on improved living conditions (notably for consumption projects: refurbishments, street lighting) and that the financing of such projects generated a feeling of inclusion, improving the understanding at the local level of what the EU could do for its citizens. The survey indicates that respondents from Lithuania are those who most believe that the project has had an impact (Figure 73, Figure 88).

In Bulgaria and Lithuania, there are several examples of social benefits and improvements because of the programme. In both countries, it is pointed out in several cases that energy efficiency in public buildings (such as hospitals, schools and kindergartens) has reduced the costs for providing a suitable microclimate in the work premises and simultaneously improving work environment conditions. In Bulgaria, this has resulted in an increased interest on the part of the population for these kindergartens and schools, becoming preferred educational centres.

In Lithuania, it is pointed out in one case that the financial savings resulting from improved energy efficiency in public buildings have benefitted the community through the public budget of the municipality. The projects have also reduced heat losses and, consequently, heating costs. This has a positive effect in particular for low-income heat consumers and also increases the market value of the apartments.

In Bulgaria and Lithuania, the street lighting projects have met with great satisfaction from the population of the municipalities. The projects clearly provide increased safety through better visibility in traffic and security for the people living in the villages and towns affected.

Several voices in Lithuania mention another positive aspect: an increased activity of the inhabitants, and the desire for environmental management. The municipality, at its own expense, is preparing to contribute to the improvement of welfare. This is a benefit to the urban community. On a different note, heat prices in Visaginas increased strongly with the new system as a consequence of the closure. This caused social unrest and notably hit economically vulnerable groups.

The social impacts have been less visible in Slovakia given the scope of the projects. It is thus not surprising that none of the survey respondents answer the question concerning the impact on social cohesion.

5.6.5 Conclusions for the sustainability criterion

The NDAP programme has had some lasting effects on the energy sector in the three countries, positively mitigating the closure of the nuclear units. By addressing all facets of the energy sector in function of national needs, it notably contributed to improve the security of supply following the loss of nuclear capacity. The supported projects positively impacted the energy system safety, by ensuring reliable electricity distribution in the countries through diversification of the energy sources and setting-up of alternative production means. It also fostered the integration into the European energy market. On the consumption side, it allowed to improve the energy intensity, and to contribute to the partial catch-up with the EU average.

In the three countries, the programme triggered subsequent projects in the energy sector, sometimes funded through private or national funds instead of European funds (e.g. “EnerVizija”).

The programme also had positive effects in terms of capacity-building. New skills were acquired within all types of organisations, from beneficiaries to ministries through implementing bodies. Based on the experiences gained, further projects were developed and implemented, including in other countries (e.g. SEFF). Project management and procurement are fields in which beneficiaries indicated they benefited from the programme. In some cases, supported-projects played a demonstrator role, giving its beneficiaries exemplar model in the country (e.g. energy efficiency and street lighting in Ignalina). Subsequently to the programme, other organisations capitalised on the experiences gained.

In terms of the development of SMEs, it should be noted that this was often a side benefit, and not a regular objective of the NDAP-supported projects. There was no monitoring framework at the project or national level. However, locally, the impacts of the programme in terms of SMEs development are quite sizable. Due to the procurement rules and the scope of some projects, local SMEs could hardly compete because of a lack of references. In most cases, local SMEs have however been subcontracted by the contractors, mostly to undertake lower-value work (e.g. construction). Their involvement depends on the position of the project in the energy value chain, with deeper involvement for consumption projects which require less technical skills. Only in a limited number of cases, indications that the project was implemented by small businesses were found. The involvement of local SMEs in NDAP-supported projects allowed them to develop competences, notably in building refurbishment, that could contribute to the further developments of a local market. Hints on the involvement of SMEs at the European level have not been identified, although European contractors have been hired.

Besides contracting local companies, the implementation of NDAP-supported projects has also had positive, although short-lived, effects on the local economy. Directly, contractors and sub-contractors have contributed to generate turnover, either with local logistical services (e.g. accommodation, food) or through material purchases. NDAP support also had indirect effects, with the reliability of the power supply, the mitigation of the energy price increase and the reduction of energy intensity that also contributed to enhance the competitiveness of local businesses.

It can be concluded that the NDAP projects have had positive impacts on local employment in the three countries, but notably in Bulgaria and Lithuania. The impacts have mostly been temporary and concern notably low-skilled workers.

The programme has had impacts in terms of social inclusion locally. It provided social benefits and improvements in the local communities, notably in Bulgaria and Lithuania, but less in Slovakia given

the scope of the supported projects. The refurbishment of public and residential buildings has improved the living and working conditions of the population, reduced the budget associated with energy bills and improved sensibility to fluctuating energy prices. For private owners, it contributed to increase the market value of the renovated apartments. In a few cases, the evolution of energy prices contributed to social unrest. Several municipal street lighting projects contributed to improve safety and security, and thus the living conditions of the citizens.

The programme has also had positive effects in terms of awareness raising. Municipal buildings refurbishments, including schools and kindergartens, generated increased interest from the population and could contribute to an increased sensibility over the energy efficiency topic, and more generally, over environmental management.

Finally, by financing local actions, the programme contributed to give a sense of inclusion in the European Union to new citizens of the Union, by showing concretely the effects of adhering to the EU.

5.7 Communications

5.7.1 KQ17: Are the communication actions addressed to the stakeholders and the public (i) effective, (ii) adequate and (iii) accurate?

Answers: Most of the supported projects undertook some communication activities. Only very few projects indicate that no communication activities have been undertaken. The form of these activities has been diverse, depending on the best perceived ways to reach out to the targeted audience.

Implemented activities have included information boards of outdoor display panels, newspaper articles, the organisation of or participation in local and national events, broadcast in TV programmes, and displaying information on the website (Figure 75). In Lithuania, social media was also a popular medium. In a few cases, beneficiaries note the participation of high-ranking officials (up to the ministry) in the communication activities. For example, ministries were represented in several communication activities, just as district governors, the EBRD and often local mayors were present. Even the Lithuanian prime minister was present at the opening ceremonies of two Lithuanian projects, as these were projects of national importance

For some projects, communications activities were quoted a key success factor. Indeed, public acceptance was identified as a major barrier for some projects (e.g. transmission project in Slovakia), and the realisation of communication activities contributed to the successful achievement of the project. In one case, a museum indicated that it displayed the pipeline of the project. Another project had press conferences at each completing stage. And finally, in one project, the mayor actively communicated with the public, both residents and the media, which was a key factor for the success of the project.

In other cases, the involvement of local authorities in communication activities raised awareness of the citizens about the programme and it helped to increase the overall participation (e.g. energy efficiency in Ignalina).

However, there are also a few cases in which almost no communication activities have been undertaken. Local people did hear of the project, but it was not publicised in the media. The reasons of the low communication activities mentioned were a limited scope and budget. In one project, local press releases were issued after successful renovations, but the public remained sceptic or even negative about the results. Improved communications could have led to more public acceptance in this case.

Overall, 18 projects have a high score on communication, 18 projects score ‘medium’ and nine projects score ‘low’ (Appendix I).

6 Conclusions

A prerequisite for the accession of Bulgaria, Lithuania and Slovakia to the European Union was a commitment to prematurely close and subsequently dismantle certain of the countries' nuclear units. In total, three nuclear power plants with a total of eight reactors were concerned.

Financial and technical assistance was provided from the early 1990s to the three countries, in addition to other partner countries. In 1999, three Nuclear Decommissioning Assistance Programmes were specifically launched to assist Bulgaria, Lithuania and Slovakia with the closure and dismantling of the eight nuclear reactors. The rationale behind the programmes was to financially support and account for some of the negative consequences of the premature closure and dismantling, which represented a significant social, financial and economic burden. NDAP did not, however, aim to cover the full costs of decommissioning nor the compensation of all economic consequences of the early closure.

Between 1999 and 2020, it is estimated that NDAP financial support provided to the three countries will total €3.8bn. The funds originate mostly, but not exclusively, from the European Union.

Several types of projects have been supported, either under the 'decommissioning window', to support the safe decommissioning of the reactors subject to early closure, or under the 'energy window', to support the implementation of mitigation measures in the energy sector (e.g. replacement capacity, environmental upgrading, modernisation and energy efficiency). The 'decommissioning window' has been effective since the inception of the programme, while the 'energy window' was primarily effective between 2007 and 2013. Although no further 'energy window' project has been supported since 2014, disbursements continue to be allocated for ongoing projects.

This ex-post evaluation covered the energy-related projects funded by the NDAP in Bulgaria, Slovakia and Lithuania. It represents a total financial support of more than €947m for 58 energy-related projects. The funds were and, in some cases, still are, channelled through the EBRD, for (€902m in the three countries), as well as by the CPMA (€45m in Lithuania only).

The accession treaties (and for Slovakia, a subsequent Council regulation) constitute the legal base for the 'energy window' intervention and specify its (broad) scope:

- Environmental upgrading in line with the EU environmental acquis (including energy efficiency);
- Modernisation of conventional energy production;
- Contribution to necessary restructuring, environmental upgrading and modernisation of the energy production, transmission and distribution sectors;
- Improving the security of supply; and
- Increasing the use of renewable energy sources (in Bulgaria only).

There was no financial limitation or split between the decommissioning and energy windows set for each country. The supported projects were proposed by the three countries.

As a result, the 'energy window' supported a varying number and different types of projects in Bulgaria, Lithuania and Slovakia. These differences arose from different contexts, various needs and starting points, diverse demands from the new Member States and the organisational preferences of project managers. Bulgaria received the highest proportion of committed budget and projects (€401m for 38 projects). For Lithuania (€364m for 15 projects) and Slovakia (€182m for 5 projects), whilst there are fewer projects, average budget is higher. 18 projects are still ongoing in the three countries.

Projects in Bulgaria have targeted the whole value chain, with a stronger emphasis downstream the value chain (networks and consumption). In Lithuania, efforts were principally oriented towards upstream (production), notably through the upgrading and modernisation of the Lithuania Power Plant to replace

capacities and partially to comply with the EU acquis. In Slovakia, networks (notably transmission), received the largest share of funds, with the objective of improving the security of supply.

NDAP intervention was found by the evaluators' team to be both instrumental and timely in the three countries, as no other programmes could finance the scope and the volume of projects covered through the 'energy window'.

The evaluators' team considers that NDAP's 'energy window' has been successful. Although objectives had not been initially set at the programme level, the majority of the supported projects achieved their initial project-level energy objectives. A small share of projects managers (about 15%) even consider that the results surpass expectations. Quite often, the projects lacked a detailed monitoring framework, and there are some uncertainties regarding the precise quantitative results achieved by the programme.

Nevertheless, the energy window effectively supported mitigation measures along the energy value chain according to national needs. On the consumption side, it supported the modernisation of production capacities and the development of renewable energy sources. On the network side, it contributed to build and modernise the energy networks, to facilitate interconnections and to diversify the energy mix. On the consumption side, it supported the refurbishment of hundreds of public and private buildings and thousands of households, the modernisation of district heating networks, the improvement of energy efficiency in the industry and the improvement of street lighting in 35 cities.

The programme contributed to the development of SMEs, although this was not a key priority and, as such, was not monitored. Although SMEs were generally not selected as contractors, they undertook subcontracting work. Their involvement allowed them to develop new skills, notably in building refurbishment, that could improve their development and contribute to the further development of a local market. The programme has also had positive, although short-lived, effects on the local economy.

Furthermore, the 'energy window' has had several lasting effects on the energy sector in the three countries. It contributed to improve the security of supply following the loss of nuclear capacities, ensure reliable electricity distribution, foster integration into the European energy market, enhance energy diversification and improve energy intensity. It has had other indirect effects, for example in terms of the reliability of the power supply, the mitigation of energy price increases and the reduction of energy intensity, which also contributed to enhance the competitiveness of local businesses. The programme also contributed to develop capacities in the three countries, leading to subsequent investments, including from private financing.

The programme has had certain impacts in terms of social inclusion at the local level. The refurbishment of public and residential buildings and improvements in street lighting has improved the living and working conditions of the population, reduced the budget associated with energy bills and improved the sensibility to fluctuating energy prices. For private owners, it contributed to an increase in the market value of renovated apartments.

In terms of cost-effectiveness, the 'energy window' proved to be efficient overall. No noticeable evidence was found of potential variations depending on the type of project or between countries. However, three projects, including the largest projects supported by the programme, were assessed as only having a limited efficiency.

The evaluators' team considers that the costs of the projects were globally assessed to be commensurate to the benefits achieved. Some differences are noted according to the position of the project in the energy-value chain, with consumption projects (notably those on energy efficiency) scoring lower, which is quite common. There are no significant differences between NDAP and programmes implementing similar projects, including EU-funded programmes. Nonetheless, the level of financing could be higher in the case of NDAP.

Several factors ensured the efficiency of the programme's projects, including its management structure and design, the intervention of the implementing body, the use of new procurement rules, the role of the project manager and the assistance of external consultants. On the contrary, questionable technological

choices, low use of the equipment, technical issues, the poor performance of contractors and difficulties with the implementation of procurement rules are among the factors that impeded its efficiency.

There is a clear EU added-value from the programme. Financially, there was no comparable programme within the countries able to equal the range of topics and the level of ambition of the energy window. Overall, the EU funding allowed projects to be implemented at a faster pace and with a greater level of ambition than would have otherwise occurred. It enabled the development of new capacities, facilitating subsequent investments. Finally, by supporting local projects, it contributed to enhancing new Member States' sense of inclusion within the European Union.

7 Lessons learnt and recommendations

Several lessons were learnt during the implementation of the Nuclear Decommissioning Assistance Programme (NDAP), and notably its 'energy window'. The lessons are in line with those of the mid-term evaluation of the decommissioning assistance carried out in 2007. The European Commission indicated that the recommendations have been implemented for the 'decommissioning window' from 2014 onwards.

7.1 The programme would have benefited from the definition of more specific objectives, in collaboration with each Member State

Although general objectives were set in the legal bases for the three countries, there was no initial split between the energy and the decommissioning windows. The choice was left to the countries to propose the projects they would like to be financed through the NDAP mechanism. The flexibility of the programme is not questioned, as it is clear from the evaluation that the impacts of the nuclear units' closure differed from country to country, and thus required individual contextualised solutions. However, this 'umbrella' approach eventually generated concerns regarding the availability of funds for the decommissioning of the nuclear power plants, as countries initially seemed to focus on the 'energy window' rather than on the 'decommissioning window'. In 2013, it was thus decided to focus the programme on the 'decommissioning window', and not to fund any additional project under the 'energy window' besides those already selected.

Retrospectively, it appears that the programme would have benefited from the definition of more specific objectives, in collaboration with each Member State. A clear identification of the scope, in terms of projects to be financed and associated budget, timeline and key performance indicators would have allowed to better streamline the programme. Different modalities would have been possible for this collaboration and the *ex-ante* identification of the projects to be supported, either under the leadership of the European Commission or upon proposal from the Member States, with an approval from the European Commission. It could have enhanced the collaboration at the national level, as it appears that in some cases, the two NDAP windows were managed by different teams.

The upstream identification of the projects and the realisation of an intervention logic could have assisted in adjusting the programme to the different needs of the countries, while ensuring that the split between energy and decommissioning remained adequate given the highest priorities of the programme. To conduct this evaluation, programme and national intervention logics had to be reconstructed ex-post.

7.2 Projects would have benefited from a detailed monitoring framework

A significant number of projects lacked a detailed monitoring framework. In some cases, the identification of the projects' results in the field of energy proved difficult, due to the absence of such an instrument. Measures or audits of the performances of the projects have not often been conducted and, consequently, most project completion reports do not include quantified energy results. In Bulgaria, as a corrective measure, a national evaluation was undertaken to quantify the effects of the NDAP-supported projects. Besides energy results and impacts, other impacts were barely quantifiable (e.g. employment), as they have not been monitored.

The requirement to identify and report quantifiable indicators would have facilitated the overall quantification of the results and impacts of the projects, but also of the programme. At the implementing body level, it would also enable an easier monitoring of the projects and their implementation trajectories, in order to ease risk identification and the adoption of corrective measures.

7.3 The reliance on implementing bodies has been positive and contributed to capacity building

Regarding the implementing bodies, it appears that their use has been positive for the programme. Their experience and the existence of structured processes were important to quickly start the programme (e.g.: EBRD with PHARE) and could partially explain its successes and cost-effectiveness. It is unlikely that the programme would have been as effective or efficient if funds had been managed directly by the Member States themselves from the start. Indeed, the closure of the nuclear power plants generated political resistance in the three countries, and they were some concerns regarding the proper use of the funds (e.g. diversion from decommissioning to energy, building of new nuclear plant). Although a change of the management structure of the programme could have happened during its implementation, for example through shared management with the new Member State, it would have generated risks for the programme's implementation. In addition, the delegation of the implementation to external bodies provided stability for the implementation of the programme and, overall, participants expressed their appreciation of their involvement.

Furthermore, the programme contributed to capacity-building, not only at the project level but also at the national level and even at the level of the EBRD. It enabled the uptake of local implementing bodies. Once sufficient capacities are available nationally, project implementation by national bodies was perceived as less cumbersome for national projects than implementation by international donors such as the EBRD.

Appendix A List of the supported projects

The table below present the supported projects in the three countries and their status as of June 2018.

For some projects involving different stages (e.g. five stages of energy efficiency in Zarasai), groupings were made.

Table 12: List of the supported projects

Project ID	Project title	Status (30/06/2018)
Bulgaria		
GA 003D	Implementation and Management of the Economic and Energy Efficiency Measures in the Power Distribution Systems as well as Energy Efficiency Measures in Public Buildings and Street Lighting and for the Consultancy Services for the Preparation and Management of the Implementation of the Strategy Implementation Plan for Energy and Energy Efficiency Projects	Finalised
GA 004E	Implementation and Management of the Rehabilitation of the Sofia District Heating Network	Finalised
GA 006F	Energy Efficiency and Renewable Energy Credit Line Framework Facility in Bulgaria	Finalised
GA 007D	Implementation and Management of the Project for Demand Side Energy Efficiency Measures in Public Buildings 14250213 14250213 0 14250213	Finalised
GA 008A	For the Contribution in the Pernik District Heating Rehabilitation Programme	Finalised
GA 009B	For Establishing a Pilot Project for Residential Energy Efficiency Credit Line Framework Facility in Bulgaria	Ongoing
GA 010B	For Establishing and Operation of an Energy Efficiency Facility in Bulgaria	Finalised
GA 012A	For the contribution in the MARITSA EAST-2 (Thermal Power Plant) REHABILITATION PROGRAMME - Installation of Gypsum Dewatering System and Rehabilitation of the Cooling Pump Station	Finalised
GA 013E	For Refurbishment and Extension of the National Electricity Distribution System – Supply and Installation of Plant and Equipment for substations Tzaravetz, Burgas, Metalurgichna, Plovdiv, Zlatitza, Shabla, Mayak, Kavarna, Marek and procurement and implementation of new substation automation systems and rehabilitation of Vacha-1 HPP switchyard and HPP systems of integrated control	Finalised
GA 014B	Construction of high pressure gas pipelines to, and gas regulation stations in Silistra, Kozloduy and Oryahovo	Finalised
GA 015A	For the Pilot Project for Rehabilitation of Municipality Street Lighting	Finalised
GA 020A	Contribution in the replacement of outdated, 20-30 year old, power transformers with work load factor less than 60% with new ones with higher efficiency and reduced losses in the Stolichno, Sofia and Pleven regions	Finalised
GA 021A	Contribution in the installation of natural gas supply pipeline for 13 cities in the South-Central region of Bulgaria, without building high pressure gas branch	Finalised
GA 022A	Contribution in the construction of the gas distribution network in town Dimitrovgrad, Chirpan and Rakovski	Finalised
GA 023A	Contribution in the installation of natural gas supply system in town Etropole without construction of high pressure gas branch	Finalised
GA 024A	Contribution in the installation of the natural gas supply system in town Svilengrad and Kardjali without construction of high pressure gas branch	Finalised
GA 025A	Contribution in the main gas pipeline to village Razliv and the development of the gas distribution system within Razliv	Finalised

GA 026A	Contribution in the rehabilitation of pipelines in Varna city heating distribution network	Finalised
GA 029A	Energy Efficiency Improvements in Public Buildings in the Municipalities of Kozloduy and Novi Han (III tranche)	Finalised
GA 030A	Energy Efficiency Improvements in Public Buildings (IV tranche)	Finalised
GA 032A	Energy Efficiency Rehabilitation of the Heavy Industrial Mining Equipment of the Maritza East Mines	Finalised
GA 033A	Construction Of A Small Hydro Power Plant On The Iliina River For The Safe And Reliable Energy Supply And For The Energy Efficiency Improvements Of The Area	Finalised
GA 034A	Technical Assistance In The Preparation Of Energy Performance Contracts For The Energy Efficiency Rehabilitation Of Buildings Within The Public Sector	Finalised
GA 036B	For Refurbishment and Extension of the National Electricity Transmission System (construction of a new 400kV power line from TPP Maritsa Iztok 2 (s/s MI) to s/s Bourgas and Construction of a new 400kV power line from TPP Maritsa Iztok 2 (s/s MI) to s/s Plovdiv)	Ongoing
GA 037A	The construction of a combined cycle power plant (CHP) in Sofia	Finalised
GA 040A	Energy Efficiency in Public Buildings	Finalised
GA 041A	Energy Efficiency in Public Buildings in Sofia	Finalised
GA 042A	Energy Efficiency in Public Buildings in Burgas	Finalised
GA 043A	Energy Efficiency in Public Buildings in Plovdiv	Finalised
GA 044A	Energy Efficiency in Public Buildings in Zagora	Finalised
GA 045A	Rehabilitation of Municipality Street Lighting	Ongoing
GA 047A	Upgrade and Modernisation of Sofia District Heating Production and Distribution System	Ongoing
GA 049A	For the Rehabilitation of Belmeken-Sestrimo-Chaira Hydro Power Complex and the Rehabilitation of Vacha-1 HPP 110Kv Switchyard and HPP Systems of Integrated Control	Ongoing
GA 053A	For Demand Side Residential Energy Efficiency Through Gas Distribution Companies in Bulgaria(Desiree Gas)	Ongoing
GA 054A	For Replacement of Bucket-Wheel Excavators	Ongoing
GA 055A	For Modernisation and extension of the SCADA/EMS system and data environment at the National Dispatching Centre	Finalised
GA 056A	For Facilitation of Energy Efficiency Sector Investments for Rehabilitation of Buildings within the Public Sector	Ongoing
GA 057A	Construction of Transmission Gas Pipelines with Automated Gas Regulation Stations to Svishtov, Panagiurishte, Pirdop and Bansko-Razlog	Ongoing
Lithuania		
GA 002D	Ignalina NPP Decommissiong Support Investment Packages – B5 heat and steam upgrading	Finalised
GA 004A	Gas pipeline from Pabrade to Visaginas and Ignalina NPP	Finalised
GA 005E	Lithuania Power Plant Environmental and Related Technical Upgrading	Finalised
GA 011A	Consultancy services for the initial phase - Parts 1&2 of the Power Interconnection between Lithuania and Poland (the LitPol Link Project)	Finalised
HUD.01	HUDA Mechanism	Finalised
IEE	Ignalina EE (Hospital)	Finalised

IEV.01	Ignalina EnerVizija	Ongoing
ISL.01	Ignalina Street Lighting	Ongoing
PI.06.02.01	Modernisation and Renovation of Visaginas town District Heating System	Finalised
VDH.02	Modernisation and Renovation of Visaginas town District Heating System	Ongoing
VEE	Visaginas EE (Hospital)	Ongoing
VEV	Visaginas EnerVizija (PPF)	Ongoing
ZEE	Zarasai EE (Schools)	Ongoing
ZEV.01	Zarasai EnerVizija	Ongoing
ZSL.01	Zarasai Street Lighting	Ongoing
Slovakia		
GA 002A	Reconstruction of Krizovany 400 KV Substation	Finalised
GA 011A	Sustainable Energy Financial Facility	Finalised
GA 014A	Measures in transmission sector consequential final shutdown of Bohunica V1	Finalised
GA 015A	Energy Efficiency in Public buildings	Finalised
GA 020A	Complex ES Bystricany - Transformation 400/110 kV	Ongoing

Appendix B Evaluation matrix

During the inception phase, an evaluation matrix was elaborated, in order to:

- Precise the key evaluative questions (KQ) through sub-questions, when appropriate;
- Define the indicators and judgement criteria to be used to answer the evaluative questions;
- Link each question with the evaluation methods to be used.

A ranking of the questions was also provided by DG ENER and is included in the table.

Table 13: Evaluation matrix

ToRs evaluation questions	Sub-questions	Indicators and judgement criteria	Evaluation methods
1. Relevance			
KQ 1) Were the interventions relevant to the original objectives of the programme? (highest importance)	Q 1.1. Are the projects relevant to the original objectives of enhancing the security of supply and energy efficiency?	• Number of projects dedicated to energy efficiency as a main activity; same for security of supply • Number of projects including energy efficiency as a secondary part of the activities; same for security of supply • Amount of funding channelled to energy efficiency; same for security of supply • Judgement on relevance of project objectives and results with energy efficiency and security of supply goals of NDAP	• Document research • Project mapping • Interviews with national policy makers • Interviews with implementing bodies • Interviews with end beneficiaries • Online consultation with beneficiaries • Public consultation
	Q 1.2. Are the projects relevant to the objective of enhancing the use of renewable energy sources?	• Number of projects dedicated to RES as a main activity • Number of projects including RES as a secondary part of the activities • Amount of funding channelled to RES • RES as a share of energy production (low priority, as many other factors could interfere)	• Document research • Project mapping • Interviews with national policy makers • Interviews with implementing bodies • Interviews with end beneficiaries • Online consultation with beneficiaries • Public consultation

	Q 1.3 Did the projects include environmental upgrading in line with the EU environmental and energy acquis?	• Number of projects including environmental upgrading as a main focus • Number of projects including environmental upgrading as a secondary part of the activities • Amount of funds disbursed on environmental upgrading • Judgement on the degree of relevance of the projects with implementation of major environmental acquis	• Document research • Project mapping • Environmental and Social Impact Assessments • Interviews with implementing bodies • Interviews with end beneficiaries • Online consultation with beneficiaries
	Q 1.4. Did the intervention lead to modernising conventional production capacity?	• Number of projects (project components) on modernising conventional capacity • Amount of funds disbursed on modernising conventional production capacity • Judgement on the relevance of the projects with the necessity for modernisation of installations in line with Best Available Techniques (BATs)	• Document research • Project mapping • Interviews with implementing bodies • Interviews with end beneficiaries • Online consultation with beneficiaries
	Q 1.5. Did the projects include other measures which contribute to the necessary restructuring, upgrading of the environment and modernisation of the energy production, transmission and distribution sectors?	• Number of projects including additional measures • List of additional measures • Amount of funding channelled to additional measures	• Document research • Interviews with implementing bodies • Interviews with end beneficiaries • Online consultation with beneficiaries
KQ 2) As the intervention is on-going, are the original objectives still relevant? (lowest importance)	Q 2.1. Are the countries still in need of energy efficiency improvements, energy supply security, environmental upgrading, modernisation of conventional energy production plants and development of renewables? How pressing is the need? And is there still catching up to do?	• Distance to Europe 2020 target in energy efficiency (energy intensity) • Distance to Europe 2020 target in renewable energy (share of renewable) • Energy import dependency	• Document and statistics research • Interviews with national policy makers
	Q 2.2. Are the objectives of the programme relevant to the national strategic objectives of the three countries as they have involved?	• Relevance of the NDAP Energy window to the national strategic objectives	• Document research • Interviews with implementing bodies and national policy makers • Online consultation
2. Coherence			

KQ 3) To what extent are the funded 'Energy window' projects coherent with the objectives set out in the Accession Treaties and subsequent regulations? (medium importance)		• List of relevant objectives set out in the Accession Treaties • Degree of alignment of the NDAP and the objectives set out in the Accession Treaties • List (if any) of objectives from the Accession Treaties not covered in NDAP • List (if any) of the project interventions which are contradictory to the Accession Treaties objectives	• Desk research • Document review • Interviews with ministries of energy, finance and environment • Interviews with implementing bodies • Interviews with the EC (DG ENV, DG Clima and DG ENER)
KQ 4) To what extent are the funded 'Energy window' projects coherent with the *EU acquis* [energy policy of the EU], in particular in the areas of energy and environment such as Industrial Emissions Directive and the Large Combustion Plants Directive, etc.? (highest importance)		• Degree of alignment of the NDAP with EU acquis • List (if any) of projects not coherent with the EU acquis in energy and environment • Amount of funding channelled to the major energy objectives (RES, energy efficiency, security of supply) (low priority, covered by KQ1) • Amount of funds disbursed on environmental upgrading (low priority, covered by KQ1) • Amount of funding channelled to additional measures (low priority, covered by KQ1)	• Desk research • Environmental and Social Impact Assessments • Interviews with ministries of energy, finance and environment • Interviews with implementing bodies • Interviews with the EC (DG ENV, DG Clima and DG ENER)
3. EU added-value			
KQ 5) What identifiable added value has resulted from the Union assistance through this specific instrument? (medium importance)	EQ 5.1. Would these projects have been implemented with the same level of ambition without the support from the NDAP?	• Judgement on the probability of the feasibility of these projects without the NDAP	• Interview with ministries • Interview with implementing bodies • Interviews with end beneficiaries • Benchmarking exercise
	EQ 5.2. To which extent the NDAP has been a catalyst for doing projects and leveraging additional funding sources?	• Level of co-financing • Additional funding leveraged; number of additional funding sources	• Project funding analysis • Interview with ministries • Interview with implementing bodies • Interviews with end beneficiaries • Benchmarking exercise
	EQ 5.3. Would these projects have been financed by different funding sources (i.e. ESIF) in the absence of the NDAP?	• Judgement on the probability of these projects being funded in a different way • Advantages from the NDAP funding compared to alternative funding	• Interviews with ministries of energy, finance and environment • Interviews with implementing bodies

			• Interviews with the EC (DG ENV, DG Clima and DG ENER) • Interviews with other IFIs • Benchmarking exercise
4. Effectiveness			
KQ 6) To what extent have the 'Energy window' objectives been achieved? What have been the quantitative and qualitative results of the intervention? (highest importance)	EQ 6.1. What have been the quantitative results of the intervention on a project level and on an aggregated sectoral and national level?	• Energy savings per year for each individual project • CO2 emissions savings per year for each individual project (depends on the share of NDAP of the national efforts in EE) • Improvement in overall national energy efficiency indicator due to all national projects • Impact due to all national projects on energy import dependency • Improvement in renewable energy generation for each individual project and in overall national renewable energy generation due to all national projects • Direct employment generated by project and sustainability of these employments • Occurrences of electricity cuts before and after the programme	• Document and desk research • Interviews with national ministries • Interviews with implementing bodies • Online consultation with beneficiaries • Benchmarking exercise
	EQ 6.2. What have been the qualitative results of the intervention?	• Non-quantifiable results for each individual project in terms of energy, environment, social or economic effects	• Desk research • Interviews with national ministries • Interviews with end beneficiaries • Interviews with implementing bodies • Benchmarking exercise • Interviews with the EC
KQ 7) How effective is the governance system? (lowest importance)	EQ 7.1. Does the governance system enable the effective prioritisation of measures with reference to the objectives for the 'Energy window'?	• Availability of a written system for measure prioritisation • Results of the prioritisation with regards to the objectives of the 'Energy window' • Judgement on effectiveness of measure prioritisation process	• Analysis of operational manuals, risk management systems, etc. • Environmental and Social Impact Assessments • Interviews with ministries of energy, finance and environment

	EQ 7.2. Does the governance system enable the effective management of risk?	• Availability of risk management system • Compliance with risk management system • Occurrences of foreseen risks • Occurrences of unforeseen risks • Occurrences of instances when the (un)foreseen risks led to serious consequences • Judgement on effectiveness of the processes of avoidance and mitigation of risks	• Interviews with end beneficiaries • Interviews with implementing bodies • Online consultation with beneficiaries • Benchmarking exercise
	EQ 7.3. Does the governance system support the minimisation and recovery from delays?	• Availability of a written procedure dealing with delays • Occurrences of significant delays • Number of delays which could have been avoided • Delays which led to serious consequences	
	EQ 7.4. Does the governance system enable the contractor to effectively overcome administrative bottlenecks?	• Availability of a written procedure dealing with administrative bottlenecks • Occurrences of serious administrative bottlenecks and consequences thereof • Speed of solving administrative bottlenecks	
KQ 8) What factors influenced (positively and negatively) the progress of the 'Energy window' projects? (highest importance, to be treated along KQ11)		• List of factors which influenced the progress of projects positively • List of factors which influenced the progress of projects negatively	• Desk research • Interviews with ministries of energy, finance and environment • Interviews with end beneficiaries • Interviews with implementing bodies • Online consultation with beneficiaries • Benchmarking exercise
5. Efficiency			
KQ 9) To what extent have the 'Energy window' projects been cost effective? (highest importance)	EQ 9.1. In comparison with similar EU funded projects under different financing mechanisms (nationally and internationally), has this programme been efficient?	• Judgement on efficiency based on comparison with similar projects funded from different financing mechanisms • Cost of programme/project management • TOE per year saved per EUR invested (where relevant)	• Desk research • Interviews with implementing bodies • Interviews with the EC (DG ENV, DG Clima and DG ENER) • Interviews with end beneficiaries

		• Additional capacity (MW) per EUR invested (where relevant)	• Interviews with ministries of energy, finance and environment • Benchmarking exercise • Interviews with other financing mechanisms
KQ 10) With reference to the method of implementation, using the indirect management mode through the implementing bodies, is the management of the 'Energy window' efficient? (lowest importance)	EQ 10.1. Is the management of the 'Energy window' efficiently able to minimise external management costs?	• Level of external management costs • Comparison with external management costs of other funding mechanisms	• Desk research • Document review • Interviews with DG ENER • Interviews with DG Regio • Interviews with implementing bodies • Benchmarking exercise • Interviews with Managing Authorities of relevant OPs
	EQ 10.2. Is the management of the 'Energy window' efficiently able to ensure best value for money?	• Comparison with other types of financing • Identification of inefficiencies	
	EQ 10.3. Is the management of the 'Energy window' efficiently able to minimise administrative delays?	• Occurrences of administrative delays • Comparison with administrative delays incurred in other funding mechanisms • Evolution of administrative delays since the beginning of the programme	
KQ 11) What factors influenced (positively and negatively) the cost-effectiveness of the 'Energy window' projects? What is the benchmark with similar EU funded projects under different financing mechanisms? (highest importance, to be treated with KQ8)		• List of factors which influenced the cost-effectiveness of projects positively • List of factors which influenced the cost-effectiveness of projects negatively	• Desk research • Interviews with end beneficiaries • Interviews with implementing bodies • Online consultation with beneficiaries • Benchmarking exercise
KQ 12) Is there evidence that the co-financing arrangements have positively affected obtaining better value for money in managing projects? (medium importance)		• Comparison of cases with co-financing arrangement with those without co-financing in terms of value for money • Judgement	• Desk research • Interviews with end beneficiaries • Interviews with implementing bodies • Online consultation with beneficiaries
6. Sustainability			
KQ 13) Has the intervention caused permanent changes / improvements in the national management systems related to the energy sector?		• New capacities acquired within the ministries, implementing bodies and end beneficiaries in terms of employees and their skills	• Desk research • Environmental and Social Impact Assessments

(medium importance)		• New types of management systems acquired due to these projects which did not exist before • Judgement on changes due to the project implementation	• Interviews with implementing bodies • Interview with other relevant ministries
KQ 14) Has the intervention fostered development of SMEs either locally or at Union level? (medium importance)		• Number of SMEs benefitted from the project for each project (locally and at Union level) • Share of each project which has been subcontracted to SMEs for external services (if data are available) • Type of services provided by SMEs	• Interview with beneficiaries • Interviews with ministries of energy, finance and environment • Online consultation with beneficiaries
KQ 15) Has the intervention fostered growth locally or mitigated negative economic conditions? (medium importance)		• Judgement on the impact of the project on the local economy	• Analysis of local/regional statistics • Environmental and Social Impact Assessments • Interviews with relevant ministries • Interviews with regional/local authorities • Online consultation with beneficiaries
KQ 16) How has the intervention impacted employment and social inclusion locally? (lowest importance)		• Judgement on the impact of the project on employment and social inclusion • Progress/improvement in skills on regional or other level related to the topic of the intervention • List of other enabling factors which have been improved	• Document research • Environmental and Social Impact Assessments • Interviews with regional/local authorities • Online consultation with beneficiaries
7. Communication			
KQ 17) Are the communication actions addressed to the stakeholders and the public effective, adequate and accurate? (medium importance)		• Number of actions addressed to the stakeholders • Number of actions addressed to the public • Impact on communication actions on the stakeholders involvement • Judgement on communications actions	• Interviews with relevant ministries • Interviews with regional/local authorities • Interviews with beneficiaries • Online consultation with beneficiaries

Appendix C Bibliography

The table below presents the documents that were analysed during the evaluation.

Table 14: List of the bibliography

Project Ref (ToR Annex 2)	Document ID	Type of source	Publishing body/ author	Date	Geographical coverage
Assessment of the results of the energy sector measures funded from the Kozloduy International Decommissioning Support Fund for the period 2001-2016	BG1	Evaluation report	adelphi/Bulgarian Consulting Centre (BCC) for the Bulgarian Ministry of Energy	2018	Bulgaria
How the EU budget is spent : Nuclear decommissioning assistance	BRI2017	Briefiing	European Parliamentary Research Service : Gianluca Sgueo and Matthew Parry	April 2017	EU
Report from the EC to the EP and the countil on the implementation of the work under the nuclear decommissioning assistance programme to Bulgaria, Lithuania and Slovakia in 2016 and previous years	COM328	Report	The EC	June 2017	EU
Special report : EU NDAP in Bulgaria, Lithuania and Slovakia.	SPE22 (EN and FR)	Special report: audit assignment	The Court of Auditors	2011	EU
Report from the EC to the EP and the council on the implementation of the work under the nuclear decommissioning assistance programme to Bulgaria, Lithuania and Slovakia in 2015 and previous years	COM405 (and ANNEX)	Report	The EC	June 2016	EU
Report from the EC to the EP and the council on the implementation of the work under the nuclear decommissioning assistance programme to Bulgaria, Lithuania and Slovakia in the period 2010-2014	COM78 (and ANNEX)	Report	The EC	March 2015	EU
Commission implementing decision on the rules of application for the nuclear decommissioning assistance programmes for Bulgaria, Lithuania and Slovakia for the period 2014-2020	COM5449 (and annexes)	Decision report	The EC	August 2014	EU
Commission implementing decision (annex1)	ANNEX1	Decision report	The EC	August 2014	EU
Commission implementing decision (annex2)	ANNEX2	Decision report	The EC	August 2014	Lithuania
Commission implementing decision (annex3)	ANNEX3	Decision report	The EC	August 2014	Slovakia
Commission implementing decision (annex4)	ANNEX4	Decision report	The EC	August 2014	Bulgaria
Commission implementing decision (annex5)	ANNEX5	Decision report	The EC	August 2014	Bulgaria
Commission implementing decision (annex6)	ANNEX6	Decision report	The EC	August 2014	
Commission implementing decision (annex7)	ANNEX7	Decision report	The EC	August 2014	
Council regulation of 13 December 2013 on Union support for the nuclear decommissioning assistance programme in Lithuania, and repealing Regulation (EC) No 1990/2006	REG1369	Regulation	The Council (EURATOM)	December 2013	Lithuania
Council regulation of 13 December 2013 on Union support for the nuclear decommissioning assistance programmes in Bulgaria and Slovakia, and repealing Regulations (Euratom) No 549/2007 and (Euratom) No 647/2010	REG1368	Regulation	The Council (EURATOM)	December 2013	Bulgaria and Slovakia
Communication from the EC to the EP and the Council on the use of financial resources earmarked for the decommissioning of nuclear installations, spent fuel and radioactive waste	COM121	Report	The EC	March 2013	EU
Staff working document accompanying the document COM121	SWD59	Report	The EC	March 2013	EU
Commission staff working paper accompanying document to the proposal for a Council Regulation on Union support for the nuclear decommissioning assistance programmes in Bulgaria, Lithuania and Slovakia.	SWD1387	Impact assessement	The EC	November 2011	EU

Project Ref (ToR Annex 2)	Document ID	Type of source	Publishing body/ author	Date	Geographical coverage
Staff working paper on the pratical implementation arrangements for commission decision C(2010) 6885	SWD834	Guidelines	The EC	June 2011	EU
EU financial assistance for the decommissioning of nuclear plants in Bulgaria, Lithuania and Slovakia : achievements and future challenges	SPE16	Audit report	The Court of Auditors	03/07/1905	EU
Report from the EC to the EP and the Council on the use of financial resources during 2004-2009 provided to Lithuania, Slovakia and Bulgaria to suppoer the decommissioning of early shut-down nuclear power-plants under the Acts of Accession	COM432	Report	The EC	July 2011	EU
Commission staff working paper "NDAP data" COM432	SWD914	Report	The EC	July 2011	EU
Regulation on financial assistance of the Union with respect to the decommissioning of Units 1 to 4 of the Kozloduy Nuclear Power Plant in Bulgaria (Kozloduy Programme)	REG647	Regulation	The Council (EURATOM)	July 2010	Bulgaria
Commission staff working document "Kozloduy Programme" ex ante evaluation accompanying the REG647	SWD1431	Ex Ante evaluation	The EC	October 2009	Bulgaria
Regulation on the implementation of Protocol No 9 on Unit 1 and Unit 2 of the Bohunice V1 nuclear power plant in Slovakia	REG549	Regulation	The Council (EURATOM)	May 2007	Slovakia
Mid-term evaluation of the decommissioning assistance to Lithuania and Slovakia provided under the protocols to the Treaty of Accession	EVAL2007	Evaluation report	The EC (DG TREN)	September 2007	Lithuania and Slovakia
Regulation on the implementation of Protocol No 4 on the Ignalina nuclear power plant in Lithuania	REG1990	Regulation	The EC	December 2006	Lithuania
Corrigendum to council regulation 1990	REG1990CORR	Regulation	The EC	February 2007	Lithuania
Protocol concerning the conditions and arrangements for admission of the republic of Bulgaria and Romania to the European Union	REG157	Regulation	The EC	June 2005	Bulgaria
Protocol No 9 on unit 1 and unit 2 of the Bohunice VI nuclear power plant in Slovakia	PRO09	Protocol	The EC	September 2003	Slovakia
Protocol No 4 on the Ignalina nuclear power plant in Lithuania	PRO04	Protocol	The EC	September 2003	Lithuania
In Bulgarian only	COM5538BG	Communication			Bulgaria
List of municipalities of the pilot project in Slovakia	SVK01	List			Slovakia
Consultancy Services for 400 kV Transmission Project	SVK02	Project completion report	GOPA International Energy Consultants for the Bohunice IDSF	August 2016	Slovakia
Commission decision on the procedures related to the Bohunice, Ignalina and Kozloduy programmes for the period 2007 to 2013	COM6885	Decision report	The EC	October 2010	EU
Energy window short summary	CPMA1	Summary	National agency of the Ignalina Programme (CPMA)	May 2018	Lithuania
Ignalina Programme monitoring report 2017/H2 financial implementation	CPMA2	Evaluation report	CPMA	February 2018	Lithuania
	CPMA3	Evaluation report	CPMA	February 2018	Lithuania
Standard Summary Project Fiche for the Ignalina programme : Modernisation and renovation of Visaginas town District Heating System	VDH.02	Summary report	CPMA	10/07/1905	Lithuania
Evaluation of the NDAP Energy Window Notes in Response to Bullet-point Questions from Peter Harrison	EVAL_Peter_Harrison	Interview report	TG	10/07/1905	Lithuania
Delegation to Lithuania 10-12 July 2012. Note on Budgetary Control		Background note	The EP	01/07/2012	Lithuania
Grant Agreement 002A	GA002A	Grant agreement	EBRD	20/11/2003	Slovakia
Implementation agreement 011A	IA011A	Grant agreement	EBRD	27/04/2009	Slovakia
Memorandum of agreement 011A	GA011A	Grant agreement	EBRD	12/06/2006	Slovakia
Grant agreement 014A	GA014A	Grant agreement	EBRD	07/12/2007	Slovakia

Project Ref (ToR Annex 2)	Document ID	Type of source	Publishing body/ author	Date	Geographical coverage
Grant agreement 015A	GA015A	Grant agreement	EBRD	21/02/2008	Slovakia
Grant agreement 020A	GA020A	Grant agreement	EBRD	06/11/2009	Slovakia
Amended and restated agreement 020A	GA020Abis	Grant agreement	EBRD	18/11/2010	Slovakia
Grant agreement 033	GA033	Grant agreement	EBRD	05/11/2009	Bulgaria
memorandum of agreement 034	GA034	Grant agreement	EBRD	05/11/2009	Bulgaria
Amended and restated grant agreement 034	GA034bis	Grant agreement	EBRD	13/01/2015	Bulgaria
Grant agreement 037	GA037	Grant agreement	EBRD	25/11/2011	Bulgaria
Grant agreement 004	GA004	Grant agreement	EBRD	14/11/2003	Lithuania
Grant agreement 005	GA005	Grant agreement	EBRD	24/06/2005	Lithuania
Amended and restated agreement 005	GA005A	Grant agreement	EBRD	05/12/2007	Lithuania
Amended and restated agreement 005B	GA005B	Grant agreement	EBRD	02/04/2009	Lithuania
Amended and restated agreement 005C	GA005C	Grant agreement	EBRD	14/01/2010	Lithuania
Amended and restated agreement 005D	GA005D	Grant agreement	EBRD	22/02/2011	Lithuania
Amended and restated agreement 005E	GA005E	Grant agreement	EBRD	10/08/2011	Lithuania
Grant agreement 011	GA011	Grant agreement	EBRD	06/06/2008	Lithuania
Grant agreement 011A	GA011A	Grant agreement	EBRD	31/03/2011	Lithuania
Project identification sheet	LitPol	Identification fiche	EBRD	30/03/2011	Lithuania
LT : work programme 1	LTWP1	Work programme	EBRD	20/03/2001	Lithuania
LT : work programme 2	LTWP2	Work programme	EBRD	13/06/2002	Lithuania
LT : work programme 2 - annex 4	LTWP2annex 4	Work programme	EBRD	14/06/2002	Lithuania
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LT : work programme 3	LTWP3	Work programme	EBRD	12/11/2002	Lithuania
LT : work programme 4	LTWP4	Work programme	EBRD	09/06/2003	Lithuania
LT : work programme 4 - annex 1 : Pre-study on a Gas Pipeline to Visaginas	LTWP4annex 1	Work programme	EBRD	10/06/2003	Lithuania
LT : work programme 4 - annex 2	LTWP4annex 2	Work programme	EBRD	11/06/2003	Lithuania
LT : work programme 4 - annex 3	LTWP4annex 3	Work programme	EBRD	12/06/2003	Lithuania
LT : work programme 4 - annex 1 : Cost estimates per pipeline section	LTWP4annex 1_9.44	Work programme	EBRD	13/06/2003	Lithuania
LT : work programme 4 - annex 1 : Economic and financial analysis, the Pabrade option and Economic and financial analysis, the Utena option	LTWP4annex 1_9.56	Work programme	EBRD	14/06/2003	Lithuania
LT : work programme 4 - annex 1 : Project time schedule	LTWP4annex 1_9.8	Work programme	EBRD	15/06/2003	Lithuania
LT : work programme 5	LTWP5	Work programme	EBRD	18/11/2003	Lithuania
LT : work programme 5 - annex 1	LTWP5annex 1	Work programme	EBRD	18/11/2003	Lithuania
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LT : work programme 6 - annex 1 : New Project Proposals relating to INPP Decommissioning Support and Energy Sector Development	LTWP6annex 1	Work programme	EBRD	01/06/2004	Lithuania
LT : work programme 6 - annex 3 : Draft Grant Agreement No. 005	LTWP6annex 3	Work programme	EBRD	01/06/2004	Lithuania
LT : work programme 7	LTWP7	Work programme	EBRD	30/11/2004	Lithuania
LT : work programme 8	LTWP8	Work programme	EBRD	24/06/2005	Lithuania
LT : work programme 8 - annex 1 : Overview of the existing and projected IIDSF grant financed or co-financed contracts	LTWP8 - annex 1	Work programme	EBRD	24/06/2005	Lithuania
LT : work programme 8 - annex 4 : IIDSF Financing Plan 2005–2006	LTWP8 - annex 4	Work programme	EBRD	24/06/2005	Lithuania
LT : work programme 8 revision	LTWP8rev	Work programme	EBRD	14/07/2005	Lithuania
LT : work programme 8 revision - annex 1	LTWP8revannex1	Work programme	EBRD	14/07/2005	Lithuania
LT : work programme 9	LTWP9	Work programme	EBRD	04/11/2005	Lithuania
LT : work programme 9 - annex 1 : Overview of the existing and projected IIDSF grant financed or co-financed contracts	LTWP9annex 1	Work programme	EBRD	04/11/2005	Lithuania
LT : work programme 9 - annex 5 : IIDSF Financing Plan 2005–2006 - Update No. 1	LTWP9annex 5	Work programme	EBRD	04/11/2005	Lithuania
LT : work programme 10	LTWP10	Work programme	EBRD	12/06/2006	Lithuania
LT : work programme 10 - annex1 : Overview of existing and projected IIDSF Grant Agreements and grant financed or grant co-financed contracts	LTWP10annex1	Work programme	EBRD	12/06/2006	Lithuania
LT : work programme 11	LTWP11	Work programme	EBRD	17/11/2006	Lithuania
LT : work programme 11 - annex 1 : Overview of existing and projected IIDSF Grant Agreements and grant financed or grant co-financed contracts	LTWP11annex1	Work programme	EBRD	17/11/2006	Lithuania
LT : work programme 12	LTWP12	Work programme	EBRD	21/06/2007	Lithuania
LT : work programme 12 - annex 1 : Overview on the status of existing IIDS Grant Agreements and existing/projected IIDSF grant financed or grant co-financed contracts	LTWP12annex1	Work programme	EBRD	21/06/2007	Lithuania
LT : work programme 13	LTWP13	Work programme	EBRD	05/12/2007	Lithuania
LT : work programme 13 - annex 1 : Overview of grant agreements, contracts and disbursements	LTWP13annex1	Work programme	EBRD	05/12/2007	Lithuania
LT : work programme 13 - annex 2 : November 2007 update of the "Overall INPP Decommissioning Planning (Level 1 plan) for the period 2005-2015"	LTWP13annex2	Work programme	EBRD	05/12/2007	Lithuania
LT : work programme 13 - annex 5 : November 2007 update of the contract schedules for the LPP upgrading project	LTWP13annex5	Work programme	EBRD	05/12/2007	Lithuania
LT : work programme 13 - annex 6 : Update by ÅF-Enprima Ltd and Ernst & Young of the Feasibility Study for Environmental and Related Technical Upgrading of the Lithuanian Power Plant	LTWP13annex6	Work programme	EBRD	05/12/2007	Lithuania
LT : work programme 13 - annex 7 : Executive Summary of the Feasibility Study by ÅF-Enprima Ltd and Ernst & Young "Combined Cycle Gas Turbine Unit of 350 – 450 MWe in Lithuanian Power Plant"	LTWP13annex7	Work programme	EBRD	05/12/2007	Lithuania
LT : work programme 13 - annex 8 : AB Lietuvos Elektrine's Project Identification Sheet "CCGT Project in Lithuanian Power Plant"	LTWP13annex8	Work programme	EBRD	05/12/2007	Lithuania
LT : work programme 13 - annex 9 : Report by IPA Energy & Water Consulting "Lithuania – Least Cost Generation Expansion Plan" relating to the development of power sector	LTWP13annex9	Work programme	EBRD	05/12/2007	Lithuania
LT : work programme 13 - annex 10 : Report by RAMBOLL Oil & Gas "Update review of the Eastern Baltic Gas Sector"	LTWP13annex10	Work programme	EBRD	05/12/2007	Lithuania

Project Ref (ToR Annex 2)	Document ID	Type of source	Publishing body/ author	Date	Geographical coverage
LT : work programme 14	LTWP14	Work programme	EBRD	06/06/2008	Lithuania
LT : work programme 14 - annex 1 : Overview of Grant Agreements, contracts and disbursements	LTWP14annex1	Work programme	EBRD	06/06/2008	Lithuania
LT : work programme 14 revision	LTWP14rev	Work programme	EBRD	30/06/2008	Lithuania
LT : work programme 15	LTWP15	Work programme	EBRD	28/11/2008	Lithuania
LT : work programme 15 - annex 1 : Overview of Grant Agreements, contracts and disbursements	LTWP15annex1	Work programme	EBRD	28/11/2008	Lithuania
LT : work programme 16	LTWP16	Work programme	EBRD	22/05/2009	Lithuania
LT : work programme 17	LTWP17	Work programme	EBRD	01/11/2009	Lithuania
LT : work programme 18	LTWP18	Work programme	EBRD	01/06/2010	Lithuania
LT : work programme 18 - annex	LTWP18annex	Work programme	EBRD	01/06/2010	Lithuania
LT : work programme 18 revision	LTWP18rev	Work programme	EBRD	July 2010	Lithuania
LT : work programme 19	LTWP19	Work programme	EBRD	01/11/2010	Lithuania
LT : work programme 20	LTWP20	Work programme	EBRD	01/06/2011	Lithuania
LT : work programme 21	LTWP21	Work programme	EBRD	01/11/2011	Lithuania
LT : work programme 22	LTWP22	Work programme	EBRD	01/06/2012	Lithuania
LT : work programme 22 - annex	LTWP22annex	Work programme	EBRD	01/06/2012	Lithuania
LT : work programme 23	LTWP23	Work programme	EBRD	01/11/2012	Lithuania
LT : work programme 24	LTWP24	Work programme	EBRD	01/06/2013	Lithuania
LT : work programme 25	LTWP25	Work programme	EBRD	01/11/2013	Lithuania
LT : work programme 25rev	LTWP25rev	Work programme	EBRD	01/12/2013	Lithuania
LT : work programme 26	LTWP26	Work programme	EBRD	01/06/2014	Lithuania
LT : work programme 27	LTWP27	Work programme	EBRD	01/11/2014	Lithuania
LT : work programme 28	LTWP28	Work programme	EBRD	01/06/2015	Lithuania
LT : work programme 29	LTWP29	Work programme	EBRD	01/11/2015	Lithuania
LT : work programme 30	LTWP30	Work programme	EBRD	01/06/2016	Lithuania
LT : work programme 31	LTWP31	Work programme	EBRD	01/11/2016	Lithuania
LT : work programme 32	LTWP32	Work programme	EBRD	01/06/2017	Lithuania
LT : work programme 33	LTWP33	Work programme	EBRD	01/11/2017	Lithuania
Grant agreement 057	GA057	Grant agreement	EBRD		Bulgaria
Grant agreement 056	GA056	Grant agreement	EBRD		Bulgaria
Grant agreement 055	GA055	Grant agreement	EBRD		Bulgaria
Grant agreement 054	GA054	Grant agreement	EBRD		Bulgaria
Grant agreement 053	GA053	Grant agreement	EBRD		Bulgaria
Grant agreement 049	GA049	Grant agreement	EBRD		Bulgaria
Grant agreement 047	GA047	Grant agreement	EBRD		Bulgaria

Project Ref (ToR Annex 2)	Document ID	Type of source	Publishing body/ author	Date	Geographical coverage
Grant agreement 049A	GA049A	Grant agreement	EBRD		Bulgaria
Grant agreement 045	GA045	Grant agreement	EBRD		Bulgaria
Grant agreement 044	GA044	Grant agreement	EBRD		Bulgaria
Grant agreement 043	GA043	Grant agreement	EBRD		Bulgaria
Grant agreement 042	GA042	Grant agreement	EBRD		Bulgaria
Grant agreement 041	GA041	Grant agreement	EBRD		Bulgaria
Grant agreement 040	GA040	Grant agreement	EBRD		Bulgaria
Grant agreement 036B	GA036B	Grant agreement	EBRD		Bulgaria
Grant agreement 036A	GA036A	Grant agreement	EBRD		Bulgaria
Grant agreement 036	GA036	Grant agreement	EBRD		Bulgaria
Grant agreement 032A	GA032A	Grant agreement	EBRD		Bulgaria
Grant agreement 032	GA032A	Grant agreement	EBRD		Bulgaria
Grant agreement 030	GA030	Grant agreement	EBRD		Bulgaria
Grant agreement 029	GA029	Grant agreement	EBRD		Bulgaria
Grant agreement 003	GA003	Grant agreement	EBRD		Bulgaria
Grant agreement 003B	GA003B	Grant agreement	EBRD		Bulgaria
Grant agreement 003C	GA003C	Grant agreement	EBRD		Bulgaria
Grant agreement 003D	GA003D	Grant agreement	EBRD		Bulgaria
Grant agreement 004	GA004	Grant agreement	EBRD		Bulgaria
Grant agreement 004A	GA004A	Grant agreement	EBRD		Bulgaria
Grant agreement 004C	GA004C	Grant agreement	EBRD		Bulgaria
Grant agreement 004D	GA004D	Grant agreement	EBRD		Bulgaria
Grant agreement 004E	GA004E	Grant agreement	EBRD		Bulgaria
Grant agreement 006F	GA006F	Grant agreement	EBRD		Bulgaria
Grant agreement 006E	GA006E	Grant agreement	EBRD		Bulgaria
Grant agreement 006D	GA006D	Grant agreement	EBRD		Bulgaria
Grant agreement 006C	GA006C	Grant agreement	EBRD		Bulgaria
Grant agreement 006A	GA006A	Grant agreement	EBRD		Bulgaria
Grant agreement 006	GA006	Grant agreement	EBRD		Bulgaria
Grant agreement 007	GA007	Grant agreement	EBRD		Bulgaria
Grant agreement 007C	GA007C	Grant agreement	EBRD		Bulgaria
Grant agreement 007D	GA007D	Grant agreement	EBRD		Bulgaria
Grant agreement 008	GA008	Grant agreement	EBRD		Bulgaria
Grant agreement 009	GA009	Grant agreement	EBRD		Bulgaria

Project Ref (ToR Annex 2)	Document ID	Type of source	Publishing body/ author	Date	Geographical coverage
Grant agreement 009A	GA009A	Grant agreement	EBRD		Bulgaria
Grant agreement 009B	GA009B	Grant agreement	EBRD		Bulgaria
Grant agreement 010	GA010	Grant agreement	EBRD		Bulgaria
Grant agreement 012	GA012	Grant agreement	EBRD		Bulgaria
Grant agreement 013	GA013	Grant agreement	EBRD		Bulgaria
Grant agreement 013A	GA013A	Grant agreement	EBRD		Bulgaria
Grant agreement 013C	GA013C	Grant agreement	EBRD		Bulgaria
Grant agreement 013D	GA013D	Grant agreement	EBRD		Bulgaria
Grant agreement 013E	GA013E	Grant agreement	EBRD		Bulgaria
Grant agreement 014	GA014	Grant agreement	EBRD		Bulgaria
Grant agreement 014A	GA014A	Grant agreement	EBRD		Bulgaria
Grant agreement 015	GA015	Grant agreement	EBRD		Bulgaria
Grant agreement 015A	GA015A	Grant agreement	EBRD		Bulgaria
Work programme 1	BGWP1	Work programme	EBRD	05/06/2001	Bulgaria
Work programme 1 - annex : List and short description of the project proposals relative to energy and energy efficiency development programme as consequential of KIDSF identified by State Agency for Energy and Energy Resources of Bulgaria	BGWP1annex	Work programme	EBRD	05/06/2001	Bulgaria
Work programme 2	BGWP2	Work programme	EBRD	09/11/2001	Bulgaria
Work programme 2 - annex 2	BGWP2annex2	Work programme	EBRD	09/11/2001	Bulgaria
Work programme 2 - annex 3	BGWP2annex3	Work programme	EBRD	09/11/2001	Bulgaria
Work programme 3	BGWP3	Work programme	EBRD	05/06/2002	Bulgaria
Work programme 4	BGWP4	Work programme	EBRD	12/11/2002	Bulgaria
Work programme 5	BGWP5	Work programme	EBRD	11/06/2003	Bulgaria
Work programme 6	BGWP6	Work programme	EBRD	18/11/2003	Bulgaria
Work programme 7	BGWP7	Work programme	EBRD	29/06/2004	Bulgaria
Work programme 7 revision	BGWP7rev	Work programme	EBRD	07/07/2004	Bulgaria
Work programme 8	BGWP8	Work programme	EBRD	29/11/2004	Bulgaria
Work programme 8 revision	BGWP8rev	Work programme	EBRD	10/12/2004	Bulgaria
Work programme 9	BGWP9	Work programme	EBRD	29/06/2005	Bulgaria
Work programme 9 - annex 1 : Results and forecast of the energy efficiency programme of the Kozloduy International Decommissioning Support Fund	BGWP9annex1	Work programme	EBRD	29/06/2005	Bulgaria
Work programme 9 - annex 2 : REQUEST for € 10 million additional Grant allocation to Memorandum of Agreement No 006	BGWP9annex2	Work programme	EBRD	29/06/2005	Bulgaria
Work programme 9 - annex 3 : Brass plaque on each public building	BGWP9annex3	Work programme	EBRD	29/06/2005	Bulgaria
Work programme 9 - annex 4 : Energy Facility for Bulgaria TERM SHEET	BGWP9annex4	Work programme	EBRD	29/06/2005	Bulgaria
Work programme 9 - annex 5 : ToR of the project for "Supporting MEER and IWG in the Implementation of the Strategy in the Energy Sector for mitigating	BGWP9annex5	Work programme	EBRD	29/06/2005	Bulgaria

Project Ref (ToR Annex 2)	Document ID	Type of source	Publishing body/ author	Date	Geographical coverage
the consequences of the early closure of VVER-440 units of Kozloduy NPP					
Work programme	BGWP10	Work programme	EBRD	07/11/2005	Bulgaria
Overview of the status of the projects within the Initial Decommissioning Investment Package	BGWP10annex1	Work programme	EBRD	07/11/2005	Bulgaria
Audit Summary for Assembly Information BULGARIAN ENERGY EFFICIENCY AND RENEWABLE ENERGY CREDIT LINE FACILITY	BGWP10annex2.1	Work programme	EBRD	07/11/2005	Bulgaria
RATIONAL ENERGY UTILISATION AND FINANCING PLAN DEVELOPMENT	BGWP10annex2.2	Work programme	EBRD	07/11/2005	Bulgaria
Bulgaria: Energy Efficiency and Renewable Energy Credit Line Support - Projects Overview	BGWP10annex3	Work programme	EBRD	07/11/2005	Bulgaria
Pernik District Heating Rehabilitation Project - Construction and Installation Works for Steam Generator No5 at CHP Plant Republika Tender EBRD 4/05 ASSESSMENT OF HEAT PRODUCTION CAPACITY OF CHP REPUBLIKA	BGWP10annex4	Work programme	EBRD	07/11/2005	Bulgaria
Letter from the Ministry to the EBRD	BGWP10annex5	Work programme	EBRD	07/11/2005	Bulgaria
Work programme	BGWP11	Work programme	EBRD	12/06/2006	Bulgaria
Update on Energy and Energy Efficiency projects	BGWP11annex4	Work programme	EBRD	12/06/2006	Bulgaria
Update on the Bulgarian Energy Efficiency and Renewable Credit Line project (BEERECC)	BGWP11annex5	Work programme	EBRD	12/06/2006	Bulgaria
Minutes of the Steering Committee meeting on BEERECL	BGWP11annex6	Work programme	EBRD	12/06/2006	Bulgaria
Update on the Residential Credit Line Facility project	BGWP11annex7	Work programme	EBRD	12/06/2006	Bulgaria
Letter from the Minister of Economy and Energy on Pernik privatisation	BGWP11annex8	Work programme	EBRD	12/06/2006	Bulgaria
Draft Memorandum of Agreement No 006B Energy Efficiency and Renewable Energy Credit Line Framework Facility in Bulgaria	BGWP11annex10	Work programme	EBRD	12/06/2006	Bulgaria
Draft Grant Agreement No 007B Pilot Project for Demand Side Energy Efficiency Measures in Public Buildings	BGWP11annex11	Work programme	EBRD	12/06/2006	Bulgaria
Work programme	BGWP12	Work programme	EBRD	17/11/2006	Bulgaria
PRELIMINARY PROJECT IDENTIFICATION SHEETS FOR HIGH PRIORITY ENERGY PROJECTS WITHIN THE SCOPE OF SIP	BGWP12annex7	Work programme	EBRD	17/11/2006	Bulgaria
REQUEST FOR ENDORSEMENT BY BEERECL STEERING COMMITTEE	BGWP12annex8	Work programme	EBRD	17/11/2006	Bulgaria
BEERECL Portfolio	BGWP12annex9	Work programme	EBRD	17/11/2006	Bulgaria
Summary on REECL	BGWP12annex11	Work programme	EBRD	17/11/2006	Bulgaria
GA010	BGWP12annex12	Work programme	EBRD	17/11/2006	Bulgaria
GA004C	BGWP12annex13	Work programme	EBRD	18/11/2006	Bulgaria
Work programme	BGWP13	Work programme	EBRD	20/06/2007	Bulgaria
List of projects for grant support approved by the Interministerial Working Group	BGWP13annex6.1	Work programme	EBRD	20/06/2007	Bulgaria
PRELIMINARY PROJECT IDENTIFICATION SHEET	BGWP13annex6.2	Work programme	EBRD	20/06/2007	Bulgaria
Summary on the increased level of incentives for the credit line facilities	BGWP13annex7	Work programme	EBRD	20/06/2007	Bulgaria
Work programme	BGWP14	Work programme	EBRD	07/12/2007	Bulgaria
Status of decommissioning projects	BGWP14annex3	Work programme	EBRD	07/12/2007	Bulgaria
Abstract from the report on the results of the energy efficiency measures in Public Building of the first tranche	BGWP14annex9	Work programme	EBRD	07/12/2007	Bulgaria

Project Ref (ToR Annex 2)	Document ID	Type of source	Publishing body/ author	Date	Geographical coverage
Proposal of €24 million additional Grant allocation to the Bulgaria Energy Efficiency and Renewable Energy Credit Line (BEERECL) Facility for Assembly information	BGWP14annex10.1	Work programme	EBRD	07/12/2007	Bulgaria
Data on the extension of the BEERECL facility	BGWP14annex10.2	Work programme	EBRD	07/12/2007	Bulgaria
Proposal of €10 million additional Grant allocation to the Bulgarian Residential Energy Efficiency Credit Line (BREECL) Facility for Assembly information	BGWP14annex11	Work programme	EBRD	07/12/2007	Bulgaria
Overview of grant agreements, contracts and disbursements	BGWP14annex12	Work programme	EBRD	07/12/2007	Bulgaria
Work programme	BGWP15	Work programme	EBRD	06/06/2008	Bulgaria
Overview of Grant Agreements, contracts and disbursements	BGWP15annex11	Work programme	EBRD	06/06/2008	Bulgaria
Work programme	BGWP16	Work programme	EBRD	28/11/2008	Bulgaria
Overview of Grant Agreements, contracts and disbursements	BGWP16annex1	Work programme	EBRD	28/11/2008	Bulgaria
BEERECL progress report	BGWP16annex7	Work programme	EBRD	28/11/2008	Bulgaria
REECL progress report	BGWP16annex8	Work programme	EBRD	28/11/2008	Bulgaria
PIS-1 for on-line control systems for optimal load and reduction of energy consumption of Maritza East Mines	BGWP16annex9.1	Work programme	EBRD	28/11/2008	Bulgaria
PIS-2 for rehabilitation of substations and construction of a new power supply transformer at “Troyanovo-3” of Maritza East Mines	BGWP16annex9.2	Work programme	EBRD	28/11/2008	Bulgaria
PIS-3 for energy management and remote reading system for Mini Maritsa Iztok EAD	BGWP16annex9.3	Work programme	EBRD	28/11/2008	Bulgaria
PIS-4 for rehabilitation of substations and construction of a new power supply transformer at “Troyanovo-north Mine” of Maritza East Mines	BGWP16annex9.4	Work programme	EBRD	28/11/2008	Bulgaria
Work programme	BGWP17	Work programme	EBRD		Bulgaria
Work programme	BGWP18	Work programme	EBRD		Bulgaria
Work programme	BGWP18annex1	Work programme	EBRD		Bulgaria
Work programme	BGWP19	Work programme	EBRD		Bulgaria
Work programme	BGWP20	Work programme	EBRD		Bulgaria
Work programme	BGWP21	Work programme	EBRD		Bulgaria
Work programme	BGWP22	Work programme	EBRD		Bulgaria
Work programme	BGWP23	Work programme	EBRD		Bulgaria
Work programme - annex	BGWP23annex	Work programme	EBRD		Bulgaria
Work programme	BGWP24	Work programme	EBRD		Bulgaria
Work programme	BGWP25	Work programme	EBRD		Bulgaria
Work programme	BGWP26	Work programme	EBRD		Bulgaria
Work programme	BGWP27	Work programme	EBRD		Bulgaria
Work programme	BGWP28	Work programme	EBRD		Bulgaria
Work programme	BGWP29	Work programme	EBRD		Bulgaria
Work programme	BGWP30	Work programme	EBRD		Bulgaria
Work programme	BGWP31	Work programme	EBRD		Bulgaria
Work programme	BGWP32	Work programme	EBRD		Bulgaria

Project Ref (ToR Annex 2)	Document ID	Type of source	Publishing body/ author	Date	Geographical coverage
Work programme	BGWP33	Work programme	EBRD		Bulgaria
Work programme	BGWP34	Work programme	EBRD		Bulgaria
Work programme	SKWP33	Work programme	EBRD	04/12/2017	Slovakia
Work programme	SKWP32	Work programme	EBRD	25/05/2017	Slovakia
Work programme	SKWP31	Work programme	EBRD	17/11/2016	Slovakia
Work programme	SKWP30	Work programme	EBRD	14/06/2016	Slovakia
Work programme	SKWP29	Work programme	EBRD	20/11/2015	Slovakia
Work programme	SKWP28	Work programme	EBRD	29/05/2015	Slovakia
Work programme	SKWP27	Work programme	EBRD	03/11/2014	Slovakia
Work programme	SKWP26	Work programme	EBRD	13/06/2014	Slovakia
Work programme	SKWP25	Work programme	EBRD	01/11/2013	Slovakia
Work programme	SKWP24	Work programme	EBRD	31/05/2013	Slovakia
Work programme	SKWP23	Work programme	EBRD	29/11/2012	Slovakia
Work programme - annex	SKWP22annex	Work programme	EBRD	23/05/2012	Slovakia
Work programme	SKWP22	Work programme	EBRD	23/05/2012	Slovakia
Work programme	SKWP21	Work programme	EBRD	23/11/2011	Slovakia
Work programme	SKWP20	Work programme	EBRD	25/05/2011	Slovakia
Work programme	SKWP19	Work programme	EBRD	18/11/2010	Slovakia
Work programme	SKWP18	Work programme	EBRD	25/06/2010	Slovakia
Work programme	SKWP17	Work programme	EBRD	06/11/2009	Slovakia
Work programme	SKWP16	Work programme	EBRD	22/05/2009	Slovakia
Work programme	SKWP15	Work programme	EBRD	28/11/2008	Slovakia
Work programme - annex	SKWP15annex	Work programme	EBRD	28/11/2008	Slovakia
Work programme	SKWP14	Work programme	EBRD	07/06/2008	Slovakia
Work programme - Overview of GA	SKWP14annex	Work programme	EBRD	07/06/2008	Slovakia
Work programme	SKWP13	Work programme	EBRD	07/12/2007	Slovakia
Executive Summary of due diligence report on three projects related to transmission network	SKWP13annex1	Work programme	EBRD	07/12/2007	Slovakia
Overview of existing and projected BIDSF grant agreements etc	SKWP13annex2	Work programme	EBRD	07/12/2007	Slovakia
Work programme	SKWP12	Work programme	EBRD	21/06/2007	Slovakia
Work programme	SKWP11	Work programme	EBRD	17/11/2006	Slovakia
Work programme	SKWP10	Work programme	EBRD	12/06/2006	Slovakia
Work programme	SKWP9	Work programme	EBRD	07/11/2005	Slovakia
Work programme	SKWP8	Work programme	EBRD	01/07/2205	Slovakia
Work programme	SKWP8annex	Work programme	EBRD	01/07/2205	Slovakia

Project Ref (ToR Annex 2)	Document ID	Type of source	Publishing body/ author	Date	Geographical coverage
Work programme	SKWP7	Work programme	EBRD	30/11/2004	Slovakia
Work programme	SKWP6	Work programme	EBRD	30/06/2004	Slovakia
Work programme	SKWP5	Work programme	EBRD	03/12/2003	Slovakia
Work programme	SKWP4	Work programme	EBRD	13/06/2003	Slovakia
Work programme	SKWP3	Work programme	EBRD	12/11/2002	Slovakia
Work programme	SKWP2	Work programme	EBRD	07/06/2002	Slovakia
Work programme	SKWP1	Work programme	EBRD	20/10/2201	Slovakia
Work programme	SKWP1rev	Work programme	EBRD	16/11/2001	Slovakia
Energy-saving data	CPMA4	Energy-saving data	CPMA		Lithuania
Energy-saving data	CPMA5	Energy-saving data	CPMA		Lithuania
Energy-saving data	CPMA6	Energy-saving data	CPMA		Lithuania
Project identification fiche for the NDAP (orginal, amendment and closure forms)	HUD	Identification fiche	CPMA		Lithuania
Project identification fiche for the NDAP (orginal, amendment and closure forms)	IEE	Identification fiche	CPMA		Lithuania
Project identification fiche for the NDAP (orginal, amendment and closure forms)	IEV	Identification fiche	CPMA		Lithuania
Project identification fiche for the NDAP (orginal, amendment and closure forms)	ISL	Identification fiche	CPMA		Lithuania
Project identification fiche for the NDAP (orginal, amendment and closure forms)	VDH	Identification fiche	CPMA		Lithuania
Project identification fiche for the NDAP (orginal, amendment and closure forms)	VEE	Identification fiche	CPMA		Lithuania
Project identification fiche for the NDAP (orginal, amendment and closure forms)	VEV	Identification fiche	CPMA		Lithuania
Project identification fiche for the NDAP (orginal, amendment and closure forms)	ZEE	Identification fiche	CPMA		Lithuania
Project identification fiche for the NDAP (orginal, amendment and closure forms)	ZEV	Identification fiche	CPMA		Lithuania
Project identification fiche for the NDAP (orginal, amendment and closure forms)	ZSL	Identification fiche	CPMA		Lithuania
Contact details of recipients of BIDSF GA	Contact_BIDSF	Contact list	EBRD		Slovakia
GA 002 completion report	GA 002	Completion report	EBRD		Slovakia
GA 011 Completion report	GA 011	Completion report	EBRD		Slovakia
GA 014 Completion report	GA 014	Completion report	EBRD		Slovakia
GA 015 Completion report	GA 015	Completion report	EBRD		Slovakia
Contact list	Main contact list	Contact list	EBRD		Lithuania
Energy sector studies	Energy sector studies	Report	EBRD		Lithuania
GA 002 - stream boiler station, heat only boiler station, rehabilitation of district heatin line boiler stations and steam stations - completion reports	Grant 002 - INPP	Grant agreement	EBRD		Lithuania
GA 004 - gas pipeline to Visaginas final report	Grant 004 - Lietuvos Dujos AB	Grant agreement	EBRD		Lithuania
GA 005 - Combined cycle gaz turbine unit, flue gas desulphurisation and dust collection and project management unit consultant - final reports	Grant 005 - Lietuvos Energija AB - Elektrine	Grant agreement	EBRD		Lithuania
GA 007 - completion report	Grant 007 - INPP	Completion report	EBRD		Lithuania

Project Ref (ToR Annex 2)	Document ID	Type of source	Publishing body/ author	Date	Geographical coverage
GA 011 - Completion report	Grant 011 - Litgrid AB	Completion report	EBRD		Lithuania
IIDSF fact sheet and chart of events and inputs	IIDSF Fact Sheet	Fact sheet	EBRD		Lithuania
GA 013E completion report	KIDSF_GA013E	Completion report	EBRD		Bulgaria
GA 014B completion report	KIDSF_GA014B	Completion report	EBRD		Bulgaria
GA 020A completion report	KIDSF_GA020A	Completion report	EBRD		Bulgaria
GA 023 completion report	KIDSF_GA023	Completion report	EBRD		Bulgaria
Ga 029 and 030A completion reports	KIDSF_GA029_030A	Completion report	EBRD		Bulgaria
GA 010B final report	KIDSF_GA010B	Completion report	EBRD		Bulgaria
GA 004 final report	KIDSF_GA004	Completion report	EBRD		Bulgaria
GA 006F BEERECL final report	KIDSF_GA006F_BEERECL	Completion report	EBRD		Bulgaria
GA 007D completion report	KIDSF_GA007D	Completion report	EBRD		Bulgaria
GA 008 completion report	KIDSF_GA008A	Completion report	EBRD		Bulgaria
GA 012A completion report	KIDSF_GA012A	Completion report	EBRD		Bulgaria
GA 015A completion report	KIDSF_GA015A	Completion report	EBRD		Bulgaria
GA 024 completion report	KIDSF_GA024	Completion report	EBRD		Bulgaria
GA 026A completion report	KIDSF_GA026A	Completion report	EBRD		Bulgaria
GA 037 final report	KIDSF_GA037	Completion report	EBRD		Bulgaria
GA 041 final report	KIDSF_GA041	Completion report	EBRD		Bulgaria
GA 042 completion report	KIDSF_GA042	Completion report	EBRD		Bulgaria
GA 044 final report	KIDSF_GA044	Completion report	EBRD		Bulgaria
Contact details of recipients of KIDSF Grant Agreements	KIDSF_Contact_list	Contact list	EBRD		Bulgaria
Evaluation of the Slovak sustainable energy finance facility I & II (GA011A)	EVAL_SSEEF	Evaluation report	EBRD	01/09/2014	Slovakia
Country Report Bulgaria 2018 including an in-depth review on the prevention and correction of macroeconomic imbalances		Commission Staff working document	European Commission	07/03/2018	Bulgaria
Towards an Energy Union -Slovak Republic Assessment of country performance and opportunities from the Energy Union		Summary	European Commission		Slovakia

Appendix D List of interviewed stakeholders

The table below presents the list of interviewees.

Table 15: List of interviewed stakeholders and their position at the time of interview

Organisation	Name	Position
DG ENER	Thomas KIRCHNER	Former Head of Decommissioning Sector
DG ENER	Gianfranco BRUNETTI	Head of Decommissioning Sector
DG ENER	Robert KUNDE	Programme Officer Bohunice Programme
DG ENER	Jean-Philippe GUISSET	Programme Officer Ignalina Programme
DG ENER	Simon MURPHY	Programme Officer Kozloduy Programme
European Bank for Reconstruction and Development	Vince NOVAK	Director Nuclear Safety Department
European Bank for Reconstruction and Development	Balthasar LINDAUER	Deputy-director Nuclear Safety Department
European Bank for Reconstruction and Development	Gunter GRABIA	Associate Director, Head of IIDSF
European Bank for Reconstruction and Development	Kees KETELAAR	Associate Director, Head of BIDSF
European Bank for Reconstruction and Development	Valentin SEIDER	Associate Director, Head of KIDSF
Bulgaria		
Ministry of Energy	Veneta TZEVETKOVA	Director, Energy Projects and International Co-operation Directorate
Ministry of Energy	Diljana NOVAKOVA	Chief Expert
Ministry of Energy	Iveta FILIPOVA	Project manager
Ministry of Economy and Energy of Bulgaria	Kolyo KOLEV	Executive Director of the Energy Efficiency Agency
Association of Bulgarian Energy Agencies	Iiyana ADIAROVA	Executive director
Toplofikacia Sofia EAD	Maria DOMUZOVA	Head of Department "Projects Management"
Electricity System Operator EAD	Maria TSOLEVA	Head of EU Project Management Department
Electricity System Operator EAD	Milena TSOLOVA	Head of European funds and projects
Electricity System Operator EAD	July LAMBRIEV	Senior expert, coordination of externally funded projects department
NEKNational Electrical Company EAD	Anastasiya MARKOVA	Director of Production and Trading
Mini Maritsa Iztok EAD	Mr. Ivan VALCHANOV MARKOV	Executive Director
Mini Maritsa Iztok EAD	Ilza CHINKOVA	Director of Financial and Economic Directorate
Toplofikacia Pernik EAD	Liubomir SPASOV	Executive Director of District Heating Pernik
Toplofikacia Varna EAD	Iliya NIKOLAEV	Former manager
Thermal Power Plant Maritza East 2 EAD	Todor MICHAYLOV	Executive director
Thermal Power Plant Maritza East 2 EAD	Jivko DINCHEV	Executive Director

Thermal Power Plant Maritza East 2 EAD	Siika ANDONOVA	
Thermal Power Plant Maritza East 2 EAD	Georgi VASILEV	Chief Engineer
Bishop of Adrianopol Evlogiy	Rosen MIHAYLOV	Legal adviser to the Beneficiary
Sofia Municipality	Emiliya ZHELEVA	Director of European Programs and Projects Directorate
Burgas Municipality	Yorkanda ANANIEVA	Deputy mayor "education and culture"
Plovdiv Municipality	Ivan TOTEV	Mayor
Plovdiv Municipality	Gergana LICHEVA / MAVREVA	Mayors Office
Stara Zagora Municipality	Zhivko TODOROV	Mayor
CNG Maritza Ltd	Plamen PAVLOV	Manager
Citygas Bulgaria AD	Aleksandar KOZHUHAROV	Director
CEZ Distribution Bulgaria	Yordanka KOVACHKA	Director Company Management
CEZ Distribution Bulgaria	Teodora KALINOVA	Regulatory expert
Pravetsgas 1 AD	Ivan MINEV	
Bulgartransgaz EAD	Mariya TRONCHEVA	Expert – Coordination of Investment Processes
Bulgartransgaz EAD	Nikolai PATEV	Expert
European Bank for Reconstruction and Development	Solomiia PETRYNA	Green Economy department
European Bank for Reconstruction and Development	Violeta SKRYPNVKOVA	Green Economy department
European Investment Bank	Emeline MONTGOMERY-WADE	Central Allocation Unit
European Bank for Reconstruction and Development	Toivo MILLER	Principal - energy efficient investment professional
Lithuania		
Ministry of Energy	Lina Sabaitienė	Vice-Minister and Ignalina Programme Coordinator
Ministry of Energy	Asta Žalnieriūtė	Head of Ignalina NPP Decommissioning Division
Ministry of Energy	Justina Ratkevičiūtė	Head of Electricity Sector Division
Ministry of Finance	Aušra Baliukonienė	Director, Head of Investment Expenditure Declaration Department
Ministry of Finance	Donatas Skara	Chief Specialist, Expenditure Declaration Division, Investment Expenditure Declaration Department
Central Project Management Agency	Peter HARISSON	Head of Ignalina Programme Division
Central Project Management Agency	Skirmantas Pileckas	Senior Programming Manager
Central Project Management Agency	Vytautas Kropas	Project Manager
Ignalina Municipality	Donatas Mačys	Deputy Director of Administration
Ignalina Municipality	Gedvilas Rudys	Senior Specialist of the Construction and Municipal Economy Department

Ignalina Municipality	Valentinas Rumbutis	Eldership of Ignalina city, manager of the buildings of Ignalina Eldership
UAB Ignalinos butų ūkis	Antanas Gilys	Director
UAB Ignalinos butų ūkis	Aleksandr Dolgov	Chief engineer
Visaginas Municipality	Sergej Mickevič	Director of Administration
Visaginas Municipality	Irina Michailova	Strategic Planning and Investment Management, Head of the Department
Visaginas Municipality	Jekaterina Kucalova	Project Coordinator, Senior Specialist
Zarasai Municipality	Arnoldas Abramavičius	Deputy Mayor
Zarasai Municipality	Benjaminas Sakalauskas	Director of Administration
Zarasai Municipality	Ramunė Šileikienė	Deputy Head of Unit
Zarasai Municipality	Jonas Žusinas	Chief Specialist
Zarasai Municipality	Elvyra Glušakova	Senior Specialist
Zarasai Municipality	Arvydas Veikšra	Advisor to the Mayor
UAB "Zarasų Būstas"	Arvydas Steponavičius	Deputy Director
Housing Energy Efficiency Agency (BETA)	Valius Serbenta	Director
Amber Grid	Andrius Dagys	Technical Director
Amber Grid	Gytis Fominas	Director of Finance Department
INPP	Sergej Krutovcov	Decommissioning Director
INPP	Saulius Urbonavičius	Head of Activity Planning Division
INPP	Vladimir Solovjov	
AB Lietuvos Energija Gamyba	Tomas Kučiauskas	Head of Project Division
AB Lietuvos Energija Gamyba	Mindaugas Kvekšas	Finance and Administration Director
Litgrid AB	Darius Zagorskis	Head of Finance Planning and Analysis Division
Litgrid AB	Ana Tursienė	Project Implementation Division Financial analyst
Slovakia		
Ministry of Economy	Alena ZAKOVA	Director Department of International Relations in Energy
Ministry of Economy	Martin Urminský	Head state advisor, Department of International Energy Relations – Energy Section
Slovak Innovation and Energy Agency (SIEA)	Peter KOVÁŘ	Head Bohunice Programme
Slovenská elektrizačná prenosová sústava, a. s.	Juraj DOŠEK	Head of EU Investment Department
Slovenská elektrizačná prenosová sústava, a. s.	Róbert VEHNER	Specialist
Slovenská elektrizačná prenosová sústava, a. s.	Anna SZER	Head of Project Management Unit
Municipality of Ružindol	Vladimír Púčik	Mayor

Municipality of Klasov	Ján Balázs	Mayor
Municipality of Prašice	Erika NEMEŠOVÁ	Mayor
European Bank for Reconstruction and Development	Oksana RYABOKON	Analyst – FI Grants Management, Green Economy Transition Portfolio
European Bank for Reconstruction and Development	Lukáš KUZMIAK	Principal Banker
European Bank for Reconstruction and Development	Friso DE JONG	Principal, Sustainable Energy Financing Facilities

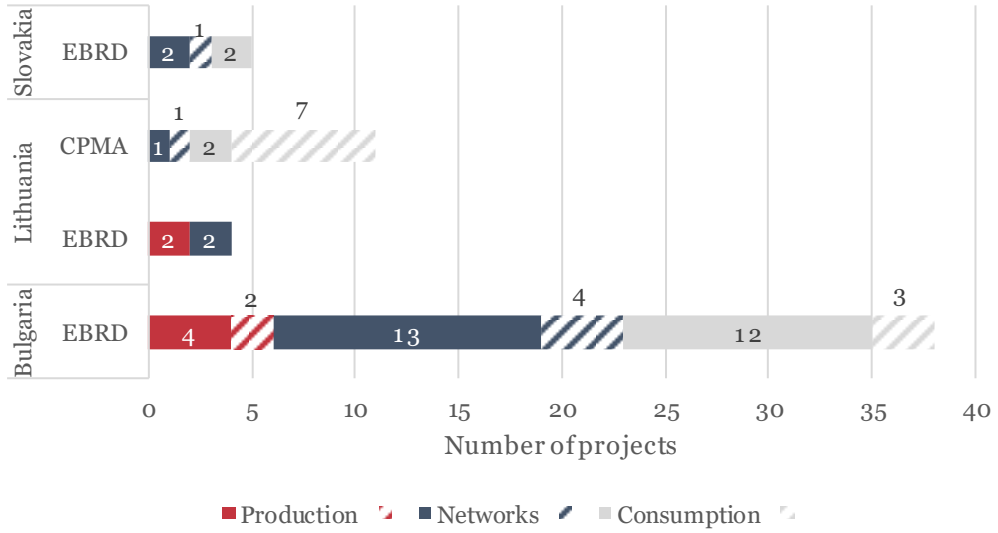
Appendix E Additional elements on the presentation of the energy window of the Nuclear Decommissioning Assistance Programme

This appendix compiles additional graphs and analyses presenting the energy window of the Nuclear Decommissioning Assistance Programme.

Number of projects per sector

The figure below presents in detail the split of the project in each country according to the sector, but also to the implementing body. The hatched projects are on-going, and it can be noted that most on-going projects are in Bulgaria and in Lithuania. For Lithuania, CPMA is the only implementing body with on-going projects. Overall, the consumption and networks sectors represent the highest number of projects.

Figure 24: Number of projects by country and by position in the value chain



Duration of projects according to their size (projects under €50m)

For smaller projects, there is no clear correlation between its size and its duration, as some projects below €50m last only a couple of years, while others last for ten years (Figure 25 and Figure **26**).

Figure 25: Initial supported project duration as a function of the overall project budget (projects under €50m)

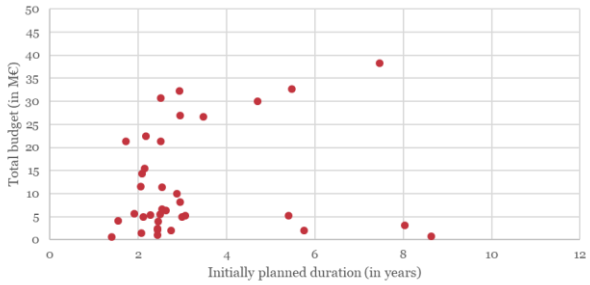
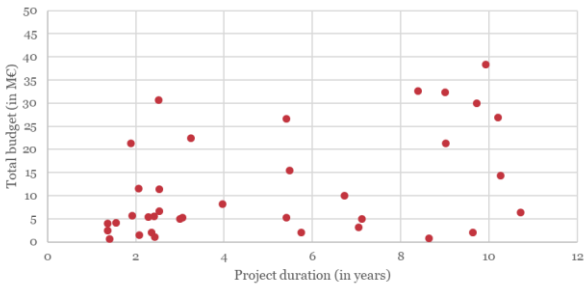


Figure 26: Latest supported project duration as a function of the overall project budget (projects under €50m)



For some projects (GA 020, 021, 022, 023, 024, 025 and 206 in Bulgaria and PI.06.02.01 in Lithuania), the initial duration is unknown. It was chosen to report the final duration.

Grant holders

An analysis of the grant holders was carried out to determine the kind of stakeholders supported by the programme. Out of the 58 projects supported by NDAP, 53 projects (91%) are managed by public stakeholders: municipalities, ministries, national agency, municipal and state-owned companies (Table 16), although the beneficiaries can be private (e.g. apartment owners). These projects take up 99% of the total budget and 99% of the budget committed to grant (€942m). The remaining projects are managed by private companies.

It is observed that the average level of financing differs according to the type of organisation, with private stakeholders getting a far-lower financing level than public entities.

Table 16: Type of grant holders supported by the programme and average level of financing

Type of organisation	Number of projects	Total budget (in €)	IDSF and CPMA budget (latest committed in €)	Average level of financing
State-owned company	17	1 065 615 946	613 902 562	58%
Ministry	16	501 227 904	195 083 000	39%
Municipality owned company	5	202 153 541	74 169 485	37%
Municipality	13	54 437 114	34 878 000	60%
National agency	2	32 413 000	23 520 000	73%
Private company	5	24 856 390	6 116 590	25%
Total	**58**	**1 880 703 895**	**947 669 637**	**50%**

In Bulgaria, grant holders such as Thermal Power Plant Maritza East 2 EAD, Bulgartransgaz EAD, Mini Maritsa Iztok EAD, Elektroenergien Sistemen Operator EAD and Natsionalna Elektricheska Kompania EOD are owned by the Bulgaria Energy Holding, which is a state-owned company in the country.

Table 17 presents the overall list of grant holders in function of the number of projects they were responsible for.

Table 17: List of grant holders and projects

Grant holders	Number of projects	Total budget (in €)	Latest IDSF and CPMA amount committed to grant	Proportion of the committed budget compared to the national committed budget
Bulgaria				
Bulgartransgaz EAD	2	48 460 000	31 000 000	7,7%
Burgas municipality	1	2 412 986	1 315 000	0,3%
CEZ Distribution Bulgaria AD	1	5 237 333	688 435	0,2%
Citygas Bulgaria AD	1	11 382 360	2 330 000	0,6%
CNG Maritza Ltd	1	6 643 965	1 300 000	0,3%
Elektroenergien Sistemen Operator EAD	3	62 100 000	45 000 000	11,2%
Enemona Utilities EAD	1	666 775	666 775	0,2%
Metamodul Ltd	1	5 359 260	1 339 815	0,3%
Mini Maritza Iztok EAD	2	47 164 213	30 150 000	7,5%
Ministry of Energy	14	468 670 419	162 465 000	40,5%
Natsionalna Elektricheska Kompania EOD	1	37 300 000	26 580 000	6,6%
Plovdiv municipality	1	3 953 546	2 425 000	0,6%
Pravetsgas 1 AD	1	804 030	480 000	0,1%
Sofia municipality	1	2 092 472	1 300 000	0,3%
Stara Zagora municipality	1	1 031 894	730 000	0,2%
Thermal Power Plant Maritza East 2 EAD	1	26 665 000	19 500 000	4,9%
Toplofikacia Pernik (District Heating Company)	1	11 590 000	10 753 782	2,7%
Toplofikacia Sofia AD	3	188 517 043	63 000 000	15,7%
Toplofikacia Varna EAD	1	2 046 498	415 703	0,1%
Lithuania				
AB Lietuvos Elektrine	1	516 580 000	257 500 000	70,7%
HUDA	1	22 413 000	13 520 000	3,7%
Ignalina Municipality	3	21 717 492	5 747 000	1,6%
Lietuvos Dujos AB	1	21 299 815	12 950 000	3,6%
Lietuvos Energija AB	1	2 000 000	2 000 000	0,5%
Ministry of Energy	1	2 557 485	2 618 000	0,7%
State enterprise Ignalina NPP	1	38 287 292	46 499 000	12,8%
Visaginas Municipality	2	18 666 376	18 737 000	5,1%

Grant holders	Number of projects	Total budget (in €)	Latest IDSF and CPMA amount committed to grant	Proportion of the committed budget compared to the national committed budget
Zarasai Municipality	3	4 562 348	4 624 000	1,3%
Slovakia				
Ministry of Economy	1	30 000 000	30 000 000	16,5%
Slovak Innovation and Energy Agency (SIEA)	1	10 000 000	10 000 000	5,5%
Slovenská Elektrizačná Prenosová Sústava (SEPS), A.S.	3	260 522 293	142 035 127	78,0%
Total	**58**	**1 880 703 895**	**947 669 637**	

In Bulgaria, the Ministry of Energy is holding grants for 14 projects of 38, which represents more than 40% of the KIDSF budget committed to the country. Some of the projects have however been implanted by other bodies (e.g. EBRD, EIB). In addition, Toplofikacia Sofia AD, Elektroenergien Sistemen Operator EAD, Bulgartransgaz EAD, Mini Maritza Iztok EAD, Natsionalna Elektricheska Kompania EOD and Mini Maritza Iztok EAD are responsible for 12 projects representing 53,6% of the nationally-committed NDAP budget. The remaining 12 projects weight 13% of the NDAP budget.

In Lithuania, one project managed by AB Lietuvos Elektrine represents 70,7% of the nationally-committed budget. The State enterprise Ignalina NPP managed the second largest project, representing about 13% of the nationally-committed budget.

In Slovakia, Slovenská Elektrizačná Prenosová Sústava (SEPS) manages 3 projects (on a total of 5), representing 78% of the nationally-committed BIDSF budget.

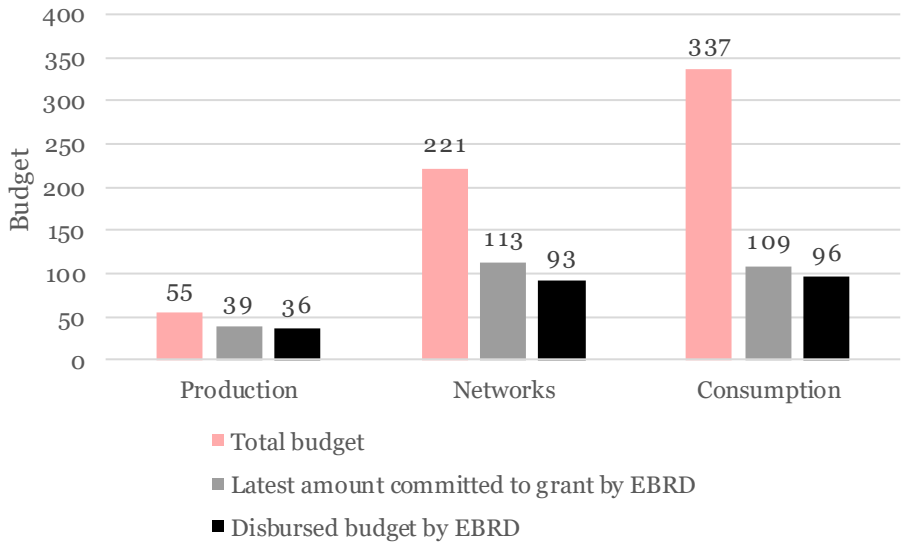
NDAP financing level

Bulgaria

In Bulgaria, finalised projects represent a total budget of €613m, with an overall KIDSF financing level of 43% and a grant consumption of 86% (Figure 27).

Grant consumption levels are all above 80% for each category. For the production category, the difference can be explained by a renewable energy project. Indeed, although the construction of a small hydro power plant on the Iliina River was initially planned with a financing level of 56%, only 1% of the grant was disbursed and the project was finally abandoned (GA 033A). For the networks, the construction of high pressure gas pipelines to, and gas regulation stations in Silistra, Kozloduy and Oryahovo (GA 014) project had a relatively low level of grant-consumption, about 40%. Reasons behind this limited level are under investigation.

Figure 27: Comparison between the total amounts, the KIDSF committed and disbursed budget per sector for completed projects in Bulgaria

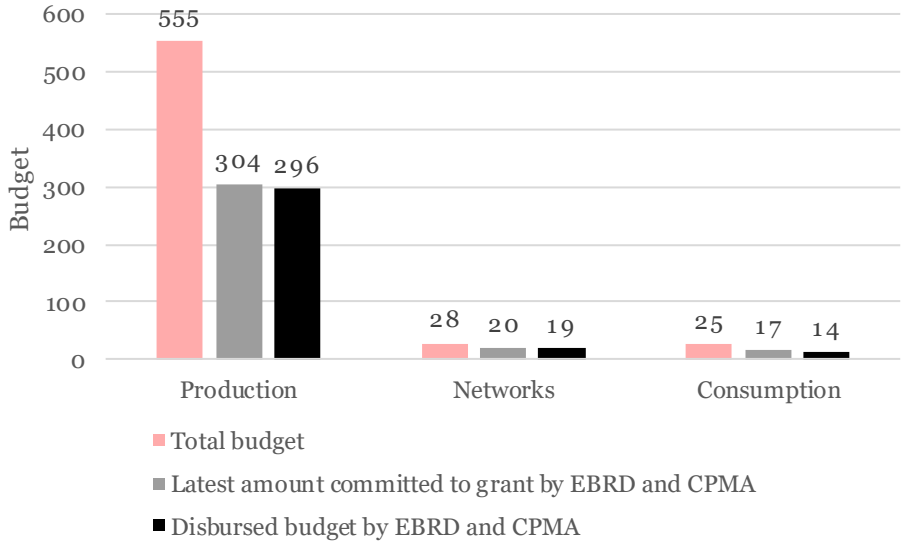


Lithuania

In Lithuania, finalised projects represent a total budget of €604m, an IIDSF and CPMA financing level of 56% and a grant consumption of 96% (Figure 28).

Across all topics, grant consumption is very high, above 82%. This consumption level was impacted by one project that benefited from a 100% financing level (fully funded by NDAP) but ended up with a final budget less than the initial budget (GA002D - Ignalina NPP Decommissiong Support Investment Packages, B5 heat and steam upgrading).

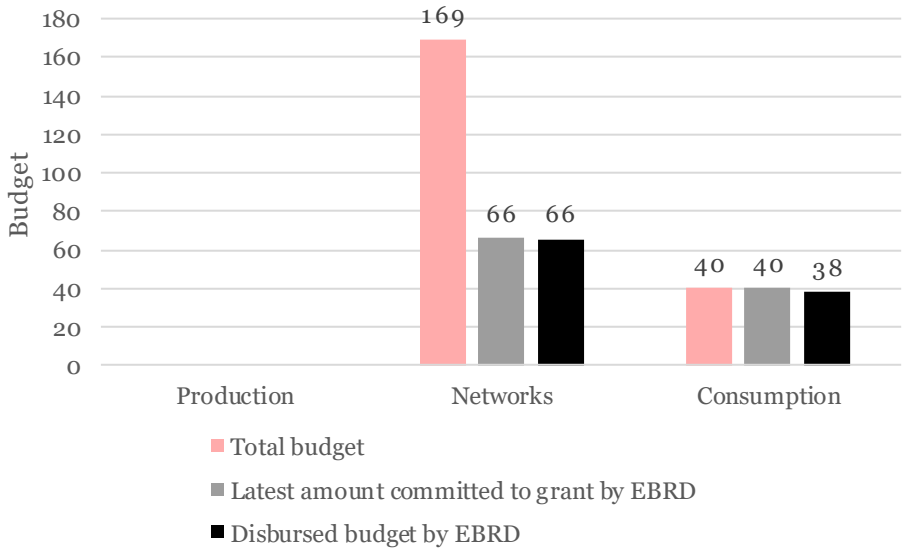
Figure 28: Comparison between the total amounts, the IISDF and CPMA committed and disbursed budget per sector for completed projects in Lithuania



Slovakia

In Slovakia, finalised projects represent a total budget of €209m, a BIDSF financing level of 51% and a grant consumption of 98% (Figure 29).

Figure 29: Comparison between the total amounts, the BISDF committed and disbursed budget per sector for completed projects in Slovakia



Amendments

An analysis of the grant agreements and their amendments was conducted to contribute to the assessment of the evolution of the projects. There are several reasons behind the amendments, both minor and major: budget reduction or shift, change of scope, delays, procurement difficulties. Overall and with the current level of information collected, it seems that amendments were made to reflect the life of the projects rather than correcting initial design issues.

It can be noted that approaches differ from a country to another:

- Slovakia did not have any amendments to the grants for its five projects.
- In Bulgaria, grants for nine projects out of 38 were amended (Table 18). Reasons behind these amendments are still under investigation.

Table 18: Amended projects in Bulgaria

Project ID	Project title	Number of subprojects	Number of amendments
003D	Implementation and Management of the Economic and Energy Efficiency Measures in the Power Distribution Systems as well as Energy Efficiency Measures in Public Buildings and Street Lighting and for the Consultancy Services for the Preparation and Management of the Implementation of the Strategy Implementation Plan for Energy and Energy Efficiency Projects		3
004E	Implementation and Management of the		4

Project ID	Project title	Number of subprojects	Number of amendments
	Rehabilitation of the Sofia District Heating Network		
006F	Energy Efficiency and Renewable Energy Credit Line Framework Facility in Bulgaria		5
007D	Implementation and Management of the Project for Demand Side Energy Efficiency Measures in Public Building	2	3
009B	For Establishing a Pilot Project for Residential Energy Efficiency Credit Line Framework Facility in Bulgaria		1
010B	For Establishing and Operation of an Energy Efficiency Facility in Bulgaria		1
013E	For Refurbishment and Extension of the National Electricity Distribution System – Supply and Installation of Plant and Equipment for substations Tzaravetz, Burgas, Metalurgichna, Plovdiv, Zlatitza, Shabla, Mayak, Kavarna, Marek and procurement and implementation of new substation automation systems and rehabilitation of Vacha-1 HPP switchyard and HPP systems of integrated control	3	4
014B	Construction of high pressure gas pipelines to, and gas regulation stations in Silistra, Kozloduy and Oryahovo		1
036B	For Refurbishment and Extension of the National Electricity Transmission System (construction of a new 400kV power line from TPP Maritsa Iztok 2 (s/s MI) to s/s Bourgas and Construction of a new 400kV power line from TPP Maritsa Iztok 2 (s/s MI) to s/s Plovdiv)		1

- In Lithuania, grants for ten projects out of 15 were amended (Table 19). Several reasons lie behind these amendments: budget reduction due to the decrease of construction prices (e.g. IEE.01 and VEE.01), shift of budget from Visaginas to Ignalina due to the limited success in Visaginas (e.g. VEV, IEV), significant change in scope as Orimulsion fuel was withdrawn from world market, budget increase and difficulties during the tendering process (GA 005). However, most amendments were made to reflect minor changes in scope, timeline or budget.

Table 19: Amended projects in Lithuania

Project ID	Project title	Number of subprojects	Number of amendments
HUD.01	HUDA Mechanism		3

Project ID	Project title	Number of subprojects	Number of amendments
IEE	Ignalina EE	4	5
IEV.01	Ignalina EnerVizija		4
ISL.01	Ignalina Street Lighting		
PI.06.02.01	Modernisation and Renovation of Visaginas town District Heating System		
VDH.02	Modernisation and Renovation of Visaginas town District Heating System		1
VEE	Visaginas EE	4	5
VEV	Visaginas EnerVizija (PPF)	2	2
ZEE	Zarasai EE	5	7
ZEV.01	Zarasai EnerVizija		1
ZSL.01	Zarasai Street Lighting		
GA005E	Lithuania Power Plant Environmental and Related Technical Upgrading		4

- In Slovakia, grants for three projects out of five were amended (Table 20). Most amendments were made to reflect minor changes in scope, timeline or budget.

Table 20: Amended projects in Slovakia

Project ID	Project title	Number of subprojects	Number of amendments
011A	Sustainable Energy Financial Facility		1
014A	Measures in transmission sector consequential final shutdown of Bohunica V1		1
020A	Complex ES Bystricany - Transformation 400/110 kV	5	1

Appendix F Localisation of the supported projects in the three countries

Bulgaria

Lithuania


LATVIA
RUSSIA
BELARUS
POLAND
Mažeikiai
Telšiai
Šiauliai
Kretinga
Plungė
Radviliškis
Panevėžys
Klaipėda
Šilutė
Tauragė
Kėdainiai
Ukmergė
Jonava
Kaunas
Vilnius
Marijampolė
Alytus
Druskininkai
Utena
Visaginas
Ignalina
Zarasai
National projects:
Cons: HUD.01
Cons:
ZEE
ZEV
ZSL
Cons:
VEE
VEV
Net:
VDH
Ignalina nuclear power plant
Prod:
002D
005E
Cons:
IEE
ISL
IEV
Net:
004A
Net: 011A
Legend:
Ongoing projects
Finalized projects
Prod: Production
Cons: Consumption
Net: Networks
40 km
20 mi
© d-maps.com

Slovakia


Nationwide projects:
Cons: 011A
POLAND
CZECH REPUBLIC
Žilina
Bystrica
Martin
Net: 014A
Ružomberok
Liptovsky Mikulas
Net: 014A
Poprad
Prešov
Net:
014A
Humenné
Trenčín
Net: 014A
Prievidza
Net: 014A
Banská Bystrica
Košice
Net: 014A
UKRAINE
Piešťany
Bystricany
Net: 020A
Zvolen
Topoľčany
Bohunice nuclear
power plant
Trnava
Cons: 15A
Krizovany
Net: 002A
Nitra
Levice
AUSTRIA
Bratislava
Nové Zámky
Komárno
HUNGARY
50 km
30 mi
© d-maps.com
Legend:
Ongoing projects
Finalized projects
Prod: Production
Cons: Consumption
Net: Networks

Appendix G Results of the survey with grant holders

The total number of respondents to the survey was 55: 30 from Bulgaria, 15 from Lithuania and 6 from Slovakia. Four answers could not be identified as to country of origin. For some projects, several respondents from different organisations provided answers. Some people did not answer to all questions, and, when relevant, the number of respondents is indicated under each graph.

The table below presents the projects supported by the programme, in function of their location, their status and the amounts committed to grant and disbursed.

Table 21: Overview of the Nuclear Decommissioning Assistance Programme: number of projects in each country, NDAP committed and disbursed budget

Country	# of finalised projects	# of on-going projects	Total # of projects	Total NDAP budget (€)	# of answered survey
Bulgaria	29	9	38	401 439 510	30
Lithuania	7	8	15	364 195 000	15
Slovakia	4	1	5	182 035 127	6
(unknown)					4

In those questions where multiple answers were possible, the responses for each project have been counted only once.

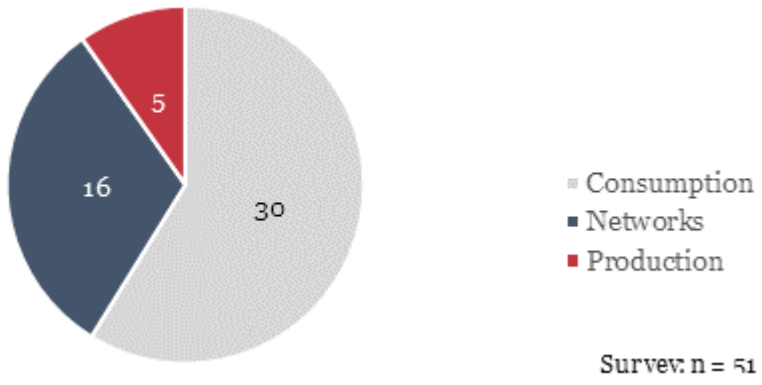
The legend of the figure indicates the questions that was answered by respondents.

G.1 Distribution of the respondents

G.1.1 In terms of topics

The figure below presents the distribution of the respondents according to the position of their project in the energy value chain.

Figure 30: Distribution of the respondents by position of their project in the value chain



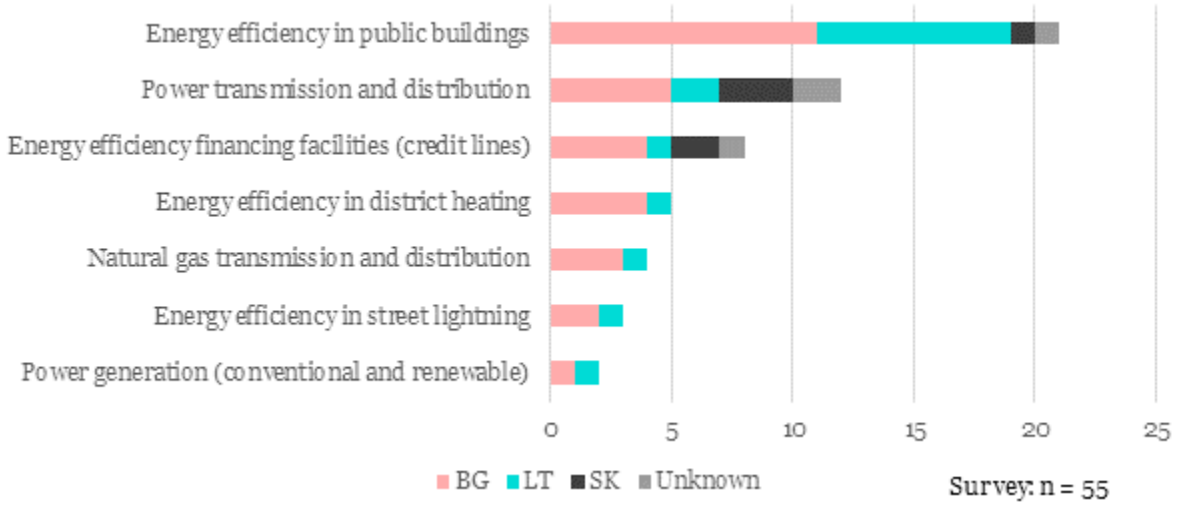
The distribution of the answers shows that 59% (30 out of 51) of those who answered the question are involved in projects concerning consumption. More than 30% (16 out of 51) are involved in networks projects, and about 10% (5 out of 51) in production projects.

Figure 31: Number of projects, distribution by position in the value chain and country

Per country, projects concerning consumption dominate in Lithuania (11 out of 15 answers). In Bulgaria and Slovakia, the answers are almost equally divided between consumption and networks projects, whereas the five production projects are found in Bulgaria (3) and Lithuania (2).

Respondents were also analysed in function of the initial topic (Figure 32).

Figure 32: Number of projects per topic and country



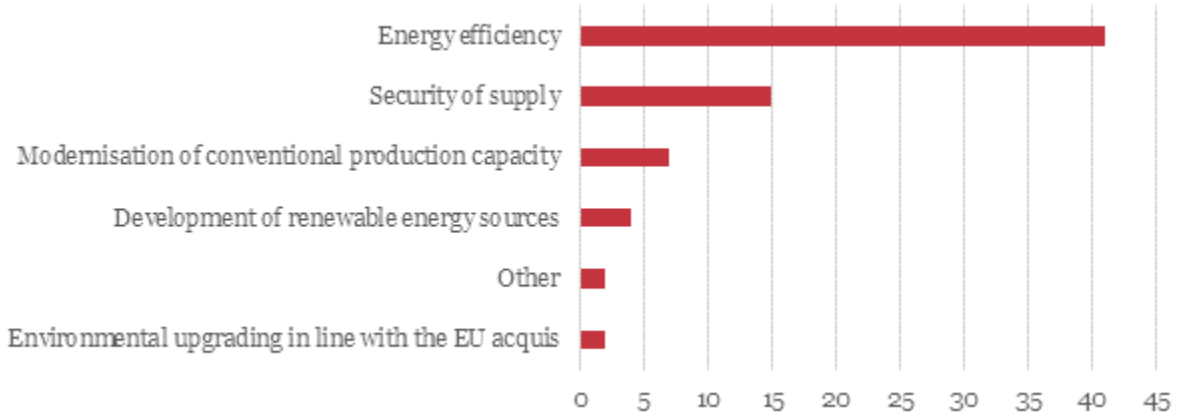
With 21 responses, energy efficiency in public buildings is the most common project topic among respondents to the survey, followed by power transmission and distribution (12 responses). Energy efficiency financing facilities count 8 answers, and energy efficiency in district heating count 5 answers. Respectively 4 and 3 respondents identify natural gas transmission and distribution and energy efficiency in street lighting as a topic for their project. Per country, the projects in Bulgaria are mainly focused on energy efficiency in public buildings, followed by power transmission and distribution. Answers from Slovakia cover three topics: power transmission and distribution, energy efficiency in

public buildings and energy efficiency financing facilities. In Lithuania, energy efficiency in public buildings is the largest topic, followed by power transmission and distribution.

G.1.2 In terms of energy objectives

In terms of energy objectives of their projects, the respondents quoted the following (several responses possible):

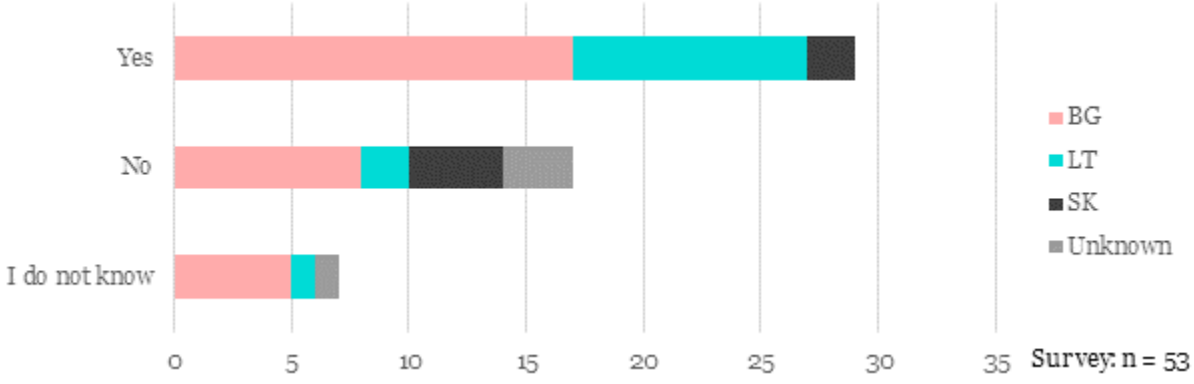
Figure 33: Energy objectives of the projects



As for the energy objectives of the projects, two objectives dominate. A large majority of the respondents (75 %, 41 out of 55) say that energy efficiency was an objective of the project. Security of supply was an objective for 15 of 55 (27%). Modernisation of conventional production capacity (13%), development of renewable energy sources (7%) and environmental upgrading in line with the EU standards (3,5%) were identified as project objectives in only a few cases.

Respondents were asked if the energy objectives of their projects were quantified (Figure 34).

Figure 34: Were these objectives quantified?



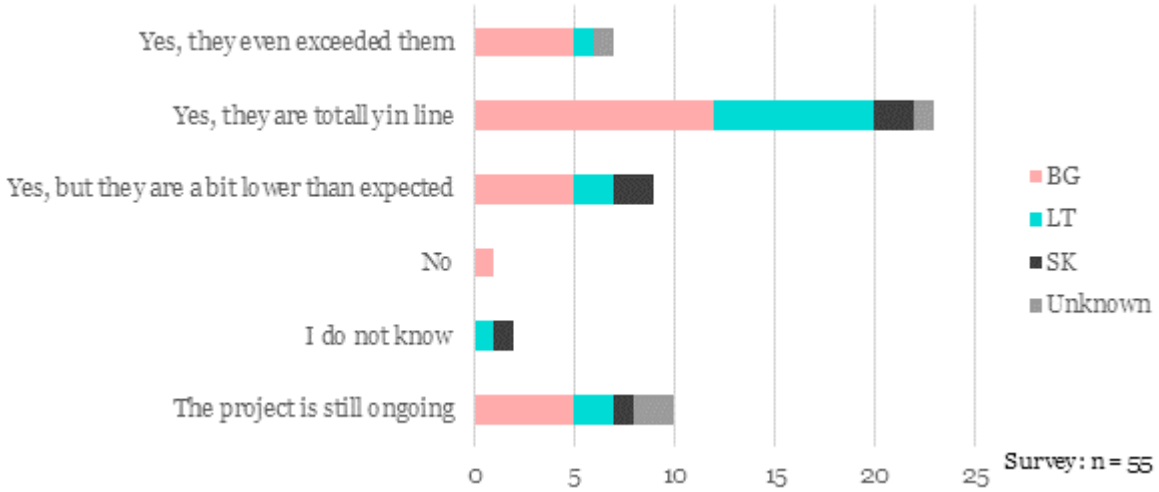
For 29 respondents (54%), the energy objectives of the projects were quantified. One third of the respondents indicate that the objectives of the projects were not quantified.

G.2 Results achieved by the projects

The scope of this section was to assess the results achieved by the projects in the fields of energy, and to identify the challenges encountered.

Figure 35 presents the extent to which respondents assessed the adequacy between projects' objectives and results.

Figure 35: Were the energy results in line with the expected objectives?

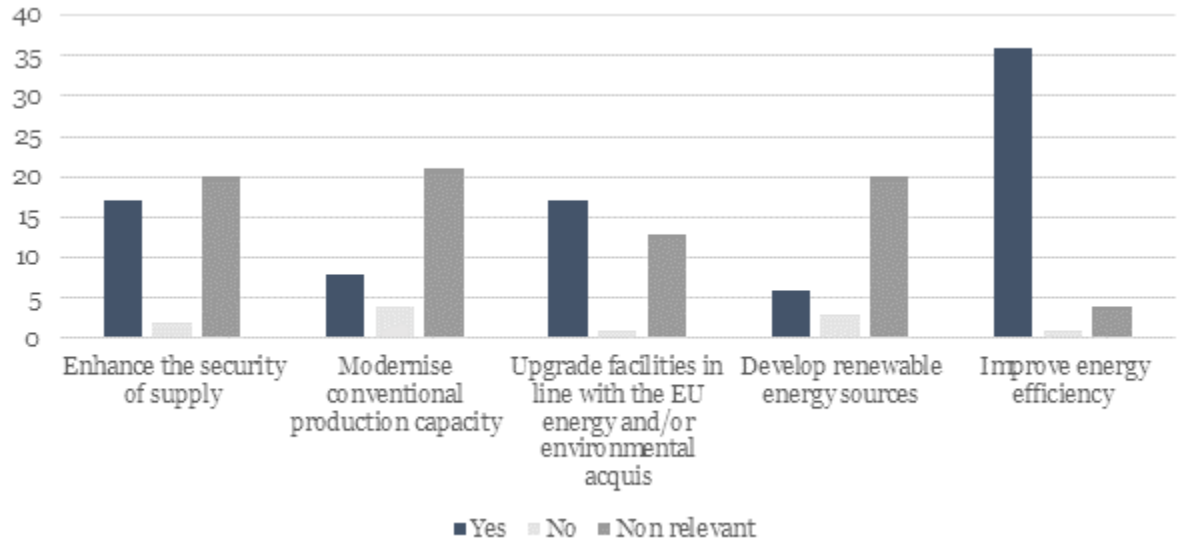


Overall, the respondents consider that the projects are in line with the expected objectives. 40% of the respondents (22 out of 55) said the results were totally in line with expectations, 13% believed energy results to have exceeded expected objectives and 16% considered results to be below expectations. 10 respondents replied that the project is still undergoing. One project did not achieve the results, as contractual difficulties impeded the intended use of the grant.

As for countries, Bulgarians and Lithuanians were particularly content: respectively 12 (43%) and 8 (53%) respondents consider that the projects were in line with the expected objectives, and 5 and 1 that it exceeded expectations. For five Bulgarian respondents and two Lithuanians, results were lower than expected. The answers from Slovakia are more mixed. Two out of six respondents considered that the projects were in line with the expected objectives, two that results were lower than expected and none that it has exceeded expectations.

G.2.1 Contribution of the projects to several goals

Figure 36: Contribution of the projects to several goals (several answers possible)



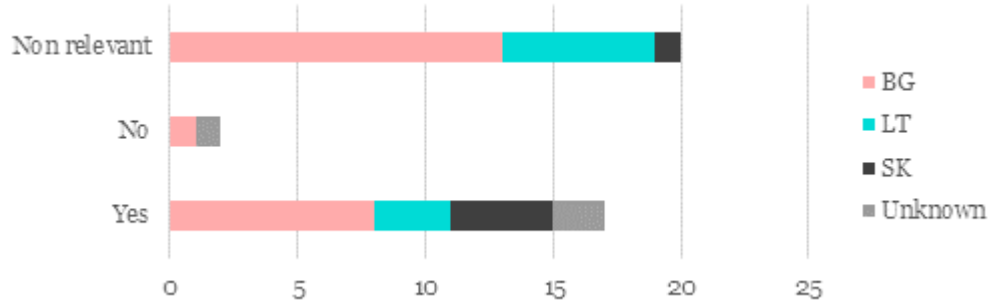
According to 36 of 55 respondents (65%), the projects allowed for improved energy efficiency. For 17 respondents each (31%), the projects allow to enhance the security of supply and to upgrade the facilities in line with the EU energy and/or environmental acquis.

For eight respondents (14,5%), the project aimed to modernise conventional production capacity and only 6 (11%) said that the project aimed to develop renewable energy sources.

It should be noted that about a third of the respondents claim that their project did not aim to enhance the security of supply, to upgrade the facilities or to develop renewable energy sources.

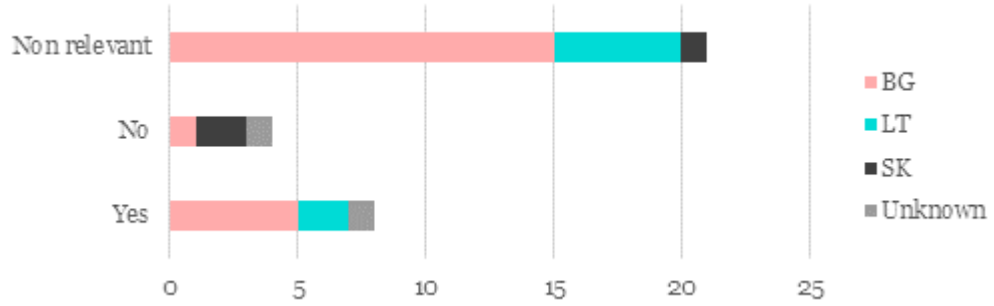
Analysing the answers according to the country of respondent, the following can be said:

Figure 37: Did the project allow to enhance the security of supply?



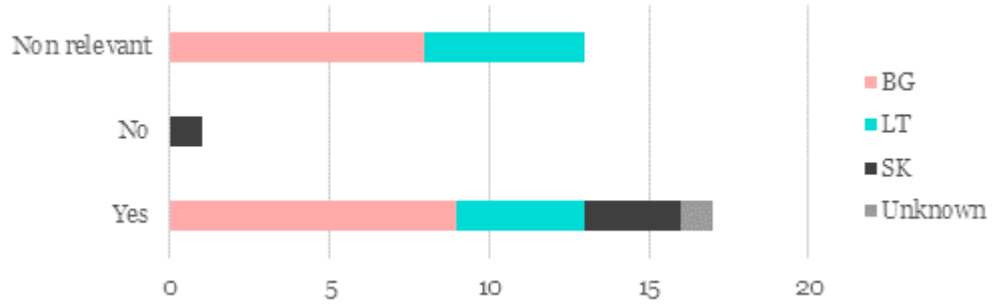
Of the 16 respondents that answered that the project allowed to enhance the security of supply, half of them are from Bulgaria. Four out of six respondents from Slovakia claim the project allowed to enhance the security of supply. Only three respondents from Lithuania answered positively to this question. Twenty respondents, mainly from Bulgaria, said their project did not aim to enhance the security of supply.

Figure 38: Did the project allow to modernise conventional production capacity?



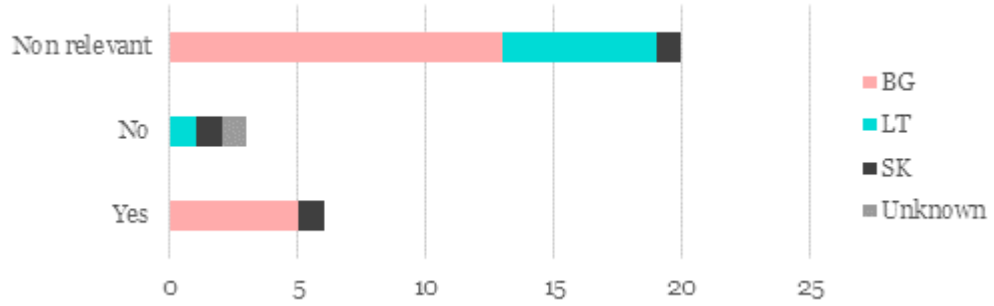
According to 8 respondents, their project aimed to modernise conventional production capacity, mostly from Bulgaria (5 responses) and Lithuania (2 responses). 21 respondents, mostly from Bulgaria did not identify this as relevant for their project. Modernising conventional production capacity was not an objective in Slovakia.

Figure 39: Did the project allow to upgrade facilities in line with the EU energy and/or environmental acquis?



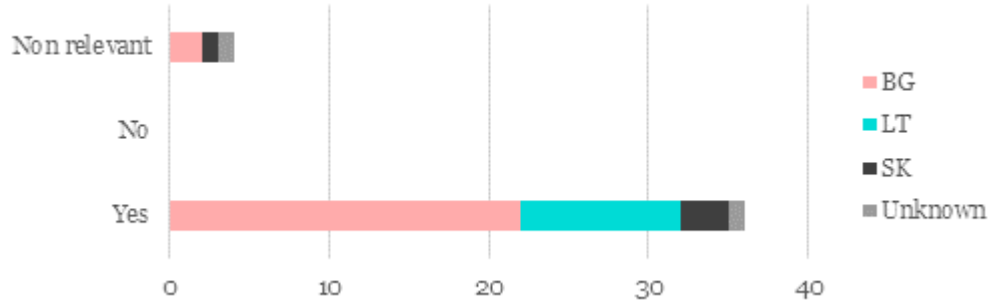
17 respondents say their projects allowed to upgrade the facilities in line with the EU energy and/or environmental acquis, 9 answered for projects in Bulgaria and respectively 4 and 3 for Lithuania and Slovakia.

Figure 40: Did the project allow to develop renewable energy sources?



6 respondents said that the project aimed to develop renewable energy sources, with 5 from Bulgaria. For the majority of the respondents to this question, their project did not aim to develop renewable energy sources.

Figure 41: Did the project allow to improve energy efficiency?

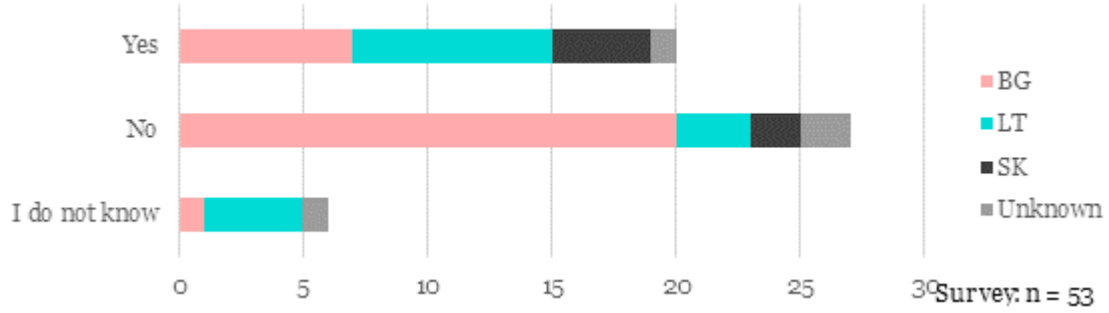


According to 36 respondents, the projects allowed for improve energy efficiency, with more than half from Bulgaria. 10 respondents from Lithuania also indicated that their project allowed to improve energy efficiency.

G.2.2 Challenges that impeded the implementation of the project

Respondents were asked to identify the challenges that impeded the implementation of the projects, if any.

Figure 42: Have you faced challenges that impeded the implementation of the project?

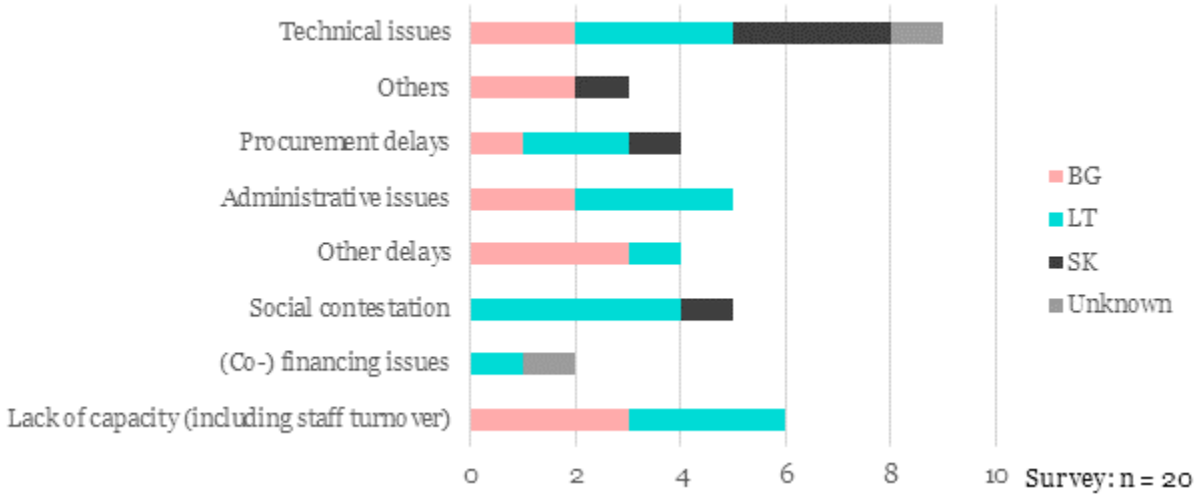


A total of 20 respondents (38%) said their projects encountered challenges, whereas 27 (51%) said there were no challenges.

Country wise, 4 out of 6 (67%) respondents from Slovakia, and 8 out of 15 (53%) respondents from Lithuania, answered there were challenges that impeded the implementation of the project. Out of a total of 28 respondents from Bulgaria, 7 (25%) faced challenges to the implementation of the project.

Respondents who according to the previous question faced challenges were asked to identify the types of challenges faced.

Figure 43: If challenges were faced that impeded the implementation of the project, which challenges were faced? (several answers possible)



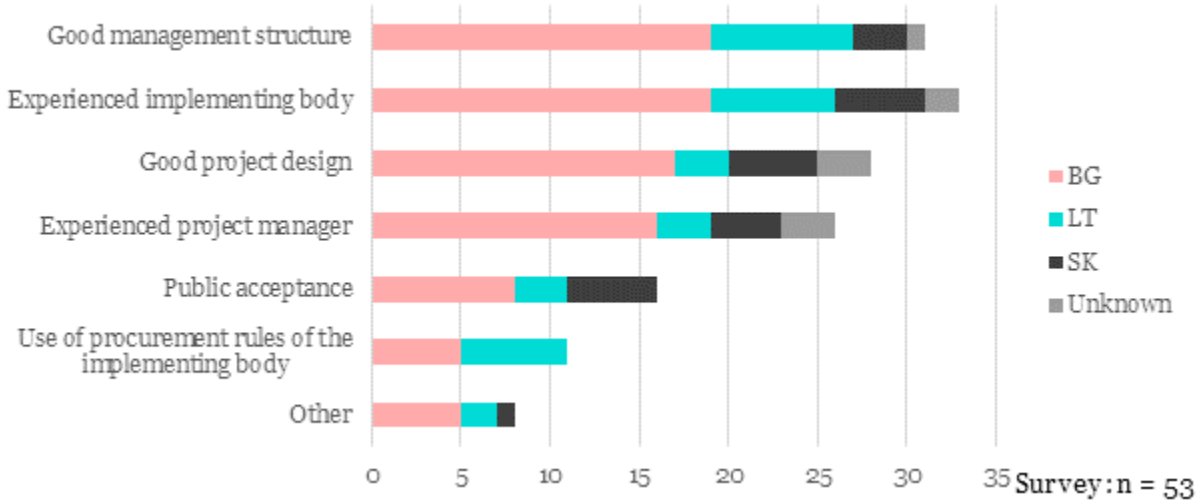
20 respondents provided details on the challenges they faced. The main problem cited was "technical issues" – 9 of the 20 respondents (45%) who cite challenges refer to this.

In all, in most projects that encountered challenges that impeded the implementation of the project, respondents identify one other reason apart from technical issues: lack of capacity (in Bulgaria and Slovakia), socio-economic factors and administrative issues (in Lithuania), procurement delays (in Lithuania and Slovakia), other delays (in Bulgaria and Lithuania), and social contestation in Lithuania and Slovakia. Other quoted reasons included: contractual issues, need for legislative amendments and need for awareness-raising among home-owners to undertake energy-efficiency projects.

G.2.3 Success factors for the implementation of the project

Respondents were asked to identify the success factor for the implementation of the project.

Figure 44: What are the success factors for the implementation of the project? (several answers possible)



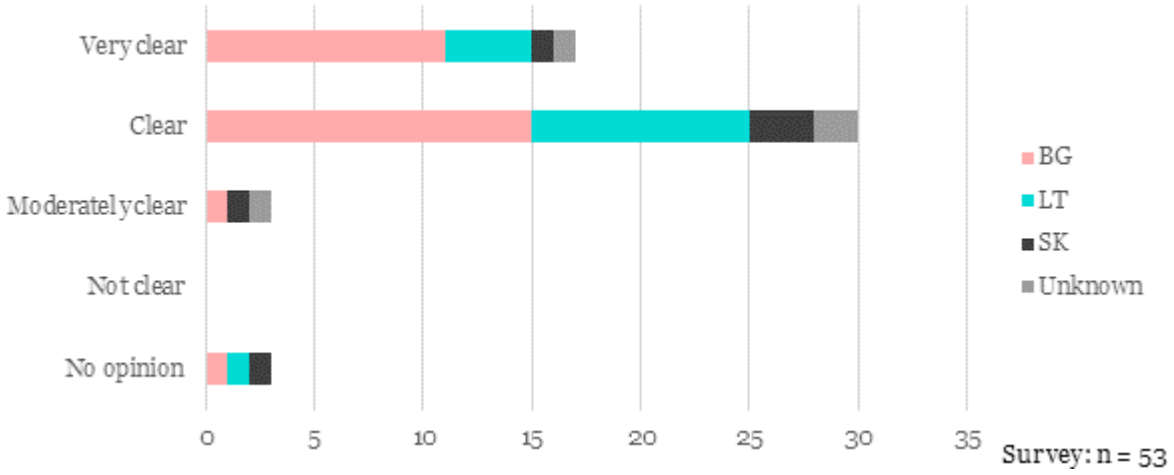
Survey respondents identify several success factors for the implementation of their project. Four success factors seem more important than others: 26 to 33 respondents out of 53 identify the experienced implementing body (62%), a good management structure (59%), a good project design (53%) and an

experienced project manager (49%) as success factors. As for countries, these four success factors seem to be the shared among countries, given the relative share of respondents. For Bulgaria, the four factors are mentioned by between 16 and 19 each, out of 30 respondents from Bulgaria (between 53 and 63%). In addition, in Lithuania, the use of the procurement rules of the implementing body is often quoted, while public acceptance was key in Slovakia.

G.3 Process of selection and follow-up of the project

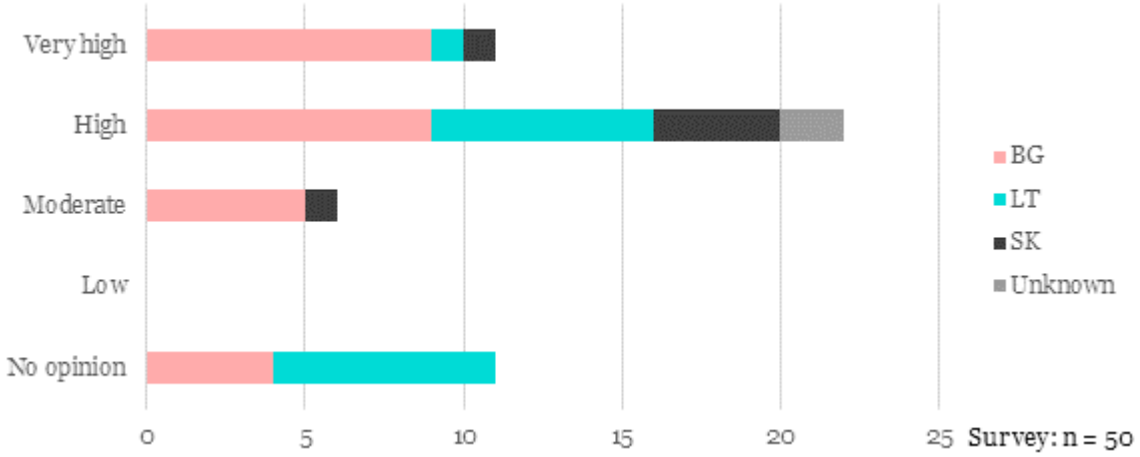
The scope of this section was to assess the processes of selection and follow-up of the projects.

Figure 45: Were the objectives of the NDAP programme clear?



The objectives of the NDAP programme were clear to the respondents of the survey: only 3 out of 53 (6%) considered the objectives only moderately clear. The answers show no discernible differences between countries.

Figure 46: What is your general degree of satisfaction with regards to the process of project selection?



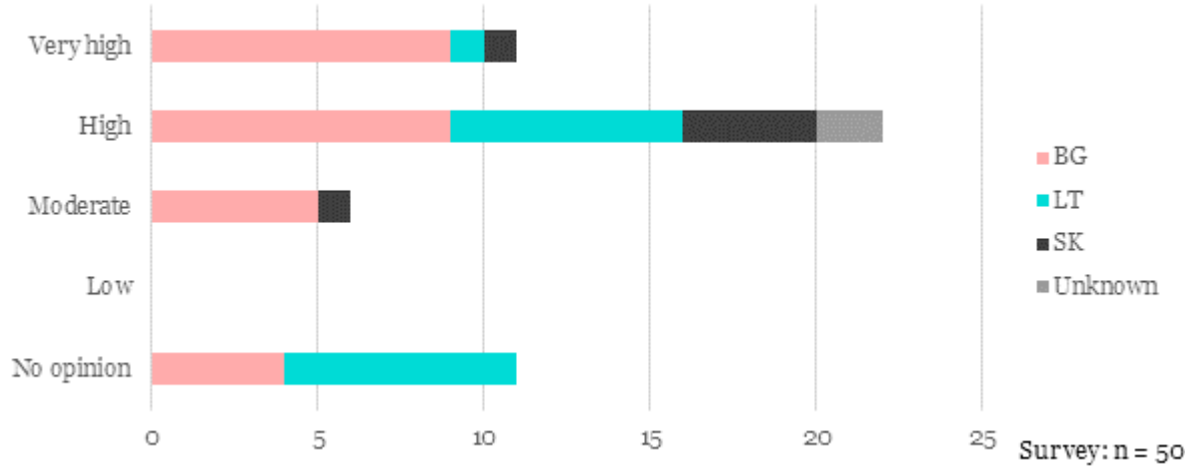
Out of the 50 respondents, 33 (66%) show a high or very high degree of satisfaction with regards to the process of project selection.

In terms of countries, 9 out of 27 (33%) respondents from Bulgaria show a very high degree of satisfaction, and a further 9 a high degree (33%). In Lithuania, 7 out of 15 respondents (47%) show a

high degree of satisfaction, and 1 a very high degree, with 7 no opinion (47%). 4 respondents from Slovakia show a high degree of satisfaction, and 1 a very high degree.

However, the survey is biased in the sense that it was directed only to respondents for projects that have been selected for funding.

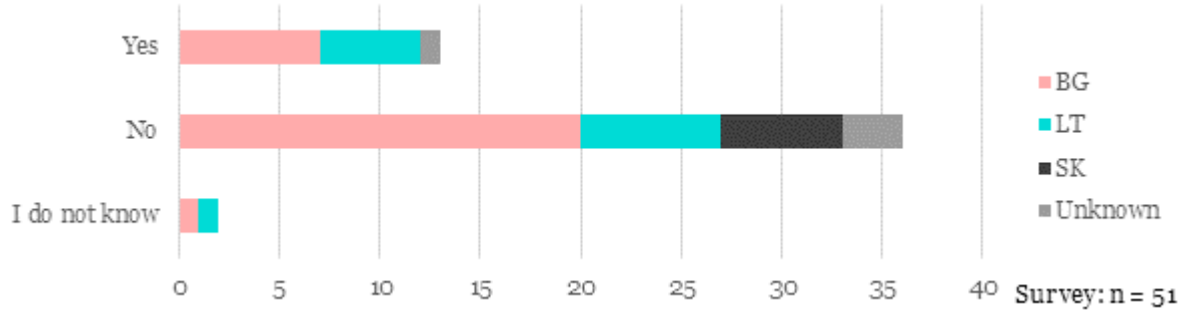
Figure 47: What is your general degree of satisfaction with regards to the process of project monitoring and follow-up?



There seem to be no major objections to the process of project monitoring and follow-up. 11 out of 50 respondents (22%) express a very high degree of satisfaction with this process, and a further 22 (44%) show a high degree of satisfaction. There is not notable difference per country.

G.3.1 Major redefining

Figure 48: Has the project needed some redefining of tasks during its implementation?

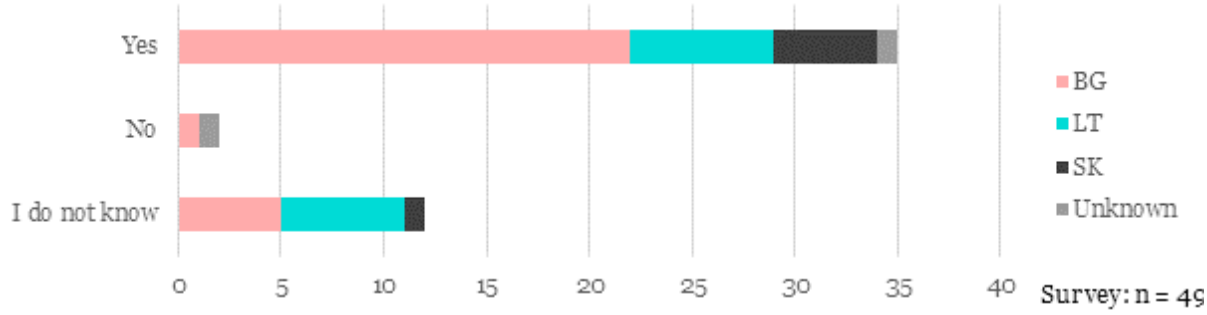


Thirteen respondents, from Bulgaria and Lithuania, claim their project needed redefining. The respondents are generally satisfied with regards to the flexibility of the programme for this redefinition: five answered “very good”, seven “good” and one “average” to the follow-up question “what is your general degree of satisfaction with regards to the flexibility of the programme for this redefinition?”.

G.3.2 Identification of risks with the assistance of the governance system of the project

Respondents were asked to indicate whether the governance system of the project supported them in identifying and managing them.

Figure 49: Has the governance system of the project supported you in identifying risks and managing them?



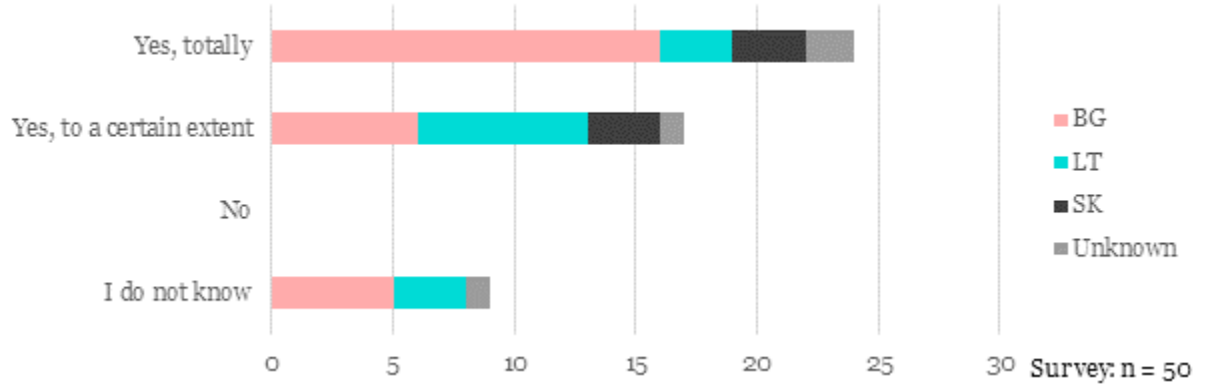
The governance system of the project clearly supported the projects in identifying risks and managing them: 35 out of 49 respondents (71%) answered in the affirmative, with 12 not knowing (25%). In Slovakia, 5 out of 6 respondents claim this was the case and in Bulgaria, 22 out of 28 respondents.

G.4 Efficiency

The scope of this section was to assess the extent to which the project has been efficient, and the underlying reasons. It also targeted the relevance of the level of resource mobilisation for the project implementation.

G.4.1 Commensurability

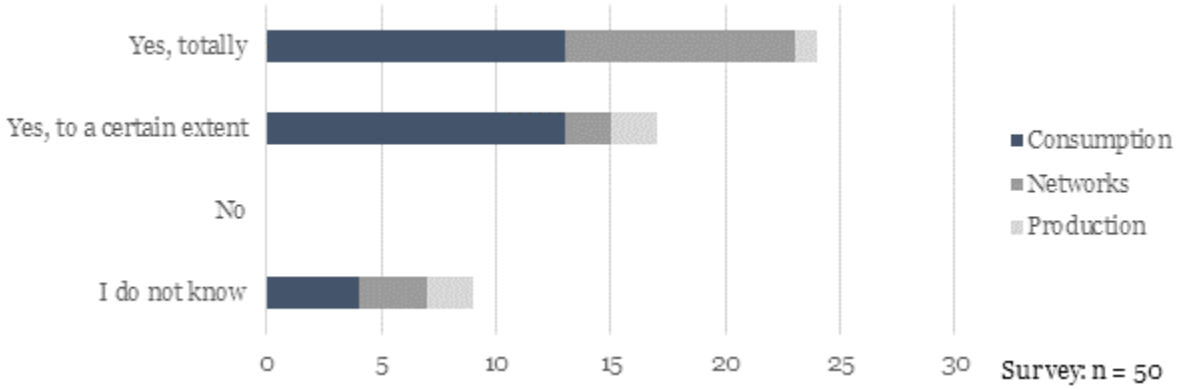
Figure 50: Were the costs of the project commensurate to the benefits achieved? (division by country)



A total of 24 respondents (of 50; 48%) consider that the costs of the project were totally commensurate to the benefits achieved. 17 respondents (34%) consider that the costs of the project were commensurate to the benefits achieved only to a certain extent. No respondent consider that the costs were not commensurate to the benefits achieved.

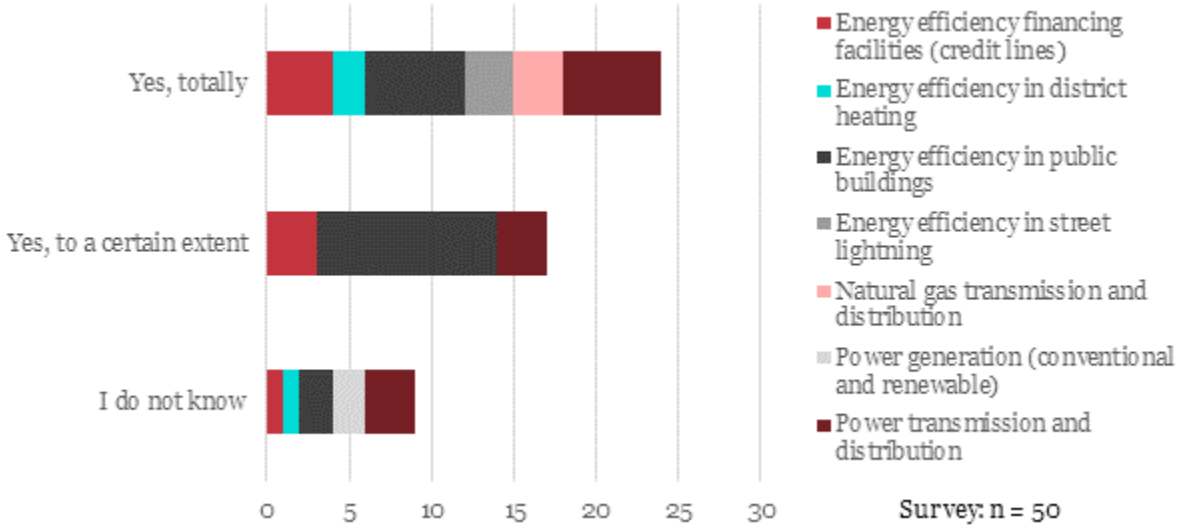
The answers from Slovakia are evenly divided between the two positive alternatives, whereas 16 of the 27 answers to this question from Bulgarian participants consider the costs of the project totally commensurate to the benefits achieved. For Lithuania, more than half the respondents consider that the costs of the projects were commensurate, but only to a certain extent.

Figure 51: Were the costs of the project commensurate to the benefits achieved? (division by position in the value chain)



Considering the same question per project topic, networks projects and consumption projects score higher than production projects. 10 respondents (of 15, 67%) consider that the costs of the networks' projects were totally commensurate to the benefits achieved, whereas 13 respondents out of 30(43%) answered the same for consumption projects. Only 1 response (of a total of 4, 25%) for production projects views the costs of the project totally commensurate to the benefits achieved.

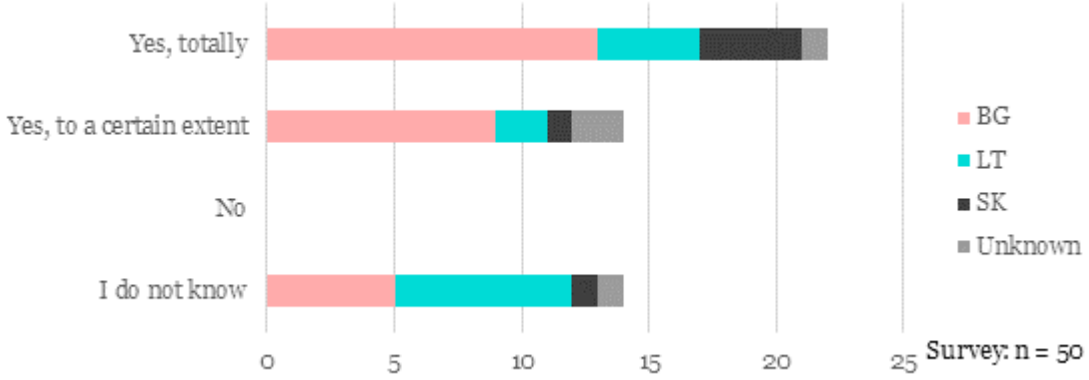
Figure 52: Were the costs of the project commensurate to the benefits achieved? (division by type of project)



Looking at the object of the project, there are no clear indications that certain types of projects have been more successful, but for energy efficiency in public buildings. There are respondents for every type of project claiming that the costs of the project have been totally commensurate to the benefits achieved. However, results are more mitigated for projects dealing with energy efficiency in buildings, power transmission and distribution, and energy efficiency financing facilities.

Notably, for energy efficiency in buildings a higher number of respondents answered "to a certain extent" than "totally". It can be linked to the fact that some projects have difficulties to reach the initially encompassed results. All respondents concerning projects covering natural gas transmission and distribution, energy efficiency in street lighting and energy efficiency in district heating claim that the costs of the project have been totally commensurate to the benefits achieved.

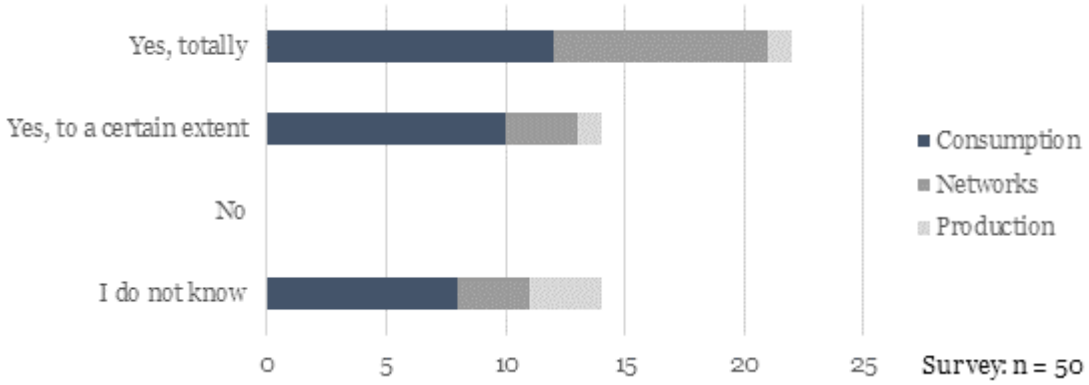
Figure 53: Were the costs of the project commensurate to similar projects? (division by country)



For most respondents, the costs of the projects were commensurate to the costs of similar projects. 44% consider the costs to be totally commensurate, while 28% consider them commensurate to a certain extent. A same percentage of respondents did not provide answers.

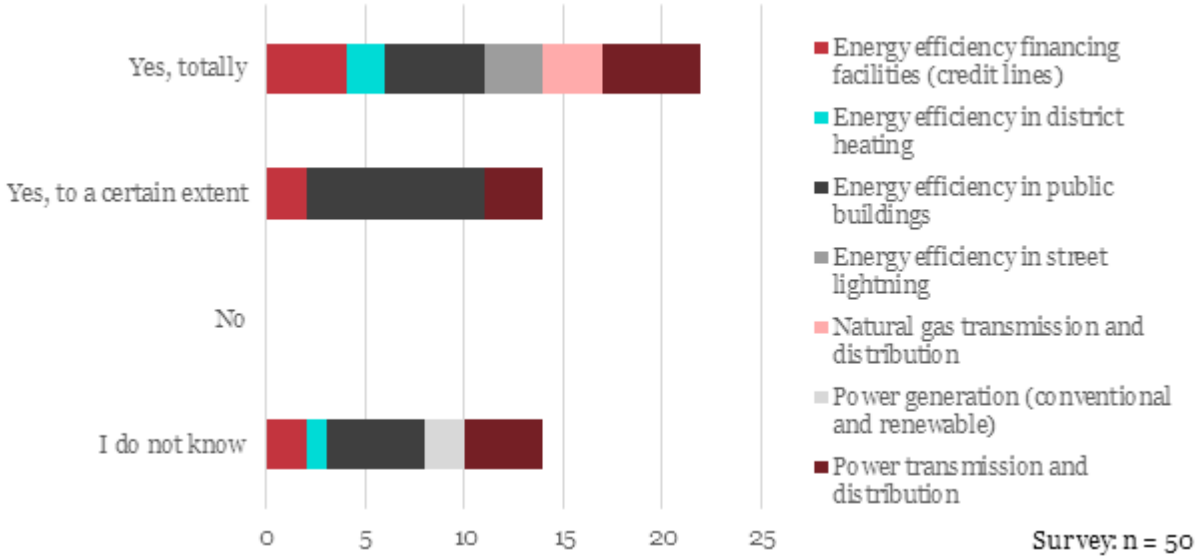
The respondents from Slovakia to a large extent consider the costs commensurate to similar projects: 4 of the 6 respondents agree with this. 13 of the 27 respondents (48%) from Bulgaria and 4 out of 13 (31%) from Lithuania who answered this question answer in the affirmative.

Figure 54: Were the costs of the project commensurate to similar projects? (division by position in the value chain)



Network projects are the ones that the respondents rate highest on the question whether the costs were commensurate to similar projects: 9 out of 16 respondents (56%) say the costs were totally commensurate to similar projects. The score for consumption projects is 12 out of 30 respondents (30%), and for production projects only 1 respondent out of 5 (20%) say the costs were totally commensurate to similar projects, with 3 saying they do not know.

Figure 55: Were the costs of the project commensurate to similar projects? (division by type of project)



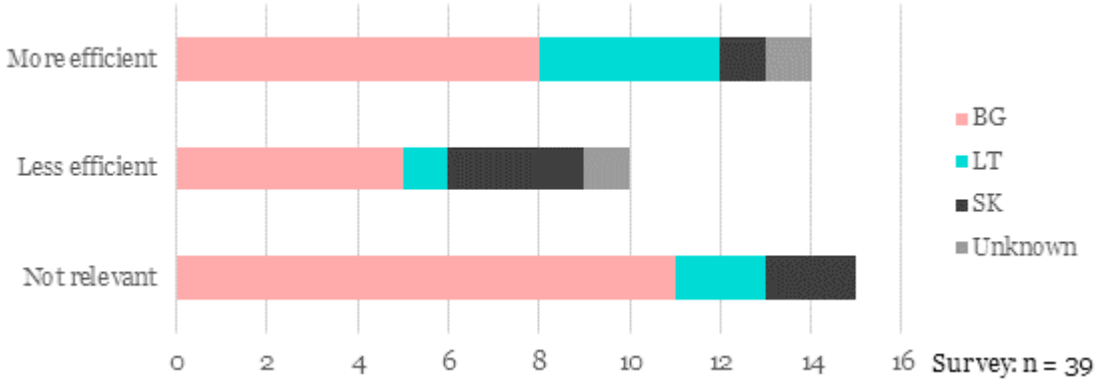
Focusing the same question on the object of the project, there are respondents for every type of project (except for power generation) claiming that the costs of the project have been totally commensurate to similar projects. All respondents concerning projects covering natural gas transmission and distribution, energy efficiency in street lighting and energy efficiency in district heating claim that the costs of the project have been totally commensurate to similar projects. Projects covering energy efficiency in public buildings stand out as the ones where respondents are more critical or sceptical about the costs.

G.4.2 Efficiency factors

Respondents were given the chance to indicate if several factors (starting point, governance, project design, internal technical capacity, external technical support) made the project more or less efficient.

Looking at all efficiency factors, the starting point is the one with the lowest score. In general, the efficiency factors mentioned in the survey seem to make the project more efficient. This is especially true for the external technical support.

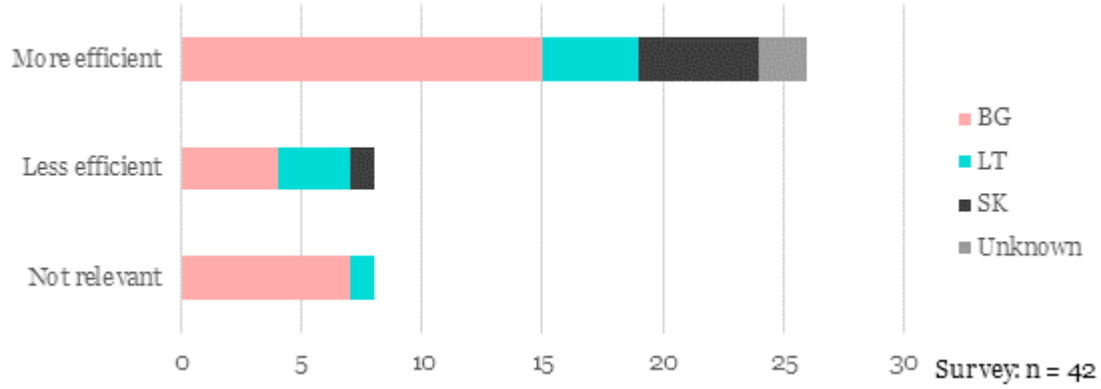
Figure 56: Did the starting point made the project more/ less efficient?



Although the starting point is considered more efficient by 14 of the 39 respondents (36%) on this question, 10 (26%) considered it less efficient. The respondents from Slovakia to a larger degree than

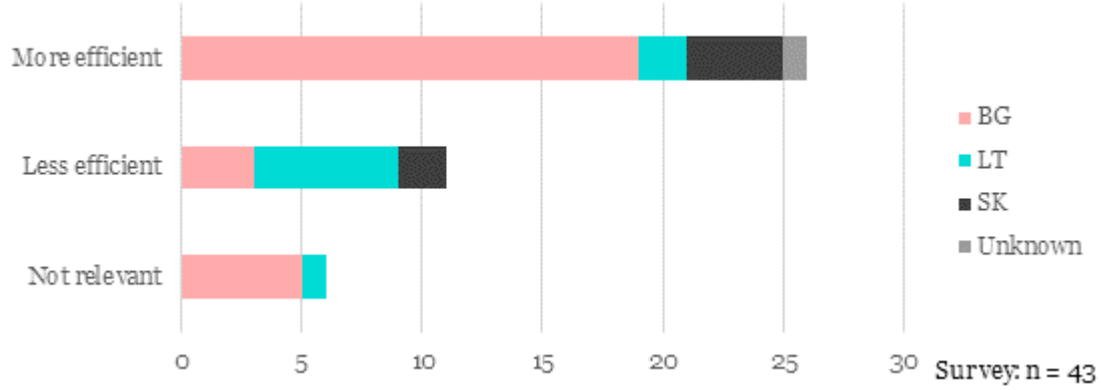
the others hold the view that the starting point made the project less efficient. In Bulgaria, the majority of the 24 respondents did not consider the starting point was a relevant factor, but 8 (33%) considered that the starting point made the project more efficient, while 5 (21%) considered that it made it less efficient.

Figure 57: Did the governance made the project more/ less efficient?



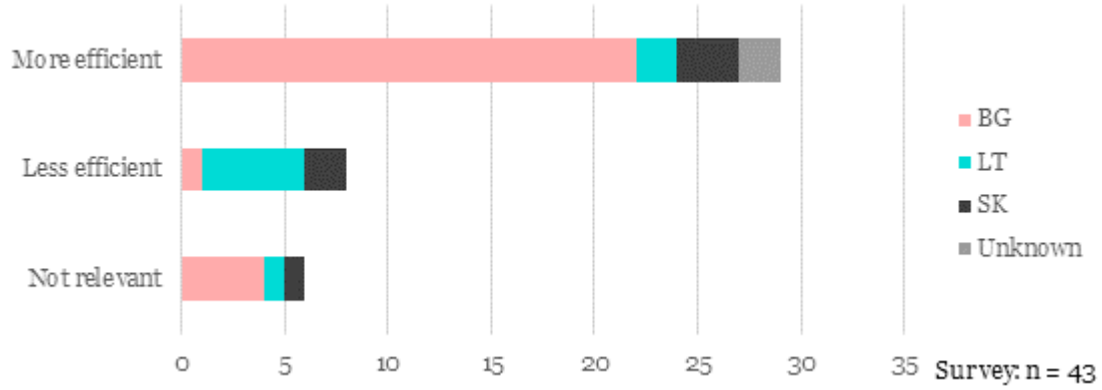
A large majority (26 respondents out of 42, 62%) considered the governance made the project more efficient. In particular, respondents from Slovakia highlight governance as a factor that favoured efficiency. Results are more mitigated for Lithuania, with a split of respondents between more and less efficient.

Figure 58: Did the project design made the project more/ less efficient?



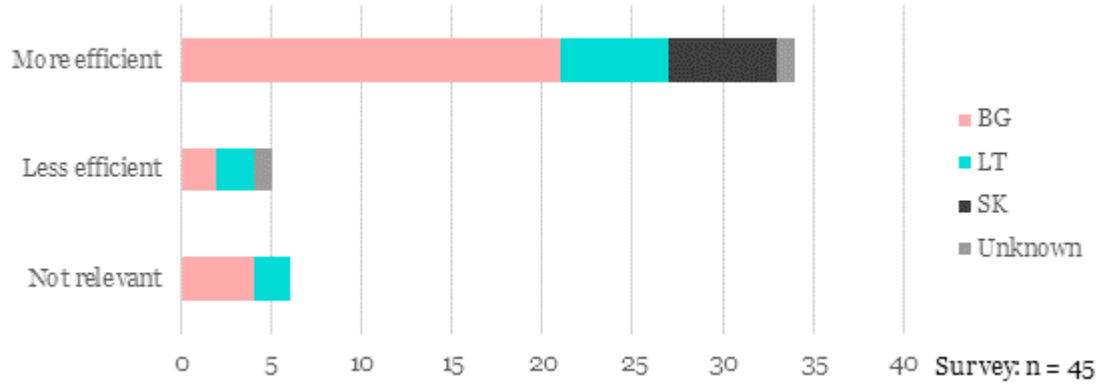
A majority of 26 respondents (out of 43, 60%) consider the project design made the project more efficient. 4 out of 6 respondents from Slovakia highlight project design as a factor that favoured efficiency, as did 19 out of 27 respondents on this question from Bulgaria.

Figure 59: Did the internal technical capacity made the project more/ less efficient?



The internal technical capacity clearly made the project more efficient: 29 out of 43 respondents (67%) agree with this. This factor seems to have been particularly important for the projects in Bulgaria, and less so in Lithuania, where the internal technical capacity seemed to have impeded some projects.

Figure 60: Did the external technical support made the project more/ less efficient?



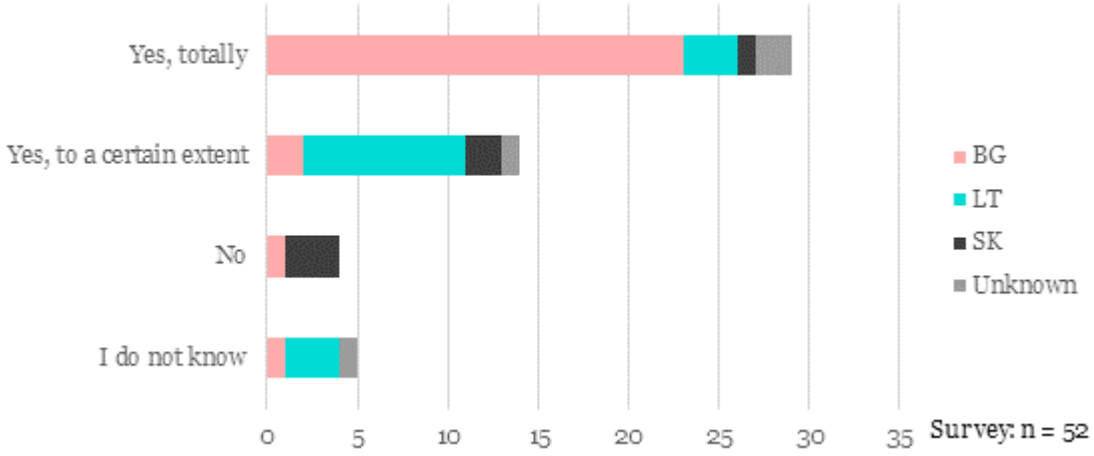
In general, the efficiency factors mentioned in the survey seem to make the project more efficient. This is especially true for the external technical support: 34 of the 45 respondents (76%) agree with this. Notably, all respondents from Slovakia claim that the external technical support made the project more efficient.

Other quoted factors improved the efficiency of the projects include: the experience gained from other similar projects and positive contexts.

Other factors that affected the efficiency of the projects include: contractual issues, contractor governance, focus of the project on a sector needing more resources and the lack of external resources.

G.4.3 Efficiency of the management structure of the programme

Figure 61: Has the management structure of the programme (through the implementing bodies) been efficient?

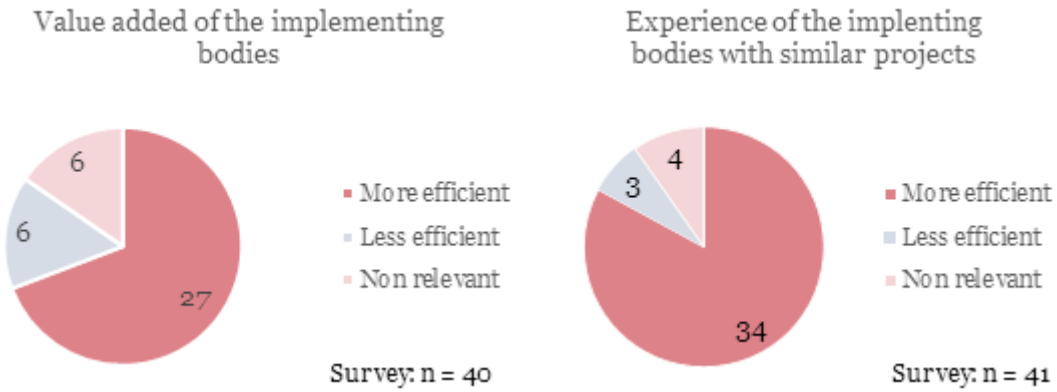


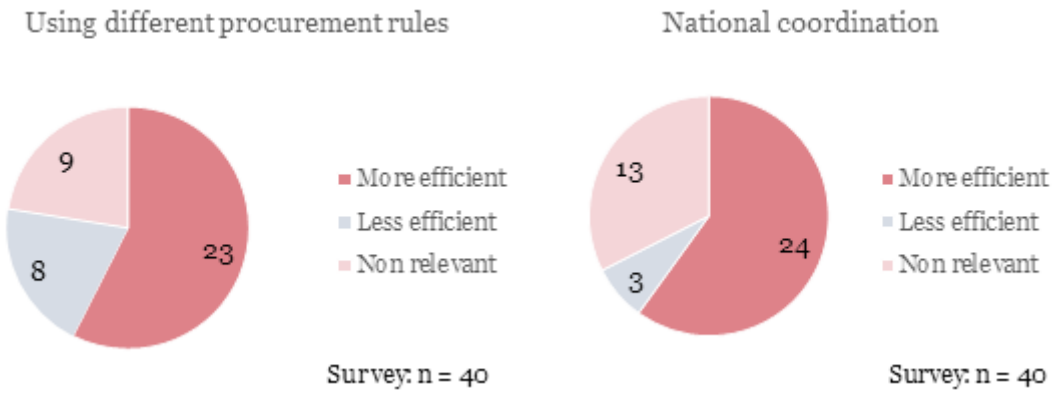
The management structure of the programme is considered efficient, and in particular the respondents from Bulgaria hold this view. Only 3 out of 15 respondents (20%) from Lithuania agree totally with this, and only 1 of the 6 from Slovakia. The majority of respondents from Lithuania consider that the management structure of the programme was only efficient to a certain extent. 3 respondents from Slovakia consider the management structure of the programme has not been efficient.

G.4.4 Factors that made the management structure of the programme more/ less efficient?

Respondents were asked to identify with factors made the management structure of the programme more or less efficient: value-added of the implementing bodies, experience of the implement bodies with similar projects, use of different procurement rules, national coordination or other factors.

Figure 62: What factors made the management structure of the programme more/ less efficient?





Most of the respondents say the management structure of the NDAP programme makes it more efficient.

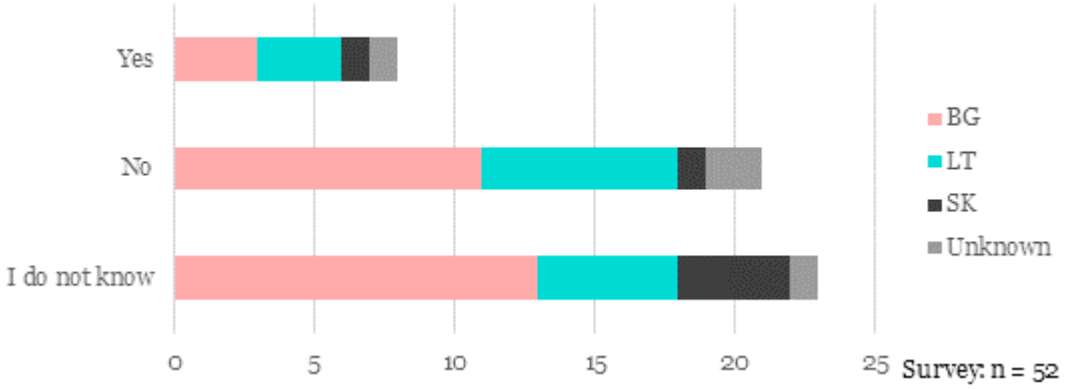
The factors that make the programme more efficient are, in descending order, experience of the implementing bodies with similar projects (34 responses out of 41, 83%), value added of implementing bodies (27 out of 39, 69%), using different procurements (23 out of 34, 68%) and national coordination (24 out of 40, 60%). At the same time, the procurement made the management structure of the NDAP programme less efficient according to eight respondents, as it generated some difficulties and delays.

G.5 Added value

The scope of this section was to assess the potential added-value from the Union intervention and the extent to which the project would have received support from different funding sources, including other European funds.

G.5.1 Implementation of the project without funding from NDAP

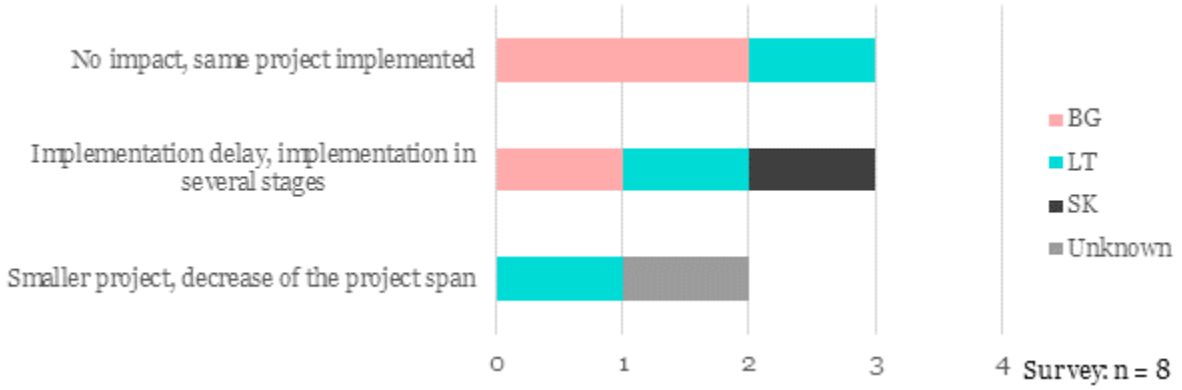
Figure 63: Would the project have been implemented if it had not been funded by NDAP?



About 44% of respondents do not know if the project would have been implemented without NDAP support. A similar figure (40%) indicate that the projects would not have been implemented without NDAP support. Only eight respondents (15%) think the project would have been implemented without NDAP.

The 8 respondents that indicated the project would have been implemented without NDAP were invited to comment on the consequences if the project had not been funded by NDAP.

Figure 64: If the project had not been funded by NDAP (through CPMA or EBRD), what would have been the consequences? (several answers possible)

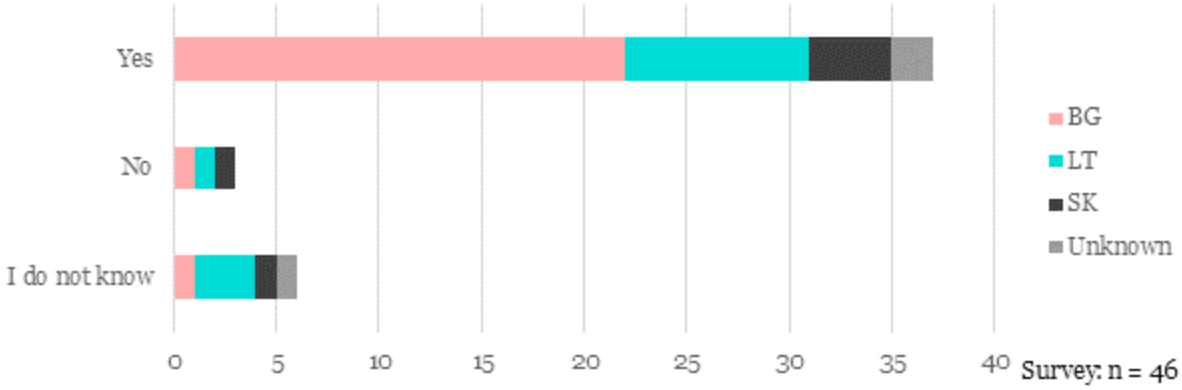


Most respondents indicated that if the project would not have been funded, there would have been impacts on the projects: 3 respondents indicated that it would have led to implementations delays or implementation in several stages, while 2 indicated that it would have decreased the project span. 3 respondents, 2 from Bulgaria and 1 from Lithuania, claimed there would have been no impact.

When asked on alternative funding, respondents indicated that it could have originated from European public or national public sources (5 respondents each). 2 respondents indicated that alternative private funding could have been mobilised.

G.5.2 Appropriateness of the level of NDAP co-financing

Figure 65: Was the level of NDAP co-financing appropriate?



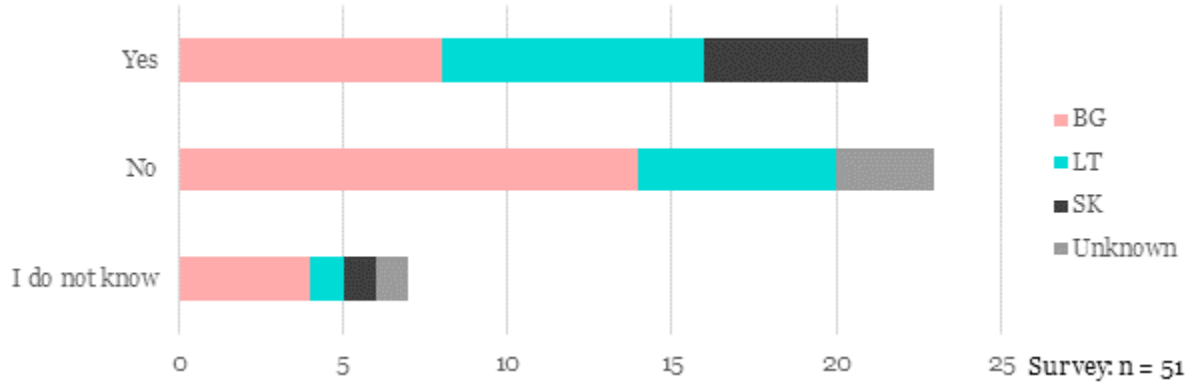
The co-funding was appropriate, according to respondents: 37 out of 46 (80%) agree with this. There are no notable differences between countries.

G.5.3 Leverage of additional funding

Out of the 8 screened answers to the question, 2 projects indicated that they leveraged additional funding, 1 in Lithuania and another in Slovakia. They both indicated that the co-funding was originating from national sources. The other 6 respondents answered no this question.

G.5.4 Comparison with other financial mechanisms

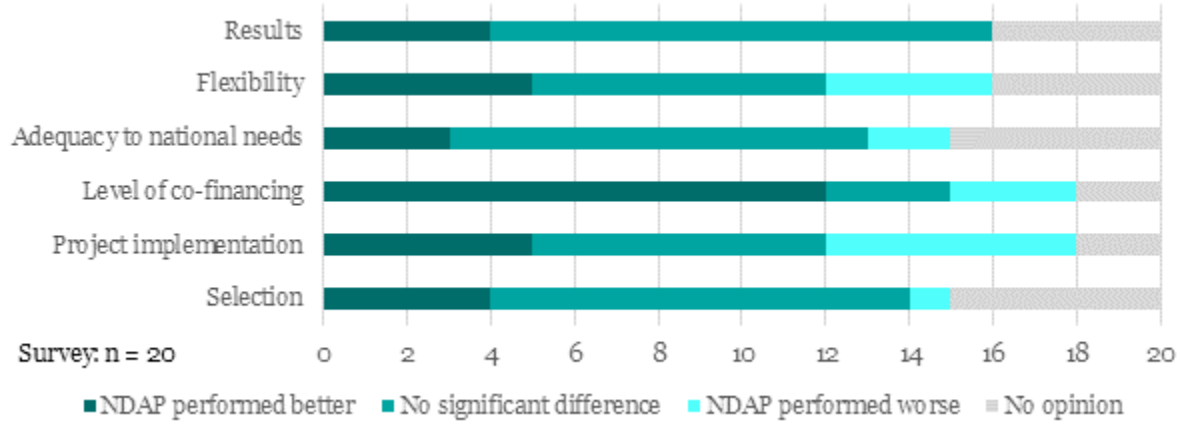
Figure 66: During the 2007-2013 period, were you granted the implementation of similar energy projects (in terms of size and/or topics) funded through other financial mechanisms than NDAP?



During the 2007-2013 period, 21 respondents say they were granted the implementation of similar energy projects funded through other financial mechanisms than NDAP. 5 out of 6 respondents from Slovakia, and 5 out of 8 from Lithuania claim this to be the case. Only 6 of the 21 respondents from Bulgaria say they were granted the implementation of similar energy projects funded through other financial mechanisms than NDAP.

Respondents who were granted the implementation of similar energy projects funded through other financial mechanisms than NDAP were invited to compare NDAP with other financial mechanisms.

Figure 67: How would you compare NDAP with these other financial mechanisms in terms of…? (several answers possible)



20 respondents provided details on the comparison of NDAP with other funding mechanisms. Overall, NDAP support was comparable to other programmes in the field of energy.

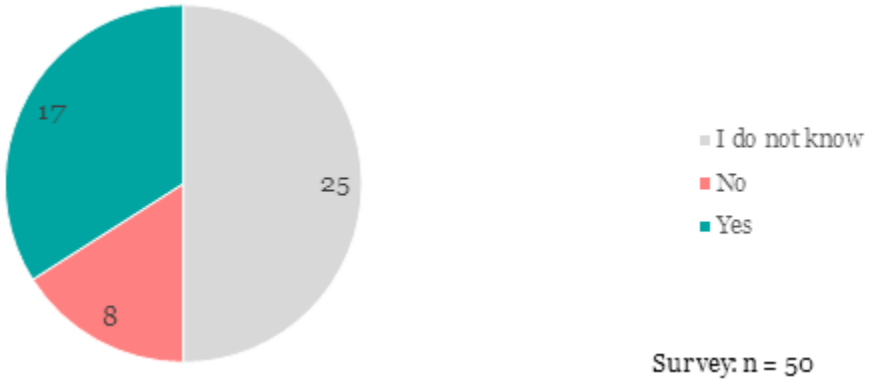
NDAP performed notably better concerning the level of co-financing (12 affirmative answers, 60%), but not so differently in all other aspects. In terms of flexibility, 5 respondents say NDAP performed better and 4 that NDAP performed worse. In terms of project implementation, 5 respondents say NDAP performed better and 6 that NDAP performed worse. In terms of results, 12 respondents considered that the results were similar, and 4 that they were better.

G.6 Sustainability

The scope of this section was to assess the impacts of the projects on the economy and at the local level.

G.6.1 Impacts on the development of SMEs locally

Figure 68: Has the project fostered development of SMEs locally?



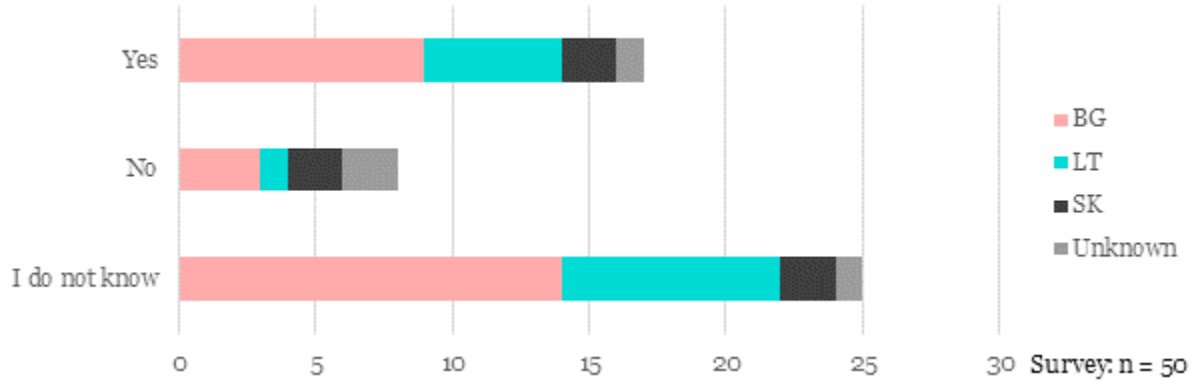
Half of the respondents do not know if the project fostered the development of SMEs locally. One third of the respondents considered that the response was positive, and 16% considered that it was not the case.

Respondents who claimed that their project has fostered development of SMEs locally were invited to clarify or give examples. 13 respondents answered:

- 5 answered that some of the SMEs were subcontracted by the contractors. One specified referring to living apartments rent, lunches in cafes and that some people get jobs in the objects. Another informs that local companies have been hired for performing of all the works of the project.
- 2 answered that the project was implemented by small businesses. One described it the following way: SMEs whose development started/continued with the Project: - producers of DH substations; - firms dealing with replacement and installation of preinsulated pipes; - other construction and installation firms in energy sector.
- 1 described that SMEs were main beneficiaries of investments in industrial energy efficiency, improving their competitiveness.
- 1 answered that SMEs were beneficiaries (end-borrowers and recipients of investment incentives) under the facility.
- 1 answered that the project “creates employment and competence”.

Out of the 50 answers on this question, 14 (36%) agree that their project has fostered development of SMEs locally.

Figure 69: Has the project fostered development of SMEs locally (geographical repartition)?

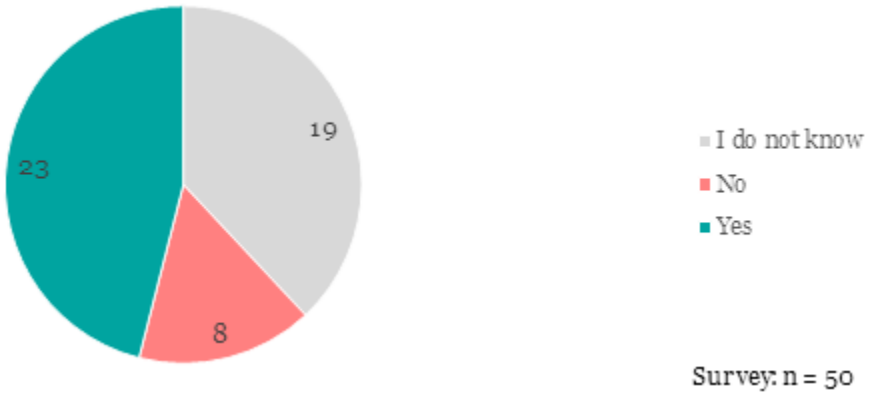


Looking at the geographical repartition, development of local SMEs seems to have been relatively more successful in Lithuania, where 5 of 14 respondents claim this to be the case. 9 respondents from Bulgaria and 2 from Slovakia say their project has fostered development of SMEs locally.

Among the factors that explained why the project did not support the development of SMEs, the focus of the projects and the procurement rules were quoted as features that impeded the participation of SMEs.

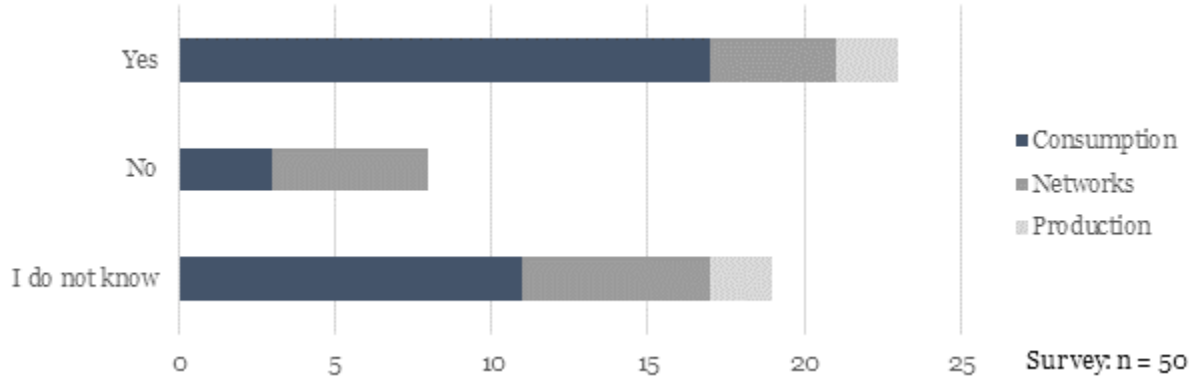
G.6.2 Impacts on local employment

Figure 70: Has the project impacted employment locally?



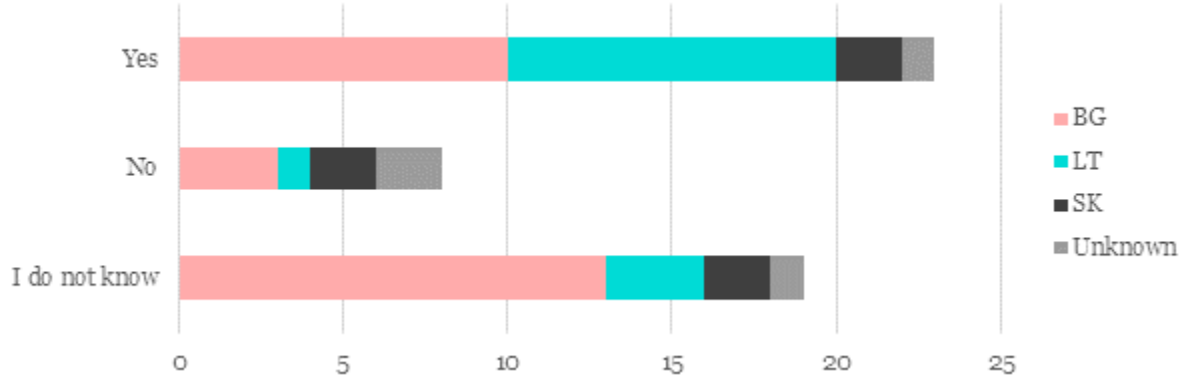
The projects seem to have had positive impacts on local employment. There are 23 affirmative answers (46%), and eight negative ones (16%). One out three who answered the question do not know.

Figure 71: Were the costs of the project commensurate to the benefits achieved? (division by position in the value chain)



Looking at types of projects, the impact on local employment is above all found in consumption projects. Out of the 31 answers regarding these types of projects, 17 (55%) claimed there has been an impact. Network projects seem to be less successful in this respect: 4 out of 15 answers (27%) agree with the statement, whereas 5 (33%) said there has been no impact.

Figure 72: Has the project impacted employment locally (geographical repartition)?



Projects in Bulgaria and Lithuania seemed to have had stronger impacts on local employment. In Lithuania, 10 out of 13 answers (77%) indicate a positive impact. In Bulgaria, 10 out of 26 (35%) answered positively, but 13 (50%) indicated that they did not know. The answers from Slovakia give an inconclusive answer.

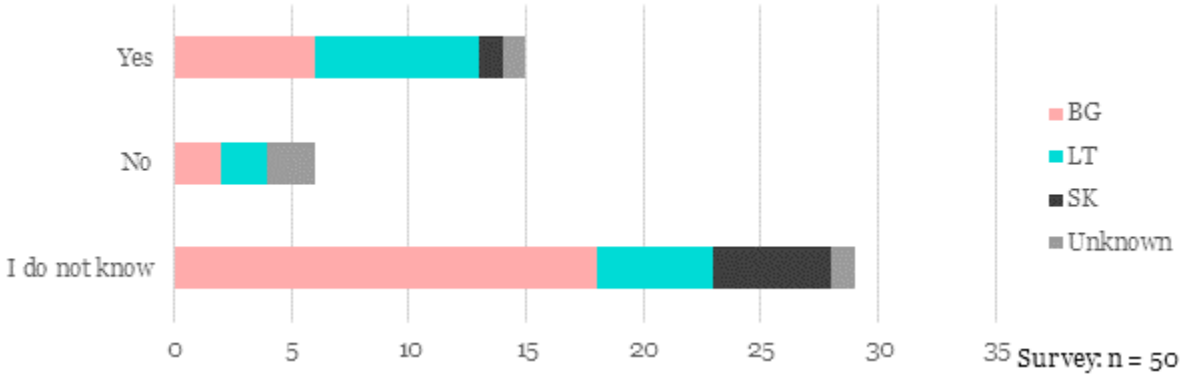
Respondents were asked to provide figures on the number of employments, but no figures were provided.

G.6.3 Impact on social cohesion locally

Figure 73: Has the project impacted social cohesion locally?

Concerning the question if the project has impacted social cohesion locally, respondents do not know if or to what extent this has been the case. Two third of the respondent indicated that they did not know which answer to provide.

Figure 74: Has the project impacted social cohesion locally?



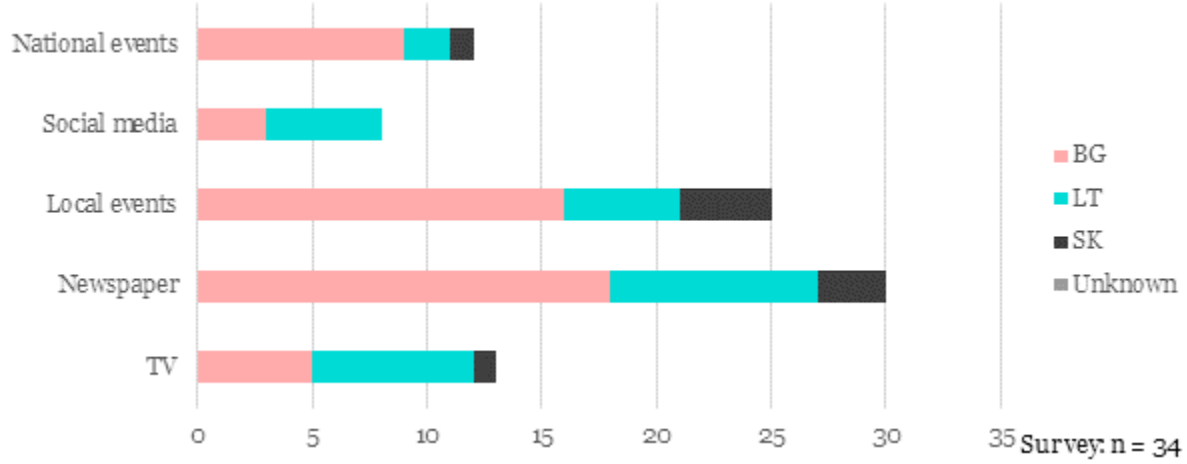
This is especially clear in the cases of Bulgaria and Slovakia. Respondents from Lithuania mainly believe the project has had an impact.

Consumption projects are to a larger extent than other types of projects believed to have had an effect. It is not clear for other type of projects.

G.7 Communication

Most stakeholders actively communicated about the projects, mostly using newspapers and local events as the type of communication. TV and national events have both been used by a bit more than a third of the respondents. In Lithuania, social media was also a popular medium.

Figure 75: Types of communication activities used



Additionally, some projects had information on a website and local communication was frequently using information boards of outdoor display panels, which described the funding source. In one case a museum displays the pipeline of the project. Another project had press conferences at each completing stage. And finally, in one project the mayor actively communicated with the public, both residents and the media, which was a key factor for the success of the project.

In several cases, highly placed people and authorities attended opening events or other promotional events of the projects. For example, ministries were represented in several communication activities, just as district governors, the EBRD and often local mayors were present. Even the Lithuanian prime minister was present at the opening ceremonies of two Lithuanian projects, as these were projects of national importance.

However, there are also a few cases in which almost no communication activities have been undertaken. Local people did hear of the project, but it was not publicised in the media. The reasons of the low communication activities mentioned were a limited scope and budget. In one project, local press releases were issued after successful renovations, but the public remained sceptic or even negative about the results. Improved communications could have led to more public acceptance in this case.

Overall, eighteen projects have a high score on communication, seventeen projects score 'medium' and ten projects score 'low'. Although most projects did undertake some communication activities, there is room for improvement on this point.

Appendix H Results of the survey with end-beneficiaries

H.1 Distribution of the respondents

In certain cases, the projects supported by NDAP benefited to other stakeholders than the ones responsible for the management of the grant. This is particularly the case for consumption projects, for instance facilities, where individuals benefited from grants that were managed by European banks.

The total number of respondents to the survey was 19, 8 from Bulgaria, 5 from Lithuania, and 6 from Slovakia. This relatively limited number can be explained by different reasons:

- The reluctance from institutions to provide the list of beneficiaries;
- The lack of updated contact details;
- Staff turnover;
- Difficulty to relate the operation to NDAP support;
- Elapsed time since the operation.

In total, more than 100 invitations to participate to the survey were sent.

Although the number of respondents is limited, the analysis of the responses allow to observe some tendencies and to provide some further elements to draw our conclusions.

The table below describes their position. 8 of them are directors of schools, hospitals or other organisations that benefited from a renovation supported by NDAP-funding. Projects only concerns renovation and financial facilities supporting energy efficiency.

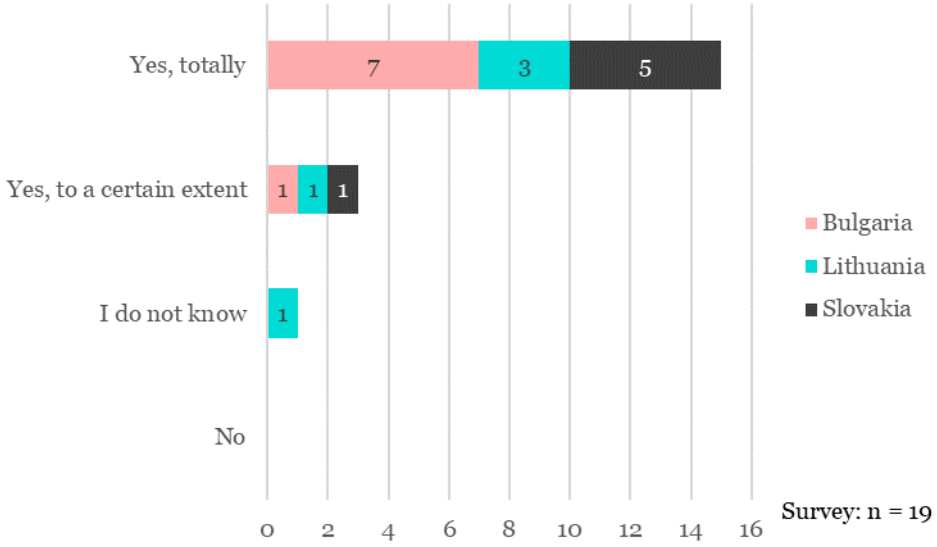
Table 22 Position and origin of respondents

Position	Bulgaria	Lithuania	Slovakia	Total
Director	4	4		**8**
Independent expert			2	**2**
Mayor			4	**4**
Unknown	4	1		**5**
Total	**8**	**5**	**6**	**19**

H.2 Results achieved by the projects

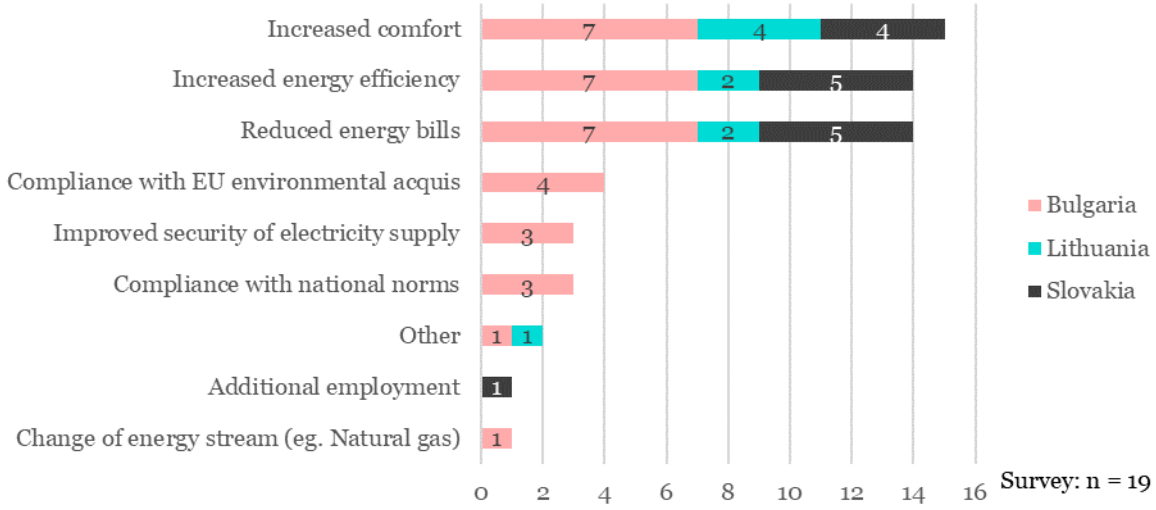
In terms of relevance, almost all respondents considered that the supported project was relevant to their needs. In particular, a beneficiary mentioned his building needed complete roof and waterproofing repairs and a new internal heat installation.

Figure 76: Relevance to the needs of the end beneficiaries



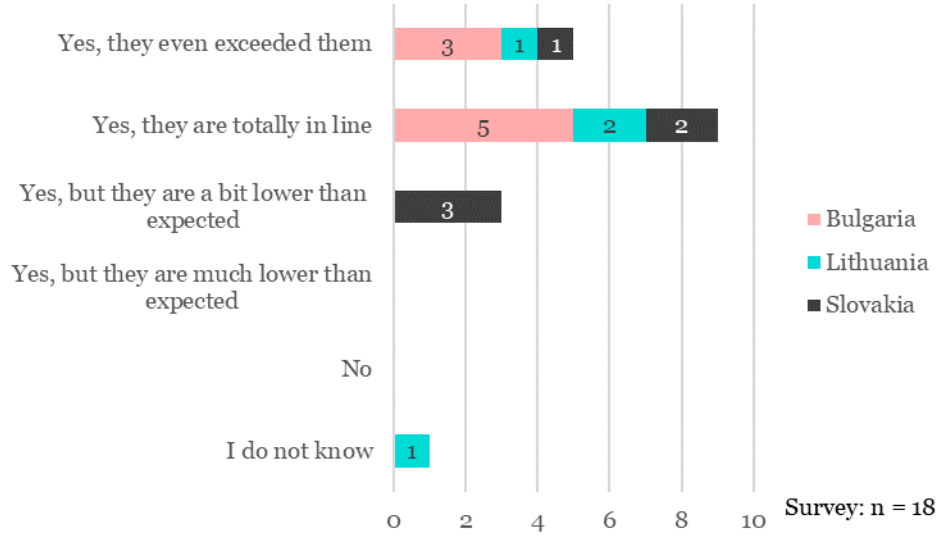
When asked what their impacts were (several responses possible), most of respondents responded that the operation contributed to increase their comfort (15), to increase energy efficiency (14) and to reduce their energy bills (14). Other impacts are dimly quoted.

Figure 77: Impacts of the projects (several responses possible)



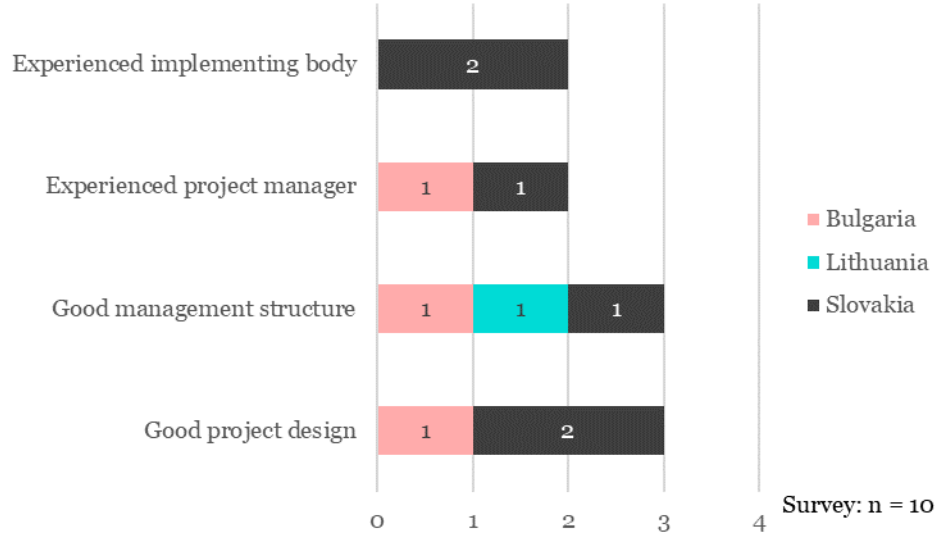
A vast majority of respondents considered the results totally in line with the objectives or above, their results are also considered as very good. In Slovakia, half the respondents indicated that the results were a bit lower than expected.

Figure 78: Were the energy results achieved in line with the expected objectives?



To explain this success, respondents were asked what factors explained this success. Even if some of them identified good project design or good management structure as key elements, half of them were not able to answer this question.

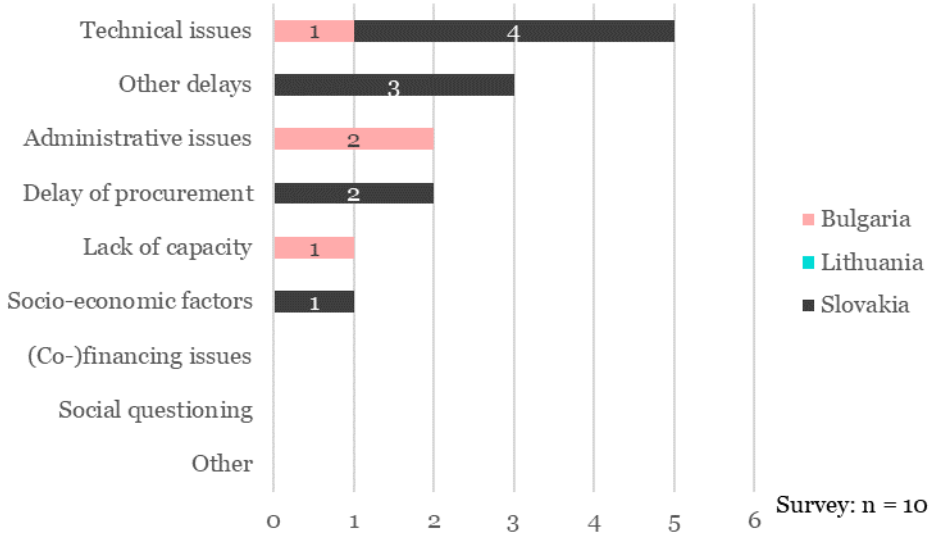
Figure 79: Success factors



Despite this success, it was easier for them to identify challenges they faced during the projects' implementation (several responses possible). Technical issues were the main reason mentioned. Other delays have not been identified. However, all these challenges have been identified only by Slovakian and Bulgarian end beneficiaries where respondents from Lithuania didn't answer.

For projects facing technical issues (5 out 19), these risks were managed effectively (3 out of 5 see next part).

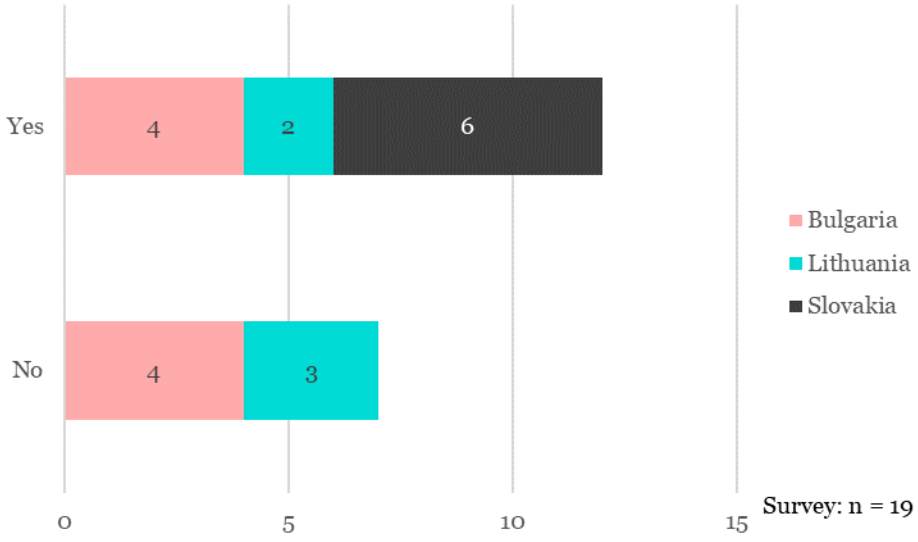
Figure 80: Faced challenges during the implementation (several responses possible)



H.3 Involvement and satisfaction

Out of 19, 12 beneficiaries have been involved in the project implementation. In Slovakia, all of them have been involved.

Figure 81: Involvement in the project implementation



As it could be presumed with an important rate of involvement (63%), satisfaction rates regarding selection and monitoring processes are also high (58%).

Figure 82: What is your general degree of satisfaction with regards to the process of project selection?

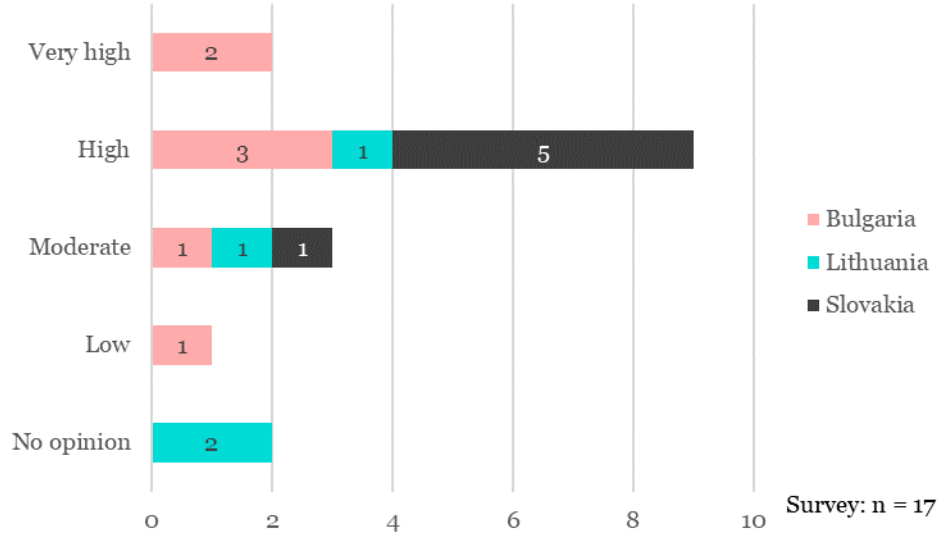
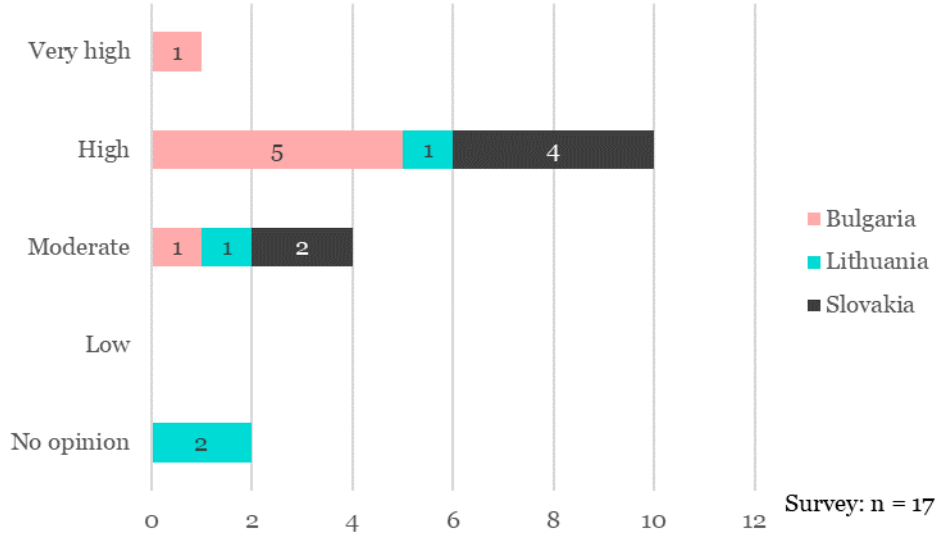
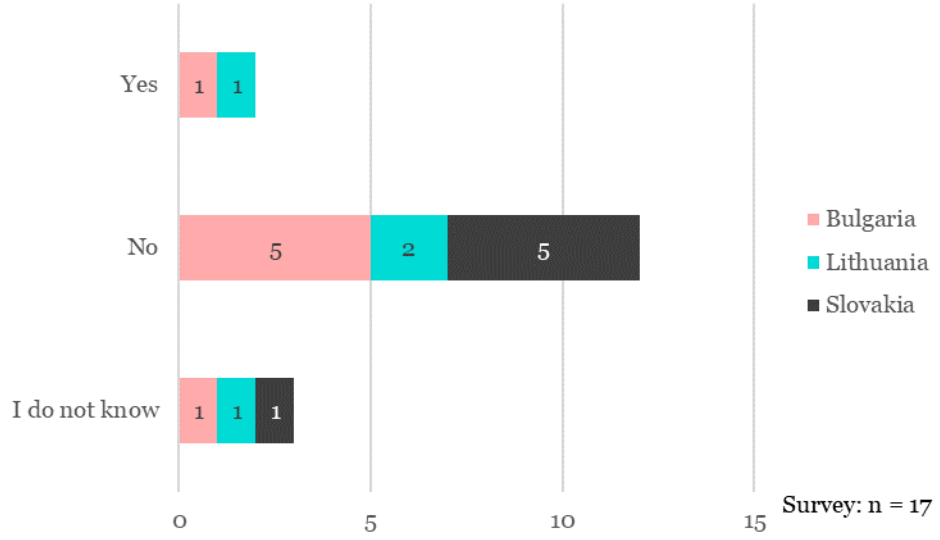


Figure 83: What is your general degree of satisfaction with regards to the process of project monitoring and follow-up?



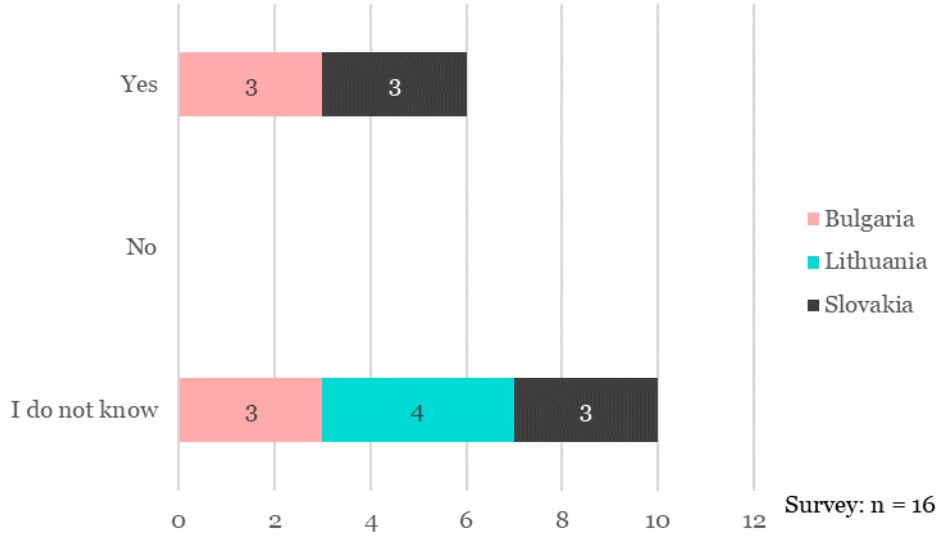
When asked if their project has needed redefining during its implementation, most of respondents (12) said no. Out the 12 respondents involved in the implementation, only two mentioned their project has needed redefining, which shows involving end beneficiaries allows a better project planification. When projects needed redefining (in two cases), all respondents were happy regarding regards to the flexibility of the programme for this redefinition.

Figure 84: Has the project needed some redefining of the tasks during its implementation?



In terms of risk management, end beneficiaries are not able to judge the governance system of the project and to say if it supported them in identifying risks and managing them. 6 respondents say yes but it appears most of them (10) are not able to evaluate this point.

Figure 85: Has the governance system of the project supported you in identifying risks and managing them?



H.4 Local impacts

Local impacts are hard to describe for end beneficiaries. Analysing the next figures, it is hard to say if the projects have had a real impact on local economy and cohesion. When answering, respondents provide a mixed opinion. In Slovakia, where end beneficiaries seem to have more information, most respondents said projects have not had an important impact locally. For three projects in Slovakia, local employment was not impacted because the construction concerned school buildings and company was not even from the city for one of them.

Figure 86: Has the project fostered SMEs development locally?

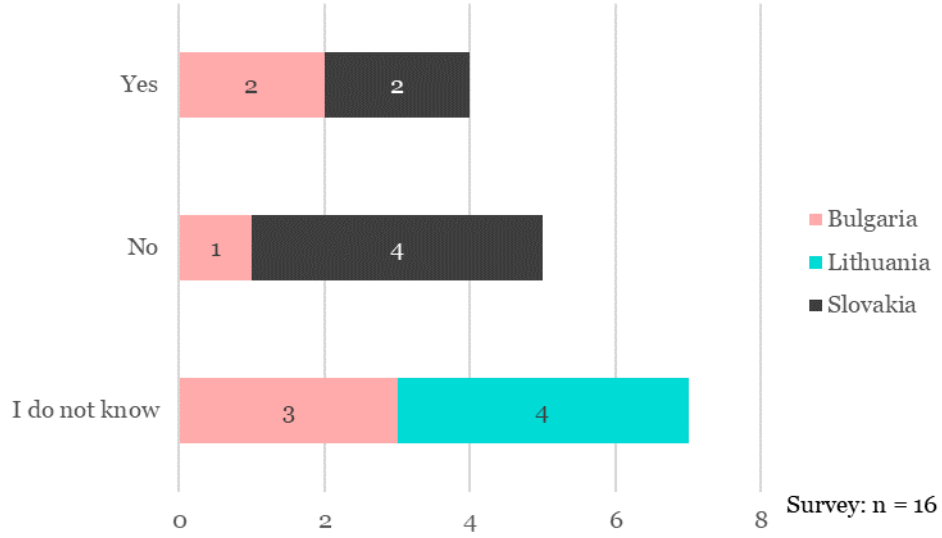
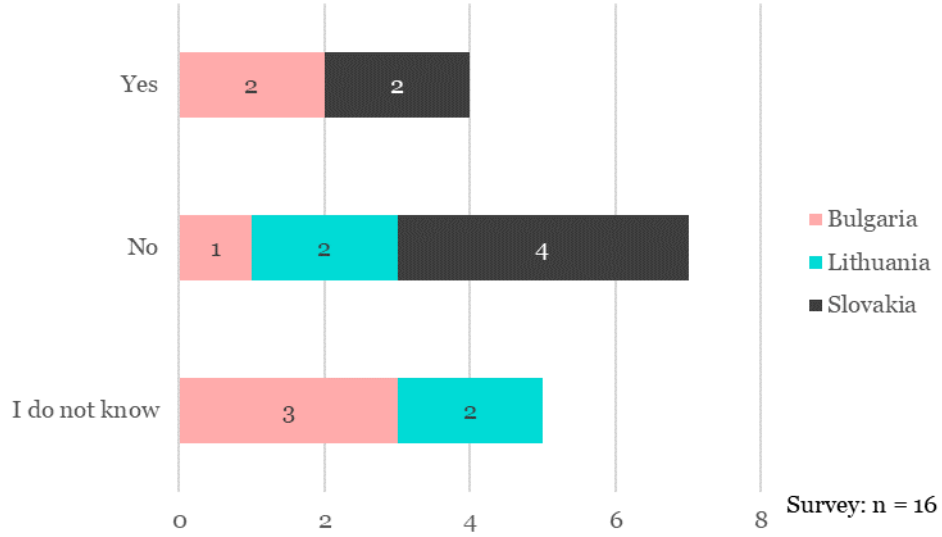


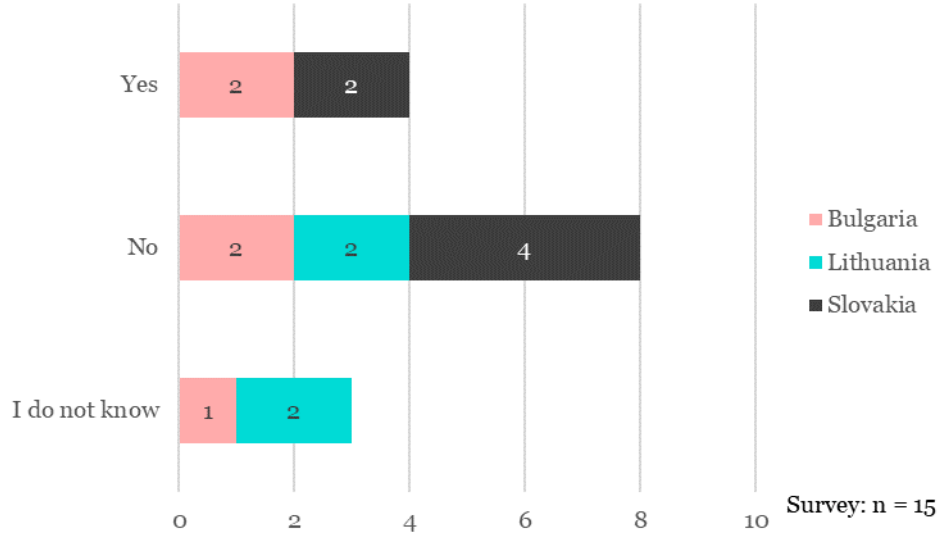
Figure 87: Has the project impacted local employment?



Among three of the projects which impacted local employment:

- A project in Slovakia created temporary jobs;
- Another project in Slovakia created one permanent job;
- A project in Bulgaria created five permanent jobs.

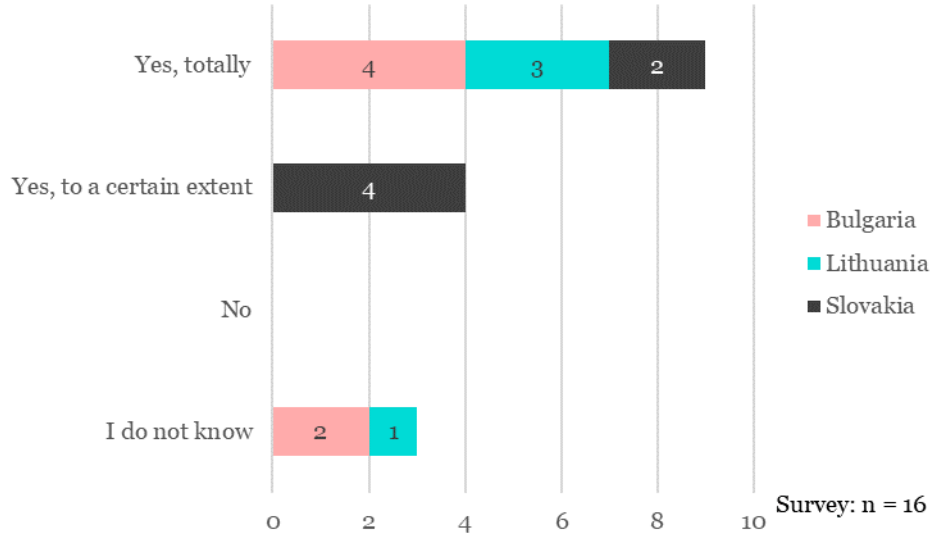
Figure 88:Has the project impacted social cohesion?



H.5 Communication

End beneficiaries are globally happy with the communication about projects. In particular, all respondents from Slovakia find the communication satisfactory.

Figure 89: Was the communication about the project and its results satisfactory?



Appendix I Individual evaluation fiches of each supported project

[Appendix in a separate document]

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