Executive Summary

1. The evaluation report covers the energy components of the Large Infrastructure Operational Program (LIOP) for 2014–20 (Axes 6, 7 and 8). An overview of the OP's development and implementation by February 2021 in the broader context indicated the following:

- Though the types of interventions are similar to other OPs in Central and Eastern European (CEE) countries, the main difference consists of the place of the OP within the broader national strategic framework for the energy sector. Poland and Lithuania use the Infrastructure OPs as instruments to support the goals of national policies, fully embedding European Union (EU) financial assistance into national policy and budgeting processes and leveraging EU funds to assist the governments in reaching national targets on climate, renewables, energy efficiency and interconnectivity. By contrast, Romania's LIOP compensates for the absence of national strategies by providing the broad directions for several policies and interventions to reach Romania's committed targets on the same policy goals. The conceptual difference is fundamental and leads to key differences in the level of progress in implementation (outputs) and sustainability (outcomes); the latter can be observed at this stage mainly in the capacity to leverage EU funds and scale up EU-funded interventions to achieve much broader impact with the limited funding. It also affects the capacity to prepare, monitor and report the key output and outcome indicators for the program, which is crucially limited by available data. If there is no national policy (e.g. energy strategy, district heating strategy and action plans), there are no mechanisms set in place to collect data and report indicators measuring the efficiency and efficacy of policy instruments by various institutions, such as the energy regulator (ANRE), the Ministry of Energy (MoE), the National Statistics Institute, etc. Institutional fragmentation (e.g. multiple entities at the central and local levels dealing with district heating, or different ministries dealing with energy vs energy efficiency in buildings) also affects the capacity to optimize programming. Thus, while the Polish and Lithuanian OPs couple energy efficiency in buildings with district heating and measures targeting renewable energy sources (RES) in the same OP (which facilitates the application and prioritization of projects by the beneficiaries), in Romania the measures are split into two different OPs, LIOP and the Regional Operational Program (ROP), with little coordination.
- For the energy components of Romania's LIOP, the level of implementation is low, with few projects finalized so far (mainly 15 smaller-scale measures such as industrial smart metering on SO 6.2 and one project on SO 7.1). This was also the experience in the previous financial cycle (2007–13), where implementation was concentrated in the last 2-3 years of funding eligibility. While some lessons were learned from the previous set of OPs and led to improvements, other factors observed in the previous cycle continue to affect the preparation and implementation of projects, as summarized in Chapter 1. Thus, interventions in LIOP refined the measures in Sectoral Operational Program (SOP) Competitiveness 2007–13 (e.g. refocusing support for increased RES in narrowed-down areas that were less attractive under SOP Competitiveness or other forms of state aid schemes, such as green certificates, smart metering for households, industrial cogeneration, and interconnectivity); and continued interventions in SOP Environment

(district heating support in seven cities, extended also to Bucharest). The implementation structure was also strengthened in the legal framework for the LIOP, with beneficiaries consistently acknowledging the smoother day-to-day relationship with counterparts in the management of the OP. However, some long-term issues continue to lead to significant delays in contracting and implementation. These consist of: low evaluation capacity at MA; low capacity on the interpretation of state aid (Competition Council) for the preparation of support schemes for each SO, including for large-scale infrastructure projects managed by local authorities or state-owned companies in natural monopoly sectors; and lack of unitary interpretations concerning expropriations and construction permits. Given the current status of the energy LIOP (with most projects under evaluation or contracting), we cannot assess the possible risks associated with project implementation, mostly procurement and monitoring / supervision of works.

- While the smaller projects covered by PA 6 are likely to be finalized by end-2023, the larger infrastructure projects on PAs 7 and 8 may exceed the deadline. One project (SO 7.2 – Bucharest DH) will probably have to be "phased" (some works finalized by 2023, after which financing would be sought in the 2021–27 financing cycle for the works remaining). SO 8.1 – Transelectrica's line and stations – may also be at risk for "phasing": currently, the procurement is ongoing and works are expected to take place over two years. Unexpected procurement issues that may arise (e.g. contestations) or works implementation delays could push the finalization of the project beyond the 2023 deadline. While "phasing" is a mechanism that avoids ineligibility of the expenditure on EU funds in the current cycle, it is a suboptimal use of available resources, as funds would have to be earmarked from the next budget for the finalization of projects from the current cycle. This limits the remaining available EU funds to be allocated for new projects.

2. The evaluation, which at this stage is mainly formative, is structured around 12 questions addressing the program's effectiveness, coherence, efficiency, impact, and sustainability. The same methodology will be used in the next evaluation. Due to the stage of implementation of LIOP energy as of February 2021, the extent to which some of the evaluation questions have been addressed (most importantly, cost-efficiency, impact, and sustainability) is limited, focusing mostly on expectations of what will happen by 2023. The current stage of the program is summarized in the following table. The evaluation covers the 36 projects for which a financing contract was signed by February 2021. Nine projects were selected for case studies which are presented in Annex D. They cover each SO – for SOs 6.1-6.4 and 7.1, the project closest to finalization or a representative project have been selected. Because SOs 7.2, 8.1 and 8.2 each consist of one project, these were analyzed as case studies.

Table ES 1. Current Status of the Large Infrastructure Operational Program in Romania

	Project title	*Beneficiary*	*MySmis Code*	*Status of physical implementation*	*Case study*
SO 6.1 – Increasing production of energy from renewable and less-exploited sources (biomass, biogas, geothermal)					
1.	Upgrading of the 20 kV overhead line (ohl) Axis Mofleşti - Melineşti and the 20 kV branch axis Fratostita and Pojaru, Dolj County to increase the distribution capacity for taking over the power delivered by the PV Power Plants	Distribuție Energie Oltenia S.A.	122825	partly implemented	
2.	Upgrading of the 20kV ohl Axis Parangu - Sadu 2B - Novaci and 20kV ohl Axis Carbunesti - Novaci, in order to increase the distribution capacity for taking over the power delivered by the Low Power Hydroelectric Power Plants in the N-E area of Gorj County	Distribuție Energie Oltenia S.A.	127410	recently started	
3.	Upgrading of transformer stations under the management of Delgaz Grid in order to take over the electricity produced from renewable sources in safe conditions of operation at SEN - Huși, Stănilești, Vetrișoaia, Fălciu, Murgeni stations	Delgaz Grid	127686	recently started	
4.	Upgrading of transformer stations of E.ON Distributie Romania S.A. - Strengthening works of the electrical network upstream of the connection point of the additional production capacities in order to take over the electricity produced from renewable resources in safe conditions of S.E.N. - Unit 110 / 20kV Hirlau, Unit 110 / 20kV Pascani, Unit 110 / 20kV Gorban	Delgaz Grid	105731	almost finalized	Yes
5.	Utilization of geothermal energy combined with heating pumps, to produce thermal agent for heating and hot water for Nufarul I Area, Oradea	Oradea Municipality	115839	recently started	Yes
6.	Increasing the production of thermal energy based on geothermal water in Beiuș	Beius Municipality	127641	recently started	
7.	Construction of the biomass thermal energy production unit and the thermal energy distribution network in Maieru	Maieru Village	119846	recently started	
8.	Increasing the production of energy from less exploited renewable resources obtained in the Salonta geothermal perimeter	Salonta Municipality	125691	recently started	
SO 6.2 – Reducing the energy consumption of industrial consumers					
9.	Implementation of a monitoring system of energy consumption (electricity, heat, compressed air) at the level of SC SORTILEMN SA	SORTILEMN SA	105740	finalized	
10.	Intelligent energy consumption monitoring system within Yazaki Component Technology Romania	Yazaki Component Technology S.R.L.	106581	finalized	
11.	Smart metering application for utility consumption and production	Vel Pitar S.A.	106965	finalized	Yes
12.	Intelligent energy consumption monitoring system within Antibiotice SA	Antibiotice S.A.	109717	finalized	

	Project title	*Beneficiary*	*MySmis Code*	*Status of physical implementation*	*Case study*
13.	Reducing energy consumption at the level of SC Zoppas SRL by implementing a high-performance monitoring system	Zoppas S.R.L.	111829	finalized	
14.	Implementation of an energy consumption monitoring system at AZUR S.A.	AZUR S.A.	116222	finalized	
15.	Smart Metering utility consumption application	COMELF S.A.	117803	finalized	
16.	Intelligent energy consumption monitoring system within CIECH Soda Romania S.A.	CIECH Soda Romania S.A.	117977	finalized	
17.	Development of energy consumption monitoring system at Hammerer Aluminum Industries Santana S.R.L.	Hammerer Aluminum Industries Santana	118591	finalized	
18.	Technical Solution Study - Energy Consumption Monitoring System	Infopress	118973	finalized	
19.	Implementation of advanced metering system with on-line monitoring to reduce energy consumption at Takata Romania SRL	Takata Romania SRL	120195	finalized	
20.	Intelligent energy consumption monitoring system within CEMACON SA	CEMACON SA	127985	finalized	
21.	Advanced metering system for reducing energy consumption at CELCO SA - Lime Factory	CELCO S.A.	128259	finalized	
22.	Implementation of energy consumption monitoring systems for industrial consumers	Heineken S.A.	128334	finalized	
23.	Energy consumption monitoring system within S.C. Meat Industrialization KOSAROM S.A.	KOSAROM S.A.	130415	finalized	
SO 6.3 – Reducing the average power consumption of households					
24.	Implementation of intelligent measurement system in Craiova, central area - partially and Sărari - approx. 10,000 consumers from Craiova	Distribuție Oltenia	114790	partly implemented	Yes
25.	Implementation of an intelligent distribution monitoring system in a homogeneous area of predominantly household electricity consumers	DELGAZ	117855	partly implemented	
SO 6.4 – Increasing savings of the consumption of primary energy produced by high-efficiency co-generation systems					
26.	Increasing the operational energy efficiency at SC AMBRO S.A. Suceava by implementing a high efficiency cogeneration installation	AMBRO S.A.	115900	finalized	Yes
27.	Optimization of primary energy consumption within CEMACON S.A. by installing a high efficiency cogeneration plant	CEMACON S.A.	119391	partly implemented	
SO 7.1 – Increasing the energy efficiency of DH systems in selected cities					
28.	Rehabilitation of the district heating system in Oradea for the period 2009-2028, to comply with environmental legislation and increase energy efficiency - Stage II	Oradea Municipality	108460	finalized	Yes
29.	Rehabilitation of the district heating system in Focșani Municipality for the period 2009 - 2028 to comply with environmental legislation and increase energy efficiency - Stage II	Focșani Municipality	114845	almost finalized	

	Project title	*Beneficiary*	*MySmis Code*	*Status of physical implementation*	*Case study*
30.	Rehabilitation of the district heating system in Iași Municipality to comply with the environmental standards on emissions and to increase the energy efficiency in the urban heat supply. Stage II	Iași Municipality	115253	almost finalized	
31.	Rehabilitation of the district heating system at the level of Râmnicu Vâlcea Municipality for the period 2009-2028 to comply with environmental legislation and increase energy efficiency - stage II	Râmnicu Vâlcea Municipality	118892	recently started	
32.	Rehabilitation of the district heating system in Oradea for the period 2009 - 2028 to comply with environmental legislation and increase energy efficiency - Stage III	Oradea Municipality	123600	recently signed	
33.	Re-engineering of the centralized district heating system in the Municipality of Timișoara to comply with environmental protection regulations on air pollutant emissions and to increase efficiency in urban heat supply Stage II	Timișoara Municipality	127006	partly implemented	
SO 7.2 – Increasing the energy efficiency of the district heating system in Bucharest					
34.	Rehabilitation of the heating system of Bucharest Municipality	Bucharest Municipality	138142	recently signed	Yes
SO 8.1 – Increasing the capacity of the national energy system to use energy produced from renewable resources					
35.	LEA 400 KV d.c. Gutinas-Smardan	Transelectrica	129245	recently started	Yes
SO 8.2 – Increasing the interconnection capacity of the National Transmission System of natural as with other neighboring countries					
36.	Developments of NTS in the North-East area of Romania to improve the natural gas supply of the area as well as to ensure the transmission capacities to the Republic of Moldova	Transgaz	122972	partly implemented	Yes

Key Findings and Recommendations

3. The key findings and recommendations from the evaluation, structured by evaluation criteria, are summarized below.

Effectiveness

Conclusion:

4. The LIOP interventions are expected to lead to the desired change by end-2023. This is despite low implementation to date, which has resulted in the currently low levels of output indicators (and in consequence also low levels of outcomes). In general, the LIOP interventions were more progressive and ambitious than other support schemes in order to further Romania's committed targets on energy efficiency, RES, modernization of grids (electricity, gas, DH) and interconnectivity; they also provided a better structure for such interventions in the absence of an energy strategy. However, the DH

interventions may have been sub-optimally designed, focusing on generation in 2007-2013 and on transport and distribution grids in the current LIOP, without proper correlation with demand (no interventions such as energy efficiency in buildings). Broader economic, demographic, and legislative factors affect the expected results of the interventions, e.g. legislative changes which limit the appetite of investors to scale up with commercial funding interventions supported by the LIOP or the changing patterns of energy supply and demand.

Recommendation:

5. The interventions may be continued in the next cycle provided they are 1) stronger embedded in national policy and budget processes (including clarification of responsible authorities for each policy, energy, DH, energy efficiency); and 2) at more ambitious technical standards, to match technological developments. Implementation delays for large projects, such as those caused by diverging interpretations of permitting or expropriation legislation for infrastructure (requiring multiple approvals from different jurisdictions), could be overcome by meetings/roundtables with all the authorities in charge with such authorizations for each project.

Coherence

Conclusion:

6. LIOP interventions substituted to a certain extent for the absence of an energy strategy, "stabilizing" longer-term policy measures to meet targets on energy efficiency, RES, interconnectivity, and emissions to which Romania committed to the EU. However, this is not a viable solution. The lack of a strategic vision (and hence of political will backing public sector investments and general reforms in the energy sector) is one of the structural causes for delays in implementation, poor selection of outcome indicators, and limited scale-up of smaller interventions with a demonstrative role (SOs 6.1-6.4). The Polish and Lithuanian examples illustrate how the OP should be integrated within the country's own policy and budgeting processes as a financing instrument supporting national policies and leveraging EU funds with national budgets and commercial funding.

Recommendation:

7. Strategic planning must be strengthened in the Ministry of Energy to ensure that the OP is an instrument to support the implementation of the strategy. This requires a full streamlining of the OP in the national strategy and budgeting processes.

Efficiency

Conclusion:

8. The LIOP administrative structure has improved compared to the 2007-2013 cycle, though several weaknesses remain: poor project evaluation capacity, limited understanding of EU state aid rules, and, possibly, public procurement and works supervision for large works (which would become visible only when large infrastructure projects such as electricity lines, gas pipelines and compressors, and DH grid projects begin physical implementation). For some SOs (e.g. SOs 6.1, 6.2, 6.3, 7.1), the capacity and appetite of beneficiaries may be limited.

Recommendation:

9. The major bottlenecks could be overcome through training in weak areas (evaluation; public procurement by public sector beneficiaries); and knowledge sharing between current and prospective beneficiaries.

Impact

Conclusion:

10. There are two separate matters of importance concerning the program's impact (which at this point can only be estimated for 2023, given the current implementation level): First, some of the outcome indicators (notably energy savings from smart metering for households and losses in DH systems) are poorly designed, given the lack of data for more adequate indicators to capture the effect of the interventions. Second, as highlighted above, the impact will be much more limited because there is no integration of the OP within broader national strategies and budgets. In particular, the SOs 6.1-6.4 consist of small pilots or demonstrative projects that, while having limited direct impact, are needed to identify the costs, benefits and scale-up potential for measures such as smart metering (industrial and households), RES, and small-scale industrial cogeneration. The absence of correlation between interventions in DH, RES and energy efficiency in buildings does not stimulate integrated projects to optimize interventions.

Recommendation:

11. Improving the impact cannot be decoupled from enhanced strategic planning in the Ministry of Energy to ensure that the OP is an instrument to support the implementation of the strategy. This requires a full streamlining of the OP in the national strategy and budgeting processes.

Sustainability

Conclusion:

12. Currently, with few projects finalized, the sustainability can only be assessed in terms of beneficiaries' expectations and provisions for maintenance for the investments after they are put in operation. For all infrastructure projects, maintenance will be recovered from regulated tariffs for electricity, gas and DH grids. The major challenge will be to ensure sustainability for projects at risk of slipping beyond the 2023 deadline (7.2, possibly 8.1). In particular in DH, there is no commitment for the support of the sector at government level, given the institutional fragmentation. Thus, there is a risk that significant funds are allocated to DH systems which might not remain viable in the future (e.g. disconnections continue beyond a tipping point from which the DH system can no longer be efficient; disconnections are more likely to accelerate in projects that are delayed and the quality of the service continues to degrade, e.g. Bucharest DH). This potential is also acknowledged by the EC (e.g. it required an institutional assessment done by Jaspers to ensure that Bucharest DH can remain viable, and the report remained inconclusive given frequent policy changes in the Bucharest municipality).

Recommendation:

13. When analyzing whether funding should be continued in the next cycle, a clear policy commitment should be in place – ideally accompanied by strong strategies with clear action plans. As above, the sustainability can be ensured only if the OP is constructed as an instrument to implement the broader energy strategy of Romania.

14. The report is structured as follows. The first chapter covers the broader context of the evaluation, including lessons learned from the previous cycle (2007-2013) and summarizes the object of evaluation and the theory of change on which the evaluation is based. Chapter 2 provides an overview of the methodology of the evaluation. Chapter 3 covers the main analysis undertaken on the 36 projects covered by this report, structured around the 12 evaluation questions. Chapter 4 summarizes the lessons learned from the relevant infrastructure OPs in Poland and Lithuania. Conclusions and recommendations are detailed in Chapter 5.