



The use of Financial Instruments in the energy and waste sectors in Poland in the Programming Period 2014-2020

A study in support of the ex-ante assessment

July 2015



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List of abbreviations and definitions

Act on EE	Act on Energy Efficiency of 15 April 2011, Dz.U. 2011, item 551, new Act on Energy Efficiency – draft version 1.23
Act on RES	Act on Renewable Energy of 20 February 2015, Dz.U. 2015, item 478
ARP	Agencja Rozwoju Przemysłu S.A.
ASA	Advisory Service Agreement signed between the European Investment Bank and the Ministry of Infrastructure and Development of Poland
BGK	Bank Gospodarstwa Krajowego S.A.
BOŚ	Bank Ochrony Środowiska S.A.
CEB	Council of Europe Development Bank
CF	Cohesion Fund
CHP	Combined Heat and Power
CPR	Regulation (EU) No 1303/2013 of the European Parliament and of the Council of 17 December 2013 laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund and laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund and repealing Council Regulation (EC) No 1083/2006 (“Common Provisions Regulation”)
DGC	Dynamic Generation Cost
EBA	European Banking Authority
EBRD	European Bank for Reconstruction and Development
EC	European Commission
EE	Energy Efficiency
EED	Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (“Energy Efficiency Directive”)
EIB	European Investment Bank
EIB Group	EIB and EIF
EIF	European Investment Fund
EPC	Energy Performance Contracting
EPBD	Directive 2010/31/EU of the European Parliament and of the Council of 19 May 2010 on the energy performance of buildings (“Energy Performance of Buildings Directive”)
ERDF	European Regional Development Fund
ESCO	Energy Service Company
ESIF or ESI Funds	European Structural and Investment Funds
EU	European Union
FI	Financial Instrument
FoF	Fund of Funds
GBER	Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty (“General Block Exemption Regulation”)
GIS	Green investment Scheme – a support scheme prepared by Poland to invest the revenues from the sale of Polish surplus of the AAUs (assigned amount units) under the Kyoto Protocol to low carbon projects
HF	Holding Fund

IA	Implementing Authority (2 nd level Intermediate Body, IB2)
IB	Intermediate Body
IDI(s)	In-depth Interview(s)
IED	Directive 2010/75/EU of the European Parliament and of the Council of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
IP	Investment Priority
IRR	Internal Rate of Return
ITI	Integrated Territorial Investment as defined in Article 36 of the CPR
JEREMIE	Joint European Resources for Micro to Medium Enterprises – an initiative of the EC and the EIB Group aimed at using FIs to support access to finance for SMEs during the 2007-2013 programming period
JESSICA	Joint European Support for Sustainable Investment in City Areas – an initiative of the EC, the EIB and the CEB aimed at using FIs to support investments in sustainable urban development
LE(s)	Large Enterprise(s)
MA	Managing Authority
MEnv	Ministry of the Environment
MEco	Ministry of the Economy
MGDD	Manual on Government Deficit and Debt
MID	Ministry of Infrastructure and Development of Poland
MO(s)	Marshall Office
mid-caps	Enterprises with the balance sheet between EUR 43-300 m
MRD	Ministry of Regional Development
MS	Member State
NAPEE	National Action Plan for Energy Efficiency
NAPRES	National Action Plan for Energy from Renewable Sources
NFOŚiGW	National Fund for Environmental Protection and Water Management
NPV	Net Present Value
NWMP	National Waste Management Plan
OP	Operational Programme
OPI&E	Operational Programme “Infrastructure and Environment 2014-2020”
OPI&E 2007-13	Operational Programme “Infrastructure and Environment 2007-2013”
PA	Priority Axis of an Operational Programme
PBT	Payback Time
PPP	Public-Private Partnership
R&D	Research and Development
Report	This study in support of the ex-ante assessment, Use of Financial Instruments in energy and waste sectors in Poland in the 2014 - 2020 Programming Period
RES	Renewable energy source(s)
SGEI	Services of general economic interest - economic activities that public authorities identify as being of particular importance to citizens and that would not be supplied (or would be supplied under different conditions) if there were no public intervention
SO	Specific Objective
SPV	Special Purpose Vehicle

SME(s)	Small and Medium-sized Enterprises, in Annex I of the Commission Regulation No 651/201
SZOOP	Detailed Description of Priority Axes (<i>Szczegółowy Opis Osi Priorytetowych</i>)
TO(s)	Thematic Objective(s)
TRF	Thermomodernisation and Renovation Fund managed by BGK
UDF	Urban Development Fund
URE / ERO	Urząd Regulacji Energetyki / Energy Regulation Office in Poland
VWMP	Voivodeship Waste Management Plan
WFD	Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (“Waste Framework Directive”)
WFOŚiGW	Regional Fund for Environmental Protection and Water Management
WM	Waste Management
WtE	Waste to Energy Plant

EXECUTIVE SUMMARY

This Executive Summary presents the key findings of the Report in support of the ex-ante assessment of the use of Financial Instruments (“FIs”) in the energy and waste sectors in Poland in the 2014-2020 Programming Period (“Report”). The Report has been performed in line with Article 37.2 of the Common Provision Regulation (“CPR”)¹ to assist the Ministry of Infrastructure and Development (“MID”), acting as the Managing Authority (“MA”) of the Operational Programme Infrastructure and Environment 2014-2020 (“OPI&E”), to support the use of FIs in four sectors:

- Renewable energy sources („RES”);
- Energy efficiency (“EE”) in large enterprises;
- Energy efficiency in multi-residential buildings located in ITIs and sub-regional cities (“EE in housing”), and
- Waste incineration plants.

The Report also seeks to demonstrate why the use of FIs can, in certain cases, be more suitable to addressing national objectives in relation to a low carbon economy. It also defines the most appropriate structures of OPI&E instruments that could be set up to address the market needs in an efficient way and proposes an investment strategy to achieve these objectives.

Using FIs and grants in low carbon sectors

Based on the Report’s findings, the market participants in Poland have a rather limited experience in using FIs. Instead, the experience from using public support in a low carbon economy has predominantly been focused on grants, and so the market participants have demonstrated continuing interest in grants as the most desirable financing method. Irrespective of the natural preference of the potential beneficiaries for “free money”, this Report shows, however, that in two sectors (i.e. EE in housing and waste incineration plants), grant co-funding is practically the only option available to address affordability issues, and so to allow projects to go forward, within the financial framework of the current OPI&E allocations to these two IP sectors

Experience from using public support in a low carbon economy has been predominantly focused on grants so far.

Market inefficiencies and sub-optimal investment situations

The Report demonstrates that market inefficiencies and sub-optimal investment situations are sector-specific rather than general. In particular, they concern the following areas:

- **Regulatory environment** – a stable and robust regulatory environment is a key requirement to attract and incentivise investors to develop and finance projects, particularly in sectors that require external public support to achieve an acceptable rate of return, such as EE and RES. The lack of regulation in RES and EE has stalled project development over the last several years.
- **Affordability issues** – create a serious barrier to projects in EE in housing and in the waste sector. Taking into account affordability limitations, grant co-funding, along with private financing for these sectors, have been recommended within the financial framework of the current OPI&E allocation. Were this

¹ Regulation (EU) No 1303/2013 of the European Parliament and of the of 17 December 2013 laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund and laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund and repealing Council Regulation (EC) No 1083/2006 (OJ L 347, 20.12.2013).

allocation to rise substantially in the near future, a combination of financial instruments and grants could be a more suitable long-term option.

- **Commercial institutions' risk aversion** – despite a generally efficient banking sector in Poland, commercial banks have problems with accepting certain risks (e.g. revenue risks inherent in RES projects due to wind conditions or development, construction and technology risks), which results in conservative project financial structures, a large equity requirement, and/or an increased cost of lending.
- **Commercial institutions' objectives** commercial banks have limited interest and capacity to assess and monitor energy and ecological effects, which often leads to sub-optimal investments in respect of energy savings (e.g. preference for projects with higher returns / shorter payback periods over projects with optimal energy and ecological effects and longer payback periods);
- **Low environmental awareness and asymmetry of information** – both individual tenants and, particularly, corporate decision makers do not fully recognise that potential savings from EE investments could be made, which may seriously limit their willingness to do EE projects.
- **Insufficient equity contribution and/or collateral** - are common problems for market players, especially in two sectors – RES (insufficient equity from private developers) and EE in housing (insufficient equity and collateral from certain types of investors). These issues have led to sub-optimal investment situations in the past and need to be addressed through FIs.

RES

The investment volume that would allow Poland to reach the 15% target of RES in its energy mix by 2020 has been estimated at **PLN 48.4 bn**. The new RES support system based on auctions, which will effectively come into force on 1 January 2016, should “unfreeze” the project pipeline, assuming that the auctions ensure reasonable off-take prices. Given the past market experience, should the RES support system be effective, the pipeline of projects currently under preparation should translate into projects in search for finance, especially given the MEco intended targeted growth in RES installations by 2020².

As anticipated in the market testing, commercial banks are willing to fund the projects that win the auctions at reasonable off-take prices. The projects that will not be supported through the auction system will most probably not be able to use repayable FIs and were, therefore, not considered further in this Report. **The investment gap relates to insufficient equity** in financial project structures. It is, therefore, recommended that this gap be bridged with FIs supported by subordinated debt to supplement the equity provided by developers to meet the banks equity requirements (which are set at rather conservative levels to cover production and other project-related risks). The potential project demand has been estimated by taking into account two project financial structure scenarios. Even for the more optimistic scenario, the OPI&E allocation covers less than 13% of the existing investment gap. However, this investment gap estimate assumes that all project sponsors will be interested in subordinated debt, which might not be the case, especially for the large utilities with a very low cost of capital.

Under the new RES support system, commercial lenders are willing to lend to projects. An investment gap relates to insufficient equity for the financial structures required by the banks.

² The MEco intends to grow RES installations from 6.074 MW at the end of 2015 to 10.335 MW by the end of 2020.

It is recommended that FI subordinated loans be deployed as soon as possible, since the first auction is planned for the beginning of 2016, and the MEco plans to run the auctions only until the end of 2018. Given the capacity and know-how required, it is recommended that the distribution of this FI be entrusted to a specialised financial institution with a relevant track record in RES project financing (including providing subordinated loans). As interest in FIs will be highly dependent on the effectiveness of the new RES support system, and the auction system in particular, it is necessary to monitor the market in cooperation with the MEco and the URE, and adjust the FI if necessary.

Energy efficiency in large enterprises

Despite significant needs for EE in large enterprises in Poland, the **number of projects supported by FIs** (especially the NFOŚiGW energy efficiency programme for large enterprises) is rather **modest**. This results from a low environmental awareness of management boards, and the fact that several enterprises implemented EE measures as part of their larger investment programmes, using either internal resources or corporate loans. The implementation of the Energy Efficiency Directive³ (“EED”) into Polish law with a number of new obligations (esp. an obligation to perform energy audits and a restrictive penalty level) should potentially incentivise large enterprises to carry out EE projects.

To date, the interest in public FIs to support energy efficiency in large enterprises has been moderate despite significant needs in this area.

Given previous experience, potential project demand has been estimated by taking into account the historical success rate of projects in EE for two scenarios: PLN 4.5 bn and 11.7 bn. The OPI&E allocation covers less than 30% of the existing investment gap, even for the more conservative scenario. It can, therefore, be concluded that the current OPI&E allocation will require the MA to closely monitor the actual absorption of FIs, and potentially to adapt the conditions and requirements (e.g. by increasing the requirements on the scale of energy savings and/or payback period, or by limiting FIs to certain groups of enterprises – e.g. mid-caps).

It is recommended that FIs be deployed through preferential loans which will favour projects with relatively high energy savings and longer payback periods envisaged in the energy audits (this measure is recommended to counterbalance the proposed “white certificates” support system that will promote projects with shorter payback periods). Particular attention needs to be drawn in this sector to the need for FIs promotion and technical support in project preparation and capacity building to improve the recognition of energy savings benefits amongst decision-makers.

Successful implementation of FIs in this area will depend on effectiveness of the new EE Act and require significant technical support to final recipients.

Given the capacity and know-how required, it is recommended that the distribution of this FI be entrusted directly to the NFOŚiGW due to its previous experience in the sector and its institutional capacity; however, it is strongly recommended that focus should be put on FIs capacity building. An alternative approach with a multilateral institution (e.g. EBI) acting as a fund of funds manager for specific types of enterprises (e.g. mid-caps) could also be considered.

Taking into account that the interest in FIs will be highly dependent on the effectiveness of the new Act on EE, which is still undergoing legislation (in particular the levels of obligations and potential penalties), and on the “white certificates” system in particular, it is necessary to monitor the market in cooperation with the NFOŚiGW, MEco and URE, and to adjust the FI if necessary.

³ Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC (OJ L 315, 14.11.2012).

Energy efficiency in multi-residential buildings located in ITIs and sub-regional cities

The years of underinvestment in multi-residential buildings have resulted in a significant EE backlog and significant market needs. The investment needs have been analysed for three scenarios (comprehensive, average and moderate), depending on the target energy class to be achieved, and they range from PLN 19.9 bn to 37.9 bn. The instrument available from the BGK (i.e. commercial bank loans supported by the BGK thermomodernisation premium after project completion), as well as loans from the regional WFOŚiGWs, were all fully disbursed in the past. The size of the investment gap is heavily dependent on the scenario adopted and, even for the least ambitious energy saving scenario, the current OPI&E allocation covers less than 30% of the existing investment gap. It is, therefore, to conclude that the MA will have to decide on further targeting or limiting the scope of intervention, either by adopting less ambitious EE targets, or extending the tenor of project paybacks (e.g. to 15 years), or by targeting specific building classes or specific beneficiaries groups (e.g. housing associations in urban areas affected by fuel poverty).

Due to the long-term nature of energy savings and affordability issues (especially relevant to less affluent tenants facing so-called “fuel poverty”), it is necessary to continue public support for EE investments in housing. It is therefore recommended that the allocation be used via grants to supplement finance offered by commercial banks and by the WFOŚiGWs (similar to the mechanism currently used in the TRF by the BGK). The intensity of support should be directly dependent on the achieved energy savings to ensure that EE investments do not cause rent increases for tenants.

It is recommended that the distribution of this OPI&E instrument be entrusted to the NFOŚiGW. It should select a group of commercial banks and the WFOŚiGWs who will lend money directly to their clients (partially pre-funding an investment premium which will be paid out by the NFOŚiGW as an investment premium in the form of a grant). This will facilitate the use of the existing network and local market access of the commercial banks (those currently cooperating with the BGK under the TRF and others) and of the WFOŚiGWs. It will also offer a simplified “one-stop shop” solution to the beneficiaries (with the grant and debt funding managed in one procedure). Alternatively, “traditional” calls for projects for EE in housing projects could be run, addressed at such potential beneficiaries as housing cooperatives, housing associations and ESCOs. It will also be important to ascertain that the OPI&E instrument is closely coordinated with the currently available FIs (esp. the BGK TRF and the WFOŚiGWs) to avoid counterproductive competition.

Waste incineration plants

The additional waste incineration capacity needed in Poland has been estimated at 800,000 tonnes/year, which will most likely translate into 4 or 5 new waste incineration projects. The location and capacity of the new incineration plants has not been determined, since EU support can only be received once the National Waste Management Plan (“NWMW”) and the derivative Voivodeship Waste Management Plans (“VWMPs”) have been updated. The capacity of 800,000

The significant needs in EE in housing have not been met in full in the past by existing preferential FIs offered by BGK with cooperation with commercial banks and the WFOŚiGW.

Due to long-term nature of savings resulting from EE measures in buildings and affordability issues, continuation of public support is recommended to supplement resources offered in the market.

Additional incineration capacities estimated at 800,000 tonnes / year will translate into PLN 3.2 bn. Poland needs to meet the EU ex-ante conditionality requirements.

tonnes/year translates into approximately PLN 3.16 bn of CAPEX⁴.

Based on the six waste incineration projects currently under development, as well as the planned waste incineration plant in Gdańsk, it can be concluded that without the EU grant support it would not be possible to meet the affordability criteria⁵ (the maximum threshold as the share in the disposable income in the relevant region).

Given the experience of the Poznań PPP waste incineration project that attracted significant interest from private investors and lenders, and the benefits resulting from private investors' involvement and risk taking, as well as public debt constraints of Polish municipalities, it is recommended that a hybrid PPP model be used, with the partial capital contribution (ca. 50% of the eligible costs to be confirmed on an individual basis, taking into consideration local conditions, especially the affordability of services for citizens) from ESIF grants, and the remainder should be covered from private sector resources (equity and debt). Given the insecurity around the grant funding that created a serious challenge in PPP financing in the past, it is recommended that the NFOŚiGW extend a stand-by loan until the EU grant part is finally and irrevocably settled and the risk of its repayment is no longer in place. Should pre-feasibility studies and the Value-for Money assessment not confirm the PPP as the most economically beneficial development option, the projects could also be realised in alternative models, as used to date by the five municipalities across Poland.

It is therefore recommended that part of the current allocation be channelled to grants (an indicative amount of PLN 1,232 m to be verified in 2016, after the adoption of the new VWMPs, including Investment Plans, and calculating the investment needs of each WtE project to be supported). The remaining funds should be used within the IP 6i for other eligible types of investments in waste management, justified according to the new (to be adopted in 2016) VWMPs. The allocation surplus, if available and after verification, could potentially be reallocated to projects within EE or RES, subject to the justified needs in future. In addition, and bearing in mind the complexity of PPP projects, technical support should be offered to municipalities to prepare and develop PPP projects.

Given its capacity and the track record, it is recommended that the distribution of grants be directly entrusted to the NFOŚiGW, which was responsible for ESIF in the waste sector in the Programming Period 2007-2013.

Estimation of investment gaps

Based on the analysis of potential investment demand and available supply, the following investment gaps have been identified in each sector:

⁴ Based on the average CAPEX of 6 incinerators currently under construction in Poland.

⁵ Pursuant to a draft methodology on the application of the affordability criteria in the investment projects with the co-financing from the EU funds, currently being prepared by MID, fees imposed on general public for the waste management should not be higher than 0.7% of a disposable income in a given region.

Table1: Estimated investment gaps per sector (PLN m)

RES											
PLN m	Demand			Supply			Gap			OPI&E Allocation	OPI&E Allocation vs. Gap
	Total	Equity	Debt	Total	Equity	Debt	Total	Equity	Debt		
Scenario 1 (D/E 70:30)	48,392	14,518	33,874	43,553	9,678	33,874	4,839	4,839	0	624	-4,215
Scenario 2 (D/E 60:40)	48,392	19,357	29,035	38,714	9,678	29,035	9,678	9,678	0	624	-9,054
Energy Efficiency in Large Enterprises											
PLN m	Demand			Supply			Gap			OPI&E Allocation	OPI&E Allocation vs. Gap
	Total	Equity	Debt	Total	Equity	Debt	Total	Equity	Debt		
Scenario 1 (Minimum)	4,509	451	4,058	2,480	451	2,029	2,029	0	2,029	624	-1,405
Scenario 2 (Maximum)	11,740	1,174	10,566	6,457	1,174	5,283	5,283	0	5,283	624	-4,659
Energy Efficiency in Housing											
PLN m	Demand			Supply			Gap			OPI&E Allocation	OPI&E Allocation vs. Gap
	Total	Equity	Debt	Total	Equity	Debt	Total	Equity	Debt		
Scenario 1 (Comprehensive)	27,722	2,772	24,949	6,645	2,772	3,873	21,076	0	21,076	1,065	-20,011
Scenario 2 (Average)	14,903	1,490	13,412	5,363	1,490	3,873	9,539	0	9,539	1,065	-8,474
Scenario 3 (Moderate)	6,806	681	6,126	4,554	681	3,873	2,252	0	2,252	1,065	-1,187
Waste											
PLN m	Demand			Supply			Gap			OPI&E Allocation	OPI&E Allocation vs. Gap
	Total	Equity	Debt	Total	Equity	Debt	Total	Equity	Debt		
Scenario 1	3,160						0	0	0		
Redirected OPI&E to grants - 50% eligible costs	1,232										1,232
With 50% grant funding	1,928	386	1,542	1,928	386	1,542	0	0	0	3,880	2,648

Source: own calculations

As shown in the table above, the investment gaps in three sectors (RES, EE in large enterprises and housing) are estimated at the level which is significantly higher than the available OPI&E allocation. Only in the case of the waste sector does the OPI&E allocation cover the estimated financial needs for incineration investments.

Proposed FIs, other forms of interventions and leverage⁶

The tables below summarise the OPI&E instruments proposed (FIs – in the case of RES and EE in large enterprises, and grants – in the case of EE in housing and waste), and all additional public and private resources to be potentially raised by all proposed OPI&E interventions (FIs and grants) in all four sectors.

Table2: OPI&E instruments proposed per sector

	Sub-measure 1.1.1 Investments into RES	Measure 1.2 EE in large enterprises	Sub-measure 1.3.2 Investments in EE in housing and sub-measure 1.7.1 Promoting EE in residential buildings in the Śląsko-Dąbrowska Conurbation	Measure 2.2 Waste management
FIs	FI - subordinated loans to cover the equity gap	FI - preferential loans to finance EE projects	N/A	N/A
EU grants	N/A	N/A, but grants for technical assistance up to 5% of allocation	EU grants as investment premium to cover CAPEX which may not be repaid from energy savings	EU grants to cover approx. 50% of eligible costs Technical assistance of approx. PLN 6 m per project
Private funds / other sources	Equity capital and commercial debt	Obligatory commercial debt for projects with CAPEX above PLN 50 m	Commercial debt, WFOSiGWs, own funds	Equity capital and commercial debt
NFOŚiGW funds	N/A	N/A	N/A	FI- stand-by preferential loans, potentially senior debt

As envisaged in the table below, the use of the OPI&E instruments (FIs and grants) could help raising additional public and private resources, including 1) commercial equity provided by external investors (waste), 2) commercial debt (all

⁶ In the ESIF context the leverage is the sum of the amount of ESIF funding and of the additional public and private resources raised divided by the nominal amount of the ESIF contribution.

four sectors) – and potentially debt to be provided by the WFOŚiGWs (EE in housing) and potentially by the NFOŚiGW (in waste). Using the FI subordinated loans in the RES sector would produce the highest leverage at 8x, whilst the preferential loans for EE in large enterprises would be at 1.5x. The leverage of the total OPI&E allocation could be 3.7x.

Table3: Additional public and private resources raised by OPI&E instruments (EUR m)

		RES	EE in LE	EE in housing	Waste	Total
1	EU grants	0	0	256	308	564
2	Equity provided by sponsors	300	25	0	0	325
3	Equity provided by 3rd party	0	0	0	96.5	97
4	FI debt / subordinated debt	150	150	0	0	300
5	Commercial debt	1,050	75	768	386	2,279
	Leverage	8x	1.5x	4x	2.6x	3.7x

Source: own calculations⁷

In addition to the quantitative value added, the OPI&E instruments would support the cultural shift from grants-only towards a more diversified market for financing low carbon economy. They would also promote much-needed forms of cooperation with private investors, including PPP and ESCO. The OPI&E intervention measures proposed should also facilitate the implementation of two important regulations – the Act on RES and the new Act on EE - by supporting various groups of bidders and beneficiaries. They would, therefore, open up the market to multiple participants, particularly those who would not be able to enter the market due to limited financial resources.

FIs will support the cultural shift from grants-only towards more diversified market for financing low carbon economy.

Proposed implementation strategy

In respect of RES and EE in large enterprises, it is recommended that an experienced financial institution (multilateral financial institution or a commercial bank) and the NFOŚiGW should be entrusted with the implementation of RES subordinated loans and FI preferential loans for EE in large enterprises, respectively. Consequently, the MA should exercise its option available to it under article 38(4)(b) of the CPR by entrusting implementation of those FIs to another body. As article 37(1) of the CPR implies that the public procurement rules are applicable in this case, the MA should ensure that all selection procedures are made in line with those rules. Polish procurement rules provide for certain exemptions concerning direct appointments of multilateral financial institutions (which could apply e.g. to the EIB or the EBRD) and direct appointment of “in-house” entities (which might potentially apply to the NFOŚiGW). The MA could consider those exemptions.

In respect of the EE in housing and waste sectors, it is recommended to entrust the NFOŚiGW with the implementation of the grant funding. Pursuant to article 123(7) of the CPR, the MA may entrust the management of part of the OPI&E to an intermediate body (“IB”) by way of a written agreement. The IB has been defined as any public or private body which acts under responsibility of or on behalf of the managing authority in relation to the beneficiaries implementing operations. Consequently, the MA should consider appointing the NFOŚiGW as an IB2 in respect of EE in housing and waste sectors.

⁷ The leverage is calculated as A) the sum of the amount of ESIF funding (positions 1+4) and of the additional public and private resources raised (positions 3+5) divided by B) the nominal amount of the ESIF contribution (positions 1+4). In case of the waste sector, no equity from the municipality is envisaged, as it would be provided by a private investor under the PPP contract.

An alternative approach with a multilateral institution (e.g. EBI) acting as a fund of funds manager for financing EE in large enterprises (specifically for mid-caps) and RES could also be considered.

Alternative options for financial support have also been suggested by Polish Authorities, as described in the relevant sections of *Chapter 4 FI description - assessment of the value added and additional public and private resources to be raised by the FIs*.

Areas of critical importance to the successful deployment of FIs in low carbon sectors

Taking into account the lessons learnt from Poland and other Member States, the MA should take into consideration the following areas of critical importance to the successful implementation of FIs and other OPI&E instruments:

- **Potential competition with grants and other forms of public interventions at national and regional levels**

Taking into account the natural preference for the traditional grant-funding model among potential project beneficiaries, and the experiences from implementing FIs in Poland and other Member States, it is critical to coordinate all forms of public intervention to avoid creating counterproductive competition that might negatively influence interest in FIs. These concerns are of particular relevance to RES (OPI&E vs. ROPs concerning installation capacity to avoid opportunistic behaviours from developers) to and EE in housing (OPI&E vs. ROPS, the BGK and the WFOŚiGWs to eliminate inconsistencies in eligibility and support intensity and avoid suboptimal decisions on beneficiary level which will not optimise ecological effect / energy savings).

- **Need for technical assistance**

Taking into account the still limited know-how and experience in designing and implementing FIs in Poland, the need for professional support to the potential final recipients in project structuring and implementation is very high. It is, therefore, strongly recommended that technical assistance should also be used to provide high-quality professional support, in addition to ensuring adequate administrative capacity within the MA, the NFOŚiGW, and the final recipients / beneficiaries.

- **Interaction with local financial markets**

Despite the good condition of the banking sector in Poland, FIs have a role to play in order to fill a market gap that exists today, particularly in relation to: equity and collateral constraints, risks accepted by commercial entities, lack of affordability and promotion of energy and ecological objectives. The banking market is liquid and competitive for financing certain sectors (esp. RES and waste), with less interest in EE.

- **FI flexibility**

Experience from the implementation of FIs in Poland and other Member States demonstrates the need for close monitoring of interest in FIs and changes in the market, and, if necessary, for investment strategy adjustments or, for implementing the necessary information and capacity building measures.

- **Project pipeline and energy audits quality**

The experience of financial intermediaries of FIs shows the relatively poor quality of project pipelines that often led to delays in project implementation and, consequently, to lesser project demand. Introduction of FIs and other OPI&E instruments should, therefore, be accompanied by measures to promote the development of an adequate pipeline of mature, feasible projects. Technical assistance should be applied to support project beneficiaries / final recipients in

project preparation and reporting. Additionally, the energy audits prepared for the projects supported with public resources were generally of insufficient quality. Thus, next to the provisions of the new Act on EE defining requirements for carrying out energy audits, it is recommended that practical guidelines be prepared for potential beneficiaries / final recipients to facilitate audits of good quality that would be commissioned by them, both ex-ante and ex-post.

- **State aid**

State aid issues have been outlined in this Report in respect of the proposed investment strategies for each sector. GBER provisions should apply with respect to all sectors, except for waste, if specific conditions set out in this regulation are met. Consequently, State aid will be held compatible with the EU law and no notification with the EC will be required. However, if the MA/IB decides to grant aid according to the Guidelines on State aid for environmental protection and energy 2014-2020, the notification of the State aid scheme will be required. Certain doubts have been raised whether the FI subordinated loans recommended for RES could be classified as loans in the meaning of GBER. If this were not the case, the scheme could be subject to a notification requirement with the EC. In respect of the waste sector, the notification with the EC of the proposed grants scheme (or on an individual basis) might be necessary, unless such grants may qualify under the provisions of the SGEI Decision for services of general economic interest⁸. Alternatively, support of incineration investments may be considered as non-aid support, if granted according to the criteria indicated in the Altmark ruling.

- **Monitoring and updating**

Given the dynamic changes envisaged in the regulatory environment that could significantly impact investors' behaviour and interest in the OPI&E instruments in particular, it is highly recommended that the conclusions of this Report are monitored and updated. In particular, we recommend monitoring actions and potentially reviewing the investment strategy for further developments and changes in: the new Act on RES and auctions implementation, the new Act on EE (esp. the level of obligations and penalties and the "white certificates" system), potential changes in competing supply (including the ROPs, the BGK TRF and the WFOŚiGWs), and the completion of the NWMP and the VWMPs, including the Investment Plans.

⁸ The Commission Decision of 20 December 2011 on the application of Article 106(2) of the Treaty on the Functioning of the European Union to State aid in the form of public service compensation granted to certain undertakings entrusted with the operation of services of general economic interest (OJ L 7, 11.01.2012, p. 3).

1. INTRODUCTION

The key objective of the Report is to provide analysis and guidance to the MID, acting as the MA of the OPI&E, to support the use of FIs in the low carbon sectors in Poland.

FIs that support energy efficiency, renewable energy and waste to energy projects have not been implemented within OPI&E in the Programming Period 2007-2013. This Report therefore will analyse these sectors to establish if there are any market inefficiencies in the provision of funding for such projects and, if there are, to recommend FIs that could be used to address them. In so doing, this Report will assist the MA in defining priorities where public resources could be used in accordance with the OPI&E objectives and corresponding priority axes.

In line with Article 37.2 of the CPR, this Report covers the following elements:

- **Chapter 2 General context of the Report** provides an analysis of the Polish policy context for the OPI&E, in regard to the four sectors of key importance to low carbon economy.
- **Chapter 3 An analysis of market failures, sub-optimal investment situations, and investment needs** discusses in detail market failures and suboptimal investment situations of general nature and also sector-specific ones. This Chapter analyses in detail the supply side, both public and private, available to projects in each of the sectors of interest. Further, Chapter 3 estimates project needs and investment demand to assess the investment gap for each sector separately.
- **Chapter 4 FI description - assessment of the value added and additional public and private resources to be raised by the FIs** discusses in detail FIs and other forms of the OPI&E interventions recommended for each sector separately. All the details concerning the FIs and other OPI&E instruments proposed for each sector are presented separately in one chapter to facilitate the understanding of key characteristic and value added of solutions proposed in each sector. Chapter 4 also covers the areas defined in Article 37 (2) of the CPR including: 1) assessment of the value added, 2) consistency with other forms of public intervention in the same market, 3) estimate of additional public and private resources to be potentially raised by the FIs (expected leverage effect), including assessment of preferential remuneration to attract counterpart resources from private investors, 4) financial products, 5) target groups and 6) possible State aid implications. The scope of Chapter 4 covers the thematic scope of Chapters 4 and 5 proposed in the *Ex-ante assessment methodology for financial instruments in the 2014-2020 programming period*⁹.
- **Chapter 5 Lessons learnt** presents the key experiences with similar instruments (FIs and other public intervention measures) and studies carried out in Poland and other Member States in the past and discusses how these lessons should feed the proposed investment strategy. In particular, the lessons learnt from implementing FIs in Poland as well as FIs in low carbon sectors in other Member States have been analysed in the context of key success factors and most serious challenges that may impact implementation of the OPI&E instruments in the Programming Period 2014-2020.
- **Chapter 6 The proposed investment and implementation strategy** examines the implementation options within the meaning of Article 38 of the CPR, financial products to be offered, final recipients targeted and the envisaged combination with grant support as appropriate. Chapter 6 also recommends institutions to manage proposed FIs and other OPI&E instruments and assesses their institutional capacities.

⁹ See: http://ec.europa.eu/regional_policy/thefunds/fin_inst/index_en.cfm

- **Chapter 7 A specification of the expected results** discusses the output and results and how the envisaged FIs and other OPI&E instruments are expected to contribute to the achievement of the specific objectives set out under the relevant OPI&E Priority Axes (“PAs”). The chapter also discusses potential monitoring and reporting tools to be used throughout the implementation of the OPI&E instruments.
- **Chapter 8 Provisions allowing for the ex-ante assessment to be reviewed and updated** presents a catalogue of potential external developments and on-going monitoring tools that could potentially require reviewing the conclusions of the ex-ante assessment and updating the investment strategy that should be implemented as potential trigger in the monitoring methodology.
- Finally, **Chapter 9 forms the Ex-ante assessment completeness checklist** in line with the “Ex-ante assessment methodology for financial instruments in the 2014-2020 Programming Period” commissioned by the EIB on behalf of the European Commission (“EC”) services.

The following tools were used in order to collect and analyse relevant information and data for the Report:

- **A thorough desk review** of existing documentation for the sectors of interest. Analysis of the documentation provided by the MID, MEco, NFOŚiGW, WFOŚiGWs and BGK (such as evaluations/analyses of public instruments provided under the OPI&E2007-2013, the NFOŚiGW, WFOŚiGW and BGK products descriptions) was supplemented by analysis of other relevant documents and external information sources as: 1) statistics (GUS and URE), sectoral reports (on EE, RES and housings) to cross-reference or supplement previous analyses where necessary.
- **A desk research** on FIs already available on the Polish and EU-level market for potential use in financing projects in the sectors of interest. Both financial parameters and procedural characteristics of the FIs were collected for further use in interviews and in financial modelling. Another part of the desk research was tied up with analysis of a considerable amount of diversified materials published in connection with:
 - OPI&E 2014-2020, including the former ex-ante analyses and drafts of SZOOP¹⁰;
 - 16 ROPs 2014-2020 based on their ex-ante evaluations accompanied by ex-ante assessments of financial instruments and drafts of SZOOPs, where available;
 - drafts of ITI Strategies;
 - National and 16 Voivodeship Waste Management Plans and implementation reports;
 - the EU directives, laws and regulation, including the latest drafts and impact assessment analyses relevant to the sectors of interest.

In addition, the data collected throughout implementing instruments / programmes by the NFOŚiGW has been analysed – in particular, a list of potential final recipients with already performed energy audits and actual EE projects performed were analysed in the form of case studies).

- **Financial modelling** – an analytical tool that enables identification of financial gap, parameters of proposed FIs and other forms of public intervention under the OPI&E.
- **Survey data collection through interviews and questionnaires:**

¹⁰ Version 1.3.

- Representatives of the MA, the relevant IBs (the MEco and MEnv) and other key stakeholders: the NFOŚiGW, WFOŚiGWs and Marshall Offices, URE, industry chambers and associations (including: Polish Chamber of Commerce, Polish Chamber of Chemical Industry, Polish Chamber of Electronics and Telecommunications, Polish Glass Manufacturers Federation, Polish Society of Transmission and Distribution of Electricity) and representatives of steel, energy and mineral sectors) were interviewed to collect relevant information.
- For most of the sectors of interest an effort was made to assess the demand, market failures and estimate the project pipeline by direct investigation with the above-mentioned tools, complemented by the supplementary survey data collection. In the case of EE projects of large enterprises, a list of potential final recipients with already performed energy audits and quantified investments was identified and analysed to the extent possible.
- **In-depth consultations / interviews** (“IDIs”) with relevant stakeholders covering both the demand-side and the supply-side, through personalised in-depth interviews (“PIDI”) and **moderated focus-group-discussions** (“MFGD”), including:
 - the MID (MA of the OPI&E), MEco (European Funds Department, RES and EE Departments), MEnv (WM Department and Ecological Funds Department), NFOŚiGW, WFOŚiGW in Katowice and BGK;
 - Commercial banks active in RES and EE, including: Bank Ochrony Środowiska S.A., Bank Polska Kasa Opieki S.A., DNB Bank Polska S.A., European Bank for Reconstruction and Development, FM Bank Polska S.A. (BizBank), mBank S.A. and Powszechna Kasa Oszczędności Bank Polski S.A.;
 - Project developers / advisors, including PPP in waste, large enterprises planning / performing EE measures.

2. GENERAL CONTEXT OF THE REPORT

Acknowledging the role of FIs in achieving the objectives of the **Europe 2020 Strategy**, the EC seeks to promote the use of FIs in the 2014-2020 Programming Period, alongside grant financing. This chapter provides an analysis of the general context for FIs.

2.1. Poland's Operational Programme – Infrastructure and Environment

The Common Provisions Regulation (“CPR”), Title IV (Articles 37 to 46), lays down provisions on the use of European Structural and Investment Funds (“ESI Funds”) through FIs towards specific Thematic Objectives (“TOs”) defined in the CPR regulation (Art.9).

The Partnership Agreement¹¹ presents a strategy for the use of ESIF under the TOs selected by Poland, including support for the shift towards a low carbon economy in all sectors (TO4) and promotion of resource efficiency (TO6). The TOs are prioritised within each operational programmes (“OP”) established at the national or regional level and approved by the EC. As regards the TO4, the Partnership Agreement has envisaged wide scope of interventions in this area, namely supporting the investments in EE both in LEs and buildings, energy and heating systems, smart grids, RES, green technologies as well as waste to energy solutions. At the same time, it has recommended an application of a wide range of instruments, including repayable and non-repayable, depending on economic and financial characteristics of investments as well as social conditions of potential beneficiaries/final recipients.

The OPI&E¹² is one of seven national OPs which is focused on low carbon economy and development of environmental, energy, transport and cultural heritage infrastructure. The table below presents the PAs responding to specific TOs, with a further split into Investment Priorities (“IPs”) with the indicative financial allocations.

¹¹ https://www.funduszeuropejskie.gov.pl/media/881/Umowa_Partnerstwa_pl.pdf, p. 54.

¹² http://www.pois.gov.pl/2014_2020/Documents/POIS_2014-2020_po_negocjacji_30122014.pdf.

Table4: OPI&E: PAs, TOs, IPs and financial allocations

Priority Axis	Thematic Objective	Investment Priority	EU Financial allocation / Fund (EUR m)
PA 1: Reduction of emissions in economy	TO 4: Supporting the shift towards a low-carbon economy in all sectors	IP.4.i Supporting the production and distribution of energy derived from renewable sources	1,828.4 CF
		IP.4.ii Promoting energy efficiency and use of renewable energy in enterprises	
		IP.4.iii Supporting energy efficiency, smart energy management and use of renewable energy in public infrastructure, including in public buildings, and in the housing sector	
		IP.4.iv Developing and implementing smart distribution systems that operate at low and medium voltage levels	
		IP.4.v Promoting low emission strategies for all types of territories, in particular for urban areas, including the promotion of sustainable multimodal urban mobility and adaptation measures which have mitigating influence on climate change	
		IP.4.vi Promoting the use of high-efficiency cogeneration of heat and power based on useful heat demand	
PA 2: Protection of the natural environment, including adaptation to climate change	TO 5: Promoting climate change adaptation, risk prevention and management	IP.5.ii Supporting investment to address specific risks, ensuring disaster resilience and developing disasters management systems	700.0 CF
	TO 6: Preserving and protecting the environment and promoting resource efficiency	IP.6.i Investing in the waste management sector to meet the requirements of the Union's environmental acquis and to address investment needs identified by the Member States, for investment that goes beyond those requirements	2,808.2 CF
		IP.6.ii Investing in the water management sector to meet the requirements of the Union's environmental acquis and to address investment needs identified by the member States, for investment that goes beyond those requirements	
		IP.6.iii Protecting and restoring biodiversity, protecting and recultivating soil and supporting ecosystem services, including through Natura 2000 and green infrastructure	
	IP.6.iv Taking actions to improve the urban environment, to revitalise cities, regenerate and decontaminate brownfield sites (including post-military areas), to reduce air pollution and to promote noise-reduction measures		
PA 3: Road network development and TEN-T multi-modal transport	TO 7: Promoting sustainable transport and removing bottlenecks in key network infrastructures	IP.7.i Supporting a multi-modal Single European Transport Area by investing in the TEN-T; IP.7.ii Developing and improving environmentally-friendly (including low-noise) and low-carbon transport systems, including inland waterways and maritime transport, ports and multimodal connections, as well as airport infrastructure, in order to promote sustainable regional and local mobility.	9,532.4 CF

PA 4: Road infrastructure for cities	TO 7: Promoting sustainable transport and removing bottlenecks in key network infrastructures	IP.7.a Supporting a multi-modal Single European Transport Area by investing in the TEN-T; IP.7.b Enhancing regional mobility through connecting secondary and tertiary nodes of the TEN-T infrastructure, including multimodal nodes	2,970.3 ERDF
PA 5: Development of rail transport in Poland	TO 7: Promoting sustainable transport and removing bottlenecks in key network infrastructures	IP.7.i Supporting multi-modal Single European Transport Area by investing in the TEN-T (compare PA IV); IP.7.iii Developing and rehabilitating comprehensive, high quality and interoperable railway systems and the promoting noise-reduction measures	5,009.7 CF
PA 6: Development of low-carbon transport in cities	TO 4: Supporting the shift towards a low-carbon economy in all sectors	IP.7.iv Promoting low emission strategies for all types of territories, in particular for urban areas, including the promotion of sustainable multimodal urban mobility and adaptation measures which have mitigating influence on climate change	2,299.2 CF
PA 7: Improving energy security	TO 7: Promoting sustainable transport and removing bottlenecks in key network infrastructures	IP.7.e Increasing energy efficiency and security of supply through the development of smart energy distribution, storage and transmission systems, and through the integration of distributed generation from renewable sources.	1,000.0 ERDF
PA 8: Protection of the cultural heritage and development of culture resources	TO 6: Preserving and protecting the environment and promoting resource efficiency	IP.6.c Conserving, protecting, promoting and developing natural and cultural heritage	467.3 ERDF
PA 9: Strengthening the strategic health protection infrastructure	TO 9: Promoting social inclusion, combating poverty and any discrimination	IP.9.a Investing in health and social infrastructure which contributes to national, regional and local development, reducing inequalities in term of health status, promoting social inclusion through improved access to social, cultural and recreational services, and the transition from institutional to local community-based services	468.3 ERDF
PA 10: Technical assistance	N/A ¹³	N/A	330.0 CF
Total			27,413.8

¹³ The Technical Assistance Priority Axis is a horizontal axis which is supported by the ERDF according to Article 59 of the Common Provisions Regulation.

Pursuant to Article 96.2.b of the CPR, each PA (with the exception of technical assistance) should outline the intended use of FIs - the OPI&E envisages the use of FIs for the following PAs:

1. PA 1 “Reduction of emissions in economy”:
 - IP.4.i “Supporting the production and distribution of energy derived from renewable sources”;
 - IP.4.ii “Promoting energy efficiency and use of renewable energy in enterprises”;
 - IP.4.iii “Supporting energy efficiency, smart energy management and use of renewable energy in public infrastructure, including in public buildings, and in the housing sector”; and
2. PA 2 “Protection of the natural environment, including adaptation to climate change”:
 - IP.6.i “Investing in the waste management sector to meet the requirements of the Union's environmental acquis and to address investment needs identified by the member States, for investment that goes beyond those requirements”.

Given these priorities, an outline of the FI's intended final recipients, measures / operations, and indicative allocations are outlined below in Table 5¹⁴.

¹⁴ “The Detailed description of the Priority Axes”, draft dated April 2015, v.1.3 and Demarcation line between OP, draft January 2015.

Table5: Investment priorities, operations/measures, final recipients and allocations

Investment Priority	Operation / measure	Indicative final recipients	Indicative allocation (EUR m)
4.i Supporting the production and distribution of energy derived from renewable sources	1.1.1 Production of energy derived from RES, including connection to the grid (minimum capacities: wind, > 5 MWe water, >5 MWe solar, 2 MWe/MWh geothermic, 2 MWe/MWh biogas, >1 MWe biomass, >5MWe/MWh)	- enterprises – producers of energy from RES	150
4.ii Promoting energy efficiency and use of renewable energy in enterprises	1.2 Energy efficiency and renewable energy in large enterprises	- large enterprises, - providers of energy services (as defined in Directive 2012/27/EU) to large enterprises	150.3
4.iii Supporting energy efficiency, smart energy management and use of renewable energy in public infrastructure, including in public buildings, and in the housing sector	1.3.2 Energy efficiency in housing (multi residential houses)	- residential cooperatives in the regional and sub-regional ITIs, - residential communities in the voivodeship cities and functionally related areas under regional ITI Strategies and sub-regional cities - providers of energy services (as defined in Directive 2012/27/EU for mentioned above FRs	225.6 + 30.4 = 256
6.i Investing in the waste management sector to meet the requirements of the Union's environmental acquis and to address investment needs identified by the Member States, for investment that goes beyond those requirements	2.2 Waste management through the use of waste incineration plants	- self-government units, - associations of self-government units - entities proving public services (of self-government units)	To be defined under the ex-ante assessment

Source: SZOOP, version 1.3

2.2. Poland's National Strategies for Energy

With regard to energy derived from renewable sources ("RES"), the EU target is set at 20% share of energy from RES by 2020, whereas Poland's national target is 15%. Significant progress has been made in Poland to reduce energy intensity and improve resources efficiency, and further measures are envisaged for Poland to meet its EU targets. Towards this end, the EC's "Position of the Commission Services on the development of Partnership Agreement and programmes in Poland for the programming period 2014-2020" (known as the "Position Paper") outlines areas for improvement and incentives for investment in RES.

Poland's 2010 National Action Plan for Renewable Energy Sources ("NAPRES") sets out the use of RES until 2020:

1. RES will be supported and maintained, including determining conditions for retaining rights already acquired for the investments completed or started, and their duration, which would reduce end user charges.
2. Maintaining "co-firing" as RES is expected until 2020, taking into account limitations with respect to forest biomass firing.
3. RES development of wind energy and biomass is primarily expected, including increasing the number of small hydro power plants, development of the heating and cooling sector, and the geothermal and solar energy.
4. RES development with respect to the transport sector, a growth in the share of biofuels and bio components in transport fuels. Estimations by industry associations that electric vehicles will not be widely used until 2020, translating to limited share of this technology in the fuel market.

For energy efficiency ("EE"), the EU-level targets of a 20% increase in EE by 2020. In order for Poland to reach this target, the absolute level of primary energy consumption in 2020 should be 96.4 Mtoe as compared to 96.9 Mtoe in 2010. It should be noted that it will be retained at approximately the same level despite expected average economic growth of 2-3% annually. It is therefore estimated that the effective reduction in consumption will need to be 13.6 Mtoe.

EC recommends strengthening EE measures in services, industry and agriculture to reduce operation costs. As buildings generate significant energy, the EC has supported numerous initiatives to enhance energy performance in buildings through legislative and financing mechanisms.

The Energy Efficiency Directive ("EED") requires MS to establish a long-term strategy for mobilising investment in public sector building energy improvements, requiring individual metering to be in place by 31 December 2016. This is already required for major EE renovation projects as per the Energy Performance of Buildings Directive ("EPBD").

Poland's third National Action Plan for Energy Efficiency from 2014 ("NAPEE")¹⁵ aims at reducing the primary energy consumption by 13,6 Mtoe by 2020 through a mix of horizontal measures such as white certificates, energy audits, metering, information campaigns and advisory, as well as specific measures for the following sectors: buildings, industry, SMEs, transport, and production and distribution of energy.

Finally, for waste management ("WM"), the EU approach is based on the waste hierarchy with priority in: prevention, preparing for re-use, recycling, recovery and, as the least preferred option, disposal (which includes landfilling and

¹⁵ „Krajowy Plan Działań dotyczący efektywności energetycznej dla Polski 2014”, Ministerstwo Gospodarki, Warszawa 2014 (see: <http://bip.mg.gov.pl/files/upload/21995/KPDzEE%202014%20wer.1.9.pdf>).

incineration without energy recovery). Poland intends to establish a complex waste management system at the national and regional level in order to meet Directives¹⁶ obligations.

National Waste Management Plan

The National Waste Management Plan 2014¹⁷ (“NWMP”) was adopted in reference to the EU Waste Framework Directive (“WFD”)¹⁸. The latter outlines the directions of treatment of each type of waste (municipal, biodegradable, packaging, certain industrial waste, construction, hazardous and other) and a strategy for reducing the landfill of biodegradable waste. The main goals for municipal waste have been defined as follows:

- to organise a municipal waste collection system including all inhabitants by 2015 at the latest,
- to organise a separate waste collection system for all inhabitants by 2015 at the latest,
- to decrease the quantity of municipal biodegradable waste directed to landfills so that the landfills do not cover more than 50% in 2013 or more than 35% in 2020 of the mass of the waste generated in 1995,
- to decrease the mass of landfilled municipal waste to the maximum of 60% of generated waste by the end of 2014,
- to prepare waste materials such as paper, metals, plastics and glass from households (and, if possible, waste of other origin from households) for re-use and recycling, at the minimum level of 50% of their quantity by 2020.

Subsequently, the objectives of the NWMP have been further translated into the Voivodeship Waste Management Plans (“VWMPs”) prepared by the regional authorities in 2013. Moreover, the Council of Ministers adopted in 2014 the National Waste Prevention Programme, which presents in a single document waste prevention measures both at the national and voivodeship levels.

Updated NWMP and VWMPs, including Investment Plans¹⁹ should be prepared by the end of 2015 and mid-2016 respectively. It should meet the ex-ante conditionality of the OPI&E 2014-2020 in the area of waste management.

¹⁶ Waste Framework Directive 2008/98/EC, Directive 1999/31/EC on landfill of waste, Directive 2012/19/EU Waste Electrical & Electronic Equipment (WEEE), Directive 2006/66/EC on batteries and accumulators and waste batteries and accumulators, Directive 2004/12/EC and Directive 2005/20/EC amending Directive 94/62/EC on packaging and packaging waste and IED.

¹⁷ „Krajowy Plan Gospodarki Odpadami 2014”, Ministerstwo Środowiska, Warszawa 2010 (see: http://www.mos.gov.pl/kategoria/3340_krajowy_plan_gospodarki_odpadami_2014/).

¹⁸ The EU Waste Framework Directive (WFD) allows municipal waste incinerators to be classified as recovery operations provided they contribute to the generation of energy with high efficiency. Waste management through incineration plants should also reduce negative effects on the quality of the environment caused by the incineration emissions into the air, water (surface water and groundwater) and land (soil). Certain technical and operational requirements as well as emission limit values must be therefore respected in line with the Industrial Emissions Directive (“IED”).

¹⁹ The newly adopted amendment of Waste Management Act (WMA) requires preparation of Investment Plans for waste management in each region, with the purpose of coordinating the investment plans and balancing the waste supply with an integrated waste management system (including preparing for re-use, recycling and other recovery processes including incineration).

3. ANALYSIS OF MARKET FAILURES, SUB-OPTIMAL INVESTMENT SITUATIONS AND INVESTMENT NEEDS

According to Article 37 (1) and (2) of the CPR, FIs will be implemented to support investments that are expected to be financially viable but are unable to raise sufficient funding on the market. Therefore, the Article 37 (2) (a) of the CPR requires an analysis of market failures, suboptimal investment situations and investment needs under the policy areas, TOs or IPs to be addressed by the envisaged FI. The aim of this chapter is to identify market inefficiencies in the provision of funding for potentially viable projects in all four sectors in general, as well as sector-specific sub-optimal investment situations and investment needs for each sector separately.

This chapter demonstrates that market inefficiencies and suboptimal investment situations are rather sector-specific than general. In particular, they pertain to the following areas:

Key market inefficiencies

- Regulatory environment
- Affordability issues
- Commercial institutions' risk aversion
- Commercial institutions' objectives
- Low environmental awareness and asymmetry of information
- Insufficient equity contribution and/or collateral

3.1. Market failures and sub-optimal investment situations

The market failures identified are relevant not just to one of the IPs selected for application of FIs, but are relevant to all IPs of interest. Other market failures, sub-optimal investment situations and investment needs, which are specific to each IP under consideration, are listed and discussed in the following subsections on individual IPs.

3.1.1. Legal and regulatory risks

A stable and robust legal and regulatory environment is an important criterion to attract and incentivise investors to develop and finance projects, particularly in sectors that require external public support to achieve an acceptable rate of return, such as energy efficiency and renewable energy.

Poland is in the process of implementing the EED that was due for implementation by June 2014. A new Act on EE, which is to replace the existing Act of 15 April 2011²⁰ on EE, is expected to introduce a number of new requirements, such as obligatory energy audits for large enterprises, improvement of the energy characteristics of public buildings and a new regulation in respect of a white certificates system to provide support to EE investments.

After three years of preparatory work, a new law was adopted at the beginning of 2015 - the Act of 20 February 2015²¹ on RES but secondary legislation needs to be adopted before the new RES support system can be put in place. Whilst the auction mechanics are still to be defined, there are lessons learnt from other European countries. In particular, "underbidding" proved to be a major problem with bidders providing overly competitive prices, thus negatively impacting deliverability and bankability of projects.

Given that a sanction for non-delivery of projects is relatively low under the new RES support regulation (PLN 30,000 per MW), this might potentially create a significant deliverability risk. In addition, there is a perceived lack of clarity on

²⁰ Dz.U. of 2011, no 94, pos. 551, with subsequent amendments.

²¹ Dz.U. of 2015, pos. 478.

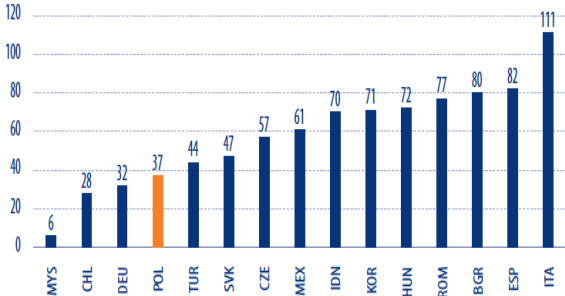
how to combine state support under the RES system (state-guaranteed auction price) with other forms of state aid (e.g.EU grants or FIs). In addition, it is unclear how many auctions, and within which timeframe, will be carried out, with the current plan of the ME covering only three years: 2016-2018.

Consequently, many commercial banks are waiting for an in-depth analysis of the new RES support system until the issues outlined above have been at least partially clarified. This poses a potential funding risk to investors/sponsors who are preparing for the future auctions.

3.1.2. Polish financial and banking sectors

The Polish financial market and banking sectors are believed to be one of the country’s competitive advantages, not just in Central & Eastern Europe (“CEE”), but also in global markets. Polish banking market has remained resilient to the international financial crisis due to its liquidity and availability of financing both to SMEs and to large capital projects.

Figure 6: Competitiveness of the financial market in the GCR ranking



Source: Global Competitive Report 2012/2013

Table7: Financial Market Development

8th pillar: Financial market development		
8.01	Availability of financial services	4.9 53
8.02	Affordability of financial services	4.6 44
8.03	Financing through local equity market	3.6 60
8.04	Ease of access to loans	2.5 97
8.05	Venture capital availability	2.3 104
8.06	Soundness of banks	5.3 54
8.07	Regulation of securities exchanges	4.9 35
8.08	Legal rights index, 0–10 (best)*	9 12

Source: World Economic Forum Competitiveness Report 2013-2014

Given Poland’s relative stability of the debt financing market through the financial crisis, Polish banks continue to provide liquidity to market participants. In parallel, the majority of private enterprises significantly reduced their investments during the crisis, thereby lowering demand for commercial financing. Whilst there is potential liquidity to finance low-carbon projects by commercial banks, there are still market inefficiencies and hurdles. These inefficiencies vary from sector to sector as summarised below:

Table8: Market inefficiencies in commercial funding

Key market inefficiencies in commercial funding	1) preference for short- to medium-term financing not corresponding to projects’ payback periods;
	2) high level of equity to be provided by the sponsors to meet debt-to equity-ratios acceptable to the banks;
	3) insufficient credit rating of certain borrowers' groups and insufficient collateral;
	4) lack of interest and capacity in evaluation of environmental effects;
	5) risk aversion at the development and operational stages;
	6) relatively small value of some projects;
	7) challenges posed by banking regulations.

- 1) The majority of Polish commercial banks have a strong preference for providing finance with tenors of up to 7 years, and occasionally up to 15. Generally, financing “green energy” projects requires significantly longer tenors than 7 years to take into account their revenue generation potential. However, it is expected that tenors for the RES projects with the fixed price under the auction system will correspond to the period in which this price is guaranteed.
- 2) Projects with high capital expenditures have a relatively higher level of risk and require more equity finance. This not only creates barriers to project development, but also increases the total costs of investment due to a relatively low leveraged ratio. Consultations with the commercial banks suggested different views on the debt-to-equity ratio for RES projects. In some cases, the banks anticipated an increase compared to the projects implemented under the old RES support system.
- 3) In some sectors, especially EE in housing, some borrowers have a relatively low credit rating and are therefore, not able to collateralise their loans. This results in a generally lower appetite to lend to such borrowers, but also because these projects are usually smaller-scale with relatively complicated structures (e.g. ESCO based on a guaranteed level of energy savings). In addition, insufficient collateral availability blocks access to debt financing from the funds offered by the Regional Environmental Protection and Water Management Funds (“WFOŚiGW”) for projects developed by housing associations (e.g. thermomodernisation).
- 4) The commercial banks are primarily focused on such commercial aspects as the probability of default, the revenue-generating potential, and the creditworthiness of their customers - rather than on the environmental effects of projects. Generally, commercial banks do not have the capacity to assess environmental effects, and so often overlook the environmental dimensions of projects.
- 5) There is some risk aversion to the development and operational stages of RES and EE projects. Development risks relate to elements specific to the project’s pre-construction and construction periods such as technology risks, delay in project completion, capital expenditure overruns, environmental, and management risks as defined in a table below for four key sectors. In addition, banks are cautious about their assessment of the operational risks, resulting in higher levels of the debt service cover ratio (“DSCR”) and reserve capital to be maintained for debt service (debt service reserve accounts, “DSRA”).

Table: Risk implications for the low carbon sector

SUB-SECTOR	RISK DESCRIPTION	RES	WASTE-TO-ENERGY (WTE)	ENERGY EFFICIENCY IN BUILDINGS	ENERGY EFFICIENCY IN LARGE ENTERPRISES
Technology risk	Relates to the novelty level of the applied project technology and equipment	In general, well-tested technologies might be not extensively applied for the larger projects eligible under OPI&E), with exception to certain geothermal / biogas projects	Technology and concepts fairly new to the market and not extensively tested and applied	In general, well-tested technologies	Different level of complication depending on specific projects / different levels of EE
Risk of construction delays and budget overruns	Relates to possible delays during construction phase and possible initial budget overruns during construction phase which may require additional financing to cover such overrun	Possible delivery delays in respect of equipment, possible equipment defects in the commissioning period	Possible technology failure / delays in completion and cost over-runs in case of new / untested technologies	Brownfield projects ²² , with relatively predictable timeframe and budget	Possible delays and budget overruns depending on the scope of specific projects
Environmental risks	Project failures or delays due to environment-related problems	A number of environmental issues, incl. EIA, permitting, potential local protest	A large number of environmental issues, usually expected local protests	Brownfield projects, usually simplified environmental procedure	Possible environmental issues depending on the scope of specific projects
Risk of inadequate management	Developer's experience, expertise and capacity to deliver the specified infrastructure and manage the project implementation process to a high industry standard	N/A to a number of experienced players guaranteeing high quality management but also a number of smaller players with limited experience	N/A to larger WtE installations that can attract developers with extensive experience in developing complex installations across the world	N/A. Most developers have previous experience in development of similar infrastructure, however potential insufficient management experience on public project grantors	Usually N/A but potential insufficient management experience depending on the scope of specific projects
Productivity risk and risk of feedstock supply	Certainty and predictability of the level of production and of the level of the feedstock supply	Insufficient (lower than forecast) wind / solar power resulting in lower level of production, Insufficient or not reliable feedstock supply	Insufficient waste supply, low quality of waste supply, lower than forecast efficiency	N/A	N/A

Source: own analysis based on market consultations with the banks

- 6) The majority of projects covering EE in housing are considered relatively small. Furthermore, these projects often require a sophisticated structuring with an energy savings guarantee arrangement, novel technologies and operational risks that make them unattractive to the commercial banks. This is also related to the lack of the banks capacity to assess the amount of energy saved.
- 7) There are challenges posed by the requirements in banking regulations in the post-financial crisis era with stricter prudential requirements of Basel III which made changes to the regulatory capital, introduced liquidity ratios (such as LCR – liquidity coverage requirement to ascertain a short-term liquidity and NSFR – net stable funding requirement to ascertain long term liquidity), leverage ratios and anti-cyclical buffers. These new rules have been transposed into the EU legislation in particular, through the Capital Requirement Regulation of 2013²³ (“CRR”) that has introduced a single rulebook for the EU. They are coming into force over 2014 - 2019.

²² Brownfield projects mean in this context new capital investments performed on existing assets in order to improve their features or extend their scope, size, feasibility or useful life.

²³ Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012, Official Journal of the European Union L 176/1.

As a result, the banks now need to re-examine the quality of their assets and risk policies. For project finance transactions, where funding should be provided for long tenors, the impact of the NSFR on the availability of long-term funding remains to be assessed.

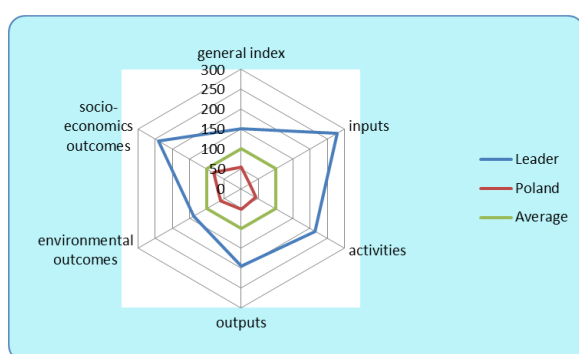
3.1.3. Low level of environmental awareness

Based on the literature review and consultations with key stakeholders (including the NFOŚiGW, BGK, MID, WFOŚiGWs and industry chambers and representatives), there is relatively low environmental awareness amongst the general Polish population, decision-makers and businesses.

Environmental and energy efficiency - awareness among enterprises

The low level of environmental awareness among managers of Polish enterprises is discussed in several studies²⁴ showing, inter alia, the eco-innovation of Polish enterprises in comparison to the EU27 Member States.

Figure10: Environmental awareness, Poland vs. EU average



Source: „Ekoinnowacyjność Przedsiębiorstw Czystszej Produkcji w Polsce; Część 1: Ogólne Aspekty Ekoinnowacyjności”

This relatively low interest in environmental and EE is also reflected in indices among the largest Poland-based enterprises, such as the RESPECT Index or the Responsible Companies Ranking which assesses corporate social responsibility (“CSR”). Only 40% of the largest Polish companies are involved in the implementation of the principles of social and environmental responsibility, with over 33% not even considering implementation of CSR. Furthermore, a survey for “Project CHANGE”²⁵ conducted among companies in the 12 European countries (including Poland) showed low environmental awareness among enterprises. The key findings show that:

- Energy audits or expert consultations are perceived as the most useful forms of support, but still rarely used. Less than 7% of companies in Poland conducted an energy audit, while the European average was 25%. In countries such as Austria, Germany and Belgium, where energy audits are financed from public funds, 50% of enterprises benefited from an audit.
- Companies primarily use their own resources to finance EE investments, whilst traditional loan or grants are used to a lesser extent. Contracting or financing of investments by external companies providing energy

²⁴ Michał Jan Cichy, Marek Szafraniec, Zeszyty Naukowe Politechniki Śląskiej, Seria: Organizacja i Zarządzanie z. 77, „Ekoinnowacyjność Przedsiębiorstw Czystszej Produkcji W Polsce; Część 1: Ogólne Aspekty Ekoinnowacyjności”, Katowice 2015.

²⁵ The Project CHANGE was conducted under auspices of Intelligent Energy Europe (IEE) whose aim is to help small and medium-sized enterprises in the optimisation of energy consumption through the development of a European advisory network located in chambers of commerce. CHANGE; Izby Gospodarcze promują Inteligentną Energię wśród małych i średnich przedsiębiorstw; Motywacje i bariery dla poprawy efektywności energetycznej w małych i średnich firmach w Polsce”, KIG, Warszawa 2010.

services in exchange for a share in the savings made (such as ESCOs) should be more often considered as a viable form of financing. This avoids excessive debt burden and is useful even when bank loans are unavailable. For this to happen at scale, an energy services market in Poland needs to be further developed to meet market needs.

The experience of the EE programme in enterprises (see detailed description in Chapter 5 *Lessons Learnt*) offered by the NFOŚiGW shows a relatively low environmental awareness among enterprises and a relatively low interest in EE measures of the top managers. Part I of that programme offered support in performing energy audits (disbursement of up to 70% of audit costs). Despite this, the interest shown by the entrepreneurs was significantly lower than expected.

The aforementioned conclusions could have potential impact on an FIs implementation strategy, in particular for Measure IP 1.2. Hence, the FIs should include a significant allocation for technical assistance (“TA”) and project development assistance (“PDA”) as described later on in Chapter 4 *Proposed Investment Strategy*.

Low social environmental awareness

Several studies show general low environmental awareness of the Polish end-users. According to one of the studies in this area²⁶ 70% of respondents were not familiar with building energy performance certificates. This is particularly important for sub-measures 1.3.2 and 1.7.1, where motivation to start a thermomodernisation project (whether from willingness to protect the environment or from legal obligations or from the willingness to increase the market value of the house²⁷) may play an important role in deciding on whether to join the programme or not.

A 2014 study conducted in Poland with the CAPI method on a random representative sample of 1,000 residents aged over 15 years²⁸, showed:

- According to most respondents, environmental problems are not the most important challenge facing Poland, therefore there is a lack of motivation to participate in EE refits. This is further exacerbated by the fact that about 40% of Poles are not aware of measures taken by their municipality to inform and educate its residents on the proper management of waste.
- Approximately 12% of respondents stated that they planned to take additional measures to increase EE of their houses and help reduce energy bills. This also had a direct correlation with income, where individuals who were financially better off were more interested than those who were “average” or “poor”. Therefore, it is reasonable to infer that EE investments would be less popular for lack of affordability among the less affluent households.
- Approximately, 21% respondents declared their readiness to spend more on "clean" energy. 40% of people who want to pay more are willing to spend up to 5% more in comparison to what they are currently paying, and another 22% could spend from 6 % to about 10% more.

²⁶ Michał Jan Cichy, Marek Szafraniec, *Zeszyty Naukowe Politechniki Śląskiej, Seria: Organizacja i Zarządzanie z. 77, „Ekoinnowacyjność Przedsiębiorstw Czystszej Produkcji W Polsce; Część 1: Ogólne Aspekty Ekoinnowacyjności”*, Katowice 2015.

²⁷ For brevity, the noun „house” will mean both houses (detached/semi-detached) and flats with reference to EE in this Report.

²⁸ „Badanie świadomości i zachowań ekologicznych mieszkańców Polski. Badanie trackingowe - pomiar: październik 2014”, Raport TNS Polska.

These findings could have an impact on sub-measures 1.3.2 and 1.7.1, as most people would not accept higher bills to meet environmental targets. Irrespective of the impact of educational and promotional campaigns, people will be unlikely to change their mind-sets without stronger financial incentives. Assistance to low-income residents should therefore, include FIs that would not increase energy costs for these residents.

3.1.4. Low level of private investment

There are a number of reasons for the low level of private investment in some areas of low-carbon economy, including the following:

- **Low returns on some projects**

EE projects (both housing and large enterprises, especially complex thermomodernisation) are generally perceived as less attractive to commercial investors due to long payback periods and a low Internal Rate of Return (“IRR”).

- **Underdeveloped ESCO market**

According to several studies, the ESCO market is largely underdeveloped.²⁹ The market size is estimated to range from EUR 10 m to EUR 25 m³⁰ in terms of annual turnover. Third party financing is not popular in Poland and ESCOs with large internal funds which can provide project financing from their own equity (e.g. Siemens), remain either in the centre of the market or apply forfeiting structures.

The major barrier perceived is the lack of specific legal framework for the ESCO environment, and the lack of clarity in the Public Finance Act pertaining to the classification of ESCO agreements (relevant to energy efficiency in public buildings).

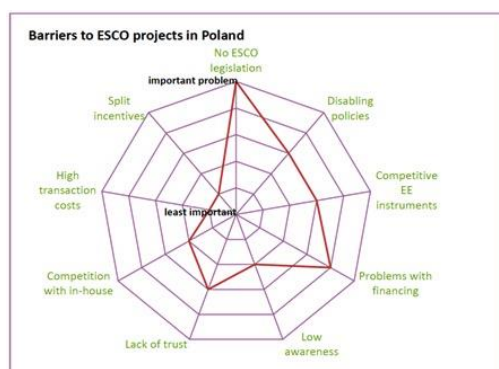
Based on the information from ESCO representatives, the investment potential for ESCO services is estimated at PLN 100 - 300 m per annum³¹. The biggest savings are expected in the industrial sector due to the economies of scale and relatively short payback periods. However, the investments are mostly performed through corporate finance and leasing structures instead of guarantee-based EPC contracts which might affect interest in ESCOs. Yet, the proposed legal provisions under the new Act on EE might increase demand for both services provided by ESCOs.

Heating investments are particularly attractive to ESCOs, including fuel oil or gas boiler replacement with biomass. However, on the demand side, customers are more interested in energy management systems and other “additional” services. The public sector constitutes about 40-50% of the ESCO market turnover, making it the largest client, but the volume has been slowly increasing. The main target subsectors include education, local administration buildings and street-lighting. The main barriers to the development of the ESCO market in Poland are shown on the graph below:

²⁹ See the Instytut Ekonomii Środowiska and the Joint Research Centre joint report ‘ESCO Market Report 2013’ stating in 2012 there were around 30 ESCO-type companies in Poland, most of them in an initial development stage and providing relatively simple projects (the majority in advisory, including energy audits, thermo modernisation and street lighting). However, the number of active companies was still under, or around, 10 at that time, showing that the Energy Performance Contracting has not achieved a wide-scale success. See also „Raport krajowy dotyczący rekomendacji dla rozwoju rynku umów z gwarancją oszczędności. Polska”, Krajowa Agencja Poszanowania Energii S.A., 2013 on the low recognition of ESCOs in the Polish market.

³⁰ Rynek ESCO w Polsce – stan obecny i perspektywy rozwoju, Instytut Ekonomii Środowiska, 2013.

Figure11: Barriers to the ESCO market in Poland



Source: ESCO Market Report 2013, Joint Research Centre, 2014

- **Underdeveloped PPP market**

The PPP market in Poland has been revived in the recent years with a number of projects reaching financial close, including a waste incineration project for the City of Poznań and a student housing project for the Jagiellonian University Collegium Medicum in Kraków. It is also expected that a financial close should soon be reached by the district court project in Nowy Sącz.

These examples suggest that there is further potential in the PPP market in Poland. However, a relatively large number of potential PPP projects have stalled for various reasons³², not least that public authorities (in particular, self-governmental) fear that PPP projects will need to go on their balance sheets³³. Finally, there is still a relative lack of knowledge and experience in delivering PPP projects, although this has been improving, both in the public and private sectors including, the advisory community.

It is also anticipated that successful PPP projects should build confidence in the market and result in new ones coming to the market in the coming years.

The PPP model is also considered as an alternative to funding EE investments. MID has recently selected advisors to implement an EE project in a specialised regional hospital in Sosnowiec.

Case Study 1: Municipal Waste Thermal Processing Plant in Poznań – a good example of a PPP project.

The City of Poznań has successfully completed a tender for the construction, operation and financing of a waste incineration facility, with SITA Green Energy being selected as a private partner. A consortium of three Polish banks (PKO BP, Pekao SA and BGK) has provided long-term debt financing, with the EU funds also blended into the financing mix. Under the underlying PPP contract, the City of Poznań is responsible for the waste supply, whereas the private partner is responsible for the operational risks.

³² According to the PPP Projects Database as of June 2015, there have been 65 PPP projects under development, and the success rate is low. Most of the projects are either not able to complete their initial analysis and modelling stages or are held off at the tender stage. This is mainly due to the fact that the projects are either not suitable for the PPP formula (e.g. small scale projects) or a structure envisaged by the public sector is not acceptable to the private sector (e.g. excessive risk shifting towards private partner or overreliance of the public sector on unstable commercial revenues expected to be generated by those projects).

³³ The off-balance sheet benefit should not be seen as the main motivation for undertaking PPPs. Instead, the authorities shall undertake proper ex-ante Value-for-Money evaluations to compare different procurement options when deciding whether a given project should be carried out as a PPP. The value-for-money guidance for PPPs should be elaborated by the MID/MEco to support procuring authorities in assessing additional benefits and costs of PPPs (in comparison to a traditional procurement method of the same investment).

3.2. Production of energy derived from renewable sources

Both desk research and consultations with the market participants have shown a number of market deficiencies which have hampered investments in the RES projects over the last 2-3 years.

3.2.1. Prolonged legislative period for the new support system

As mentioned in the Section 3.1.1 *Legal and regulatory risks*, the uncertainty about the final shape of the new RES support system has been a major setback to the market in the recent years with many banks withholding their financing to the RES projects, in particular those whose implementation was to be based on a project finance formula. The more cautious investors have also put their projects on hold until the new support system has emerged. This situation should improve with the introduction of the new RES support system.

Under the new system, the RES projects that win auctions will enjoy a guaranteed price for a period of 15 years starting from the year in which a given RES installation generated energy eligible for first-time support for the first time - but no longer than until 31 December 2035. Consequently, it is expected that the auctions will be organised only until 30 June 2021. Nevertheless, the consultations carried out with the MEco indicate that the auctions will most probably be organised only over a period of three years (2016 – 2018) which should allow Poland to reach a 15% level of the renewable energy in its energy mix by 2020.

In general, all types of RES technologies are eligible for support under the RES new system except for co-firing plants, hydropower plants with a total installed capacity exceeding 5 MW, and biomass or biogas plants with a total installed capacity exceeding 50 MW. However, the MEco expects that predominantly the on-shore wind and biomass projects will be sufficiently competitive to win the auctions.

In order to qualify for the auctions, the development of the new RES projects will have to be sufficiently advanced with all the environmental and building permits, inter connection and business and financing plans in place. As such, in order to be prequalified, investors will need to bear significant development cost without any assurance that their projects will be completed. This, however, may prove difficult for smaller developers with limited equity.

For each calendar year, an auction “reference price” will be determined. It will constitute a maximum energy price (per MWh) which can be bid for by the participants in an auction organised in that year. The reference prices pertaining to the new RES installations will be determined on the basis of an economic analysis of the average costs of energy generation in these installations, taking into account: the CAPEX required for the development of a RES project, its operating costs and the efficiency and capacity of the RES project. Reference prices for the new installations are expected to ensure a 12% equity IRR after tax (a reference return quoted in a MEco document attached to the draft of the new RES law). For the auctions to succeed, it will be crucial to ascertain that the reference price is based on solid market data in order to assure that this price guarantees bankability of the winning projects.

Although reference prices for new RES installations will be determined separately for different RES capacities and technologies (e.g. wind, solar, hydro below 5 MW, biomass), all new RES installations will compete in the same auctions. As such and as mentioned above, only the most competitive technologies (i.e. on-shore wind and biomass) are likely to receive support.

The winning projects will have to start production of energy no later than within 48 months from the date of closing the auction (for off-shore wind: 72 months and for solar energy: 24 months). Although the deadlines appear reasonable, the

banks will closely assess the construction and technology risks vis-à-vis those deadlines (see also Section 3.2.4 *Project financing*).

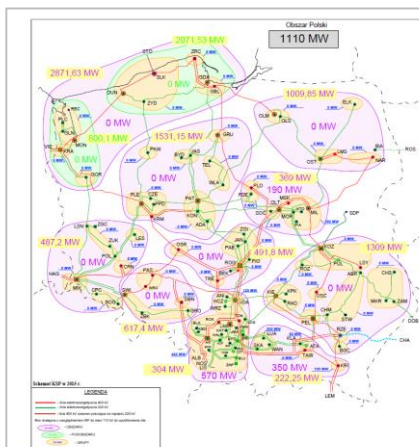
The winners of the auctions will have to comply with the yearly volumes of energy production declared in their offers. Failure to produce at least 85% of the amount of energy defined in the winning offer over the relevant 3-year periods will be subject to a fine equal to the product of 0.5 and the auction-determined energy price multiplied by the difference between the quantity of the minimum production of energy declared in the auction and the actual production in a given period. This will add another angle to the productivity risk in the banks perception (see also Section 3.2.4 *Project financing*).

Taking the above into account, the new support system is still to be tested and its full assessment will only be possible after the first auctions have been launched in 2016.

3.2.2. Limited access to grid infrastructure

Another barrier to the development of RES, e.g. in large-scale wind, is the insufficient grid capacity due to the underinvestment in network extension³⁴. Recent data on transmission grid connections (February 2015)³⁵ suggests that the existing grid infrastructure allows for the connection of new installations with a cumulative power of up to 1,110 MW, as shown in the graph below.

Figure12: Availability of transmission grid connections



Source: PSE S.A. (as of 27 February 2015)

It has been reiterated by various market participants that priority should be given to the construction of new electricity grids in the coming years³⁶.

³⁴ “Analysis of Deviations and Barriers 2013/2014”, eclareon, Fraunhofer ISI, June 2014 (see: www.keepontrack.eu).

³⁵ „Informacja o dostępności mocy przyłączeniowej do sieci przesyłowej (stan na 27 lutego 2015 roku)”, Polskie Sieci Energetyczne, 2015 (see: <http://www.pse.pl/index.php?dzid=144&did=758>).

³⁶ Construction and modernisation of electricity grids with at least 110 kV of voltage is foreseen for financing under Measure 1.1.2 of OPI&E 2014-2020. Given that these actions will be financed through non-repayable grants, they are not subject of the present Report. Insufficient spare capacity in the grids has also been quoted by the European Court of Auditors (“ECA”) as one of the key barriers to the large-scale integration of RES electricity into the transmission and distribution grids. As stated in the ECA’s report, the most frequently cited impediments to an effective RES integration to the grids were technical problems and high costs related thereof.

Support for network development for RES connection in the Programming Period 2014-2020:

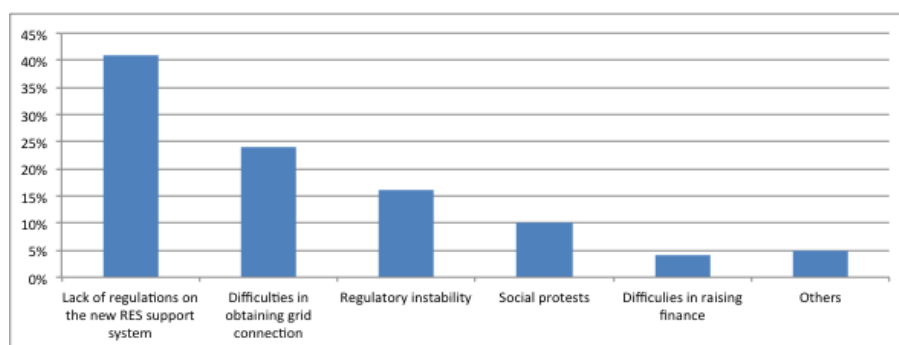
Due to the insufficient development of the electricity network in Poland, the OPI&E allocation of EUR 150 m will be available to projects to build networks facilitating connection of RES units to the National Electricity System (KSE) (Transmission System Operators projects) and distribution networks with a voltage of (above) 110 kV (Distribution System Operators projects). The entire 400 km network will be supported under the OPI&E.

Support for connecting RES to the KSE will cover not only the connection to the grid, but also the reconstruction of the network to the extent necessary for the proper functioning of the connections to improve the conditions for grid connection for RES. Complementary to the OPI&E, under four ROPs (Małopolskie (with allocation of EUR 32.6 m), Kujawsko-Pomorskie, Warmińsko-Mazurskie and Zachodniopomorskie³⁷) support for the Distribution System Operators will be provided for construction and reconstruction of a network with a voltage of (below) 110 kV for RES connection (totally for 3 regions ca. 860 km, excluding Zachodniopomorskie as no data were available).

3.2.3. Challenges to development

The administrative barriers, such as the lack of local spatial development plans, are often considered detrimental to implementation³⁸, and particularly challenging when the plans do not make provisions for the location of RES. Planning approvals are not only costly and time-consuming, but may also considerably delay the preparation of investment. Furthermore, an Environmental Impact Assessment (EIA)³⁹ is required to obtain a planning permit and that is a lengthy process in itself. Lastly, there is often local opposition to building RES facilities, in particular with respect to decreasing land value, health hazards and negative impact on the environment, irrespective of the environmental benefits.⁴⁰ Taken together, these administrative barriers could potentially delay projects for up to 2-3 years.

Figure 13: Key barriers to wind farm development in Poland



Source: Wind energy in Poland, TPA Horwath 2013, p.49, data based survey, group of wind investors

³⁷ No data available on financial allocations for Kujawsko-Pomorskie, Warmińsko-Mazurskie and Zachodniopomorskie.

³⁸ "Analysis of Deviations and Barriers 2013/2014", eclareon, Fraunhofer ISI, June 2014 (see: www.keepontrack.eu).

³⁹ The Environmental Impact Assessment necessary to obtain building permit, is a multi-step procedure used to determine the project's effect on the environment (including the effect on human health) which includes: verification of the Environmental Impact Assessment Report and obtaining the required legal opinions and approvals. The area that creates most challenges is normally a potential acoustic impact on the environment; the existing legal framework defines admissible noise levels for developed area. Another risk factor is the location of potential wind farm in vicinity of Natura 2000 areas.

⁴⁰ According to the study conducted by the Polish Wind Energy Association in collaboration with the research institute GfK Polonia, residents living in close proximity to wind farms declare strong support for wind installations (92% survey participants) whilst 78% of respondents support further farm wind development in their region. According to residents, wind farms has a positive impact on: economic development (63%), the quality of their lives (61%) and the local landscape (70%).

3.2.4. Project financing

In depth consultations with the commercial banks suggest that RES projects should be eligible for debt financing in the project finance formula⁴¹. Although most of the banks have not carried out an in-depth analysis of the new RES support system yet, they have indicated that the elimination of the price risk by the new support system is a welcome development.

However, taking into account a competitive pressure on prices to be offered in the auctions, it is envisaged that the banks may require a relatively high level of the debt-to-equity ratio. Some banks quoted even a 50%-50% split (most of them expecting higher debt-to-equity ratio but rather not more than 60:40) as an acceptable level for most of the projects in order to pass a bankability test. Although this will be most likely assessed on a project-by-project basis, equity requirements are expected to be a major problem for smaller and mid-size developers who intend to use the project finance model.

Project finance is a method of funding in which the lender looks primarily to the revenues generated by a single project, both as the source of repayment and as security for the exposure.

In addition, although the price risk has been removed by the new RES support system, energy production levels continue to be viewed as a major risk for the banks, in particular for wind projects. Wind studies are perceived as unreliable in the short-term (1-3 years of operation) but in the longer term they usually prove more accurate. Nevertheless, the banks usually apply a conservative approach basing their financial forecasts on a P90 or P95 scenarios⁴². This translates into both higher equity levels required for the projects and higher levels of the debt service cover ratio throughout the project operational phase. In addition, any profit generated above the forecasted levels is used, in whole or in part, for an early prepayment of the senior debt financing (cash-sweep).

Finally, construction and technology risks are also perceived as the major risks by the banks, in particular when unstable or new technologies are used. This may be a problem for biomass or biogas projects where it is relatively difficult to reach the assumed productivity levels. All of the above characteristics of RES projects may create bankability issues for investors, thus decreasing a potential level of investment in these projects. The market analysis confirmed an adequate interest of the banks in debt financing, provided that significant levels of equity capital is made available by the developers. This was a barrier in the past for smaller and midsize developers who intended to finance their projects in the project finance formula, and it will remain a challenge under the new RES support regime, unless it is addressed by the FIs.

⁴¹ As defined in the Basel Committee on Banking Supervision, International Convergence of Capital Measurement and Capital Standards ("Basel II"), November 2005. "Project finance may take the form of financing of the construction of a new capital installation, or refinancing of an existing installation, with or without improvements. In such transactions, the lender is usually paid solely or almost exclusively out of the money generated by the contracts for the facility's output, such as the electricity sold by a power plant. The borrower is usually an SPE (Special Purpose Entity) that is not permitted to perform any function other than developing, owning, and operating the installation. The consequence is that repayment depends primarily on the project's cash flow and on the collateral value of the project's assets."

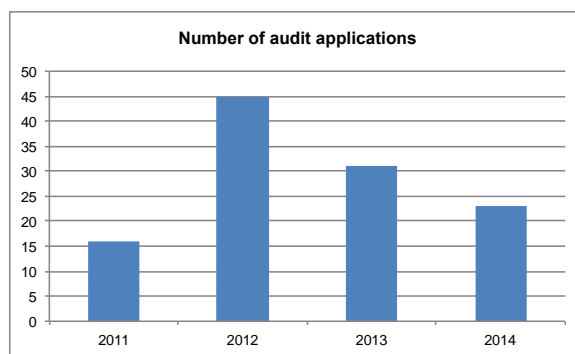
⁴² P90 (i.e. Probability 90%) denotes a 90% probability of a wind turbine to produce energy over an average year, given the uncertainties in the measurement, analysis and wind turbine operation.

3.3. Energy efficiency and renewable energy in large enterprises

3.3.1. Limited interest in investing in energy efficiency by large enterprises

A limited interest in EE investments by large enterprises relates to a low level of environmental awareness of Polish enterprises in general, which has been discussed in *Section 3.1.3 Low level of environmental awareness*. Consultations with various stakeholders including the NFOŚiGW, commercial banks and industry chambers lead to the following conclusions:

- For major large enterprises, the key driver to investing in EE measures are potential cost savings to be generated from the investment;
- Growth in Polish GDP and industrial output over the recent years with no corresponding increase in energy consumption shows that many enterprises invested in EE improvements on their own. This assumption has been cross-referenced with the information from URE on the number of EE projects that have applied for the “white certificates” in 2013 and 2014⁴³. This assumption has also been confirmed by the representatives of industry chambers and individual companies; most often, enterprises limit the scope of their investments to those with the lowest payback periods and the least potential business disruption risks;
- Core-business related investments often also include EE elements and are not treated as EE investments;
- Polish enterprises need to seek opportunities to increase their competitiveness on the regional and global markets and cost-optimize their operations which could make additional improvements in energy consumption more popular.



The NFOŚiGW has the broadest experience in promoting EE investments in Poland by supporting energy audits and capital investments in EE since 2011. As stated by the NFOŚiGW, “the interventions in the area of EE are undertaken by the private sector on a very limited scale and only with external funding allocated for this purpose. What this means is that in view of the present stage of development of the market, the private sector is not overly interested in carrying out such investments using own resources or means from other commercial sources. This fact is one of the elements representing market failures in the intervention in question”⁴⁴.

The present Report draws the following additional conclusions based on the NFOŚiGW experience in implementing their programs:

- There was a relatively healthy interest in performing energy audits, with 115 applications submitted and 88 audits supported / financed by the NFOŚiGW;

⁴³ The number of projects in EE completed and applying for “white certificates” was 212 in 2013 and 487 in 2014, with the majority of projects performed by the enterprises.

⁴⁴ Analiza i ocena możliwości zintegrowania działań w obszarze efektywności energetycznej z uwzględnieniem odnawialnych źródeł energii, w tym z odpadów komunalnych i osadów ściekowych; raport końcowy, PwC, September 2013.

- The audit scope undertaken by enterprises was in the majority of cases limited to the processes with the relatively largest energy savings / lowest payback period;
- Only 14, including 13 directly related to EE investments were finally supported by the NFOŚiGW which is rather moderate. The NFOŚiGW believes that the major reason for a relatively low interest in EE investments is a low awareness of the top managers about the actual potential of achieving real savings. Also, the NFOŚiGW refers to a relative short-termism of the top management in deciding the scope of their investments. This has been confirmed by the contacts with industry chambers representatives who define the payback period as their key decision driver and cap it at a maximum of 10 years;
- It is also believed (and often proves to be true) that preparation of EE investments (e.g. construction permits, environmental impact assessment, etc.) requires a large financial and organisational effort. This market barrier is also documented in other ex-ante assessments of financial instruments⁴⁵.
- The foregoing points may lead to the hypothesis that the potential market inefficiency results from the **asymmetry of information** where corporate decision makers do not fully envisage the potential savings from EE investments which, in turn, may seriously limit their willingness to do EE projects.

According to the EEFI Group Report⁴⁶, the key drivers affecting demand for EE investment regardless of the sector are: investment returns, a clear business case & baseline, awareness amongst the key corporate decision makers, human capacity, leadership and energy price volatility (see the table below: drivers ranked by their relative importance, with 1 being the most important).

Table 14: Key drivers affecting demand for energy efficiency investment by sector

	EE Investment Returns	Clear Business Case and Baseline	Awareness at Key Decision Maker Level & Leadership and Human Capacity	Price and Volatility of Energy	Limited Business Interruption Risk	Binding EE Targets	Existence of Public Subsidies for EE Projects	Existence of Soft Loan or Public Co-Finance
Large energy intensive*	1	3	5	2	4	7	24	34
Large non-energy intensive**	1	2	3	4	6	5	19	32
mid-caps*	1	2	5	6	17	19	3	4

Source: EEFIG 2015

* Large enterprises - enterprises whose total balance sheet exceeds EUR 300m.

** Large non-energy intensive - enterprises whose total balance sheet exceeds EUR 300 m and whose primary production value-added does not contain use more than 3% of energy cost.

*** mid-caps enterprises from all sectors whose balance sheet size is EUR 43-300 m.

Table 12 shows that whilst investment returns, clear business case and key decision makers are of vital importance to all enterprises (there are clear differences between the largest and mid-cap companies with the latter included amongst large enterprises for the purpose of this Report). For the largest companies, the limited business interruption risk and binding EE targets were of key importance, whereas public subsidies and public co-finance were the key decision factors for mid-caps.

⁴⁵ „Badanie ewaluacyjne pn. „Ewaluacja ex-ante instrumentów finansowych RPO WO 2014-2020”. Raport końcowy, Agrotec Polska.

⁴⁶<https://ec.europa.eu/energy/sites/ener/files/documents/Final%20Report%20EEFIG%20v%209.1%2024022015%20clean%20FINAL%20osent.pdf>. The Energy Efficiency Financial Institutions Group (“EEFIG”) was established as a specialist expert working group by the EC and United Nations Environment Programme Finance Initiative (“UNEP FI”) in 2013 as a dialogue and work platform between the EC and the financial sector on the topic of energy efficiency finance. 120 participants from public and private financial institutions, industry representatives, SMEs, experts, IEA, EC and UNEP FI work under EEFIG.

The same differences might be seen from an analysis of the supply side for EE investments. Whilst the regulatory stability, availability of performance data and clear/transparent monitoring and measurement of savings versus baseline was of key importance to all groups irrespective of the enterprise size, energy audits and good metering systems are shown to be vital for decision-making on financing. For the large enterprise lenders, the industry/sector risk combined with the knowledge and skills to assess EE investment were of key importance as well. For the mid-caps lenders, the EE awareness amongst key corporate decision makers together with leadership and human capacity and the development of easy-to-use standards for all steps in an EE investment process were all of key importance.

Table 15: Key drivers affecting supply for energy efficiency investment by sector

	Regulatory Stability	Availability of Performance Data & Transparent Monitoring / Measurement of Savings vs. Baseline	Industry/ Sector Risk	Knowledge of EE Technologies and Necessary Skills to Assess EE Investments	Technology Risk
Large energy intensive	1	2	3	4	5
Large non-energy intensive	1	2	3	4	5
mid-caps	1	2	10	9	17

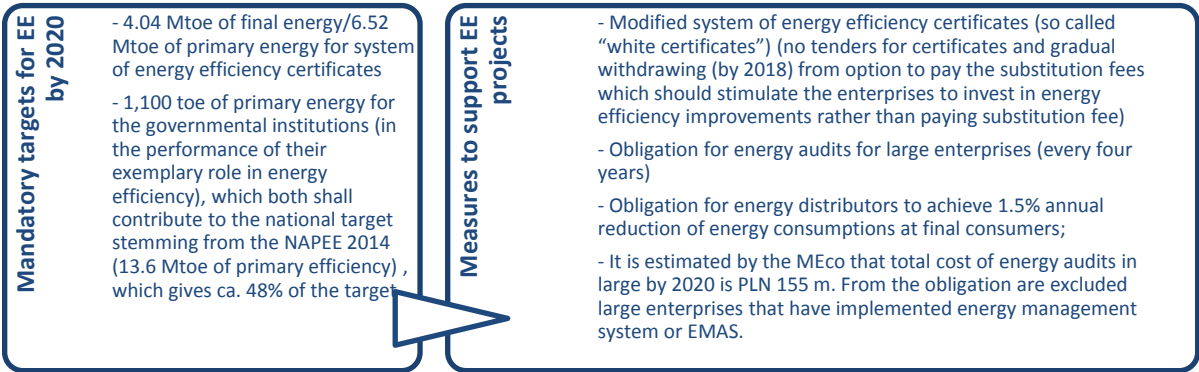
Source: EEFIG 2015

While these findings do not refer to Poland only, they should be taken into account while both designing the FIs as well as defining their conditions and implementation structures. In particular, the company-size factor might potentially play the key role within the large enterprises group as driver for EE investment (see also *Chapter 4 FIs description - assessment of value added and additional public and private resources to be raised by FIs*).

3.3.2. Regulatory environment

The key EE regulation to consider is the Act of 15 April 2011 on EE⁴⁷. To be in full compliance with the requirements of EED, a new Act on EE has been prepared by the MEco, which is now in a legislation process⁴⁸. The latest draft of the Act on EE introduces targets and measures to support EE, alongside incentives for investments in EE projects and mandatory obligation for large enterprises to carry out energy audits.

Figure16: Key elements of a draft of the Act on EE



Source: Draft Act on EE, v. 1.23

⁴⁷ Dz.U. of 2011, no. 94, pos. 551, with subsequent amendments.
⁴⁸ Though it should have been implemented into Polish law by June 2014.

The new Act on EE is also expected to “unlock” access to the certificates system, which at present is not efficiently used (in the first tender performed by URE, only 4% of the total allocation for white certificates has been granted (13.5 ktoe, in the second ca. 80 ktoe), which should give as declared final energy savings of ca. 977.5 ktoe⁴⁹).

On-going monitoring and evaluation will be required in due course as and when the new Act on EE is in effect to ensure that the EE-focused instruments are aligned with the “white certificates” system and to prevent the “crowding-out” effect (the utilisation of both support instruments – “white certificates” and FIs should not be allowed).

As the energy intensive sectors that are subject to the EU Emissions Trading Scheme (“ETS”) has not been excluded from the support under the 1.2 Measure, unless they carry out investments aimed exclusively at greenhouse gases reduction, the EU ETS as a regulatory instruments should be considered here. So far, the EU ETS has not been effective in incentivising large energy-intensive enterprises to invest in EE measures due to very low carbon prices and surplus of emission allowances in the EU carbon market. Restructuring measures of the EU ETS are being currently under revision at the EU level, focusing in particular on tackling the surplus of emission allowances that would trigger a higher price of emission allowances. Hence, this would represent an incentive for large energy-intensive industrial companies to invest in EE measures rather than buying emission allowances.

In addition, it may be expected that the new national targets (for 2030) in regard to non-ETS sectors could be imposed on the Members States, which will also mobilise the sectors to invest in the EE, and which is the key activity in these sectors to effectively reduce greenhouse gases emissions.

3.3.3. Lack of capacity of the commercial banks to assess energy efficiency projects

As discussed in *Section 3.1.2 Polish financial and banking sectors*, the commercial banks have limited understanding of and the capacity to assess energy and environmental effects of the EE projects and there is not much interest in developing such expertise at this stage. Based on the consultations with commercial banks, their clients generally look for funding to modernise or extend their technological lines rather than strictly for EE projects. Such projects are usually financed with corporate loans from the banks (corporate bonds are also used) and no other financing structures are available (such as e.g. project financing).

Moreover, no ESCO-specific financial products have been developed for EE projects to remunerate ESCOs from the energy savings generated by these EE projects. This happens because the commercial banks have not developed internal expertise for the assessment of EE projects but also because the supply of such projects and their scale are limited (EE market in Poland is still immature and at the initial stage of using more advanced financial solutions).

⁴⁹ <http://bip.ure.gov.pl/bip/efektywnosc-energetyczn/swiadectwa-efektywnosci>

3.4. Energy efficiency in housing

3.4.1. Regulatory environment

In order to promote cost-effective improvements to drive the efficiency of energy end usage, Poland has fulfilled the requirements from Directive 2010/31/EU through the Construction Law⁵⁰ and Law on Energy Performance of Buildings⁵¹ as well as their supporting regulations, including in particular:

- the Ordinance of the Minister of Infrastructure and Development of 27 February 2015 on the methodology for calculating energy performance of a building or a building unit and energy performance certificates⁵²; and
- the Ordinance on the technical conditions to be met by a building and its location with its amendments (included in the Ordinance⁵³ of Minister of Transport Construction and Maritime of 5 June 2013 amending regulation on the technical conditions to be met by a building and its location).

By issuing the abovementioned regulations, which:

- defines the minimum requirements related to the energy performance of buildings;
- establishes a system of certification of the energy performance of buildings and
- ensures strategic planning on EE,

Poland met the ex-ante conditionality indicated in the OPI&E - Supporting energy efficiency, smart energy management and renewable energy use in public infrastructure, including in public buildings, and in the housing sector. The requirements introduced by the abovementioned legal provisions (esp. increasing requirements regarding energy efficiency when designing, constructing, reconstructing and changing the building's function) have to be taken into account when preparing and performing the investment projects to be supported under the OPI&E.

3.4.2. Affordability challenges

A relatively low income level in Poland compared to the rest of the EU27⁵⁴ that often does not correspond with the cost of living (including energy bills) leads to a relatively high share of energy costs in the households expenditures and to a so-called “fuel poverty”.

This could have implications for the success of EE housing projects, especially for households with below-average disposable income. In extreme cases, this could result in the households' inability to cover their energy expenses often causing insufficient energy consumption that does not cover the basic needs (e.g. keeping the house warm in winter). This is known as “fuel poverty”⁵⁵ as illustrated in Figure 17 and Figure 18 below.

⁵⁰ Construction Law of 7 June 1994, O.J. 1994 nr 89, 414 with amendments.

⁵¹ The Act of 29 August 2014 on energy performance of buildings, O.J. 2014, 1200.

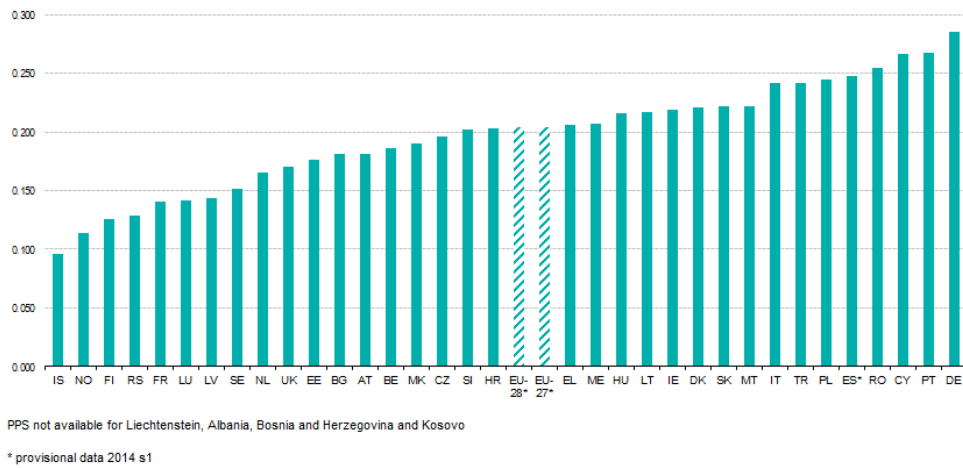
⁵² Rozporządzenie Ministra Infrastruktury i Rozwoju z dnia 27 lutego 2015 r. w sprawie metodologii wyznaczania charakterystyki energetycznej budynku lub części budynku oraz świadectw charakterystyki energetycznej.

⁵³ Rozporządzenie Ministra Transportu, Budownictwa i Gospodarki Morskiej z dnia 5 lipca 2013 r. zmieniające rozporządzenie w sprawie warunków technicznych, jakim powinny odpowiadać budynki i ich usytuowanie.

⁵⁴ According to Eurostat, in 2013 a median income per household in Poland was EUR 5,174, i.e. 33,5% of a median for EU-27 (EUR 15,430).

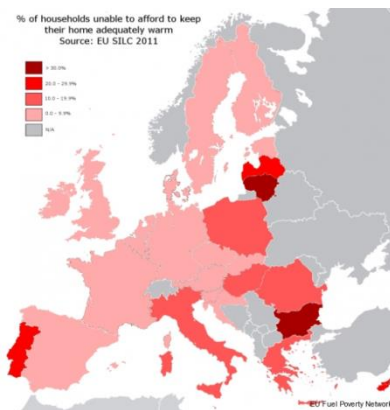
⁵⁵ The meaning of the term “fuel poverty” is taken from the Warm Homes and Energy Conservation Act 2000 (WHECA) adopted by the UK authorities. Since then, the term “fuel poverty” is used commonly instead of other terms referring to the same phenomenon (like “energy poverty”, etc.).

Figure17: Electricity prices for household consumers in PPS



Source: Eurostat, first half of 2014, EUR/kWh

Figure18: Households in fuel poverty



Source: <http://fuelpoverty.eu/>

In 2011, 10.0-19.9% of households in Poland could not afford to keep their houses adequately warm. Although an improvement over 2010 (20.0-29.9%), the pace of change is rather slow. This is typical of the post-communist countries with their old and poorly insulated housing stock and rapid rises in energy prices.⁵⁶

Fuel poverty has direct implications for EE measures in the housing sector. It may result in the exclusion of low-income groups from using FIs, even though these individuals need the most support for thermomodernisation projects. Households experiencing fuel poverty are typically considered "non-bankable", as they cannot offer adequate collateral. Consultations with housing associations reinforced the view that more support would be required.

⁵⁶ David Buchan "Eastern Europe's energy challenge: meeting its EU climate commitments", The Oxford Institute for Energy Studies, July 2010.

3.5. Waste management through the use of waste incineration plants

3.5.1. OPI&E funding conditional on the new waste management plans

The objectives of waste management in Poland until 2020 are outlined in the NWMP, which, together with the VWMPs, should make the roadmap for meeting the EU requirements. The monitoring actions of the VWMPs implementation have identified a need for more amendments required to achieve the 2020 objectives, including in particular:

- Insufficient work was planned to promote prevention, preparing for re-use, and recycling, and
- No promotion of economically and environmentally sustainable investments (i.e. excessive treatment capacities foreseen for incineration, insufficient capacities for the selective collection of municipal waste).

Additionally, an introduction of a new municipal waste collection system in mid-2013, including a separate waste collection system for all residents, has triggered verification of the waste management plans to adjust the existing infrastructure to the waste flows.

Poland prepared in mid-2015 the guidelines for draw up waste management plans. A new NWMP should be adopted by the end of 2015 and VWMPs - by mid-2016. This work will help the central and self-governments meet the relevant ex-ante conditionality for the use of the ESIF in waste management⁵⁷.

Investment Plans attached to the VWMPs should include projects for waste-to-energy plants, including their treatment capacities and locations. Only investments listed in the Investment Plans, and approved by the Ministry of the Environment, will be eligible for support under the OPI&E. It should be also stressed that the building of a waste incineration plant could only be supported under the OPI&E, if it constitutes a complementary and indispensable element of the waste management system.

Therefore, the final project pipeline should be known only by mid-2016. Nevertheless, analyses and interviews performed so far, provide sufficient information on the potential additional capacities needed (see *Section 3.7.4 Waste Management*).

3.5.2. Affordability of waste management services

Fees paid by residents for waste collection and treatment make another key factor influencing the investment decisions at local level.⁵⁸ The survey among the communes⁵⁹, carried out in January 2014, shows that average fees applied by the communes range from 29.5% to 56% of the maximum fee stipulated in the Act. For the majority of communes (over 65%), the average fee constitutes 29.5% of the maximum fee. There is, therefore, potentially some leeway for the municipalities if they should need to raise the fees. To standardise the approach, the MID has prepared a draft of the guidelines for applying affordability criteria for the projects co-financed by the ESIF⁶⁰. It would be used when calculating the maximum tariffs for some types of services, including waste management. The draft guidelines define

⁵⁷ 6.2. Waste sector: Promoting economically and environmentally sustainable investments in the waste sector, particularly through the development of waste management plans consistent with Directive 2008/98/EC, and with the waste hierarchy.

⁵⁸ Maximum fee level is regulated by the Act of 28 November 2014, amending the Act on maintaining cleanliness and orderliness/tidiness in municipalities and some other acts (Art. 6k, point b))("Waste Act").

⁵⁹ 2,168 out of 2,479 communes (i.e.87%) participated in the survey carried out by the MEnv.

⁶⁰ The drafted Guidelines are in the process of internal consultation carried out by the MID.

an affordability threshold for the waste fees (ensuring affordability of the public service for the customers, i.e. the residents in the catchment areas) at the maximum of 0.7% of their disposable income.

All six regional waste incineration plants were planned with the assumption of relatively heavy (ca. 53%) grant support from public resources. Any lighter support would induce a drastic rise of the cost of waste management, which could be socially unacceptable and well above the affordability thresholds. Table 19 below presents the CAPEX of the six regional waste incineration plants, together with the EU grants used, the fees to be paid by the customers after the EU grants were spent, and the project returns (“IRRs”) with and without the EU grants.

Table 19: CAPEX and fees level of six waste incineration plants

	Location	Capacity Mg/year	CAPEX	% EU grant support	Fees as % of disposable income (1st year of operation)	IRR without EU grant	IRR with EU grant
1	Bydgosko–Toruński Metropolitan Area	180,000	522,101,801	59.99%	0.87%	-1.9%	4.6%
2	Kraków	220,000	826,905,444	55.42%	0.87%	-1.3%	6.4%
3	Konin	94,000	381,884,263	49.79%	0.75%	-2.9%	4.7%
4	Szczecin Metropolitan Area	150,000	711,415,215	45.13%	0.75%	-2.4%	3.0%
5	Białystok Agglomeration	120,000	482,996,029	53.37%	1.02%	1.6%	5.9%
6	City of Poznań	210,000	925,051,957	52.23%	1.06%	3.2%	6.2%
TOTAL		974,000	3,850,354,710	52.61%			

Source: The NFOŚiGW and own calculations

Despite the heavy EU-grant support (the lowest at the level of 45.13% and the highest at 59.99%), the waste treatment fees to be paid by the customers in the first year of operations range from the minimum of 0.75% to 1.08%, which go above the affordability level of 0.7% recommended by the MID.

The example of the Gdańsk incinerator, being prepared under the OPI&E 2007-2013 support for projects preparations, gives additional insights into the financials of an incineration project. A feasibility study prepared for the project proves the need for a combination of grant support with other sources of financing due to affordability limitation (i.e. limitation of a gate fee due to a maximum acceptable fee of waste management service per inhabitant).

- Key parameters of the Gdańsk incineration project

Incineration capacity: 160,000 tonnes /year

Estimated investment value: **PLN 440 m**

The project envisages a PPP formula with a private partner covering: design, build, finance and operation.

- Financing options and affordability

Financing option	Estimated 'gate fee' (PLN/Mg) with an assumption of PLN 23 /GJ 30*	Estimated 'gate fee' (PLN/Mg) with an assumption of PLN 16.4/GJ 50*
Fls	385	424
50% of grant and FI (preferential loan)	211	250

* discount of the current price of heat to be paid by the local heating company GPEC

The calculations based on the estimation of an affordability criterion at the level of 0.75% of disposable income, following JASPERS'

Guidelines 2007-2013 on project preparation in environmental sector, assume that the **gate fee should not exceed PLN 217**.

The Draft Guidelines for applying affordability criteria to the projects co-financed by the ESIF, under preparation by the MID, suggest an even lower affordability threshold of 0.7% of disposable income, which would additionally reduce the acceptable maximum gate fee, assuming the maximum acceptable monthly fee for waste service per inhabitant at the level of PLN 10.37 (0.7 % x PLN 1,481 (disposable income for Gdansk) = 10.37).

These calculations, subject to verification, prove the need for continuing with the EU grant support for waste incineration plants to be built in the Programming Period 2014-2020, as was the case in the Programming Period 2007-2013 for the six waste incinerators. The level of support should be established on an individual basis, taking into account the local conditions.

In addition to the calculations presented above, an alternative option has been considered, i.e. the application of **a flat rate for net-revenue generating projects in the solid waste sector** (as an option indicated in the Art. 61 of the CPR and defined in its Annex V).

In the case of Gdańsk project, the maximum aid under the OPI&E has been calculated as follows:

Total estimated eligible costs (A) estimated as 78% of CAPEX (based on the historical data from six incinerators supported under the OPI&E 2007-2013)	PLN 338.8 m
Flat rate for a solid waste sector (B)	20%
Financial gap indicator (C) $R = 100\% - 20\%$ (flat rate)	80%
Maximum support intensity for 2.2 Measure with a flat rate option applied (D) $Max\ CR_{FR} * R = 85\%^{61} (MaxCFpa) * 80\%$ (R), where Max CFpa is a maximum intensity support for PA or Measure	68%
Maximum intensity of the EU grant for Gdańsk project: (A) x (D) $Max\ CF = PLN\ 338.8\ m * 68\%$	PLN 230.38 m

The maximum intensity of aid must not be higher than the maximum intensity, as defined by the relevant State aid rules, to avoid excessive aid /compensation (to be calculated on an individual basis).

Source: The NFOŚiGW

Therefore, due to a high CAPEX of investments in thermal treatment and affordability limitations, EU grants are assumed to ensure access to incineration for municipal waste, which is indispensable to meet Poland's commitments defined by the EU law.

3.5.3. Public debt considerations for municipalities

Pursuant to the Waste Act, the construction of a new waste treatment installation should be subject to public tender rules. As such, municipalities cannot make a direct appointment of an in-house entity in this respect. In this context, there appears to be a strong rationale for a PPP model, particularly following a successful waste incineration PPP project in Poznań.

However, as mentioned in Section 3.1.4 *Low level of private investment*, a PPP model is still relatively new in Poland. Furthermore, due to debt and deficit constraints, the municipalities require PPP projects to be classified outside public debt via a PPP model.

In order to classify the obligations under a PPP contract outside public debt, a private partner needs to carry the majority of the construction risk and the majority of the availability or demand risks, taking into account the guarantees and financing provided by a public partner, and the provisions concerning allocation of assets subject to a PPP project, following the termination of that PPP contract. This rule has been first set out in a Eurostat⁶² decision of 2004 on the

⁶¹ According to the Annex 4 of the SZOOP.

⁶² Eurostat is a statistical office of the European Union and it is a part of the European Commission as a Directorate-General located in Luxembourg.

treatment of public-private partnerships⁶³. It was further implemented into Polish primary legislation by Article 18a of the Act on public-private partnership of 2008⁶⁴. However, in order to achieve the out-of-public debt treatment of a specific PPP project, it is necessary to carry out an in-depth analysis of a PPP contract in the context of the risk sharing provisions concerning specific sub-risks included in the category of the construction, availability and demand risks. Eurostat has provided detailed guidelines in this respect in its Manual on Government Deficit and Debt (“MGDD”)⁶⁵. In addition, the Ministry of Economy has adopted a secondary legislation for this, which sets out different sub-categories of the construction, availability and demand risks⁶⁶.

However, a proper sharing of risk in a PPP contract, which enables the out-of-public debt treatment, still creates a lot of difficulties in the market (e.g. commercial banks often require that if there is a termination of the PPP contract due to a private partner default, they should be repaid in full by a public partner. Such regulation may be recognised as shifting risks back to the public partner and, as such, may require the on-balance sheet treatment).

Nevertheless, with proper risk sharing, it is possible to achieve the out-of-public debt treatment of the PPP contracts. As such, the PPP model should be a welcome alternative for the municipalities, helping them finance much-needed infrastructure in the waste sector. In contrast, all other waste incineration projects, which are currently under development and co-financed by the NFOŚiGW, require the relevant municipalities to issue sureties/guarantees for the obligations of the entities involved in the development and construction of the facilities⁶⁷. Such sureties and guarantees need to be included in the public debt.

The off-balance sheet treatment of the PPP contracts is also a potential problem in the EE sector (in particular in relation to the statistical assessment of ESCO/EPC structures), albeit for EE projects developed by the public authorities which are not eligible under the OPI&E and, therefore, not relevant to this Report.

3.6. Supply side analysis

This section covers the supply side of relevant financial instruments in each sector, both from the commercial and public sources, including EU and national sources.

3.6.1. Private funding – general

Figure 16 shows a sample list of banking products used in financing projects within the scope of interest of the Investment Priorities applicable to this Report. The list does not include the instruments, which are generalist in nature, which are no longer offered, or which are being phased out.

Commercial banks offer specialised products that can variably address projects financial requirements in most sectors. The key characteristics of commercial financing in each sector are given below.

⁶³ Eurostat’s decision no. 11/2004 of 11 February 2004 on deficit and debt – treatment of public – private partnerships, Eurostat News Releases on the Internet: <http://europa.eu.int/comm/eurostat/>

⁶⁴ Law on public-private partnerships of 19 December 2008 (Dz.U. of 2009, no. 19, item 100, as amended).

⁶⁵ Manual on Government Deficit and Debt, Eurostat Methodologies and Working Papers, 2014 edition.

⁶⁶ Regulation of the MEconomy of 11 February 2015 on the type of risks and items taking into account in their assessments (Dz.U. of 2015, item 284).

⁶⁷ As per the information received from the NFOŚiGW.

Table 20: Banking products in low carbon sector

	Instrument name	Provider	Funding source	Preferential conditions	Sectors and types of projects supported	Beneficiary/final recipient	Maximum loan amount	Maximum tenor (years)	Grace period in capital repayment (years)	Maximum loan share in total CAPEX %	Maximum project value
1	Kredyt Eko Inwestycje (LEME)	BOŚ		up to 15% capital rebate	Energy Efficiency and RES from LEME list	SMEs, housing cooperatives, maximum 250 employees and turnover of EUR 50 m	EUR 250 ths. - LEME list EUR 1 m - large projects	15/SME - 10	1	100%	
2	Kredyt EKOMontaż	BOŚ		n/a	Energy Efficiency in buildings and RES	Enterprises	up to PLN 300 ths.	10	1	max 85% net	
3	Kredyt Energia na Plus (LEME)	BOŚ	EIB	12% of capital rebate (max EUR 120 k)	Energy Efficiency (industrial and residential buildings) and RES from LEME list	SMEs	EUR 12.5 m	3 to 10 (up to 15 - RES)		max 90%	EUR 25 m
4	Kredyt Zielona Energia	BGŻ		na	Energy Efficiency in buildings and RES	Enterprises		15	2	max 80% - fixed individually for each of the project	
5	Energy efficiency and RES - CLOSED		Norwegian Funds loans - banking sector, premium funding NFOŚiSGW		Energy Efficiency in buildings and RES	Public or private bodies performing public tasks	EUR 3 m	20 years		100% (loan + grant) 20% or 40% (grant)	
6	PROSUMENT	BOS/WFOŚiGW		up to 20%/40% in 2015	Energy Efficiency in buildings and RES (small and microinstallations)	Communities and housing associations managing multi-family residential buildings		15	0.5 from project close	100%	PLN 100 - 450 ths.
7	PoISEFF2 (LEME)	BNP Paribas/Idea Bank/BOŚ, BPS		10-15 % of loan value	Energy Efficiency in buildings and RES	SMEs				100%	EUR 1 m 250 ths. - LEME list
8	BOCIAN	NFOŚiGW		interest rate WIBOR3M (not less than 2% p.a.)	RES - Construction, expansion or reconstruction of the installation from RES, hybrid systems, energy storage supporting RES development	Entrepreneurs active in RES sector in Poland	PLN 40 m	15	1.5	85%	
9	Kredyt inwestycyjny dla wspólnot mieszkaniowych	ING			Energy Efficiency in buildings (including complex refurbishment)	Housing associations	PLN 2 m	15		80%	
10	Corporate investment and refinancing loan	ING			RES - development, construction and expansion	Enterprises		10		100% net (without VAT)	
11	Investment loan co-financed by the EIB	BGK	EIB		financing of investment activities related to i.a. environmental protection	public entities (i.a. enterprises)		10	3	EIB - 50% together with other EU support instruments - 90%	EUR 25 m
12	Loan from the EIB for regional development	BGK	EIB		Environment (incl. RES) - Co-financing of projects supported by EU structural funds, Co-financing of projects in line with the strategy of local and regional development (without the support of the EU).	Public or private bodies performing public tasks	EUR 12.5 m	15	5	EIB - 50% together with other EU support instruments - 90%	EUR 25 m
13	EU Bridge Financing	BGK			EU bridge financing for RES	Beneficiaries of projects co-financed by the ESIF	PLN/USD/EUR/CHF				
14	Investment loan co-financed by the EIB	BGŻ	EIB		RES - development, construction and expansion	Enterprises	PLN 45 m/EUR 12.5 m	15	1		
15	EBI MID CAPS B	mBank	EIB		RES and Energy Efficiency in buildings- development, construction and expansion	SMEs	EUR 25 m	from 2 to 20		100%	EUR 25 m
16	Thermomodernisation Loan	GETIN Bank		Loan with thermal modernization bonus from BGK	Energy Efficiency in buildings	Housing communities and housing associations	not defined (depending on individual credit rating)	20	yes	100%	
17	KREDYT EKODNOWA	BOŚ	KfW Bank		Energy Efficiency in SMEs	SMEs	PLN 250 ths. or EUR equivalent	10	2	85%	
18	Kredyt EKO zysk	Deuche Bank	KfW Bank	up to 7.5% of loan amount, not more than PLN 315 ths.	Energy Efficiency in SMEs	SMEs	PLN 16 m				PLN 16 m

Source: publicly available information from banks' websites

Renewable Energy Sources (RES)

Commercial banks were generally active in funding RES assets under the old support regime based on the green certificates, although due to the uncertainties as to a final structure of the new RES support system and a prolonged legislative process related to the implementation of that system, many banks have withheld their financing to the RES projects in the recent years. In addition, due to the interim period in practice, no financing is available to the RES projects (to be implemented under the project finance model), beginning from the second quarter of 2015 until the time of the first auction, when the winning projects will appear in the debt financing markets.

A market risk should substantially decrease, owing to the new RES-support regime (see also *Section 3.2.1 Prolonged legislative period for the new support system*) with its auction system guaranteeing fixed prices for a period of 15 years. Consequently, the new regime is perceived as more “user-friendly” to the banks in comparison to the old system.

During the IDIs, most of the banks have declared their interest and willingness to fund RES projects. However, based on the IDIs and our experience, several issues have been identified that might negatively influence market development, in particular:

- A relatively low level of prices which is expected to be quoted at auctions (as confirmed during auction simulations carried out so far, particularly between sources such as wind and biomass where the competition is the most severe) may in turn have a negative impact on the bankability of such RES projects, in particular, to be financed in a project finance formula. The banks have underlined that as a result of such low pricing levels, they may require higher levels of equity from the project sponsors which may prove especially difficult for the stand-alone developers.
- Although the levels of a debt service cover ratio may decrease as a result of the new RES system (a guaranteed price for up to 15 years in comparison to the energy price risk assumed under the old regime), there are no clear views on whether bank margins will decrease.
- Penalties for a non-delivery of a volume of energy quoted at auction will result in fines payable by a RES project. This adds additional pressure on the assessment of the productivity risk and so the banks might seek to secure such risk with higher levels of reserve capital to be maintained by RES projects.
- Deadlines for a RES project to commence production of energy after an auction (in particular, a 48-month deadline for e.g. the on-shore wind and biomass installations) add additional layer to the assessment of the construction and technology risks. It is expected that the banks will closely monitor those phases and will require additional time reserve between first utilisation of their loans and the lapse of the 48-month period. In addition, they may expect investors to utilise first their equity in full before the debt financing is advanced (and not pro rata as it was sometimes agreed under the old system).

Energy efficiency in large enterprises

The interviews with industry associations and enterprises show that enterprises would typically decide to invest in EE projects mainly from their own resources. In fact, the majority of Polish enterprises have relatively low debt levels, so they often finance projects directly from corporate resources (equity or corporate lending). The latter was confirmed by the commercial banks interviewed as part of this Report. Due to small interest amongst the enterprises, the banks offer limited products in this area.

Energy efficiency in buildings

Commercial banks have not yet shown significant interest in EE in buildings (other than under the BGK TRF), mainly due to the following reasons: 1) an insufficient project value, 2) payback periods too long for investments exceeding very basic thermomodernisation and which do not correspond to the normal lending tenors, and 3) problems in assessing investment risk and credit worthiness of certain types of project beneficiaries – especially housing associations, 4) insufficient collateral, and 5) no interest in environment-related outcomes.

Waste sector

As suggested by the experience of the Poznań PPP waste incineration project, commercial banks and multilateral financial institutions are generally interested in financing well-structured PPP projects. Pursuant to the interviews carried out with the commercial banks, there is sufficient liquidity in the market to co-finance the remaining waste incineration projects, in particular if they were carried out in the PPP model. Tenors above 15-years may prove difficult to offer by some commercial banks, however, the multilateral financial institutions and various commercial lenders should fill in the gap.. Given the budgetary constraints of municipalities, it will be important to negotiate the underlying PPP contracts in a way which will not result in the treatment of the debt financing to the PPP projects as public debt (esp. if banks require full repayment of their loans upon termination of a PPP contract due to a private partner's default).

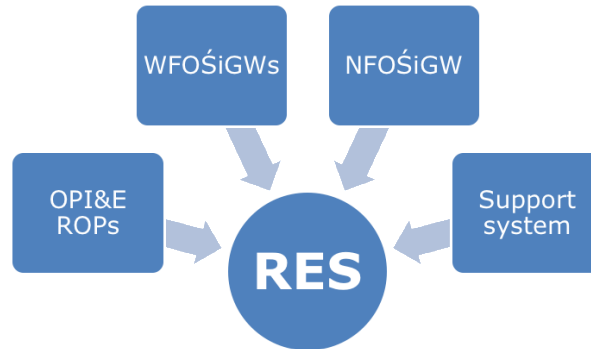
Recently, the commercial banks have also expressed interest in the refinancing of the waste incineration projects (currently under development) which are co-financed with the NFOŚiGW loans. This is again a sign of the commercial banks' appetite for the projects and their improved confidence in the waste sector. Most of the banks which were interviewed for this Report, expressed their interest in financing the projects, already at their early stages, especially given initial positive experience in the pilot project in Poznań and an increased risk appetite.

Public funding - EU and national schemes

There are several EU and national initiatives, utilising public funds, in all four sectors, including the support system discussed in detail in Sections: 3.2.1 *Prolonged legislative period for the new support system*, 3.3.2 *Regulatory environment*, and 3.4.1 *Regulatory environment*.

3.6.2. Renewable Energy Sources

There are four major sources of public funding for RES, including:



Regional Operational Programs: Large RES installations are eligible for support both under the OPI&E and ROPs under the Programming Period 2014-2020 as well as in Programming Period 2007-2013. Key characteristics of the OPI&E instrument, such as an indicative allocation, minimum capacities of installations and outputs/results expected to be achieved, are given in the Table 21 below.

Table 21: 2014-2020 ROP allocations for RES

Region	Type of instrument (FI/grant)	Available allocation		Eligible beneficiaries/final recipients	Planned outputs to be achieved				
		RES total	Comments		New capacity [MW]	Number of units	Target share of electricity production in total electricity production [%]	CO2 reduction [Mg CO2 equivalent]	
Dolnośląskie	FI tbc	231,330,445	EU contribution only. Potential allocation for FI not indicated	enterprises and public sector	59.02	37	12.79	9,410	
Kujawsko-Pomorskie	FI	159,734,212	EU contribution only (wind excluded)	enterprises and public sector	13.52	45	64.07	24,179	
Lubelskie	FI tbc	471,377,026	EU and national contribution	Local governments, their associations and unions, legal entities of them, public finance units, church entities	83	14903	5.6	245,704	
	FI tbc	211,606,267		SMEs; enterprises only with majority shares owned by local governments or their associations; others					
Lubuskie	FI	47,964,927	EU and national contribution	enterprises and public sector	18	27	14.95	5,143	
Łódzkie	grants	190,646,215	Allocation for activity under ITI and beyond. EU contribution only	enterprises and public sector	32	71	4.7	62,142	
Małopolskie	FI tbc	153,308,235	EU and national contribution	enterprises only with majority shares owned by local governments or their associations	40	670	18	20,000	
Mazowieckie	FI	80,852,616	Total allocation for RES in FI JESSICA	enterprises and public sector	40	na	15	50,000	
Opolskie	FI	94,907,654	Loan funds recommended	enterprises only with majority shares owned by local governments or their associations and public sector	6.16	151	6.96	12,300	
Podkarpackie	FI	459,481,282	Allocation is estimated as 40% of total allocation for the PA	enterprises and public sector	23	na	15	37,000	
Podlaskie	FI tbc	249,600,000	EU contribution only	enterprises and public sector	32	66	18.6	na	
Pomorskie	FI	58,385,750	EU contribution with national part (wind excluded)	enterprises and public sector	45	na	na	na	
	grants	136,275,015		enterprises and public sector					
Śląskie	FI	319,384,770	allocation for FI under ITI and beyond; EU and national contribution	enterprises and public sector	na	na	na	na	
Świętokrzyskie	grants	327,495,195	Allocation is estimated as 40% of total allocation for CT4	enterprises only with majority shares owned by local governments or their associations and public sector	20	23	19	59,200	
Warmińsko-Mazurskie	grants	112,609,683	EU and national contribution	enterprises and public sector	59.63	89	81.29	180,927	
Wielkopolskie	FI tbc	152,703,200	EU and national contribution	enterprises and public sector	na	na	na	114,521	
Zachodniopomorskie	grants	258,481,600	EU contribution only	enterprises and public sector	54.78	20	48.1	908,908	
	grants (included)	1,025,507,708			total	526.11	16,102	324	1,729,434
	FI tbc (included)	1,469,925,172							
	FI confirmed (included)	1,220,711,210							
	in regions	3,716,144,089							

The demarcation line defined between the OPI&E and ROPs refers to the capacity of installations of 5MWe for wind, water and biomass, 2 MWe for solar and geothermal and 1 MWe for biogas. As described in more detail in *Section 2.1 Poland's Operational Programme – Infrastructure and Environment*, the demarcation line may result in unhelpful competition between the OP support on central and regional levels, since RES investments are easy-scalable and can “be adapted” to more attractive terms and conditions of support. This could happen, for example, by fragmenting a 20MW wind farm into four SPVs of just below 5MW each to use grant funding available under a ROP, and not FIs available under the OPI&E.

The total allocation for RES support, calculated on the basis of the ROPs and available SZOOPs, is almost seven times larger than for the OPI&E. 27% of the allocation is earmarked for grants (in five regions – Łódzkie, Świętokrzyskie, Warmińsko-Mazurskie, Zachodniopomorskie and partially Pomorskie), which might result in grants competing with the OPI&E FIs on projects with borderline values in these five regions. Other five regions (Dolnośląskie, Lubelskie, Małopolskie, Podlaskie and Wielkopolskie) have not taken their decisions yet. The remainder, six regions and Pomorskie (partially), have all decided to use FIs in support of RES installations.

It would, therefore, be helpful to monitor the MAs decisions with respect to the FIs terms and conditions to be applied under the ROPs, and to verify the terms and conditions for grant support offered in RES installations. This should also include estimates of the scale of support under FIs and grants in order to avoid (or at least to minimise) opportunistic behaviour of developers and the “crowding-out” effect of OPI&E instruments, should the ROPs support prove more attractive.

The WFOŚiGWs: In addition to ROPs, the WFOŚiGWs historically offered instruments in support of RES installations. In 2014 only 4 of 16 WFOŚiGWs did not offer support for RES for enterprises⁶⁸. Based on the data received from WFOŚiGW⁶⁹, 5 of them allocated financial resources for air protection, including RES for 2015.⁷⁰

As there is no binding demarcation line between the OPI&E and the WFOŚiGWs, RES support via instruments from these two sources may result in unhelpful competition. However, all the WFOŚiGWs responding to the questionnaire are open to providing financial resources to the beneficiaries of OPs in order to cover their own contributions, and to adjust their offer to minimise competition with the ESIF. It is, therefore, recommended that the future scope of RES support from the WFOŚiGWs is considered by all the stakeholders to ensure complementarity with the OPI&E and ROPs.

The NFOŚiGW: support for RES has been offered by the NFOŚiGW over the recent years, including preferential loans with a rebate option of up to 50% since 2009. Currently, no calls for new capacities are being run under this Priority Programme, and it will continue until 2018 when the last projects are implemented. As no new allocations are foreseen under this Programme, it has been mentioned in the *Chapter 5 Lessons Learnt*.

In 2014, the NFOŚiGW started a new RES support programme, called BOCIAN, which offers both preferential and commercial loans for RES installations, as given in the table below, BOCIAN would potentially compete with the OPI&E programme in certain subsectors (see the allocations highlighted in red but, according to the NFOŚiGW, it will be adjusted after the OPI&E support is agreed to avoid the “crowding out” effects on OPI&E resources.

⁶⁸ According to the WFOŚiG Annual Reports.

⁶⁹ Data on the WFOŚiGWs' activities is based on the responses to the Questionnaires provided by 11 out of 16 WFOŚiGWs.

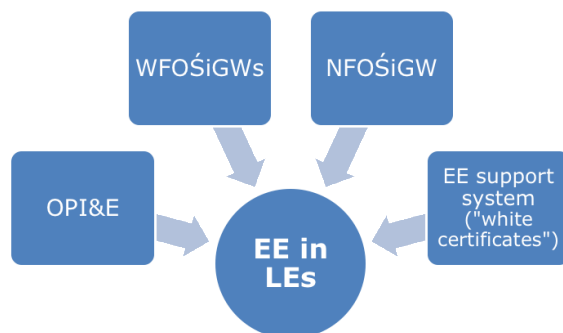
⁷⁰ Financial allocation cannot be indicated, as some of WFOŚiGWs have not divided allocations for certain types of investments under air protection programmes.

Table 22: Investments in RES installations - the NFOŚiGW instruments

Objective	BOCIAN			
Beneficiaries	Enterprises			
Period	2014-2023			
Key requirements	Construction, development and reconstruction of RES installations:			
	No	Type of project	Min capacity	Max capacity
	a)	Wind farms	>40 kWe	3MWe
	b)	Photovoltaic systems	>40 kWp	1 MWp
	c)	Generating of the energy from geothermal waters	5 MWt	20 MWt
	d)	Hydropower plants	300 kW	5 MW
	e)	Generating of the thermal energy using biomass	>300 kWt	20 MWt
	f)	Large solar collectors with heat accumulator	(>300 kWt+3MW)	(2 MWt +20 MWt)
	g)	Generation of electricity and/or the heat using agricultural biogas	>40 kWe	2 MWe
		Installations of agricultural biogas plant in order to introduce it into gas distribution network and direct.		
h)	High-efficiency cogeneration using biomass	>40 kWe	5 MWe	
Note: the interventions that might directly compete with the OPI&E have been highlighted in red.				
Instrument parameters	<ul style="list-style-type: none"> Loan (on preferential terms – state aid) up to 85 % of eligible costs Variable interest rate WIBOR 3 m, but no less than 2 %, term up to 15 years, grace period up to 18 months There is a possibility to get a loan (up to 85% of eligible costs) on market terms (no State aid): the reference rate established in accordance to the Commission Communication regarding Base rates calculated in accordance with the Commission communication of 19.01.2008			
Allocations and absorption	<ul style="list-style-type: none"> Number of continuous calls: 2 (1 ongoing call); Number of applications submitted: in 1st call - 48 applications (25 PV systems, 15 biogas, 4 wind farms, 4 biomass); Value of total loans requested: PLN 320.5 m (including: PLN 87.4 m - PV systems; PLN 141 m - biogas; PLN 14.3 m - wind farms; PLN 77.8 m biomass); No of project supported: 3 (including: 2 - wind farms, 1 - PV systems); The value of total costs of supported projects: PLN 30.8 m (including: PLN 25.2 m - wind farms; PLN 5.6 m - PV systems); Average % of eligible expenditure covered by loans: 45% Total value of loans granted: PLN 11.8 m (including: PLN 7.6 m- wind farms; PLN 4.2 m - PV systems); 			
Effects achieved	Ecological effect planned to be achieved from 3 signed agreements: <ul style="list-style-type: none"> production of electricity 11 174 MWh/year production of the thermal energy 0 GJ/year CO₂ emissions reduction 9 012 Mg/year 			
Key lessons learnt	Due to the ongoing call, there are no key lessons learnt.			
Relevance to OPI&E	Measure 1.1.1			

3.6.3. Energy efficiency in large enterprises

There are four major sources of public funding for EE in large enterprises (LEs), including:



OPI&E: According to the demarcation line between the OPI&E and ROPs, EE in large enterprises is to be supported only at the national level, i.e. under the OPI&E. However, the analysis of the ROPs shows that two regions (Lubelskie and Kujawsko-Pomorskie) indicated large enterprises as eligible applicants for support in energy efficiency, provided they: 1) have the majority shareholding of the regional government, 2) are acting in a sector of regional smart specialisations, or 3) are located in protected areas. To make a system transparent for beneficiaries, and to avoid the overlapping of support, the demarcation line should be respected.

The WFOŚiGWs: Half of the WFOŚiGWs offered support for large enterprises in EE in 2014. According to the data received from 11 WFOŚiGW, almost all of them allocated financial sources to energy efficiency in enterprises for 2015.⁷¹

The NFOŚiGW

Efficient Use of Energy (Efektywne Wykorzystanie Energii – EWE): To date, only one instrument (available since 2011) has been offered by the NFOŚiGW (preferential loans with a grant option for an energy audit) to large enterprises investing in EE. The analysis shows that enterprises were not sufficiently interested in carrying out EE investments resulting from the audits, despite preferential financial conditions of support offered: attractive interest rates and long tenor. Only 14 (including 13 strictly related to EE) investments have been supported (among 27 applications submitted), using PLN 327 m, i.e. only 41% of indicative allocation available. Concerning support for energy audits, some more interest from large enterprises has been identified only recently⁷², most likely due to the legal obligation for energy audits soon to come into force in Poland. It is worth mentioning that EWE was the only instrument available on the market supporting energy audits for large enterprises and stimulating their EE-related actions. The marketing of this instrument has been suspended until the EE & RES ex-ante assessment is finalised and the MA decides on intervention in EE for large enterprises. The instrument will be modified or closed in order not to compete with the OPI&E. Experience with using this instrument has been outlined in *Chapter 5 Lessons learnt*.

E-Kumulator: Under a comprehensive Programme: Support for entrepreneurs in the field of low emission and resource efficient economy a newly created product, E-Kumulator (a loan up to 75% of eligible costs with an option of a capital rebate of up to 15-20% depending on the values of ecological effect achieved), supports investments in the reduction of materials use and emissions of: PM NO_x and SO₂ and CO₂. Even though the respective areas of support are not the same

⁷¹ Financial allocation cannot be indicated, as some of WFOŚiGWs have not divided allocations for certain types of investments under air protection programmes.

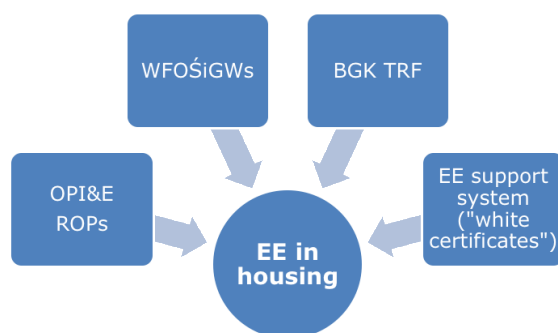
⁷² Over 4 years, only 83 support agreements for audits were signed (from 115 submitted) and 49 audits completed, using PLN 16.5 m, i.e. only 41% of indicative allocation.

in E-Kumulator and the OPI&E, should this instrument prove to be more attractive than the FIs under the OPI&E, it may encourage investments in these areas (where improvements are legally obligatory due to IED and MCP Directives), instead of investments into EE.

Energy efficiency support system: An additional public support tool – which may be considered as potentially competitive or complementary (depending on the final terms of both instruments) to the OPI&E – is a white certificate system, discussed earlier in Section 2.2 *Poland's National Strategies for Energy*. Proposed amendments, such as an application for white certificates instead of a tender procedure, may make the amended system more attractive to entrepreneurs. However, the final assessment could be done only after the adoption of the Act on EE by the Parliament.

3.6.4. Energy efficiency in housing

There are four major sources of public funding for energy efficiency (EE) in housing, including:



Energy efficiency in both multi-residential and public-sector buildings has been supported from various public sources for many years, including national, EU/EIB, EBRD and GIS.

Regional Operational Programs: In the Programming Period 2014-2020, the demarcation line effectively separates support geographically – the multi-residential buildings in the regional ITIs and sub-regional cities should be funded under the OPI&E, whereas the areas outside it fall under the ROPs. However, it is already feasible that not all regions respected the demarcation lines, and some of them (e.g. Małopolskie and Pomorskie) also offer support for areas within the ITIs in their ROPs.

Based on the data available from the ROPs (approved by the EC), on and the draft SZOOPs (available on the MAs websites), the majority of the total allocation to EE in buildings will be spent via FIs, ca. 63%, and only 5% (in Świętokrzyskie and Zachodniopomorskie) as grants. The final decisions on the type of instruments used for the remaining 31% of the total regional allocation will be taken after the MAs finalise their regional ex-ante assessments. If the demarcation line between the OPs is respected, no competition should ensue between the OPI&E and ROPs instruments. However, in the interest of ensuring coherence and efficiency in spending public resources, it seems reasonable to apply the same approach in support of EE in housing across Poland (both at central and regional levels). It should be based on: the acceptable energy class to be achieved, the relative costs of energy savings and payback periods, and on promoting more effective investments.

Table 23: 2014-2020ROP allocations for EE in housing (PLN ths.)

Scheme/instrument	Type of instrument (FI / grant)	Available allocation		Number of households with better energy use class	Type(s) of eligible beneficiaries/final recipients
		Available allocation	Comments		
Dolnośląskie	FI	99,574,675	Allocation for total area, planned to use for housing sector. EU contribution only	2,565	Local governments, their unions, associations and organisational units, entities owned / founded by local governments; housing co-operatives and associations; social building societies; NGOs; PGL, State Forests); churches, religious associations); entities, which implement the FIs
Kujawsko-Pomorskie	FI	62,775,777	Allocation for ITI only and for residential buildings only in a form of loan	2,131	Owners or managers of residential buildings
Lubelskie	FI tbc	107,718,050	Allocation for residential buildings only. The final decision on FI use to be taken when the ex ante assessment is prepared	3,270	Housing co-operatives and home owners associations and public sector
Lubuskie	FI	184,664,875	allocation for FI for residential buildings and public sector, EU and national contribution	2,118	Local governments, owners/managers of buildings
Łódzkie	FI	91,520,000	EU allocation for residential buildings only in FI	2,750	Residential "to be specified"
Małopolskie	FI	92,988,235	EU allocation for residential buildings only in FI	5,800	Housing co-operatives and home owners associations
Mazowieckie	FI	166,375,182	as nd available, value estimated as 10% of allocation for Priority Axe 4	7,300	Housing co-operatives and home owners associations and public sector
Opolskie	FI	58,643,765	as nd available, value estimated as 10% of allocation for Priority Axe 3	nd	public sector excluding housing co-operatives and home owners associations
Podkarpackie	FI tbc	114,870,320	as nd available, value estimated as 10% of allocation for Priority Axe 3	500	Housing co-operatives and home owners associations and public sector
Podlaskie	FI tbc	187,200,000	only EU contribution	nd	Housing co-operatives, home owners associations, facility managers
Pomorskie	FI	56,926,110	allocation for IF under ITI +national contribution	1,280	Owners of buildings
		69,576,354	allocation for IF beyond ITI + national contribution		
Śląskie	FI	591,657,531	allocation for IF under ITI+national contribution in public buildings and housing together - no specific allocation for housing only Allocation only EU contribution	699	Housing co-operatives and home owners associations and public sector
		489,236,072	allocation for IF beyond ITI + national contribution EE in public buildings and housing together - no specific allocation for housing only. Allocation only EU contribution		
Świętokrzyskie	grants	81,873,799	as nd available, value estimated as 10% of allocation for CT4	nd	nd
Warmińsko-Mazurskie	FI tbc	107,551,841	Total allocation for residential buildings only, EU and national contribution. Decision on FI use will be taken when ex ante assessment is prepared	3,000	Housing co-operatives and home owners associations and public sector
Wielkopolskie	FI tbc	443,451,108	in public buildings and housing together - no specific allocation for housing only Allocation - only UE contribution	nd	Housing co-operatives and home owners associations and public sector
Zachodniopomorskie	grants	62,400,000	only EU contribution	568	Housing co-operatives and home owners associations
	grants	20,800,000	only EU contribution	nd	local governments, their unions and associations, TBS, NGOs, partnerships of mentioned entities
Total		711,359,418	within ITI	29,416	
		2,378,444,276	beyond ITI		
		165,073,799	grants (included)		
		960,791,319	FI tbc (included)		
		1,963,938,575	FI confirmed (included)		
		3,089,803,694	in regions		

The WFOŚiGWs: there is no formal demarcation line between the OPI&E and WFOŚiGWs offer. According to data received from the questionnaires, in 2015, 7 out of 11 WFOŚiGWs have been active in providing loans for air protection, including thermomodernisation in housing sector. The largest in term of value contributor to support for thermomodernisation of housing is WFOŚiGW in Katowice.

The majority of WFOŚiGWs provide support (loans with a capital rebate up to 20-40%). They offer preferential loans both to housing cooperatives (*spółdzielnie mieszkaniowe*) and housing associations (*wspólnoty mieszkaniowe*), albeit the vast majority (well over 90%) of the WFOŚiGWs clients are housing cooperatives. This is mainly due to the WFOŚiGW limitations on accepting several types of collateral (for details see *Chapter 5 Lessons learnt*).

It is recommended to continue talks with the WFOŚiGWs about the scope of their future assistance to eliminate the overlapping between FIs for EE in housing, not only under the OPI&E but also under the ROPs. Due to the significant potential demand for EE in housing, merging the assistance offered by the WFOŚiGWs and OPs could be considered. Data analysis suggests that 11 of 16 WFOŚiGWs are interested in using their own sources to complete the ESIF support, with the total of ca. PLN 410 m earmarked for EE loans for housing cooperatives and associations by 2020.

The BGK Thermomodernisation and Renovation Fund: The most visible instrument to support thermomodernisation in Poland is the Thermomodernisation and Renovation Fund (“TRF”), managed by the BGK since 1999. The TRF provides financial support for investment in retrofitting, repair and renovation of residential buildings (including houses, tenement houses and block of flats) through granting premiums for thermomodernisation resulting in energy savings. Premiums are paid as a capital rebate for investment loans provided by commercial banks cooperating with BGK⁷³.

Table 24: The Thermomodernisation and Renovation Fund

	Thermomodernisation premium	Repair premium	Compensation premium
Beneficiaries	Owners or managers of buildings ⁷⁴	Owners or managers of residential buildings, the use of which started before 14 th August 1961 ⁷⁵	Individuals (owners, co-owners and heirs of residential buildings), who became the owners of the buildings no later than 25 th April 2005
Type of investment / investment objective	- reduction of energy consumption for heating and hot water systems; - reduction of the heating costs; - reduction of transmission losses in district heating networks; - total or partial replacement of traditional energy sources and the use of efficient cogeneration.	Retrofitting of buildings, including: - renovation and/or reconstruction of buildings; - replacement of windows; - renovation of balconies, equipping buildings with adequate facilities and equipment. ⁷⁶	Refinancing all or part of the eligible project costs, both financed with the loan as well as from investor's own sources
Eligibility of projects	- performing an energy audit and its positive verification; - submitting a premium application to the crediting bank.	- performing a repair audit and its positive verification; - submitting a premium application to the crediting bank.	
Premium granted	20% of the loan used ⁷⁷	20% of the loan used for the repair project ⁷⁸	A bonus compensation relating to costs carried by the investor

Source: own study on the basis of materials provided by BGK

⁷³ 13 banks cooperate with the BGK under the Thermomodernisation and Renovation Fund, offering their loans for thermomodernisation investments, including: Bank BPH S.A., Bank DNB Polska S.A., Bank Millennium S.A., Bank Ochrony Środowiska S.A., Bank Pekao S.A., Bank Poczty S.A., Bank Polskiej Spółdzielczości S.A., Bank Zachodni WBK S.A., ING Bank Śląski S.A., Krakowski Bank Spółdzielczy, PKO BP S.A., Spółdzielcza Grupa Bankowa - Bank S.A. and Getin Noble Bank.

⁷⁴ The managers of residential buildings, accommodation buildings, public buildings owned by local government and used by them to perform public duties, district heating, local heat source.

⁷⁵ Individuals, community housing, housing associations, TBSs.

⁷⁶ Required to put into residential use, in accordance with the technical specification.

⁷⁷ Not more than 16% of the costs incurred for the project thermomodernisation and twice the expected annual savings in energy costs, determined on the basis of an energy audit.

⁷⁸ Not more than 15% of the project costs.

So far, the TRF granted 32,473⁷⁹ premiums of the total value of PLN 1,774 m, the majority for thermomodernisation premium (89% of all premiums granted and 88% in respect of value – PLN 1,562.7 m).

The TRF has no demarcation line with the OPs, thus it may compete with the FIs, especially as is well-recognised in the market and not very demanding in respect of environmental and energy outputs to be achieved. Every year, approximately 85-93% of the rebate applications receive support, and an annual allocation has been spent.

3.6.5. Waste incineration plants

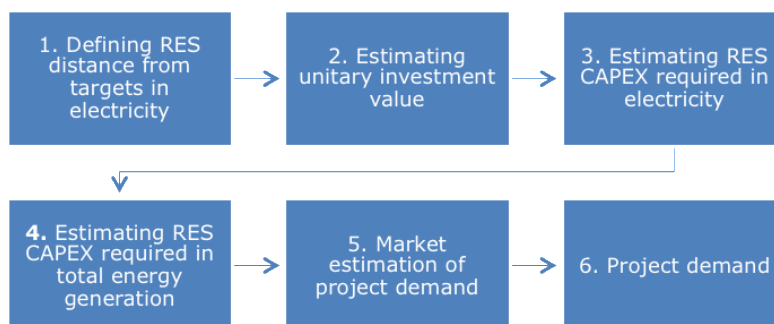
The NFOŚiGW is the only source besides the ESIF that provides funding for waste-to-energy projects. The NFOŚiGW financial support (via its own resources) to waste incineration plants has been mainly related to the six OPI&E 2007-2013 projects. It has provided loans to 5 of 6 beneficiaries of the OPI&E 2007-2013 (without Poznań which used a PPP option). The total value of the preferential loans was PLN 1,051 m (an average loan amounting to 35% of the total eligible costs, with no option for a capital rebate). The NFOŚiGW offered a fixed interest rate of 3.5% per annum (since 2015: WIBOR 3 m, but not less than 2% p.a.) with a tenor up to 15 years.

Apart from this instrument available under the OPI&E 2007-2013, the NFOŚiGW has offered an additional instrument in support of waste incineration plants, funded from its own resources since 2011. It is not linked to the ESIF. According to the information from the NFOŚiGW, there has been no interest in this offer, as all of the waste incineration plants have been built with the ESIF support so far. As in the other cases presented before, the NFOŚiGW will adjust its offer in this area, lest it competes with the ESIF, including the FIs, should they be offered.

3.7. Demand side analysis

3.7.1. Production of energy derived from renewable sources

The needs for investments and project demand in RES have been estimated based on the following methodology:



The need for significant investments in RES seeks to support Poland in achieving its energy reduction and to meet the 15% of energy mix production from renewable sources. The national target for 2020 and detailed objectives were set out in the NAPRES adopted in 2010⁸⁰.

⁷⁹ Reference period 1999-2014.

⁸⁰ „Krajowy plan działania w zakresie energii ze źródeł odnawialnych”, Ministerstwo Gospodarki, Warszawa 2010 (see: http://www.mg.gov.pl/files/upload/12326/KPD_RM.pdf).

Step 1) The distance from the future target, as well as the generation capacities to date, have been used to assess the required investment needs, as follows:

Table 25: Distance to the target in the electricity sector

Production of electricity		2006	2007	2008	2009	2010	2011	2012	2013
1	Total (TWh)	161,7	159,3	155,3	151,7	157,7	163,5	162,1	164,6
2	from RES (TWh)	4,3	5,4	6,6	8,7	10,9	13,1	16,9	17,1
3	Share of RES (%)	2,7	3,4	4,3	5,7	6,9	8,0	10,4	10,4
4	Ratio of energy production to electro-energy use (%)	118,3	114,2	108,1	110,7	109,1	110,8	109,2	109,9
5	Share of RES in total electro-energy use (%)	3,1	3,9	4,6	6,3	7,5	8,9	11,4	11,4
6	Distance from 15% target (GWh)	19 247	17 688	16 152	13 200	11 824	9 976	5 837	5 924
7	Derivative distance in nominal power (MW)	4 394	4 038	3 688	3 014	2 700	2 278	1 333	1 353
8	Required investment (MPLN)	39 015	35 853	32 740	26 756	23 968	20 223	11 832	12 008
9	Required investment (MEUR)	9 754	8 963	8 185	6 689	5 992	5 056	2 958	3 002

Source: BDL database of Central Statistical Office plus own calculations based i.e. on the data provided by the NFOŚiGW^{81,82}

Step 2) Unitary investment value estimation: To estimate the average **unitary investment value** (referred to as UEC – Unitary Electricity CAPEX), it is assumed that the mix of installations and locations for the 2014-2020 Programming Period will not differ materially from the 2007-2013 Programming Period. Therefore, the calculations use the average level of investment expenditure (CAPEX) per 1 MW of nominal electric power for RES installations supported by the NFOŚiGW in the Programming Period 2007-2013 at: $UEC = \text{PLN } 8.878 \text{ M/MW}$.

The estimation takes into account all projects pre-qualified for support by the NFOŚiGW, excluding biogas installations, with a distinctly higher level of CAPEX (See Appendix 1 for the calculations).

Step 3): Estimated required investment in RES in electricity production: The resulting investment needs: the demand for financing necessary to reach the 15% target in electricity production by 2020 was estimated at EUR 3,002 m.

Step 4) Estimated required investment in RES in total energy production: The electricity sector is only one of the segments in the energy mix. In order to take heat production into account as well, the estimated required investment in RES in electricity production at EUR 3,002 m should be multiplied by a factor $Q=4.151$, accounting for the heat and electricity production ratio (See Appendix 3 for the explanation of the factor Q).

Therefore, the total necessary investment in RES installations producing energy until year 2020 is estimated at:

RES investment needs in total energy production= EUR 3,002mx 4.151 = EUR 12,462 m.

This number corresponds well with the estimate of EUR 12.5 bn provided by another ex-ante analysis prepared by the World Bank⁸³.

⁸¹ The values in rows 1, 2 and 4 are the raw data provided by the Central Statistical Office. The investment necessary expressed in PLN (line 8) is expressed in EUR by multiplying PLN values by the factor of 4.

⁸² Estimated required investment (PLN) = NPN (MW) × UEC (PLN/MW), where:
 NPN = Nominal power needed (MW) - estimated from distance target of 5,924 GWh with the assumption of a mix of different types of installations set at a annual production of 4,380 hours;
 UEC = Unitary investment value per MW required to build a renewable source with a nominal capacity of 1 MW – estimated as below.

Alternative scenarios based on projections of future needs

In the forthcoming years, both demand for heat and electricity and their supply will change. The expectations concerning demand vary by stakeholders. Some expect dynamic growth correlated with GDP dynamics, some envisage contraction induced by more energy-effective technologies employed in industry and households.

In addition to changes in demand, the existing capacity of conventional energy will undergo modifications (removal of old installations, modernisation, enlargement, repowering new capacity building). Also future RES installations may diverge significantly from the estimate derived above, based on status-quo analysis. For instance, the projections of MEco assume that between 2015 and 2020 the overall installed power of RES installations would grow from 6.074 MW as of the end of 2015 to 10.335 MW by the end of 2020. This would require a **3.15 times higher increase** of RES installations during the years 2016-2020 than the (status-quo-based) 1.335MW estimated in this Report. Consequently, the estimate of the required CAPEX would have to be over 3 times higher than that estimated above, and amount to over EUR 37bn.

On the other hand, the unitary CAPEX for RES installations falls over the years and their productivity rises, which should result in CAPEX reduction from the levels reported in the Programming Period 2007-2013.

Estimated investment needs will certainly not translate into equal project demand, hence these **estimations have been discussed in Step 5 with the market participants**. The key conclusions from these analyses have been summarised below:

- **Banking market consensus:** The market consensus on the capacity of RES projects, prepared by private developers and discussed with the banks, is at 1.000-2.000 MW over the next 2-3 years.
- **Trial auctions:** Also, auction performed in May 2015⁸⁴ have seen over 140 projects participating, with over 3.700 MW capacity (including 3.550 MW in wind and 123 MW in biomass). The trial auction did not require meeting any preconditions, so it could be assumed that some players participated in the auction to obtain some knowledge on how the market would operate, with projects at the early stage of development. However, the number could be seen as a prediction of potential project pipeline over the next 3 years (until the auctions are run).
- **Regional demand:** The investment potential / potential project demand in RES installations has been identified by the regional Marshall Offices across Poland, and is summarised in the table below.

Table 26: Demand for investment in RES installations

Region	Amount (PLN m)
Zachodniopomorskie	11,154.0
Dolnośląskie	13.9
Lubelskie	34.5
Małopolskie	120
Mazowieckie	150.8
Opolskie	65.4
Śląskie	271.6
Świętokrzyskie	136.3
Wielkopolskie	160
Total	12,107.7

Source: NAPE calculation based on the data from the regional governors (Marshall Offices).

⁸³ „Ex-Ante Assessment of Financial Instruments for the Proposed Operational Programme on Infrastructure and Environment 2014-20 in Selected Sectors” World Bank 2013.

⁸⁴ The trial auction performed by the Polish Wind Association (“PSEW”), PwC and DZP in May 2015.

As these are estimates, these figures should not be treated as a credible assessment of the potential project demand. They should also take into account the demarcation rules between the OPI&E and ROPs, but they could be treated as supporting evidence for creating potential interest in these types of projects.

Estimates from the NFOŚiGW pipeline: The NFOŚiGW database is based on the information obtained by implementing a range of Priority Programmes for RES installations projects, including: 1) "Program for projects in the field of renewable energy sources and cogeneration" (RES 1), 2) "Green Investment Scheme Part 2) Biogas plants and 3) BOCIAN.

Within the aforementioned programmes, the applications for support amounted to PLN 14.6 bn, out of which only 11%, i.e. projects totalling PLN 1.6 bn, received support. According to the NFOŚiGW, the prevailing cause of not receiving support was that projects presented for support were in too-early stages of preparation. The total value of projects, which have not received support, amounts to PLN 13.0 bn. As in the case of regional estimations prepared by the Marshall Offices, the projects that did not receive support should not be treated as a credible estimate of the potential project demand, but rather as supporting evidence for creating potential interest in these types of projects.

Calculation of the investment gap

The investment volume that would bring Poland to the 15% target of RES in energy mix by 2020 has been estimated at EUR 12,098 M (or PLN 48,392 M). How this investment needs will translate into real projects and in consequence into the financing needs will depend on effectiveness and efficiency of implementation of the new Act on RES (in particular efficiency of auctions that will ensure reasonable off-take prices).

Given market experiences from the past, should the RES support system be effective, the pipeline of projects currently under preparation should translate into the projects looking for financing, especially given the ME intended growth in RES installation from 6,074 MW as of the end of 2015 to 10,335 MW by the end of 2020. Therefore, in **Step 6: project demand** has been estimated at EUR 12,098 m.

Given the analysis of potential project demand and supply and adopting the following assumptions:

- Potential project demand has been estimated taking into account two scenarios of project financial structures, differentiated by the amount of own funds / equity required by the project developer (Scenario 1: 70:30 D/E, and Scenario 2: 60:40 D/E);
- Based on a market testing performed among commercial banks, it was assumed that the commercial banks are able to provide funding for well-structured RES projects that benefit from off-take prices established and won in auctions;
- Additionally to commercial debt supply, as the project demand is estimated for all RES, irrespective of project capacities, the available supply was increased by the current allocation for RES in the ROPs which is PLN 3,716 m;
- As envisaged in the market testing, the investment gap relates to insufficient equity in project financial structure. The minimal equity that needs to be made available by developer was assumed at 20% of project investment needs. It is assumed that the rest of equity requirement represents the investment gap and will be addressed by FIs.

The investment gap has been calculated as following:

Table 27: Investment gap in RES (PLN m)

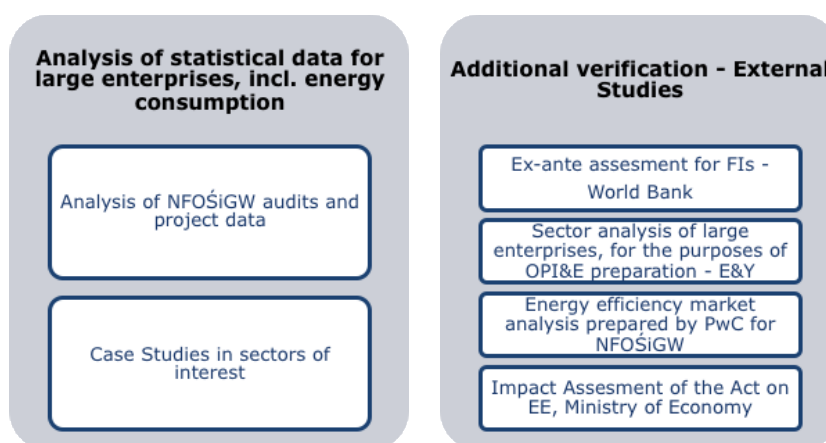
PLN m	Demand			Supply			Gap			OPI&E Allocation	OPI&E Allocation vs. Gap
	Total	Equity	Debt	Total	Equity	Debt	Total	Equity	Debt		
Scenario 1 (D/E 70:30)	48,392	14,518	33,874	43,553	9,678	33,874	4,839	4,839	0	624	-4,215
Scenario 2 (D/E 60:40)	48,392	19,357	29,035	38,714	9,678	29,035	9,678	9,678	0	624	-9,054

As it can be seen, the size of investment gap is heavily dependent on the Scenario adopted (requirements for the financial structure assumed) and even for the more optimistic Scenario 1, the current OPI&E allocation covers less than 13% of an existing investment gap. However, this investment gap estimation assumes that all project sponsors will be interested in subordinated debt however, it might not be the case, especially for the large utilities with very low cost of capital which would effectively decrease the investment gap, however with no auctions and FIs in place yet, this assumption could not be verified at this stage.

3.7.2. Energy efficiency and renewable energy in large enterprises

There are neither statistical data on the needs in EE in enterprises in Poland, nor updated information about the scope and scale of capital projects in the EE space. This presents a challenge in estimating the needs, and in particular the potential demand for FIs.

The approach adopted in this Report has been based on a combination of statistical data analysis and case studies for the selected sectors with the highest energy consumption (and so potentially with the highest investment needs and potential energy savings). The conclusions have been additionally verified against the external data and studies.



Analysis of statistical data

Step 1: Defining the most energy consuming sectors

Based on the data published by the Polish Statistical Office, average energy consumption and a number of large enterprises in each of the industry sector have been estimated. All large enterprises have been narrowed down to individual sectors (see the table below) only for conservative reasons while assessing the investment needs. This does not mean that large enterprises in the service sector should be excluded from the support system, or from being eligible for FIs.

Table 28: Seven most energy consuming industry sectors

	Energy consumption kgoe/euro05 in 2012	Number of large enterprises
Metal	1.15	182
Chemical	1.118	62
Mineral	0.605	91
Paper	0.437	38
Wood	0.394	45
Food	0.204	271
Fuel & energy	no data	54
TOTAL		743

Source: "Efektywność wykorzystania energii 2002-2012", Polish Statistical Office, July 2014

Fuel and energy sectors have not been discussed in the Polish Statistical Office report, but these sectors are also energy-consumption intensive and have a significant share in the industrial output in total. The analysis, therefore, includes these two sectors, too, especially that they have also been the most represented ones in the applications for support for energy audits to the NFOŚiGW through their Priority Programme "Support for entrepreneurs in the field of low-carbon, resource-efficient economy. Thirteen of them also implemented projects (resulting from energy audits) with support of the NFOŚiGW loans.

The sum of the investment needs resulting from 49 energy audits of the group under consideration, performed by the NFOŚiGW, equals to **PLN 1,120.8 m, which gives an average investment CAPEX of PLN 22.9 m**. However, it needs to be noted that the variability of investment CAPEX, as well as other variables (in particular the payback period), varied significantly across the sample. However, assuming the average CAPEX value of EE projects implemented is representative for large enterprises in the six most energy consuming sectors, **the total investment needs for all 743 enterprises in these seven sectors would be estimated at PLN 17,015 m**.

Step 2: Case studies in the sectors of interest

The sectors of key interest have been analysed in more detail, using a case studies approach. They were based on the audits and investment projects funded by the NFOŚiGW, as well as on the additional information from external sources, including sector representatives from industry chambers and individual investors. Six case studies for eight sectors have been prepared - chemical, fuel and energy, mineral, metal, wood and paper and food. A case study for the chemical industry is given in the box below, with the remaining five case studies in Appendix 5.

Figure 29: Chemical sector – case study in energy efficiency

Chemical Sector
<p>The chemical sector is the second most energy-consuming sector in the Polish economy. Its average energy consumption was estimated at 1.118 kgoe/euro05⁸⁵ in 2012⁸⁶. The manufacturing of chemicals and chemical products in 62 large Polish chemical companies, amounting to over PLN 36.8 bn, accounted for approximately 4.9% of total industry production.</p> <ul style="list-style-type: none"> • Interest of the chemical sector in energy efficiency <p>According to the Polish Chamber of Chemical Industries, large enterprises in this sector have already made a lot of investment in EE, but further investments (especially those requiring significant CAPEX and resulting in longer payback periods) are still required, especially due to new legal requirements.</p>

⁸⁵ kgoe = 1/1000 toe i.e. kilogram of oil equivalent (energy unit); euro05 – unit of gross value added expressed in terms of EUR 1 equivalent of computed with the 2005 forex rate.

⁸⁶ „EFEKTYWNOŚĆ WYKORZYSTANIA ENERGII 2012”, Central Statistical Office, serie „Informacje i opracowania statystyczne”, ISSN: 1732-4939, ZWS, 2014. Publication available on www.stat.gov.pl. English version available at <http://www.odysseemure.eu/publications/national-reports/>

- **Energy audits supported by the NFOŚiGW**

The chemical sector was one of the most active partners for the NFOŚiGW, with 14 energy audits verified and supported by the NFOŚiGW (17% of all such audits). The audited areas (and in some cases subsequent investments) covered mainly: technology processes, buildings and internal heating networks.

Key results of 14 audits in the chemical sector:

Estimated total energy savings - 938.6 GWh/year

Estimated total CAPEX – PLN 426.3 m (ca. 40% of total investments value identified from all verified audits)

- **Energy Efficiency investment projects supported by the NFOŚiGW**

Two energy efficiency investment projects have been supported by the NFOŚiGW in the chemical sector, both in large enterprises:

1. **Grupa Azoty Zakłady Chemiczne Police S.A.**

The project covered the modernisation of the ammonia synthesis process. Based on the energy audit of the technological process, the investment covered all the recommended operations.

CAPEX	PLN 155,5 m
NFOŚiGW preferential loan	PLN 90 m
Annual energy use before the investment	3.806 MWh/year
Annual energy savings after the investment	7.35%
	279.6 MWh/year
Annual energy savings on investment in relation to total annual energy consumption	4.32%
Payback period (SPBT)	3 years
CAPEX/Tangible assets	2.24%
CAPEX/Revenues from operations	5.62%

2. **PCC Rokita S.A.**

The project covered the modernisation of the installation of membrane electrolysis - replacement of the mercury cells with the membrane. Based on the energy audit of the technological process, the investment covered all the recommended operations.

CAPEX	PLN 142.2 m
NFOŚiGW preferential loan	PLN 24.1 m
Annual energy use before the investment	414,934 MWh/year
Annual energy savings after the investment	7.83%
	32,498 MWh/year
Annual energy savings on investment in relation to total annual energy consumption	5.40%
Payback period (SPBT)	7 years
CAPEX/Tangible assets	13.66%
CAPEX/Revenues from operations	12.08%

- **Conclusions**

The chemical sector, as one of the most energy-consuming, represents significant potential for EE measures. The sentiment expressed by the industry representatives, combined with the outcomes of the NFOŚiGW energy audits, both show significant interest of the chemical sector in implementing EE measures. This is fully understandable, given that potential energy savings to be achieved are significant in relation to total energy consumption by the companies in the sector (based on two projects supported by the NFOŚiGW – the savings were 4.32% and 5.40%, respectively). The investment projects supported by the NFOŚiGW were significant, ranging from PLN 100 m to 150 m, and both related directly to the modernisation of production processes, with payback periods varying from 3 to 7 years. Based on this information, the investment projects seem economically and financially viable.

If the two projects are taken as representative for the entire chemical sector and for the remaining 34 large enterprises, the potential project demand resulting from the changes in production processes should be between PLN 3.4 – 5.1 bn. It should also be noted that neither of the projects covered all EE needs, but focused only on the improvements related directly to the production process.

Conclusions derived from the case studies in each sector suggest that the body implementing the FIs should take an individual approach to each sector. That body should also promote real case studies of those projects that were successfully implemented to show potential benefits and the scope of recommended investment, tailored to particular industries and their characteristics.

Step 3 – Estimating potential project demand

Potential project demand has been estimated by taking into account the historical success rate of EE projects, based on the NFOŚiGW sample of energy audits. The success rate, based on the number of audits completed (49) vs. the number of projects actually completed (13)⁸⁷, was at 26.5%, which would give a potential project demand of 26.5% * PLN 17,015 m = PLN 4.5 bn (the Minimum Scenario). However, taking into account that the beneficiaries completed projects of higher values which gave them tangible cost savings, the value-weighted success rate was 69%, which would give a potential project demand of 69% * PLN 17,015 m = PLN 11.7 bn (the Maximum Scenario). The above-described methodology of estimating potential project demand is simplified in its nature, given a limited number of projects actually completed under the NFOŚiGW Programme. Therefore, in addition, the Report presents case studies for specific sectors that refer to the key success factors and barriers that may influence the actual project demand in each sector and which should be considered while preparing a detailed implementation strategy and FI product parameters.

Additional verification – External Studies

As part of an additional verification process, the most recent external reports/studies were analysed. As part of their scope, they estimated the level of investments needed for achieving EE in enterprises. As given in table below, the estimated investment values vary significantly across the studies which would suggest a lack of market consensus. The investment needs and project demand estimated here falls, however, within the values cohort estimated in these studies.

Table 30: Estimation of the relevant investments reported in other studies

	Scope of assessment	Value of investment estimated (PLN m)	Assumptions and comments
PwC Report	EE investments in enterprises	38,400	Number of enterprises stable by 2020 (3,200 of large ones); average value of public support for large enterprises - PLN 12 m (average from different support programmes).
EY Report	Indicating sectors potentially eligible for EE investments in large enterprises and access criteria for projects	no estimations on investment	
WB ex ante assessment	Non-specified investments in manufacturing, residential, public and commercial sectors	13,416	EUR 3,225 m, EE in buildings
Impact assessment of Energy Efficiency Act	Impact assessment of new legal provisions on State budget	6,349	The value refers to investments in utilities obliged to energy savings, no estimations on total value of EE investments required to reach the national target, estimated total costs of energy audits in large enterprises PLN 155 m (with estimated number of 2,583).

⁸⁷ It should be noted that 5 out of 13 projects actually carried out were based on the audits performed by the beneficiaries themselves. The success rate refers however to the total number of projects completed, irrespective of the source of the audit performed.

Calculation of the investment gap

Given the analysis of potential project demand and supply and adopting the following assumptions:

- Potential project demand has been estimated taking into account the historical success rate of projects in energy efficiency, for two scenarios at PLN 4,509 m (Minimum Scenario) and PLN 11,740 m (Maximum Scenario);
- It has been assumed that the large enterprises who decide to implement EE measures will contribute 10% from their own funding for the project and these funds will be available to them;
- It has been assumed that commercial debt funding will be available for the projects at a level of 50% of debt funding requirement;

The investment gap has been calculated as following:

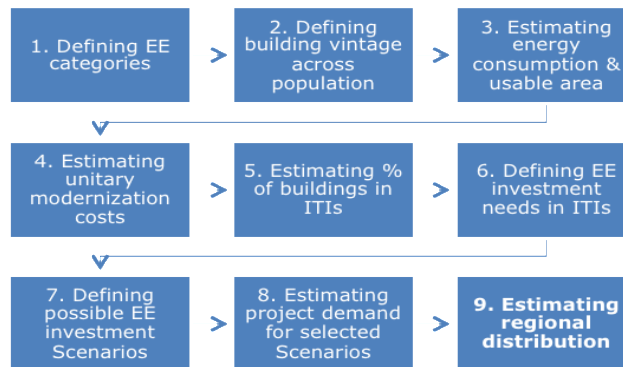
Table 31: Investment gap in EE in large enterprises (PLN m)

PLN m	Demand			Supply			Gap			OPI&E Allocation	OPI&E Allocation vs. Gap
	Total	Equity	Debt	Total	Equity	Debt	Total	Equity	Debt		
Scenario 1 (Minimum)	4,509	451	4,058	2,480	451	2,029	2,029	0	2,029	624	-1,405
Scenario 2 (Maximum)	11,740	1,174	10,566	6,457	1,174	5,283	5,283	0	5,283	624	-4,659

As it can be seen, the size of investment gap is heavily dependent on the Scenario adopted and even for the more conservative Scenario 1 (Minimum), the current OPI&E allocation covers less than 30% of an existing investment gap. It is therefore to conclude that the OPI&E current allocation will require the MA to closely monitor the actual absorption of FIs and potentially adapt the conditions and requirements (e.g. by increasing the requirements on the scale of energy savings or limiting FIs to certain group of enterprises - e.g. mid-caps).

3.7.3. Energy Efficiency in housing

The needs for EE investments in housing, as well as project demand, have been estimated based on the following methodology⁸⁸:



- **Step 1. Defining EE categories across population**

The following assumptions have been used:

1. The EE of a building population can be approximated based on the technologies used for its construction⁸⁹;
2. The vintage of a building typically determines the technology used for its construction. The vintage of a building defines the passage of time from its construction, or from its capital refurbishment, whichever is shorter⁹⁰, to the present time.

It has been assumed that the vintage of the building is strongly correlated with its energy performance, and so it could be used as a proxy to determine energy class.

To estimate the scope of EE improvements needed, an additional modelling step was taken by splitting the vintage categories into eight intervals, each corresponding to an energy class denoted by letters A (best) through H (worst), as given in Table 32⁹¹: Class E stands for the energy demand of a reference building requiring annually 100 kWh/m² of

⁸⁸ Important Note: The estimates given in this Report are believed to be fair enough to prove that: (i) the needs are by far exceeding the allocation, and that (ii) public support is both justified and needed. While building these estimates, however, many assumptions and approximations had to be used. The list of the most significant assumptions and estimates of their potential influence on the exactness of the model results are given in Appendix 4.

All of the assumptions used are supported by the authors' experience. However, the model used can neither be exact nor can it support more detailed analyses. Detailing the implementation plan requires access to a nation-wide electronic database, facilitating: access and analyses of data characterising all of the individual characteristics of each particular building: a ge, location (including meteorological data, e.g. insulation conditions, and administrative data, e.g. an affiliation with a particular administrative unit and a planning unit, e.g. ITI), technology of construction and heat transfer coefficients of the basic elements (walls, roof, basement, windows, doors, ventilation channels), the shape (or at least areas and of external walls, roof, basement and openings), legal status, energy maintenance equipment, and connections to energy carriers and media, the degree of technical wear and tear or at least the consumption rate. The TA facility available under the OPI&E FIs should support a systemic approach to facilitate a best-targeted assistance based on the actual data.

⁸⁹ This is in general true, although of course for each single building many parameters play an important role; two buildings using the same technologies may differ significantly from each other as far as their individual demand for useable energy is concerned, if they have different shapes, are situated in different environments (average outside temperature, winds, insolation), are differently populated; additionally, their energy consumption may differ, depending on the energy sources and technology used.

⁹⁰ The refurbishment of the building usually involves the implementation of the modern technologies in current use.

⁹¹ In Poland, no energy classes are defined by law; for the purpose of this Report the above classification has been adopted as the one best-suited to reflect the conditions of the housing stock across Poland.

energy to maintain standard living conditions. Class A represents near-zero-energy buildings, and Class H represents buildings with the highest-average annual energy consumption exceeding 175 kWh/m²⁹².

- **Step 2. Defining building vintage across population**

When associating the vintage with energy classes typical for buildings of a particular age, the following points were taken into account:

- (i) Class C gives “deep thermomodernisation” although thermomodernisation to lower classes may also be OPI&E-eligible, provided it guarantees a minimum 25% of energy savings⁹³;
- (ii) Increased pressure to minimise energy consumption resulted in the recent construction of some class A and B buildings in Poland only quite recently;
- (iii) Classes A, B and C buildings have minimum influence on low emissions, and their further improvement is not envisaged as a priority.

Therefore, class D was considered as the minimum target class of projects eligible for support under sub-measures 1.3.2 and 1.7.1, whereas both classes A, B and C were excluded from the estimate of demand for support. Class C buildings have, in practice, been put into service since 2011, Class D buildings exist since 2009, and Class E since 1998. Typical buildings built after 1992 were Class F, while those built between 1991 and 1992 were Class G. Older buildings fell under class G.

- **Step 3 Estimating energy consumption and usable area**

Based on previous experience, the individual building energy consumption for each energy class was estimated, as given in the table below. The total usable area of the housing stock was also estimated in each class, based on the number of dwellings built over the last two decades and on the refurbishment works done in the past to maintain the building stock. (See Appendix 4 for the methodology).

Table 32: Assumptions for the building-stock age and energy demand

Energy class		Average primary energy index EP (in kWh/m ² per year)	% in total housing stock	Vintage of construction/ major refurbishment)
C	0.50 < E ≤ 0.75	60	14.2%	Newer than of 2010
D	0.75 < E ≤ 1.00	80	7.0%	From 2009 till 2010
E	1.00 < E ≤ 1.25	105	41.3%	From 1998 till 2008
F	1.25 < E ≤ 1.50	128	21.0%	From 1993 till 1997
G	1.50 < E ≤ 1.75	160	11.2%	From 1991 till 1992
H	1.75 < E	180	5.2%	Older than of 1991

⁹² In reality, there are buildings with much higher energy consumption than even the 300kWh/m² but they are rare. In order to account for such buildings in the estimate, it is assumed for thermomodernisation of class H the consumption far above 200kWh/m²

⁹³ Section 2, p. 30 of SZOOP stipulates that: “Projects to modernise energy performance of buildings must comply with the Regulation of the Minister of Infrastructure of 12 April 2002, On technical conditions to be met by buildings and their location, the amendment of which, providing for an increase in the requirements for energy efficiency, it came into force on January 1, 2014 r.”; the afore-mentioned amendment provides that from 1-st of January 2021 the maximum value of the index of primary energy used for heating, ventilation and DHW heating in case of multifamily building should not exceed in 65 kWh / (m² per year), which is close to the average value of EP index for class C; the same amendment, however, introduces also paragraph 328(1a), establishing weaker requirements for buildings undergoing the thermomodernisation. Therefore, under these conditions also thermomodernisation to classes lower than C can be eligible for OPI&E sub-measures 1.3.2 and 1.7.1.

Based on the above data, and using the average prices of heat and electricity, and the national ratio of use of energy, it can be estimated that the annual use of energy of this building stock is approx. 30.216 TWh, of which the heating costs amount to approx. PLN 3,745 m, while the electricity costs to approx. PLN 6,735 m per annum.

- **Step 4 Estimating unitary modernisation costs**

The unitary⁹⁴ modernisation costs of buildings from all the lower classes up to energy class C were modelled. In a typical situation, the transformation of a building from class D to class C requires installation of some RES equipment, e.g. solar collectors or heat pumps, as buildings of class D are normally already well-insulated and have proper windows and ventilation. However, modernisation methods are numerous, and the investment needed may vary, depending on many individual parameters and solutions. The variation is huge, ranging from 100 PLN/m² to 400 PLN/m². For further calculations, the cost of 200 PLN/m² was used.

Similarly, the transformation from class E to C was modelled through the introduction of solar collectors, replacing the windows and installing induced ventilation with energy recovery. Again this could be substituted by other means. The associated unitary investment was assumed to amount to 300 PLN/m². Transformations from class F, G and H to C were modelled by adding 10, 20 or 30-cm insulation and a plaster finish to the aforementioned measures. The estimated averaged investments per square meter used for the calculation were 372.3, 383.3, and 394.3 PLN/m², respectively. The need for insulating the roof and the basement varies from building to building. Also, the ratio of the external walls area to the total usable area of the building varies strongly between buildings, depending on their shape. Both these issues were accounted for in the model used through the normalised shape parameter of 1.2, with the actual values varying from 0.5 to 2.0.

Further, using the age distribution of the housing stock and the above unitary costs (calculated per square meter of the usable area), the total CAPEX of transforming the building substance to the desired target class C⁹⁵ was estimated.

- **Step 5 Estimating % buildings in ITIs**

The estimation of actual demand has to take into consideration that the OPI&E will support investment only in housing cooperatives and housing associations in the ITIs and sub-regional cities. As in the current ITI strategies there are no such estimates, a demographic key was used to determine the need in the areas eligible for the OPI&E. The key used the percentage share of the population living in the ITIs. The numbers of dwellings, their useful area and the percentage of population living in it in particular regions, are all given in Table 33 below. Significant differences can be observed. Only 17% of the Podkarpackie region lives in the Rzeszów ITI, while 61 % of the Śląskie region lives in the Katowice ITI. The weighted (with population) average of the percentage of population living in the regional ITI for the entire country is 41%.

⁹⁴ Relating to 1 m² of a typical building.

⁹⁵ The selection of class C as the target energy class for the residential buildings stock is an important step toward a consistent definition of the infrastructural policy, which may facilitate the creation of a functional definition of deep thermomodernisation that could be used in the selection and appraisal processes of projects applying for support under sub-measures 1.3.2 and 1.7.1 of the OPI&E.

Table 33: Share of buildings in ITIs (%)

REGIONS/VOIVODSHIPS	TABL. 1 DWELLING STOCKS IN 2013	Population in ITI of main cities	% of population in ITI	DWELLING STOCK OWNED BY HOUSING COOPERATIVES AND CONDOMINIUMS IN 2013		Estimate of ITI Dwelling Stock Owned by Housing Coops and Condominiums in 2013	
	Population	Population	%	Dwellings	Useful floor area of dwellings in m ²	Dwellings	Useful floor area of dwellings in m ²
Lódzkie	2 513 093	1 116 000	44%	387 851	18 527 360	172 235	8 227 524
Mazowieckie	5 316 840	2 654 000	50%	947 977	48 233 245	473 200	24 076 525
Małopolskie	3 360 581	1 034 142	31%	358 606	17 534 495	110 353	5 395 840
Śląskie	4 599 447	2 784 951	61%	726 580	36 515 458	439 942	22 109 997
Lubelskie	2 156 150	547 784	25%	185 851	9 413 926	47 217	2 391 669
Podkarpackie	2 129 294	358 929	17%	146 898	7 243 723	24 762	1 221 054
Podlaskie	1 194 965	411 531	34%	141 389	7 050 703	48 693	2 428 174
Świętokrzyskie	1 268 239	350 774	28%	120 968	5 884 608	33 458	1 627 586
Lubuskie	1 021 470	341 065	33%	158 378	8 118 561	52 882	2 710 757
Wielkopolskie	3 467 016	1 014 194	29%	380 840	19 586 023	111 406	5 729 430
Zachodniopomorskie	1 718 861	686 900	40%	305 255	16 043 265	121 988	6 411 291
Dolnośląskie	2 909 997	725 219	25%	532 863	27 594 841	132 798	6 877 087
Opolskie	1 004 416	337 398	34%	124 591	6 566 990	41 852	2 205 948
Kujawsko-pomorskie	2 092 564	852 705	41%	256 133	12 594 192	104 372	5 132 044
Pomorskie	2 295 811	1 260 092	55%	358 554	18 511 527	196 798	10 160 343
Warmińsko-mazurskie	1 446 915	447 589	31%	216 615	10 864 178	67 008	3 360 727
TOTAL	38 495 659	14 923 273	39%	5 349 349	270 283 095	2 073 735	104 778 266

- **Step 6 Estimating EE investment needs in ITIs**

Applying the model built for all of the housing cooperatives and housing associations in Poland to its share located in the ITIs only, the following investment needs were estimated.

Table 34: Estimated CAPEX necessary to transform the buildings to class C in ITIs

Upgrade scope	Investment	Energy savings	Energy savings	CO ₂ reduction	Cost reduction	SPBT without support
	PLN m	%	GWh annually	Mg annually	PLN m /annually	years
H → C	2,719	67%	689,607	441,129	239	11.4
G → C	5,695	63%	1,238,137	792,014	429	13.3
F → C	10,333	53%	1,572,759	1,006,066	545	18.9
E → C	16,374	43%	2,046,756	1,309,273	710	23.1
D → C	1,841	25%	153,387	98,119	53	34.6
Total upgrade effect	36,962	19%	5,700,646	3,646,601	1,977	18.7

- **Step 7: Defining possible EE investment Scenarios**

An actual project demand should be estimated in relation to the most efficient approach vis-à-vis the scope of an EE project (in principle, what class should be targeted, taking into account the balance of energy savings possible to achieve, necessary CAPEX, and the available resources – public and private), and based on the best practice from other countries, it was assumed that:

- Investments leading to rent increases for the public would not be undertaken, thus the energy cost savings have to cover all the required CAPEX during the payback period;
- The payback period should not exceed 10 years;
- The expenditure and costs that cannot be covered with energy savings within the period of 10 years should be covered by the grant support available under the OPI&E.

In order to assess the overall amount of required grant support, it was assumed that the interest rate of commercial financing would be 5% p.a. Under this assumption, and based on the above support principles, the following calculation can be made for three different scenarios (Scenario 1 Comprehensive – target class C, Scenario 2 Average – target class D, Scenario 3 Moderate - target class E).

Scenario 1 Comprehensive

Scenario 1 assumes that buildings from all categories below C will be upgraded to category C. This approach will most probably ensure the most comprehensive thermomodernisation, but will be, most probably, not financially viable. The support intensity for this approach would have to be very high (on average: 72%) and the total support required exceeds PLN 26bn, with the allocation of less than a PLN 1 bn. This would mean that, on average, only 4% of total project demand could be satisfied.

Table 35: Scenario 1 Comprehensive (upgrade to Class C) – key parameters

Upgrade scope	Investment	Energy savings	Energy savings	CO ₂ reduction	Cost reduction	SPBT without support	Financing costs	Required support	Required support
	PLN m	%	GWh annually	Mg annually	PLN m /annually	years	% of investment	% of investment	PLN m
H --> C	2,719	67%	689,607	441,129	239	11.4	28%	37%	1,007
G --> C	5,695	63%	1,238,137	792,014	429	13.3	33%	50%	2,825
F --> C	10,333	53%	1,572,759	1,006,066	545	18.9	47%	72%	7,462
E --> C	16,374	43%	2,046,756	1,309,273	710	23.1	58%	82%	13,369
D --> C	1,841	25%	153,387	98,119	53	34.6	86%	96%	1,769
Total upgrade effect	36,962	19%	5,700,646	3,646,601	1,977	18.7	47%	72%	26,431

Source: own calculations⁹⁶

Scenario 2 Average

Given the financial constraints, Scenario 2 could concentrate support on upgrading buildings to class D rather than to class C, with an additional requirement of at least 25% energy savings to be achieved. As described earlier on in this section, in line with paragraph 328(1a) of the amended Regulation of the Minister of Infrastructure of 12 April 2002, “On technical conditions to be met by buildings and their location” not only class C buildings, but also lower energy classes buildings could satisfy the conditions set for the buildings undergoing thermal modernisation. Because of this, similar estimates are given for transformations of buildings of lower EE to class D.

Table 36: Scenario 2 Average (upgrade to Class D) – key parameters

Upgrade scope	Investment	Energy savings	Energy savings	CO ₂ reduction	cost reduction	SPBT without support	Financing costs	Required support	Required support
	PLN m	%	GWh annually	Mg annually	PLN m annually	years	% of investment	% of investment	PLN m
H --> D	2,173	56%	574,673	367,608	199	10.9	27%	33%	723
G --> D	4,519	50%	990,510	633,611	344	13.2	33%	49%	2,213
F --> D	6,282	38%	1,110,183	710,164	385	16.3	41%	64%	4,002
E --> D	6,896	24%	1,137,087	727,374	394	17.5	44%	68%	4,676
Total upgrade effect	19,870	13%	3,812,452	2,438,757	1,322	15.0	38%	58%	11,615

⁹⁶ whereas the “Required support” is calculated as the following:

Required support = Loan + Interests – Savings

Intensity = $1 + (0.5 \cdot IR - \text{Annual Savings}/\text{Investment}) \cdot \text{PBT}$ where:

Intensity – sum of all forms of support divided by the total investment,

IR – annual interest rate

PBT – payback time (in years).

This strategy is recommended for implementation, given the very limited financial resources, the very significant investment needs, and the affordability issues at stake. The investment need for upgrading to class D is 46% lower than upgrading to class C, and the support required is by 66% lower. At the same time, the drop in energy savings is only 33%.

Scenario 3 Moderate

Scenario 3 offers a further reduction in target class, focusing support on upgrading buildings to class E rather than to class C or D, with an additional requirement of at least 25% energy savings to be achieved.

Table 37: Scenario 3 Moderate (upgrade to Class E) – key parameters

Upgrade scope	Investment	Energy savings	Energy savings	CO ₂ reduction	Cost reduction	SPBT without support	Financing costs	Required support	Required support
	PLN m	%	GWh annually	Mg annually	PLN m annually	years	% of investment	% of investment	PLN m
H --> E	1,609	42%	431,005	275,706	149	10.8	27%	32%	516
G --> E	3,303	34%	680,975	435,608	236	14.0	35%	53%	1,767
F --> E	4,163	18%	531,963	340,287	184	22.6	56%	81%	3,359
E --> E	0	0%	-	-	-	n.a.	n.a.	n.a.	n.a.
D --> D	0	0%	-	-	-	n.a.	n.a.	n.a.	n.a.
Total upgrade effect	9,075	5%	1,643,943	1,051,601	570	15.9	40%	62%	5,642

Investment associated with this strategy is by 54% lower than for the strategy upgrading to Class D, while the support required drop by 51%. This is because the energy savings are relatively smaller. However, Scenario 3 will facilitate the thermomodernisation of the highest number of buildings.

- **Step 9: Estimating regional distribution**

The estimated distribution of investment and support between the regions for all three possible Scenarios (upgrading to Class C, D and E, respectively) is given in the table below.

Table 38: Required investment and support by region for the three Scenarios

REGION	Scenario 1		Scenario 2		Scenario 3	
	Investment required	Support required	Investment required	Support required	Investment required	Support required
	PLN m	PLN m	PLN m	PLN m	PLN m	PLN m
Łódzkie	2,763	1,976	1,485	868	678	422
Mazowieckie	8,085	5,782	4,346	2,541	1,985	1,234
Małopolskie	1,812	1,296	974	569	445	277
Śląskie	7,425	5,309	3,991	2,333	1,823	1,133
Lubelskie	803	574	432	252	197	123
Podkarpackie	410	293	220	129	101	63
Podlaskie	815	583	438	256	200	124
Świętokrzyskie	547	391	294	172	134	83
Lubuskie	910	651	489	286	224	139
Wielkopolskie	1,924	1,376	1,034	605	472	294
Zachodniopomorskie	2,153	1,540	1,157	677	529	329
Dolnośląskie	2,309	1,651	1,241	726	567	353
Opolskie	741	530	398	233	182	113
Kujawsko-Pomorskie	1,723	1,232	926	542	423	263
Pomorskie	3,412	2,440	1,834	1,072	838	521
Warmińsko-Mazurskie	1,129	807	607	355	277	172
TOTAL	36,962	26,431	19,870	11,615	9,075	5,642

- **Alternative approaches**

Apart from selecting one of the scenarios described above, additional criteria restricting support to a subset of the building stock under consideration could be envisaged. Spatial, demographical or buildings-category-based criteria could be used. For instance, focusing on Class H buildings could bring together cost-efficiency and the need to support the most vulnerable social groups.

Alternatively, the MA could decide to increase the assumed payback period from 10 years. It would be in line with approaches adopted in other countries (e.g. the maximum payback period in the Lithuania Fund for Energy Efficient Housing Renovation is up to 20 years – see *Chapter 5 Lessons learnt*). The tables below show how the increase in accepted payback periods would impact the level of required support for Scenario 2. Increasing the payback period to 15 years would reduce the level of required support from PLN 11,615 m to PLN 7,487 m, and to 20 years – to PLN 3,360 m. These approaches would however need to be discussed in detail with the banks to align the OPI&E support with loan tenors acceptable to the banks.

Table 39: Scenario 2 Average (upgrade to Class D) – key parameters with 15-year PBT

Upgrade scope	Investment	energy savings	energy savings	CO2 reduction	cost reduction	SPBT without support	financing cost	Required support	Required support
	PLN m	%	GWh annually	Mg annually	PLN m annually	years	% of investment	% of investment	PLN m
H → D	2,173	56%	574,673	367,608	199	10.9	27%	0%	-1
G → D	4,519	50%	990,510	633,611	344	13.2	33%	23%	1,060
F → D	6,282	38%	1,110,183	710,164	385	16.3	41%	46%	2,862
E → D	6,896	24%	1,137,087	727,374	394	17.5	44%	52%	3,566
All above transformations together	19,870	13%	3,812,452	2,438,757	1,322	15.0	38%	38%	7,487

Table 40: Scenario 2 Average (upgrade to Class D) – key parameters with 20-year PBT

Upgrade scope	Investment	energy savings	energy savings	CO2 reduction	cost reduction	SPBT without support	financing cost	Required support	Required support
	PLN m	%	GWh annually	Mg annually	PLN m annually	years	% of investment	% of investment	PLN m
H → D	2,173	56%	574,673	367,608	199	10.9	27%	-33%	-726
G → D	4,519	50%	990,510	633,611	344	13.2	33%	-2%	-92
F → D	6,282	38%	1,110,183	710,164	385	16.3	41%	27%	1,722
E → D	6,896	24%	1,137,087	727,374	394	17.5	44%	36%	2,456
All above transformations together	19,870	13%	3,812,452	2,438,757	1,322	15.0	38%	17%	3,360

Calculation of the investment gap

Given the analysis of potential project demand and supply and adopting the following assumptions:

- The investment needs have been analysed for the three Scenarios (Comprehensive, Average and Moderate) depending on the target energy class to be achieved and accounted to PLN 36,962 m, PLN 26,431 m and PLN 19,870 m respectively;
- Based on the market sounding, including consultations with the WFOŚiGWs, BGK and housing representatives, there is a certain percentage of tenants that will not be interested in EE projects other than if they were fully funded with grants - for various reasons, including: lack of interest or motivation to perform investments, lack of credit worthiness, procedural and ownership problems. The share of such tenants was estimated at approximately 20-50% for housing associations. As the housing cooperatives

were historically more active in initiating EE projects than housing associations that were questioned, an average interest rate to perform EE projects among housing associations and cooperatives together has been assumed at 75%;⁹⁷

- Given that practically the entire allocations of funds available as the BGK premiums and WFOŚiGWs' instruments were fully absorbed in the past, it has been assumed that all housing associations and cooperatives that initiate EE projects will seek financing;
- It has been assumed an own contribution from both housing associations and cooperatives at 10%. This is in line (or lower) with the current requirements imposed by banks under the TRF funding or WFOŚiGWs financing (mostly through the financial resources accumulated at so called renovation fund maintained by each housing association and cooperative;
- The available supply has been estimated using two sources: 1) commercial banks – it has been assumed that the banks will extend the loans at an average historical level of the loans granted under the TRF which amounted to PLN 8,658 m since 1999, i.e. at PLN 3,463 m over the next 5 years and 2) the indicative amount of funding of PLN 410 m declared by 11 WFOŚiGWs questioned as part of market sounding. Therefore, the total supply available for the OPI&E has been estimated at PLN 3,873 m. This is a conservative assumption that may be verified in the future should the FIs effectively attract commercial funding as in accordance to BGK, the cap on TRF thermomodernisation premium effectively limited demand for projects and supply of commercial bank loans;

the investment gap has been calculated as following:

Table 41: Investment gap in EE in housing (PLN m)

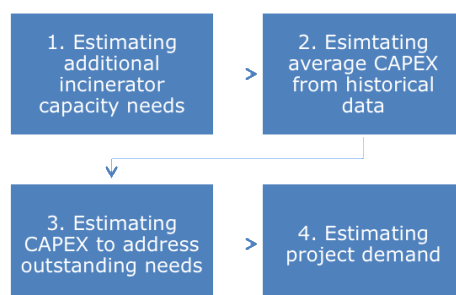
PLN m	Demand			Supply			Gap			OPI&E Allocation	OPI&E Allocation vs. Gap
	Total	Equity	Debt	Total	Equity	Debt	Total	Equity	Debt		
Scenario 1 (Comprehensive)	27,722	2,772	24,949	6,645	2,772	3,873	21,076	0	21,076	1,065	-20,011
Scenario 2 (Average)	14,903	1,490	13,412	5,363	1,490	3,873	9,539	0	9,539	1,065	-8,474
Scenario 3 (Moderate)	6,806	681	6,126	4,554	681	3,873	2,252	0	2,252	1,065	-1,187

As it can be seen, the size of investment gap is heavily dependent on the Scenario adopted and even for the least ambitious Scenario 3 (Moderate), the OPI&E allocation covers less than 50% of an existing investment gap. It is therefore to conclude that the OPI&E current allocation will require the MA to decide on further targeting or limiting the intervention scope, either by adopting less ambitious energy efficiency targets (e.g. Scenario 3), extending the tenor of project payback (e.g. to 15 years) or focusing on specific building classes (e.g. classes H and G as the ones that require thermomodernisation most and where the energy savings effects are strongest) or target specific beneficiaries groups (e.g. housing associations in urban area endangered by fuel poverty).

⁹⁷ National Chamber of Property Managers (Krajowa Izba Gospodarowania Nieruchomościami) – Questionnaire conducted in June 2015 among housing associations.

3.7.4. Waste management

The needs for investment in waste management, as well as project demand, have been estimated with the following methodology:



Step 1: Estimating expected additional incineration capacity needs: Given the lack of updated N&VWMPs including the Investment Plans, the additional waste incineration plants capacity estimates take account of both Poland's commitments under the EU and national laws and the projected municipal waste production.

Table 42: Estimation of additional capacity in waste incineration by 2020

Municipal waste	Volume (Mg/year)	Justification/source of data
Municipal waste volume (million Mg/year)	10.0	total estimated volume of municipal waste at the same level till 2020 – ca. 10 million Mg/year - according to Statistical Office (assumed increased consumption of inhabitants but balanced by more intensive prevention-actions)
Selectively collected (at least 50% of waste)	5.0	at least 50% of municipal waste selectively collected and prepared for reuse and recycling (according to Directive 2008/98/EC)
MBP (ca. 20% of waste)	2.0	60% of municipal waste not-landfilled by the end of 2020; decrease of quantity of municipal biodegradable waste directed to landfills so that the landfill does not cover more than 35% in 2020 of the mass of the waste generated in 1995
Incinerated (up to 30% of waste), including:	3.0	estimated maximum volume allowing for waste management according to directives requirements
<i>6 POIE incinerators</i>	<i>1.0</i>	planned treatment capacity of the incinerators supported under the OPI&E2007-2013 (according to ME data - 0.974 Mg/year)
<i>co-firing in industry</i>	<i>1.2</i>	estimated industry capacity for co-firing of municipal waste by 2020 (according to ME data (at present the level of 0,5 Mg/year with expected increase of co-firing capacity, esp. in cement sector) by 2020
<i>additional capacity needed</i>	<i>0.8</i>	estimated maximum treatment capacity for the new incinerators in Poland

* it should be noted that the preliminary estimates of municipal waste collected in 2014, as announced by the MEnv, are at 11 million tonnes. However, these data will be subject to further verification by the Ministry, and the present estimation was based on more conservative data, which was based on the historical data verified by the MEnv.

The estimated additional waste incineration capacity at the level of ca. 800,000 Mg/year in total is slightly less conservative than the estimation presented in the OPI&E (650,000 Mg/year)⁹⁸. These calculations have been discussed with the MEnv to ascertain if they are in line with their assumptions.

It must be underlined that the estimated capacity of waste incineration plants will have to be verified when the VWMPs including Investment Plans are prepared and the latter approved by the Minister of Environment (by mid-2016).

⁹⁸ The estimation was based on the following estimations: 3 most matured projects (Gdańsk – 200 Mg/year, Olsztyn – 100 Mg/year and Łódź – 200mg/year and 150Mg/year for 3 other types of WM plants.

In Step 2, potential investment needs have been estimated on the basis of additional incineration capacity needed (800,000 Mg/year) and the **average CAPEX of the six waste incineration plants currently under construction estimated**. Despite significant differences in CAPEX for Mg of capacity (the lowest of 2,901 and the highest of 4,743, with the average cost of 3,953 PLN/tonne of annual capacity), these data are the most reliable to estimate future project demand for outstanding waste incineration capacity needed.

Table 43: Average CAPEX of currently developed waste incineration plants

	Location	Capacity Mg/year	CAPEX PLN	CAPEX / Mg
1	Bydgosko–Toruński Metropolitan Area	180,000	522,101,801	2,901
2	City of Kraków	220,000	826,905,444	3,759
3	City of Konin	94,000	381,884,263	4,063
4	Szczecin Metropolitan Area	150,000	711,415,215	4,743
5	Białystok Agglomeration	120,000	482,996,029	4,025
6	City of Poznań	210,000	925,051,957	4,405
TOTAL		974,000	3,850,354,710	
AVERAGE CAPEX / Mg				3,953
ESTIMATED CAPEX - 800,000 Mg				3,162,509,002

Step 3: the CAPEX for the outstanding 800,000 tonnes p.a. incinerating capacities needed is estimated at PLN 3.16 bn. It has been assumed that given that the investment needs will be rigorously assessed in the VWMP and the Investment Plans, the revised investment needs will translate into actual project demand (Step 4). This assumption is backed by the current track record of six waste incineration plants all of which will most probably reach the operational phase as envisaged. However, given the concentration of investment in few locations (4-5 locations planned) there is a risk of potential delays or project cancelations that may negatively impact an actual project demand.

Calculation of the investment gap

Given the analysis of potential project demand and supply and adopting the following assumptions:

- The project demand of PLN 3,160 m will be covered by a combination of EU grants and private funding using PPP model;
- Grant funding will amount to 50% of eligible costs and the rest will ultimately be covered by private funding (20% equity and 80% debt), with additional stand-by loan extended by the NFOŚiGW – for details please refer to Chapter 4 FIs description - assessment of value added and additional public and private resources to be raised by FIs;

the investment gap has been calculated as following:

Table 44: Investment gap in waste sector (PLN m)

PLN m	Demand			Supply			Gap			OPI&E Allocation	OPI&E Allocation vs. Gap
	Total	Equity	Debt	Total	Equity	Debt	Total	Equity	Debt		
Scenario 1	3,160						0	0	0		
Redirected OPI&E to grants - 50% eligible costs	1,232										1,232
With 50% grant funding	1,928	386	1,542	1,928	386	1,542	0	0	0	3,880	2,648

Therefore, it is recommended to allocate the part of the current allocation the IP 6i of PLN 3,880 m to grants in a total indicative amount PLN 1,232 m (or EUR 308 m) to support the waste incineration plants. This indicative financial allocation to grants should be verified on an individual project basis, taking into account local conditions, especially the affordability of services for inhabitants. The remaining funds should be used within the IP 6i for other eligible types of investments in waste management, justified according to the new (to be adopted in 2016) VWMPs and Investment Plans. Any allocation surplus, if available after verification in 2016, could be potentially reallocated to projects within EE or RES (under IP 4i, 4ii and/or 4iii), subject to the justified needs in future.

In addition to the calculations presented above, the MA may consider applying a flat rate for net-revenue generating projects in the solid waste sector - for the whole sector, a subsector or a type of an operation (as an option indicated in the Art. 61 of the CPR and defined in its Annex V). In that case, the maximum intensity of support under 2.2 Measure would be 68% (with the following assumptions applied: 1) a flat rate for the solid waste sector at the level of 20% which gives a financial gap indicator at the level of 80% and 2) the maximum intensity of support under 2.2. Measure – 85%). It gives the indicative allocation for incinerators under 2.2 Measure required at the level of EUR 418.88 m (i.e. EUR 616 m (eligible costs)*68%). It must be emphasised that the amount of aid granted per each project should be calculated on an individual basis, taking into account the State aid rules.

It should be stressed that the *Guidelines of the MID for the preparation of investment projects, including revenue generating projects and hybrid projects*⁹⁹, impose a requirement to calculate financial viability parameters for all projects, for which a feasibility study / other documents under the ESIF rules need to be prepared. It means in practice that the key calculations of a financial gap have to be performed by potential beneficiaries anyway.

3.8. Investment gap assessment

Taking into account the analyses performed for each sector, the below calculation of investment gap can be concluded:

⁹⁹http://www.mir.gov.pl/media/5193/NOWE_Wytyczne_PG_D_PH_2014_2020_podpisane.pdf

Table 45: Investment gaps per sector of interest (PLN m)

RES											
PLN m	Demand			Supply			Gap			OPI&E Allocation	OPI&E Allocation vs. Gap
	Total	Equity	Debt	Total	Equity	Debt	Total	Equity	Debt		
Scenario 1 (D/E 70:30)	48,392	14,518	33,874	43,553	9,678	33,874	4,839	4,839	0	624	-4,215
Scenario 2 (D/E 60:40)	48,392	19,357	29,035	38,714	9,678	29,035	9,678	9,678	0	624	-9,054
Energy Efficiency in Large Enterprises											
PLN m	Demand			Supply			Gap			OPI&E Allocation	OPI&E Allocation vs. Gap
	Total	Equity	Debt	Total	Equity	Debt	Total	Equity	Debt		
Scenario 1 (Minimum)	4,509	451	4,058	2,480	451	2,029	2,029	0	2,029	624	-1,405
Scenario 2 (Maximum)	11,740	1,174	10,566	6,457	1,174	5,283	5,283	0	5,283	624	-4,659
Energy Efficiency in Housing											
PLN m	Demand			Supply			Gap			OPI&E Allocation	OPI&E Allocation vs. Gap
	Total	Equity	Debt	Total	Equity	Debt	Total	Equity	Debt		
Scenario 1 (Comprehensive)	27,722	2,772	24,949	6,645	2,772	3,873	21,076	0	21,076	1,065	-20,011
Scenario 2 (Average)	14,903	1,490	13,412	5,363	1,490	3,873	9,539	0	9,539	1,065	-8,474
Scenario 3 (Moderate)	6,806	681	6,126	4,554	681	3,873	2,252	0	2,252	1,065	-1,187
Waste											
PLN m	Demand			Supply			Gap			OPI&E Allocation	OPI&E Allocation vs. Gap
	Total	Equity	Debt	Total	Equity	Debt	Total	Equity	Debt		
Scenario 1	3,160						0	0	0		
Redirected OPI&E to grants - 50% eligible costs	1,232										1,232
With 50% grant funding	1,928	386	1,542	1,928	386	1,542	0	0	0	3,880	2,648

Source: own calculations

4. FIS DESCRIPTION - ASSESSMENT OF VALUE ADDED AND ADDITIONAL PUBLIC AND PRIVATE RESOURCES TO BE RAISED BY FIS

The following Chapter 4 discusses in detail FIS recommended for each sector separately. It follows the same structure for each sector, covering the following areas, as articulated in Article 37 (2) of the CPR as the required context of ex-ante assessment:

- assessment of the value added of the FI, consistency with other forms of public intervention in the same market;
- estimation of additional public and private resources to be potentially raised by the FI, including assessment of preferential remuneration (when needed);
- financial products and target groups; and
- possible State aid implications.

The scope of this Chapter 4 covers the thematic scope of Chapter 4 *Assessment of the value added of the financial instrument* and Chapter 5 *Additional public and private resources to be potentially raised by the financial instrument* as proposed in the *Ex-ante assessment methodology for financial instruments in the 2014-2020 programming period*¹⁰⁰. All the details concerning the FIS proposed for each sector have been presented separately in one chapter to facilitate the understanding of the key characteristics and the value added of the solutions proposed for each sector.

The FI description in each sector covers:

-
1. Summary of the conclusions
 2. Value added of the FIS
 3. Target market
 4. Target Final Recipients
 5. Financial products - with envisaged financial structure
 6. Risks and advantage related to the implementation of the FI
 7. Leverage calculation
 8. Implementation options
 9. Envisaged combinations with grant support
 10. State aid implications

4.1. FI description for RES

4.1.1. Summary of the conclusions

Need for the RES projects to meet the EU targets

As indicated in *Chapter 3 An analysis of market failures, sub-optimal investment situations, and investment needs*, the need for the new RES projects in order to achieve a 15% threshold of the renewable energy in Poland's energy mix was

¹⁰⁰Version 1.2 - April 2014

estimated at ca. EUR 3bn. With the new RES support system coming effectively into force from 2016, it is expected that the market (that is currently on hold due to the interim period) is able to mobilise new projects with a potential capacity between GW 1 to GW 2 in the next 2 – 3 years.

Due to the country's strategy to provide support to the most competitive RES technologies, it is assumed (including approach presented by the MEco) that in relation to investments relevant to the OPI&E, the on-shore wind and biomass installations will predominantly be capable of winning auctions. Only such auction winning projects will enjoy adequate support to achieve bankability and should be eligible for the FIs support.

Availability of debt financing and high equity levels

Based on our experience and several consultations with the banks active in the Polish RES market, it appears that debt financing should be made available for the auction winning projects. However, most of the banks are still waiting with their in-depth analysis of the new RES support system until secondary legislation is adopted.

Nevertheless, they are already indicating that although the price risk will be eliminated by the new RES support system, debt financing in the project finance model may require significant levels of equity capital (between 30 % to 40% of equity depending on the project) due to in particular, productivity risk (with substantial fines for not-reaching levels of productivity quoted in the auction) and potentially, relatively low bidding prices which will ensure winning the auction.

Such relatively high equity levels may constitute a problem for smaller and midsize sponsors (developers) who intend to finance their projects in the project finance formula. This will not be the case for large sponsors, in particular, for four Polish utility companies (Energa, Enea, Tauron and PGE) who are able to obtain an on-balance sheet financing for their investments on very competitive conditions (e.g. 5 yrs. bonds issued in 2015 by ENEA were subject to a margin of 0.85% over 6M WIBOR, 5 yrs. bonds issued in 2013 by PGE were subject to a margin of 0.7% over WIBOR and 4.5 yrs. bonds issued in 2015 by Tauron were subject to a margin of 0.90% over 6M WIBOR¹⁰¹) providing them with a competitive advantage in auctions over small and midsize sponsors due to very low cost of capital.

A subordinated loan has been selected as a more appropriate instrument to address the identified market gap of high equity requirement of commercial banks, also ensuring an attractive private funding leverage of 8x.

Use of subordinated loans in RES project financing

The equity contribution required by the banks in a project finance model can be provided as a simple equity or a combination of equity and subordinated loans. Such subordinated loans can be provided either by the project's sponsors or by external investors. Use of subordinated debt to supplement equity is a standard approach in project finance that facilitates an optimal project structure and tax benefits. For the banks, it is of key importance that a subordinated loan is subordinated to their senior loans in case of any project's distress. If properly structured, a subordinated loan can be treated by senior lenders (banks) as a quasi-equity and effectively reduce equity levels to be provided by the project's sponsors to meet banks' requirements. Subordinated debt is a standard instrument used by sponsors and accepted by banks in project finance structures for RES projects in Poland. Subordinated debt (mezzanine) instruments have also been widely used in financing low-carbon projects and other capital-intensive investments in Europe and around the world. The multilateral institutions that heavily promote this form of finance include: the EIB (including LGGT or RSFF instruments and many more), EIF (acting as a fund of funds for several

¹⁰¹ www.gpwcatalyst.pl

mezzanine funds in various sectors and countries (e.g. the Mezzanine Facility for Growth) and the EBRD (investing in several mezzanine funds across their countries of operations). The London Green Fund offers recent experience in using subordinated instruments in the EE sector. Also, most equity players funded by public or quasi-public funds, such as the Marguerite Fund or Polskie Inwestycje Rozwojowe, offer mezzanine instruments alongside their equity instruments.

Additionally to subordinated loans, the guarantee option has been discussed with commercial banks. Based on the information received in the interviews, as well as the experience in the market, guarantee instruments, while addressing certain issues (esp. risk aversion of commercial lenders in relation to lower than forecasted wind or solar power, lower efficiency of technology used or construction risk), would pose challenges referring to:

- 1) The size of the FI guarantee facility vs. coverage to be offered to ease banks' funding requirements (e.g. to allow banks to apply a zero-risk weight under Basel III to justify guarantee pricing);
- 2) Leverage - given the very small allocation for RES (EUR 150 m vs. EUR 3bn estimated investment needs), the FI would need to seek a way of leveraging¹⁰² the allocation to make a real difference in the market,
- 3) Timing – actions required to increase the leverage would be quite challenging in Poland, and also time consuming. Given that the auctions will start early 2016 and most probably will last only for 3 years, this could be a risky approach and therefore, has not been recommended.

4.1.2. Value added of the FIs

Introduction of the FIs which will address the issue of relatively high levels of equity required by the banks for debt financing of the RES projects in the project finance model will improve financial viability of such projects. This will apply in particular, to projects developed by the small and midsize sponsors, and will help such sponsors to provide more competitive bids at auctions. It is important to note that the support with FIs should be offered only up to a certain level of equity requirement and should still require a relatively substantial financial participation of project sponsors / developers to ensure adequate risk mitigation for FIs. In this Report, such a private developer's (other investors') participation is assumed at 20%. A significantly lower developers' contribution may create additional risks due to potential insufficient interest in a project success or higher developers' risk appetite which impose additional risk on an FI.

4.1.3. Target market

FIs should be available for RES projects within the OPI&E demarcation capacities, located in Poland without any geographical restrictions or limitations.

4.1.4. Target Final Recipients

FIs should be available to all project companies winning auctions and seeking debt financing in the project finance formula. Such scoping of the group of addressees will partially help to address the issue of insufficient equity available to small and midsize sponsors.

¹⁰² One possibility would be to layer several tranches to maximise the leverage factor with a view to having potentially a larger guarantee facility, e.g. a guarantee facility with an equity piece which acts a first-loss coverage (OPI&E), a second layer that acts as a second-loss (funded by other financial institutions, including domestic, and/or international financial institutions), and a third layer which acts as third-loss and which could be funded by e.g. the insurance market.

Furthermore, it needs to be emphasised that support discussed in this proposed investment strategy refers solely to RES projects eligible under the OPI&E (in particular projects with a capacity above 5 MW for wind and biomass). Any ESIF support for projects below that threshold is available at the ROPs level. As the RES projects are scalable (e.g. it is possible to divide a project of 10 MW into two projects of 5 MW), there might be potential competition between the FIs discussed in this proposed investment strategy and other forms of FIs or grants provided in the ROPs.

4.1.5. Financial products

As discussed in *Chapter 3 An analysis of market failures, sub-optimal investment situations, and investment needs*, the market analysis proved an adequate interest and willingness of the banks in debt financing, provided significant levels of equity capital are made available by the developers. This was a barrier in the past for smaller and midsize developers, and will remain a challenge under the new RES support regime. Therefore, in order to address the insufficient equity levels, an FI in the form of a subordinated loan could be introduced.

In order to define the detailed parameters of the proposed FI, additional detailed analyses need to be performed that have been outlined in *Section 6.7 Next steps to be undertaken to define details of the proposed financial products*.

If Polish Authorities intend to diversify the existing policy on RES support (with the strategic objective of purchasing energy from the most financially viable RES via an auction system), an alternative approach could be contemplated; including the one envisaged in *Chapter 4.1.10 An alternative implementation option presented by Polish Authorities*. It could, for example, include support for immature RES technologies, apart from the ones that will most likely win the auctions (i.e. wind and biomass), including hydroelectric power plants (above 5 MW)¹⁰³ and biogas. Should the MA decide to follow this route, instead of, or in parallel with, the FI proposed in this Report, additional analyses should be carried out to identify the most suitable instruments to best address other possible RES policy objectives.

Structure of a RES project with FI

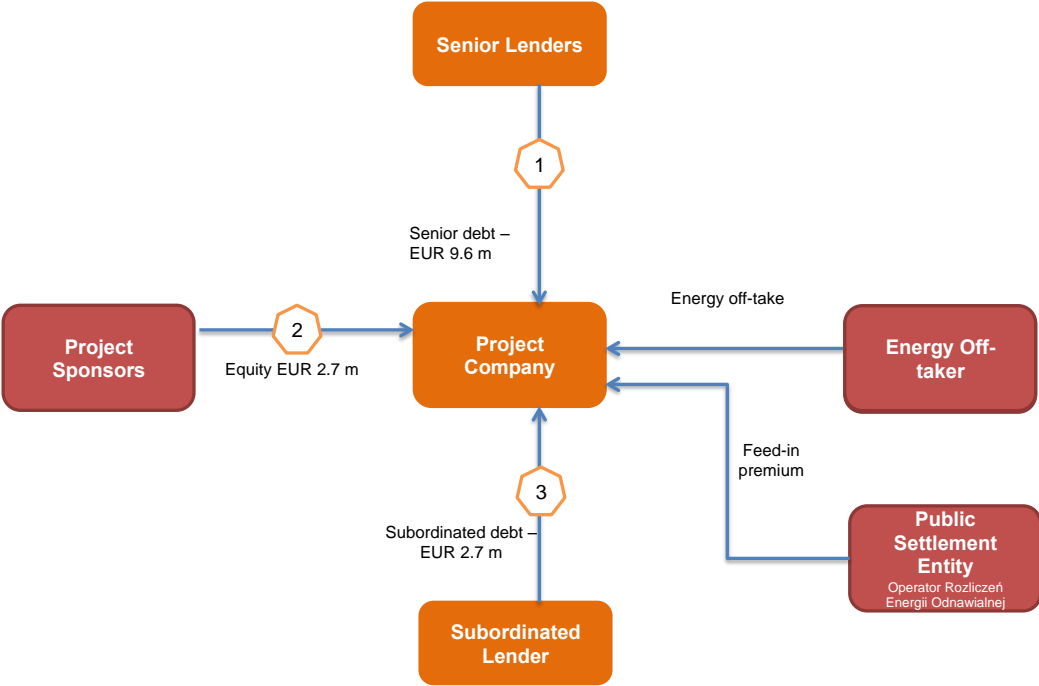
Taking into account the project finance model, a project company dedicated solely to a RES project and set up by its sponsors will carry out that project. The RES project will be financed in part with (1) debt financing provided by banks/bondholders as senior lenders (senior debt) and (2) equity capital provided by the sponsors (such equity capital to be subordinated to senior debt). Depending on the requirements of the senior lenders, the level of required equity will usually be within a range of 20% to 50% depending on risks involved in a specific RES project and RES support mechanism. Taking into account the IDIs with the commercial lenders and their conservative approach, such level may be closer to the higher end of that threshold. As such, to address the elevated levels of the equity capital that may not be available on the market in particular for the small and midsize sponsors, an FI subordinated loan provided to the project companies and treated as equity by the senior lenders, should help to close that gap.

In order for such FI subordinated loan to be treated as equity capital by the senior lenders, the FI subordinated loan will need to be subordinated in terms of repayment priority towards the senior debt.

The following graph presents a potential simplified financial structure of a RES project with the approximate CAPEX of EUR 16 m and a 60% to 40% debt to equity ratio required by the senior lenders.

¹⁰³ Plants of this kind are excluded from the auction system, but are eligible under the OPI&E.

Figure 46:RES – simplified financial structure



Pursuant to item (1), senior lenders will extend a senior loan to a project company in the amount of EUR 9.6m (60% of the total financing). In addition, the requirement for equity capital will be split in equal parts between the equity provided by the sponsors (item (2)) and quasi-equity provided by way of an FI subordinated loan (item (3)).

The financial structure presented above was used as a proxy in order to estimate potential demand for FIs and should not be viewed as definitive. The financial structure will vary on a project-by-project basis, depending on its characteristics and its risk profile.

Subordination of the FIs

As mentioned above, the FI subordinated loans will need to be structurally and contractually subordinated to the senior debt. Consequently, any repayment of the FI subordinated loan or payment of interest incurred on such loan will only be possible at a specific point in time (e.g. once or twice a year) and will be subject to conditions imposed by the senior lenders (including e.g. no existing payment default on senior debt, no existing breach of financial covenants, completion of the construction period, fully funded reserve accounts, etc.). The senior lenders will closely monitor such permitted distribution mechanism.

In order to maintain interest of the sponsors in the FI subordinated loans, repayment of the FI subordinated loans should be proportional to the repayment of the equity capital provided by such sponsors (i.e. if all conditions to a permitted distribution imposed by the senior lenders are met, any sums available to a project company for such distribution should be used proportionally for a repayment/payment of interest of the FI subordinated loan and for a repayment/payment of interest/dividend payment on the account of equity capital provided by the sponsors).

In the case of insolvency of a project company, the FI subordinated loan should have a lower repayment priority than the senior debt, however, a higher repayment priority than the equity provided by the sponsors.

Pricing of the FI subordinated loans

Pricing of the FI subordinated loans should be higher than the cost of senior debt but substantially lower than the pricing of equity provided by the sponsors. Taking into account that the pricing of the senior debt as estimated by the commercial banks during the IDIs will be in a range of 200 – 300 bps plus WIBOR and that the expected IRR on equity capital is estimated at 12% (as expected to be used within the new RES system to calculate a reference price for a purpose of auctions), pricing for the FI subordinated loan could be set at a level of 100 bps above the senior debt margin (i.e. WIBOR plus 300 – 400 bps) – so called subordination premium.

Such pricing should assure that the FI subordinated loans remain competitive to the alternative sources of equity capital which may either not be available at all for a given RES project or may be significantly more expensive.

Ratio of the FI subordinated loan to the total amount of equity

The FI subordinated loans should not be used as a full substitute for the equity capital provided by the sponsors as this could promote projects which would otherwise not be bankable due to the excessive risk level. In addition, the senior lenders could negatively view such an approach, as they usually require the actual sponsors to have their own equity capital at risk.

Hence, for the purpose of availability of the FI subordinated loan, it would be necessary to indicate a minimum level of equity capital to be provided by the sponsors in any RES project. This minimum level could be set within the range of 15% to 20%.

Duration of the FI subordinated loan

Duration of the FI subordinated loans should correspond to the term of the senior debt (up to 15 years).

Security package

Repayment of the FI subordinated loans should be secured substantially with a security package similar to that of the senior debt, including pledges over bank accounts and assets of the project company. However, such security package should have a lower ranking than the security package securing senior debt (e.g. a second ranking registered pledge over turbines).

Promise to grant an FI subordinated loan

In order to enable the sponsors to include pricing of the FI subordinated loans into their bids at auctions, it is necessary to prepare standard terms and conditions for such loans with standard documentation to be used for the RES projects that have won auctions.

The clarity of such terms and conditions and certainty of receiving a benefit of the FI subordinated loans will be a key factor for a success or failure of these FI instruments. It is also important that an institution entrusted with granting of FI subordinated loans has sufficient capacity and experience in funding the RES projects to keep the granting process sufficiently streamlined and predictable.

4.1.6. Risks and advantages related to the implementation of the FI

A SWOT analysis of the implementation of the FI subordinated loans has been presented in the graph below.

Figure 47: SWOT analysis - RES



Important Note: a good coordination of the FI subordinated loans with the auction system will be of critical importance to their successful implementation. The works should be initialled with immediate effect given that the first auctions will be run in the first quarter of 2016 and the FI subordinated loans require detailed planning in coordination with the URE, MEco, banking sector as well as careful considerations of State aid implication and actions to be taken thereupon.

4.1.7. Leverage

Conservative Scenario

Given the parameters of FI subordinated debt, and assuming a rather conservative scenario of required D/E ratio of 60:40, the FI subordinated debt leverage has been presented in the table below.

Table 48: Private funding FI leverage for RES – Conservative Scenario

	EUR m
FI subordinated loan	150

Equity provided by private developer (min. 20% of CAPEX)	150
Senior debt provided by commercial lenders	600
FI leverage	5x

Basic Scenario

Given the parameters of FI subordinated debt, and assuming more aggressive (but still realistic) financial structure scenario of required D/E ratio of 70:30, FI subordinated debt leverage has been presented in the table below.

Table 49: Private funding FI leverage for RES – Basic Scenario

		EUR M
1	FI subordinated loan	150
2	Equity provided by private developer (min. 20% of CAPEX)	300
3	Senior debt provided by commercial lenders	1,050
	FI leverage¹⁰⁴	8x

4.1.8. Implementation options

For details, please refer to *Chapter 6 Proposed investment and implementation strategy* and to *Appendix 7 Alternative implementation options*.

As mentioned in *Section 4.7 Promise to grant an FI subordinated loan*, for a successful implementation of the FI subordinated loans, it is crucial that a granting institution has sufficient capacity and experience in both funding and financial analysis of the RES projects in the project finance model (preferably, under Polish and English law as often used for senior debt documentation) as well as in assessing energy and ecological effects.

The implementation should start as soon as possible, due to the constraints resulting from the planned timing of the auctions that should start in early 2016 and continue throughout 2017 and 2018. It is necessary to closely monitor the effectiveness of FI after each auction to identify potential adjustments needed.

4.1.9. Envisaged combination with grant support

No combination of the FI subordinated loans with EU grants has been envisaged. As mentioned above, the RES support system based on auctions should provide sufficient stability to the system by addressing the price risk. Consequently, there should be enough interest from the commercial banks to provide debt financing to the RES projects on competitive terms. At the same time, the FI subordinated loans should help to cover a gap with insufficient equity in particular, for small and medium-size project sponsors. Consequently, even without the grant funding, the RES projects are capable of being financed and produce sufficient return to incentivise the project sponsors to implement such projects. This is based on the assumption that the RES support system will be efficient enough to discourage “underbidding”.

Finally, project sponsors and commercial banks have or should be able to obtain in the market sufficient expertise concerning implementation of the RES projects and no grants to cover cost of technical assistance are required.

¹⁰⁴ The leverage is calculated as A) the sum of the amount of ESIF funding (position 1) and of the additional public and private resources raised (position 3) divided by B) the nominal amount of the ESIF contribution (position 1).

4.1.10. An alternative implementation option presented by Polish Authorities

A summary of an alternative implementation option, which has been developed by the MEco, based on the consultations with the MA and other stakeholders, has been presented in this Report as an alternative approach proposed by Polish Authorities. Due to the non-restrictive nature of this ex-ante study, the MA may consider the use of options alternative to the ones recommended in this Report, including the one presented here.

Financial product description

If the Polish authorities intend to diversify the existing policy on RES support, the MA could offer support both to technologies that win an auction and to immature technologies that are not able to cope on the market without public support. The technologies that win and auction are usually mature with relatively high profitability and replicability, therefore, it appears that commercial loans would constitute a sufficient measure of support.

For projects outside the auction system, preferential loans combined with grants or repayable assistance could potentially be an adequate supporting measure. This instrument could also be addressed at hydroelectric power plants (above 5 MW), which are not covered by the auction system, but are eligible under the OPI&E. A shared allocation of funds between preferential and commercial instruments could be considered.

Intensity of support

The intensity of support (a preferential loan combined with a grant) or a commercial loan (financed by the ESIF) would have to be analysed in detail to ensure sufficient support, but also to offer levels of return that are in line with the RES support system in general, and that would guarantee an adequate equity involvement from the developers, which would be necessary to manage project risks for the OPI&E instruments.

The FI loan tenor suggested in this option could be up to 15 years to match the RES support offered via the auctions.

4.2. FI description for EE in large enterprises

4.2.1. Summary of the conclusions

Need for the EE projects in large enterprises

As indicated in *Chapter 3 An analysis of market failures, sub-optimal investment situations, and investment needs*, although it appears that there is a large potential for investment to improve EE in large enterprises, little interest in public support has been expressed so far for that type of projects. In the last 5 years, the NFOŚiGW has provided preferential loans only to 13 investment projects improving EE in the sector of large enterprises.

Different reasons have been given in this respect, including lack of awareness and capacity of large enterprises to assess potential energy savings, difficulties in the implementation of such projects and disbelief of the management of large enterprises that such investments may bring significant savings. In addition, it should be noted that EE is sometimes a part of larger investments carried out in large enterprises and they are not classified by them as purely energy savings projects.

However, it is expected that with the implementation of the EED into Polish law, new statutory obligations will be imposed on large enterprises relating to EE (including an obligation to carry out energy audits every four years) and an

existing support system of “white certificates” will be improved (the current system has not been widely used by large enterprises). Together with severe sanctions provided in a draft Act on EE prepared by the Ministry of Economy for non-compliance with the provisions of that law (e.g. up to 5% of turnover for non-compliance with the energy audit obligation), it is believed that this should incentivise large enterprises to invest into the EE projects. However, as legislative process on the law transposing the EED into the Polish law has not been completed yet, it is not possible to assess whether the proposed measures will sufficiently stimulate investments leading to the improvement of the EE in large enterprises.

Consequently, it is necessary to monitor the legislative work on the new Act on EE in order to ensure that the EU funds allocated to the EE investments in large enterprises are aligned with the support system of “white certificates” in order to avoid competition between those two support systems.

Furthermore, it is necessary to stress here that the current version of the draft Act on EE promotes the EE projects with short payback periods. This may not be sufficient to promote more substantial investments in the energy efficiency measures, which may require longer payback periods. As such, the EU support should promote investments with more substantial EE effect, including projects with longer payback periods.

Corporate financing

Based on our experience and consultations with the banks active in the Polish market and industry chambers and associations, it appears that most of the investments carried out by large enterprises are financed on-balance sheet, using either corporate financing provided by banks, or through issuance of corporate bonds, or from own resources. As such, it is expected that projects improving energy efficiency will also be financed in this way. It is unlikely that the project finance model will be used, in particular as the commercial banks do not have sufficient experience and capacity in assessing energy efficiency effects of specific projects.

4.2.2. Value added of the FIs

Introduction of the preferential FIs should provide additional incentive for large enterprises to implement the EE projects. FI funding should also lower the cost of compliance with the new obligations to be imposed by the law incorporating EED into Polish law, which may otherwise put an additional pressure on such enterprises. In addition, allocation of funds to technical assistance should enable large enterprises to obtain sufficient external advice as to measures available for improvement of EE and as to methods of implementation of such measures.

4.2.3. Target market

FIs should be available to large enterprises carrying out projects improving EE in their facilities located in Poland without any geographical restrictions or limitations. Despite lack of formal limitations on sectors eligibility, it is believed that the sectors with the highest energy consumption are more likely to benefit from FIs, especially taking into account potential energy savings they can achieve in relation to their total cost base.

4.2.4. Target Final Recipients

FIs should be available to all large enterprises carrying out projects improving EE, apart from the sectors excluded by State aid regulations. Funds available as technical assistance should be provided to large enterprises implementing the EE projects (i.e. they must not be available to cover cost of the obligatory energy audits).

4.2.5. Financial products

In order to incentivise large enterprises to carry out projects improving EE, an FI in the form of a preferential loan may be introduced (FI preferential loan).

In addition, to address a knowledge and experience gap in the implementation of the EE projects, up to 5% of the allocation for such EE projects should be provided in the form of technical assistance to cover environmental studies in respect of EE investment projects (other than costs of obligatory energy audits).

In order to define the detailed parameters of the proposed FI, additional detailed analyses need to be performed that have been presented in Section 6.7 Next steps to be undertaken to define details of the proposed financial products.

The additional analyses would examine if there is sufficient evidence for more intense support, and they could lead to modifications of the FIs proposed in this Report.

As also indicated in Section 6.7, further in-depth analyses and consultations to define the detailed parameters of the proposed FI could result in an increased intensity of support for specific types of EE projects considered by large enterprises (e.g. specific processes, sectors or types of enterprises – e.g. mid-caps) that may not be financially viable using only the FI proposed. Increased intensity of support should strongly correspond to the achieved energy savings and relate to the payback period. It could be reflected in the form of an additional non-repayable part of support (FI loan + EU grant or FI loan + repayable assistance). The additional analyses would examine if there is sufficient evidence for more intense support, and if so, they could lead to modifications of the FIs proposed in this Report.

Structure of an EE project with FIs

Taking into account the current practice, large enterprises will predominantly carry out their EE projects on-balance sheet. Consequently, the EE projects will be financed in part with (1) own funds of large enterprises and (2) FI preferential loans.

In addition, it should also be possible to mobilise debt financing from commercial banks or bondholders to co-finance the EE projects. Such debt financing should be obligatory for EE projects with CAPEX above a certain threshold (PLN 50 m has been assumed) in order to ensure certain leverage of the EU funds with commercial lending. Alternatively, a cap of a maximum 45% of eligible costs for the projects above PLN 50m could be introduced.

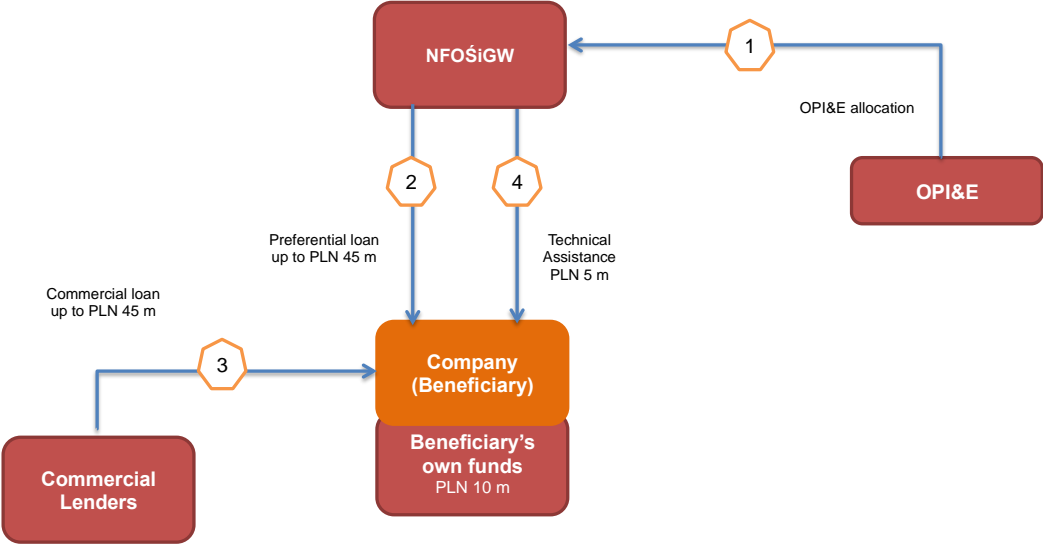
Further, the ratios of own funds and commercial debt to the amount of FI preferential loans may depend on certain characteristics of the EE project – such characteristics (including energy savings and payback periods) to be developed further with the implementing authority.

As EE projects are often a part of larger investment plans, it is also necessary to ascertain that the FI preferential loans are available only to finance eligible costs (or a part of the eligible cost, if the eligible cost is above PLN 50 m, as indicated above).

Finally, the FI preferential loans should not be available to such EE projects where the envisaged CAPEX is over-proportionally high in comparison to the level of the expected energy savings. Detailed solutions should be discussed with the MA/IB (e.g. by financing the costs only to that level of energy savings which is believed to be optimal for a sector or type of investment).

The following graph presents a potential simplified financial structure of an EE project with CAPEX of PLN 100 m and a 10% own funds provided by a large enterprise and the remaining 90% provided with external debt financing, with a 50%:50% split between commercial debt and the FI preferential loan. In addition, there are funds available for technical assistance up to 5% of CAPEX.

Figure 50: EE in large enterprises – simplified financial structure



Pursuant to item (2), the NFOŚiGW as a financial intermediary will extend an FI preferential loan to a large enterprise (final recipient) in the amount of PLN 45m (45% of the total CAPEX). The EE project will be co-financed with a loan from commercial banks (3) in the amount of PLN 45m (45% of the total CAPEX) and with own funds of the large enterprise in the amount of PLN 10m (10% of the total CAPEX). The large enterprise will also receive up to PLN 5 m as technical assistance (4) for environmental studies (excluding obligatory energy audits) directly related to the EE investment.

The financial structure presented above was used as a proxy in order to estimate potential demand for FIs and should not be viewed as definitive. The financial structure will vary on a project-by-project basis, depending on its characteristics and its risk profile.

Pricing of the FI preferential loans

Pricing of the FI preferential loans should depend on the payback periods and expected levels of the energy savings (with minimum energy savings set as a requirement).

The pricing as a percentage of a market rate available for a specific enterprise should take into account the pricing for a corporate substantially unsecured loan available on the commercial debt market to that enterprise (such pricing will usually take into account the rating of such enterprise, its leverage ratio, etc.).

An impact of the expected level of energy savings on the pricing should be discussed with the MA/IB.

The financial intermediary should not charge any arrangement fees and commitment fees.

The above pricing setting mechanism should assure that the FI preferential loans provide an incentive for EE projects with a more substantial energy savings effect coupled with longer payback periods. This will also close the gap with a

current proposal of the support mechanism of “white certificates” that gives preference to projects with shorter payback periods.

Duration of the FI preferential loans

Duration of the FI preferential loans should correspond to the payback periods of the specific EE projects. The EE projects with a payback period over a certain period of time (assumed at 15 years – to be confirmed individually for each sector) should not be eligible for the FI preferential loans.

Security package

An approach to the scope of the security package to be put in place to secure repayment of the FI preferential loans should depend on the specific EE project and the large enterprise in question. In particular, any set and inflexible rules in this respect should be avoided. For large enterprises with an investment grade rating, the security package should be limited predominantly to promissory notes. If clearly identifiable, a pledge could be established over a new asset of substantial value that is included in the EE project as a measure to improve energy efficiency.

4.2.6. Risks and advantages related to the implementation

A SWOT analysis of the implementation of the FI preferential loans has been presented in the chart below.

Figure 51:EE in large enterprises – SWOT



4.2.7. Leverage

Given the parameters of the FI preferential loans, and assuming that 50% of EE projects will have a CAPEX value over PLN 50 m, and that a split between commercial debt and the FI preferential loans in such projects will be at the 50% to 50% level, the leverage of the FI preferential loans has been presented in the table below.

Table 52: Funding envisaged for the EE projects for large enterprises

		EUR m
1	FI preferential loans	150
2	Equity provided by investor (10% of CAPEX)	25
3	Commercial debt	75
	FI leverage¹⁰⁵	1.5x

4.2.8. Implementation options

For details, please refer to *Chapter 6 Proposed investment and implementation strategy* and to *Appendix 7 Alternative implementation options*.

For a successful implementation of the FI preferential loans, it is crucial that a financial intermediary has sufficient capacity and experience in funding of EE projects and assessing the energy savings and ecological effects. Taking into account that the NFOŚiGW has provided preferential loans from its own funds to EE projects in the past and that it has supported a large number of energy audits in large enterprises, it appears to be the most qualified institution to manage the FI preferential loans in the Programming Period 2014-2020 for EE projects in large enterprises. Alternatively, an implementation option for part of the funds, targeting specifically the mid-caps, with the EIB acting as a fund of funds manager could be considered. For details, see Appendix 7.

4.2.9. Envisaged combination with grant support

No combination of the FI preferential loans with EU grants has been envisaged at this stage of the assessment; except for grants for technical assistance.

The FI preferential loans combined with new obligations to be imposed in the implementation measures of the EED should constitute a material incentive for large enterprises to implement EE projects. Preferential cost of funding should enable such enterprises to service the FI preferential loans and generate substantial savings in the energy consumption. Accordingly, there is no need for grant funding in this sector.

In addition, there is sufficient liquidity throughout the banking sector for corporate lending to large enterprises, which should be available to them for projects above a PLN 50 m threshold (proposed to be imposed by the terms and conditions of the FI preferential loans). As indicated above, commercial banks are less interested in small-scale projects, as they do not currently possess sufficient experience and expertise in risk assessment of EE projects.

Finally, due to the information and capacity gap relating to the EE sector in particular, that exists within the decision-making corporate bodies, grants for technical assistance should help to raise awareness of potential advantages of

¹⁰⁵ The leverage is calculated as A) the sum of the amount of ESIF funding (position 1) and of the additional public and private resources raised (position 3) divided by B) the nominal amount of the ESIF contribution (position 1).

such projects (including covering the cost of different environmental studies or design and technical documentation) and as such, they should be combined with the FI preferential loans.

Should further in-depth analyses and consultations to define the detailed parameters of the proposed FI result in a need to introduce an increased intensity of support for specific types of EE projects considered by large enterprises, an option of combining FIs with grants could be envisaged.

4.3. FI description for EE in housing

4.3.1. Summary of the conclusions

Need for EE projects in the housing sector

As indicated in *Chapter 3 An analysis of market failures, sub-optimal investment situations, and investment needs*, it has been estimated that the needs for EE projects in housing in the ITIs and sub-regional cities have been estimated to exceed by far the available allocation of the EU funds (EUR 256 m¹⁰⁶). In addition, such allocation is limited to the housing stock managed solely by the housing cooperatives and housing associations (i.e. standalone owners are not eligible).

Different scenarios have been reviewed in order to assess what level of improvement in the energy characteristics of the housing stock, in terms of energy classes (A to H), would bring satisfactory energy savings when compared to the available level of funds for EE projects in the housing sector (including public support). In addition and based on best practices, it has been assumed that EE projects in housing should (i) not result in rent increases for the tenants, (ii) have payback periods not exceeding 10 years and (iii) obtain EU grants to cover any excess CAPEX for the implementation of such EE projects over the expected (and specified) energy savings calculated for a 10-year period.

Based on calculations carried out for three (3) scenarios (scenario 1 Comprehensive – target class C, scenario 2 Average – target class D and, scenario C Moderate – target class E) and taking into account financial constraints and affordability issues, upgrading the housing stock to class D (scenario 2 Average), with a minimum requirement of 25% of the energy savings to be achieved, is considered as the optimum class target¹⁰⁷.

The investment needs for upgrading to class D are 46% lower than to class C and the support of public funds required is lower by 66%. At the same time, the energy savings are only 33% lower when compared with scenario 1 Comprehensive. If, however, scenario 1 Comprehensive were selected, approximately only 4% of the total project demand could be satisfied (taking into account that the total support needed exceeds PLN 26 bn and the EU allocation at approximately PLN 1 bn). The selection of scenario 3 Moderate would enable the broadest intervention measured by numbers of buildings to undergo thermomodernisation. However, the estimated energy savings would be relatively low.

In addition to selecting one of the above scenarios, certain additional eligibility criteria could be considered including spatial, demographical or based on buildings category (e.g. focusing on class H buildings could bring together both cost-efficiency and the need for supporting the poorest social groups).

¹⁰⁶ EUR 256 m is a sum of allocations for sub-measures 1.3.2 (225.6) and 1.7.1 (EUR 30.4 m).

¹⁰⁷ Class C buildings have in practice been put into service since 2011, Class D buildings have been built since 2009, and Class E since 1998. Typical buildings built after 1992 were Class F, while those built between 1991 and 1992 were of Class G. Older buildings were categorized as class G.

Finally, further discussions might focus on the payback periods, which could be increased from 10 years to e.g. 15 years, and which would significantly reduce the need for a support from public funds. However, this would need to be discussed with commercial lenders and the WFOŚiGWs, which have provided debt financing to such EE projects.

Existing support mechanisms

So far, public support for EE projects in housing has been provided through the TRF (managed by the BGK) and WFOŚiGWs.

Under the TRF, housing cooperatives and housing associations, which had carried out EE projects with at least 25% level of energy savings, were eligible for a thermomodernisation premium up to 20% of the loan borrowed to fund the required CAPEX. This thermomodernisation premium was paid out after completion of the EE projects and upon confirmation that the targeted level of energy savings had been achieved through an energy audit. The premium was used for a pre-payment of loans given to the EE projects in the housing sector by the commercial banks cooperating with the BGK.

The above system has proved efficient and attracted cooperation from the commercial banks that offer loans for financing and partial pre-financing of EE projects.

Consequently, it would be reasonable to expect that a system of distributing the ESIF to EE projects in the housing sector could use a structure similar to that used by the TRF, with the EU funds available in the form of a premium after the completion of the EE projects and subject to achieving a targeted level of energy savings. Such an approach would also help to mobilise (repayable) private funds to co-finance such projects as well as the WFOŚiGWs resources, which would allow supporting more EE investments by 2023 with the usage of the ESIF as a premium. In addition, there should be close cooperation between the MID and the MF (responsible for the TRF) to agree the right approach to avoid cannibalisation of FIs by the TRF.

4.3.2. Value added of the EU funds

Introduction of the EU funds should enable the housing cooperatives and housing associations to implement EE projects by covering a financial gap between CAPEX and the estimated energy savings, without simultaneous rent increases. In addition, making the ESIF available to ESCO firms could create an additional incentive for the development of such firms focused on EE projects in the housing sector.

4.3.3. Target market

EU grants should be available to EE projects in the housing sector in the ITIs and sub-regional cities located in Poland, including the Śląsko-Dąbrowska Conurbation.

4.3.4. Target Final Recipients

The EU funds should be available to housing cooperatives and housing associations, and to ESCO companies that provide services to them in the ITIs and sub-regional cities.

Taking into account that the ESCO market is underdeveloped in Poland, it may be sensible to make the EU funds available also to the ESCO companies implementing EE projects in the housing sector by providing EE services to housing cooperatives and housing associations. This could potentially help them to offer the implementation of EE projects in a quasi-PPP model with ESCOs being remunerated over a longer period of time from the energy savings generated by the supported EE projects.

4.3.5. Financial products

In order to enable the implementation of EE projects in the housing sector, EU grants should be available in the form of an investment premium payable after completion of EE projects, provided that the targeted level of energy savings has been achieved (similar to the model currently used by the TRF). This investment premium system is assumed as a separately administered system.

In addition, to address the knowledge and experience gap in the implementation of EE projects by the housing associations and/or housing cooperatives, funds for technical assistance should be made available to those entities¹⁰⁸.

In order to define the detailed parameters of the proposed OPI&E instrument, additional detailed analyses need to be performed that have been outlined in *Section 6.7 Next steps to be undertaken to define details of the proposed financial products*.

The recommended OPI&E instrument has been designed with the primary objectives of:

- 1) creating a support system which will maximise the number of EE investments in the housing sector completed by 2020 to maximise contributions to the policy targets and avoid higher costs of EE investments which could result from further delays in EE investments in the sector. This is in line with the market gap analysis that demonstrates significantly larger project demand than the available OPI&E support; and
- 2) ensuring a relatively high leverage effect by using diversified resources from entities experienced in co-financing these type of investments for loans (in particular, commercial banks and WFOŚiGWs), with the ESIF only for investment premiums necessary to make the EE projects financially feasible. This approach would also use the existing system that is well-recognised in the market.

However, should the MA intend to create a system of support, which will be available in a long-term perspective, it could opt for the use of the ESIF not only as a non-repayable investment premium, but also as FIs (loans). Such an approach would retain part of the repayable funds in the system and contribute to sustaining the long-term support for EE after 2020. In order to maximise the leverage effect of the ESIF allocation, the latter could be blended with loans both from national sources (e.g. the NFOŚiGW / WFOŚiGWs) and from commercial banks, depending on the beneficiaries' creditworthiness and their ability to collateralise loans (e.g. the NFOŚiGW / WFOŚiGWs could lend to housing cooperatives, and the banks could lend to housing associations' projects). In addition, part of the grant support (additional investment premium) should depend on the building energy standards endorsed in the "Regulation of the Minister of Infrastructure on technical conditions and the location of buildings", e.g. by granting a higher investment premium, if the primary energy consumption resulting from investment falls below 40 kWh/(m² x year).

This alternative option needs to be further analysed in detail to:

¹⁰⁸ Moreover, the RES and EE advisory system will be available for public and housing sectors as well as enterprises under the sub-measure 1.3.3.

- 1) ensure that there is no “crowding-out” effect by using national public resources, also in the form of loans, especially taking into account that the current TRF system, with banks lending both to housing associations and housing cooperatives, is working and is well-recognised in the market;
- 2) decide on the form of public support (at least two options are available: 1) a loan as an FI and an investment premium as a grant (with distinguished eligible costs per each instrument), and 2) a loan and repayable assistance;
- 3) define detailed parameters of the financial products (e.g. the level of an investment premium per gained energy savings unit, and other terms and conditions, including pricing and tenor).

Structure of an EE project with an EU grant

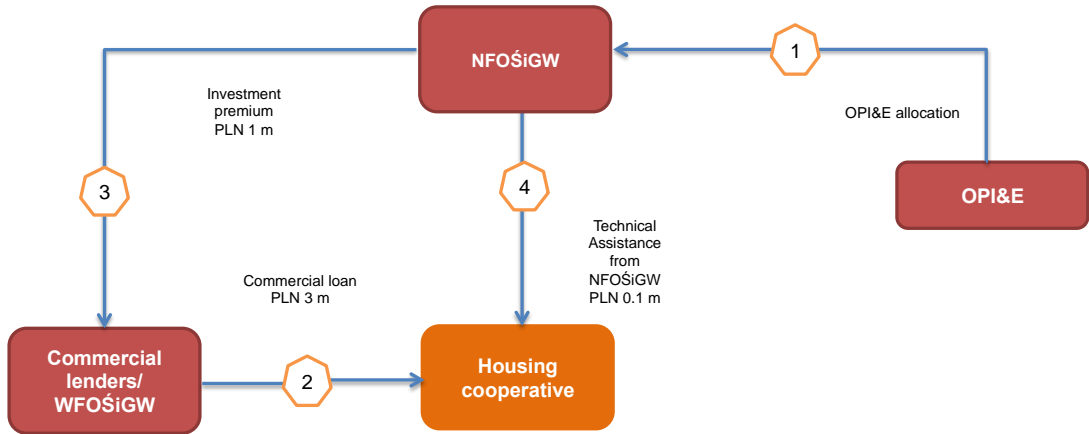
Taking into account the experience with the TRF managed by the BGK, EE projects should be able to receive debt financing from commercial banks and the WFOŚiGWs to cover CAPEX, provided that such debt financing could be repaid from the energy savings brought about by the EE projects. If there is a financial gap between the CAPEX and the estimated energy savings, the EU grants should be provided to the EE projects to close this gap. However, EU grants should be made available as an investment premium payable after completion of an EE project, provided that the targeted level of energy savings (confirmed by an energy audit) has been achieved: certain level of tolerance should be provided in this respect, e.g. +/-5%. The payment of an EU grant should be made directly to a commercial bank or the WFOŚiGWs which has provided debt financing to the EE project.

For the support system to provide sufficient assurance and incentivise the commercial banks and the WFOŚiGWs to finance EE projects in the housing sector, the NFOŚiGW, as the implementing authority, should enter into cooperation agreements with the commercial banks and the WFOŚiGWs. Such cooperation agreements should regulate the cooperation between the NFOŚiGW and the lending entities. A single point of contact for a beneficiary should be established, with a single set of documentation to be submitted by the beneficiary. Cooperation agreements should define the information and monitoring obligations and technical rules for the prepayment of loans by EU grants. Legally, a beneficiary will be eligible for an investment premium: this premium will be paid to beneficiary’s account kept by the lending entity. The entity will, in turn, have a right to use the proceeds of this premium to prepay the loan it extended to the beneficiary.

Once the implementing authority is appointed, it should run a tender / selection process to appoint a limited number of commercial banks and the WFOŚiGWs interested in lending to EE projects in the housing sector, and with whom cooperation agreements would be signed.

The following graph presents a simplified financial structure of a potential EE project to upgrade of buildings from the class H to the class D with CAPEX of PLN 3 m and a financial gap of 33% of the CAPEX.

Figure 53: EE in housing – simplified financial structure



Pursuant to item (1), the NFOŚiGW will act as the implementing body for the OPI&E. Commercial lenders or the WFOŚiGWs will provide a loan of PLN 3 m to the housing cooperative/association to finance the CAPEX of the EE project (2). Following completion of the EE project and confirmation that the EE project has achieved a targeted level of savings, the NFOŚiGW, as the implementing body, will release an investment premium of PLN 1 m directly to the lenders (through housing cooperative’s/association’s account kept by the lenders) (3). The housing cooperative/association will also receive PLN 0.1 m as technical assistance (4).

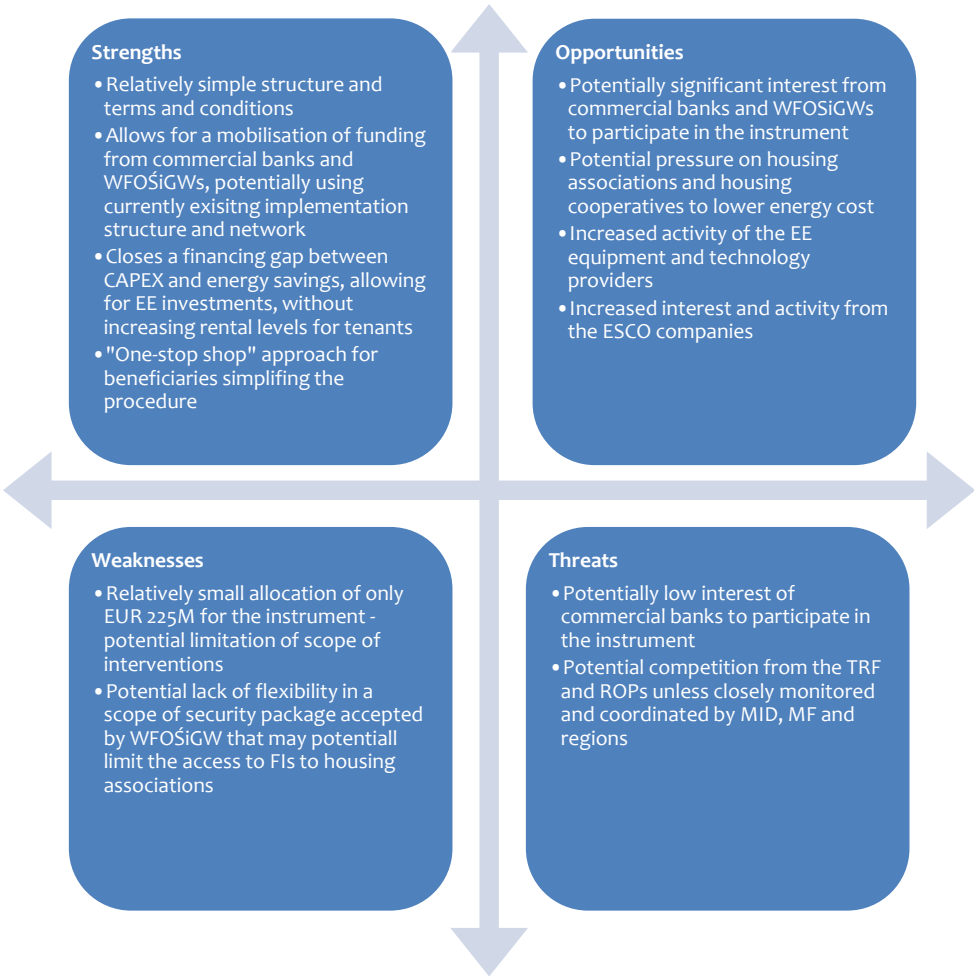
The financial structure presented above was used as a proxy in order to estimate potential demand for an OPI&E instrument and should not be viewed as definitive. The financial structure will vary on a project-by-project basis, depending on its characteristics and its risk profile.

With regard to the Śląsko-Dąbrowska Conurbation, a similar approach is recommended – an investment premium in the form of a grant to be distributed by the WFOŚiGW in Katowice from the ESIF, and loans provided by commercial banks cooperating with the WFOŚiGW. If the supply of commercial loans were not sufficient, the use of the WFOŚiGW funds for loans, alongside commercial loans, could be considered. However, this should be carefully analysed after WFOŚiGW’s decision to enter into cooperation agreements with the commercial banks to mitigate any possible “crowding out” effects and any possible conflicts of interest.

4.3.6. Risks and advantages related to the implementation

A SWOT analysis of the implementation of the EU grants has been presented in the graph below.

Figure 54: EE in housing – SWOT



4.3.7. Leverage

Given the parameters of the EU grants and assuming that (i) scenario 2 Average will be implemented, (ii) the EU grants will be used to cover a financial gap between the cost of CAPEX and energy savings generated from the EE projects and (iii) the average amount of such financial gap will be equal to 33%, the EU grants leverage has been presented in the table below.

Table 55: Funding envisaged for the EE projects in housing

		EUR m
1	EU grants	256
2	Commercial debt	768
	FI leverage¹⁰⁹	4x

4.3.8. Implementation options

For details, please refer to Chapter 6 Proposed investment and implementation strategy.

¹⁰⁹ The leverage is calculated as A) the sum of the amount of ESIF funding (position 1) and of the additional public and private resources raised (position 2) divided by B) the nominal amount of the ESIF contribution (position 1).

For a successful implementation of EU grants, it is crucial that a granting entity has sufficient capacity and experience in funding EE projects and in assessing the energy savings effects. Taking into account that support for the Śląsko-Dąbrowska Conurbation is ring-fenced, and that both the NFOŚiGW and WFOŚiGW in Katowice have provided funding to the EE projects in the past (albeit the NFOŚiGW for public buildings only), they appear to be the most qualified institutions to manage the EU grants in the OPI&E for EE projects in the housing sector – both across Poland and in the Śląsko-Dąbrowska Conurbation.

4.3.9. Envisaged combination with grant support

No combination of EU grants in the form of an investment premium with FIs from the ESIF has been envisaged at this stage. Should the MA, after in-depth analyses, decide to use another option of the support system, e.g. as presented in section 4.3.5, a combination of EU grants with FIs could be envisaged.

As an up-to-date experience with the TRF and funding provided by the WFOŚiGWs shows, housing cooperatives and housing associations (to a lesser extent) have no material problem with access to debt financing for EE projects. However, in order to avoid rent increases, and so help implement EE projects in the less affluent parts of ITIs and sub-regional cities, grant funding is necessary to support the EE projects that would otherwise not be able to repay commercial debt from the generated savings in the energy consumption, within the payback periods acceptable to the commercial sector. Consequently, there is no need for additional FIs from the ESIF to address any gap in debt financing.

In addition, the aforementioned grant funding for EE projects in housing (investment premium) should be combined with grants for technical assistance. This would help grow the capacity and expertise of the housing cooperatives and housing associations in of the EE projects.

4.4. FI description for waste sector

4.4.1. Summary of the conclusions

Demand for waste incineration projects

As indicated in *Chapter 3 An analysis of market failures, sub-optimal investment situations, and investment needs*, it is estimated that – in addition to the waste incineration plants currently under development and co-financed with the EU grants from the OPI&E 2007-2013 – Poland will need additional waste incinerators with the aggregate capacity of 800,000 tonnes/year. This will most likely translate into 4 or 5 new plants.

The location and capacity of the new incineration projects has not been determined yet. Before this could be done, Poland needs to update its NWMP (expected by the end of 2015) and, subsequently the VWMPs, including Investment Plans by mid-2016. The Investment Plans will offer proposals for the location and capacity of new waste incinerators that will need to be approved by the Minister of Environment. Approval at the national level should ascertain an equal geographical distribution of waste incinerators, taking into account the regional waste generation capacities.

Consequently, the final project pipeline for waste incinerators cannot be known earlier than by mid-2016.

Affordability issues

Pursuant to the draft methodology on the application of the affordability criteria in the investment projects with ESIF co-financing, currently prepared by the MID, the fees for the waste management for the general public should not be higher than 0.7% of the disposable income in a given region. Accordingly, the financing plan for any new incineration project should keep fees below that threshold.

Based on the example of six waste incineration projects currently under development, it clearly appears that the EU grants have been material in helping meet the affordability criteria. Furthermore, even for the six incinerators mentioned, EU grant support at the average level of ca. 52.61% has not suffice to keep the waste fees below the recommended threshold of 0.7%, ranging from 0.75% to 1.06% of the disposable income in a given region

PPP model in waste incineration projects

Five of the six incinerators currently built are traditionally developed (i.e. build or design and build models), and only one of them in the PPP model (the Poznań PPP waste incineration project).

The experience of the Poznań PPP project has shown considerable interest of private investors (five consortia at the competitive dialogue stage) as well as banks in preparation of the project. In addition, the PPP model has helped the City of Poznań to contract out not only the design and construction of the incineration plant, but also its operation and financing under a single PPP contract, with the private partner (Sita Zielona Energia) taking the availability risk. The City of Poznań is responsible for supplying waste to the incinerator. Well-designed PPP contracts should help Polish municipalities to classify their PPP projects as out-of-public-debt operations, which is of critical importance to many of them (see Chapter 3, Section 3.5.3 *Public debt considerations for municipalities*).

Should pre-feasibility studies and the Value-for-Money assessment not confirm the PPP as the most economically beneficial development option, the projects could also follow alternative traditional models, as used to date by the five municipalities across Poland.

4.4.2. Value added of the EU support

Taking into account the affordability criteria, support of the EU grants is necessary to help implementation of waste incinerators. Without EU grants, such projects would cause steep increases of waste management fees payable by the general public, which would cause serious affordability problems. This assumption has recently been confirmed by the project team for the waste incineration plants in Gdańsk, where significant fee increases were forecasted without the support of EU grants (see Chapter 3, Section 3.5.2 *Affordability of waste management services*).

4.4.3. Target market

EU support should be given to those waste incinerators which will be defined in the Investment Plans attached to the VWMPs and approved by the Minister of Environment.

4.4.4. Target Final Recipients

The financial products referred to in Section 4.4.5 *Financial Products* should be available to the approved waste incineration projects (as indicated in Section 4.4.2 *Target Market* which will be implemented under the PPP model or other alternative models, should pre-feasibility studies and the value-for-money assessment not confirm the PPP as the most economically beneficial development option.

In addition to all other factors mentioned in *Section 4.4.1 PPP Model in the waste incineration projects* above, the use of the PPP model with EU funds would help leverage the private sector funds (see *Section 4.4.7 Leverage* below).

The EU grants and funds for technical assistance should be provided to the public partner (i.e. a municipality); whilst the NFOŚiGW preferential stand-by loans should be provided to the private partner.

4.4.5. Financial products

Taking into account the affordability criteria, EU support for waste incinerators would need to be provided in the grant form. In addition, it is recommended that preferential loans are offered by the NFOŚiGW to address inefficiencies in the hybrid PPP model, as set out below.

In addition, taking into account that the Polish PPP market is still underdeveloped (see *Chapter 3 Section 3.1.4 Low private investment level*), it is recommended that part of the allocation of the EU funds (approx. PLN 30 m, which translated into ca. PLN 6 m per project, taking into account 5 potential projects) should be offered as technical assistance to the municipalities developing PPP waste incineration projects.

In order to define the detailed parameters of the proposed OPI&E instrument, additional detailed analyses need to be performed that have been presented in *Section 6.7 Next steps to be undertaken to define details of the proposed financial products*.

EU grants

Based on the experience with the aforementioned six waste incinerators, EU grants should cover approx. 50% of the eligible investment cost of a given project. The amount of the EU grants offered should be assessed on a project-by-project basis, taking into account affordability issues in a given region, and the potential revenue streams from the incineration plant, which would be generated by the sale of energy and heat as the by-products of waste incineration. In addition, the EU support level needs to consider that the energy generated in waste incineration plants may be qualified, under certain conditions, as renewable energy and benefit from the new RES support system. This implies an additional source of revenues that needs to be considered, after taking into account the cumulation of aid provided that would effectively reduce the auction reference price.

NFOŚiGW preferential stand-by loans

Based on the experience with the Poznań waste incinerator, and the consultation with the banks and investors, the risks of failure in obtaining or repaying EU grants are major risks to a financing structure of PPP projects. Those risks are difficult to accept by the commercial banks and investors. As such, when bidding for a project, they usually need to take into account the availability and the cost of funding of the project without the EU grants, which in turn increases the overall cost of the project (in particular, the cost of commercial financing of the whole CAPEX, including arrangement and commitment fees).

In order to address those risks and costs resulting therefrom, an NFOŚiGW stand-by preferential loan could be provided to the private partner, which would correspond to the amount of the EU grant. The NFOŚiGW stand-by preferential

loan would be disbursed solely after the whole equity and senior debt has been disbursed and the project has not obtained EU grants. As the Poznań project shows, EU grants were made available to the project only during the construction period, following the first disbursement of the senior debt.

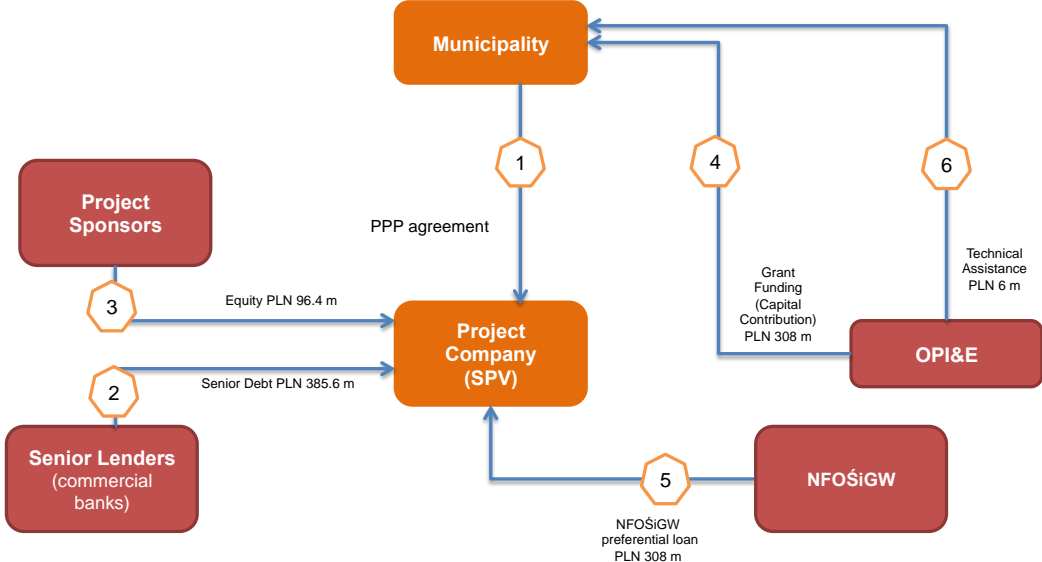
Further, the NFOŚiGW stand-by preferential loan would stay in place until the EU grants are finally and irrevocably settled, and the risk of their repayment obtains no longer. However, if a part or a whole amount of the EU grant must be repaid, the NFOŚiGW stand-by preferential loan will be disbursed to cover the gap in financing and the loan will be repaid proportionally to the senior debt.

The above structure with the NFOŚiGW stand-by preferential loan should result in a substantial decrease in financing costs, which would otherwise be borne by the project (in particular, cost of commitment fees charged by the senior lenders for (i) the additional amount of senior debt made available to a project company to cover part of the CAPEX which would otherwise be covered by an EU grant as well as (ii) the stand-by facility provided by the senior lenders to secure a potential obligation to repay the EU grants). In addition, it may result in a decrease of required equity capital to be provided by the sponsors up-front to maintain a debt-to-equity ratio (e.g. of 80%-20%) when calculating the entire amount of the CAPEX (i.e. including the amount which would otherwise be covered by the EU grant).

Financing structure of a waste incineration project

The following graph presents a potential simplified financial structure of a waste incineration project with the approximate CAPEX of PLN 790 m (cost of 1 Mg/year at the level of approx. PLN 3,953), an EU grant at the level of 50% of the eligible costs which are estimated at 78% of the CAPEX (PLN 616 m - eligible costs and PLN 308 m - grants) and a 80% to 20% debt to equity ratio required by the senior lenders¹¹⁰:

Figure 56:Waste sector – simplified financial structure



Pursuant to item (1) a public partner (municipality) will sign a PPP contract with a private partner (project company – a Special Purpose Vehicle). The project will be financed with a senior debt of PLN 385.6 m provided by the commercial

¹¹⁰As in the Poznań waste incineration project. The senior debt could also be extended by the NFOŚiGW, should commercial banks not be able to provide debt funding on the terms and conditions that address affordability concerns. This approach should, however, be rigorously assessed vis-à-vis a potential “crowding-out” effect on the commercial banks by NFOŚiGW.

senior lenders (2) and equity capital of PLN 94.6 m provided by the sponsors (3). The remaining 50% of the eligible costs will be financed with the EU grant (4), if approved for that project. However, if an EU grant is not approved and made available to the project, the funds equal to the remaining 50% of the eligible costs will be secured with the NFOŚiGW stand-by preferential loan (5).

Besides, a part of the EU funds should be provided as technical assistance to the municipality to finance development costs (analysis, advisers, etc.) of the project (6).

The financial structure presented above was used as a proxy in order to estimate potential demand for an OPI&E instrument and should not be viewed as definitive. The financial structure will vary on a project-by-project basis, depending on its characteristics and its risk profile.

Pricing of the NFOŚiGW stand-by preferential loans

Pricing of the NFOŚiGW stand-by preferential loans should be significantly lower than the cost of senior debt. Taking into account the pricing of senior debt, which is currently at the level of 200 – 300 bps plus WIBOR for long-term projects financed in the project finance model (this model is used for financing PPP projects), the pricing of the NFOŚiGW preferential loans could be set at a level close to WIBOR. The NFOŚiGW should not charge any commitment fees.

Such pricing would not put unnecessary pressure on the affordability threshold, especially if an EU grant is obtained.

Tenor of the NFOŚiGW stand-by preferential loans

The NFOŚiGW stand-by preferential loans should run until the EU grants provided to a given project are finally and irrevocably settled with no additional risk of their return.

If the EU grant is not provided the tenor of the NFOŚiGW stand-by preferential loan should be extended to correspond with the tenor of the senior debt.

Security package of the NFOŚiGW stand-by preferential loans

Repayment of the NFOŚiGW stand-by preferential loans should be secured substantially with the same security package as senior debt, including pledges over bank accounts and assets of the project company. However, such security package should have a lower ranking than the security package securing senior debt (e.g. a second ranking registered pledge over bank accounts) to achieve a structural subordination in the case of enforcement or insolvency of a project company. As such, the senior lenders should be able to treat such an NFOŚiGW stand-by preferential loan as a quasi-grant. However, the NFOŚiGW stand-by preferential loan should be serviced proportionally to the senior debt.

Promise to grant an NFOŚiGW stand-by preferential loan

In order to enable the bidders to include pricing of the NFOŚiGW stand-by preferential loans into their bids at public tender stage for a PPP waste incineration project, it is necessary to prepare standard terms and conditions for such loans with standard documentation. A lending institution should be available for discussion of the standard terms and conditions and the loan documentation with each bidder at the tender stage, with all confidentiality and Chinese walls rules put in place to ascertain that no information about specific bids is purportedly or accidentally shared with the other

bidders. Given that this allocation of EU support would be given to a maximum of five projects, and that usually between 5 to 6 bidders participate in the competitive dialogue, this should be possible.

The clarity of the terms and conditions, and the certainty of receiving NFOŚiGW's stand-by preferential loans, would be a key for the success or failure of those instruments.

4.4.6. Risks and advantages related to the implementation

A SWOT analysis of the implementation of EU grants and NFOŚiGW's stand-by preferential loans has been presented in the graph below.

Figure 57: Waste sector – SWOT



4.4.7. Leverage

Given the parameters of EU funds and assuming the PPP model with debt to equity ratio of 80% to 20%, funding structures and possible leverage have been presented in the table below.

Table 58: Envisaged funding in a waste sector

		PLN m
1	EU grants	1,232
2	NFOŚiGW stand-by Preferential Loan	1,232

3	Equity provided by private sponsor (20% of CAPEX to be financed outside the EU grants)	386
4	Senior debt provided by commercial lenders (80% of CAPEX to be financed outside the EU grants)	1,542
	Leverage¹¹¹	2.56

4.4.8. Implementation options

For details, please refer to *Chapter 6 Proposed investment and implementation strategy*.

For a successful implementation of the EU funds, it is crucial that a granting institution has sufficient capacity and experience in funding and financial analysis of waste incineration projects. Given that the NFOŚiGW managed the EU grants and provided preferential loans to 5 out of 6 waste incineration plants currently under development in the OPI&E 2007-2013, this institution appears to be the most qualified institution to be responsible for the management of EU grants and NFOŚiGW's stand-by preferential loans in the Programming Period 2014-2020 for waste incineration projects.

4.4.9. Envisaged combination with grant support

No combination of EU grants with FIs has been envisaged except for the FI preferential stand-by loans.

Taking into account the affordability issue, waste incineration projects require a substantial part of funding to be provided as grants. At the same time and as experience shows (in particular, of the Poznań PPP waste incinerator), there is sufficient liquidity in debt markets to provide financing for the remaining part of the CAPEX. Consequently, there is no need for an additional FI to finance the CAPEX except for FI preferential stand-by loans to be provided by the NFOŚiGW.

The FI preferential stand-by loans are necessary to address risks related to mixing grants with commercial financing in hybrid PPP projects, which result in higher financing costs (with stand-by facilities provided by commercial banks with arrangement and commitment fees and initial debt to equity ratio calculated without a grant component, imposing an unnecessary and additional financial burden on PPP projects).

Finally grants to cover part of the CAPEX should be combined with grants for technical assistance for the municipalities that implement waste incinerators in the PPP model. Such grants should help the municipalities obtain sufficient expertise to successfully implement such projects (this was also the case in the Poznań PPP, with the cost of external advisors being covered by the MID).

4.5. State aid implications

This section presents an overview of the State aid provisions relating to different forms of the EU support discussed in Chapter 4 *FIs description - assessment of value added and additional public and private resources to be raised by FIs*. However, this section does not purport to provide an in-depth and exhaustive State aid analysis.

¹¹¹ The leverage is calculated as A) the sum of the amount of ESIF funding (position 1) and of the additional public and private resources raised (position 3+4) divided by B) the nominal amount of the ESIF contribution (position 1).

4.5.1. General rules on State aid

As stipulated in Article 107 (1) of the Treaty on Functioning of the European Union (“TFEU”)¹¹², any aid (i) granted by a Member State or through state resources in any form whatsoever which (ii) distorts or threatens to distort competition by (iii) favouring certain undertakings or the production of certain goods (selective economic advantage) is, in so far as it (iv) affects trade between Member States, incompatible with the internal market. If any of the conditions mentioned above are not met, no State aid will exist.

In respect of the EU support discussed in this Report, it has to be noted that the financing from the EU funds has been considered by the Commission on numerous occasions as granted by the state or through state resources.¹¹³

The main regulations concerning investment aid which may apply to the EU support discussed in this Report (i.e. EU grants and loans¹¹⁴) are set out in GBER which declares certain categories of aid as compatible with the TFEU. However, to apply exemptions provided in GBER, such aid must meet certain conditions and, in particular, it must be transparent and must have an incentive effect¹¹⁵. Pursuant to article 5 of GBER:

- 1) grants are transparent; and
- 2) loans are transparent where the gross grant equivalent has been calculated on the basis of the reference rate prevailing at the time of the grant.

Such calculation would need to be based on the rules set out in the Communication from the Commission on the revision of the method for setting the reference and discount rates.¹¹⁶ This communication sets out the methodology for the calculation of the reference and discount rates. Those rates are applied as a proxy for the market rate and to measure the grant equivalent of aid.

4.5.2. RES

Investment aid

Pursuant to article 41 of GBER, investment aid for the promotion of energy from renewable sources should be compatible with the internal market and should be exempted from the requirement to notify such aid with the Commission.

Investment aid may be granted to RES projects, provided that certain conditions are met and in particular:

- 1) aid can be granted only to new installations (further limitations apply to hydropower installations); and
- 2) the eligible costs are the extra investment costs necessary to promote the production of energy from renewable sources.

¹¹²The Treaty on the Functioning of the European Union, OJEU C 326, 26/10/2012.

¹¹³ See for example: the Commission decision of 13.7.2009 r. in the case No N 56/2009 – Poland – Pomoc na wymianę i modernizację sieci dystrybucji energii elektrycznej w Polsce; Commission decision of 5.10.2011 in the case No SA.31953 (2011/N) – Poland – Budowa terminalu regazyfikacyjnego skroplonego gazu ziemnego w Świnoujściu.

¹¹⁴ If a repayment of any part of a loan is waived, such waiver may result in changing the aid form in the waived part from a loan to a grant.

¹¹⁵ Pursuant to article 6 of GBER to maintain such incentive effect, a written application for aid should be filed with the relevant authority before work on the project or activity starts. Start of works means: “the earlier of either the start of construction works relating to the investment, or the first legally binding commitment to order equipment or any other commitment that makes the investment irreversible. Buying land and preparatory works such as obtaining permits and conducting feasibility studies are not considered start of works”.

¹¹⁶ OJEU C 14, 19.1.2008, p. 6.

The aid intensity should in principle not exceed 45% of the eligible cost with additional intensity provided for SMEs and aid granted in a competitive bidding process.

Form of aid

Aid can be granted in various forms under GBER, provided that they are transparent.

GBER does not regulate specifically subordinated loans such as FI subordinated loans. It only refers to quasi-equity investment for SMEs which rank between equity and debt and which can be structured as: 1) a debt instrument (unsecured and subordinated (including mezzanine debt)), 2) an instrument convertible into equity or 3) a preferred equity. However, this definition does not apply to the FI subordinated loans which are subordinated to senior debt but rank *pari passu* with all other obligations of a final recipient and are secured with the second ranking security package. In addition, other than quasi-equity instruments, the granting entity will not have any shareholders' or quasi-shareholders' rights in the final recipient. Consequently, FI subordinated loans may either be classified as loans under GBER or as instruments remaining outside GBER.

If the former classification were applied, in order to ensure that the FI subordinated loans are transparent it would be necessary to calculate their gross grant equivalent.

If, however, FI subordinated loans were classified outside GBER or if the calculation of the gross grant equivalent were not possible, it would be necessary to notify the FI subordinated loans scheme with the Commission.

In addition, it should also be possible to structure FI subordinated loans as a loan non-aid scheme. This would require a confirmation that the terms and conditions of the FI subordinated loans reflect market conditions.

Cumulation with operating aid under the RES auction system

Pursuant to the provisions regulating the new RES auction support system, any EU support will need to be deducted from the operating aid available under the RES support system. According to the information received from MEco, the auction reference price will be reduced for the entities receiving EU support by a value of this support.

4.5.3. EE in large enterprises and housing

Investment aid

Pursuant to article 38 of GBER, investment aid supporting entities to achieve energy efficiency should be compatible with the internal market and should be exempted from the notification requirement.

The eligible costs are only the extra investment costs which are necessary to achieve a higher level of energy efficiency.

The aid intensity should not exceed 30% of the eligible costs, with additional intensity for areas covered under Article 107 (3)(a) of the TFEU¹¹⁷ and areas under Article 107 (3)(c) of the TFEU¹¹⁸ and for SMEs.

Aid cannot be granted where improvements are to ensure only that entities comply with Union standards already adopted, even if they are not yet in force¹¹⁹.

¹¹⁷ Aid to promote the economic development of areas where the standard of living is abnormally low or where there is serious underemployment, and of the regions referred to in Article 349 of TFEU, in view of their structural, economic and social situation.

¹¹⁸ Aid to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest.

¹¹⁹ However, in the Guidelines on State aid for environmental protection and energy 2014-2020 (OJEU C 200, 28.6.2014, p. 1) – point 53, the Commission has indicated that aid granted to adapt to future Union standards has an incentive effect, including when the standard has already been adopted but is not yet in force. However, in such the case, the investment must be

Form of aid

Aid can be granted, amongst others, in the form of loans and grants. As such, and provided that all other conditions are met, FI preferential loans for EE in large enterprises and grants for housing projects should qualify as aid under article 38 of GBER.

Aid for environmental studies

Pursuant to article 49 of GBER, aid for studies, including energy audits, directly linked, amongst others, with the EE projects in large enterprises and housing projects should be compatible with the internal market and should be exempted from the notification requirement. However, energy audits for large enterprises may not benefit from this aid.

The aid intensity may not exceed 50% of the eligible costs with additional intensity provided for SMEs.

If the MA/IB decides to grant aid according to the Guidelines on State aid for environmental protection and energy 2014-2020, the notification of the State aid scheme will be required.

4.5.4. Waste Management

EU grants foreseen for measure 2.2 *Waste Management* will not be able to enjoy any of the exemptions provided under GBER.

Waste management and disposal services may be classified as services of general economic interest. Commission Decision of 20 December 2011 on the application of Article 106(2) of the Treaty on the Functioning of the European Union to State aid in the form of public service compensation granted to certain undertakings entrusted with the operation of services of general economic interest¹²⁰ (“SGEI Decision”) sets out the conditions under which State aid in the form of public service compensation granted to undertakings entrusted with the operation of SGEI is compatible with the internal market and exempt from the notification requirement. The following issues should be taken into account:

- 1) the SGEI Decision applies to compensation not exceeding an annual amount of EUR 15 m;
- 2) the SGEI Decision applies where the period for which the undertaking is entrusted with the operation of the SGEI does not exceed 10 years. IF such period exceeds 10 years, the SGEI Decision may still apply to the extent that a significant investment is required from the service provider that need to be amortised over a longer period in accordance with the generally accepted accounting principles;
- 3) the amount of compensation shall not exceed what is necessary to cover the net cost incurred in discharging the SGEI, including a reasonable profit.

If the SGEI Decision were not applicable, the aid would need to be notified with the Commission on an individual basis or as a State aid scheme.

Alternatively, support for incineration investments may be considered as non-aid support, if granted according to the four criteria indicated in the Altmark ruling.

implemented and completed at least one year before the Union standard enters into force. Although, the rule in the Guidelines is more lenient, the State aid granted according to the Guidelines requires notification to the Commission.

¹²⁰OJEU L 7, 11.01.2012.

Cumulation with operating aid under the RES auction system

In addition, should the energy generated in waste incineration plants be qualified as renewable energy and benefit from the new RES support system (should they win the auctions), the aid cumulation rules should be considered to effectively reduce the auction reference price.

4.6. Summary of the quantitative value added and additional public and private resources to be raised by the FIs

The table below summarises all additional public and private resources to be potentially raised by all proposed OPI&E interventions (FIs and grants) in all four sectors.

Table 59: Additional public and private resources to be raised by the FIs

	RES	EE in LE	EE in housing	Waste	Total
1 EU grants	0	0	256	308	564
2 Equity provided by sponsors	300	25	0	0	325
3 Equity provided by 3rd party	0	0	0	96.5	97
4 FI debt / subordinated debt	150	150	0	0	300
5 Commercial debt	1,050	75	768	386	2,279
Leverage	8x	1.5x	4x	2.6x	3.7x

As envisaged in the table above, the use of the OPI&E instruments (FIs and grants) will facilitate raising additional public and private resources, including 1) commercial equity provided by external investors (waste), 2) commercial debt (all four sectors) – and potentially debt to be provided by the NFOŚiGW. Using the subordinated debt FI in RES sector will allow for the highest leverage at 8x whereas the preferential loans for energy efficiency in large enterprises at 1.5x. The leverage on total OPI&E allocation will be at 3.7x.

4.7. Consistency with other forms of public intervention

The table below summarises the key features of OPI&E instruments in the context of other forms of public intervention currently available in the market and discusses potential areas of inconsistencies that may lead to challenges in implementing the OPI&E instruments as well as recommendations on potential mitigants.

Table 6o: Consistency with other forms of public intervention

	Proposed instruments			Consistency with other public interventions	Potential inconsistency with other public instruments	Mitigants
	EU grants	FI (debt / subordinated debt)	TA support			
RES	NO	YES	NO	RES auctions (operational aid), aid granted under the FI diminishes the reference price under the auction	ROPs support RES installations (grants, FIs) may constitute competition for the OPI&E FI, esp. for boardline capacity of installations and scalable (wind) projects	Redefining a demarcation line ROPs and OPI&E
					NFOŚiGW - BOCIAN Programme competing with the OPI&E FI	Adjustment of the scope to align with the OPI&E FIs
EE in LE	NO	YES	YES	EE certificate system (white certificates) - potentially, complementary to "white certificate" system preferring projects with short payback period	Two ROPs (Kujawsko-Pomorskie and Lubelskie) envisage support for LEs (under certain conditions)	Negotiations with the Regions with purpose of excluding support for EE in LEs under ROPs
EE in housing	YES	NO	YES	EE certificate system (white certificates) - potentially, complementary to "white certificate" system preferring projects with short payback period	TRF of BGK	Elimination of competition between TRF and OPI&E (ensuring complementarity of instruments / changing TRF requirements to align with the OPI&E or merging merging with OPI&E instrument)
					WFOŚiGWs loan instruments (with capital rebate option)	Involving WFOŚiGWs in the OPI&E support system as loans providers, next to commercial banks
					Some ROPs	Negotiations with the Regions with purpose of applying demarcation line / apply the same approach as proposed for OPI&E
Waste	YES	NO	YES	RES auctions (operational aid), aid granted under the FI diminishes the reference price under the auction	N/A	N/A
				NFOŚiGW Loan Programme		

In addition, it should be noted that JESSICA offered FIs for thermomodernisation. Some regions, in particular Mazowieckie and Pomorskie, have seen several projects in thermomodernisation of residential buildings that are of relevance to this Report. The values of projects were very diversified – ranging from single buildings with the value below PLN 100 ths. to larger-scale financing of approximately PLN 5 m for larger housing cooperatives.

Table 61: FIs for thermomodernisation from JESSICA

	Number of projects	Total FI value (PLN m)	Types of investments supported
Mazowieckie	13	69.1	Refurbishments of heating systems and installation of RES facilities to increase energy efficiency incl. thermomodernisation of railway station, shopping centers and housing (housing associations), others
Pomorskie	15	14.8	Thermomodernisation of schools, universities, housing (housing associations, housing cooperatives, and TBS) and sport facilities. The largest projects of the value of PLN 2-5 m (project pipeline), the smallest below PLN 100 ths. (single building)
Śląskie	1	6	Other residential facility
Wielkopolskie	2	4.7	Thermomodernisation of schools
Total	31	94.6	

Source: EIB

The regional level decisions on the interventions areas for JESSICA over 2014-2020 should, therefore, be monitored and discussed with regional MAs to avoid unnecessary competition in the local markets, particularly in EE in housing.

4.8. Qualitative value added elements of FIs

The value added from the FIs in the Member States (Programming Period 2007-2013), together with the areas for improvement that are of potential relevance to all four sectors analysed here are listed in the table below. The key value added areas, identified in the FI Stocktaking Study¹²¹, will also be of relevance for the OPI&E FIs.

Table 62: Value added by FIs as compared to grant-based schemes

Added values	Areas for improvement
<ul style="list-style-type: none"> • Revolving character of funds and support • Improving economic, urban and local development while contributing to social cohesion targets • Fulfilling considerable market gaps in financing projects and motivating private sector to invest more actively • Flexibility (e.g. to structure and to add funds) and possibility of multiple use of funds • Utilising local knowledge • Building institutional capacity and gaining experience from FI implementation • Improving cooperation between private sector and public bodies and making PPPs more popular • Potential for grants and FIs to be combined as well as financing with other forms of support 	<ul style="list-style-type: none"> • Lack of assistance in the preparation of technical documents • Long time needed for set up and take off • Lack/delay of the guidelines necessary for the implementation of FIs resulted in difficulties in the implementation of specific projects. • Need to stimulate latent demand • Awareness because of young FI culture • Difficult to attract private investors • Restricted time for the disbursement of funds

Source: Financial Instruments: A Stock-taking Exercise in Preparation for the 2014-2020 Programming Period – Final.

¹²¹ “Financial Instruments: A Stock-taking Exercise in Preparation for the 2014-2020 Programming Period – Final”, Mazars LLP, 2013.

With the limited use of FIs and external financing in Poland, the deployment of FIs would support the cultural shift from grants-only to a more diversified financing of low-carbon economy. The horizontal benefits of FIs in Poland include:

- **Addressing a specific market failures** – the envisaged FIs are specifically tailored to address market failures that impact the sectors under consideration (e.g. insufficient equity contribution in RES, affordability constraints in the waste sector or energy poverty in EE in housing);
- **Supporting implementation of new regulations and contributing to national objectives** – the OPI&E intervention measures proposed should also foster implementation of two important regulations – the Act on RES and the Act on EE by supporting various groups of bidders and beneficiaries; and therefore opening up the market to multiple participants, in particularly those who would not be able to enter the market due to limited financial resources;
- **Supporting competitiveness of enterprises and economy** – the FIs offered to large enterprises should help them lower their cost level and increase their competitiveness on local and global markets. Allocation of funds to technical assistance should enable large enterprises to obtain sufficient external advice on the methods of improving EE. FI should also reduce the cost of compliance with the obligations to be imposed under the new Act on EE which may otherwise put an additional pressure on enterprises.
- **Activating private investments** – recommended OPI&E intervention measures will promote much needed forms of cooperation with private investors, including PPP and ESCO. The use of PPPs should ease the strain on budgets of local municipalities and help them share risks with experienced investors and benefit from their experience in cost-efficient long-term project operation. Making FIs available to ESCOs could create an additional incentive for a development of such firms focused on the EE projects in the housing sector.
- **Capacity building** – FIs will facilitate capacity building among a wide community of investors and sponsors, supported by specific expertise and skills of financial intermediaries and external consultants through technical assistance measures;
- **Achieving synergies** – the envisaged FIs should in general rely on existing organisational structures and expertise and do not have to invest resources in duplicating facilities, such as distribution networks or credit rating systems. This allows the FIs to operate via existing channels without all the costs that would otherwise be incurred. FIs in RES will required cooperation with specialised know-how in the field of RES project financing;
- **Affordability and social inclusion** – the beneficiaries of the envisaged OPI&E intervention measures (esp. in EE in housing and waste) will benefit directly to the extent that would not normally be available to them within the commercial market without a significant public intervention.
- **Positive impact on the labour market** – the shift toward slow carbon economy might result in the creation of approximately 4,320¹²² new work places in the energy sector. This is important in the context of the expected workforce reductions in the fossil fuel sector. Also in large enterprises and multi-residential buildings, the shift towards EE should create new jobs e.g. performing energy audits and induce the projects rollouts, design, as well as the construction and installation works.

¹²² Compared to fossil fuels, renewable energy creates about 1.5 to 7.9 times more jobs per year per unit of energy produced (see Wei, Patadia, and Kammen, “Putting Renewables and Energy Efficiency to Work: How Many Jobs Can the Clean Energy Industry Generate in the US?”).

5. LESSONS LEARNT

The purpose of this section is to capture both success factors and pitfalls of past and recent experience from: 1) the implementation of FIs and other instruments from previous and existing financing schemes in Poland, and 2) relevant experience and lessons learnt from other countries that have implemented FIs. This would provide a framework for improving both the effectiveness and efficiency of the implementation of future FIs to avoid potential risks and maximise the potential benefits.

5.1. EU and national schemes implemented in Poland

The key characteristics of supply have been discussed in detail in Chapter 3 *Analysis of Market Failures, Sub-optimal Investment Situations and Investment Needs*. As the Polish market has been heavily dependent on grant funding, the key lessons learnt from implementing grant funding, along with the experience in implementing FIs should be considered while programming FIs under the current OPI&E.

The key lessons of horizontal nature learnt from the implementation of the EU schemes¹²³, which should be taken into consideration for a new implementation system, are as follows:

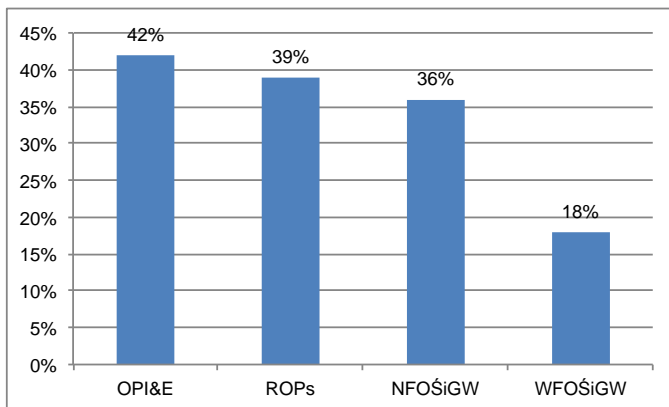
- Complicated application documentation¹²⁴ (especially in defining eligible costs, payment claims), which require simplification and more transparency on the one hand and organising information campaigns and meetings for potential beneficiaries/final recipients on the other.
- Changes of terms and conditions for granting support (e.g. criteria, indicators) for calls for proposals, which should be well thought-out and prepared (based on previous experience), and tested before launching calls for proposals to reduce confusion of potential beneficiaries/final recipients and of project preparation costs.
- Considerable changes in the scope of projects in the implementation phase (81% of projects), mainly due to technical and organisational reasons (42.6%), badly defined scope of work for energy audit (20.4%), and need for different technological solutions than those given in the application form (22.2%). All this suggests that there is a need for flexibility of the scope of investments to be supported, if it should lead to a more efficient use of public resources, including the ESIF.
- Energy audits were not used by the majority of the OPI&E 2007-2013 beneficiaries (85%) to estimate energy savings and the necessary works to be undertaken to achieve these savings which was generally required in the case of the ROPs (ca. 65%), the NFOŚiGW (ca. 45%), and the WFOŚiGWs (ca. 55%). The fact that energy audits (ex-ante and ex-post) are obligatory in the OPI&E should be emphasised to the potential beneficiaries and final recipients.

An important lesson learnt in the context of FIs programming is that the beneficiaries of the OPI&E 2007 - 2013 reported that projects financed under it encountered more problems than those funded under the ROP, NFOŚiGW or WFOŚiGWs, respectively. In general, the OPI&E provides funding for larger and more complicated projects, therefore this perception needs to be taken into consideration while designing new FIs and grant support measures.

¹²³ Analiza i ocena możliwości zintegrowania działań w obszarze efektywności energetycznej z uwzględnieniem OZE, w tym odpadów komunalnych I osadów ściekowych, PwC, Final Report 18 September 2013.

¹²⁴ 80% of the OPI&E applicants used external services for preparing applications.

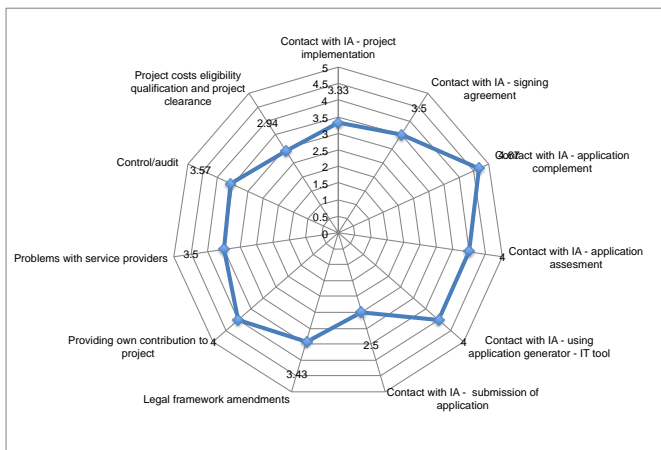
Figure 63: Share of projects which experienced problems in the beneficiaries' opinion



Source: Analiza i ocena możliwości zintegrowania działań w obszarze efektywności energetycznej z uwzględnieniem OZE, w tym odpadów komunalnych i osadów ściekowych, PwC, Final Report 18 September 2013.

The beneficiaries of the OPI&E 2007-2013 referred, in particular, to the key barriers in project implementation shown in the graph below.

Figure 64: Impact of problems in project implementation (1-5, with 5 being the most relevant)



Source: Analiza i ocena możliwości zintegrowania działań w obszarze efektywności energetycznej z uwzględnieniem OZE, w tym odpadów komunalnych i osadów ściekowych, PwC, Final Report, 18 September 2013.

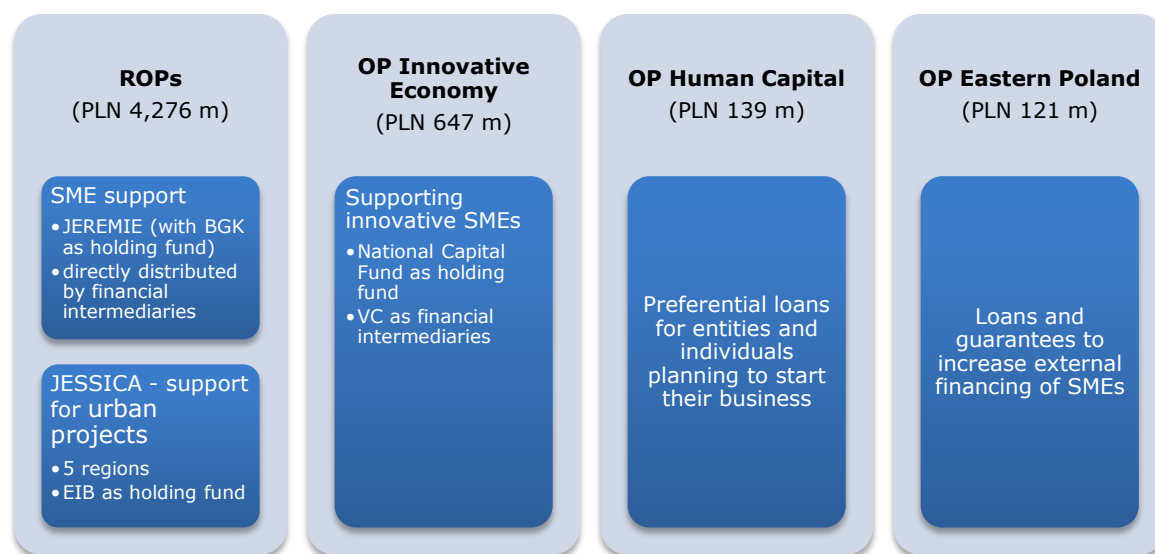
It has been acknowledged that FIs are generally more challenging to implement than other forms of financial support; therefore, the focus should be put on improving contacts with the specific IB/IB2 during the preparation, clarification and assessment phases as well as potential final recipients by emphasising requirements in regard to energy audits.

5.1.1. FIs under the National Cohesion Policy in the Programming Period 2007-2013

Poland allocated a total amount of PLN 5,183 m for FIs in the Programming Period 2007-2013 which constitutes only 1.6% of the total allocation for this period. The FIs offered include:¹²⁵:

¹²⁵ „Instrumenty Finansowe w polityce spójności”, Department of Regional Programmes and Digitalisation, MID, July 2013.

Figure 65: Overview of FIs in Poland, Programming Period 2007-2013



Two FI initiatives of considerable value, which were implemented in the Programming Period 2007-2013, were JESSICA and JEREMIE. The experience and lessons learnt from their implementation should, therefore, be also taken into account.

JESSICA

JESSICA - Joint European Support for Sustainable Investment in City Areas - is a technical assistance initiative of the EC developed jointly with the EIB and in collaboration with the Council of Europe Development Bank (“CEB”). It provides support to sustainable urban development and regeneration through FIs. JESSICA addressed the challenges and complexity of sub-optimal performance within the urban sector, and deployed FIs as a strategic tool for cities to promote investment projects as an integrated investment strategy, rather than on a stand-alone basis. Under the procedures applicable in the 2007-2013 Programming Period, MAs in the Member States were offered the possibility to invest some of their ESIF allocations in FIs (revolving funds), supporting urban development, and to recycle financial resources in order to enhance and accelerate investments in urban areas. To this end, Urban Development Funds (“UDFs”) were set up under JESSICA to invest in PPPs and in other projects included in the integrated plans for sustainable urban development.

JESSICA in Poland: Poland was one of the first countries to implement JESSICA. The total programme envelope was EUR 256.3 m. At the preparation stage, several Polish regions showed interest in using JESSICA as part of their ROPs, with five regions effectively implementing it, including: Wielkopolskie, Zachodniopomorskie, Śląskie, Pomorskie and Mazowieckie. Even with a late start under the Programming Period 2007-2013, JESSICA has been making good progress, as shown below:

- Total number of investment agreements signed as at 16 June 2015: 148;
- Total amount of investment agreements as at 16 June 2015: PLN 1,159.4 m;
- Total amount disbursed to final recipients as at 31 March 2015: PLN 789.8 m.

Although the stakeholders (both beneficiaries and MAs) involved in implementing FIs to date were generally positive about the experience, many also noted the challenges involved.

Key lessons learnt from JESSICA implementation in Poland

- Competition with grant funding - taking into account the traditional grant-funding model, it is critical to establish under the ROPs a clear division between the types of projects eligible for grants from those projects that could potentially use FIs. This division would minimise unnecessary competition. In some cases, the beneficiaries mentioned the time-consuming procedures associated with FIs, whilst private promoters indicated the areas for improvement in technical assistance provision to design acceptable financial structures of projects.
- Initial low recognition of FIs - it is necessary to prepare promotion campaigns early on in FIs implementation to help potential beneficiaries understand FIs requirements. MAs should also consider simplifying the monitoring and reporting requirements and provide technical assistance in such areas as project financial structuring.
- Insufficient equity contribution and/or collateral – this created problems for urban development FIs, especially to: smaller developers with obsolete or limited asset base; companies at an early stage of development and Special Purpose Vehicles (“SPVs”). The FIs could help out in such cases by, e.g. supporting collateral deficiencies.
- Low quality of project pipelines – caused by poor project preparation, resulting in non-bankable structures. Successful completion of projects required proactive support given to project promoters and a high level of technical assistance.
- In the Programming Period 2007-2013, the EIB was appointed as the manager of the JESSICA Holding Funds for all MAs implementing JESSICA in Poland, providing the set-up, management and control. Given limited FIs implementation experience of the Polish MAs, EIB added real value and helped JESSICA to be a success. We, therefore, believe that irrespective of the implementation strategy finally to be adopted for FIs in the current OPI&E, an experienced financial intermediary should play a key role in successful implementation.

JEREMIE

JEREMIE is a joint initiative developed by the EC in co-operation with the EIB and other financial institutions to support SMEs, particularly with guarantee products.

JEREMIE in Poland: During the Programming Period 2007-2013, JEREMIE was implemented in seven regions: Dolnośląskie, Kujawsko-Pomorskie, Łódzkie, Mazowieckie, Pomorskie, Wielkopolskie and Zachodniopomorskie. In six of them, JEREMIE was managed by the BGK as a Fund of Funds that cooperates with financial intermediaries.

Table 66: JEREMIE regions and financial allocations, Poland (2007-2013)

Region	Allocation in (PLN m)
Dolnośląskie	405.7
Łódzkie	188.6
Mazowieckie	61.5
Pomorskie	287.4
Wielkopolskie	501.3
Zachodniopomorskie	280.0
total	1,724.5

Source: BGK

JEREMIE provides support to SMEs, particularly micro- and small enterprises. The implementation period 2007-2013 resulted in the following:

- 230 agreements signed with financial intermediaries to the total value of PLN 2,910 m (168% of allocation);
- Almost 23,900 enterprises supported;
- Total value of PLN 4,320 m of loans for SMEs signed, giving 2.5x leverage.

Key lessons learnt from JEREMIE implementation in Poland

- Flexible forms and parameters have been crucial in facilitating SMEs requirements of the FIs;
- Loans have been the most attractive instruments for SMEs, but guarantees were most often used;
- A regional character of the instruments has discouraged some larger commercial banks from involvement in the implementation process;
- Further development of the financial intermediaries network is required, mainly by involving local and regional stakeholders;
- A not fully transparent legal framework has caused many problems in the implementation process;
- Poor understanding of FIs by the controlling authorities, including the EC (i.e. imposing grant rules on FIs difficult to be applied esp. on guarantees).

Based on the FIs track record analysis, and after discussions with the stakeholders – including the EIB as a holding fund, the BGK as a financial intermediary for JESSICA and a holding fund for JEREMIE, the MAs, and the end beneficiaries – the main challenges for implementing FIs in the Programming Period 2007-2013¹²⁶ were identified as follows:

- The timescale in establishing FIs – avoid a funding lapse between programming periods.
- Maintaining existing fund of funds – a platform for FIs to manage the funds flexibly and to address reinvestment.
- Co-Financing – attract additional independent private investment at the level of financial intermediaries or eligible final recipients.
- Revenue Funding - required to develop, set-up and meet holding funds costs and management fees.
- ERDF draw-down – a new concept of tranching ESIF payments is an additional operational step in the implementation of FIs.

5.1.2. Polish experience in RES support

Poland has a relatively broad experience in supporting RES investment, including:

1. Construction of RES installations supported under:
 - a. By grants under the OPI&E and ROPs 2007-2013 in the form of grants,
 - b. NFOŚiGW funding (under the GIS (loans and grants for biogas and biomass; grants for RES grid connections) and from own sources), and
 - c. WFOŚiGW funding (preferential loans with a capital rebate option),
2. Small-scale RES projects – under the ROPs, the NFOŚiGW (Prosument programme in cooperation with commercial banks – loans with a capital rebate option) and from WFOŚiGW sources.

¹²⁶ This is based on the UK experience on implementing JEREMIE in England. See: David Read – DCLG (Managing Authority), England's presentation. https://www.fi-compass.eu/sites/default/files/publications/presentation_20150602_Vienna_ERDF_David-Read.pdf

Within the OPI&E 2007-2013, under measure 9.4, 65 projects out of the 212 submitted have been supported with grants to the total value of PLN 1,569.7 m, with the additional RES capacity of 838.33 MW. This non-repayable instrument was preferred over the RES loans provided by the NFOŚiGW, the latter being used for only 28 projects. Many projects “migrated” from the NFOŚiGW to use grants under the OPI&E. It is also worth noting that due to the positive NPV of all projects submitted, no redemptions of the disbursed loans could have been granted. A detailed description of the NFOŚiGW RES Loan Programme is included in Appendix 6.

The WFOŚiGWs also offered instruments in support of RES. Based on the data from the WFOŚiGWs,¹²⁷ 8 of the 11 WFOŚiGWs provided support for RES (without micro-installations), to the total value of PLN 217 m via loans with a capital rebate option (almost 50% of the value came from the WFOŚiGW in Katowice).

Key lessons learnt from RES public sector support in Poland

- Grants effectively “crowded-out” FIs in RES when they were available to the same types of projects. This is of key relevance also for the Programming Period 2014-2020 where the demarcation line (maximum capacity and easy “scalability” of RES projects) between the OPI&E and ROPs might result in slicing up or merging projects to fit the grants available to wind installations smaller than 5MW.
- Very intensive support for RES under the OPs in the Programming Period 2007-2013 (52.1% for RES installation projects¹²⁸) via grants triggered similar expectations for grant support under the current OPI&E.
- The main problems identified by RES support applicants under the OPI&E 2007 - 2013¹²⁹ included: a poor technical condition of the electrical grid, problems with funding support for project implementation, problems with environmental protection (changes in law, Polish law non-compliant with the EU law, protests and appeals against environmental approvals), the obstacles resulting from poor municipal spatial planning and the maximum value of subsidy (this encouraged investors – under measure 9.4 – to cut up large projects into smaller ones to raise profitability. Most of these challenges will also apply to the Programming Period 2014-2020 and might impact FIs implementation.

5.1.3. Polish experience in support of energy efficiency in enterprises

EE related investments in enterprises have been supported through different public resources, namely by the NFOŚiGW and in a much smaller scale by the WFOŚiGWs.

The NFOŚiGW Priority Programme “Efficient use of energy” with PLN 820 m allocation for energy audits and energy efficiency investment resulting from the audits was the largest available FIs. The take-up by enterprises for this instrument was low – only 14 projects, including 13 strictly related to EE, have been financed and less than 50% of allocation has been used. Detailed information on the available instrument is presented in Appendix 6.

Based on the data from the WFOŚiGWs, 8 out of 11 provided support for enterprises, including large enterprises, in the EE with of a total value of PLN 560 m in the form of loans with a capital rebate option in some WFOŚiGWs (Śląskie and Podlaskie). Majority of the allocations came from the WFOŚiGW in Katowice (PLN 287.9 m) and Opole (PLN 183.8 m).

¹²⁷ Financial data on the WFOŚiGWs’ operations in this chapter are based on the responses to the questionnaire provided by 11 of 16 WFOŚiGWs during this ex-ante study.

¹²⁸ „Analiza korzyści i ograniczeń przy zastosowaniu inżynierii finansowej jako instrumentu wsparcia projektów inwestycyjnych z zakresu energetyki”, Ecorys Polska Sp. z o.o., December 2012.

¹²⁹ „Identyfikacja problemów i barier w realizacji IX I X Priorytetu POIiŚ w ocenie wnioskodawców, pogłębiona o analizę przyczyn braku spełnienia Kryteriów Oceny Projektów przez projekty odrzucone w Działaniach 9.4, 9.5, 9.6 i 10.3 POIiŚ”, Agrotec Polska Sp. z o.o., November 2013.

Key lessons learnt from public support of energy efficiency in enterprises

- Companies refrained from large capital investments (including EE) due to economic crisis and unpredictable business environment.
- Relatively low level of trust in energy audits and their recommendations limited the interest of decision-makers in enterprises to launch significant capital investments in the EE projects.
- Generally, enterprises are more interested in the EE investments that are closely related to their core business.
- Leaders in their sectors finance most of investment from their own funds or with corporate debt (likely investments with the lowest CAPEX to achieve energy savings and short payback periods).
- Relatively low interest in the NFOŚiGW loan instrument - among reasons indicated by applicants were too restrictive administration requirements related in particular to ecological effect verification and so called “project durability” obligation and, not surprisingly, a lack of a grant incentive.
- Projects supported by the NFOŚiGW with preferential loans have very different characteristics - very short and very long payback periods (from 2 up to 27 years) as well as negative, but also very high positive DGC (from minus 475 up to 6,654), which shows that the project economic viability was not a key factor influencing support decisions. It is recommended that these parameters were taken into account while determining the intensity of support in designing the FIs parameters.
- Energy efficiency is still not a well-recognised area for enterprises, thus requires additional incentives (one of them is a modified “white certificate” system envisaged in the new Act on EE) but also promotion of good practice and advisory support in projects preparation on the basis of energy audits.
- Still pending works on the new Act on EE does not allow for predicting its real impact on the EE market and enterprises behaviours and needs. The “white certificate” system should be complementary to other schemes, esp. FIs. Thus, it is required to monitor the legislation process and implementation of the regulation and adjust FIs under the OPI&E, if required.

5.1.4. Experience from providing support to EE in buildings in Poland

Financial resources to support EE in residential buildings¹³⁰ have been mainly available from the TRF managed by the BGK and, to a much lower extent, from WFOŚiGWs funding (predominantly WFOŚiGW in Katowice).

TRF of the BGK

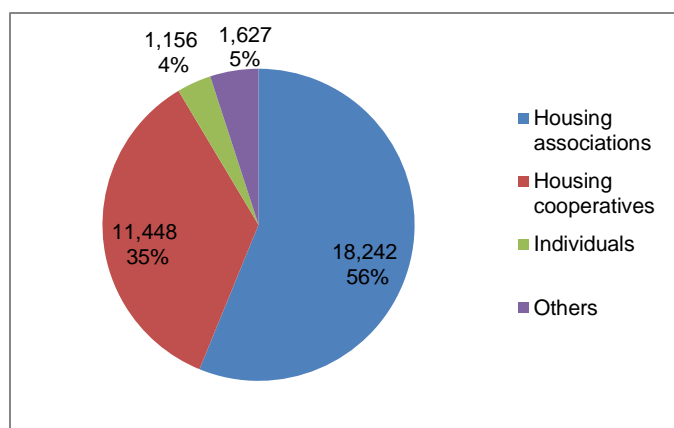
TRF is a widely recognised instrument that granted 32,473 premiums with a total value of PLN 1.774 m over the period of 1999 and 2014 with a majority of them as the thermomodernisation premium (89% of all premium granted and 88% in respect of value – PLN 1,562.7 m).

¹³⁰ In the Programming Period 2007-2013, support for deep thermomodernisation was not a priority and the public sector was an only eligible beneficiary in EE-related investments in buildings under the ESIF (9.3 OPI&E and ROPs 2007-2013 via grants). The NFOŚiGW provided support under the GIS (via grants and supplementary loans to cover own contributions) - but also only to the public sector – for details, please see Appendix 6. Under ROPs 2007-2013, some thermomodernisation work in the common parts of buildings were eligible for support, but only as a small part of refurbishment projects, so this is excluded from the lessons learnt.

Under the OPI&E 2007-2013, 40 thermomodernisation projects (130 in the public sector) have been supported with grants to the total value of PLN 421.7 m (i.e. 72% of the total investment cost). The total cost of supported investments was PLN 585.2 m. All supported projects should bring about energy savings of 264 677.6 MWh/year, which is, on average, 55% of energy savings (min. 42% and max 77%), with a minimum requirement for projects being 30%.

Another instrument for the public sector, launched in 2010 by the NFOŚiGW, was the GIS on EE with a grant up to 30% of the eligible costs, and a preferential loan of up to 60% of the eligible costs, with the minimum energy savings of 40%. Under the scheme, 317 grant agreements (out of 620 applications) were signed for the total amount of PLN 472,2 m, and 211 loan agreements for the total amount of PLN 439,5 m. The investments should result in 646 111 MWh/year energy savings (on average, 60% of energy savings). See Appendix 6 for a detailed description of the instrument.

Figure 67: TRF



The total investment supported under the TRF amounted to PLN 11,124 m with commercial banks loans providing funding of PLN 8,658 m, which gives a leverage effect of thermomodernisation premium at the level of 4.9. Total value of energy savings achieved as a result of the investments is PLN 932.2 m. The TRF allocated its available funds in full every year. The BGK continues providing the premium in 2015 with an annual allocation of PLN 120 m.

The BGK has been cooperating with 13 commercial banks that lend money at their own risk. The BGK pays a thermomodernisation premium after an investment is completed and an ecological effect confirmed. The cooperation with the commercial banks works well with the thermomodernisation premium being a well-recognised product among the banks' customers.

However, the TRF parameters do not encourage very high energy and ecological outputs. The majority of projects supported by TRF do not facilitate deep thermomodernisation. The TRF does not provide financial preferences for projects with higher energy efficiency results.

See *Appendix 6* for a detailed description of the TRF.

WFOŚiGWs loans

The majority of the WFOŚiGWs have long-term experience in supporting EE in residential buildings, but not all of them are active in this area. Based on the data received, 11 of 16 WFOŚiGWs spent almost PLN 240 m in loans with a capital rebate option (up to 20-40%) in some regions (e.g. Śląskie and Świętokrzyskie). 90% (PLN 216 m) of this allocation comes from the WFOŚiGW Katowice, and the second largest from WFOŚiGW Kraków (PLN 15.5 m). Hence, EE support from all the remaining WFOŚiGWs is limited and amounts to PLN 8.5 m.

The WFOŚiGWs offer preferential loans both to housing cooperatives (*spółdzielnie mieszkaniowe*) and housing associations (*wspólnoty mieszkaniowe*). Discussions with the WFOŚiGW representatives (Śląskie), showed that the vast majority (well over 90%) of their clients are housing cooperatives. This is mainly due to the WFOŚiGW limitations in accepting collateral. As housing associations have no assets to collateralise, they find it challenging to offer sufficient collateral to the WFOŚiGWs. The latter, unlike most of the commercial banks, expect assets (i.e. real estate) to be mortgaged to secure loans. This route, however, is possible for housing cooperatives which have their own assets to collateralise.

Key lessons learnt from public support for EE in housing

1. The investment in EE should be socially acceptable and should prevent energy poverty. Thus, it is recommended to consider grants to support excessive payback periods and help out with affordability, i.e. to mitigate the risk of rent increases, if the saving streams are not sufficient.
2. As a well-recognised instrument, the TRF might compete with OPI&E instruments. Therefore, both instruments should be coordinated to avoid cross-cannibalisation. It is recommended that competition between these instruments is avoided (e.g. by merging them) to reduce administrative costs of implementation and increase transparency of public support.
3. The experience and delivery structures of the TRF and the WFOŚiGWs are relevant to the implementation of the OPI&E instruments, and they should be considered for EE support instruments. The TRF mechanism (cooperation with commercial banks providing loans for investment, which ease beneficiaries access to finance) could be taken into consideration as an implementation option for support of EE in housing. One could also consider involving experienced WFOŚiGWs, alongside commercial banks, as loan providers from their own resources.
4. Other EE support instruments, such as GIS for EE in public buildings, delivered relatively higher energy savings (required min. 40% energy savings for projects to be supported – the average energy savings achieved at ca. 60%). The requirements for minimum energy savings for OPI&E instruments should be benchmarked against these lessons learnt, taking into consideration differences in buildings characteristics.
5. Experience shows that collateral requirements are crucial for the success or failure of FIs availability to the final recipients. Collateral requirements of banks (cooperating with the BGK) are laxer than the ones employed by the WFOŚiGWs (using public resources requires more comprehensive collateral). Housing associations are not able to provide any substantial collateral for loans, and so typically are not among the beneficiaries of the WFOŚiGWs' loans, In contrast, the associations are the main customers for the thermomodernisation premium offered by the TRF.
6. The amount of energy, the ecological effects, and the cost of energy savings to be achieved under EE investment, together with pay back periods, should be taken into account when drafting the parameters for OPI&E FIs, especially with regard to intensity of support.

5.1.5. Experience in supporting waste to energy initiatives in Poland

Public support for waste incineration projects is strictly related to the OPI&E 2007-2013, within which six investment projects, and three technical assistance projects, were supported by grants.

In complementary support to the OPI&E beneficiaries, the NFOŚiGW offered them preferential loans to cover their own contributions (covering eligible costs). As discussed in Chapter 3 *Analysis of Market Failures, Sub-optimal Investment Situations and Investment Needs*, all six projects used intensive grant support, and 5 out of 6 also used the NFOŚiGW loans. Detailed information on all instruments available for the waste incineration plants is given in Appendix 6.

Key lessons learnt from providing support to waste to energy (waste incineration plants)

1. The experience of the Poznań PPP waste project shows that waste incinerators can be developed as PPPs.
2. PPP implementation could meet the municipalities requirements for out-of-public-debt financing. This does not apply to waste incinerators developed in the traditional way and co-financed with loans from the NFOŚiGW: they require municipality's guarantee (surety) as collateral.
3. Waste incinerators require grants to meet affordability requirements.
4. Waste incineration investments may require technical assistance for project preparation, especially if the PPP route is envisaged.
5. Investment preparation, including administrative procedures (permits, assurance of waste stream delivery, public procurement) and implementation show that such projects are very time consuming. This could limit a number of projects to be completed by 2023 due to eligibility rules and ex-ante conditionalities.
6. Over 2010-2014, there was no interest from the local government or municipal companies for loans (not linked to grants) to support construction of waste incinerators.

5.2. Lessons learnt from implementing FIs targeting low carbon economy in other Member States

As of 31 December 2013, there were 32 FIs covering specifically EE and RES in 11 Member States (out of 872 FIs in total, i.e. 4.2%). Out of 32 FIs, 8 were implemented through Holding Fund (“HF”) structures, 7 were specific funds implemented through a HF, and the remaining 17 were specific funds without a HF.

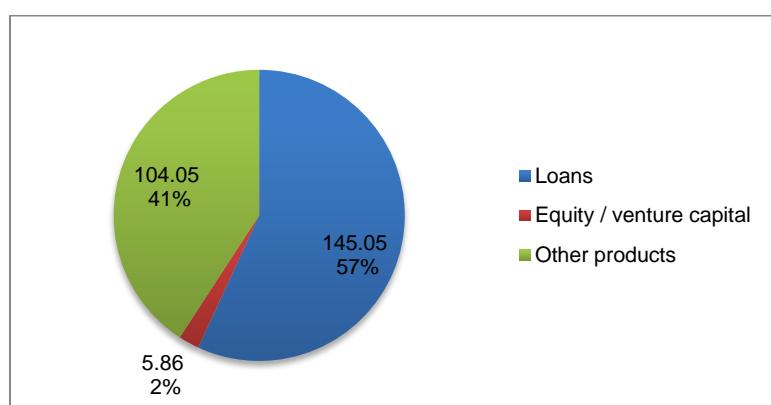
Table 68: FIs for EE and RES set up (end of 2013)

Member States	Number of FIs	out of which HF	out of which specific funds with a HF	out of which specific funds without a HF
BG	1	0	0	1
CZ	1	1	0	0
DE	1	0	0	1
DK	2	0	0	2
EE	1	0	0	1
EL	2	1	1	0
ES	2	1	1	0
IT	10	4	4	2
NL	3	1	1	1
SK	1	0	0	1
UK	8	0	0	8
Total	32	8	7	17

Source: Summary of data on the progress made in financing and implementing financial engineering instruments-financed by Structural Funds, EC, September 2014

Most of the funds tended to focus on retrofitting existing buildings and other fixed assets to reduce energy consumption, including renewable energy upgrades in existing buildings. The main type of products offered by the FIs in terms of volume were loans, followed by equity investments and other financial products, as shown in the table below. None of the specific FIs for EE and RES offered guarantees.

Figure 69: Types of FIs in the EU for energy efficiency and RES



Source: Summary of data on the progress made in financing and implementing financial engineering instruments co-financed by Structural Funds, EC, September 2014

In addition, some JESSICA FIs, operating in urban development, also provided financing for investments in EE and RES as part of integrated, sustainable urban projects. A brief overview of several FIs that could be relevant in the Polish context is provided below, together with links for further reading.

5.2.1. Slovak Energy Efficiency and Renewable Energy Finance Facility (SlovSEFF)

The Slovak Energy Efficiency and Renewable Energy Finance Facility (SlovSEFF) is a joint initiative between the EBRD and the Slovak Government, supporting investments in EE for industry, EE for housing and development of RES. In the first phase of the scheme (2007-2009), the total allocation of the EBRD's credit line was EUR 60 m, with almost 300 projects supported.

The first phase was extended with an additional EUR 90 m as SlovSEFF II (2010-2013), where loans between EUR 20,000 and EUR 2,500,000, and grants between 7.5% and 20% of the loan amounts, together with free technical assistance were all available through local banks to private enterprises and housing associations implementing EE and RES projects. Almost 600 projects were completed in the residential sector, resulting in a refurbished floor area of more than 2.5 million m². More than 86,000 people benefitted from lower energy bills and better thermal comfort, with annual primary energy savings exceeding 580,000 MWh. The beneficiaries achieved an average energy saving of 33%, whereas “deep renovation” led to a “substantial decrease” in energy consumption, ranging from 30 to 60%.

The key success factors for the SlovSEFF have been the combination of loans with grant support and technical assistance. The free technical assistance, such as consultancy services and incentive payments, was funded by grants. Sub-borrowers were eligible to receive incentive payments calculated as a percentage of the sub-loan amount, based on independent verification. The SlovSEFF model has, therefore, proved effective as a one-stop-shop for the borrowers. It has provided a fully integrated package of loans, grants and technical assistance.

Lessons may also be learnt from the swiftness of resource allocation within the Slovakian JESSICA initiative. It was implemented in 2013 and focused solely on EE in residential buildings, with the funding of EUR 11.5 m. Within 4 months of the first call, registered applications covered more than 75% of the funds allocated to the JESSICA instrument, and rose to 95% by the end of 2013¹³¹. Although the FI had its shortcomings, e.g. its failure to leverage additional sources of private finance, its quick implementation shows the importance of appointing a fund manager with a very good knowledge of the local market (including investment needs and market failures) and an ability to work in close co-operation with the beneficiaries.

Relevance to the Polish OPI&E

- Swift implementation thanks to transparent products and simple procedures adopted;
- One-stop-shop approach – funding (both commercial and grants) as well as technical assistance in one product “packaged” for the final recipients/beneficiaries;
- Key role of a fund manager with relevant experience and local network that facilitates access to the potential beneficiaries – therefore, it is advisable to consider using the existing network of the TRF and the WFOŚiGWs in Poland.

¹³¹ SFRB (2014a): Výročná správa o postupe implementácie iniciatívy JESSICA. Štátny fond rozvoje bývania.

5.2.2. Estonian Renovation Loan Fund for Apartment Buildings

The Estonian Renovation Loan Fund for Apartment Buildings was the first of its kind to be established using EDRF. Managed by KredEx, the state-owned non-profit guarantee fund, it was set up in 2009 with the ERDF contribution of EUR 17.74 m and another EUR 48.97 m coming from national public resources. All these resources were transferred to two local banks which offered loans (interest rate approx. 4.2% fixed for 10 years, tenor up to 20 years) to housing associations to finance renovation works which improve the thermal performance of buildings.

The Fund took advantage of the existing synergies with other KredEx financial products. For instance, apartment associations could fund 50% of a compulsory energy audit through a separate grant scheme. A KredEx grant could also cover costs of project preparations based on the energy audit, such as technical inspection, building design documentation, advice, consultancy, and coaching. There was also synergy with the grants, loans and guarantees that apartment associations could use to fund their own 15% contributions to the renovation loan scheme. In addition, housing associations could also obtain KredEx guarantees when applying for a loan. It could also be combined with other schemes offering free advice on project preparation, as well as with rebate-type grants based on the energy efficiency achieved¹³². By November 2014, 619 apartment blocks with over 22,000 apartments became more energy-efficient with an improved living environment through this scheme.

The main success factor behind this scheme was the combination of financial products to address needs of end users and to fill in the market gap. The products mix included grants for technical documentation to help projects off the ground, advantageous loans to fund projects, technical assistance to guide recipients through implementation, and grants to help recipients save as much energy as possible.

Relevance to the Polish OPI&E

- Implementation of a mix of financial products to address the needs of end users (especially affordability issues) and to fill in the market gap. The same principle to be used by the OPI&E – use grants and commercial loans to address affordability issues and ensure EE, including „deep thermonomodernisation” where feasible.
- Good leverage of funds and skills of local KredEx and local commercial banks – to be possibly replicated by the use of the existing BGK and WFOŚiGWs structures.
- Importance of clear rules and guidelines for banks and end users that made the FI comprehensible and user-friendly.

5.2.3. Lithuania Fund for Energy Efficient Housing Renovation

The EUR 227 m (EUR 127 m from the ERDF and EUR 100 m from the EIB) Fund for Energy Efficient Housing Renovation was established under JESSICA Holding Fund managed by the EIB. Private co-investment in the fund comes from domestic and Scandinavian commercial banks through which the loans are awarded at preferential terms, i.e. with a fixed interest rate up to 3%, 2-year grace period for capital repayment during construction works, maturity up to 20 years, and no third party guarantee required. These loans are combined with grants to prepare technical documentation (100% of the underlying costs) and, exceptionally, 100% subsidy on all expenses for low-income persons. Up to date, 800 multi-apartment buildings have signed loan contracts for a total value of EUR 180 m, 7,500 apartments have completed EE modernisation works, and 33,500 apartments are undergoing works. The energy savings have

¹³² If total energy savings after the renovation proved to be 20 to 30%, then 15% of the loan principal could be transformed into a grant. For energy savings of at least 40%, the direct grant was 25%, while apartment owners would get a grant covering 35% of their costs, if they achieved at least 50% energy savings. These grants were not offered as part of the same financial instrument, but funds came from the sale of carbon credits.

reached 65% on average. Due to the successful implementation of the scheme so far, the EIB decided to award an additional loan of EUR 40 m to the fund in September 2013¹³³.

Relevance to the Polish OPI&E

- Good leverage of private funds of local and international commercial banks thanks to attractive terms and conditions that refer to EE project characteristics (including extended tenors and reduced margins) – to be possibly replicated in Poland, given its efficient banking sector and a good track record of cooperation between the commercial banks and the BGK on the TRF.
- The key challenges throughout the implementation process were: extensive programme start-up time, a voting majority needed to implement the project for multi-apartment buildings renovation, need for municipalities' involvement and for the capacity of municipal administrators to implement renovation projects. The Fund and its intermediaries assisted the national authorities in public relations campaigns on EE in multi-apartment buildings. Most of these challenges will also be relevant to the current OPI&E. Hence, the role of experienced intermediaries with good understanding and contacts in the local markets will be of key importance.

5.2.4. London Green Fund

Established in 2009, the London Green Fund (“LGF”) invests in carbon reduction projects in line with the Climate Change component of the London Plan. Managed by the EIB on behalf of the Greater London Authority (“GLA”), there are three UDFs: Foresight Environmental Fund (Waste); London Energy Efficiency Fund (“LEEF”); and Greener Social Housing. The total size of this FI is EUR 479.7 m, including EUR 70.8 m from the ERDF, EUR 59 m of regional public funding, EUR 112.1 m of private funding and EUR 236 m from the EIB loan. The investment strategy is to support viable but not commercially attractive public and private sector waste management and decentralised energy and EE projects across all 33 London Boroughs.

The financing for EE investments consists of loans of up to 12 years, targeting investments from EUR 3.5 to 11.8 m. The Fund has focused initially on the provision of senior debt with two types of repayment model: (i) payment of interest only, once the loan is drawn down with the repayment of the capital later or (ii) payment of capital and interest at the outset. Mezzanine loans and equity are also available depending on the project financing structures and State aid considerations.

As regards waste, the Fund offers equity, normally with a limit of 10% of the Fund. There is no formal “soft support”, such as technical assistance, advice, mentoring, grants for preparatory steps, etc. combined within the LGF. However, the Fund Managers provide an informal advisory service to projects on the use of the Fund. In addition, ELENA (European Local Energy Assistance, run by the EIB and funded by the EC) supports two programmes (RE:FIT and RE:NEW) to assist with the development of EE projects. To date, the LGF has invested EUR 117 m in 15 projects, with a combined project value of EUR 800 m.

Relevance to the Polish OPI&E

- The experience and knowledge of the Holding Fund manager was the key success factor for credibility and confidence of the LGF, of the GLA as MA, and of private sector investors. An independent investment board provides critical value, by steering the process, adjusting the investment strategy and providing sound decision

¹³³<http://www.eib.org/about/press/2013/2013-136-further-support-from-eib-for-energy-efficient-housing-renovation-in-lithuania.htm>

making, long term vision, and securing commitment of stakeholders to meet the challenges in establishing and delivering the fund. A mix of skills and experience at governance levels, including through financial intermediaries operating for each specific investment area, is also crucial for success.

- This FI is most relevant to the planned FIs investment strategy in the RES sector where subordinated debt is envisaged. As in the case of LGF, financial intermediaries need to have relevant experience and track record in the specific area of project financing for RES.

5.3. Conclusions

The analysis of the experience of Poland's current and past financing schemes, augmented by the comparative experience in other EU countries over the 2007-2013 Programming Period, shows that the following lessons should be taken into account while preparing OPI&E FIs in the areas covered by this Report:

Table 70: Lessons learnt and recommendations

Challenge	Recommendation
<p>1. ‘Grant mentality’¹³⁴: Although considerable amount of support was already provided via FIs, it constituted only 1.6% of the total EU contribution under the National Cohesion Policy in the Programming Period 2007-2013. Historical use of grant-funding has been considered a major challenge and barrier to the successful implementation of FIs both on the side of investors, who naturally prefer grant support over repayable support, and of administrations (national or regional) who have traditionally employed grants as the preferred method of Structural Funds’ disbursement.</p>	<p>Recommendation: due to natural preference of beneficiaries for grant funding, it is of key importance to avoid potential competition of FIs with grants and/or other more beneficial forms of funding (in particular from the ESIF and national resources, including the NFOŚiGW, WFOŚiGWs and the BGK). Demarcation lines must be negotiated, strictly observed and continually monitored.</p>
<p>2. Awareness-raising and market-enabling activities: Because FIs are a relatively new concept in some areas, many of the potential market participants lack adequate understanding of the requirements involved, or their potential benefits, including the institutional set-up, administrative procedures, funding requirements etc. This lack of understanding may represent a significant barrier to the implementation of FIs.</p>	<p>Recommendation: given the limited experience of potential final recipients but also financial institutions in respect of the ESIF instruments, awareness-raising and market-enabling activities should be included by the MA/respective IBs in their implementation plans. Capacity building should be focused on technical assistance for specific projects, along with seminars and consultations with stakeholders, to better familiarise them with FIs.</p>
<p>3. Hybrid financial products: Introducing hybrid products combining FI products with non-repayable support, such as grants for the technical support and for co-financing of products, would allow FIs to better meet the specific needs of different kinds of projects. In addition, these hybrid types of products may also have the benefit of lowering financing costs, thus enhancing the impact of ESIF and national contributions. These structures proved working in several Member States and should allow for a smooth transition from grant-dominated environment.</p>	<p>Recommendation: depending on the implementation models to be applied for FI, use of new types of instruments (as subordinated loans in the case of RES) may require additional support for institutional capacity development or choosing new institutions to ensure adequate experience in the FI implementation. The role of experienced financial intermediaries was of key importance to several FIs in low carbon economy in Poland and other Member States.</p>
<p>4. Optimising leverage level: It is essential that FIs are designed to maximise the share of external resources to increase the leverage of the public support. The experience from the Programming Period 2007-2013 show that leverage was not the major objective of employing the ESIF, especially in the new Member States.</p>	<p>Recommendation: implementation structure with intermediate bodies which would contribute their own resources, would not only increase the impact of their funding but also the use of their know-how and expertise in financing of investments.</p>
<p>5. Project pipeline quality: Experience of financial intermediaries shows a relatively poor quality of project pipeline that led to delays in project implementation and in consequence to a shortfall in demand.</p>	<p>Recommendation: Introduction of FIs should be accompanied by measures to promote the development of an adequate pipeline of mature, feasible projects. Technical assistance should be applied to support project beneficiaries in project during the pre-development phase when crucial project documentation needs to be prepared, such as feasibility studies, cost-benefit analyses and other technical documentation on which the merits of their projects will be assessed.</p>

¹³⁴ Evaluators in Lithuania noted that the shift from grants to loans, or investments into equity, would be “mentally difficult” and require considerable technical assistance. It should be noted that the financial crisis also had an impact on the banking sector. Hence, there was interest in utilising JESSICA-type of funding from potential investors. Studies from Poland and Hungary supported the Lithuanian experience. Although there was strong interest in JESSICA in the Zachodniopomorskie Region, direct EU funding continued to be the most attractive source of project co-financing due to its non-repayable character, despite the significant formal requirements involved, which made them less attractive to private entrepreneurs¹³⁴. A study on the Łódzkie Region found that due to the perceived low attractiveness of JESSICA in comparison to “traditional” EU funding, there was lower interest initially. Furthermore, the JESSICA evaluation report for Hungary stated that, “until EU grants are available with low own resource proportion for urban regeneration, those projects which fit into the requirements of the grant, will not be motivated to use the JESSICA sources.” Also, financial intermediaries for JESSICA in Poland, who shared their experience of implementing FIs, noted a significantly raised recent interest in FIs, once grants were no longer available.

See also:

JESSICA Evaluation Study for Lithuania, Europos socialiniai, teisiniai ir ekonominiai projektai (ESTEP), 2009.

Evaluation Study: Implementing JESSICA Instruments in West Poland, ARUP & Partners International Limited, 2009.

Evaluation Study: Implementing JESSICA Instruments in Łódzkie Voivodeship, Poland, Deloitte, 2011.

Evaluation Study - Implementing JESSICA Instruments in Hungary, Final Report, Mazars, 2011.

Additionally, special attention should be given to the following to make the process of implementing the OPI&E instruments as streamlined as possible, including marketing and early buy-in from stakeholders.

- **Evaluation and monitoring of the OPI&E instruments performance:** the MA should ensure that financing is linked to, if not made conditional on, meeting performance indicators. The OPI&E instruments should be designed to include performance-tracking indicators to give the MA assurance that the allocated funding has impact on the targeted areas. For EE investments, delivery of funds should be made conditional on the results of a certified energy audit and energy savings achieved. More generally, collecting performance data would help the MA to monitor if their funds are achieving the intended goals, and would help the IB/IB2 adjust their approach, if a given product is underperforming.
- **Need to reduce the administrative burden:** Lessons learnt show that the administrative burden involved in funding applications should be minimised. The time, effort and cost spent on meeting administrative requirements for the ESIF were frequently mentioned as significant obstacles by stakeholders. Reducing this burden is the responsibility of not only the relevant MA and IBs/IB2, but also of the financial institutions. The latter could help the final recipients with the assessment procedures and other requirements. Clear rules and guidelines for banks and end users, particularly for eligibility and State aid, could make the OPI&E instruments effective and user- friendly.
- **Involving and obtaining buy-in from stakeholders:** In residential housing renovation projects, problems with getting the owners to cooperate on financing renovation projects has been a constant theme in JESSICA evaluation studies. In Lithuania, it was extremely challenging to achieve joint agreements of all multi-apartment houses residents, as they tended to focus on the maintenance and upgrades of their private apartments, and less so about building improvements (e.g. walls insulation, pipes replacement, etc.¹³⁵). In Romania, the odd mix of income groups living in one building made unanimous decision-making difficult, with low-income families unable to afford EE-related outlays¹³⁶. In Slovakia, many elderly residents of residential buildings put up resistance to EE investments, especially to the financially demanding maintenance and thermal insulation works¹³⁷. Consideration, therefore, needs to be given to how best to overcome the problems of low affordability, and/or low interest of apartment owners, in spending money on EE in their buildings.

¹³⁵ JESSICA Evaluation Study for Lithuania, Europos socialiniai, teisiniai ir ekonominiai projektai (ESTEP), 2009.

¹³⁶ Investor Interest And Capacity Building Needs, Economic Commission For Europe, Financing Energy Efficiency Investments For Climate Change Mitigation Project Investor Interest And Capacity Building Needs, United Nations, 2009.

¹³⁷ Evaluation Study: Implementing JESSICA Instruments in Slovakia, Final Study, Obviam Regio, Energy Centre, 2010.

6. PROPOSED INVESTMENT AND IMPLEMENTATION STRATEGY

This *Chapter 6 Proposed Investment and Implementation Strategy* sets out a proposed investment strategy in relation to the ESIF support in the four sectors discussed in this Report.

It is important to emphasise that the proposed investment strategy (“PIS”) offered here is indeed a proposed one and, therefore, not meant to be restrictive. Even though the OPI&E resources suggested for the FIs/grants are considered as being most suitable, the present PIS does not seek to restrict the MA from directing other OPI&E resources towards other FIs/grants, or indeed from applying alternative solutions.

The analysis and recommendations pertaining to all financial support - including grants, repayable financing, technical assistance and various forms of financial instruments – and also to different implementation options, have all been made on the basis of the current allocations to the relevant Investment Priorities, as defined in the OPI&E and the associated documents. Should those allocations increase in any material way in the near future, supplemental analysis could be carried out to reassess the structuring and implementation of grants and FIs combined, and alternative options could be more appropriate, such as involving grants and FIs for EE in housing.

In order to avoid repetitions with respect to *Chapter 4 FIs description - assessment of value added and additional public and private resources to be raised by FIs*, this chapter includes cross-references to Chapter 4 with respect to the financial products to be offered, financial recipients targeted, and combination with EU grant support.

6.1. Financial products to be offered

As described in *Chapter 4 FIs description - assessment of value added and additional public and private resources to be raised by FIs*, different forms of EU support should be considered under the OPI&E depending on the specific OPI&E measures / operations discussed in this Report. The table below gives a summary of the proposed forms of support.

Table 71: Forms of the EU support for specific measures under the OPI&E

	Sub-measure 1.1.1 Investments into RES	Measure 1.2 EE in large enterprises	Sub-measures 1.3.2 and 1.7.1 Investment in EE in housing	Measure 2.2 Waste Management
FIs	FI subordinated loans	FI preferential loans	N/A	N/A ¹³⁸
EU grants	N/A	N/A	Investment premium	Grant of up to approx. 50% of eligible costs
Technical assistance	N/A	Grants up to 5% of the entire allocation	Grant up to PLN 0.1 m per project	Grant of up to PLN 6 m per project

Chapter 4 FIs description - assessment of value added and additional public and private resources to be raised by FIs provides detailed characteristics of each proposed form of support, including its value added, detailed structure, proposed pricing (if applicable), proposed security package (if applicable), SWOT analysis and potential leverage.

No use of the off-the-shelf financial instruments outlined in Article 38 (3)(a) of the CPR has been envisaged.

¹³⁸Preferential stand-by loans to be provided by the NFOŚiGW.

6.2. Financial recipients and beneficiaries targeted

As described in *Chapter 4 FIs description - assessment of value added and additional public and private resources to be raised by FIs*, different entities have been indicated as financial recipients of FIs and beneficiaries of the EU grants. The table below gives a summary of the proposed classes of the final recipients and beneficiaries.

Table 72: Final recipients and beneficiaries of the EU support under the OPI&E

	Sub-measure 1.1.1 Investments into RES	Measure 1.2 EE in large enterprises	Sub-measure 1.3.2 Investments in EE in housing and sub-measure 1.7.1 Promoting EE in residential buildings in the Śląsko-Dąbrowska Conurbation	Measure 2.2 Waste management
FIs	Enterprises winning RES auctions and seeking debt financing in the project finance formula	Large enterprises carrying out EE investments, apart from the ones from the sectors excluded by the State aid regulations	N/A	N/A
EU grants	N/A	N/A	Housing cooperatives, housing associations and ESCOs (carrying out EE projects in housing) in regional ITIs and sub-regional cities	Municipalities carrying out incineration projects in PPP model (or other models if PPP not feasible)
Technical assistance	N/A	Large enterprises carrying out EE investments, apart from the ones from the sectors excluded by the State aid regulations	Housing cooperatives, housing associations and ESCOs (carrying out EE projects in housing) in regional ITIs and sub-regional cities	Municipalities carrying out incineration projects

6.3. Envisaged combination with EU grant support

As described in *Chapter 4 FIs description - assessment of value added and additional public and private resources to be raised by FIs*, no combination of FIs and EU grants available under the OPI&E is envisaged¹³⁹ within the specific OPI&E measures discussed in this Report. However, in each of those measures, participation of private funds has been envisaged, with the anticipated leverage computed. Accordingly, the table below gives a summary of the proposed combination of FIs and EU grants with private funds.

Table 73: Combination of FIs and EU grants (available under the OPI&E) with private funds

	Sub-measure 1.1.1 Investments into RES	Measure 1.2 EE in large enterprises	Sub-measure 1.3.2 Investments in EE in housing and sub-measure 1.7.1 Promoting EE in residential buildings in the Śląsko-Dąbrowska Conurbation	Measure 2.2 Waste management
FIs	FI - subordinated loans to cover the equity gap	FI - preferential loans to finance EE projects	N/A	N/A
EU grants	N/A	N/A, but grants for technical assistance up to 5% of allocation	EU grants as investment premium to cover CAPEX which may not be repaid from energy savings	EU grants to cover approx. 50% of eligible costs Technical assistance of approx. PLN 6 m per project
Private funds / other sources	Equity capital and commercial debt	Obligatory commercial debt for projects with CAPEX above PLN 50 m	Commercial debt, WFOSIGWs, own funds	Equity capital and commercial debt
NFOŚiGW funds	N/A	N/A	N/A	FI- stand-by preferential loans, potentially senior debt

6.4. Entities to be entrusted with the implementation of EU support

As described in *Chapter 4 FIs description - assessment of value added and additional public and private resources to be raised by FIs*, different entities have been suggested to manage the relevant EU forms of support, depending on the specific OPI&E measures discussed in this Report. The table below gives a summary of those entities.

¹³⁹ In respect of the EE in large enterprises measure, FI preferential loans are combined with grants provided for technical assistance.

Table 74: Forms of EU support for specific measures under the OPI&E

	Sub-measure 1.1.1 Investments into RES	Measure 1.2 EE in large enterprises	Sub-measures 1.3.2 and 1.7.1 EE in housing	Measure 2.2 Waste Management
Proposed entity	Multilateral financial institution (e.g. EIB)* or commercial bank	NFOŚiGW or multilateral financial institution (e.g. EIB)*	NFOŚiGW (1.3.2) WFOŚiGW in Katowice (1.7.1)	NFOŚiGW

* Please refer to Appendix 7 for details on alternative implementation options with the EIB as the implementing body.

6.4.1. Financial institution - FIs in RES

As discussed in Chapter 4, Section 4.1 FI Description for RES, an institution to be entrusted with the implementation of the FI subordinated loans in RES (i.e. the body implementing financial instruments or beneficiary in the CPR terminology), should have extensive experience in funding RES projects in the project finance model, and in subordinated debt structures (i.e. mezzanine financing). In addition, it should have a good understanding of the new RES auction system, and the capacity concurrently to deal with multiple investors whose RES projects won an auction and are eligible for RES subordinated loans. Furthermore, this institution would need to be familiar with senior debt loan documentation typically used in the RES projects, preferably under the Polish and English law¹⁴⁰. If this institution was also providing senior debt to projects, it should have efficient tools in place to avoid any conflict of interest with the FI subordinated loans. Finally, all the specific criteria should be met, as listed in the CPR and all other implementing rules, particularly in article 7 of the Commission Delegated Regulation (EU) No. 480/2014 (“CDR 480”)¹⁴¹.

Consequently, commercial banks or multilateral financial institutions (i.e. the EIB or the EBRD) could potentially be considered. Given that many of the commercial banks have not been recently active in the RES market, and that they are still to carry out their in-depths analysis of the new RES auction system, multilateral financial institutions could be a better option.

As the first auctions should take place in the first quarter of 2016, the process to select the entity which would implement the FIs should be launched and completed as soon as possible. The selected entity should be capable of setting up the relevant internal processes without delay.

In addition, before the selected entity becomes fully operational with the FI subordinated loans, it would be necessary to prepare and approve the general terms and conditions for the loans. They should be made available to the potential bidders before the first auction under the RES support system is launched.

6.4.2. The NFOŚiGW- the remaining measures under the OPI&E

The NFOŚiGW has been named in Chapter 4 FIs description - assessment of value added and additional public and private resources to be raised by FIs as the institution well-suited to be entrusted with the implementation of EU support in respect of measure 1.2 EE in large enterprises, sub-measure 1.3.2 Investment in EE in housing and measure 2.2 Waste Management.

¹⁴⁰ Many RES projects, which have been so far financed in Poland, have used English law to document financing arrangements in particular, where either foreign-based sponsors or multilateral financial institutions as the EIB or EBRD were involved.

¹⁴¹ Commission Delegated Regulation (EU) No 480/2014 of 3 March 2014 supplementing Regulation (EU) No 1303/2013 of the European Parliament and of the Council laying down common provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund, the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund laying down general provisions on the European Regional Development Fund, the European Social Fund, the Cohesion Fund and the European Maritime and Fisheries Fund, OJEU of 13.5.2014, L 138/5.

The NFOŚiGW, established in 1989, is an environmental protection fund. It operates as a public legal person under the Act on environmental protection of 2001¹⁴². It plays an important role in the Polish system of financing environmental protection initiatives. It has significant financial resources (the annual budget of PLN 6,356 m in 2015) and a sizeable institutional capacity (ca. 555 employees, including ca. 200 engineers).

The NFOŚiGW offers preferential loans, grants and other forms of investment support, inter alia, to self-governmental bodies, public entities, enterprises, community organisations, and individuals. It has been involved in the implementation of the OPs in the low carbon economy since Poland's accession to the EU in 2004. It is experienced in cooperating with other market players, including the WFOŚiGWs, banks and multilateral financial institutions.

Over 25 years (1989-2013) of operations, the NFOŚiGW has supported investments of PLN 130,000 m with public resources of over PLN 33,000 m from the national funds, and almost PLN 20,000 m from EU contributions.¹⁴³

The key strengths of the NFOŚiGW together with areas for improvement have been given in the table below.

Table 75: Key strengths and areas for improvement of the NFOŚiGW

Strengths	Areas for improvement
Long-term experience in cooperation with external entities (the WFOŚiGW, commercial banks, multilateral financial institutions) - potential leverage opportunities and access to the market.	Historically, relatively low recognition of the NFOŚiGW as a project finance lender.
Institutional capacity to support and manage financing of projects from different sources (EU, GIS, foreign financial institutions).	Relatively low flexibility on collateral accepted, difficult and time-consuming collateral establishment in the case of co-financing (esp. project finance).
Experience in combining different forms of support - grants, loans, premiums, liquidity provision for the WFOŚiGW and banks.	Need to utilise the resources of borrowers in the first place (<i>no pari-passu</i>).
Experience in supporting RES (ca. 100 agreements signed), EE in large enterprises (over 88 energy audits supported and 13 EE projects financed), EE in public sector (over 350 projects) and WtE (six waste incineration plants).	Relatively long assessment process of applications and projects approvals, however significant improvement over the last years (in the case of applications from ca. 235 days in 2012 to ca. 160 days in 2014).
Capacity and experience in assessing ecological effects of investments.	Additional requirements for beneficiaries (such as environmental effects and durability of projects) not flexible enough to compete with commercial lending.
Introduction of cost effectiveness criteria in project selection process for all support instruments (since 2015).	The onus to manage FIs on NFOŚiGW, which might cause issues with NFOŚiGW capacity and expertise to manage a very large FI programme in diversified sectors and making investments rather than providing grants – this may be mitigated by appropriate technical assistance support.
Additional NFOŚiGW resources available to co-finance with the EU support.	
Systematic organisational and management improvement since	

¹⁴² Uniform text, Dz.U of 2013, item 1232, as amended.

¹⁴³ <http://www.forum-ekonomiczne.pl/wp-content/uploads/2014/03/25-lat-NFOŚiGW.pdf>

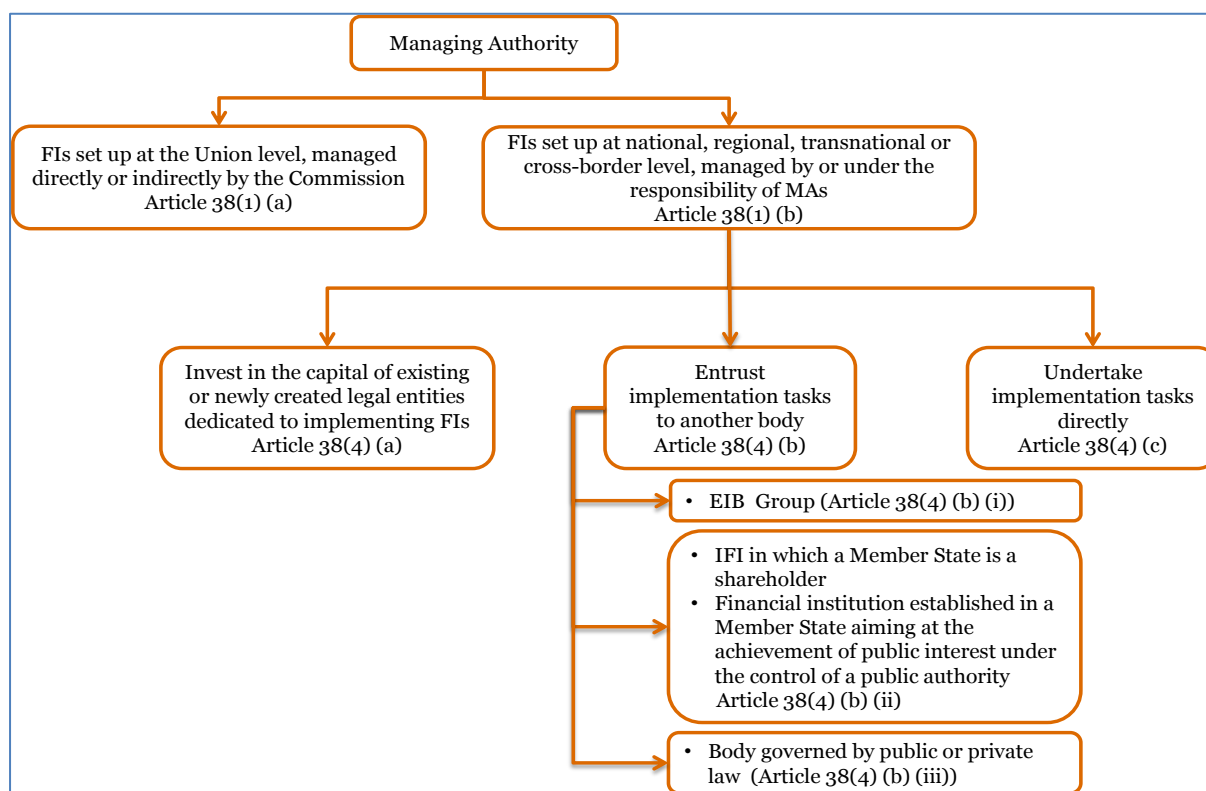
<p>2013, resulting from the external audits of processes, including implementation of EFQM (10 projects (inter alia on risk management, competences development, process management, financial planning) to be completed by the end of 2015).</p>	
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Given the above strengths and areas for improvement of the NFOŚiGW, combined with its experience in evaluating energy savings and environmental effects in different projects (including EE projects in public buildings and large enterprises as well as RES project), and also in providing support to waste incineration projects (including six projects currently under development) – the NFOŚiGW appears well-equipped to implement the proposed support instruments in all measures discussed in this Report, except for the proposed FI in the form of subordinated loans for RES projects.

6.5. Options for implementation arrangements regarding FIs

Article 38 of the CPR sets out different options for the implementation arrangements relating to the proposed FI investment strategy. They have been presented in the graph below.

Figure 76: FIs implementation options



Source: European Commission, EIB, PwC, 2014.

Consequently, FIs set up at the EU level will be managed directly or indirectly by the EC, whereas FIs set up at national and regional level will be managed by or under responsibility of a MA. FIs discussed in this Report will be developed at the national level within the OPI&E for which MID has been appointed as the MA in respect of the OPI&E.

As set out in article 38(4), when supporting FIs the MA may either:

- 1) invest in the capital of legal entities (existing or newly created) dedicated to the implementation of FIs and which will undertake implementation tasks (article 38(4)(a) of the CPR); or
- 2) entrust implementation to another body (article 38(4)(b) of the CPR); or
- 3) implement FIs directly (article 38(4)(c) of the CPR).

As discussed in Section 6.4 *Entities to be entrusted with the implementation of the EU support*, it has been recommended that specific bodies are entrusted with the implementation of FIs discussed in this Report (i.e. an experienced financial institution (multilateral financial institution or commercial bank) in respect of the RES subordinated loans and the NFOŚiGW in respect of the FI preferential loans for large enterprises). Accordingly, the MA should exercise option 2) above (i.e. to entrust implementation to another body).

Article 37(1) of the CPR implies that when entrusting implementation to another body, the MA may be obliged to comply, amongst others, with the public procurement rules. As such, the MA should ensure that all selection procedures are made in line with those rules. It should be noted that there are specific exemptions under Polish procurement regulations¹⁴⁴ concerning direct appointments of multilateral financial institutions (which could apply e.g. to the EIB or the EBRD) and direct appointment of “in-house” entities (which might potentially apply to the NFOŚiGW). Availability of those exemptions could be considered by the MA. Additional guidelines in this respect are expected from the EC.

Based on the fact that there is significant legal uncertainty around the ability of NFOŚiGW to be directly appointed as either a fund of funds manager or a financial intermediary, EIB recommends either obtaining legal certainty specifically with the Commission (should such a delivery option still be contemplated by the MA) or follow the Art 38 (4)(c) alternative presented here, and which we believe to be in compliance with the Regulations.

6.6. Implementation arrangements for EU grants

As measure 2.2 *Waste Management* and sub-measures 1.3.2 and 1.7.1 *Investment in EE in housing* foresee EU grants instead of FIs, article 38 of the CPR will not apply to the appointment of a body implementing EU grants.

Pursuant to article 123(7) of the CPR, the MA may entrust the management of part of an operational programme to an IB by way of a written agreement. The IB has been defined as any public or private body, which acts under the responsibility of, or on behalf of, the MA in relation to the beneficiaries implementing operations¹⁴⁵. In addition, such IB is required to provide guarantees of its solvency and competence in the specific domain and have administrative and financial management capacity.

Consequently, the MA may appoint the NFOŚiGW as IB2 for measure 2.2 *Waste Management* and sub-measure 1.3.2 *Investment in EE in housing* under the OPI&E as well as the WFOŚiGW in Katowice for sub-measure 1.7.1.

6.7. Next steps to be undertaken to define details of the proposed financial products

Based on the proposed investment and implementation strategy, including description of the financial products for all the sectors of interest, the MA should take the final decisions on the forms of the EU support to be applied.

¹⁴⁴ Act on public procurement of 29 January 2004 (uniform text, Dz.U. of 2013, pos. 907, as amended).

¹⁴⁵ Article 2(18) of the CPR.

The next recommended steps to be taken by the MA should help define detailed parameters of the adopted financial products, which may require actions as outlined in the table below.

Table 76: Proposed actions to be taken to define details of the proposed financial products

	RES	EE in LEs	EE in housing	WtE
Financial product specification	<p>Preliminary definition of FIs subordinated loan parameters, including proposed project selection criteria</p> <p>Define implications of FI implementation for financial structure and pricing</p>	<p>Preliminary definition of FI preferential loan parameters, financial modelling (energy and financial savings, CAPEX, returns, payback periods) and proposed project selection criteria</p> <p>Prepare draft preferential loan product - individual for each sector, if relevant</p> <p>Analyse potential needs for increased intensity of support for projects that may not be financially viable using the FI proposed</p>	<p>Preliminary definition of financial product parameters, financial modelling (energy and financial savings, CAPEX, returns, payback periods), and proposed project selection criteria</p> <p>Prepare draft grant product - individual for each energy class / beneficiaries groups***</p> <p>Analyse in details the alternative option for financial product and implementation option if required</p>	<p>Preliminary definition of grant product parameters and proposed project selection criteria</p> <p>Prepare draft grant and/or stand-by loan products</p>
External consultations	<p>Confirm with MEco and ORE the auction system - final structure and timetable</p> <p>Confirm with URE and MEco the methodology of reference prices calculation</p> <p>Consult FI subordinated loan with the banks</p> <p>Consult FI subordinated loan with developers and investors / PSEW</p>	<p>Stage 1 - Market screening* for potential final recipients - preliminary individual consultations / workshops</p> <p>Stage 2 - Market testing* of FI preferential loan with potential project beneficiaries</p> <p>Confirm with MEco and URE the white certificate model and its implications**</p> <p>Consult FI preferential loan with the banks - potential co-financing for larger projects</p>	<p>Confirm with MEco and URE the white certificate model and its implications****</p> <p>Consult grant product with the banks and the WFOŚiGWs - potential co-financing</p>	<p>Consultations with potential beneficiaries - municipalities</p> <p>Setting up PPP preparation facility</p>
State-aid implications	<p>Define State-aid options</p> <p>Market testing for market conditions for FI subordinated loan</p> <p>Define State-aid strategy</p> <p>Potentially - prepare documents for State-aid notification</p>	<p>State-aid analysis under GBER for the final product specifics</p> <p>Preparing State aid scheme</p>	<p>State-aid analysis under GBER for the final product specifics</p> <p>Preparing State aid scheme</p>	<p>Define State-aid options, including SGEI and non-aid options</p> <p>Preparing State aid scheme, other legal provisions if required</p>

Potentially - State-aid notification procedure			
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* - market screening and market testing should be performed among a representative sample of 4-6 enterprises from the key sectors
 ** - depends on the progress of legislation works - potential need for subsequent product adjustment, should the EE Act not be agreed till the end of 2015

*** - product specification should be done for major scenarios, energy classes and beneficiaries groups

**** - depends on the progress of legislation works - potential need for subsequent product adjustment, should the EE Act not be agreed till the end of 2015

The process of defining details of the proposed financial products should also cover verifying the output and result indicators and their values for each product, not only quantitative (e.g. leverage effects, number of final recipients / beneficiaries supported) but also relevant qualitative targets (e.g. energy savings and environmental effects).

The actions to be taken may result in additional in-depth surveys and analyses to be carried out to collect information and data required to parameterise financial products to optimise the values of outputs and results of the OPI&E interventions and consequently their contribution to the national targets in the areas of RES, EE and WtE.

7. SPECIFICATION OF THE EXPECTED RESULTS

7.1. Establishing and quantifying the expected results of the FIs

The FIs and other forms of support aimed at developing low carbon economy presented in *Chapter 4 FIs description - assessment of value added and additional public and private resources to be raised by FIs* should be structured such as to contribute to the SOs of the IPs of the OPI&E, namely to the output and result indicators defined in the OPI&E and the SZOOP. The detailed information on the indicators to be achieved as a result of the OPI&E interventions in low carbon economy is presented below.

Table 77: Result and output indicators for low-carbon economy IPs by 2023

Operation/Measure	Result/Output indicator	Unit	Value
1.1.1 Production of energy derived from RES, including connection to the grid	Estimated annual decrease of GHG (RI*)	tonnes of CO ₂ eq.	115 000
	Production of electric power derived from new RES installations (RI)	MWe	126 000
	Production of heat derived from new RES installations (RI)	MWt	34 000
	Additional capacity of energy production from RES (COI)	MW	102
	Additional capacity of energy production from RES	MWe	78.5
	Additional capacity of energy production from RES [MWt]	MWt	23.5
	Number of enterprises receiving support (OI)	enterprise	7
1.2 Energy efficiency and renewable energy in large enterprises	Estimated annual decrease of GHG (RI)	tonnes of CO ₂ eq.	193 000
	Decrease of final energy consumption (RI)	GJ/year	700 000
	Decrease of primary energy consumption (RI)	GJ/year	875 000
	Additional capacity of energy production from RES (OP CI)	MW	35
	Number of enterprises receiving support (CI)	enterprise	36
1.3.2 Energy efficiency in housing	Estimated annual decrease of GHG (RI)	tonnes of CO ₂ eq.	111 000
	Decrease of final energy consumption (RI)	GJ/year	1 650 000
	Savings of electric power (RI)	MWh/year	54 900
	Savings of heat (RI)	GJ/year	339 000
	Decrease of primary energy consumption (RI)	GJ/year	2 090 000
	Number of households with improved energy consumption classification (COI)	household	49200
	Additional capacity of renewable energy production (COI)	MW	46 ¹⁴⁶
1.7.1 Promoting energy efficiency in residential buildings in the Śląsko-Dąbrowska conurbation	Estimated annual decrease of GHG (RI)	tonnes of CO ₂ eq.	9 000 ¹⁴⁷
	Decrease of final energy consumption (RI)	GJ/year	130 000 ¹⁴⁸
	Number of households with improved energy consumption classification (COI)	household	6 800
	Additional capacity of renewable energy production (COI)	MW	17 ¹⁴⁹
2.2 Waste management through the use of waste incineration plants ¹⁵⁰	Processing/treatment capacity of waste management plants supported (RI)	Mg/year	650 000
	Number of people participating in a system of waste management (RI)	person	3 400 000
	Number of modernised/established complex waste management plants (OI)	plant	6 (incl. 1 modernised and 5 established)

*RI – result indicator

** COI – common output indicator

¹⁴⁶ The value refers to both operations – 1.3.1. and 1.3.2.

¹⁴⁷ The value refers to all operations under 1.7.

¹⁴⁸ The value refers to all operations under 1.7.

¹⁴⁹ The value refers all operations under 1.7.

¹⁵⁰ The values refer to all types of plants to be supported under measure 2.2.

With regard to the proposed FIs for RES projects (FI subordinated loans), the values of the output and result indicators of the OPI&E and SZOOP should be seen as obligatory. They should be cross-referenced, however, with the RES quantities to be acquired under the RES auctioning system, as planned by the MEco. The forecast of volume of energy production from RES by source in Poland by 2020 is presented in the table below.

Table 78: Projection of energy production from RES by source (2015 – 2020)

Energy from RES by source	2015		2016		2017		2018		2019		2020	
	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh	MW	GWh
Water:	1002	2439	1012	2471	1022	2503	1032	2535	1042	2567	1152	2969
<1 MW	122	427	126	441	130	455	134	469	138	483	142	497
1 MW – 10 MW	208	624	214	642	220	660	226	678	232	696	238	714
>10 MW	672	1 388	672	1 388	672	1 388	672	1 388	672	1 388	772	1 758
Geothermal water:	0	0	0	0	0	0	0	0	0	0	0	0
Solar:	2	2	2	2	3	3	3	3	3	3	3	3
PV	2	2	2	2	3	3	3	3	3	3	3	3
Wind:	3540	7541	4060	8784	4580	9860	5100	11210	5620	12315	6650	15210
On-shore	3350	7370	3800	8550	4250	9563	4700	10810	5150	11845	5600	13 160
Off-shore	0	0	0	0	0	0	0	0	0	0	500	1500
Small installations	190	171	260	234	330	297	400	400	470	470	550	550
Biomass:	1530	9893	1630	10348	1780	11008	1930	11668	2230	12943	2530	14218
solid	1300	8 950	1 350	9 200	1 400	9 450	1 450	9 700	1 500	9 950	1 550	10 200
biogas	230	943	280	1 148	380	1 558	480	1 968	730	2 993	980	4 018
biofuels	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	6 074	19 875	6 704	21 605	7 385	23 374	8 065	25 416	8 895	27 828	10 335	32 400
Incl. energy produced in cogeneration	505	3156.5	545	3334	610	3614	675	3894	815	4481.5	955	5069

Source: MEco

With regard to the proposed FIs for EE in large enterprises (FI preferential loans), the values of the output and result indicators should be achieved at the levels presented in the OPI&E and SZOOP.

As far as support for EE in housing is concerned, the estimated output values and result indicators given in the OPI&E and SZOOP should be verified against the final decision of the MA on the selection parameters criteria and the implementation option to be applied for the selected form of financial support. Given that the proposed support is supposed to cover only an investment premium, and not preferential loans as assumed initially by the MA in the OPI&E, the revised indicators could be higher than currently set in the OPI&E.

For WtE support, according to the demand for waste management estimated in this Report, the total treatment capacity to be achieved as a result of waste incineration plants support should be round about 800 000 tonnes/year.

For the number of established waste management plants, and the number of people covered by waste management, the numbers should be verified on the basis of the Investment Plans (attached to the VWMPs), approved by the Ministry of the Environment (by mid-2016).

7.2. Contribution to the strategic objectives

The proposed FIs and grant support will significantly contribute to the SOs of low-carbon IPs of the OPI&E. For EE in large enterprises, the FI proposed is the only intervention to result in achieving the SOs. For the other instruments proposed in this Report, all of them will contribute in a complimentary way to the SOs, alongside the other instruments, supporting: grids (sub-measure 1.1.2), EE in public sector (sub-measure 1.3.1) and other types of waste management plants (measure 2.2.).

Table 79: Contribution to the strategic objectives

Investment Priority	Specific Objective	Operation/Measure	Contribution of instrument
4.i Supporting the production and distribution of energy derived from renewable sources	Increased share of energy produced from RES in gross final energy consumption	1.1.1 Production of energy derived from RES, including connection to the grid	FI will contribute directly to the SO by supporting the RES installations construction (new RES capacities) and their connection to grids, resulting with increased share of RES in total energy consumption and reduction of emissions into atmosphere (complimentary to support for grids – 1.1.2)
4.ii Promoting energy efficiency and use of renewable energy in enterprises	Increased energy efficiency in enterprises	1.2 Energy efficiency and renewable energy in large enterprises	FI will contribute directly to enhanced energy efficiency in LEs, resulting with energy savings, reduction of operating costs and emissions into atmosphere
4.iii Supporting energy efficiency, smart energy management and use of renewable energy in public infrastructure, including in public buildings, and in the housing sector	Increased energy efficiency in multi-residential and public buildings	1.3.2 Energy efficiency in housing 1.7.1 Promoting energy efficiency in residential buildings in the Śląsko-Dąbrowska Conurbation	Instrument will contribute to the SO by supporting EE in housing sector, which will result in energy, including heat savings and RES use (complimentary to support for public sector – 1.3.1)
6.i Investing in the waste management sector to meet the requirements of the Union's environmental <i>acquis</i> and to address investment needs identified by the Member States, for investment that goes beyond those requirements	Decreased amount of municipal waste landfilled	2.2 Waste management through the use of waste incineration plants	Instrument will contribute to the SO by support of incineration infrastructure which will result in heat and energy production from waste (complimentary to support for other types of waste management plants – 2.2)

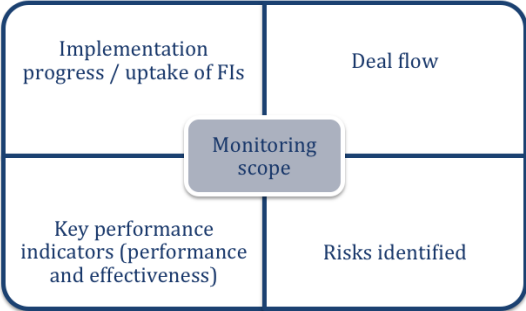
7.3. Monitoring and reporting

One of the key challenges and lessons learnt from the Programming Period 2007-2013 (see *Chapter 6 Lessons learnt*) was the monitoring and reporting requirements from the final recipients and beneficiaries. It was noted that a simplified and streamlined reporting mechanisms would be welcome, particular as FIs are expected to be more prevalent in the Programming Period 2014-2020. The monitoring and reporting system of the FIs should be based on the good practice of the previous financial perspective. It should improve on the weaknesses indicated then by the beneficiaries and final recipients.

The CPR introduces special provisions under Article 46 of Regulation (EU) No 1303/2013 for monitoring of the implementation of FIs imposed by the MA, which should complement the ESIF monitoring system.

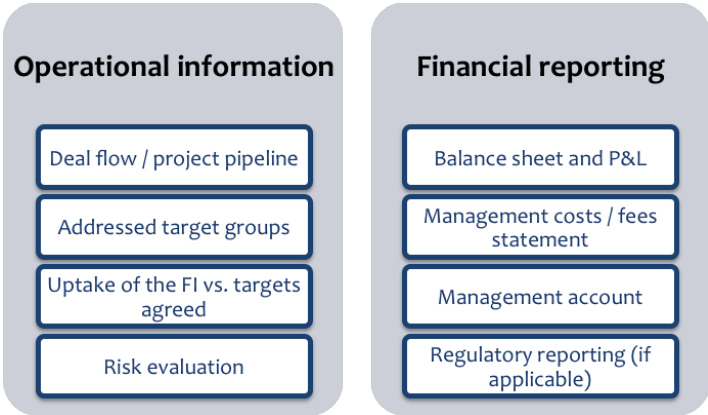
The on-going monitoring of key performance indicators (defined by the funding agreements) is essential to assess each FIs' performance and effectiveness, and to ascertain whether modifications are necessary to reflect, for instance, changes in market conditions or to improve its successful implementation. The Monitoring Committee will be specifically responsible for examining FI performance using the data collected.

As such, there is strong emphasis on putting a robust monitoring and reporting mechanisms from the onset, ideally in parallel to designing FIs and their investment strategies. At minimum, the data collected should be sufficient to generate information on FIs operations, such as the deal flow, FIS up-take, the leverage achieved, risk, and the financials (i.e. balance sheets, P&L statements, management costs, etc.)



It is suggested that MA should identify all actors in the reporting system and map the data to be collected and reported on to each of the actors, thus providing for further in-depth analysis in future. Reporting should cover both operational and financial information. Good case study examples could be had from the JEREMIE North West England and FRIM (Fondo di Rotazione per l'Imprenditorialità) ERDF in Lombardia, which used web-based data management systems to help monitor projects from the beginning, generating periodic reports in real-time and in different formats.

As for reporting to the EC, the early phases FI reporting was done on a voluntary basis, which was then aggregated in the Synthesis Report (2011). The results were inconclusive and inconsistent at best. Hence, in 2012, reporting on FIs became mandatory, although the data remains problematic. The new framework requires MAs to submit to the EC a specific report on operations, comprising FIs as an Annex to the Annual Implementation Report, and using a reporting template.



Equally important are regular checks and verifications at all levels to ensure that projects financed by FIs comply with the regulations. A methodology for on-the-spot checks and verifications is required by the MAs. Evaluations to assess the overall programme effectiveness should at least be undertaken at the interim and ex-post stages.

Another important reason why a robust monitoring system is needed is to scrutinise and identify areas of “triggers” which would require an ex-ante update. Some of the main trigger drivers include: absorption rates, poor take-up or demand for FIs, general macroeconomic conditions, etc. For details, please see *Chapter 8 Provisions for the update and review of the ex-ante assessment methodology*.

8. PROVISIONS FOR THE UPDATE AND REVIEW OF THE EX-ANTE ASSESSMENT METHODOLOGY

The Article 37(2)(g) of the CPR requires that ex-ante assessments include provisions for re-assessment, if market conditions change. This could include new legislations or policies which might impact the performance of FIs.

As the OPI&E recommendations are heavily dependent on various economic and other conditions, which often are beyond the control of the MAs, it is recommended that an update programme is planned, based on the FIs results achieved during implementation, and on specific events expected in the market, both in the regulatory environment and the relevant economics

The table below proposes possible triggers for review the ex-ante assessment (often referring only to a specific sector), which could require an update or verification of the expected results of the FIs and other OPI&E instruments and measures proposed.

Table 80: Possible triggers for updating OPI&E instruments

	Review trigger	Timing
RES	Review the operation of the Law on RES in practice, in particular:	
	· Auction system implementation - after the 1st auction completed	Q2 2016
	· Auction system implementation - after the 1st year of auction system in place	31.12.2016
	· State aid - ERO methodology for establishing reference price for projects using OPI&E	31.12.2015
	· Final decisions on demarcation line between ROPs and OPI&E	30.09.2015
	· Verify actual interest in product and impact on the market (ongoing and as periodically)	31.12.2016
	· Review and adjust FIs after the auction system is ceased	31.12.2018
EE in LEs	· Implementation and detailed solutions / requirements resulting from the Act on EE – esp. level of obligations, penalties and "white certificate" system	After the Law on EE finally agreed
	· Verify "white certificates" system implementation and its impact on the market	1 year after the Law on EE is implemented
	· State aid implication on combining OPI&E with "white certificates" (if applicable)	After the Law on EE finally agreed
	· Verify FIs' parameters in regard to energy savings achieved vs. FI's pricing	1 year after FI implemented
	· Verify actual interest in product from specific groups of enterprises (certain sectors, certain types of enterprises – largest enterprises vs. midcaps)	1 year after FI implemented
EE in housing	· Final decisions on demarcation line between ROPs, TRF, WFOŚiGW and OPI&E	30.09.2015
	· Verify OPI&E instruments' parameters adopted vs. other scenarios available (target energy class, beneficiaries groups, tenors)	31.12.2016
	· Final decisions on demarcation line between ROPs and OPI&E in ITIs	30.09.2015
	· Verify actual interest in product (esp. housing associations) and check if energy savings achieved	1 year after OPI&E instrument is implemented
Waste sector	· Verify VWMP, including Investment Plans	30.06.2016
	· Verify the final outputs from the completed 6 incineration plants funded from OPI&E 2007-2013 to confirm support intensity and costs eligibility (ongoing)	31.12.2016
	· Verify the EC ex-ante conditionality	31.12.2016
	· Verify municipalities' investment plans and procurement timetables	31.12.2016

Apart from the triggers for verifying the ex-ante assessment and potentially adjusting the FIs and other OPI&E instruments proposed above, the update and review methodology should also allow for inputs from the ongoing monitoring, including:

- Regular reporting/monitoring of the FIs;
- Predefined trigger values (which are compared with the reporting figures) of the FI / OPI&E instrument, particularly a significantly faster or slower take-up of the FI / OPI&E instrument than originally envisaged;
- Conclusions from the ad hoc or planned evaluations (e.g. on-going evaluations).



Given that the current recommendations on the OPI&E are heavily dependent on the external conditions that could be subject to changes over the next years, an update and review of the ex-ante methodology should allow for adjustments if and when needed during the Programming Period 2014-2020.

9. EX-ANTE ASSESSMENT COMPLETENESS CHECKLIST

Ex-ante requirement	Addressed in this Report
General	
1. Understand the rationale for an increased use of FIs and consider the experience gained with FIs in the 2007 – 2013 period.	Chapter 2, 3 and 5
2. Understand the different types of FIs available, the possible implementation arrangements and the different possible flows of investment contributions	Chapter 4 (types of instruments available) and Chapter 6 (possible implementation options)
3. Define the scope and the time frame of the ex-ante assessment	Introduction
4. Check the consistency with the Partnership Agreement and the Programme Strategy Preliminary considerations	Chapter 2
Article 37 (2) a	
1. Identify the market problems existing in the country or region in which the FI has to be established	Chapter 3 Section 3.1 (regulatory risks, financial & banking sectors, environmental awareness, private investments (ESCO, PPP)) RES - Section 3.2 (3.2.1 Act on RES, 3.2.2 access to grids, 3.2.3 challenges (spatial development plans), 3.2.4 financing terms and conditions) EE in LEs - Section 3.3 (3.3.1 relatively low interest in EE, asymmetry of information, 3.3.2 new Act on EE, incl. white certificate system, obligation for energy audits, commercial banks' low interest/capacity to assess energy/environmental effects) EE in housing - Section 3.4 (3.4.1 law on EE in buildings, ex ante conditionality, 3.4.2 affordability/fuel poverty) WtE - Section 3.5 (3.5.1 update of N & VWMPs, ex ante conditionality, 3.5.2 affordability, 3.5.3 public debt regime of municipalities)
2. Analyse the gap between supply and demand of financing and by identifying sub-optimal investment situations	Chapter 3 Supply side - Section 3.6 Private sector supply - Section 3.6.1 (description of banks' offer, esp. RES, EE and WtE) Public sector supply - Section 3.6.2 (ROPs, NFOŚiGW, WFOŚiGWs, BGK per each sector -3.6.3 – RES, 3.6.4 EE in LEs, 3.6.5 – EE in housing and 3.6.6. WtE) Demand side - Section 3.7

	<p>RES - Section 3.7.1 (investment needs and demand, scenarios for investment gap)</p> <p>EE in LEs - Section 3.7.2 (investment needs and demand, scenarios for investment gap)</p> <p>EE in housing- Section 3.7.3 (investment needs and demand, scenarios for investment gap)</p> <p>WtE- Section 3.7.4 (investment needs and demand, investment gap)</p>
3. Quantify the investment gap to the extent possible	<p>Chapter 3</p> <p>Section 3.8 (investment gaps summary per sector)</p>
Article 37 (2) b	
1. Identify the quantitative and the qualitative dimensions of the value added of the envisaged FI and compare it with the added value of alternative approaches	<p>Chapter 3</p> <p>Section 3.7 (quantitative dimension of the value added of FI) by sector:</p> <p>RES - Section 3.7.1</p> <p>EE in LEs - Section 3.7.2</p> <p>EE in housing- Section 3.7.3</p> <p>WtE- Section 3.7.4</p> <p>Chapter 4 (value added, target market and financial recipients (FRs), financial products, risks, leverage, implementation options) by sector:</p> <p>RES - Section 4.1</p> <p>EE in LEs - Section 4.2</p> <p>EE in housing - Section 4.3</p> <p>WtE - Section 4.4</p> <p>Section 4.8 (qualitative value added)</p>
2. Assess the consistency of the envisaged FI with other forms of public intervention	Section 4.7
3. Consider the State aid implications of the envisaged FI	Section 4.5
Article 37 (2) c	
1. Identify additional public and private resources to be potentially raised by the FI and assess indicative timing of national co-financing and of additional contributions (mainly private)	<p>Chapter 3 (additional public and private resources to be potentially raised by the FIs) by sector:</p> <p>RES - Section 3.7.1</p> <p>EE in LEs - Section 3.7.2</p> <p>EE in housing - Section 3.7.3</p> <p>WtE - Section 3.7.4</p> <p>Chapter 4</p> <p>RES - Section 4.1</p>

	<p>EE in LEs - Section 4.2</p> <p>EE in housing - Section 4.3</p> <p>WtE - Section 4.4</p>
2. Estimate the leverage of the envisaged FI	<p>RES - Section 4.1</p> <p>EE in LEs - Section 4.2</p> <p>EE in housing - Section 4.3</p> <p>WtE - Section 4.4</p>
3. Assess the need for, and level of, preferential remuneration based on experience in the relevant markets	n/a
4. Choose an approach for alignment of interest with private co-financing	Chapter 4 (financing structures for each sector demonstrating OPI&E instruments and private co-financing on project level)
Article 37 (2) d	
1. Gather relevant available information on past experiences, particularly on those that have been set up in the same country or region in which the envisaged FI will be established;	<p>Chapter 5</p> <p>National and EU schemes - Section 5.1</p> <p>RES - Section 5.1.2</p> <p>EE in LEs - Section 5.1.3</p> <p>EE in buildings - Section 5.1.4</p> <p>WtE - Section 5.1.5</p> <p>Other MS LL - Section 5.2</p>
2. Identify the main success factors and the main pitfalls of these past experiences;	<p>RES - Section 5.1.2</p> <p>EE in LEs - Section 5.1.3</p> <p>EE in buildings - Section 5.1.4</p> <p>WtE - Section 5.1.5</p>
3. Use the collected information to enhance the performance of the envisaged FI (e.g. mitigate and reduce risk, ensure a faster set-up and roll-out of the FI).	Section 5.3 (Recommendations)
Article 37 (2) e	
1. Define the level of detail for the proposed investment strategy maintaining a certain degree of flexibility	Chapter 3 and 4 (financing structures for each sector demonstrating OPI&E instruments) on project level, providing for adjustments resulting from projects specifics, MA decision on level of targets to be achieved, recommendations on OPI&E instruments adjustment triggered by actual project demand and market

	conditions)
2. Define scale and focus of the FI consistently with the results of the market assessment and the value added assessment, in particular by selecting the financial product to be offered and the target final recipients	Chapter 4 (detailed information on FIs) by sector: RES Section 4.1 EE in LEs Section 4.2 EE in housing Section 4.3 WtE Section 4.4 Summary information on financial products – Section 6.1 Summary information on FRs – Section 6.2
3. Define the governance structure of the FI, by selecting the most appropriate implementation arrangement and the envisaged combination with grant support	Chapter 6 Implementation structure (entities and arrangements) – Section 6.4.1 and Section 6.5 (for FIs) and Section 6.4.2 and Section 6.6 (for other instruments (grants)) Summary information on combination with grants - Section 6.3 RES – Section 4.1.9 EE in LEs – Section 4.2.9 EE in housing – Section 4.3.9 WtE – Section 4.4.9
Article 37 (2) f	
1. Establish and quantify the expected results of the FI by means of result indicators, output indicators and FI performance indicators as appropriate	Chapter 7 Section 7.1
2. Specify how the envisaged FI will contribute to deliver the strategic objectives for which it is set up	Section 7.2
3. Define the monitoring system in order to efficiently monitor the FI, facilitate reporting requirements and identify any improvement areas	Section 7.3
Article 37 (2) g	
1. Define the conditions and/or the timing in which a revision or an update of the ex-ante assessment is needed	Chapter 8

APPENDIX 1 DATA FOR CALCULATION OF UEC

Calculation of UEC – Unitary Electricity producing from renewable energy installation CAPEX parameter based on data collected by the NFOŚiGW.

Priority Programme (PP)/Measure	# applications	Investment [PLN m]	Nominal Installation Power [MW]	UEC [PLN m/MW]	Averages over PP
Biogas plants I, of which:					
all applications	62	1 561	60	26,02	
applications qualified	11	234	13,2	17,72	
contracts signed	11	174	13,2	13,14	
Biogas plants II, of which:					
all applications	26	634	38,99	16,25	
applications qualified	13	230	15,6	14,72	
contracts signed	7	127	8,68	14,60	
Biogas plants III, of which:					
all applications	55	974	60	16,23	
applications qualified	11	173	12	14,42	
contracts signed	11	173	12	14,42	
Total of biogas installations, of which:				weighted average	PP average
all applications	143	3 168	159	19,93	19,50
applications qualified	35	637	41	15,60	15,62
contracts signed	29	473	34	13,97	14,05
Measure 9.1 on RES of the OPI&E 2007-2013, of which:					
all applications	46	1 494	112,361	13,30	
applications qualified	12	453	38,874	11,66	
contracts signed	9	226	29,33	7,70	
RES 1st call, of which:					
all applications	61	1 639	204,11	8,03	
applications qualified	7	188	24,41	7,72	
contracts signed	3	72	7,83	9,17	
RES 2nd call, of which:					
all applications	87	2 072	233,59	8,87	
applications qualified	10	242	32,26	7,50	
contracts signed	7	159	20,22	7,84	
RES 3rd call, of which:					
all applications	151	5 665	565,34	10,02	
applications qualified	22	718	107,34	6,68	
contracts signed	20	654	104,39	6,26	
"BOCIAN 2014" of which:					
all applications	48	538	52,57	10,23	
applications qualified	24	274	25,32	10,83	
contracts signed	2	25	4	6,30	
RES total, of which:				weighted average	PP average
all applications	393	11 409	1 168	9,768	10,090
applications qualified	75	1 875	228	8,218	8,878
contracts signed	41	1 135	166	6,849	7,456

APPENDIX 2 KEY FINANCIAL FIGURES FOR RES TECHNOLOGIES

Key financial figures for all RES technologies¹⁵¹

2015		Nominal investment	Total O&M		Fixed O&M	Variable O&M	
		(M€/MW)	%	(€/MWh)	(€/MW/yr)	(€/MW/yr)	(€/MWh)
01	Advanced Pulverized Fuel Power Plant						
	- Coal fired	2,04		7,0		57200	2,0
	- fired by wood pellets	2,04				57200	2,0
	- natural gas fired	1,40				38000	0,82
03	Rebuilding coal power plants to biomass						
	- wood pellets	0,18					
	- wood chips, straw	0,42					
	- wood chips, dried	0,52					
04	Gas Turbine Single Cycle						
	- large scale plant	0,65		2,4			
	- medium scale plant	1,20		7,0			
	- mini gasturbines	1,75		9,0			
	- micro gasturbines	1,20		15,0			
05	Gas Turbine Combined Cycle						
	- steam extraction	0,87				30000	2,5
	- back-pressure	1,35		2,5			
06	Gas Engines	1,25		9,2			
07	CO2 Capture and Storage	3,30				79500	3,75
08	Waste-to-Energy CHP Plant	8,50				16500	23
09	Biomass CHP, Steam Turbine						
	- woodchips (medium)	2,60				29000	3,9
	- woodchips (small)	4,25	3,5		150000		
	- straw (medium)	4,00				40000	6,4
	- straw (small)	5,15	4,0				
10	Stirling Engines, Gasified Biomass	5,00				32000	26

¹⁵¹ Technology Data for Energy Plants Generation of Electricity and District Heating, Energy Storage and Energy Carrier Generation and Conversion; Danish Energy Agency and Energinet.dk, 2012; pp. 19-21.

2015		Nominal investment	Total O&M		Fixed O&M	Variable O&M
		(M€/MW)	%	(€/MWh)	(€/MW/yr)	(€/MW/yr)
20	Wind Turbines - Onshore					
	- large	1,40		14		
	- medium	1,40		14		
	- small (> 5 kW)	2,15				
	- small (< 5 kW)	4,75		30		
21	Wind Turbines - Offshore	3,10		19		
22	Solar Photovoltaic Cells, Grid-connected	2,00		34		
23	Wave Power	7,80		20,0		
30	Solid Oxide Fuel Cells					
	- Continuous Power Generation	5,00		25,0		
	- Balancing Plant	2,00		25,0		
31	Proton Exchange Membrane Fuel Cells					
	- Continuous Power Generation	5,00		25,0		
	- Balancing Plant	2,00		25,0		
40	Heat Pumps					
	- Heat pumps (ambient temperature)	0,68			5500	
	- Heat pumps (35 °C)	0,68			5500	
	- Absorption heat pumps (flue gas)	0,40			18500	
41	Electric Boilers					
	- 400 V; 1-3 MW	0,15			1100	0,5
	- 10 kV; 10 MW	0,08			1100	0,5
	- 10 kV; 20 MW	0,06			1100	0,5
42	Waste-to-Energy District Heating Plant	1,20			54000	5,6
43	District Heating Boiler					
	- Wood chips	0,80		5,4		
	- Wood pellets	0,40		2,7		
	- Straw	0,80		4,0		
44	District Heating Boiler - Gas Fired	0,10			3700	
45	Geothermal District Heating					
	- Absorption heat pump (70 °C)	1,80			47000	
	- Absorption heat pump (50 °C)	2,00			49000	
	- Electric heat pump	1,60			37000	
46	Solar District Heating			0,57		

2015		Nominal investment	Total O&M		Fixed O&M	Variable O&M	
		(M€/MW)	%	(€/MWh)	(€/MW/yr)	(€/MW/yr)	(€/MWh)
50	Pumped Hydro Storage	0,60				9000	
51	Compressed Air Energy Storage					14000	
52	Batteries						
	- Sodium Sulphur (NaS)	2,20				51000	5,3
	- Vanadium Redox (VRB)	1,50				54000	2,8
60	Heat Storage - Water Pits		0,7				
61	Large Scale Hot Water Tanks						
71	Underground Storage of Gas						
72	Hydrogen Storage						
80	Electrolysis						
	- Alkaline electrolysis (AEC)	1,40	4,0				
	- Solid Oxide Electrolysis (SOEC)						
	- Polymer Electrolyte Electrolysis (PEMEC)	6,00					
81	Centralised Biogas Plants						
	- Input: 300 Tons per Day	5,80		35			
	- Input: 550 Tons per Day	4,10		31			
	- Input: 800 Tons per Day	3,40		31			
	- Input: 1000 Tons per Day						
82	Upgraded Biogas						
	- Generating Capacity: 200 Nm3/h						
	- Generating Capacity: 1000 Nm3/h						
83	Biomass Gasifier, Pre-gasifier to Boilers	0,50		2,40			
84	Biomass, Gasifier, Updraft	3,70				185000	19
85	Biomass, Gasifiers, Staged Down-draft	3,55				69000	18

APPENDIX 3 THE FACTOR Q CALCULATION

Derivation of the factor for scaling investment needs in power-generating RES installations into total investment needs for construction of RES that generate heat and power.

TIN= total investment in new RES installations,

INE= investments in RES installations generating electricity

INH= investments in RES installations generating heat,

HP= nominal installed power of heating installations,

EP= nominal installed power of installations generating electricity,

UHC= unitary CAPEX for installations generating 1 MWth

UEC= unitary CAPEX for installations generating 1 MWe.

Given that:

$$\begin{aligned} TIN &= INE + INH = INE * \left(1 + \frac{INH}{INE}\right) = \\ &= INE * \left(1 + \frac{HP * UHC}{EP * UEC}\right) = INE * \left(1 + \frac{HP}{EP} * \frac{UHC}{UEC}\right) = INE * Q \end{aligned}$$

Where:

$$Q = 1 + Q_1 * Q_2,$$

$$Q_1 = \frac{HP}{EP},$$

$$Q_2 = \frac{UHC}{UEC},$$

The Q_1 quotient is equal to 2.69. It results from the summary of the final energy demand from renewable sources broken down by types of energy included in the national plan of RES development¹⁵²;

The denominator of quotient Q_2 (the *UHC* parameter) was already referred to above. Its value was assumed as 8,878 (MPLN/MWe), based on the historical values encountered and accepted by the National Fund during OPI&E 2017-2013. This value proves to be close to the CAPEX typical of small (but bigger than 5kW) onshore wind turbines installed in Denmark (see position 20 in Appendix 2, based on the findings published in “Technology Data”¹⁵³, which – being equal to 2.15 MEUR/MWe – would be exactly the same as the *UHC* estimate in Poland, if the exchange rate of EUR/PLN was equal to 4.1295 – a fairly typical value over the recent years).

¹⁵²„Krajowy plan działania w zakresie energii ze źródeł odnawialnych”, Ministerstwo Gospodarki, Warszawa 2010 (see: http://www.mg.gov.pl/files/upload/12326/KPD_RM.pdf). 2,69 is the ratio of heating energy consumption in years 2015-2020 and electricity consumption in years 2015-2020 projected in Table 3 of the National Plan.

¹⁵³Technology Data for Energy Plants Generation of Electricity and District Heating, Energy Storage and Energy Carrier Generation and Conversion; Danish Energy Agency and Energinet.dk, 2012.

The nominator of quotient Q_2 (the *UHC* parameter) was assumed to be 10.4 MPLN/MWth, based on the following reasoning and sources. Firstly, both national and international practice is that heating plants alone are relatively less popular than CHP installations (compare also IRENA Remap 2030¹⁵⁴: “District heat is a necessity for the use of CHP, which is the most efficient way to use biomass for energy production”). Secondly, though the spectrum of technologies and types of installations generating heat is wide (compare “Technology Data”¹⁵⁵ in Appendix 2), for the sake of the present estimate the relatively cheapest and most popular technologies should be taken into account. Because of this, to compute the *UHC*, the data presented in the aforementioned publication was used for a medium scale CHP that uses wooden chips – see Appendix 2 position 09. The value 2.6 MEUR/MWth, as multiplied by the exchange rate 4.0, gives the value of the *UHC* parameter given at the beginning of this paragraph.

Using the above *UEC* and *UHC* values, the end result is:

$$Q_2 = 8.784 / 10.4 = 1,1714$$

Thus

$$Q = 1 + 2.69 * 1,1714 = 4.151.$$

¹⁵⁴ IRENA (2014), REmap 2030: A Renewable Energy Roadmap, June 2014. IRENA, Abu Dhabi. www.irena.org/remap

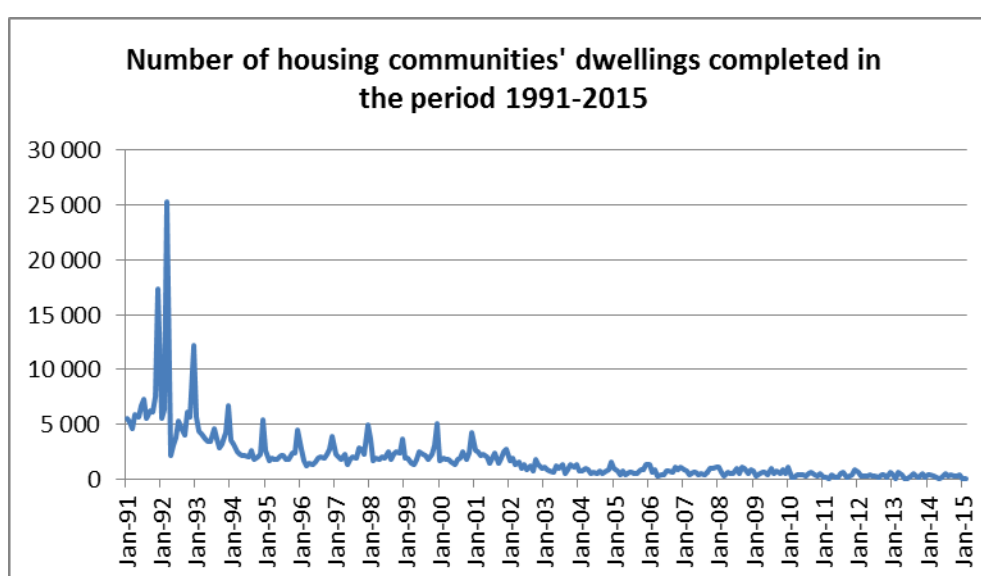
¹⁵⁵ Technology Data for Energy Plants Generation of Electricity and District Heating, Energy Storage and Energy Carrier Generation and Conversion; Danish Energy Agency and Energinet.dk, 2012.

APPENDIX 4 THE METHODOLOGY FOR CALCULATING THE TOTAL USABLE AREA OF THE HOUSING STOCK IN EACH CLASS

In order to estimate the total usable area of the housing stock in each class, in the absence of the real data for particular buildings, other statistics were used, including a parametric identification technique associated with fitting the model parameters to replicate the actual national value of the wear and tear of the building stock (i.e. the depreciated share of the value of the gross fixed assets) indicated by Central Statistical Office¹⁵⁶ is 34.5%.

The number of dwellings built in the last two decades were considered first. These data are given below. The peaks appearing each December are purely of a reporting nature. In fact, construction takes place throughout the year, and the actual level of construction is, therefore, much more stable than shown.

Number of dwellings completed in the years 1991-2015



Source: own computation based on CSO "Tablice przeglądowe prezentujące miesięczne zestawienie danych dotyczących ilości mieszkań oddanych do użytkowania od 1991 r." available at: <http://stat.gov.pl/obszary-tematyczne/przemysl-budownictwo-srodko-trwale/budownictwo/budownictwo-mieszkaniaowe-tablice-przegladowe-od-1991-r-6,3.html>

The housing communities stock of 2015 combined the newly built dwellings, with about 3.099 m of housing associations dwellings as of the end of 1990¹⁵⁷, and which were still in use as of the end of 2015. A number of these dwellings had already been so outdated in 1990 that, in order to be fit for continuing occupancy until 2010, they must have been renovated between 1991 and 2015. The number of the renovated buildings depended on their material condition in 1990. In the absence of the relevant time-distributed data, it was assumed that the renovation rate was stable. Based on this assumption, a bijective relation could be established between the following two parameters related to the part of the dwellings portfolio in 1990 and not renovated between 1991 and 2010:

- the assumed degree of wear and tear of these buildings at the end of 1990 (parameter 1), and

¹⁵⁶Rocznik statystyczny 2014, Tab. 9(14) DEGREE OF CONSUMPTION OF FIXED ASSETS BY SECTIONS AND DIVISIONS IN 2013, as of 31 XII.

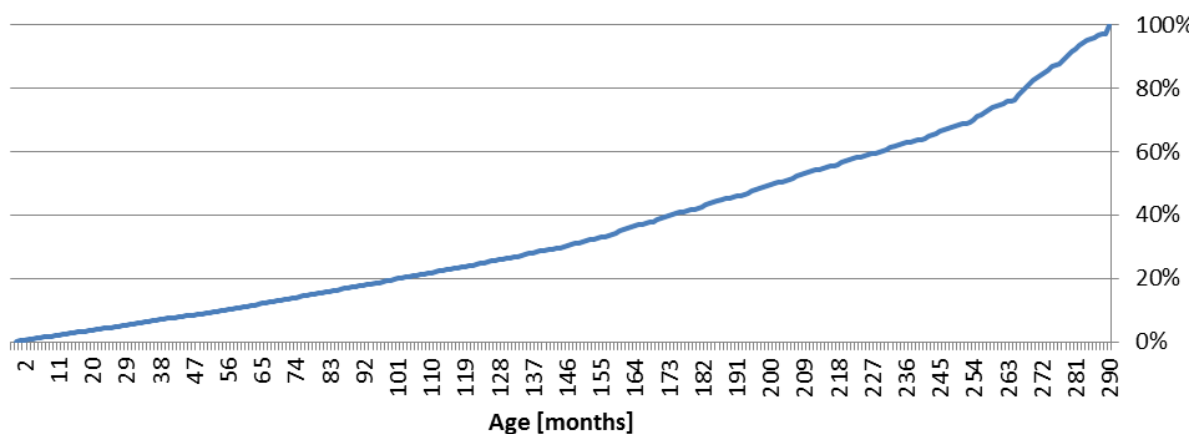
¹⁵⁷Based on Parliament information BSE no 738 (IP-92 S), Tab 3. The rate of inflows and outflows of dwellings to the stock due to processes of removal, were negligible. Transformations connected with privatization led mostly to transfer to housing associations, which constitute the supplementary part of the stock under consideration.

- the assumed degree of wear and tear at the end of 2014 of these buildings which have not been renovated since 1990 (parameter 2).

It was assumed that the value of parameter 2 is equal to 70%. The resulting value of parameter 1, which results from the sequential procedure of seeking the value leading to the effective overall degree of real estate consumption index 34.5% – is about 32.7%. The remaining parameters identified through this fitting procedure are: the share of 1990 stock survived until 2015, which was not renovated since 1990 – 6.1 % (ca. 190 ths of dwellings) and, respectively, 93,9% - the percentage of this sector that continued to exist until 2015 and underwent refurbishment during this period (ca. 2,9 m dwellings).

Based on these numbers, the numbers of dwellings renovated between 1991 and 2010 were calculated. By adding these numbers to the numbers of newly-completed dwellings, an estimate of the age distribution¹⁵⁸ of the dwellings in 2010 can be given, as shown below. It should be noted that the small peak at 290 months results from adding up all of the dwellings older than 290 months.

Age distribution of housing cooperatives dwellings as of 2010 (in months) - accumulated probability distribution function on age (in months) of dwellings belonging to housing cooperatives, as of February 2015



Source: own computation based on CSO “Tablice przeglądowe prezentujące miesięczne zestawienie danych dotyczących ilości mieszkań oddanych do użytkowania od 1991 r.” available at: <http://stat.gov.pl/obszary-tematyczne/przemysl-budownictwo-srodki-trwale/budownictwo/budownictwo-mieszkaniowe-tablice-przegladowe-od-1991-r-,6,3.html>

Next, **weights** were given to the building classes in the population of interest (the share of usable area of buildings in a particular class in the usable area of all buildings of this population). TO achieve this, the following additional simplifying assumptions were made:

- the age-distribution function of the housing stock belonging to housing associations is the same (a big part of the existing housing associations stock resulted from the privatisation of cooperative dwellings),
- random variables, such as the individual dwelling’s usable area, its age and location, are mutually independent,
- the vast majority of dwellings under consideration is located in multifamily houses.

¹⁵⁸The “age” is understood the time elapsed from construction or from the last general renovation.

Even on national level the statistics on dwellings belonging to housing associations are not as available as for the cooperatives, so a probability distribution function of age similar to the one given in Fig. 2 could not be calculated for lack of data. In consequence, the verification of each of the above assumptions could not be given without access to the nation-wide electronic database.

Combining the data presented above, i.e. the weights of particular energy classes and the national statistics of usable floor area¹⁵⁹, the following characteristics of the existing dwelling stock under consideration can be given.

Characteristics of the existing multifamily dwelling stock¹⁶⁰

average energy consumption multiplier of 100kWh/m ²	0,6	0,8	1,05	1,28	1,6	1,8
Energy class	C	D	E	F	G	H
status quo share in the stock	14,2%	7,0%	41,3%	21,0%	11,2%	5,2%

¹⁵⁹HOUSING In 2013 information and statistics, CSO Warsaw October 2014. Tab. 1(17), Tab. 1(54).

¹⁶⁰ Recall that we included classes A and B into class C.

APPENDIX 5 CASE STUDIES IN ENERGY EFFICIENCY IN LARGE ENTERPRISES

Fuel / energy sector

Fuel/energy sector is the most energy-intensive in the entire industry. The energy intensity of the power generation part of the sector is estimated at 34.8 kWh/100PLN of sold production in 2010¹⁶¹, while the lowest value of this indicator is estimated at 2.2 kWh/100PLN in the transport sector. Generation of electricity, gas, steam and hot water in 54 large Polish energy and heat companies amounts to over PLN 89.8 bn, accounting for approximately 11.9% of the total production in large enterprises.

- **Interest of the sector in energy efficiency**

The interest is driven by two main factors: a large part of the generation facilities is outdated, and the provisions of the Act on EE, which requires annual increases in energy efficiency (1,5% in the year 2015).

- **Energy audits supported by the NFOŚiGW**

Fuel/energy sector was the most active partner for the NFOŚiGW, with 16 energy audits verified and supported by the NFOŚiGW (19% of all audits verified). The audited areas (and subsequent investments in some cases) covered mainly technology processes, and heating networks.

Key results of 9 audits in fuel/energy sector are implemented with the NFOŚiGW support:

Estimated total energy savings – 258.924 GWh/year

Estimated total CAPEX - PLN 186.40 m (ca. 16% of total investments value identified from all verified audits)

- **Energy Efficiency investment projects supported by the NFOŚiGW**

Two selected energy efficiency investment projects have been supported by the NFOŚiGW in fuel/energy sector, both in large enterprises:

1. Elektrociepłownia Białystok S.A. (Co-generation Plant)

The project covered the modernisation of heat recovery unit from fuel gases.

CAPEX	PLN 25.50 m
NFOŚiGW preferential loan	PLN 17.85 m
Annual energy use before the investment	673.1 GWh/year
Annual energy savings after the investment	7.51% 47.0 GWh/year
Annual energy savings on investment in relation to total annual energy consumption	2.16%
Payback period (SPBT)	27.25 years
CAPEX/Tangible assets	6.71%
CAPEX/Revenues from operations	10.27%

2. Zakład Energetyki Ciepłej Sp. z o.o. w Białogardzie (District Heating Company)

The project covered the modernisation of the district heating network run by the company.

CAPEX	PLN 28.52 m
NFOŚiGW preferential loan	PLN 21.07 m
Annual energy use before the investment	34.47 GWh/year
Annual energy savings after the investment	10.84% 3.74 GWh/year

¹⁶¹ After: Joanna Kott, Marek Kott, Zdzisław Szalbierz „Wskaźniki energochłonności w przemyśle”, published in Zarządzanie i Finanse Journal of Management and Finance, University of Gdansk 1/2 2012, http://jmf.wzr.pl/pim/2012_1_2_49.pdf.

Annual energy savings on investment in relation to total annual energy consumption	10.84%
Payback period (SPBT)	10.00 years
CAPEX/Tangible assets	650.12%
CAPEX/Revenues from operations	439.30%

- **Conclusions**

The energy consumption of the fuel/energy sector is very high. The project proposals submitted to the NFOŚiGW show significant savings potential in relation to the total energy consumption by companies (based on two projects supported by the NFOŚiGW – 2.16% and 10.84%, respectively). The investment projects supported by the NFOŚiGW were of medium scale (PLN 25-30 m) and both related directly to the modernisation of the production processes, with payback periods ranging from 10 to 25 years. The first brought about significantly high energy savings, but the cost per saved-unit was very high. The second project indicators were very positive in both energy and economic efficiency areas.

If both projects are deemed representative of the entire sector and of the remaining 53 large enterprises, the potential project demand resulting from the changes in production processes should be PLN 5.0 bn for the co-generation and district heating sectors. It should also be noted that neither of the completed projects covered all energy efficiency needs, but focused only on the improvements directly related to the production process.

Minerals Sector

Energy consumption of the minerals sector is quite high in Poland. Its average energy consumption was estimated at 0.605/kgoe/ euro05¹⁶² in 2012¹⁶³. Manufacturing of non-metallic mineral products in 91 large Polish mineral companies generated PLN 23.2 bn, accounting for approximately 3.1% of the total production of large enterprises.

- **Interest of mineral sector in energy efficiency**

According to one of the applicants, large enterprises in this sector have already made a lot of investment in EE related to energy consumption in their buildings, but further investments in new technologies are required, especially due to new legal requirements.

- **Energy audits supported by the NFOŚiGW**

The minerals sector was a moderately active partner for the NFOŚiGW, with 7 energy audits supported by the NFOŚiGW (13% of all audits verified). The audited areas (and subsequent investments in some cases) covered mainly: technology processes, buildings and internal heating networks.

Key results of 7 audits in the minerals sector:

Estimated total energy savings – 2.142 GWh/year

Estimated total CAPEX - PLN 80.4 M (ca. 7% of total investments value identified from all verified audits)

- **Energy Efficiency investment projects supported by NFOŚiGW**

Two EE investment projects have been supported by the NFOŚiGW in the minerals sector, both in large enterprises:

1. **Cemex Polska Sp. z o.o.**

The project covered the modernisation of a carbon-grinding mill.

CAPEX	PLN 11.60 m
NFOŚiGW preferential loan	PLN 8.7 m
Annual energy use before the investment	1.4 GWh/year
Annual energy savings after the investment	19.97% 0.3 GWh/year

¹⁶²kgoe = 1/1000 toe i.e. kilogram of oil equivalent (energy unit); euro05 – unit of gross value added expressed in terms of equivalent of EUR 1 calculated by use of exchange rate of year 2005.

¹⁶³After: „EFEKTYWNOŚĆ WYKORZYSTANIA ENERGII 2012”, Central Statistical Office, serie „Informacje i opracowania statystyczne”, ISSN: 1732-4939, ZWS, 2014. Publication available on www.stat.gov.pl. English version available at <http://www.odyssee-mure.eu/publications/national-reports/>.

Annual energy savings on investment in relation to total annual energy consumption	0.05%
Payback period (SPBT)	50 years
CAPEX/Tangible assets	1.98%
CAPEX/Revenues from operations	1.40%

2. Cemex Polska Sp. z o.o.

The project covered the installation for drying of alternative fuels heat with the usage of heat from waste recovered from core activity processes (calcination of clinker).

CAPEX	PLN 15.30 m
NFOŚiGW preferential loan	PLN 10.64 m
Annual energy use before the investment	2048.87 GWh/year
Annual energy savings after the investment	7.30% 149.55 GWh/year
Annual energy savings on investment in relation to total annual energy consumption	6.77%
Payback period (SPBT)	2.44 years
CAPEX/Tangible assets	2.19%
CAPEX/Revenues from operations	1.16%

• Conclusions

The minerals sector energy consumption is relatively high. The project proposals have been submitted by one company and show significant savings potential in relation to the company's total energy consumption, amounting to 6.82% (based on two projects supported by the NFOŚiGW – 0.05% and 6.77%, respectively). The investment projects supported by the NFOŚiGW were not of a significant scale (PLN 10-15 m) and both related directly to the modernisation of the production processes, with their payback periods ranging from 2 to 50 years. The first project resulted in high energy savings, but the cost per saved unit was extraordinary high. The second project's indicators were very positive in both energy and economic efficiency.

If both projects are deemed representative of the entire sector and of the remaining 90 large enterprises, the potential project demand resulting from the changes in production processes should be between PLN 0.32 – 0.37 bn. It should also be noted that neither of projects completed covered all EE needs and focused only on the improvements directly related to the production process.

Metal industries

The metal sector is the topmost energy-consuming sector in the Polish economy. Its average energy intensity was estimated at 1.15 kgoe/euro05¹⁶⁴ in 2012¹⁶⁵. The sold production of basic metals and metal products in 182 large Polish entities amounted to over PLN 56.6 bn and accounted for approximately 7.5% of the total industry production.

• Interest of metallurgical sector in energy efficiency

The total production capacity of steel in Poland corresponds to the size of domestic consumption, but the structure of production is unsuited to the needs of the country. IGMNiR¹⁶⁶ estimates that the share of electricity costs in sector sales is 4.1%, but there are companies where the share is 18.4% (in the cost structure reaches up to 23%). Today, the biggest an

¹⁶⁴kgoe = 1/1000 toe i.e. kilogram of oil equivalent (energy unit); euro05 – unit of gross value added expressed in terms of equivalent of EUR 1 calculated by use of exchange rate of year 2005.

¹⁶⁵After: „EFEKTYWNOŚĆ WYKORZYSTANIA ENERGII 2012”, Central Statistical Office, serie „Informacje i opracowania statystyczne”, ISSN: 1732-4939, ZWS, 2014. Publication available on www.stat.gov.pl. English version available at <http://www.odyssee-mure.eu/publications/national-reports/>.

¹⁶⁶ Izba Gospodarcza Metali Nieżelaznych i Recyklingu - Chamber of Commerce Non-Ferrous Metals and Recycling.

indicator of energy consumption of electric energy in sector characterised by production of electrolytic zinc. Thus, although the basic reserves have already been somewhat used, there is still much room for EE investments. In this sector, however, they are exceptionally capital-intensive.

- **Energy audits supported by the NFOŚiGW**

The metal sector was represented by 14 entities in the NFOŚiGW Energy Efficiency Programme (ca. 16% of all audits) of which 4 received support (ca. 10% of the supported entities).

Key results of 13 audits in the metal sector:

Estimated total energy savings – 19 512.1 GWh/year (the biggest amount of all sectors);

Estimated total CAPEX - PLN 22,309.9 m

Estimated total energy savings in supported projects – 58.4 GWh/year

Estimated total CAPEX in supported projects - PLN 33.1 m

- **Energy Efficiency investment projects supported by NFOŚiGW**

Just one energy efficiency investment project based on the audit received support from the NFOŚiGW in the metal sector.

1. **Re Alloys Sp. z o.o.**

The project, based on the audit of the technological process, covering the internal heating network and buildings, pertained to just one task identified in the audit: the reconstruction and modernisation of the heating network in the Łaziska Górne plant.

CAPEX	PLN 3 m
NFOŚiGW preferential loan	PLN 2.25 m
Annual energy use before the investment ¹⁶⁷	9,152.28 MWh/year
Annual energy savings after the investment	34.2% 3,130.0 MWh/year
Annual energy savings on investment in relation to total annual energy consumption	0.41%
Payback period (SPBT)	8,4 years
CAPEX/Tangible assets	3.95%
CAPEX/Revenues from operations	0.58%

- **Conclusions**

Metal industries, as the most energy-intensive one in the entire industry, represent a significant potential for EE measures. The sentiment expressed by the sector's representatives and the results of the NFOŚiGW audits both confirm this potential. The first investment supported by the NFOŚiGW was of insignificant value (PLN 3 m); therefore, it cannot be treated as a representative sample. However, the extraordinarily high percentage of energy savings (34.2%) suggests that, while the main technological processes might have been to some extent optimised in the past, there is potentially still a significant need for further optimisation of other (non-critical) processes.

Wood and paper industry

The two branches of the industry outlined below belong to the group of those between energy-intensive and energy-non-intensive industries:

- Manufacturing of wood, cork, straw and wicker products – with average energy intensity (final energy consumption/value added) estimated at 0.394 kgoe/euro05¹⁶⁸ in 2012¹⁶⁹, and

¹⁶⁷It applies only to project covered by a loan (not to the entire plant).

- Manufacturing of paper and paper products – with the average energy intensity estimated at 0.437 kgoe/euro05

Together, these two branches include 83 large enterprises (45 and 38, respectively) as of 31 December 2013, and their annual sold production amounted to PLN 30.4 bn, constituting ca. 4% of the overall industrial output.

- **Interest of wood and paper sectors in energy efficiency**

Both segments belong to the industries with the lowest energy intensity drop since 2000. In fact, the energy intensity of paper manufacturing was higher at the end of 2012 than in 2000. It should be noted, however, that both of these industries lowered their energy intensity by ca. 50% in the previous decade.

The advantage of exports over imports in the production of the majority of wood products is very beneficial for this segment of the Polish economy (with foreign trade deficits in the other segments). The share of the wood sector in the value of Polish exports in 2012 amounted to about 8.6%, and of imports to 3.8%. This relatively comfortable situation may be one of the reasons of relatively low interest of the two sectors in further cost optimisation, particularly in EE.

- **Energy audits supported by the NFOŚiGW**

Only two companies from the wood and paper sectors were among the beneficiaries of the NFOŚiGW Programme "Support for entrepreneurs in the field of low-carbon and resource-efficient economy". Both of them were furniture manufacturers. The audit costs amounted to PLN 0.8 m. However, none of them approached the NFOŚiGW again, and so there is no data available for this industry as of June 2015.

- **Conclusions**

The wood and paper sectors – the fourth and fifth most energy-intensive segments in the Polish industry – have not demonstrated their potential for EE measures yet. Experience from other countries (e.g. USA and Japan¹⁷⁰) proves that these sectors have various optimisation opportunities though.

Food Industry

The food industry sector belongs to the group of sectors with middle energy intensity, but it happens to be the least energy-intensive sector of the Polish industry. Its average energy intensity was estimated at 0.204 kgoe/euro05¹⁷¹ in 2012¹⁷². The sold production of 271 large Polish entities of this sector amounted to over PLN 111 bn and accounted for approximately 14.7% of the total industry production.

- **Interest of food industry in energy efficiency**

The rise in EE dynamics in the food industry was the highest among all industrial sectors in Poland during the last decade. Compared to 2000, when its energy intensity amounted to ca. 0.48 goe/euro05, 2012 saw a drop by almost 57%. This shows how fast the new technologies contributed to the modification of the key processes in this sector.

- **Energy audits supported by the NFOŚiGW**

Food industry was represented by 12 companies in the NFOŚiGW Energy Efficiency Programme (ca. 14% of all audits) of which 4 received support (ca. 10% of the supported entities).

Key results of 12 audits in food industry:

Estimated total energy savings in the supported projects – 7.0 GWh/year

¹⁶⁸kgoe = 1/1000 toe i.e. kilogram of oil equivalent (energy unit); euro05 – unit of gross value added expressed in terms of equivalent of EUR 1 calculated by use of exchange rate of year 2005.

¹⁶⁹ „EFEKTYWNOŚĆ WYKORZYSTANIA ENERGII 2012”, Central Statistical Office, serie „Informacje i opracowania statystyczne”, ISSN: 1732-4939, ZWS, 2014. Publication available on www.stat.gov.pl. English version available at <http://www.odysseemure.eu/publications/national-reports/>.

¹⁷⁰ Raport dotyczący kluczowych polskich energochłonnych przemysłów, z identyfikacją ograniczeń we wdrażaniu efektywności energetycznej w zakładach oraz opracowaniem rozwiązań dla tych przemysłów, KAPE, 2008.

¹⁷¹ kgoe = 1/1000 toe i.e. kilogram of oil equivalent (energy unit); euro05 – unit of gross value added expressed in terms of equivalent of EUR 1 calculated by use of exchange rate of year 2005.

¹⁷² „EFEKTYWNOŚĆ WYKORZYSTANIA ENERGII 2012”, Central Statistical Office, serie „Informacje i opracowania statystyczne”, ISSN: 1732-4939, ZWS, 2014. Publication available on www.stat.gov.pl. English version available at <http://www.odysseemure.eu/publications/national-reports/>.

Estimated total CAPEX in the supported projects - PLN 2.2 m

- **Energy Efficiency investment projects supported by NFOŚiGW**

Of the aforementioned 12 energy audits, just one company with two EE investment projects was selected for NFOŚiGW support in the food industry sector:

1. **Wrigley Poland Sp. Z o.o.**

The project, based on the audit of the technological processes, led to the following concept measures:

- Installing compressors with VFD.
- The outer air intakes for compressors.
- The variable temperature evaporator refrigeration compressors.

The other part of the audit, concerning buildings and internal grids, led to the following concept measures:

- Optimised control strategy - battery Munters air pre-treater.
- Lowering the temperature of the air pre-heating.

Based on the information current as of June 2015 the financial agreement between the NFOŚiGW and the enterprise was cancelled.

Based on information available in May 2015, another project was also prepared for support:

2. **BIOAGRA S.A.**

The project pertained to the modernisation of installations for rectifying ethyl alcohol by implementing a system for heat recovery with the technology from Katzen INC ZPE Goświnowice; the parameters of the project were as follows:

CAPEX	PLN 40.5 m
NFOŚiGW preferential loan	PLN 30.375 m
Annual energy use before the investment ¹⁷³	420,838 MWh/year
Annual energy savings after the investment	13% 54,709 MWh/year
Annual energy savings on investment in relation to total annual energy consumption	11.75%
Payback period (SPBT)	6.17 years
CAPEX/Tangible assets	12,5%
CAPEX/Revenues from operations	7.91%

- **Conclusions**

A significant proportion (14%) of the enterprises in the food industry, which are interested in NFOŚiGW energy audit demonstrate an active interest in EE. On the other hand, a small number of representatives of this industry who implemented audit recommendations, may indicate the need for investment support.

¹⁷³It applies only to project covered by a loan (not to the entire plant).

APPENDIX 6 LESSONS LEARNT – PROGRAMMES DESCRIPTION AND INFORMATION ON INCINERATORS
SUPPORTED UNDER THE OPI&E 2007-2013

Description of the NFOŚiGW RES Loan Programme

Objective	Investments in RES installations
Beneficiaries	Enterprises
Period	Implementation period: 2009-2018 (closed scheme)
Key requirements	<p>Construction, development and reconstruction of RES installations:</p> <ol style="list-style-type: none"> 1) thermal energy generation from biomass (sources with a capacity up to 20 MWt); 2) electricity generation from biomass in cogeneration (up to 3 MWe); 3) electricity and/or heat generation from biogas produced from sludge or organic waste; 4) construction, development or reconstruction of agricultural biogas plants in order to connect them to gas distribution network; 5) wind farms (up to 10 MWe); 6) energy generation from geothermal waters; 7) hydropower plants (sources up to 5 MWe); 8) high-efficiency cogeneration (other than biomass).
Instrument parameters	<ul style="list-style-type: none"> • Loan - up to 75% of eligible costs; • Loan amount - from PLN 4 m to 50 m; • The minimum total project costs - PLN 10 m; • Fixed interest rates - 6% annually (1st call for proposals); • Variable interest rates - WIBOR 3M+50 bps.(2nd call for proposals); • Variable Interest rates - WIBOR 3M – 100 bps, but no less than a 4% per annum (3rd call for proposals); • Loan tenor - not longer than 15 years, grace period - no longer than 18 months; • Option for redemption up to 50% of the outstanding loan capital, depending on profitability of the investment (measured with NPV). <p>Main collateral: Bill of exchange, shareholders' guarantee, pledge on shares, pledge on assets produced in the project, mortgage, assignment of receivables from the bank account, irrevocable power of attorney to the brokerage account, assignment of contracts for the sale of electricity and heat, assignment of rights resulting from sales agreements of certificates of origin.</p>
Allocations and absorption	<ul style="list-style-type: none"> • Number of calls for proposals conducted: 3; • Number of applications submitted: 299 (including: 87 biogas, 45 biomass, 130 wind farms, 8 water, 2 geothermal energy, 27 cogeneration); • Total value of loans requested: PLN 5,300 m (including: PLN 1300 M – biogas; PLN 1,100 M – biomass; PLN 2,300 M - wind farms; PLN 71 M – water; PLN 34M - geothermal energy; PLN 550 M - cogeneration); • Number of projects supported: 28 (including: 2 biogas, 1 biomass, 20 wind farms, 2 water, 0 geothermal energy, 3 cogeneration); • The project costs of supported projects: PLN 817.7 m (including: 54.7 M – biogas; 28.7 M – biomass; 638.8 M - wind farms; 24.8 M – water; 0 - geothermal energy; 70.7 M - cogeneration); • Total value of loans granted: PLN 541.1 m (including: 32.6 M – biogas; 12.4 M – biomass; 438.1 M - wind farms; 18.4 M – water; 0 - geothermal energy; 3.6 M - cogeneration); • Amount of redemptions: PLN 0
Effects to be achieved	<p>Ecological effects to be achieved from the agreements signed:</p> <ul style="list-style-type: none"> • electricity production: 436,494 MWh/year • thermal energy production: 1,482,437 GJ/year • CO₂ emissions reduction: 359,892 Mg/year
Lessons learnt	<ul style="list-style-type: none"> • Suspension of many investments decisions due to long legislation process on the new Act on RES; • Migration of projects to the OPI&E 2007-2013 to use non-repayable instrument on RES (9.4); • No redemption granted (as all the projects with a positive NPV); • Biogas – majority of biogas projects are below 1 MWe (in the OPI&E the threshold above 1 MWe); • Geothermal waters – no interest of potential applicants (NFOŚiGW does not support costs of drilling); • Low interest in hydropower plants due to controversy regarding their influence on the phyto-fauna in Poland (due to a lack of full transposition of the EU relevant directives).

NFOŚiGW Priority Programme „Efficient use of energy”

Objective	Reduction of Energy consumption in enterprises
Beneficiaries	Enterprises with an annual minimum energy consumption at 50 GWh/year (later reduced to 20 GWh/year)
Period	2011-2014
Key requirements/ scope of projects	Each investment to improve EE must be based on the energy audit, which can be financed with grant under the Part 1 of the Programme (grants up to 70% of eligible costs). A condition for granting support was the beneficiary's commitment to implement the investment (or its part) resulting from the audit (at a minimum cost not less than the amount of grant awarded). With verified and approved energy audit beneficiaries gained right to apply for the preferential loan (under Part 2 of the Programme) dedicated for financing investment (or its part) resulting from the audit. Required, minimal ecological effect adopted at the level of 7% of energy savings in the audited area.
Instrument parameters	Preferential loan from PLN 0.5 M to PLN 90 M Financing period - 10 years Grace period - 12 months
Allocations and absorption	<p>Part 1 of the Programme – energy audits (budget PLN 40 m)</p> <ul style="list-style-type: none"> • Number of calls for applications: 16 • Number of projects applied: 115 (249 audits) • Total value of requested support: PLN 26.9 m • Number of audits resulting from financing agreements (programme's indicator): 188 • Number of supported projects: 83 • Total value of supported projects: PLN 29 m • Total value of financing granted: PLN 16.1 m • Average intensity of support: PLN 234 K • Contracted support: PLN 16.5 m <p>Part 2 of the Programme - investment (budget PLN 780 m)</p> <ul style="list-style-type: none"> • Number of calls for applications: 13 • Number of projects applied: 27 • Total value of requested support: PLN 901 m • Average value of requested loan: PLN 33.4 m • Number of projects supported: 15 • Total value of loans granted: PLN 374.6 m • Total value of projects completed: PLN 281.9 m • Average value of loan granted: PLN 25 m • Total cost of projects contracted: PLN 715 m
Effects achieved	Ecological effect resulting from agreements signed under Part 2 of Programme – investment projects (15 agreements): <ul style="list-style-type: none"> • reduction of the energy consumption: 625,088 MWh/year • additional ecological effect resulting from additional investments resulting from energy audits: reduction of the energy consumption: 224,622.3 MWh/year • reduction of the CO₂ emission: 201,668 tons/year
Key lessons learnt	<ul style="list-style-type: none"> • Over the first two years - relatively low interest in the scheme among enterprises and low quality of projects submitted. • An increased interest among applicants over the last two years - almost all of the projects submitted were granted support. • A relatively low interest in preferential loans for EE investments – despite the beneficial financing conditions (low margins, long tenors, attractive forms of collaterals), beneficiaries have not found them attractive enough, mainly due to administrative burdens (esp. verifications of ecological outputs). • Payback period and any limits for Dynamic Generation Cost (“DGC”) of investment have not been taken as the key selection criteria.

Description of the TRF of BGK (1999-2014)

Objective	Financial support for investment in retrofitting, repair and renovation of residential buildings (including houses, tenement houses and block of flats)
Beneficiaries	Owners and managers of residential and public buildings (including individuals, community housing, housing associations, housing cooperatives and TBSs.)
Period	1999- 2014 (continued in 2015)
Key requirements/scope of projects	Loans for projects concerning retrofitting, repair and renovation of residential and public buildings offered through cooperating commercial banks. In addition to granting the loan, the TRF offers further incentives including: <ul style="list-style-type: none"> • thermomodernisation premium – for reduction of heat consumption and promotion of cogeneration; • repair premium – for retrofitting of residential buildings which use started before 14.08.1961: • compensation premium - refinancing of eligible project costs, both financed with the loan and from investor's own sources – available for individuals who were the owners of the buildings before 25th April 2005.
Instrument parameters	Thermomodernisation premium - 20% of loan used (capped at max. 16% of the costs incurred or twice the expected annual savings in energy costs, determined on the basis of an energy audit); Repair premium - 20% of the loan used for the repair projects, not more than 15% of project expenditure; Compensation premium - a bonus compensation relating to costs carried by the investor. The loans are granted by banks under conditions that are at their discretion. Based on information from BGK, the key parameters include: <ul style="list-style-type: none"> • Examples of collaterals required by commercial banks for housing associations – generally satisfied with assignment of receivables and pledge on associations' accounts (incl. renovation fund and insurance); • Tenor – various; • Average interest rates applied (for the period of 2009-05/2015 and only in 2015) <ul style="list-style-type: none"> – Loans with thermomodernisation premium – 6.15%, 4.53% – Loans with repair premium – 6.18%, 4.66%
Allocations and absorption	<ul style="list-style-type: none"> • Total value of premium granted PLN 1,774 m, with annual allocations¹⁷⁴ • Total loans granted: PLN 8,658 m • Total project value: PLN 11,124 m • Number of premium applications: 35,044 (over 88% for thermomodernisation premium) • Number of applications supported: 32,473 • Value of support paid: PLN 1,514 m (over 90% for thermomodernisation premium)
Effects achieved	<ul style="list-style-type: none"> • Total energy savings: no data available • Number of buildings supported with premium: 32,473 (including: housing associations – 18,242, housing cooperatives – 11,448, individuals – 1,571, others 162) • Number of multiresidential buildings supported – 30,546
Key lessons learnt	<ul style="list-style-type: none"> • Well-recognised instrument across Poland among various beneficiaries groups; • Full absorption of annual allocations for premium each year; • Lack of requirements on energy and ecological effects to be achieved resulted in relatively low ecological effects which should be eliminated by requiring minimum energy efficiency effect; • Efficient cooperation with 13 commercial banks cooperating with the TRF; • Efficient cooperation with external consultants verifying refurbishment and energy audits on behalf of the TRF; • Experience in financial and economic assessment of investments; • Unstable source of financing for the TRF due to annual allocations.

¹⁷⁴ Compiled data from the period 1999 – 2014.

NFOŚiGW Priority Programme „GIS-Green Investments Scheme Part 1) Energy management in public buildings”

Objective	Reducing CO₂ emissions by funding projects to improve EE in public buildings
Beneficiaries	<ul style="list-style-type: none"> • local government units and associations thereof; • local legal entities established under separate laws in order to perform public tasks; • Volunteer Fire Brigades; • universities and research institutions; • public healthcare institutions and healthcare entities; • non-governmental organisations, churches and other religious organisations.
Period	2010 –2017
Key requirements/scope of projects	<ul style="list-style-type: none"> • Minimum total project costs - PLN 2 m. • Thermomodernisation of public buildings, including replacement of the equipment in order to achieve the highest economically viable standards for EE, related directly to the thermal modernisation of buildings. • Replacement of internal lighting to energy-efficient one (as additional tasks implemented with the thermomodernisation of buildings).
Instrument parameters	<ul style="list-style-type: none"> • Grant up to 30% of eligible costs. • Loan up to 60% of eligible costs. • Merging of grant and loan allowed. • Financing in the form of a loan: <ul style="list-style-type: none"> a) variable interest rate: WIBOR 3M + 50 bps b) tenor: up to 15 years from the date of the first tranche, c) grace period: not longer than 18 months from the project completion.
Allocations and absorption	<ul style="list-style-type: none"> • There were 6 of calls for proposals within the programme. • 620 applications were submitted. • The total cost of the projects exceeded PLN 2 bn. • The amounts requested: <ul style="list-style-type: none"> - as grants: PLN 950.4 m, - as loans: PLN 1,233.1 m. • 317 grant agreements were signed for a total amount of PLN 472.2 m and 211 loan agreements for a total amount of PLN 439.5 m. • The average cost of projects financed - PLN 3.9 m, which allowed for an average energy saving of 166 toe/year per project.
Effects to be achieved	<p>Environmental result - reducing CO₂ emission: 214,899 Mg/year. Energy savings: 646,111 MWh/year (2.326,000 GJ/year), on average 60% of energy savings.</p>
Key lessons learnt	<ul style="list-style-type: none"> • Taking into account a large amount of applications with the total costs exceeding PLN 2 bn, the mechanism of the support, proposed in the programme, should be generally considered appropriate and needed. • Relatively low interest in loans (which was not obligatory). • Low level of collateral required in comparison to commercial banks requirements. • Profitability of the project should be considered as a criterion for estimating the level of co-financing. • Additional selection criteria such as IRR, NPV or DGC should be used for assessing intensity of support (differentiation of intensity depending on viability of investment). • Main reasons for rejecting applications: not well-prepared projects (lack of administrative decisions), non-eligible applicants, mistakes in energy audits, insufficient projects values and / or energy savings.

Allocations of grants and loans granted to incinerators supported under the OPI&E 2007-2013

No.	Beneficiary	Area	Planned capacities Mg/year	Total investment cost	Total eligible costs	EU grant	% of	NFOŚiGW loan in PLN	% of co-financing
							co-financing		
1	Międzygminny Kompleks Unieszkodliwiania Odpadów ProNatura Sp. z o.o.	Bydgosko–Toruński Metropolitan Area	180,000	522,101,801.10	425,756,652.46	255,424,188.50	59.99%	163,350,000	38.40%
2	Krakowski Holding Komunalny S.A.	City of Kraków	220,000	826,905,444.43	670,791,523.20	371,728,052.96	55.42%	298,230,000	44.50%
3	Miejski Zakład Gospodarki Odpadami Komunalnymi Sp. z o.o.	Konin sub-region	94,000	381,884,263.17	310,333,842.00	154,513,841.15	49.79%	145,115,159	46.80%
4	Zakład Unieszkodliwiania Odpadów Sp. z o.o.	Szczeciński Metropolitan Area	150,000	711,415,215.00	565,012,913.00	255,000,000.00	45.13%	280,681,947	49.70%
5	LECH Sp. z o.o.	Białystok Agglomeration	120,000	482,996,029.00	393,468,424.00	210,000,000.00	53.37%	164,000,000	41.70%
6	Miasto Poznań	City of Poznań	210,000	925,051,956.81	632,152,355.11	330,188,978.26	52.23%	0	0%
Total			974,000	3,850,354,709.51	2,997,515,709.77	1,576,855,060.87	52.61%	1,051,377,106	35.10%

NFOŚiGW – Programme – “Financing of construction of waste incineration plants”

Objective	Financing of construction of municipal waste incineration plants
Beneficiaries	Local governments and their associations, entrepreneurs
Period	2007-2013 – OPI&E 2007-2013 grants and NFOŚiGW preferential loans linked to the OPI&E 2007-2013 2010-2014 – NFOŚiGW loans
Key requirements	Construction of incineration plants as indispensable elements of municipal waste management systems
Instrument parameters	<p>OPI&E grants: Grant support was determined in accordance with the Regulation No. 1083/2006, the European Commission's methodologies, guidelines of the Ministry of Infrastructure and Development - based on the so-called, “the method of funding gap”. Average intensity of support – 53% of total eligible costs.</p> <p>NFOŚiGW preferential loan (linked to the grants):</p> <ul style="list-style-type: none"> • The maximum value - up to the gap between the amount of eligible costs and the value of EU grant; • Fixed interest rate of 3.5% per annum (since 2015: WIBOR 3M, but not less than 2% p.a.); • Repayment period consistent with the provisions of the application for funding from OPI&E; • Interests paid quarterly. <p>NF preferential loans (not linked to grants):</p> <ul style="list-style-type: none"> • The maximum value of the loan - up to 75% of eligible costs; • Fixed interest rate - 3.5% p.a. (since 2015: WIBOR 3M +50 bps, but not less than 2% p.a.); • Tenor - up to 15 years; • The possibility to redeem up to 30% of the loan (the possibility of redemption since 2015: up to 25% of the loan principal, but not more than PLN 10 m); • Interests paid quarterly.
Allocations and absorption	<p>OPI&E grants for investments:</p> <ul style="list-style-type: none"> • 6 major projects supported out of 8 submitted (2 not mature enough to be supported) • Total eligible costs – PLN 2,998 m • Total value of grant aid - PLN 1,577 m • Total allocation spent – PLN 1,225 m <p>OPI&E grants for project preparation:</p> <ul style="list-style-type: none"> • Number of projects supported – 3 • Value of total eligible costs – PLN 21.1 m • Intensity of support – 85 % • Value of support granted – PLN 17.9 m <p>NFOŚiGW loans for the 6 incinerators (as own contribution of beneficiaries):</p> <ul style="list-style-type: none"> • Number of applications submitted - 5 • The total value requested - PLN 1,051 m • The average loan value requested - PLN 210 m • Average % of eligible cost covered by loans – 35% • Total loan value - PLN 1,051 m <p>NFOŚiGW loans not linked to grants – no interest of potential beneficiaries over 2010-2014.</p>
Effects to be achieved	Total capacity - 974 Mg/year
Lessons learnt	<p>1) Grants and NFOŚiGW preferential loans linked to grants:</p> <ul style="list-style-type: none"> • The use of the funding gap method minimised the risk of over-financing of an individual project with grant (from the EU); • The above approach led to the limitation of financial inefficiency of projects, but ultimately NPV of investments, including grants, remained negative; • The EU support increased social acceptability of investments; • The estimated tariffs for waste disposal have to take into consideration maximum levels as defined in the Act of 28 November 2014 amending the Act on maintaining cleanliness and orderliness/tidiness in municipalities and some other acts (Art. 6k, point b) and the affordability criterion. A reasonable "gate fee" should mitigate the risk of the waste supply not being directed to the installations; • Eligibility of expenditures by 2015 eliminated a few projects from the support due to long development periods. <p>2) NFOŚiGW loans not linked to grants: over 2010-2014 no interest from the local governments or municipal companies in the instrument to support construction of waste incinerators.</p>

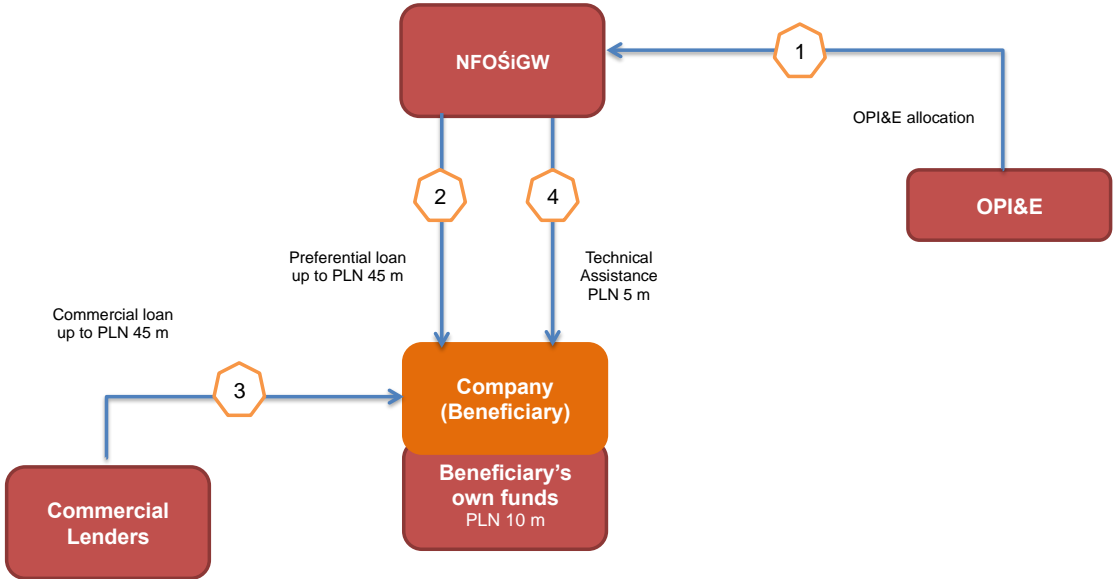
APPENDIX 7 ALTERNATIVE IMPLEMENTATION OPTIONS

This appendix shows the alternative financial instruments and implementation options for two investment areas: EE in large enterprises and RES.

I. EE in Large Enterprises

(1) The implementation proposal outlined in the PIS:

EE in large enterprises – simplified financial structure



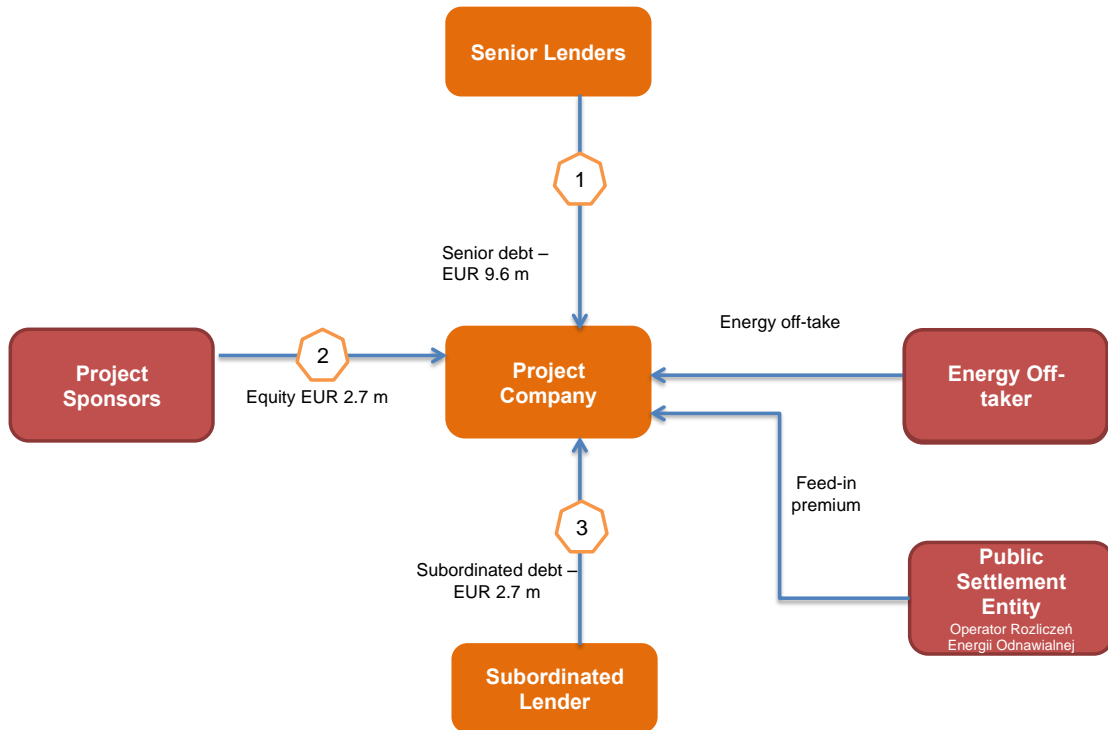
(2) An alternative model, for part of the funds, and targeted specifically at the mid-caps, could be:

- Financial Product:** EIB Mid-Cap EE Facility (MCEEF) – offering a combination of EIB funding and ESIF loans provided at preferential conditions (both in terms of interest rates and tenor).
- Target:** Mid-cap companies in Poland implementing EE projects/project components.
- Implementing Body:** EIB as a fund of funds manager + financial intermediaries, selected by EIB and being eligible also for EIB lending, which would channel lending to mid-cap companies.
- Rationale:** EIB’s involvement would add value based on experience in managing financial instruments. EIB also has an established, bigger lending activity for mid-caps in Poland, which MCEEF would complement (market analysis suggests that companies do not borrow **only** for energy efficiency improvements as stand-alone projects). EIB funding could therefore also be used by the mid-caps for other types of projects, thereby allowing the intermediary(ies) to offer a more holistic funding solution, that blends funds from EIB and ESIF. The NFOŚiGW does not have a similar scope to finance beyond low-carbon activity. EIB could be directly appointed to run the MCEEF as a FoF manager.

II. Renewable Energy Sources (RES)

(1) The implementation proposal outlined in the PIS:

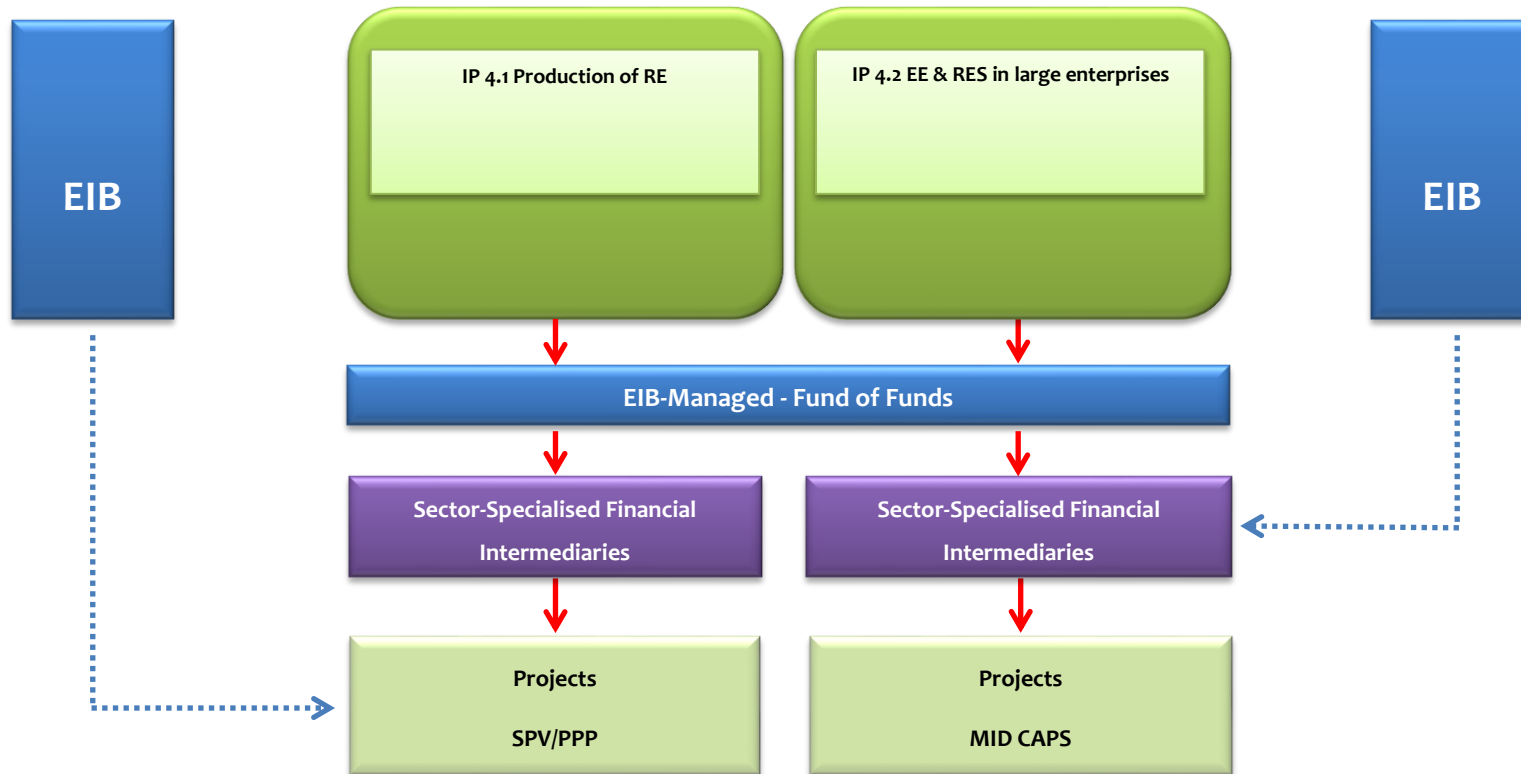
RES – simplified financial structure



(2) An alternative model could be:

Financial Product:	Mezzanine Instrument (quasi-equity)
Target:	Project sponsors/promoters of RES projects to be implemented using a PPP/project finance model.
Implementing Body:	EIB as a fund of funds manager + financial intermediary(ies) lending to project companies (most likely being special purpose companies).
Rationale:	EIB's involvement would add value. EIB has experience both in mezzanine products, PPP/project financing techniques, and as a FoF manager for ESIF funds. EIB could be directly appointed as a FoF manager.

Both the MCEEF and the mezzanine instrument could be implemented via a single FoF managed by the EIB, with funds ring-fenced, but capable of reallocation between the two Investment Priorities (i.e. IP 4.1 and IP 4.2), based on demand for either financial instrument/product





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