



**EXPERT EVALUATION NETWORK
DELIVERING POLICY ANALYSIS ON THE
PERFORMANCE OF COHESION POLICY 2007–2013
YEAR 1 – 2011**

**TASK 1: POLICY PAPER ON RENEWABLE ENERGY AND
ENERGY EFFICIENCY OF RESIDENTIAL HOUSING**

POLAND

VERSION: FINAL

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**A report to the European Commission
Directorate–General Regional Policy**

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LIST OF ABBREVIATIONS

- EEN – Expert Evaluation Network
- ERDF – European Regional Development Fund
- ESF – European Social Fund
- NEEAP – National Energy Efficiency Action Plan
- NFEPWM – National Fund for Environmental Protection and Water Management
- OP – Operational Programme
- RES – Renewable Energy Sources

1. EXECUTIVE SUMMARY

As the Polish energy sector is dominated by fossil fuels, in particular hard coal and lignite, the country's interest in RES development and energy efficiency improvement in residential housing is insufficient. It remains low despite substantial possibilities in this respect. The potential of economically justified RES development is estimated at 22% of consumed energy [Możliwości ..., 2007]. Possible energy savings in the residential sector amount to 34.5–42.8 TWh, which accounts for 23–28% of the whole energy saving potential in Poland [Węglarz 2011].

Poland has developed a system of proprietary rights to certificates of origin, i.e. documents certifying that a particular amount of electricity has been generated from a renewable source, and it constitutes the basic system measure supporting renewable energy development.

The National Fund for Environmental Protection and Water Management (NFEPWM)¹ not only manages state financial resources but also acts as an implementing agency for a large part of the EU funds.

An analysis of the expected EU financial support within the operational programmes shows that only 1.4% of the resources available under the European Regional Development Fund (ERDF) and the Cohesion Fund will be allocated for RES development. Out of this, biomass and wind energy will receive the highest support (31% and 29% respectively). Synergy between the EU funds and the environmental funds could have been, however, larger.

The Thermo-modernisation Fund constitutes the largest mechanism for financing energy efficiency improvement in the building construction sector. New legislation on the energy performance of buildings came into force in January 2009. In practical terms, however, the above regulations do not function properly. Adoption of the Act on Energy Efficiency constitutes an important step that may help implement the above mentioned measures. The act was signed by the President in April 2011. It introduces the system of "white certificates", i.e. energy efficiency certificates.

¹ The resources of the National Fund for Environmental Protection and Water Management derive from the following: fees paid for use of the environment for economic activity; penalties for violation of the environmental legislation – which is closely connected with the Environmental Protection Law; utilization and concession fees collected under the Geological and Mining Law; fees determined under the Water Management Law, and also the act on recycling of decommissioned vehicles. Since co-financing mostly takes the form of loans, the National Fund constitutes a "renewable source of financing" for environmental protection projects. Loans and grants, as well as other forms of co-financing provided by the National Fund, are mainly designated for co-funding large national and pan-regional capital projects for controlling water, air and land pollution.

The current and expected EU financial support for energy efficiency improvement in residential buildings is very low – 1.2% of the financial resources available under the European Regional Development Fund and the Cohesion Fund.

Support for energy efficiency improvement in residential buildings is negligible. Therefore, any form of support that improves the current system is by all means desirable and useful.

2. NATIONAL POLICY

Renewable energy

The Energy Policy of Poland until 2030 states that the share of renewable energy sources (RES) in the final energy mix should increase to 15% by 2020, i.e. the level required by the EU legislation, and that further it will increase to only 16% by 2030. The government does not perceive RES as a critical option for the Polish energy sector. Annex Table A presents the economic potential of primary RES use.

The system of proprietary rights to certificates of origin, i.e. documents certifying that a particular amount of electricity has been generated from a renewable source, constitutes the basic system measure supporting renewable energy development. Subjects that produce green electricity but do not sell it are also entitled to obtaining and selling such certificates. At the same time, energy companies that sell electricity to end users are obliged to obtain certificates of origin (i.e. documents guaranteeing that energy was generated in a renewable source) and submit them for redemption. Otherwise, they have to pay a substitute fee.

The current system is costly, complicated (especially for smaller energy producers) and fails to focus on promotion of solutions that could contribute to the 15% target of RES share in consumed energy in 2020. Legislation should be changed so as to stimulate new investments in efficient RES technologies. The current system is more favourable for RES of larger capacities, as it generates costs and barriers that for smaller energy producers prove too difficult to overcome. Energy consumers do not benefit from the expected cost reduction (due to the economies of scale), while system costs are increasing proportional to the size of sources.

A number of other incentives have been implemented, focusing on: power grids, wind farms, bio-fuels and some exemptions from excise tax. Various institutions implement support measures for renewable energy development in Poland. The key role plays the National Fund for Environmental Protection and Water Management (NFEPWM). Co-financing for RES is provided within four programmes. It is planned that EUR 0.6 billion will be allocated from state funds in 2009–2012.

An analysis of the main sources of RES financing shows that in 2007–2010 significant resources from the state environmental funds (mainly from additional payments and fees imposed on energy companies for not fulfilling their obligations related to renewable energy) coincided with support from the EU funds. This clearly has had a positive impact on the amount of RES investments and the share of renewable energy in the state energy mix. In particular RES technologies for electricity generation received additional support – subsidies and preferential loans. No significant changes have been introduced to RES

support measures since 2007. The economic crisis has not had an impact on the level of support for RES. Moreover, it is uniform throughout Poland, i.e. it is not diversified according to regions.

Energy efficiency of residential housing

Average energy consumption for apartment heating (in terms of floor space) amounts to 170 kWh/m² per year. This is a rather high ratio when compared with other European countries (e.g. in Norway it equals around 115 kWh/m² per year, in Lithuania 140 kWh/m² per year). Annex Table B presents the potential reductions in energy use.

In June 2007, the Ministry of Economy approved the National Energy Efficiency Action Plan (NEEAP). The NEEAP proposes the following measures aimed at energy efficiency improvement in the residential sector: introduction of the system of energy performance assessment for buildings (referred to as an energy passport of a building or an apartment), introduction of the Thermo-modernisation Fund, promotion of rational energy consumption at the household level.

The Act of 1998 on support for thermo-modernisation initiatives (in 2008 transformed into the Act on support for thermo-modernisation and renovations) is one of the legal acts aimed at energy efficiency improvement. It provides for thermo-modernisation grants paid for owners of residential buildings that have renovated their facilities following the recommendations of the energy audit. Between 1999 and 2010, around 20 thousand thermo-modernisation grants, with the total value of over EUR 0.3 billion, were granted within this mechanism, instigating investments valued at over EUR 1.6 billion. Despite this, some experts question the Fund's effectiveness, as its operational rules do not provide for any regular assessment of the financial results of the investments supported within this mechanism [Sobolewski 2011]. In 2010, the Polish government did not transfer any financial resources from the state budget to the Fund. The bonuses were financed from the funds left from the previous years (around EUR 25 million). The 2011 state budget allocates around EUR 50 million for bonuses within the thermo-modernisation programme.

New legislation on the energy performance of buildings came into force in January 2009. According to the new regulations, an energy performance certificate has to be prepared for new buildings as well as buildings intended for sale or rental. In practical terms, however, the above regulations do not function properly and experts refer to them as "a total failure of the energy certification system" [Sobolewski 2011].

Adoption of the Act on Energy Efficiency constitutes an important step that may help in implementing the abovementioned measures. The act was signed by the President in April 2011 and introduces the system of white certificates, i.e. energy efficiency certificates (a mechanism providing incentives for energy saving solutions and enforcing them).

Support for energy efficiency of residential housing is not spatially diversified.

3. ERDF AND COHESION FUND SUPPORT AND CONTRIBUTION TO NATIONAL POLICY

Renewable energy

Apart from state financial resources, NFEPWM manages also EU funds, and they can be allocated among other for RES development. Under the Measure 4.5 of the Operational Programme Infrastructure and Environment – Support for companies in air protection initiatives – beneficiaries can receive a subsidy for up to 30% of the costs resulting from modernisation of existing fuel combustion installations (not more than EUR 5 million) if the installation is fully or partly based on RES. If a planned investment in RES (e.g. a bio-power plant) fulfils the requirements of high-efficiency co-generation, it can receive a subsidy under the Measure 9.1 – High-efficiency energy generation. Moreover, if an integrated thermo-modernisation project includes an RES installation (e.g. solar panels), it can also apply for a subsidy under the Measure 9.3 – Thermo-modernisation of public buildings.

The Ministry of Economy acts as an implementing institution for three measures within the Operational Programme Infrastructure and Environment that provide significant support for RES investments. They are outlined below.

- Measure 9.4 – Generation of energy from renewable sources, aimed at increasing the amount of power and heat produced from renewable resources. It provides support for construction of wind farms, hydro power plants with capacity up to 10 MW, biomass or biogas power plants, geothermal heat generating plants or solar panels. Maximum EU co-financing amounts to 30–70% of eligible expenses, while the total value of support varies from EUR 2.5 million to EUR 10 million.
- Measure 9.5 – Fuel production from renewable resources, targeted at companies that plan to use RES in biofuel production. Maximum EU co-financing amounts to 30–70% of eligible expenses, while the total maximum value of support varies from EUR 5 million to EUR 7.5 million.
- Measure 10.3 – Development of industry for RES, available only for companies that invest in the construction of modern technological lines for manufacture of equipment used for power and heat generation from RES, biocomponents and biofuels. Maximum EU co-financing amounts to 30–70% of eligible expenses, while the total maximum value of support varies from EUR 2 million to EUR 7.5 million.

An analysis of the expected EU financial support within the operational programmes shows that only 1.4% of the resources available under the European Regional Development Fund and the Cohesion Fund will be allocated for RES development. Out of this, biomass and wind

energy will receive the highest support (31% and 29% respectively). The situation in Poland is better than in most of the other new EU Member States, as the average share of funds for RES amounts to 1.3%. The Czech Republic (2.5%), Latvia and Slovenia have decided to allocate the highest share of EU funds for this purpose.

As a rule, projects of lower value (less than EUR 5 million, and for electricity generation from biomass or biogas or development of small hydro power plants – less than EUR 2.5 million) can receive support for new RES investments under the 16 Regional Operational Programmes, implemented in respective voivodships. As far as regional operational programmes are concerned, 1.7% is on average allocated for RES development. Lubelskie (3.1%), Łódzkie, Lubuskie, Podkarpackie and Zachodniopomorskie voivodships have the highest share, while Śląskie and Wielkopolskie the lowest, i.e. less than 1%.

Table A below shows the allocation of financial resources for RES.

Table A –Allocation of funds for RES, EUR million

	Funds under OP E&I	Funds under ROPs	Total
Solar energy	59	51	110
Hydro energy and other	149	86	235
Wind energy	228	48	276
Biomass	339	70	409
Total	776	254	1,030

Source: Wiśniewski G. Wsparcie finansowe dla inwestycji w odnawialne źródła energii. Institute for Renewable Energy, Warsaw 2011. Published as manuscript.

It appears, however, that the scale of state aid (i.e. subsidies) for RES was not fully correlated with support for green electricity from the certificates of origin. Had both instruments been optimised, the investment incentive would be larger than currently observed on the market [Wiśniewski 2011a].

Energy efficiency of residential housing

The current and expected EU financial support for energy efficiency improvement in residential buildings is very low – 1.2% of the financial resources available under the European Regional Development Fund and the Cohesion Fund. This share is lower than in other EU12 Members States, which averages just over 2%. The Czech Republic has the highest share – 3.4%. Only Lithuania decided to allocate less for energy efficiency improvement – 1%.

The share of funds allocated for energy efficiency improvement in residential housing is relatively higher within the Regional Operational Programmes (ROP) than in other EU support programmes. It amounts to 2.2%, with Dolnośląskie, Lubelskie, Mazowieckie, Pomorskie and

Wielkopolskie voivodships as leaders – they have allocated 2.5%, and Pomorskie as much as 4.3%. This share is much lower in ROPs for Małopolskie and Podlaskie voivodships – less than 1%.

Support for energy efficiency improvement in buildings from the state funds as well as EU funds is so low that it is difficult to assess differences, complementarity or overlaps between them.

ERDF CONTRIBUTION TO NATIONAL POLICY

Renewable energy

In general, ERDF financing supports national mechanisms aimed at RES development. Synergy between the EU funds and the environmental funds could have been, however, larger. The extent of state aid, e.g. subsidies, for RES development, may significantly decrease already in 2012/2013, as the EU funds for RES are expected to finish soon (within the OP Infrastructure and Environment already in 2011/2012 and within Regional OPs in 2011/2012), while the funds that NFEPWM receives for RES are going to decrease too. The structure of subsidies should be altered so that it better corresponds with the Directive 2009/2/EC, especially the National Renewable Energy Action Plan. Support for micro sources and green heat should be strengthened, while assistance for green electricity and biofuels optimised [Wiśniewski 2011a].

As far as energy generation is concerned, the support from the EU funds is comparable with the support from the state resources. EU aid can be, however, allocated for production of RES-related equipment and development of local networks enabling proper operation of this equipment. Therefore, these two sources of support are definitely complementary.

The economic crisis has not had a significant impact on the level of support for RES. Under the OP Infrastructure and Environment, the support was not differentiated according to regions. There were, however, differences resulting from the decisions made in the regional operational programmes.

Energy efficiency of residential housing

As already mentioned, support for energy efficiency improvement in residential housing is negligible. Therefore, any form of assistance aimed at improving this situation should be seen as highly desirable and useful. Implementation of the white certificates system may change the current state for better. Only if this happens, it will be possible to discuss complementarity or overlaps between different sources of support.

Except for reduction of financing for the Thermo-modernisation Fund, the economic crisis has not had a major impact on the level of the support for energy efficiency improvement in residential housing.

Under the OP Infrastructure and Environment, the support was not differentiated according to regions. There were, however, differences resulting from the decisions made in the regional operational programmes.

4. RATIONALE FOR PUBLIC INTERVENTION

Renewable energy

The time frame for the main support measure, i.e. green certificates, has been defined up to 2017 but it is planned to expand to 2019. Nevertheless, the instrument is aimed at achieving the target planned for 2014 and in Energy and Climate Package. The support provided by e.g. NFEPWM depends on the scale of respective measures and interest of potential beneficiaries.

Potential additional benefits from RES support, e.g. social ones, are referred to in general, e.g. the number of additional jobs created due to RES support. They are not, however, defined for respective types of support. Environmental benefits are defined in terms of avoided GHG emissions. On the other hand, unfavourable environmental impacts can also occur. Although the analysed support mechanisms do not include environmental criteria, the Polish environmental law, in particular in the area of environmental impact assessment, allows to properly control RES investments in this respect. Nevertheless, investors frequently complain that Natura 2000 legislation is not flexible enough, hindering RES development.

Respective RES types do not differ when it comes to the time of operation of the support measures, additional social or environmental benefits.

Energy efficiency of residential housing

In general, ERDF support for state interventions is negligible, similar to the state support for energy efficiency improvement in residential buildings. The level of available funds is highly insufficient and proposed support is not adjusted to possible initiatives to be undertaken by respective social groups. For example, if an owner of a multifamily building decides e.g. to improve its insulation, the tenants will derive the benefits, as they pay for heating, and not the owner. Therefore, interest in this measure is negligible.

Support within the Thermo-modernisation Fund depends on the resources allocated each year in the state budget. The Act on Energy Efficiency, adopted in April this year, introduces the white certificates system, which may have an impact on energy efficiency improvement in residential housing. Nevertheless, it remains binding only to 2016 and after that year the future of the system is unknown.

Similar to RES, also here additional benefits are defined only in general, e.g. by the number of additional jobs, and are not specified for respective measures. Environmental benefits include GHG emission reduction and the amount of saved heat or power.

5. RATE OF SUPPORT AND PROFITABILITY

Changes in support for RES and energy efficiency improvement in residential housing depend to a certain extent on the market situation in these areas. The substitute fee in the green certificates system depends on the level of inflation and changes on the annual basis. It does not differ, however, according to regions or RES types. Support for energy efficiency improvement in buildings depends on the amount of thermo-modernisation work to be conducted. It is, however, limited by the national law, as it can cover up to 20% of the loan and cannot exceed 16% of all investment costs and the amount of expected savings on energy costs during two years, to be calculated on the basis of the energy audit. To a certain extent this is related with the changes in electricity or heat prices, as higher energy costs increase the profitability of such an investment. On the other hand, if savings exceed the expected amount during two years, support will have to be limited.

As already mentioned, licensed producers of energy from renewable sources are entitled to receiving certificates of origin confirming that energy was produced from RES. These certificates can be sold and companies trading in electricity are interested in purchasing them. Pursuant to the Energy Law Act, all entities selling energy are obliged to guarantee a certain share of energy from RES in their trade balance. If they fail to fulfil this obligation, they have to submit a substitute fee. The share of renewable energy increases on the annual basis and is defined for each year in the Regulation of the Minister of Economy.

Revenues of green electricity producers comprise of:

- Electricity price: suppliers of last resort in the area where the RES is located are obliged to purchase energy at the price that is calculated as an average for the year in question for electricity prices at the wholesale market. This price is announced each year by the president of the Energy Regulatory Office; in 2010 it amounted to approximately EUR 48 (PLN 195.32);
- Certificates of origin price: it depends directly from the level of the substitute fee that is each year adjusted by the President of the Energy Regulatory Office (in 2010 it amounted to approximately EUR 68 (PLN 274.42)).

Certificates of origin can be sold during sessions of the Polish Power Exchange, as proprietary rights, at the market of RES proprietary rights. Nevertheless, most of renewable energy producers opt for another method of sale, namely, bilateral agreements with

companies trading in electricity for sale of certificates at predefined prices (OTC transactions).

Support for RES includes:

- a) On the basis of the Energy Law Act and implementing regulations to this act, among others:
 - an obligation to purchase energy from RES imposed on last resort electricity suppliers that have issued conditions for connection to the grid for this source,
 - an obligation imposed on operators of electricity grids to ensure that all the subjects have priority in transmission and distribution of electricity produced from RES,
 - a 50% reduction in the fee for connection to the grid, specified on the basis of the actual costs of executing the connection, for RES with installed capacity not higher than 5 MW and co-generation units of up to 1 MW,
 - special balancing rules for wind farms,
 - additional support for small RES (less than 5 MW) generating electricity (e.g. exemption from the stamp duty on the concession and certificates of origin);
- b) On the basis of other regulations:
 - exemption from the excise tax for energy produced from renewable sources (currently this tax amounts to PLN 20 for 1 MWh),
- c) Financial support for RES investments, in the form of subsidies or low-interest credits and investment loans:
 - from public funds, including EU resources under the OP Infrastructure and Environment and Regional Operational Programmes,
 - from regional funds, including EU resources, for RES investment projects,
 - from the resources of the National Fund for Environmental Protection and Water Management,
 - from the resources of the EcoFund, which in 2005–2009 co-financed investments in solar energy, wind energy, energy from biomass and biogas as well as high-efficiency co-generation,
 - from the resources of the European Economic Area, including the Norwegian Financial Mechanism, which in 2004–2009 co-financed among others projects increasing RES use.

6. CONCLUSIONS

Renewable energy

Main barriers to RES development in Poland include [Wiśniewski 2011b]:

1. The structure of RES generation is obsolete. Simple possibilities allowing production of green energy with not advanced technologies have been exploited (biomass combustion and co-combustion).
2. OPs provide support for more modern technologies for electricity generation, while green certificates, i.e. assistance at the operational stage, support older technologies. In case of biofuels, support was provided only for technologies that will soon be phased out.
3. To date, support for manufacture of equipment for renewable energy (green economy) has been delayed and largely insufficient when compared with support for green electricity generation. The market of modern equipment has been too small to mobilise private capital to investing in new technologies or to applying the mechanism of technological transfer.
4. The National Renewable Energy Action Plan until 2020 includes new technologies (also technologies connected with distributed generation, such as solar panels, geothermal heat pumps, small wind farms) and new large-scale technologies (offshore wind energy). These technologies should receive special support in the 2014–2020 programming period.
5. Support at the operational stage – green certificates – should be reviewed. It should not be combined with the support system for investments (subsidies). The support system should be more flexible.
6. Micro sources of up to 10 kW capacity should be supported under a more foreseeable system of technologically diversified fixed prices (they are not treated as state aid). Additional support, in the form of investment subsidies, can be provided for these sources (innovativeness and development potential for Poland).
7. The system of support for biofuels should be revised, in particular to promote biofuels of second generation and green electricity in transport. Gradual reduction of support for first generation biofuels (from traditional agricultural produce) at the operational level can be connected with stronger subsidy support for second generation biofuels and application of green electricity in transport (including energy storage).
8. The regulation on state aid and the guidelines on aid intensity for the implementing institutions should be reviewed. Aid intensity should be significantly decreased (below 50%). Cost analyses should be conducted prior to making a decision and their results publicly available (reference costs for RES technologies).
9. Support criteria should be changed. The costs of CO₂ emission reduction and the reduction potential (the decade of the Energy and Climate Package) should constitute the overriding criterion for state aid intensity and allocation of funds for RES and the energy sector as such. Projects with lower reduction costs should be prioritised

(considering not only the RES technology but also the technology that is being replaced).

Energy efficiency of residential housing

The main recommendations on energy efficiency improvement in the residential sector include [Raport... 2009]:

- defining new, more stringent requirements on the energy performance of new buildings,
- designing and implementing financial support measures, adjusted to each group of buildings, including single-family houses,
- introducing changes to the energy certification system in relation to: possessing such a certificate, correcting substantive mistakes in calculations, improving the layout and including new information on the certificates,
- introducing a uniform solution for defining and verifying energy performance of buildings, on the basis of the minimum unit energy demand,
- introducing procedures for acceptance of energy performance of new and modernised buildings and for verification of audits and certificates.

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TABLES

Annex Table A – Economic potential of primary energy use from renewable energy source in 2020

RES type	Real economic potential for RES development – final energy use*
	[TJ]
Solar energy	83,312.20
Geothermal energy	12,367.0
Biomass	600,167.8
Hydro energy	17,974.4
Wind energy	444,647.6
Total	1,158,469.0

*Figures are expressed in PLN (EUR 1 = approximately PLN 4).

Source: Możliwości wykorzystania odnawialnych źródeł energii w Polsce do roku 2020, Warszawa, December 2007. A report commissioned by the Ministry of the Economy from Instytut Energetyki Odnawialnej with cooperation with Instytut na rzecz Ekorozwoju.

Annex Table B –Potential reduction in energy use by 2020

Energy efficiency improvement areas	Potential [TWh/per year] ²	Share [%]
Electricity generation	40.0	18.8
Household appliances and domestic lighting	9.7	4.6
Residential and public buildings, SMEs, local heat production	142.5	67.0
Electric motors	12.4	5.8
Modernisation of heat transmission and distribution networks	3.1	1.5
Modernisation of power transmission and distribution grids	3.5	1.6
Street and square lighting	1.3	0.6
Hall and workshop lighting	0.3	0.1
Total	212.8	100.0

Source: Raport. Potencjał efektywności energetycznej i redukcji emisji w wybranych grupach użytkownika energii. Droga naprzód do realizacji pakietu klimatyczno-energetycznego. Polish Ecological Club – Upper-Silesian Branch, Foundation for Energy Efficiency, INFORSE, European Climate Foundation, Katowice 2009.

² Lower heat consumption was recalculated from PJ to TWh.