

Report synthesis

Vision of solar thermal energy development in Poland and action plan up to 2020



Institute for Renewable Energy
in cooperation with
Alliance of Solar Energy Equipment Producers and Installers
(Solar Alliance 20x2020)

Warsaw, December 2009

The coalition of Solar Energy Equipment Producers and Installers called "Solar Alliance 20x2020" was established by 9 companies being prominent part of Polish solar thermal energy market and also biggest Polish exporters of solar collectors. The Alliance was established after discussion at the II Solar Energy Industry Forum held during GreenPower Fair on 21 May 2009 as an industry response for the EU directive on the promotion of the use of energy from renewable sources (2009/28/WE from 25 June 2009).

The logo for ACTION, featuring a green square with a white triangle pointing right, followed by the word "ACTION" in bold black capital letters.The logo for ferroli, with an orange arc above the word "ferroli" in bold black lowercase letters. Below it, in smaller text, is "technika grzewcza i klimatyzacyjna".The logo for JUNKERS, featuring a blue triangle with a white cross-like symbol, followed by "JUNKERS" in bold black capital letters and "Grupa Bosch" below it.The logo for RAPID, with the word "RAPID" in bold black capital letters inside a blue double-lined border.The logo for SchäferSOLAR, with a yellow arc above the word "SchäferSOLAR" in bold black capital letters.The logo for suneX, with the word "sune" in grey lowercase letters and "X" in a stylized gold font.The logo for Vaillant, featuring a green square with a white rabbit head icon, followed by "Vaillant" in bold green lowercase letters and "Intelligentne Systemy Grzewcze" below it.The logo for VIESSMANN, with "VIESSMANN" in bold red capital letters and "climate of innovation" below it.The logo for watt, with the word "watt" in bold blue lowercase letters.

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Introduction

Thousands of responsible Poles, many public organisations, NGOs, local authorities and small entrepreneurs decided to invest in exploitation of solar thermal energy for preparation of utility hot water, heating of swimming pools. Some of them have been even already using solar energy for space heating and cooling. They all pave the way for practical use of "green technology" and for lowering costs of energy in the future.

In the European Commission's barometer about the reasonability of the EU climate package "3 x 20%", particularly in the new directive on the promotion of the use of energy from renewable sources, more than $\frac{3}{4}$ of Poles confirmed their readiness to buy more expensive products if they are "green" and environmentally friendly. Within the group with a higher education this percentage exceeds even 85%¹. According to these results Poland does not differ from other European countries. In the public opinion survey conducted by CBOS², solar thermal energy is the most friendly for the environment and the climate and along with its development brings better environment protection effects than many other energy technologies.

The mission for the national solar energy industry and the installers is to deliver the equipment of the highest quality in relation to prices, which will be more suitable for wide range of energy consumers that dream about clean environment and broader energy independence. The users of solar thermal systems are waiting for significant improvement of competitiveness and availability of the solar energy systems. This would require a better and demand-tailored national support system, technology development and its further improved competitiveness on the energy market.

The EU Climate package „3 x 20%" and especially the new EU directive on the promotion of use of energy from renewable sources are forming perfect and unique framework for a fast development of many renewable energy technologies by 2020. Solar thermal energy sector seems to be on the best way to cover consumers' expectations and to support Polish government to fulfil the national renewable energy target of 15% energy from renewables in the final energy consumption balance by 2020.

This study is a vision of solar thermal energy development created by the national industry in co-operation with The Institute for Renewable Energy (IEO) with respect to the new EU directive and – to a considerable extent – to the current new national energy and ecological policies. The Alliance of Solar Energy Equipment Producers and Installers, called "The Solar Alliance 20x2020", was appointed for this study.

The solar energy industry declares its capability to install ca. 20 mln m² of solar collectors in active systems in Poland by 2020. This meets the expectations and the requirements of the citizens and contributes substantially to the governmental policy aimed at the development and implementation of a new national directive "The National Renewable Energy Action Plan (NREAP) up to 2020".

The implementation of the goal set by "The Solar Alliance 20x2020" will bring several social advantages in the form of:

- many new jobs,
- reduction of fuels combustion products emission to the atmosphere,
- diversification of energy supply and better energy security for households, companies, municipalities, regions and the country;

The solar energy industry would like this study – describing either courageous or responsible solar energy development vision – to become a guide for the solar energy sector in its aspirations to implement excellent solutions and for all energy users to be a source of information and inspiration in seeking for possibilities of acquiring energy in clean, ecological way.

The authors hope that this study will be used as a base for further activities and as a support for the government, particularly for:

- Ministry of Economy that is responsible for the energy policy and the implementation of the directive on the promotion of the use of energy from renewable sources in

¹ Eurobarometr: *Attitudes of European Citizens towards the Environment*, Brussels, March 2008.

² Public Opinion Research Center: *Poles opinion about climate changes, (in Polish)*, Warsaw, 2009.

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Poland, especially responsible for elaboration of a new national directive “National Renewable Energy Action Plan (NREAP): Pathways for the development of the use of renewable energy sources up to 2020”,

- Ministry of Environment responsible for the UN Climate Convention and implementation of the EU climate package as well as for the national system of ecological funds, that are significantly important for the solar energy sector from both historical and future perspective,
- Ministry of Infrastructure responsible for implementation of the energy performance of buildings directive; there is a growing importance and increasing share of solar energy in energy demand for buildings,
- Ministry of Science and Higher Education establishing priorities in research policy and National Research and Development Centre implementing innovation policy targeted towards industry and economy needs.

The Polish solar energy industry also would like to share its vision with international partners and solar energy industry including members of the European Solar Thermal Energy Federation (ESTIF).

Objectives

The objective of the report „**Vision of solar thermal energy development in Poland with action plan to 2020**” is to present the economic potential and to propose development directions in solar thermal energy that guaranty implementation of the EU directive on the promotion of the use of energy from renewable sources (RES) in Poland. The report, that significantly confirms possibly large share of green heat usage, including solar energy, in effective implementation of the targets resulting from the above mentioned directive, should also be used in the national „Implementation plan: Pathways for the development of the use of renewable energy sources up to 2020” („Action plan”).

Solar thermal “state of the art” in Poland

Solar thermal energy is one of the fastest developing renewable energy sectors in the EU and particularly in Poland, where the average annual growth rate in the 2001-2008 period reached 43%. In 2008 the solar installations sales were at the highest level of 130 thousands m², what gives a cumulated value of 365 thousand m² installed area that is an equivalent of app. 526 TJ of „green heat” used for utility hot water preparation and for heating purposes. Poland has become the seventh solar energy market in the EU. Moreover, 20 national solar collectors’ producers, especially 3 leading companies, export more than 50% of their produced devices. This is a distinguishing feature of the solar thermal energy sector in Poland in comparison to other RES technology industries, in case of which the imports usually dominates the exports and often the national production does not exist.

Figure 1 presents annual and cumulative development of solar thermal in Poland, in terms of solar collectors area installed between 2001 and 2008. It is worth to notice that the sector’s growth was sustained, despite rather modest and irregular national support of subsidy schemes.

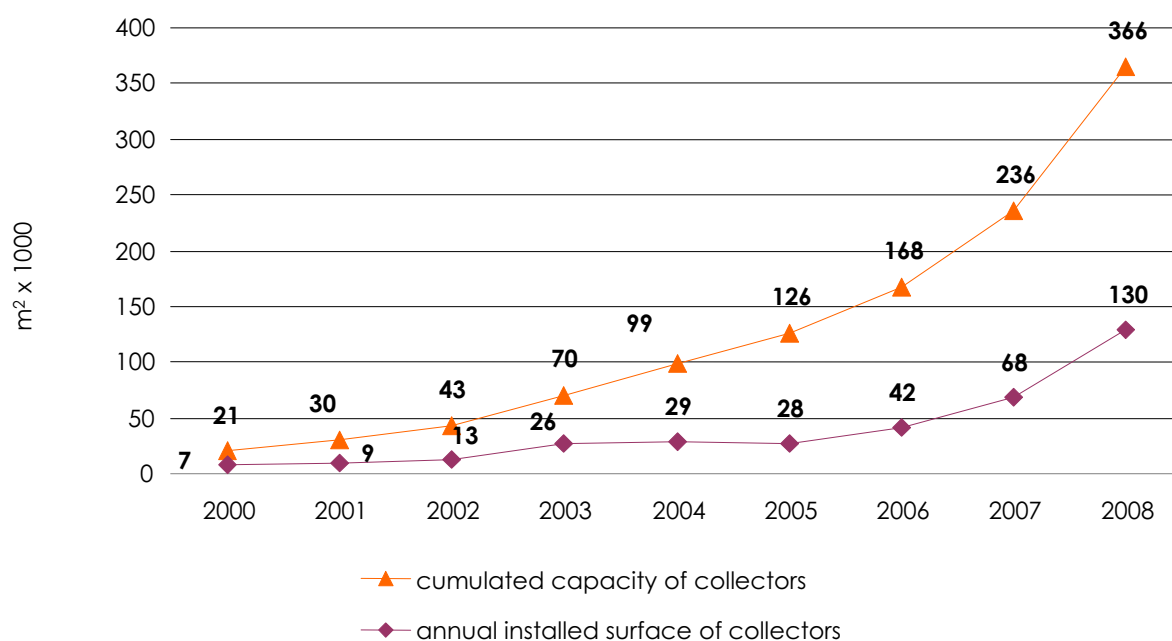


Figure 1. Solar collectors area installed in Poland, 2000-2008. Source: IEO “The Polish solar thermal market report ’2009.

In Table 1 we present the growth rate of solar thermal in Poland, in comparison with the growth rates of other green heat technologies.

Table 1. Growth rate of heat production from different RES technologies in Poland, 2001-2008. Source: Own estimations based on GUS³ data and EC BREC IEO⁴.

	2001	2002	2003	2004	2005	2006	2007	2008	2001-2007
Biomass	-1%	4%	32%	-9%	29%	7%	28%	-	12 %

³ GUS – The Central Statistical Office: *Energy from renewable sources in 2007*, Warsaw, 2008 and GUS: *Energy from renewable sources in 2006. (in Polish)*, Warsaw, 2007

⁴ Institute for Renewable Energy (EC BREC IEO): *Solar collectors market in Poland. The analysis of investigation on solar collectors sales in 2008, (in Polish)*, Poznań, 2009.

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Biogas	-35%	925% *	22%	82%	50%	-14%	0%	-	52 %
Geothermal energy	-3%	119%	18%	2%	50%	12%	-18%	-	20 %
Solar thermal energy	43%	44%	61%	42%	28%	33%	41%	55%	41 %

* this high value probably resulted from statistical correction/adjustment.

Compared to other renewable energy heating technologies used in Poland, the solar thermal sector expands in a very stable way. Due to the high rate of growth all over decade, in 2008 its share in green heat was already the same as the share of other technologies like biogas and geothermal, already well established in Poland.

Many studies, i.a. these published by the European Commission, confirmed that solar thermal energy is the most effective heat production technology, when the greenhouse gases emission limits are taken into account. The national funds supporting renewable energy sector have not fully perceived the important role of solar energy so far. In 2005-2008 the total amount of subsidies for solar thermal equalled to only 24 mln PLN/year (Euro 6 M/year).

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Forecast

According to the simulations and analysis done in the report, total solar thermal energy potential that might be used in practical applications in Poland equals to more than 32 000 TJ, what gives up to 22 mln m² solar collectors by 2020 (see Figure 2).

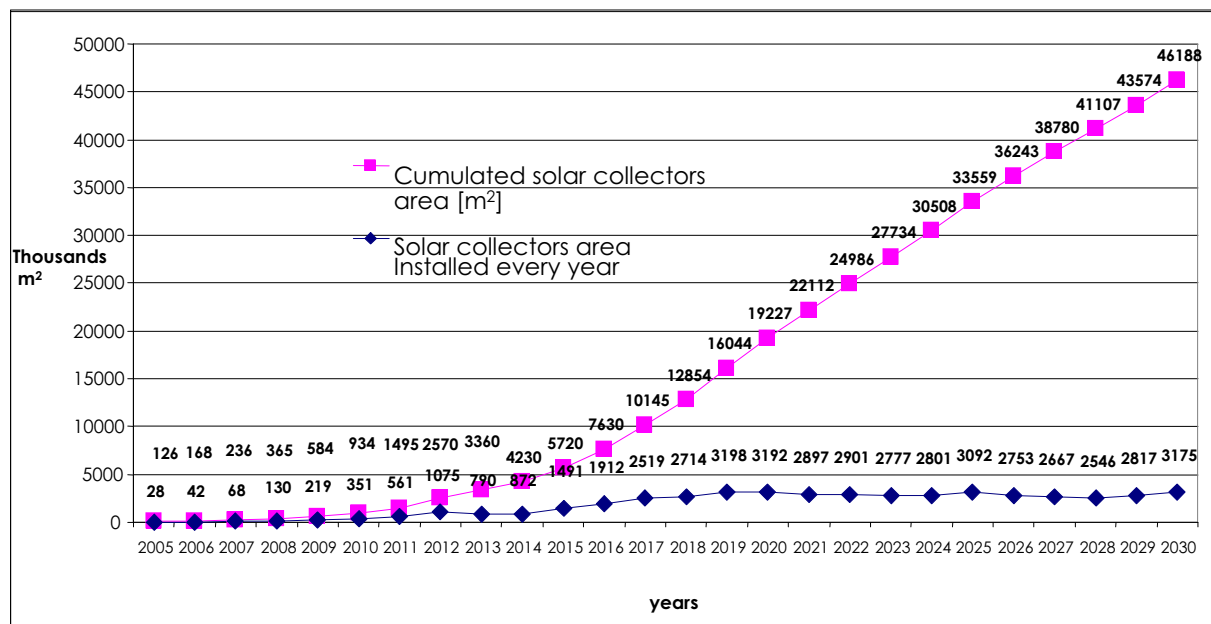


Figure 2. Yearly installed and cumulated solar collectors area in Poland.

Source: Own estimations.

“Green revolution” that is approaching, requires a change in the paradigm regarding energy and a wider than ever opening to decentralised energy systems, especially in such countries like Poland. The scenario (the pathway and the road map) of solar thermal energy development by 2020 is based on a macroeconomic background titled „Long term clean energy carriers supply scenario for Poland” written in 2008 by IEO for Greenpeace Poland. **According to the results estimated in that report, a real solar heating energy input to cover supply for heating and cooling is equal to almost 28 000 TJ in 2020, what requires almost 20 mln m² of solar collectors area**, installed in sectors with the following targets:

- Heating of utility hot water in households – 53%
- Space heating in households – 17%
- Heating of utility hot water in services and public sector – 9%
- Space heating in services and public sector – 5 %
- Technological heat production in agriculture and industry – 5%
- Solar cooling in services sector – 2%
- Solar cooling in households– 1%

while the remaining 8% of solar energy represents heat produced for district heating systems (in majority for district heating and hot useful water heating).

The role (share) of each of above mentioned solar energy applications up till 2030 is presented in Figure 3. They appear on the market gradually, following their economic competitiveness.

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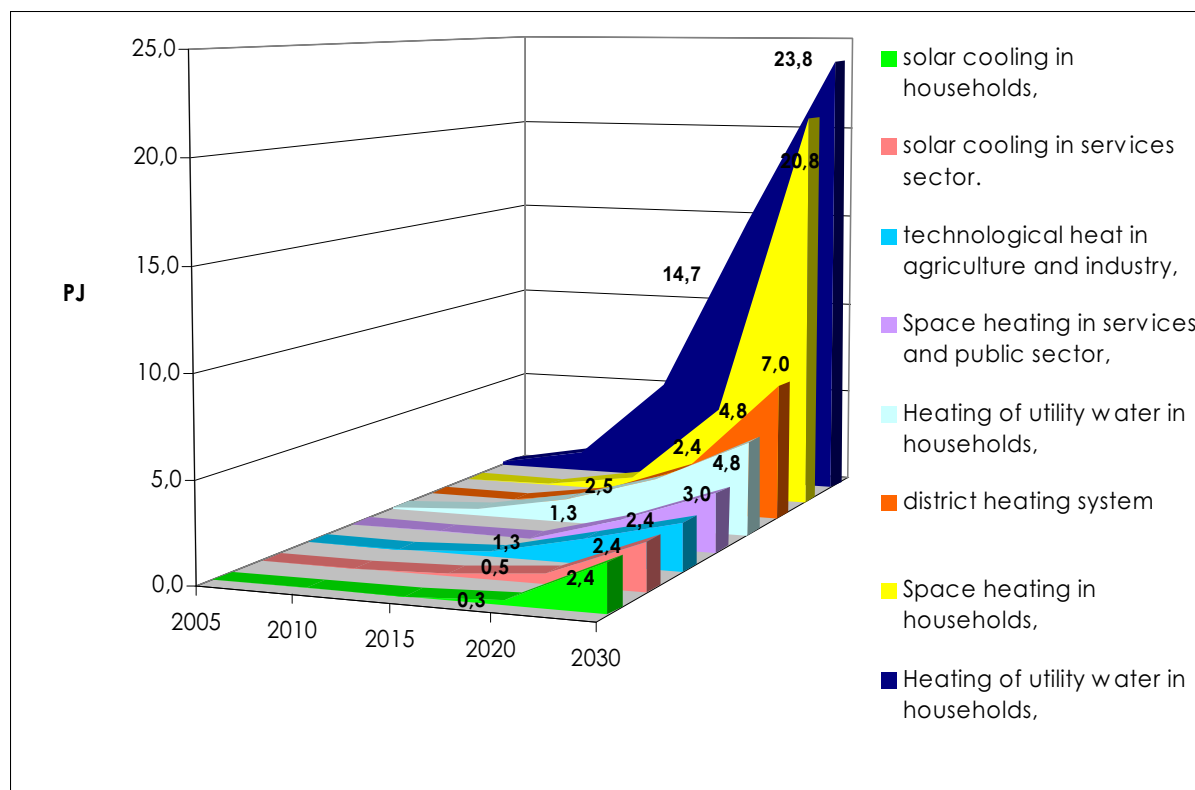


Figure 3. Solar thermal energy contribution for covering requirements of local heating and cooling in households, services, including public services, industry and agriculture and also in district heating sector in Poland by 2030. *Source: Own estimations.*

The predicted average rate of growth of the solar thermal sector in-between 2009 and 2020 equals to 40% and within the 2020-2040 period equals to 9%.

Considering above results, the estimated solar energy share in renewable energy consumption in 2020 will be equal up to 4,4% and more than 1% in final energy consumption in Poland. These results constitute a rational basis to declare the second decade of XXI century as "solar thermal energy" decade in Poland.

Table 2. Solar thermal energy in green heat and energy from renewable sources balances.

Source: Own estimations.

Share of solar energy in:	2005	2010	2015	2020	2030	2040
green heat consumption	0,1%	0,7%	2,9%	7,5%	14,1%	23,0%
gross green energy consumption	0,1%	0,4%	1,5%	4,4%	7,9%	11,5%
total heat consumption	0,0%	0,1%	0,5%	1,8%	4,2%	8,3%
final energy gross consumption	0,0%	0,1%	0,3%	1,0%	2,1%	3,3%

If there is further solar thermal energy development in Poland the unquestionable benefit for the society will be creation of more than 40 thousand jobs (Figure 4). More than half of all employed in this sector are persons working in the retail sales, installations and after installation maintenance. These jobs are mostly of local character, often in small and medium enterprises. According to the prognosis of the European Renewable Energy Council (EREC) the employment in the solar thermal energy sector in the EU will expand to 660 thousand jobs and this will be the highest share in comparison to other renewable energy sectors.

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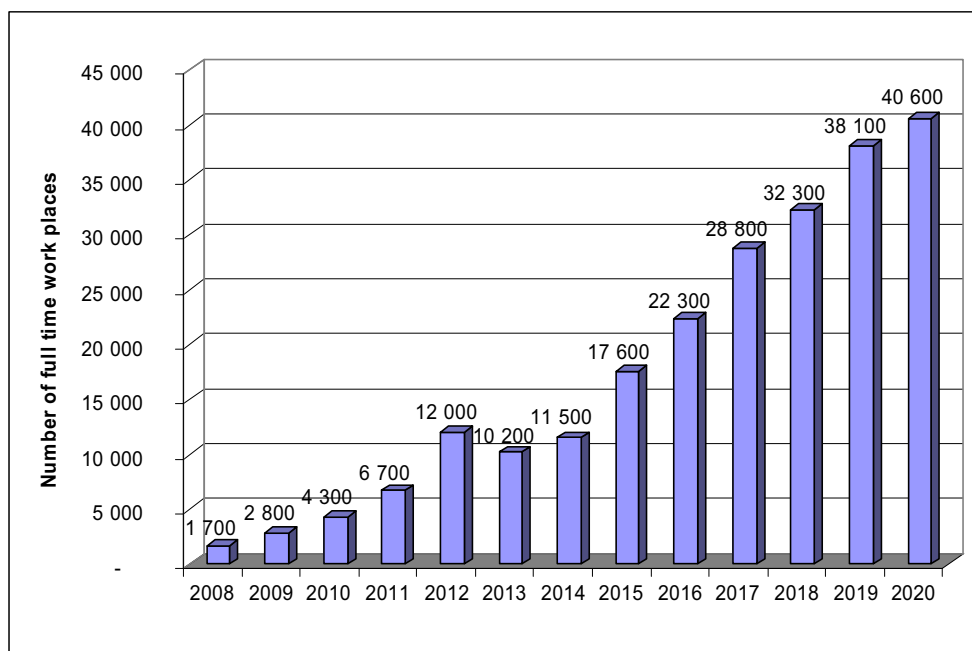


Figure 4. Number of full time jobs in solar thermal energy sector in Poland in 2008-2020 (yearly sector productivity growth is assumed at 4%)⁵. Source: Own estimations.

⁵ As showed on the graph, employment decrease around the years 2013-2014 results from termination of the EU financing period for years 2007-2013, what could result in smaller solar collectors sales and reduction in number of persons directly involved in production, sales and installation of solar heating systems. However the activity of most of the companies is not limited to this specific technology, therefore the slowdown presented on the graph might not be necessary connected with job losing by persons earlier employed, but rather with diversion of their activity to sales and installations of conventional heating systems. Moreover, the graph does not include the employment related to the exports of solar collectors.

Support required for solar thermal systems

To maintain the public support for solar thermal energy sector within the 2009-2014 period at required average level of 12% of total investment cost, the yearly subsidy amount should be equal to 180 mln PLN/year (this is a level of subsidies comparable to the one currently given typically to 4-5 projects in the other RES sectors like wind, biomass and in some cases in geothermal sector). In addition, this financial assistance should be disposed in a cost-effective way to build up as high as possible capacity of the solar thermal energy supply within dedicated solar subsidies and as high as possible quality of products and services on the market. Solar energy should be more fairly and seriously considered as a beneficent in the EU funds program for the 2014-2020 period.

The members of „Solar Alliance 20x2020”, the companies and the supporting organisations, believe that the most effective tool for solar thermal energy promotion is the institutional support rather than “project by project” approach. This assistance should include the whole country and provide all stakeholders with the transparent and understandable action plan, followed by the schedule and the monitoring. The most important elements of such “system” support are specified below:

- subsidies in level of 30% of investment cost for single family home owners,
- subsidies in level of 50% of investment cost for public sector, industry and agriculture,
- personal income tax (PIT) deductions up to 10 thousands PLN for single houses owners.

In addition to this „hard” support aimed at a significant group of investors, there also should be a horizontal support offered, including:

- trainings for installers with 50% subsidy given by ecological funds and installers certification,
- national education and information campaign, financed by ecological funds in amount of PLN 10 mln,
- support to research on solar energy in amount of 100 mln PLN financed from the science budget.

Table 3 presents the list of requested support tools.

Table 3. Proposed new solar energy sector support tools and proposals of improvement of current support tools. *Source: Own estimations.*

Support tool	Expected result	Target group	Date of start ⁶ and finish
1. Subsidies, 30% investment costs	5 mln m ² installed solar collectors area	Single family homeowners	2011-2013
2. Subsidies, 50% investment costs	1,2 mln m ² installed solar collectors area	Public sector, industry and agriculture	2011-2013
3. Releases in income tax PIT, to high PLN 10 thousand.	13,7 mln m ² installed solar collectors area	Single family house owners	2012-2017
4. Installers trainings and their certification with 50% financing by ecological funds	30 thousand of installers trained	Solar systems installers, solar collectors producers and distributors	2013-2020
5. National education and information campaign financed by ecological funds, PLN 10 mln	Change of social behaviour of potential solar installations users	Owners and houses administrators, touristic objects, schools and others educational centres	2010-2020

⁶ Means the latest date of start of given support tools (being in force).

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The total amount of public funds for the solar energy sector should be of ca. PLN 800 mln by 2014. In response to this market based demand the National Fund for Environmental Protection (NFOiGW), that is one of the key financing institutions supporting environmental investment in Poland, has offered PLN 300 mln of subsidies for solar thermal (especially for home owners) for the period of 2010-2012. It is very likely that this dedicated subsidy scheme will be enlarged by 16 regional environmental protection funds and the EU structural funds available as well at the regional level. This support paves clear way for further development of subsidies scheme in the 2014-2020 period. According to the Ministry of Economy it is very likely that starting from 2011 (2012) the solar thermal sector might also benefit from the income tax deduction.

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Commitments and the way forward '2020

The Solar Alliance 20x2020 responsibly declares its ability to achieve all of the objectives and goals presented above and expressed in detail in the Alliance's *Declaration*, enclosed as an appendix to the report. The relevant documents are available on the website of the Solar Alliance: www.panelsloneczny.eu . The Alliance would like to cooperate with all public and private partners.

The Individuals, companies and organisations supporting this joint commitment and interested in cooperation are invited to contact the "Solar Alliance 20x2020" and its secretariat at the Institute for Renewable Energy (IEO): panelsloneczny@ieo.pl .

The Solar Alliance 20x2020 believes that its vision will be fully integrated into the Polish National Renewable Energy Action Plan up to 2020 (currently elaborated at the Ministry of Economy) and that the Alliance will play an active role in its implementation and monitoring.