

RECOMMENDATIONS FOR PV DEVELOPMENT IN THE EUROPEAN UNION NEW MEMBER AND CANDIDATE STATES

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The paper presents the state of the art of photovoltaics (PV) in the European Union New Member And Candidate States: Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia. The attempt was made to cover all photovoltaics activities in NAS, from research to industry and markets as well as from technology development to dissemination and education. The document covers the following topics and issues: organization of PV research and demonstration activities, scientific potential of NAS PV community, PV activities carried out in NAS countries, PV policies and support mechanisms, achievements and barriers, challenges and needs to the development of PV in the NAS. The paper also presents the recommendations for PV development in NM&CS.

Keywords: Economic analysis, Funding and incentives, National programme, R&D Demonstration programme

1. INTRODUCTION

In the new, enlarged European Union (EU-25) the target of 21% of the electricity from RES will become more ambitious and to reduce the gap between the new and the old EU members will be, as it seems, a vital factor influencing the European competitiveness on the global PV market.

There are significant differences as to the extent of PV RTD among the EU New Member and Candidate States (NM&CS) and even bigger differences when compared with those in EU-15 countries. There is a need for identifying and overcoming existing barriers to PV development in NM&CS. The new enlarged European PV industry and the energy market require an emphasis on technology transfer and dissemination, if new and improved energy technologies are to successfully develop. It is also of strategic importance to have updated information, to use available results, to avoid mistakes made earlier by others, and, if possible, to orientate the ongoing research activities towards problems which are typical and important for both, the NM&CS and the EU-15 countries.

The PV-NAS-NET project aimed at creating the enhanced networking and coherence of PV RTD activities as well as formulation of recommendations for NM&CS governments and European Commission on PV RTD programming in the NM&CS in order to achieve the above mentioned objectives in the manner focused on market, social and environmental needs.

2. NATIONAL PV ACTIVITIES

Almost all NM&CS have their own strategy for RES development expressed in a set minimum share of RES in the whole energy mix. This is mostly due to EU accession requirements, but also manifests states' commitment to support RES. However, photovoltaic technology plays a minor role in those strategies, because

RES targets are hardly technology-specific. Only two countries (Poland and Romania) set specific PV goals (indicative values: 1,3 MW for Poland and 2 MW for Romania by 2010).

There is no central authority to coordinate activities related to solar energy issues. Usually the responsibility is scattered among several ministries only partly responsible for renewable energy development. This concerns mostly ministries of environment and it has to be pointed out that there is not much involvement of ministries of science and technology, except for Poland perhaps.

There is no PV rooftop programme in any of the NM&CS. Moreover, at present, the benefits arising from the use of renewable energy sources, not to mention PV, are unfortunately not considered a priority.

In NM&CS PV RTD is usually placed in the frame of general RTD programmes. PV related project proposals thus have to compete with others without special preferences. Nevertheless, some countries (Lithuania, Hungary and Poland) have formulated such programmes. However, they have either not been implemented (Lithuania, Hungary) or there is no continuity of the support, as was the case in Poland.

The Polish Ministry of Scientific Research together with the PV Centre participates in the PV-ERA-NET project (as the only partner from all NM&CS). Recently the process to formulate specific RTD policies and instruments (including those relevant for PV) has been intensified in Poland.

Universities, research institutes (Academies of Sciences or industrial), which are mostly concentrated on basic research of materials and solar cells, education and demonstration activities, play an important role in PV research in the NM&CS. Centres of Excellence dedicated to solar energy were established in Bulgaria, Estonia Lithuania, Poland, Romania. These Centres serve as focal points to conduct and stimulate research and demonstration activities, organise meetings, workshops and conferences, and disseminate information. The setting up of these Centres gave some new impetus to the

development of PV in the NAS by promoting solar photovoltaics as a reliable and economic energy source and technology.

Fig. 1 shows a number of staff and scientists working on different issues in the PV field. These are quite considerable numbers (about 309 scientists and 481 people of total staff in 2004) which indicate that there exists a significant intellectual potential in the NM&CS. Moreover, in 2004 number of the scientific personal grew about 10% against 2003. It was especially noticeable in Poland, Lithuania and the Czech Republic). Most of the activities concentrates on basic research of materials, which are used for solar cells and other semiconductor devices.

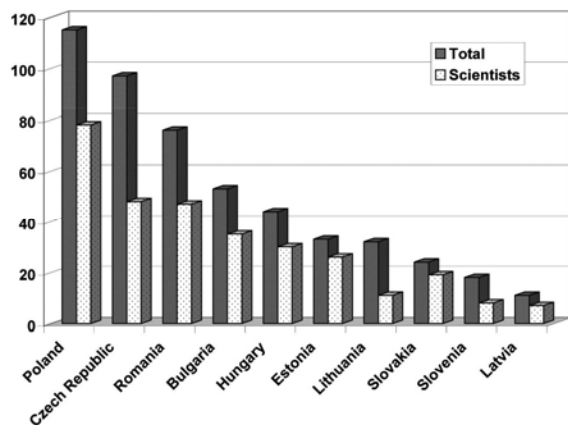


Fig. 1. Number of staff in the field of PV RTD

PV research in the NM&CS has traditions and a significant theoretical and experimental basis. Scientific groups of the region are actively working in many fields of modern PV solar cell research, and in some of those fields they have reached very significant achievement. In general, the range of PV activities in the NM&CS is wide, covering nearly all of the most important fields of PV RTD, from different materials for PV cells to inverters and other components of grid connected PV systems.

The quantity and quality of achievements have reached a considerable level despite of the rather limited (financial and other) resources and of the lack of the legislative support for the PV development. The success of PV RTD and the implementation of results depend very much on the enthusiasm, professional skills, and on the individuals' devotion. This can be perceived as a prerequisite for the further renewables development, and thus photovoltaics in the NAS. However, it is of utmost importance now to create the favourable conditions for the NM&CS researchers to avoid brain drain.

3. FUNDING

The total available funds for PV RTD and demonstration activities amounted during the period 1996 – 2003 to a mere 13,86 mio EUR, split into 52% from national funding and 48% from other sources but mostly from the European Commission (38%) (Fig. 2). However national funding shares vary from 8% (Bulgaria) to 82% (Poland). Most of the funds went to RTD (82%) and the rest to demo/dissemination activities. Only Romania

does not fit into this picture at all. It spent 82% of its total PV budget on demonstration and dissemination activities.

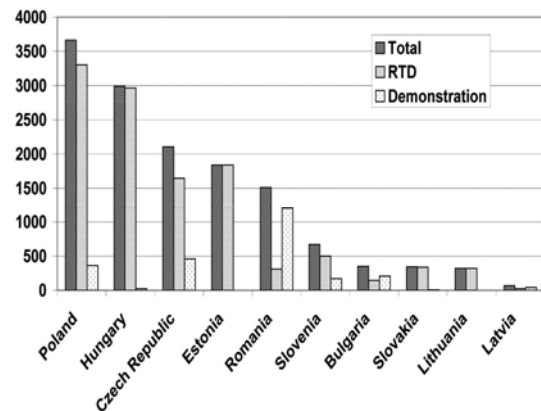


Fig. 2. Amount and origin of the funds for PV RTD and demonstration/ dissemination (in kEUR)

The support within European Commission programmes has a great significance for most NM&CS countries (5,3 mio EUR in 1996 – 2003) as it is, apart from other advantages, it also plays an important political role allowing researchers working in the PV field to have better motivation for their activities on the national level. The EC networking projects are also very important to foster collaboration. The approach reflected in these projects coincides well with the approach described in the Commission communication "Towards a European Research Area".

However, all NM&CS state that cooperation within EC programmes should be intensified considerably in order to fully take advantage of their potential and capability.

The attractiveness and importance of the EU RTD programmes is unquestionable. However, a bilateral cooperation with the states in and outside the EU is also considered to be very positive as a way to increase the level of research and researchers' qualification in the Newly Associated States.

NM&CS countries have also traditionally good contacts with the best institutions from the Commonwealth of Independent States. This provides promising perspectives for NM&CS by building a bridge between the EU and the CIS.

4. INSTALLED PV POWER

Installed power of photovoltaic systems and their types may serve as indicators of the volume of different PV activities and the effectiveness of national PV policies and support mechanisms. There are considerable differences as to PV extent among the EU New Member and Candidate States and they are even bigger when comparison is made between the NM&CS and the EU15 Member States. PV installed power at the end of 2004 in the EU (including Switzerland and Norway) amounted to approx. 1 000 MW and only 1,32 MW installed in 12 NM&CS. The share of off-grid installation amounts to 67%. (Table 1).

The Czech Republic is a regional leader in PV system installations with the strongest industrial activities (Solartec). A relatively high installed power of on-grid PV systems reflects success of the Czech national "Sun to schools" demonstration programme carried out since 2000 together with demonstration projects supported by the European Commission. However, annual (in 2004) installed PV power growth in the Czech Republic was low (only 10%). Poland, by contrast, more than doubled its installed power in 2004, mostly in off-grid applications. Installed power slightly increased in the majority of other NM&CS is still very low.

Due to the fact that there are not support programmes in NM&CS almost all on-grid systems are installed within some projects as demonstration, educational or research PV systems.

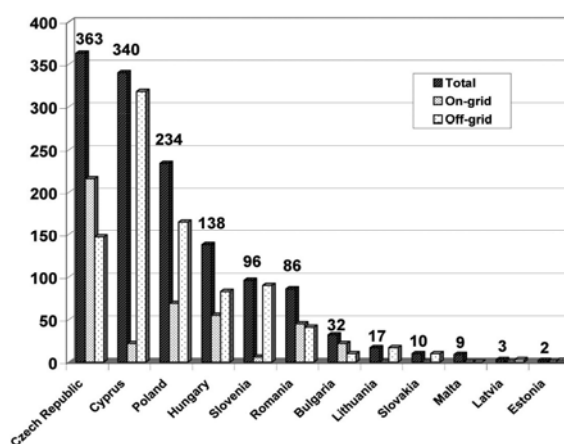


Fig. 4. Total installed PV power in the NM&CS

Table 1. Installed PV power by type of installation in the NM&CS (2004)

Country NMS/NAS	2003			2004			Total growth [kW]	Total growth %
	Off-grid	On-grid	Total	Off-grid	On-grid	Total		
	[kW]	[kW]	[kW]	[kW]	[kW]	[kW]		
Czech Republic	130	200	330	147	216	363	33	10
Cyprus	242	12	254	318	22	340	86	34
Poland	60	47	107	165	69	234	127	119
Hungary	75	25	100	83	55	138	38	38
Slovenia	49	2	51	90	6	96	45	88
Lithuania	17	0	17	17	0	17	0	0
Slovakia	10	0	10	15	0	15	5	50
Malta		4	4		9	9	5	
Latvia	3	0	3	3	0	3	0	0
Estonia	2	0	2	2	0	2	0	0
Total	588	290	878	840	377	1217	339	38
Romania	35	15	50	41	45	86	36	72
Bulgaria	8	12	20	10	22	32	12	33
TOTAL	631	317	948	891	444	1 335	387	34

5. RECOMMENDATIONS

Through discussion, the European Commission should encourage NM&CS governments to develop short, medium and long term PV strategies and strengthen the coordination and cooperation among RTD institutions, industry and education in order to further improve coherence and efficiency of PV RTD and simultaneous market deployment. Besides the important research issues, this strategy has to include raising public awareness, industry and market development, as well as a the development of an efficient legal framework, while facilitating fair and easy access to the electrical grid.

Recommendations for RTD

EU policy and support from the EC is crucial for PV RTD in the NM&CS and positively influences national research and deployment strategies. Due to limited resources and lack of RTD equipment, partners from NM&CS find it difficult to participate successfully in the fierce competition for EU funding. The EC should consider how to find adequate solutions to support

NM&CS and to solve their backlog in human resources and equipment required for RTD.

- The research infrastructure should be strengthened; e.g. using the structural funds. The national governments should give the priority to use these funds for research.
- National governments should establish national strategies and calls for PV RTD topics according to national priorities. Such strategies should be coordinated with the EU PV strategy.
- To achieve the above targets, enlarged budgets for research should be allocated for longer periods in the EU and at national levels.
- The scientific community in NM&CS should play an active role in enhancing the awareness, knowledge and promotion of PV related activities.

Recommendations for Industry

There is an existing and fast growing EU market for PV. Building industrial capacity to serve the growing PV market along the whole value chain is crucial for the

deployment of PV. The development and presence of a PV industry in NM&CS is important in order to enhance the broader interest for PV and can represent a long term driving force for PV RTD and deployment activities.

- The industry in NM&CS should more widely identify and explore the opportunities and needs of the present large range of PV stand alone applications.
- Dedicated small development projects should be kept in the EU financing schemes and should stimulate international cooperation of the industry from NM&CS.
- The industry should be more widely invited to participate in the development of PV projects and programmes and have committed RTD institutions actively take part in them.

Recommendations for PV Market Deployment

PV markets are already being developed rapidly and are becoming increasingly competitive for stand alone systems in a broad range of possible applications. For a sustained market deployment of grid connected PV systems, PV specific support schemes are required to build the bridge towards fully competitive solutions during a transition phase. In NM&CS the awareness regarding the benefits of PV is still rather low and insufficient. Substantial initiatives on an EU level can stimulate or initiate the necessary changes at national levels.

- The feed-in tariff system used in some EU countries has proved to be the most effective in PV market growth stimulation and should be seriously examined for implementation, as the commonly recommended policy on the EU level.
- Investigation on other market oriented long term supporting schemes for PV and RES in general should continue in parallel.
- National governments in NM&CS should assure simple and fair access to the grid in accordance with EU electricity and RES directives, and remove all unnecessary barriers. National NM&CS governments should promote their countries as economically favourable regions for the creation of new PV industries. To raise awareness, the implementation of more extensive PV demonstration programmes in NM&CS should be stimulated by national and EU programmes.
- The EC and national governments should stimulate and/or support an industry driven development of the PV sector.

Recommendations for the Education System

A substantial market penetration of PV is expected in the coming 20 to 50 years. Therefore, there is an important need to raise the awareness about this new technology. Due to the low level of knowledge and awareness of PV in NM&CS, there is a need for basic education on PV technologies, which will also allow further developments of the PV sector and RTD.

- The relevant ministries should stimulate educational initiatives on RES and incorporation of lectures on sustainable development. These initiatives should address the educational needs at all levels: from basics to professional levels, and including higher education.

- Support for the installation of PV systems on schools, such as the "Sun to Schools" demonstration programme, testing, learning and normal operation should be set up or continued from national and EU sources.
- A specific approach for education on energy savings and RES should be initiated for architects, engineers, installers, etc., since they are the designers of future energy active buildings, which can be integrated with PV systems.

6. CONCLUSIONS

The history of PV in NM&CS is not long yet but some countries can already be proud of their achievements in this field, e.g. Poland, Czech Republic and Hungary. Photovoltaic activities are slowly emerging and markets are already being created in the NM&CS. Further success stories are needed in order to convince decision makers to create favourable legal environments, to attract more potential investors and convince will-be customers to invest their funds in PV installations. A clear commitment and stable framework is necessary in order to make different stakeholders invest in NM&CS (PV RTD), not only to create new wealth but also to prevent further losses (brain drain).

Lack of interest in PV from the general public and politicians is not conducive to investing and impedes further success. Although some instruments of support exist in the NM&CS, they are targeted mainly at other RES and do not give priority to PV. RES policies are unclear and unstable. Therefore potential investors are reluctant to locate their money in the NM&CS region. Such a situation does not create a solid ground for a sustainable and continuous development of photovoltaic technology and industry. Since in NM&CS PV markets are still in their infancy, they need a long term support scheme to make PV a magnet for private capital. A feed in tariff has already proved to be a successful mechanism with undisputed environmental benefits, job creation, and additional tax-revenue from exports. Therefore, efforts should be made to properly implement this effective PV incentive mechanism on the widest possible scale around Europe and NM&CS in particular.

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