



PHOTOVOLTAIC Clusters
Development and Implementation Measures
of a Seven Region Strategic Joint Action Plan
for Knowledge-based Regional Innovation

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PROJECT FINAL REPORT



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1. Final publishable summary report

1.1 Executive summary

SOLARROK has brought together **seven European PV regions** and partner from 9 countries (Navarre (Spain), Rhône-Alps (France), Central Germany, Slovenia, Austria, Lithuania with a Norwegian research partner, Belgium and Netherlands (cross-border ELAt region). The consortium has carried out joint activities (12/2012 – 11/2015) to (1) improve access to international markets, to (2) support regional PV innovation systems through interregional knowledge exchange, to (3) identify approaches for long-term cluster collaboration and to (4) strengthen the competitiveness of European PV clusters.

Based on regional analyses of the PV sector environments and a study of global trends and opportunities, the consortium developed the **SOLARROK RTD-Atlas** (WP2). The Atlas includes results of interviews among 74 research institutes and 114 companies in all project regions which provided a detailed picture of actual research and business hot spots as well as an assessment of expected future trends. The insights from the RTD-Atlas were used to establish **expert groups** focusing on regional and interregional exchange processes (WP3 and WP4) around sharing RTD infrastructures, training and mobility, smart specialization and regional best practices for collaboration business models in PV.

In parallel, the SOLARROK **Joint Action Plan** (WP3) was developed in two steps leading to a set of actions fostering the further cooperation of the SOLARROK PV clusters with foci on training and education (incl. concept for a summer school), market support, R&D infrastructures, internationalisation, BIPV, and PV Grid integration. In addition, **regional Action Plans for Smart Specialisation** revealed differences in regional support measures and policies for the PV sector, demonstrated regional achievements during the project's lifetime and gave recommendations.

The project's **internationalisation** approach (WP5) responded well to the PV clusters' needs and has created tangible benefits through cooperation. After attuning possible topics and strategies in an expert workshop on European level, major global-level PV clusters were evaluated. The selected **PV clusters beyond Europe** in Turkey, Egypt and Tunisia were visited by SOLARROK delegations and then invited for three consecutive **match-making workshops** in the project regions Rhône-Alps, Central Germany and ELAt which resulted in immediate benefits for the participating cluster members (companies & research institutes).

The project has created impact in the project regions and neighbouring PV clusters in MENA countries through **dissemination activities** on different levels: 7 regional workshops, 9 international workshops, participation at international fairs, presentations at multiple regional and international occasions. To conclude the project and set the scene for the future cooperation between European and neighbouring PV Clusters from MENA countries, the final conference was carried out as **first EU Forum of PV Clusters** during the Open Days of Regions and Cities 2015 in Brussels (14.10).

A future meta-cluster cooperation shall focus on knowledge exchange and joint internationalisation activities, making the best use of regional experiences, RTD and business capacities and established international networks.

1.2 Summary description of project context and objectives

Project Context

The United Nations' Climate Change Conference held in Paris in November 2015 (to be signed by April 2016) resulted in an agreement adopted by all of the 195 UNFCCC participating member states to hold "the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change". The Paris Agreement calls for zero net anthropogenic greenhouse gas emissions to be reached during the second half of the 21st century.

This calls for a coordinated transformation of the world's energy systems to more and more renewable energies used in a more efficient way, while at the same time increasing energy efficiency. The grid needs to be developed and adapted to a more flexible distribution of energy. Efficient storage systems including electro-mobility have to interact with the grid to allow for reliable and efficient operation. In the future energy mix, solar energy will play a crucial role. In the last decade, funding programmes in European countries have created a market for solar energy and supported immense research and development activities creating a huge innovation boost. During the last years, European solar industry has faced a growing competition from Asian market actors which has led to a rapid and drastic decrease of prices and cost for solar energy. In 2015, installed solar power capacity worldwide was expected to hit 200 GW (<http://solarlove.org/global-solar-pv-capacity-nearing-200-gw/>; Zach). A study by the Fraunhofer ISE in 2015 concludes that "In a few years, solar energy plants will deliver the most inexpensive power available in many parts of the world. By 2025, the cost of producing power in central and southern Europe will have declined to between 4 and 6 cents per kilowatt hour, and by 2050 to as low as 2 to 4 cents." (www.agora-energiewende.de/fileadmin/downloads/publikationen/Studien/PV_Cost_2050/AgoraEnergiewende_Current_and_Future_Cost_of_PV_Feb2015_web.pdf).

The European PV industry cannot attempt to produce standard solar cells at less cost than in Asia. But a collective, coordinated research in Europe is working on a whole spectrum of new technologies and has a chance for technology leadership bringing new technologies, which allow higher efficiencies at lower production cost, quickly into the market.

In the SOLARROK "Regions of Knowledge" project, European regions have developed a collaboration approach in order to keep innovative capacities in the photovoltaics (PV) sector. PV clusters from Navarre (Spain), Rhône-Alps (France), Central Germany, Slovenia, Austria, Lithuania, Belgium and Netherlands (in their cross-border collaboration as ELAt region), and the Norwegian research institute SINTEF address the most important current challenges for the European PV sector by knowledge exchange and joint activities in European and emerging markets.

The managements of the participating clusters stand for more than 600 companies & 40 research institutes across Europe. The SOLARROK therefore puts a considerable network power in motion – facilitated by regional communication channels. Regional experts representing the entire PV value chain contribute to establishing the knowledge base.

Objectives

The SOLARROK PHOTOVOLTAIC Clusters Development and Implementation Measures of a Seven Region Strategic Joint Action Plan for Knowledge-based Regional Innovation has been based on 4 objectives, namely:

- **To improve access to international markets** by developing new joint business models for RTD-& business actors of the European solar sector (GO1)
- **To supporting innovation system** by filling RTD-gaps through interregional knowledge exchange and identifying approaches for long-term cluster collaboration and fostering creative entrepreneurship (GO2)
- **To build international collaboration capacities** by optimising concepts to facilitate the development of new products, services and processes in the solar sector with special regard to education and training programmes (GO3)
- **To strengthen European competitiveness by joint action** developing a SOLARROK Joint Action Plan at European level including advice mechanisms, regional chapters for smart specialisation and an internationalisation strategy (GO4)

GO1 – Improving Access to International Markets

Developing new joint business models and improving the access to international markets for RTD and business actors of the European solar sector is crucial to reach sustainability of the partners' cooperation.

Matching collaboration partnerships between research and industry or SMEs and creating platforms for knowledge exchange would be insufficient without further support. All involved clusters have a wealth of experience in providing services to support technology- and knowledge transfer. To learn from each other in terms of exchanging on the different models to organise possible successful cooperation between the RTD actors (IPR rights, examples for work flow organisation, etc) is therefore a major concern of the consortium. Consequently, and in connection with possibly emerging new business models, the project addresses the access to international markets by active promotion and matchmaking activities supported by the partner clusters' different established relations and "bridgeheads" in international markets.

GO2 – Supporting the Innovation Systems

Strengthening the innovation systems of the participating clusters and within the European PV sector is the core objective of the project and is addressed by a multilevel approach. Based on the established

complementarities of the innovation systems and RTD offer and demand, the clusters strive to align their joint innovation performance with the future challenges for the PV sector and the energy systems.

Coordinated action of regional innovation actors will be carried out to address the technological and economic challenges of the PV sector and encourage new ways to use solar energy. A multi-stakeholder exchange process is foreseen and planned in the project which will efficiently address all elements of the innovation chains: technological interdisciplinarity, new PV integration models, resource and cost efficient production, collaboration scope of the triple helix actors (regional and interregional), and innovative cluster services.

GO3 – Building International Cooperation Capacities

The SOLARROK consortium fosters international cooperation in two major parts of the project's working structure, addressing two aspects: cooperation within Europe and with extra-European partners.

The partners are well aware of the difficulties of such an endeavour and have dedicated a carefully planned multi-step process to establish a successful cooperation environment on global level. A well-matched "coopetition" process with clusters beyond Europe will help to open up collaboration opportunities, and will additionally inform the SOLARROK partners about global trends and help to benchmark their innovation systems, thus serving in the same time to optimise and realign regional smart specialisation strategies.

On the European level, partners will engage to utilise their complementary strengths: to share research infrastructures and activate the human potential by increasing researchers' mobility, to organise knowledge transfer between research and industry, and facilitate access to private and public funding.

GO4 – Strengthening European Competitiveness by Joint Action

The SOLARROK consortium takes care to establish consultation activities and advice mechanisms to set up the JAP. This process will be started by stakeholder interaction as soon as the information base is prepared (month 8-11). The Joint Action Plan is not only a core document of the project, the process of developing concerted actions and collaboration opportunities, models and plans is the main activity throughout the whole project. Joint action will be reconsidered at the end of the project, and a plan for further cooperation within the consortium, with other European PV competence regions and on global level will be developed. By a careful assessment of technical and economical feasibility of the planned cooperation activities, the sustainability of the JAP will be supported to achieve the overall objective of improving European competitiveness. Establishing regional JAPs for smart specialisation will support the successful transfer of the JAP to the regional level.

1.3 Description of the main S&T results/foregrounds

As a Coordination and Support Action, SOLARROK has focused on (i) analytical and (ii) strategic investigations, (iii) the development of Joint Action Plan(s), as well as (iv) benchmarking and internationalisation activities. In the following section the project's results are described and correlated to the sub-objectives of the respective workpackages.

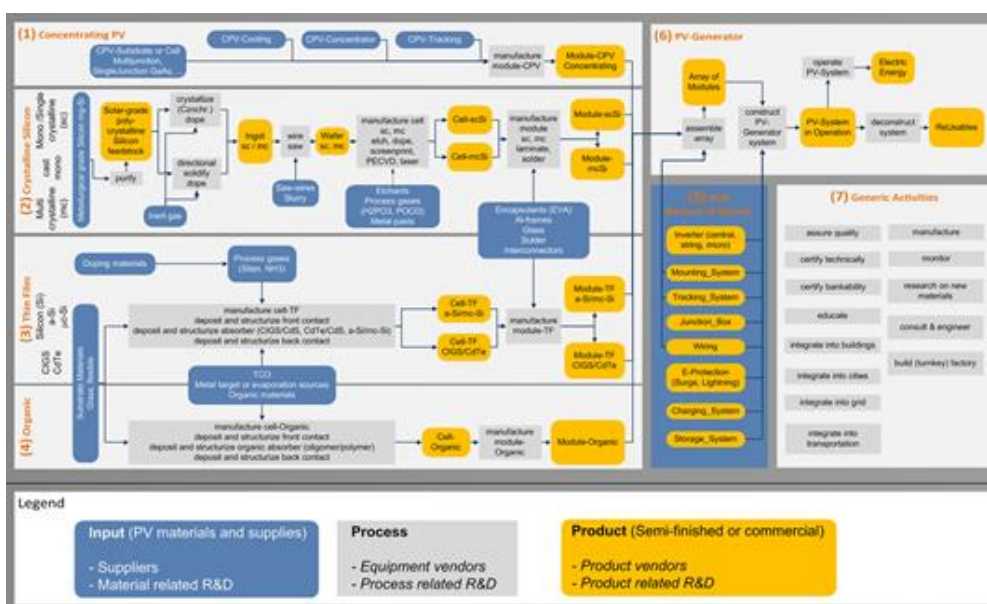
RESULTS OF WORKPACKAGE 2

2.1 Task 2.1 Definition of the Analyses Methodology

Objective: To develop methodology, procedures and structures for intra- and cross-regional analyses

A methodology was developed to structure the analyses on different levels.

1. To set the scene, a study of Global trends, challenges and opportunities of the EU PV sector including a co-competition analysis of global supply chains and innovation networks and market profiles based on the cluster members' experience was carried out, highlighting different frameworks for PV and cultural aspects (e.g. IPR protection, business practices), as well as international tenders.
2. In a next step, the report on Regional RTD Environments established RTD, economic, and policy environments and needs in the cluster regions describing key stakeholders and activities in the field of photovoltaic in the SOLARROK regions.
3. The RTD-Atlas was designed to recognize competencies of each PV cluster for better and more specific collaboration in different aspects: RTD, education, internationalization, sharing infrastructure, personal transfer, market, PV penetration into grid. The methodology comprised desk research and field research, including an overview of PV regions (policy, research, education, players in industry and research) and in-depth research along the PV value chain research needs. Based on a jointly developed PV Value Chain, a survey among relevant research institutions and producing PV industry was prepared.



Graphic: SOLARROK PV Value Chain

4. A SWOT analysis was carried out based on the following indicators: participation of regional institutions or companies collaborative research projects, research roles, patenting focus at regional level, expected impacts, etc.

2.2 Regional RTD Environments

Objective: To analyse RTD, economic, and policy environments and needs in the cluster regions vis à vis a global background in order to improve regional smart specialisation.

Key stakeholders and activities in the field of photovoltaic in the SOLARROK PV cluster regions have been collected in this task, including all relevant actors in research & technological development, in business and industry as well as supporting regional and national authorities. The resulting regional capacity, where applicable, has been assessed in terms of size (jobs, persons, budget) or turnover. In addition to the description of single dimensions of activity (RTD, industry and governance), the internal report describes regional and national issues, like research programs, representative training and education measures, and outstanding best practices. The task prepared the interviews among PV stakeholders that have been carried out in all SOLARROK regions for the RTD-Atlas (D2.3).

2.3 Global Trends and Opportunities Study

Objective: To identify synergies and opportunities for all clusters and partners involved

The internal report on global trends and opportunities is one of the base documents for the strategic work within SOLARROK: the aggregation of the SOLARROK RTD-Atlas with Regional and Global SWOTs and preparing the internationalisation activities in WP5. Global trends, challenges and opportunities of the EU PV sector for the short and mid future have been compiled, leading to a detailed competition analysis of global supply chains and innovation networks.

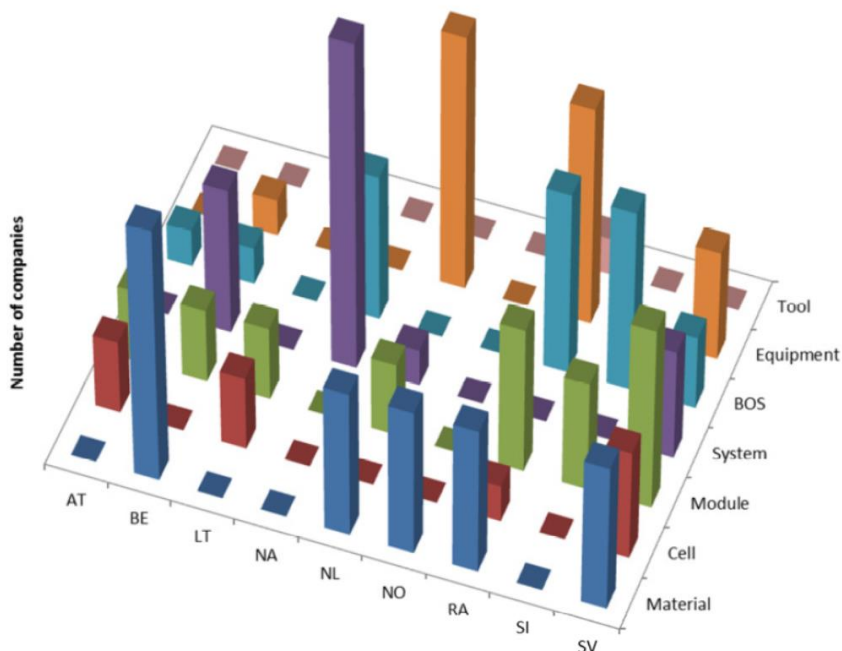
Market profiles have been developed collecting the cluster members' experience and focusing on the emerging markets in Asia and the MENA countries, including specific legal frameworks for PV and cultural aspects (e.g. IPR protection, business practices). Examples for international tenders have been collected.

Starting from the status today (PV industry and system market), PV roadmaps and national/ regional targets are described world-wide and for the project regions. Global trends and opportunities are analysed with regard to general trends, upcoming challenges for the RTD sector, the global supply chain and markets.

2.4 SOLARROK RTD-Atlas

Objective: To develop SWOT Analyses and to map the SOLARROK RTD Directory

Based on the established regional RTD environments and the Global Trends and Opportunities Study, the RTD atlas was developed assessing in detail the existing resources and identifying research potentials in the different photovoltaic regions. The data used are based on a survey among relevant research institutions and producing PV industry in all SOLARROK regions (July-September 2013). In total, 74 research institutes and 115 companies were asked about key figures (turnover, employees ...), research activities and their rating importance future research areas.

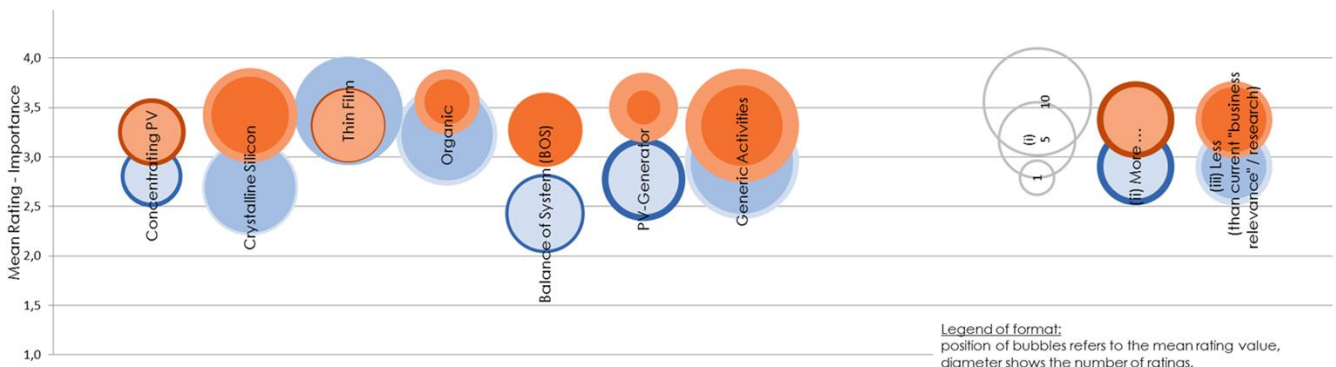


Legend:

- AT Austria
- BE Belgium
- LT Lithuania
- NL Netherlands
- NA Navarra
- NO Norway
- RA France (Rhône-Alpes)
- SI Slovenia
- SV Germany (Solarvalley)

Graphic: Main classes of product on a regional base, i.e. the number of companies providing a specific product in a specific region

The RTD-Atlas – accompanied by a SWOT analysis – outlines meaningful data of the SOLARROK regions. It illustrates the SOLARROK regions as having a high density of companies with a turnover under 10 Mio € and additionally a remarkable quantity of companies between 10 Mio € and 100 Mio €. The investigated companies are predominantly small and medium enterprises. Research institutions and companies were also asked to rate the specific value chain elements in terms of their relevance in the next 5 years in the survey.



Legend of format:
position of bubbles refers to the mean rating value,
diameter shows the number of ratings.

Graphic: Future Needs for Research Capacities: Research Institutes (n=32) <> Producing Companies (n=65)

Legend: Value Chain Element According to PV Value Chain (● RESEARCH/ ● COMPANIES)

The outcome gives key aspects for certain research areas in the future regarding to technological fields of the value chain (CPV, crystalline silicon, thin film PV, OPV, BOS, PV Generator) and generic activities like quality aspects, integration into grid and education. It has provided valuable information about potential for future research, in particular for setting up the SOLARROK Joint Action Plan and workshops with various European and national players of politics.

RESULTS OF WORKPACKAGE 3

3.1 Moderated Consultation Process Structuring the JAP

Objective: To consult and involve regional triple helix stakeholders for strategy development

In the SOLARROK Regions of Knowledge project, the Joint Action Plan (JAP) was developed in two steps: an intermediate JAP was produced at project mid-time and revised, adapted and complemented at the end of the project. Regional workshops were carried out in all project regions and in addition, the objectives of the project were discussed at different opportunities in regional events. Nevertheless, as the consortium made the experience, that in times of cutting down feed-in-tariff and other subsidies for PV it was in some regions difficult to even raise the issue of the European solar industry and RTD capacities. Successful engagement of regional triple helix stakeholders could be reached with specific sectors, e.g. the introduction of Building Integrated PV in Navarra as a new topic in a regional workshop on BIPV with participation regional government, research (renewable energies, engineering & architecture, including students) and companies. The ELAt regions' PV cluster SOLLIANCE was presented on several occasions as successful and innovative best practice example for triple helix collaboration and regional smart specialisation which is successful as a PV R&D platform for thin film attracting industrial interest on a global level.

3.2 Production of the Joint Action Plan

Objective: To produce a consortium JAP and seven regional JAPs including business plan and internationalisation strategy

To develop the JAP, partners have identified complementarities between regional clusters. The analyses carried out in WP2 but also the implementation of joint actions within other workpackages (e.g. the PV Tour in WP5 with three consecutive match-making workshops in three selected SOLARROK regions with an invited delegation of representatives from MENA countries) where clusters presented themselves jointly, were a way to identify topics of collaboration. Within WP3, the consortium continuously exchanged information, shared best practices and opened the dialogue between different regional stakeholders. To structure this process, the consortium created expert groups to develop collaborations around the following topics:

- Training and education
- Market support
- R&D Infrastructures
- Internationalisation
- BIPV
- PV Grid integration
- Si Wafer Technologies

The intermediate joint action plan was produced at the middle of the project and allowed the consortium to test collaboration propositions. Some of them were a success, and will be further developed, others have been considered as best practices to be shared with regional actors who could implement actions, and others have been left out of the JAP as they are not feasible or do not present any positive interest for collaboration. The final JAP contains all the joint actions that the consortium has agreed to implement on the short and medium terms after the end of the project.

The JAP is a first milestone in the work achieved by the consortium to foster interregional collaboration and inter-clustering in the field of PV. The concept of "coopetition" could be applied to

SOLARROK activities: it reflects how European competitors have learnt to work together in areas in which they are complementary in order to be more competitive as a whole. At the EU level, this coordination was oriented towards an increased regional smart specialisation to better support innovation processes. At the global level, SOLARROK aimed at developing a coordinated approach between European stakeholders.

3.3 Regional JAPs for Smart Specialisation

Objective: To produce a consortium JAP and seven regional JAPs including business plan and internationalisation strategy

At project mid-time (June 2014), the SOLARROK PV Clusters have analysed the status of smart specialisation policies in their regions with regards to PV and produced the so-called « Intermediate Joint Action Plans for S3 ». The ‘Regional JAPs for smart specialisation’ link the analysis of regional S3 with regard to the PV sector to the SOLARROK Joint Action Plan. SOLARROK stakeholders being key actors in the innovation process in the field of PV, have formulated recommendations for both regional and Brussels’ authorities. These constitute a road map for the update of regional policies, initiatives, programmes and processes needed to implement the strategies identified in the SOLARROK JAP and to support regional smart specialisation.

Regional analyses have shown that despite the fact that clean energies are listed as a societal challenge for Horizon 2020, a majority of the regions involved in the SOLARROK project have decided not to include PV explicitly as a priority in their innovation strategies. This trend is worrying as the RIS3 policies will impact the allocation of European regional funds.

The SOLARROK regions have a very different history regarding policies for the support of PV implementation. Therefore, the current status of either radical drawback from former programs or creating a new focus on advanced PV applications or intelligent business models displays a broad range across all SOLARROK regions. Through the SOLARROK exchange activities and workshops on local, interregional and international level, this range of different experiences and conclusions has been used to trigger rethinking and strategic creativity.

RESULTS OF WORKPACKAGE 4

Expert groups were set up to structure the interregional knowledge exchange and collaboration process along the following major fields:

4.1 PV cluster environment & European collaboration

Objective: To make best use of regional innovation capacities through new cross-regional collaboration models

In several steps, future collaboration potentials among European PV clusters were addressed, resulting in a “Work program for Solarrok+” discussed at the interregional workshop in Vienna (as input for the JAP) that described (among others), the

- Organization of a future and “ideal” European competence specialization in PV
A strategy for an optimized distribution of complementary innovation competencies amongst all relevant European PV clusters, mainly driven by and reflect the market needs with a special focus on emerging extra-European markets.
- Interdisciplinary Joint Roadmaps for Smart PV
Interdisciplinary issues were clearly identified as of high potential for the market penetration of PV products: building integration and integration in urban infrastructures, ICT, mobility, materials (in particular Nano materials), water, waste and energy management, maintenance and recycling, etc.
- Information platform for PV-applications
According to the results of other research projects (e.g. PV-Grid), there still is a need to exchange on technological issues as well as good and even bad practices on market and policy issues.
- Moderation between authorities and regional industry
Regional Authorities are rated to cause the most critical hurdles, so a powerful and well (across clusters) informed entity should be installed (e.g. on developing legal framework, setting up RTD programs, developing educational content).

4.2 Mobilise human resources and infrastructure exchange

Objective: To build the human potential by initiation of joint education and training programs

The clusters and research organisations within the SOLARROK consortium have created an inventory for European summer schools in Europe. A concept for a joint summer school was developed and action was taken to achieve funding for the proposed program. In addition, a directory for sharing the R&D infrastructures among the members of SOLARROK project was developed and exchanged with the SOPHIA project. SOLARROK was presented at a SOPHIA event in France with a panel discussion.

4.3 Cooperation business models: developing joint research and innovative projects

Objective: To demonstrate advanced European technologies

Collaboration business models have been developed on different levels, including models for citizen participation, public procurement, young peoples’ education (pupils, students), new business models for shared ownership of installations, and new financing models.

On a technological level, SOLARROK partners have practised intense knowledge exchange and engaged in several joint applications for funding programs, among them topics like e.g. wafer technologies, recycling, and BIPV.

4.4 PV Technologies – best practice demonstration within Europe

Objective: To work towards the sustainable implementation of the joint action plan and stabilise a platform for European PV cluster collaboration.

In addition, the partners decided to collect best practices focusing rather on regional policies, exploring regional action plans and support measures, than on a purely technological level. These best practices were put together in a document and used for dissemination and discussion with diverse target groups in the respective project regions. This effort to foster interregional exchange of policies and support measures was also supported by the 4. Interregional Workshop on smart specialisation strategies (Bodø, Norway) and the workshop on efficient policy design in Ljubljana.

RESULTS OF WORKPACKAGE 5

The overall objective of WP5 (Internationalisation) is to foster sourcing, R&D cooperation and sales opportunities for the research and industry partners involved in regions beyond Europe. The European Solar energy clusters' competitiveness shall be enhanced by strengthening innovation related co-operation with international communities through benchmarking of the innovation systems, building up lasting relations with foreign regions/markets, and further stabilising the European clusters collaboration structures by joint activities in global markets.

To achieve the main objectives of WP5, a four steps approach in was followed:

1. Step: Preparing the Background for Collaboration

A workshop with the European PV Clusters was carried out at the imec research institute in Leuven in April 2014 in order to align needs and potentials of the different regions for the internationalisation strategy (see 5.1). In 2015, a second workshop targeted PV policies and smart specialisation strategies to support global competitiveness of European PV clusters (see 5.4).

2. Step: Delegation Visits to Selected MENA Countries (see 5.2)

3. Step : PV Tour d'Europe (see 5.3)

4. Step: SOLARROK Forum of European PV Clusters, October 14, 2015, in Brussels (SOLARROK Final Conference) with in-depth public discussion of collaboration potentials and conditions with experts (industry, associations & public bodies & research) from MENA countries (see D6.63 Conference Proceedings, available on the project website).

5.1 Benchmarking workshop exploring global PV cluster expertise

Objective: To identify possible collaboration opportunities and to prepare a strategy for exchange with clusters beyond Europe

The international SOLARROK Workshop on "Building Competitive Strength of the EU PV-Industry through Joint Action of Regions" (April 2014) held at imec in Leuven, Belgium, brought together experts from more than ten European countries. How to secure a share of the globally growing PV markets for the European PV value chain was the main question discussed in five moderated breakout sessions and a set of recommendations was developed. The structure of the five sessions is also reflected in the SOLARROK Joint Action Plan:

- Internationalisation
- Models for R&D Collaboration
- Overcoming Market Barriers
- PV Penetration into The Grid
- Regional Specialisation for PV Applications

Recommendation addressed the following issues, e.g.: European PV clusters' unique selling points; role of certification and quality control for the market; integrating systems and applications; joint lobbying and marketing for EU PV opportunities; European registry of R&D resources as well as demonstration projects; new business models and services for PV grid integration and self-consumption; impact monitoring for policies; development of PV applications for emerging markets with special conditions (climate, investment, etc). The outcome of the workshop served for both, development of the SOLARROK Joint Action Plan, and the further set up of the internationalisation

strategy in WP5 including the selection of targeted clusters beyond Europe (see also D5.1 Report PV Cluster Benchmark in Global Context).

5.2 Enhancing the base for global competition

Objective: To strengthen networks of trust in the respective international markets and RTD/production environments

PV clusters in Morocco, Russia India, Turkey, Brazil, Egypt, Tunisia and Chile had been preselected and analysed in-depth in D5.1 considering focus and sizes of PV industry and institutes, level of organization, national solar energy programs and policies, regional solar energy potential in terms of solar radiation. Out of these, three clusters were selected to target personal exchange with local stakeholders that could act as representatives of research, industry and local authority.

The identification of the clusters was also aligned with ongoing collaboration of SOLARROK partners with other programs and projects and programs, like e.g. RES4MED (Renewable Energy Solutions for the Mediterranean) and the KIC Inno Energy. Delegations of SOLARROK partners have been set up and visited selected institutions (industry associations, research institutes, government and public agencies) in Turkey (February 2015), Egypt (December 2015) and Tunisia (November 2014) in order to deepen relations with the respective chosen clusters beyond Europe, assess collaboration potentials and identify most promising multipliers for further interaction.

The outcome of the visits and the consecutive PV Tour d'Europe was published in D5.53 (Match-making Workshop Reports) and D5.4 (Report Market Access and Collaboration Profiles).

5.3 Establishing bridgeheads of trust beyond Europe

Objective: To organize a match-making & knowledge exchange process with global actors

During a one week visiting tour, connected match-making workshops with delegations from these countries have been carried out in three selected SOLARROK regions (ELAt, Central Germany and Rhone-Alps) from June 15-20 2015, involving SMEs and research institutes from these, but also from other SOLARROK regions. The mutual exchange with cluster members from industry and research has proven very fruitful and resulted in ongoing collaboration activities.

The PV Tour d'Europe is an excellent example for a feasible and focused collaboration of PV Clusters. Joint initiatives of European regions for outreach to neighbouring emerging markets should be a best practice example: Making the best use of complementary competencies, market & innovation offers and pooling of well-established individual networks leads to increased efficiency. SOLARROK has created awareness for the regional dimension of PV collaboration in Europe.

The match-making workshops have been very well received among cluster members in the Netherlands, Belgium, Rhône Alps and Central Germany. The feedback by companies on this novel type of cluster service confirms that the majority finds it very useful, and as much as 17% expect immediate benefits. All companies are willing to participate again in this type of initiative.



Graphic: Participation of companies in the three match-making workshops

5.4 Policy development for globalization

Objective: To align and improve European innovation support with smart specialisation and globalisation strategies

In collaboration with the project SUNROAD, the SOLARROK consortium organised an international workshop in Ljubljana (June 2015) under the title “How to design regional policies in the energy sector?: Changing technical & market scenarios, monitoring, long-term efficiency”. The workshop addressed the role of regions, regional policies and authorities in the use of solar energy and targeting mainly regional authorities, intermediaries, consumer associations and NGO’s from the SOLARROK regions.

Questions in focus were: How can regional policies (financial incentives, regulatory framework, etc.) impact the market expansion of the European PV sector? How can regions exchange their strategies and experience with changing scenarios in the energy market, e.g. self-consumption, decentralized/intermittent energy production, energy storage, net metering? How could regions pave the way to more collaboration and synergy in the regulatory frameworks, leading to more competitiveness of the European renewable energy sector? How can the PV sector interact more successfully with regional smart specialisation strategies?

The outcome of the workshop was published on the project website and further discussed at the SOLARROK Final Conference during the Open Days 2015.



1.4 The potential impact

Fairs, Exhibitions, Conferences

As a coordination and support action, the project has focused on network building and knowledge exchange and therefore organised a wealth of face-to-face activities on different levels:

Regional (WP3)

Each region has carried out regional workshops in the local language to engage regional stakeholders.

Interregional (European level – WP4 and WP5)

Four Interregional Workshops on European level focused on different topics around cluster management, BIPV, smart specialisation and advanced materials, two international workshops were carried out to discuss policies and collaboration strategies in view of improving the coordination of European internationalisation activities and competitiveness.

International (exchange with MENA countries – WP5, WP6)

SOLARROK has been presented twice (booth and panel discussion, poster) at the international congress and fair of the PV sector, PVSEC (Paris, 2013 and Amsterdam, 2014 - WP6). Within WP5, three delegation visits to Tunisia, Morocco and Egypt have been carried out, preparing the PV Tour d'Europe with three match-making workshops involving invited delegations from the same MENA countries. The projects' final conference has brought together the different audiences as an official Side Event at the Open Days 2015.



The projects' Final Conference has been carried out during the Open Days of the European Regions and Cities in 2015 to demonstrate the importance of the regional dimension of European collaboration in the PV sector, and at the same time the solar future for European citizens as well as new trends in technologies and business models. In addition, the frame of the Open Days helped to place the outreach activities of the SOLARROK community towards MENA countries into the background of institutionalised European knowledge exchange and interaction of regions. That helped to make the approach that has been followed by SOLARROK even more convincing.

Important lessons learned in four expert panel discussions during the conference day can be found in detail in the conference proceedings (published on the project website) but as a conclusion the following messages can be mentioned here:

- The global transformation of the energy system is the most important technological challenge of the 21st century and offers tremendous market opportunities. On the global scale, a huge market for PV power generation is predicted for the future. Europe is well-positioned with the availability of cutting-edge technologies and experience in system integration.
- For a smarter use of solar electricity, the direction must be: ICT for intelligent grid solutions, prosumer integration, new business models facilitated by an intelligent and attuned regulatory framework.
- Building Integrated Photovoltaics (BIPV) is a local market and therefore an opportunity for the local European manufacturers. It needs a new holistic approach to unlock the full potential of energy efficiency in buildings and solar power production.
- PV is booming in many Middle-East countries for many reasons: Turkey, Egypt and Morocco lead the scene with extreme high needs for Renewable Energies (RE) due to ambitious developmental goals and a very young, rapidly growing and vocal population. European business actors should collaborate locally in joint ventures on advanced PV technologies and applications that are adapted for specific MENA needs (e.g. climate conditions, regulation, business models) – competing with cheap products is not recommendable.
- SOLARROK should continue to foster cooperation and focus on goals that can be accomplished without too much overhead administration. The KIC InnoEnergy strongly supports this networking of different regions and clusters, and offers to accompany joint measures.



Next to the dissemination activities mentioned above, the project has been presented and discussed at many occasions, among them the EU PV Clusters' 2nd Workshop and General Assembly (Spain), the Industrial Technologies 2014 conference on nanotechnologies, biotechnology, advanced materials and new production technologies (Greece), and the EU PV Clusters' Workshop (France).

Socio-economic impact and post-project dissemination

With the Paris Agreement adopted at the COP21 in November 2015 and the prediction of a huge growth of worldwide expected PV capacity, the socio-economic benefits of joint action from

European research, innovation and business actors are not to be underestimated. Coordination of research and innovation agendas will support European technology leadership in the future field of PV. SOLARROK has formed a collaboration community of organisations and stakeholders that each represent knowledge hubs in their regional environments. The consortium has decided to further engage in this community at least by yearly meetings at international events (e.g. the INTERSOLAR) which will be organised alternately. In addition, it is planned to jointly organise internationalisation activities following the successful example of the SOLARROK PV Tour d'Europe.

Wider societal implications

The SOLARROK project has facilitated and encouraged patterns of collaboration between European regional PV clusters. These patterns include the automatic exchange of information, which allows for the emergence of fields of cooperation. The establishment of an interregional dialogue has enabled the discovery of common issues for which a joint response is appropriated. In three years, SOLARROK clusters have also developed a “reflex” of working together: developing joint proposals, joint actions, co-organising events and workshops. SOLARROK partners have now a tendency to think about informing or including other SOLARROK partners when developing or implementing new projects. Finally, SOLARROK consortium has evolved into a network of clusters.

We are now at the end of the project, and many activities and projects await the SOLARROK network. The consortium will continue its growth and development to become a Meta cluster. Finally, SOLARROK has proved its added value as a driver for inter-clustering and as a network facilitator between triple helix actors on European and International markets.

The SOLARROK project has encouraged the development of transnational cooperation between regional research-driven clusters, while reinforcing the link between the clusters and regional authorities.

Public deliverables are available on www.solarrok.eu:

- SOLARROK RTD-Atlas including Regional and Global SWOT Analyses
- SOLARROK Program for Sharing RTD Infrastructures
- SOLARROK Training and Mobility Agenda
- Report on PV Cluster Benchmarking in Global Context
- Best Practice: SOLARROK Collaboration Business Models
- Report Market Access and Collaboration Profiles
- Reports SOLARROK Interregional Workshops
- Report Policy Maker Workshop in Ljubljana
- Report PV Tour d'Europe
- Joint Action Plan
- Regional Action Plans for Smart Specialisation
- Conference Proceedings EU Forum of PV Clusters

1.5 The address of the project public website

The project website has been online since month 4. Since then layout and content have been revised, augmented and updated according to project progress. The website is up-to-date:

www.solarrok.eu

2. Use and dissemination of foreground

The project has not produced scientific (peer reviewed) publications.

The project has not produced trademarks, patents, registered designs, etc.

Several platforms for dissemination activities were established and used throughout the project. In addition to the project **website**, another channel for spreading relevant information and keeping in contact with the project network has been launched in **LinkedIn, facebook** and **twitter**.

Articles were published in different media, including daily press, professional journals, online media, and relevant websites. Information about SOLARROK was published in Slovenian, Spanish, French, Flemish, Lithuanian and German in the respective partner regions.

One **dissemination plan** has been produced to ensure the broad dissemination of the project results and activities beyond the project lifetime. The dissemination plan

- describes dissemination rules & principles
- gives an overview on basic dissemination products and channels
- gives detailed information about hosted and planned events, collaborations and activities
- describes in detail specific measures to ensure the effectiveness of the dissemination

No	Type of Activity	Main Leader	Title	Date	Place	Type of audience	Size of Aud.	Countries addressed
1	conference	13	The Future of Photovoltaics – how can European Regions Participate in the Growing Market for Solar Energy?	14. Okt 15	OPEN DAYS 2015 Side Event, Brussels	all	100	Europe, MENA countries
2	exhibition	1	booth and panel discussion."How to strengthen the competitiveness of solar industry in Europe"	02. Okt 13	PVSEC Fair, Paris	PV sector, triple helix	3000	International
3	exhibition	1	Booth at Hannover Fair 2014	08. Apr 14	Hanover	all	220000	International
4	exhibition	14	SOLARROK presentation at the Protech stand	04. Jun 14	Intersolar 2014, Munich	all	43000	International
5	exhibition	1	Booth at 30. Symposium Photovoltaische Solarenergie (04.-06.03.2015)	05. Mrz 15	Bad Staffelstein	PV sector, triple helix	3000	Germany
6	exhibition	1	Booth at Intersolar 2015 , 10.-12.06.2015	10. Jun 15	München	Research & Industry	43000	Germany
7	facebook	9	facebook.com/pages/MODERNA-NAVARRA/308709571324?fref=ts	Jan 13	Fundación MODERNA Facebook	all		Spain
8	facebook	7	Video with Dr. Sabine Schmidt presenting Solarrok project at the EU PV Cluster 2nd Workshop and General Assembly in Barcelona. https://www.facebook.com/photo.php?v=432260133540372	Nov 13	Facebook	all		
9	meeting	7	Presentation of Solarrok project in National Council of the Republic of Slovenia	09. Jan 15	Ljubljana	Energy sector	30	Slovenia
10	meeting	7	Presentation of Solarrok project at Ministry of Agriculture, Forestry and Food	20. Jan 15	Ljubljana		5	Slovenia
11	meetings	5,6	Tunisia: meetings with representatives of government and public agencies, industry, research institutes	05. Nov 14	Tunis	PV sector, triple helix	10	Tunisia
12	meetings	3	Egypt: meetings with representatives of government and public agencies, industry, research institutes	01. Dez 14	Cairo	PV sector, triple helix	20	Egypt
13	meetings	1,3	Turkey: meetings with representatives of public agencies, industry, research institutes	26. Feb 15	Ankara	PV sector, triple helix	8	Turkey
14	meetings	14	Collaboration meeting with stakeholders from	Mai 15	Berlin	Research & industry	10	Germany

			Germany, Poland, Baltic States and Scandinavian countries					
15	meetings	14	The VI Annual Forum of the EUSBSR, 'Achieving e-Quality by Connecting the Region'	Jun 15	Riga	Research & industry	5	Latvia
16	meetings	14	Collaboration meeting with regional stakeholders	Jun 15	Tartu	Research & industry	5	Estonia
17	meetings	14	EU PVTP Conference "Energy Efficiency in Buildings and Building-integrated Photovoltaics: Where Sustainability meets Aesthetics"	Jul 15	London	PV sector, research and industry	150	UK
18	newsletter	6	„Un nouvel élan pour la filière photovoltaïque européenne“ - file:///C:/Users/charline.dufournet/Downloads/bulletin-n27.pdf	Apr 14	Ines-solaire.org	PV sector, R&D, Industries, Public Institutions, regional and national	5000	France
19	newsletter	6	„Stratégie régionale d'innovation: l'oubli européen du photovoltaïque“ file:///C:/Users/charline.dufournet/Downloads/bulletin-n28.pdf	Jul 14	Ines-solaire.org	PV sector, R&D, Industries, Public Institutions, regional and national	5000	France
20	newsletter	6	„Solarrok: vers une approche conjointe à l'international“: file:///C:/Users/charline.dufournet/Downloads/bulletin-n30.pdf	Dez 14	Ines-solaire.org	PV sector, R&D, Industries, Public Institutions, regional and national	5000	France
21	newsletter	6	„Solarrok: un tour du photovoltaïque en Europe“: file:///C:/Users/charline.dufournet/Downloads/bulletin-n32.pdf	Jul 15	Ines-solaire.org	PV sector, R&D, Industries, Public Institutions, regional and national	5000	France
22	newsletter	6	„Solarrok continue ses actions à l'international!“: file:///C:/Users/charline.dufournet/Downloads/bulletin-n33.pdf	Okt 15	Ines-solaire.org	PV sector, R&D, Industries, Public Institutions, regional and national	5000	France
23	newspaper	1	Vereint gegen die Konkurrenz aus Asien	Feb 13	Naumburger Tageblatt	all		Germany
24	newspaper	1	Europäische Solarfirmen bekämpfen asiatische Konkurrenz	Feb 13	Bielefelder Nachrichten	all		Germany
25	online journal	9	El Gobierno de Navarra, la Fundación Moderna y CENER participan en el proyecto europeo SolarRok sobre energía solar	Jan 13	europapress.es	all		Spain
26	online journal	9	El Gobierno de Navarra, la Fundación Moderna y CENER participan en el proyecto europeo SolarRok sobre energía solar	Jan 13	20minutos.es	all		Spain

27	online journal	9	El Gobierno de Navarra, la Fundación Moderna y CENER participan en el proyecto europeo SolarRok sobre energía solar	Jan 13	Un Impulso A La RSE	all			Spain
28	online journal	6	Solarrok: la coopération européenne dans le photovoltaïque est en marche	Jan 13	L'ECHO DU SOLAIRE	all			France
29	online journal	7	http://www.slonep.net/eko-bivanje/obnovljivi-viri/novice/pricetek-projekta-solarrok	Jan 13	Slonep; www.slonep.net	all			Slovenia
30	online journal	7	http://www.energetika.net/novice/energetska-politika/solarrok-solarni-grozd	Jan 13	Energetika.net	Energy sector			Slovenia
31	online journal	7	http://www.nas-stik.si/1/Projekti/Novica/tabid/202/ID/1186/Skupni-evropski-fotovoltaični-projekt.aspx	Jan 13	Naš stik	Energy sector			Slovenia
32	online journal	1	Europas Solarfirmen tun sich gegen China zusammen	Feb 13	Business-Panorama	all			Germany
33	online journal	1	Vereint im Kampf gegen Fernost: Forschungsallianz der Europäischen Solarfirmen	Feb 13	Clean Thinking	all			Germany
34	online journal	1	Vereint im Kampf gegen Fernost	Feb 13	Wind Journal	all			Germany
35	online journal	7	Grozde fotovoltaike s skupnim akcijskim načrtom	Mrz 13	DELO	all			Slovenia
36	online journal	9	El Gobierno de Navarra, la Fundación Moderna y CENER participan en el proyecto europeo SolarRok sobre energía solar	Mai 13	lainformacion.com	all			Spain
37	online journal	6	„Le solaire oublié des stratégies régionales“, Michel Deprost: http://www.enviscope.com/energie/solaire/le-solaire-oublie-des-strategies-regionales/20779	Jul 14	www.enviscope.com	Public and private actors from environment sector	10 000		France
38	online journal	6	„Savoie Technolac, l'INES et Tenerdis représentent la filière solaire de l'innovation française aux Open Days 2015“: http://www.tecsol.fr/news/indexnews.asp?id=6286	Sep 15	www.tecsol.fr	Professional audience from the solar sector	10 000		France
39	online journal	6	„Energie solaire: Savoie Technolac représente l'innovation française à Bruxelles“: http://www.intelligible.fr/energie-solaire-savoie-	Sep 15	www.intelligible.fr				France

			technolac-filiere-de-linnovation-francaise-a-bruxelles/					
40	online journal	1	Konsortium zur Stärkung der PV-Industrie in Europa legt Abschlussbericht vor	Jan 16	http://www.sonnwindwaerme.de/photovoltaik/konsortium-staerkung-pv-industrie-europa-legt-abschlussbericht	Professional audience from the solar sector	10 000	Germany
41	online presentation	7	http://www.slideshare.net/ZSFI/solarrok-workshop-celje	Sep 14	SlideShare	all		Slovenia
42	paper & presentation	1	Progress in Photovoltaics and Nanotechnology: from FP7 to Horizon 2020 - The EU PV Clusters 2nd Workshop and General Assembly: Presentation of RTD Atlas results and project	26. Nov 13	Barcelona	PV sector, triple helix	60	International
43	poster	1,13	"SOLARROK, regional excellence for global competition"; in TOPIC 7.3 - PV Globalization, Policies, Administrative Issues	22. Sep 14	PVSEC Amsterdam	PV sector, triple helix	300	International
44	presentation	12	Photovoltaic Kongress	18. Apr 13	Vösendorf	PV sector, triple helix	300	Austria
45	presentation	12	Cluster management (TPPV) meeting	15. Okt 13	Amstetten	PV sector, triple helix	20	Austria
46	presentation	13	A Regions Of Knowledge capitalisation exercise: Thematic workshop on resource efficiency: Presentation of RTD Atlas results and project	29. Nov 13	Brussels	clusters	50	Belgium
47	presentation	12	Energy Day 2014	24. Sep 14	Vienna	RE-Students	80	Austria
48	presentation	12	Cluster management (TPPV) meeting	14. Feb 14	Graz	PV sector, triple helix	20	Austria
49	presentation	12	Industrial Technologies 2014 conference on nanotechnologies, biotechnology, advanced materials and new production technologies: Presentation of RTD Atlas results and project	09. Apr 14	Athens	Experts on advanced materials	60	International
50	presentation	6	Solar Decathlon Europe (International conference)	03. Jul 14	Paris	Architecture and Engineering Schools from different countries, public authorities and companies	50	International
51	presentation	14	Challenges and issues for BIPV: FP7 project	15. Sep 14	CEA-INES, Le	PV sector, triple helix	50	France

			Smartflex		Bourget du Lac			
52	presentation	12,13	EU PV Clusters Workshop: Presentation of RTD Atlas results and project	Sep 14	Saint-Paul-Lez-Durance	PV sector, research and industry	30	International
53	presentation	12	Cluster management (TPPV) meeting	Okt 14	Vienna	PV sector, triple helix	20	Austria
54	presentation	6	Session Solarrok „Regional initiatives: PV clusters development and implementation measures of a seven region strategic joint action plan for knowledge-based regional innovation“ at Sophia final conference	Jan 15	INES, Rhône-Alps	European Research and industrial partners, national and regional public authorities	200	International
55	presentation	14	Investment incentives	Apr 15	Grow your Region – Delivering Smart Specialization, Brussels	all	70	Belgium
56	presentation	1	Profile presentation of SOLARROK at Info Day on "Smart Cities & Communities"	Nov 15	Brussels	Regional Public authorities, companies, clusters, SMEs and Start-ups	50	Belgium
57	press release	7	Press release for SOLARROK regional workshop Slovenia (related event): http://us9.campaign-archive2.com/?u=21fe42b13d0f07da09043fcb5&id=72ad27fbc3	Sep 14	MailChimp	Energy sector	500	Slovenia
58	publication	14	ES 7BP projektas SOLARROK	Sep 13	FETK newsletter, 2013 No.1, Vilnius	all	500	Lithuania
59	radio	1	Solarvalley: "Eine andere Chance haben wir nicht"	Feb 13	MDR (Radio)	all	40 000	Germany
60	radio	1	Europas Solarindustrie bläst zur Attacke gegen Fernost	Feb 13	MDR (Radio)	all	40 000	Germany
61	radio	1	Solarfirmen wollen Forschungsergebnisse bündeln	Feb 13	DRadio Wissen	all	40 000	Germany
62	twitter	3	http://solarmagazine.nl/nieuws-zonne-energie/i10066/solarrok-organiseert-forum-met-europese-pv-clusters-in-brussel#.VgoSP_r3Xlc.twitter	Aug 15			10 000	Netherlands
63	twitter	7	6 ZSFV twits mentioning Solarrok project		Twitter	all		

64	twitter	7	Solarrok own twitter account (@solarrok) with 31 twits and retweets (RT) where Solarrok is mentioned		Twitter	all		
65	twitter	7	31 twits with Solarrok hashtag (#) published by different organisations and individuals		Twitter	all		
66	website	9	El Gobierno de Navarra, la Fundación Moderna y CENER participan en el proyecto europeo SolarRok sobre energía solar	Jan 13	Navarra Government	all		Spain
67	website	9	Moderna participa en el lanzamiento del proyecto europeo solarrok	Jan 13	Fundación Moderna	all		Spain
68	website	9	El Gobierno de Navarra, la Fundación Moderna y CENER participan en el proyecto europeo SolarRok sobre energía solar	Jan 13	ERA SOLAR NET - La Actualidad de la Energía Solar	all		Spain
69	website	7	http://www.zsfv.si/novice/167-vodilni-evropski-industrijski-grozdi-na-podro%C4%8Dju-son%C4%8Dne-energije-razvijajo-skupni-akcijski-na%C4%8Drt-za-prihodnost-fotovoltaike-v-evropi-pri%C4%8Detek-projekta-solarrok.html	Jan 13	ZSFV press release	PV and energy sector		Slovenia
70	website	12	www.technikum-wien.at/fh/institute/erneuerbare_energie/projekte	Apr 13	Technikum Vienna	all		Austria
71	website	13	SOLARROK at PVSEC 2013	Okt 13	www.solarrok.eu	all		
72	website	6	„Discover Solarrok, the European network of PV clusters“: http://en.savoie-technolac.com/151-international-expansion.htm	Nov 13	www.savoie-technolac.com	Regional Public authorities, companies, clusters, SMEs and Start-ups, regional and local authorities	10 000	France, Rhône-Alps
73	website	13	SOLARROK International Workshop at imec, Leuven	Apr 14	www.solarrok.eu	all		
74	website	7	Regional Workshop in Celje, Slovenia	Sep 14	www.solarrok.eu	all		
75	website	13	Developing Joint Actions: Progress Meeting in Navarra	Dez 14	www.solarrok.eu	all		
76	website	9	Photovoltaics seeking business opportunities in architectural integration	Apr 15	www.solarrok.eu	all		
77	website	6	„Journées portes ouverte des territoires européens	Jun 15	www.savoie-	Local/ regional level Rhone- Alpes		France

			(open days 2015)“ http://www.savoie-technolac.com/presse/93/81-espace-presse.htm		technolac.com			
78	website	13	Efficient Policy Design for Solar Energy	Jun 15	www.solarrok.eu	all		
79	website	13	http://ec.europa.eu/regional_policy/opendays/od2015/side_events.cfm	Aug 15	Open Days Program, Side Events announcements	all		Belgium
80	website	6	http://www.eupvclusters.eu/News/Solarrok-European-Forum-of-Photovoltaic-Clusters	Aug 15				
81	website		http://www.solliance.eu/events-calendar/	Sep 15				ELAt region
82	website	6	„Energie solaire: Savoie Technolac, territoire de l’innovation en France“: http://www.intelligible.fr/wp-content/uploads/2015/09/2015-SavoieTechnolac_SOLAIRE_DossierPresse.pdf	Sep 15	www.intelligible.fr	Regional Public authorities, companies, clusters, SMEs and Start-ups	3000	France, Rhône-Alps
83	website	4	http://www.imecinteract.be/14102015-groefactoren-voor-de-europese-pv-industrie-bipv-slimme-netwerken-samenwerking/	Okt 15				Belgium
84	website	7	Description about Solarrok project at LinkedIn with direct connections to 14 individuals working in frame of Solarrok project		LinkedIn	all		
85	workshop	4	"Building Competitive Strength of the EU PV-Industry through Joint Action of Regions"	26. Apr 14	Imec institute, Leuven	PV sector, triple helix	50	Belgium
86	workshop	7	SOLARROK regional workshop Slovenia	20. Sep 14	47th International Trade and Business Fair (MOS), Celje	all	30	Slovenia
87	workshop	5,6	SOLARROK regional workshop Rhone-Alpes „Building-Integrated Photovoltaics“: Session at Sophia workshop (BIPV)	15. Sep 14	CEA-INES, Le Bourget du Lac	Research and 87 industrial partners, Engineers and Architects from BIPV sector	100	France
88	workshop	3	SOLARROK regional workshop Netherlands	19. Nov 14	„SUNDAY“ event in Arnhem	all	300	Netherlands

89	workshop	1	SOLARROK regional workshop "Smart Energy Ostdeutschland" in Germany	12. Nov 14	Erfurt	PV sector, triple helix, energy storage sector, construction sector	50	Germany
90	workshop	9	SOLARROK regional workshop Navarra "Hybridization of PV technologies, sustainable construction and new materials"	31. Mrz 15	Pamplona	all	50	Spain
91	workshop	12	Interregional Workshop 1 – Best Practices in Regional Cluster Management	11. Mrz 15	Vienna	PV sector, triple helix	30	Austria
92	workshop	9	Interregional Workshop 4 – Role of RIS3 in sector and cluster development	08. Apr 15	Bodø	PV sector, triple helix	25	Norway
93	workshop	14	SOLARROK regional workshop Lithuania (integrated with the Interregional Workshop 2	19. Mai 15	Vilnius	PV sector, research & industry	30	Lithuania
94	workshop	14,6	Interregional Workshop 2 - BIPV in Baltic countries – Trade mission to Vilnius, Lithuania	19. Mai 15	Vilnius	PV sector, research & industry	30	Lithuania
95	workshop	12	SOLARROK regional workshop Austria	19. Jun 15	Graz	PV sector, triple helix	20	Austria
96	workshop	6	Match-making Workshops Rhône-Alps	15. Jun 15	Le Bourget du Lac	PV sector, triple helix	50	France
97	workshop	1	Match-making Workshops Central Germany	17. Jun 15	Halle	PV sector, triple helix	50	Germany
98	workshop	3	Match-making Workshops ELAt region	19. Jun 15	Eindhoven	PV sector, triple helix	50	Netherlands
99	workshop	7,8,13	"How to design regional policies in the energy sector? :Changing technical & market scenarios, monitoring, long-term efficiency"	02. Jun 15	Ljubljana	policy makers, industry	40	Slovenia
100	workshop	10	Interregional Workshop 3 – Towards manufacturing of innovative photovoltaics industrialization, final steps of testing and LCA analysis	15 May 15	Lille	PV sector, research and industry	30	France
101	youtube	7	//www.youtube.com/channel/UCHU0UGsPgGOBW6dF8VPF3Yw	Nov 13	YouTube	all		

3. Report on societal implications

Background, Aim and Method to the Report on Awareness and Wider Societal Implications

As the FP7-Programme was designed to focus, integrate, structure and strengthen the European Research Area (ERA), the influence of science and technology on society is a central aspect.

This was acknowledged when the ERA was established and the importance of having a healthy dialogue between science and society has been recognised. As a part of the policy to structure the ERA under the heading Science and Society, the underlying report incorporates ethical, gender and communications issues together with issues affecting education and youth and governance.

The questionnaire has been designed to help coordinators respond to contractual reporting requirements (Article II.10.3 of the contract states that consortia must engage with actors beyond the research community) and to facilitate the monitoring of the science and society dimension in FP7.

The replies to the questions shall assist the European Commission to obtain statistics and indicators on societal and socio-economic issues addressed by projects. The questions are structured in a questionnaire and arranged in a number of key themes. The Commission will produce statistics from that and will not make replies public.

In terms of that background, the SOLARROK beneficiaries were informed that

- **the gathered information/data through will be confidential and**
- **will not be disclosed to any third parties**
- **or used in any way that could be linked to individual projects.**

All SOLARROK partners were asked to complete as many questions as possible in the questionnaire by filling out information where requested and ticking boxes.

The information gathered through this questionnaire is kept confidential and will not be disclosed to any third parties or used in any way that could be linked to any projects.

Overview Key Themes and Description of Input Collection

The following key themes were addressed in the questionnaire to report on Awareness and Wider Societal Implications in the course of the SOLARROK project.

- A - General Information
- B - Ethics
- C - Workforce Statistics
- D - Gender Aspects
- E - Synergies with Science Education
- F - Interdisciplinarity
- G - Engaging with Civil Society and Policy Makers
- H - Use and Dissemination
- I - Media and Communication to the General Public

The corresponding input collection has been effected in the following steps:

- 1. Structuring the questionnaire into a workable formate**
- 2. Presentation on the background, key themes and coordination to project partners**
- 3. Definition of one contact from each project beneficiary for communication and exchange**
- 4. Collection of partner replies**
- 5. Preparing and finalizing the final document of the questionnaire**

The Completed Questionnaire

A General Information
Grant Agreement Number: 320028
Title of Project: SOLARROK - PHOTOVOLTAIC Clusters Development and Implementation Measures of a Seven Region Strategic Joint Action Plan for Knowledge-based Regional Innovation
Name and Title of Coordinator: Dr. Peter Frey, Solar Valley GmbH

B Ethics	
1. Did your project undergo an Ethics Review (and/or Screening)? If Yes: have you described the progress of compliance with the relevant Ethics	No

<p>Review/Screening Requirements in the frame of the periodic/final project reports?</p> <p>Special Reminder: the progress of compliance with the Ethics Review/Screening Requirements should be described in the Period/Final Project Reports under the Section 3.2.2 '<i>Work Progress and Achievements</i>'</p>	
<p>2. Please indicate whether your project involved any of the following issues (tick box):</p> <p>RESEARCH ON HUMANS</p> <p><input type="checkbox"/> Did the project involve children?</p> <p><input type="checkbox"/> Did the project involve patients?</p> <p><input type="checkbox"/> Did the project involve persons not able to give consent?</p> <p><input type="checkbox"/> Did the project involve adult healthy volunteers?</p> <p><input type="checkbox"/> Did the project involve Human genetic material?</p> <p><input type="checkbox"/> Did the project involve Human biological samples?</p> <p><input type="checkbox"/> Did the project involve Human data collection?</p> <p>RESEARCH ON HUMAN EMBRYO/FOETUS</p> <p><input type="checkbox"/> Did the project involve Human Embryos?</p> <p><input type="checkbox"/> Did the project involve Human Foetal Tissue / Cells?</p> <p><input type="checkbox"/> Did the project involve Human Embryonic Stem Cells (hESCs)?</p> <p><input type="checkbox"/> Did the project on human Embryonic Stem Cells involve cells in culture?</p> <p><input type="checkbox"/> Did the project on human Embryonic Stem Cells involve the derivation of cells from Embryos?</p> <p>PRIVACY</p> <p><input type="checkbox"/> Did the project involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)?</p> <p><input type="checkbox"/> Did the project involve tracking the location or observation of people?</p> <p>RESEARCH ON ANIMALS</p> <p><input type="checkbox"/> Did the project involve research on animals?</p> <p><input type="checkbox"/> Were those animals transgenic small laboratory animals?</p> <p><input type="checkbox"/> Were those animals transgenic farm animals?</p>	
<p><input type="checkbox"/> Were those animals cloned farm animals?</p> <p><input type="checkbox"/> Were those animals non-human primates?</p> <p>RESEARCH INVOLVING DEVELOPING COUNTRIES</p>	

<p><input type="checkbox"/> Did the project involve the use of local resources (genetic, animal, plant etc)?</p> <p><input type="checkbox"/> Was the project of benefit to local community (capacity building, access to healthcare, education etc)? YES</p> <p>DUAL USE</p> <p><input type="checkbox"/> Research having direct military use 0 Yes 0 No</p> <p><input type="checkbox"/> Research having the potential for terrorist abuse</p>	
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C Workforce Statistics		
3. Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).		
Type of Position	Number of Women	Number of Men
Scientific Coordinator	1	7
Work package leaders	4	4
Experienced researchers (i.e. PhD holders)	6	21
PhD Students	0	3
Other	9	21
4. How many additional researchers (in companies and universities) were recruited specifically for this project? 0		
Of which, indicate the number:		
research associates (male/female)		
research assistants (male/female)		
PhD students (male/female)		
master student (male/female)		
other: please specify:		

D Gender Aspects		
5. Did you carry out specific Gender Equality Actions under the project?	<input type="radio"/>	Yes
	<input checked="" type="radio"/>	No
6. Which of the following actions did you carry out and how effective were they?		
	Not at all effective	Very

			effective
<input type="checkbox"/>	Design and implement an equal opportunity policy	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/>	Set targets to achieve a gender balance in the workforce	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/>	Organise conferences and workshops on gender	<input type="radio"/>	<input type="radio"/>
<input type="checkbox"/>	Actions to improve work-life balance	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	Other		
7. Was there a gender dimension associated with the research content – i.e. wherever people were the focus of the research as, for example, consumers, users, patients or in trials, was the issue of gender considered and addressed?			
<input type="radio"/> Yes- please specify			
<input type="radio"/> No			

E Synergies with Science Education
8. Did your project involve working with students and/or school pupils (e.g. open days, participation in science festivals and events, prizes/competitions or joint projects)?
<input type="radio"/> Yes- please specify: <ul style="list-style-type: none"> • Involvement of students in visits and workshops <input type="radio"/> No
9. Did the project generate any science education material (e.g. kits, websites, explanatory booklets, DVDs)?
<input type="radio"/> Yes- please specify: <ul style="list-style-type: none"> • Website, Conference • D 4.1 Alternatives for sharing the R&D infrastructures among the members of SOLARROK project • D 4.2 Training_and_Mobility_Agenda <input type="radio"/> No

F Interdisciplinarity
10. Which disciplines (see list below) are involved in your project?

Main disciplines:

Engineering

Associated disciplines:

G Engaging with Civil society and policy makers		
11a Did your project engage with societal actors beyond the research community? (if 'No', go to Question 14)	<input checked="" type="radio"/>	Yes
	<input type="radio"/>	No
11b If yes, did you engage with citizens (citizens' panels / juries) or organised civil society (NGOs, patients' groups etc.)? <input type="radio"/> No <input type="radio"/> Yes- in determining what research should be performed <input type="radio"/> Yes - in implementing the research <input checked="" type="radio"/> Yes, in communicating /disseminating / using the results of the project		
11c In doing so, did your project involve actors whose role is mainly to organise the dialogue with citizens and organised civil society (e.g. professional mediator; communication company, science museums)?	<input checked="" type="radio"/>	Yes
	<input type="radio"/>	No
12. Did you engage with government / public bodies or policy makers (including international organisations) <input type="radio"/> No <input type="radio"/> Yes- in framing the research agenda <input type="radio"/> Yes - in implementing the research agenda <input checked="" type="radio"/> Yes, in communicating /disseminating / using the results of the project		
13a Will the project generate outputs (expertise or scientific advice) which could be used by policy makers? <input checked="" type="radio"/> Yes – as a primary objective (please indicate areas below- multiple answers possible)		

Yes – as a secondary objective (please indicate areas below - multiple answer possible)

No

13b If Yes, in which fields?

Agriculture	Energy	Human rights
Audiovisual and Media	Enlargement	Information Society
Budget	Enterprise	Institutional affairs
Competition	Environment	Internal Market
Consumers	External Relations	Justice, freedom and security
Culture	External Trade	Public Health
Customs	Fisheries and Maritime Affairs	Regional Policy
Development Economic and Monetary Affairs	Food Safety	Research and Innovation
Education, Training, Youth	Foreign and Security Policy	Space
Employment and Social Affairs	Fraud	Taxation
	Humanitarian aid	Transport

13c If Yes, at which level?

Local / regional levels

National level

European level

International level

H Use and dissemination	
14. How many Articles were published/accepted for publication in peer-reviewed journals?	0
To how many of these is open access ¹ provided?	-
How many of these are published in open access journals?	-
How many of these are published in open repositories?	-
To how many of these is open access not provided?	-
Please check all applicable reasons for not providing open access:	

¹ Open Access is defined as free of charge access for anyone via Internet.

<p>publisher's licensing agreement would not permit publishing in a repository</p> <p><input type="checkbox"/> no suitable repository available</p> <p><input type="checkbox"/> no suitable open access journal available</p> <p><input type="checkbox"/> no funds available to publish in an open access journal</p> <p><input type="checkbox"/> lack of time and resources</p> <p><input type="checkbox"/> lack of information on open access</p> <p><input type="checkbox"/> other²:</p>		
<p>15. How many new patent applications ('priority filings') have been made? <i>("Technologically unique": multiple applications for the same invention in different jurisdictions should be counted as just one application of grant).</i></p>		0
<p>16. Indicate how many of the following Intellectual Property Rights were applied for (give number in each box).</p>	Trademark	0
	Registered design	0
	Other	0
<p>17. How many spin-off companies were created / are planned as a direct result of the project? <i>Indicate the approximate number of additional jobs in these companies:</i></p>		0
<p>18. Please indicate whether your project has a potential impact on employment, in comparison with the situation before your project:</p>		
<p><input type="checkbox"/> Increase in employment, or</p> <p><input checked="" type="checkbox"/> Safeguard employment, or</p> <p><input type="checkbox"/> Decrease in employment,</p> <p><input type="checkbox"/> Difficult to estimate / not possible to quantify</p>	<p><input checked="" type="checkbox"/> In small & medium-sized enterprises</p> <p><input checked="" type="checkbox"/> In large companies</p> <p><input type="checkbox"/> None of the above / not relevant to the project</p>	
<p>19. For your project partnership please estimate the employment effect resulting directly from your participation in Full Time Equivalent (FTE = one person working fulltime for a year) jobs:</p>	<p><i>Indicate figure: 3,28 FTE women, 3,59 FTE men</i></p>	
<p>Difficult to estimate / not possible to quantify</p>	<p><input type="checkbox"/></p>	

<p>I Media and Communication to the general public</p>	
<p>20. As part of the project, were any of the beneficiaries professionals in communication or media relations?</p>	

² For instance: classification for security project.

<input type="radio"/> Yes <input type="radio"/> No
21. As part of the project, have any beneficiaries received professional media / communication training / advice to improve communication with the general public?
<input checked="" type="radio"/> Yes <input type="radio"/> No

22 Which of the following have been used to communicate information about your project to the general public, or have resulted from your project?	
<input checked="" type="checkbox"/> Press Release <input type="checkbox"/> Media briefing <input type="checkbox"/> TV coverage / report <input checked="" type="checkbox"/> Radio coverage / report <input checked="" type="checkbox"/> Brochures /posters / flyers <input checked="" type="checkbox"/> DVD /Film /Multimedia	<input checked="" type="checkbox"/> Coverage in specialist press <input checked="" type="checkbox"/> Coverage in general (non-specialist) press <input checked="" type="checkbox"/> Coverage in national press <input type="checkbox"/> Coverage in international press <input checked="" type="checkbox"/> Website for the general public / internet <input checked="" type="checkbox"/> Event targeting general public (festival, conference, exhibition, science café)
23 In which languages are the information products for the general public produced?	
<input checked="" type="checkbox"/> Language of the coordinator <input type="checkbox"/> Other language(s) – French, Slovenian, Spanish, Lithuanian	<input checked="" type="checkbox"/> English

Conclusion

The given data in the above completed questionnaire highlights the details and activities that the project SOLARROK has addressed to enhance the awareness about its outcomes and also to mention the wider societal implications of the project among the respective areas.

All specified information and mentioned tools supported the central aim of the project SOLARROK but are not only relevant for facilitating decision making or changing mind-sets immediately. The project consortium believes, that at the same time it helps to generate awareness in terms of initiatives regarding (i) research integration for photovoltaics, (ii) trans-regional innovation dynamics, (iii) international experts' promotion and driving (iv) cluster competitiveness in global context including joint internationalisation activities.

One of the main achievements through SOLARROK lies in opening up the cooperation between European and neighbouring (MENA countries) solar clusters.

Furthermore, the cooperation between PV experts and cluster initiatives, the involvement of public and private utilities and the cooperation between actors among the respective European regions supported the idea of SOLARROK.

As discoverable in the filled questionnaire, enhanced efficiency and impact through knowledge sharing, through identifying key challenges and creating business opportunities for the PV sector in Europe were of central meaning during the SOLARROK project.