Latest Developments, Project Results, Lessons Learned and Outlook

Stefan Nowak, Managing Director
NET Nowak Energy & Technology, Switzerland
Coordinator of SOLAR-ERA.NET

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To start: Who we are and what we do

A European Network and Consortium of Research and Innovation Agencies
to enable and push European Cooperation in PV RTD
+ recent members
- members lost
A long track record of European cooperation in PV and CSP


PV ERA NET
(FP6)
2 calls
6 projects
5 MEUR funding
Focus on building network
and identifying gaps and
opportunities

PV ERA NETwork
(self-sustained
follow-up network)

SET Plan (with
Integrated Roadmap)

Energy Union

SET Plan (with SEII)

SOLAR-ERA.NET
(Cofund (H2020))
1 Cofund call
~ 15-20 projects
~ 20 MEUR funding

SOLAR-ERA.NET
Cofund 2
(H2020)
1 Cofund call
+ 1 additional joint call
~ 30+ projects
~ 30 MEUR funding

SOLAR-ERA.NET
(FP7)
4 calls
~ 40 projects,
i.e. ~ 10 projects per call
40 MEUR funding
i.e. ~ 10 MEUR funding per call

SOLAR-ERA.NET
(Cofund (H2020))
1 Cofund call
~ 15-20 projects
~ 20 MEUR funding

Clean Energy Technology Partnership?
Working along the value chain

Concepts → Technologies → Solutions → Applications

Components → Systems → Integration
Recent SOLAR-ERA.NET Topics

- Advanced industrial PV technologies
- Emerging PV technologies
- BIPV and infrastructure applications
- Operation, diagnosis and system integration of PV plants
- CSP low cost and next generation technologies
Some facts and figures

- Overall 7 joint calls over 7 years, different support schemes
- 310 preproposals and 166 full proposals submitted
- 87 projects supported
- of which 38 projects running, 38 terminated and 11 in preparation
- 456 partners involved in projects (multiple counting)
- 111 MEUR project volume with 75 MEUR funding, of which 9 MEUR from EC

Typical project:
- 3 – 5 partners from 3 – 4 countries
- 1,2 MEUR project volume (of which 0,8 MEUR public funding)
Thematic split of the 87 projects – over all 7 calls (simplified)
Added value

- Benefit for the project participants: stepping stone for international cooperation
- Complementarity between national and EU funded programmes
- Enabling targeted bi- and multilateral cooperation
- Building a more robust and consistent research landscape
- Increasing strengths and reducing weaknesses
- Flexibility and bottom-up nature, no “one size fits all” approach
- Innovative transnational research for medium-sized projects
To be more concrete: Some Examples

Results, Experiences and Lessons Learned
NELL: Novel Encapsulant for Long Lifetime high voltage PID-resistant PV

- Two partners:
  - Specialized Technology Resources España S.A., Spain, industrial partner and coordinator
  - ZSW Zentrum für Sonnenenergie- und Wasserstoff-Forschung Baden-Württemberg, Germany, research partner

- Project duration 01.01.2018 – 31.12.2019
- Total project costs € 533’734
- Requested funding budget € 417’864
Results

- new developed polyolefin (POE) based encapsulant with better performance compared to EVA under standard IEC TS 80604-1 test conditions
- less leakage current and transferred charge compared to EVA

<table>
<thead>
<tr>
<th>Item</th>
<th>Condition</th>
<th>Module/ EVA-1</th>
<th>Module/ EVA-2</th>
<th>Module/ POE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extreme chamber test</td>
<td>Chamber 85°C/ Al-foil @ -2500 V</td>
<td>9.5 C</td>
<td>10 C</td>
<td>20 C</td>
</tr>
<tr>
<td>Transferred charge for x% PID degradation</td>
<td>(for -5%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outdoor field test</td>
<td>Outdoor operation @ -750 V Germany</td>
<td>4.7 C/yr</td>
<td>0.46 C/yr</td>
<td>0.34 C/yr</td>
</tr>
<tr>
<td>Transferred charge per year</td>
<td>(for -5%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outdoor service time</td>
<td>Outdoor operation @ -750V Germany</td>
<td>2.1 yrs</td>
<td>22 yrs</td>
<td>60 yrs</td>
</tr>
<tr>
<td>for x% PID degradation</td>
<td>(for -5%)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Graph showing relative power versus PID test duration [h] for different conditions and materials.
Feedback of the project consortium

Success factor
• Very fast proposal procedure (less than 1 year for a 2 stage proposal)

Critical factor
• Different administrations (sometimes different starting dates for partners)

Lessons learned
• Small consortia can be very effective and more flexible to cope with unforeseen events in contrast to big EU consortia
• Restrict the number of topics in your project
ENMESH: 
ENabling Micro-ConcEntrator PhotovoltaicS with Novel Interconnection MethOds

• Three partners:
  – Universidad Politécnica de Madrid, Spain, research partner and coordinator
  – Dycotec Materials, UK, industrial partner
  – Insolight SA, Switzerland, industrial partner

• Project duration 01.02.2018 – 01.02.2020
• Total project costs € 801’799
• Requested funding budget € 513’979
Lenses concentrate direct sunlight onto very small high-efficiency cells on a transparent backplane that lets through diffuse sunlight.

Horizontal movements of a few mm per day keep the cells aligned with the lights beams.

Direct sunlight below modules

THEIA modules

direct sunlight

diffuse sunlight

Insolight translucent PV modules at 30% record efficiency under direct sunlight produce more electricity.

Natural diffuse sunlight illuminates the interior of the building with no shading and no glare.

see also session 1AO.2
Results, impact and lessons learned

- 29% module efficiency reached early 2019
- 2019 follow up in HIPERION project under Horizon 2020 with 16 partners
- Funding volume 10.6 Mio €
- Series-A funding round with a volume of 5 Mio CHF in 2020

→ interesting approach first funded by SOLAR-ERA.NET
→ SOLAR-ERA.NET as first international instrument to work on new ideas
→ first industrial production planned in 2021
1500-SIC:
Develop a new photovoltaic inverter with SiC for full power operation at 1500V

• Three partners:
  – Gamesa Electric S.A., Spain, industrial partner and coordinator
  – Infineon Technologies AG, Austria, industrial partner
  – ETH Zürich, Switzerland, research partner

• Project duration 01.03.2018 – 30.06.2020
• Total project costs € 1’592’439
• Requested funding budget € 712’267
SOLAR-ERA.NET open to changes within a project

- Due to further developments within the semi-conductor industry the consortium performed a comparative simulation in early 2020
- Result was a change in the originally planned layout of the power module
- Main focus of the project was on the development of the inverter module, which was achieved
  → Therefore no problem, SOLAR-ERA.NET even supporting that decision and project officially completed
  → Development of a new power block compatible to the developed inverter module now in a follow up project under H2020
To summarize and conclude
Overall Observations and Impact

- Networking and collaboration between countries and agencies across Europe – building trust and enabling coordination
- Good practice for supporting projects on transnational level
- Sizable project portfolio (87 projects, 111 MEUR project volume)
- Common initiatives and implementation activities
- New industry-led innovation opportunities and partnerships
- More transnational cooperation bottom-up / «cut to measure»
- Flexibility in dealing with project requirements and changes, including Covid-19
Conclusions and Outlook

• PV in pole position to become a backbone of the future clean energy system
• European collaboration in PV RTD and implementation must and will go on
• Ongoing collaboration in the different dimensions is needed
  - from research to industry to implementation and end-users
  - from national to international (transnational and EU)
• New bold initiatives are needed
• New partnerships are developed under Horizon Europe: European Partnership for Clean Energy Transition
• Build on the wide experience and good practice gained over the past decade
• Keep the momentum, improve on efficiency and accelerate the efforts
PV – the race goes on!

Thank you for your attention

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