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COGEM CPV - An innovative Ceramic Heatsprider within HCPV (High Concentration Photovoltaic) Technology



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Results in Brief

Upgradeable solar cells exploit the latest developments easily and cost effectively

Imagine if you could quickly and easily replace outdated solar cells with the latest technology – as easily as changing a lightbulb – rather than sticking with 'hard-wired' cells while innovation passes you by.





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Solar panels can now be found throughout Europe and have a critical role to play in the world's energy transition. However, the technology is facing increasing challenges related to efficiency, cost, recycling and disposal. Existing tariff and incentive schemes are no longer economically feasible for most governments.

What if you did not have to recycle or dispose of your aging photovoltaic (PV) systems and invest in new ones, but could upgrade cost-

effectively, enhancing performance and extending lifetime at a fraction of the original investment cost. The EU-funded Cogem CPVTM C project has developed a way to achieve this.

Goodbye conventional panels, hello 'solar bulbs'

"Multijunction solar cells already have record efficiencies and they continue to improve. Their current lifespan is about 25 years. Our pioneering advances enable easy replacement of the multijunction solar cells in our Cogem concentrating PV (CPV) system, whose other components consist almost entirely of recyclable glass and metal with an extended lifetime. This will extend the system lifetime to over 40 years," says Giovanni Lanzara of Italian SME <u>Solergy</u> and Cogem CPVTM project coordinator. Solergy is also the only manufacturer to make CPV lens completely of glass. Altogether, this makes Cogem CPV the most environmentally sustainable solar technology available today.

Tracking the sun, spreading the heat

Lanzara explains the technology: "Our patented heatspreader exploits active cooling to capture and use excess heat, enabling combined heat and power generation. The multijunction cells are mounted on the heatspreaders [2] and this two-unit system can be easily replaced in the field." Optimisation of the heatspreader design improved thermal performance by 62 % and module efficiency by 15-17 %; it also reduced complexity and facilitated automated assembly, decreasing manufacturing and maintenance costs.

Taking advantage of all that requires diligently following the sun across the sky. Solergy's high-precision 2-axis CPV tracker ensures that the panels do that with a maximum error of 0.1 ^o even in winds up to 180 km/h; it also has remote monitoring and control capabilities. Yoav Banin, also of Solergy adds: "Our 2-axis trackers are currently being commercialised for use with conventional and bifacial PV panels C; they reduce the levelised cost of solar energy by up to 25 % compared to 1-axis trackers."

A revolutionary leap in solar energy technology

After the costs of a Solergy power plant have been amortised over 15-20 years, an upgrade provides 20-25 years of additional operation with higher performance – like getting a new, higher-power-capacity plant at 10 % of the cost of the original. Lower cost and higher performance makes <u>adding storage</u> conomically feasible to maintain energy supply when the sun is not shining. Finally, Cogem CPV system <u>co-generates heat at no additional cost</u>; it can be used for heat and hot water in buildings, in industrial processes and even desalination processes. The technology has already been integrated into <u>a renewable smart grid system at Rome-Fiumicino International Airport</u>, the first application of its kind. Lanzara summarises: "Cogem CPVTM has successfully demonstrated a novel, highly scalable and cost-effective approach that should increase the contribution of renewable solar energy to the max, while enhancing its sustainability and minimising its environmental impact."

Keywords

Cogem CPVTM, CPV, photovoltaic (PV), heatspreader, multijunction solar cells, 2axis tracker, grid system at Rome-Fiumicino International Airport

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Project Information

| | Funded under SOCIETAL CHALLENGES - Secure, clean and |
|------------------------------|---------------------------------------------------------|
| 11 | efficient energy |
| | Total cost € 2 997 793,75 |
| | EU contribution € 2 098 455,63 |
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