



## Press Release

Le Bourget-du-Lac, 28 January 2025

# **CEA and 3SUN break a new record for fotovoltaic cell efficiency**

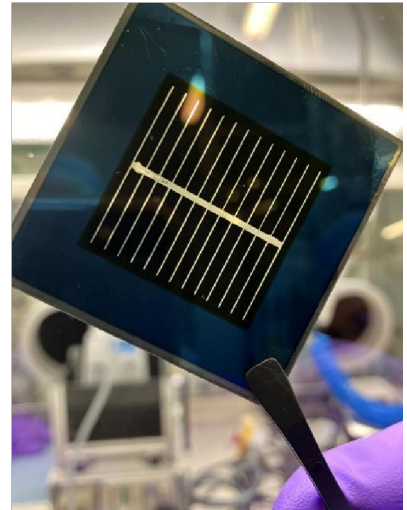
As part of CEA and 3SUN's joint development programme on the tandem perovskite-over-silicon solar cell technology, a new milestone was reached, setting a new efficiency record of 30.8%.<sup>1</sup> This cell was developed in CEA's laboratories, located on the campus of the National Institute for Solar Energy (INES).

The tandem architecture used by the CEA and 3SUN for this record makes exceeding the theoretical efficiency limit - set at around 29% for conventional silicon technologies currently being produced in photovoltaic gigafactories - possible. Furthermore, while most international records are achieved on a 1 cm<sup>2</sup> area, CEA and 3SUN achieved this performance on a 9 cm<sup>2</sup> cell, which should facilitate the transition to industrial scale.

This success illustrates the high potential of the tandem perovskite-over-silicon photovoltaic cell, and positions it as a credible successor to current conventional silicon-based technologies. The perovskite part of the tandem cell increases light capture, by better absorbing higher energy photons (in the ultraviolet and part of the visible spectrum), thus improving the performance potential of the technology.

### **+2.4% in one year**

In one year of development, the CEA and 3SUN teams gained a 2.4% efficiency on cells of this type, from 28.4% in January 2024 to 30.8% in January 2025. Based on this excellent result, the research programme between CEA and 3SUN will continue, in 2025 and beyond, to tackle the final hurdles to mass production, in particular by moving to larger cells and improving their durability.



<sup>1</sup> This record was certified by an independent body after shading correction.

Enhancing photovoltaic cell efficiency – specifically maximising their ability to convert received solar energy into electricity – is a major challenge for the industry. To illustrate the full potential of this tandem technology, we can examine the expected benefits we would have, by replacing current conventional technologies (cells with an efficiency of around 25/26%) in our solar parks, with tandem cells with an efficiency of 30/31%:

- Over 20% increase in electric power production
- Or 20% reduction of the plant's land use and CO2 impact

"We are very proud of this new record," enthuses David Duca, head of CEA's Solar Technology Department. "Our partnership with 3SUN, one of Europe's leading industrial players in the sector, is now more than 10 years old and maintains its momentum. We are regularly improving this record and proving that Asia's domination in the photovoltaic module production sector is not inevitable. Research operators and industrialists can still be competitive in Europe. This is very good news for our industrial and energy sovereignty'.

"This achievement represents a significant progress towards large-scale production of Tandem solar cells. Thanks to their high performance, these cells are destined to replace conventional silicon-only solar cells. In the coming years, this technology is expected to become the standard in the photovoltaic industry, overcoming the limitations of silicon cells." Says *Stefano Lorenzi, Head of 3SUN*, emphasising that 'this technological progress is crucial for maintaining European competitiveness and promoting a more sustainable future'.

## **About CEA**

*CEA is a major research hub, at the service of the state, the economy and citizens. It provides concrete solutions to their needs in four main areas: energy transition, digital transition, technologies for future medicine, and defence and security. With 20,000 employees, located in the heart of the French regions, in 9 centres with very large research infrastructures, CEA benefits from a wide range of academic and industrial partners in France, Europe and abroad. It ranks first among French research organisations in terms of patent filings in France and Europe, according to Clarivate's ranking. For more information: [www.cea.fr](http://www.cea.fr)*



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### About 3SUN

3SUN (Enel Group), located in Sicily, is Europe's first Gigafactory with new production lines for high-efficiency heterojunction silicon photovoltaic panels. Its capacity will reach 3 GW and will include cell production and panel assembly. For more information: [www.3sun.com/it](http://www.3sun.com/it)

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