

# climate tech

for a Sustainable Planet

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FOR TOMORROW



# Executive conversations with...



**ELIANO RUSSO**  
Head of 3SUN Gigafactory

**Enel Green Power**



# POWERING AHEAD WITH EUROPE'S LARGEST SOLAR PANEL GIGAFACTORY

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Founded in 1962, Enel has grown to become one of the largest electricity and gas operators in Europe, with a focus on sustainability and clean energy solutions. The company is headquartered in Rome, Italy, and operates in more than 30 countries. Enel's Green Power's 3Sun Gigafactory, in Catania, Sicily will become Europe's largest solar panel factory by 2024

*Eliano Russo is Head of Enel Green Power's 3Sun Gigafactory, in Catania, Sicily, which will become Europe's largest solar panel factory by 2024. 3Sun's mission is to produce new-generation photovoltaic (PV) panels and modules, combining research, innovation, and sustainability, thereby supporting a transition to clean energy. The Capgemini Research Institute spoke to Eliano about his work and the future of solar energy.*

**You are Head of the 3SUN gigafactory. Can you help us understand the factory and your own role?**

The gigafactory started in 2010 when the technology deployed was thin film. In 2015, we started deploying bifacial technology internally and, around the same time, Enel Green Power incorporated 3Sun as an extra division. Last year, we committed to invest more than 600 million euros to increase production capacity fifteen-fold.

As CEO, I'm responsible for running the business, and for ensuring that the 3-GW production capacity will be fully operational by July 2024. We will start with the first 400 MW as early as September this year, with the intention of reaching full capacity in July 2024. My responsibility is to ensure that everything will happen on time and within budget.



**Eliano Russo,**  
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### **What do you think is the role of solar energy in our overall transition?**

Solar energy will play a key role in meeting the growing demand for sustainable energy. Currently, we are at 1 TW of installed solar capacity globally, but this is expected to increase sevenfold by 2040. We expect most of the additional demand to be satisfied by solar energy because it's easy to install and it's increasingly competitive with conventional and other renewable sources. It will certainly play a key role in ensuring that this transition is sustainable and will eventually allow us to stabilize CO<sub>2</sub> emissions in the atmosphere.

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THE LARGEST SOLAR PANEL GIGAFACTORY IN EUROPE

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**In terms of scaling, how does a gigafactory differ from a traditional factory?**

We stopped production of our existing lines in July last year, having reached the production capacity of 200 MW. We are now increasing capacity fifteenfold, to 3 GW annually. This will make 3Sun the largest European solar-cell and solar-module manufacturer. Our proposition is not based exclusively on efficiency and economies of scale. It's more closely related to the promotion of robust, unique technologies that we have developed since 2015; we've achieved a certified level of efficiency with a clear roadmap to continue developing this technology.

**How are you making sure that the gigafactory is itself sustainable?**

Sustainability is a key to everything we have been doing to date, from sourcing materials such as cement and iron, to grinding, excavating, and recovering materials. We are also embedding circularity principles; we use materials that are already recycled in the construction phase. We reused excavated ground as the foundation of this factory. We minimize consumption of water and electricity. Everything is finalized to create a real connection with the local environment and minimize the impact of what we are building here. We plan to achieve 100% recyclability soon. We would like to upcycle and make sure that most of our components can be recycled directly in our sector and reused to produce new modules.

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**WE PLAN TO  
ACHIEVE 100%  
RECYCLABILITY SOON.**

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## ENTERING MANUFACTURING TO ACCELERATE DECARBONIZATION

**What were some of the broader challenges you faced in setting up the gigafactory?**

At Enel, we are not just talking about circularity and sustainability. We are asking ourselves what needs to be done differently. The challenges are enormous. We started before the pandemic reached its peak, but it was already a big issue, impacting logistics and availability of staff; then, the war in Ukraine started just as we made these investment decisions. But, thanks to the commitment of all the people working with us on time and in budget, we have reached our targets. Nevertheless, we are aware, of course, that there will be other unexpected events that will influence the way we execute and operate the factory.

**What other roadblocks have you faced?**

One of our biggest challenges was the decision to enter manufacturing. Although it's not Enel's core business, the move makes sense strategically, as it will accelerate decarbonization; remove bottlenecks in the supply chain; and promote energy independence. The challenge now is to ramp up operations, optimize throughput, minimize operational expenses, and hit our technology-development targets.

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### BUILDING AN ECOSYSTEM OF PARTNERS

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#### **How do you collaborate with partners, other organizations, and stakeholders to drive greater adoption of solar energy?**

In Europe, we want to achieve 740 GW of solar capacity by 2030, which requires building and installing an additional 540 GW. This cannot be achieved by just one single company or via a typical supplier-customer relationship. We are building an ecosystem of partners, in which we align interests to accelerate this process. We need to make sure that we have visibility of the entire value chain, to avoid developing new dependencies on other countries for key components. The only way to do it is by joining forces and building partnerships.

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### BIFACIAL SOLAR PANELS TO PRODUCE MORE POWER

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#### **Can you shed some light on the technological innovations in your own process to drive the efficiency of solar panels?**

The key component of Enel's technology is bifacial solar cells, made of amorphous silicon and coupled with cells of monocrystalline silicon. We have achieved the highest bifaciality factor [power produced by the back side in relation to the energy absorbed by the front side] in the world, and the cells have already achieved a certified efficiency level of 24.6%. We plan to develop tandem technology by coupling monocrystalline cells with perovskite cells to capture a wider spectrum of light and increase efficiency. The heterojunction process, a process where we combine the two different types of solar cells used in our technology, is managed at a relatively low temperature, which allows for a longer lifetime, lower degradation, and higher energy production. We aim to employ materials that can be reused in the PV value chain for circular and sustainable technology.

Also, our factory has a strong level of automation and digitalization, which allows us to fully exploit digital intelligence and machine learning for quality control, reduce waste, and improve circularity. We plan to track everything that happens in the factory using a manufacturing execution system and build analytics and KPIs for continuous improvement. Technology will drive higher production efficiency. Ultimately, this will differentiate us from other players.

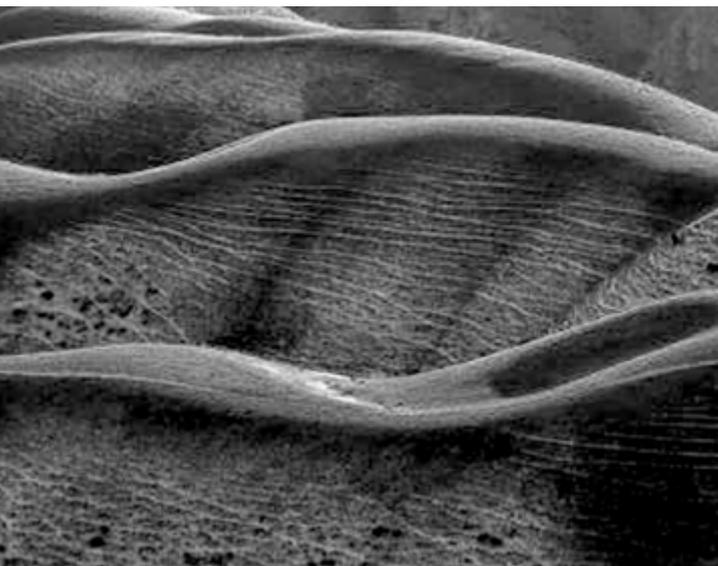
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### MAKING THE TRANSITION TO RENEWABLES REAL

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#### **Are policymakers doing enough to push renewable energy?**

We need support, financial and regulatory, to incubate new industries such as ours. Financial support can help cover the funding gap that arises when competing against more traditional players, but regulatory support defines standards for compliance with carbon-footprint reduction, circularity, and labor laws.



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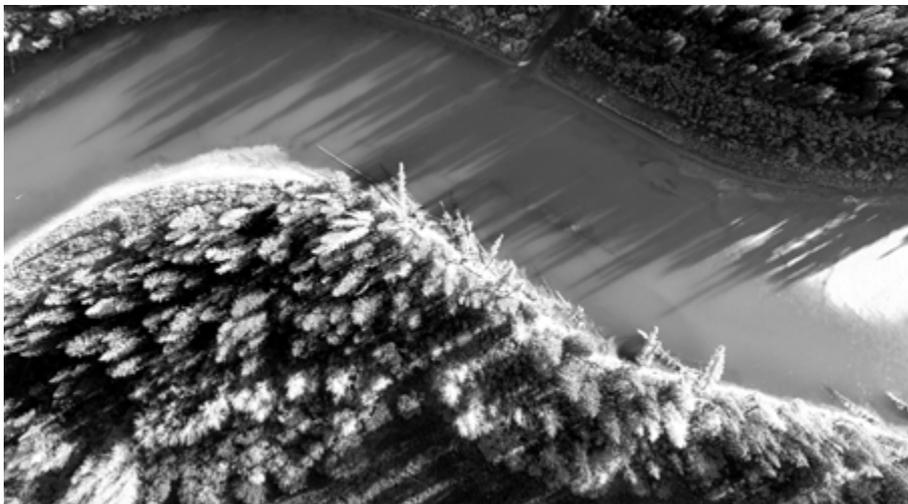
## Executive Conversations

### **What do you see as the future of green energy, and what place does solar occupy in that?**

Diversification is going to be key. The technology is getting cheaper, which will allow the renewables journey to accelerate. There are some sectors that are very energy-intensive and difficult to fully electrify unless you make green hydrogen viable. Renewable energy is currently seen as the answer and the direction to go, and the focus should be on maximizing efforts to reduce CO<sub>2</sub> emissions because time is running out to stabilize concentrations in the atmosphere. Our CO<sub>2</sub> budget is close to zero, though, so we must stay open to other options. We need to manage the transition and to make sure that those alternatives become viable, technically and economically. However, we cannot wait for new solutions and must continue to accelerate current efforts.

### **If you had a magic wand, what would you do to give clean tech a massive fillip?**

We need the courage to make the transition to renewables real; this will require significant funding. I think we need to have the courage to start planning in one direction and providing support. My desire, my dream is that we really start thinking with some long-term vision, rather than staggering from crisis to crisis. To paraphrase Seneca, there is no favorable wind for those who don't know in which direction they want to go. If you only look at your feet, you will get lost. So, I would use that magic to give people the courage to look far enough ahead and then follow that vision.





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**"We need the courage to  
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