

Maximising rooftop output

As the drive to mitigate climate change continues, PES was keen to catch up with Cemil Seber, Vice President, Global Marketing, Product Management & Corporate Strategy at REC Group, to hear of their plans for maximising solar panel performance in order to close the emissions gap.

PES: Welcome to PES Cemil, it's great to touch base with you. Perhaps it would be timely to begin with a brief introduction to REC Group, for readers who may not be familiar with the name?

Cemil Seber: Of course. We began 25 years ago in Norway with hand-washed wafers. Today, we are a global solar energy company, known for our patented innovations, award-winning products and reliable long-term performance. We manufacture in Norway and Singapore, but have regional hubs in North America, Europe, and Asia-Pacific.

We are dedicated to empowering consumers with clean, affordable solar power and drive global energy transitions. We understand that this can only happen with bold innovations and through high-quality solar panels with a leading power density. We have always been committed to a low carbon footprint in our solar materials and panels and believe that as the solar industry grows in importance, so does our responsibility to be even more sustainable.

PES: After the impressive launch of the REC Alpha Series at Intersolar Europe in May 2019, REC Group is launching a new product at this year's Intersolar. What can the industry expect from REC's new solar panel?

CS: The REC Alpha Series was a bold revolution in 2019. At the time, it was the highest power solar panel in a 60-cell format, but also had an outstanding power density. We achieved this because we took a bold decision and went for HJT on mass, one of the most advanced cell technologies.

In 2021, we launched REC Alpha Pure, a high-power density successor, but even more sustainable as we eliminated lead, allowing us to offer a RoHS compliant solar panel to the cautious consumer.

In 2022, with the new product, we will continue to focus on high power density innovations while also providing a more sustainable solar panel. The newest REC solar panel will specifically target rooftop customers who are extremely cautious about getting the best out of their roof space, such as homeowners, and making the best environmental contribution.

After 25 years in this industry, we know two things for sure: firstly, only with bold innovations bringing the highest power densities, will we be able to mitigate climate change and have a chance to reach the Paris Agreement and limit temperature increase to 1.5°.

Secondly, as the solar industry grows in importance, we need to be more sustainable too. This means increasing energy yield to offset more CO₂ emissions, but as a manufacturer also reducing our own water, energy and waste consumption as much as possible, getting rid of hazardous materials and increasing circularity. REC stands for all of this and we hope that this year's product launch will be another inspiration for the industry.

PES: Indeed, hardly a week passes where we do not have climate change warnings from scientists, that we are off track to reach the Paris Agreement or natural disasters like the severe floods in Australia. How



Cemil Seber

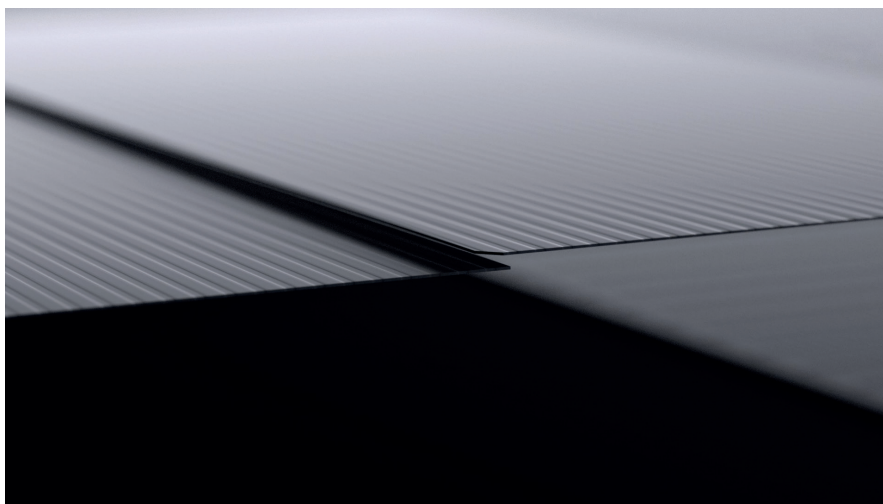
important is solar power from your perspective in helping guard against climate change?

CS: Solar power is a key pillar to mitigate climate change. The efficiencies are continuously increasing, the generation costs plummeting, it doesn't require big infrastructures like LNG terminals or pipelines, it can be deployed fast and can be put almost everywhere, on rooftops, on the ground or even on water.

In early 2016, right after the Paris Agreement, we asked ourselves 'What does this agreement mean for our industry? How much solar PV capacity is needed?' We put these questions into the hands of our best analysts. The outcome was our COP21 study, with a proposed ramp-up for solar PV capacities worldwide and in certain countries in order to get us on track within ten years to reach the targets of the Paris Agreement.

The results have been amazing and shocking at the same time. To be on track by 2025 to close the emissions gap, the global solar capacity ramp-up had to be up to 480 GW per year above the 2015 forecast.

While we have been extremely ambitious with our target by 2025 and the required ramp-up was far beyond any forecast at this time, the global solar PV markets have seen continuous uptrend in recent years. In line with this, IRENA calculated that 500 GW per year until 2050 will be needed. REC expects that under an optimistic scenario, the industry can get close to 300 GW of new solar PV installations in 2023.



REC Alpha Pure Series, featuring a gapless cell layout



N-type mono wafer

The high-power density REC Alpha Pure solar panel is based on HJT, one of the most advanced cell technologies

PES: 500 GW per year. Does this mean that we need the highest power output solar panels possible?

CS: No, it means that we need the highest possible power density solar panels. The 500 GW every year still has to go somewhere. Take the example of the REC Alpha Pure with 222W/m²: comparing this with a standard panel, I can save 10% of space or get 10% more power. On top, packing in more power into the same format solar panel means

better savings on the resources and less to recycle after its end of life.

Apart from the power density, technologies allowing bifaciality and lower temperature coefficients, like the HJT cells in the REC Alpha Pure solar panel, allow higher energy yields per m² and are therefore critical.

PES: Over the last few years we have been seeing wafers getting bigger and bigger in order to get higher power solar panels. Do you think this is the wrong direction for the

industry to be going in?

CS: Again, a clear no. But we need to consider more aspects when choosing the right solar panel. The pure watt class should not be the one and only selling argument. As said, power density matters far more, the guaranteed energy yield over the lifetime of a solar panel, as this makes the business case for the consumer, and the sustainability aspects make the business case for the environment.

Larger wafers have their advantages, but also their limits, e.g currents to be handled by inverters, size of the panels to be handled by the installers, in particular for the rooftop segments.

As REC continues to be highly focused on high-efficiency solar panels for the rooftop customers, we will not just go bigger. This is too simple and not our solution.

PES: You mentioned also the environmental aspects of manufacturing solar panels. What should installers and consumers look for and what are you doing specifically in this regard?

CS: Silicon is the most energy intensive manufacturing step of a solar panel. So it matters where the production of this is taking place. For example, REC has a silicon production site in Norway, a country which uses mainly clean hydro power. You can assume that the carbon footprint of silicon manufactured in China will probably be different. The same for manufacturing cells and solar panels.

Another aspect: When sawing wafers from silicon blocks, 30% of the silicon is waste.

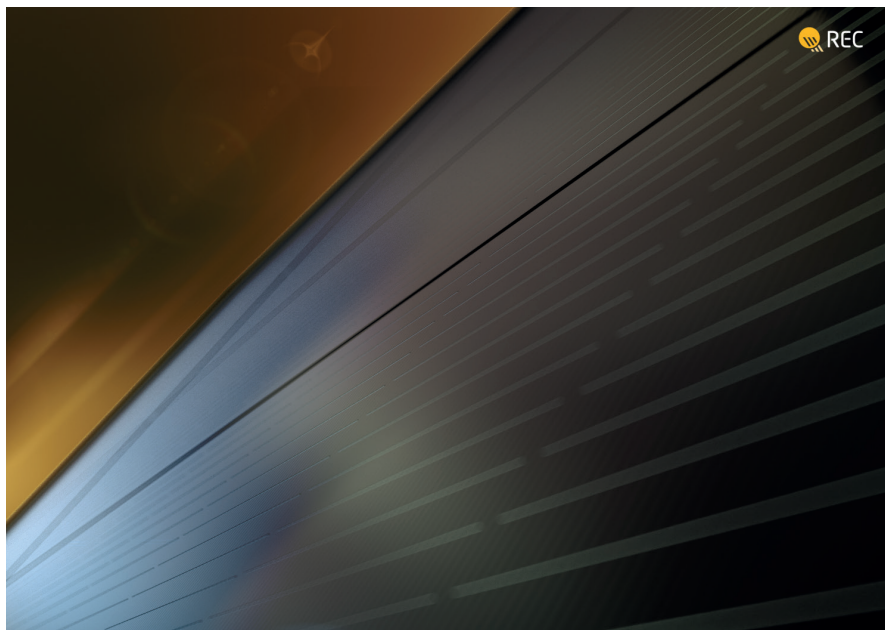


REC Alpha cell production in Singapore

Our Norwegian colleagues invented a proprietary technology to recycle this to solar grade silicon at such a quality that it can be used again in the solar PV production process. This allows us to reduce the carbon footprint of our silicon by 96% compared to the standard Siemens process as mainly used by Chinese manufacturers. And it helps to reduce mining activities.

Also important to know: different cell technologies require different processes, manufacturing steps and energy consumptions. HJT has some advantages here because there are fewer manufacturing steps at lower temperature levels. This requires less energy.

At our modern manufacturing site in Singapore, we are using Industry 4.0 practices and running continuous energy, water and waste reduction programs. We are collecting all kinds of components for recycling during the manufacturing process



REC eliminated lead in its Alpha Pure Series, making it a RoHS compliant solar panel



REC Alpha Series launch at Intersolar Europe 2019

and disassembling scrapped modules into their components, also for recycling. This again saves resources.

When designing new solar panels, we design them to be as easy as possible to recycle after their end of life in 25 or 30 or more years. That's why we eliminated lead in the REC Alpha Pure Series, because the issue is not when the solar panel is on the roof but when it is taken down.

All of these efforts are translating into more sustainable REC solar panels, such as the lead-free and LCF Alpha Pure. We are proud that we have two solar panels certified as LCF solar panels by the French Certisolis, Alpha Pure and TwinPeak 4, and all our solar panels received EPDs by the Norwegian EPD association, Alpha Pure, TwinPeak 4 and N-Peak 2. This is really Responsible Solar.

PES: It does sound like big strides are being taken in the right direction. So what's next for REC after Intersolar and over the coming months?

CS: As the solar industry and the demand for REC solar panels is continuously growing, our key priority for the rest of the year, and probably beyond, are our expansion plans.

Together with our new owner, Reliance Industries Limited, we are looking to significantly expand our capacity in several locations around the world.

We are talking about multiplying our current production capacity over the next couple of years. Our production in Singapore is already expanding. We will also have factories in India and other locations are under discussion.

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