



New REC Alpha Pure-R, lead-free and RoHS compliant

Greening up the solar industry

As mitigating climate change has never been more important, PES was keen to catch up with Cary Hayes, President REC Americas at REC Group, to hear what makes a solar panel a real green choice.

PES: Welcome to PES, Cary. 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?

Cary Hayes: Of course. Last December, we celebrated our 25th anniversary, which makes us one of the most experienced and longest-standing solar panel brands in the world.

Twenty-five years ago, we began 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.

Together with our new owner, Reliance Industries Limited, a Fortune Global 500® company, we are dedicated to empowering consumers with clean, affordable solar power and drive global energy transitions through industry-leading innovations and

high-power density solar panels with a low carbon footprint.

PES: After the impressive launch of the REC Alpha Series at Intersolar Europe in May 2019, REC Group launched its newest innovation, the Alpha Pure-R, at this year's Intersolar Europe and will introduce it to US customers during RE + SPI in Anaheim, CA. What can the industry expect from REC's new solar panel?

CH: The REC Alpha Series was a bold revolution in 2019. At the time, it was the



solar panel continued REC's success as an industry award-winner, earning the prestigious 2022 Intersolar Award this May.

The REC Alpha Pure-R, which we are launching in 2022, builds on this great heritage. It is also lead-free and RoHS compliant for less environmental impact, showing that we take our environmental responsibilities seriously. With a high-power density and at under two square meters in size, Pure-R specifically targets rooftop customers who wish to make maximum use of their roof space. The bold move here is that we are bringing large G12 wafers and cells into a compact HJT solar panel, suitable for the residential segment. With up to 430 Wp, the new REC Alpha Pure-R hits the sweet spot in terms of its power output, size, weight, and handling.

After 25 years in this industry, we know two things for sure: firstly, only with bold innovations and highest power densities will we be able to mitigate climate change on a grand scale.

Secondly, as the solar energy industry grows, our best practices in sustainable manufacturing need to evolve, too. This means increasing energy yield to offset more CO₂ emissions, and as a manufacturer, also focusing on reducing our 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 targets of the Paris Agreement or natural disasters like floods in Missouri and Kentucky or wildfires in California and the Southwest. How important is solar power from your perspective in helping guard against climate change?

CH: 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 to get us on track within ten years to reach the Paris Agreement targets.

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 were extremely ambitious with our 2025 target, and the required ramp-up was far beyond any forecast at this time, the global solar PV markets have seen a continuous uptrend in recent years. REC expects that under an optimistic scenario, the industry can get close to 300 GW of new solar PV installations in 2023.

PES: Does this mean that we need the highest power output solar panels possible?

CH: No, it means that we need the highest possible power density solar panels. Take the example of the REC Alpha Pure-R with 223W/m²: comparing this with a standard panel, I can save 10% of space or get 10% more power. On top, packing 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?

CH: Again, a clear no. But we need to consider more aspects when choosing the right solar panel. Watt class should not be the one and only selling argument. Power density matters far more, with the guaranteed energy yield over the lifetime of a solar panel making the business case for the consumer, as the sustainability aspects make the business case for the environment.

Larger wafers have their advantages, but also their limits. For example they require inverters with higher input current, so inverter compatibility must be considered, and typically we see a larger panel size which can be onerous for rooftop installations.

As REC continues to be highly focused on high-efficiency, high-yield solar panels for rooftop customers, we will not just go bigger.

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?

CH: Silicon is the most energy-intensive manufacturing step of a solar panel. So it matters how and where the silicon is produced. For example, REC has a silicon production site in Norway, a country which uses mainly clean hydro power. The same goes for manufacturing cells and solar panels.

Another aspect is when wafers are sawn from silicon blocks, 30% of the silicon is



Cary Hayes

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 transitioned to HJT, one of the most advanced cell technologies in solar manufacturing.

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 conscientious consumer. This



REC Alpha Pure-R, featuring a gapless cell layout

waste. 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 energy consumption of our silicon by 85%, compared to the standard Siemens process. And it helps to reduce mining activities.

Also important to know is that 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 apply Industry 4.0 practices and run continuous energy, water and waste reduction programs. We collect all kinds of components for recycling during the manufacturing process.

We design our solar panels to make them as easy as possible to recycle after their 25-year service life. That's why we eliminated lead in the REC Alpha Pure and Pure-R Series: the issue is not when the solar panel is on the roof, but when it is taken down.

We are proud to have two solar panels, the

REC Alpha Pure and TwinPeak 4, certified as LCF solar panels by the French Certisolis. Both products as well as the N-Peak have received EPDs from the Norwegian EPD association.

Regarding social aspects, we follow strict human rights policies not only at our production sites in Norway and Singapore, but we also promote diversity and equality and have a zero-tolerance policy towards human rights violations, and require this of our suppliers who we are regularly auditing.

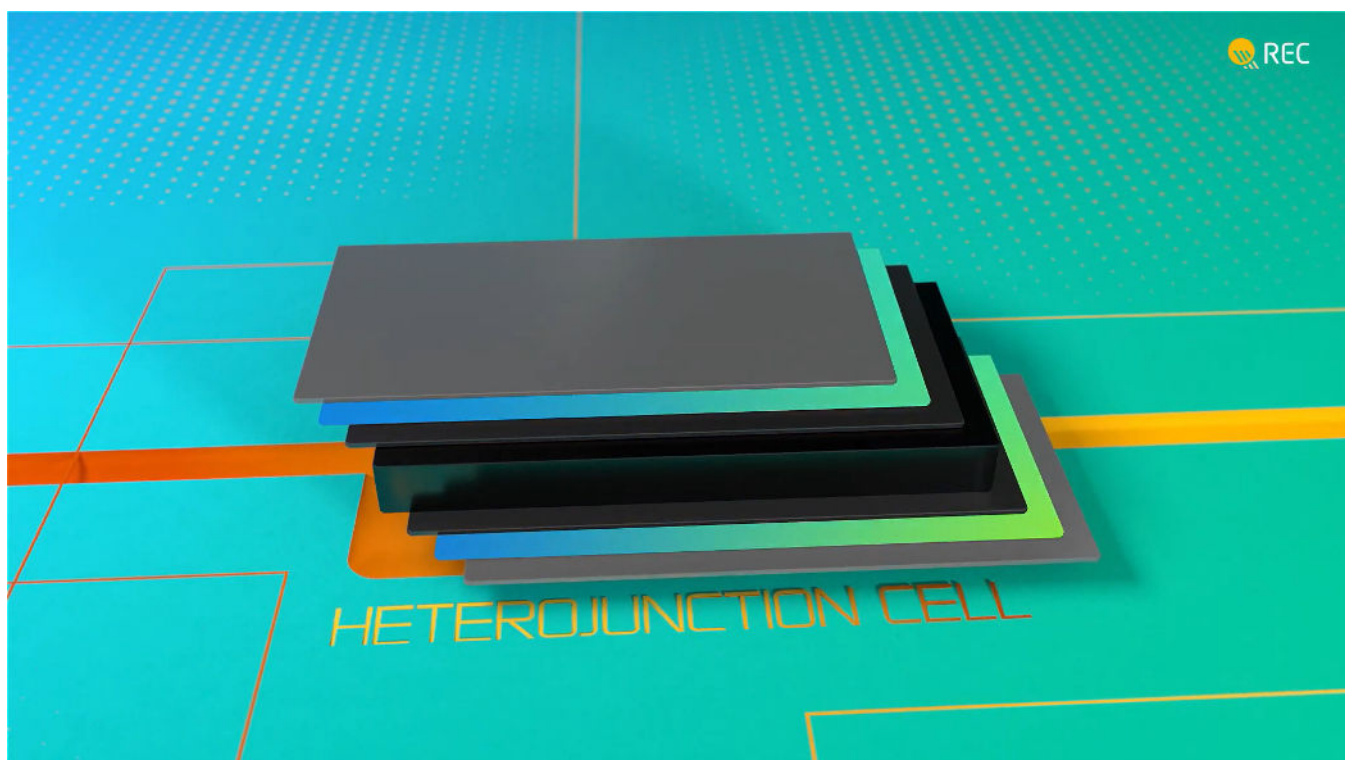
PES: It does sound like big strides are being taken in the right direction. So what's next for REC?

CH: The solar industry is continuously growing, and so is the demand for REC solar panels. 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.

With the launch of REC Alpha Pure-R, we are already adding 600 MW of our HJT Alpha capacity at our production site in Singapore. We will also have factories in India and other locations are under discussion. As you can see, it is a very exciting time for REC, our employees and our customers and we are looking for many new passionate talents to grow our team.

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