Customer centric, flexible design solutions to meet global targets on solar expansion

Solar installation accounted for 20 GW, or 50% of all new electricity-generating assets added in the US in 2022[1]. This is the largest annual share in the industry's history and the fourth consecutive year that solar was the top technology with new electric capacity installations. As energy providers across the world move fast to expand renewable-sourced power supply, flexibility proves key to acceleration.

To get a better sense of the true scale of the growth of the sector: it is enough to power 25 million homes. This process has far-reaching implications for people at every point in the process, from generators to regulators to consumers.

Ambitious growth targets are a worldwide challenge

The unprecedented changes to the global energy grid are boosted by government initiatives worldwide. In the US, the passage of the Inflation Reduction Act (IRA)[2] has created significant upside to the long-term solar forecasts. This is a worldwide movement.

In April, Australia, the world's sixth biggest investor in renewable energy, raised its climate targets[3]. Its stated goal is to ensure renewable energy accounts for 82% of its low carbon power generation mix by 2030. This figure currently stands at 27%, so significant acceleration is needed. In Europe too, governments are pushing the sector to expand faster than ever before. On March 30th, the European Parliament[4] set its sights on raising the binding renewable energy target to circa 42.5% by 2030.

The growth trajectory has momentum, and the goals set worldwide are impressive. Ensuring these goals are reached in a reliable, sustainable way is essential in securing grid reliability for generations to come.

'In each geography, the energy industry is moving fast to respond. Over the next 10 years, the US industry is expected to grow to a size five times larger than it is today, with a total solar fleet of over 700 GW by 2033 from its current base of 142 GW,' says Daniel Ribeiro, Global Product Manager at TE Connectivity. 'In Europe the challenge facing the sector is just as great and the industry needs to move fast to expand its capacity. That is where TE can help.'

Implementation: flex for success

The key to whether countries reach these targets will lie in the implementation. Companies in this sector across the spectrum are looking for solutions that offer flexible and adaptable design, coupled with easy and fast installation.

Over 150 GW of solar power generated worldwide is supported by TE Connectivity's solar solutions today supporting the generation of, a contribution that continues to grow.

Evidence of this can be found in the success of our Customizable Trunk Solution, or CTS. CTS has to date seen over 10 GW of total net new generation, and its future is even more promising. CTS is designed for DC grid systems, where it eliminates the need for solar combiner boxes, and instead provides each customer with plug and play flexibility from the string harness to the inverter.

Solar farms benefit from decreased voltage drop losses, augmented power generation efficiency, and significantly reduced burden associated with cabling and installation: CTS can save up to 40% on material and labor.

TE's solar solution range speaks for itself. TE's SOLARLOK 2.0 DC Plug Connectors slash the installation time by 80%. A mated pair can be installed in as little as 30 seconds using standard tools and no required training.

Customers appreciate SOLARLOK's Crimp Connectors, because they are compact, efficient solutions that are able to withstand harsh environments and deliver a durable waterproof connection, which minimizes power losses.

TE Connectivity has over 65 years' experience in the sector. It understands the business, and its products offer the flexibility and high-performance standards that customers can rely on for decades.

Looking beyond connections with professional services support

TE's CTS solution comes with comprehensive end to end engineering service support, supporting customers in further strengthening the position of solar power in the overall energy mix, one solar farm at a time.

'Customers appreciate our ability to respond quickly to their needs. We can do this thanks to the flexibility that is inherent in how our solutions are designed. When an issue arises during project planning and implementation, impacting the design it would take other providers months to redesign their solutions. We can do it in weeks, simply because our engineering prioritizes flexibility, and therefore makes this possible,' says Ribeiro.

CTS: a winning combination of experience, expertise and excellence

Adopting CTS can improve operational efficiency on site, due to its design flexibility. The solar insulation piercing connectors can be installed in the field where and when they are needed, making it possible to easily adapt to changing site conditions.

This also makes it possible to have longer trunk bus runs, dramatically reducing the amount of wire needed with any type of combiner box additionally reducing labor time.

Markets like Australia, where traditional designs dominate, are already sensing the benefits of this transition, since the TE CTS system is easier to work with and faster to implement than the available alternatives.

TE Connectivity's experts offer detailed designs and layouts that respond to the needs of the solar farm in any topography, in any climate, in addition to MV and HV cable accessories for the collection system, and substation solutions. Customers trust TE to deliver at speed when needed and to provide an efficient solution for every solar project.

Electrification as a shared priority and common value

The world needs a power grid ready to support the demands of the energy transition. That is where electrification comes into the game as the main transformation enabler. Electricity demand is expected to double by 2050[5], reaching 62P Wh/y, rising from 27P Wh/y in 2020. This runs

in parallel to the expansion of solar and wind, which will account for about 70% of the energy mix[6] in 2050, up from today's 11%.

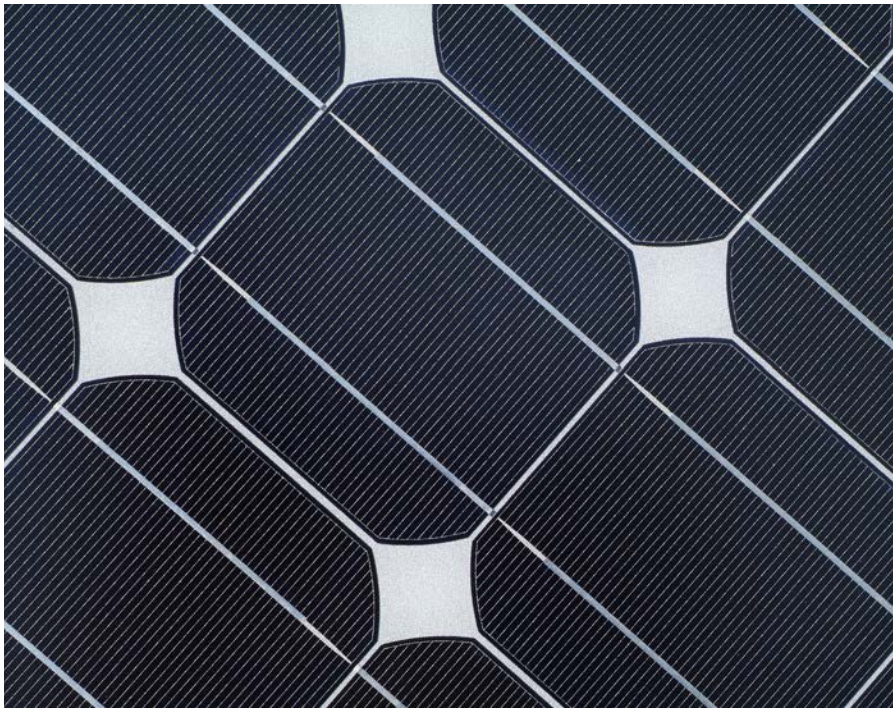
Increasing electricity demand[7] means that more grid connections will be needed, in fact experts predict that worldwide transmission lines will expand from over 6 million circuit-kilometers to 18+ million by 2050. Distribution lines will almost triple in the same period, reaching over 230 million circuit-kilometers worldwide by 2050.

Modern life requires reliable electricity infrastructure. With the absorption of renewable energy into the grid, this system will involve increasing numbers of widely distributed elements connected by a strong backbone.

This means widespread grid modernization to reinforce or upgrade transmission and distribution systems. To achieve this, there must be investment in international connections, decentralised energy data and information flow processes, and a smart grid rollout. These changes in turn mean adapting existing business processes and models to add flexibility. Across the renewables industry, power companies are moving fast to deliver safe, reliable, and sustainable energy to people in communities large and small worldwide.

'With shared values of high performance and sustainability hard wired into our solutions, TE Connectivity is a great fit for companies in the energy sector when it comes to renewables, today and in the decades to come,' concludes Ribeiro.

www.te.com/energy



References

[1] https://www.seia.org/research-resources/solar-market-insight-report-2022-year-review

[2] https://www.seia.org/research-resources/impact-inflation-reduction-act

[3] https://www.iea.org/news/australia-has-raised-its-climate-targets-and-now-needs-to-accelerate-its-clean-energy-transition-says-new-iea-review

[4] https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-targets_en#:~:text=On%2030%20March%202023%2C%20the,at%20least%2042.5%25%20by%202030

[5] https://www.energylivenews.com/2021/01/18/global-power-consumption-to-almost-double-by-2050/#:~:text=Global%20power%20consumption%20will%20almost,30%25%20by%20mid%2Dcentury.

[6] https://www.dnv.com/energy-transition-outlook/rise-of-renewables.html

[7] https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2018/Apr/IRENA_Report_GET_2018.pdf