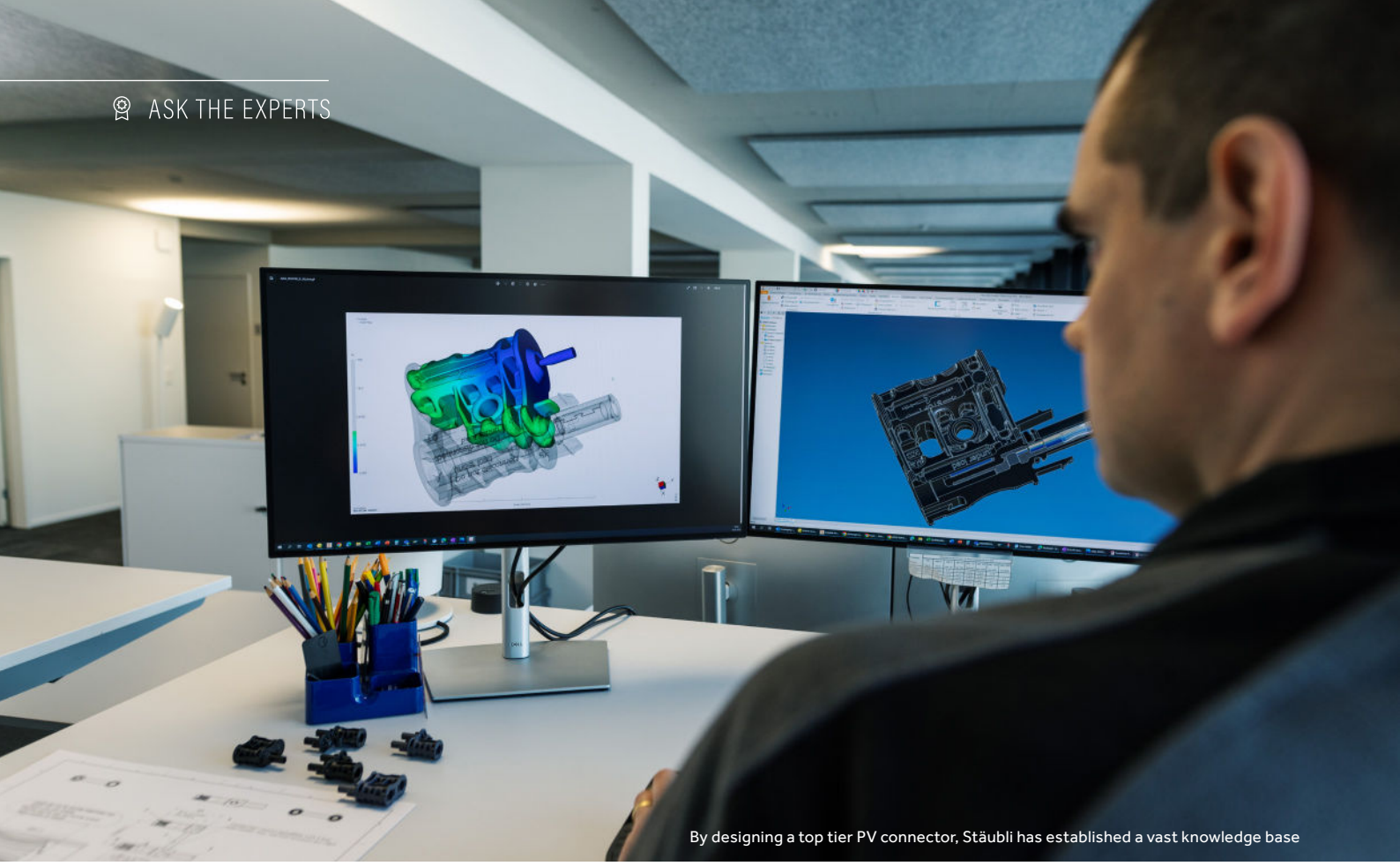


By designing a top tier PV connector, Stäubli has established a vast knowledge base

Reliable operation is more than just products

Stäubli is the market leader when it comes to connecting PV systems safely and reliably. But it is more than just the most trusted PV connector in the industry. We had the opportunity to have an exchange with Olivier Haldi, Global Marketing Officer at Stäubli Electrical Connectors. He explains why and how the business is making solar power safer, more sustainable and adding value to industry stakeholders.

PES: Olivier thank you for taking the time to explain to our readers why Stäubli is more than just a product, the world's best known PV connector.

Olivier Haldi: Let's take a quick look at the journey we've taken. As a company, we have always placed the highest priority on product quality, i.e. reliability and longevity. With the background of successfully providing unparalleled quality and reliability in electrical contact technology for all types of industrial applications for more than 30 years, we pioneered the PV industry by introducing the MC3 PV connector.

This first pluggable PV cable coupler was followed in 1996 by the MC4 photovoltaic connector, which has always been a registered trademark of Stäubli, at that time still Multi Contact, the inventor and sole manufacturer. MC4 is not a standard or generic designation.

With excellent product characteristics and durable contact quality, the MC4, has set the benchmark in the industry. For almost 30 years now, we have been gathering experience in the solar industry, which has developed into a tight community. We learn from the best thanks to the many intensive exchanges during our long term relationships with our business partners. Designing and manufacturing the most reliable PV connector in the industry has allowed us to accumulate an extensive knowledge base.

But we have also accepted and met the challenge of growing with the industry. This means that we have scaled production to high volumes while maintaining the same level of quality for every single piece. At the same time, we have become more efficient in keeping up with price pressures. As the photovoltaic industry developed, the technology became increasingly competitive with conventional power generation. A fact that attracted investors.

Over time, solar power plants have become more than just green energy generators. They are investment assets and as such, owners are increasingly focused on the optimal long term balance between CAPEX and OPEX to improve LCoE and ensure safe returns. However, it is not only asset owners and investors who need a safe and reliable power supply. In many countries, solar energy is an important share of the energy mix for the safe supply of the population.

PES: Stäubli has been a pioneer in the PV industry from the very beginning and has continuously grown with it. How do you see the current situation?

OH: PV is a relatively young industry, but it is already the most competitive technology for power generation in many regions. The decreasing cost of solar modules and improvements in their efficiency, as well as new energy storage capabilities, have led to a sharp rise in solar power installations worldwide. This evolution led to a decline in the Levelized Cost of Electricity (LCoE) for solar power.

With the rapid growth of the PV industry, the focus on quality products and workmanship may have taken a back seat. Furthermore, the industry is undergoing a consolidation phase with production capacity exceeding rapidly growing market demand at declining price levels, which can lead to a reduction in product quality. Manufacturers are steadily looking to minimize costs in production processes and materials to remain competitive.

So, the race for cost savings on all components for PV systems continues. However, low quality components cannot meet the qualifications required for long-term operation. Getting all the parts for your PV system for less money may seem attractive, but it's not guaranteed to pay off.

Investors and owners of solar power plants should not be lured by the lowest prices on the market. Their systems are expected to operate hassle free for more than 30 years in the best case. If quality aspects are not considered at the beginning, there is a certain risk that costly maintenance and replacements need to be done after a short period, which in the end is not sustainable and more costly.

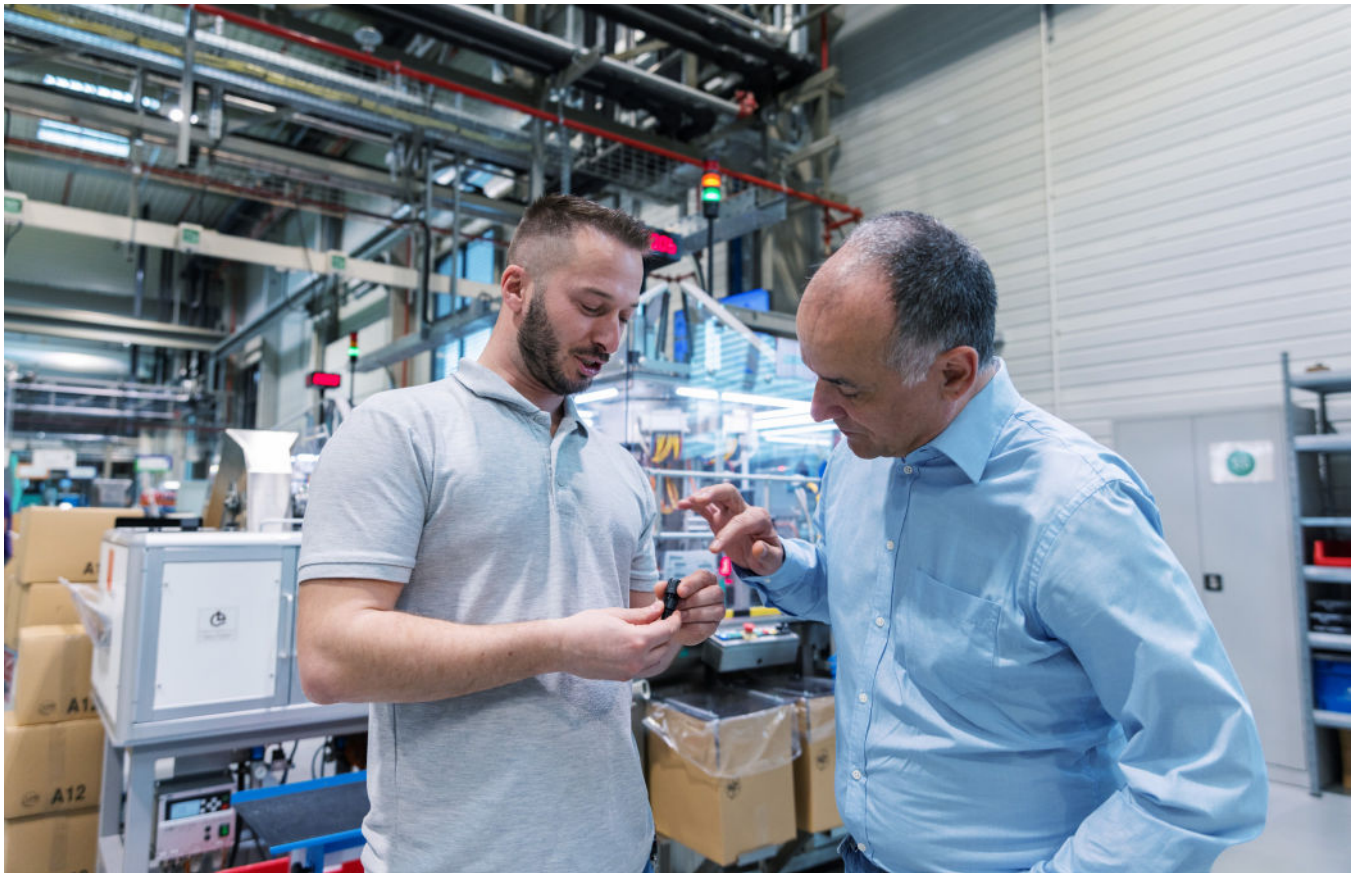
We always point out, that the DC wiring system with the cable couplers, also called eBOS, electrical Balance of System, are the lifelines of a PV system. If these lifelines show weaknesses, it can lead to failures or downtime, in severe cases even fire, resulting in higher maintenance costs and lower performance and yield. Therefore, the quality of the smallest components, the PV connectors, has a big impact.

PES: Considering the fact you mentioned that PV plants are capital assets and are expected to deliver the forecasted performance, such weaknesses in the DC wiring system have a significant impact. Where do you see the role of Stäubli?

OH: Well, we have been a player in the solar industry since its beginning and have gained broad experience and built-up expert knowledge, and we stand for and defend the quality approach. We feel that it's our responsibility to share this knowledge to make the PV industry safer and lay the foundation for more reliable and long-term system operation.

Recent research shows that many PV systems are significantly underperforming, leading to serious concerns about their overall profitability. Many studies and real-world experiences point to numerous technical problems associated with wiring and connectors, which can have a significant financial impact. A primary cause of these issues is often a lack of understanding of how critical these components are for both safety and profitability.

So, one aspect covers the quality of all parts of the system, including the small cable couplers. Like most components on the market, our PV product portfolio is certified based on official standards. But we go the extra mile. We test our products beyond the standards because we consider the regulatory framework set by the official standards committees to be a minimum, entry level requirement, an entry level.



With advanced manufacturing expertise, Stäubli successfully increased production volumes, maintaining quality and enhancing efficiency to stay competitive in pricing

The DC wiring system with cable couplers, or eBOS, is the lifeline of a PV system

However, effective risk mitigation requires more than just quality products. Proper planning and design, correct handling, and installation of these components are essential.

Recognizing that simply manufacturing and supplying quality connectors is not enough, we want to share our expertise and extend the Stäubli quality to the entire DC wiring system (eBOS), including all associated components such as fuses and splitters.

To provide comprehensive support to the industry and its stakeholders, it is necessary to offer value added solutions. A fundamental approach involves training and education. But we also see the demand to be involved in the early stages of PV systems, providing project consultation during the design and conception phases, offering supervisory support during installation, and conducting assessments during operation. When existing systems experience technical problems, it is essential to conduct thorough inspections to identify and analyze the root causes.

PES: We know that Stäubli not only designs and manufactures the most installed PV connectors but also offers a quality service. What form does this support take for customers?

OH: Exactly. Over the years, we have also grown with the PV industry and have now developed a full range of services to support the various phases of a PV project. It takes more than just quality products to make a PV system safe and dependable in the long term.

For example, we just launched our Stäubli Training Academy with online courses, as well as classroom seminars or customized training with a strong focus on connector assembly and field installation. Major EPCs and contractors in the US are already taking advantage of this opportunity to ensure that their field installers are trained in the safe handling and assembly of PV connectors. Our Head of Services Renewable Energy, Dominic Buergi, had the opportunity to introduce this service in the last issue of PES Solar magazine.

In addition to customized training, and based on close relationships with our business partners, we also offer consultations in the design and conception phase for optimized DC wiring concepts. There is potential to increase the performance of the PV system by tailoring the wiring concept specifically to the given circumstances.

Once the PV system has been installed, we can provide a commissioning service as well as field inspections for solar systems that have been in operation for several years. The goal of the asset owners and O&M managers is to detect faulty connections or improper connector installations to mitigate potential risks and eliminate points of failure.

We can even examine suspect connectors extensively in our test labs, a kind of 'health check'. The results can provide the O&M manager with information on what exactly led to the failure of a component in the wiring harness.

In another area of the PV industry, where we work with manufacturers of PV modules, inverters, and MLPE who integrate our connectors into their product solutions, we have a dedicated offer of tailor-made connector solutions. Our engineering specialists develop customized product solutions according to the exact customer specifications.

In addition to all the services offered by Stäubli, the customer wants to have a trustworthy partner at his side, enabling him to secure his investment over the entire service life of the system. Our goal is to reduce all technical risks associated with the connectors. We are not talking about the warranty as a piece of paper. It's about the real situation, about trust in knowledge and experience.

Our services address the individual needs of the various stakeholders in their PV projects. The overall goal of our solution approach, combining products and services, is to mitigate all risks associated with wiring and connectors.

The clear objective is to improve system performance, profitability, and safety throughout the PV system lifecycle. Our commitment is to avoid a scenario comparable to fast fashion where systems are built with lower quality, resulting in underperformance, and the need for refurbishment or repowering after only a few years, a practice that is neither resource efficient nor financially sustainable.

www.staubli-renewable-energy.com

About Olivier Haldi

Olivier has acquired an extensive knowledge of the photovoltaic industry over the last 10 years and has more than 23 years of professional experience in marketing and sales.

He joined Stäubli's photovoltaic business as a Global Business Development Manager and was in charge of key account and business unit management, market development and strategic partnership projects.

Today he is responsible for the global marketing of Stäubli's Electrical Connectors Division.

He holds a BSc in Economics and an MBA in Marketing & Business Development from the University of Basel, Switzerland.