

A new dawn in solar panel production technology



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Leading the change

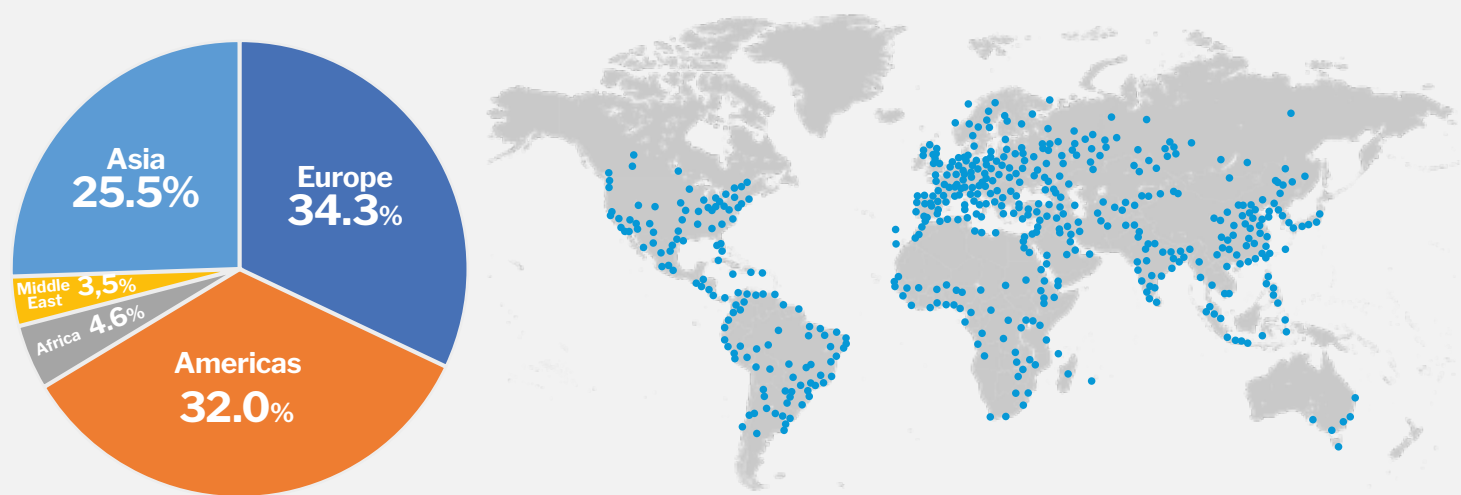
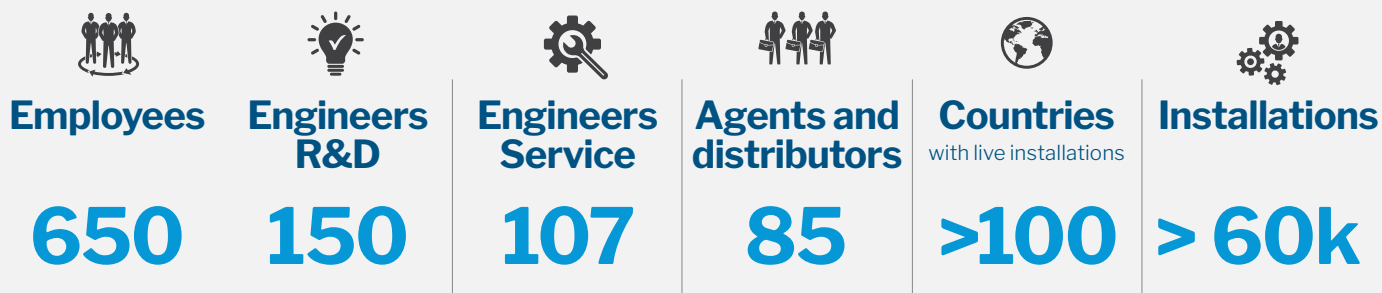
All the Bottero experience, all the energy of the sun

- EPC company for Automated Solar PV Manufacturing
- New, advanced, cutting-edge player in Solar PV Manufacturing
- Extensive experience in continuous and non-interruptible process

Bottero DNA

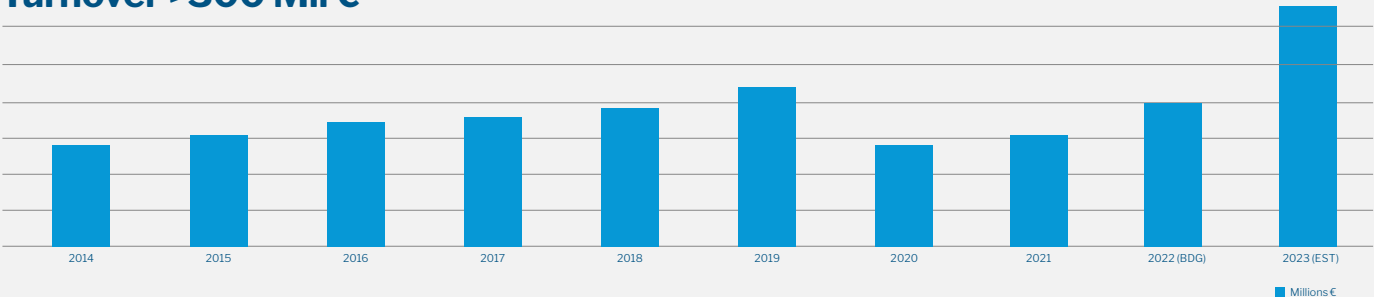
Bottero has been working, since 1957, on non-interruptible production processes in the field of flat glass and hollow glass.

Our DNA is to create **resilient automated** factories capable to maximize production processes performance by using machine learning (ML) and artificial intelligence (AI) algorithms. We are the only company in the world able to design and manufacture machinery for flat glass and hollow glass production, as well as entire processing downstream lines for float glass and laminated glass.



With **more than 60.000 installations** spread all over the world, Bottero guarantees first-class technical and commercial assistance.

Turnover >300 Mil €



Bottero is also the only company in its sector having widely invested in the development and application of artificial intelligence (AI) algorithms to real-time process control through the company GlassForm.AI

GlassFORM.ai
<https://www.glassform.ai>



> Bottero is Solar PV

Our innovative technology and commitment to quality have made us a leading player in the glass industry with more than 60,000 active installations.

Bottero Solar is therefore the natural evolution of our core competencies in the solar module industry. A sector in which our skills and aptitude for automation and integration reach their maximum expression.



Ready for great achievements

With many years of experience in the treatment of glass in all its forms and in the construction of some of the most complex and efficient plants in the world, we are convinced in our ability to provide our customers with state-of-the-art solutions.



Locations

8

Commercial locations

Bottero S.p.A. - Headquarter
Cuneo - Italy

Revimac S.r.l.
Vicenza - Italy

Bottero France SA
Roanne - France

Bottero U.K Limited
Rockdale - United Kingdom

Bottero GmbH
Grevenbroich - Germany

Bottero Glass Industry Co. Ltd
Shanghai - China

Bottero Flat Glass Inc.
Kernersville - North Carolina - USA

Bottero do Brasil
S.Paolo - Brasil

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Industrial locations

Bottero S.p.A. - Headquarter
Cuneo - Italy

Revimac S.r.l.
Vicenza - Italy

Bottero Glass Industry Co. Ltd
Foshan - China

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R&D Centers

Bottero S.p.A. - Headquarter
Cuneo - Italy

Revimac S.r.l.
Vicenza - Italy

Bottero Engineering GmbH
Donauwörth - Germany

Bottero Glass Industry Co. Ltd
Foshan - China

JV Bottero & Tiama - Glassform.AI
Rovereto - Italy

➤ More than 65 years experience in the treatment of glass

➤ We provide our customers state-of-the-art solution

➤ Our presence all over the world allows us to always be close to the customer



Bottero is Partner of 3SUN Gigafactory

Since 2015 we have contributed to the new 3SUN GigaFactory located in Catania (Italy): a 50,000 m² cell manufacturing facility and a new area of 50,000 m² for PV module assembly.

3Sun is the largest European PV module factory, located in the heart of the Mediterranean Sea, started with thin-film module technology and evolved into industrial-scale cSi bifacial HJT modules.



Complexity becomes simple

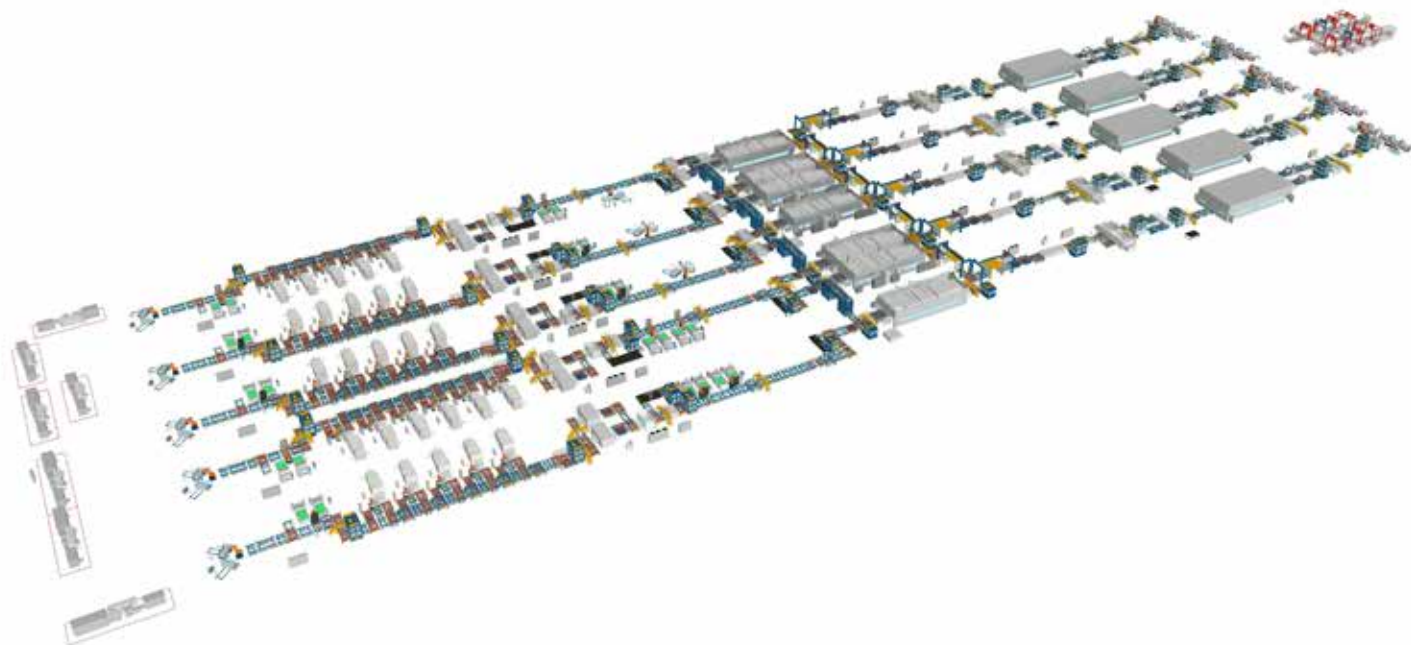
What does it mean to create an interconnected, integrated intelligent factory?

Imagine a manufacturing facility where all the machines, equipment and systems are connected and able to communicate together.



> The expansion project financed by Enel Green Power, in which we are actively involved, includes the transition from the current 200MW/year to 3GW/year PV modules production capacity by 2024.

> At 3SUN we are creating an efficient, flexible and responsive manufacturing environment, able to guarantee the production of thousands of panels a day on several lines thanks to the coordination achieved by our proprietary engine AI³.



This allows **real-time data sharing**, which can be used to optimize production processes, improve efficiency, **reduce downtime** and increase overall **productivity**. Additionally, advanced technologies such as artificial intelligence (AI), machine learning (ML) and the internet of things (IoT) are often integrated into the factory to further enhance its capabilities.

This means managing thousands of devices through our proprietary engine AI³, using kilometers of optical fiber to connect them and thus managing tens of thousands of I/Os. In essence, it means making complexity simple and secure.

For the customer, above all, it means having fewer problems and guaranteed solar PV modules output for its Gigafactory. Impressive results, in short, demonstrate a capacity for innovation and integration with few equals.

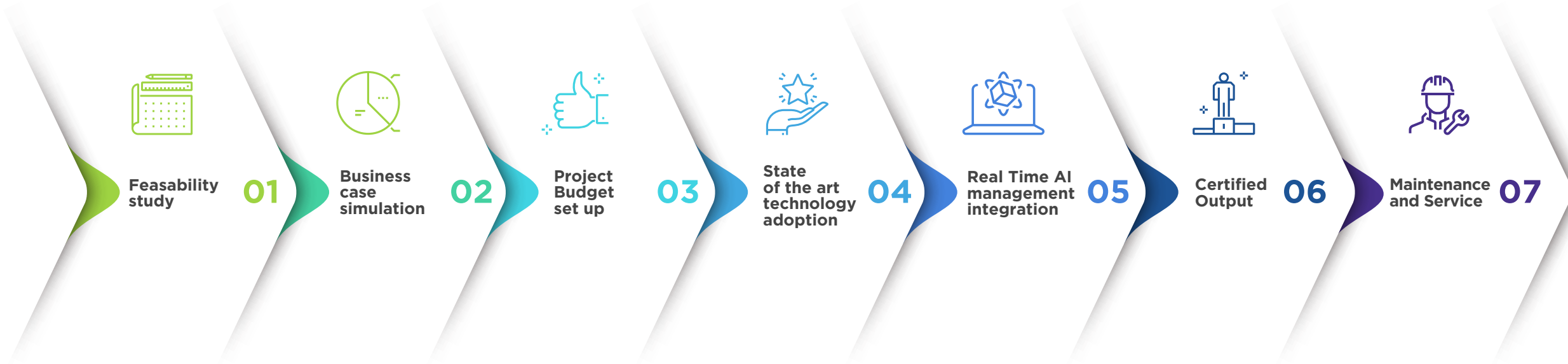
Bottero is **THE Solar EPC** for you

The holistic approach to process integration issues, the ability to operate as an EPC (Equipment, Procurement and Construction) and our history in the world of automated glass factories, make Bottero a solid and reliable partner. Our comprehensive approach to solar PV manufacturing includes design, engineering, procurement and on-site services, ensuring that your Gigafactory project is completed on time and on budget.



Don't settle for anything less than the best

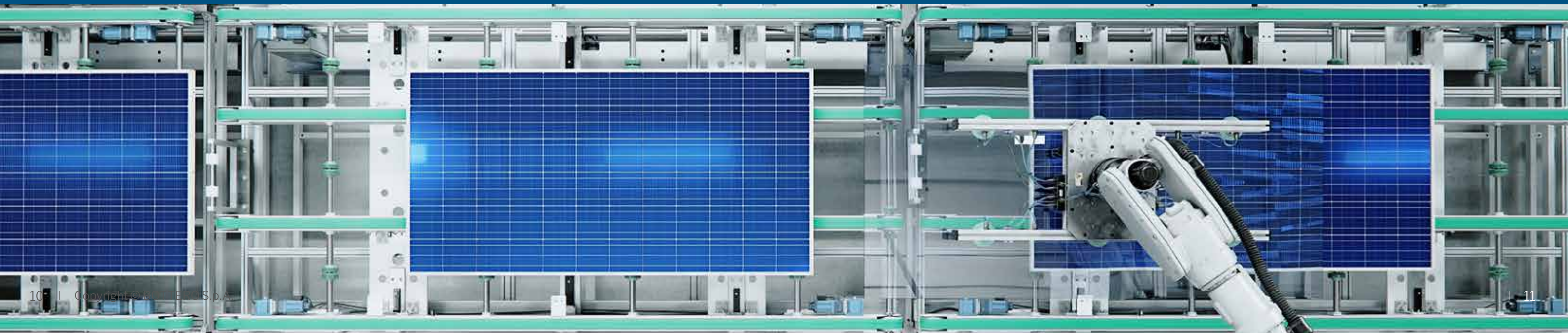
We are the only one in our sector capable of offering smart, resilient factories equipped with the intrinsic ability to react to external conditions by using artificial intelligence algorithms.



Our team is available to answer any question you may have throughout the entire solar PV manufacturing process and we work with you to ensure that the final product is exactly what you envisioned. We understand that every project is unique, we carefully listen to your needs, and we offer our extensive experience to advise only best-in-class solutions for your needs.

➤ **Smart & resilient factory**

➤ **AI algorithm to react to external conditions**



Bottero is Industry 5.0

Bottero is Industry 5.0 because we play an active role in providing customers solutions to challenges for society including the preservation of resources, climate change and social stability. We help you to create resilient organizations able to anticipate, react and learn timely and systematically from any constraint and thereby ensure stable and sustainable performance throughput.

Your people will ask questions, your factory will provide solutions thanks to our proprietary engine AI³. Humans are at the helm, supported by artificial intelligence (AI) and data analytics (DA).



We support the transition to a sustainable, human-centric and resilient industry, since we're now certified ISO 26000.

Thanks to the industry 5.0 approach, Bottero Solar introduces numerous elements of innovation in the workflow, which contribute significantly to making our solutions for solar PV modules manufacturing resilient and capable to adapt and recover from challenges/disturbances and react in real-time to production complexities.

The energy produced with photovoltaic systems can contribute significantly to the reduction of polluting emissions and to the protection of ecosystems. Ensuring efficient and environmentally friendly production is our first goal, to help our customers grow sustainably.

Bottero Solar adopts innovative technologies tailored to the specific needs and wants of the people who will be using them, making them more likely to be adopted and used effectively, keeping the human element always in the first place, supporting decision-making processes.

➤ Our research and innovation at the service of the transition to a sustainable, human-centric and resilient industry, supporting the Corporate Social Responsibility

Resilient



Artificial intelligence (AI) & Advanced Analytics to allow 360 degree visibility

Optimization and rescheduling of production flows

Real-time recommendations at all levels of production process

Your factory grows and learns with you

Artificial intelligence (AI) & Machine Learning (ML) solutions reshape factory management

Continuous process improvement towards self-correction and self optimization

Sustainable



Energy efficient production process

Efficient material management

Improved product quality
= Higher solar energy conversion

Human-centric



Fully automated factory to increase safety and well being

Artificial intelligence (AI) and Data analytics (DA) to drive easy through complexity

Support humans to carry over decisions and let machines perform repetitive tasks



The Engine of Bottero Industry 5.0

We ensure that integrated, intelligent and interconnected systems work together so that they can thus express the maximum degree of efficiency, effectiveness, and flexibility in PV modules industrial production.

When all three factors work together, they can lead to highly efficient, effective and adaptable systems. This can help organizations and industries working harder, **more efficiently and make more informed decisions**, which ultimately translates into better performance and more productive use of resources.



Integrated system

Every machine and every component in the productionline is fully integrated and managed by artificial intelligence (AI).

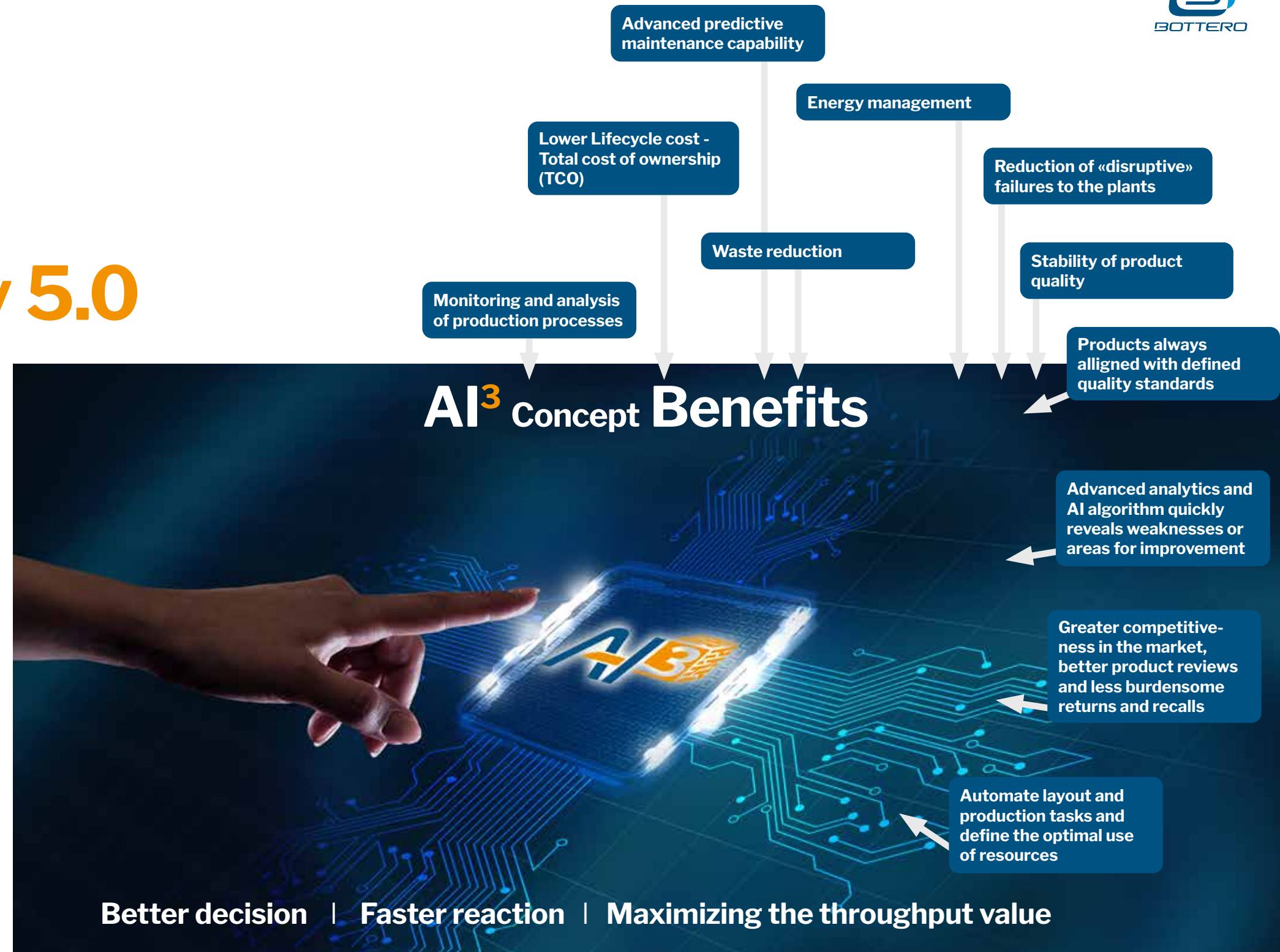
Intelligent system

Real-time processes are controlled via an artificial intelligent (AI) algorithm.

Interconnected system

Every production line could be fully interconnected to any other in parallel mode. The whole system is supervised and managed by artificial intelligence (AI) algorithms.

AI³ Concept Benefits



Realtime data analysis and decision

Making the process of analyzing data as it is being generated, rather than analyzing it after it has been collected and stored. This allows **faster and more accurate decision-making processes based on the most current information available**. Every aspect of the production process is supervised to ensure better decisions, quicker reactions and value generation.

Guaranteed **throughput**, **cost optimization** and reduction of **start-up time**

Very few companies can commit to production throughput, cost optimization and reduction of start-up time for complex industrial processes. Bottero Solar has the experience and knowledge to design end-to-end factories for PV module production and packaging.



Our procurement team carefully manages the supplier selection process building strong relationships with the entire supply chain stakeholders and improving cost reduction and delivery time.

- Our engineering team provides optimized design for production processes considering all the involved technologies for solar PV module manufacturing avoiding any bottleneck upfront, thanks to the self-developed real-time simulation tools.
- We've implemented a high-end cooperation platform to ensure a fast and efficient information exchange with our customers during the overall project.
- We integrate complex systems ready to be supported by machine learning (ML) and artificial intelligence (AI) algorithms where appropriate, to make production cycles efficient and capable to react in real-time to unforeseen events.
- We've adopted lean construction principles and careful pull planning to reduce waste and improve overall efficiency.

Bottero Solar can support customers with tailored solutions for the service and maintenance of solar PV module production lines also using proprietary artificial intelligence (AI) algorithms to boost predictive maintenance solutions.



Nature thanks

PV technology offers important and exclusive advantages in terms of environmental protection. Solar energy systems do not produce any emissions or pollutants being a clean and environmentally friendly source of energy. They also require minimal maintenance and have a long lifespan making them a real cost-effective option in the long run.

Solar panel manufacturers make a significant contribution to the environment, helping to conserve natural resources and supporting wildlife and biodiversity.



Solar energy can be easily integrated into existing buildings and infrastructure, making it a versatile and adaptable option for powering private homes, firms and communities.



Bottero Solar contributes to nature by implementing sustainable practices in the production process.

This can include the use of energy-efficient equipment, recycling materials and reducing waste in the manufacturing process. We are proud and honored to play an important role in reducing energy costs for a new and more sustainable world.

Within this perspective, we've achieved the ISO 26000 certification to enhance our contribution to sustainable development.



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BOTTERO FRANCE

39 Rue du Moulin Paillasson
42300 Roanne
France

BOTTERO GMBH

Marie Curie Strasse 7
41515 Grevenbroich
Germany

BOTTERO U.K. LIMITED

Unit P1, Bay, 15 Heywood Distribution Park
OL10 2TT Heywood, Lancashire
United Kingdom

BOTTERO GLASS INDUSTRY

Workshop NO. 7, NO 6
Chengyou RD, Danzao Town
Nanhai DT,
Foshan 528216
China

BOTTERO DO BRAZIL

Rua George Rexroth, 609 Bl.F cj.01 JD.
Padre Anchieta - CEP.09951-270 Diadema - SP
Brazil

BOTTERO FLAT GLASS INCORPORATED

121 Shields Park Dr
Suite J,
Kernersville, NC, 27284
USA

BOTTERO S.p.A.

via Genova 82
12100 Cuneo Italy
Tel. : +39 0171 310611
Fax : +39 0171 401611
sales.solarepc@bottero.com
www.bottero.com