



# NES

NEW ENERGY SOLAR



*THE ART OF PHOTOVOLTAIC PANEL MANUFACTURING*

By EXPLORAR GROUP COMPANY



*“THE ART OF PHOTOVOLTAIC PANELS MANUFACTURING”*



TECHNOLOGY MADE IN ITALY – USA PRODUCTION







AIM IS SUPREMACY OF TECHNOLOGICAL INNOVATIONS AND SOLUTIONS

NES New Energy Solar concept was born from the study and implementation of state-of-the-art technology applied to the generation of renewable energy, safeguarding the most precious asset, our planet.

Explorar Group Company is the owner and since its inception has been in charge of participating in large-scale projects in generation and transmission of electrical energy worldwide.

The commitment to the environment promoted the creation of NES so that, through the basic engineering necessary for the manufacture of solar panels from scratch. It's cutting edge technology and that is why "Made in Italy" is present in our modular plant.

Aware that experience is the first thing that a client evaluates we opted to invest in it and today it is a tangible reality to have an impressive track record of electricity generation of more than **600 MW** in the **development of photovoltaic parks**.

This experience is based on the acquisition of the company "Energia y Ambiente" which, added to our own latest technology production line, positions us at a competitive price against any other possible competition.

One Strategic Alliance when we make decisions, participating as Project Manager, EPC or Entrepreneurship Partner.

- SOLAR PHOTOVOLTAIC PLANT 11 "CERRO DEL SOL"	<b>5 MW</b>
- SOLAR PHOTOVOLTAIC POWER PLANT "SOLARES DE LA PUNTA"	<b>5 MW</b>
- PHOTOVOLTAIC SOLAR PLANT "CALDENES DEL OESTE"	<b>24.75 MW</b>
- SOLAR PHOTOVOLTAIC PLANT "LA CUMBRE 3"	<b>10 MW</b>
- PHOTOVOLTAIC SOLAR PLANT "DIVISADERO I"	<b>50 MW</b>
- PHOTOVOLTAIC SOLAR PLANT 11CATAMARCA I	<b>25 MW</b>
- SOLAR PHOTOVOLTAIC PLANT "CORDILLERA 1-	<b>93.3 MW</b>
- CALICANTO" SOLAR POWER PLANT	<b>12.5 MW</b>

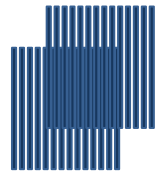


Juan Eduardo Garrido  
 Founder & CEO  
 EXPLORAR GROUP COMPANY



*TECHNOLOGICAL INNOVATIONS AND SOLUTIONS*



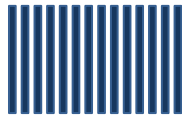


## OUR PHILOSOPHY

# NES HAS ENVIRONMENT RESPECT PRINTED IN ITS DNA

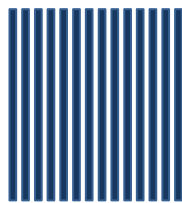
When state of the art technology is combined with proven experience, **the result is visible** for this reason, we prepare each new project based on the perspective of the needs of each client whether it residential, industrial or governmental.

### FLEXIBILITY



- Standard, Bifacial, Cut cells, BIPV and more
- Customized solutions
- Quick&Easy production

### SIMPLICITY



- Internet connection for remote Service&Support
- Low spare parts cost
- 24h per day production
- Reduced production space
- Low&Easy maintenance level
- User friendly concept

### MODULARITY



- Quick&Cost competitive production ramp up
- Modular solutions from 10MW to 1GW
- Simple upgrade from semi to fully automatic solutions

**Replace traditional construction materials with ours that produce electricity. NES manufactures and develops solutions that integrate photovoltaic technology into the buildings's facade to make them more beautiful and energy producing.**

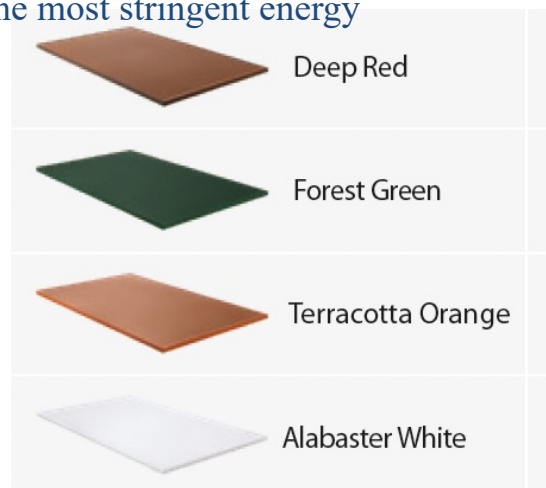
More advantageous than a traditional facade thanks to the Energy Production.

*"Like a tailor made suit "*

We offer total customization of a panel that not only meets the most stringent energy requirements of the global market but also with the visual aesthetics of each project.

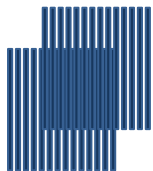
From Alpine green to Tuscan terracotta and why not the greece white.

without forgetting that our classic **Ivory black** never goes out of style.







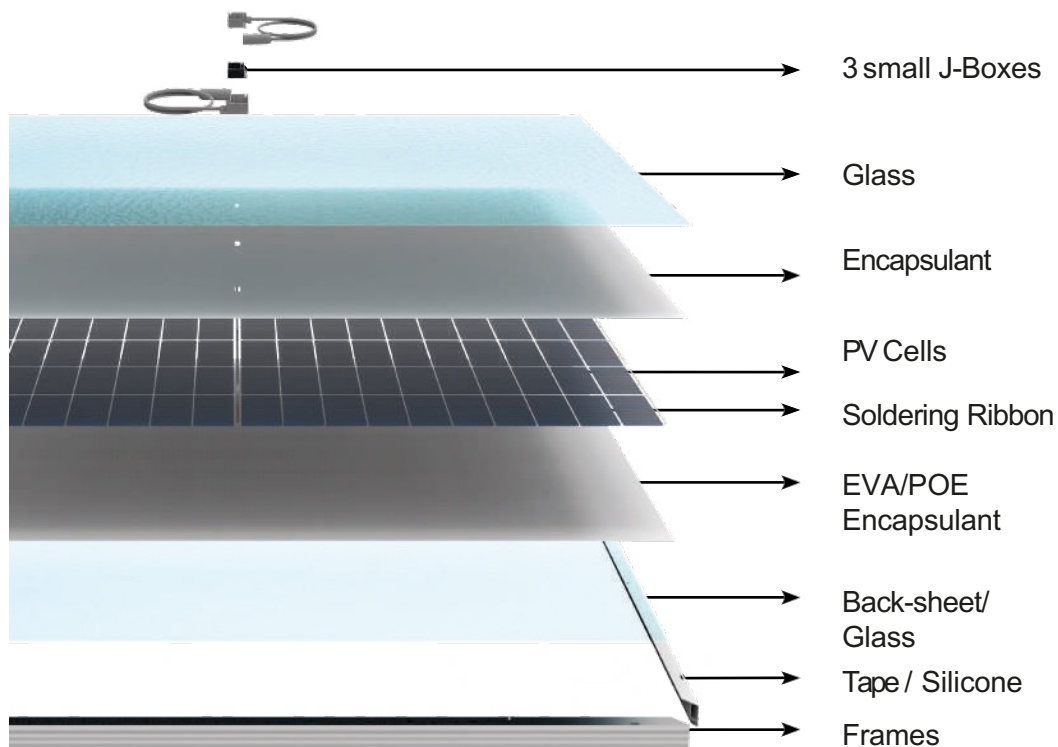


# Photovoltaic panel

## THE MAIN COMPONENTS OF A PV PANEL

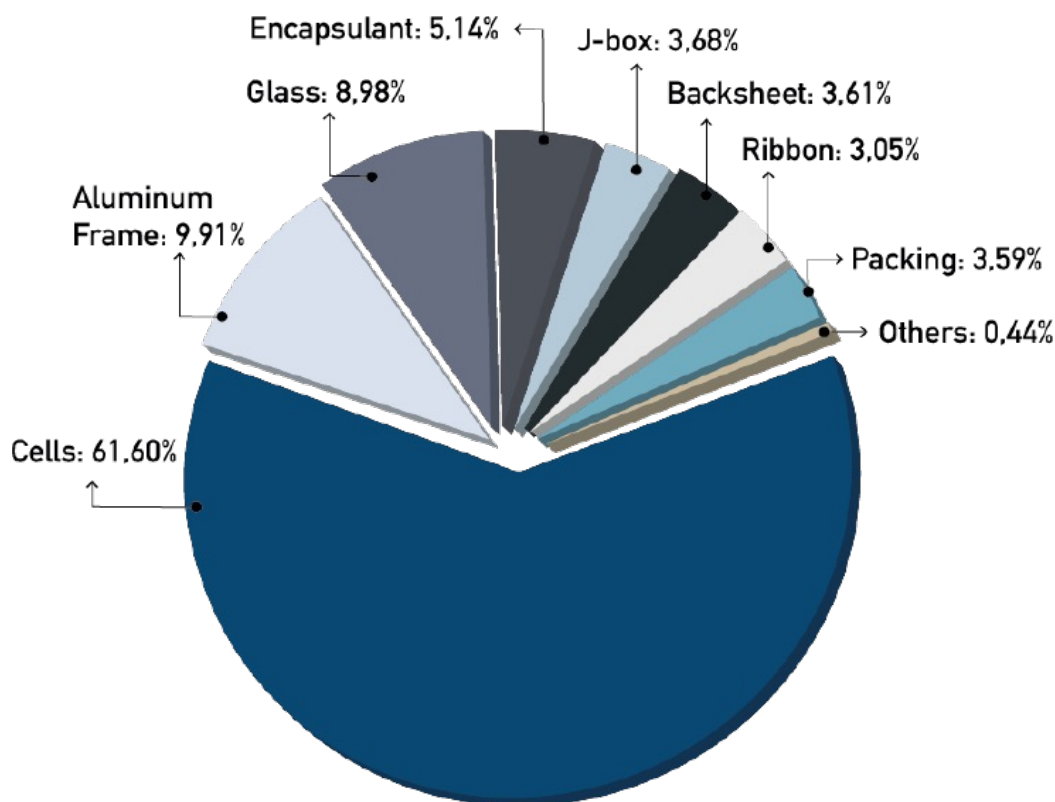
### STRUCTURE OF A PV MODULE

Example: Half cut cells, Centralized panel



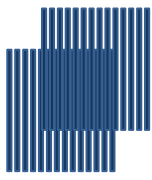
### MATERIAL CONTRIBUTION

Based on data from 2022







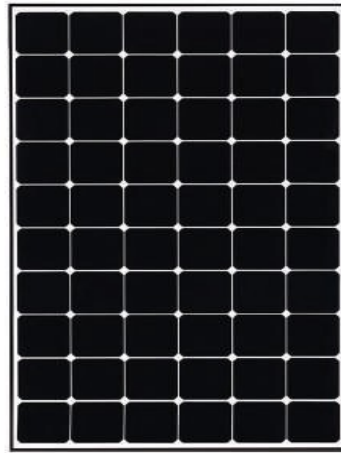


# Photovoltaic module production lines

complete manufacturing solutions



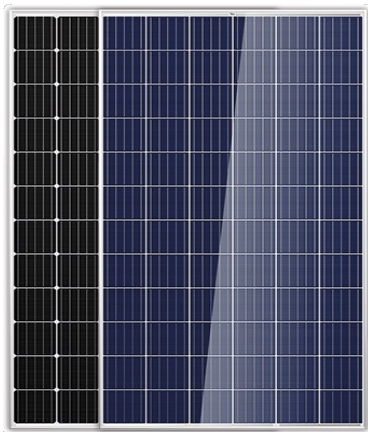
half cut, twin peak



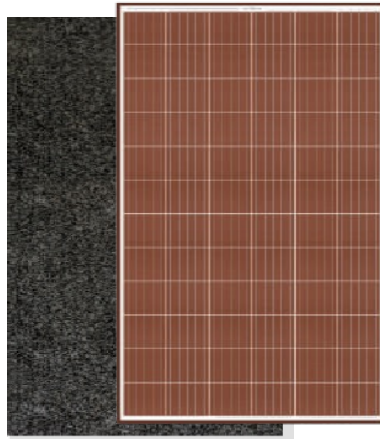
back contact



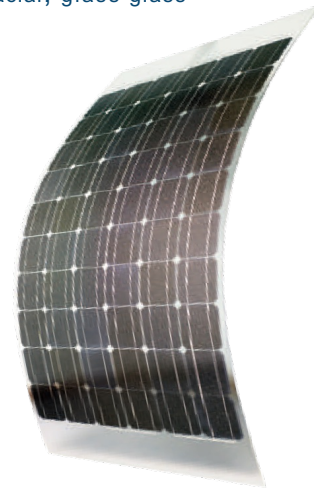
bifacial, glass glass



poly & monocrystalline



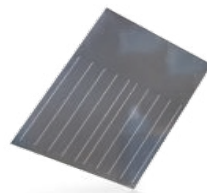
Colored pv and bipv



curved and custom design



solar street lights



solar roof tile



flexible panels



## TAILOR MADE AND CUSTOMIZED PRODUCTS

- Ecoprogetti integrates the customer's needs in the offered solutions.
- Complete design of the manufacturing facility.
- Solution for standard production or dedicated to custom technology.

## PLUG AND PLAY

- Delivery of "ready to start" solutions.
- User friendly technology.
- Low and easy maintenance level.
- Low cost of spare part and consumables.

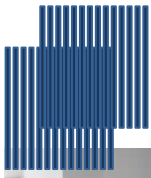
## ACCESSORY AND SERVICES

- Installation, start-up, commissioning, remote assistance.
- A single reference for a prompt 360° feedback regarding the process, material, innovations, R&D and more.

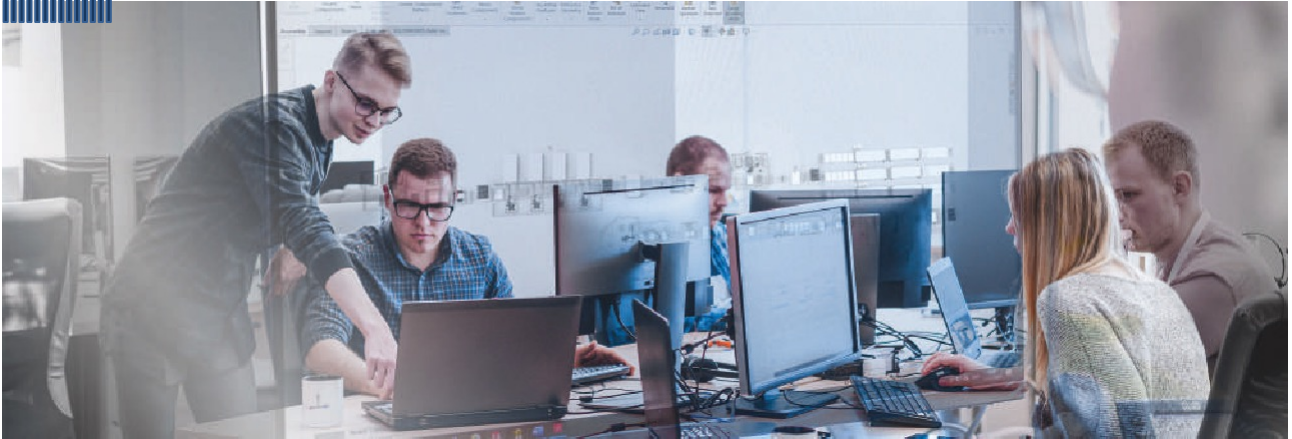








# CUSTOMIZATION SERVICE



## CLEVER ITALIAN DESIGN

**NES** offers services aimed at the prototypical development of customized projects according to the client's requirements. **NES** collaborates with the customer for ideas and solutions and stays in contact throughout the development of the project to maintain a solid and trusting relationship.

### CUSTOM MACHINE DESIGN



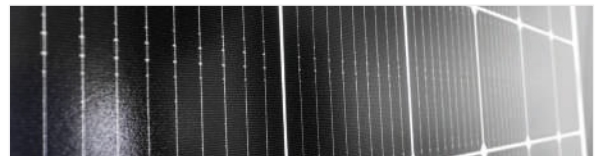
### CUSTOM PANEL SIZE & SHAPE



### CUSTOM LAMINATION RECIPE



### SPECIAL RAW MATERIALS



## WE WORK WITH A SMART APPROACH

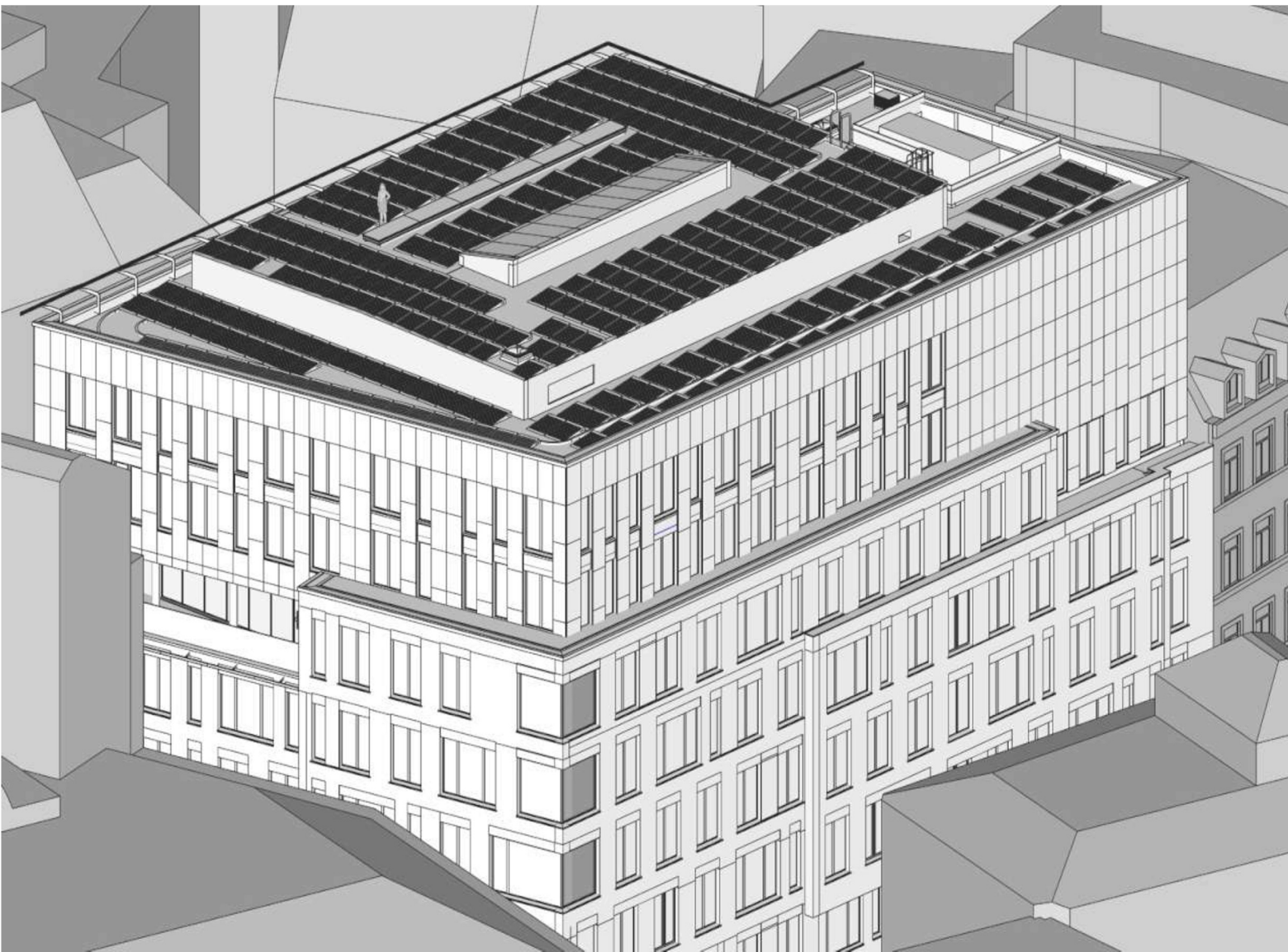
At NES we apply the same concepts, systems and automation that have already been consolidated and adapt them to the new project.

- Laboratory experiments aimed at fabricating prototype solar panels.
- Comparative screening of layer sequences using different combinations of components (encapsulation materials and polymer front sheets).
- Determination of optimal process parameters

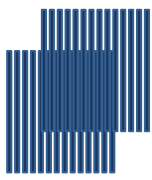
### CREATING OPTIMAL SOLUTIONS FOR SPECIFIC PRODUCTION PROCESS

We work in the field and focus on daily manufacturing processes to refine products, develop new equipment and test new raw materials.

Laboratory experiments on new raw materials and applications targeted at fabrication of PV panels
Complete design, assembly and installation of the manufacturing facility
Comparative tests using different recipes and combinations of raw materials
Counseling both for photovoltaic and chemical-industrial raw materials
Evaluation of key performance parameters of prototypical panels
Analysis of running production lines to optimize the KPI
Optimization of cycle times and efficiency of operators
Testing temperature profiles, stress tests, efficiency, uptime improvements, production flow test
Theoretical and practical training for the client







# PV MODULE PRODUCTION PROCESS

## raw material preparation

## string & layup

## interconnection & inspection

## lamination

## framing

## testing

- GLASS WASH
- CELLS TEST
- EVA FOIL CUT
- BACKSHEET CUT
- RIBBON CUT&BEND

- STRINGER MACHINE
- LAYUP STATION

- BUSSING STATION
- AUTOMATIC BUSSING
- EL TEST
- DARK I-V TEST
- ELECTRICAL TEST
- QUALITY INSPECTION

- LAMINATION
- COOLING
- GEL CONTENT TEST

- TRIMMING
- FRAMING
- CORNER PUNCHING
- SILICONE DISPENSER
- J-BOX APPLICATION

- I-V MEASUREMENT
- POWER RATING
- EL TESTER
- HI-POT TESTING
- SUN SIMULATION



raw material



stringing



automation

# NES

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busbar

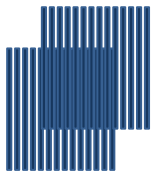


el testing



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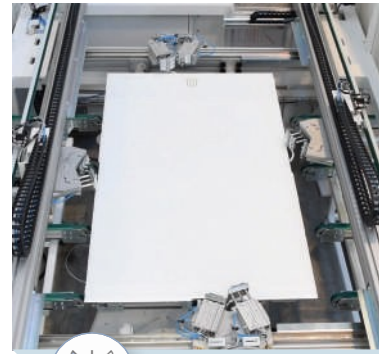




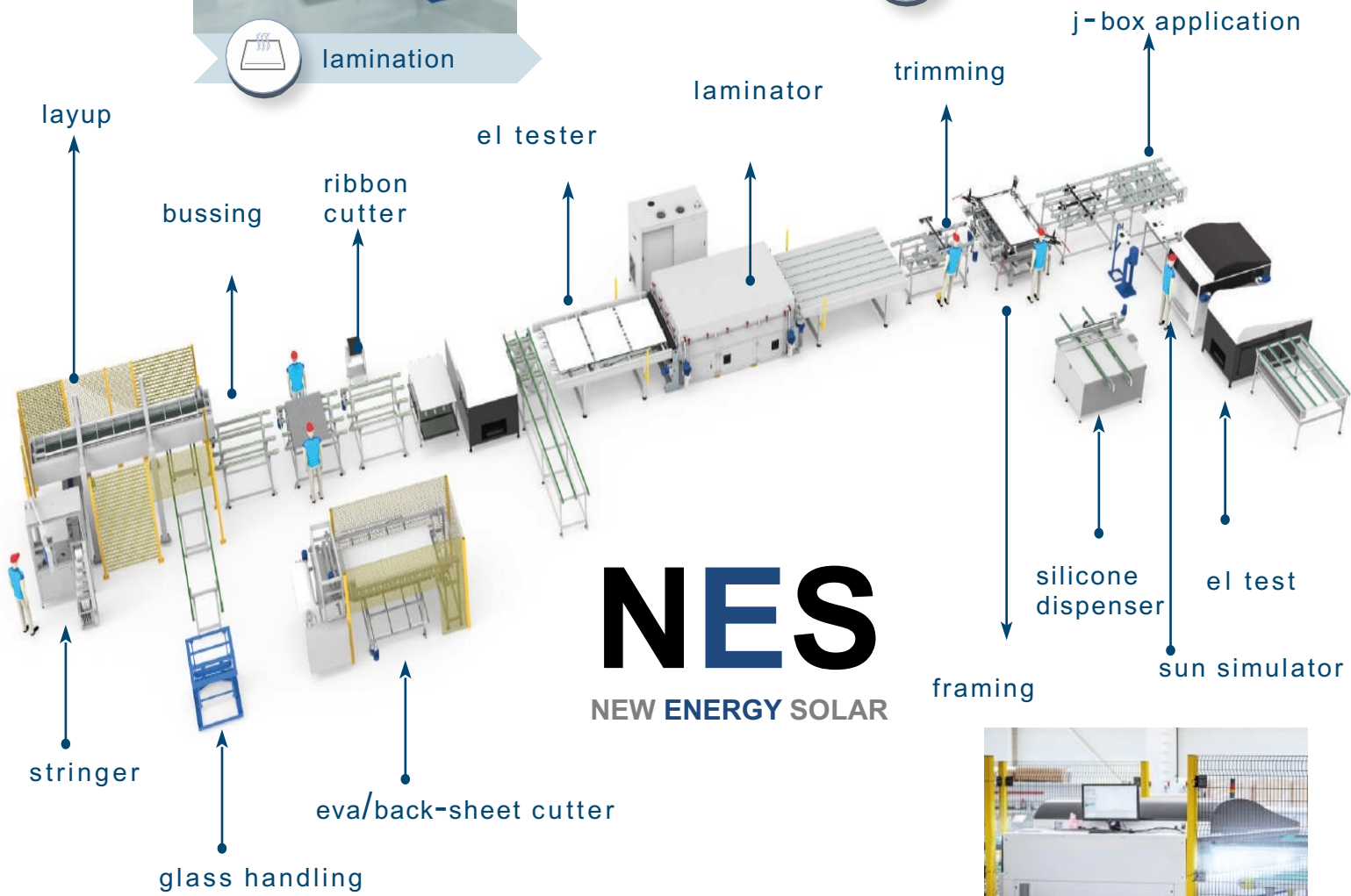
# PV PRODUCTION PROCESS



lamination



trimming



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framing



packing



sun simulation





# Module Production Line

complete solution for pv module manufacturing



**20**  
MW/Year



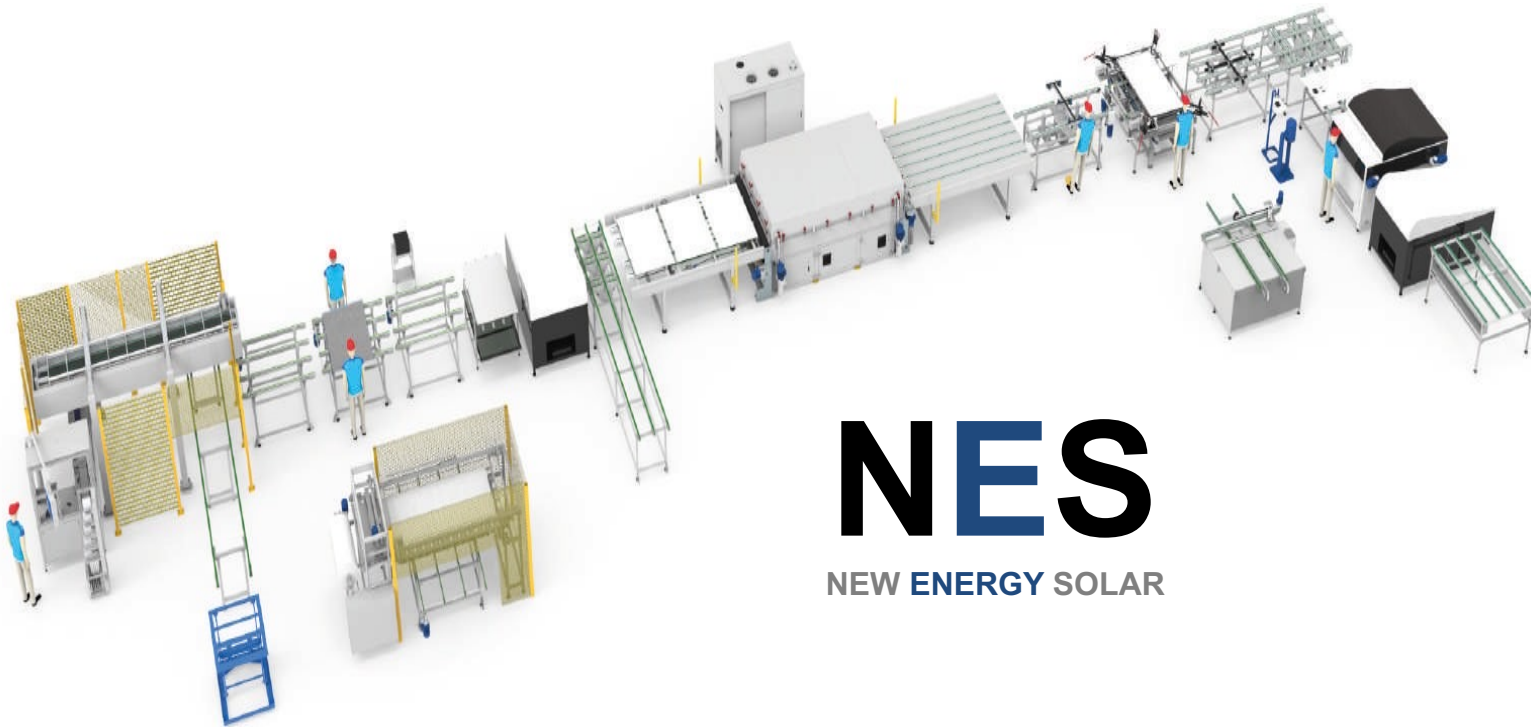
**10**  
panels/h



**6** workers  
per shift



**55** kW/h  
6bar | 800 nL/1'



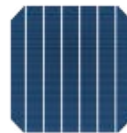
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**500** sqm  
area required

**5.2**  
W/cell



**72** cells  
per module



**3** shift  
of 8 hours



**330**  
days/year



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# Module Production Line

complete solution for pv module manufacturing



60  
MW/Year



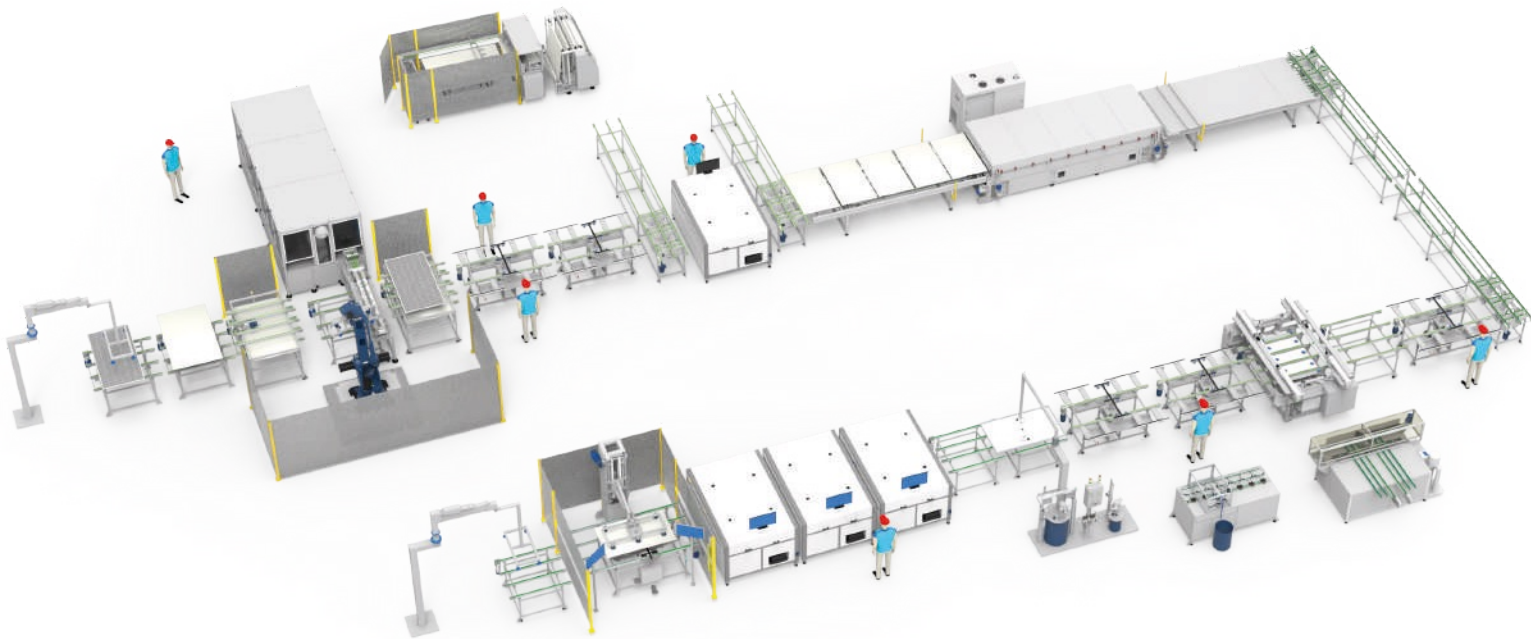
15  
panels/h



7 workers  
per shift



130 kW/h  
6bar | 1100 nL/1'



1200 sqm  
area required

## HALF CELL



M6  
166mm



480 W  
per module



3 shifts  
of 8 hours



330  
days/year

### EQUIPMENT LIST

1. Glass loader
2. Stringer Machine
3. Layup
4. In-line manual bussing station
5. Foil cutter machine
6. In-line EL tester before lamination
7. Laminator
8. Manual trimming and automatic framing
9. J-box application station and Potting
10. LED sun simulator + EL tester + Hi-pot
11. Visual inspection station 90°
12. Panels unloader
13. All accessories and spare parts included



TECHNOLOGY MADE IN ITALY – USA PRODUCTION







# Module Production Line

complete solution for pv module manufacturing



100  
MW/Year



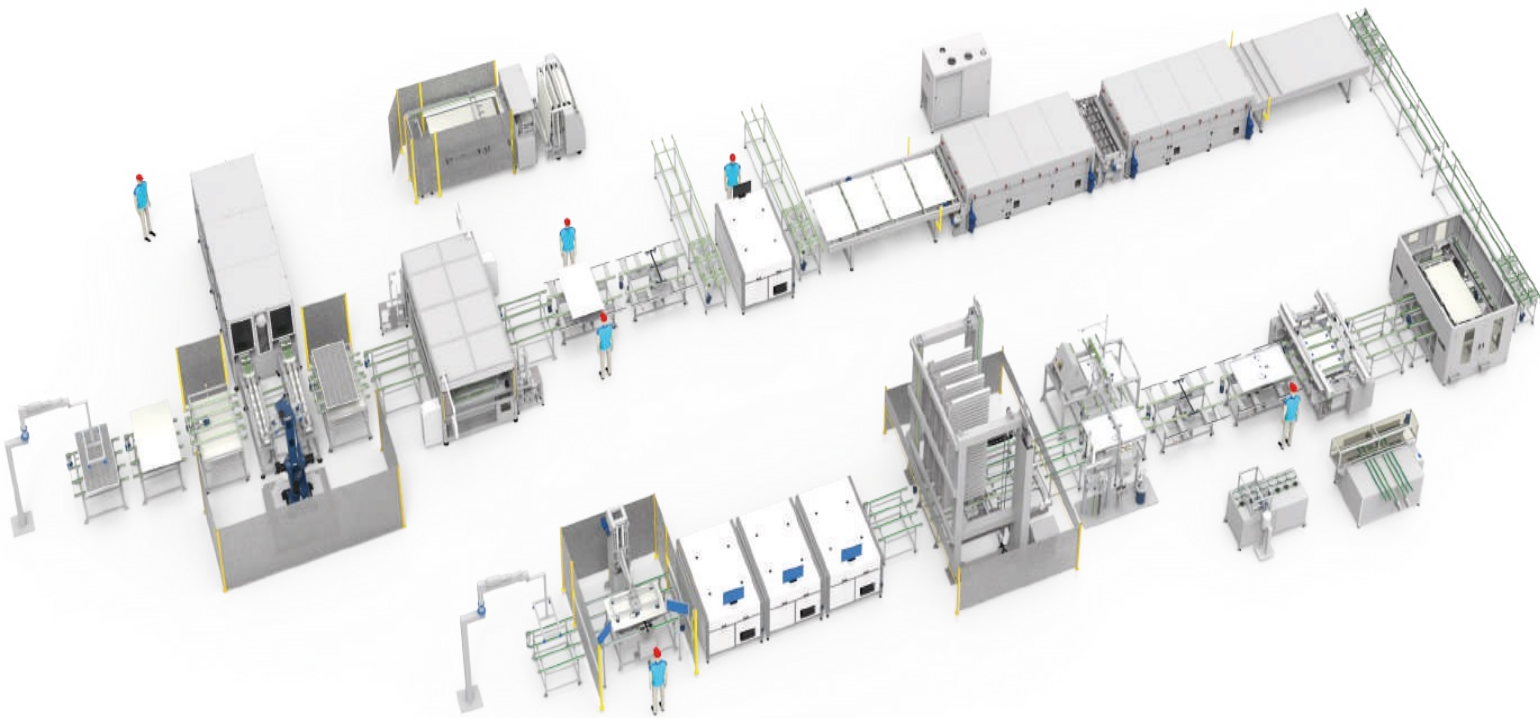
25  
panels/h



6 workers  
per shift



150 kW/h  
6bar | 2650 nL/1'



1500 sqm  
area required

## HALF CELL



M10 - M12  
182mm - 210mm



550-600 W  
per module



3 shifts  
of 8 hours



330  
days/year

## EQUIPMENT LIST

1. Glass loader
2. Stringer Machine
3. Layup
4. Automatic bussing machine
5. Foil cutter machine
6. In-line EL tester before lamination
7. Laminator double step
8. Automatic trimming and Automatic framing
9. J-box application station and Potting
10. Modules storage system
11. LED sun simulator + EL tester + Hi-pot
12. Visual inspection station 90°
13. Panels unloader
14. All accessories and spare parts included

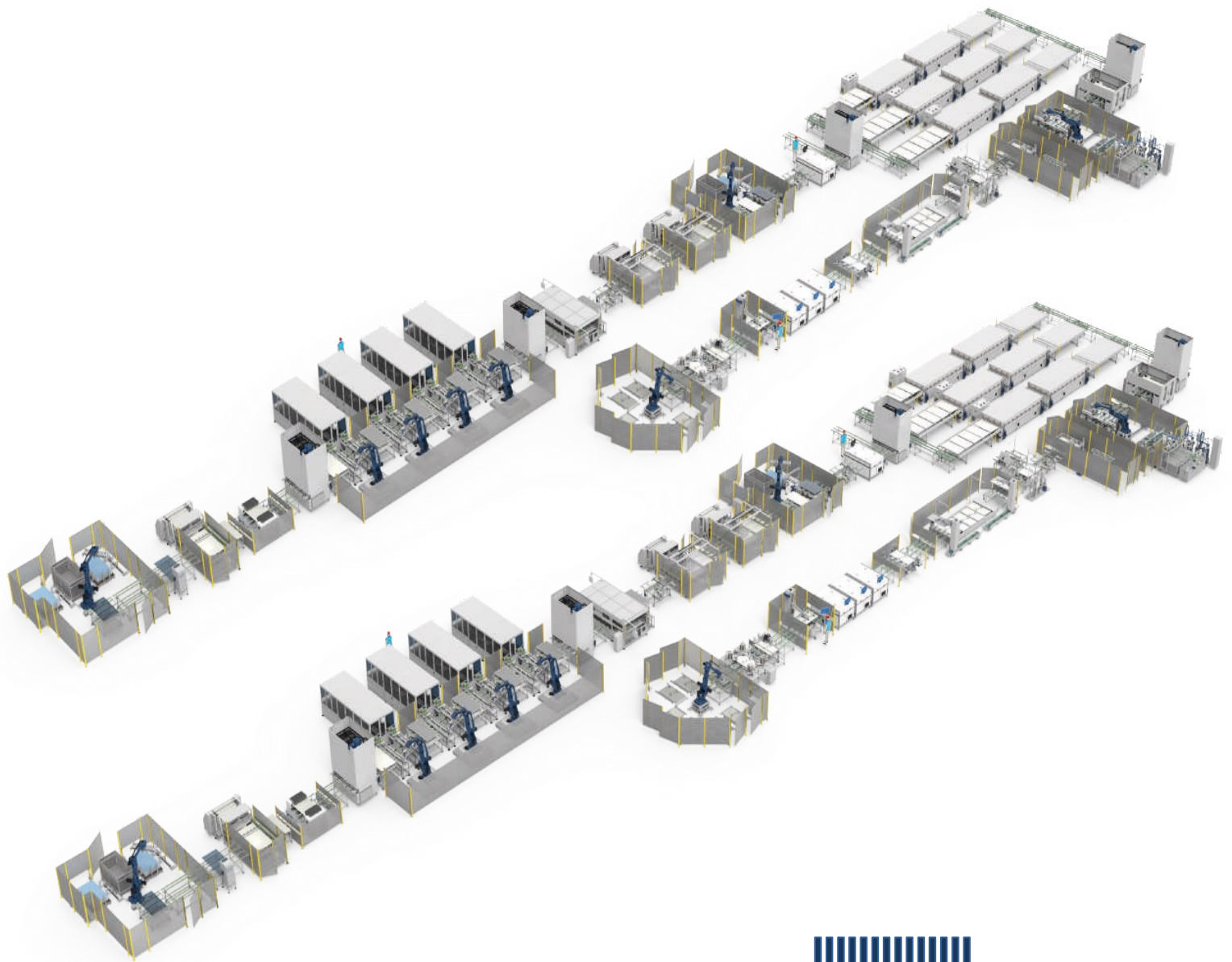


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# Module Production Line

complete solution for pv module manufacturing



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# COMPARATIVE Production Line

complete solution for pv module manufacturing






 **300** MW/Year  **4** workers per shift  **470** kW/h  
6bar | 6300 nL/1'  **75** panels/h  **2800** sqm area required





HALF CELL  **M10 - M12**  
182mm - 210mm  **550-600 W** per module  **3 shifts** of 8 hours  **330** days/year

 **500** MW/Year  **3** workers per shift  **600** kW/h  
6bar | 6300 nL/1'  **100** panels/h  **3000** sqm area required

HALF CELL  **M10 - M12**  
182mm - 210mm  **550-600 W** per module  **3 shifts** of 8 hours  **330** days/year

## 1GW UNIVERSAL FULLY AUTOMATIC PRODUCTION LINE

 **1000** MW/Year  **7** workers per shift  **1200** kW/h  
6bar | 6300 nL/1'  **240** panels/h  **7000** sqm area required

HALF CELL  **M10 - M12**  
182mm - 210mm  **550-600 W** per module  **3 shifts** of 8 hours  **330** days/year

500 MW/Year + 500 MW/Year



## PROCESS TRAINING

know-how transfer

The success of the module manufacturer is strongly linked with the choice of partners.

NES, in order to guide the customer in the right direction towards success, follows closely the market trend and the manufacturing process. Working closely to the manufacturing process is also of high importance in order to develop the equipment, test new equipment, test new raw material and last but not less important, study a real time business plan for the customers.

NES offers a training centre for the customers where they can receive a full know-how transfer regarding the production process, working directly with the raw material and the machines.

## CERTIFICATION SUPPORT

take advantage of our experience

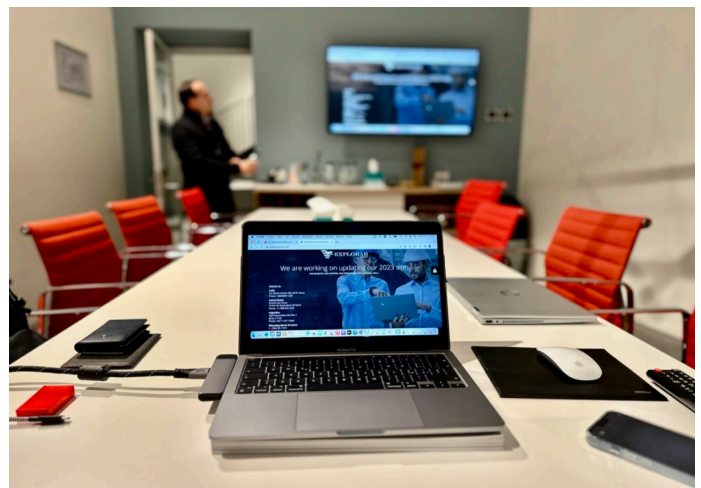
NES can support the customer for the entire certification process both by helping the customer to spot the best suitable raw material as well as performing pre-certification quality tests on the material and on the finished product.



## INSTALLATION & COMMISSIONING

quick and professional installation

By listening to the customers' needs and requirements, the qualified personnel of NES advise how to optimize the design and structure of the plant for a tailor made project. All machines and complete production lines are supplied on a ready to use basis and only a few days pass from the installation start to the production of the first modules. NES support doesn't finish with the installation of the equipment but the customers are followed during the complete production ramp-up process and even further.







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## AFTER SALES SUPPORT & REMOTE ASSISTANCE

360° support service

NES pays special attention to guarantee an efficient and on-time service to the customers and to obtain this, Ethernet connection has been installed in all equipment. This in-line connection allows a communication between the machines and gives the possibility to NES technicians to provide a quick and efficient supervision and assistance through internet.



REMOTE  
SUPERVISION



TRAINING FOR  
WORKERS



RAW MATERIAL  
SUPPORT

With this connection the machines are also predisposed for a management supervision system of the line. Moreover a “full assistance package” can be offered, for one year, which consists in further know how and advice services for a correct and high quality production process. This package can be formulated also with a full time on site technical presence.

NES qualified technicians have years of experience in the photovoltaic industry and can guarantee a prompt technical feedback both regarding the machines as well as questions regarding the production process and raw material. Both remote and on site assistance are also easily and quickly .



# NES

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[www.explorargroup.com](http://www.explorargroup.com)

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