

Towards 30 GW of PV Manufacturing in Europe

Status Report
Q2 2023

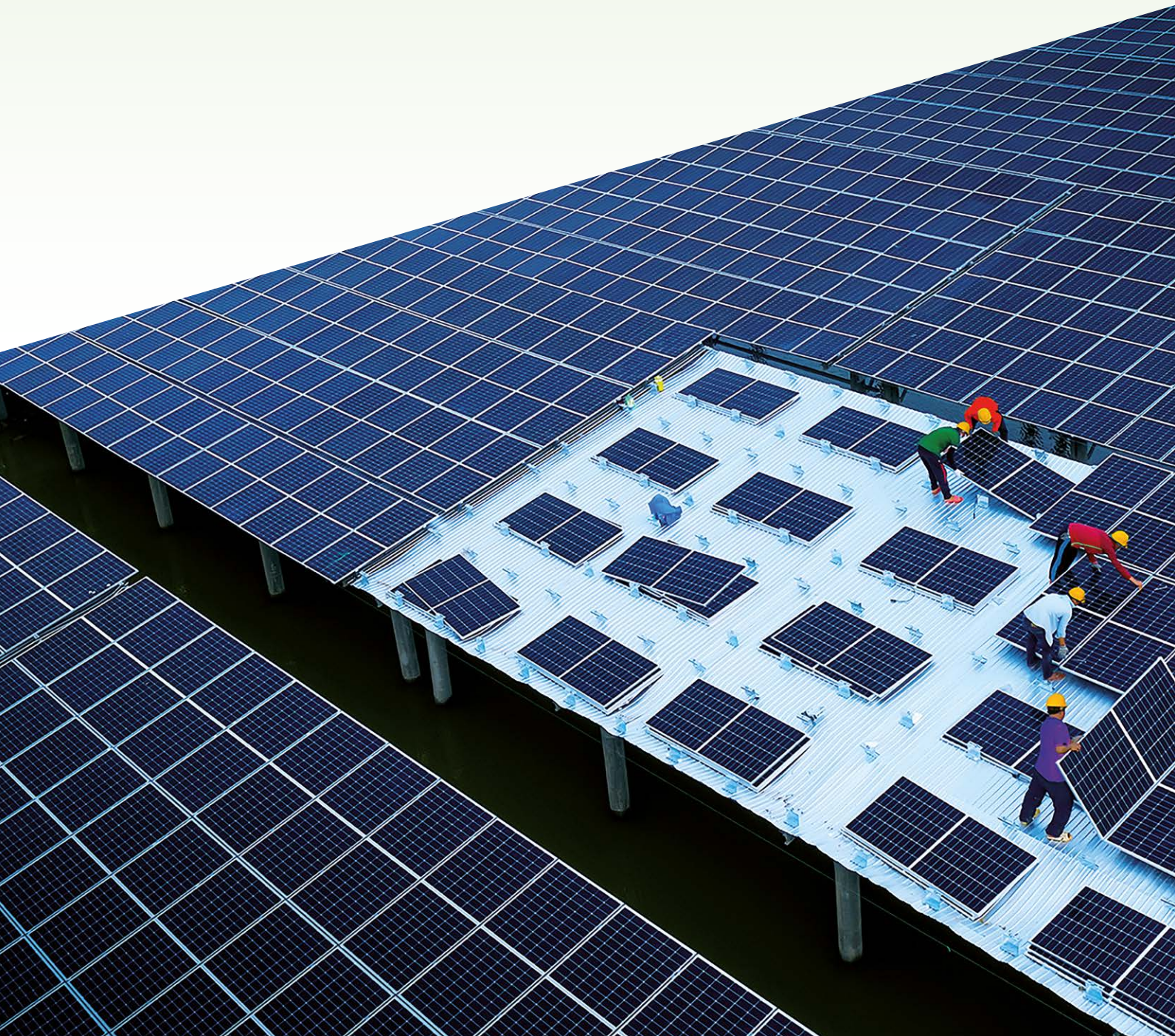
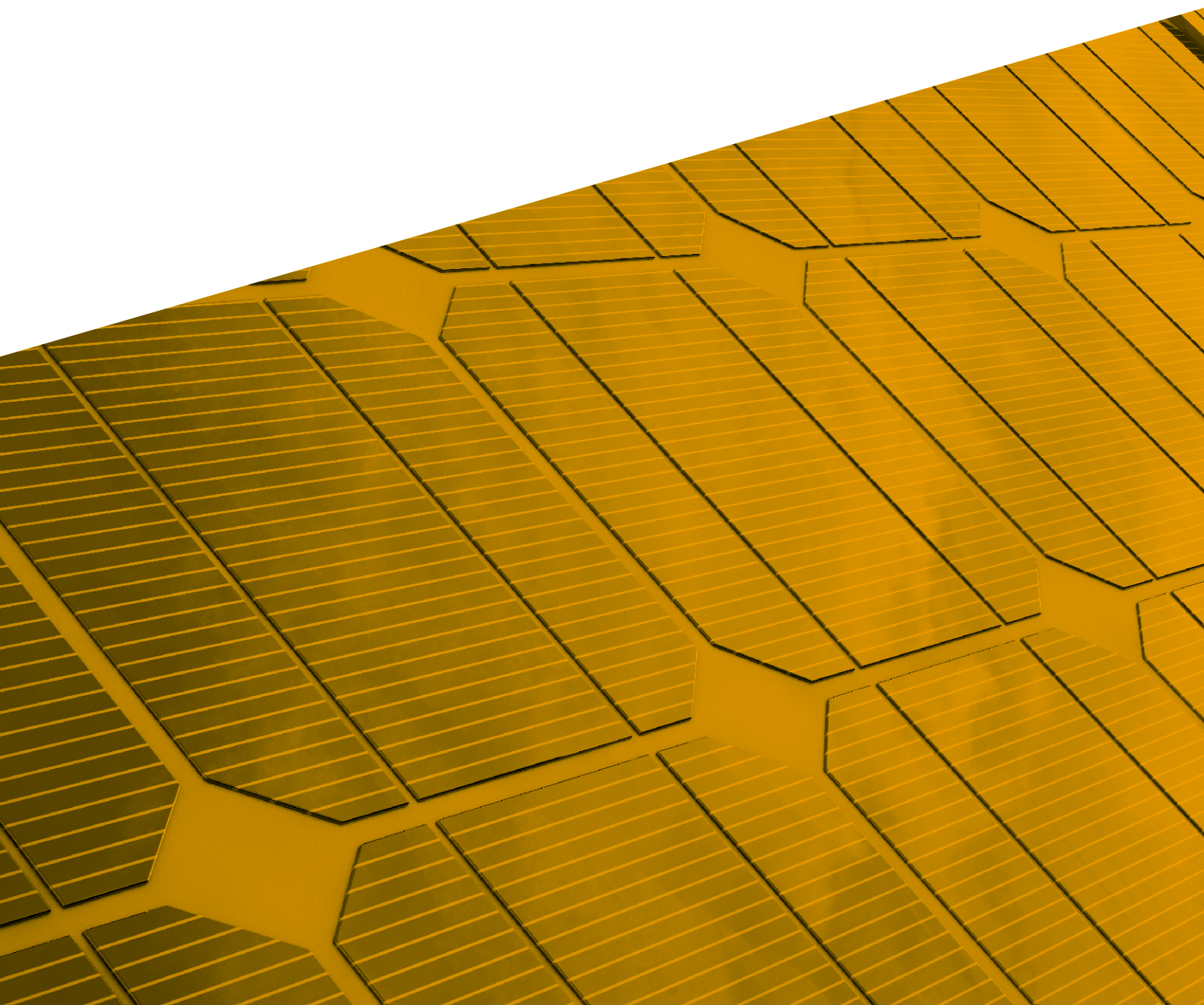


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About the ESIA

The European Solar PV Industry Alliance (ESIA) aims to facilitate and de-risk the scaling up of Europe's solar PV manufacturing to cover 30 GW of domestic manufacturing capacities by 2025, thus supporting the EU's decarbonization targets and at the same time ensuring long-term competitiveness of the EU industries.

Launched in 2022 by over a hundred organisations across the industry, the ESIA is backed by the European Commission who, as a member of the steering committee, is supporting the members by working on the various proposals and facilitating that these reach the appropriate DGs. EIT InnoEnergy leads the Secretariat and is joined by SolarPower Europe and the European Solar Manufacturing Council on the alliance's Steering Committee.





Developing a resilient European solar PV manufacturing value chain

To deliver on the EU Solar Strategy objectives, the Alliance aims to create the right conditions for investment in large-scale PV manufacturing capacity in Europe, by re-develop, de-risk and accelerate the PV industry in Europe across all segments of the value chain to create its competitive position in the context of booming demand for solar PV in Europe and globally.



The objective of the Alliance

The targets set by the Alliance, together with the European Commission, are to develop an industry with a production capacity of 30 GW by 2025 along the entire value chain, adding 60 billion euros of GDP every year in Europe and creating more than 400,000 new jobs (direct and indirect).



Working across the entire value chain

The Alliance will foster an innovative and value-creating industry in Europe, by scaling up manufacturing of innovative PV products and components. Bringing key industry stakeholders together, the Alliance works across all value chain segments including polysilicon, ingots, wafers, cells, modules and recycling.



What are the priority actions?

The Alliance will first focus on: financing for European solar PV manufacturing projects, ensuring a sustainable level playing field, swift implementation of codesign requirements for PV systems and products, and anticipating the skills requirements of this industry with the start of the European Solar PV Industry Alliance Academy.

Working Groups

The Alliance has created four working groups: Non-Pricing conditions (Demand-side policies), Supply Chain, Financing, and Skills led by key industry players such as Carbon, Enel Greenpower, Engie, IBC, Meyer Burger Technology AG and Wacker Chemie AG, to elaborate a series of concrete actions that will re-invigorate the European solar PV industry.





Work Group
1

Non Pricing Conditions

(Demand Side Policies)

Manager: **SolarPower Europe**

Chair: **Carbon Solar & IBC Solar**

Members involved: **60 different entities**



“*As chairs of the Demand side Working Group we have been working closely together in defining a set of non-price criteria that give effective market signals for solar systems produced in Europe while at the same time not impacting the pace and cost-effectiveness of solar PV deployment.*

In direct reflection of the COM Net Zero industry Act proposal currently discussed with European policy-makers, the WG has developed a proposal on what criteria and metrics could be used to define Best-in-Class (BiC) solar and how to relate this to bonus points in whole public procurement and specific tenders to facilitate and support the consolidation and development of the European solar industry”

Jörg Ebel,
Head of Public Affairs,
IBC Solar

Pierre-Emmanuel Martin,
co-founder and Chairman,
CARBON

Work Group 1

Main Challenges

The main challenge for the non-pricing conditions WG is to define a set of non-price criteria that give effective market signals for solar systems produced in Europe without impacting the pace and cost-effectiveness of solar PV deployment. The diversity of organisations in the WG, from manufacturers to developers, represents that balance.

Non-price criteria are an effective policy instrument to create visibility on and support to market demand for solar systems produced in the EU. However, the implementation of non-price criteria needs to be (1) strictly harmonised at EU level to avoid bureaucratic complexity and patchwork application, (2) not create market bottlenecks (leading to tender undersubscription or resulting in a situation where eligible products are provided only by a small number of manufacturers) or (3) to unsustainable increase of PV product and component prices above 10-20%.

The WG works to develop recommendations for effective and practical implementation of non-price criteria in public procurement and auctions, starting from the proposals in NZIA Chapter IV (Access to Market), which is currently under the legislative co-decision process. The WG has developed a proposal on what criteria and metrics could be used to define Best-in-Class (BiC) solar and how to relate this to bonus points in public procurement and auctions.

First Actions

The WG has focus its efforts in the NZIA proposal, made by the European Commission, in Chapter IV and has developed recommendations for its effective and practical implementation. The WG has developed a proposal on what criteria and metrics could be used to define Best-in-Class (BiC) solar and how to relate this to bonus points in public procurement and auctions, focussing on specific parameters related to environmental sustainability (including on carbon footprint, aligning with EPEAT thresholds, and recycled content), social and governance aspects (including on worker's rights and job creation), innovation, system integration and resilience (including share of economic value of solar PV supply chain that comes from Europe).

Work Group 1

Implementation of “Best-in-Class” solar definition or award system would complete the work being developed in the finance, supply chain and skills working group by incentivizing the demand of high-quality PV. This definition is essential in order to further propose specific criteria defining the application level, bonus points, weight and metric that should be applied in the public auctions under the NZIA.

At the same time the working group developed a concept for financial support for Best-in-Class solar supply chains inspired in the recently announced Hydrogen Bank and some of the mechanisms that other countries such as the US or India are applying in the solar manufacturing sector. This was transferred to the WG Finance and currently representatives from both working groups are working on this concept and proposal.

Next Steps

In a next step, the WG looks forward to present its recommendation to decision-makers in the European Parliament and Member States to progress the Net Zero Industry Act co-decision process, and further refine its suggestions for non-price criteria.



Work Group
2

Supply Chain

Manager: **European Solar Manufacturing Council**

Chair: **Meyer Burger & Enel**

Members involved: **70 different entities**



“ *Rebuilding a truly European solar industry is one of the most valuable insurances against energy dependency. This is a matter of commitment and investment throughout the entire supply chain – especially in those parts where Europe is already behind today. It is up to the Supply Chain Working Group to identify effective measures to fill the gaps and grow the existing industry in line with European targets* **”**

Christoph Podewils, Head of Public Affairs and Corporate Communications,
Meyer Burger

Work Group 2

Main Challenges

Sufficient financing is crucial at every stage of the PV value chain and securing adequate funding is the cornerstone of PV industrialization in Europe. However, the current conditions for accessing financing throughout the PV value chain do not align with the ambitions of rapid PV manufacturing deployment across Europe. Furthermore, it is uncertain that the possibility to access direct financial support through the lifted state aid rules reaches along with the net zero resilience framework conditions in the Net Zero Industry Act are accessible/ transferred to all part of the value chain and that these policy changes are enough to attract investment and strengthen the weakest parts of the value chain.

To address this issue, various solutions can be implemented at the European level to accelerate financing and establish a framework comparable to global standards, ensuring adequate support for PV investments. One of the key tasks is to ensure synchronized development of PV manufacturing capacities along the entire PV manufacturing value chain – time differences might be inevitable, but adequate capacities should be developed in all critical parts of the industries.

In addition, the European PV manufacturing value chain would benefit from stronger resilience and sustainability legislations. Sustainability, both in terms of environmental and social sustainability, is currently a strength of the European PV manufacturing industry, which thus far has not translated sufficiently well into a market advantage or monetary value. Legislation is needed to boost this strength of the European PV manufacturing value chain and to exert pressure on the global value chain to develop more sustainable production and products.

Work Group 2

First Actions

The current issues that the WG have addressed so far are the following:

1. The current energy prices in Europe are very high in comparison to energy prices in the US and China. In both countries' energy prices of 0,03 €/kWh and lower are offered to producers in the PV value chain. The current European energy prices are 3–5 times higher than in the US and China. Thus, almost 100 percent of the wafers and glass used for photovoltaics are produced in China. For re-shoring the PV industry to Europe, especially the energy intensive production steps, energy for such productions must be available at an internationally competitive level.
2. Today, the glass of the solar panels produced in China and installed in the EU cannot be safely recycled in float glass furnaces because of impurities and the lack of traceability of their composition. In particular, the presence of antimony limits the recycling. The unwanted contamination would have significant impact on the yield and the lifetime of a glass melting furnace. Yield loss or reduced lifetime will cause extremely negative CO₂ footprint which is contrary to the carbon reduction targets of the float glass sector and the 2050 climate goals of the European Union.
3. In the EU Solar Energy Strategy, the EcoDesign regulation and the Energy Labelling regulation are measures mentioned to increase efficiency, durability, reparability and recyclability of products and systems, to incentivise environmentally sustainable devices. Currently the proposed methodology of the EcoDesign is the Product Environmental Footprint Category Rules (PEFCR), however, the industry is worried that this methodology could lead to cheating and greenwashing, and the intention of the regulation will be lost. Hence, the WG propose that the Electronic Product Environmental Assessment Tool (EPEAT) criteria, recently launched for PV modules by the Global Electronic Council (GEC), should replace the PEFCR methodology calculating the carbon footprint.

In addition, two different methodologies, one for the EcoDesign legislation and another global recognized methodology for the 'best-in-class' modules is counterproductive and increases the classification time and cost for module manufacturers.

Work Group 2

Next Steps

There currently exist some shortcomings in the proposed NZIA, such as (1) lack of definitions of sustainability and resilience, (2) no explicit EU content definition (due to WTO), (3) height of incentives is very limited and might even favour Chinese modules (10% max), and (4) the financing of NZIA (draft) originating from national budgets or renewable energy schemes.

The Supply Chain WG plan to address this by drafting a Net-Zero Resilience Bonus System, and the process includes:

- Defining, what a resilient PV product is
- Defining criteria for an ecological sustainable PV product
- Defining a reward system for those criteria
- Reward system is based on the idea to concrete the „15-30 %“ overweight (Art 19, 20) and the price premium (Art 21)

Concrete and predictable sustainability criteria would ensure more stable domestic PV manufacturing supply along the entire value chain – accordingly this is of critical importance to define sustainability criteria and to introduce price motivation for each single product of the entire value chain.



Work Group **3**

Finance

Manager: **EIT InnoEnergy**

Chair: **Enel Green Power & Wacker Chemie**

Members involved: **50 different entities**



“ *Ambitious and accelerated financial support for large-scale PV manufacturing projects is urgently needed, flanked by a competitive OPEX and CAPEX support for the entire supply chain. Current financial vehicles, like the Innovation Fund or the IPCEIs, are welcome instruments but they do not send the much-needed short-term signals required to attract immediate and massive investments into new manufacturing sites at unprecedented scale in Europe* **”**

Eliano Russo, CEO, 3SUN



“ *Like the American IRA or the Indian PLI the European PV manufacturing sector needs competitive OPEX and CAPEX support instruments to have predictable and solid business cases for potential large scale investments in European PV manufacturing. Established European ESG standards will also help to ensure a high and sustainable product quality of PV products being used in Europe. Time is of essence and we should now act based on the recommendations from the ESIA working groups* **”**

Dr. Christian Westermeier, Vice President Marketing, Sales and Application Engineering, Wacker Polysilicon, Wacker Chemie

Work Group 3

Main Challenges

PV has clearly become one of the fundamental pillars for the energy transition. Being aware of this, other regions are introducing subsidies and supporting mechanisms to ensure PV is manufactured locally, such as the Production Linked Incentives (PLI) in India, or the Inflation Reduction Act in the US. The competitiveness of European industry players is thus at risk.

EU-based industry is currently not capable of covering much of domestic demand. Only in the polysilicon side does the EU have a relatively high production capacity in this regard, albeit not sufficient in the long run either. All other steps in the value chain can cover between 2 and 4 GW of that demand. The ESIA has set the challenge of bringing back up to 30 GW of production capacities across the value chain, but for achieving that goal the right conditions need to be created so that the industry can flourish again.

Seeing as solar PV is a fundamental pillar of the Green Deal, it is required to find supporting mechanisms to close the gap to other geographies. These support mechanisms will have to be limited in time and end once the main goal is achieved and the competitiveness of the industry is re-built. The sector requires sound support mechanisms looking into industrial innovation and upscaling rather than technology innovation. Most of the existing support mechanisms target research innovation and thus do not fully serve the current ambition. One of the sought characteristics is also simplicity and predictability.

In this context, and for setting an ad-hoc solution, the ESIA WG Finance members agreed to study the specific gaps and propose mechanisms that can close it.

Work Group 3

First Actions

The work of the WG Finance was divided in two main activities. The first was about quantifying the gap (OPEX and CAPEX) the industry is facing to stay competitive. This gap analysis was performed at each of the steps of the value chain, identifying the critical factors causing the gap.

The second block of activities are related to defining a menu of proposals to the European Commission and the Member States on how to help close those gaps. Five different kinds of solutions are being studied at this very moment:

Analysis of current instruments and how they should be adapted.

Led by Siemens, an exhaust analysis is being carried out, based also in experience of the members, of the current mechanisms mainly for CAPEX and R&D in order to see whether the PV industry could benefit from them. Members are also working on possible modifications that would make the instruments reachable for the entities, especially considering that the PV sector it is not currently a highly innovative, contrary to what these programs tend to aim for.

IRA replica for the EU. Led by Enel and with the inputs and collaboration of the colleagues in the Supply Chain WG, members are developing a proposal with a similar approach to the incentives implemented with the IRA in the US for Europe.

Chips Act replica for the PV sector. Led by Wacker, an study was carried in order to analyse if proposing a replica of the chips act released by the European Commission last year could be developed for the PV sector. However, the conclusion was that due to the length of time such a legislative proposal would take and the measures requested, which would be similar to those of the IRA, would make such a proposal not sufficiently effective and immediate for what the sector is demanding. That is why it has been decided to set aside this line of work for the time being.

Strategic PV projects support. Members are also studying the possibility of proposing an approach similar to the IPCEI on strategic projects for the PV Industry.

Work Group 3

Solar Bank. Proposal coming from the non-pricing conditions WG, the Solar Bank proposal is inspired in the Hydrogen Bank recently which was recently launched. It also takes some inspiration for the local content variable from the Indian IPL. The proposal consists of a system of two-sided auctioning where the most cost-competitive supplier can be matched with off taker's highest willingness to pay. In doing so, the funding gap would be minimized. Members are currently working, studying and developing such novel proposal that could be used to kick-start the investments in the market.

Next Steps

A consensus on the gap analysis has been achieved. There are several factors that affect the lack of competitiveness but as a summary (each of the steps are affected in different ways) we can state that the main ones are:

- Lack of financial instruments for CAPEX and OPEX support
- CAPEX may be significantly higher than for the Chinese counterparts
- Globally uncompetitive high energy prices
(3 different scenarios have been studied)
- High staff costs
- Lack of economies of scale



Work Group

4

Skills

Manager: **EIT InnoEnergy**

Chair: **EIT InnoEnergy**

Members involved: **36 different entities**



“ *Bolstering “PV made in Europe” will not happen without a skilled workforce. If we want to meet the ambitious targets of the EU for the solar industry - we have to accelerate the reskilling and upskilling and put forward an innovative, Europe-wide training offer aligned with industry needs* **”**.

Oana Penu, Director, InnoEnergy Skills Institute

Work Group 4

Main Challenges

Different analyses project that the deployment of solar PV in the EU could soon be reaching the landmark of 60-80 GW per year.

However, the EU-based industry is not able to cover most of this demand, also because there exists a shortage of the necessary workforce. Re-shoring 30 GW of solar PV manufacturing to the EU will require up to 50,000 new, skilled workers, above all in the sectors of cells, modules, and ingots/wafers.

The vast majority of these jobs would be direct, coming on top of hundreds of thousands of jobs in installation and O&M.

The NZIA (Net-Zero Industry Act) released in March 2023 has defined some measures, e.g. creating Net-Zero Academies (Art. 23) and simplifying equivalence and ease of mutual recognition of certification schemes, and training accreditation processes across EU (Art. 24) as well as establishing a Net-Zero Europe Platform, whose responsibilities could include guiding the process of job profile revision. Moreover, the EU Solar Energy Strategy has promised identifying funding from European Social Fund and Erasmus+ to complement national and private funding for training.

In this context, the WG Skills was set up to identify actions needed to secure a workforce for the PV manufacturing industry.

Work Group 4

First Actions

The WG conducted a problem identification and validation, which was then used to elaborate a number of actions across three clusters: Training & Education, Attractiveness & Awareness, and Mobility. The WG met with representatives from the European Commission on 16th May 2023 (DG GROW, DG EAC, DG ENER) to present and discuss these preliminary findings.

These actions were followed with the identification of the main stakeholders to be involved in each of them (industry, academia, public authorities, etc.) and some execution plan.

Some of the identified challenges include the lack of knowledge of the actual workforce need, unstandardised job profiles and curricula across EU, unstandardised accreditation and certification, as well as insufficient options for remote (up)skilling and training funding. Moreover, there appears to be a low level of awareness of possibilities in PV manufacturing and obstacles in the way of speedily bringing in global talent, among others.

As for the actions, the WG Skills has set the following actions to be placed:

Training & Education

- Map out industry needs on numbers, qualification levels, and location of workers
- Road map for skills current needs and long-term vision, incl. added value of PV made in EU
- Revise job families and jobs and their required skills / cert. profiles
- Define minimum curriculum requirements for each qualification level to guide education and (re)training providers
- Advocate for equivalence and ease of mutual recognition of certification schemes, and training accreditation processes across EU
- Build new (degree) courses in consultation between TVET providers and universities and industry
- Fund and build new Solar Academy modelled on EBA Academy for wider access to new curricula and remote upskilling
- Dedicate national and ESF funds for training professionals to new technologies systems and applications
- Promote training cooperation

Work Group 4

Awareness & Attractiveness

- Run a Europe-wide public communication campaign encouraging (re)training for PV manufacturing jobs
- Issue best practice guidelines on how to approach jobs / (re)training marketing and professional development
- Develop and promote existing platforms for jobs and training

Mobility

- Define instruments to attract global key talent, esp. process engineers and operations specialists
- Embed stays in other European countries as part of PV manufacturing. TVET / degrees ("PV Manufacturing Erasmus")
- Increase visibility on geographical distribution of training & jobs

Next Steps

- Mapping industry needs on numbers, qualification levels, and location of workers.
- Road map for PV manufacturing skills with current needs and a long-term vision, incl. skills programme for added value of PV made in EU
- Revise job families, elaborate jobs and their required skills / cert. profiles
- Define minimum curriculum requirements for each qualification level to guide education and (re)training providers

Start advocating for equivalence and ease of mutual recognition of certification schemes, and training accreditation processes across EU set the bases for the future Solar Academy.

ESIA members

Abora Energy S.L.	Evolar AB	KILOWATTSOL	Climate Protection
AE SOLAR	Exasun B.V.	KIRA VENTURES	Environment and Agriculture (SMEKUL) , Schuman Associates scrll
AE SOLAR HORIZON AD	EXE S.r.l.	KLARIMEX GmbH	SERMA TECHNOLOGIES
AGC Glass Europe	Ferroglobe Innovation	Landlele	Siemens Energy Global GmbH & Co. KG
Akuo	Forschungszentrum Jülich GmbH	Lapmaster Wolters GmbH	Singulus Technologies AG
Arago Sp. z o.o.	Fraunhofer Institute for Solar Energy Systems ISE)	Lightsource bp	SMA Solar Technology AG
ASCA SAS, an ARMOR GROUP Company	Fronius International GmbH	Lightyear	Solar Impulse Foundation
ASTRASUN SOLAR PLC	FUNDACION TECNALIA RESEARCH & INNOVATION, Futurasun s.r.l.	M10 Solar Equipment GmbH	Solarge International bv
Bee Solar S.r.l.	FutureVoltaics	Maravela	SOLARWATT
Bieki Solar Energy, S.L.	Gamesa Electric	Popescu & Asociații SPRL	SolvElectric Technologies Ltd.
Bottero S.p.A.	GigaPV	MAXEON SOLAR TECHNOLOGIES	Systovi (CETIH Group)
BRITE HELLAS S.A.	Glass for Europe	MCPV GmbH	TECHNOLOGIES ENERGIES NOUVELLES ENERGIES
Bundesverband Solarwirtschaft e.V.	Government of Navarra	Meyer Burger Technology AG	RENOUVELABLES RHONE
Capstone	Green Energy Venture AG	MONDRAGON ASSEMBLY	ALPES DROME ISERE SAVOIE (TENERDIS)
CARBON	Greenland Giga Factory Endesa	MOTOR OIL RENEWABLE ENERGY SINGLE MEMBER S.A.	TGVH ENERGY
CENER - National Renewable Energy Centre of Spain	GREENSQUARE	Multisun Sp. z o.o. Sp. K	The Quartz Corp AS
COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES (CEA)	greentech.training	NexWafe GmbH	Turku University of Applied Sciences
Cosol Community Solar Ltd	Heliatek GmbH	Nines PV	UNIVERSIDAD POLITÉCNICA DE MADRID
DualSun	Helmholtz-Zentrum Berlin für Materialien und Energie GmbH (HZB)	NorSun AS	Valencian Government (Generalitat) - DG for Ecological Transition
EDF ENR PWT (PHOTOWATT)	HOLALUZ-CLIDOM S.A.	Norwegian Crystals	Verband Deutscher Maschinen- und Anlagenbau e.V. (VDMA)
EIFFAGE	HoloSolis SAS	Norwegian Solar Energy Cluster	VITRONIC Dr.-Ing. Stein Bildverarbeitungssysteme GmbH
EIT Innoenergy	Housing Europe - The European Federation of Public, Cooperative and Social Housing, IBC SOLAR AG	Over Easy Solar AS	Volkswagen AG
Encavis AG	Iberdrola Renovables Energía S.A.U.	Oxford PV Germany GmbH	Voltaro Energy GmbH
Endurance Solar Solutions bv	IGNIS ENERGY HOLDING	paXos Solar GmbH	Voltec Solar
Enel Group	IMEC, Infineon Technologies AG	Pelion Green Future	VON ARDENNE
Energetica Industries GmbH	INL - International Iberian Nanotechnology Laboratory, innity UG	Phyrtonics GmbH	Wacker Chemie AG
ENGIE	Institut für Solarenergieforschung GmbH	PVcase	WIP Renewable Energies
Enpal GmbH	INSTITUT PHOTOVOLTAIQUE D' ILE DE FRANCE	QUANTOM	
EPIA SolarPower Europe	Institute for Energy Technology	RCT Solutions GmbH	
EUREC EEIG	International Solar Energy Research Center Konstanz e.V.	REC Solar EMEA GmbH	
Euroalliages		Rising.eco Kft.	
European Aluminium		ROSI	
European Solar Manufacturing Council		RUSERIO SOLAR SRL	
European Technology and Innovation Platform on Photovoltaics - ETIP PV		RWE Renewables GmbH	
		Satinal s.p.a.	
		Saxon State Ministry for Energy	

info@solaralliance.eu
www.solaralliance.eu

