



# Das geopolitische Rennen um die Kontrolle über die PV-Herstellung – Macht Europa mit?

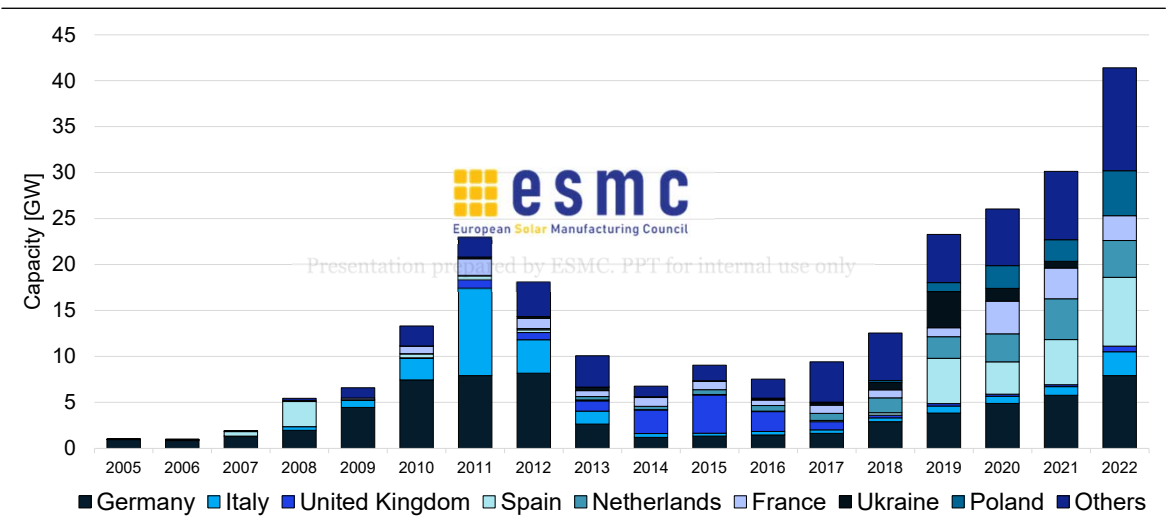


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Dr. Johan Lindahl, Secretary General of ESMC

21th Swiss Photovoltaics Conference,  
March 2023

## Annual installed PV capacity in Europe

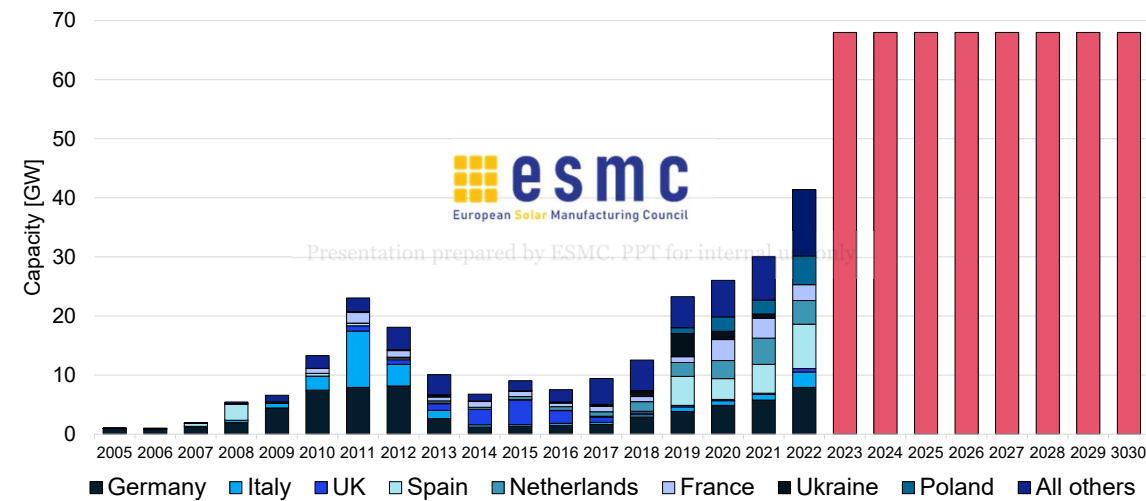


Source: IEA PVPS, ESMC, the European Commission



### Annual installed PV capacity in Europe

The EU Solar Strategy sets a target of 750 GWdc (600 GWac) by 2030, a significant increase in pace

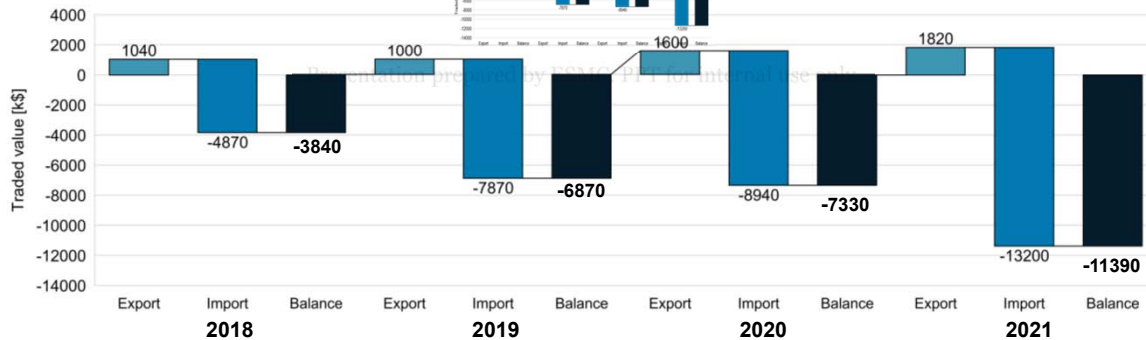


### High EU PV deployment ambitions vs. low manufacturing capacities

The manufacturing capacity in 2022 was:

- Polysilicon: 22.1 GW, Elkem & Wacker
- Wafer & Ingots: 1.4 GW, Norsun, Norwegian Crystals & EDF Photowatt
- Cells: 0.76 GW, Solitek/Valoe, Enel, Ecosolifer, etc.
- Modules: 8.28 GW, above 100 different companies

The total value of traded cells and modules<sup>1</sup>. All data is presented in million of US\$.



1. The total value of traded Photosensitive semiconductor devices, including photovoltaic cells whether assembled in modules or made up into panels; Light emitting diodes with European countries from 2016 to 2021.

Source: Fraunhofer ISE, ESMC, ITC data base trademap

## The PV import dependency of Switzerland

### Trade flows of PV module and cells

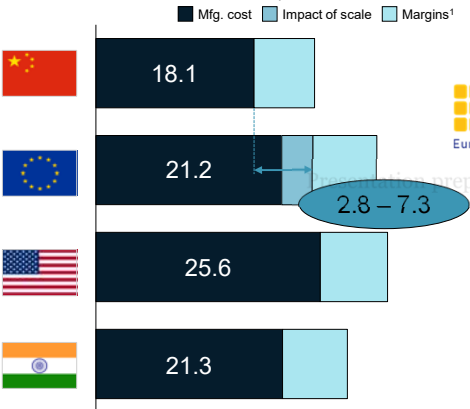
The imported value of the total import in to and export out of Switzerland in 2022<sup>1</sup>, for a selection of export regions and countries.

	Cell import [US\$, thousands]	Module import [US\$, thousands]	Total import [US\$, thousands]	Cell export [US\$, thousands]	Module export [US\$, thousands]	Total export [US\$, thousands]
Rest of N&C America	139	188	327	0	49	49
USA	369	3 111	4 480	1	23	24
South America	0	0	0	0	266	266
Africa	0	3	3	3	44	47
Middle East	0	156	156	29	0	29
Rest of Asia	231	3 916	4 147	0	1	1
South Korea	2	1 488	1 490	0	0	0
China	4 869	254 149	259 018	7	12	19
Japan	1 330	448	1 778	0	20	20
Taiwan	112	707	819	0	0	0
Malaysia	83	396	479	0	0	0
Oceania	0	5	5	0	0	0
Europe	5 011	212 395	217 406	307	4 727	5 034
Total	12 146	476 952	489 098	347	5 142	5 489

1. The total value of traded goods in the HS-codes 854142 Photovoltaic cells not assembled in modules or made up into panels and 854143 Photovoltaic cells assembled in modules or made up into panels.  
Source: ESMC, ITC data base trademark

## European solar manufacturing is at an average of 2.8 – 7.3 \$c/Wp disadvantage compared to China

### Local mfg. cost of solar modules<sup>2</sup> (excluding logistics), \$c/W<sub>p</sub>, 2022

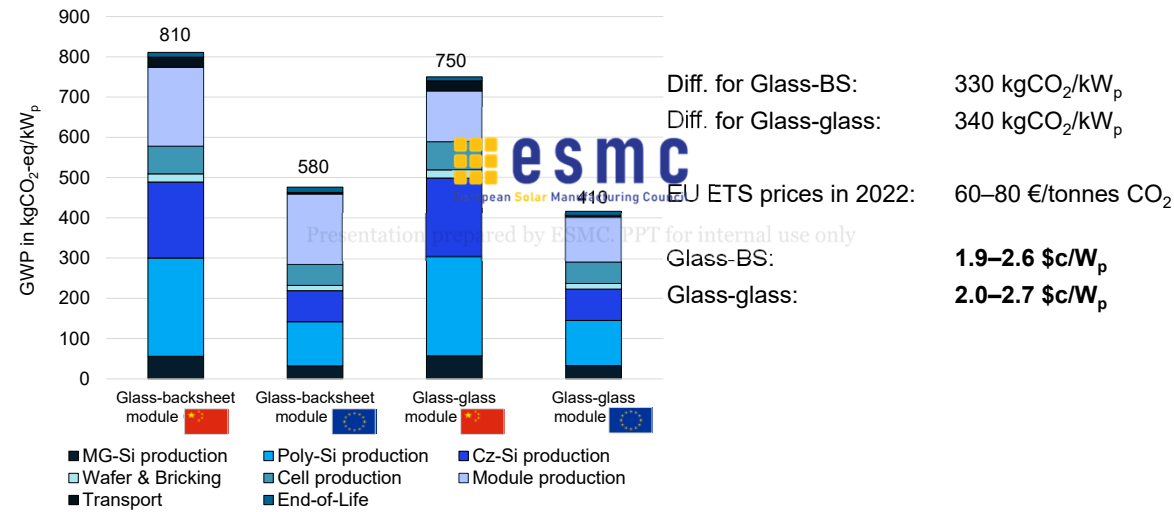


### Key drivers of gap EU vs. China, \$c/W<sub>p</sub>

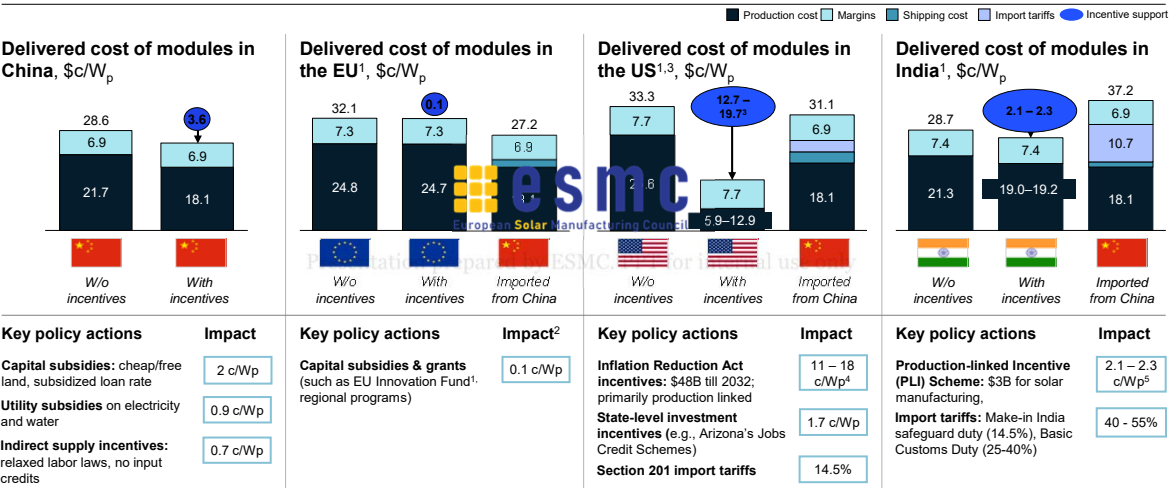
Electricity	0.4–0.5	+10–100%
Labor	1.2–3.1	2–3X
Material	1.6–3.1	+20–30%
Depreciation	0.1–0.2	+10–20%
Total gap	7.3	+17–37%
Shipping cost	~1	
Impact of scale	~3.6	
EU Premium/ Subsidies/ CO2 cost	2.7	

1. China and India margins are calculated from local producer data and expert interviews. EU/US margins are derived using corporate tax rates of 21.7%/25% and ROIC of 10% at each value chain stage. Estimated CapEx is \$0.14/W for polysilicon, \$0.19/W for ingot wafer, \$0.13/W for cells, and \$0.10/W for modules  
2. All cost based on stable energy markets (doesn't include current Poly-Si prices or high EU electricity prices)

Impact of location on life cycle assessment of silicon PV modules

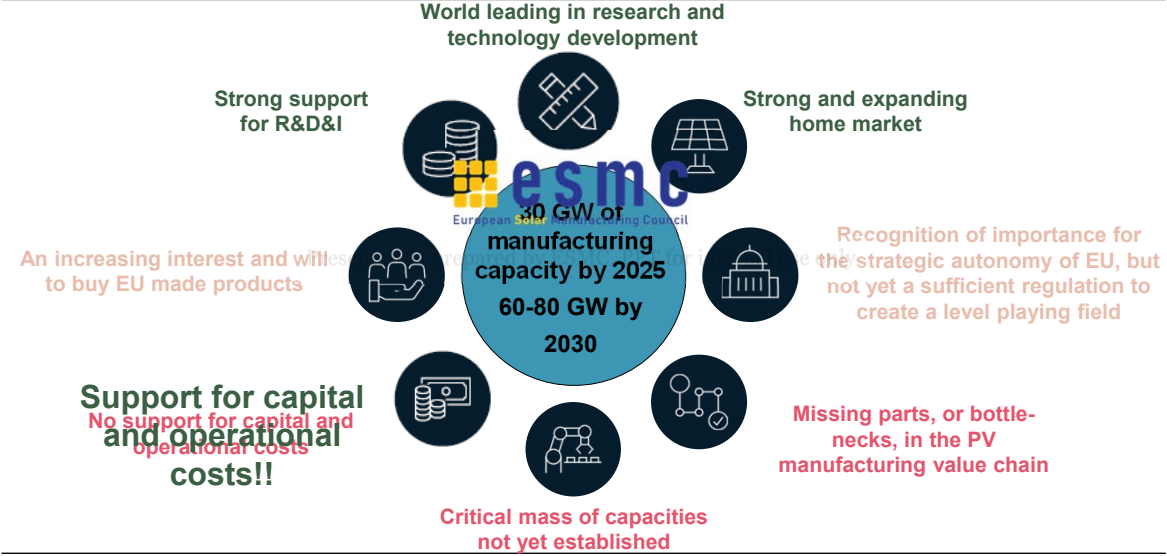


Impact of policy incentives on local solar manufacturing cost across the regions



Current situation of the European PV manufacturing landscape

Strengthens and weaknesses in the peruse of reaching the manufacturing goal of the EU commission



Policy instruments to foster European PV manufacturing and current status — IN PLACE

**Temporary Crisis and Transition Framework (TCTF)** — Lifted state aid rules unlocked opportunities for state aid support

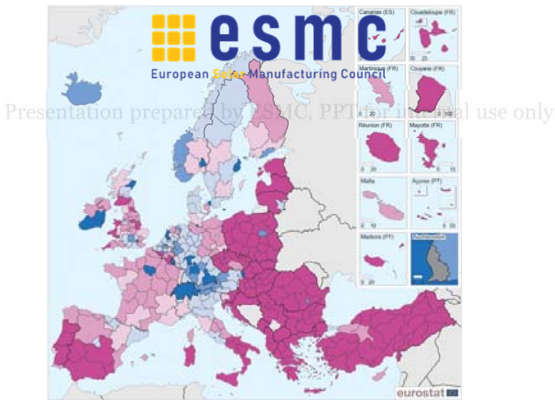
Through the General Block Exemption Regulation (GBER), and the proposed Temporary Crisis and Transition Framework (TCTF), following the aggression against Ukraine by Russia, the European Commission adopted the 9 March the proposal that EU Member States will be able to 31 December 2025 support clean tech production in Europe, including the PV manufacturing industry.

	Type of support	General support	Development area ("c" areas)	Development area with high needs ("a" areas)
Large enterprise	CAPEX support	15%	20%	35%
	Tax advantages, loans or guarantees	20%	25%	40%
Medium enterprise	CAPEX support	25%	30%	45%
	Tax advantages, loans or guarantees	30%	35%	50%
Small enterprise	CAPEX support	35%	40%	55%
	Tax advantages, loans or guarantees	40%	45%	60%

## Policy instruments to foster European PV manufacturing and current status — IN PLACE

### Temporary Crisis and Transition Framework (TCTF) — Lifted state aid rules unlocked opportunities for state aid support

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## Policy instruments to foster European PV manufacturing and current status — IN PLACE

**Temporary Crisis and Transition Framework (TCTF)** — Lifted state aid rules unlocked opportunities for state aid support.



**Revised REPowerEU Regulation** — Amends the Regulation for REPowerEU chapters in the Recovery and Resilience plans (RRPs)



On February 27, a revised REPowerEU Regulation was adopted, which amends the Regulation for REPowerEU chapters in the Recovery and Resilience plans. The Commission requests that Member States submit their revised/modified RRs by April 30th. This sets the legal groundwork for Member States to support their PV manufacturing industry, provided they include it in their RRs, by EU funds rather than their own state budget.



## Policy instruments to foster European PV manufacturing and current status — IN PLACE

**The EU Solar PV Industry Alliance** — The general objective is to enable the development of an EU solar PV industrial ecosystem.

The alliance will bring together industrial actors, research institutes, consumer associations and other stakeholders with an interest in the solar PV sector. Discussed and foreseen activities are:

- Identify manufacturing scale up bottlenecks and provide recommendations.
- Set voluntary quantified objectives for EU manufacturing capacity and a diversified value chain.
- Map the availability of financial support.
- Facilitate access to finance, including by establishing commercialization pathways for solar PV manufacturing.
- Provide framework for cooperation actions for development and uptake



**The Just Transitions Funds (JTF)** — the JTF is dedicated to transform coal regions to renewables hubs. JTF have a budget of €17.5 billion, of which Five Member States – Poland, Germany, Romania, Czechia and Bulgaria – comprises almost 60% of all JTF budget (59,26%), which equals to €10.4 billion.

**Innovation Fund** — The Innovation Fund is a funding programme for the demonstration of innovative low-carbon technologies.

ENEL's Catania 3 GW bifacial heterojunction project TANGO was granted €118 million in the 1<sup>st</sup> Large-Scale Call (LSC). A budget for the 3<sup>rd</sup> Large-Scale Call (LSC) of € 3 billion has been made available. The 3<sup>rd</sup> LSC will be dedicated to three windows:

- **Innovative clean tech manufacturing (€ 750 million)**
- Innovative electrification and hydrogen applications in industry
- mid-sized pilot projects that focus on validating, testing and optimising highly innovative solutions



**Policy instruments to foster European PV manufacturing and current status — UPCOMING**

**PV in the EcoDesign regulatory framework** — Increased quality and CO2-emission content favour European manufacturers.

The drafting of regulatory texts to include PV modules into the EcoDesign regulatory framework aims at:

- Foster module and inverter designs that have improved long-term energy yield, circularity and smart readiness.
- Take products off the market that are of a low quality.
- Inform users in a comparable manner about module performance and carbon footprint to provide them with a common basis to compare different products.



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**Policy instruments to foster European PV manufacturing and current status — ADVOCATED ADDITIONAL POLICIES BY ESMC**

**Important Projects of Common European Interest (IPCEI)** — Makes it possibility for the EU Member States to support domestic innovative industry projects without violating the EU Internal Market and the State Aid guidelines.

- Currently 59 member companies and organisations, participating in 6 projects.
- Encouragement from the EU commission and official support from **Spain**, Poland Austria, Belgium, Lithuania, Luxemburg and *Norway*.
- Germany, France, Netherlands and Italy in progress, and we are expecting their support.

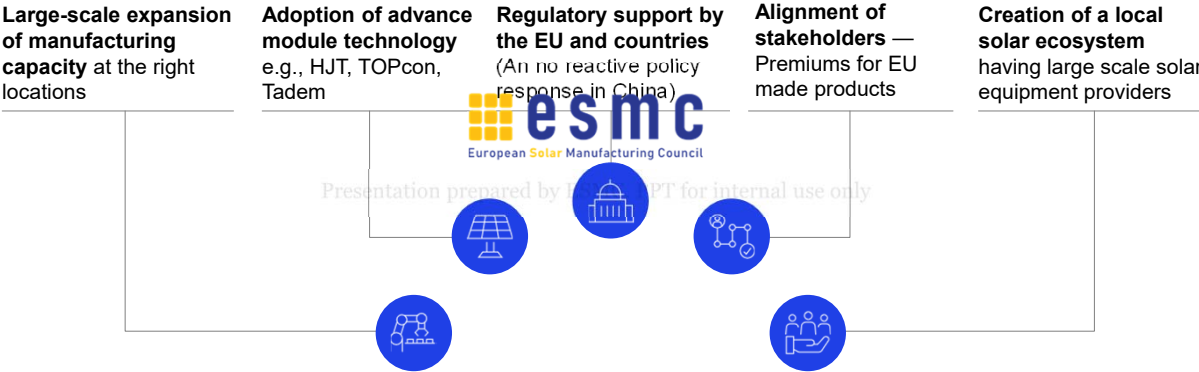


**The Carbon Border Adjustment Mechanism (CBAM)** — Including PV modules would reduce inequity between European manufacturers that pay for their emissions and Asian manufacturers that don't.





Key criteria for successful enablement of PV supply chain in EU



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