

EUROPEAN CLUSTER CONFERENCE 2022

26-27 SEPTEMBER 2022, PRAGUE



Energy Security and Strategic Resilience of the European Economy

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MCPV



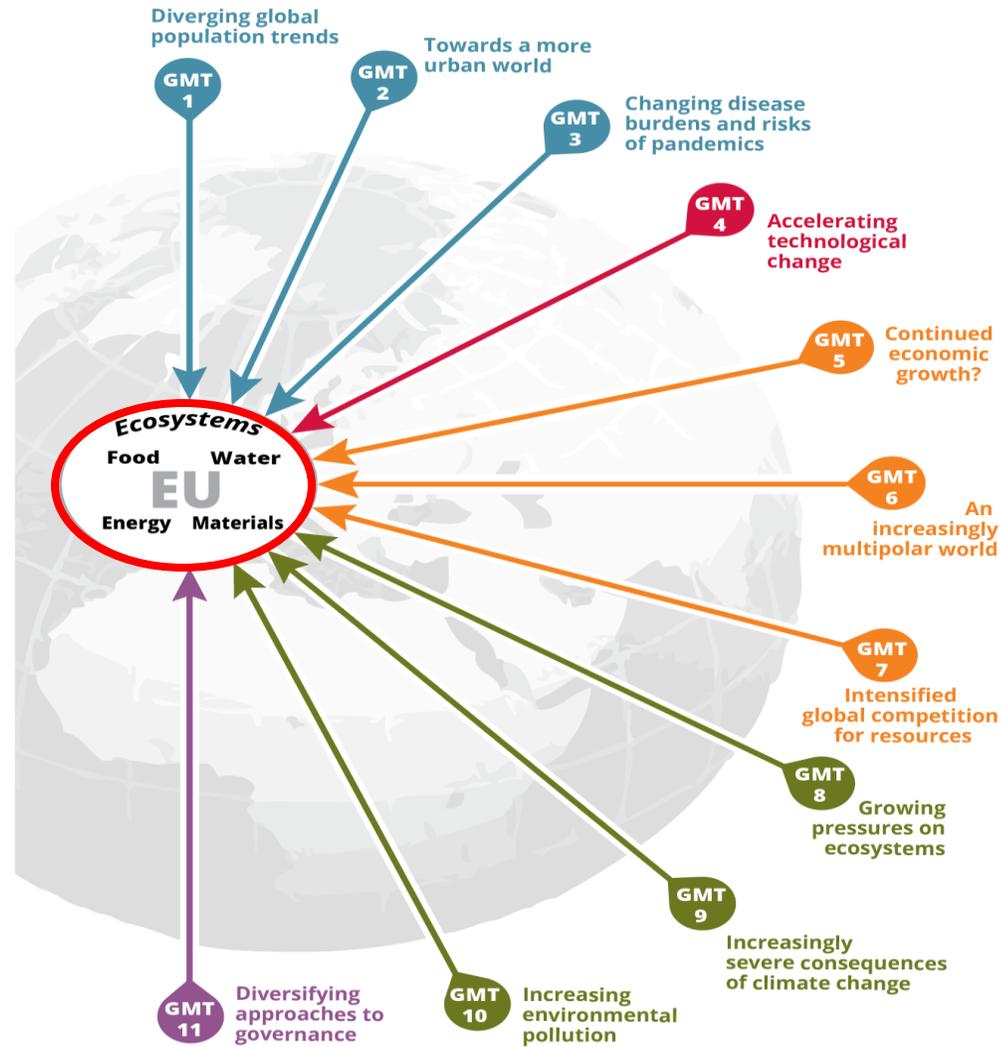
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CONFERENCE 2022



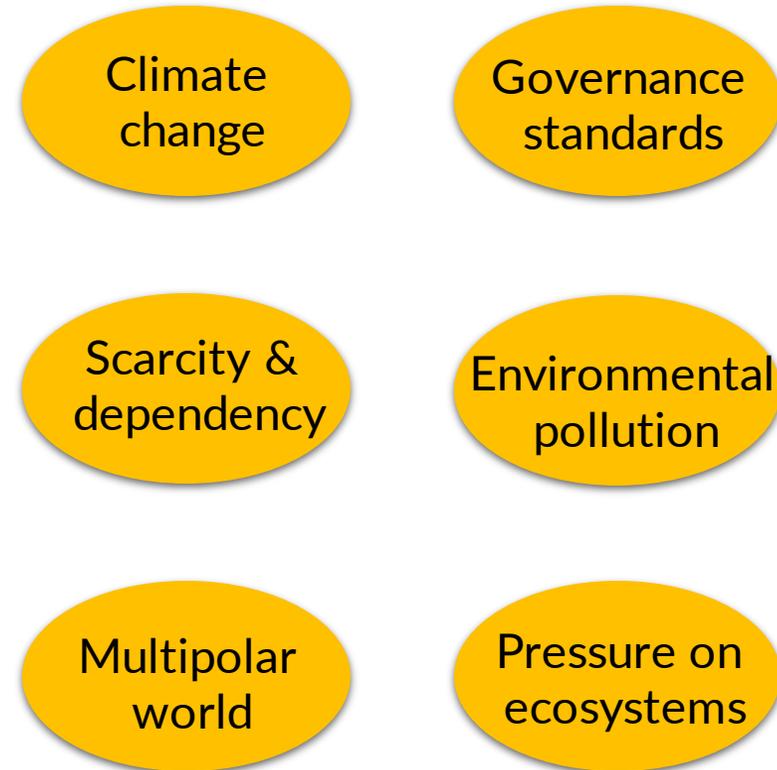
#EUClusterConference

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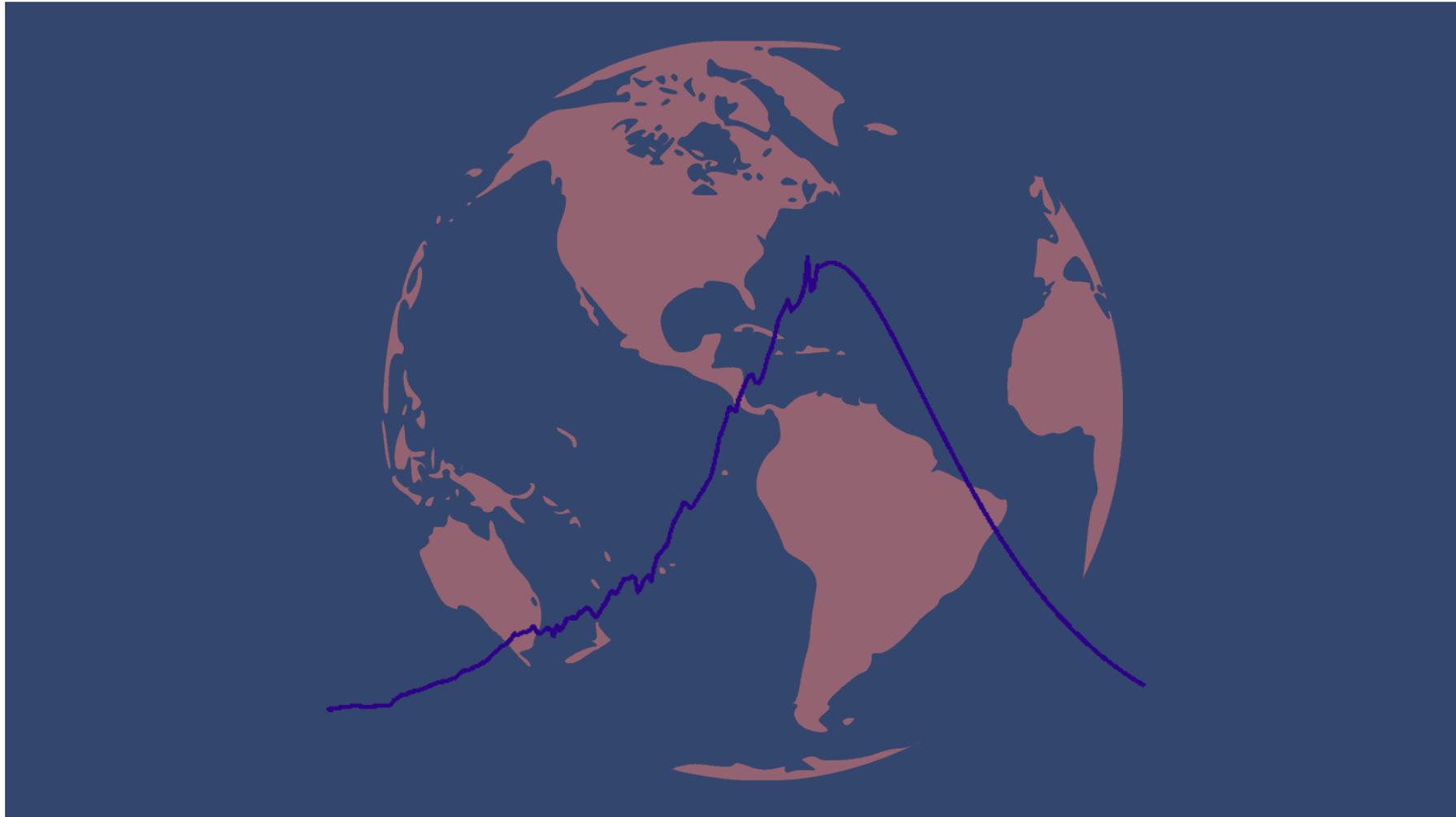
Global megatrends

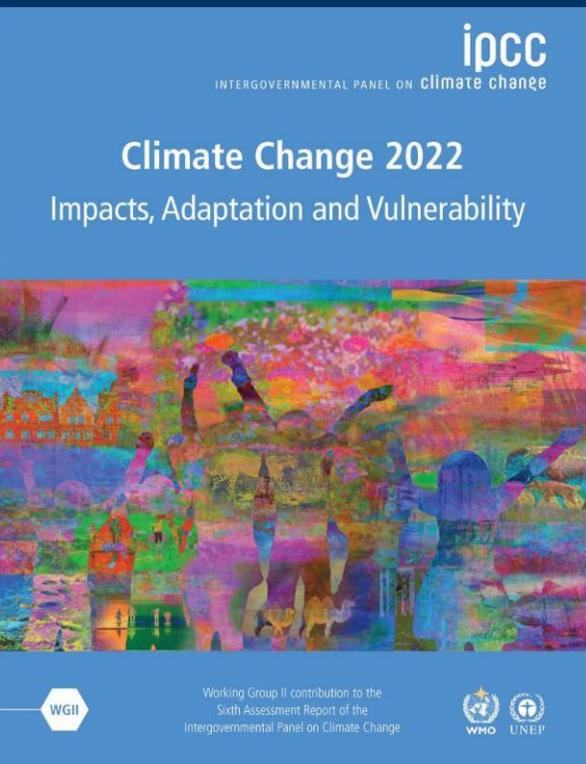


Megatrends which will define decades to come



Carbon Budget





The image shows the cover of the IPCC report 'Climate Change 2022: Impacts, Adaptation and Vulnerability'. The cover features a vibrant, abstract painting of people in various poses, some with arms raised, set against a colorful background. The text on the cover includes the IPCC logo, the title 'Climate Change 2022: Impacts, Adaptation and Vulnerability', and the subtitle 'Working Group II contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change'. Logos for WGI, WHO, and UNEP are also present.

“ The scientific evidence is unequivocal: climate change is a threat to human well-being and the health of the planet. Any further delay in concerted global action will miss the brief, rapidly closing window to secure a liveable future. This report offers solutions to the world.

ipcc
INTERGOVERNMENTAL PANEL ON climate change

ipcc
INTERGOVERNMENTAL PANEL ON climate change
WMO UNEP

The new IPCC report Consequences of climate change and solutions for Europe

Europe

Europe is warming faster than the global average. The effects can be seen everywhere, with major regional differences. Some consequences are irreversible, such as the loss of glaciers and the extinction of species.

Floods

In a scenario where warming exceeds 3°C, the damage caused by river floods may double. As 2100 approaches, damage as a result of coastal flooding will, in the 3°C scenario, be ten times higher than current levels. Early warning systems, room for rivers, flood defences, and the relocation and prevention of building in high-risk areas will limit the consequences.

Heat

Heat stress will inflict more casualties. In the 3°C scenario, this risk will be 2 to 3 times higher than in the 1.5°C scenario. Early warning systems and the greening of cities will help to reduce the risk.

Drought

The risk of water shortages will increase with higher levels of warming, particularly in western and central Europe and southern Europe. The more efficient storage, retention and re-use of water are effective measures. Physical and technological circumstances will limit adaptation options.

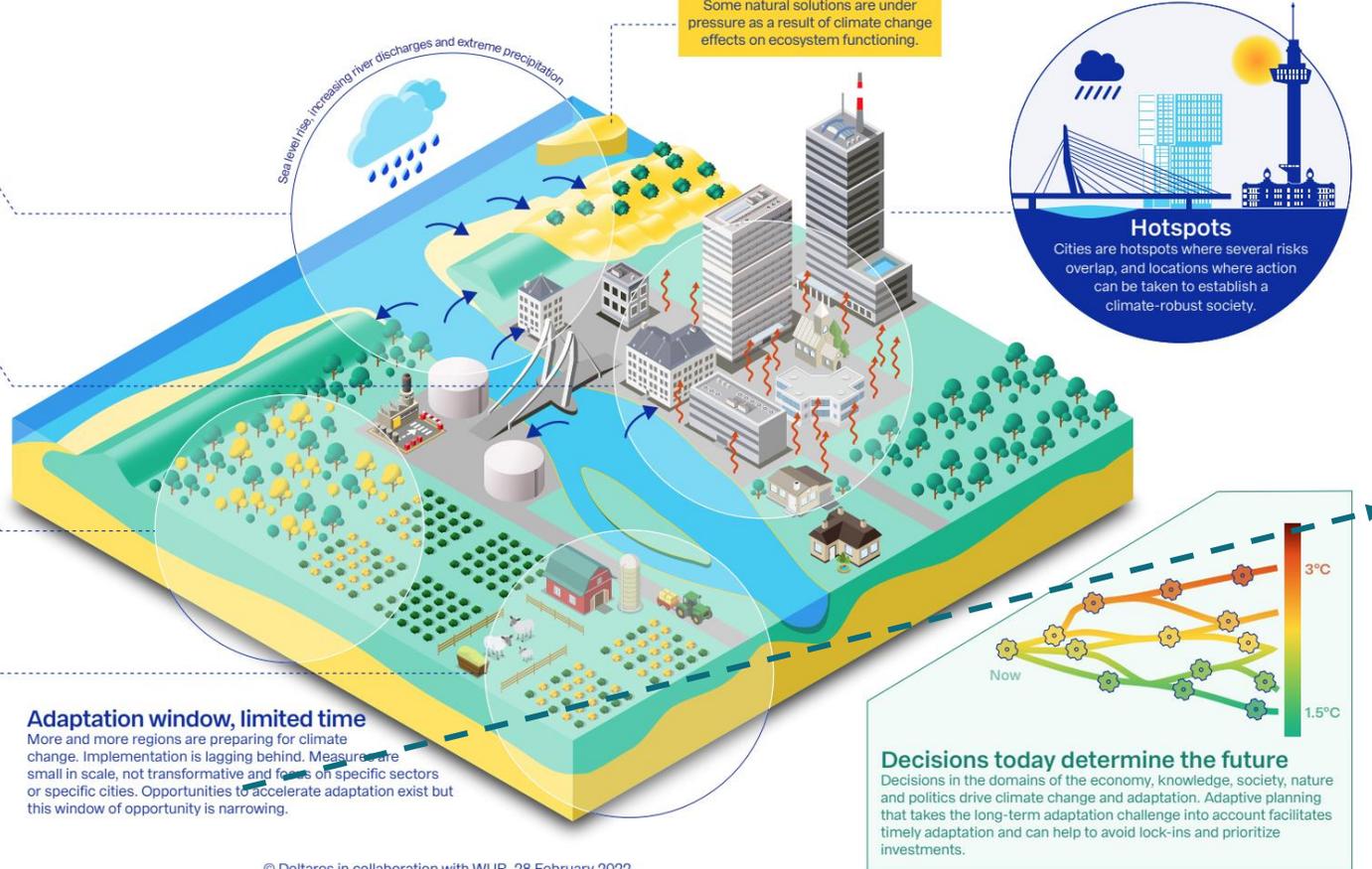
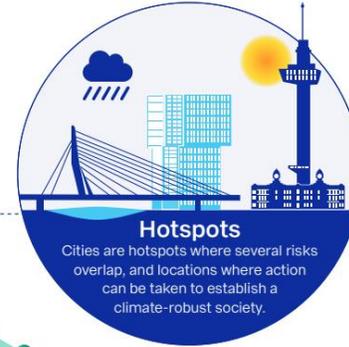
Nature

The habitat for current land and marine ecosystems will be reduced, with irreversible consequences. This process will accelerate if warming exceeds 2°C. The restoration, extension and linkage of protected nature areas will enhance the capacity of ecosystems to adapt.

Agriculture

A combination of drought and heat will exacerbate the risk of crop losses. In the short term, irrigation will be effective but, over time, it will increase risk of water scarcity.

Some natural solutions are under pressure as a result of climate change effects on ecosystem functioning.



More and more regions are preparing for climate change. **Implementation is lagging behind. Measures are small in scale, not transformative and focus on specific sectors or specific cities. Opportunities to accelerate adaptation exist but this window of opportunity is narrowing.**

Deltares

© Deltares in collaboration with WUR, 28 February 2022

(b) Observed impacts of climate change on human systems

| Human systems | Impacts on water scarcity and food production | | | | Impacts on health and wellbeing | | | | Impacts on cities, settlements and infrastructure | | | |
|---------------------------|---|-----------------------------|--|---|---------------------------------|------------------------------|---------------|--------------|---|--|---------------------------|---------------------------------|
| | Water scarcity | Agriculture/crop production | Animal and livestock health and productivity | Fisheries yields and aquaculture production | Infectious diseases | Heat, malnutrition and other | Mental health | Displacement | Inland flooding and associated damages | Flood/storm induced damages in coastal areas | Damages to infrastructure | Damages to key economic sectors |
| | | | | | | | | | | | | |
| Global | ± | - | ○ | - | - | - | - | - | - | - | - | - |
| Africa | - | - | - | - | - | - | ○ | - | - | - | - | - |
| Asia | ± | ± | - | - | - | - | - | - | - | - | - | - |
| Australasia | ± | - | ± | - | - | - | not assessed | - | - | - | - | - |
| Central and South America | ± | - | ± | - | - | - | not assessed | - | - | - | - | - |
| Europe | ± | ± | - | ± | - | - | - | - | - | - | - | - |
| North America | ± | ± | - | ± | - | - | - | - | - | - | - | - |
| Small Islands | - | - | - | - | - | - | ○ | - | - | - | - | - |
| Arctic | ± | ± | - | - | - | - | - | - | - | - | - | ± |
| Cities by the sea | ○ | ○ | ○ | - | ○ | - | not assessed | - | ○ | - | - | - |
| Mediterranean region | - | - | - | - | - | - | not assessed | - | ± | - | ○ | - |
| Mountain regions | ± | ± | - | ○ | - | - | ○ | - | - | na | - | - |

Confidence in attribution to climate change

- High or very high
- Medium
- Low
- Evidence limited, insufficient
- na Not applicable

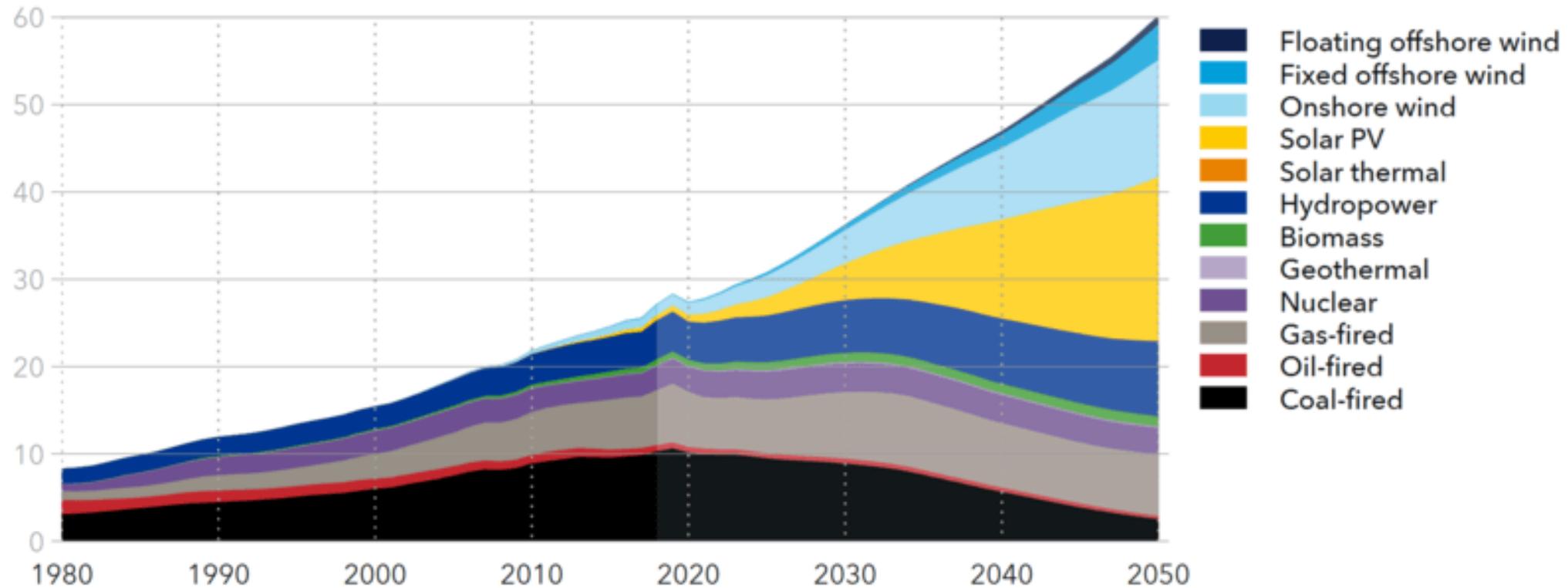
Impacts to human systems in panel (b)

- Increasing adverse impacts
- ± Increasing adverse and positive impacts

What do we need to mitigate?

World electricity generation by power station type

Units: PWh/yr

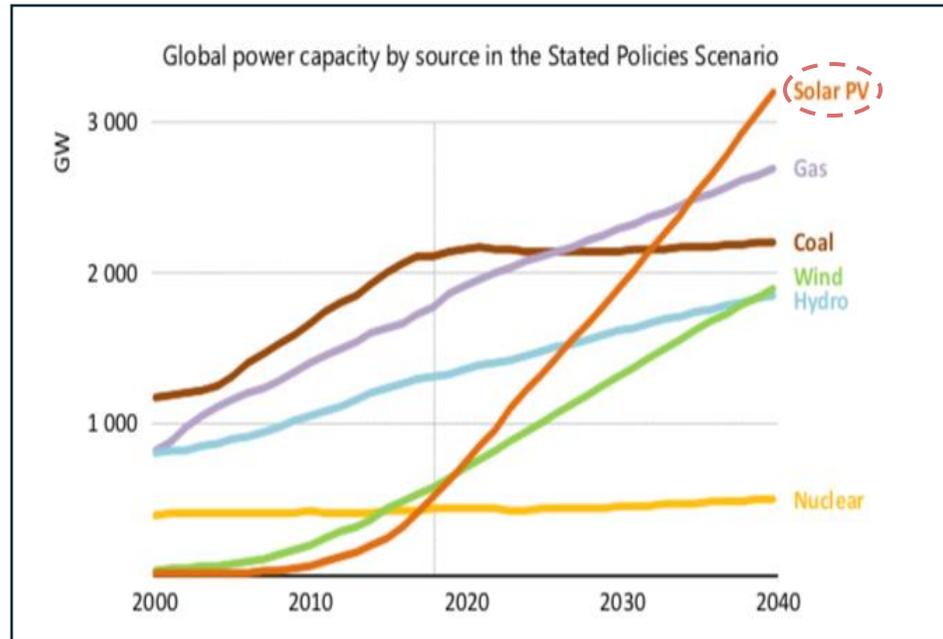


©DNV GL 2020

Historical data source: IEA WEB (2019), IRENA (2019)

Solar PV is the key enabler of the energy transition

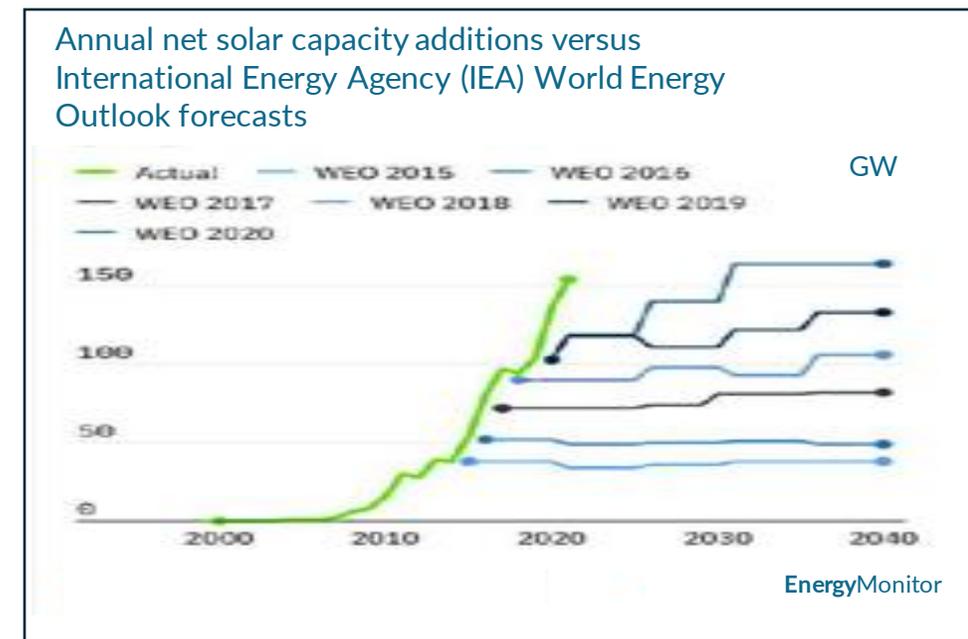
Installed power capacity 2000-2040



- Global PV installed capacity exceeded 1TW in '22
- For 100% renewable energy generation, need ~ 30-60 TW of PV installed (and 20-40 TW Wind)

Source: IEA

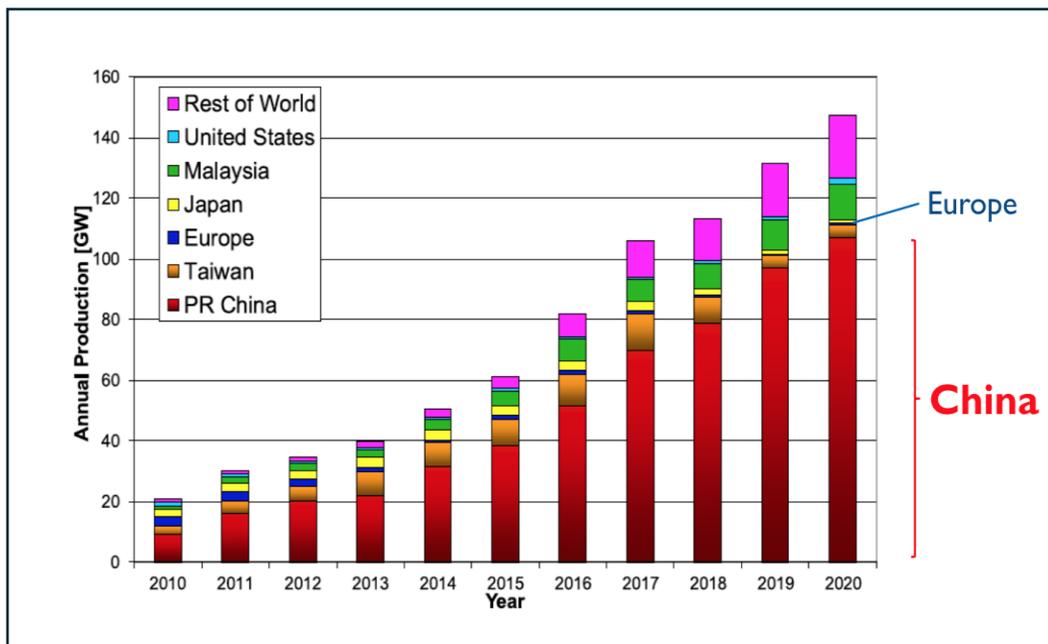
Annual net solar additions vs forecasts



- Annual Solar PV additions consistently higher than forecasts
- Solar PV growth outperforming due to it being the lowest cost of renewable energy and climate change imperatives

EU energy dependency: from fossil fuel to renewable energy

Global annual PV production by country / region

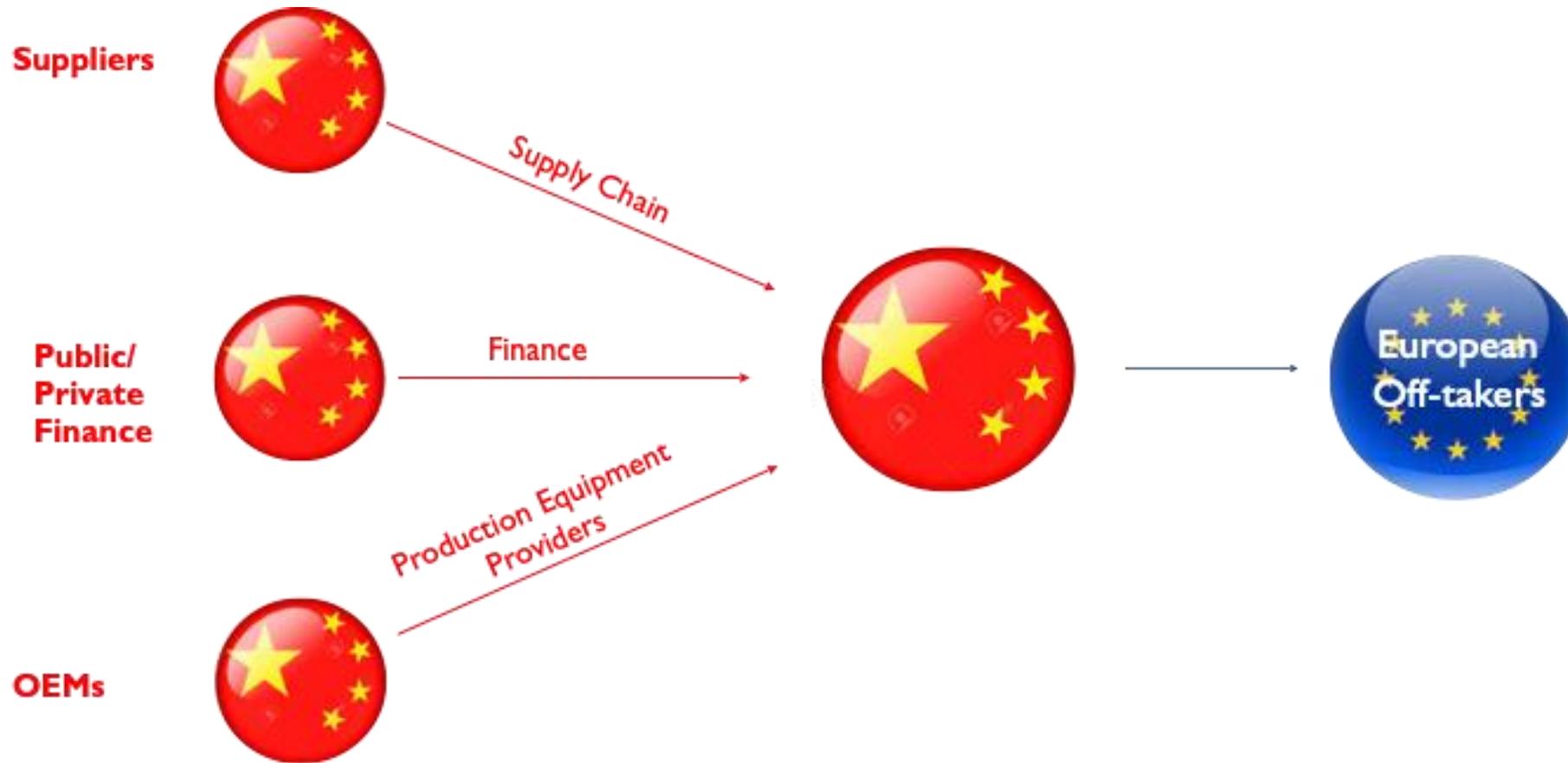


“... The rapid growth of renewable energy is likely to alter the power and influence of some states and regions relative to others, and to redraw the geopolitical map in the 21st century”

International Renewable Energy Agency (IRENA)

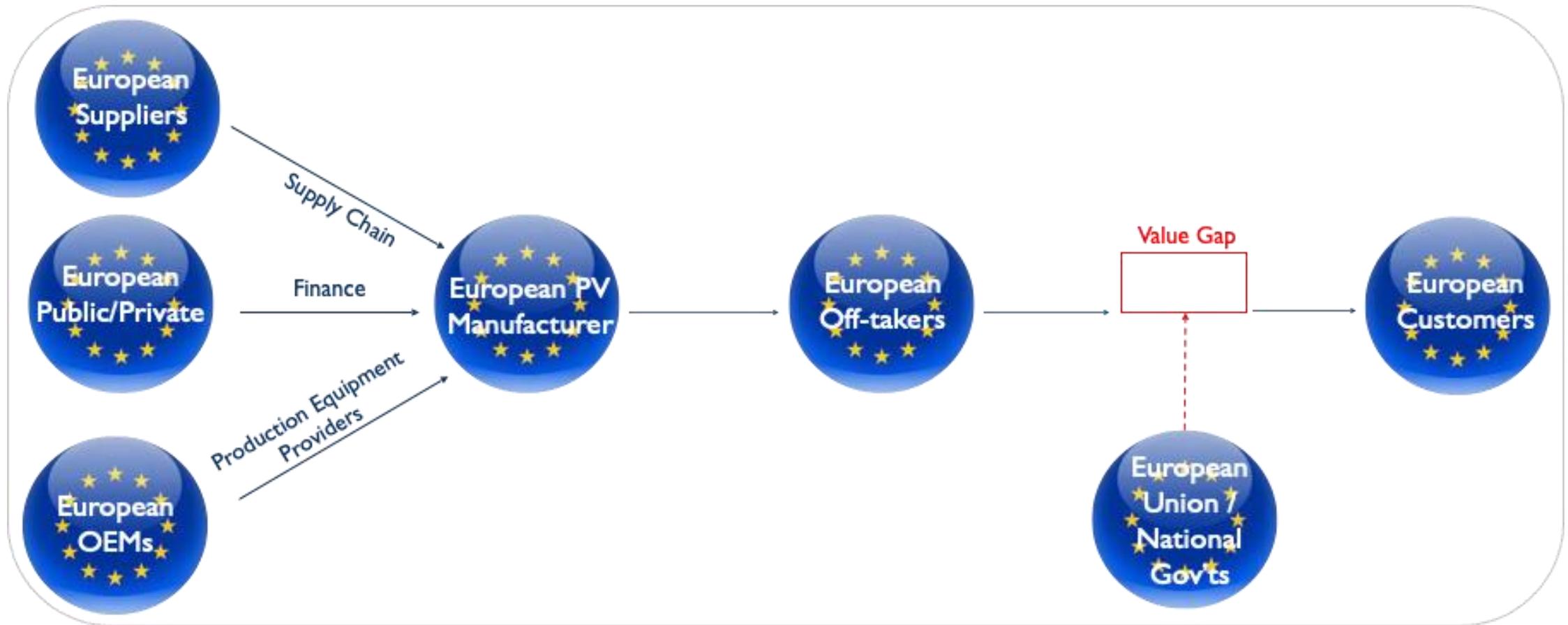
urgent need
Europe has an opportunity to become energy independent

European PV Industry – Current Supply Chain



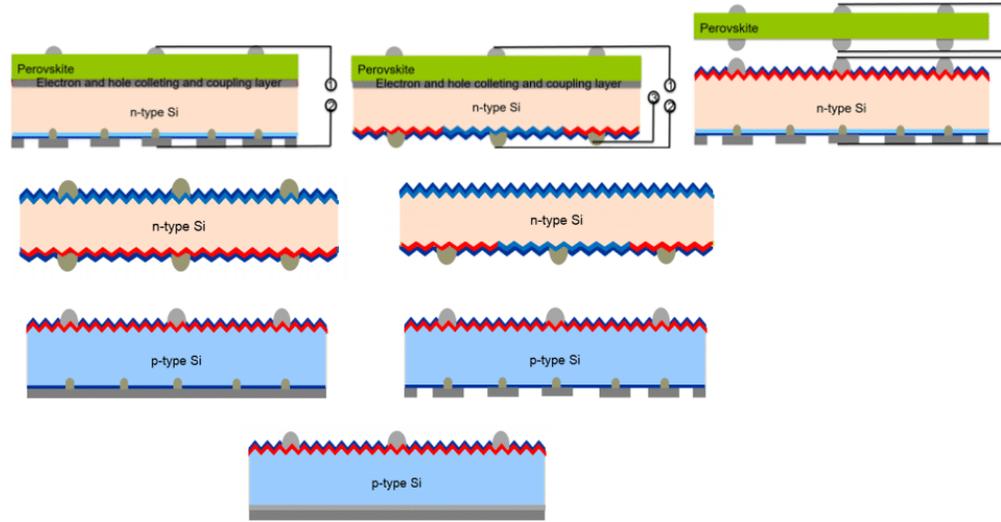
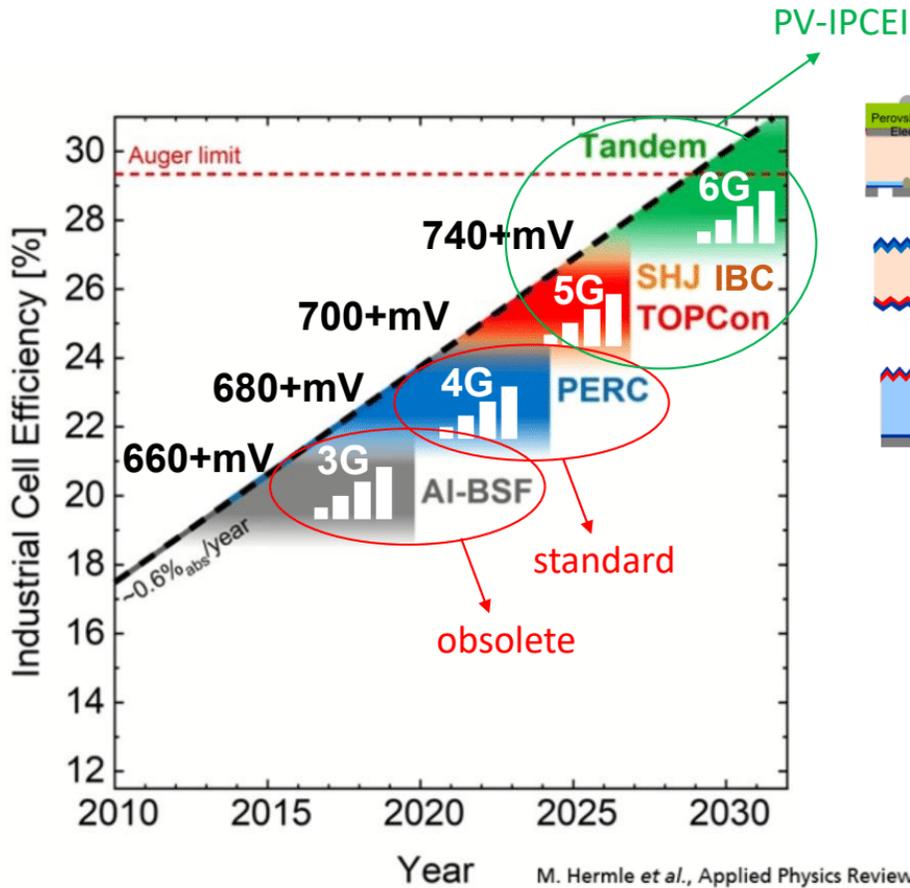
Chinese dominated supply chain

European PV Industry – Target Supply Chain



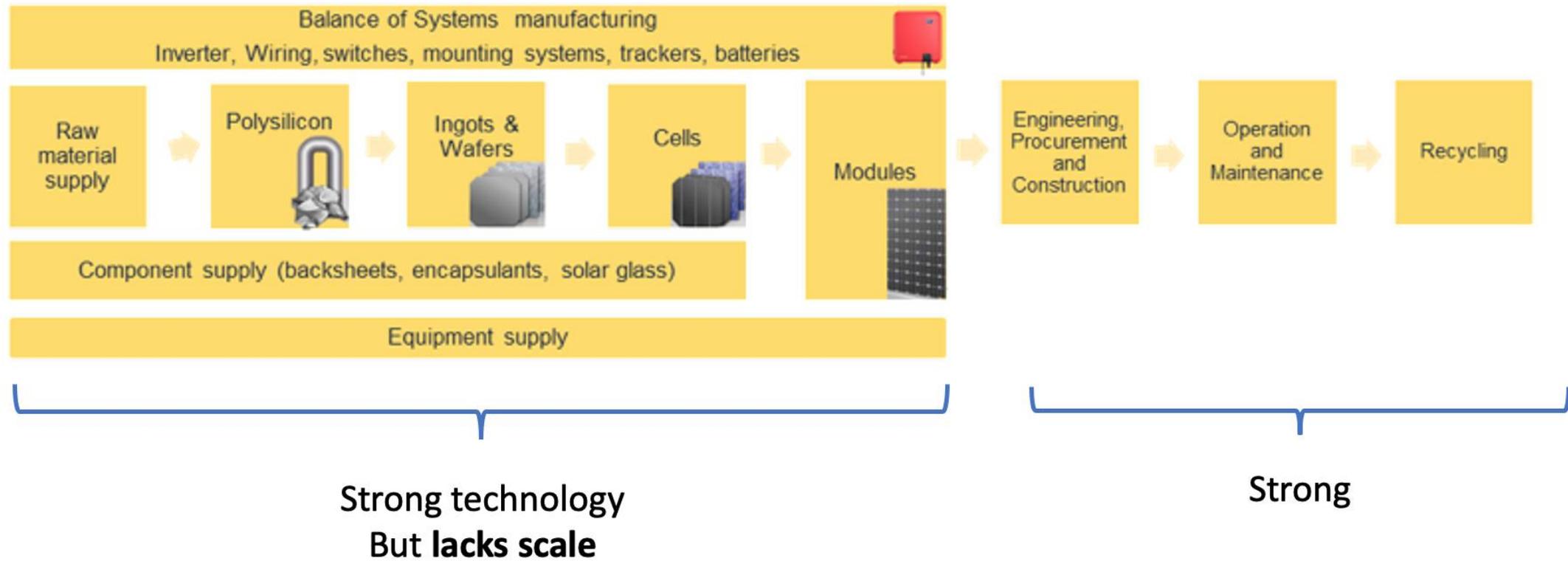
The EU needs to underwrite any “value gap” that may arise for an initial period of time

EU Solar PV Opportunity



The PV-IPCEI projects are all based on next-tech advanced n-type bifacial technologies.

EU Supply Chain



Mobilization within the EU



Private sector champions - major European IPP's making the case for an EU solar PV manufacturing base

On Public agendas at the highest levels

End-to-end EU Private-Public Industrial strategy for Solar PV

President von der Leyen
Vice-President Timmermans
Commissioner Simon
Commissioner Britton
Heads of States and Governments

Brussels, 26th January 2022

Developing a Strategic Action Plan for the solar PV industry in Europe

Dear President, Vice-President, Commissioners,
Dear Heads of States and Governments,

Solar will be at the core of the future European renewable-based and integrated energy system. Thanks to record low prices, now well below industrial and residential prices, and to a unique scalability allowing an optimized use of land, large capacities of solar PV can be deployed to decarbonise the energy system at the lowest costs for the European economy. The EU market is already growing exponentially, defying all forecasts: while the Commission foresees 470 GW of solar PV installed in 2030, current market trends show that Europe will exceed that capacity before 2030¹. And we can go much higher: to be on track of climate-neutrality, Europe will have to install 870 GW by 2030². The undersigning companies, Europe's major solar and renewable developers, are ready to deploy solar at a faster pace.

This exponential growth of the solar industry will create green growth in Europe. The solar industry itself will sustain half a million of high-quality jobs by 2025³, and support millions of additional jobs in the renewable hydrogen industry or the decentralized battery storage industry. Market competitive solar corporate sourcing solutions will benefit to EU businesses, and in particular the 2.6 million jobs in the EU energy intensive industry.

An industry can develop sustainably only if it has a comprehensive vision of its supply chain. Europe has diversified from the most strategic steps of the solar PV value chain, and most of the EU project developers rely on a limited number of suppliers, with significant concentration in a limited number of countries outside Europe. The European solar industry has flourished in the past years thanks to a fruitful cooperation with these global partners, and there is no sign that such a cooperation will stop tomorrow.

Nevertheless, in the medium term, this raises questions about the impact on the EU solar industry. Future disturbances in the supply chain, such as the current increase of shipping costs, the 40% increase of polysilicon costs or the expected shortage of solar PV modules supply in 2022, could cause temporary yet costly stress and delays in module procurement and project development. This is detrimental to the speed of European decarbonisation. Allowing access to a diversified supply of components in the medium term is necessary to ensure a healthy competition among manufacturers, sustain a continuous innovation cycle, improve the sustainability of the supply chain and strengthen the resilience of the industry in case of future shocks.

We must engage to develop a European strategy for the solar PV value chain to be endorsed by the Competitiveness Council in 2022. This is necessary to achieve the objectives of the European Green Deal set by the European Commission. Pragmatic and progressive, such a strategy should include a comprehensive set of measures ensuring a level playing field for the EU industry, in line with the EU approach of an open and strategic autonomy. Major partners of the EU, such as India and the United States, have already identified the solar PV industry as strategic and are reinvesting into domestic manufacturing. Europe has many strengths on which to count: a historical industrial ecosystem and know-how, a technological leadership on the edge of the future thanks to a vibrant research and innovation community.

¹ SolarPower Europe expects 585 GW with current market growth trends.
² SolarPower Europe forecasts (see the [Global Market Outlook for Solar 2021](#)) and climate-neutrality scenarios ([100% Renewable Europe 2050](#)).
³ SolarPower Europe EU Solar Jobs Report 2021.

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NEWS (HTTPS://WWW.PV-TECH.ORG/CATEGORY/NEWS/)

European Commission launches consultation ahead of solar strategy reveal

By [Liam Stoker](https://www.pv-tech.org/author/liamstoker/) (https://www.pv-tech.org/author/liamstoker/)
January 21, 2022

Financial & Legal (https://www.pv-tech.org/industry-segments/financial-legal/),
Markets & Finance (https://www.pv-tech.org/industry-segments/markets-finance/),
Policy (https://www.pv-tech.org/industry-segments/policy/)

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LATEST

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Duke Energy to exit coal by 2035, plans US\$50bn capex investment over five years (https://www.pv-tech.org/duke-energy-to-exit-coal-by-2035-plans-us50bn-capex-investment-over-five-years/) NEWS

Australia's Fortescue plans renewables hub featuring 3.3GW of solar (https://www.pv-tech.org/australias-fortescue-plans-renewables-hub-featuring-3-3gw-of-solar/) NEWS

Solariant Capital, Daiwa unit partner to develop US solar and storage pipeline

The consultation will educate the EC's solar strategy, due to be published later this year. Image: Flickr/Glyn Lowe.

The European Commission has launched a public consultation on solar energy on the continent as it continues preparations to publish its solar strategy later

Important Projects of Common European interest (IPCEI)

- Projects of EU strategic importance relating to innovation in resource-intensive core market segments
- Promotes innovative industrial deployment, facilitating policy and private-public joint partnerships
- Existing IPCEI projects
 - Battery value chain
 - Microelectronics
 - European batteries innovation
- Solar PV next

Solar market & need for European module production: political support



EU will do 'whatever it takes' to rebuild solar energy manufacturing in Europe



“We need to bring manufacturing back to Europe, and the Commission is willing to do whatever it takes to make it happen ... Part of this is looking at possible financing options,” Kadri Simson - Commissioner for Energy

EU Solar Action



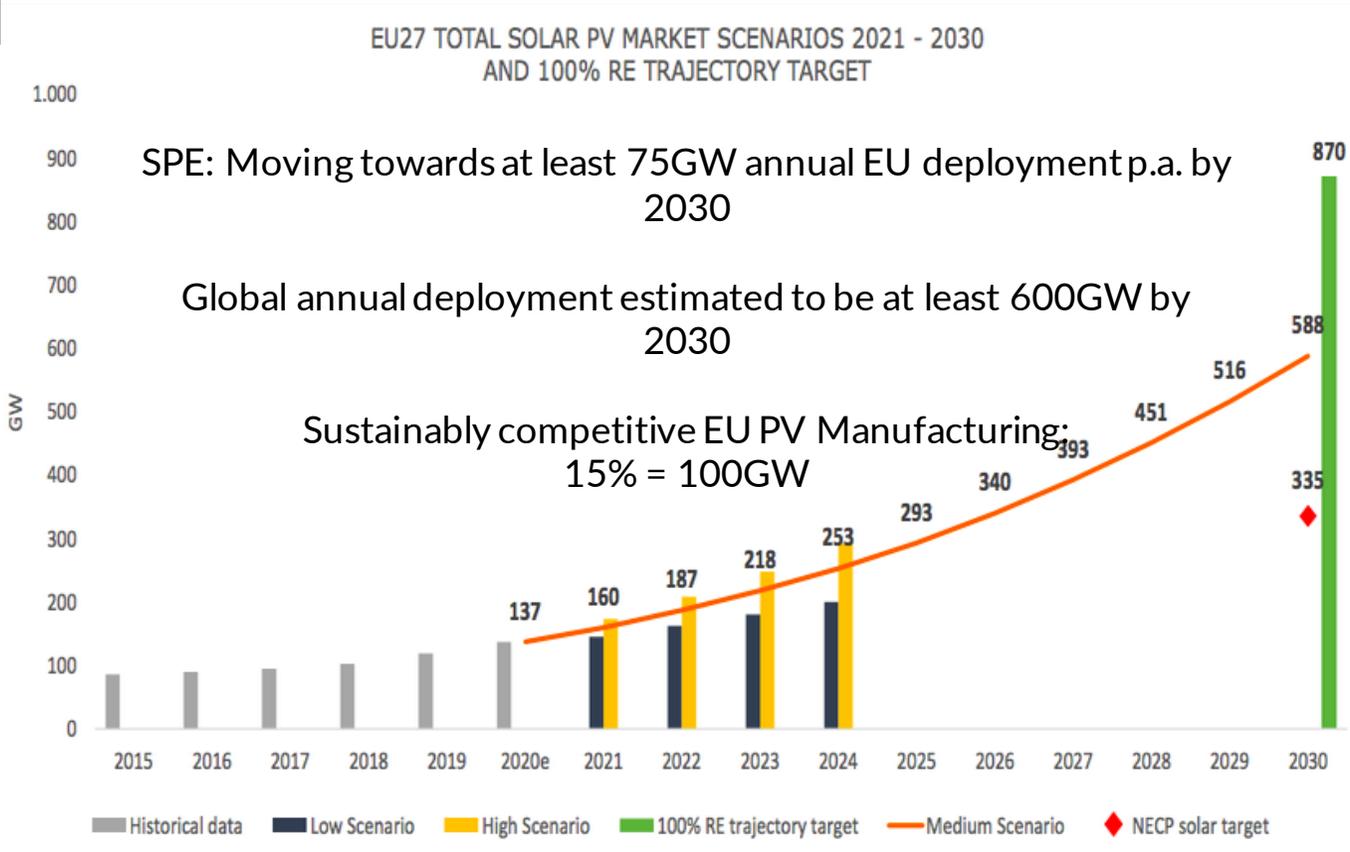
A new European Solar Initiative
20 GW solar by 2025 | 40B€ of GDP/y | 400 000 jobs

2025

320 GW

2030

600 GW



“By 2030 the share of wind and solar energy in power production capacities should double from the current level of 33% to 67%. And by then solar energy will also be the largest electricity source in the EU with more than half coming from rooftops.”
 Kadri Simson

Energy Security



EU ENERGY SECURITY = Technology + Scale + Level Playing Field

| KEY Industries | Technologies | Scale | Level Playing Field | PROPOSED ACTIONS |
|----------------|--------------|-------|---------------------|---|
| WIND | | | CBAM/TAXONOMY/... | <p>ACCELERATE EXISTING PLANS</p> <p>PROTECTION THROUGH STANDARDS</p> <p>SUPPORT MANUFACTURING AND OFFTAKE</p> <p>BOOST EU SOLAR VALUE CHAIN</p> <p>REVIEW AUCTION MECHANISM TO ENABLE STRONG INDUSTRIAL BALANCE SHEETS</p> |
| BATTERIES | | | + IPCEI | |
| HYDROGEN | | | + IPCEI | |
| SOLAR | | | NOTHING | |

SPEED IS KEY

U.S. IRA and Indian PLI

- \$9 billion in consumer home energy rebate programs and 10 years of consumer tax credits to make homes energy efficient;
- \$60 billion to on-shore clean energy manufacturing in the U.S. across the full clean energy supply chain, including billions dedicating to clean technology and clean vehicle manufacturing facilities;
- Over \$60 billion in tax credits and grants to invest in programs and technologies to reduce emissions in every sector of the economy, including from electricity production, transportation, industrial manufacturing, buildings, and agriculture;
- Over \$60 billion in environmental justice priorities to promote investments in disadvantaged communities; and
- Over \$25 billion in investments in clean energy development in rural communities, climate-smart agriculture, forest restoration, and land conservation.

If successful, the IRA would propel the U.S. ahead of European Union and other similarly situated jurisdictions in achieving ambitious climate goals.



Indian government approves second phase of solar manufacturing incentive scheme

The Indian cabinet allocated around \$2.4 billion for the second phase of the incentive scheme.

SEPTEMBER 22, 2022 **UMA GUPTA**

EU – Urgency to Act



- RUSSIA – UKRAINE: THERE IS NO TIME TO WASTE – STATE OF EMERGENCY FRAMEWORK
- UNCERTAINTY IMPACTS PRIVATE MARKET FUNDING: PUBLIC SUPPORT TO FILL THE GAP
- EU AND MS FUNDING INSTRUMENTS: TOO SLOW AND TIMING MISALIGNED WITH URGENCY
- FOR IMMEDIATE IMPACT WE NEED:
 - ✓ ACCELERATED ALLOCATION GRANT INSTRUMENTS* TOWARDS MATURE PROJECTS
 - ✓ ISSUE STATE/CREDIT GUARANTEES – TO UNLOCK AND ACCELERATE PROJECTS
 - ✓ TAX CREDIT SYSTEM – NO NEED TO REINVENT THE WHEEL

WE NEED AN EU GREEN ENERGY MARSHALL PLAN

* RRF, IF, InvestEU, ERDF, EIB, IPCEI, NGF...

A new European Solar Initiative
20 GW solar by 2025 | 40B€ of GDP/y | 400 000 jobs

MCPV – Enabling the EU PV sector



Gigawatt HjT production lines scale-up plan

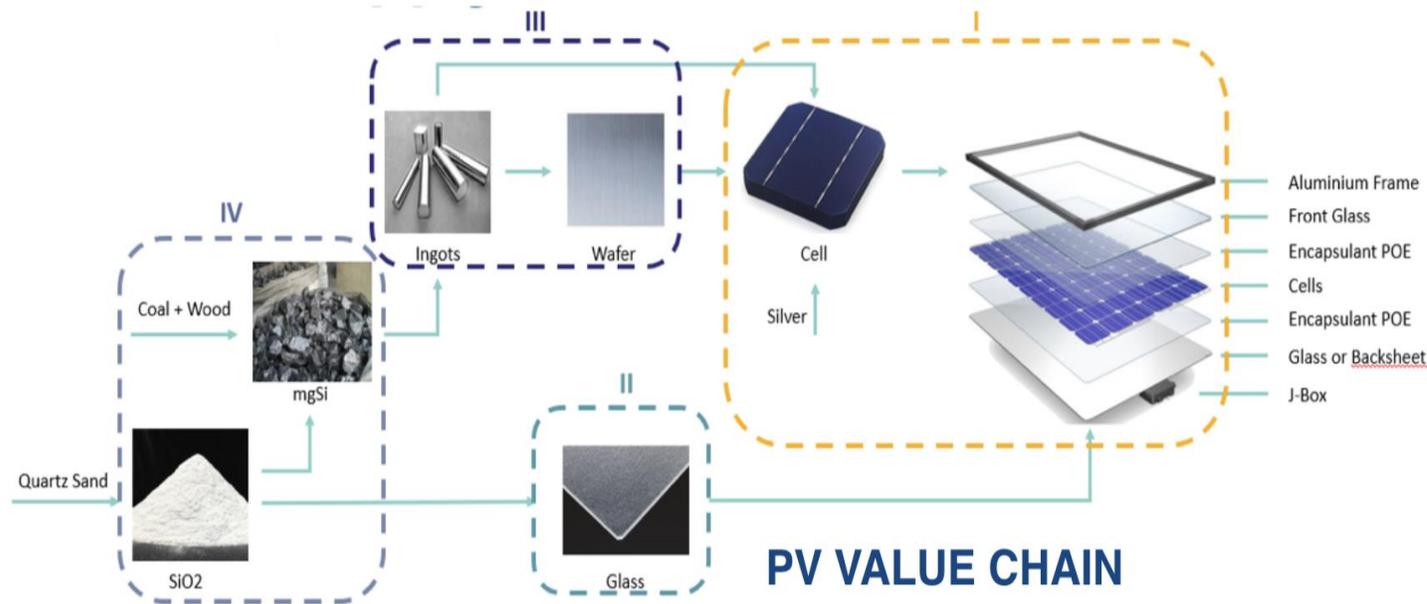
| | | Cell site* | Module sites (options)** Proximity to end markets |
|---------|--|--|---|
| 2024 | Phase 1 (3+ 3GW Cell and Module) | 3 GW  Netherlands | 3 GW  Spain |
| 2025 | Phase 2 (3 + 3 GW Cell and Module) | 3 GW  Germany | 3 GW  Morocco |
| 2026/27 | Phase 3 (3 + 3 GW Cell and Module) | 3 GW  | 3 GW   |
| 2028/29 | Phase 4 (6 + 6 GW Cell and Module) | 6 GW  | 6 GW   |



* Cell lines supply corresponding module lines in same phase

** Manufacturing sites are currently planned in Germany and Netherlands (Cells), Spain and Morocco (Modules)

PV Supply Chain



- **Short Supply Chain**
- **All Raw Materials available in EU**
- **All technologies available in EU**
- **EU leading in R&D**
- **Can recapture global market with next generation manufacturing technology**

MCPV – Collaborative Supply Chain Scale Up



Collaboration areas include (among others):

- Resource optimization
- Industry 4.0 & 5.0
- Artificial Intelligence & data spaces
- Supply chain enablement
- Sustainable building & production
- Recycling & 2nd life

NB: company and institution names are merely indicative

Collaborative Approach to Scaling the EU Supply Chain

- Cross Value Chain Coordination to ensure timely raw material and manufacturing scale-up
- Cross Value Chain risk mitigation and visibility through long term offtake agreements starting at IPP and Energy Utilities level and then upstream
- Public-Private Partnerships across Member States to ensure timely availability of public funding and risk mitigating instruments where needed (especially in early phases)
- EU and Member State Policy action: Standards on CO2 footprint, labor rights, circularity, IP protection, local content (contribution to GDP, jobs, energy security...)

Thank you

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