



Sunday

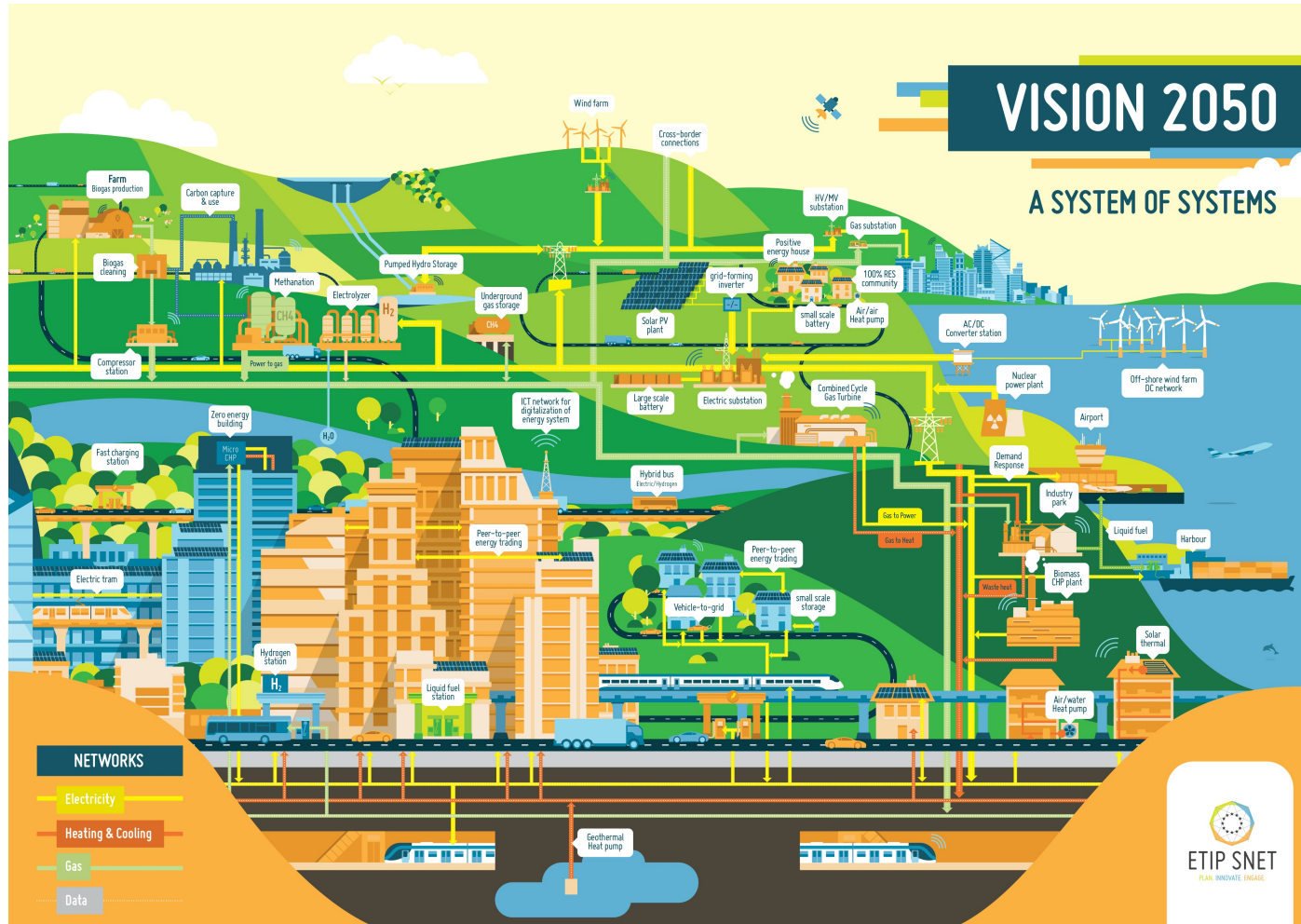
Bringing PV-manufacturing back to Europe and the Netherlands.

Circulaire geïntegreerde
hoog-rendements zonnepanelen



- 1 **Introduction – MCPV / Resilient Group**
- 2 **Global Context – Why is now the time to scale PV manufacturing in Europe?**
- 3 **What do we need to create a successful European solar value chain?**
- 4 **How can we Accelerate and De-Risk the PV Industry Scale-up?**
- 5 **Why is The Netherlands a good location to kick-start European cell manufacturing?**
- 6 **What can you do to support this strategic effort?**

Introduction – MCPV / Resilient Group



www.resilientgroup.eu

Marc Rechter
Co-Founder & CEO

European Clean
Hydrogen Alliance

Kick-starting the EU Hydrogen Industry to
achieve the EU climate goals



European Solar PV Industry Alliance

Accelerating the energy transition

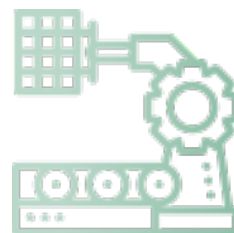


Green Hydrogen

Develop, own and operate green hydrogen production and distribution infrastructure



www.resilienthydrogen.eu



Solar Cell and Modules

Manufacturing of next generation Solar PV cells in state-of-the-art facilities



www.mcpv.eu

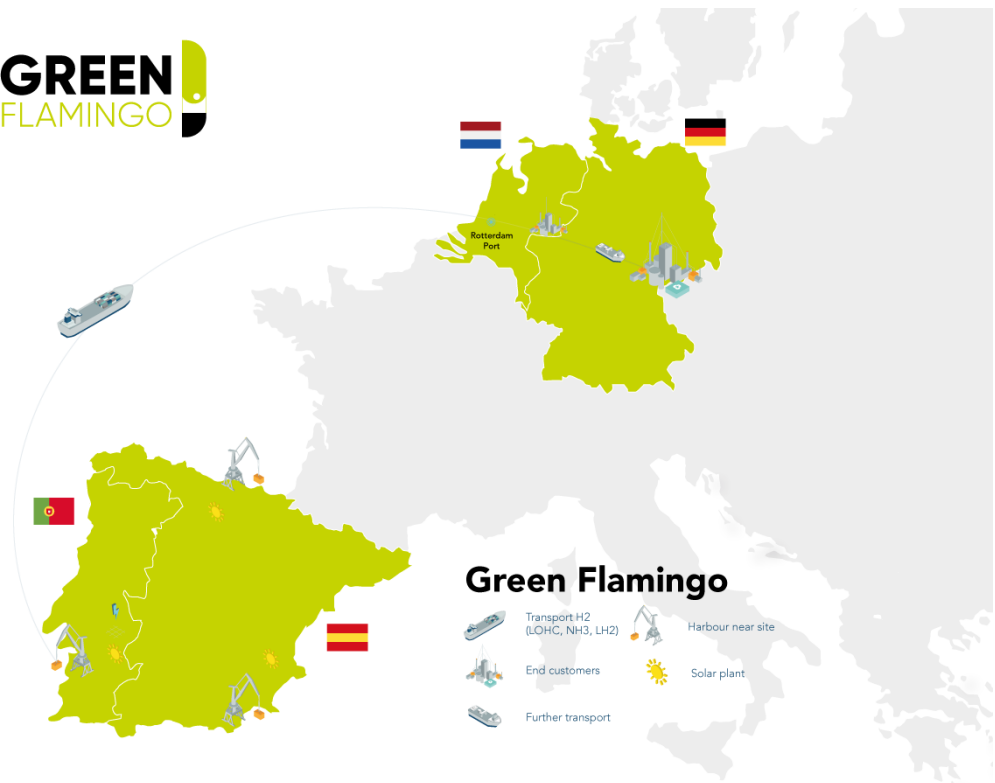


Digitalisation Enablement

Digital solutions and platforms for cross domain resources optimisation and asset management



www.enercoutim.eu



Four Hub corridor



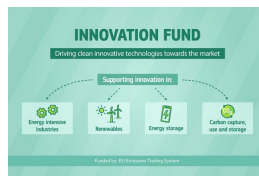
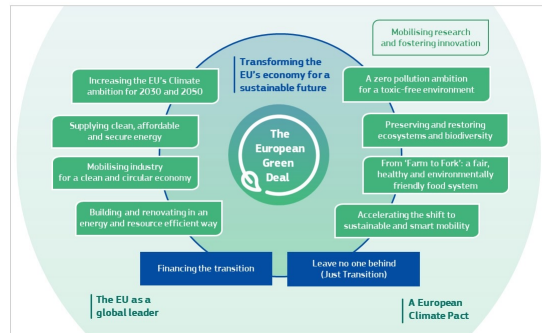


Gigawatt HiT production lines scale-up plan

	Cell site*	Module sites (options)** Proximity to end markets
2024	Phase 1 (300 MW <u>cells</u>) 🇳🇱 Netherlands	
2025	Phase 2 (2.7 GW <u>Cells</u> + 600 MW Modules) 🇳🇱 Netherlands	0.6 GW 🇪🇸 Spain
2026/27	Phase 3 (3 <u>cells</u> + 3 GW Module***) 🇳🇱 Netherlands	3 GW 🇪🇸 Spain
2027	Phase 4 (6 + 6 GW Cell and Module***) 🇩🇪 Germany	3.6 GW 🇲🇵 Morocco / Mid East
2028	Phase 5 (3 + 3 GW Cell and Module) 🇩🇪 Germany	3.6 GW 🇲🇵 Morocco / Mid East
2028	Phase 6 (3 + 3 GW Cell and Module) 🇩🇪 Germany	3.6 GW 🇲🇵 Morocco / Mid East

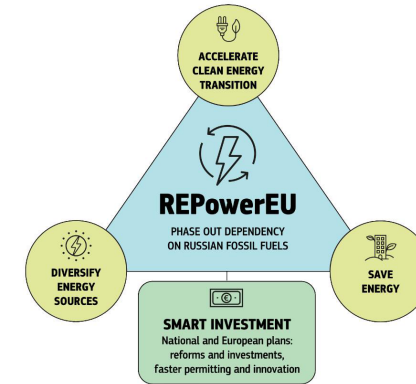
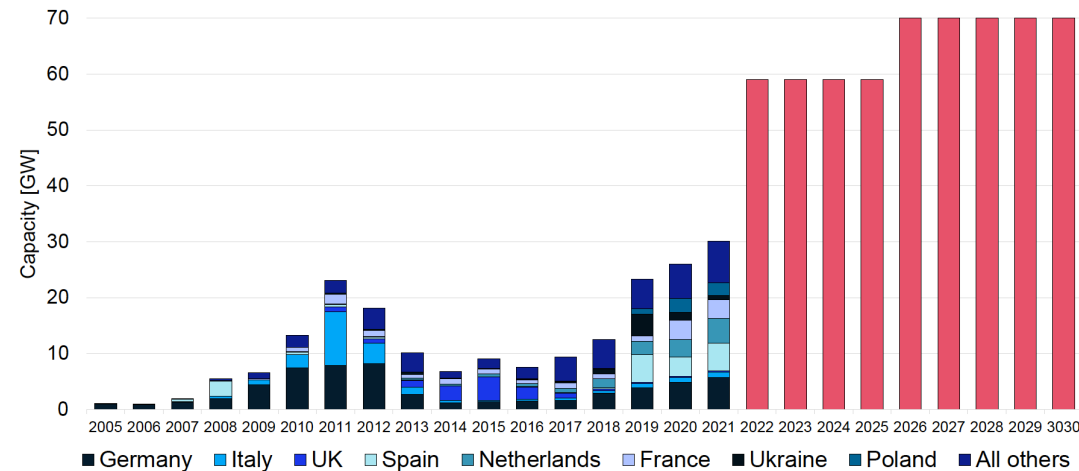
Global Context – Why is now the time to scale PV manufacturing in Europe?

Energy transition in Europe - Demand

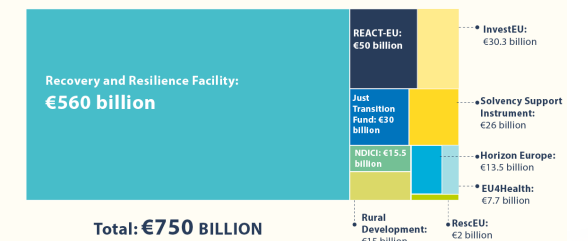


Annual installed PV capacity in Europe

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



Next Generation EU



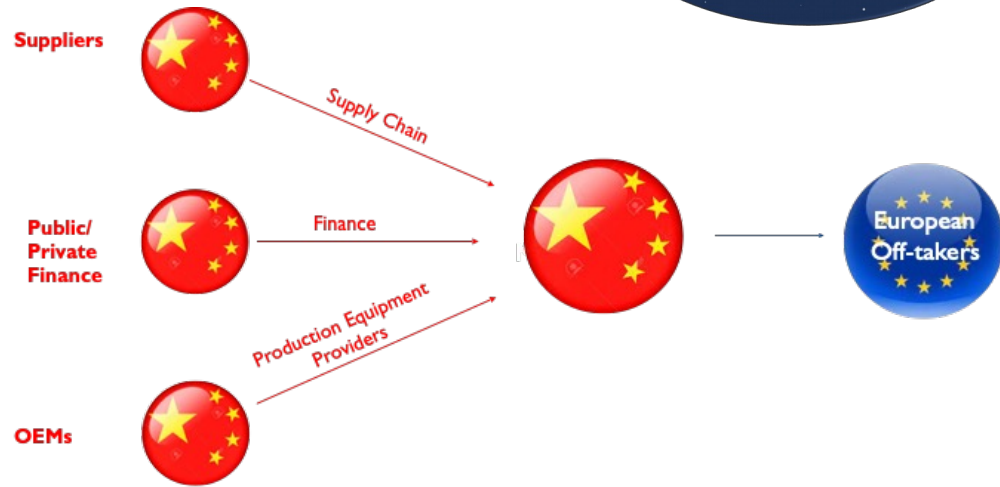
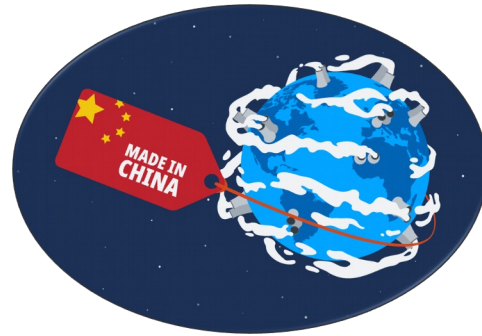
Cell Technology Shift

Growth of HJT driven by potential for **higher cell efficiencies**, and relatively **less complicated production process**, resulting in **attractive LCOE***

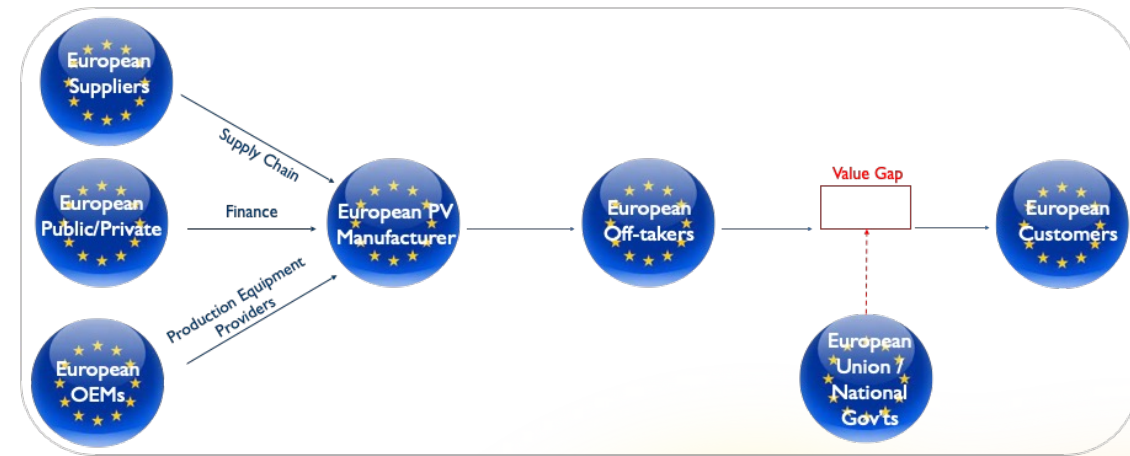
Wafer-based crystalline silicon PV	Key performance indicators				
	2020		2025E		Comments
	Cost	Efficiency	Cost	Efficiency	
AI-BSF	●	○	●	○	<ul style="list-style-type: none"> Expected to be phased out in next 5 years
PERC	◐	◐	◐	◐	<ul style="list-style-type: none"> Currently most cost-effective technology Reaching technology efficiency limit
N-PERT / TOPCON	◐	●	◐	◐	<ul style="list-style-type: none"> Only at early stage of mass production Existing PERC lines can be upgraded, but new capacities mostly come from new production lines
HJT	◐	●	◐	●	<ul style="list-style-type: none"> Only at early stage of mass production Fewer production steps than PERC and TOPCON Entirely incompatible with current production lines

Emerging tech

COVID-19: Supply Chain Risk

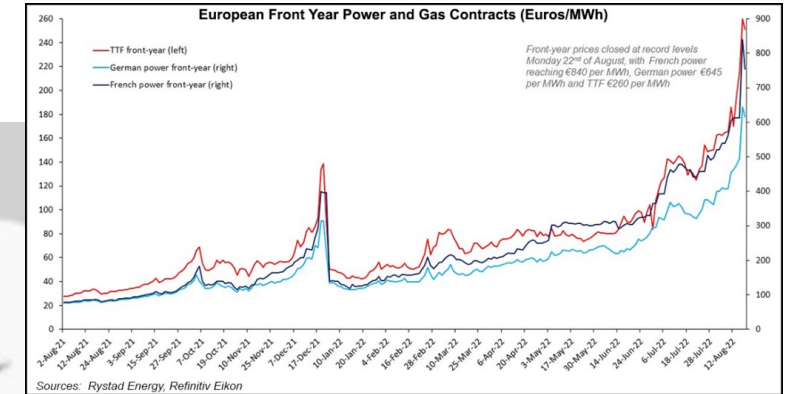


Chinese dominated supply chain



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

Russian Invasion



Europe's \$1 Trillion Energy Bill Only Marks Start of the Crisis

- High prices could last years and aid is becoming unaffordable
- Relief on global gas markets isn't expected until 2026

Europe needs an Energy Marshall Plan

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

Deployment alone \neq Energy Security

Energy Security $=$ Integrated Supply Chain $=$ Materials + Manufacturing @Scale

US Inflation Reduction Act

OVER THE NEXT 15 YEARS, INFLATION REDUCTION ACT CLEAN ELECTRICITY TAX CREDITS WILL:

SAVE U.S. households
\$60 BILLION
in cumulative
ELECTRICITY BILL SAVINGS

DRIVE
\$420-\$467 BILLION
in CUMULATIVE GDP GROWTH

ADD
580 GW
of CAPACITY
for new zero-
and low-carbon
resources on the grid

PREVENT
2.9 BILLION TONS
of CUMULATIVE
CARBON EMISSIONS
from power sector

DELIVER OVER **\$74 BILLION** IN CUMULATIVE HEALTH BENEFITS, PREVENTING:

9,200
premature deaths

18,700
asthma attacks,
cardiac arrests,
and strokes

6.1 Million
lost school
and workdays

IN 2035, INFLATION REDUCTION ACT CLEAN ELECTRICITY TAX CREDITS WILL:

SAVE the
average U.S.
household
\$52 ANNUALLY
on ELECTRICITY BILLS

CREATE
341,000-382,000
HIGH QUALITY JOBS

DRIVE
\$52-\$58 BILLION
in new
ECONOMIC
ACTIVITY

46%
GROW WIND AND SOLAR
POWER GENERATION to
46% of the nation's electricity

CUT
340 MILLION TONS
of annual carbon emissions
from the power sector

DELIVER
\$9.5-\$10.1 BILLION
in HEALTH
BENEFITS from avoided
air pollution

A Game Changer for the Global Energy Sector ...and Climate Change

Europe's Response

January 2023

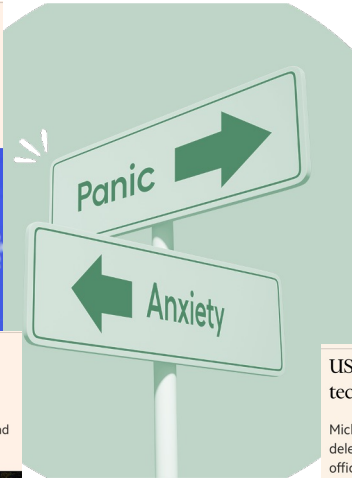
EU makes green pitch to rival US subsidy splurge

Ursula von der Leyen pledges 'unprecedented' investments in clean technologies



CBI chief urges UK to counter US and EU 'arms race' on green subsidies

Tony Danker warns that Britain is falling behind rival nations in investing in green technology



Davos delegates praise Biden's 'huge' green package, as Europe voices complaints

Company chief executives and investors say Inflation Reduction Act will be an 'engine' for US growth



US states recruit European clean tech groups with green subsidies

Michigan, Ohio, Georgia and others send delegations overseas amid complaints from EU officials



April 2023

European Commission

THE GREEN DEAL INDUSTRIAL PLAN

State aid Temporary Crisis and Transition Framework.
Fast, clear and predictable framework to accelerate green investments

March 2023

Paving the way for Member States to design and implement support measures in sectors which are key for the transition to a net-zero economy

NZIA

EU NET-ZERO INDUSTRY ACT

NetZeroIndustry

EU Critical Raw Materials Act

EU Competitiveness

European Commission

Commission européenne

© European Union, 2023. Photograph: Jennifer Jacquemart

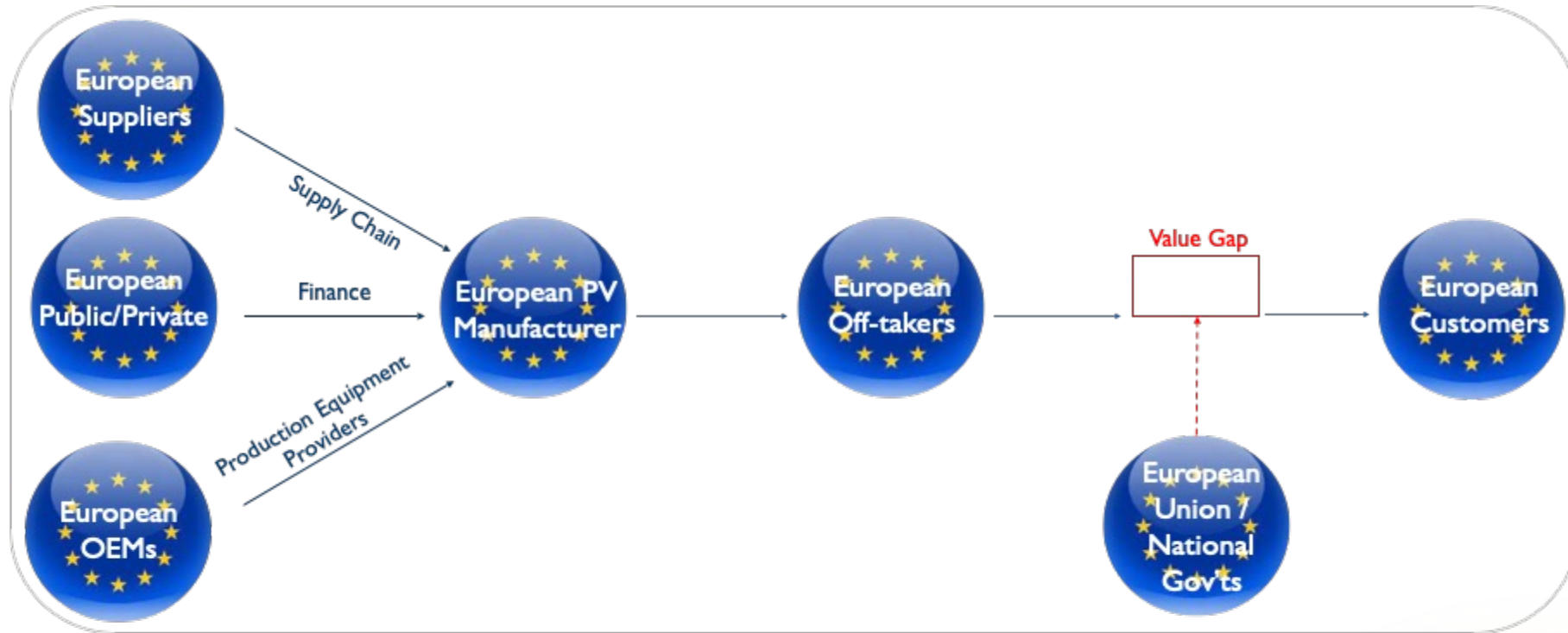
CRMA

Von der Leyen Says EU Must Boost Clean Tech Funds to Counter US

- Commission chief proposes temporary changes to state aid rules
- Bloc must also respond to unfair Chinese practices, she says

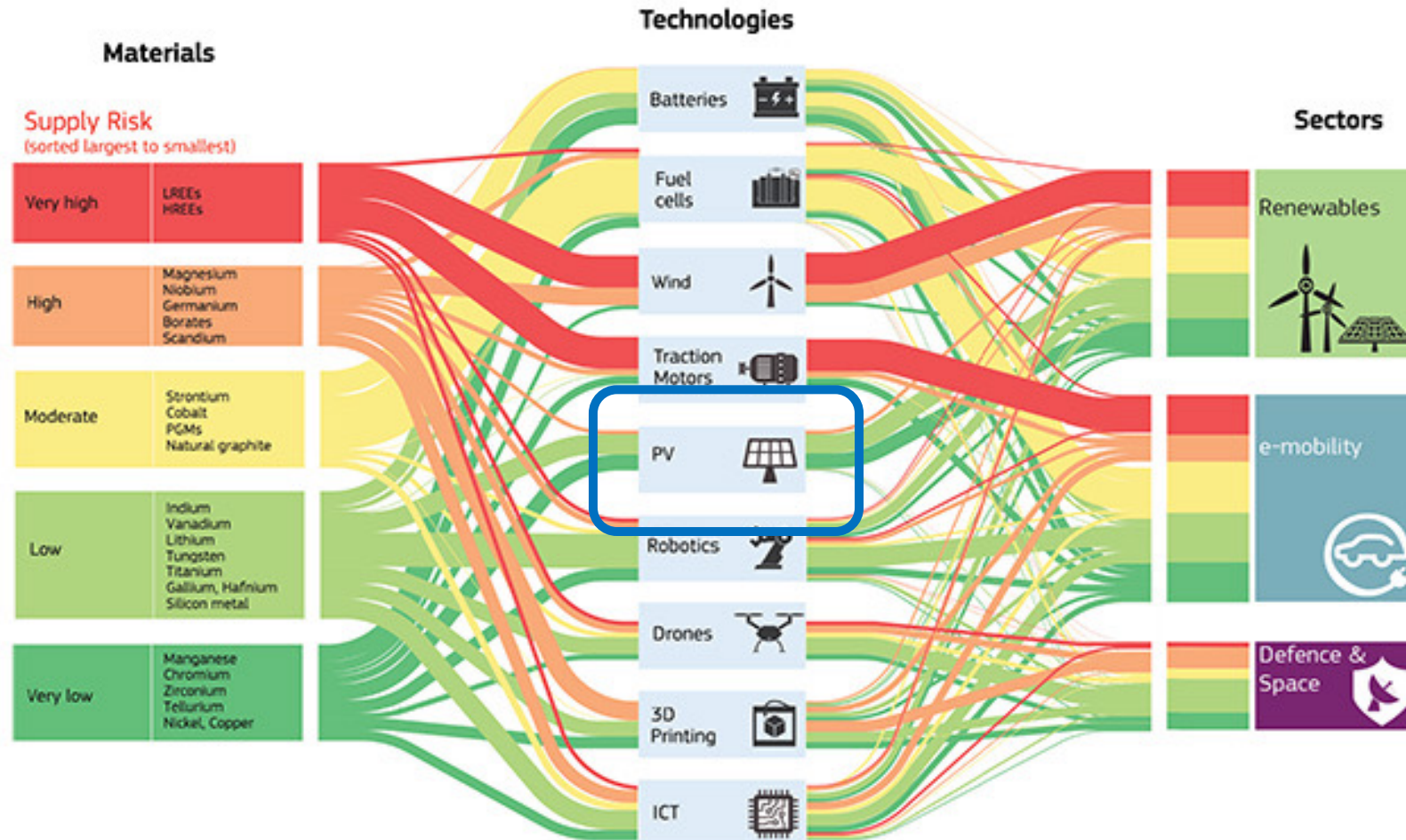
What do we need to create a successful European solar value chain?

Level Playing Field & De-Risk Private Investment



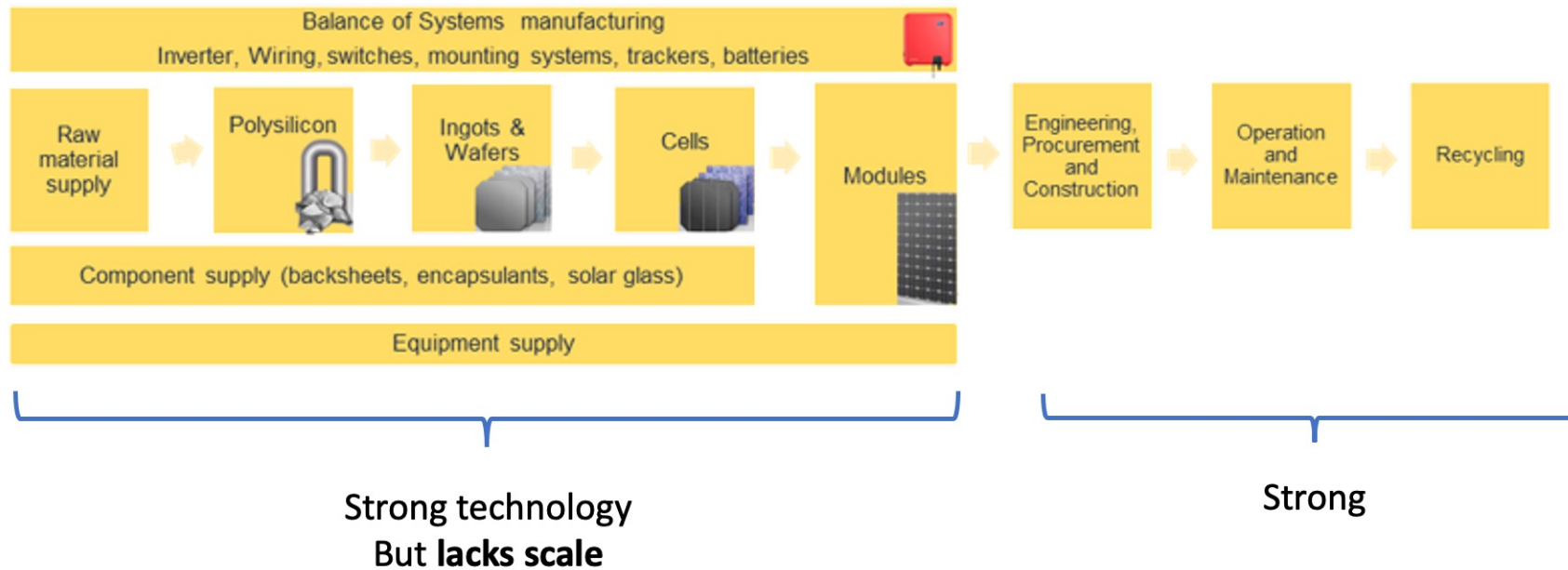
The EU needs to underwrite any “value gap” that may arise for an initial period of time

Supply Chain



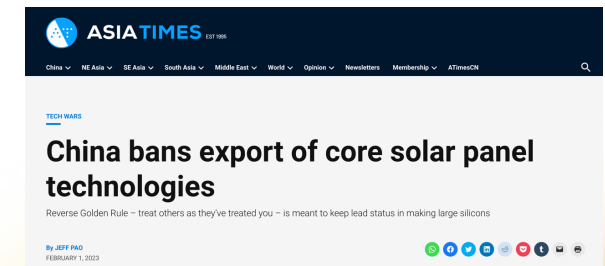
PV in EU:
 most supplies and technologies readily available

Supply Chain



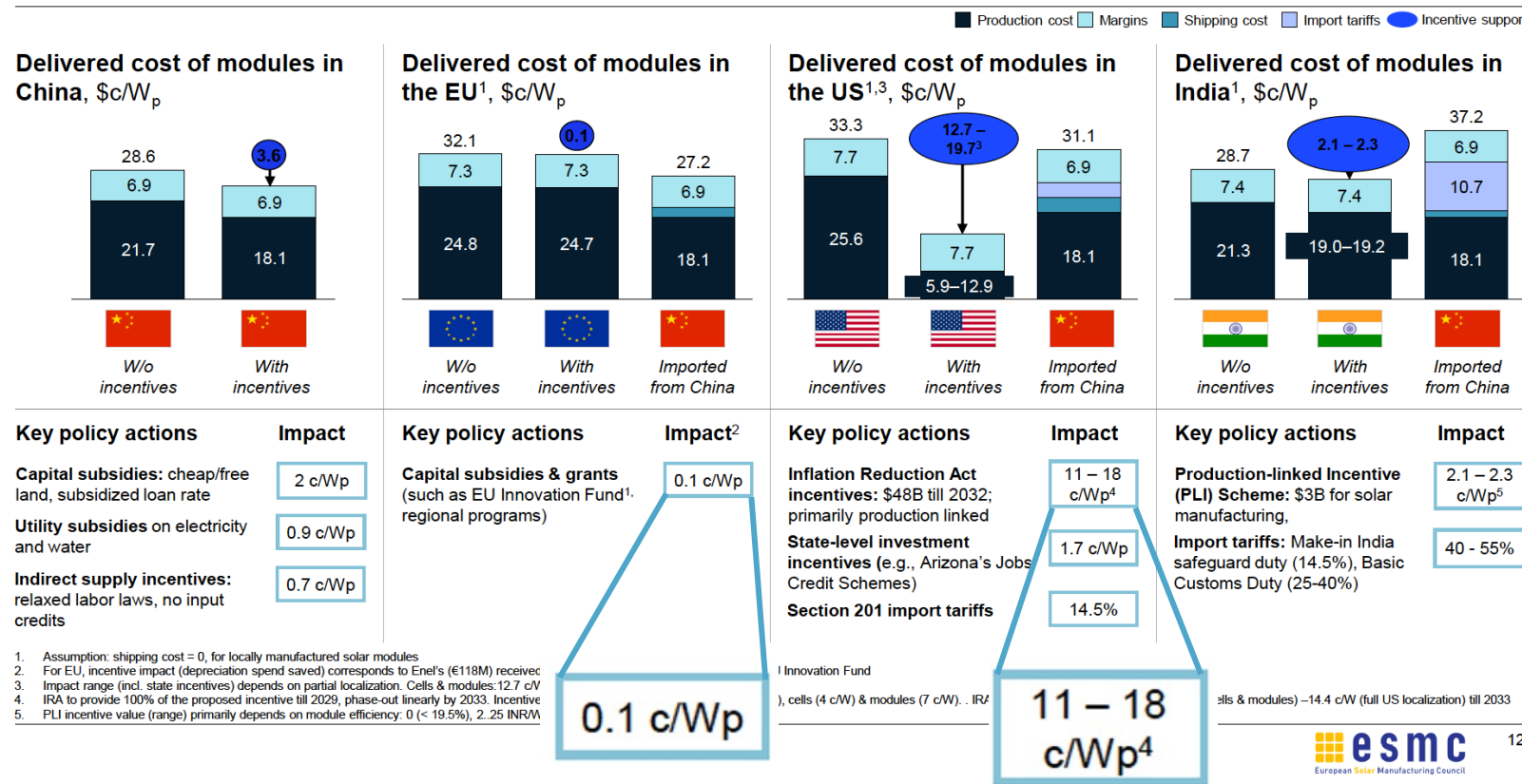
BUT:

- **Strong downstream, lack scale upstream**
- **Strong in technology**
- **Weak in scale**
- **Short term supply chain risks: cells & wafers**
- **Module supply chain risk**



Finance

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



But we need a level playing field, to attract investment.

TCTF & NZIA are a good start but we need EU instruments in addition to MS, less complexity and more speed.

Equipment Manufacturing

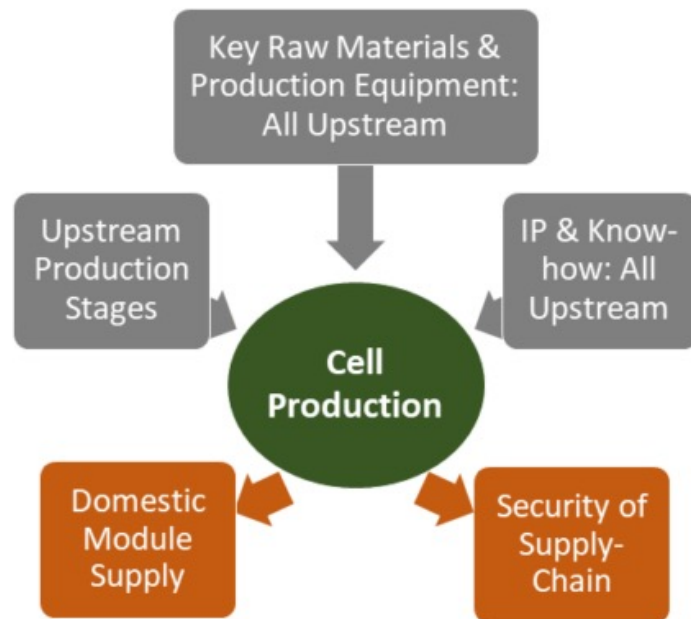


**Strong technology and equipment manufacturing, but...
Bottleneck ahead due to IRA and Indian demand...
So Europe needs Speed...**

How can we Accelerate and De-Risk the PV Scale-up?

- 1. Finalize the EU Policy & Support Framework Fast – Simplicity / Speed / Certainty / Protection**
- 2. To ensure a level playing field**
- 3. Ensure parallel and fast scaling of the entire value chain “Made in Europe”**
- 4. Ensure stable demand**
- 5. Ensure skilled labor force**
- 6. Ensure dedicated Public & Private finance across the value chain**
- 7. Prioritize permitting for industrial and deployment projects**

Solar Cell Prioritized c-Si Manufacturing Model



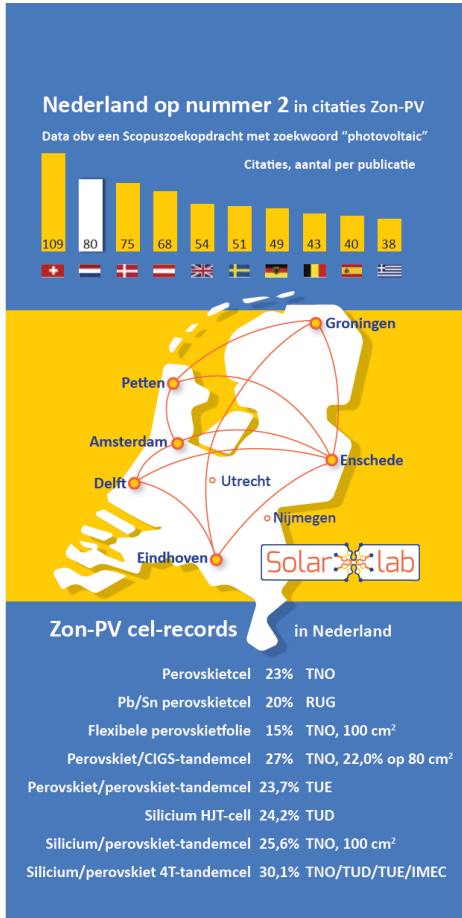
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Industry-led Scaling Plan

- Cell at the Core
- De-risks Module scale-up
- Enables Ingot & Wafer investment

Why is The Netherlands a good location to kick-start European cell manufacturing?

Why is The Netherlands a good location to kick-start European cell manufacturing?



- World-class R&D eco-system
- Highest per-capita PV deployment in Europe
- National Growth Fund - SolarNL
- Semi-conductor sector



The Netherlands has the most solar panels per capita in Europe



The whole Semicon value chain in one country

The Netherlands is one of three countries in the world, together with the USA and Japan, to have a complete value chain within its borders.

2023

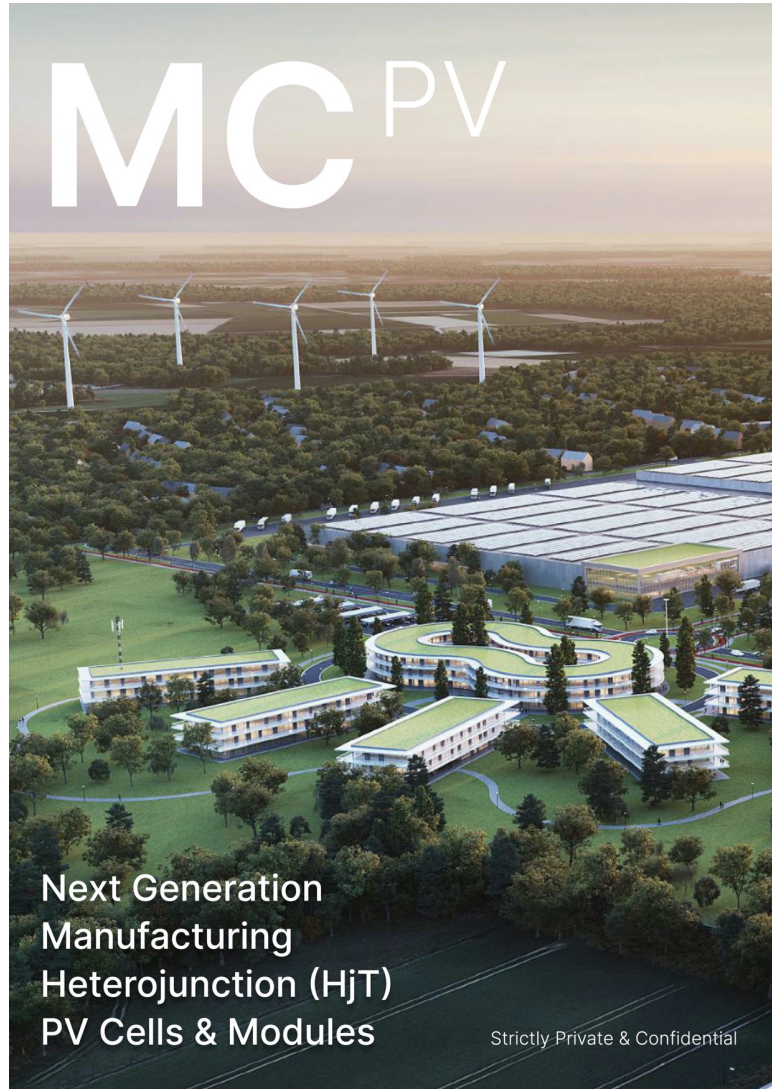
Why is The Netherlands a good location to kick-start European cell manufacturing?

<https://www.solarnl.eu/>



2023

Why is The Netherlands a good location to kick-start European cell manufacturing?



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What can you do to support this strategic effort?

Policy Makers

- **Accelerate & Simplify access to public funding – there is no time to lose. Private investment needs a Level Playing Field and de-risking first...**
- **Deploy all possible instruments: REPowerEU / RRP €455mio end of April. Support NZIA, IPCEI, Sovereign Fund. Europe will need to deploy everything it has to keep its industry...**
- **Accelerate industrial permitting – as proposed in the NZIA...**

Industry

- **Engage – contact us, we need your active support!**
- **Buy – sustainable offtake necessary to build a competitive industry**
- **Invest – PV will boom in the next decades and will be a critical energy technology**
- **Pass on the Word – there is only one way to Energy (and Economic) Security in Europe**
- **We are all in this together – your success is our success**

2023



Thank you!
m.rechter@mcpv.eu