Solar in Europe by 2050, a key asset for a successful European Green Deal and European recovery plan



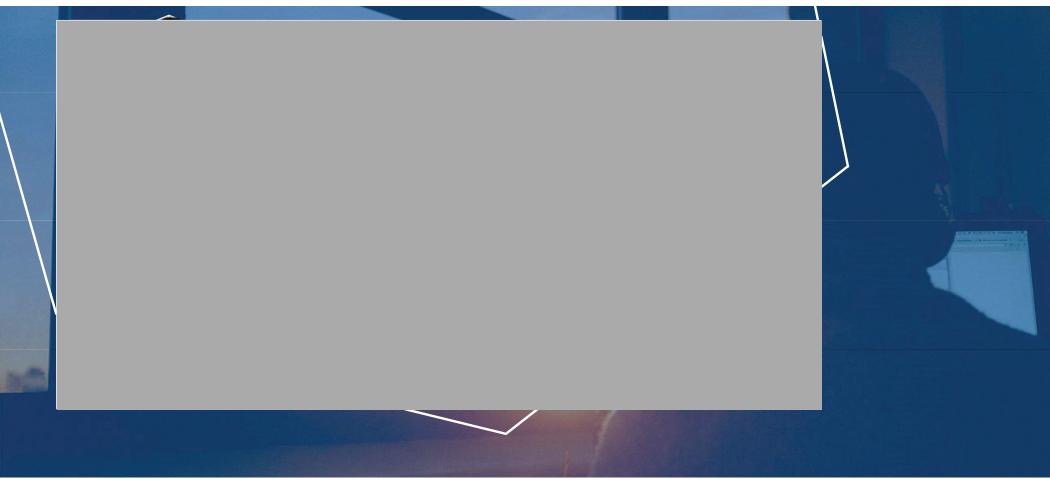
#ShineOnSolar #RenewableEU

Welcome





Input presentation



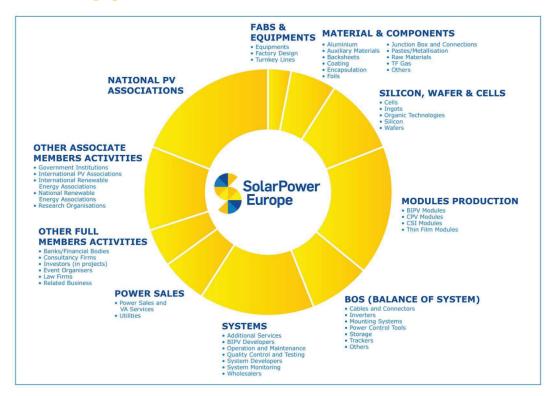


What is SolarPower Europe?

We represent over 200 companies from the whole solar value chain

We help shape the policy environment and make business

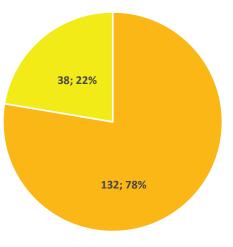
happen in the solar industry



Our aim is to ensure that more energy is generated by solar than any other energy source by 2030 and lead our members to make solar the core of a smart, sustainable, secure and inclusive energy system in order to reach EU climate neutrality before 2050

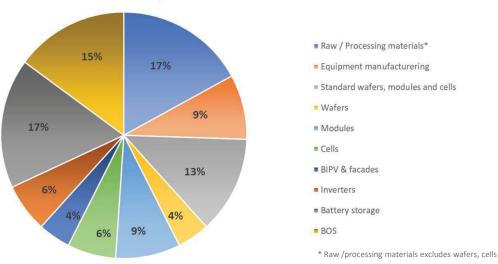
Solar, a strong European industry





■ Members with HQ in Europe ■ Members with HQ outside of Europe

Members with upstream activities with EU HQ



- Over three quarters of SolarPower Europe's members have their headquarters in Europe
- More than one quarter of European members have at least one upstream activity
- > SolarPower Europe's manufacturing members are active all across the solar value chain from silicon to solar module production



AWARD WINNING ASSOCIATION







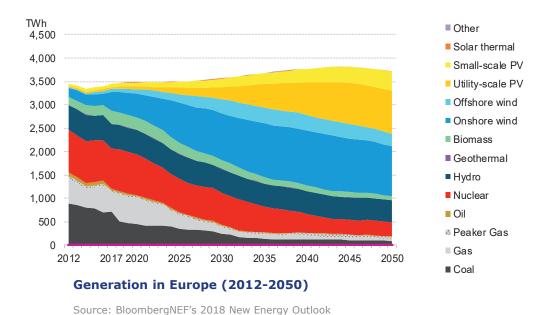
WINNER

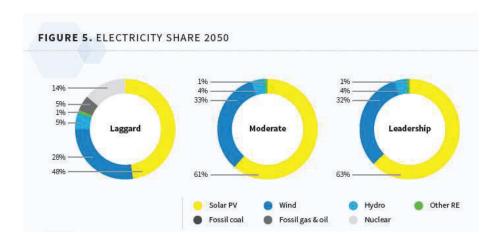
Overall Best European Association (secretariat with less than 30 employees)





Thanks to falling costs and scalability, **solar will drive the energy transition**. In a **100% renewable energy system**, solar could power more than 60% of Europe's electricity generation





Electricity generation in Europe in various 2050 scenarios

Source: SolarPower Europe's 100% Renewable Europe study (2020)

The solar industry can create economic activities and jobs, a key asset for the European Green deal and upcoming recovery

- In climate-neutral scenarios, solar could employ more than
 4 million people in Europe in 2050 (LUT University)
- Jobs in installation, operation and maintenance are particularly suited for economically transition regions (JRC).
- Small-scale solar installations (rooftops) are a key driver for this growth
- **Utility scale solar installations** are instrumental to achieve the fast and cost-competitive penetration of renewables intro the energy mix.



Solar is also key to build a clean and competitive energy-intensive industrial sector.

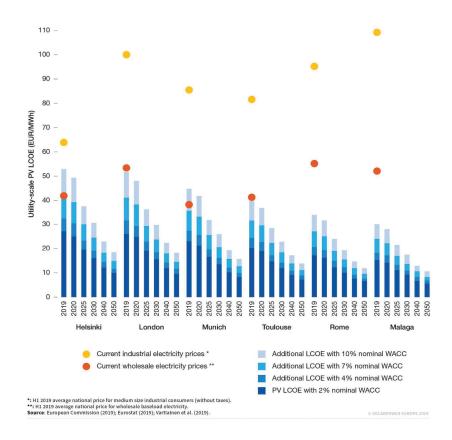


Solar PPAs for chemical companies

Source: Grupa Azolty S.A.

Solar Hydrogen for the steel industry





PV Levelised Cost of Electricity (LCOE) in six European locations compared to current industrial and wholesale electricity prices, 2019-2050

Europe is a global leader in innovative solar technologies

Highly innovating and efficient cells



Source: Enel

New applications of cells: Building-Integrated PV



Source: P.Andrianopoli / Issol

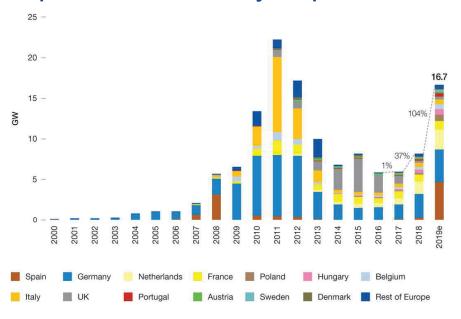
Floating solar technologies

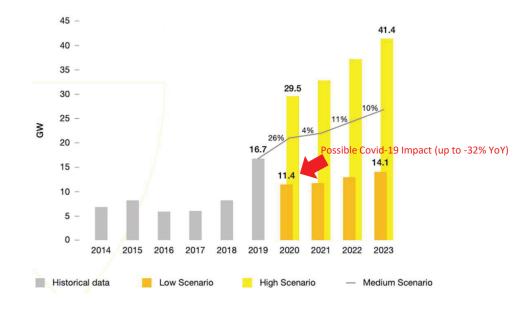


Source: Akuo Energy

European policies must support the upscaling and market deployment of these technologies

In 2019 solar installations grew over 100% in the EU, confirming the positive dynamic of the European solar market, marking a new era of solar growth – although COVID-19 is expected to heavily impact solar deployments in 2020





EU-28 Annual solar PV installed capacity 2000-2019

Source: EU Market Outlook for Solar Power 2019, SolarPower Europe

EU-28 Outlook annual solar PV installed capacity 2000-2023

Source: EU Market Outlook for Solar Power 2019, SolarPower Europe

Harvesting the potential of solar in Europe

- Solar power is a key factor of the energy transition. In order to untap its potential we need enhanced administrative and permitting procedures
- 2. Renewable-based electrification in all sectors is a priority. It will facilitate the integration of larger shares of renewable generation and decarbonize the economy
- 3. Renewable hydrogen will provide the solution to complement direct electrification for full decarbonisation (CEP implementation)
- 4. Invest in upgrading, expanding, and modernising Europe's electricity grids (Smart sectoral integration strategy, TEN-E)
- 5. Accelerate deployment of decentralised flexibility resources (Smart sectoral integration strategy, CEP implementation)
- 6. Roll-out solar industrial strategy (EU Industrial policy, Smarter approach to instrument toolbox going beyond IPCEI's for smaller size projects)
- 7. Develop skills and training program to unlock potential of solar jobs (EU skills Agenda, training programmes)



Prioritizing electrification and removing bottlenecks to the ambitious deployment of renewables in Europe by 2030



Antonio Cammisecra CEO Enel Green Power



Solar stakeholder meeting with EU Commissioner Kadri Simson

Antonio Cammisecra, CEO, Enel Green Power

14 May 2020



Enel Green Power is a world leader in renewables Green Power MW **Plants** Technology North America Italy Hydro Plants: 101 Plants: 606 28.106 794 Iberia Capacity: 14.050 MW Capacity: 5.960 MW Plants: 268 Geo 878 Capacity: 7.408 MW 38 Romania Mexico Plants: 12 **Panama** Capacity: 534 MW Plants: 20 Wind 12.357 263 Capacity: 2.664 MW Morocco Plants: 8 Greece-Bulgaria Capacity: 362 MW Plants: 1 Solar 4.458 119 Guatemala Plants: 59 Capacity: 13 MW Capacity: 503 MW Plants: 5 Capacity: 164 MW **Biomass** 13 Colombia 61 India Plants: 13 Costa Rica 1.227 Total 45.895 Plants: 3 Capacity: 3.183 MW Capacity: 172 MW Plants: 3 Peru Capacity: 81 MW Brazil Zambia Plants: 10 Plants: 69 Plants: 1 Capacity: 1.104 MW Capacity: 2.732 MW Capacity: 34 MW **Australia** Chile **South Africa** Argentina Plants: 2

3 GW built in 2019 1.227 plants 45,9 GW installed 109,8 TWh produced 21 Countries

Plants: 8

Capacity: 570 MW

Note: 31.12.2019 data including plants managed in BSO. Argentina not including 35 MW of generators Chocon installed in Costanera plant.

Plants: 2

Capacity: 1.328 MW

Plants: 36

Capacity: 4.723 MW

Capacity: 275 MW

Accelerate massive deployment of renewables by 2030, the key to achieving climate-neutrality



Solar power is a key factor of the energy transition

Europe is not permitting enough renewable plants to deliver the Green Deal

European Commission should support the return to Europe of large part of the value chain, including PV manufacturing

The future of solar power relies on important investments in innovation





Eric Scotto
CEO Akuo Energy

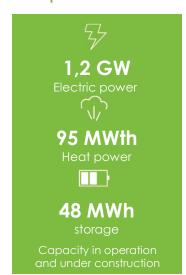


AKUO ENTREPRENEURS BY NATURE



Independent global renewable energy power producer and developer

Focus on territories 2007 Independence Integrated player creation Éric Scotto & Patrice-Development, construction, Decentralised renewable Financing, Asset Lucas energy solutions Colam Entreprendre* Mangement - O&M > € 260 m € 2,5bn > 15 > 650 MW > 350 Revenues Locations Cumulative investment In operation in Europe **Employees**











Storage

2019 year-end

^{*} Colam Entreprendre is a private family-owned company that is the founding shareholder of Sonepar, the world's number one B-to-B distributor of electrical products, solutions and related services.

OUR BUSINESS MODELS USING SOLAR IN MORE WAYS THAN ONE







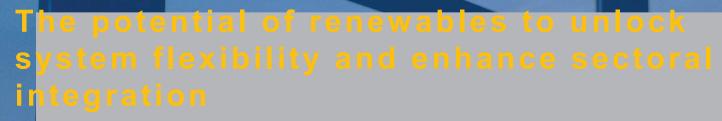




| A NECESSARY TAILOR-MADE REGULATORY SYSTEM

- Our solutions offer an opportunity for Europe to develop its industrial strategy around renewable energy
- Our innovative business models enable the use of the sun in more ways than one and allow the EU to take advantage of its building stock, agriculture and land in order to accelerate the transition
- These business models require a specific regulatory and support framework as they fulfill different needs than mainstream and lowestcost solar projects







Johan Mörnstam
Senior Vice-President
Energy Networks Europe
EON



E.ON Energy Networks: Distribution in eight EU Member States

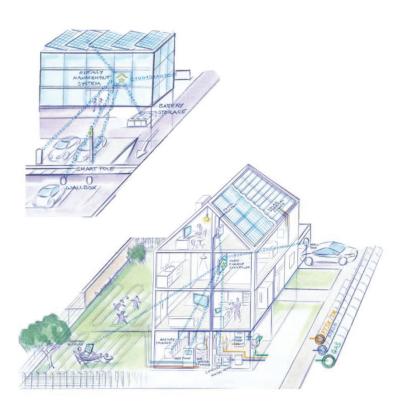
What we do

- E.ON group present in 15 countries, 50 million customers, 70,000 employees, focus on grids and customer solutions.
- We provide the infrastructure for the new energy world. We manage our electricity and gas grids in a smart way, to promote the integration of renewable capacity.
- About 39.400 employees work in Energy Networks.



Connected EU customers in million									
	CZ	DE	HR	HU	PL	RO	SE	SK	total
Electricity	1.6	14.7	n/a	4.9	1.0	1.5	1.0	1.2	25.9
Gas	0.1	1.8	0.1	0.6	n/a	1.8	n/a	n/a	4.4

Solar will provide easy-to-access flexibility for smart digitalised distribution systems of the future



- An accelerated energy transition as central part of the recovery effort results in a win-win-situation for climate protection and the economic recovery.
- **DSO will play a central role** in facilitating the integration of renewables on a local and regional level.
- Efficient investment will promote the increasing digitalisation of the energy system enabling optimal flexibility use for distribution congestion management:
 - Solar in combination with other sources will provide a significant part of this flexibility.
- It is critical that the review of the **TEN-E regulation** enables a **stronger focus on smart grid** infrastructures e.g. by expanding it to cover low-voltage grids.

Solar is a main contributor to decentralised energy sector integration



- Optimised energy systems of all sizes are the building blocks of an energy transition organised bottom-up, e.g.:
 - Prosumers
 - Energy Communities
 - Municipalities
 - Small and larger DSO
- Solar as the only form of generation available in all sizes is a vital component of these optimised energy systems.
- E.ON explored sector integration in the **InterFlex** project.





Elisabeth Engelbrechtsmüller-Strauß CEO Fronius





Elisabeth Engelbrechtsmüller-Strauß Fronius International GmbH Froniusplatz 1, 4600 Wels OPTIMAL PATHWAY TO ACHIEVE A FULLY SUSTAINABLE EU HYDROGEN STRATEGY



DEEP INTEGRATED EUROPEAN ADDED VALUE

PRODUCTS DEVELOPED & MADE IN

EU

5540 **EMPLOYEES**

GLOBALLY POSITIONED

> IN FAMILY **OWNERSHIP** SINCE 75 **YEARS**

3 BUSINESS UNITS



BUSINESS UNIT SOLAR ENERGY > 18 GW

installed PV-power

> 26 TWh

renewable energy per year

- / SPECIALISTS IN DISTRIBUTED SMALL-SCALE, ON-ROOF, SELF-CONSUMPTION & PROSUMER SYSTEMS
- / ALMOST TWO DECADES OF EXPERIENCE WITH GREEN HYDROGEN



EU INDUSTRIAL LEADERSHIP THROUGH GREEN H2



ENVIRONMENTAL CONTRIBUTIONS:

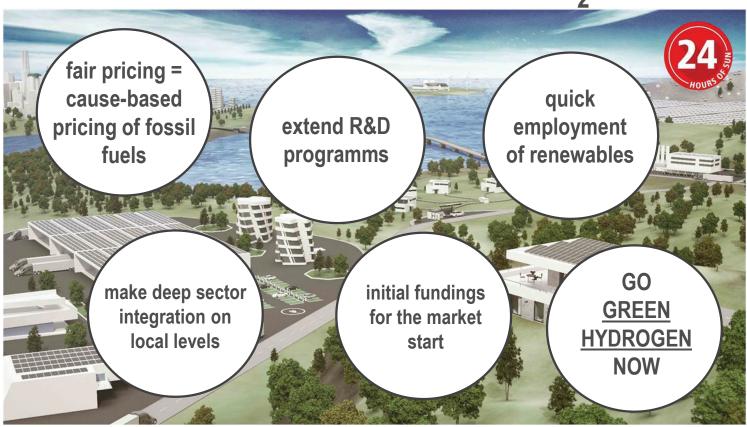
- / Distributed and flexible system
- / Green H₂ is produced where it's needed
- / Using excess energy from solar
- / Sector integration of renewable energy

ECONOMIC CONTRIBUTIONS:

- / Distributed renewable energy systems bring a maximum boost for job creation in Europe!
- / High European added value supports EU industrial leadership!
- Opportunity to create <u>new innovative business models</u> with green H₂.
- / Unlock local investments for H₂-users
- Strengthen the European leading-position in the green H₂ field



HOW TO BOOST A SUSTAINABLE EU H₂ STRATEGY?







SMA – a global pioneer in PV and storage system technology for nearly 40 years



85 GW of installed SMA inverter power

help to prevent 59 million tons of ${\rm CO_2}$ emissions per year in over 190 countries and are proof of SMA's strong market position over many years.

2 GW of SMA battery inverter power

ensure round-the-clock sustainable electricity supply worldwide and make us the global leader in battery system technology.

>1,500 patents and utility models

granted worldwide prove our high innovative strength.

3,000 SMA employees

are working with our partners and customers to pave the way for the energy supply of SMA Solar Technology tomorrow, today.















31

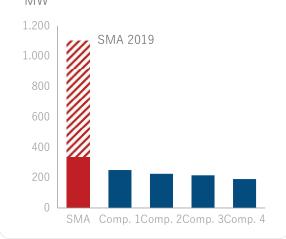
We leverage our system expertise and our digital abilities to develop sustainable solutions in important future fields



Storage systems are the backbone of future energy supply

supply
SMA is the global leader in storage system technology with unrivalled experience and expertise.

Battery inverter output sold in 2018¹ MW



Future mobility is electric

We use competences from all SMA units to develop intelligent solutions for the charging infrastructure for e-vehicle fleets in companies.



Digital services connect the future energy system

The SMA IoT energy management platform ennexOS is the basis for new business models in a digital and interconnected energy world.

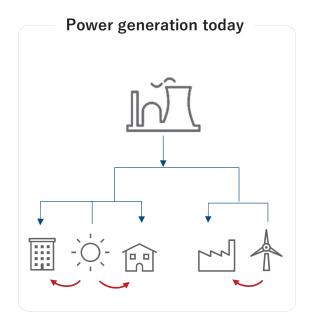


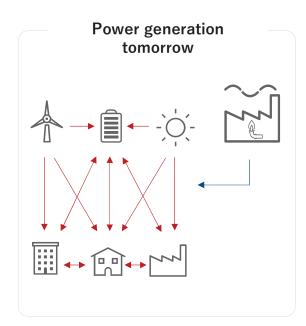
SMA Solar Technology

1. IHS Energy Storage Inverter (PCS) Report 2019 for 2018 figures; SMA for figure "SMA 2019" (= total battery inverter output, for which SMA has signed contracts in 2019)

Power generation today and tomorrow







- Decentralized solar power is becoming increasingly cost-effective.
- Storage systems and digital solutions balance out generation and consumption, and enable households and businesses to share their electricity with other consumers.
- To provide a sustainable, secure and cost-effective electricity supply, all players will have to be seamlessly integrated and interconnected.
- In order to integrate them seamlessly and secure a reliable power supply, a comprehensive understanding of the system is essential.

SMA Solar Technology

A sustainable solar value chain is a key benefit for all market participants

Since the very beginning of the energy transition, the longterm goal has been to combine environmental protection and economic success.



Holding on to the Green Deal is the best contribution to the recovery plan.



The re-industrialization of a renewable value chain needs a sustainable footprint as USP.



As the most cost-efficient electricity generation, solar energy must play a central role in the European industry strategy.



A renewable state aid regulatory framework to create a European-level value chain.







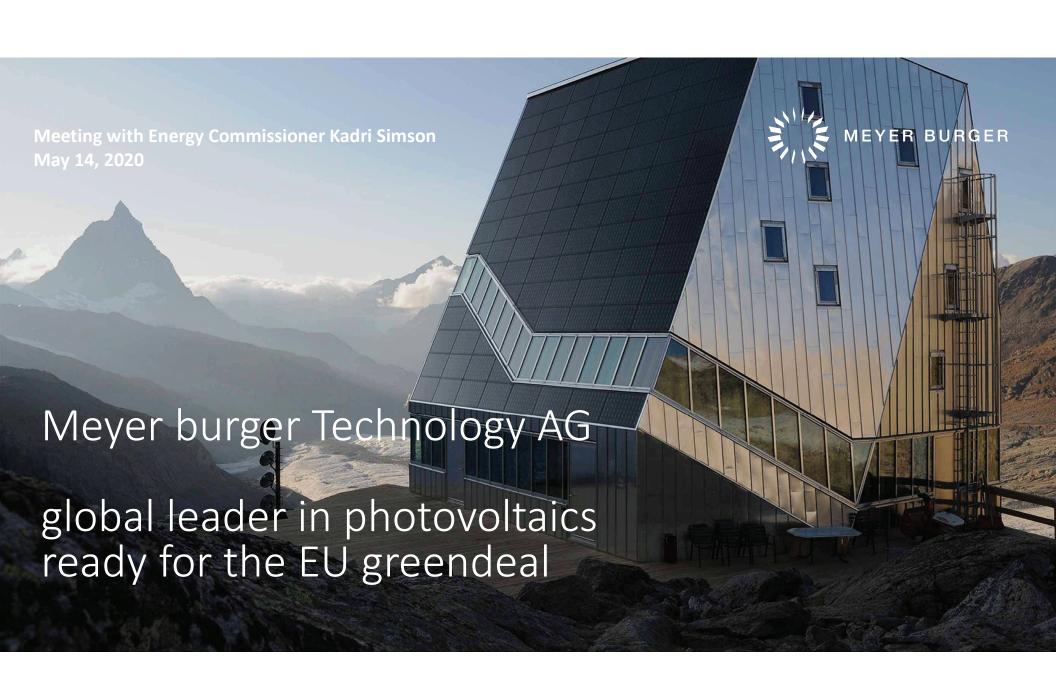
SMA Solar Technology 34





Gunter Erfurt
CEO Meyer burger





We have a common goal: our Vision.





- We are a leading technology company for innovative and cost efficient solutions based on semi-conductor technologies and with a focus on photovoltaics.
 - We decisively shape the future energy mix to the advantage to our customers by combining our technologies with the infinite power of the sun.

Key messages



Superior and Proprietary Technology

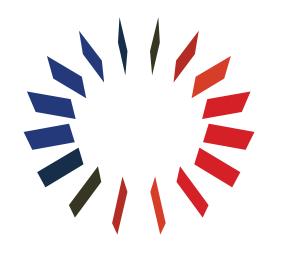
Used in a "captive" business model

> In a growing Global Green Energy Market

- Meyer Burger is the global leader in photovoltaics technology and has played a decisive role in growing the global solar industry in the past 20 years
- Meyer Burger is the "industrialization incubator" for new technology trends in photovoltaics technology bringing new technologies from lab-to-fab
- The current photovoltaics technology cycle (PERC) introduced by Meyer Burger in 2012 – is globally coming to an end and does not provide further cost down and performance improvement potential, making this a big challenge for especially Chinese companies
- The next technology (Heterojunction) developed proprietarily by Meyer Burger is ready for industrial implementation now while the technology roadmap towards Perovskite tandem technology is in the works at Meyer Burger already
- The need for the new technology cycle provides the unique chance to regrow the solar manufacturing industry in the EU and to re-take global leadership (e.g. by combining photovoltaics with sector coupling (P2X), both "Made in EU")



Unique chance to bring solar manufacturing back to the EU now and making the EU the leader in photovoltics



MEYER BURGER





Dr.Tobias Brandis
CEO Wacker Chemie
Polysilicon

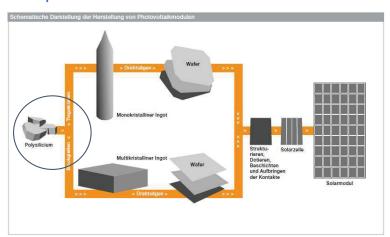




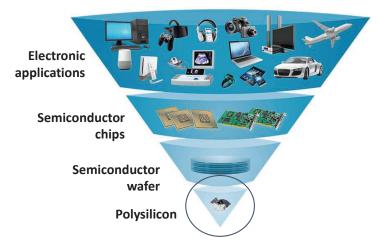
WACKER Polysilicon – First step in the Solar and Semiconductor value chain

- ▶ WACKER is the leading manufacturer of hyperpure polysilicon the key raw material for the semiconductor and PV industry providing 3000 high wage industrial jobs in the EU
- As the <u>only</u> manufacturer in Europe, WACKER's polysilicon is a strategic industrial component for driving the renewable energy transformation and digitalization in the EU.
- ▶ WACKER polysilicon has a significantly lower CO2-footprint than other manufacturers: Additional 3 Mio/t. CO₂ emissions annually, in case of production substitution from China

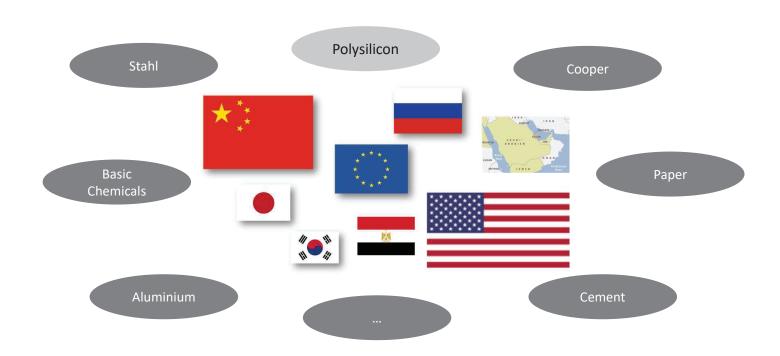
Example: Solar modules



Example: Electronics



Energy Intensive Industry in EU is Exposed to Competitiors in Other Regions of the World Receiving Subsidized Electricity Prices



"Made in China 2025": The solar value chain is already dominated by China; Semiconductor industry is the next target......

Status as of 2020



- Decisive factor for competitiveness is electricity cost!
- ▶ Chinese profit from a variety of state subsidies (e.g. coal-generated electricity < 2,6 ct/kWh!).

Source: WACKER Polysilicon

An Own "Strategic Value Chain" for Renewables Would be Key to Achieve the targets of the EU Green Deal.

- 1. Electrification of the EU Industry needs huge renewable energy production capacity to reach climate neutrality by 2050.
- Solar as a strategic value chain and re-launching European solar production via IPCEIs accelerates renewable deployment and strengthens Europe's technological and industrial autonomy from Asia towards decarbonization.
- 2. European carbon leakage protection must include an instrument that considers the incremental transformation costs (OPEX), to enable CO2-free production technologies to be competitive in a global environment.
- Introducing industrial electricity prices based on contracts for differences would offer economic incentives to invest in electrification as well as provide effective support for transitioning sectors exposed to carbon leakage risk.
- 3. Funding for OPEX-instruments must be secured either on a European level or by allowing Member States to establish national aid instruments.
- This requires a targetd revision of the EEAGs.