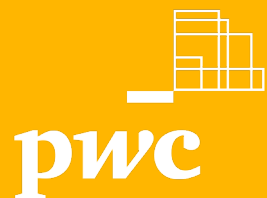


The Solar Revolution

Germany's major future electricity source
and what's in for local supply chains

November 2022



“

We have to switch our energy system over as quickly as possible, out of fossil fuels and into renewable energy sources.

This sends a clear signal to the markets and will give solar energy a decisive shot in the arm.

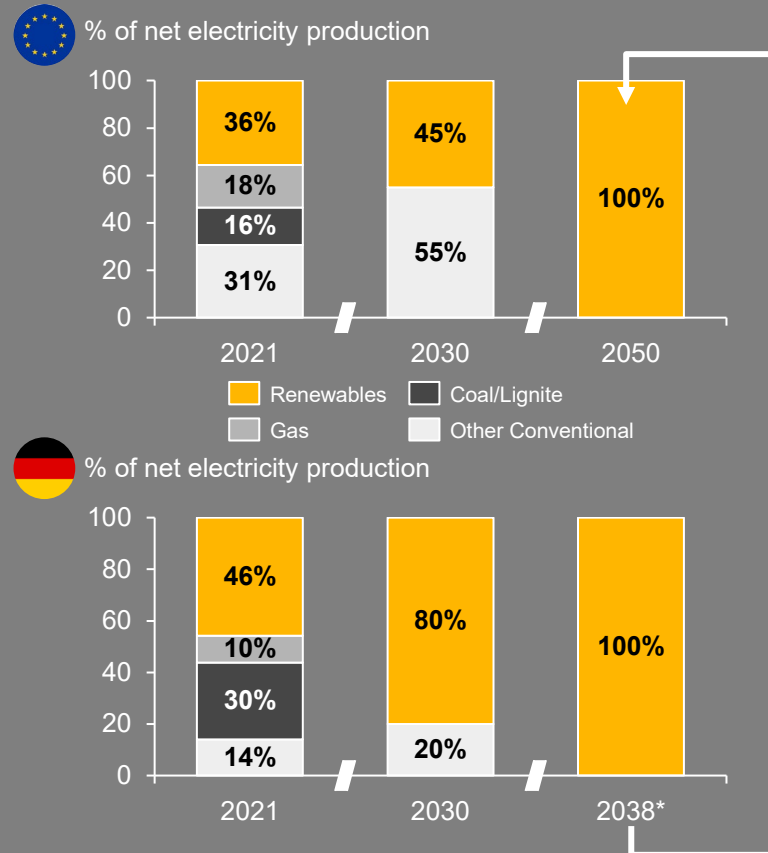
Robert Habeck

Federal Minister for Economic Affairs and Climate Action

New ambitious renewable energy targets are driven by the urgent need for decarbonization due to the climate crisis...

Share of renewable energy in current and future net electricity production in Germany and the EU

CO₂



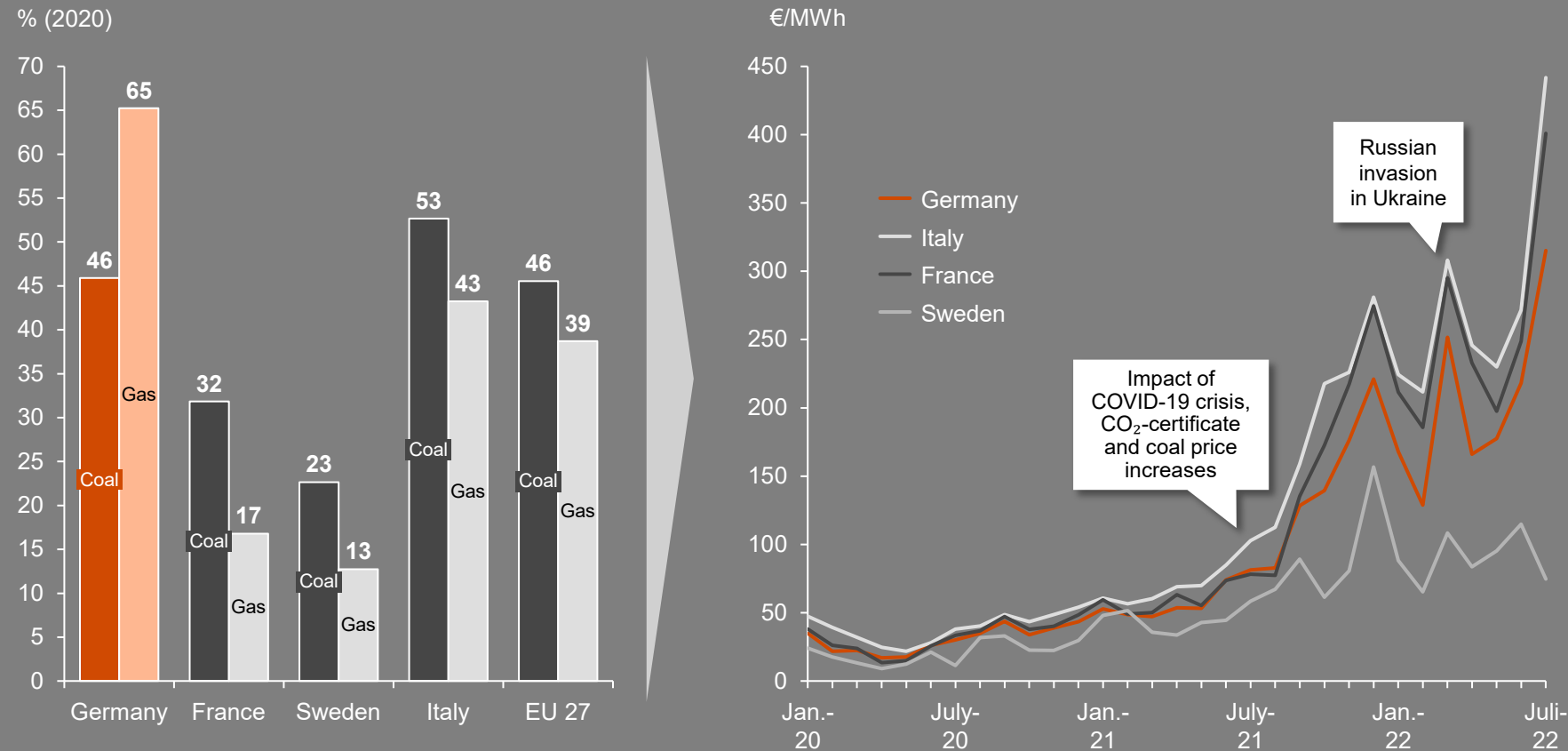
Germany >10 years earlier at 100% green electricity with an almost 30% higher planned average annual growth rate

Key Takeaways

- The increasingly visible and often **dramatic impacts of climate change** within Europe and Germany require an acceleration of the decarbonization of all sectors including electricity.
- The **share of conventional generation** technologies in the European and German electricity mix is **still high** but shall be reduced significantly.
- The new German coalition has set **unprecedented target levels** for this technological transition path; far above European average.

...and for energy independence and diversification of energy sources due to the European energy crisis.

Share of Russian imports of gas and coal for selected European countries and their recent electricity price increase

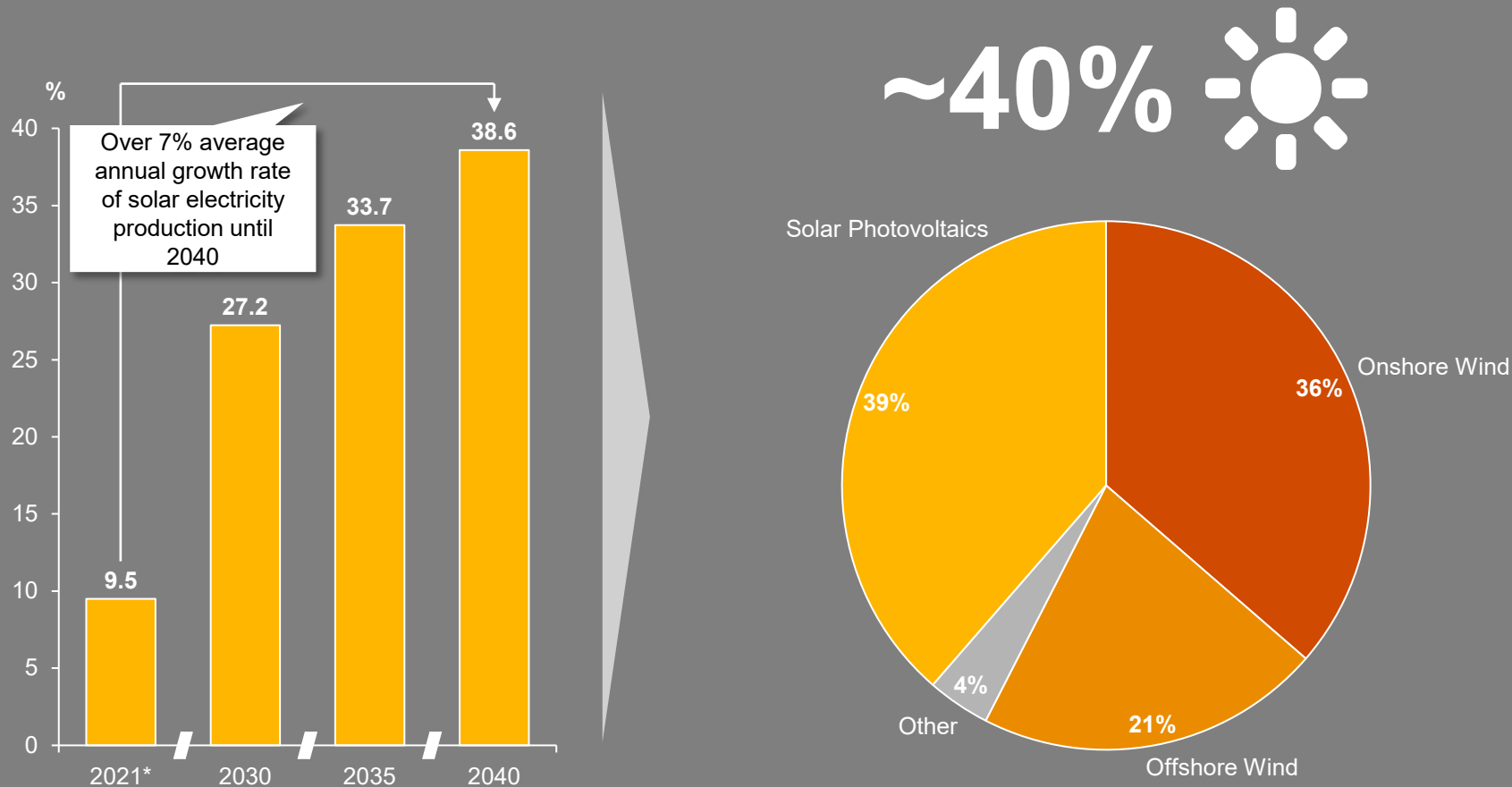


Key Takeaways

- Germany and other major European economies have a **high dependency** on Russian gas and coal imports.
- Compared to its European peer group Germany's **dependency on Russian gas is above average**
- The high dependency on Russia's gas and coal and the impact of the COVID-19 crisis are the main catalysts contributing to the **rising electricity costs**.

Solar Photovoltaics has been identified as a major source of electricity in the future German electricity mix...

Expansion targets for Solar PV as a share of gross electricity generation in Germany and the projected German electricity mix for 2040

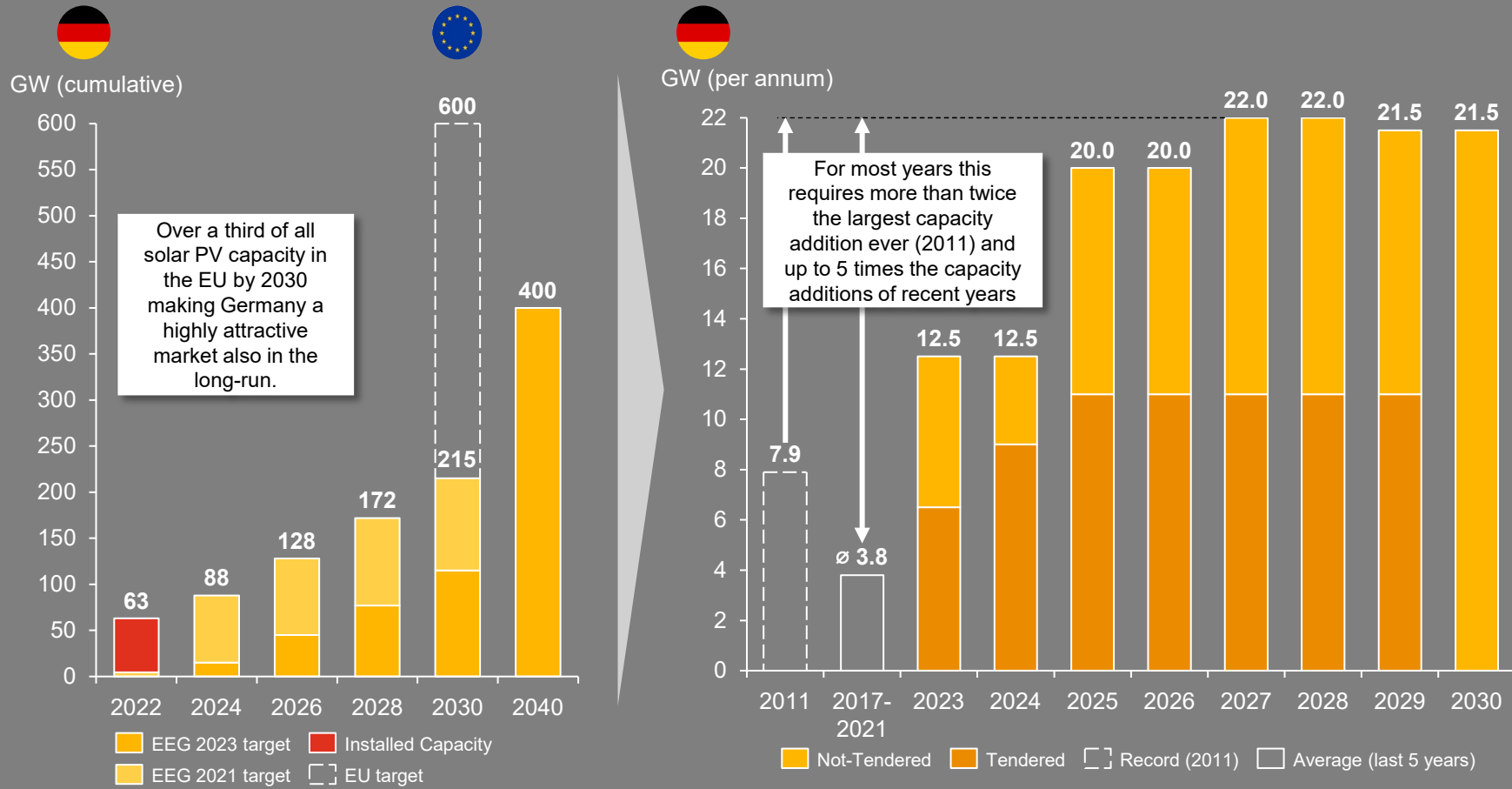


Key Takeaways

- The German government sets the target of covering 80% of Germany's electricity consumption with renewable energies as early as 2030 and increasing this share to **100% by 2038**.
- **Solar PV shall be a major source for electricity production** in 2040 covering almost 40% of generation.
- Over the next 20 years solar electricity generation will have to **increase by over 7% annually**.

...requiring a massive increase in the amount of annual Solar PV installations in Germany.

Solar PV capacity expansion targets and the required amount of annual GW addition required to achieve those targets



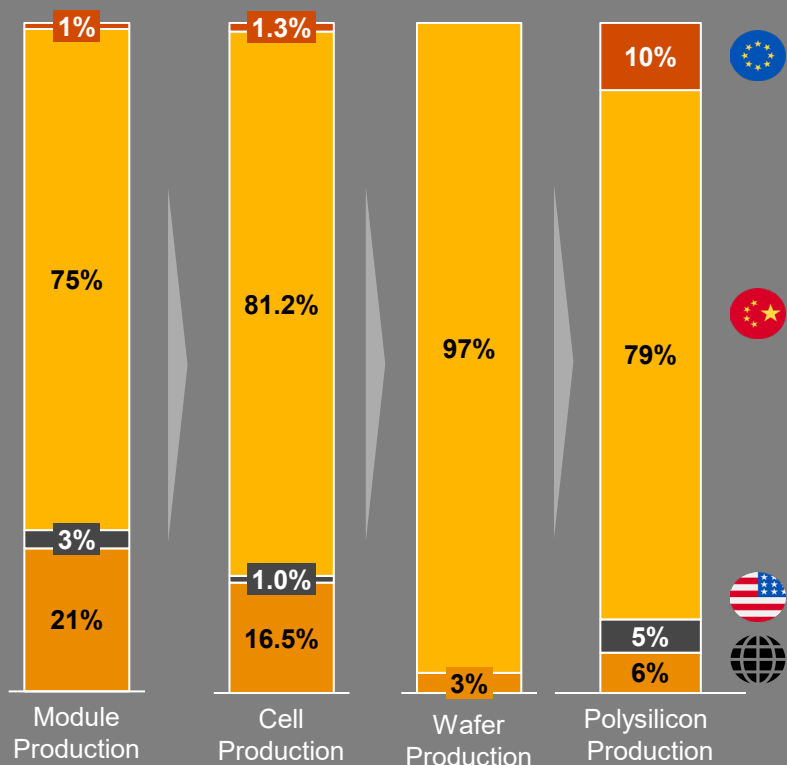
Key Takeaways

- Germany will have to **massively speed up its capacity addition** of all types of Solar PV installations with some years over 22 GW new installations planned.
- For the years to come this means **doubling or almost tripling** the quantity added in **the record** year 2011 of 7.9 GW.
- Based on an average module capacity of 440 Wp this translates to a requirement of **up to 50 million PV modules per year** (e.g. 2027/28).

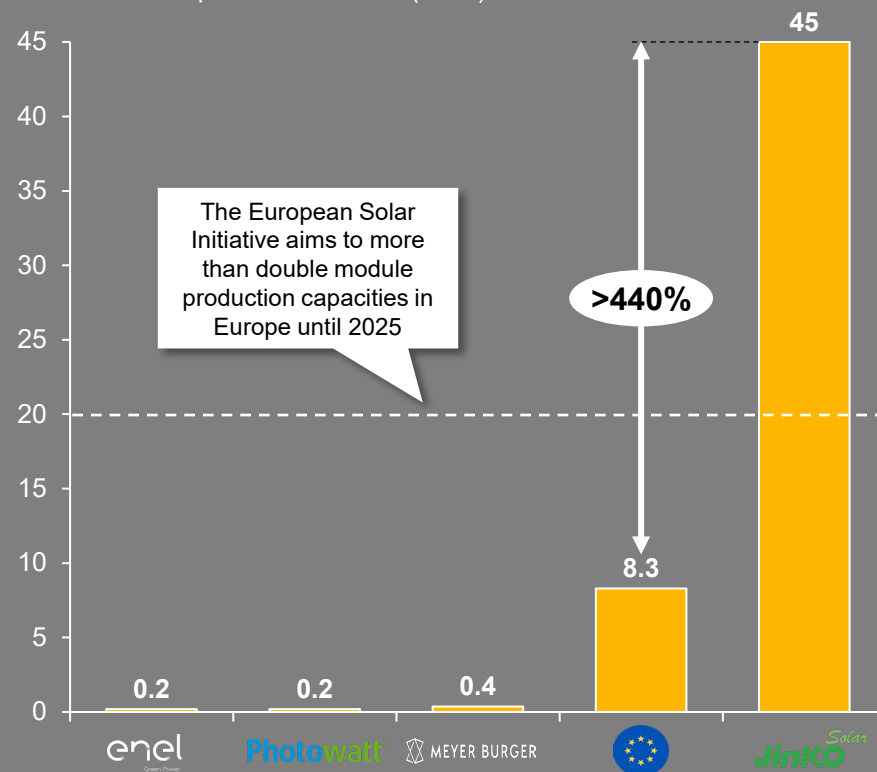
Germany and the EU are, however, even less diversified with regard to Solar PV than with respect to fossil fuels...

Module, cell, wafer and silicon production shares and comparison of module production capacities of selected European and Chinese producers

Market share in % (2021)



Annual module production in GW (2021)

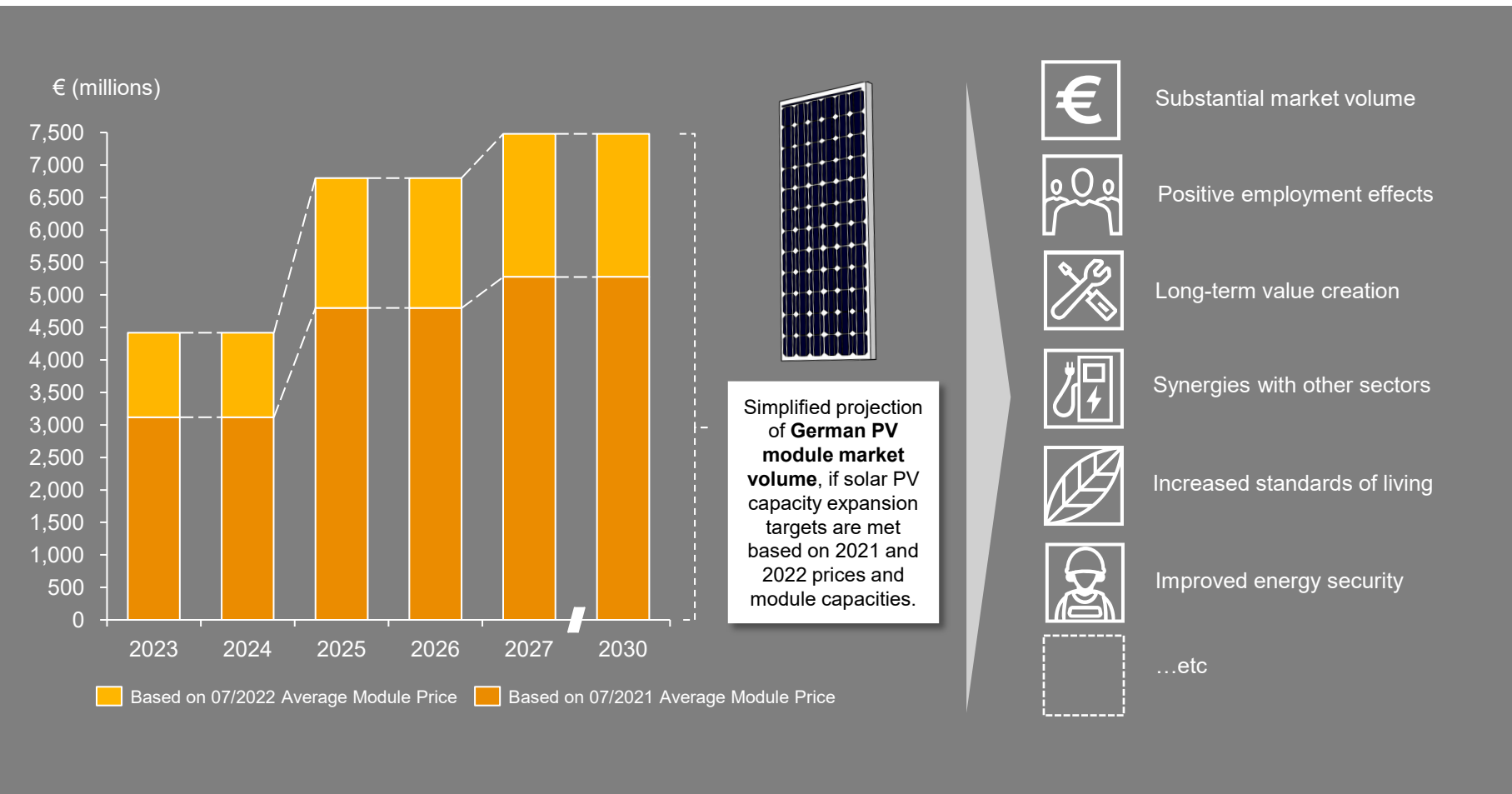


Key Takeaways

- Since the politically induced decline of the German and European solar module industry around 2010 **production of modules, components and raw materials is dominated by Chinese manufacturers.**
- **Production capacities of Chinese module manufacturers are often more than 100 time larger** than any of the European competitors.
- The **entire EU production capacity is well below individual major Chinese competitors (e.g. Jinko).**

...which is not only strategically challenging but also does not raise the full potential for economic growth and employment.

Projected market volume of PV modules in Germany and selected economic, social, political and environmental benefits

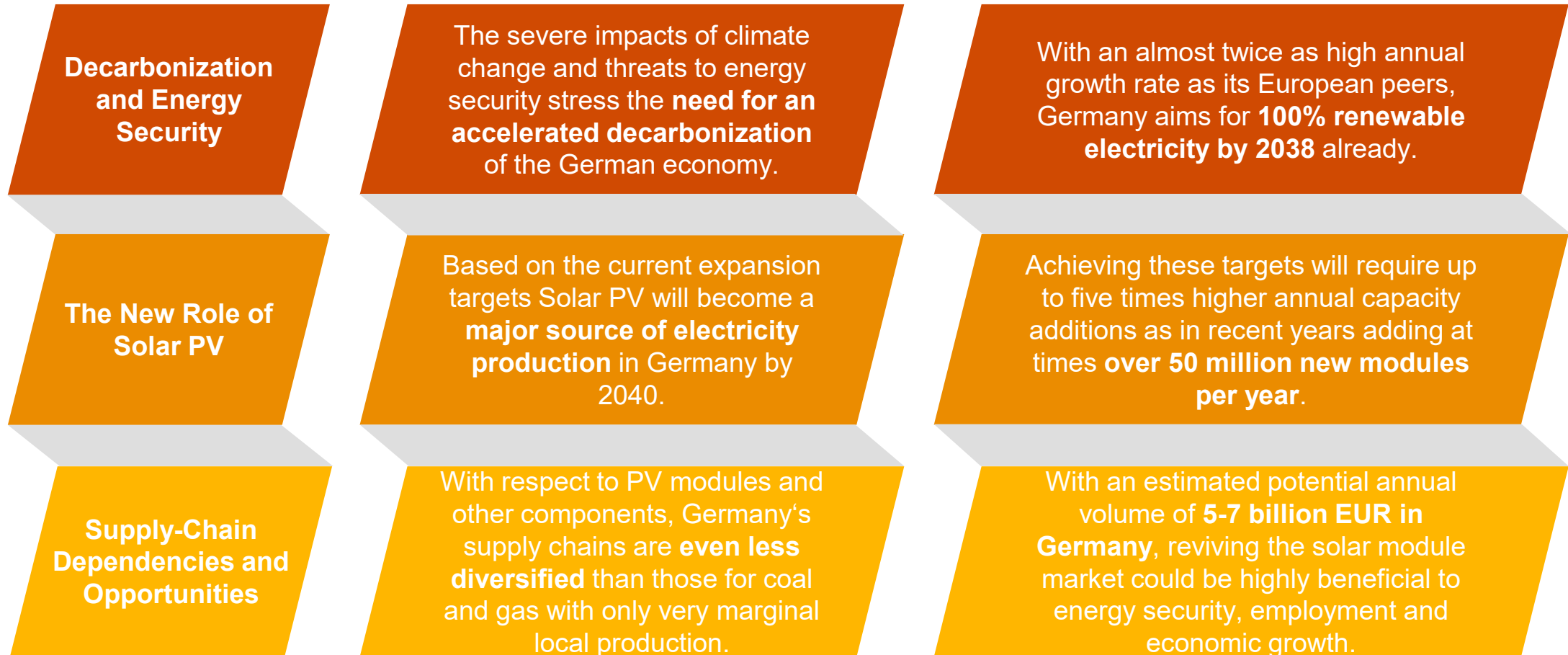


Key Takeaways

- The capacity additions for solar PV could lead to an **annual market volume of ca. 5-7 billion EUR** in Germany by the mid-twenties for **PV modules alone**.
- Adding inverters, cabling, mounting systems or transformers the overall **market volume for PV components** and all related services will be **substantial**.
- The **number of employees** in the PV sector could **double** to about 100,000 according to BSW-Solar.

Solar PV will play an unprecedented role in the future German electricity mix offering many opportunities for the market

Key take-aways and implications





PwC occupies a leading position on the market for auditing and consultancy. PwC provides support to clients from all sectors to enable them to obtain their objectives – thanks to our worldwide network, the opportunities are boundless.

PwC advises groups and family-owned companies, industrial and service companies, global players and local heroes, the public sector, associations and NGOs. Because they are able to rely on us, we are the leading auditing and consultancy company in Germany. And because more than 12,000 specialists with around 600 partners at 21 locations in Germany are working every day to ensure that this trust is justified.

Our dedicated PwC Germany Renewable Energy team was established in 2000 and has ever since been working exclusively on renewable energies. We focus on commercial and financial advice for solar PV, on- and offshore wind projects. We offer M&A advice, benchmarking, valuation and financial modelling as well as strategic advice. Our clients include project developers, utilities, banks, strategic and financial investors.

www.pwc.com

Contact us



Heiko Stohlmeyer
Director, Head of Renewable Energy
PwC Germany
heiko.stohlmeyer@pwc.com



Carl-Maria Bohny
Senior Manager, Renewable Energy
PwC Germany
carl-maria.bohny@pwc.com



Lisa Anna Pregla
Senior Associate, Renewable Energy
PwC Germany
lisa.anna.pregla@pwc.com



Jens Behrensen
Senior Associate, Renewable Energy
PwC Germany
jens.behrensen@pwc.com