



PV Supply Chain: Status and diversification considerations

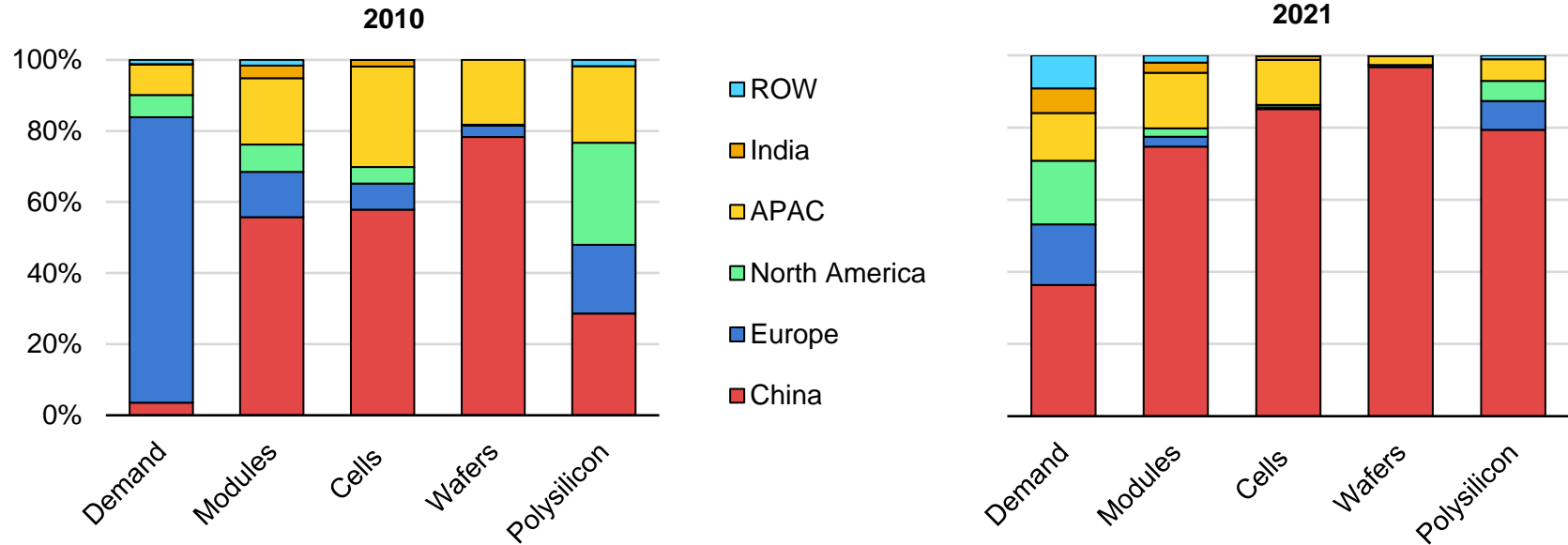
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China currently dominates global solar PV supply chains

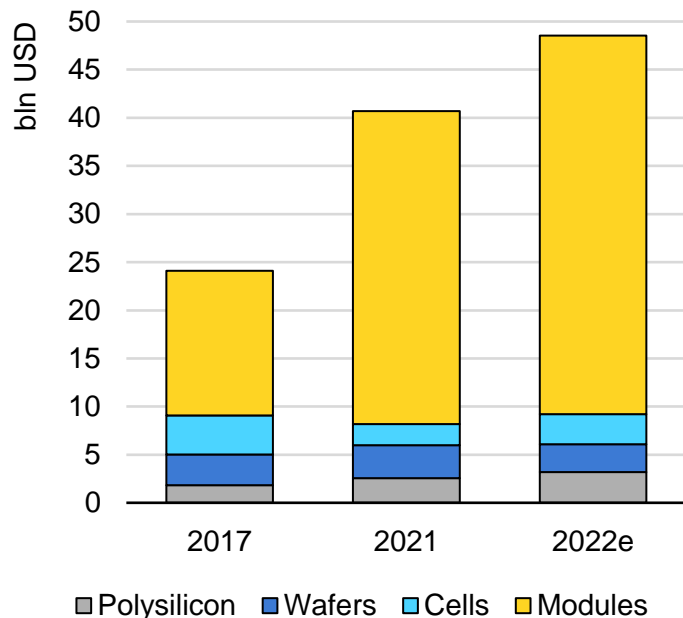
Solar PV manufacturing capacity by country and region, 2010-2021



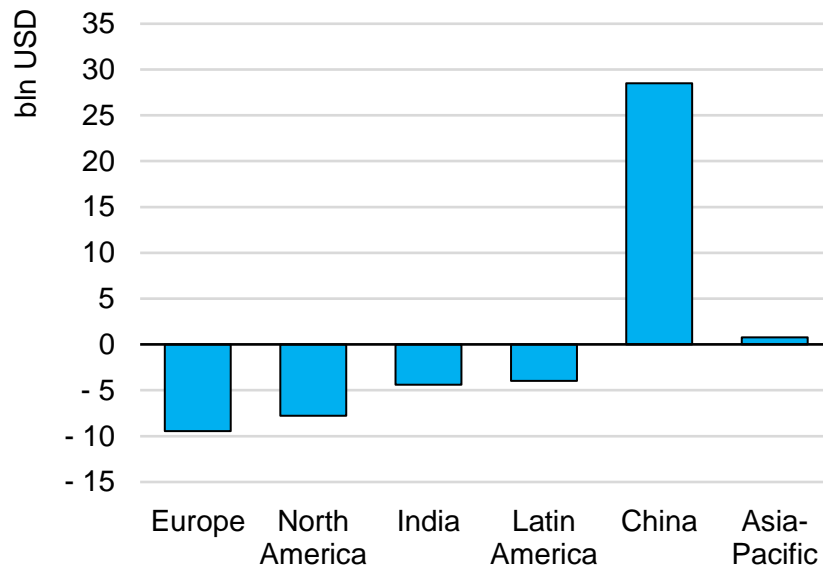
Chinese supply and demand policies have enabled economies of scale and cost reductions in all manufacturing stages. Module prices declined by over 80% and conversion efficiency increased almost 50% in the last decade.

Solar PV trade brings huge economic benefits for major exporters

PV international net trade value, 2017-22



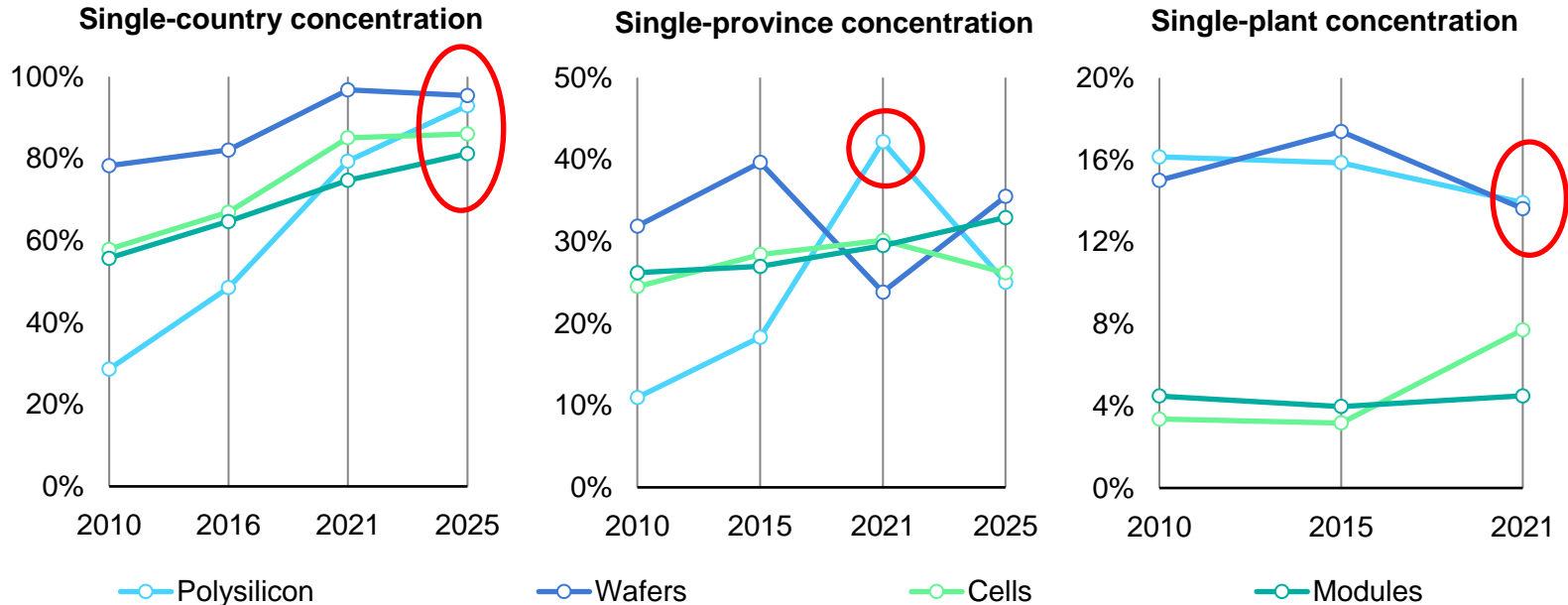
Solar PV trade balance by country, 2021



Higher PV prices contribute to global PV export value reaching a record in 2022. PV trade accounts for 7% of China's trade balance. European, US and Indian solar PV trade deficit together reached more than USD 20 billion in 2021.

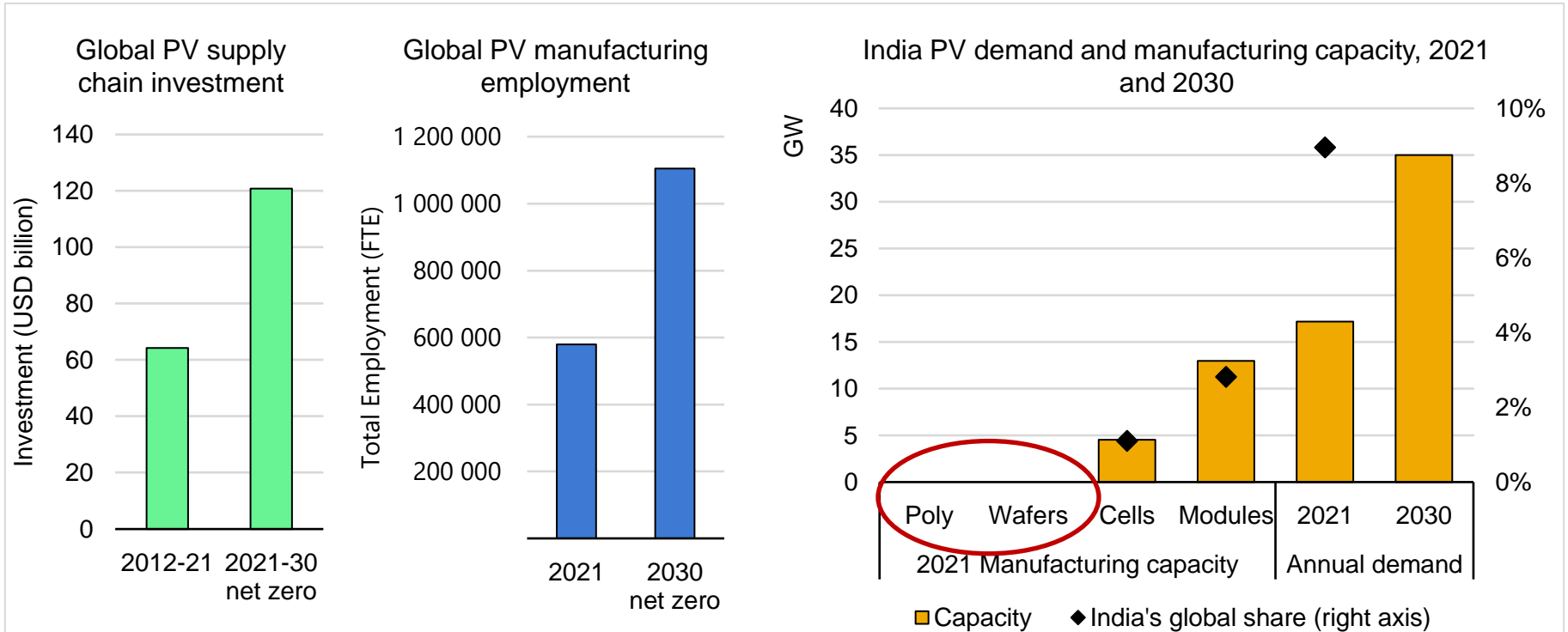
Solar PV manufacturing concentration risks security of supply

Country, province and single-plant concentration as shares of global manufacturing capacity



High physical concentration make the supply chain vulnerable to single incidents. In 2020 technical issues at just one polysilicon facility cut global production capacity by 8%, reducing supply and increasing costs globally.

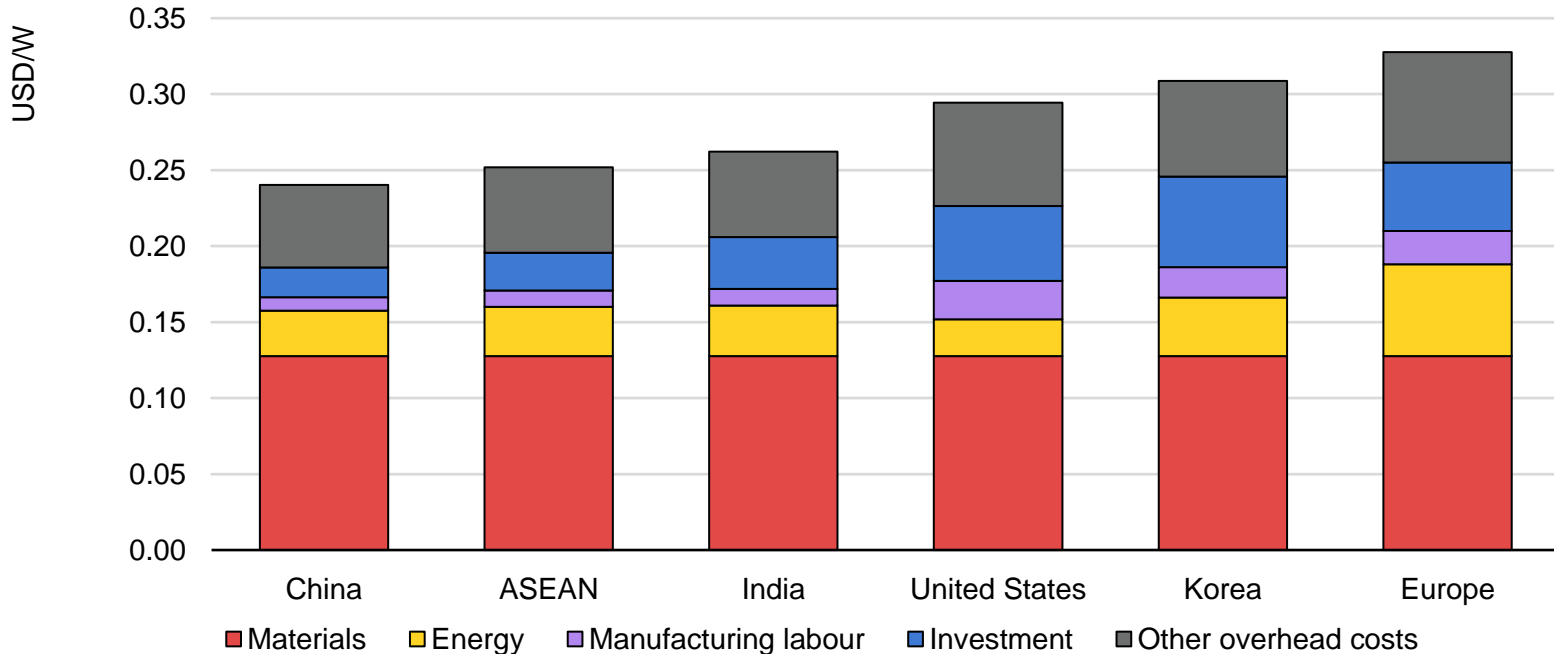
India can be a major beneficiary of PV supply chain diversification



One GW of integrated manufacturing can create between 1 000 and 1 300 jobs depending on facility size and location. India's growing PV demand and potential cost competitiveness could bring huge economic benefits

India's PV manufacturing could be competitive with policies and scale

Solar PV manufacturing costs by input in selected countries and regions



Lowering investment and energy costs could make India more competitive with China and ASEAN while integrating manufacturing facilities can realize economic efficiencies.

1. Diversify raw material supplies and manufacturing

- Move solar PV supply chain diversification up the policy agenda as an integral part of advancing clean energy transitions.

2. De-risk manufacturing investment

- Facilitate investment in manufacturing, e.g. through finance and tax policies, and other measures to de-risk PV manufacturing investment.

3. Ensure environmental and social sustainability

- Strengthen international cooperation on creating clear and transparent standards, taking into account environmental and social sustainability criteria

4. Continue to foster innovation

- Expand research and development funds with the aim of further improving solar cell conversion efficiency and reducing raw material use and costs

5. Develop and strengthen recycling capabilities

- Implement comprehensive regulatory frameworks and minimum requirements for collection and recycling

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