Employment effects of the energy transition – the case of Germany

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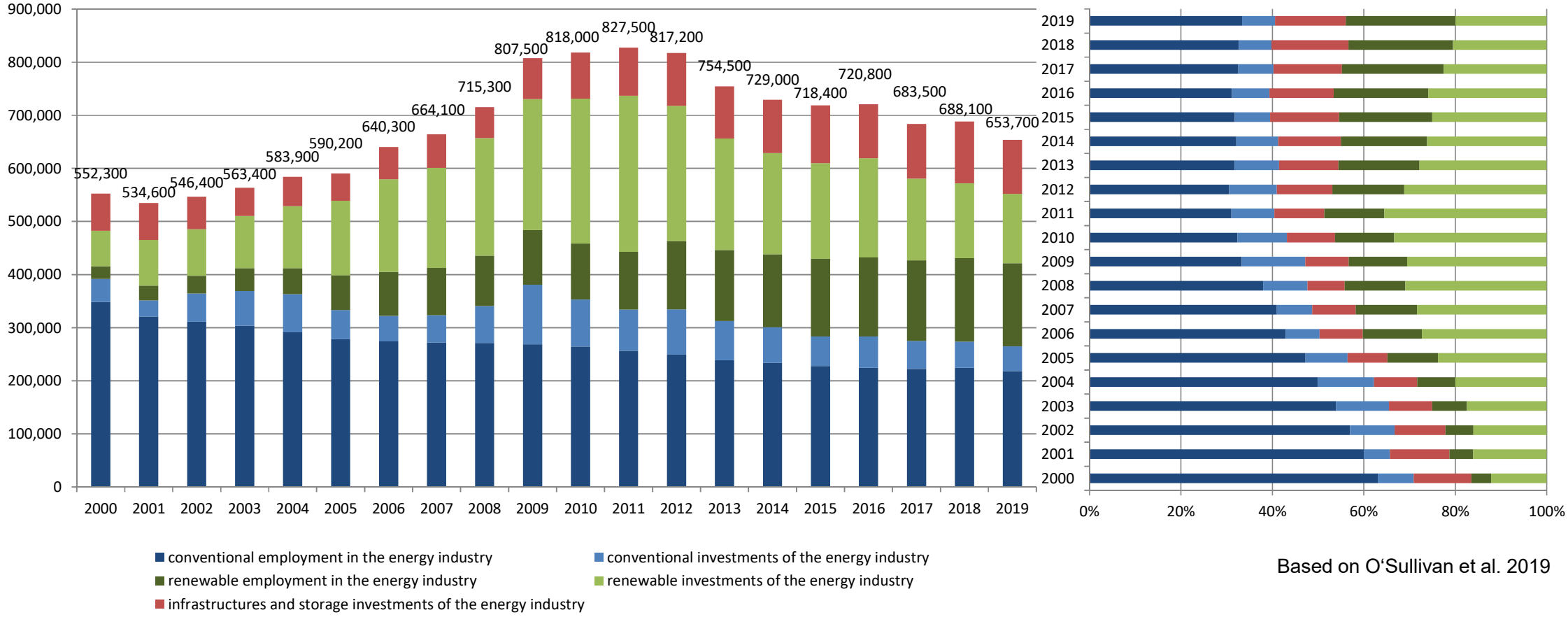
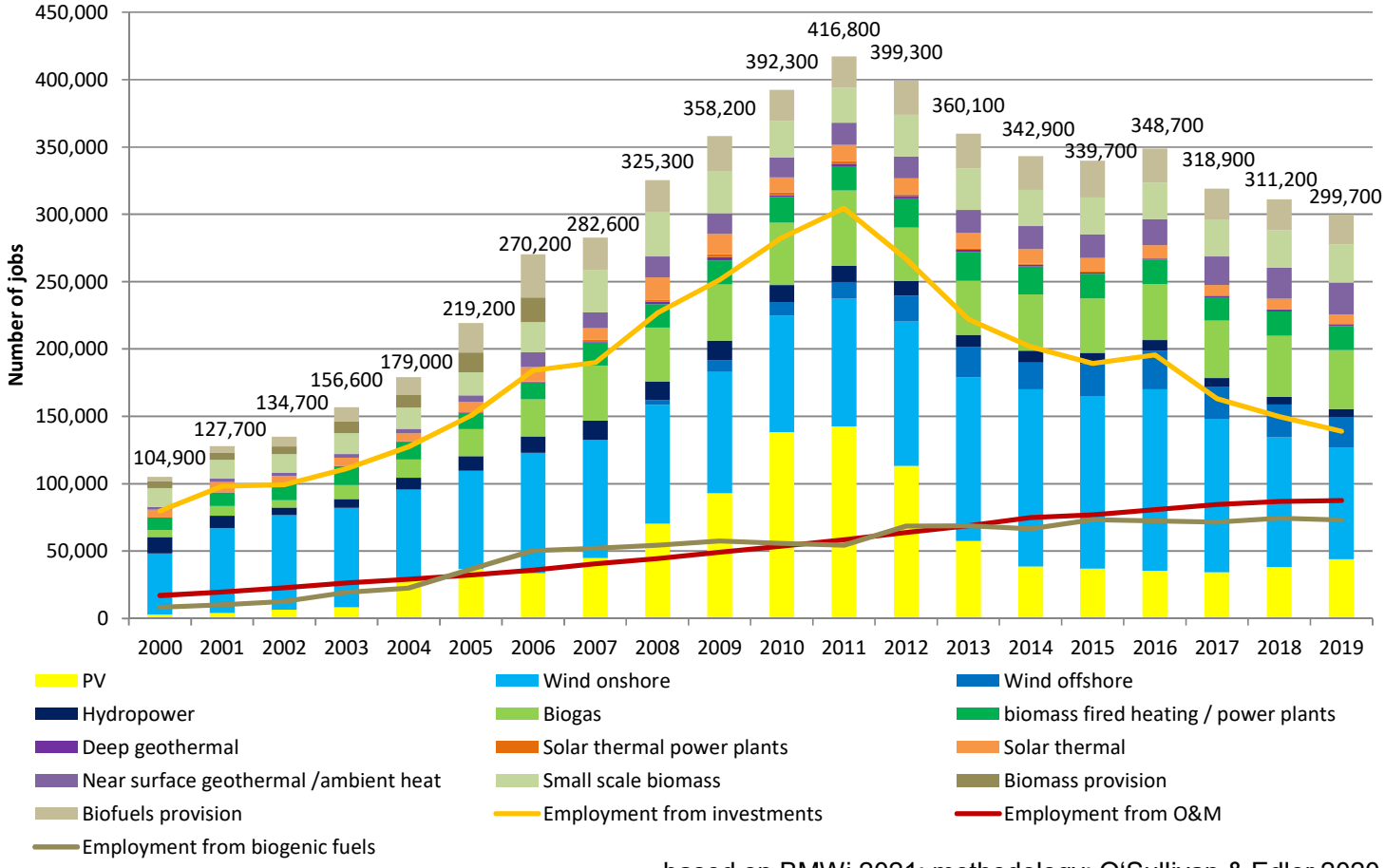
Transition of gross employment within the „energy industry“



Based on O‘Sullivan et al. 2019

Renewable energies – gross employment effects

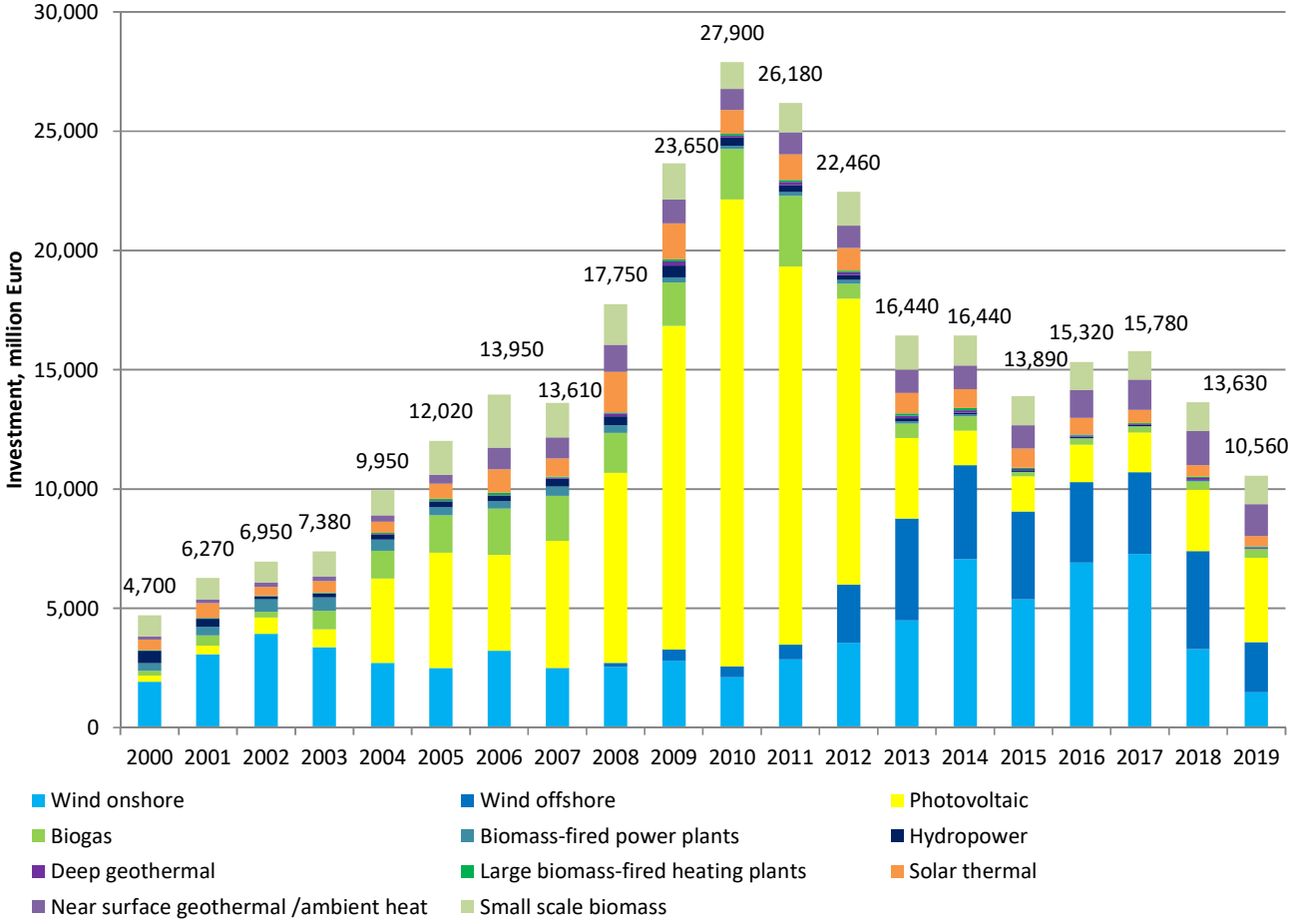
- Main driver of gross employment development so far: investment in new RES-installations.
- Operation & maintenance (O&M) and provision of biogenic fuels are gaining importance and provide stability.
- More than half of the job in the RES-industry in Germany in 2019 in these sectors.
- Installation, O&M as well as provision of biogenic fuels have a high potential for local value creation.



based on BMWi 2021; methodology: O'Sullivan & Edler 2020

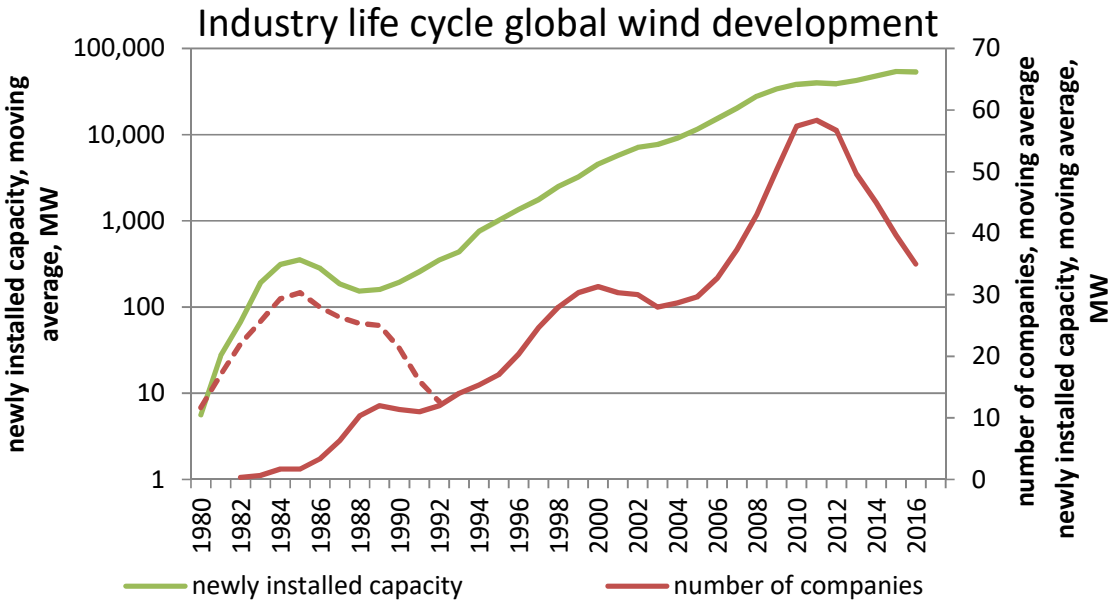
Where are we headding: Investments in RES in Germany

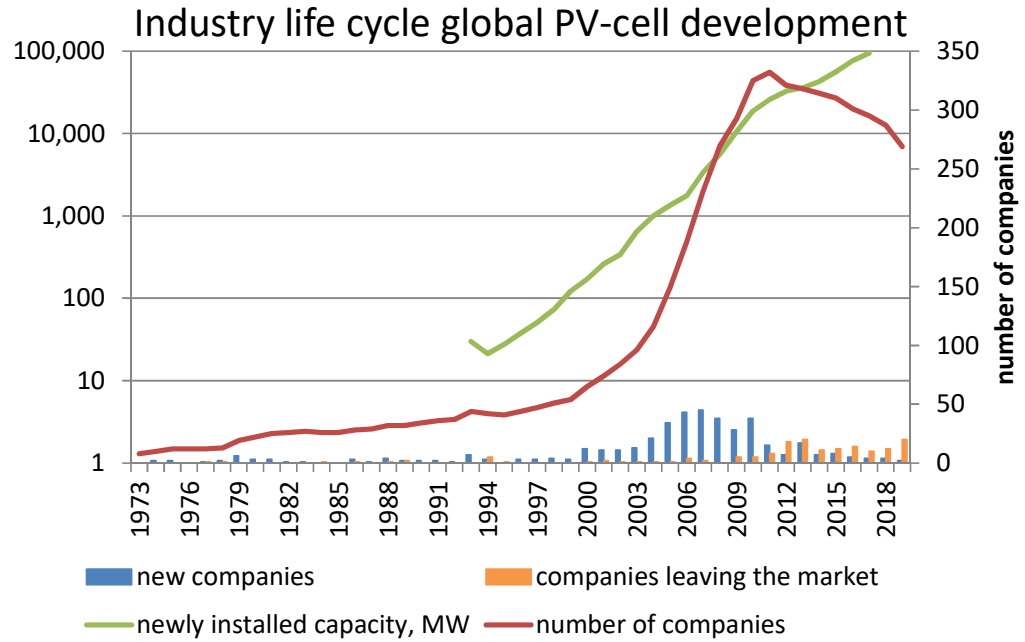
- Photovoltaics:
  - Highest level of newly installed capacity to date: 8 GW in 2012. Currently: 3-5 GW yearly.
  - The coalition agreement calls for an installed capacity of 200 GW by 2030.
  - On average, an installation of about 15 GW per year is required.
- Wind onshore:
  - More than 5 GW installed in 2017, 1 GW installed in 2019.
  - About 7 GW yearly required to reach coalition agreement.
- Wind offshore:
  - No installations in 2021 expected.
  - Another 22 GW required until 2030.



based on BMWi 2021b; methodology: O'Sullivan & Edler 2020

Relevance of national markets for the development of industries





based on O'Sullivan 2021

- The wind and solar cell industry have in common that the creation of a national demand has been a driver for the creation of companies in a country.
- In the case of wind turbine manufacturers, the domestic market seems to play a decisive role in the survival of companies.
- For solar cell manufacturers, however, the development of the global market is of greater relevance.

Positive and negative economic effects of RE technology deployment

substitution effect

Positive effects (+): → job increases	Negative effects (-): → job losses	Effects**
increase in investment in RET	displaced investment in conventional generation technology	direct & indirect
increase in O&M in RE generation	displaced O&M in conventional power generation	direct & indirect
increase in fuel demand (biomass)	decrease in fossil fuel demand	direct & indirect
increase in trade of RE technology and fuel (biomass)	decrease in trade of conventional technology and fossil fuels	direct & indirect
higher household income from employment in RE industry	lower household income from employment in CE industry	induced type 1
decreased electricity price for households and industry due to merit-order effect, CO_2 pricing, etc*	increased electricity price for households (budget effect) and industry (cost effect) due to additional generation cost of RE-based power generation	induced type 2

budget effect

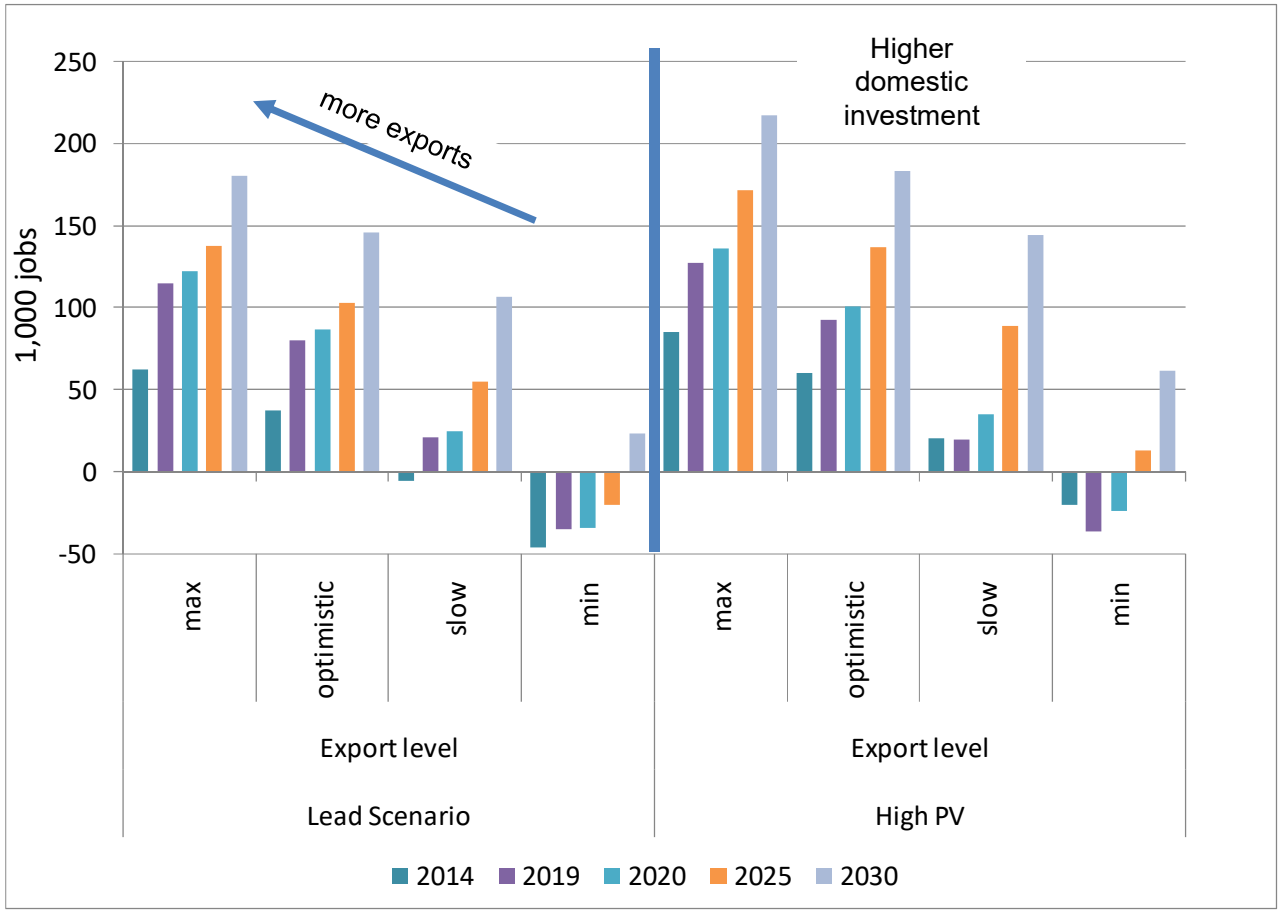
*So far, electricity from RE is usually more expensive than electricity from fossil energy sources

***Direct effects refer to effects within the respective RE industry while indirect effects also include effects in the RE upstream industries (supply of material and services). Induced effects relate to effects that occur in the consumer goods or non-RE manufacturing industries.*

based on Breitschopf et al. 2013

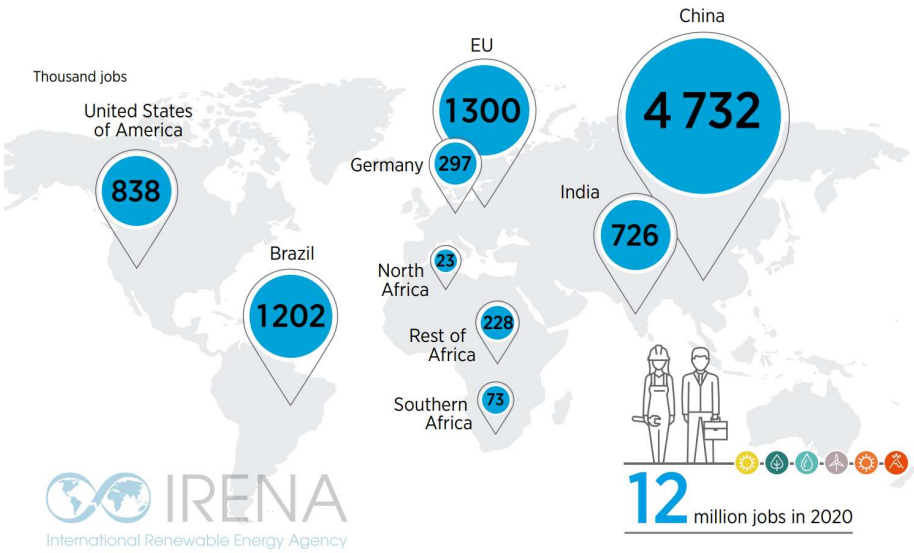
Macroeconomic effects / net impact of RE deployment in Germany

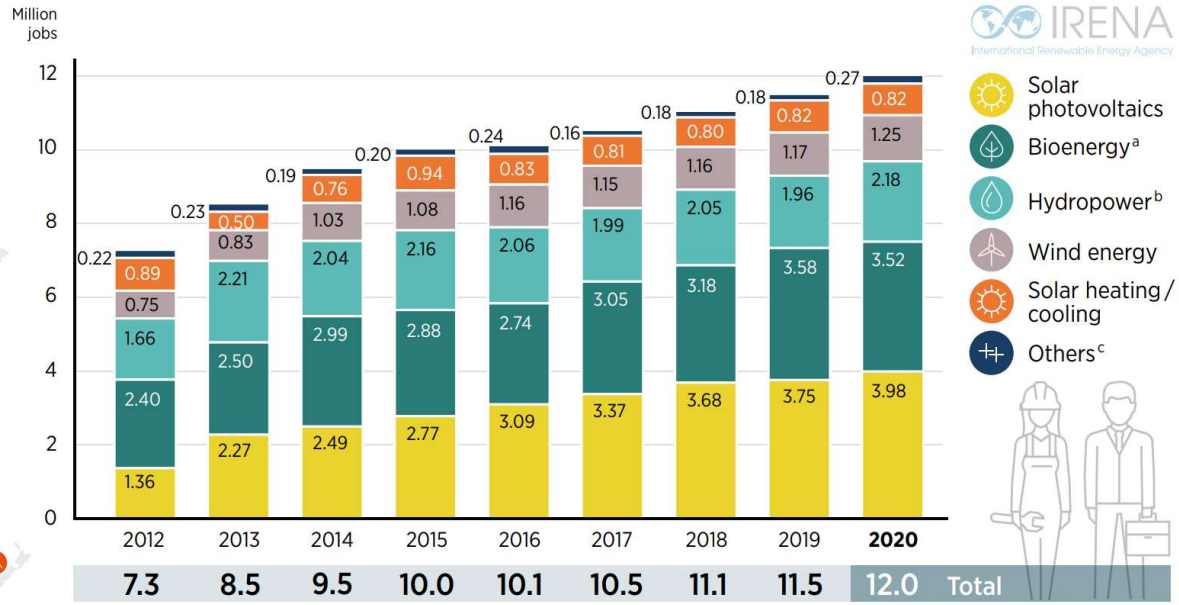
- The net effects result from the difference between two scenarios.
- Key factors determining the net development are:
  - Domestic investments
  - Foreign trade
  - Fossil fuel prices
- A current study shows positive net impact of ambitious climate mitigation policies in Germany (Lutz et al. 2021).
- Another shows that the exact way in which the GHG target is reached does not make a major difference to the net effects (Ulrich et al. 2021).



based on Lehr et al. 2015

International developments





Source: IRENA & ILO 2021

- Steadily growing employment in RES on a global level so far
- Current results on global employment effects by Ram et al. 2022 of a zero THG energy szenario show that:
  - Gross employment will doubble on a global level,
  - share of global energy jobs in Europe will grow from 7% in 2020 to 12% in 2050,
  - RES value chains are more labor intensive than extracting fossil fuels,
  - positive impacts on the future stability and growth of economies around the world.

Conclusion

- According to the current state of economic research, the energy transition will in all likelihood not lead to a reduction in the level of employment.
- However, there will be shifts in employment within sectors of the economy which may also include the employment in regions.
- National expansion of new energy technologies is not a guarantee for a long term establishment of technology manufacturers.
- However, substantial parts of the value added will be created nationally and will lead to national employment.
- Due to the decentralized nature of renewable energy sources, many of these jobs will be created locally.
- One challenge in the coming years will be to attract sufficient skilled workers for the energy transformation.
- However, due to the past experience of many workers, this will require a clear, reliable and long-term perspective.

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