Methodologies for employment impact assessment of renewable energy deployment – the German case

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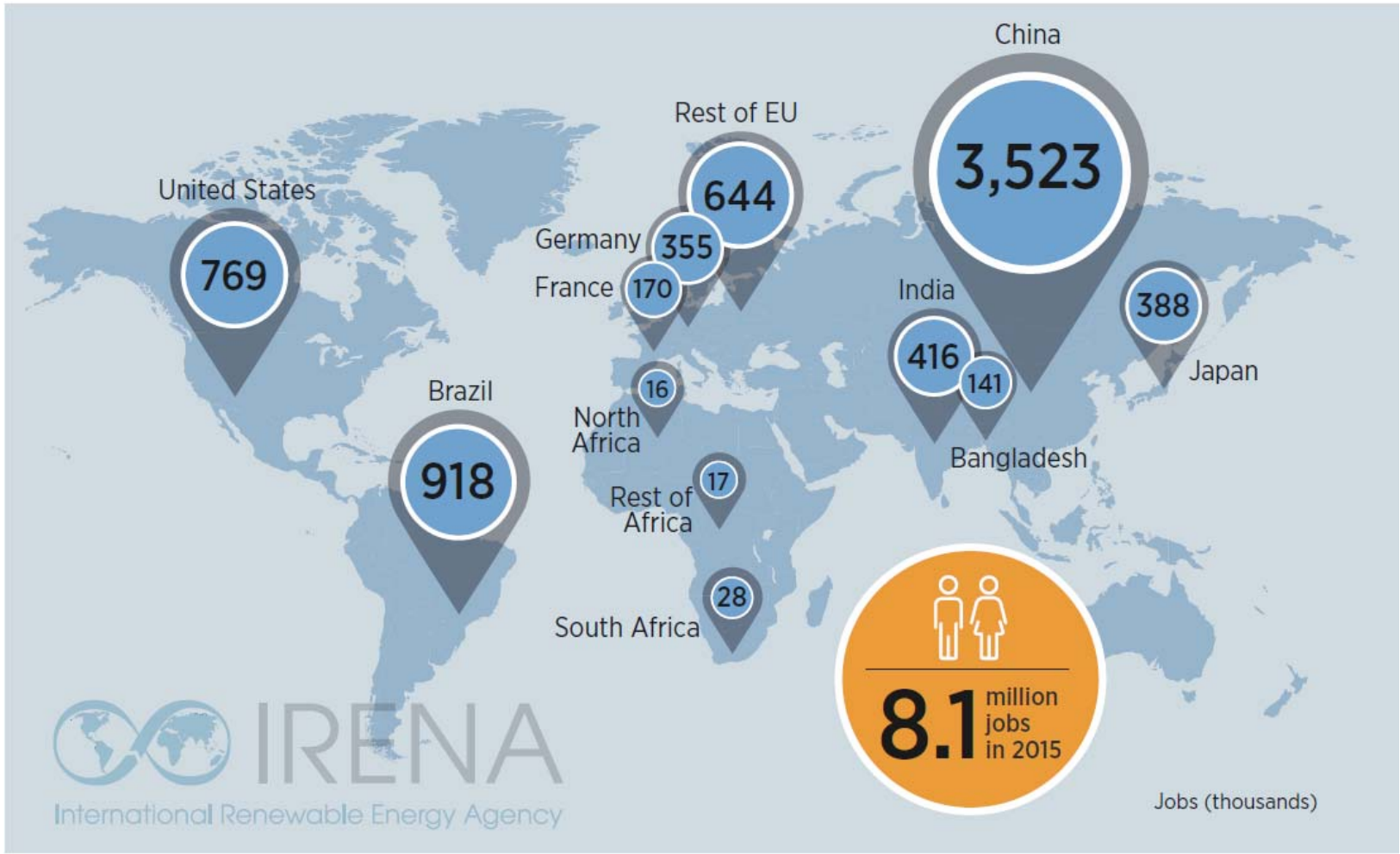
Renewable energy employment in selected countries and regions (IRENA 2016)



Positive and negative economic effects of RE technology deployment (IEA-RETD)

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.*

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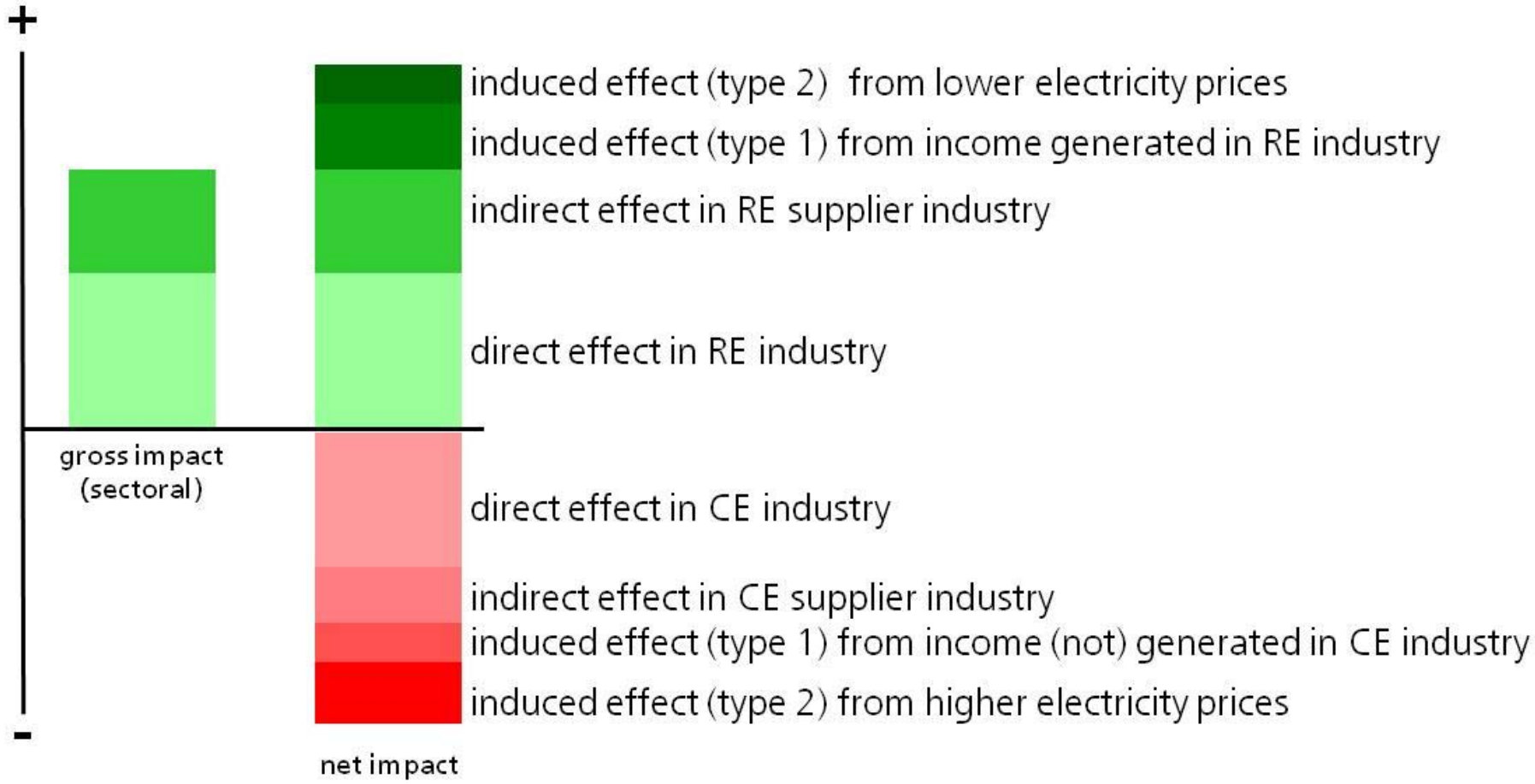
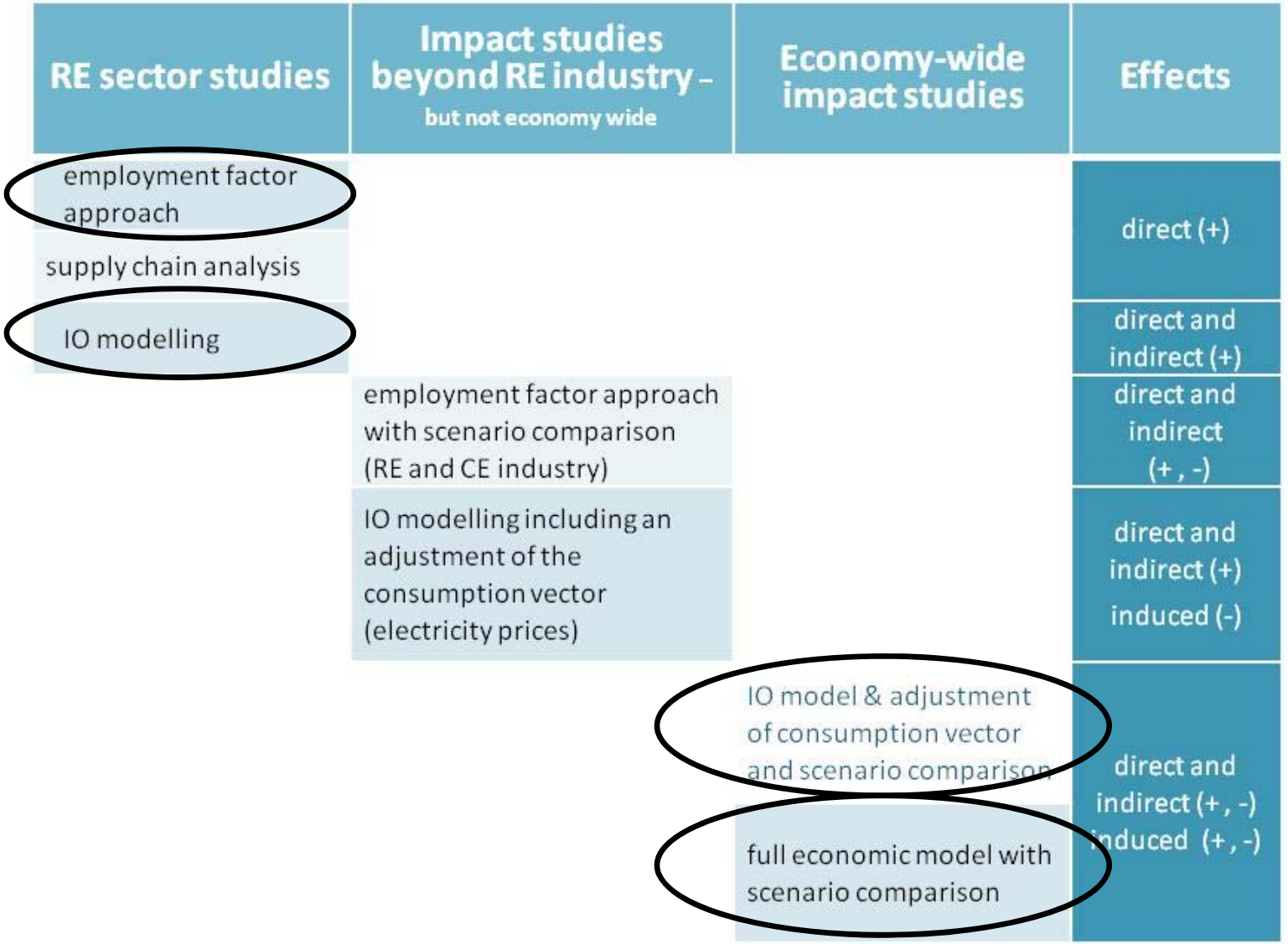
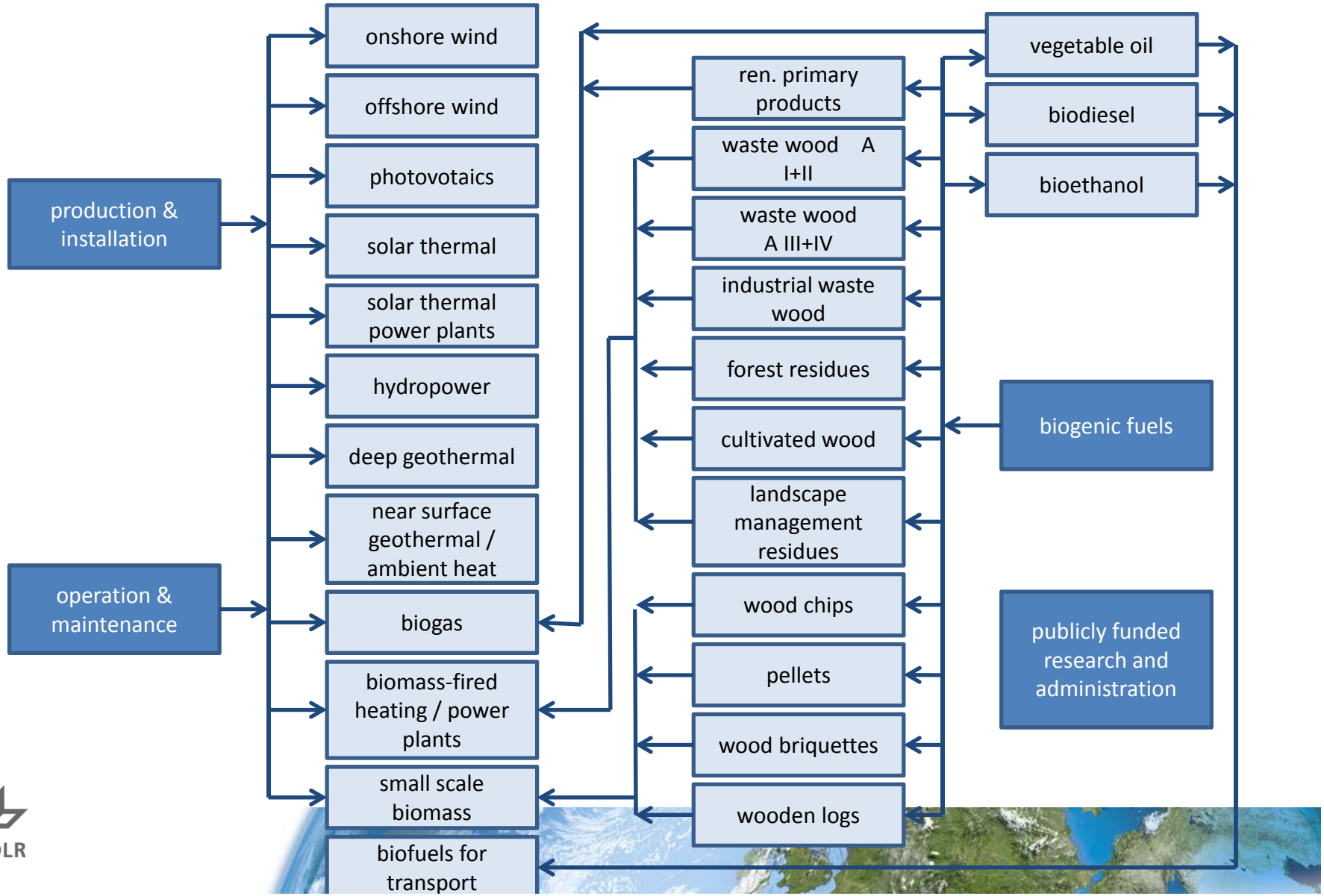
Two main types of impact studies



Methodological approaches by economic outreach and effects (IEA-RETD)



Areas of investigation and subsectors defined in the framework of the input output table for Germany



Data requirements for the creation of a new sector in the input-output framework

Company survey

structural information

- Important intermediate inputs
- Information about suppliers
- Production range of manufacturers
- Imported intermediate inputs
- Exports

Techno-economic data

Structure of RE systems

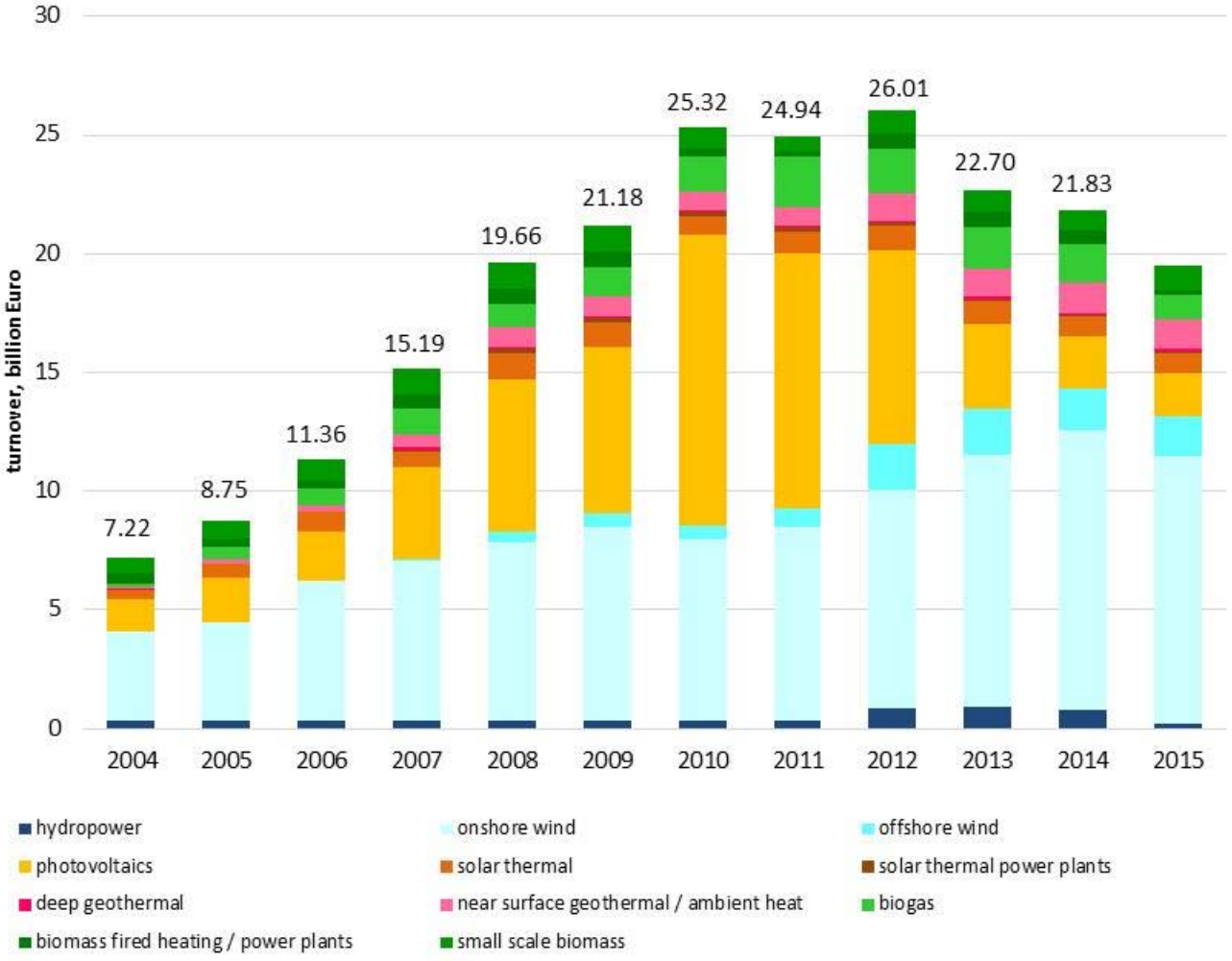
- Technical structure of RE systems
- Cost allocation of components in RE systems
- Allocation of components to sectors input-output table

production and installation of RE systems as a new sector in input-output table

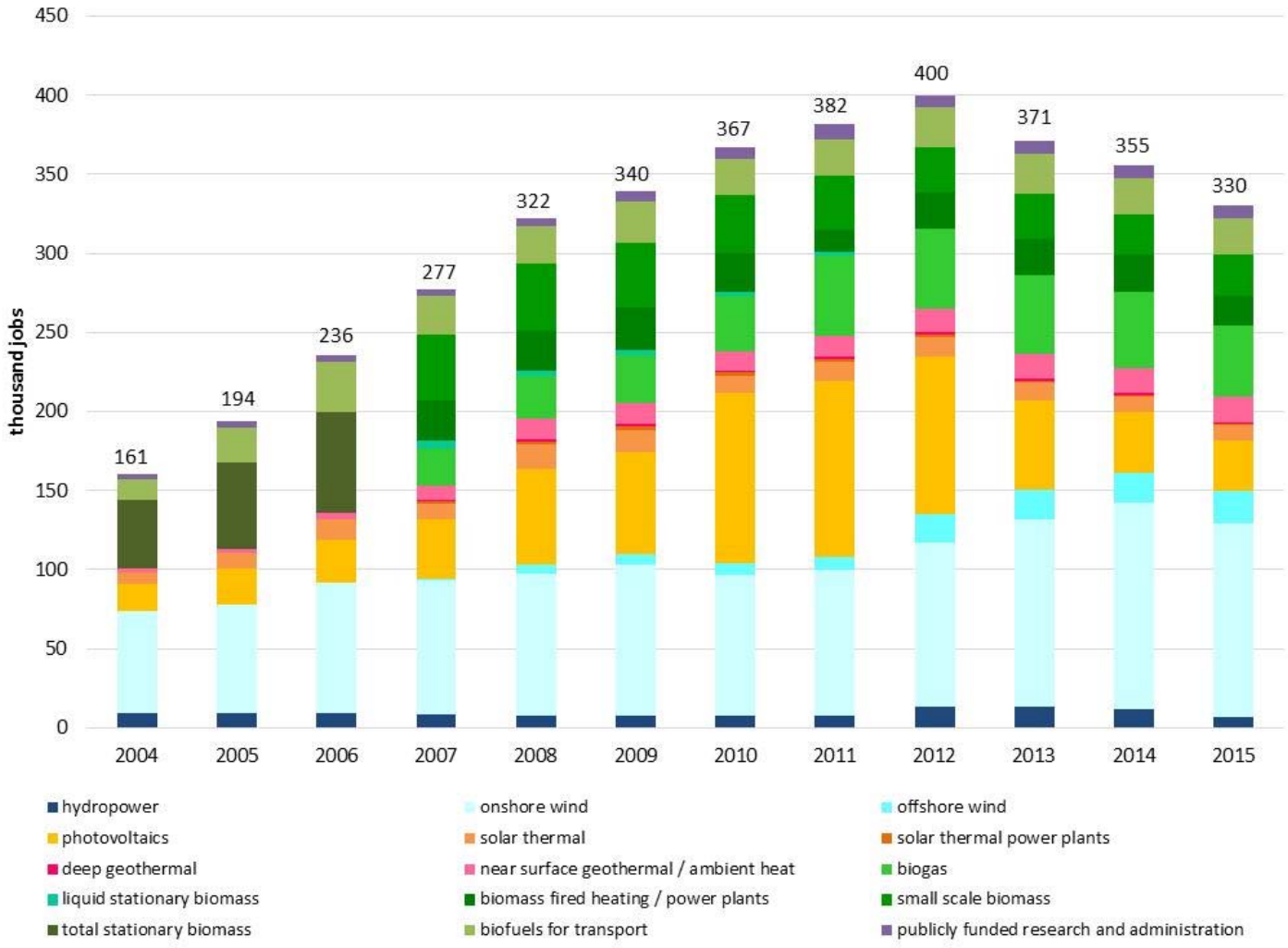
- "uncritical, supplementing" intermediate inputs
- Cost structure of sectors with technological proximity

Supplementary information from existing input-output table

Turnover of German-based manufacturers of RE installations



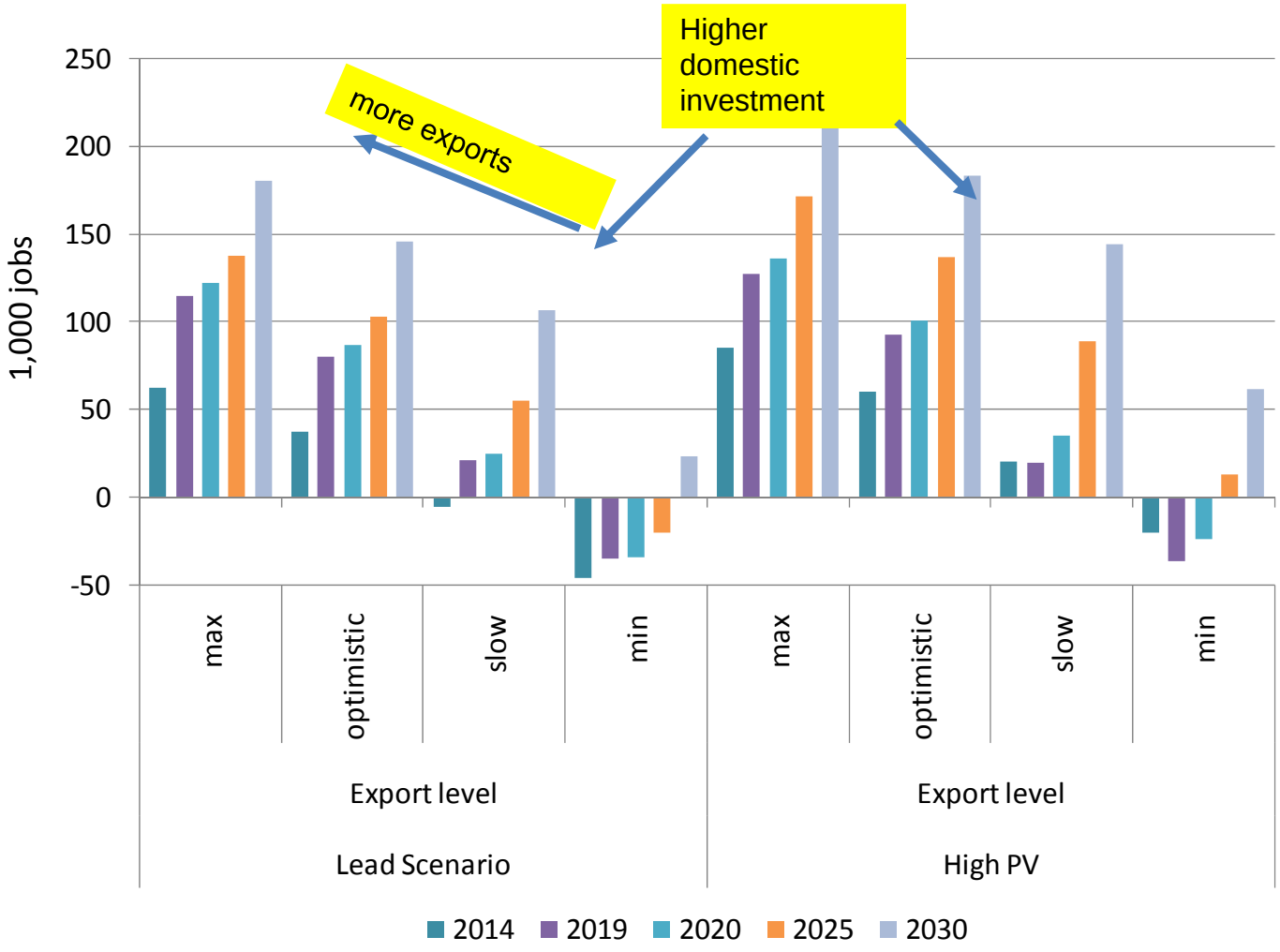
Gross employment from RE in Germany 2004-2015



Gross employment from RE in Germany

	jobs provided by investment (incl. export)	jobs provided by maintenance and operation	jobs provided by fuel supply activities	total no. of jobs in 2015	total no. of jobs in 2014
onshore wind	100,600	21,800		**122,400**	*130,500*
offshore wind	14,700	5,800		**20,500**	*18,700*
photovoltaics	20,900	10,700		**31,600**	*38,300*
solar thermal	8,500	1,400		**9,900**	*10,300*
solar thermal power plants	700			**700**	*700*
hydropower	2,000	4,700		**6,700**	*11,800*
deep geothermal	900	300		**1,200**	*1,100*
near surface geothermal	13,100	3,000		**16,100**	*16,100*
biogas	9,500	12,400	23,100	**45,000**	*48,300*
small scale biomass	10,300	4,000	12,200	**26,500**	*25,400*
biomass fired heating / power plants	1,600	8,700	8,600	**18,900**	*23,100*
biofuels for transport			22,800	**22,800**	*23,100*
total	182,800	72,800	66,700	**322,300**	*347,400*
publicly funded research and				**7,700**	*8,000*
total				**330,000**	*355,400*

Macroeconomic effects / net impact of RE deployment in Germany



Main factors:

- Foreign trade
- Fossil fuel prices

Thank you for your attention!

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