


Institute for Advanced Sustainability Studies IASS in Potsdam

Generating Socio-economic Values from Renewable Energies

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Background on the topic in 4 theses

Thesis 1: Within the timeline of the UN Sustainable Development Goals (up to 2030), renewable energy can offer solutions for the dual objective of ensuring economic growth and the imperative to decarbonise economies across the globe.

Thesis 2: Co-benefits is the predominant concept in the scientific literature that tries to reconcile climate and development goals – However, net effects and risiks are often blinded out.

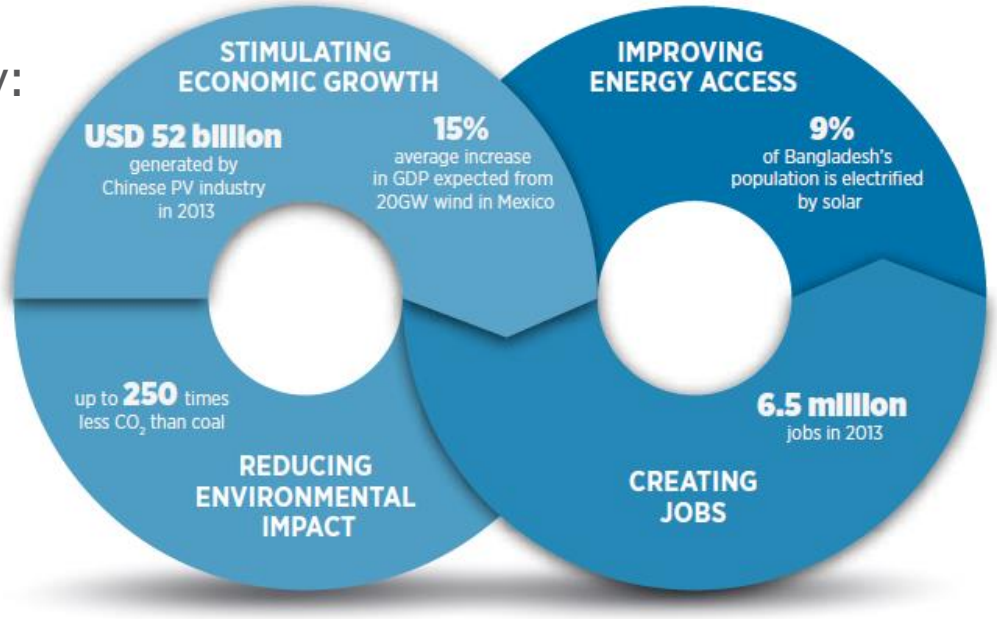
Thesis 3: Analytical frameworks and methods for assessing socio-economic co-impacts are available, but they do not consider sufficiently specific country conditions and research interests of emerging economies.

Thesis 4: The example of Germany shows that research questions and methodology development on co-benefits have changed in the course of the German energy transiton.

Thesis 1: Value circles of decarbonization and economic growth

Examples of socio-economic benefits from renewable energy:

» Stimulating economic growth
» Creating jobs
» Maximising value creation
» Expanding energy access
» Reducing environmental impacts



There is growing evidence that renewable energy has a positive ripple effect throughout society, simultaneously advancing economic, social and environmental goals.

Source: IRENA, 2015

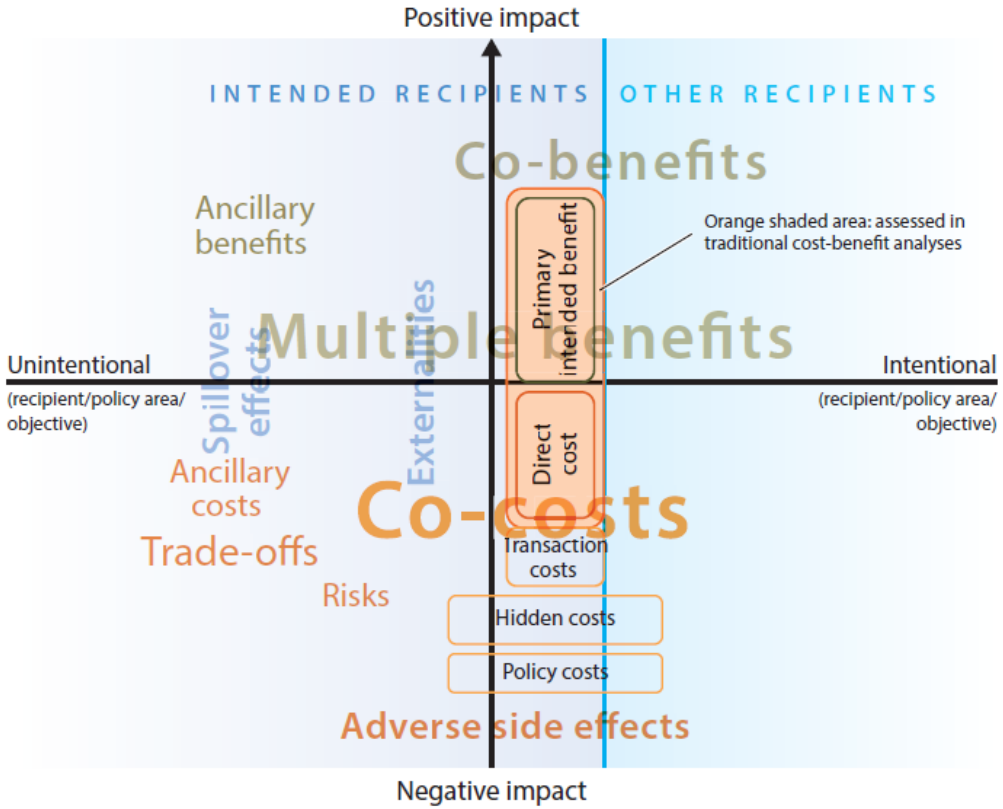
Thesis 1: Measuring the economics – results at global scale

Doubling the global share of Renewables by 2030 (IRENA REmap scenarios) would:

- boost global GDP by up to USD 1.3 trillion.
- increase direct and indirect employment to up to 24 million by 2030.
- Improve overall welfare far beyond gains in GDP.
- impact fuel importers and exporters and new markets will be created.

Source: IRENA, 2016

Thesis 2: Co-benefits as the scientific concept to reconcile climate and development goals



Two parameters put the different terms into relation:

(a) positive/negative nature of the effect

(b) Intentionality (adverse side effects/spillover effects)

There is a huge variety of terms in the literature… biggest problem: most studies concentrate on cost/benefit analysis, risks are often neglected

Source: Ürge-Vorsatz et al., 2014

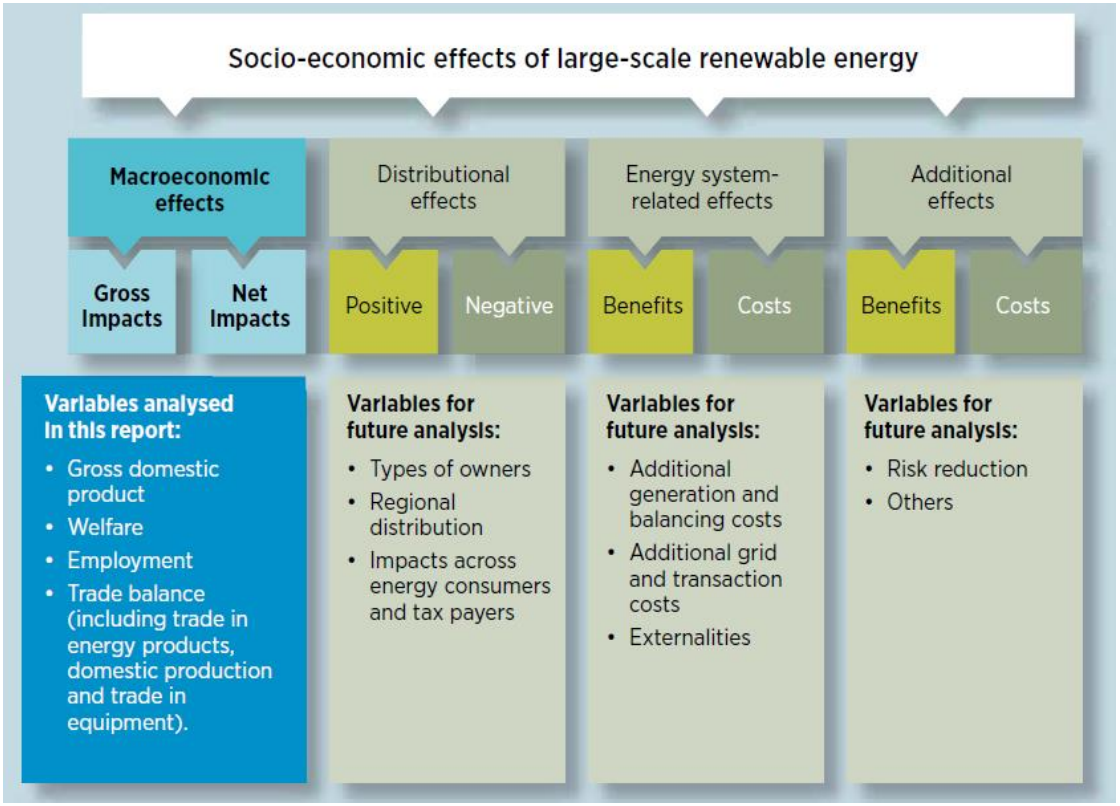
Thesis 2: Socio-economic ‚co-impacts' and ‚net-impacts' of renewable energies

How to translate the co-benefits approach into economics speech?

Impacts and effects of renewable energies	
‚Co-impact' of renewables	‚Net-impact' of renewables
Co-benefit (gross): renewable energies industry, sectoral imapct	Net-benefit: impact on the economy as a whole, all economic sectors are considered
Effects: positive, in/direkt	Effects: positive/negative, in/direkt and induced
Part of the picture	Whole picture

Gross (sector-perspective) and net effects (economy-wide perspective) of implementing different energy policies can be differentiated.

Thesis 3: Development of an analytical framework for co-benefits



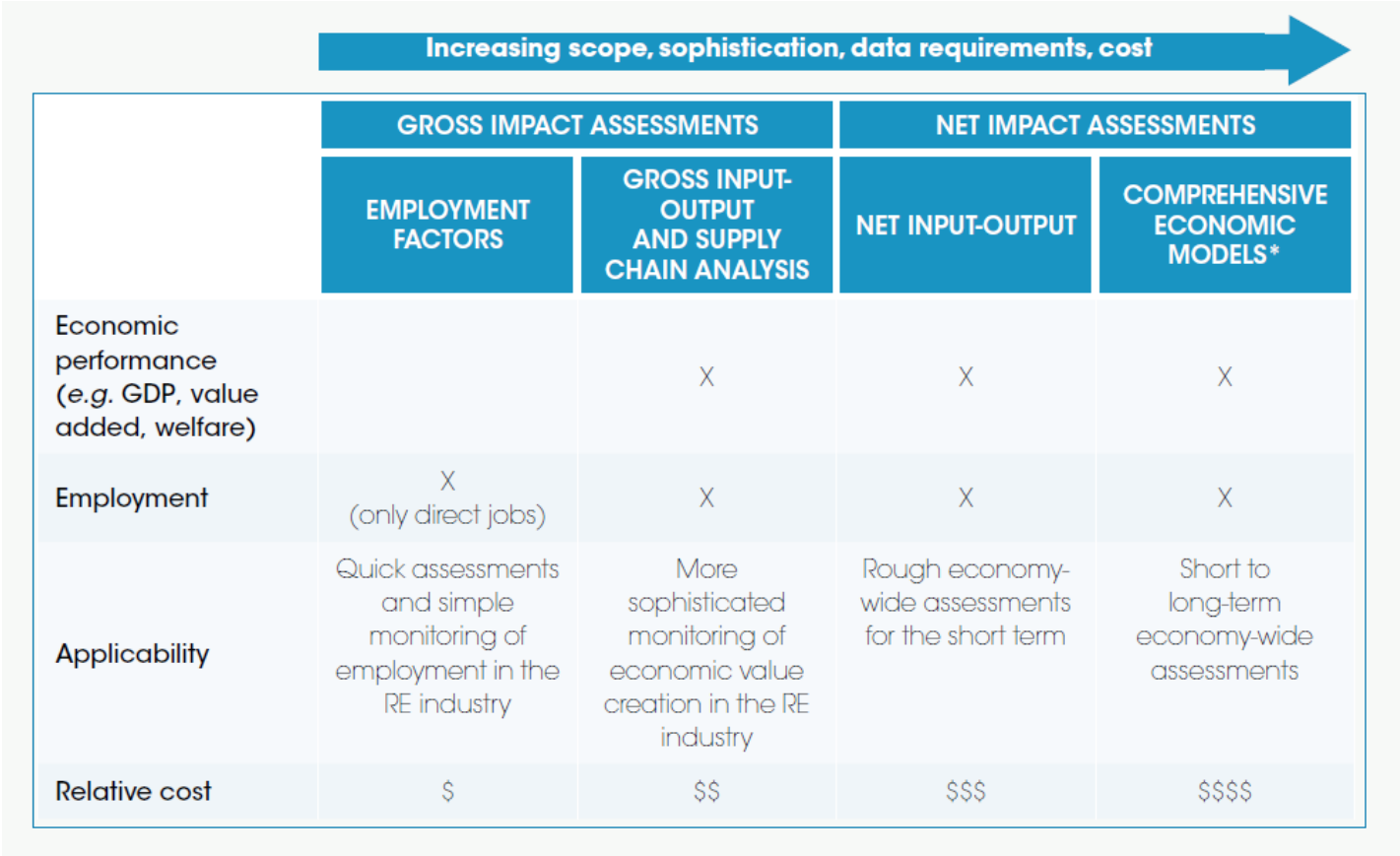
Limitations – the framework does not entail:

- Energy access/ energy poverty
- Municipal or regional level
- Rural development
- Health impacts
- Energy security/ resilience

An encompassing analytical framework for assessing socio-economic effects has been proposed by IRENA – yet essential dimensions are missing.

Source: IRENA, 2016, based on Fraunhofer ISI et al., 2012

Thesis 3: Typology of impact assessments according to their complexity



Increasing scope, sophistication, data requirements, cost

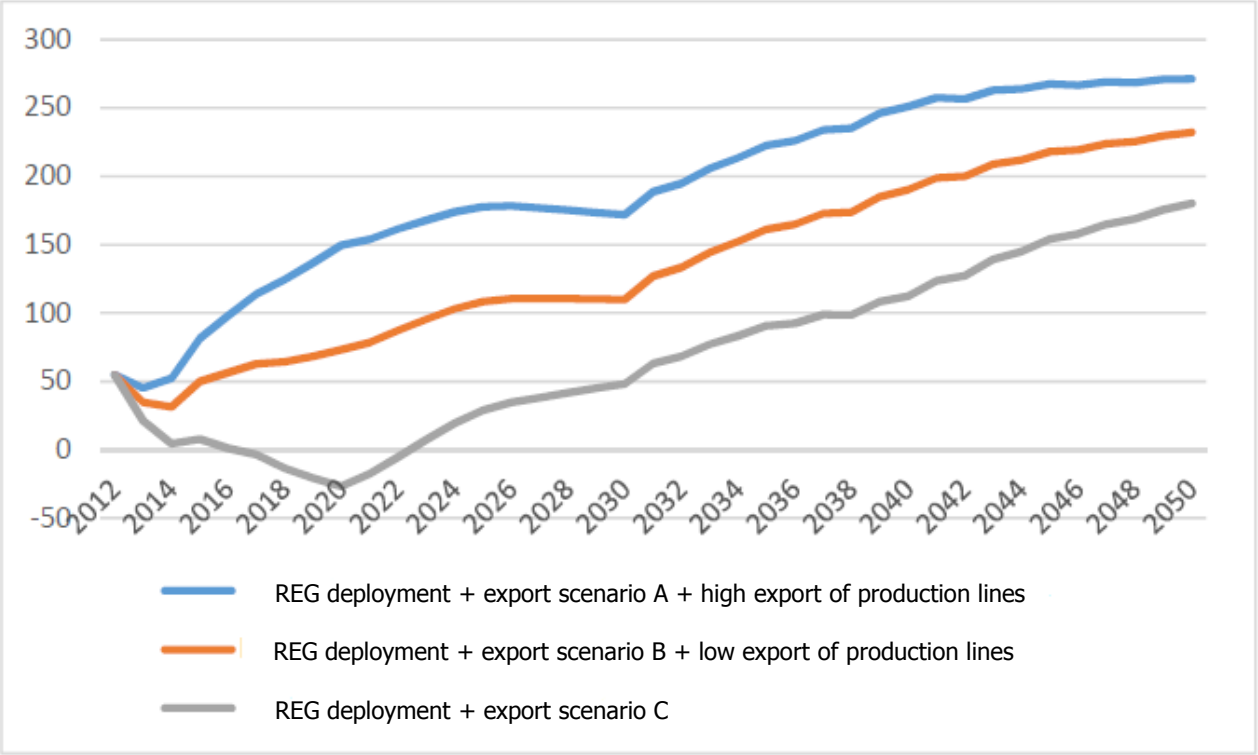
	GROSS IMPACT ASSESSMENTS		NET IMPACT ASSESSMENTS	
	EMPLOYMENT FACTORS	GROSS INPUT-OUTPUT AND SUPPLY CHAIN ANALYSIS	NET INPUT-OUTPUT	COMPREHENSIVE ECONOMIC MODELS*
Economic performance (*e.g.* GDP, value added, welfare)		X	X	X
Employment	X (only direct jobs)	X	X	X
Applicability	Quick assessments and simple monitoring of employment in the RE industry	More sophisticated monitoring of economic value creation in the RE industry	Rough economy-wide assessments for the short term	Short to long-term economy-wide assessments
Relative cost	$	$$	$$$	$$$$

Basically, gross methods can be distinguished from net methods. Net methods are more complex and resource intensive.

Source: IRENA, 2014

Thesis 4: Net employment by renewable energies in Germany (under different export scenarios, in 1000 persons employed)

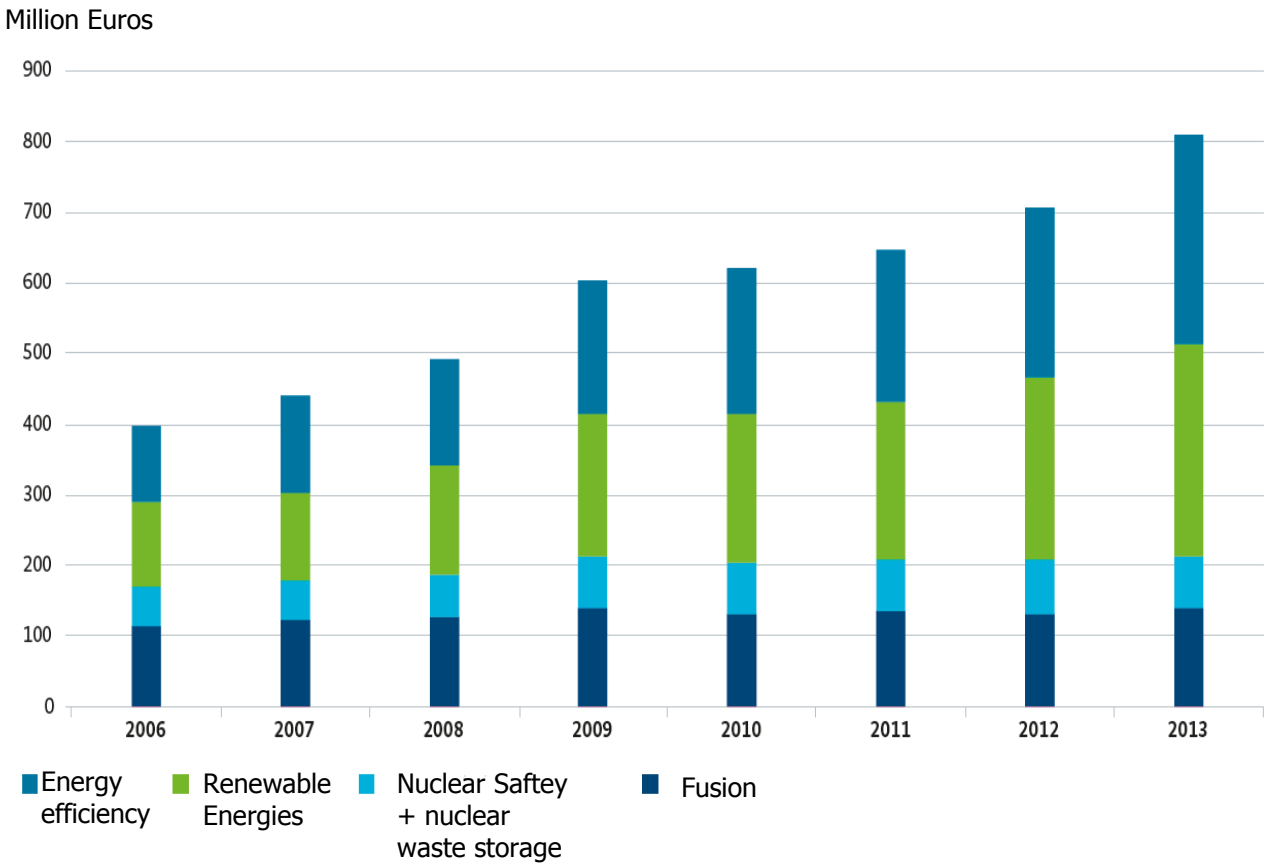
The German Energy Transition generates net employment (orange line):
2015: 50.000
2020: 73.000
2050: 232.000



The higher the export volume of renewable energy plants and production lines the higher the net employment effect.

Source: GWS, DLR, DIW, Prognos, 2015

Thesis 4: Innovation impulses for the German energy transition – Federal expenses for energy research



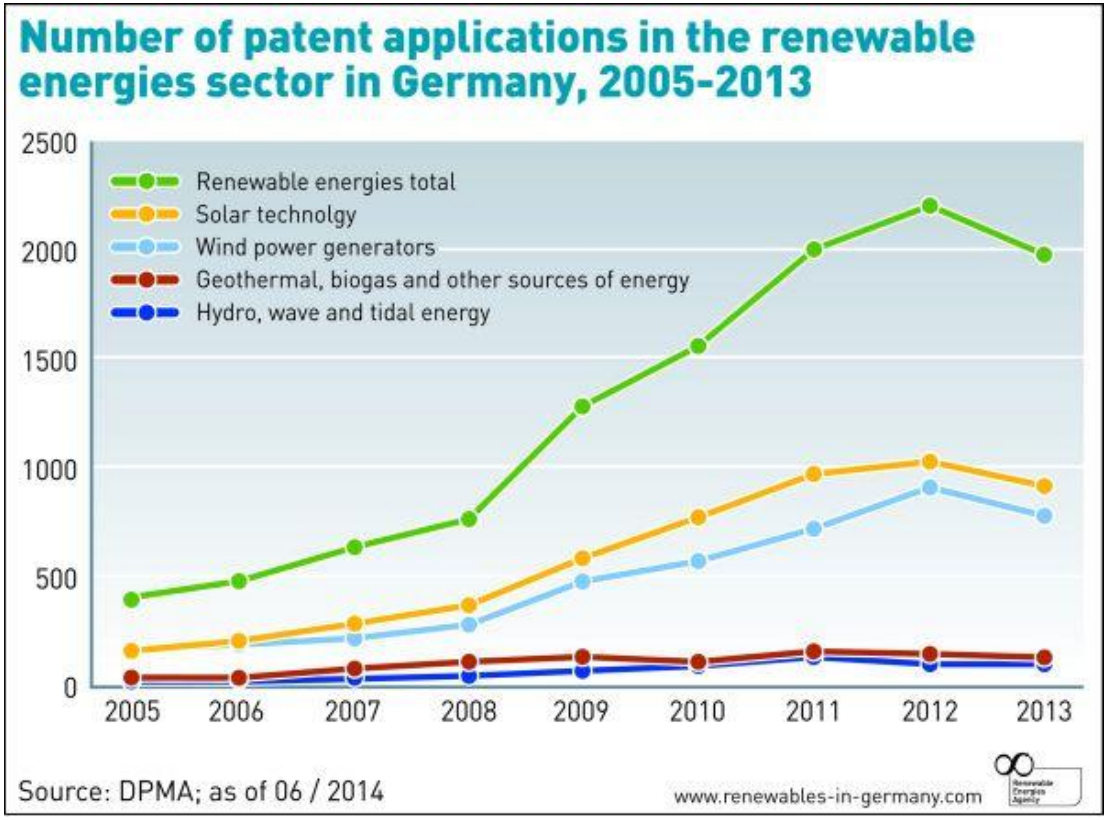
Research for Renewables: 530 million EUR in 2014 (- 3 %)

Private R&D in energy technologies: 54 billion EUR in 2013

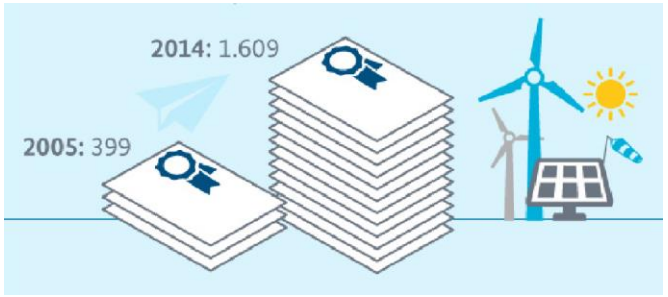
Publicly funded energy research spurs technology development, and innovation. However, further indicators should be regularly monitored, e.g. private R&D and provision of venture capital.

Source: BMWI, 2014

Thesis 4: Innovation impulses of the German energy transition – Innovative technology



The number of patent applications has risen sharply over the last decade:
From 399 in 2005 to 1.609 in 2014.

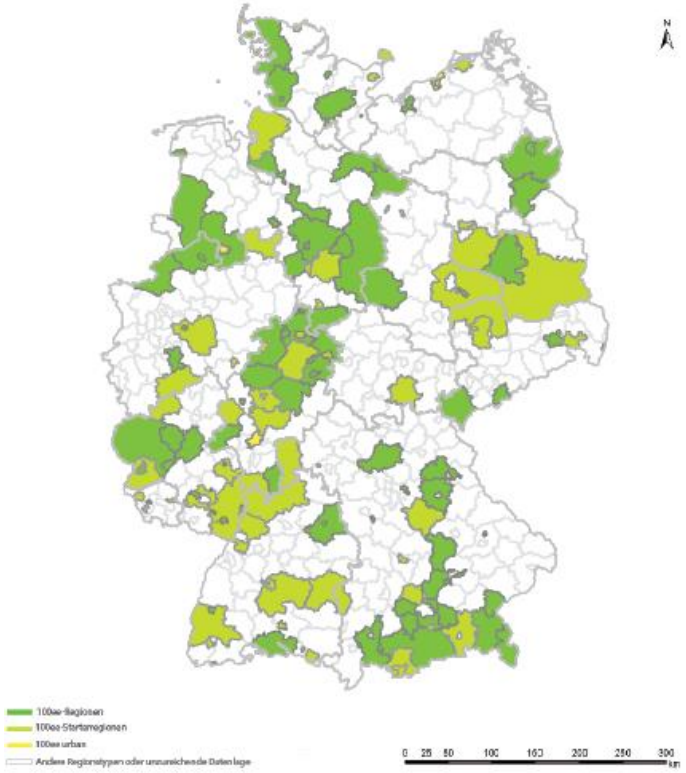


Publicly funded R&D and patent applications do not necessarily lead to marketable products. Monitoring should include new products, start-ups or cost degression of energy efficiency products.

Source: BMWI, 2015

Thesis 4: Renewable energies – New life for rural areas in Germany

100% Renewable Energy Regions (June 2016)



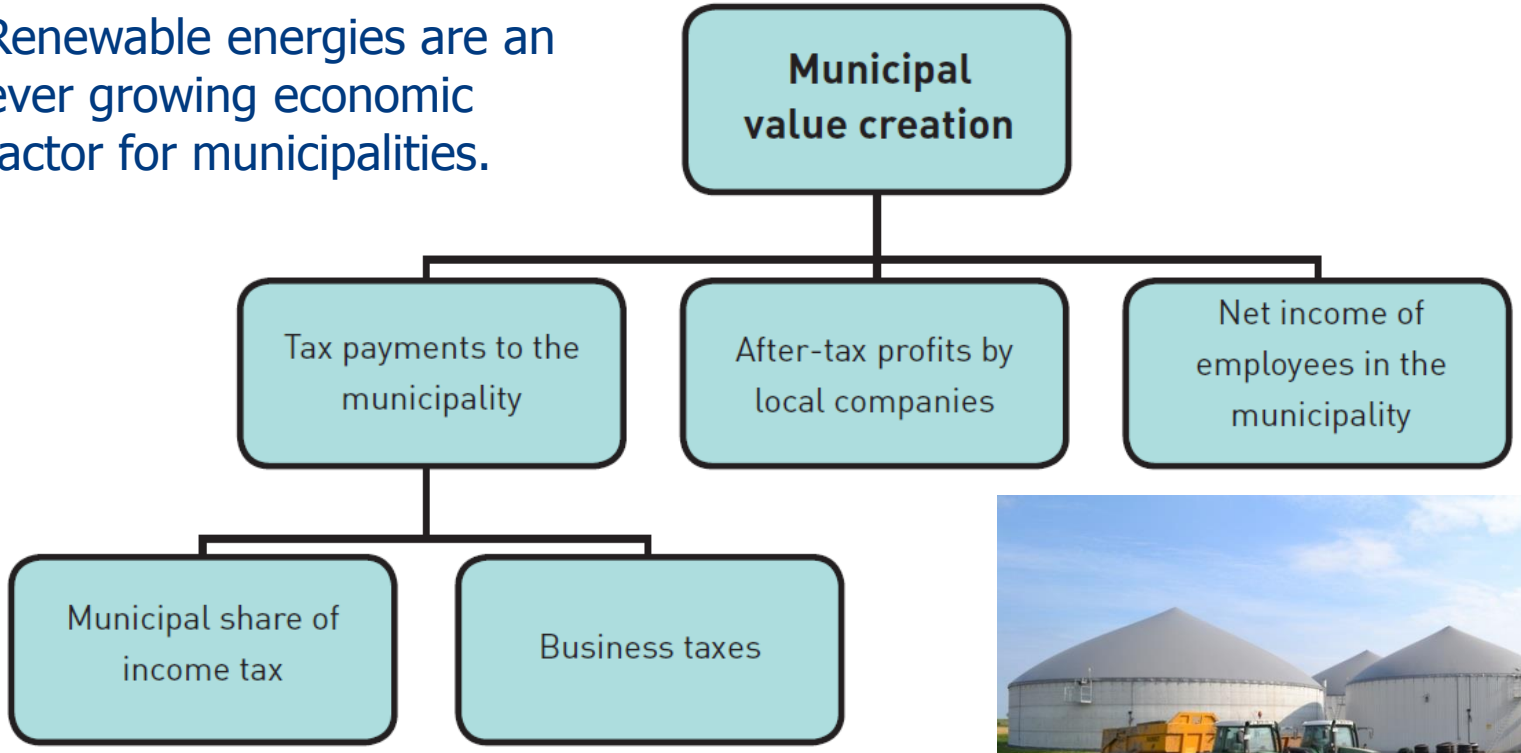
151 regions = 24 million inhabitants.

Especially rural areas profit from the Renewable Energies Act.

Source: Plankl 2013; 2015

Thesis 4: Value added at local level

Renewable energies are an ever growing economic factor for municipalities.



Municipal value creation amounted to 11 billion EUR in 2012 = two thirds of the total added value generated by renewable energies

Source: Hirschl et al., 2010

Discussion on relevant topics and future research needs

- Which socio-economic dimensions are relevant to Chinese decision-makers? Which questions do you consider worthwile researching?
- Are there special interests of the private sector? Where do you see need for further research?
- Which experiences has Chinese academia gained in assessing socio-economic values generated by renewable energies? Which were the topics you have dealt with, which methods and tools have you used? What are upcoming topics?

Contact

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