

Renewable Energy & Employment

What is the IEA-RETD EMPLOY project about?

The impact of renewable energy (RE) on employment is an important issue of public interest, especially today, where job creation is ranking high on the agenda of policy makers. Employment impacts have been analysed in a large number of studies over the years. The studies use a large variety of methodological approaches which make the discussion and comparison of the results difficult. Against this background, IEA-RETD commissioned a project to develop methodological guidelines to assess the employment impact of renewable energy use in a structured and coherent way. This project, called the IEA-RETD EMPLOY project, focuses on electricity generation from renewable sources. By developing a transparent set of guidelines to calculate employment effects, IEA-RETD aims to provide concrete tools to improve the determination of the job creation related to large-scale renewable energy deployment.

Is renewable energy generating jobs or not? – Different viewpoints

Roughly speaking you will find two opposite opinions in the public debate on renewables and employment. A first group, stating that renewables generate additional employment as decentralised renewable energy is more labour intensive compared to conventional energy, so the job gains are greater than the job losses. Furthermore, new markets are emerging and the energy demand worldwide is increasing. Therefore additional export opportunities are created for those countries that are developing RE industries first. Additionally, it is argued that renewable energy puts the energy industry and employment in energy generation back on the domestic terrain for those countries, which have few domestic fossil resources. Contrarily, the second group of economists argue that for the economy as a whole, a shift towards renewable energy sources would lead to job losses, as renewables are still more expensive compared to conventional energy. These economists argue that renewables lead to higher energy generation costs for the society, which would result in lower purchasing power and consequently lower employment and a lower GDP.

What do the studies tell us?

Although the results of the various employment impact studies are difficult to compare, given the methodological differences, there are a couple of general tendencies.

Studies looking at the number of jobs generated in the RE sector show that deployment of RE contributes positively to employment:

- Sectoral employment impacts of renewable energy are analysed by so-called 'gross employment' studies.
- This type of study clearly shows that renewable energy generates jobs. The exact magnitude depends on aspects like the RE technology, the respective region or country, the envisaged time period, and the phase of the production cycle.
- A national gross employment impact study costs approximately six person months to carry out, depending on data availability.

Studies looking at the job impacts of the economy as a whole tend to show a positive impact on jobs:

- Economy wide employment impacts of renewable energy are analysed by the so-called 'net employment' studies.
- Two recent studies seem to be comprehensive and cover all relevant employment and economic effects aspects (positive, negative, direct, indirect, induced, dynamic, feedback) as also defined by the EMPLOY guidelines: "EmployRES" (EU, 2009) looking at the job impacts in the EU, and "Renewably employed!" (Lehr et al., 2011, commissioned by BMU) looking at the RE employment effects in Germany. The main results are presented in the text box below. Other models and scenarios look at partial effects.
- A full economic analysis will cost approximately 3 person years to execute.
- Especially for net studies, one of the most important factors influencing the results concern the quality of the input data (data has to be technology specific, country specific, recent and disaggregated) and the assumptions used (especially on fossil energy prices and exports).

Results from two recent net employment studies

According to the EmployRES study, RE policy would lead to a slightly positive impact on employment and GDP in the EU. Business as usual RES policies in EU member states combined with moderate export expectations have a roughly constant positive effect on employment with 115,000 - 201,000 new jobs in 2020 and 188,000 - 300,000 jobs in 2030. More ambitious RE policies combined with moderate export expectations lead to a slightly higher increase in average employment of 396,000 - 417,000 new jobs by 2020 and 59,000 - 545,000 by 2030. Current RE policies in the EU member states would result in an increase of GDP by 0.11% - 0.14% by 2020 and by 0.15% - 0.30% by 2030. More ambitious policies would result in an increase of GDP by 0.23% - 0.25% in 2020 and 0.36% - 0.40% in 2030.

For Germany the results look even more promising, which is due to the industrial structure and the export orientation of the country (Lehr et al., 2011). With gross employment reaching more than 380,000 jobs today, the net effects currently are around 70,000 and can increase to 200,000 new jobs by 2030, even with moderate export assumptions. More optimistic export assumptions lead to 270,000 new jobs by 2030. GDP will increase by 0.4% in 2020 and 0.8% in 2030. Though electricity prices tend to be higher from the RE surcharge in the German feed-in system, the positive impacts outweigh this burden. Exports are considered additional and do not crowd out other exports, which is a sensitive assumption, since the RE market worldwide - though increasing - is not as large as the fossil fuel market in the time horizon of the study.

In sum, most employment studies support the hypothesis of employment generation as a co-benefit of turning to the more climate compatible heat and electricity generation from renewable energy sources.

What can policy makers do? – 3 recommendations

On the methodology

1. **Support the further development of calculation models, the improvement of data availability and data quality, and the standardisation of calculation approaches.** It is recommended that governments stimulate the further development of calculation tools to estimate the long-term employment effects of renewable energy. Better insight in employment and economic effects will enable governments to optimise their policies. This implies that it would help if governments would (1) invest in the further development of the calculation tools and models,

(2) improve the data provision at their national statistical bodies (especially input-output data as well as statistics on RE installations (capacities, generation, costs)) and (3) encourage the standardisation of calculation methods (f.e. build on the EMPLOY guidelines).

On the results of employment impact studies

2. Treat the figures with caution. Job impacts are not only difficult to measure, the results presented in studies are also dependent on various variables, such as the methodology, the quality of the input data, and the assumptions. This implies that policy makers have to look with some caution at figures which are presented to them and realise that the figures can only be used if the context, the research questions, the assumptions, the data quality and the method are known. In the EMPLOY project, a checklist has been developed to classify net employment impacts studies (see box). Such checklist can clearly show to policy makers which effects are included or excluded in the analysis. Further, the impressive developments of RE technologies

(as an example, PV costs have decreased by 40% within one year) imply that, in general, studies are outdated rapidly.

Example of a checklist to classify employment studies						
Title of study:						
Research question:						
impact mechanisms		direct	indirect	induced	activity fields:	scenario
investment	+	[shaded]	[shaded]	[shaded]	installation	difference between scenarios
	-				reinvestments	
O&M	+				O&M	national scenario
	-				fuel generation	
fuel demand	+				RE trade	global scenario
	-				fuel trade	
techn. Trade	+					export scenario
	-				time horizon:	
fuel trade	+					past
	-					present
productivity change	-		future			
direct AGC	-	[shaded]		regional extension:		
indirect AGC	-	[shaded]		local		
merit order, CO ₂ price, ...	+	[shaded]		national		
multiplier effect	+/-	[shaded]		regional		
accelerator effect	+/-	[shaded]		global		
feasible for a net study		AGC: additional generation costs			+ positive, - negative effect	IS-eff: income & substitution effect
pointless for a net study		does not exist			B-eff: budget effect	C-eff: cost effect

On the policy development

3. Use the outcome of the employment impact studies in a broader national socio-economic and environmental debate. Employment effects of renewable energy relate to a wide range of socio-economic and environmental issues. Although employment impact studies can certainly serve as a basis for the development of green job policies, it is questionable whether governments should develop those job policies on a solitary basis. For the transition towards a more sustainable economy, it is recommended that governments use the results of employment impact studies in a broader policy framework, which may include industrial policies, economic development plans, RD&D strategies, pricing policy of externalities such as greenhouse gas emissions, and the more fundamental discussion on taxing material versus labour. In such way, employment impact studies can form a useful element of the entire chain.

More information

EMPLOY: <http://iea-retd.org/archives/ongoing/employ>
 About IEA-RETD: www.iea-retd.org