

Sustainable Energy Briefing 2: Renewable Energy = Jobs

Using renewable energy means thousands more jobs than business as usual.

So finds a study into the employment potential of renewable energy in South Africa that was undertaken by AGAMA Energy in 2003.

Summary of research into employment potential of renewable energy:

According to the research:

- If South Africa generates just **15% of total electricity** use in 2020 using Renewable Energy Technology, it will create 36 400 new direct jobs, without taking any jobs away from coal-based electricity.
- Over 1.2 million direct and indirect jobs would be generated if a portion of South Africa's **total energy needs**, including fuels, were sourced with Renewable Energy Technologies (RETs) by 2020 (see table 2 below).

The study first looked at the employment rates to generate 205 Terawatt hours¹ of electricity (which is how much SA currently generates) in terms of both installed capacity and electricity generated. It then looked at the number of people needed to generate the additional 62 Terawatt hours of electricity that SA is predicted to need in 2020, when this is generated with diverse energy technologies – including conventional technologies like coal and RETs like solar and wind. The target chosen for RET use is 15% of the total 267 TWh to be consumed in 2020. A 15% target was chosen because previous research showed that this share could be achieved at no additional cost to the economy as a whole (see the sub-heading: Costs to the SA economy below).

Using data from developing as well as OECD countries and applying these to South African conditions, the researchers are able to show that generating electricity from renewable energy means many more jobs than when using conventional energy. The study also reports the kinds of jobs involved, e.g. in manufacturing, operation and maintenance etc. and the scale of development needed to ensure that the jobs are all in South Africa. The key results are summarised in the tables below:

Conventional Energy Technology	Total		Renewable Energy Technology	Total	
	/MW	/GWh		/MW	/GWh
Coal (current)	1.7	0.3	Solar thermal	5.9	10.4
Coal (future)	3.0	0.7	Solar Panels	35.4	62.0
Nuclear	0.5	0.1	Wind	4.8	12.6
Pebble Bed Modular Reactors	1.3	0.2	Biomass	1.0	5.6
Gas	1.2	0.1	Landfills	6.0	23.0

¹ Note on units: The standard billing unit for electricity use is the kilowatt-hour (kWh) – 1 000 Watts used for one hour. One thousand kW is a MegaWatt (MW) and one thousand MW is a GigaWatt (GW), so using a million kW for one hour is a Gigawatt-hour (GWh) and a thousand of these are a Terawatt-hour; thus 267 TWh is 267 billion units.

The table on the left, shows that for every 1 GWh of electricity produced from coal, 0.3 jobs are currently created, though this may increase to 0.7 jobs in the future; 0.2 jobs are expected for every GWh of electricity produced from a pebble bed modular reactor, while 0.1 jobs will result from every GWh produced from gas. Job creation is also reported per Megawatt (MW) of installed generation capacity, in the middle column.

The table on the right shows jobs created when electricity is generated from various Renewable Energy Technologies. When solar thermal energy is used to generate 1GWh of electricity, 10.4 jobs are created; using wind results in 12.6 jobs; biomass in 5.6 jobs and landfills in 23 jobs. Because a great number of photovoltaic panels are needed to generate a million units of electricity, at least 62 jobs are formed when 1GWh of electricity is generated from solar panels, which is equivalent to 35.4 jobs for each MW of installed capacity.

The researchers distinguished between direct jobs and indirect jobs to show how many direct and indirect jobs would be created through RE technologies contributing to SA's total energy mix by 2020:

Technology	Direct Jobs	Indirect Jobs	Total Jobs
Solar thermal (10% of target)	8 288	24 864	33 152
Solar Photovoltaic (0.5% of target)	2 475	7 425	9 900
Wind (50% of target)	22 400	67 200	89 600
Biomass (30% of target)	1 308	3 924	5 232
Landfill (5% of target)	1 902	5 706	7 608
Biogas <i>Where 150 000 residential biogas digesters are installed in rural areas</i>	1 150	2 850	4 000
Solar Water Heaters <i>Includes the manufacture and installation of the equivalent of a 2.8m² solar water heater on each house in the country</i>	118 400	236 800	355 200
Biofuels <i>Includes 15% ethanol and diesel substitution</i>	350 000	350 000	700 000
TOTAL	505 923	698 769	1 204 692

As shown in table 2 above:

- In addition to the 505 923 direct jobs that will be created, 698 769 indirect jobs will result if 15% of South Africa's electricity is generated from Renewable energy (six different technologies contributing to the total – jobs not analysed or shown for micro-hydro, contributing 4.5% of target), where 150 000 small biogas digesters are installed in rural areas, 2.8m² solar water heaters are installed on each house in the country and 15% of South Africa's diesel is from biofuels.
- In total, 1 204 692 jobs can be created by 2020.

Why does RE offer so many more jobs?

Generating electricity from RET is more energy intensive than generating electricity from conventional energy – in other words, you need more people. And not only highly skilled people, as is the case in developing the pebble bed modular reactor – where very specialist skills are needed. Further, because RE is decentralised it means that jobs will be created in rural areas of SA, where unemployment and poverty rates are highest. This is good news in South Africa, where unemployment is estimated to be as high as 40%, and where 546 000 jobs need to be created every year for SA to halve unemployment by 2014.

The potential for RE to address SA's high unemployment rate is especially striking when placed against the backdrop of thousands of job losses in the electricity sector in the last 20 years. In this time, 70 000 jobs have been lost (130 108 to 59 987) even though the amount of electricity generated increased by over 60% between 1980 and 2000.²

Recommendations of research into employment potential of renewable energy:

The researchers into the employment potential of RE, make the following conclusions and recommendations in their research report:

- The South African economy needs a higher target for Renewable Energy than what is outlined in White Paper on Renewable Energy (2003) to get the maximum employment benefits. The current RE target for SA is 10 000 Gigawatt hours by 2014, which is less than 0.5% of SA's total energy needs, and less than 4% of SA's electricity needs.
- Sub-targets need to be made for the different energy sources, in consultation with the industry, so that the targets that are set stimulate investment in that industry. For example, while the researchers considered the employment potential of a 15% renewable energy target to meet SA's electricity needs in 2020, industry experts in the wind sector have shown that if up to 1% of South Africa's electricity needs were met by wind energy within the next 10 years (e.g. 1 000 MW installed over 10 years), that this would be a high enough target to stimulate 100% local production of the wind industry.
- The South African Government can stimulate massive employment almost immediately and easily by investing in solar water heaters and biofuels.
- While more investment (money and skills) is needed in renewable energy electricity technology the long-term benefits – economically and socially – are quantifiable and dramatic.
- The findings of this research project must be included in the Integrated Energy Planning process that government has committed to starting this year, having acknowledged that the existing IEP is inadequate.

Costs to the SA economy:

Previous research undertaken by the University of Cape Town has established that with the right combination of government policy and market mechanisms to support both RETs and energy efficiency interventions, the 15% electricity target and a reduction of energy use through efficiency and conservation can be achieved at less over-all cost to the economy than following a business as usual energy path.

Copies of the research document, Employment Potential of Renewable Energy in South Africa can be downloaded from SECCP's WebPage, see www.earthlife.org.za/seccp/ Choose the research option on the main menu, and then choose the sub-topic Employment Potential of Renewable Energy in South Africa. Alternatively, request copies from seccp@earthlife.org.za

Policies and measures to support renewable energy and energy efficiency are outlined in research undertaken by the University of Cape Town - Energy & Development Research Centre with modelling by the Energy Research Institute entitled Policies and Measures for Renewable Energy and Energy Efficiency in South Africa. Copies can also be downloaded from SECCP's WebPage or requested from SECCP.

² Policies and Measures for Renewable Energy and Energy Efficiency in South Africa (2003), Energy and Development Research Centre