MYTH 5: NUCLEAR ENERGY IS ENVIRONMENTALLY FRIENDLY

Many people believe that nuclear energy is environmentally friendly, that it is cheaper than most alternatives and is a much better low-carbon alternative than renewable energy.

But the facts are different.

The nuclear industry proclaims that nuclear power is cheap.[39] But the latest nuclear power projects, particularly in Europe, have raised concerns.
In 2005, the Finnish cabinet licenced TVO[40] to build a new unit (Unit 3)[41] at the Olkiluoto nuclear power plant, which is located in western Finland. The new unit, consisting of a first-of-its-kind 'third generation pressurized water reactor' (known as EPR) was expected to be safer, more efficient, as well as faster and cheaper to build than existing plants.[42] Initially, the main contractor was Areva NP (a joint venture between Areva and Siemens) but in 2009 Siemens sold its shareholding and pulled out of the nuclear business.[43] The construction was expected to be completed by 2009 but has been plagued by delays. The current expectation for the reactor to become operational is nine years after the original date (2018).[44] The delays have been due to lawsuits, technology failures, construction errors and miscommunication.[45] The estimated cost has risen from USD 3.6 billion to USD 9.5 billion. Currently, TVO and Areva are locked in a USD 10.5 billion legal battle over the cost overrun.[46] If the lawsuit goes against TVO, a utility company in Finland owned by shareholders, it would affect local industries in Finland. Another EPR reactor is to be constructed at the Hinkley Point C facility in the UK. An analysis by a renewable energy association found that Hinkley Point C will cost consumers USD 36.9 billion but a solar facility with electricity storage would cost British consumers just USD 18.2 billion.[47]
Over and above the construction cost of projects like Olkiluoto Unit 3 and Hinkley Point C, an additional concern is that countries will eventually have to pay the full cost of nuclear energy. This includes decommissioning and waste storage long after nuclear energy companies have moved out. Figure 5 in Myth 1 shows an estimate of the full cost of generating nuclear energy for Germany compared with other energy forms. The full cost for nuclear includes waste disposal and the risks of a nuclear accident.

Environmental concerns regarding nuclear waste

Apart from the cost, we must factor in the severe damage to the environment and human health that nuclear energy has caused in the past and will potentially cause for a further 300,000 years. According to GE Hitachi, USD 100 billion was set aside for the management and disposal of nuclear waste worldwide in 2015.[48] But it is doubtful as to whether this will be enough to deal with the long-term storage of nuclear waste.
Each year, nuclear power generation facilities worldwide produce about 10,000 truckloads of low and intermediate-level radioactive waste[49] and about 500 truckloads of

39 World Nuclear Association (2016 E) **40** Teollisuuden Voima Oyj, a Finnish nuclear power company. **41** Schneider et al. (2011) **42** Carbon Brief (2015) **43** World Nuclear News (2011 A) **44** World Nuclear News (2011 B) and The Ecologist (2015) **45** Carbon Brief (2015) **46** The Ecologist (2015) **47** Solar Trade Association (2015) **48** WNA (2016 A) **49** Intermediate level waste includes filters, steel components with reactor with a radioactivity of 4%. 90% of the volume consist of low level waste (tools, work clothing) with a radioactive content of 1% (WNA, 2016 B) **50** 3% of the waste consists of high-level waste of used nuclear fuel with a radioactive content of 95% (WNA, 2016 B) high-level radioactive waste.[50] These materials remain radioactive and dangerous to human health for thousands of years. Currently, there are two options for dealing with this poisonous load:

1. Direct disposal into a geological repository. However, no country has started storing radioactive waste on a permanent basis in a geological repository. Only the USA and Sweden have selected sites for their material after the intermediate cooling period.[51] It takes about 300,000 years for the radioactive waste to reach the same level of radioactivity as the original ore. The repositories must keep the waste safe throughout this time to prevent radioactivity from polluting the environment.
2. Reprocessing of the spent nuclear fuel. This enables partial reuse in power plants. However, it takes about 9,000 years for the radioactivity of the leftover material to decay.

Box 6 gives an example of the devastating effects of an improperly managed nuclear waste site in Russia.

Box 6: Lake Karachay – Effects of a nuclear waste disposal site

The Soviet Union used Karachay as a dumping site for radioactive waste from Mayak, a nuclear weapons factory, built in the 1940s. It is in Russia's south-west Chelyabinsk region, close to the northern border with Kazakhstan. Today, Lake Karachay is the most polluted spot on Earth.

Initially the radioactive waste from Mayak were dumped into the nearby Techa River, on which the local population depended. This method was changed to storage in rows of vats after it was found that 65% of the local population was affected by radiation sickness. The storage facility exploded in September 1957, spewing about 70 tons of radioactive waste a mile high and the resulting dust cloud spread over 9000 square miles (over 23,000 km²). Around 270,000 citizens and their food sources were affected. Lake Karachay was designated as a storage site since there were no outlets for the lake. This practice continued until 1967, when a severe drought dried up the lake exposing the radioactive sediments in the basin. Today, huge tracts of the region remain uninhabitable.[52]

Concerns regarding nuclear accidents

A further concern is nuclear accidents, which have been numerous throughout the history of civil nuclear energy use. The British newspaper, the Guardian, has identified 33 serious incidents and accidents at nuclear power stations since the first one recorded in 1952 at Chalk River in Ontario, Canada.[53] An uncontrolled reaction in a nuclear reactor can potentially result in widespread contamination of air and water.[54] The three biggest nuclear accidents happened at reactors in Three Mile Island (1979) in the US,[55] Chernobyl Unit 4 (1986) in the Soviet Union and Fukushima (2011) in Japan.[56] Box 7 and Box 8 give short overviews of what occurred in Chernobyl and Fukushima.

51 Intermediate storage lasts 40-50 years, during which the material must be cooled using cooling water (WNA, 2016 A) **52** Gayle (2012) **53** The Guardian (2016) **54** EIA (2015) **55** In the Three Mile Island nuclear plant (Pennsylvania, USA), Unit 2 partially melted on 28 March 1978. **56** WNA (2016 C)

Box 7: Chernobyl 1986 – Disaster at a nuclear power plant in Europe

The Chernobyl reactor in the Soviet Union (Ukraine, near the border with Belarus) exploded on April 26, 1986, during a reactor systems test. The World Health Organization (WHO) has reported that about 200 times the radioactivity of that released by the Hiroshima and Nagasaki atomic bombs was spread across the Western Soviet Union and Europe.[57]

About 70 % of all radioactive substances released into the atmosphere during the accident fell on the territory of Belarus, which lost 23 % of its national territory to the catastrophe. The territory of the Polessye State Radiation-Ecological Reservation (1,300 km^2), the area nearest to the power plant, will remain uninhabitable due to high contamination by long-lived radioactive isotopes for tens of thousands of years.[58]

Almost 30 % of Belarussian forest land was affected by significant levels of radioactivity; over 22 % of total agricultural land was contaminated and 15 % of agricultural land was lost. Immediately after the accident, a significant increase in gamma radiation exposure was registered throughout Belarus and it was declared a zone of ecological calamity.[59]

Because of the disaster, approximately 220,000 people had to be relocated.[60] Over 1.1 million Belarussians still live in radioactively contaminated territories. Continued increases in morbidity have been observed.

Box 8: Fukushima 2011– Disaster at a nuclear power plant in Asia

In Japan, after an earthquake followed by a tsunami, the backup diesel generators needed to cool the reactors of nuclear power plant Fukushima were flooded. Overheating of fuel in the plant's operating reactor cores led to hydrogen explosions that severely damaged three reactor buildings. Fuel in these reactor cores melted and radiation released from the damaged reactors contaminated a wide area surrounding the plant and forced the evacuation of nearly half a million residents. Highly radioactive water was released into the Pacific Ocean.

In November 2011, the Japanese government determined that about 11,580 square miles (or 30,000 km^2, the surface area of Belgium) had been contaminated with long-lived radioactive caesium.[61] By 2012 around 160,000 people had been displaced due to the accident.[62] The total economic loss is estimated to be in the range of USD 130 billion.[63]

57 WHO (1995) **58** Dawe (2016) **59** Kenik (1995) **60** Union of Concerned Scientists (n.d.) **61** Starr (2016) **62** Fukushima On The Globe (n.d.); Blei (2016) **63** WNA (2016 D)

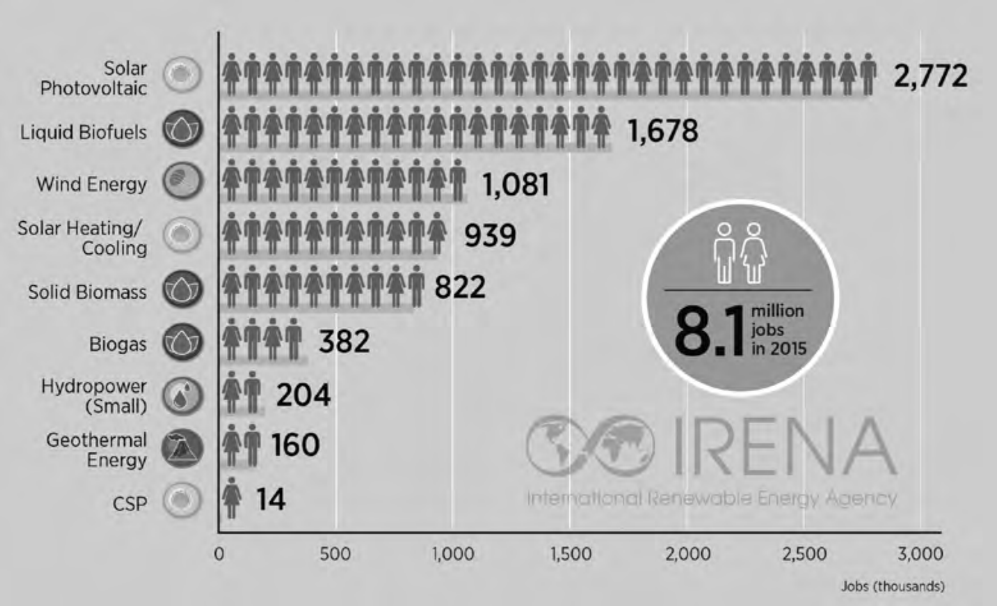
MYTH 6: TRANSITION TO RENEWABLE ENERGY COSTS JOBS

A common myth is that a transition to renewable energy costs jobs; that jobs will be lost in coal mining, oil and gas extraction, in the shipping of fossil fuels, and in pipeline, thermal power plant and transport infrastructure construction. The transition to renewable energy, it is claimed, would not match these losses with the creation of new jobs.

But the facts are different.

The total number of jobs in renewable energy increased globally by 5% to 8.1 million in 2015,[64] which is in stark contrast to the depressed labour markets in other parts of the energy sector. There was a 3% decrease in renewable energy employment in the EU, but over one million people were still employed in renewable energy with 355,000 renewable energy sector jobs in Germany alone. In the United States, renewable energy jobs increased by around 6%, whereas employment in oil and gas extraction (and support activities) decreased by 18%. In China, renewable energy employed over 3.5 million people, exceeding the 2.6 million employed in China's oil and gas sector. Bangladesh employed 127,000 people in solar PV. In addition, there are an estimated 1.3 million jobs in large hydroelectricity.[65]

Figure 16: Global renewable energy employment in 2015



Source: IRENA (2016)

64 Most of these data are from: IRENA (2016) **65** According to commonly accepted definitions, renewable energy includes small hydro with an installed capacity below 30 Megawatt (MW); it excludes large hydroelectricity.

Most jobs are in solar PV, as can be seen from Figure 16. Solar PV equipment manufacturing is predominantly in Asia and, because of import duties in the EU and USA on Chinese solar panels, China relocated some production to countries such as Brazil, India, Malaysia and Thailand in 2015. Liquid biofuel provides a lot of employment in countries such as Brazil that grow, refine and utilise biofuels on a significant scale. Many people in China, the US and Germany work in wind power, and India and Brazil now also have large and growing workforces in this sector. China, India and Germany have the largest workforces in biogas.

By comparison the coal, oil and gas industries jointly provide about 13 million jobs globally and are currently responsible for nearly four times more energy compared with renewable energy plus large hydropower.[66] Although these figures exclude some construction and jobs in coal and gas power plant operation, this data clearly suggests that a transition to renewable energy would deliver more jobs, not fewer.

This is confirmed by a study in Vietnam that compared the expected effects on employment of the official Power Development Plan up to 2030 (with its primary focus on power generated using coal), which is expected to create 260,000 jobs, and an Advanced Sustainable Energy Scenario (with a major focus on solar, biomass and wind power) that is set to deliver 700,000 additional jobs.[67] Similarly, a study in Australia on the impact of a change from 34 % to 50 % of electricity generated from renewables by 2030 also highlights net employment creation across Australia, notably from the construction and installation of solar PV.[68]

Jobs in renewable energy tend to be clean and require important skills. Data from an IRENA survey of 90 companies from 40 countries also suggests that an average 35 % of their workforce are women, whereas women only make up 20 to 25 % of the workforce in the entire energy industry, which is still dominated by fossil fuels.[69] This is promising, but not everyone from the sector would have the skills needed to find employment in the renewable energy sector. Many jobs in renewable energy are unsuitable for (former) coal miners, so re-training would be needed and alternative employment opportunities must be created.

MYTH 7: A LACK OF RENEWABLE ENERGY EXPERTISE HOLDS BACK DEPLOYMENT IN DEVELOPING COUNTRIES

Objections to early and fast deployment of renewable energy in developing countries include the myth that it is being held back by a lack of expertise. The technology is said to be too complex and too difficult for domestic companies to develop or acquire and therefore it would make developing countries dependent on foreign companies and experts. Deployment in remote, rural and poor areas, it is argued, would also fail because of lack of services for installation, repair and maintenance.

But the facts are different.

Human resources are important but need not be a major barrier to the deployment of renewable energy. With support from governments delivered by universities and technical colleges to capacity development programs, and technology exchanges between businesses, it is possible to address limitations in human resources for renewable energy development in a short period of time. For example, as soon as renewable energy was given the go ahead by the Chinese government, semi-governmental industries started producing wind energy converters, first as part of joint ventures with foreign companies and later under licencing agreements. This was accompanied by joint research projects, the establishment of numerous university degrees, as well as technical vocational skills programmes. This led China to become a leading producer of renewable energy technologies.
Many renewable energy technologies are fully developed, which means that they are being manufactured by numerous companies in different countries. Moreover, they have become affordable and are now being deployed on a very large scale. This can be said of wind power, solar PV and solar heating, biogas digesters (at different scales) and, of course, hydro-electricity generators and biomass-based boilers and power generators, as well as Concentrated Solar Power (CSP). A wealth of information on these technologies is very widely available and taught at schools and colleges in many countries of the world, and new assembly and manufacturing companies can be established using this knowledge. For example, there are 20 universities in Vietnam offering courses in renewable energy and/or research in wind power and two universities have developed renewable energy courses at bachelor and master levels.[70]
Renewable energy companies often provide direct training for their staff, distributers and prosumers. Large companies and research institutes are undertaking research and development (R&D) into some components, such as into the efficiency of solar cells and of batteries. R&D is mainly happening in developed countries, but it does also take place in developing countries. China is now a world leader in several technologies. New manufacturing processes and products may be patented so companies are also establishing production units in other countries. They are licensing local companies to use their technologies; they want to sell their products abroad and are seeking cooperation with investors and domestic companies to set up power plants. Furthermore, components of renewable energy systems are being manufactured in some developing countries even if the local deployment is still in its infancy, as illustrated by Box 9.

70 GIZ (2016)

Box 9: Trade disputes over towers for wind turbines from Vietnam

Developing countries can develop competitive renewable energy products in short periods of time, as is demonstrated by the international trade disputes over towers for wind turbines.

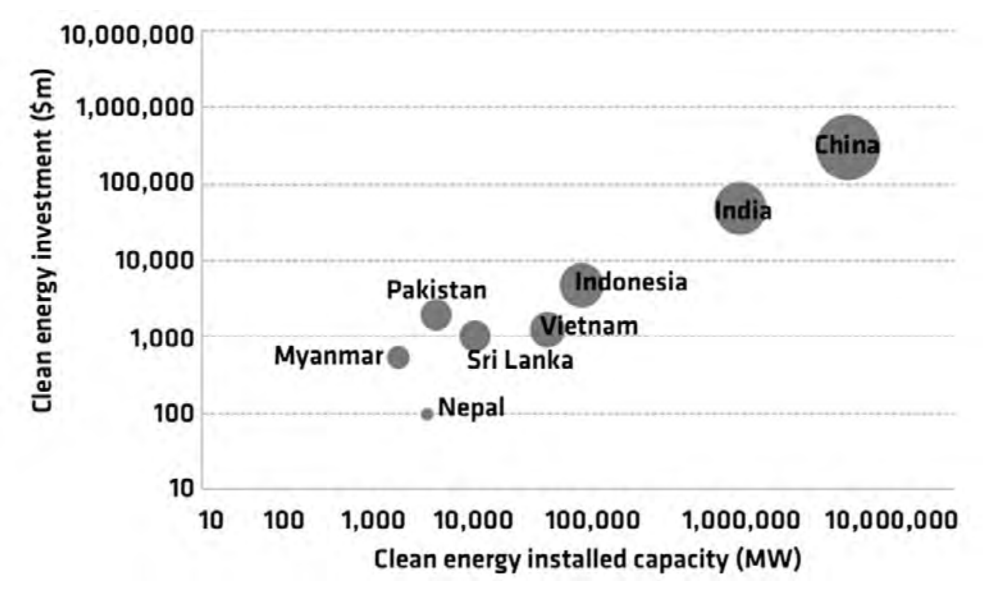
Vietnam only has a very small number of wind power parks, but companies manufacturing and exporting wind towers emerged even before any wind turbines had been erected in the country. CS Wind (Vietnam) was established in 2003 as the first such company, and it still is the main wind tower production base of CS Wind, a Korean company. UBI Tower, a Vietnamese company started building wind towers in 2010.

US manufacturers started a trade dispute in 2011, alleging that wind towers exported from Vietnam and China to the US were being sold at around two thirds of their 'normal value'.[71] The US International Trade Commission assessed the case[72] and China asked the World Trade Organization (WTO) for arbitration on imposed duties, with Vietnam as a 'third party.[73] In 2015, an 'administrative review by the US Department of Commerce of anti-dumping duties imposed on wind tower exports from Vietnam concluded that the prices of CS Wind (Vietnam) were not unfairly low, although according to the USA, Vietnam is a non-market economy, which continues to make such duties justifiable.[74]

The annual Bloomberg Climatescope Report, which assesses renewable energy markets in developing countries, found that 'Asian countries performed exceptionally well in Low-Carbon Business and Clean Energy Value Chains'.[75] Figure 17 presents the completeness of the value chains in Asia with China reaching the maximum score of the assessment.

71 Bloomberg (2011) **72** US International Trade Commission (2013) **73** WTO (2016) **74** Vietnam Breaking News (2016) **75** BNEF (2015)

Figure 17: Asia value chain completeness, compared to installed capacity and investment



Note: Larger bubbles indicate more complete value chains. China has a perfect score of 5.00 for value chains.
Source: BNEF (2015)

Making renewable energy equipment available is not the only problem: it also needs to be deployed – in the form of large power plants or boilers for industrial drying, biogas digesters, solar water heaters, and solar PV power generation units at household and community level. The reach of new technology into remote rural areas and the uptake by poor and often illiterate people has been questioned but there are many examples where capacity building has been extremely successful and has enabled widespread distribution and adoption. The examples on capacity building for spreading solar PV technology and bio-digesters in Box 10 and Box 11 illustrate this.

Box 10: Grandmothers turned solar engineers

The Indian Barefoot College proves very well that sophisticated technical knowledge can be acquired by anybody and that this can empower people and transform their lives.

Barefoot College has trained illiterate and semi-literate women, often grandmothers, from all over India and 76 other countries in solar PV technology assembly, maintenance and repair (Figure 18). Villages that are not connected to the power grid select some women who are then trained as solar engineers over a period of 6 months. They then return to serve their village and earn a regular income. This has provided at least 14,500 households with solar power. The Barefoot College also trains women in solar water heaters, solar cookers and solar-powered desalinisation of water. It has received international awards and very wide recognition for its numerous achievements.[76]

Figure 18: Barefoot College solar engineer training classroom

Source: Courtesy of Barefoot College[77]

76 Barefoot College (2016a); Top Documentary Films (2012); YouTube (2011); also: ADB (n.d.) **77** Barefoot College (2016b)

Box 11: Biogas digesters: capacities were built but support to investment still needed

Household-level bio-digesters using (notably) animal manure and producing gas for cooking, heating and lighting as well as slurry to fertilise fields have become popular in many countries. SNV has facilitated the installation of over 700,000 bio-digesters in several countries in Asia, Latin America and Africa, which now benefit an estimated 3.5 million people. This includes Cambodia's National Biodigester Programme (NBP) which has reached about 20,000 households since 2006.[78]

As is the case in other countries, NBP trains local bio-digester construction groups and provides a small subsidy to beneficiaries to reduce their investment costs but the aim is to create a market-oriented, self-financed biogas sector. This capacity building and local demand for bio-digesters creates employment and other benefits such as saving on expenditures and on cooking time, improved indoor air quality, reduced use of wood for fuel and improved fertiliser for crops.

Due to its climate change mitigation potential and social benefits, the NBP has received the 'gold standard' for carbon credits that are sold on the international carbon market.[79] This delivers a revenue stream to make it a self-sustaining programme and replaces the Official Development Assistance (ODA) subsidy on bio-digester investments. It is been involved in capacity building and the technology is now well known in many localities. However, carbon credits are low priced and complete financial independence from subsidies has proven difficult to achieve. Further growth in this technology requires continued support through (small levels of) investment: 'Governmental regulation and coordination will remain needed and carbon finance will not easily fully replace ODA and governmental financial support'.[80]

78 SNV Netherlands Development Organisation (2016a) **79** SNV Netherlands Development Organisation (2016b) **80** Buysman and Mol (2013); see also: ADB (n.d.)

MYTH 8: RENEWABLE ENERGY IS BACKWARD TECHNOLOGY

Some believe that renewable energy technology is simple, old fashioned and outdated and that it does not fit a modern and urban model of development. They argue that the renewable energy prevents developing countries from moving forward, and in cases where the technology is viewed as modern and efficient, it is said to be controlled by companies from developed countries. Critics, therefore, conclude that it is not worth investing in renewables.

But the facts are different.

Waterwheels and windmills have powered artisanal and small-scale industrial processes for two millennia, as well as drainage and irrigation systems for agriculture (see Figure 19).

Figure 19: Traditional water power use in Vietnam

Source: author's picture

The industrial revolution was first powered by trees, leading to vast deforestation, and then by fossil fuels such as coal for steam engines. Even today we use fossil fuel technologies (most of which were invented in the 19th century) for transport and electricity production. Windmills producing electricity also hail from the 19th century.
However, since the second half of the 20th century, most of these technologies have made quantum leaps in efficiency and size. These fields have seen the application of technological knowledge developed in the space and aircraft industries, not only with regards to materials, but also as part of their manufacturing processes and cybernetics. The technologies developed within these fields can be really large: the largest offshore wind turbines now have an installed capacity of 8 MW, a rotor diameter of 164 meters and a total height of 220 meters, which is as high as a 65-storey skyscraper (see Figure 20).

Figure 20: Vestas V164-8MW - the largest (offshore) wind power turbine available

Source: Courtesy of MHI Vestas Offshore Wind[81]

Turbines to capture the energy of ocean waves also use very sophisticated mechanics and advanced engineering. New materials are being invented in the 21st century and applied to all sorts of renewable energy technologies to increase efficiency and strength and to reduce costs. Modern electronics and information technology are also very much part of renewable energy development.
The first practical solar cell was developed by Bell Labs in the 1950s in the context of the 20th century space race. Tesla, also a US company, is at the technological cutting edge in terms of electric cars, battery technology and solar PV home systems, and it aims to reach mass markets. All large car companies in the world are conducting research and development and some have started the production of hybrid and all-electric cars.

81 MHI Vestas Offshore Wind (n.d.)

This trend will benefit from increasingly decentralised ('distributed') power production such as rooftop solar PV, because car batteries can be charged when supplies are high, and cars can become a power source for homes when renewable energy production is low or absent.

The integration of renewable power production, power storage and electric transport is part of a transformation that is about to happen in developed countries and that will soon affect developing countries. For example, there is a draft EU directive that will require electric vehicle charging points to be available for every new house built in Europe; and policies are being prepared in different European countries to phase out the sale of new cars with internal combustion engines from 2030.

These trends are partly driven by consumers who want cleaner and greener products and by voters and policy makers who are sending a signal to industry that influence major decisions; they no longer accept 'greenwashing' but want to see real change in investment. The international movement for 'divestment' out of fossil fuel companies[82] is supported by a wide variety of institutions, ranging from pension funds and local authorities such as German federal states[83] to churches and universities, which are moving their savings to other investments. This reinforces the signals sent to the financial markets by the 'Paris Agreement' under the UN Framework Convention on Climate Change that many of the known reserves of coal and petroleum may never be exploited; that the actual value of 'big oil' and coal mining companies, therefore, is less than it seems and that a shift to renewable energy is not only ethical but also a financially wise move to make.

The divestment movement and others are starting to have a real impact. For example, some 88 global companies have joined 'RE100' and have made a commitment to become '100 % renewable'.[84] This includes some of the largest companies in the world in sectors ranging from banking, electronics and IT to foodstuffs, cosmetics and car manufacturing. Some of the big names include: Apple, Bank of America, BMW, Coca Cola, Commerzbank, Facebook, General Motors, GoldmanSachs, Google, Johnson+Johnson, Microsoft, Nike, Philips, SwissRe, Tata Motors, Unilever and Walmart. They are making various commitments, including installing solar PV generation systems on their facilities across the world, which will provide a boost to local manufacturing, supply and installation companies and jobs in the local renewable energy industry (see also Box 4). And shareholders and the public can hold them to account to enact their promises.

Finally, as argued in the section on employment and human capacity development, the sophisticated nature of renewable technology and the fact that some patents are held by international companies do not necessarily constitute major barriers for developing countries, local industry or even for illiterate people who no longer need to remain outside of the renewable energy transition. Vietnam is exporting wind towers, even before deployment of this technology has taken off in the country itself and despite trade barriers (Box 9). Barefoot College in India demonstrates that sophisticated knowledge from all over the world can be acquired by illiterate grandmothers, if they are empowered to help transform their communities with modern, renewable energy technology (Box 10).

82 Fossil Free(n.d.) **83** 350 (2016): North Rhine Westphalia in January 2016, followed by Baden Württemberg, Berlin and Rheinland-Pfalz **84** RE100 (n.d.)

RENEWABLE ENERGY MUST BE SCALED UP RAPIDLY EVERYWHERE FOR THE BENEFIT OF ALL

Setting the record straight on renewable energy myths is important. A transformation to renewable energy is happening in many parts of the world, but it needs to happen faster, and it needs to benefit all countries, poor and disadvantaged women and men and local businesses.

The question as to *how and when* we will achieve a renewable energy future in developed and developing countries is key and we conclude that a fast and fair transition is possible through changes in economic policy and action. These changes must be real changes by governments, foreign and domestic investors, and not just 'greenwash'.

Making the transition fast and for the benefit of all means that many interests must be aligned, which is why we are challenging misconceptions with this booklet. It is crucial that the public remains aware of the fact that fossil fuels are a finite resource and that they lead to negative environmental, health, economic and social impacts: fossil fuels are the primary cause of global climate change which is threatening the foundations of human civilisation. Public awareness of the advantages and limitations of renewable energy is also important in order to reach a consensus on national policy objectives on renewable energy.

Every country will need different policy objectives, but they could include the following:

a) Provide all people and businesses with access to sustainable energy[85]
b) Create local jobs and develop local value chains including the manufacture, supply, installation, repair and maintenance of renewable energy technologies
c) Increase the ambition to reduce greenhouse gas emissions in revised Nationally Determined Contributions (NDCs). These have been submitted by all countries under the UNFCCC but are inconsistent with the overall aim of limiting average global warming to 1.5°C above pre-industrial temperatures and avoiding dangerous climate change
d) Reduce local landscape destruction and pollution, losses to local livelihoods and negative effects on health and even death due to the exploitation, transportation and use of fossil fuels
e) Reduce import dependency by lowering the use of fossil fuels, and developing energy generation technologies

A transition towards renewable energy requires key action in developing and developed countries. The actions required will also be different, but they could include the following:

1. Invest in renewable power generation projects and steadily increase investments over time
2. Enable distributed renewable power production such as solar PV on the rooftops of businesses, groups of households (neighbourhoods, villages) and individual households through 'net-metering' regulations
3. Stop investing in new coal and nuclear plants and shut down old coal-fired power plants as they reach the end of their lifespan
4. Retrain workers from the fossil fuel industry, including coal miners, and if possible offer them clean, green jobs in the renewable industry (where employment opportunities need to be created)

85 This is consistent with Sustainable Development Goal 7 - https://sustainabledevelopment.un.org/sdg7

5. Increase energy efficiency (many countries have huge potential in this regard)
6. Support independent renewable energy solutions especially in remote off-grid areas, including hybrid mini-grids

These policies and actions will bring numerous benefits to people, economies and the environment.

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Imprint

Is published by the Rosa-Luxemburg-Stiftung
Responsible: Nadja Charaby and Liliane Danso-Dahmen
Authors: arepo consult, GreenID, Koos Neefjes
Franz-Mehring-Platz 1 · 10243 Berlin · www.rosalux.de
ISSN 2199-7713 · Editorial deadline: December 2016
Cover photo: Derivative work of David Tong, used under CC BY-NC 2.0,
adapted according to design by MediaService GmbH Druck und Kommunikation.
(https://www.flickr.com/photos/davidxvx/30990865466/in/album-72157677084769696/)
Proofreading: Linguatransfair, Berlin
Production: MediaService GmbH Druck und Kommunikation

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