



# Shifting the energy paradigm: A sustainable reality

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**F**ood, water and energy are central to our existence and are the cornerstones of our economy. The dynamic interactions between these resources are now clearer than at any time in human history.

As the world's population rises to over 9 billion by the middle of this century, ensuring food, water and energy for all faces a growing challenge – a challenge that is only being aggravated by climate change.

Energy is essential for poverty reduction, yet the means by which we have been producing energy – fossil fuel combustion – is the biggest contributor to climate change. We have an obligation to provide energy to those who need it, but burning more coal, oil and gas is going to worsen global warming, only further threatening food and water security for them and for all of us.

WWF's goal is for the world to embark on 100 per cent renewables by 2050 and thus develop an equitable, low-carbon economy, which is resilient to the climate change that is unavoidable. All efforts should be undertaken to limit warming of global average temperature to not exceed 1.5°C compared to 1850.

Growth of energy use is not universal – the average American uses as much energy as 20 Bangladeshis. Almost 87 per cent of world primary energy comes from high-carbon fossil fuels such as oil, gas and coal.

Fossil fuel combustion is primarily responsible for the exponential increase in atmospheric CO<sub>2</sub> concentrations since the industrial revolution and the principal cause of anthropogenic climate change. Today the world faces a record atmospheric CO<sub>2</sub> concentration of 400 parts per million (ppm) that is unprecedented in human history. While 2°C would be a dangerous increase in global mean temperature, our current path is likely to lead us to more than 4°C above pre-industrial levels, with severe economic, social and environmental consequences.

Our dependence on fossil fuel energy is impacting energy security for nations across the world. We see rising negative effects of burning fossil fuels – particularly coal – on human health and the environment. Global air pollution from fossil fuels kills about 2 million people annually. According to the International Energy Agency's *World Energy Outlook 2012*, more than two-thirds of proven fossil fuel reserves must remain unburned if the world is to prevent dangerous climate change.

We must choose to correct this course – much worse impacts are in store if we do not. Renewable energy and

energy efficiency can lower our global carbon footprint and help mitigate dangerous climate change. But while renewable energy is advancing swiftly, we have yet to achieve the growth rate needed to prevent dangerous climate change. Most energy decision-makers do not understand the current realities of energy markets, costs and technologies, and have not established the policies, support mechanisms and investments that will transform the global energy system for the greater good.

The cornerstone of this agenda is renewable energy. Renewable energy is abundant by nature. Solar, wind, geothermal, hydropower, ocean and bioenergy can provide 100 times the present global energy consumption. With a potential like this, delivering 100 per cent renewable energy for the entire world could be done sustainably with sound long-term strategies paired with strong energy efficiency measures.

We just need political commitment, strong investment, and global action to make this a reality.

The case is compelling. Renewable energy technologies are already becoming more competitive with fossil fuel in many parts of the world. In many cases, renewable energy systems are the first and easiest source of electricity for remote communities who before had none. Investments in renewables averaged US\$245 billion annually from 2010-2012, already a fourfold increase since 2006. While on a projected curve of growth, this year the figures are expected to be roughly the same. We know we need more – US\$ 350 billion annually over the next four years as a starting point.

To achieve that growth, governments need to provide enabling policies and certainty, to tilt the balance of investment away from fossil fuels and towards renewables. This means ambitious renewable energy targets, grid connectivity, research and development, and ending fossil fuel subsidies.

As investments rise in renewables, manufacturing costs fall fast and renewable power generation becomes increasingly competitive year after year. For example, in some markets, prices for solar photo voltaic modules have fallen by more than 60 per cent compared to 2009 and wind turbines by around 25 per cent. At current prices for conventional technologies, renewables are the most cost-effective option for off-grid electrification and some centralised technologies. In geologically active regions such as the Pacific Ring of Fire, geothermal electricity has already reached or surpassed grid parity in countries like the Philippines.

If externalities such as air pollution, waste generation, decommissioning of plants and of course CO<sub>2</sub> emission of conventional fuels were to be included in the costing exercise, electricity prices would be 30 per cent to 150 per cent higher – and most renewables are already more cost-effective than nuclear and fossil fuels today.

We can already see this shift in energy paradigm. Today, Denmark, Germany, Ireland, Spain, Portugal, Australia, Italy, the Philippines and some states in the US all get a large share of their energy from renewable sources. And South Africa was the global champion last year, investing close to one per cent of its GDP in renewables.

Some 138 countries now have renewable energy targets. We have seen many countries just in the last few years acting to increase their renewable electricity share, such as Costa Rica, New Zealand, China, Uganda, the Philippines, Morocco, Tunisia, Mexico, India and South Africa to name just a few newcomers. Even Saudi Arabia agreed to run most of its power supply by 2030 with solar and wind.

In addition to lower costs and a cleaner climate, renewable energy offers many other advantages. Solar, geothermal and wind energy hardly use any freshwater in their operations. Conventional energy today is the second largest consumer sector of freshwater worldwide after agriculture. Clean renewable energy does not emit noxious gases that create smog, health problems, acid rain and reduce agricultural harvests. Neither do they create water pollution or radioactive waste.

And investment in renewables creates jobs. The renewable energy industry now provides almost 6 million jobs. The worldwide 20 largest oil and gas companies employ only about 2 million people.

Like all energy sources, the growth of renewables must not be at the expense of the natural environment. This is particularly important for technologies such

as hydropower and bioenergy, which can have significant negative environmental and social impacts if not managed carefully.

But despite the fast growth of renewables in the world energy supply, we are still far from reaching that global shift in energy paradigm. Understanding the nexus between food, water and energy is essential to creating management plans that will ensure the long-term wellbeing of people and the planet. We must transform. We must transition in a way that is just and fair. And we must succeed.

To facilitate inclusive and sustainable development, the world must invest much more money now in clean, renewable energy.

Investment in renewables must be ramped up to about US\$500 billion per year by 2020 in order to avoid dangerous climate change. Yes, this comes with challenges – not least resisting the economic interests and influence of conventional energy players.

But achieving the world we want is also achieving the world we can't live without. It is less a choice than an imperative. And it's possible. The time to act is now. □

*In some markets, prices for solar PV modules have fallen by more than 60 per cent since 2009*

