

Statkraft
Climate
Roundtable

*Towards a
greener future*



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Reflections
from the Statkraft
Climate Roundtable

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In November 2014, Statkraft had the pleasure of arranging its second Climate Roundtable at Vang Gård in Norway for two days of presentations and in-depth discussions. The participants were selected business executives, climate scientists, economists and NGO representatives. Their collective contribution sparked optimism for a more sustainable future by highlighting the role business can play in combatting climate change. This booklet offers insights on how to accelerate the green shift, where the opportunities lie, and what it will take to inspire more people to demand and create change.





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Making change happen

Once upon a time, only a handful of politicians, NGOs and individuals were even aware of climate change. Today, the perils of global warming are too obvious to ignore. Combatting and mitigating climate change is becoming a part of policy making, business strategy, and everyday life, as political leaders, business executives, and ordinary citizens alike ask themselves how climate change will affect their future, and what they – and all of us – can do now to make a difference.

One such individual is Siddharth Hande. Hande lives in Chennai, one of India's largest and fastest-growing cities. With 4.9 million people, Chennai's population is already roughly the size of Norway's as a whole. Hande sees the environmental and economic challenges of rapid urbanisation every day. For him, climate change is not an abstract problem – it is something we need to face right away.

I met Hande in January during the World Economic Forum meeting in Davos, where he presented the “Kabadiwalla Connect” project, an online platform that allows local waste pickers to collaborate with businesses and individuals to reduce the amount of waste that ends up in landfills. Statkraft was proud to support this project through an initiative with World Economic Forum that engages young people in the climate issue. We share Hande's view that none of us can afford to wait for progress; as Kabadiwalla Connect says on its website, “Sustainability starts with you.”

It is that mentality of accountability and action that led Statkraft CEO Christian Rynning-Tønnesen to convene a group of business executives, climate scientists and NGO representatives at the second Climate Roundtable at Vang Gård. The roundtable's goal was to highlight the role business can play in combatting climate change – recognising, as Rynning-Tønnesen argues, not only the costs of shifting to a green economy, but also the significant growth opportunities.

We are encouraged that a growing contingent of business leaders and scientists share these views – and we are eager to build on that consensus as we look to December 2015, when global leaders will gather in Paris for the important COP21 meeting, and attempt to reach agreement on global emissions. To paraphrase roundtable participant and leading climate scholar Dimitri Zenghelis, “Change happens when momentum increases, and enough people understand that change is inevitable.” We believe business has a responsibility to help drive that momentum.

Change doesn't happen through scaremongering. Change happens when we realise that actions can improve our lives, our business, or our country; when we produce our own green electricity, when a business cuts costs by reducing waste, or when politicians dare to take bold steps.

We believe we are moving towards this point. More and more business leaders also realise that climate change can drive innovation and is a wealth-generating opportunity. There are still barriers to overcome. The energy industry is going through a big transition due to low fossil fuel prices and new technologies putting old business models to the test. Still, there is every reason to believe in a future with a cleaner economy. At Statkraft we continue to play our part in getting us there.



By Bente E. Engesland
SVP Corporate Communication, Statkraft

Innovating for a sustainable economy

As we reach for a prosperous future, free of poverty, we must find ways to achieve global economic growth without unsustainable pressure on resources. Such a future depends on our ability to direct innovation to transform human activity.

Climate change is already having serious economic consequences, especially in more exposed areas of the world. Without stronger action in the next 10-15 years, it is near certain that global average warming will exceed 2°C, the level the international community has agreed not to cross. Based on current trends, warming could exceed 4°C by the end of the century, with extreme and potentially irreversible impacts.

Yet there is still hope. Human ingenuity and innovation in technologies, processes and institutions have in the past allowed us to get more out of the resources we have, escaping the impending Malthusian trap by building knowledge capital. Knowledge capital is dependent on a number of factors such as cumulative R&D expenditures and physical and human capital investment. For example, new equipment enables new ideas and innovation in technologies. Investing in computers sparks bright ideas on how to use them. Investment in physical and knowledge capital also drives increasing returns.

In this virtuous spiral, knowledge leads to increased output and frees resources for more investment. The problem is that with knowledge building on knowledge, changing technological paths can be difficult.

The fossil fuel network, for example, includes not just mines, refineries, ports, pipelines, generation plants and filling stations, but also a vast knowledge and wealth pool, which allows fossil fuel companies to hire top innovators to extract fuels from ever more inaccessible sites. They also have extensive lobbying power in various governments.

Ideas and practices are also hard to change. The QWERTY keyboard was built to prevent English language typewriters from jamming. We no longer use typewriters, but much of the world is stuck with the keyboard, whether or not it enhances productivity. The shape and location of London's office blocks and tube stations are in part determined by Roman planning two millennia ago.

And it's more than just bricks and mortar. Any visitor to Copenhagen or Amsterdam will be struck by the popularity of cycling. People explain this as a result of first-class infrastructure. But the infrastructure could be a result of the ▶▶



By Dimitri Zenghelis
Co-Head Climate Policy,
London School of Economics



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Human ingenuity and innovation in technologies, processes and institutions have in the past allowed us to get more out of the resources we have. For example, investing in computers sparks bright ideas on how to use them in ways no one could foresee just a decade ago. Investment in physical and knowledge capital also drives increasing returns.



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In order to be able to sell more of their electric vehicles, Tesla simultaneously needs scale and an entirely new vehicle-charging infrastructure. In June, Elon Musk, founder of Tesla Motors, announced that his company would make their electric vehicle patents public thus stimulating the innovative resources of all car companies and thereby expanding the whole market, including their own share.

popularity of cycling. The point is that path-dependencies lead to mutually reinforcing feedback mechanisms.

There is also a well-established political economy asymmetry that favours incumbents. The losers from change shout louder and more effectively than winners, even if the latter group is larger.

Yet changes in technologies, systems and behaviours do happen because either a clearly superior system appears, or there is a clear and credible social objective to be met. The switch from horses to cars, kerosene to electricity, canals to rail and charcoal to coke fall into the first category. They all faced strong opposition from losers but the changes could not be put off forever. The Apollo missions or the Manhattan project fall onto the second category. So do the many technological spill-overs that come from a commitment to military spending. The move from slavery to a free labour market has elements of both.

What all historical transformations have in common is the belief that the transition will be inevitable. They all required dislodging entrenched social, economic and behavioural networks. Without fully aligned expectations, deep transformational change will not occur.

The payoff to a business or political leader considering investment in renewables and energy efficiency depends on what she expects others to do. If no one else is expected to move, then the risks are high, the technologies expensive, the financing niche and the market immature.

But if large players such as China or the U.S. are expected to move at scale, then one would expect technology and finance costs to fall and huge new markets to emerge. The development of new skills as well as supportive institutions and behaviours would further reduce unit costs. As everyone moves, expectations become self-fulfilling.

Businesses must also play a role in steering expectations. For instance, in June, Elon Musk, founder of Tesla Motors, announced that his company would make their electric vehicle patents public. Many commentators leapt to applaud this apparent sacrifice as an astute business decision. Rightly so.

In order to be able to sell more of their electric vehicles Tesla simultaneously needs scale and an entirely new vehicle-charging infrastructure. It has to battle against the vast existing network of petrol stations, and vested interests of car dealerships, that make driving a combustion-engine car so convenient. Rather than trying to win this fight alone, Tesla decided to grow a new market by stimulating the innovative resources of all car companies. Tesla understood that innovation does not just happen. Entrepreneurs and companies need clear incentives to innovate.

Government and businesses have a role in shifting the expectations by credibly committing to climate policy and changing the initial conditions by investing in green infrastructure or funding clean energy research so as to lower technology costs. The key challenges to achieving full decarbonisation of the economy are not technological or economic; they are cultural, institutional and political.

“ Ideas and practices are also hard to change. The shape and location of London's office blocks and tube stations are in part determined by Roman planning two millennia ago. ”

Dimitri Zenghelis, London School of Economics



LONDON, ENGLAND: Finance is the key means to support the implementation of climate change mitigation and adaptation activities. Pictured is the London Stock Exchange.

Climate finance to tackle climate change

Climate change is higher on the agenda – both in the private and public sector – than many people are aware of. CICERO is an independent and interdisciplinary research institute, and our mission is to acquire knowledge that can help mitigate the climate problem and enhance climate cooperation. One of the areas where CICERO has specialised is green bonds. Our climate finance team provides independent second opinions on green bonds and conducts research on climate finance.

Finance is the key means to support the implementation of climate change mitigation and adaptation activities. The demand for financial instruments that account for climate-related risks is rapidly growing, in parallel with the need for robust and concise information regarding the environmental impacts of investments.

Rapid growth of green bonds

Green bonds are a particularly promising instrument for financing low-carbon and climate-resilient infrastructure projects. Essentially, a green bond is a debt instrument that finances projects that are environmentally-friendly. The green bond market is growing rapidly – new issuances of green bonds tripled in 2014 to \$35 billion. However this is still only a fraction of a percent – 0.04% – of the total global bond market.

To date, most green bonds have been issued by development banks, but interest from the private sector is increasing, with the first issuance by a corporation in 2013. Municipalities are also

becoming more active in issuing green bonds. Most of the green bonds have been issued in Europe, North America, and Asia.

In Norway, several green bonds have been issued, including by Kommunalbanken, BKK and NTE. The Oslo Børs established a separate green bond listing in January – the first stock exchange in the world to do so. One of the requirements for a green bond to be listed on Oslo Børs is the use of a publically-available second opinion.

Environmental quality

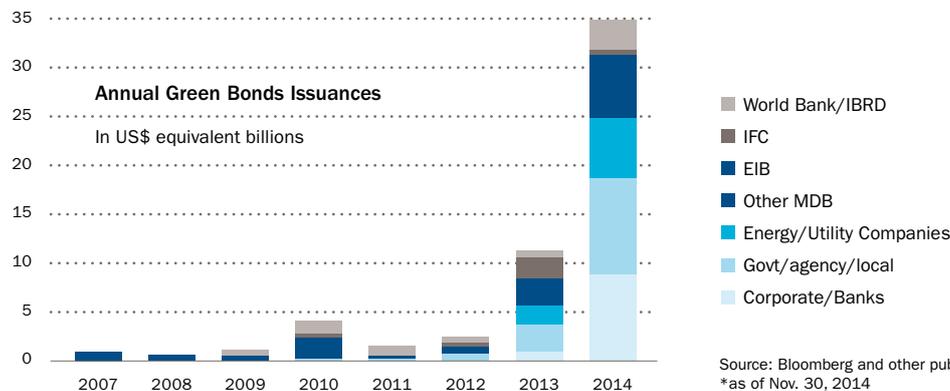
However, there is no environmental standard for what constitutes a green bond. Many investment banks are signatories to the Green Bond Principles, which focus on earmarked use of proceeds and for green projects and transparency, but say little about environmental quality.

To increase investor confidence that investment decisions are taken with careful consideration of environmental risks, >>



By Kristin Halvorsen

Director at CICERO, Center for International Climate and Environmental Research, Oslo



many green bond issuers are seeking independent environmental assessments of their investment frameworks. Independent second opinions provide environmental due diligence at the time of issuance on green bond investment frameworks.

The role of financial markets

Climate finance will be crucial to achieve a global climate agreement in Paris at the end of this year. Governments alone cannot deliver the amounts of money that are needed to support a transition to a low-carbon economy. Private sector and financial markets will have an important role in raising climate finance and are increasingly aware of that. Several pension funds have decided to exclude coal from their investments. This spring, the Norwegian Parliament will discuss how to improve the ethical guidelines of the Government Pension Fund (one of the world's largest sovereign wealth funds) in a climate-friendly way. The challenge is to find the financial instruments that channel capital to climate-friendly investments on a commercial basis. CICERO is contributing with its research on climate finance and green bonds.

CICERO second opinions

CICERO has been the leading market provider of green bond second opinions since the market's inception in 2007. CICERO second opinions focus on the potential environmental impacts of

the types of projects to be financed by the green bond, and also consider the confidence of the issuing institution's capacity to fulfill the environmental aims of the green bond framework. CICERO has provided second opinions for approximately 30 green bonds to date, across a range of issuers from multi-lateral development banks, corporations, municipalities, and government-related entities. Issuers that used a CICERO second opinion include World Bank, European Bank of Reconstruction and Development, African Development Bank, Korea Export Import Bank, the city of Gothenburg in Sweden, the province of Ontario in Canada, Vasakronan Properties, in addition to Kommunalbanken and BKK in Norway.

Read more on www.cicero.oslo.no/greenbonds

“ The green bond market is growing rapidly - new issuances of green bonds tripled in 2014 to \$35 billion. ”

Kristin Halvorsen, CICERO



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Private sector and financial markets will have an important role in raising climate finance and are increasingly aware of that. Pictured above is Statkraft's trading floor at the Lilleaker offices.

Empowering the green shift

As we are heading into a new energy era it is becoming increasingly apparent that business has a big role to play and much to gain by pushing for a green shift in the economy.

Last autumn, the New Climate Economy project released its report. The conclusions were clear: The world must continue to strive for economic growth, while also reducing the impact of climate change. In order to achieve this, growth must be powered by renewable energy.

According to the International Energy Agency (IEA) the global energy demand is expected to rise by 37 per cent in the next 25 years, driven by the needs of a growing population and emerging markets. To achieve sustainable growth on a global basis, a large part of this demand must be supplied by renewable energy. This is a great business opportunity, but it is also critical, in order to have a chance at staying close to the two-degree trajectory.

Internationally we are already seeing the fast expansion of renewable energy, with the rapid installation of solar photovoltaic capacity as a global frontrunner. The expansion is driven by increased regulatory support and reduced technology costs, with emerging markets like China and India in the lead. India's solar power ambitions for the next seven years have risen sharply, from 22 GW to 100GW, following the newly elected government's ambitious targets.

We are also seeing consumer habits changing. Japan now has more electric vehicle (EV) charging points than gas stations. In the U.S., German carmakers BMW and Volkswagen have agreed to join the EV charging network, to help finance the rollout of fast chargers along the busiest corridors of the U.S. coasts. This would not have happened unless these companies considered it profitable.

Adequate storage has for a long time been a limitation for smart use of intermittent sources of renewable energy. However, more intelligent systems are being developed rapidly. The innovation in the storage business dramatically improves the economics of renewables and of the appliances dependent on them. Tesla founder Elon Musk recently announced that his next big venture would be into home batteries, enabling people to store the electricity they produce in their homes and thus be less dependent upon the electricity grid. >>



By Christian Rynning-Tønnesen
President and CEO,
Statkraft



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MONJOLINHO, BRAZIL: At Statkraft, our long term ambition is to keep up our growth as a profitable international leader in pure energy. Since 2010, we have invested more than NOK 27 billion in renewable energy.



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SHERINGHAM SHOAL WIND FARM, OFF THE COAST
OF NORTH NORFOLK, UK: The wind farm has a
capacity of 317 MW, consists of 88 wind turbines
and an annual production of 1.1 TWh. It covers an
area of approximately 35 square kilometres.

The capital markets are inevitably realising the potential the green shift holds for future profitability. Citigroup, for instance, plans to lend, invest and facilitate deals worth \$100 billion by 2025 to support projects that will fight climate change and protect the environment.

The role of business must change but there is no silver bullet. What is promising, though, is the wealth of evidence that validates the measures and actions that can be taken to achieve this double-pronged success of economic growth and climate stewardship. It is encouraging to see how new players – Microsoft and Google among others – that have previously been disassociated from the energy industry, are making significant long term financial commitments both to meet their carbon footprint targets and to leverage the potential this new opportunity presents for the future.

At the same time, around USD 500 billion is spent annually to subsidise fossil fuels. The transport sector still depends largely upon fossil fuels, and energy from coal, oil and gas are still predominant on a global basis. The green transition is dependent upon businesses as a driving force, but policy makers and the public are both elements the transition depends upon. Without a market, no business can thrive. And without the right political framework (CO₂ taxes, green subsidies, etc.) the profitability is in many cases too low to encourage the necessary business activity.

At Statkraft, our long term ambition is to keep up our growth as a profitable international leader in pure energy. Since 2010, we have invested more than NOK 27 billion in renewable energy. As 2014 came to an end, our international growth strategy got the stamp of approval from the Norwegian government, injecting new equity and reduced dividends to increase national and international investments in renewable energy for a total of NOK 60 billion over a period of five years.

We currently have operations in over 20 countries, and this year we will mark our 120-year anniversary by opening new

hydropower plants in Turkey and Peru. Both countries are key markets for Statkraft, due to their growing energy demand, economic growth and hydropower resources. Earlier this year Statkraft acquisitions of developing rights for a new offshore wind project in the UK and several onshore wind projects are under development. Our core strategy today is to provide renewable energy through hydropower, wind power, district heating and other technologies, but also explore business opportunities in other energy sources such as solar energy, for example.

As one of Europe's most experienced producers of clean energy, these are exciting times for Statkraft. We are continually assessing our energy portfolio, testing out new forms of energy, allowing for flexibility and efficiency in our production systems. We have strong production and market competence and a robust financial position, but competition is fierce, and we will have to fight hard and smart to stay highly profitable in the green shift.

Nobody can predict exactly what the future looks like, or which technologies or disruptions will dominate future businesses, but if we make the right choices now, there is a brighter, greener and profitable future ahead of us.

“What is promising, though, is the wealth of evidence that validates the measures and actions that can be taken to achieve this double-pronged success of economic growth and climate stewardship.”

Christian Rynning-Tønnesen, Statkraft



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When measuring the true cost of electricity, it's important to take all factors into account. A meaningful cost measurement system includes social impact, transmission costs, variability costs, employment effects, geopolitical risk, and environmental impact.

Cost of energy

We continue to live in a challenging and volatile energy environment. Just one example of this volatility is the recent dramatic drop in oil prices – something none of us expected. At the same time many of our most pressing energy challenges remain. I would argue that the most urgent of these continue to be the risks associated with climate change.

Responding to these threats requires immediate action. As the IPCC reported in November 2014, the 2°C goal continues to be within reach. I share this view. But how we get there remains unclear.

To reach this goal it is essential that we develop effective and cost-efficient CO₂-free power sources. Carbon dioxide accounts for more than 80 per cent of total global greenhouse gas emissions and the energy sector is the single largest contributor, responsible for more than 40 per cent of emissions globally. By 2035 this figure could grow to more than 60 per cent.

The good news is that we are already well underway in developing CO₂-free power sources and CO₂-free renewable energy sources. The single greatest challenge remains making these power sources more economically competitive. This demands accurate measurement of the costs of competing energy sources.

The conventional yardstick for measuring the cost of energy sources continues to be “Levelised Cost of Energy” (LCoE).

LCoE is the sum of discounted capital and operating costs, including fuel and emission costs, divided by the lifetime sum of discounted energy output.

LCoE is a useful tool in some ways, but I would argue that it does not accurately measure the true costs to society of various sources of electricity. LCoE is too narrow and overlooks important externalities. The result is that relying only on LCoE can produce misleading – and potentially invalid – conclusions about true energy costs, leading to faulty decision-making.

A more accurate and comprehensive way to measure the true cost of electricity is what I call “Society’s Cost of Electricity” (SCoE). This measurement tool takes into account additional factors or social costs. There are six categories of these costs that must be factored into an accurate measurement of energy prices. ▶▶



By Markus Tacke
CEO Wind Power And Renewables Division,
Siemens AG

1. **Social impact.** These include factors such as health risks, the risks of nuclear power accidents, water consumption of nuclear and coal plants, and potential declines in the price of property in the case of renewables.

2. **Transmission costs.** In the case of renewables, grids must often be reinforced as power sources such as offshore wind or solar are usually not centrally located. Clearly such costs must be reflected in an accurate measurement.

3. **Variability costs.** These include payments to keep gas power plants, for example, on stand-by as backup capacity for variable renewable energy sources.

4. **Employment effects.** Generating electricity creates jobs and value – but some types of energy production are more labour intensive during the construction phase, while others create more jobs through installation and maintenance.

5. **Geopolitical risk.** Some energy sources can serve as a hedge against price increases or political interference. Wind, for example, has no fuel price and cannot be manipulated by adverse foreign parties.

6. **Environmental impact.** The cost of CO₂ is already reflected in LCoE. At present, however, CO₂ costs are exceptionally low and do not accurately reflect the impact of emissions on the environment or on air quality.

SCoE takes these factors into account, resulting in a more meaningful and accurate cost measurement system.

A traditional LCoE calculation demonstrates that onshore wind power is already close to being cost-competitive today, and that offshore wind is rapidly becoming more competitive.

“ The single greatest challenge remains making CO₂-free power sources and CO₂-free renewable energy sources more economically competitive. This demands accurate measurement of the costs of competing energy sources. ”

Markus Tacke, Siemens AG

When one applies the more comprehensive SCoE measurement, the viability of wind becomes even more pronounced. Looking ahead to 2025, one sees that wind power, both onshore and offshore, will be the single most inexpensive source for power generation, with natural gas the most cost-efficient backup for variable renewable sources.

While market mechanisms like CO₂ pricing and emission trading schemes (ETS) should be the adequate means to drive investment decisions towards lower SCoE, so far they have not demonstrated that they work with sufficient impact. Until these deficiencies are overcome, binding targets for renewables are needed.

The future development of wind power will be increasingly driven by economic factors. Therefore, it is crucial that we have an accurate and comprehensive method of calculating true costs. SCoE can provide this, helping investors, policy makers, and the public to better understand our true energy picture and to make the best decisions going forward.



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Looking ahead to 2025, one sees that wind power, both onshore and offshore, will be the single most inexpensive source for power generation, with natural gas the most cost-efficient backup for variable renewable sources.

Creating value by cutting carbon

Christian Rynning-Tonnesen, CEO of Statkraft, has been known to say, “Green is good.” We agree, but offer an addition to the statement, pronouncing that green is, in fact, good for the economy.

Our analysis indicates that a transition to a low-carbon energy system is a compelling opportunity for nations around the world. A shift to low-carbon power along with reducing oil in transport could save the global economy trillions over the next 15 years, if this transition is managed appropriately with proper attention paid to finance, policy and industry structure.

In work we undertook for the New Climate Economy project, we analysed the two energy transitions that would require the biggest reallocation of financial resources – the transition away from coal to renewable sources in the power sector, and the transition away from oil in the transport sector.

A low-carbon power system could create trillions in value for financial markets.

For the transition from coal power to renewable energy, operating expenses associated with extracting and transporting coal and gas would fall significantly in a low carbon economy with lower gas and oil consumption. These lower costs outweigh the higher investment, which leads to higher depreciation and financing costs in a renewable energy system. Benefits outweigh costs

even when considering “stranded assets” – that is, the loss of value that fossil fuel resource owners would face when oil, gas and coal prices fall as a result of lower demand in a low carbon economy, or when those assets are no longer needed. All together the net financial impact of a global transition from coal to renewable power could be a benefit of \$1.8 trillion by 2035.

To maximise these benefits, it is critically important to reduce the cost of capital for low-carbon energy. Technology costs for low-carbon energy have come down dramatically in recent years, but financing costs remain inefficiently high. Low-carbon energy infrastructure like wind and solar power represents a low-risk, long-term investment that is well-suited to the needs of large institutional investors with long time horizons. Our analysis shows that well-structured investments driven by institutional investors could reduce the cost of electricity from renewable sources by close to 20 per cent – a potentially game-changing savings that could make it easier for low-carbon energy to compete with fossil fuels in Europe and the United States. ▶▶



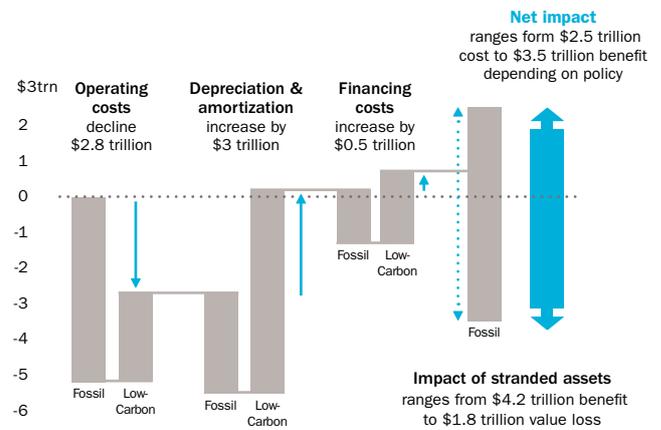
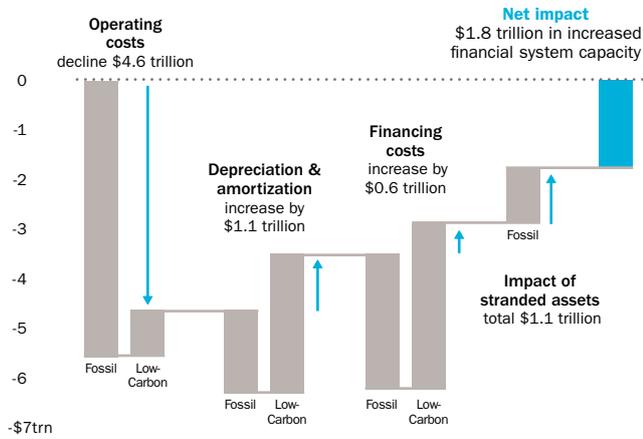
By David Nelson
Senior Director of Climate Policy Initiative



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WESTCOAST, GERMANY: Our analysis indicates a transition to a low-carbon energy system that is a compelling opportunity for nations around the world. Electricity is produced here by solar and wind power. The barns rotate with the cycle of the sun.



MALMÖ, SWEDEN: Reducing oil in transport could save the global economy substantial amounts over the next 15 years. The Exqui.City is a hybrid (biogas-electric) tram-bus, a 24-metre double-articulated vehicle with an electric engine, whereby the electricity is generated by a power generator connected to a biogas engine.



A low carbon transport system can, if managed wisely by reducing demand and encouraging innovation, save the United States, European Union countries, China, Japan, and India trillions.

The story for the transition away from oil is a bit more nuanced. Our analysis shows that here, too, many nations stand to benefit, if they manage the transition wisely. As net consumers of oil, the United States, European Union countries, China, Japan, and India could see huge financial benefits by transitioning to a low-carbon economy. For them, transitioning away from oil makes sense for reasons of self-interest and, even if they act without net producers, they stand to benefit. Intriguingly, our analysis also shows that if this group of countries chooses to act, net producers would minimise their financial losses by also reducing domestic demand for oil.

Policy should focus on reducing demand and driving innovation to maximise the benefits and minimise the costs across net-consuming and net-producing countries.

A key point for policymakers looking to maximise the benefits of the transition is that policies matter. Our analysis shows

“ A shift to low-carbon power along with reducing oil in transport could save the global economy trillions over the next 15 years. ”

David Nelson, Climate Policy Initiative

that a combination of demand reduction policies (such as through reduced subsidies or increased taxes for fossil fuels) and innovation provides the most promising policy approach. Crucially, our analysis shows that restricting production without addressing demand is an inefficient approach that creates numerous costly distortions to the economy.

The takeaway from the analyses of the costs of transition, both for the power and transport sectors, is clear. Countries concerned about the financial health of their economies over the coming decade and beyond should be looking hard at a low-carbon transition in energy.



NEW YORK, USA: Occupy Wall Street protesters march on Broadway in New York. Activists gathered in downtown Manhattan to participate in the Flood Wall Street protest ahead of the UN Climate Summit, which was held in the city 23 September 2014.

Achieving a renewable future by mobilising the masses

History was made 21 September, 2014. On this autumnal Sunday more than 400 000 people took to the streets of New York demanding government action on climate change, and there were 2 646 solidarity events in 162 countries around the world. UN Secretary-General Ban Ki-moon, whose climate summit formed the backdrop, was handed signatures from two million people asking that the world become 100 per cent renewable. He followed up by encouraging governments and private stakeholders to move investments out of fossil fuels.

Last year in China, there were around 400 000 environmental demonstrations. In the USA and Canada continuous popular protest has led to U.S. President Barack Obama vetoing the Keystone oil pipeline, and in Norway almost 15 000 people have signed a petition in favour of a climate law. When working towards a renewable future, it is clear that political mass mobilisations calling for new solutions to the climate crisis are vital.

In particular we need to make sure that coming generations are mobilised. We see how a majority of those standing up for the climate are young men and women, while decision makers and corporate stakeholders in the most important spheres of society – such as the energy sector – are men in their 50s and 60s who often drag their feet to act on climate change. A lot of young people know that they will have to deal with serious climate challenges for the rest of their lives. That does something to your motivation and your capacity to create lasting change.

“ We need to mobilise energy consumers to become sustainable producers, as we see it being done in African countries, Europe, India and the USA. ”

Nina Jensen, WWF-Norway

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An important part of the mobilisation and the climate solution is that people choose and promote renewable energy. Future energy systems will look different than today, with customers not just being consumers but also producers. It might be a mother of about 30 years, living in a poor country and trying to make ends meet – with a small solar panel on the rooftop securing light and other amenities. Actually, she and others are out there already. ▶▶



By Nina Jensen
Secretary General,
WWF-Norway



THURSO IN SCOTLAND. Last year renewable energy made up 22 per cent of power generation around the world. In 2013 more renewable power was built than for coal, oil, gas and nuclear combined – for the first time in history. Pictured above is Baillie Wind Farm, which consists of 21 turbines produces about 170 GWh of clean energy annually, enough to meet the electricity needs to the equivalent of 35 000 homes.

One such is Joy Nyalu, mother of seven from the Kasese district in Uganda. Her solar panel has been purchased through a clean energy project that WWF is proud to contribute to.

Last year renewable energy made up 22 per cent of power generation around the world. In 2013 more renewable power was built than for coal, oil, gas and nuclear combined – for the first time in history. We need to mobilise energy consumers to become sustainable producers, as we see it being done in African countries, Europe, India and the USA. In India the plan is to achieve 40 000 MW of power from rooftop solar projects by 2020. And solar installations are seen to be economically competitive in 47 of 50 American states by 2016.

If we are to create a sustainable future for all, we need politicians and corporate leaders all over the world to take the

necessary steps to cut emissions, divest from fossil fuels and to promote renewable solutions in all sectors. And we need ordinary people to stand up and remind them of that. When men and women, young and old, unite in a common concern for our planet, it is a powerful tool. As shown by the labour movement and the fight for women's rights: together humans can change the world.

“ When men and women, young and old, unite in a common concern for our planet, it is a powerful tool. ”

Nina Jensen, WWF-Norway



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NADA, INDIA: Future energy systems will look different than today, with customers not just being consumers but also producers. Across India, thousands of homes are receiving their first light through small companies and aid programs that are bypassing the central electricity grid to deliver solar panels to the rural poor. Those customers could provide the human energy that advocates of solar power have been looking for to fuel a boom in the next decade.





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BLÅSJØ, NORWAY: Its great storage and pumping capacity makes Blåsjø a very important part of Norway's hydropower system.



Statkraft AS

Lilleakerveien 6,
PO Box 200 Lilleaker,
0216 Oslo, Norway

www.statkraft.com