IEAGHG Information Paper: 2017-IP22; Energy Transition Commission Report:
Better Energy, Greater Prosperity

The Energy Transitions Commission (ETC) was convened to help identify pathways for change in our energy systems to ensure both better growth and a better climate. The ETC is funded by Bank of America Merrill Lynch, BHP Billiton, BlackRock, Energy Systems Catapult, CO2 Sciences, the European Climate Foundation, General Electric, Generation Foundation, the Grantham Foundation, OPower, the Paulson Institute, the Rocky Mountain Institute, Royal Dutch Shell, RWE, Schneider Electric, Statnett and the UN Foundation.

The ETC aim is to accelerate change towards low-carbon energy systems that enable robust economic development and limit the rise in global temperature to well below 2 degrees Celsius. We will provide decision-makers with insights and options for action at local and sector level, based on objective research and wide engagement with actors in the energy system.

For more information on the ETC and its Commissioners go to http://www.energy-transitions.org/
The ETC has published a new report entitled: Better Energy Greater Prosperity in April 2017, see: http://www.energy-transitions.org/better-energy-greater-prosperity

The report examines a number of pathways for low-carbon energy systems and describes options on how to:

- cut annual carbon emissions from 36 Gt today to 20 Gt by 2040 (compared to 47 Gt expected by 2040 in a business as usual scenario),
- and set the stage for the further emissions reductions that will be required in the second half of the century, while ensuring universal access to 80-100 GJ of affordable, reliable and sustainable energy per capita per annum.

The report concludes that these objectives can be achieved through four interdependent pathways:

1. ***Clean electrification*** - By 2040, half of emissions reductions compared to a business as usual scenario could come from the combination of the decarbonization of power generation and the electrification of a wider set of activities in the transport and buildings sectors.

   Provided appropriate policies are put in place, the ETC suggests it will be possible within 15 years to build power systems that rely on variable renewables for 80/90% of power supply. These power systems should be able to deliver electricity at an all-in cost (including back up and flexibility needs) of less than $70 per MWh, which is likely to be competitive with fossil fuels based power generation. This reflects the dramatic reductions in the cost of renewables and batteries now being achieved and most likely to continue. Clean electricity should then be used in an increasing range of economic activities, with growing potential to substitute clean electricity for fossil fuels in light vehicle transport and heating.

2. ***Decarbonization of "hard-to-electrify" sectors*** – In addition, the ETC proposes the need to cut carbon emissions from activities that cannot be electrified cost-effectively in transport, industry and buildings. This they believe will become increasingly important as the potential for additional clean electrification is exhausted. But they consider that the technologies to do that – including bioenergy, waste heat, hydrogen, and the multiple forms of carbon capture and sequestration – are not yet achieving the cost reductions and scale deployment seen in renewables and batteries. Hence, they suggest that Governments and companies need to make significant R&D and initial deployment investments to ensure that these technologies become cost effective.

3. ***A revolution in the pace of energy productivity improvement*** - Energy productivity improvement could deliver a third of required emissions reductions by 2040, but this would demand greatly accelerated energy efficiency progress across the buildings, transport and industry sectors, as well as structural changes in the economy to deliver more economic growth with less energy-intensive goods and services.

4. ***Optimization of remaining fossil fuels use*** – the ETC believes these transitions would result in a 30% decrease in fossil fuels use by 2040, but fossil fuels would still represent up to 50% of final energy demand. Meeting climate objectives therefore also requires a ramp-up in all forms of carbon capture and sequestration (conversion into products, underground storage, natural carbon sinks). In this context, fossil fuels use should be concentrated in highest value applications, which implies a rapid decrease in unabated coal consumption, a peak of oil in the 2020's and a continued role for gas provided methane leakages are reduced significantly

Achieving accelerated progress

The ETC indicates that the transition to low-carbon energy systems across the world will require faster improvement than in the past 20 years and faster than the INDCs promise. Each year, energy productivity needs to increase by 3% and the share of energy from zero-carbon sources needs to rise at least one percentage point. Strong public policies will be essential to achieve this.

The ETC believes that these must include meaningful carbon pricing, phase-out of fossil fuels subsidies, R&D and deployment support for low-carbon technologies, robust standards and regulations, appropriate market design, and public investment in transport and urban infrastructure. In addition, the progress implies a major shift in the mix of investments in the energy system: investments in fossil fuels over the next 15 years could be about $3.7 trillion lower than in a business as usual scenario, while investments in low-carbon technologies and more energy efficient equipment and buildings could increase by $6 trillion and $9 trillion respectively. This would mean an extra $300-600 billion in annual investment. The ETC suggests that this does not pose a major macroeconomic challenge in a world where global savings and investment reach $20 trillion annually. But public policies that reduce risk are needed to reduce the cost of capital for long-term sustainable infrastructure investment and extra support will be required for developing countries with the greatest investment requirements and more limited access to capital.

John Gale
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