



THE ENERGY TRANSITION AND DISRUPTIVE TECHNOLOGIES - ASIA-PACIFIC WILL USHER IN A SUSTAINABLE ENERGY FUTURE

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Energy is an indispensable factor for human progress – powering industrial production, services, transport, communication and enabling comfort and convenience in our daily lives. However, the benefits of modern energy also entail negative externalities on society and the environment. The most blatant and substantive of these is the enormous cost from climate change as energy use contributes close to 80 percent of total global greenhouse gas emissions. A further concern is air pollution from fossil fuel use, leading to acute impacts on human health and economic productivity. While energy is bringing both costs and benefits to societies we must remember that not all of us have modern energy.

The globally agreed 2030 Agenda for Sustainable Development provides a blueprint for the collective social, economic and environmental achievements needed for promoting shared prosperity of successive generations. Energy production and its use is critical for sustainability as it impacts across the three dimensions. It is in this context that SDG7 proposes a holistic approach - ensure universal access to energy, increase substantially the share of renewable energy and double the global rate of improvement in energy efficiency.¹

In response to imperatives of climate change and sustainability, the global energy system is undergoing a profound transformation, perhaps the most dramatic change since the introduction of centralized power generation and electricity grids. The energy transition is on several fronts. Renewables are emerging as the principal source of new generation, eroding the dominant role of fossil fuels. Each year, newly installed renewable generation capacity outstrips fossil fuel installations. The cost of solar power is now lower than fossil fuel in many markets. Deutsche Bank estimates that solar power has already reached parity with grid electricity in 50 countries. Energy efficiency is improving as economies' energy demand growth is slowing, improving the use of existing energy reserves. The Asia-Pacific has achieved a reduction in energy intensity of more than 40 per cent since 2000, outpacing other global regions.² Approaches such as cross-border power interconnection, distributed energy, energy storage and smart grids offer new ways of better sharing and managing energy. Internet technologies such as blockchain are emerging, allowing peer-to-peer energy trading, with consumers becoming generators and participating in energy markets.

Thus, there are multiple drivers of energy transition whose effective management is critical. On one hand there is increasing understanding and recognition of the uncosted externalities of carbon based fuels and inefficient use of energy. On the other hand, the desire to change incumbent technologies is being supported by a wave of energy innovation that allows low cost, clean and more flexible and decentralized generation. Innovation is disrupting conventional technologies, business models and paradigms. Innovation-based solutions using hardware, software and business models enhance how we generate, trade and use energy. These solutions are providing policy makers with an array of increasingly affordable, practical and comprehensive solutions for achieving their high-level energy policy goals. Policy intervention is critical as supportive policies spur a "virtuous cycle" for innovative technology development, where market uptake increases scale and lowers costs, in turn stimulating more demand. Solar photovoltaics, batteries, electric vehicles and offshore wind energy are examples of technologies that have demonstrated steep learning curves, with costs continuing to drop. From the financing perspective, as market share and confidence in these technologies grows, investor risk decreases and the cost of finance can fall.

The upheaval at both the generation and consumption ends of the energy chain are combining to usher in the beginnings of a sustainable energy future. There are a series of signposts that indicate the impacts of the energy transition are already being felt. Globally, a wedge has been driven between greenhouse gas emissions and GDP growth, a first step before overall reductions of emissions. The International Energy Agency has reported that 2016 was the third year in a row where global emissions remained flat despite increasing global GDP.³ This decoupling is also evident in many economies across the Asia Pacific, most notably in China which has reduced coal consumption and plateaued its emissions despite ongoing GDP growth.⁴ So while the transition has begun, the challenge is to accelerate it to meet the goals of the Paris Agreement.

The Asia-Pacific region is of central importance to any discussion on energy transition. The region represents the crucible in which the forces of the global energy transition are playing out. Indeed, the Asia-Pacific will determine the pace of the global energy transition and the extent to which it will deliver on its full potential. There are several reasons for this.

Firstly, it is an enormous market for energy, consuming some 49 percent of the world's primary energy. At the same time the Asia-Pacific with its progressive policy stances and abundant renewable resources, is installing more renewable energy capacity than any other, amounting to an investment of \$110 billion in 2016, almost half the global total. Looking to the future, the region will capture a massive \$3 trillion in investment in the period to 2040. Two countries alone - India and China - will account for 43 per cent of all global investment in renewable power to 2040.⁵

Secondly, beyond its role as a market for new energy technology, it is a hub for innovation and manufacture of advanced energy technologies, from photovoltaics to energy storage and advanced energy efficiency. These industries will create high quality jobs and drive economic growth through the enormous global demand for these technologies. Continued innovation and cost competitiveness is key to sustaining the momentum of the energy transition.

Lastly, despite progress being made in tapping new energy sources in many economies, there remains an unacceptably large population, over 400 million in the region, with no access to electricity. This is almost half of the global total, with South Asia representing the subregion in most need. Bringing the benefits of modern energy to all will require innovative approaches, continued investment by governments and a mixture of centralized and stand-alone power solutions. Engaging the private sector in this task is critical but sustained policy efforts will be needed to bring modern energy to the poorest and most remote regions. If Asia-Pacific fails to electrify its remote and rural populations, the world cannot meet this goal.

Ultimately the energy transition must take us to a future where energy is affordable, clean and available to all. The seeds of this transition have already been sown and the transformative role that the Asia-Pacific will play is clear. It is therefore appropriate that this year Thailand will host the 7th Asian Ministerial Energy Roundtable to progress the global energy dialogue. Decisions being made today on how to direct energy investments by countries like Thailand will determine whether the global energy transition will be fast enough to ensure sustainable energy for all by 2030.

¹ Sustainable Development Knowledge Platform (n.d.). Sustainable Development Goal 7. Retrieved from: <https://sustainabledevelopment.un.org/sdg7>

² Global Tracking Framework (forthcoming). Asia-Pacific Progress in Sustainable Energy.

³ <https://www.iea.org/newsroom/news/2017/march/iea-finds-co2-emissions-flat-for-third-straight-year-even-as-global-economy-grew.html>

⁴ World Resources Institute, Climate Action Tracker <http://climateactiontracker.org/countries/china.html>

⁵ Bloomberg New Energy Finance, New Energy Outlook 2017.