Green technologies for Asia–Pacific economies

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United Nations recently reported that the current world population of 7.2 billion is projected to rise to 8.1 billion in 2025, and next hitting 9.6 billion in 2050. This additional population growth of 2.4 billion in the next 3.5 decades translates into additional requirements of energy, transportation and many other needs for which resources will have to be extracted from planet Earth. Note that approximately 50 % of the projected population will live in the Asia–Pacific region, which means greater attention is needed to ensure the practice of sustainable development in this region.

According to the World Energy Outlook 2012 of the International Energy Agency (IEA), with the New Policies Scenario (which takes into account policy and plans of various countries in reducing greenhouse gas (GHG) emissions and in phasing out fossil-energy subsidies), the global energy demand is projected to grow to 16,730 million tonnes oil equivalent (toe) in 2035, i.e. an increase of more than one-third compared to the figure in 2010 (12,380 million toe). Once again, 60 % of this growth is contributed by China and India in the Asia–Pacific region, as well as the Middle East countries. Despite the growth in low carbon energy sources, fossil fuels remain dominant in the global energy mix.

Closely related to the issue of energy use is the deterioration of environmental quality. Carbon dioxide (CO₂) concentration in the atmosphere has been reported to

exceed 400 ppm in May 2013 for the first time in human history. The 2013 IEA report (Redrawing the Energy–Climate Map) also reported that global energy-related CO₂ emissions has increased to 31.6 Gt in 2012, with 60 % of the emission contributed by non-OECD countries, i.e. an increase of 45 % over 2000. In the IEA's perspective, energy is the core of the problem, since fossil fuels accounts for 80 % of global energy consumption, and hence contributes approximately two-thirds of the global GHG emissions.

In the past decade, we have seen active developments in the Asia–Pacific region of various green technologies. One may define the latter as any technique, strategy or procedure which helps with movements towards the goal of *sustainable development*. Some had also known it as 'clean technology'. Some governments in this region have been weaving green technology into their respective national culture and policy as a mean of ensuring sustainable improvement. For instance, a number of laws were enacted by China to implement green policies, including the Law on Promotion of Clean Production and the Law on Renewable Energy. In Japan, the Council for Science and Technology Policy aims to contribute to sustainable development by constructing mutually beneficial relationships with partners. As one of the leading developing countries, Malaysia has launched National Biomass Strategy to enhance Malaysia's competitiveness as a clean technologies hub. With the main objective of 'Biomass to Wealth', the Malaysian National Biomass Strategy would pave the way for the growth of new high value industries from locally-developed innovation and technologies, including of bio-based chemicals and bio-energy. In the Philippines, Biofuels Act of 2006 is in place for the mandatory use of biofuel blends for transportation. Recent experience has shown significant opportunities to explore

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novel technologies and feed stocks for the large-scale production of such low-carbon fuels.

This special issue focuses on the various green technologies developed by researchers in the Asia–Pacific region. A total of nine research papers and one book review are included in this issue, contributed by authors from Japan, India, China, Malaysia, Taiwan, Korea and the

Philippines. They report the various exciting research developments in the Asia–Pacific region for both energy and environmental aspects, covering topics in process integration, power plants, biorefineries, biodiesel, among others. We hope that the special issue will provide the readers with a glimpse of the various green technology research thrusts in this region.