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Editorial

Green Energy Economies Are Continually On-Going

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The Special Issue on "Green Energy Economies" was open for submission on 30 March 2021 and closed on 30 March 2022. Green energy is not only a sustainable source of energy; it is also a driving force for reshaping sustainable economic modeling. The development of green energy has macroeconomic as well as microeconomic impacts on the whole world. This Special Issue welcomed both empirical and theoretical papers to submit. During this one-year period of being open for submission, twelve papers were accepted for publication. The authors are from China, India, Poland, and Taiwan.

These twelve papers find the driving forces of developing green energy economy, including new technology, energy structure optimization, international and regional cooperation, government policy, information disclosure, readiness to use, voluntary initiatives, scenario analysis, business models, returns of investment, etc.

Applying dynamic DEA models, Wu et al. [1] compute the dynamic energy efficiency scores of Asia-Pacific Economic Cooperation (APEC) economies during 2010–2014. They suggest that the APEC economies should actively develop new energy technologies to effectively reduce CO_2 emissions and achieve optimal energy efficiency. That is, the new technology is a key driving force toward a green energy economy.

Wang et al. [2] use a sustainable development perspective and apply optimal control theory to build up a cost-effective model, in order to evaluate a long-term (2050), climate-resilient power generation mix for Taiwan. They also apply the STIRPAT approach to predict the demand for electricity by 2050 for the demand side management. They suggest that the share of renewable energy should be increased to 25%. Meanwhile, the coal ratio should be controlled to be below 40%. The natural gas share should be maintained at around 30%. Therefore, the increase in renewable energy share is a key point for developing a green energy economy in Taiwan.

Yang et al. [3] estimate the environmental efficiency of 150 economies during 2010–2017. They find that statistically significant differences exist in terms of environmental efficiency among four income-level groups. The low-income group's environmental efficiency is deteriorating. Only the lower-middle-income group's environmental efficiency increased after the adoption of the Paris Agreement. International cooperation is a must to help the low-income countries move toward a green energy economy.

Hu and Chang [4] apply the context-dependent total-factor energy efficiency (CD-TFEE) to find the multi-layer disaggregate energy efficiency frontiers of twenty administrative regions in Taiwan in 2016. They find that different regions have different abilities to efficiently use different types of energy. Regional cooperation and energy policy are required to promote energy efficiency levels among regions.

Liu et al. [5] use a meta-frontier framework to analyze the sustainable development practices of China's artificial intelligence (AI) industry. They find that the disclosure group outperforms the non-disclosure group in operating scales, efficiencies, as well as technologies. Information disclosure is hence an effective tool for enterprises to achieve sustainable development goals (SDGs).

Ho and Wu [6] integrate the technology readiness and acceptance model (TRAM) into the norm activation model (NAM) and propose an integrated model of TRA-NAM. They

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find that technology readiness positively influences perceived usefulness and perceived ease of use and further improves consumers' intention toward adopting electric scooters. That is, consumers are willing to adopt a new device if they consider it to be easy to use.

Information and communication technologies (ICT) are being integrated with the energy systems. Hu et al. [7] review the literature on energy-ICT with economic and managerial viewpoints. Energy-ICT has been drastically reshaping the energy economy. Even though ICT is energy-consuming in its own nature, most of the existing empirical studies support that energy-ICT has net positive effects on energy savings, energy efficiency improvement, emission reduction, and economic growth at both enterprise and economy-wide levels. In addition to technology development, future research and development opportunities remain on these issues of the fair competition, cybersecurity, and promotion policy of energy-ICT. Energy-ICT is a key driving force for the green energy economy.

Chang and Lo [8] study the adoption of renewable energy by companies in G20 countries by using Hierarchical Linear Modeling (HLM). They find that companies which engage in the Science-Based Target initiative (SBTi) are more willing to use renewable energy to achieve their targets, whereas the effect of a national-level target on corporate renewable energy use is insignificant. Therefore, the voluntary initiatives joined by enterprises are more effective in promoting renewable energy usage.

Wisniewski et al. [9] assume two scenarios for Poland's energy system development by 2050—Green (radical) and Red (competitive). They then collect and analyze the opinion of a purposively selected group of experts. The analysis focuses on the most possible and popular scenarios. According to experts, the development of business model links should be based on the Red scenario. They emphasize that the decision-making is based on scenario analysis instead of scenario planning.

Li et al. [10] re-compute the total-factor energy efficiency (TFEE) scores of China's regions by bootstrapping, and they also perform clustering analysis. They find that the northeast and central regions in China need more government assistance and resources to get on the track to sustainable development. That is, regional imbalance still exists and needs government policy to correct it.

Wei et al. [11] apply the Bass diffusion model to assess the feasibility of developing electric light commercial vehicles (eLCVs) shared architecture in Taiwan. They find that the Business-to-Business (B2B) model is suitable for introducing eLCVs into the logistics fleets. In addition, policy support and complementary measures are needed to diffuse eLCVs further.

Day et al. [12] employ two representative global exchange-traded funds (ETFs) with more than 10 years of data—iShares Global Clean Energy ETF (Green) and iShares Global Energy ETF (Traditional). They find that these two ETFs may have opposite share price performances. While the green energy ETF reached a relatively high price, investors following the contrarian strategies may reap profits by investing in the traditional energy ETF. Therefore, the returns from investing in traditional energy ETF may still be higher, which may reduce the incentive to invest in green energy ETFs.

From the above twelve papers published in this Special Issue, we can find that these driving forces may be still weak in reality, such that the green energy economy is still on its way to realization. Even though the green energy economy is an ideal economic pattern for sustainable development, the benefits of investment in it may not be the highest and the cost of consumption of the related products and services may not be the lowest in the current status quo. However, the more and more serious issues of climate change and natural hazards will compel the transition toward a green energy economy. The emergence of new technologies and business models will make the green energy economy more feasible and profitable. This Special Issue is, of course, not a completion of the research on green energy economy but a record of the continually on-going development of green energy economy.

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