
Guest editorial: Green and energy efficiency finance

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Promoting green energy and improving energy efficiency is an immediate and effective option for transforming energy systems. Improving energy efficiency through new investments requires focused and aggressive policies that support green innovation through more stringent energy efficiency regulations, fiscal incentives for new technologies, investment incentives for the private sector and pricing greenhouse gas (GHG) emissions.

Since 2015, global improvements in energy intensity, a key measure of the economy's energy efficiency, have been declining. This trend suggests an urgent need for action to boost energy efficiency. Even before the COVID-19 pandemic, new investments in green energy projects were insufficient to meet sustainability goals. The main reason behind this low level of investments and the reluctance of the private investors to the green sector is the existence of various risks and the economic uncertainty that force the investors to look for safer assets. This low interest in green energy and energy efficiency investments would threaten the fulfillment of the Paris Agreement on climate change and the achievement of several sustainable development goals (SDGs).

The COVID-19 crisis increased this uncertainty further. Due to the COVID-19 pandemic and the global economic recessions, the ongoing investment in green energy and energy efficiency dropped drastically. This means that in the wake of COVID-19, the importance of green finance and investments for renewable energy and energy efficiency improvements to achieve climate-related goals is further highlighted.

The special issue on "Green and Energy Efficiency Finance" provides empirical policy-oriented papers that deal with innovative and market-based solutions for unlocking green and energy efficiency finance and investments.

The special issue consists of eight papers:

In the first paper, Anh Tu and Rasoulinezhad study the role of green bonds in filling the finance gap of energy efficiency projects in Organization for Economic Co-operation and Development (OECD) member countries and provide practical policy recommendations for the post-COVID-19 era. The major results reveal the positive impacts of issued green bonds and regulatory quality index on energy efficiency. At the same time, any increase in inflation rate and urbanization decelerates energy efficiency enhancements.

In the second paper, Iqbal and Bilal assess the role of public support for energy efficiency financing in the G-7 countries. The study presents a way to mitigate the energy financing barriers incurred during the COVID-19 pandemic. The study findings report a consistent positive effect of public support on energy efficiency financing indicators during the COVID-19 crisis. By this, study findings warrant maximum support from public organizations for energy efficiency optimization.

In the third paper, Taghizadeh-Hesary *et al.* review the status of green bond markets in Africa. They find that Africa's green bond market is still at the early stages. However, countries are using innovative ways to adapt to their current economic conditions and increase their investment attractiveness in issuing green bonds. While some countries focus on central and local government bonds, others use corporate bonds and few combine government and corporate green bonds. To expand this market further in these countries, they recommend fostering a public-private partnership backed by policies and political will.

In the fourth paper, Ngo *et al.* analyze the impact of green finance (i.e. green investment, green security and green credit) along with capital formation and government educational expenditures on the economic development of the Association of Southeast Asian Nations



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(ASEAN) member countries. The results reveal that green finance, capital formation and government educational expenditures positively affect ASEAN countries' economic development.

In the fifth paper, Tran examines the relationship between green finance, economic growth, renewable energy consumption and CO₂ emission in Vietnam using multivariate time series analysis. The study's results confirm the existence of cointegration among the variables. The Granger causality test reveals unidirectional causality running from renewable energy consumption to CO₂ emission and green investment to CO₂ emission.

In the sixth paper, Awawdeh *et al.* estimate the relationship between technological innovation, green finance and corporate environmental performance among energy companies in Egypt. The results indicate that technological innovation influences environmental performance and positively impacts the companies' performance. The impact of green financing for on environmental performance is also significant and positive.

In the seventh paper, Sadiq *et al.* investigate the role of green finance in sustainable entrepreneurship and environmental corporate social responsibility during COVID-19 in Asia and particularly in Southeast Asia. The study emphasizes the role of green funds that can be established nationally or regionally, essentially in Southeast Asia, for their post-COVID-19 green recovery plans.

In the eighth and final paper, Quang *et al.* investigate the determining factors of sustainable foreign direct investment (FDI) in Vietnam. The findings show that Vietnamese FDI volume is positively affected by political and social factors, globalization, and green energy consumption. At the same time, geographical distance is a significant obstacle to the increase of FDI inflows to the country.

The special issue collectively provides policy recommendations for designing optimal green and energy efficiency financing schemes for researchers, policymakers and market players on access to green and energy efficiency finance.

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