frontiers | Frontiers in Energy Research

TYPE Editorial
PUBLISHED 31 March 2023
DOI 10.3389/fenrg.2023.1189701

OPEN ACCESS

EDITED AND REVIEWED BY
Hailong Li,
Central South University, China

*CORRESPONDENCE
Aliya Isiksal,
aisiksal@wpucyprus.com

SPECIALTY SECTION
This article was submitted to Carbon Capture, Utilization and Storage, a section of the journal Frontiers in Energy Research

RECEIVED 19 March 2023
ACCEPTED 27 March 2023
PUBLISHED 31 March 2023

CITATION
Isiksal A, Tutumlu A, Katircioglu S, Mohsin M and Naeem MA (2023), Editorial: Carbon capture, financial development, and sustainable energy. *Front. Energy Res.* 11:1189701. doi: 10.3389/fenrg.2023.1189701

Editorial: Carbon capture, financial development, and sustainable energy

Aliya Isiksal[1]*, Assel Tutumlu[2], Salih Katircioglu[3], Muhammad Mohsin[4] and Muhammad A. Naeem[5]

[1]Department of Business Administration, via Mersin 10, World Peace University, Nicosia, Türkiye, [2]Department of Political Science, TRNC, Near East University, Nicosia, Türkiye, [3]Department of Banking and Finance, Eastern Mediterranean University, Famagusta, Türkiye, [4]Jiangsu University, Zhenjiang, China, [5]United Arab Emirates University, Al-Ain, United Arab Emirates

KEYWORDS

carbon accounting, local variables in accounting models, sustainable energy technologies, carbon capture, financing projects

Editorial on the Research Topic
Carbon capture, financial development, and sustainable energy

With the rapid growth in renewable energy technologies and financial innovations in areas of environmental sustainability, the methods of carbon capture and carbon accounting are high not only on the political but also on economic agendas. Paris Agreement has attempted to control double accounting of carbon emissions through the "corresponding adjustments" in which a country that sells its carbon credits must deduct them from the nationally determined contributions. Multiple stakeholders with competing goals are involved in carbon emissions making accounting a truly complicated process.

This Research Topic addresses three key themes related to carbon accounting. First, articles in the issue recognize that the proper accounting of carbon emissions is a complex multistakeholder process that requires strong coordination and careful enforcement and verification of standards to be successful looking through 137 studies, Hazaea et al. have found that so far the academic literature has been interested in studying the impact of various characteristics of companies and consumers on the accounting methods and carbon mitigation. Much less attention has been paid to economic and behavioral theories, particularly when it comes to voluntary carbon disclosures. Carbon accounting should operate in multiple dimensions and integrate national, project, organizational, and product scales into a coherent system. However, the signs of global multilevel concerted efforts are missing as the United Kingdom, Australia, and China are setting the discourse framework, while others have not paid enough attention to this problem yet. Our authors recommend more attention be paid to the carbon emissions from real financial reporting to work out more rigorous international standards and improve the verification process. Strict international standards coupled with unified financial reporting will significantly ease the performance evaluation of different actors involved in carbon emissions.

Second, the articles in the Research Topic also pay attention to the accounting strategies claiming that unconventional approaches to incorporating digitalized local and international factors into accounting models can be very effective in supporting market dynamics and predicting carbon mitigation. Digitalization of local factors also plays a crucial role in decreasing potential conflict between state and society. For example, Bykowa et al. develop a

model of digital cadastral appraising that goes beyond the national standards to show that local factors, such as soil quality, environmental health, proximity to waste storage, and cell towers do have an impact on property valuation that need to be included into the models. Based on the case of Russia, the authors argue that social tensions can decrease if land appraisals include local-pricing factors. The state-led accounting models play an important role in accounting for carbon mitigation.

Recognizing the importance of renewables in China and their potential in accounting for carbon emissions, Yang et al. also zoom in on the local variables. They examine domestic policies that encourage the use of solar technologies in China to study variations in the investment benefits using the real options method. The authors evaluate the efficiency of government subsidies for carbon capture and storage (CCS) technologies vis-a-vis the rooftop distributed photovoltaic (RTDPV) market using subsidy data from 24 provinces. The least squares Monte Carlo simulation model applied to six scenarios showed that when the carbon prices are low, coal-based power plants prefer RTDVP as CCS technologies are more expensive. However, the RTDVP applies to only 10 provinces making the nationwide application difficult to achieve. Therefore, the authors recommend a policy that combines both approaches since under certain circumstances, CCS offers better investment returns than RTDVP. They also show that equal subsidies in CCS as in RTDPV development may produce amplifying effects that are better than the carbon market incentive effect and initial investment cost subsidy.

Besides domestic and local factors, there is a growing recognition of international factors and their impact on carbon accounting. Using the case of China, Wu et al. note that nuclear energy offers a unique opportunity for China to sustain economic growth and decrease carbon emissions in line with the global emission targets. With a modified Granger causality test applied to data on Chinese energy production and economic growth from 1992 to 2020, the authors show that contrary to the expected logic, the growth of renewable energy in China did not lead to a significant decrease in carbon emissions. The growth of nuclear energy production was the key to environmental transformation. In other words, although Chinese firms are global leaders in the production of solar modules and wind turbines, they are insufficient in procuring the necessary decline in carbon emissions without nuclear energy. With this said, the authors propose not to discount nuclear energy as many European countries have done but given Chinese energy demand to continue adopting this technology and decrease the carbon footprint.

The overview of local and international factors on carbon accounting and financial development offers a promising agenda for further research that must go beyond conventional models and require innovations as well. Current CCS technologies are encouraging in abatement and reduction of emissions, and take a significant aspect in the transition of energy and climate change combat. Financing the projects expedite the CCS technologies development, by addressing the technology risks. Support of the governments in dealing with the associated risks will significantly affect the financing of CCS projects.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note