New International Survey Data from Organisations Undertaking Low-Carbon Investment: Which Barriers Matter Most?

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Overview

Despite the progressive investments on low carbon power generation, there remain a sizeable shortfall of investment flows into this sector due to barriers that exist within countries. Our study seeks to measure the perceptions of barriers that influence low carbon investment (LCI). In doing so, we compare how decision makers in different types of organisation and geographic regions perceive the relative importance of potential barriers and enablers for LCI projects. Our study adopts the Multilevel Perspective approach from sociotechnical framework to group the elicited measures of perceived barriers and desired policy changes. These measures are grouped into: (i) policy-level factors, (ii) market-level factors, and (iii) firm-specific factors. Data collected from the organisations in our sample reveal marked heterogeneity in perceived LCI barriers and enablers, even among those organisations already committed to increasing LCI. In order to empirically investigate how these investment barriers and enablers are being played out in a greater detail, we concuted semi-structured ethnographic interviews to gain more information than that provided by the quantitative data. It is crucial to better understand the perceived LCI barriers in a differentiated context given its implication in influencing actors' decision to undertake LCI, which accumulatively will shape LCI trajectories.

Methods

First, we describe the data with summary statistics. The primary components of these summary statistics are arithmetic means, empirical ranges (i.e., maximum versus minimum response), and standard errors of arithmetic means that help to measure how likely a contrast between two or more arithmetic means was to arise by random chance (or sampling error) rather than systematically different perceptions in different subpopulations. Second, we move to fully conditional statistical modelling to measure the systematic effects of organisation type, organisation's size, geopolitical blocs, and region-specific institutions on organisations' view of LCI barriers and enablers. The empirical models are estimated first by Ordinary Least Squares (OLS); augmented by Fixed Effects (FE) that provides some additional control for otherwise unmeasured institutional differences across 12 multi-country regions; and finally Data Envelopment Analysis (DEA) that provides a country rank by efficiency in generating absence of LCI barriers and LCI commitment. We also include an additional country-level analysis of LCI efficiency (computed in the DEA model) relating countries' population and GDP per capita to the achievement of best-practices institutional change for encouraging and nurturing LCI.
We also conducted one-on-one semi structured ethnographic interviews that are focused on: (i) the decision making processes undertaken by project developers and financiers that guides LCI; and (ii) identify how LCI risks are determined, evaluated, and managed. In order to ground the discussions, geothermal power development in Indonesia and New Zealand are employed to exemplify the points being raised in each interview.

Results

Based on a survey of stakeholders engaged in LCI, our analysis suggests that perceived barriers are more uniform at the firm level, and are more divergent at the broader sociotechnical landscape level (e.g., policy- and market-level barriers). The estimation results show that ASEAN respondents have generally positive coefficients on the LCI barriers survey items, which suggests that ASEAN respondents perceive more barriers in general, compared to OECD respondents. ASEAN-country respondents viewed under develop low carbon supply chain as the most important market-level LCI barriers, whereas respondents from OECD viewed volatile energy prices as most important. Simultaneously adding more control variables for otherwise unmeasured institutional differences, our data reveals the problem of high-perceived risk was significantly more important for low carbon project developer and policy uncertainty-related barriers consistently appear across the three major group of barriers. Subsidised credit, loan guarantees and harmonisation of existing policies were listed roughly twice as frequently as other policy enablers that could meaningfully induce the respondent's organisation to realise new LCI projects. Observation from the interviews reveal similar findings to the empirical modelling and estimation results from our quantitative data. Among other barriers, unfavourable energy prices and policy uncertainty-related barriers are prevalent among

geothermal for project developers. Given the high risk nature of geothermal investment (i.e., financial-, resource-, and technological-risks), government play a significant role as a prime mover to accelerate geothermal progress.

Conclusions

Heterogeneity in perceived LCI barriers and enablers—across geopolitical blocs (10 OECD countries; 10 ASEAN countries; and countries that belong to neither block, which include China, India, and South Korea)—reflects distinct needs and preferences for policy changes that could enable transition to low carbon economies by following different transition trajectories in different places. Counter intuitively, regions with less developed energy infrastructure may face lower opportunity costs of low carbon transition, suggesting that gains toward achieving sustainability goals may be surprisingly more achievable in less developed countries than previously thought. There has been a wide concesus among project developers and financiers that strong energy or climate targets will be ineffective to encourage LCI if the investment climate is not favourable for market players (e.g., unattractive energy prices, uncertain policies). According to our analysis, success would seem to depend on finding policy and regulatory approaches that are well matched to the particulars of different respondents' institutional and market characteristics.