Institutional Governance Framework for Determining Carbon-related Accounting Practices: An Exploratory Study of Electricity Generating Companies in Malaysia

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Abstract. Electricity industry is the major contributor of the global carbon emissions which has been scientifically identified as the main cause of climate change. With the various initiatives being implemented at the international, national, and industry levels, companies in the electricity industry are currently facing immense pressure from various stakeholders to demonstrate their policies, initiatives, targets, and performance on climate change. Against this background, accounting system is argued to be able to play important roles in combating climate change. Using institutional governance as the underlying framework, we have identified several governance mechanisms as the determining factors for companies to have a systematic accounting system related to carbon emissions. The factors include environmental management system certification, environmental organization, publication of stand-alone sustainability reports, the use of GRI guidelines, environmental strategic planning, governance quality, and participation in CDP surveys and emissions trading scheme. We explored this issue in the context of major electricity generating companies in Malaysia and found that except for certified environmental management system, the other governance mechanisms are still lacking. The findings suggest that companies in Malaysia, in particular, from the electricity industry are not well prepared in facing risks related to climate change.

1. Introduction
Electricity industry is the largest contributor of carbon dioxide (CO$_2$) emissions [1]. In 2011, the industry was responsible for 42 percent of energy-related CO$_2$ emissions. In fact, the emissions from the industry had increased by 70% as compared to the level in 1990. The issue of CO$_2$ emissions is significant for several reasons. Firstly, the report by Intergovernmental Panel on Climate Change [2] has identified greenhouse gas (GHG) emissions build-up (of which 77% is CO$_2$ emissions) as the main cause of climate change. Secondly, various initiatives have been established at the international, regional, and national levels to mitigate climate change issues including the ratification of Kyoto Protocol, the implementation of European Union Emissions Trading Scheme (EU ETS), and the establishment of investor groups like Carbon Disclosure Project (CDP). These developments have made companies from the electricity industry at the centre of debates and discussion. Thus, it is of paramount importance for electricity companies to demonstrate carbon accountability to their
stakeholders (including shareholders, creditors, the government, and society). In essence, they need to show the public that they are taking necessary measures to mitigate CO\textsubscript{2} emissions and climate change issues.

Against this background, accounting system is argued to be able to be a powerful tool to manage carbon emissions as well as other environmental issues [3]. In the context of the environment, environmental accounting could mean "all areas of accounting that may be affected by the business response to environmental issues, including new areas of accounting" [4, p. 7]. These include accounting for contingent liabilities/risks, cost analysis, the development of new accounting information systems and auditing. Some of the potential applications of environmental (management) accounting include: to estimate ecological strengths and weaknesses and improvements needed; to control negative impacts on the environment; to assess eco-efficiency; to provide a foundation for both internal decision making and external communication; and to help promote ecologically sustainable development [5]. Empirical findings also suggested that environmental costs (i.e., both capital and operating) [6] and reward systems [7] are associated with better environmental performance. This relationship could be extended to climate change in which companies with accounting system that captures CO\textsubscript{2} emissions could have a better carbon performance.

In order to establish an accounting system that will be able to capture and manage climate change issues, there is a need for supporting mechanisms - both internally and externally. Institutional governance framework essentially argues that corporate competitiveness relies on both: (1) firm resources, capabilities, and strategies, and (2) governments and institutions interventions [8]. In the context of carbon-related accounting practices, companies need to have the necessary internal mechanisms to allow them to develop such a system. These might include financial resources and non-financial resources (e.g., management systems, leadership, and governance). Additionally, they must be pressure imposed by parties external to the organizations including from the governments, industry associations, non-governmental organisations, media and public at large.

Hence, the objectives of the study are twofold. Firstly, it aims to identify several governance mechanisms that are essential to help companies in their climate change initiatives. Specifically, we reviewed institutional governance framework as proposed by [8] and other related literature. Secondly, it explores the implementation level of institutional mechanisms identified among the major electricity generating companies in Malaysia. By so doing, this study adds to the body of knowledge by identifying institutional governance mechanisms imperative in determining the carbon-related accounting practices, which in turn, can be implemented by organizations.

The remaining sections of the paper are structured as follows. The next section provides the review of literature on institutional governance framework. It is followed by the discussion on sample and findings. The final section concludes, highlights the limitation, and provides some recommendations.

2. Institutional governance framework
Institutional governance system can be defined as "the configuration of state and private organizations and institutional arrangements that impact and create mechanisms by which economic and social outcomes in nations are produced" [9, p. 416]. The framework has been developed in response to the limitations inherent in the arguments put forth in the strategic management literature and political economy literature in regards to the national industry and corporate competitiveness [8]. The proponents of strategic management literature posit that the generation of competitive advantage is firm-centric in which it is driven by companies' internal resources, capabilities, and strategies and industry characteristics and structures. By contrast, the proponents of the political economy literature emphasize on the important role of national governments and institutions in fostering competitive capabilities (hence, state-centric). Therefore, institutional governance system framework proposes the
integration of four institutional arrangements for national industrial competitiveness, namely market governance, corporate governance, state governance, and joint governance [see further [8]].

Institutional governance implies that for environmental initiatives to be effective, there must be internal corporate governance in place and the pressure from the market and state [8]. In this regard, a study by [10] found that the voluntary greenhouse gas emissions disclosure (and its credibility) among the largest Australian companies are positively associated with environmental management system, compliance to GRI recommendations, voluntary participation in CDP survey, corporate governance quality, company size, and environmental sensitivity of the industry. This indicates the importance of appropriate internal organizational structure [see [11]] to manage, monitor, measure, and report on environmental issues.

Meanwhile, in another study by [12] on the web-based environmental reporting of 278 public listed companies in Malaysia found that the environmental disclosure is positively associated with the certification of environmental management system, the establishment of a specific organizational structure, the inclusion of environmental issues in the strategic planning, the publication of a stand-alone sustainability report or a report in conformity with GRI guidelines, and the quality of corporate governance.

Therefore, based on the above discussion, it can be posited that the proclivity of companies to have a carbon-related accounting system is dependent upon several factors. Carbon-related accounting system will in turn improves corporate carbon performance. Figure 1 depicts the conceptual model and Table A1 in the appendix describes each of the variables.

![Figure 1. The conceptual model](image)

3. Sample and Findings
Table 1 provides the sample included in this exploratory study. The list of electricity companies in Malaysia was obtained from the Energy Commission website [13], after matching the subsidiaries with the parent companies for data availability reason. Units generated (GWj) were estimated based on [13], while percentage of operations was determined using the data reported in the 2014 annual reports. The data for institutional governance mechanisms were obtained through content analysis of annual reports, stand-alone sustainability and corporate websites for the 2007-2014 period.
Table 1. Summary of the findings for each company

| Companies                      | EMS | ORG | SAR | GRI | MISS | GOV | CDP | ETS |
|--------------------------------|-----|-----|-----|-----|------|-----|-----|-----|
| Eden Inc. Bhd                  | ✓   | X   | X   | X   | X    | X   | X   | X   |
| Malakoff Corporation Bhd       | ✓   | X   | X   | X   | X    | X   | X   | X   |
| Mega First Corporation Bhd     | X   | X   | X   | X   | X    | X   | X   | X   |
| MMC Corporation Bhd            | ✓   | X   | X   | X   | X    | ✓   | X   | X   |
| Tenaga Nasional Bhd            | ✓   | ✓   | ✓   | X   | ✓    | ✓   | X   | X   |
| YTL Corporation Bhd            | ✓   | ✓   | ✓   | X   | ✓    | ✓   | X   | X   |
| YTL Power International Bhd    | ✓   | X   | X   | X   | X    | ✓   | X   | X   |

Based on Table 1 above, we found that all but one company have their environmental management system (EMS) being certified, particularly ISO14001. Additionally, three companies are included as among the Top MCGI companies (GOV), while two companies with vision and/or mission statement (MISS) addressed environmental issues. None of the sample companies prepared their report in accordance to GRI (GRI), participated in CDP surveys (CDP), and involved in any emission trading scheme (ETS). Finally, only one company published stand-alone sustainability reports (SAR) and has a specific committee on environmental issues. If these factors were imperative for the development of carbon-related accounting system, it can be inferred that Malaysian electricity companies are generally not well prepared in facing risks associated with climate change.

4. Conclusion and Direction of Future Research

This paper reviews institutional governance framework and discusses the application of the framework in the context of carbon-related accounting practices. In essence, it argues that in order for companies to establish a systematic accounting system, they need to first have established several institutional mechanisms including certification of environmental management system, establishing a specific environmental committee, publication of stand-alone sustainability reports, the use of GRI guidelines, inclusion of environmental issues in the vision and/or mission statement, good corporate governance and participation in CDP surveys and emissions trading scheme. Since carbon-related accounting practice is a new concept, the institutional mechanisms identified earlier could be indicators for the readiness of companies in Malaysia to deal with climate change risks. Using a sample of electricity generating companies as a case, we found that except for environmental management system certification, other mechanisms are still lacking among the sample companies. Considering that the industry is the main contributor to CO\textsubscript{2} emissions, this situation is rather alarming and regulatory intervention seems to be needed to ensure that the aim to reduce national emissions by 40% by the year 2020 will materialize (as compared to the 2005-emission level).

Several research can be proposed based on this paper. Firstly, researcher could identify the extent of existing accounting system used by the companies has incorporated carbon and climate change issues. This could be in the form of carbon disclosure (reporting in the annual reports and stand-alone sustainability reports, and on the website) or actual carbon accounting system using questionnaire survey or interview methods. Secondly, using primary data collection methods would also reveal as to whether the factors identified in the paper are able to explain the carbon-related accounting practices. The sample could be extended to other industries to increase the generalizability of the findings.

References

[1] IEA 2013 CO\textsubscript{2} Emissions from Fuel Combustion: Highlights
[2] IPCC 2007 Climate change 2007: Synthesis report
[3] Alrazi B, De Villiers C and Van Staden C 2015 J. Clean. Prod. 102 44
Appendix

Table A1. Summary of each institutional governance variables.

| No | Variables                                                                 | Description                                                                                                                                                                                                 |
|----|---------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Environmental management system certification (EMS)                       | • Assist in developing appropriate environmental policies and goals, their execution, and monitoring their effectiveness; identifying legislative requirements and prioritizing environmental impacts; fostering and managing employees’ commitment and awareness; enhancing employees’ skills; establishing a management process to review and audit; and maintaining appropriate communication with relevant internal and external parties [14].
  |                                            | • Necessitates the development of environmental targets, improvement in processes on a continuous basis, and participation in regular audits by the certifying organization [15].
  |                                            | • Requires communication to both internal and external stakeholders [10].                                                                                                                                 |
| 2  | Environmental organization (ORG)                                          | • Including having a specific manager/committee/department dealing with environmental issues.
  |                                            | • Enables to monitor corporate environmental policy [16], oversee its ecological impacts [17] [18], and continuously monitor and manage relationship with key stakeholders [19] [20].
  |                                            | • More likely to see the importance of environmental reporting to their public, government, and other stakeholders [10] and thus demand accountability from management so as to protect reputation [18]. |
| 3  | Publication of stand-alone sustainability reports (SAR)                    | • Voluntary in nature; various labels including Corporate Citizenship Report, Corporate (Social) Responsibility Report, Sustainable, Development Report, Sustainable Value Report, and Sustainability Report.
  |                                            | • Contents are usually based on some stakeholder engagement activities or reporting guidelines/standards.                                                                                                  |
| 4  | GRI guidelines (GRI)                                                     | • Contains a total of 30 indicators on the environment and at least 5 indicators related to climate change.                                                                                                 |
| No | Variables | Description |
|----|-----------|-------------|
| 5  | *Environmental strategic planning (MISS)* | - Subject to external assurance of the report (optional)  
- Having a specific vision/mission statement on the environment or vision/mission statement incorporates environmental issues.  
- Provide objectives, guiding principles and values, which are important in directing its strategic decision making and actions [20]. |
| 6  | *Governance Quality (GOV)* | - Quality of governance system, measured by whether the company is included as among the Top MCGI index.  
- More likely to better align stakeholder expectations with corporate goals and objectives. Failure in managing the environmental issues properly could result in financial disaster which in turn could hurt the shareholders’ returns. |
| 7  | *Participation in CDP surveys (CDP)* | - A voluntary effort to encourage standardized reporting procedures for companies to provide investors relevant information relevant about the business risks, opportunities from climate change [21].  
- The CDP represents several large investors with assets of over $US55 trillion and is supported by institutional investors. These investors are concerned about the risks associated with climate change, thus are calling for more information about how companies are addressing the challenges of climate change. |
| 8  | *Participation in emissions trading scheme (ETS)* | - Requires the development of corporate accounting and technical expertise to manage and to report on CO₂ emissions [21].  
- Participants of an ETS are required to submit verified emissions data annually to a central registrar [22].  
- Causes investors, policy makers, and the general public to be more interested in corporate CO₂ emissions management, cash flow implications, the potential impacts the ETS has on the long term company viability [23], and the extent to which the ETS has shifted company focus on managing other significant environmental impacts. |