

論文の内容の要旨

論文題目 **A comparative analysis of Oil and Gas corporate strategies
to climate change mitigation in Southeast Asia**

(東南アジア諸国の石油・天然ガス企業における気候変動対策戦略の比較研究)

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The present research examines the corporate responses of the O&G industry to climate change mitigation, placing a special focus on business diversification from fossil fuels to renewable energy. Considering the severe impacts of global climate change and the Paris climate agreement, the long term phase-out of fossil fuels and the substitution by low-GHG alternative energy resources appears imperative. The study of the investments in renewable energy that are made by O&G companies is vital to the sustainable development of human society as a whole. However, existing literature appears to have limitations in capturing the complexity of O&G corporate strategies to climate change mitigation. Thus, the present study addressed some important gaps in existing literature. Firstly, the majority of existing literature investigated a small group of the world's major O&G companies, mostly on International Oil Companies (IOCs) from the US or the EU and a few National Oil Companies (NOCs) from the Middle East, China and Russia. The present study thus targeted three NOCs from emerging economies in Southeast Asia -PTT from Thailand, PERTAMINA from Indonesia and PETRONAS from Malaysia- as case studies. These three NOCs can serve as a starting point for the study of the wider picture on NOCs, which are typically the main energy suppliers of a given countries. The study also included two associates of PTT- Bangchak Petroleum and Thai Oil-, in order to provide a more in-depth picture of the specific case of Thailand.

Secondly, the socio-economic phenomenon which are taking place in the 21st century i.e. volatility of crude oil prices, the discovery of shale oil and gas, new global climate change agreements, not to mention the global movement to divest from fossil fuels, have not been well-examined in the existing literature. The present study designed an analytical framework to investigate those aforementioned factors to see how they affect O&G corporate strategies in the development of renewable energy. The last gap, which the study addressed, is that little analysis was carried out on the discourses that O&G companies have used to legitimize their business diversification from fossil fuels to renewable energy sources, given the fact that such renewable energy technology is not their core business. The research conducted three studies representing, each of which attempted to answer one of the three sub-objectives of this thesis. The main purpose and findings of each sub-objective are presented below.

Sub-objective 1: To examine renewable energy development projects of state-owned oil and gas companies and their associates in Thailand, Indonesia and Malaysia, in the first 15 years of 21st century

The questions asked in this sub-objective are 1) whether major O&G companies in Southeast Asia have conducted renewable energy investment or not, and 2) which energy sources they are putting investment efforts to. These seem to be simple questions; however, the literature suggested that world major O&G companies have an on-off relation with renewable energy. Some major IOCs (such as ExxonMobil) are even opposing renewable energy developments, by stating that they are not profitable and outside the role of O&G companies. Understanding the renewable energy investment activities and changes throughout years of five O&G companies from Thailand, Malaysia and Indonesia is thus important in order to compare the investing behaviors of major world OG companies.

The study conducted a thorough review on the actual renewable energy investment projects of PTT, Thai Oil, Bangchak, PERTAMINA and PETRONAS during the first 15 years of 21st century. The results showed that all five companies have invested in renewable energy, but to various degrees and on a range of different technologies. Investment activities can be carried out in the forms of R&D, commercialization, and even CSR activities. All five companies have produced and commercialized biofuels. Bangchak and PTT appear to be more active in biofuels business than the other three companies. However, the study also found that such investments appeared to be correlated with the oscillations in global crude oil prices. Solar PV only became the focus of the attention of PTT, Bangchak and PETRONAS in recent years, when the cost of solar cells dramatically dropped and their respective governments initiated attractive Feed-in-Tariff policies. Lastly, PERTAMINA is the only one company involved in the development and exploitation of geothermal energy, although it aims to invest more in tidal, ocean, wind and solar PV in the coming years.

Sub-objective 2: To examine discourses or language-in-use of state-owned oil and gas companies and their associates in justifying renewable energy investment

The focus is to examine the discourses that O&G companies used to justify their investment in any given renewable energy source. The present study analyzed the discourses written in the annual reports of all five companies, which are all available in the companies' websites until the 2015 annual reports, the latest published at the time of writing. Three questions were asked in the sub-objective, 1) what are discourses each oil and gas company applies to justify a given source of renewable energy?, 2) what sort of discursive legitimization strategies are used to justify a given renewable energy by oil and gas companies in Thailand, Indonesia and Malaysia?, and 3) what are the implications of a discourse study for the diffusion of renewable energy?

The results showed that for biofuel investment all five companies referred to discourses on responding to government policy, and four companies except PETRONAS applied discourses on enhancing

national energy security and biofuels are good for environment and health. At the time when PTT and Bangchak started the sale of biofuels products, the discourse on following the King's initiate and helping farmer were also found. These are interesting findings because the companies chose to cite these two discourses rather than the discourses on complying to government policy or environment protection. Not only these two discourses are specific to the socio-economic context of Thailand, the use of such discourses highlights the role of socio-political discourses on renewable energy development and diffusion, in particular at the early stages in their development and commercialisation. For solar PV, it is found that the four companies used authorization, rationalization and mythopoesis, but not the moral evaluation, as discursive legitimacy strategies. This is because the companies sell power generated from solar PV to the grid, without directly being in touch with end-consumers, in contrast with what happens in their biofuel business. Thus, they do not have to apply moral rationales to gain public acceptance.

The third question is on the implications of the discourse study for renewable energy diffusion. The findings from a discourse analysis on the investments in renewable energy of O&G companies provide a potential solution to address 'behavioral challenges', one of three sets of socio-technical barriers for renewable energy diffusion or penetration. The discourse analysis and discursive legitimacy strategies conducted in this present study revealed how the O&G companies promoted and justified new renewable energy sources to the public using the fact that they are not conventional energy like fossil fuels. The most obvious contribution of the discourse study regards the public awareness and acceptance on biofuels products, as they are directly involved with a large group of consumers. Among the five companies studied, Thai O&G companies (PTT and Bangchak) applied a wide range of discourses and legitimacy strategies on biofuels. Considering that Thailand's biofuels is the most successful case in Southeast Asia, the discourses that the Thai companies used can serve as a good example for other O&G companies in other countries to promote their biofuel products. However, further research is needed to see to what extent the discourses of O&G companies can influence public acceptance

Sub-objective 3: To investigate factors that influence state-owned oil and gas companies and their associates to invest in or divest from renewable energy

Developing on the results of sub-objective 1, which pointed out that some companies (in particular those in Thailand) have been relatively active in investing in renewable energy, the study investigated the factors that influence companies to invest in or divest from low-carbon energy. In addition, in the study of discourses in sub-objective 2, the study acknowledged limitations in the methodology on critical discourse analysis. Discourse analysis helps revealing communication strategies, which O&G companies used to promote or justify their new green energy products. However, what the companies said as a reason of their green investment cannot necessarily be claimed to be the actual rationale for them to take action. This limitation is common in existing literature regarding applied discourse analysis on secondary data, such as the sustainability reports of the mining industry.

As a result, the study applied a novel analytical framework to comparatively analyze all five companies. The framework comprised three sets of factors obtained from a literature review on both academic journals and news articles from well-known business magazines. The three sets of factors were 1) company's specific features i.e. ownership structure and role of the CEOs and shareholders, expectation on short-term and long-term economic advantages, view on global climate change, 2) national factors i.e. home country's renewable energy and climate change policy, country's O&G reserves and renewable energy resources, social demand for environmental conservation and business-government relation, and 3) global factors i.e. volatility of world crude oil prices, discovery of shale oil and gas, development and cost of technology, and peer influences among O&G industry.

The study applied both secondary and primary data to answer questions in this sub-objective. The results show that among the three sets of factors, global factors are less influential for O&G corporate strategies to conduct renewable energy investment than company specific features and national factors. This can be seen from the fact that company interviewees from all five companies did not raise any concerns on some global factors i.e. global movements to divest from fossil fuels companies, the discovery of shale gas/oil or the Paris agreement- the latest global climate change agreement. Secondly, company specific features were seen to be the most influential to drive O&G companies in Thailand to invest in renewable energy. Thirdly, country's O&G reserves was the most influential factors that drive O&G companies in Thailand and Indonesia, which were more active in developing renewable energy sources than the O&G company in Malaysia. Moreover, it was found that most of factors can be applied to the five O&G companies in the study, and some findings correspond to what happened with major IOCs and NOCs in the literature. Factors which appeared to have less influence or different influence on five O&G companies are 1) the role of private shareholders and the lesson learned from past experience in renewable energy business. Last but not least, the study concluded that Bangchak from Thailand appears to be the most active in green energy investment; whereas PETRONAS from Malaysia is the least active company and projects to remain in the core O&G business. The different condition between Bangchak and PETRONAS in terms of company specific features, national factors and global factors are proposed to be characteristics of O&G companies which are the most and the least likely to invest in renewable energy respectively.

In order to encourage O&G companies from Thailand, Malaysia and Indonesia to diversify their energy portfolio to invest more into renewable energy, the study drew policy recommendations to the governments of these three countries. Finally, the study raised topics which should be conducted in the future research. They include 1) covering more case studies, 2) expanding time period, 3) conducting discourse analysis on government energy policy to compare with discourses of O&G companies, 4) doing a research on impact of O&G companies' discourses on renewable energy on public acceptance, and 5) improving research methodology and analytical framework.

(1998 words including research title and texts)