Developing a green lending model for renewable energy project (case study electricity from biogas fuel at Palm Oil Industry)

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Abstract. In the last two decades, development initiatives solely aimed to generate economic growth has been placed under scrutiny, particularly amidst the rampant discussion on the quality decline of the environment, growing social divide and climate change along with its implications thereof. Considerations of the negative impacts brought about by the economic development process prompted the move to adopt the sustainable financing model that gives precedence to economic, environmental and social aspects. We introduced Green Lending Model for Renewable Energy Project (Case Study Electricity From Biogas at Palm Oil Industry) based on sustainability financing, which is used as variable to implementing financial institutions’ lending policies. There are two major trends in the literature relating to sustainability and the banking industry: external and internal practices. The external practices strand analyzes the relevance of sustainability to the bank’s communication with shareholders and other stakeholders, and how investors use it as a measure to help achieve optimal portfolio allocation. The internal practices literature, more relevant to the present work, studies how sustainability criteria are integrated into risk management models and lending practices. Its first implementation is in the Palm Oil industry at South Sumatera. The results explained that sustainability is not related to profit either from a short- or long-term perspective. The Sustainable Green Lending Model is related to the Equator Principles and its application is driven to project financing. It also related with short- and long-term risks and opportunities, instead of short-term sustainability impacts.

1. Introduction
In the last two decades, development initiatives solely aimed to generate economic growth has been placed under scrutiny, particularly amidst the rampant discussion on the quality decline of the environment, growing social divide and climate change along with its implications thereof. According to [1] argues that considerations of the negative impacts brought about by the economic development process prompted the move to adopt the sustainable financial model that gives precedence to economic, environmental and social aspects. Based on [2], realizing the importance of sustainable development in Taiwan, many industries have tried to amplify sustainability element in their organizations. However, in order to achieve sustainability objectives, it is crucial that the stakeholders of the industry understand the macro-environment. To analyze the macro-environment, their research employs a political, economic, social, technological (PEST) approach to develop an understanding of the big picture of the macro-environment related to sustainable development. According to [3]
argues that besides the existing wealth of proposals, mainly along the lines of better governance and co-financing strategies, need a complementary approach: parallel Quantitative Easing (QE) for Sustainable Development Goals (SDGs).

There are two major trends in the literature relating to sustainability and the banking industry: external and internal practices. The external practices strand analyzes the relevance of sustainability to the bank’s communication with shareholders and other stakeholders, and how investors use it as a measure to help achieve optimal portfolio allocation [3, 4, 5, 6]. The internal practices literature, more relevant to the present work, studies how sustainability criteria are integrated into risk management models and lending practices. Weber et al. [7] use sustainability as a predictor of future financial performance and contend that bank should apply it in their credit risk models. Another example is Thoumy and Vachon [8], who show the relevance of sustainability to project finance in Canada.

We focus, on the sustainable financing model as a decision tool for financial institutions and present a case study in which a multinational bank applies the methodology to the crude palm oil and biogas industry in Indonesia. The main goal of this paper is to present a new way to incorporate sustainability into banking practices by focusing on a sustainable financing model to improve financial institutions’ lending policies. Many banks now use the Equator Principles (EPs) as a framework for assessing environmental and social risks into project finance, but few integrate sustainability into more widespread credit products.

In the present paper, we analyze the case of Indonesian Government that creates a sustainable financing model to be used in loans to project renewable energy. We find no evidence of a similar approach to determine reputational risk based on sustainability issues. We contribute to the literature by discussing the implications of voluntary sustainability practices in a commercial bank’s lending practices. There is a growing literature on the relationship between regulation and sustainability in the banking industry; for instance, [9] argues that regulation must target the financial sector because of its profits from unsustainable practices. However, if there is an eco-premium [10], market mechanisms may complement regulation in integrating sustainability and management practices. The aim of this study is to implemented environmental risk at financial lending practices for bank guidelines.

2. Methodology

Lending practices by commercial banks rely on credit score systems, developed to estimate the risk of default by borrowers. New regulatory standards under the heading Basel III mean that banks need to estimate the loss parameters: probability of default, loss given default, and exposure at default. Usually banks rely on credit-worthiness as the main criteria, and all information for the decision-making is related to financial information or qualitative data on how likely is that borrowers can repay their loans.

In the present case, the Sustainable Financing Model for Renewable Energy would complement regular credit rating models by yielding qualitative and quantitative information that would lead to improved decision-making. For example, it was assumed that companies would be rated in the same way as in regular credit models, with sustainability worthiness ranging from triple S (prime borrowers) to D (default). Assume a company with a low sustainability rating, below investment grade (usually in the BB range or lower). This could mean increased interest rates or denial of credit by the, even if the company is otherwise creditworthy. Conversely, companies with high sustainability ratings could get preferred treatment, either in terms of costs or access to capital.

The Indonesian Banking industry uses the same criteria as in most countries, based on Basel standards. In the present case, BNI Bank is chosen, because it has the most advanced sustainability department among the subsidiaries of the bank. The idea is that the Sustainable Financing Model for Renewable is tested in Indonesia and, if it improves the lending ability of the bank, is going to be introduced to the other banks. The methodology is based on a bottom-up approach. First is the renewable energy project industry analysis, followed by the definition of critical issues regarding the renewable energy project industry and its long-term sustainable path. then distill these issues into their environmental, economic, and social aspects and relate them to three main paths for sustainable
development: Business As Usual (BAU), Sustainable Business (SB), and Future Sustainable Business (FSB).

Due to the inherent uncertainty of dealing with forecasting, adopt a generic conception of these development stages, include:

1. BAU refers to the present stage in which the industry practices are directly related to past practices, which may or may not be sustainable.
2. SB is a future stage (mid-term, around 2020), resulting from the adoption of new sustainable practices by companies. These are mainly derived from emerging technologies, new commercial practices, and evolving legislation.
3. FSB is a future stage (long-term, around 2050 marked by the foreseen role of the industry in a sustainable path that would allow continuing economic, social, and environmental development [11].

![Analytical methodology for the green lending model](image)

**Figure 1.** Analytical methodology for the green lending model

The main contribution of this methodology is that the resulting can help to develop proactive short- and long-term commercial practices. Researcher turn to this later, but a simple example of long-term commercial practices follows. By conducting a long-term analysis, researcher try to establish the possible future sustainability of the industry itself. For instance, let us assume that our analysis of the palm oil industry shows that its long-term yield productivity is going to be low and that the only way for the industry to survive is to expand geographically into protected environments and/or displace other cultures, generating negative benefits for society. In this case, the FSB analysis would show that companies would only be able to achieve FSB practices if they change their core business by focusing on more sustainability-promising products. This could result in the development of credit strategies in which loans are given to companies investing in changing their business model toward a more sustainable one. On the other hand, it may be that the FSB is one which companies are technological leaders and would be able to obtain much better yields by focusing on new crops and new techniques. In this case, directing loans to companies searching for those opportunities could be part of a proactive long-term credit policy.

3. Industry Analysis

The industry analysis methodology combines examination of the crude palm oil industry practices with an analysis of the global challenges. It forms the basis for all the subsequent analyses. Relating it to the global challenge allows us to decide on the major issues that crude palm oil companies and consequently the crude palm oil industry have to address in the coming decades.

The variables that determine environmental, social, and economic changes are many, and the relationships among them are dynamic and complex. From the countless challenges and issues
regarding sustainability [12, 13, 14, 15], among many others, thirteen are selected, either because of their global comprehensiveness (such as water and climate change issues). For each one, we identify possible sources of sustainability risks, but also opportunities for the dynamics development of the industry.

The next step is to relate these challenges to the crude palm oil industry. We achieve this by dividing the analysis into six topics: economic outlook, value chain, business life cycle, public policies and legislation, industry self-regulation and programs and innovation.

4. Critical Issues
The industry has established some important self-regulatory measures. These measures can be subdivided into programs, initiatives, and formal commitments. They attempt to mitigate some of the negative externalities generated by the industry. Some of the initiatives are related to labor practices, such as labor productivity and minimum prices paid to produce crude palm oil. There is also an initiative for an international environmental standard, called International Sustainable Palm Oil (ISPO) Certification. This attempt to gain acceptance among international market products are especially important for crude palm oil, because commodization breeds market penetration.

Innovation is a key success factor to development of the crude palm oil industry, whichever development path it should take. There are many Reserach and Development initiatives regarding the development of new palm oil varieties, but also relevant is innovation in terms of industrial flexibility in methan and crude palm oil production.

The results from the GRI G4 analyses indicate 70 issues relevant to the sustainability of the Crude Palm Oil Industry. On this set of issues, further analysis is carried out, and reseracher select 34 critical issues. Those issues are developed in eight categories. The next step is to give materiality to the groups of selected critical issues. First, researcher divide the issues and relate them to the dimensions of sustainability. The purpose is to provide guidelines for the intra-industry relationship between companies and relation to their stakeholders.

The then proceed to separate the group of critical issues into a development path represented by three categories: BAU-the average company in the industry; SB-the top tier of companies regarding sustainable practices; FSB-the average sustainable future company, in which innovations shape the industry according to sustainability requirements. There are two main paths for development: the dissemination of sustainable practices, in which the average company turns to sustainable practices (from BAU to SB); and the innovation path, which leads company from their present sustainable practices to future sustainable practices (from SB to FSB). The Researcher establish SB practices for the crude palm oil industry, which form the basis of the credit score in the next section.

The last informational step is to determine which of the some potential risks and opportunities would be relevant to the strategies of a commercial bank. Researcher filter the information through two development paths-from BAU to SB and from SB to FSB.

5. Weights, Iteration, and Measurements
For the final measurements, We need to assign weights to the different development paths and the different sustainability dimensions. We use subjective criteria. The subjective criteria are going to be validated through the testing of the questionnaire in the field through successive iterations of the process. After testing it with a few companies, the final measurements should be evaluated and then the criteria can be refined. There is no inherent problem with qualitative and subjective criteria in credit risk modelling in general, which has a long tradition. Agencies today are calling for more subjectivity in their credit risk models, a point that is contentious in the financial literature [16] are skeptical of allowing subjectivity in such model. Model validation is paramount to risk modelling using subjective criteria [17], and in the present case, the absence of extensive quantitative data makes the validation process even more important. The central idea behind the validation process is that it is conducted by the research department of the bank. The SCSS is an evolving tool, with changes being incorporated to reflect the feedback from the application of the questionnaires.
6. Using the Sustainable Credit Score System (SCSS)

Using the SCSS means developing a questionnaire to be completed by branch and account manager with private information regarding companies in the crude palm oil industry. There are two necessary conditions for the SCSS to be effective: information gathering and incorporation into the decision-making process. There is no hard evidence that the SCSS is actually efficient in classifying companies based on sustainability issues, and it can easily be discarded if an organization feels that it is not accomplishing its main goal. Unless it has internal ramifications, the commercial bank will be stuck in its BAU mode, even though the main objective is to move toward a future SB.

However, if used well, it can change the criteria used to make loans and to establish portfolio allocation. It fits well into the framework of [18] and can bring forth concrete information on how banks value the CSR practices of borrowers as in [19]. There is precious little information on banks’ management practices regarding CSR, but if companies in the industry start adopting mechanisms similar to the SCSS, sustainability may be driven voluntarily instead of being forced by regulation; this scenario would generate positive externalities for society. The present case shows an example of a bank that is trying to act in a more socially responsible way to enhance its competitive advantage, which corroborates the result of [20].

7. Developing a green lending model for renewable energy project

Renewable energy project financing scheme generally comes from banking institutions and non-banking institutions such as multilateral institutions or financial institutions which established by the government. Some government and banking financing schemes such as: (1) Revolving Fund; (2) Investment Credit Scheme; (3) “Murabahah” Sharia Financing Scheme; (4) “Musyarakah” Sharia Financing Scheme; (5) “Mudharabah” Sharia Financing Scheme.

In order to accelerate the development of national infrastructure, Government attracting private funds both from local or international investor and established PT. Sarana Multi Infrastruktur (SMI). PT SMI developing various project financing at the renewable energy such as: (1) Subordinated Loan Facility Scheme; (2) Equity Investment Scheme.

Another alternative financing scheme for renewable energy projects such as: (1) Pooled Bond Financing; (2) Utility On-Bill Financing; (3) On-Bill Repayment; (4) Loan Purchase Program; (5) Energy Saving Insurance (ESI); (6) Linked Deposit Program.

8. Conclusion

Sustainability is still not a deciding factor in risk models by commercial banks. We argue that developing a SCSS can provide value creation for a bank and positive externalities to society. We show the development of such a system for a multinational bank, which is using the system for rating companies in the crude palm oil industry. The development of the SCSS consists of the following stages:

1. Selecting the industry, with corresponding analysis of its economic outlook, product life cycle, value chain, legislation and public policy, industry self-regulation, and innovation.
2. Measuring paths for the average company: BAU, SB, and FSB.
3. Defining variables related to individual companies, in each of six sustainability dimensions: economic growth (EG), environmental protection (EP), social progress (SP), socio-economic development (SD), eco-efficiency (EE), and socio-environmental development (SE).
4. Unveiling of the materiality issues pertaining to the average company, plus vulnerabilities and opportunities regarding the sustainability of the industry.
5. Combining the information to obtain questions for the composition of the score system.
6. Defining the weights for the analytical hierarchy process.

Companies that rating low on the SCSS would be denied credit, even if they are financially sound. The SCSS tries to build a competitive advantage for a financial institution by reducing the bank’s long-term exposure to reputational risk. There is precious little evidence of internal management
practices regarding sustainability. Financial products that are based on sustainability issues, like sustainable funds, abound, but the criteria for selecting companies are usually based on sustainability reports. Internalizing sustainability into everyday banking operations is a major challenge. Commercial bank has the ability to become proponents of societal changes. The implication for managers is clear: banks that take into account sustainability into their lending decisions would have less reputational risks and could build competitive advantage by having less default in the long run than the average bank.

There is still no hard evidence that incorporating sustainability into credit score systems leads to less defaults. Future research could show if thats is the case. There are plenty of other avenues for further research. Are market mechanisms relevant to the financial industry or should more regulation promote lending policies that are based on sustainability? Also, more direct evidence of new practices, such as the SCSS, may help us to understand how the financial industry is evolving regarding internal management practices based on sustainability.

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