Systematic Sustainability Assessment (SSA) Tool for Hydroelectric Project in Malaysia

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Abstract. Sustainably developed and managed hydropower has enormous potential to contribute to global sustainability goals. It is known that hydroelectricity contributing small amounts to greenhouse gas emissions and other atmospheric pollutants. However, developing the remaining hydroelectric potential offers many challenges, and public pressure and expectations on the environmental and social performance of hydroelectric tend to increase over time. This paper aims to develop Systematic Sustainability Assessment (SSA) Tool that promotes and guides more sustainable hydroelectric projects in the context of Malaysia. The proposed SSA tool which not only provide a quality and quantitative report of sustainability performance but also act as Self-Assessment Report (SAR) to provide roadmap to achieve greater level of sustainability in project management for continuous improvement. It is expected to provide a common language that allow government, civil society, financial institutions and the hydroelectric sector to talk about and evaluate sustainability issues. The advantage of SSA tool is it can be used at any stage of hydroelectric development, from the earliest planning stages right through to operation.

1. Introduction

1.1. Background
In October 2015, Bursa Malaysia launched a new Sustainability Framework, comprising amendments to the Listing Requirements and the issuance of a Sustainable Reporting Guide and Toolkit [1]. Although the Bursa Malaysia has launched Corporate Social Responsibility (CSR) Framework on 5th Sept 2006, research by Harvard Business Review research in 2014 [2] found that the reporting does not increase the levels of disclosure of corporate transparency of the companies on environmental, social and corporate governance-related issues towards its stakeholders. Conventionally CSR was perceived and implemented by majority of the Malaysian companies as philanthropic initiatives with very little link to the business core or strategy [3]. Such report is lack of quantitative and qualitative information that convey organizations’ abilities to address the stakeholders’ demand [3].

The directive from Bursa Malaysia is aligned with the global business trend which now operates in the era of sustainability [4]. Investors are increasingly looking at sustainable business practices and companies are trying their best to conform to the reporting criteria developed by the Global Reporting Initiative (GRI), an independent organization working in cooperation with the United Nations [5, 6]. On this front, the FTSE4Good Bursa Malaysia Index evaluates the top 200 companies (in terms of market capitalisation) that meets a variety of environment, social and governance (ESG) criteria. Such
reporting includes areas ranging from anti-corruption to climate change through to labour standards and is based on The Triple Bottom Line (TBL) principles [7] which measures the company's economic value, "people account" – which measures the company's degree of social responsibility and the company's "planet account" – which measures the company's environmental responsibility.

A challenge with the triple bottom line (TBL) principle-based reporting is the difficulty to compare the people and planet accounts in terms of cash – the way the profit account is measured [8]. The deliverables in the current practice of sustainability reporting is based on separate reports (process approach) on the 3Ps (Planet, People and Profit) and lack of integration (system approach) which is proposed in this research. The differences are illustrated in Figure 1 below.

This research attempts to develop a systematic sustainability assessment tool (SSA) for environmental monitoring programme in Malaysian Hydroelectric Project. The project will involve the project team and stakeholders from the Department of Environment (DOE) and the Local Municipal Council. The outcome of the project is expected to close the gap of the current sustainability reporting of companies in Malaysia by establishing a world standard of reporting which is in compliance with the Global Reporting Initiative (GRI) and in line with the United Nations (UN) 17 Sustainable Development Goals (SDGs). This will set a benchmark in sustainability reporting in the country thus fulfilling the Bursa Malaysia New Sustainability Framework requirement launched in October 2015.

The sustainability report produced in this project using the SSA tool will be quantitative unlike the conventional report thus enabling energy player in Malaysia to establish its own measurable performance in the organisational sustainability levels. This will set another benchmark for Malaysia as currently companies in general are yet to be able to baseline their sustainability performance against a 'Malaysian Sustainability Performance Level'.

1.2. Justification of Research

Justification of this research are as follows:
(a) The development of Systematic Assessment Tool (SSA) for Environmental Monitoring Programme will result in a quantitative Sustainability Report compared to the existing qualitative report and enhance the quality of the report to the global platform as it conforms to the Global Reporting Initiative (GRI-compliance).

(b) SSA tool is unique to TNB as it is developed based on the company’s corporate mission and its strategic plans but globally comply to the Global Reporting Initiatives (GRI).

(c) SSA tool also acts as a ‘sustainability calculator’ to provide a measurement on Sustainability performance according to the TBL principles and align with 17 Sustainable Development Goals (SDGs) of the United Nations (UN) strategies.

(d) SSA tool also acts as a self-assessment reporting tool to provide a roadmap for energy player in Malaysia to achieve greater level of sustainability based on organisational sustainability levels recognised by the UN using the GPM P5 standard as the baseline.

1.3. Objective
The research has objectives as follows:
(a) To develop a Systematic Sustainability-Assessment (SSA) Tool for Malaysian hydroelectric industry to deliver the needs of Environmental Monitoring Program of which the best practices of portfolio, program and project management is combined using Global GPM P5 Standard™.

(b) The deliverables i.e Sustainability Reporting is according to Global Reporting Index (GRI) which also act as a Self-Assessment Report to provide a continuous improvement roadmap in achieving excellence in sustainability performance.

1.4. Project Model
The project is expected to give business impact as follows:
(a) Energy company own worldwide established Sustainability Reporting Standard in compliance with Global Reporting Initiatives (GRI) and Green Competency and Sustainability Development.

(b) Worldwide reporting standard enable the company to:
   i. Attract international funding i.e. UN Sustainable Development Goals (SDG)
   ii. Boost the company’s corporate sustainability branding globally
   iii. Use a globally recognised competency badge for sustainability practices

Additionally, the SSA Tool developed in this project would benefit the company significant organisational benefits as summarised below:
(a) Provides a clear picture of where you stand
   Determination of the organisational sustainable change delivery baseline.

(b) Strengthen vertically and horizontally
   Identification of current organisational strengths and potential areas for increased sustainability integration.

(c) Continuous improvement
   Determination of strategic goals for continuous and sustainable improvement.

(d) Provide assurance
   Leverage ISO standards to provide assurance to the sustainability report in order to breathe confidence to the investors and stakeholders.

(e) Infrastructure benefits
   Builds the business case and outlines benefits for investing in change delivery infrastructure and competence development.

(f) Reduce costs
   Reducing costs and increasing benefits from organisational change delivery (Portfolios, Programmes and Projects)

(g) Sustainability and transparency reporting
Establishes the basis by which change initiatives can be material in sustainability or non-financial reporting.

(h) Support risk mitigation over 50 areas
Provides new areas of focus in order align social and environmental parameters to mitigate and manage risk to change, product development, and service delivery.

2. Methodology

2.1. Methodology
The project will be managed using project management methodology i.e. Green Project Management (GPM) standard for sustainability which highlights areas of sustainability and integrates them into the traditional core project phases to reduce negative environmental and social impacts. GPM P5 Standard provides a measurable framework for portfolios, programs, and projects, which should be materialised to sustainability reporting. The to-be-developed systematic sustainability assessment (SSA) tool based on GPM P5 standard can evaluate any organization in determining where it is now in terms of sustainability performance and validate where it want to be in order to prepare a sound investment plan to improve the organization’s sustainability benefits maturity and realization.

The general process of proposed approach is as depicted in Figure 2.

![Figure 2. General process of proposed approach](image)

The main activities in order to develop sustainability “calculator” are illustrated in the research framework shown in Figure 3.

![Figure 3. Research framework (development of sustainability “calculator”)](image)
2.2. **Deliverables**

The development of SSA tool will deliver as follows:

(a) Sustainability Report which comply to the Bursa Malaysia New Sustainability Framework 2015.

(b) Sustainability Report which comply to Global Reporting Initiative (GRI) and is aligned with 17 Sustainable Development Goals (SDGs) of the UN.

(c) Sustainability Report which uses Global Project Management (GPM) methodology, a multidisciplinary approach and applicable to all the essential areas of sustainability performance i.e. Planet, People and Profit.

(d) Sustainable Report which not only provide a quality and quantitative report of sustainability performance but also act as Self-Assessment Report (SAR) to provide roadmap to achieve greater level of sustainability for continuous improvement.

(e) Sustainability Report will be unique to the company corporate mission and at the same time act as a global business credential to foreign investors.

2.3. **The SSA Tool**

The scale between 0 – 6 was developed to ease the respondents’ group for rating the impact for each sustainability criteria. The rating value obtained from the survey then will be used to quantify the sustainability performance at later stage. Table 1 shows the scale of “Weighting criteria” for the SSA Tool [9].

| Numerical Rating | Descriptions              |
|------------------|---------------------------|
| 0                | Negative Impact High      |
| 1                | Negative Impact Medium    |
| 2                | Negative Impact Low       |
| 3                | Neutral                   |
| 4                | Positive Impact Low       |
| 5                | Positive Impact Medium    |
| 6                | Positive Impact High      |

The process of gathering data will be conducted in several departments of the energy company using the same research questions. The research questionnaire will be distributed at the listed departments where the results is the transmitted into the scoring board as shown in Figure 4. The scoring board comprises of the five operation elements which are correlated to each other. Apart from that, the relation of the environmental, social and financial elements with the product and process part are being illustrated in the graph as depicted in Figure 5. The graph will automatically show the mean value, minimum value and maximum value of each individual sustainability criteria under the three main elements. Finally, the SSA Tool will show the sustainability performance as depicted in Figure 6, where it is able to interconnecting the new idea of combining the three elements of sustainability into one concept of assessment.
| SSA Ver. 1.0 | PEOPLE | PLANET | PROFIT |
|-------------|--------|--------|--------|
| Labor Practices & Decent work | Human Rights | Society & Customers | Ethical behaviour | Materials and Procurement | Energy | Water | Transport | Waste | ROI | Economic Stimulation | Business Agility |
| Environment | 5 | 5 | 5 | 4 | 5 | 5 | 5 | 4 | 5 | 4 | 4 | 4 | 4 | 4 |
| Safety | 6 | 5 | 6 | 5 | 6 | 6 | 6 | 4 | 6 | 4 | 4 | 4 | 4 | 4 |
| Health | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 | 5 | 4 | 5 |
| Lifespan | 4 | 4 | 5 | 5 | 5 | 4 | 4 | 4 | 4 | 4 | 5 | 4 | 5 | 5 |
| Dual-Focus | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 5 | 4 | 4 | 4 |
| Criteria Mean | 4.8 | 4.6 | 5 | 4.6 | 5 | 4.8 | 4.8 | 3.6 | 4.8 | 4.4 | 4 | 4.6 | 4 | 4.6 |
| Max | 6 | 5 | 6 | 5 | 6 | 6 | 6 | 4 | 6 | 5 | 4 | 5 | 4 | 5 |
| Min | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 3 | 4 | 4 | 4 | 4 | 4 | 4 |
| Index Mean | 4.75 | 4.60 | 4.33 |
| Normalised Mean | 0.35 | 0.34 | 0.32 |

| PROCESS (Method) | PEOPLE | PLANET | PROFIT |
|------------------|--------|--------|--------|
| Environment | 5 | 4 | 5 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 4 | 4 |
| Safety | 6 | 4 | 6 | 5 | 6 | 5 | 5 | 5 | 5 | 5 | 4 | 4 |
| Health | 6 | 5 | 6 | 5 | 6 | 5 | 5 | 5 | 5 | 5 | 4 | 4 |
| Work-In-Process | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 5 | 4 |
| Mean | 5.5 | 4.25 | 5.5 | 4.5 | 5.5 | 5 | 4.75 | 4.5 | 5 | 4.75 | 4 | 4.25 |
| Max | 6 | 5 | 6 | 5 | 6 | 5 | 5 | 5 | 5 | 5 | 4 | 5 |
| Min | 5 | 4 | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 5 | 4 | 4 |
| Index Mean | 4.94 | 4.95 | 4.33 |
| Normalised Mean | 0.35 | 0.35 | 0.30 |

**Figure 4.** Scoring input

**Figure 5.** Sustainability score
2.4. Usefulness of the tool
Usefulness of the SSA tool are:
(a) Triple Bottom Line (TBL) principle-oriented thinking is built in this new framework.
(b) Sustainability achievement is able to be assessed in reporting during project evaluation phase.
(c) SSA as a tool for continuous improvement (self-assessment) in sustainability reporting.
(d) SSA is customised in company’s mission but align with UN 17 Sustainable Development Goal (SDG).
(e) SSA is a calculator for corporate credential globally recognised in CSR reporting.

2.5. When is the SSA used?
The SSA can be used at any stage of hydroelectric development, from the earliest planning stages right through to operation (see Figure 7). It has also been designed to work on projects and facilities anywhere in the world. It incorporates four tools:
(a) The early stage tool, a screening tool for potential hydroelectric projects.
(b) The preparation tool, which covers planning and design, management plans and commitments.
(c) The implementation tool, used through the construction phase.
(d) The operation tool, used on working projects.

3. Conclusion
Sustainably developed and managed hydroelectric has enormous potential to contribute to global sustainable development goals. The hydroelectric industry is focussing its efforts on ensuring that benefits of new developments maximised and the negative environmental, social and economic impacts are avoided, mitigated and compensated.

The proposed SSA tool which not only provide a quality and quantitative report of sustainability performance but also act as Self-Assessment Report (SAR) to provide roadmap to achieve greater
level of sustainability in project management for continuous improvement. SSA will be unique to company’s corporate mission and at the same time act as a global business credential for foreign investors. As a conclusion,

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