
# The importance of identifying and addressing non-technical risks to avoid hydropower project delay

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## 1. Introduction

Delay is a major problem for large construction projects and hydropower projects are no exception. Delays are always costly to a developer, particularly during the construction phase. In addition project stakeholders can suffer broad economic cost when project benefits are delivered later. Delays to hydropower projects are caused by multiple factors and rarely by one factor alone. The types of issues that cause delay can be technical, such as engineering or commercial challenges, or they can be non-technical such as environmental, community, safety or licensing challenges. Non-technical risks are complex because they combine a tangible, measurable and identifiable issue, with stakeholder perception of the significance of that issue, to create the risk of project delay. Whilst the hydropower industry has a firm grasp of the technical causes of delay, in many contexts there remains room for improvement in identifying and addressing non-technical causes of delay which pose an ongoing risk to successful project delivery. This paper will argue that the Hydropower Sustainability Assessment Protocol is the most effective tool currently available to measure non-technical risks associated with a hydropower project, and that its use could help developers deliver projects on time and to budget. A survey of 42 international hydropower projects which experienced pre-construction delay showed that a Protocol assessment would have identified the cause of delay in 44% of the cases.

## 2. The impact of delay

### Cost for investors

From an investor's point of view, unpredicted delay is a major project risk, particularly once debt financing has been committed and released. Project delays cause a decline in net present value due to delayed revenue and cost escalation. There are many examples from around the world regarding the financial cost of delays, some case studies are given in Box 1.

A developer must also contend with a range of less tangible costs caused by project delay. A widely publicised delay may damage a company's reputation, causing revenue loss and staff retention and recruitment issues. Failure to deliver projects on time can also restrict a company's access to future concessions, particularly if a competitor has proved they can deliver projects quickly and effectively. Significant project delays can also reduce shareholder trust in company management, potentially jeopardising CEO or board positions (Laking and McNicoll, 2013).

### Delayed benefits for stakeholders

Delays also reduce the economic benefit a project delivers to wider society because project benefits are realised later. This might include delayed financial returns for the government or state sponsor, delayed developmental and poverty alleviating impact for local communities, and delayed construction of roads and bridges which could facilitate economic development. Other wider costs include consumers having to bear additional cost to obtain other energy supplies and lack of secure power supply deterring new investment in an area. From an environmental perspective a delayed project contributes to carbon emissions from alternate electricity supplies (typically coal or diesel) and the project area can suffer environmental degradation by local people in the absence of clear land ownership whilst waiting for a project to commence (Plummer 2013).

**Box 1: Case study delay costs**

The 50 MW Bumbuna completion project in Sierra Leone which was commissioned in 2010. The total investment was approximately US$ 327m and a 2-year delay during the final project completion, is estimated to have reduce the economic rate of return from 42.2% to 28.5%.

The 410 MW Rampur project in India which was commissioned in 2014 had a total investment cost of approximately US$ 665m. A 1-year delay in construction is estimated to have reduced the economic rate of return from 14.5% to 12.4% and reduced the financial rate of return from 9.3% to 7.7%.

The 2,000 MW Lower Subansiri project in India suffered forced suspension of work on the project when it was half completed due to protests about dam safety and potential environmental and social impacts. The total project cost increased by US$ 195m in the initial two and a half years of delay. (Haas and Skinner, 2015)

## 3. Causes of delay

Delays to hydropower projects can be caused by technical issues, such as engineering or commercial challenges, or they can be caused by non-technical such as environmental, community or health and safety challenges. Although there is not extensive data on the cause of hydropower project delay, a study of oil, gas and mining projects by ERM (an environmental consultancy) shows a pattern which is potentially very similar to that experienced by the hydropower industry (see Figure 1 and 2 below).

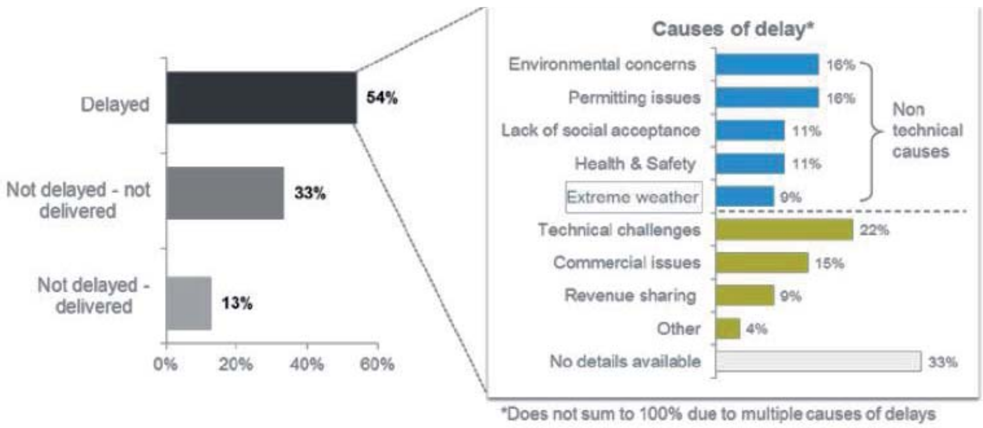



*Figure 1: Causes of project delay (Laking and McNicoll, 2013)*

Figure 1 shows that the majority of projects surveyed experienced some type of delay, and that of these a large proportion were due to non-technical causes, particularly environmental concerns, permitting issues and lack of social acceptance. In addition, Figure 2 shows that non-technical causes were responsible for more projects that incurred a delay greater than two-years.

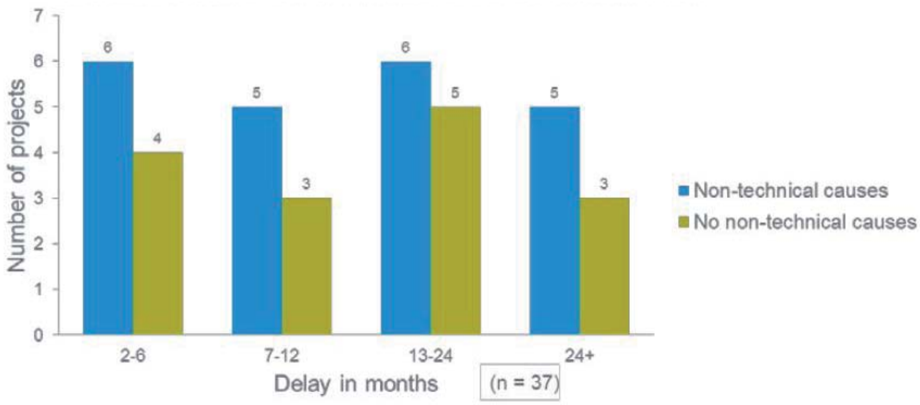



*Figure 2: Length of project delay (Laking and McNicoll, 2013)*

### The importance of stakeholders

Non-technical risks are complex because they combine a tangible, measurable and identifiable issue, with stakeholder perception of the significance of that issue, to create the risk of project delay:

**project impact x stakeholder perception = non-technical risk**

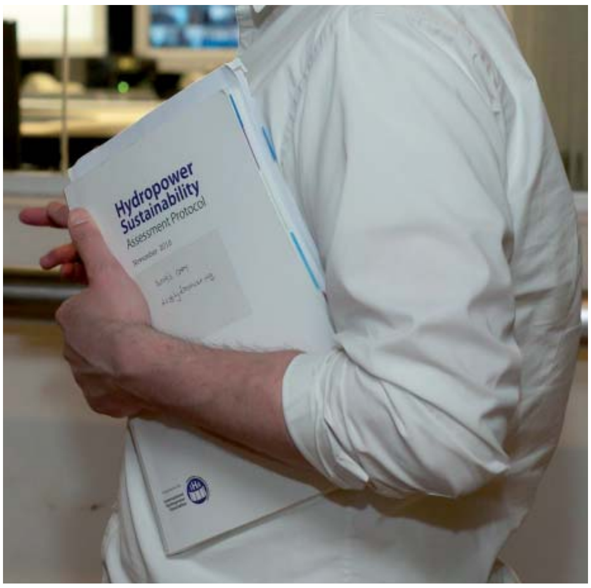
Regulator concern about project environmental impacts creates environmental delay risk, affected people's concern about project socio-economic impacts creates community delay risk, employee concern about working conditions creates health and safety delay risk, and governmental concern about any aspect can create regulatory or permitting delay risk.

Traditional Environmental and Social Impact Assessments (ESIAs) are effective at identifying project impacts and potential mitigation measures, but can overlook stakeholder expectations and perceptions. Failure to address an issue which stakeholders perceive to be significant can cause a costly project delay. As such, managing the risk of delay requires an understanding of project impacts and project stakeholder's perception of those impacts (Laking and McNicoll, 2013).

## 4. How to identify and address non-technical causes of delay

Identifying and addressing non-technical risks is an essential part of avoiding costly project delays. To understand a project's non-technical delay risks, a developer needs to understand the impacts (i.e. through an ESIA) and project stakeholders' perception of these impacts. The Hydropower Sustainability Assessment Protocol is widely recognised as the most effective tool currently available to measure non-technical delay risks associated with a hydropower project. It is particularly effective at identifying these risks as it has strong focus on measuring stakeholder engagement and acceptance over broad range of topics.

*"This review concludes that the most practical and effective tool currently available for measuring and communicating good practice, and the degree of respect for World Commission on Dams guidelines and general good practice of individual projects, is the Hydropower Sustainability Assessment Protocol." (Haas and Skinner, 2015).*




A Protocol assessment provides a consistent, verifiable and independent assessment of performance. It provides a framework for assessing the sustainability of hydropower projects, defining sustainability in 23 clearly topics. Each topic is scrutinised against up to six criteria: assessment, management, stakeholder engagement, stakeholder support, conformance and compliance, and outcomes. As such, an assessment audits a developer's understanding of impacts, its management plans to deal with these impacts, and the level of stakeholder engagement and support. On this basis a Protocol assessment will highlight non-technical risks which have the potential to cause a costly project delay. A survey of 42 international hydropower projects which experiecned pre-construction delay showed that a Protocol assessment would have identified the cause of delay in 44% of the cases.

## The value of Protocol assessments at different project stages

The Protocol can be used at any stage of hydropower development, from the earliest planning stages right through to operation. It has also been designed to work on projects and facilities anywhere in the world. It incorporates four tools, shown in Figure 3.

### Early Stage

Developers and regulators can use the early stage tool to choose the right projects to develop. An assessment can determine the potential feasibility of different options and identify potential causes of delay or 'show stoppers'. The tool can help a developer to assess whether they fully understand a project's potential non-technical risks and whether these can be avoided, minimised, mitigated or compensated.

### Preparation

Developers can use the preparation stage tool of the Protocol to guide project design and planning, or to check that planning has covered everything it needs to. An assessment at this stage can provide assurance that potential non-technical risks have been minimised, and that potential benefits enhanced. The preparation stage tool prompts developers to engage all stakeholders (project-affected people, government, financiers, regulators, NGOs etc.) as soon as possible on all issues of direct and indirect consequence to them. The tool encourages developers to create management strategies to avoid, minimise and mitigate non-technical delay risks throughout a project's implementation stage.

The cost of a hydropower project's preparation studies may run into many millions of dollars, but a developer will not be able to recoup this investment if a project is not completed and does not create the anticipated revenue. As such, the cost of a Protocol assessment to check that project preparation has covered all non-technical risks necessary is minor in comparison (Haas and Skinner, 2015).

### Implementation

The implementation stage tool can be used to manage project construction to produce an operating asset consistent with the planned scope, cost and schedule. A review of project implementation will check that necessary measures are in place to mitigate non-technical risks to avoid project delays. A Protocol assessment will check that emerging risks and opportunities have been identified and responded to, and that measures are in place to deliver commitments.

The implementation stage tool prompts a developer to continue stakeholder engagement throughout the construction process. Meeting the Protocol's requirements helps a developer maintain their social licence to operate by checking that commitments are met, two-way engagement is sustained, and feedback on how issues have been accounted is provided. Following the Protocol's guidance helps build and maintain trust with stakeholders, putting developers in a better position to address an emerging issue with potential to cause a project delay.

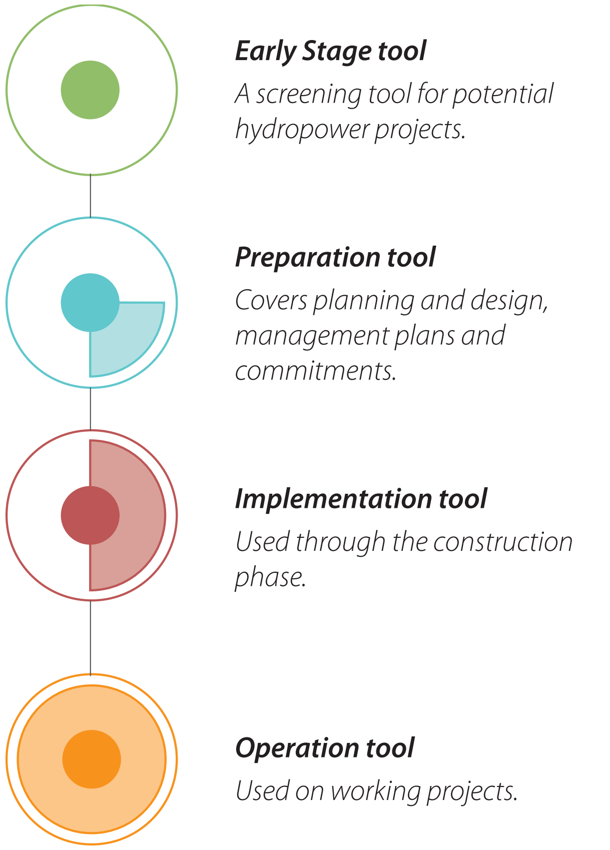



*Figure 3: The four stages of the Hydropower Sustainability Assessment Protocol*

During the construction phase, a Protocol assessment could also be used to inform negotiations between stakeholders regarding the release of financial contingencies. An assessment could justify the release of contingency budget to manage unforeseen issues which could potentially cause delay (Haas and Skinner, 2015).

### Operation

The operation stage tool can be used to ensure that no problems arise during a project's operation. It can be used to assure stakeholders that performance is in line with specification and that all project commitments are met. This can contribute to the maintenance of the project's social licence to operate, which can have broad benefits for a company.

During the operation phase the operator is focused on meeting the contractual obligations of the project agreement, power purchase agreements and legislative requirements. A Protocol assessment can be used to identify potential non-technical risks which could disrupt this process, and justify the release of contingency budget to address issues which could threaten the project's social licence to operate (Haas and Skinner, 2015).

## 5. Financial Benefit

There is increasing evidence to suggest that identifying and addressing non-technical risks is good for business. A Harvard University study into corporate sustainability culture found that corporations that voluntarily adopted environmental and social policies exhibited fundamentally different characteristics to firms that adopted almost none of these policies (Eccles et al. 2012). In particular, the study found that boards of directors of these companies were more likely to be responsible for sustainability, and executive's incentives were more likely to be a function of sustainability metrics. Moreover, they were more likely to have organised procedures for stakeholder engagement, to be more long-term oriented, and to exhibit more measurement and disclosure of non-financial information. The study found that companies focused on sustainability significantly outperformed their counterparts over the long-term, both in terms of stock market and accounting performance (see Figure 4). The outperformance was stronger in extractive industries, a context where project delay can be extremely costly.

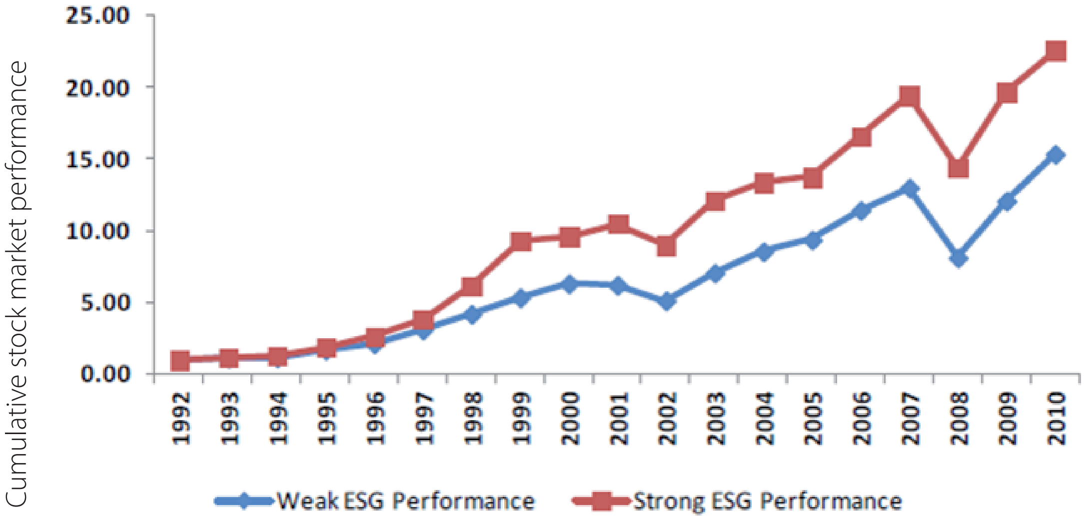



*Figure 4: Financial Performance of companies with weak and strong sustainability performance (Eccles et al. 2012)*

## 6. Conclusion

Non-technical risks can have as significant an impact on a project's net present value as traditional technical risks which are typically well accounted for in a business model. Being able to identify and measure the potential impact of non-technical risks to a business is the first step towards avoiding costly delay. Businesses can only manage what they measure. Understanding non-technical risk helps business leaders to make decisions which meet the approval of all project stakeholders (Laking and McNicoll, 2013). The Protocol is a tool which is proven to identify non-technical risks at all project stages. Its use could save project developers costly delays and ensure that project stakeholders receive economic benefits in a timely manner. This is particularly true in a weak regulatory context or in the absence of strict bank lending conditions, when meeting legal or financial requirements is unlikely to address all non-technical risks.

As with other businesses, successful hydropower operators and developers are those that move beyond compliance, to build and maintain social licence to operate by minimising non-technical risks to avoid project delays. Following the structure of the Protocol provides a means of assuring investors or company directors that a project can manage uncertainty and be delivered on time and to budget.

**Box 2: Uses for the Protocol**

A Protocol assessment can be used to:

- reduce the risk of delay, maintain social licence to operate, and ultimately avoid a decline in net present value
- choose a project at lowest risk of delay (either though intrinsic lower risk, or though better solutions to mitigating the non-technical risks)
- build good stakeholder relationships before a problem arises to make it easier to prevent a minor issue becoming a significant project delay
- maximise a company's return on investment
- give greater certainty of future revenues and broader economic benefits
- maximise society's economic benefit from the project.

Hydropower Sustainability Assessment Protocol

## 7. References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