

*Keywords:*

Sustainable hydropower, environmental and social risks, risk management, sustainable development, public goods

## Policy pointers

### Addressing

environmental and social risks effectively during project preparation reduces financial uncertainty for private investors.

### When developing

countries seek to mobilise private investment for hydropower, they should stipulate Hydropower Sustainability Protocol Assessments in project agreements and financing.

### The international public

sector could do more to help least developed country government agencies to play their role more effectively and thereby foster responsible private investment.

### Bilateral donors should

use innovative funding instruments to help 'de-risk' investments in E&S assessments, and so leverage private sector commitment to improved E&S outcomes.

## Managing the environmental and social risks of hydropower: private and public roles

Private sector hydropower projects are driven primarily by returns on equity investment balanced by perceptions of risk. This can lead to concerns that such projects may overlook environmental and social (E&S) issues that are fundamental to sustainability. But the two need not be mutually exclusive. We present the business case for adopting the E&S risk management tools developed by the international public finance sector: that better understanding and management of risks can protect expected financial returns and the developer's reputation. We suggest that bilateral donors support implementation of these tools through a combination of grants and risk management guarantees. In this way, public funds support public goods and local development goals, while private sector funds generate a return on private capital, together furthering sustainable development and growing the global green economy.

### Hydropower and future energy needs

According to the International Energy Agency (IEA),<sup>1</sup> US\$10 trillion is required globally to meet our growing power generation needs to 2035. This mainly affects developing countries, where over one billion people still lack basic access to electricity. Despite the recent resurgence of investment in hydropower and other renewable energy options, the IEA and World Energy Council<sup>2</sup> suggest that fossil fuel power generation will continue to attract the bulk of investment in developing countries, with an increasing proportion coming from private investment and private capital markets. Thermal options such as natural gas and coal are more attractive to private sector investors, offering lower financing risks and intrinsically requiring

less capital than renewable energy technologies or the construction of infrastructure with multiple development functions.

Yet, seen from a global sustainability perspective, the lower greenhouse gas emissions from hydropower contribute to the transition to a low carbon energy economy.<sup>3</sup> Incentives already exist to encourage low carbon generation but the question remains as to how public sector policies and financial incentives can best leverage other aspects of sustainability (poverty reduction, improving local development outcomes and environmental quality, for instance) when the private sector is engaged largely for infrastructure provision. Without addressing this, the perceived inadequacy of environmental and social (E&S) standards and of compliance with them contributes to public mistrust of large hydropower,

which in turn challenges the delivery of global greenhouse gas emission reduction targets.

### The importance of improving E&S safeguards

A review of E&S safeguards for large dam projects<sup>4</sup> showed that many large hydropower projects in developing countries financed wholly

by the private sector are regulated by nominal national standards alone. These requirements do not specifically capture recent advances in industry-accepted approaches for incorporating sustainability into hydropower business practices.<sup>5</sup>

In practical terms, reliance on weak E&S standards and regulation constrains developing countries' ability to balance

development risks with opportunities in their water and energy infrastructure strategies. This is especially true where the private sector is expected to overcome chronic shortfalls in public finances by funding infrastructure that is essential to national economic development and growth aspirations. Weak E&S standards also increase the difficulties local communities face in engaging constructively with hydropower projects to manage their livelihood and poverty risks, and in taking community-level action to optimally grow local economies affected by dam projects. From the private- investor and lender perspective, low or ambiguous standards add uncertainty to the respective responsibilities of the project entity and of government to manage critical E&S risks.

### E&S risk management: the business case

Responsible private hydropower developers and lenders approach E&S standards as a risk mitigation and management issue. Improving E&S standards reduces investment risk and ensures the incremental costs of improved

standards are factored into long-term project financing and revenue streams. This protects the private developers' returns and reputation for future business, and may specifically reduce the risk of implementation delays that trigger contractual penalties and significant interest payments on multi-million and billion dollar projects (see Box 1). Improving E&S often costs less than 3–5 per cent of total project costs and typically can be absorbed into debt financing, if identified early and reflected in key project agreements such as the power purchase and concession agreements. Ultimately the cost is internalised in the long-term electricity tariffs consistent with the 'user pays' principle.

### Who should take responsibility?

But is this business case robust enough to prompt private developers to voluntarily adopt higher E&S standards, beyond national and private lender requirements?<sup>6</sup> Or should regulators in developing countries simply adopt and enforce best practice safeguards? The practical reality is that government regulators, commercial lenders and private developers all have a role in decision-making about responsible private investment and how risks that shape development outcomes are managed.

The business case recognises that specific types of project risk are best managed by the party most able to address them effectively and, equally, that the negotiated allocation of responsibility between government and private developers to manage critical risks should be transparent. Typically, hydropower developers can manage project risks such as engineering and geotechnical risk.<sup>7</sup> But for critical E&S risks, the roles of government agencies and private developers are intertwined.

While E&S risks alone may not preclude responsible investment in all cases, how E&S risks are balanced with other technical, financial, market or reputational risks is a vital calculation. Moreover, the failure to manage E&S impacts effectively is a primary reason why public and local communities oppose hydropower, especially when management tools are readily available but simply ignored. The international public sector — largely bilateral and multinational donors —

*Government regulators, commercial lenders and private developers all have a role in decision-making about responsible private investment and how risks that shape development outcomes are managed*

#### Box 1. The financial costs of ignoring E&S risks

The forced suspension of work on the 2,000MW Lower Subansiri hydropower project in 2011 in India, due to protests when it was half completed, increased the project cost by US\$195 million in the initial two and a half year delay alone. A two year delay on the 50MW Bumbuna project in Sierra Leone during final project completion (2005–2008) was assessed as reducing the economic rate of return of the project from 42.2 per cent to 28.5 per cent.<sup>8</sup>

could do more to help the government agencies of the least developed countries to play their role more effectively, and in doing so foster responsible private investment.

### Sustainability assessment tools

Over the past decade the shift toward sustainable hydropower has started to pay dividends by stimulating multi-stakeholder collaboration and innovation. As a result, sustainability assessment tools that can diagnose critical risks early in the project planning and appraisal stages have emerged. If a project is implemented, these tools can then benchmark measures against internationally accepted practice, and prioritise the use of contingency budgets to manage the critical risks during construction and operation stages.

A multi-stakeholder forum hosted by the International Hydropower Association developed the voluntary Hydropower Sustainability Assessment Protocol.<sup>9</sup> The World Bank indicates that the protocol is a useful guide to developing sustainable hydropower that reduces risks to lenders, private developers and all stakeholders.<sup>10</sup> The World Bank now funds protocol assessments on a voluntary basis to improve the quality of its hydropower project portfolio.

But the new assessment tools are not standards: the World Bank's latest review of the protocol emphasised that it complements, rather than competes with, the World Bank's safeguard policies. Similarly, these assessments complement International Finance Corporation (IFC) Performance Standards and the Equator Principles, or more specifically, can be used in conjunction with them to enhance outcomes.

### The role of international public finance

Helping developing countries 'de-risk' private infrastructure provision is an effective way to improve broader development outcomes in the landscape of private infrastructure investment. In this context, international public finance already extends support through the programmes, lending facilities and guarantees of multilateral financial institutions such as the IFC and multilateral investment guarantee agencies.

Where no such multilateral participation exists, there is further scope to support the implementation of E&S safeguards and so help to de-risk private investment in hydropower developments. In this scenario, bilateral donors should underwrite and leverage the voluntary adoption of improved risk management practices in ways that reinforce the business

### Box 2. An example of public sector support for private E&S investment

Private developers risk financial capital to develop hydropower investment proposals. The cost of upfront studies may exceed US\$10 million per project. If the project does not go ahead these expenditures are lost as 'abort costs'. In this context it is hard to convince developers to spend more high-risk capital on E&S processes, as potential losses will be greater for the one in ten projects that do not reach financial closure.

One option for leveraging more E&S studies (incremental costs in the order of US\$1–2 million) is to offer a financial guarantee for the small proportion of projects that spend these funds but do not ultimately go ahead.

case for improving E&S standards and prospects for responsible private investment (see Box 2). An industry subsidy is not proposed; rather the approach is to help developing countries leverage profitable private investment and enhance sustainability. Public funds will leverage sustainability in the public interest, while private capital continues to seek profitable investment projects.

### Developing a bilateral funding facility

A results-oriented approach to help de-risk private infrastructure development, in this case hydropower schemes, may require a three-part funding facility. This maximises the voluntary uptake of improved E&S measures by the private sector while maintaining effectiveness in different developing country situations. The facility may draw on experience of an existing bilateral export credit or technical assistance scheme, and comprises the following three instruments:

- **Instrument A.** Grants to fund use of new sustainability assessment tools (especially the Hydropower Sustainability Assessment Protocol, which includes certified assessors) by hydropower developers working in co-operation with government authorities.
- **Instrument B.** A study reimbursement or risk-sharing provision that guarantees the developer's incremental cost of enhanced project preparation studies if the project does not proceed.<sup>11</sup> It also enables the cost of improved E&S standards to be factored into project financing plans, for example, by providing analysis to convince all parties of the merits of doing so including the government negotiators, energy offtakers, private lenders and project equity partners.
- **Instrument C.** Help financing or providing technical assistance for the implementation of critical E&S risk management measures in

selected, qualifying projects, as advised by the Hydropower Sustainability Assessment Protocol where the eligibility criteria match national and bilateral programme priorities. This could include, for example, offering financial products that lower the cost of borrowing, or a mix of direct lending and grants.

Instrument A grants would primarily fund timely, early protocol assessments before project appraisal; the assessments would inform the business case and factor the incremental cost of improved standards and contingencies into project financing plans. The grants may also fund protocol assessments at implementation and operation stages, which assist with release of contingency budgets, assess whether promised results are delivered and, in particular, provide a mechanism to help to reinforce weak regulatory capacity. If we use the data to 2013 from the Clean Development Mechanism (CDM) hydropower portfolio as an indication of scale, the total cost of assessing all 2,475 CDM hydropower projects under Instrument A (at US\$75,000 per assessment) would have been US\$185 million.

The costs of implementing Instruments B and C will depend on the criteria established. For instance, Instrument B may have a ceiling amount, for example, US\$1–2 million per eligible project, but as a risk-sharing guarantee it would only be invoked for those projects failing to reach financial closure (perhaps 10–20 per cent of projects).

Functional details, eligibility criteria and adequate controls should be developed to ensure these funding instruments do not create perverse incentives, and instead motivate private investors to climb the E&S standards ladder.

## Conclusions

From a sustainability perspective, private sector hydropower development pursued with 'business as usual' thinking is the cause of ongoing concern. Efforts to identify and manage E&S risks and integrate sustainability are challenged by limited government institutional capacity and experience in implementing new standards. Hydropower will remain controversial while the best available practices to manage E&S impacts and risks are underutilised or ignored outright, and little attention is given to improving regulation, monitoring and adaptive management.

Advancing sustainable forms of hydropower and other renewable energy options to reduce the carbon intensity of economic development calls for new thinking. New approaches should improve public–private sector co-operation, reduce uncertainty about each sector's role and de-risk sustainable hydropower projects. The multilateral financial institutions and private finance community, through initiatives such as the Equator Principles, have shown that improving E&S standards is now seen as synonymous with reducing investment risk and enhancing development returns.

Part of the solution, therefore, is result-oriented innovation that extends public finance to private hydropower projects through multilateral and bilateral donor channels to meet the public goods objectives of large hydropower, while the private sector focusses on generating a return on private capital. Taken together, this will further sustainable development and grow the global green economy.

### Lawrence J Haas and Jamie Skinner

Jamie Skinner is principal researcher in IIED's natural resources group and team leader for water. Lawrence J Haas is an independent consultant and former Team leader in the Secretariat of the World Commission on Dams.



## Knowledge Products

The International Institute for Environment and Development (IIED) promotes sustainable development, linking local priorities to global challenges. We support some of the world's most vulnerable people to strengthen their voice in decision making.

### Contact

Jamie Skinner  
jamie.skinner@iied.org

80–86 Gray's Inn Road  
London, WC1X 8NH  
United Kingdom

Tel: +44 (0)20 3463 7399  
Fax: +44 (0)20 3514 9055  
www.iied.org

IIED welcomes feedback via: @IIED and  
www.facebook.com/theiied

This research was funded by UK aid from the UK Government, however the views expressed do not necessarily reflect the views of the UK Government.



## Notes

<sup>1</sup> World Energy Outlook (WEO-2014), and Technology Roadmap: Hydropower (2012). International Energy Agency. OECD / IEA, Vienna. / <sup>2</sup> WEC. 2013 and 2014. World Energy Issues Monitor. World Energy Council. See <http://www.worldenergy.org/news-and-media/press-releases/wec-report-highlights-the-critical-issues-affecting-the-global-and-regional-energy-sector/> Last accessed Dec 2014. / <sup>3</sup> A significant share of the world's remaining 13,000 TWh /year of hydropower potential is in developing countries, especially in Asia, Latin America and Africa which together accounted for the bulk of the 29–33 GW of new hydropower capacity commissioned globally in 2012 (IHA Hydropower Report, IHA, 2013). In addition, storage hydropower backs up intermittent renewable sources, such as wind and solar, that would form part of a renewable portfolio. / <sup>4</sup> Skinner, J. and Haas, L. 2014. Watered Down? A review of social and environmental safeguards for large dam projects. IIED, London. See <http://pubs.iied.org/17517IIED> / <sup>5</sup> Moreover, MFIs are involved in no more than 5–10 per cent of large hydropower worldwide due to dynamic shifts underway in global infrastructure financing. / <sup>6</sup> Some responsible investors argue adopting best practice for E&S risk management is part of their corporate social responsibility ethos, business model and comparative advantage. Others may seek to limit spending to managing risk and dealing with problems as they may arise, recognising that regulatory capacity, governance or monitoring is weak. / <sup>7</sup> How much developers (as operators) are compensated via the power purchase agreement tariffs for taking on specific risks or agreeing on the level of the contingency budget is established in negotiations. / <sup>8</sup> World Energy Outlook (WEO-2014) (see note 1) / <sup>9</sup> Hydropower Sustainability Assessment Council. 2011. Hydropower Sustainability Assessment Protocol (HSAP). Developed by a multi-stakeholder Forum hosted by the International Hydropower Association. See [www.hydrosustainability.org](http://www.hydrosustainability.org) / <sup>10</sup> Liden, R and Lyon, K 2014. The hydropower sustainability assessment protocol for use by World Bank clients: Lessons learned and recommendations. Water Partnership Program (WPP) Water Papers. World Bank Group, Washington, DC. See <http://documents.worldbank.org/curated/en/2014/06/20106007/hydropower-sustainability-assessment-protocol-use-world-bank-clients-lessons-learned-recommendations> / <sup>11</sup> In particular, the ESIA family of studies that include the construction and operation stage environment mitigation and management plans and related monitoring plans (EMMPs and EMMMPs).