

The business case for bilateral support to improve sustainability of private sector hydropower

Lawrence Haas and Jamie Skinner

Discussion Paper

March 2015

Water

Keywords:
Hydropower, Development

About the authors

The authors Jamie Skinner, Institute for Environment and Development, and Lawrence Haas, independent, are former members of the World Commission on Dams Secretariat (2000) and currently members of the multi-stakeholder Social Chamber of the HSAP hosted by the International Hydropower Association.

Acknowledgements

The authors would like to extend their appreciation to the following people who participated in an informal survey and contributed their perspectives on this topic:

- André Abadie, Managing Director and Global Head, Environmental and Social Risk Management, J.P. Morgan in London
- Gabriel Azevedo, Director of Sustainability, and Alexandre Moreira Baltar, Sustainability and Climate Change Manager, Odebrecht SA, Brazil
- Emmanuel André Boulet, Environmental Lead Specialist, Inter American Development Bank (IADB), Also HSAP Finance Chamber Chairman and Governance Committee Member
- Cameron Ironside, Sustainability Director, International Hydropower Association
- Ritu Kumar, Director, Environment and Social Responsibility, CDC Group Plc, UK
- Helen Locher, Principal Consultant Sustainability, Hydro Tasmania, and Accredited Lead Assessor for the Hydropower Sustainability Assessment Protocol, previously the Coordinator for the Hydropower Sustainability Assessment Forum
- David MacGray, Infrastructure Director, PricewaterhouseCoopers LLC (PwC UK), London
- Derrick Penman, Principal Project Engineer, MWH Global, Canada
- Narendra Prajapati, CEO Bhote Koshi Power Company and Chairman of the Nepal IPP Association, Nepal
- Donal O'Leary, Senior Advisor, Transparency International, also HSAP Social Chamber Chairman and Governance Committee Member
- Gary Sharkey, Global Sustainability Network Director, PricewaterhouseCoopers International Limited (PwCIL), London, and
- Stephen Sparkes, Vice President and Acting Head of Corporate Responsibility & HSE, Statkraft AS, Norway.

In addition the authors would like to thank Gerrit Bodenbender and Dominik Densch (GIZ), David Harrison (TNC), Cameron Ironside, Helen Locher, David MacGray, Donal O'Leary, Jean-Paul Penrose (DFID), Judith Plummer (Cambridge University), Stephen Sparkes and Gary Sharkey for their constructive comments on a first draft of this document.

International Institute for Environment and Development
80-86 Gray's Inn Road, London WC1X 8NH, UK
Tel: +44 (0)20 3463 7399
Fax: +44 (0)20 3514 9055
email: info@iied.org
www.iied.org

 @iied

 www.facebook.com/theIIED

Download more publications at www.iied.org/pubs

The views expressed in this paper, and any errors or omissions are those of the authors alone and should not be taken to represent the views of those acknowledged above in any way. This report has been funded by UKAid from the UK government. The views expressed do not necessarily reflect the UK government's official policies.

Produced by IIED's Natural Resources Group

The aim of the Natural Resources Group is to build partnerships, capacity and wise decision-making for fair and sustainable use of natural resources. Our priority in pursuing this purpose is on local control and management of natural resources and other ecosystems.

First published by International Institute for Environment and Development (UK) in 2015

Copyright © International Institute for Environment and Development

All rights reserved

Haas, L and Skinner, J (2015) *The business case for bilateral support to improve social and environmental risk management on private hydropower developments*. International Institute for Environment and Development, London.

<http://pubs.iied.org/17573IIED.html>

ISBN 978-1-78431-165-0

Printed on recycled paper with vegetable-based inks.

Is there a business case for voluntary improvement of environmental and social risk management on private hydropower in developing countries, beyond national standards and private lender requirements? Or should national regulators simply adopt best-practice safeguards required by multilateral financial institutions?

This paper explores the practical reality where government regulators, public entities, commercial lenders and private developers all play roles in reaching decisions about responsible private investment and managing risk. It also proposes aligning international public financial support through bilateral and multilateral channels, where public- and private-sector roles in delivering sustainability are intertwined.

Contents

Acronyms	4	4 Why call on international public finance	28
Abstract	5	4.1 Reinforcing bilateral support for public-private partnership in delivering sustainability	29
Executive summary	6	4.2 Where targeted bilateral support can make a difference	30
1 Introduction	10	4.3 Conclusions	34
2 The changing global investment landscape	12	5 References	35
2.1 Multiple actors	13	Annex 1: Initial feedback on the Actions and Incentive concept	37
2.2 Public- and private-sector roles with negotiated outcomes	13		
2.3 Evolving conditionality of MFIs and lenders: the standards ladder	13		
3 The business case: improving risk management	17		
3.1 Risk categories	19		
3.2 How does the private-sector address environmental and social risk?	19		
3.3 Managing environmental and social risk along the project cycle	21		
3.4 Definition of roles – the national context	26		

Acronyms

CDM	Clean Development Mechanism
CER	Certified Emissions Reduction
CSR	Corporate Social Responsibility
DAC	Development Assistance Committee
ECA	Export Credit Agency
EMMP	Environmental and Social Management and Monitoring Plan
E&S	Environmental and Social
EPC	Engineering, Procurement and Construction
EPFIs	Equator Principle Financing Institutions
ESIA	Environmental and Social Impact Assessment
EU	European Union
GHG	Greenhouse Gas
Govt	Government
HSAP	Hydropower Sustainability Assessment Protocol
IEA	International Energy Agency
IFC	International Finance Corporation
IIED	International Institute for Environment and Development
IPP	Independent Power Producers
LDC	Less-developed Countries
MFI	Multilateral Financing Institutions
NT2	Nam Theun 2
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
PPA	Power Purchase Agreement
PPP	Public-Private Partnerships
ROE	Return on Equity
ROR	Run of River
WCD	World Commission on Dams
UNFCCC	United Nations Framework Convention on Climate Change

Abstract

This paper interrogates the business case for the voluntary improvement of environmental and social (E&S) risk-management practices on private hydropower developments included in the water and energy infrastructure strategies of developing countries.

Although the focus is on independent private hydropower-financing models, the discussion is valid for public-private projects. It accepts the philosophy of the Equator Principle Association (EPA) that improving E&S standards is synonymous with reducing investment risk and improving development returns on dam projects.

Beyond characterising the business case, this paper proposes the consideration of funding mechanisms within bilateral official development assistance (ODA) programmes to help de-risk private hydropower development, where public- and private-sector roles are intertwined and overlap. This would support the use of tools such as the Hydropower Sustainability Assessment Protocol (HSAP, 2010), which was developed in a multi-stakeholder process hosted by the International Hydropower Association. In essence, public funds will leverage sustainability in the public interest, while private capital continues to seek profitable investments. How this bilateral facility helps to align international public support extended through bilateral and multilateral channels is also highlighted.

The development outcomes sought include higher-quality infrastructure projects, adopting proven best practice as well as improved delivery of responsible and profitable private investments that help developing countries to grow. Emphasis is placed on meeting public- and private-sector objectives nationally (less-developed countries) and internationally (bilateral ODA) to strengthen sustainable development; raising incomes to help reduce poverty; investing in climate change mitigation and adaptation; reinforcing regulation capacity where private investment is expected to play a greater role; and growing the green economy worldwide.

The primary audience are professionals working in the ODA development and climate-change fields, who have a stake in improving E&S standards and seek opportunities to integrate that support into their own bilateral programmes where it is practical and relevant. The wider audience are practitioners in the finance, industry, civil-society and government sectors who to varying degrees are already deeply immersed in the sustainable hydropower agenda and advancing sustainable solutions.

Executive summary

A review of social and environmental safeguards for large dam projects¹ showed that many large hydropower projects in developing countries, which the private sector has wholly financed, are regulated by nominal national standards alone. These requirements do not specifically capture advances in the past 3-5 years in safeguards of multilateral financing institutions (MFIs), the Equator Principle Association (EPA)'s minimum standards for private financial institution lending, or industry-accepted approaches for incorporating sustainability into hydropower business practices.²

In practical terms, reliance on weak environmental and social (E&S) standards and regulation constrains the ability of developing countries to balance development risks and opportunities in their water and energy infrastructure strategies, especially where the private sector is expected to help overcome chronic shortfalls in public financing for infrastructure essential to underpin 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 their ability through local action to optimally grow local economies that dam projects affect. From the private investor and lender's perspective, low or ambiguous standards add uncertainty to the respective responsibilities of the project entity and the government to manage critical E&S risks. On a global scale, scepticism about the adequacy of E&S standards and compliance contributes to a lack of sustained public acceptance of large-scale hydropower, which challenges the delivery of global greenhouse gas (GHG) emissions reduction targets.

According to the International Energy Agency (IEA, 2014), US\$10,000 billion is required globally to meet growing power generation needs to 2035, mainly in developing countries where over 1 billion people still lack basic electricity access. Despite a recent resurgence of investment in hydropower and infusion of capital into other renewable options, the IEA and World Energy Council (WEC, 2014) 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 (eg natural gas and coal) are more attractive to private-sector investors because they offer lower financing risks, and intrinsically require less capital than renewable energy technologies or infrastructure with multiple development functions.

Yet seen from a global sustainability perspective, the lower GHG emissions from hydropower are attractive for the transition to a low-carbon-energy economy.³ Incentives already exist to encourage low-carbon generation, but the question remains how public-sector policies and financial incentives can best leverage other aspects of sustainability when the private sector is engaged to provide infrastructure, especially for poverty reduction, improving local development outcomes and environmental quality. Similarly, context-specific opportunities exist where storage reservoirs may play a role in regulating irregular river flows as part of national climate-adaptation strategies, as well as growing recognition of the need to assess proposed new hydropower-storage projects with respect to climate vulnerability impacts and adaptation potential.

The business case: improving risk management

Building on multi-stakeholder feedback explored in Skinner and Haas (2014), this paper reviews how responsible private hydropower developers and lenders approach E&S standards as a risk mitigation and management issue. It first argues the business case for improving E&S standards, which essentially accepts the Equator Principle philosophy that improving standards is synonymous with reducing investment risk. A specific aim is to ensure the incremental costs of improved standards are factored into project financing and revenue streams. This protects private developers' return on equity and reputation for future business, and may specifically reduce the risk of implementation delays that trigger contractual penalties and significant

¹ Skinner and Haas, 2014.

² Moreover, MFIs are involved in no more than 5–10% of large hydropower projects worldwide due to dynamic shifts underway in global infrastructure financing.

³ A significant share of the world's remaining 13,000 terawatt hours per year of hydropower potential is in developing countries, especially in Asia and Latin America and Africa that together accounted for the bulk of the 29–33 GW of new hydropower capacity commissioned globally in 2012 (IHA, 2013). In addition, storage hydropower backs up intermittent renewable sources (eg wind and solar) that would form part of a renewable portfolio.

interest during construction charges on multi-million- and -billion-dollar projects. The cost of doing so is often less than 3–5% of total project costs and typically can be absorbed in debt financing if identified early and reflected in key project agreements, such as power-purchase and concession agreements. Ultimately, the cost is internalised in long-term electricity tariffs consistent with the ‘user pays’ principle.

The degree of risk can be illustrated by, for example, the forced suspension of work on the 2,000-MW Lower Subansiri hydropower project in 2011 in India (due to protests when it was half completed), which increased the project cost by US\$195 million during the initial 2.5-year delay. A 2-year delay on the 50 MW Bumbuna project in Sierra Leone during final project completion (2005–08) was assessed to have reduced the economic rate of return of the project from 42.2 per cent to 28.5 per cent.⁴

Is this business case robust enough to prompt private developers to voluntarily adopt higher E&S standards beyond national and private lender requirements?⁵ Or should regulators in developing countries simply adopt best-practice safeguards? The practical reality is that government regulators, commercial lenders and private developers all play a role in reaching decisions about responsible private investment and how to manage risks that shape development outcomes. The business case further recognises that specific types of project risk are best managed by the party most capable of addressing them effectively; and equally, the negotiated allocation of responsibility between governments and private developers to manage critical risks should be transparent. Typically, hydropower developers can manage many of the project risks, such as engineering and geo-technical risks.⁶ But for critical E&S risks, the roles of government agencies and private developers (ie the public and private sectors) are uniquely intertwined and overlap. Although E&S risks on their own may not preclude responsible investment in all cases, how they are balanced with other technical, financial, market or reputational risks is a vital calculation. Moreover, public and local communities often see failure to manage E&S impacts effectively as the primary reason for opposing hydropower, especially when tools to do so are readily available but simply ignored. The international public sector could do more to help government agencies in less-developed countries to play their role more effectively and thereby foster responsible private investment.

Sustainability assessments to complement standards and reinforce regulation

Over the past decade the shift toward sustainable hydropower has changed the tone and dynamic of the debate around large hydropower. It has also started to pay dividends by stimulating multi-stakeholder collaboration and innovation. One result is the emergence of sustainability-assessment tools to bolster early diagnosis of critical risks in project planning and appraisal stages; and if a dam project is implemented, to benchmark measures against internationally accepted practice, and prioritise the use of contingency budgets to manage the critical risks during construction and operation stages. The voluntary Hydropower Sustainability Assessment Protocol (HSAP), which a multi-stakeholder forum hosted by the International Hydropower Association developed between 2007–2010, is an example of an assessment tool designed for such purposes. Regulators may also reinforce their monitoring and supervision capacities using HSAP implementation- and operation-stage assessments with certified independent assessors to guide use of this protocol.⁷

The new assessment tools are not standards. In its latest review of the HSAP (the Protocol), the World Bank emphasized that it complemented rather than competed with the Bank’s safeguarding policies. It is a useful tool to guide the development of sustainable hydropower to reduce risk to lenders, private developers and all stakeholders (Liden and Lyon, 2014). The World Bank now funds HSAP assessments on a voluntary basis to improve the quality of its hydropower project portfolio. 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.

Why call on international public finance?

Dialogue (see Annex 1) suggests that helping developing countries ‘de-risk’ private infrastructure provision is an effective way to improve broader development outcomes in the private-infrastructure investment landscape. International public-financing

⁴ See references in Section 3 and Table 1.

⁵ Some responsible investors argue that 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 efforts to manage risk and deal with problems as they may arise, recognising that regulatory capacity, governance or monitoring is weak.

⁶ 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.

⁷ See www.hydr sustainability.org

support is already extended on that theme through programmes, lending facilities and guarantees of multi-lateral institutions (eg IFC and MIGA). Further scope exists to help de-risk private investment in hydropower developments, directly and indirectly supported by Organisation for Economic Cooperation and Development (OECD) official development assistance (ODA) programmes in the aid, trade and climate-change fields, where there is no MFI participation.

This paper therefore argues for the consideration of bilateral support to underwrite the voluntary adoption of improved risk-management practices, in ways that reinforce the business case for improving E&S standards and prospects for responsible private investment. An industry subsidy is not proposed. Rather the approach is to help developing countries leverage profitable private investment and enhance sustainability. It elevates the conventional notion of public-private partnerships in infrastructure from the project level to one of broader co-operation to incorporate sustainability into hydropower business practices. Public funds will leverage sustainability in the public interest, while private capital continues to seek profitable investment projects.

In relation to ODA financial flows, this materially reflects the philosophy of the Paris Declaration on Aid Effectiveness (2005) signed by more than 90 countries, which calls for the alignment of external development finance extended through MFI and bilateral channels and a focus on result-oriented approaches, where results get measured. It specifically recognises that capital risk is a significant barrier to boosting renewable-energy use in developing countries (NARUC, 2014), which has development consequences. Hydropower opportunities not pursued by responsible private investors, for whatever reason, are either: (a) picked up by the public sector, with or without MFI participation; or by other private developers and lenders less concerned about E&S standards and reputational risk; (b) not pursued at all; or (c) replaced by investment in equivalent thermal power (mainly). Although market analysis is needed to quantify the national development opportunities forgone or missed in each situation,⁸ an indication of the scale of bilateral ODA support for hydropower may be seen in the Clean Development Mechanism (CDM). By 2013 the 24 United Nations Framework Convention on Climate Change (UNFCCC) Annex II countries supported 2,475 hydropower projects (245,000 MW of installed capacity) with carbon-financing, most without MFI participation. This simply illustrates OECD bilateral support for private hydropower is significant and offers a helpful entry point that can make a difference.

The concept and elements of a bilateral funding facility

Dialogue suggests that results-oriented approaches to help 'de-risk' private infrastructure development, in this case hydropower schemes, may require a three-part funding facility to maximise voluntary uptake by the private sector as well as effectiveness in different developing country situations, and to meet bilateral programme aims. The facility may draw on the experience of existing bilateral export credit or technical assistance schemes and logically comprise:

- **Instrument A – a grant** to fund use of new sustainability assessment tools by developers working in co-operation with government authorities, in particular the multi-stage Protocol (HSAP), which has an inclusive process and certified assessors.
- **Instrument B – a study reimbursement/risk-sharing provision** to guarantee the developer's incremental cost of enhancing project preparation studies as advised by a Protocol assessment,⁹ when it enables the cost of improved E&S standards to be factored into project-financing plans (eg specifically helping to convince all parties in the project negotiations including the government negotiators, offtakers, and potential private lenders and equity partners of the merits of going beyond legal minimum E&S standards on a particular project).
- **Instrument C – implementation support** to help finance or provide technical assistance for the actual delivery of critical E&S risk management measures in selected, qualifying projects, as may be advised by the Protocol assessment or as a result of it, where eligibility criteria match national and bilateral programme priorities and special cases (eg offering financial products that lower the cost of borrowing, or a mix of direct lending or, potentially, grants).

Instrument A grants would primarily fund early or preparation stage protocol assessments in a timely way before project appraisal (ie informing the business case and factoring the incremental cost of improved standards and contingencies into project-financing plans). They may also fund implementation and operation stage protocol assessments that assist with the release of contingency budgets, as well as assessing whether promised results are delivered; and, in particular, provide a mechanism to help to reinforce weak regulatory capacity.

⁸ If a hydropower project is not pursued, national development opportunities may be forgone (eg carbon reduction, poverty alleviation and environment sustainability); likewise if a hydropower project proceeds with weak provisions for E&S risk management, some national benefit may be gained at the expense of higher local impoverishment risks.

⁹ In particular, the ESIA family of studies including the construction- and operation-stage environmental mitigation and management plans (EMMPs) and related monitoring plans; for example, environment mitigation, management and monitoring plans (EMMMPs).

Bilateral agencies may use implementation- and operation-stage protocol assessments to benchmark the quality (sustainability) of their hydropower portfolios to draw lessons for future programmes and better manage potential reputational risk. Using the CDM hydropower portfolio (data to 2013) as an indication of scale, if all 2,475 CDM hydropower projects were assessed under Instrument A (at US\$75,000 per assessment) the total cost would have been US\$185 million. Split equally among the 24 UNFCCC Annex II countries the average cost per 'bilateral' country would have been US\$7.7 million. The costs of implementing Instruments B and C will depend on the criteria established. For example, Instrument B may have a ceiling amount (eg US\$1-2 million per eligible project); though as a risk-sharing guarantee it would only be invoked for those projects that failed to reach financial closure (eg perhaps 10–20 per cent of projects). That may amount to US\$10–20 million for the CDM hydropower portfolio on average for the 24 UNFCCC Annex II countries. Similarly, Instrument C may have a ceiling for certain geographic regions, types or scales of hydropower projects set according to the bilateral criteria, and conformity to export-credit and technical-assistance schemes. Functional details, eligibility criteria and adequate controls will need to be developed to ensure these windows do not create perverse incentives, and provide incentives to genuinely leverage private investors up the E&S standards ladder.

Conclusions

Private-sector hydropower development pursued with 'business as usual' thinking remains challenging. Limited institutional capacity and experience in implementing new standards challenge identification and management of E&S risks and integration of sustainability. Hydropower will remain controversial, particularly when best practices to manage E&S impacts and risks are underused or ignored outright, and little attention is given to improving regulation, monitoring and adaptive management. Advancing sustainable forms of hydropower with other renewable energy options to reduce the carbon intensity of economic development and growth calls for new thinking and greater public- and private-sector co-operation to work together to de-risk 'good' hydropower projects (measured from a sustainability perspective) and reduce uncertainty about public- and private-sector roles. Efforts of the MFIs and private finance community through initiatives such as the Equator Principles show that improving E&S standards is now seen as synonymous with reducing investment risk and enhancing development returns. Result-oriented innovation that ensures international public support extended through multilateral and bilateral ODA channels is optimally aligned is thus part of the solution.

Introduction



IIED began exploring the hydropower and large dam standards nexus with partners in 2013. IIED noted the rise of climate mitigation and adaptation as a global development priority, as well as shifts in ways this infrastructure is financed globally affecting the implementation of environmental and social (E&S) safeguards, and the related debate on how large hydropower options are viewed in emerging carbon-financing mechanisms. The resulting review (Skinner and Haas, 2014) offers an analysis of the changing global landscape of E&S standards for dams; and recommends timely steps in European Union (EU)-supported processes that aim to improve dam safeguards and how they interconnect with water- and energy-resource, environmental and climate-change policies and programmes.

The review also notes the significant rise in private-sector financing and delivery of hydropower in developing countries, and the nature of (often nominal) mandatory E&S standards linked to national legislation, as well as (more stringent) conditionality imposed by funding sources. IIED therefore set out to explore industry and other interest in voluntarily improving E&S outcomes for private hydropower projects that attract bilateral support, in particular for projects falling outside of the scope of MFIs and Chinese commercial and state banks.

The findings of an initial dialogue with private-sector stakeholders are detailed in Annex 1 and are drawn on in the ensuing sections. Given that private investors and

lenders are particularly motivated by return on equity (ROE) and reducing lending risk, this paper seeks to develop a business case for private-public partnership that meets private-sector culture and practice, and public-sector sustainability and poverty-reduction goals related to water and energy infrastructure provision. The primary audience are professionals working in the official development assistance (ODA) development and climate-change fields who are not necessarily familiar with private infrastructure-financing and risk-management practices, but have a stake in improving E&S standards and seeking opportunities for integrating that support into their bilateral programmes where it is practical and relevant.¹⁰ The wider audience are practitioners in the finance, industry, civil-society and government sectors who to varying degrees are already deeply immersed in the sustainable hydropower agenda and advancing sustainable solutions, and are otherwise familiar with core issues in the wider hydropower and dams debate.

Discussion in this paper primarily relates to independent power producer (IPP) or non-utility hydropower generator models, where a developing-country government seeks to mobilise private investment. Although data are limited, private-sector investment accounts for a growing share of global investment in hydropower generation, perhaps as much as 40 per cent of the International Hydropower Association (IHA)'s estimate of 29,000–33,000 MW of new hydropower commissioned in 2012.¹¹

¹⁰ Among different stakeholders tension exists between the objectives of achieving better hydropower only (in sustainability terms), achieving more hydropower and both aims.

¹¹ Data on private investment in hydropower are limited. Three generic types of financing models are public, public-private and private. Generally, IFIs such as the World Bank Group participate in no more than 5–10% of hydropower projects initiated each year globally (Skinner and Haas, 2014). Regional variations occur, such as in Africa and Latin America where MFI and OECD involvement in hydropower is higher and public and public-private models are common.

The changing global investment landscape

2

In little more than two decades, the philosophy in the power sector has swung from largely public ownership to private ownership and operation in many developing and middle-income countries around the world (especially for power generation). This has followed the trends towards economic liberalisation since the late 1980s.

Increasingly, private finance is sought when already overstretched public budgets alone cannot meet projected requirements to finance infrastructure. There is a considerable focus on improving the investment climate in less developed countries (LDCs) to attract more foreign direct investment (FDI), recognising also that developing countries today compete for FDI as demand outstrips the supply of private investment capital. A variety of models exist for private infrastructure development and financing that allocate risk and share responsibilities and revenue between the public and private sectors and the communities that hydropower affects.¹² The reality is that certain types of private infrastructure development, including hydropower, have been challenging from a sustainability perspective. In some respects hydropower has moved from a public to a private model and is now heading for a next generation of public-private partnership (Rabin, 2008).

The recent pace of accelerated hydropower development has led to more private developers coming forward, some with little actual experience in hydropower development and managing E&S risks that are unique to large dams. This has focused attention on the need to build capacity among developers, as well as electricity companies and governments (Fields *et al.*, 2009) and enhancing transparency, particularly where national standards and enforcement capacities are weak.¹³

2.1 Multiple actors

Private infrastructure provision brings together many individuals and organisations with development and business orientations, whose interests may overlap even though their core missions may differ. Figure 1 conceptually illustrates the institutional landscape for private hydropower and IPPs. Interests range from local communities concerned about what a project means for local livelihoods and development; to power utilities concerned about energy security with a mandate to ensure affordable and reliable power supply; to an international finance consortium concerned about return on investment, and debt default and repayment.

Many interests are shared, including poverty alleviation, how resource-use benefits will be spread across society in the longer term, and how the 'economic rent' of

hydropower will be applied to manage the development trade-offs and risks of projects effectively. This interest would be reinforced if all parties involved in hydropower projects also agreed that corruption risks were transparently identified and mitigated (O'Leary *et al.*, 2010). A new project often involves a new set of local actors and local governments for the first time, each with varying capacities. Thus any project needs an inclusive and holistic engagement process from the very start.

2.2 Public- and private-sector roles with negotiated outcomes

Figure 2 illustrates how government and private-sector roles change and overlap through the project cycle. Governments decide the policy and regulatory framework for private infrastructure development, starting with the fundamental political decision whether to invite private participation; and if yes, to determine what options the private sector may pursue. In the case of hydropower, governments decide which river sites (or river reaches) to offer the right to develop as a private licence and the regulations on which to base the commercial negotiation of project agreements, including the E&S standards to apply. Private developers enter the picture when competitive bids are invited for hydropower development or developers make unsolicited proposals.

How E&S risks are managed reflects not only the mandatory national standards and conditionality of lenders (if any), but also the outcome of negotiations in the project-preparation phase that involve the government, private developer and financiers and are captured in key project agreements. This includes the allocation of responsibility to manage and share the various risks.

2.3 Evolving conditionality of multi-lateral financing institutions and lenders: the standards ladder

Since 2010 many MFIs have updated their standards for the assessment and management of E&S impacts and risks. Although the standards 'bar' is gradually rising, considerable debate remains over specific issues (Scheumann *et al.*, 2014). In parallel, a number of international conventions and EU directives have

¹² Head (2000) argued: "There are undoubtedly many possible models for sharing responsibilities, risks and revenues between the public and private sectors." For larger complex hydropower facilities and multi-purpose projects there may be a swing towards a mix of public and private investment in what many people still see as essentially public services, where the role for the private lenders would increase.

¹³ Many countries want to accelerate hydropower development and call on private developers to make it happen faster with many projects in parallel. Regulators are under pressure to make it happen without the capacity or time to adopt best practice or closely oversee projects. The capacity of new developers with little previous hydropower experience is a concern where E&S risk management plans developed during project preparation are not always adequate or robust enough to anticipate and respond to the real issues that arise.

Figure 1 a) and b): Institutional landscape of actors and their perspectives on private hydropower development and management

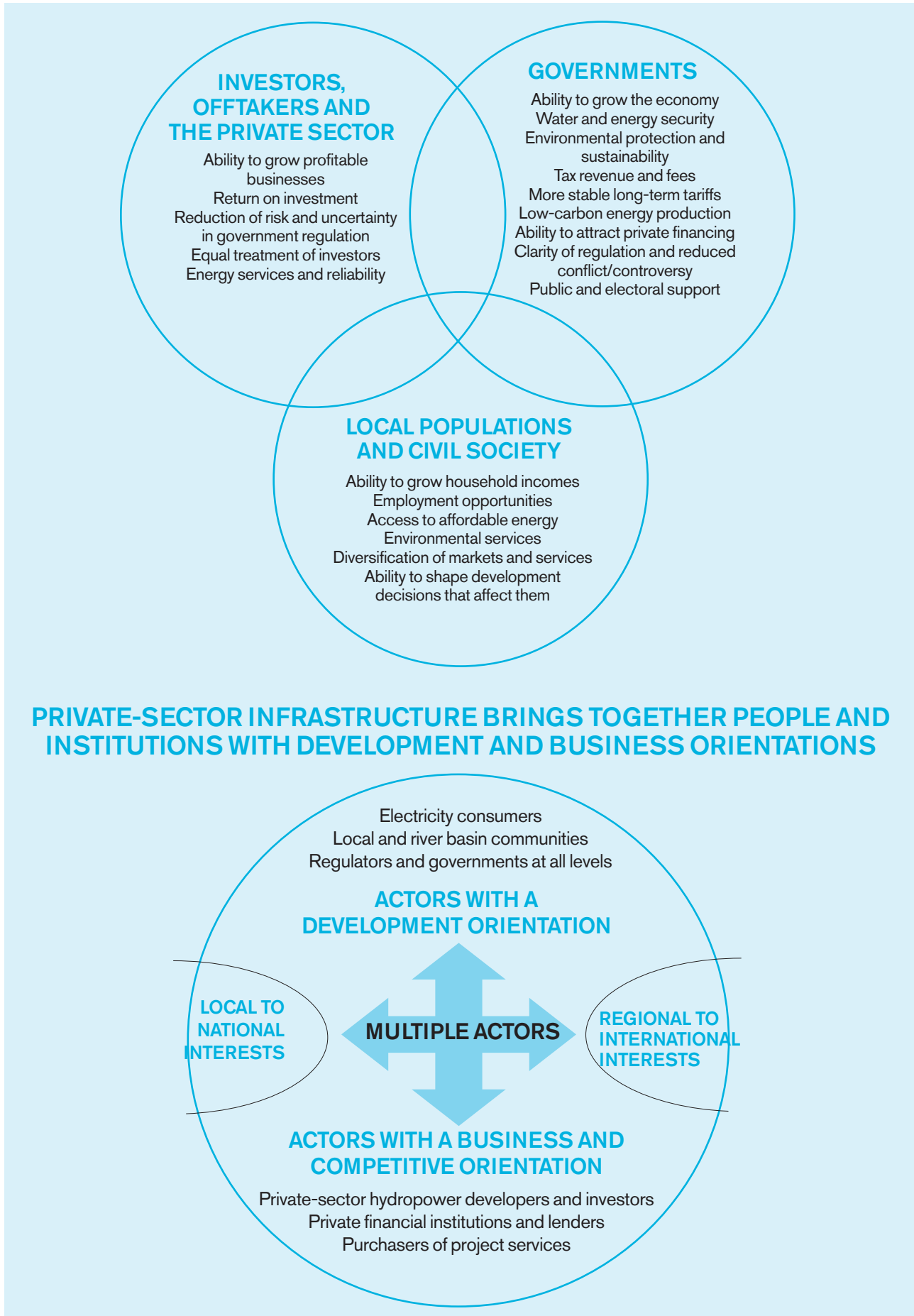
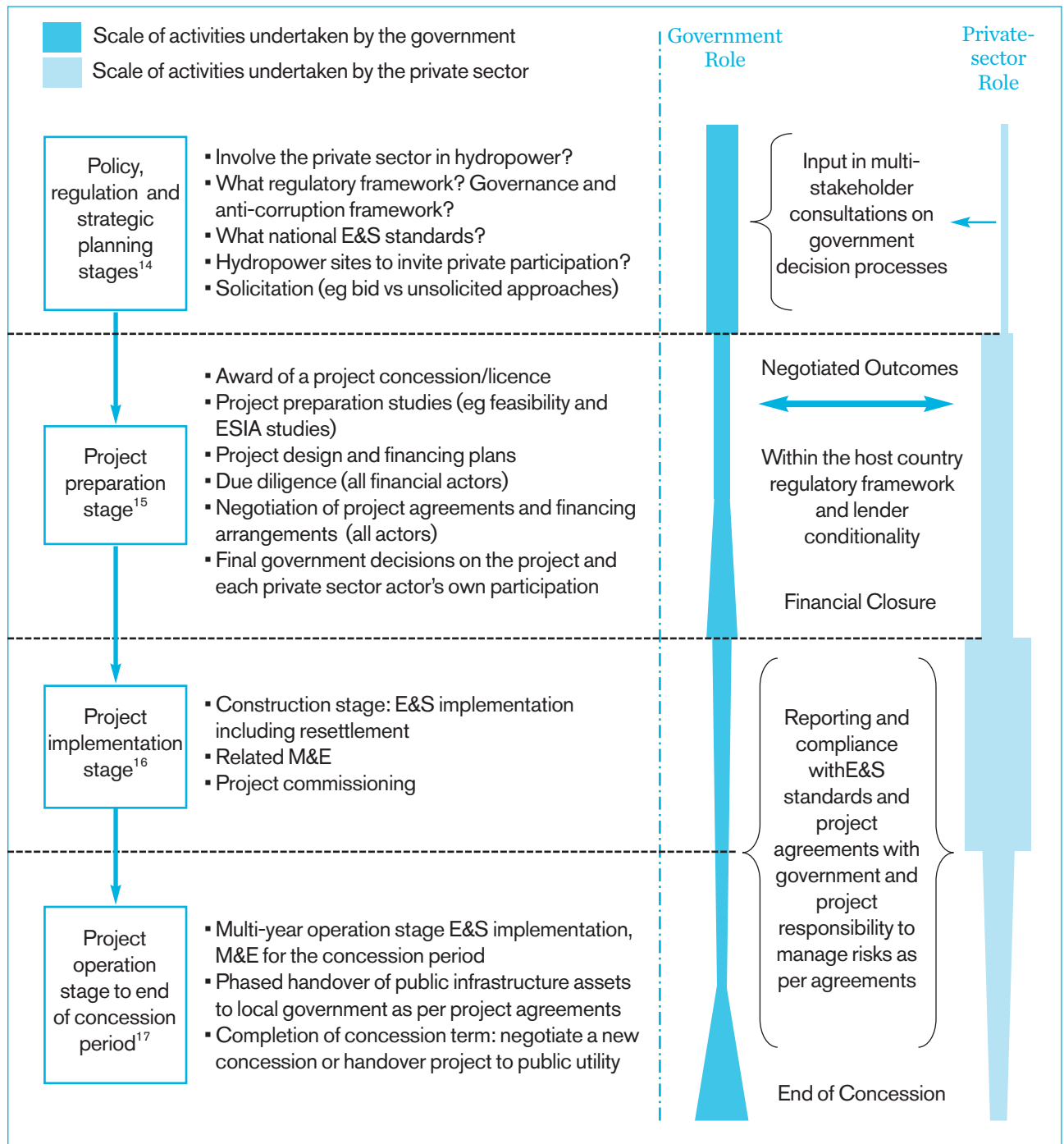


Figure 2: Government and private-sector roles at different stages of private hydropower development (Independent Power Producers model)



¹⁴ In the first stage of the project which is the pre-project phase (i.e. the policy, regulation, strategic planning stage), the government is the main actor. Government agencies (or the government via instructions to a public electricity utility) are responsible to initiate processes and prepare or fund the relevant studies that inform any up-front government decisions influencing private hydropower development such as the electricity generation options to be pursued in the national development framework. Thus at that stage, the government plays a major role while the private sector is mainly limited to participate, as one stakeholder interest in any government-led process for consultation to establish the development policy framework (e.g., the normal public, private and civil society sector engagement).

¹⁵ If the policy implies that there will be some private hydropower, the next stage "Project Preparation" which is project specific, will see the private sector, consisting of private developers and financiers, play a much greater role. The main tasks the developer undertakes at that stage, as indicated in Figure 2, includes all the project preparation studies, which may cost a few \$US million to 10's of \$US millions. These studies can stretch several years or even decades. The government plays a smaller role at this stage although it monitors and leads the reviews to approve project studies. Centrally, it negotiates the various project agreements with the developer.

¹⁶ If the project achieves financial closure, the private sector becomes the main actor during the construction stage, which runs over several years, while the government supervises and undertakes the project-related activities falling under the agreements he committed to (e.g. constructing access roads).

¹⁷ In the final operation stage (20-35 years), the private sector operates the project and does the operation stage EMMP while the government regulates the operation. The debt repayment period on a private project is typically of 8 to 12 years. Toward the end of the concession period the private sector hands over the project to the public sector. The private sector role at that stage may terminate. Or the government may retain the same private operator, or retender for operation of the project in a new concession.

adopted references to the multi-stakeholder World Commission on Dams (WCD) and Protocol (HSAP); for example, the EU Linking Directive (2004) on carbon-financing regarding member country support for large hydro-electric dams¹⁸ and OECD Export Credit Agency (ECA) support for equipment and services for hydropower projects (2013).¹⁹

In effect a standards ladder has evolved, where risk management is accepted as synonymous with adopting improved standards, but not a guarantee. The Equator Principles, introduced in 2003, establish a lower rung on the ladder with a minimum acceptable norm for private financial institutions to apply in their due diligence. It is not static: the third iteration (Equator Principles III) was adopted in 2013 and now requires use of International Finance Corporation (IFC) Performance Standards on dams seeking project financing in emerging-market economies and LDCs where regulation capacity tends to be weaker, in effect moving further up the standards ladder as real or perceived risk increases.

For governments and developers alike, the logic to improve standards is to enhance access to private financing (when the project offers a lower risk profile) and potentially to reduce financing costs. It is wholly consistent with the Integrated Water Resources Management Principle of water as an economic good and 'user pays' principle to internalise avoidance, mitigation and enhancement costs in project financing and revenue streams, and recognises that the ultimate user is the electricity consumer. This underpins the business case for incorporating the costs of better managing E&S risks in project financing.

Experience shows that neither voluntary action nor legal obligation can guarantee sustainable outcomes. A lot depends on how standards are interpreted and implemented. Practices such as independent evaluations, for example, add a degree of rigour and transparency that helps all stakeholders to better understand the specific risks, and informs negotiations on the best way to share and manage them.²⁰

Feedback from industry dialogue

The private sector will apply any E&S standards the host government or commercial banks require, provided that the costs are reflected in the negotiated project agreements, and there is a clear allocation of responsibility to manage E&S risks and boost local development between the project company and the government. Beyond these minimum regulatory standards, some developers may also adopt measures equivalent to higher E&S standards, according to their assessment of business risk.

Adopting IFC Performance Standards for project appraisal is a significant step, but does not mean the same implementation oversight and evaluation will apply as when actual IFC staff support is available. Although MFI standards actually vary and are rising, national standards are more likely to be the ones for private developers to meet. This discrepancy between international and national norms can result in E&S risks not being adequately anticipated and managed.

¹⁸ See http://ec.europa.eu/clima/policies/ets/linking/documentation_en.htm and [http://search.oecd.org/officialdocuments/displaydocumentpdf/?cote=tad/ecg\(2012\)5&doclanguage=en](http://search.oecd.org/officialdocuments/displaydocumentpdf/?cote=tad/ecg(2012)5&doclanguage=en)

¹⁹ The HSAP started as an industry response to the WCD (2000), which reinforced the call to improve practices. It is not a standard; rather the Protocol aims to complement standards. It is an enhanced sustainability assessment tool used to measure individual projects against globally applicable criteria and guide performance in the hydropower sector. Assessments rely on objective evidence to create a sustainability profile against some 20 topics, depending on the relevant stage of planning and development, covering all aspects of sustainability. It helps to better manage risk and provides a status baseline and benchmarking mechanism for continuous improvement.

²⁰ It may help private investors to decide whether they are considering a 'bad project' with unacceptable risks to avoid, even though it is financially or politically attractive, or to support a project where risks can be managed. It provides clear feedback to inform government thinking about improvement of regulation that may improve the quality and supply of private-sector investment to support a national development framework.

The business case: improving risk management

3

In an ideal situation the host government establishes a robust regulatory framework and adapts good practice to national circumstances. The private developer is obligated to meet whatever standards the government requires and to use them to manage risks. The estimated costs are reflected in key project agreements, in particular the power purchase agreement (PPA) and concession agreement, not forgetting adequate contingencies to manage unforeseen risks. The costs are included in the project-financing plan, which the developer prepares to seek commercial loans, and are factored into the investor's own calculations of expected ROE.

Working back from this situation, an important question is how interested and affected stakeholders – especially environmental and social impact assessment (ESIA) staff of private developers – can make a convincing case for developers to spend more time and money on upfront studies to more accurately identify critical construction- and operation-stage E&S risks and ways to manage them. This essentially equates to adopting improved E&S standards, when there is no clear regulatory obligation to do so, though this may also raise liability risks (Box 1).

From the investor's perspective, often the major fear is an unexpected and prolonged delay in construction once debt financing has been committed and released. The risk of delay in a project's approval is a concern, but is often less problematic to the developer (Plummer, 2014). A stall in construction for various reasons (including local political party, local resident or environmental campaign protests) can trigger contractual penalties and additional interest during construction, which are enormously costly on a 'project that may cost many millions or billions of dollars.' Although developers may argue that delays were beyond their control, it can significantly reduce a

BOX 1: LEGAL CONSTRAINTS AND LIABILITY

Company lawyers scrutinise all aspects of concession agreements and financing instruments. Perhaps perversely, the perception may be that additional E&S measures, undertaken voluntarily, may increase the developer's role in mitigation and possibly expose the company to additional and open-ended liabilities concerning project impacts.

project's economic rate of return (ERR) and private investors' ROE (see Table 1).

Unlike thermal power projects (eg gas turbines that are 'off the shelf' with short, fixed implementation schedules), hydropower is characterised by long periods of construction where cost overruns and project delays are at times substantially higher than the initial cost estimates, and may last years longer than anticipated. For example, with the forced suspension of work on the 2,000-MW Lower Subansiri project in 2011 in India when it was half completed – due to protests about dam safety and E&S impacts – the total project cost increased by 1,200 crore rupees (US\$195m) in the initial 2.5 years of delay alone.²¹ Up to 70 per cent of a hydropower project's total debt may be for civil works and specified in regional currencies with double-digit interest rates. Developers involved in projects that experience construction delays may also acquire a reputation for not being able to deal with challenges as governments increasingly place greater emphasis on managing E&S risks and expect developers to have those capacities.²²

Table 1: Effects of construction delays on the rate of return on hydropower projects

50MW Bumbuna completion project in Sierra Leone (commissioned in 2010). Total investment about US\$327m	410MW Rampur project in India (commissioning 2014–15). Total investment about US\$665m
The dam was 85% complete when abandoned in 1997 due to civil war. A 2-year delay during final project completion (2005–08), could reduce the ERR from 42.2% to 28.5%.	A 1-year delay in construction could reduce the ERR from 14.5% to 12.4% and reduce the financial rate of return from 9.3% to 7.7%

Source: Plummer, 2013. Primary data from the Economic Analysis Report Bumbuna Power Project and the World Bank Project Appraisal Report, Rampur Project (World Bank).

²¹ <http://news.biharprabha.com/2014/07/subansiri-project-dispute-to-be-resolved-through-negotiations> See also www.thehindubusinessline.com/economy/aranachalassam-row-over-subansiri-hydro-power/article6283440.ece?ref=relatedNews

²² The same principles may apply to private-sector developers bidding on EPC (Engineering, Procurement, and Construction) and turnkey contracts for projects developed by the public sector.

Table 2: Financial and business risk categories²³

Market risk	The value of an asset falls because of changes in the price of the individual components, their yield or their costs.
Credit risk	An asset loses value because of its ability to redeem that value (repay). This can be because it is downgraded (credit rating) or, in extreme cases, because it defaults.
Liquidity risk	Initially to raise the liquid cash to meet collateral obligations, or to execute a transaction at the current market price (funding versus asset liquidity).
Operational risk	Systems failure, management errors, faulty controls, internal or external fraud, human error, inadequate processes.
Legal and regulatory risk	Contract unexecutable as the counterparty did not have the authority, changes in laws or regulations.
Business risk	Making the wrong business decisions; miscalculating demand, pricing, technology, channels, marketing.
Strategic risk	Incorrect business strategies.
Reputation risk	Loss of reputation for fair dealing, loss of belief that a firm is successful, legal execution of the business, dealing in 'disreputable' activities.

3.1 Risk categories

An investor typically assesses the overall risk level of a given project prior to agreeing to participate in a project and extend financing. In a regulatory framework risk is generally categorised by type. Each risk type (Table 2) is measured, managed and reported, and the aggregate level of risk is then compared to the expected return to make an investment decision.

Project finance in general, and large hydropower projects in particular, may present a mixture of risks under these categories simultaneously. Sound management of technical, financial, legal, regulatory and other risks is needed for a successful project. Business and regulatory risks (eg failing to acquire the necessary permits and licences or to conclude negotiations on risk allocation and sharing between the various public- and private-sector actors involved) pose the largest risks to project finance in the early stages of a project. These are followed by risk in the construction phase (unforeseen delays and interruption), which may result in liquidity and credit risks (eg failing to make payments or secure additional funding). Not addressing the E&S risks adequately could be one cause of the risks described above. The impact could also be severe if a risk materialises during the operational phase. This may be caused by poor planning and implementation (operational risk) or by a changing regulatory environment (regulatory risk).

3.2 How does the private sector address environmental and social risk?

Typically, potential private developers assess E&S risks in terms of mandatory compliance with applicable national standards and lenders' requirements.²⁴ They balance these with other categories of risk and benchmarking against accepted good practice in due diligence processes to arrive at a business decision whether to participate in a particular project, and on what terms. In practice, private developers usually have several decision gates in the project-preparation process, as they identify, weigh and assess risks and opportunities, and commit new tranches of funding. Box 2 illustrates a range of internal risk-management processes at companies that develop hydropower.

Private financial institutions (PFIs) that consider participation in a consortium — whether as lenders, equity investors or otherwise — consider a variety of

Feedback from industry dialogue

"In considering an investment in hydropower there is nothing the Board of a company dislikes more than uncertainty in how uncertainty will be handled."

²³ In addition, various other project-related risks exist, such as geotechnical and construction risks, hydrology risk and E&S risks.

²⁴ Some standards are subject to interpretation as regards quality and effectiveness in avoiding or mitigating adverse impacts and enhancing positive impacts.

BOX 2 INTERNAL RISK ASSESSMENT APPROACHES OF COMPANIES VARY

Most large companies have corporate social responsibility commitments and internal procedures. For example:

- Odebrecht (Brazil) undertook an internal evaluation of all company procedures against IFC Performance Standards when it applied for a partial risk-guarantee facility to finance hydropower and other infrastructure projects, and otherwise places E&S risk in the high-risk category in internal assessment procedures.
- Statkraft (Norway) uses a system whereby senior department managers sign off on assessments of risk at various stages of project preparation to authorise successive tranches of spending financed by equity.
- MW Global (USA) operates an internal risk-management committee that vets all project-preparation studies prepared for private developers, and proposals to work with contractors and partners on the construction and implementation of projects, including engineering, procurement and construction proposals.
- Bhote Khosi (Nepal) undertakes normal ESIA studies and applies the ISO1400 family of standards as part of a continuous improvement process in E&S management.

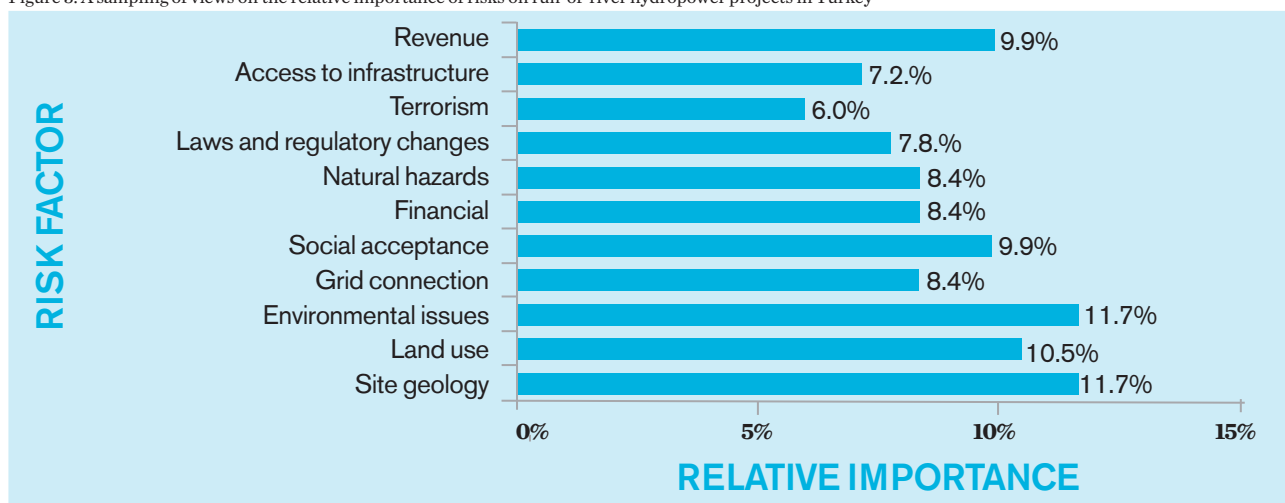
potential E&S risks, even when the project complies, or appears to comply, with the nominal standards embodied in the laws of the host country. Their primary concern during the transaction appraisal processes and subsequent negotiations on whether to extend project financing is to identify and limit exposure to financial, legal and reputational risks. Other risks, such as governance risks that are part of country risks may also be a concern.²⁵

The private developer and its equity partners will balance the various technical, legal, financial, E&S, market and country risks they see and decide which are more significant than others. Broadly, this argues for assessment tools (such as the HSAP) that improve the ability to look comprehensively across all risk categories, and do not only look at E&S risks in isolation. But generally, on their own, higher E&S risks as perceived by private developers may not be the major impediment to responsible private-sector investment in hydropower. Rather, how E&S risks are weighed and factored into the overall risk assessment calculations that private developers and lenders make, and in independent due diligence studies they commission, is a key consideration.

One illustration of the private-sector perception of the relative importance of a selection of risk factors on run-of-river (ROR) schemes is illustrated in Figure 3, which provides data for Turkey. Site geology and environmental issues were seen as the two most important risks.²⁶

In practice a company's risk assessment processes will detail project-specific risks, such as identified in the project's ESIA studies; but as they escalate up the corporate ladder and are communicated to the executive and board levels, the attention and focus may be more about business risk. For an environmental incident, the risk will be of a fine or prosecution, or reputational risk, not so much the risk to the biota or surrounding community. If regulatory capacity is weak, the developer may assess the business risk from an incident to be low and not spend additional money on preventing it, but instead deal with it if it happens and it is picked up by monitoring. Hence the standards and supervision capacity of national governments are important for sustainability, as is the consideration of risks that all stakeholders may perceive to be important.

Figure 3: A sampling of views on the relative importance of risks on run-of-river hydropower projects in Turkey



Source: Kucukali, 2011

²⁵ Although the ability to identify and manage risk concerns all financial actors, the perspectives are subtly different. Some actors, such as MFIs, are concerned with ways to improve the overall country risk-management framework established by the body of relevant law and regulation. Bilateral export credit agencies may also offer guarantees to mitigate country risk.

²⁶ Based on a qualitative assessment where 14 experts from commercial banks and companies involved with ROR schemes were asked to grade the relative importance of risk factors in ROR projects, which typically have comparatively low resettlement and reservoirs (Kucukali, 2011).

Private developers also need to understand if they can manage E&S risks and thus decide what risks they may take at implementation and operation stages, and what risks they expect the government or third parties to manage, and if they are likely to deliver.²⁷ Most companies are reluctant to assume risks they cannot manage alone, and thus a process involving all parties is needed. Private developers must also judge whether they have sufficient internal capacity and financial resources to assess the critical risks accurately upfront, and whether the government has the capacity to deliver its part of the bargain, along with a contingency plan if it is unable to do so.

3.3 Managing environmental and social risk over the project cycle

Figure 4 illustrates the project cycle for an IPP project and Figure 5 shows the agreements, contracts and partnerships that are typically put in place.²⁸ Apart from strategic planning where the government decides the regulatory framework, including national E&S standards to apply, the three main stages start with project preparation

Feedback from industry dialogue

Staff of a developer in charge of ESIA's must make a business case to their manager for ESIA study budgets, and in effect compete with other disciplines for budget. Justification is needed for incremental spending (beyond normal) to demonstrate the added value of meeting higher E&S standards during construction and operation.

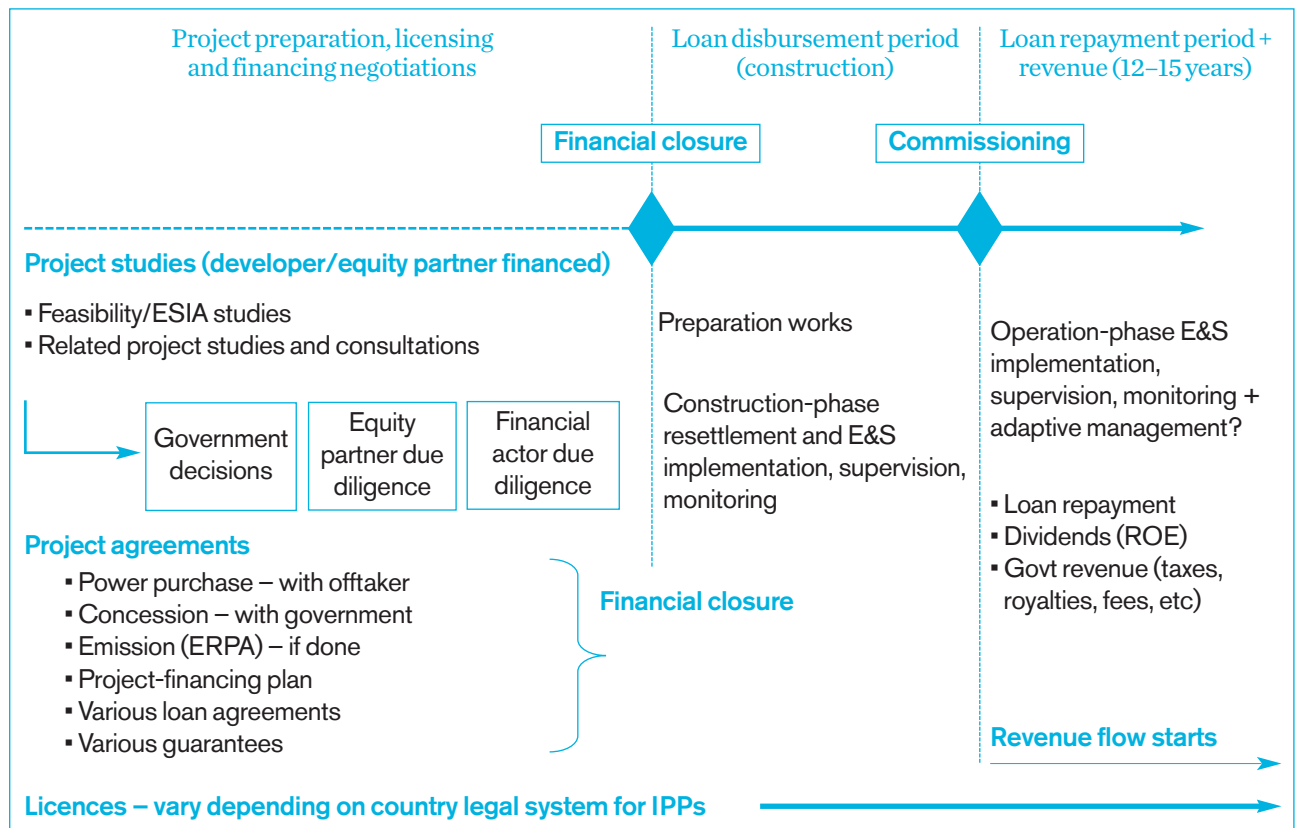
and include implementation and operation stages that span the concession term, generally of 25–30 years or more.

Once the developer acquires the concession rights, a locally incorporated project company is usually formed as the legal entity to construct and operate the hydropower project, where an equity stake is held by the consortium partners (eg the private developer and other equity investors). In public-private hydropower projects, such as the Nam Theun 2 project in Lao PDR, the government itself may also take an equity stake, which it must finance.

Preparation phase

Typically, the developer (project company) is responsible for the project-preparation studies and bears all expenses

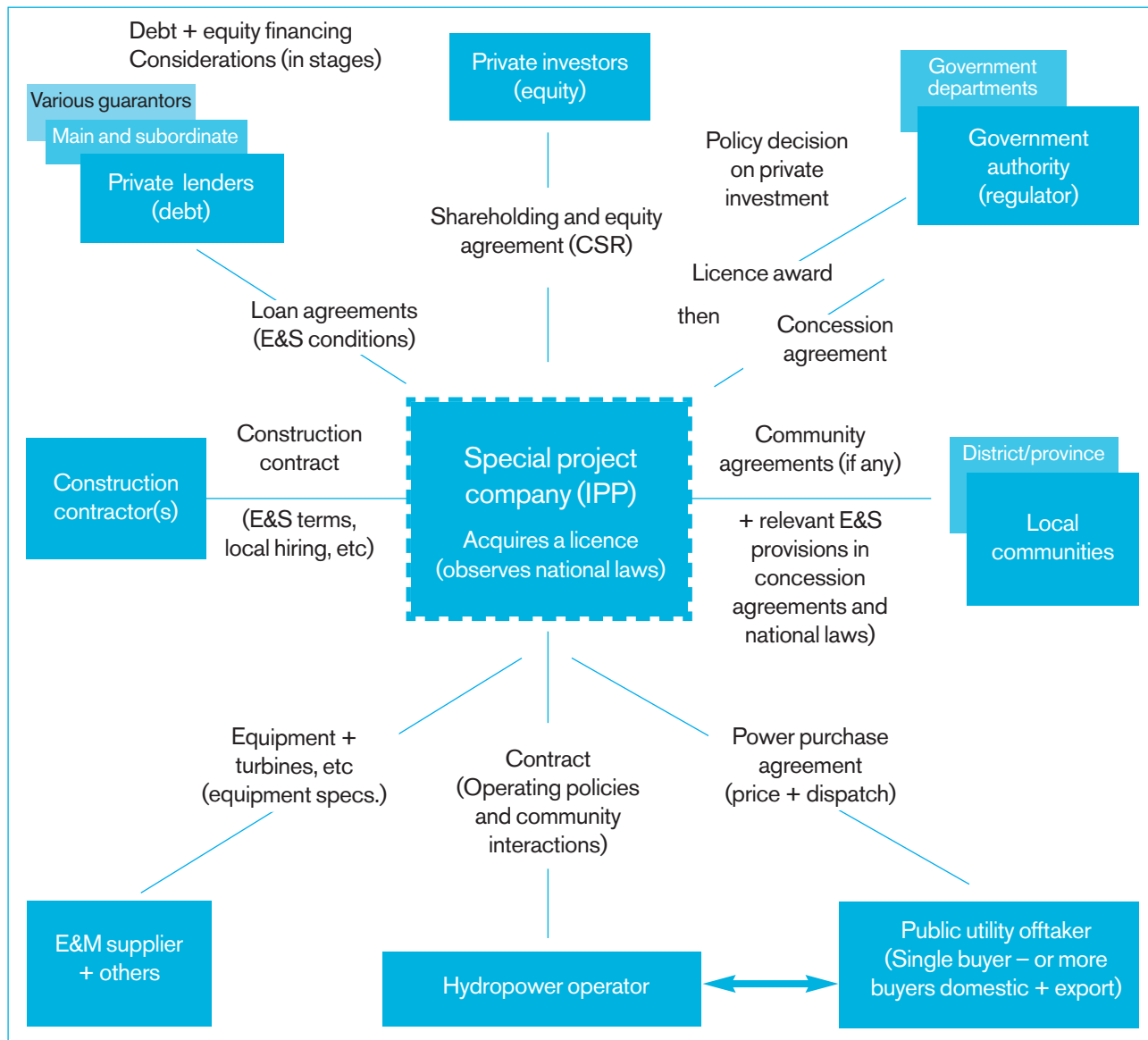
Figure 4: Risk assessment and management at different stages of the project cycle in private hydropower development



²⁷ When governments implement E&S activities as part of their commitment to a project, but due to lack of capacity (or other failures) this is not carried out in time or correctly, the impact on the project is the same in terms of potential delays, but developers may be almost powerless to address the issues.

²⁸ In a comprehensive risk-management framework, E&S issues need to be considered from the strategic planning stages, where the actual options are identified, and through the subsequent stages of the project lifecycle. Strategic planning is also fundamentally important to select alternative river sites to avoid and minimise adverse impacts of potential dam options. The private sector typically comes into the picture only after the government has reached those kinds of decisions, though there are circumstances where a private developer's feasibility study may consider site location options for a dam, but generally within the same river reach.

Figure 5: Illustration of actors and relationships in a private hydropower project



and risks during the development stage, as noted in Figure 4. The upfront development costs are recovered if the project is built, but are lost ('abort costs') if the project should fail to reach completion.²⁹ The developer, host government and utility (offtaker) negotiate project agreements, including the concession agreement (Figure 6) that establishes responsibilities to share or manage various risk.³⁰ The studies and project agreements, with the financing plan that the developer prepares form part of a security package used to finalise the lending and equity finance agreements and support financial closure, which is a milestone that typically culminates in an event on a single day when all financing parties gather to sign the various project-financing instruments concurrently.

Full financial closure is finally reached if and when all conditions in the agreements are satisfied within a pre-defined period. This is a typical strategy to short-circuit the 'chicken or egg dilemma' of signing binding agreements and securing funding at the same time.

Including the incremental costs of improved E&S measures in the project-financing plan may be accomplished by a combination of providing additional budget, higher contingencies or financial products to help mitigate risks, such as E&S performance bonds and insurances. The challenge is that upfront money spent assessing E&S impacts and management plans is not recoverable if the project fails to reach completion. This

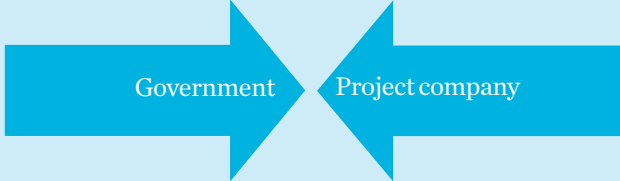
²⁹ Developers argue short-term borrowing costs and financing charges require deep pockets and may be prohibitive, which adds to their reluctance to borrow to finance project-preparation studies.

³⁰ Although there may be a complex array of agreements and letters of commitment, key agreements include: first, the PPA between the project entity and electricity utility (domestic or foreign) that establishes the tariff structures for long-term power offtake and the mode of operation of the reservoir for dispatch (among other operating parameters); and, second, the concession agreement or licence between the national authority and project entity, which typically encompasses E&S management obligations and the allocation of responsibility to manage the various types of project risk, including the E&S risks, as well as construction, hydrological, market, currency, financing, etc.

BOX 3: HOW MUCH MIGHT PRIVATE OR PUBLIC DEVELOPERS SPEND IN THE PROJECT PREPARATION STAGE?

- US Security Exchange filings (August 2003) suggest that AES Corporation spent upwards of US\$75 million (all activities) before abandoning construction of the 250-MW Bujagali project in Uganda in 2003, due to multiple controversies over national affordability, governance issues, allocation of risk between the government and the developer, and local environmental and cultural concerns.
- In 2011 Brazilian developer Odebrecht abandoned feasibility studies on the 1,287-MW Tambo 40 project in Peru due to social unrest, despite sunk investment and studies to secure the concession.
- By 2013 Sithe Global had spent over US\$11 million on third-party environmental, technical and legal costs associated with the development and financing of the proposed 165-MW Amaila Falls project in Guyana before it withdrew amid growing controversy over hydrological and environmental impacts that precluded it from securing project loans.
- Public developer Hydro-Québec reportedly spent upwards of US\$70 million on E&S baseline and related studies before shelving the multi-billion dollar Great Whale hydro-electric project (James Bay Phase 2) in 1994, after intense debate over its environmental and cultural impacts affecting First Nation indigenous peoples.
- The Nepal Electricity Authority backed by MFIs spent upwards of US\$25 million before abandoning the preparation works on the 401-MW Arun 3 project in the early 1990s due to a combination of issues related to environmental and social impacts and export sales.

Figure 6: Concession agreement terms negotiated in project preparation stages

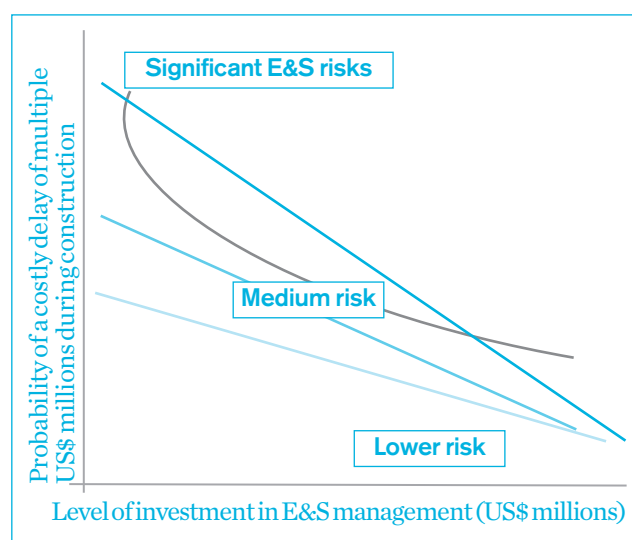
NEGOTIATED OUTCOME	TYPICAL ELEMENTS OF CONCESSION AGREEMENTS
<p>In terms and allocation of risk, who absorbs or manages various risks and over what period?</p> 	<ul style="list-style-type: none"> ▪ Exclusive property rights ▪ Concession term ▪ Social (resettlement and livelihood restoration) ▪ Environmental impact mitigation and management ▪ Other development enhancement and public infrastructure ▪ Transfer to government ▪ Royalties and taxes ▪ Buy-out conditions

Adapted from Helsler (2013).

limits how much a private developer may be willing to spend on ESIA, including baseline surveys and E&S risk assessments, let alone additional studies that go beyond business-as-usual practice, and regulatory requirements.

Developers of smaller hydropower projects may spend a few to several million dollars on project-preparation studies. On larger projects, preparation costs may be considerably more (see Box 3), which invariably leads developers to make trade-offs (eg how much to spend on ESIA versus on-site drilling to prove geotechnical conditions, where civil works are often up to 70 per cent of project costs). In situations where the amount budgeted for E&S measures is 3–5% of the total capital cost, E&S spending may be lower than contingency budgets for geotechnical risk. Thus the incremental cost of improving E&S measures may be absorbed in project financing arrangements and internalised in PPA negotiations, if they are known and quantified in advance.³¹

Figure 7: Effectiveness of investing to manage risk is project specific



³¹ For construction-phase E&S risk mitigation, it is harder to raise an additional US\$1m for unforeseen impacts after financial closure than it is to raise US\$501m instead of US\$500m for the investment, wrapping incremental costs of improved E&S into the overall project-financing package (debt and equity).

Figure 7 conceptually illustrates the risk trade-offs where investments in E&S management (funded by debt) reduce the risk of construction delay (risk to the developer's pocket totally or partially). Given that risk profiles differ significantly between projects, developers need to assess which of the many possible risk-management lines they are likely to be on. They can reduce some risks by additional funding to improve project preparation and planning; others may be less responsive.

Governments and investors also want to avoid pre-construction delays that can last years. Such delays can tie up resources and may prevent them taking up other power-supply options. Delays are costly for society at large, particularly when the economic and social costs of unserved electricity demand are high. Good E&S studies can reduce arguments and controversy over E&S and speed up decisions on projects, even though enhanced studies themselves may take additional, but limited, time. Steps to ensure the necessary E&S studies (or enhancements) are done in parallel with rather than after the necessary technical studies (eg feasibility studies) are helpful. Government regulators and developers have a strong interest and also a shared responsibility in ensuring the project-preparation stage is robust, optimised and has maximum public acceptance as an inclusive process.

Implementation phase

At this stage the private developer is responsible for the environmental and social management and monitoring plan (EMMP), including resettlement and livelihood restoration as specified in project agreements with the government, as lending conditions (if any) and with reference to national laws.

The developer does not risk money (equity) with implementing measures that improve risk management, unless they have been included in the financing plan (loans), which ideally includes contingencies to manage unforeseen risks.

Sustainability assessments undertaken during the construction stage can also inform negotiations between all parties on the release of financial contingencies to manage unforeseen problems that may trigger actual construction delays or other costs. As Table 3 indicates, perceptions of risk and the type of support needed to more effectively manage risk also depend on the size and experience of the developer, as well as the project's complexity and scale.³² Sustainable development nevertheless means that a project of any scale (large or small) must still deliver promised local benefits and grow local economies that the project affects, beyond compensating those people directly affected for loss of property and livelihoods, and managing impoverishment risks effectively.

Operation phase

After a private hydropower project is commissioned, the revenue provided by the PPA — usually struck with a public utility — is applied to operate the project and finance the operation-stage EMMP, along with related community participation and reporting. Revenue is also applied to retire project debt, pay taxes and make dividend payments. The private operator's main interest at that stage is to meet contractual obligations locked into the project agreements reached prior to financial closure (several years earlier), including handing over public infrastructure and services to agreed schedules.³³ It therefore makes sense for all parties to

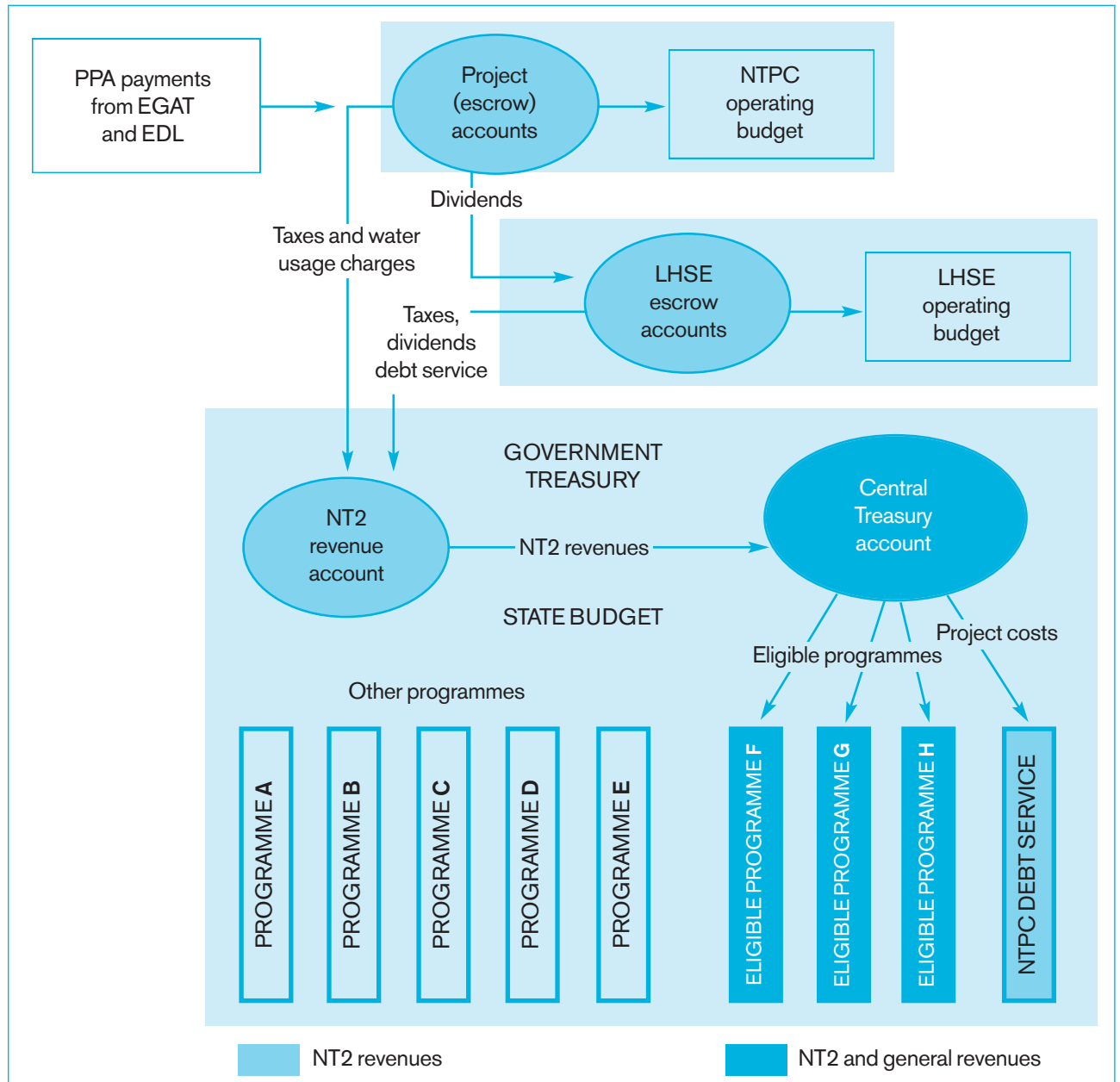
Table 3: Illustration of perspectives of small and large hydropower developers

SMALL DEVELOPER PERSPECTIVES	LARGE DEVELOPER PERSPECTIVES
<p>Smaller developers typically have limited financial resources. As a consequence, they argue public funding is needed to offset the cost of improving risk and sustainability assessments beyond what is required by the government, and to 'backstop' financing of additional measures that such assessments say are needed. Some measures, such as an independent international panel of experts, are proportionately higher for small hydropower projects developed with local technical capacities, especially when a small developer's comparative advantage is related to lower project costs. (From an HSAP perspective, projects that do not involve an independent safety panel will get an unsatisfactory score in this respect).</p>	<p>Larger developers typically have corporate social responsibility (CSR) policies that influence their interest in improving risk assessments in project preparation and scrutiny in construction and operation stages. The CSR commitments of responsible developers and lenders, lead some (not all) developers to favour projects that exhibit a lower E&S risk (eg ROR schemes), all factors being equal. Pursuing low-risk strategies may suit CSR interests, but not the economic interest for optimal development of water resources. For more complex projects (eg with large reservoirs) responsible developers generally welcome MFI participation, which invokes more rigorous risk assessment and detailed management/monitoring regimes with supervision.</p>

³² For example, where the same number of panel-of-experts visits as needed on larger projects are required on smaller projects to meet higher ESIA standards and stakeholders' expectations.

³³ The project company hands over infrastructure and services such as health to local government on schedules in the concession agreement. The literature points to a number of concerns where local governments have limited funds to maintain infrastructure that is handed over (some a few years after commissioning), such as maintaining local roads and resettlement facilities and health services.

Figure 8: Proposed revenue and expenditure management arrangements on Nam Theun 2 in Lao PDR



Source: Mekong River Commission (2014) adapted from the World Bank (2005).

ensure that adequate operation-stage contingency budgets and other financial products (eg letters of credit, performance bonds and environmental insurances, etc)³⁴ are factored into long-term project agreements and hence the private investor’s profitability calculations and consumer tariffs. More attention to critical risks when project agreements are finalised helps to achieve that aim. Construction- and operation-stage protocol assessments (undertaken later, and

several years apart) then help to establish the priorities for the release of those contingencies and insurances and more broadly to consider gaps in promoting sustainability in national regulations by benchmarking against best practices.³⁵

For illustration purposes only, Figure 8 depicts revenue- and expenditure-management arrangements proposed for the Nam Theun 2 (NT2) hydropower project in Lao

³⁴ For example, Lao PDR’s standard Concession Agreement Model for IPP hydropower projects and mining project concessions (2014) includes provisions for the negotiation of amounts for: (i) Environmental and Social Obligations Letter of Credit; (ii) Unanticipated Adverse Impacts Letter of Credit; (iii) Resettlement Termination Obligations Letter of Credit; and (iv) Environmental Insurance.

³⁵ From a government perspective, such assessments undertaken in an inclusive way may help reinforce monitoring and adaptive management and prepare for negotiation of new concessions when existing terms are due to expire.

PDR in 2005 (MRC, 2014).³⁶ The model shows how hydropower revenue flows to finance various obligations during operation, including payment to the government's Treasury account. It also provides a context for a longstanding criticism of private hydropower, where commercial agreements can limit flexibility (and financial incentives) to address unforeseen E&S impacts that inevitably arise over concessions that span 25–40 years or more. In the NT2 case, during project preparation, consideration was given to flexible revenue- and expenditure-management arrangements for the net US\$80 million per year the Lao PDR Treasury was to receive while project debt was repaid (though concerns have arisen over the allocation to national poverty-alleviation programmes since NT2 operations began in 2010, which were part of lending conditionality).³⁷

Interest and experience are growing, for example, with revenue-management arrangements and market-based financing mechanisms (revenue sharing) to more equitably spread resource-development benefits and flexibly manage operation-stage E&S risks over the longer term. Although regulation of this nature is a government responsibility, private developers have a stake in reducing uncertainty with respect to what is expected of them and impacts on their operations. Most developers also feel pressure from local communities to help finance local development needs, which signals public expectations, but which developers may argue are beyond their project and legal remit. The implementation of improved E&S standards is particularly attractive to risk-averse investors that take a long-term view because the measures improve the likelihood that the project will have fewer E&S problems during the full concession period and a mechanism is available to help address local development concerns that arise.

To some extent mechanisms are already being introduced on MFI-supported projects that use hydropower revenue to fund public watershed-management entities and permanent community-development funds. These also link to funding sustainable management of land and natural resources, including measures to reduce soil erosion and plant headwater forests in ways that create synergies for local development, improve water management and help to protect long-term hydropower revenue flows (eg reducing silting of reservoirs that reduces useful reservoir storage and power-generation capacity), which is a significant benefit for private investors, power purchasers

and governments alike, and a fundamental part of sustainability. In some countries revenue sharing has long been part of the constitution (eg Brazil). Other countries have more recently introduced regulations — or are contemplating them — that allocate a portion of hydropower-project revenue to permanent local area-development funds and area watershed-protection and -management programmes, the cost of which is imbedded in regulation or concession agreements and ultimately in consumer electricity tariffs (MRC, 2014).

3.4 Definition of roles: the national context

Many actors are involved in hydropower developments, which means the clear allocation of responsibility to manage E&S impacts and risks, though not a panacea, is an overarching consideration that is essential to improve sustainability outcomes and achieve full development benefits. For hydropower to remain competitively priced and attract private investment, a certain level of public- and private-sector risk sharing needs to be achieved, which leads to a more realistic probability of a public-private partnership (PPP) where the appropriate risks are shared and managed by both parties. Box 4³⁸ illustrates how private hydropower developers in Lao PDR in 2014 called for greater clarity in the legal responsibility of the government and developers to reduce poverty in hydropower-project areas beyond the resettlement area.

In many LDCs regulatory capacity is weak, and although the government may take on part of the risk management, it will often lack the technical capacity or

BOX 4: DEVELOPERS ASK FOR CLEAR LEGAL OBLIGATIONS FOR ENVIRONMENTAL AND SOCIAL IMPACTS

Hydropower developers want to better understand the extent to which their contribution and role in government- and community-managed benefit-sharing schemes is used to help reduce poverty and improve people's livelihood. "Companies need to know their requirements. If language in legal documents is vague, there is room for misinterpretation or confusion."

³⁶ Project revenue is derived from PPA agreements between the Nam Theun 2 Power Company (NTPC) exporting to Thailand (EGAT) and selling domestically to Lao PDR (EDL). After operating expenses, revenue is allocated to the state holding company (LHSE) to accommodate the government's equity share. Other amounts are released for dividend and debt service arrangements. The balance of the revenue flows to the national Treasury for allocation in the state budget process. The net revenue Lao PDR receives from EGAT power sales is about US\$80 million per year (for the current PPA and concession agreement). NT2 revenue management policies were agreed with the IFIs that provided loan and credit guarantees (MRC, 2014).

³⁷ See World Bank NT2 Implementation Status & Results Report June 2014 www-wds.worldbank.org/external/default/WDSContentServer/WDSP/EAP/2014/06/29/090224b082541c33/1_0/Rendered/PDF/Lao0People0s0D0Report000Sequence006.pdf

³⁸ IFC – Mekong Hydropower Developers Working Group (2014) www.ifc.org/wps/wcm/connect/lao_ext_content/sustainable_hydropower/news/hydropower+developers+working+group+appoints+governance+committee+and+prioritizes+top+issues

budgetary resources to deliver. In countries where many hydropower projects are planned, it makes sense to target public finances to bolster regulatory capacity alongside measures to motivate voluntary adoption of better risk management, with a genuine commitment to critical risks (ie a business case), rather than to expect that private developers will assume responsibility for broader, possibly less well-defined risks they are ill placed to manage effectively.

Political support and a clear policy framework for integrating sustainability into infrastructure projects are factors, even where some regulatory capacity exists. Not only does regulatory capacity sometimes need bolstering, but also measures are needed to increase public-sector accountability and transparency to show that regulatory functions are being delivered. Transparency International offers a number of new tools such as integrity pacts to help improve public acceptance of hydropower and public- and private-sector roles.³⁹

These trends all reinforce new thinking where multi-stakeholder risk assessments help to reduce ambiguities and clarify responsibilities, which helps attract responsible private investment. At the same time, the assessments done in an open and transparent way help the government regulator to ensure that risks the public sector absorbs to make hydropower projects attractive to private financiers and to secure the development benefits come at an acceptable price. A recent report on power-sector regulatory reform in the Economic Community of West African States (ECOWAS), which argues that capital risk is the greatest barrier to the penetration of renewable energy sources in Africa, emphasises “one of the roles of the regulator is [the] balancing of investor risk with the need to protect final users from excessive and improper electricity costs” (NARUC, 2014).

³⁹ Transparency International www.transparency.org/topic/detail/water

Why call on international public finance?

4

Neither the public nor the private sectors alone can provide the US\$10,000 billion that the International Energy Agency (IEA) estimates is required to invest in power generation to 2035, mainly in emerging-market economies and LDCs, where over 1 billion people still lack basic electricity access. A significant share of the world's remaining 13,000 terawatt hours per year of hydropower potential is in emerging-market economies and LDCs, especially in Africa, Latin America and Asia.

Over the past decade international public finance extended through bilateral and multilateral channels has significantly influenced hydropower sustainability and financing trends. MFIs have increased support in parallel with improving mandatory standards, but still represent a small percentage of projects globally. That the Equator Principle lenders and OECD bilateral programmes now require IFC Performance Standards for project appraisal is an important step in the right direction, but still does not invoke the full monitoring that IFC support extends in construction and operation.⁴⁰ In bilateral terms, China in particular has stepped up official assistance and underwriting of commercial financing for hydropower to the point that it now accounts for half of hydropower investment globally, mainly applying national standards to manage E&S risks.

International public finance clearly recognises that improving standards is synonymous with improving the capacity of private developers and governments to work together to better manage risk, and thereby improve investment conditions. The 'standards ladder', undergoing progressive improvement as a risk-management

framework, proves the point. Industry also regards improving E&S standards on a statutory or voluntary basis as good for business, if achieved in a transparent, practical way linked to hydropower financing and revenue streams (see Annex 1). Responsible developers suggest voluntary adoption of improved standards is, or could be, part of their business model, where they can offer governments assurances they can manage stakeholder expectations and risks and deliver projects on schedule, if governments value those aspects.⁴¹

4.1 Reinforcing bilateral support for public-private partnership in delivering sustainability

Among the direct outcomes sought by international public finance is the unlocking of private investment to enable emerging-market economies and LDCs to develop the infrastructure they need to support poverty-alleviation, development and growth and to move towards sustainability. Many considerations shape the evolving role of international public finance in private-infrastructure provision. Those relevant to considering MFI and bilateral roles include the alignment of public support through MFI and bilateral channels, and the calls for result-oriented approaches, such as the Paris Declaration on Aid Effectiveness (2005), which recognises that bilateral and multilateral aid could and should have a greater impact (see Box 5).

BOX 5: FIVE PILLARS OF THE PARIS DECLARATION ON AID EFFECTIVENESS

1. **Ownership:** Developing countries set their own strategies for poverty reduction, improve their institutions and tackle corruption.
2. **Alignment:** Donor countries support these objectives and use local systems.
3. **Harmonisation:** Donor countries co-ordinate, simplify procedures and share information to avoid duplication.
4. **Results:** Developing countries and donors shift their focus to development results, and measure those results.
5. **Mutual accountability:** Donors and partners are accountable for development results.

BOX 6: OTHER AIMS AND RATIONALES FOR BILATERAL SUPPORT

- To contribute to national development objectives aligned with bilateral support in poverty reduction and sustainability.
- Overcoming market failure, which helps ensure a level playing field for responsible investors.
- Supporting improvements in governance and regulation, recognising limited capacities and financial resources.
- Incorporating sustainability into business practices.
- Building capacity in the private sector for adopting best practices in risk assessment and management.

⁴⁰ For example, when the UK Commonwealth Development Corporation applies IFC Performance Standards in project-preparation stages and to appraise potential support for private-sector hydropower projects in ODA, though highly positive, the full implementation and oversight capacity of the IFC for implementation is not engaged in the same degree as an actual IFC Partial Risk Guarantee.

⁴¹ When the government process to select a private developer is competitive (ie competitive bidding for a license), a responsible developer may place itself at a commercial disadvantage by volunteering to implement best practice or higher E&S standards (ie adopt more costly measures for environment and social management) than those legally required. This is especially a concern if the country places little value on the improvement of project-related risk management and sustainability, or has no mechanism in place to account for those aspects in selecting among the competing bids of potential private developers. On the other hand, some responsible developers and investors claim that offering to implement best practice (equivalent to offering to use best practice or implement higher standards) is part of their comparative advantage and business model, or could be (See Annex 1).

Many OECD countries have bilateral ODA programmes in the aid, trade and climate-change fields that directly or indirectly support private-sector hydropower, which may or may not have MFI support.⁴² These include, for example: hydropower projects that receive ECA support for equipment and services; financial products and services underwritten by bilateral governments delivered through commercial banks; bilateral financial grants and other financial products to foster private-sector capacities in developing countries that involve hydropower; and hydropower projects that receive bilateral carbon-financing support.

Broader policy aims for considering bilateral support to help de-risk private-infrastructure investment in developing countries are noted in Box 6, that may apply to existing bilateral programmes at sector, country or regional levels, and aim to improve government regulatory capacity and the quality of private-infrastructure provision.

One underlying argument in this paper reflects the view that hydropower has gone from public development to private-sector models in many countries, and may now be headed for a next generation of public-private co-operation, which affords greater opportunity to ensure sustainability and manage risks (after Head, 2000 and Rabin, 2008). In this respect, traditional PPP thinking may move from the project level to promoting broader public-private collaboration to better incorporate sustainability into hydropower business practices.

Calls for results-oriented approaches in aid and trade (eg the Paris Declaration, 2005) suggest that underpinning existing initiatives with new sustainability assessment tools is a good strategy, in particular the multi-stakeholder HSAP with its four assessments (Early Stage, Preparation, Implementation, and Operation).⁴³ This approach is consistent with the MFIs, where the World Bank supports the Protocol as noted in its energy strategy, *Towards a Sustainable Energy Future for All—Directions for the World Bank's Energy Sector* (World Bank, 2013). After its latest review (Liden and Lyon, 2014) the WBG will now finance use of the Protocol on a voluntary basis on hydropower projects in its portfolio. The review also emphasized that the Protocol complements, rather than competes with its safeguarding policies and is a useful tool to guide the development of sustainable hydropower to reduce risk to lenders and all stakeholders.

4.2 Where targeted bilateral support can make a difference

Three main areas have been identified where additional public-sector funding support could improve the development returns of infrastructure strategies that involve the private sector:

- First, improving the identification and allocation of responsibility to manage E&S risks in more open, transparent and collective reviews of risk, and identifying the cost of managing those (respecting aspects where commercial negotiation is needed).⁴⁴
- Second, reducing the financial risk developers face in voluntarily improving upfront preparation work (eg increasing investment in ESIs), where the developer alone bears the 'abort costs' if a project does not go to completion.
- Third, providing support for processes and mechanisms to better manage risks during project implementation (or operation) where government capacity to play its role effectively is weak, and also for projects that have achieved financial closure hence project agreements are already fixed.

To advance bilateral capacity to help developing countries de-risk private investment, a flexible result-oriented approach could include a three-part financing facility with:

- 1 **A grant instrument:** to fund new sustainability assessment tools to be applied by private developers working in co-operation with regulators and government authorities, in particular to use the multi-stakeholder HSAP for inclusive early-stage and project-preparation appraisals, wherein certified assessors help identify critical risks and gaps to be addressed; for example, in the construction and operation stage EMMPs.
- 2 **A study-reimbursement/risk-sharing instrument:** to guarantee reimbursement of developers' costs of enhancing project-preparation studies to help ensure the cost of improved E&S risk-management provisions is included in the project-financing plan (and convincing all parties of the merits of doing so, including government negotiators, offtakers, private

⁴² As a measure of aid flows, in 2013 the 28 members of the Development Assistance Committee (DAC) reportedly contributed about US\$135 billion as ODA, the European Commission as an entity about US\$15.9 billion, and non-DAC countries an additional US\$9.4 billion. Total bilateral and multilateral climate-related external development finance to developing countries reached US\$37 billion in 2013 (as recorded in OECD DAC statistics; see www.oecd.org/dac/environment-development). The OECD defines ODA as: "Flows of official financing administered with the promotion of the economic development and welfare of developing countries as the main objective, and which are concessional in character with a grant element of at least 25 percent (using a fixed 10 percent rate of discount). By convention, ODA flows comprise contributions of donor government agencies, at all levels, to developing countries ('bilateral ODA') and to multilateral institutions. ODA receipts comprise disbursements by bilateral donors and multilateral institutions. Lending by export credit agencies—with the pure purpose of export promotion—is excluded." See <http://stats.oecd.org/glossary/detail.asp?ID=6043>

⁴³ See www.hydrosustainability.org for further information on the four protocol assessments.

⁴⁴ Putting the issues on the table so that different actors in an open, transparent and collective review, can assume risks (or as necessary negotiate responsibility for dealing with them), and include the costs in the project budget.

lenders and project equity partners). The guarantee is only invoked if the project does not achieve financial closure and the developer has to cover abort costs.

3 An implementation support instrument: to help finance the implementation of E&S risk-management measures in selected, qualifying projects (equivalent to applying higher E&S standards), where the technical nature of the measures is based on HSAP recommendations, or as a result of it, and eligibility criteria match national and bilateral programme priorities and special cases (eg offering financial products that lower the cost of borrowing, or a mix of direct lending at concessionary rates, technical assistance and potentially grant funding).

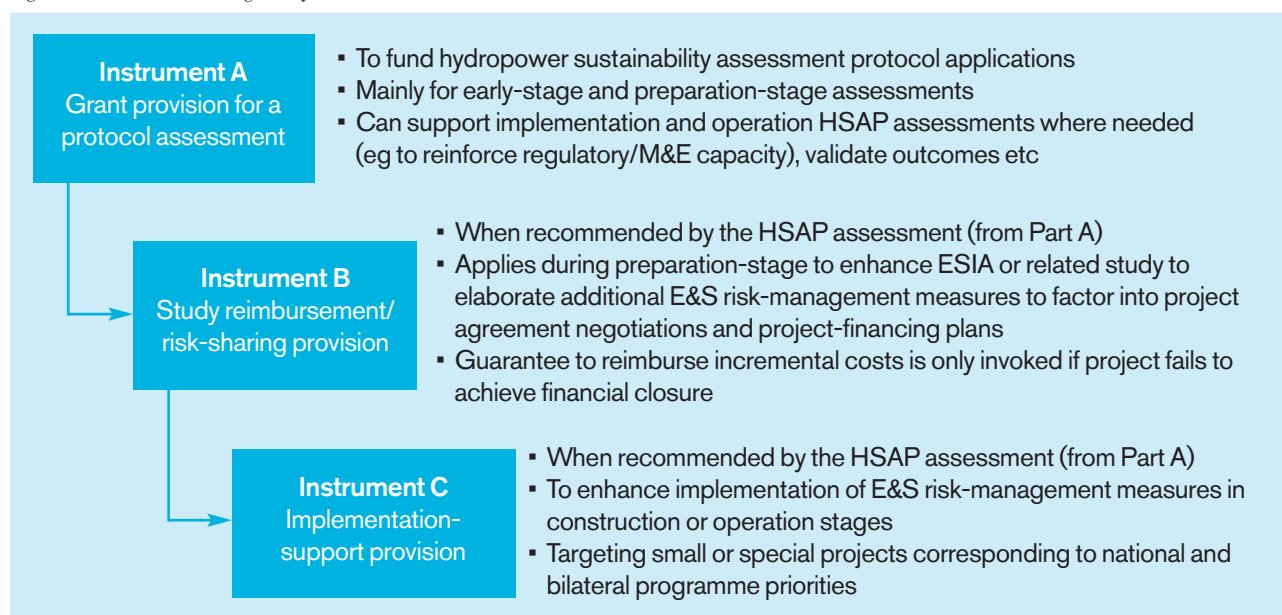
Figure 9 illustrates this three-part financing facility in terms of an 'ABC' arrangement, where three possible packages are a combination of instruments A, A+B, or A+C. This recognises that private developers and governments may be interested in one or more of these provisions for different project situations, depending on the stage their project has reached, and also whether it is a new project or a rehabilitation or extension of an existing dam project.

Although the primary aim of Instrument A is to support developers (or government regulators or a river basin agency in co-operation with the developer) in undertaking an early-stage or preparation protocol assessment before project appraisal, Instrument A grants may also fund implementation- and operation-stage protocol assessments. Structured assessments undertaken at that stage in an inclusive process by

independent certified assessors can help the government to reinforce weak regulation (eg monitoring and compliance capacity), where that is of value. They can also validate that the project delivered what was promised and establish a benchmark (sustainability audit) that may help draw lessons and provide a catalyst for continuous improvement of national E&S standards. Undertaking an operation-stage assessment conforms to WCD Policy Principles (ie respect for WCD Strategic Priority 3: Existing Dams), which call for periodic assessments of large dams. In this case the sustainability audit can inform continuous improvement of business practices and regulations. In parallel, the Protocol may be used by donor agencies to assess the quality of hydropower projects in the bilateral portfolio, whether support is extended for carbon-financing or other aims.

Completion of a Protocol assessment funded by Instrument A would be a prerequisite for applying for Instrument B or C support. The assessment would inform decisions on further steps in accessing the facility (eg Instruments B and C). For this it brings together inputs from the independent and certified assessors and views of government actors, the developer and stakeholders from the inclusive process the Protocol embodies. Instruments B and C may reasonably focus on de-risking the E&S elements of project sustainability, recognising there is no significant call for international public finance to help manage engineering or hydrological risks, the responsibility for which is negotiated and may be factored into project contingencies. It also recognises that E&S risk is the weakest part of the sustainability equation and needs reinforcing.⁴⁵

Figure 9: ABC bilateral funding facility illustration



⁴⁵ The unique challenges associated with improving the E&S dimensions of hydropower sustainability are detailed in the WCD (2000) and multi-stakeholder guidance for implementation of the Hydropower Sustainability Assessment Protocol (2010). If Bilateral Development Agencies feel that support to enhance project preparation study of other risks associated with hydropower development and management should be considered (eg managing risks not specifically related to E&S sustainability dimensions of hydropower, such as market risk during operation or geotechnical risk during construction, then additional 'windows' may be established on existing bilateral facilities for such technical support, or a new facility can be established for such purposes.

A further question is whether a financing facility would be perceived as a private-sector subsidy. An industry subsidy is not proposed. Rather, the approach is to help developing countries leverage profitable private investment and enhance sustainability in business practices. This aligns bilateral ODA support with international public-financing support already extended through programmes and financing facilities of multilateral institutions (eg IFC and MIGA). It recognises that capital risk is a significant barrier to renewable-energy sources in developing countries (NARUC, 2014), which has development consequences. Private capital would continue to support profitable investments, while public funds seek to underpin good development outcomes in the broader public interest.

Introduction of the funding facility

A phased strategy to introduce the facility may be considered, such as to open the grant instrument window first to support sustainability assessments across all four stages of the project cycle (ie early-stage, preparation, implementation- and operation-stage protocol assessments).⁴⁶ After trialling Instrument A, windows for other instruments may be opened, applying eligibility criteria and funding ceilings that are based on a review of Instrument A outcomes and industry consultation. Further opportunities exist for collaboration among bilateral programmes and to co-ordinate with ongoing MFIs and Equator Principles Association efforts.

Possible take-up of the financing facility and scale

Instrument A: Responsible private developers may be interested in how early- or project preparation-stage Protocol assessment improve their calculation of risk (all topics) and to compare with best practice in managing particular risks. A specific aim may be to negotiate successfully with government and private lenders on incorporating measures into the project agreements and financing plan that address gaps the Protocol identifies (eg with regard to the business case for improving E&S standards), where the motivation is to reduce risk overall.⁴⁷ The implementation- and operation-stage Protocol assessments (funded by Instrument A) may reveal the opportunity to improve practices and to reinforce specific regulatory and monitoring capacities of the government, as well as identify the potential for value-added technical support from Instrument C in these regards.

A global and regional market assessment would help establish the number of hydropower projects supported through bilateral programmes that may be eligible for the Instrument A grant, and among those how many projects already attract MFI support that may offer equivalent support.

Using the Clean Development Mechanism (CDM) hydropower portfolio as a proxy indicator for the necessary scale of bilateral-only investment, if all 2,475 hydropower projects active under the CDM (2013 data) had been assessed with one protocol assessment (eg early stage) at US\$75,000 per assessment,⁴⁸ the total cost would have been US\$185 million for the total global CDM hydropower portfolio. Split equally among the 24 UNFCCC Annex II countries that finance carbon credits under CDM obligations,⁴⁹ the average cost per Annex II country would have been US\$7.7 million.

Overall in the global CDM hydropower portfolio of 244,711 MW, a total of 380 million certified emissions reductions (CERs)⁵⁰ were expected. That implies rates of roughly US\$750 per megawatt and US\$0.5 per CER as the cost of undertaking a preparation-stage protocol assessment. Projects in the CDM averaged 100 MW (see Box 7). If all four HSAP assessments were applied over the 10–15 year period, the total cost might increase by a factor of three, if one accepts that economies may be made in the cost of subsequent assessments.

BOX 7: PROVISION A AND B APPLIED THE CDM HYDROPOWER PORTFOLIO

Total CDM hydropower portfolio:

- Number of projects: 2,475
- Total capacity: 244,711 MW
- Average size 100 MW
- CERs (000's): 381.888

Provision A indicators (cost ratios):

- US\$75,000 per project per assessment
- US\$ 750/MW (equivalent)
- US\$0.5/CER of emission reduction equivalent
- Total: US\$7.7 million averaged over 24 Annex II Countries

Provision B indicators (cost ratios):

- At a 10% rate of invoking a guarantee of US\$1 million
- US\$10 million averaged over 24 Annex II Countries

⁴⁶ The UK Technical Assistance Facility (TAF). See www.pidg.org/what-we-do/companies/taf

⁴⁷ For example, in respect of the incremental costs of an improved construction- or operation-stage EMMP or resettlement action plan, or extending the term before certain public infrastructure or services are handed over to local governments after project commissioning.

⁴⁸ The direct cost of conducting an HSAP assessment on the US\$411 million Trung Son (260 MW) project in Viet Nam in 2013 was US\$ 130,000 for independent assessors, not including the costs of translation, interpretation, local travel, accommodation, and time for the developer's project staff. The average size of a CDM hydropower project was 100 MW, though many are smaller projects. Thus higher average cost may need to be considered for a wider range of project sizes.

⁴⁹ The 24 Annex II Parties to the UNFCCC including the EU and OECD countries required to provide bilateral financial and technical support to economies in transition and to assist them in reducing their GHG emissions by purchasing CERs.

⁵⁰ One CER equates to an emission reduction of one tonne of CO₂.

Instrument B: In other situations developers would be interested in Instruments A+B. This would enable E&S staff to make the business case to their respective executive for more in-depth preparation, without having to compete with pressures to spend on other potential risk exposures, provided the transaction costs of applying for the reimbursement guarantee (for incremental costs only) were not high and possibly backed by recommendations from the Part A protocol assessment. The cost of E&S management studies in project preparation stages (eg ESIA and related surveys, baseline studies and community and public consultations, and preparing construction- and operation-stage EMMPs) may be a few million dollars for small- and medium-scale hydropower projects. It would be more for larger and complex hydropower projects. The incremental costs of more in-depth study of topics identified in the Protocol typically would be a portion of these costs.

Thus a ceiling may be established of US\$1-2 million as a reimbursement guarantee, and there may also be merit in making this available directly to the financing institutions as part of the risk-capital provision. As an assumption, invoking the guarantee may occur on 10–20 per cent of projects. Using again the CDM hydropower portfolio as a scaling reference, with 10 per cent invoking the guarantee and the US\$1 million figure, the average cost per Annex II country would have been US\$10 million for Instrument B, applied to the whole CDM hydropower portfolio (as a one-time cost).

Instrument C: If Instruments A+B are undertaken successfully the need for Instrument C should be limited; hence an A+B+C combination is less likely because the main purpose (and business case) is to incorporate the

incremental costs of improved E&S measures in project-financing and revenue streams. Where projects have already achieved financial closure and are under construction, or operating, there may be special cases where A+C may be considered. That may be the case, for example, if the decision were taken to revisit all projects previously financed under bilateral support to ensure ongoing sustainable performance, and there is a case for technical assistance to help facilitate an operation-stage improvement in risk management to enhance the development outcome.

Overall, any bilateral financing facility must be designed in a collaborative process with industry, financing interests and government representatives, with a trialling and adjustment period. In practice, genuine use of the Protocol would lead to a range of outcomes depending on the nature and financial viability of a project and its setting. Ultimately, the Protocol will bring out factors that inherently reflect site-specific conditions (i.e. affecting the relative cost of developing the site's power generation potential) and the legal and regulatory environment for private investment in the country (including prevailing electricity tariffs and availability of alternatives). Equally, the degree of acceptance by investors will differ. Table 4 lists possible outcomes of implementing improved E&S measures on a project.

The premise of this paper is that more projects are likely in the first two categories than in the last two, and that the costs of improved E&S should also result in lower financing costs or extended maturities as the risks are assessed, understood and managed. It is likely that the risk guarantee (Instrument B) will only be triggered for a small number of projects every year.

Table 4 Possible outcomes of improved E&S measures supported by proposed instruments

SCENARIO	DESCRIPTION
Win-Win	Better management of E&S risks improves the profitability and sustainability of the project, lowers risks for all stakeholders, facilitates access to project financing, and enables the government to mobilise private investment.
Win	The incremental cost of measures to improve the management of E&S risks matches the quantifiable benefits, enables access to financing and allows the project to move ahead with less risk.
Goodwill (with responsible investors)	Cost of implementation of additional E&S measures is higher than quantifiable benefits, but enables the project to generate an acceptable return for responsible investors.
Risk situation	Measures to meet high E&S standards and mitigate associated risks may lead to protracted negotiation of project agreements and increase the risk of private investors withdrawing; or otherwise see the project proceeding with weak risk-management provisions and typically higher project costs.
High-risk situation	A combination of factors, including a complex or controversial project and a high-risk environment for private investment with weak or uncertain regulation, make the project unattractive for responsible private investors, unless MFIs participate.

4.3 Conclusions

Private-sector hydropower development is challenging. It will always remain controversial, particularly when the best available practices to manage E&S impacts and risks are underused or ignored outright. Advancing sustainable forms of hydropower with other renewable-energy options to reduce the carbon intensity of economic development and growth calls for new thinking and greater public- and private-sector co-operation to de-risk hydropower projects and reduce uncertainty about the roles in doing so.

Through the collaborative efforts of governments, industry and international civil society, new tools are now available such as the multi-stakeholder HSAP to help identify critical E&S risks and factor in measures to better manage them in project-financing and revenue streams. They open the door to greater voluntary adoption of improved standards by responsible investors and can help governments improve regulation. The efforts of MFIs and the private-finance community through initiatives such as the Equator Principles show that improving E&S standards is synonymous with reducing investment risk and improving development returns. Result-oriented innovation that extends international public support to further reduce private-sector risk at key points in the local development process is part of the solution.

References

- Fields, Daryl, Odegard, Lars, French, Laura, Revell, Geoff (2009) Directions in hydropower: scaling up for development. Water Working Notes; Note No. 21. Washington, DC, World Bank. See <http://documents.worldbank.org/curated/en/2009/06/10709396/directions-hydropower-scaling-up-development>
- Head, Chris (2000) 'Financing of Private Hydropower Projects.' World Bank Discussion Paper No 420, World Bank. Washington, DC.
- Head, Chris (2004) 'A Fresh Start: Prospects for Financing Hydropower in Developing Countries', Paper presented at the UN Symposium on Hydropower and Sustainable Development, 27–29 October 2004, Beijing.
- Heiser, Walter (2013). 'Lao PDR Hydropower Concession Agreements Key Issues.' Workshop presentation on Hydropower Development in the Mekong Region. Sept. 2013, Thailand.
- 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
- IEA (2014) World Energy Outlook (WEO-2014), and Technology Roadmap: Hydropower (2012). International Energy Agency. OECD/IEA, Vienna.
- IHA (2013) 2013 IHA Hydropower Report. IHA. See www.hydropower.org/report. Last accessed December 2014.
- IIED (2014a) Concept Note: Actions and incentives to improve delivery of safeguards and sustainability standards for hydropower and large dam projects and mitigation of climate change. IIED, London, UK
- IIED (2014b) Initial Findings Note on Actions and Incentives Initiative. Note circulated by IIED at the Stockholm International Water Week, September, 2014.
- Kucukali, S (2011) Risk assessment of river-type hydropower plants by using fuzzy logic approach. Paper presented at the World Renewable Energy Congress, 2011, Kinkoping, Sweden.
- 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. Washington, DC, World Bank Group. See <http://documents.worldbank.org/curated/en/2014/06/20106007/hydropower-sustainability-assessment-protocol-use-world-bank-clients-lessons-learned-recommendations>
- Mekong River Commission (2013) Basin-wide Rapid Sustainability Assessment (RSAT), Vientiane Lao PDR. See www.mrcmekong.org/about-mrc/programmes/initiative-on-sustainable-hydropower/r-sat-overview-the-basin-wide-hydropower-sustainability-assessment-tool/
- Mekong River Commission (2014) National-to-Local Benefit Sharing Options for Hydropower on Mekong Tributaries, Vientiane Lao PDR. See www.mrcmekong.org/about-mrc/programmes/initiative-on-sustainable-hydropower/benefit-sharing-options-for-hydropower-on-mekong-tributaries-ish13/
- National Association of Regulatory Utility Commissioners (NARUC) (2014) Principles of Regulating Clean Energy in the ECOWAS Region, prepared by Matteo Leonardi for USAID on behalf of the Economic Community of West African States (ECOWAS) Region, USAID. Washington, DC. See www.naruc.org/USAID/WestAfricaCleanEnergyPrinciples
- O'Leary, Donal T, Haas, Lawrence, JM and Mazzei, Leonardo (2010) Lesotho Highlands Water Project: communication practices for governance and sustainability improvement. World Bank Working Paper; No. 200. Washington, DC, World Bank. See <http://documents.worldbank.org/curated/en/2010/01/13074543/lesotho-highlands-water-project-communication-practices-governance-sustainability-improvement>
- Plummer, J (2014) Five Myths of Delays in Hydropower Projects. Special Lecture on the Impacts of Delays on Hydropower Projects. Presented at the IHA World Congress in 2013, University of Cambridge. See www.slideshare.net/hydropower/iha-2013-world-congress-judith-plummer-special-lecture-on-the-impacts-of-delays-on-hydropower-projects
- Rabin, M (2007) 'What are the Geological and Hydrological Risks and Issues Affecting Hydropower Financing?' Paper available from the Centre for Energy, Petroleum and Mineral Law and Policy, Dundee (CAR), UK. See www.dundee.ac.uk/cepmlp/gateway/?news=29281

Scheumann, W, Hensengerth, O and Chaounhury, N (2014) Have International Sustainability Norms Reached the Emerging Economies? *Evolution of Dam Policies: Evidence from the Big Hydropower States*, German Development Institute, Bonn.

Skinner, J and Haas, L (2014) Watered Down? A review of social and environmental safeguards for large dam projects. IIED, London UK. See <http://pubs.iied.org/17517IIED.html>

WEC (2013 and 2014) World Energy Issues Monitor. World Energy Council. See www.worldenergy.org/news-and-media/press-releases/wec-report-highlights-the-critical-issues-affecting-the-global-and-regional-energy-sector/ Last accessed December 2014.

WCD (2000) Dams and Development: A New Framework for Decision-Making. Report of the World Commission on Dams, November 2000.

World Bank (2013) Towards a Sustainable Energy Future for All—Directions for the World Bank's Energy Sector, Washington, DC.

World Bank (2009) Enhancing development benefits to local communities from hydropower projects: A literature review. See <http://documents.worldbank.org/curated/en/2009/05/16461317/enhancing-development-benefits-local-communities-hydropower-projects-literature-review>

Annex 1: Initial feedback on the Actions and Incentives concept

The following is a synthesis of feedback from an informal 'key informant' survey of a limited number of private investors and developers. The process sought to identify, and justify, proposals for actions and incentives from the public sector that could support the social and environmental sustainability of private hydropower investments. It is based on a three-page Findings Note circulated at the Stockholm International Water Conference in September 2014.

Indications from dialogue to date

Initial soundings of private-sector hydropower developers and lenders and MFIs that support private infrastructure suggest that E&S considerations can be a barrier to responsible private investment in hydropower in emerging-economy markets and LDCs, in some, but not in all situations.

Potential hydropower opportunities not pursued by responsible private investors (for whatever reason) are either: (a) developed by the public sector with or without support of MFIs and Equator Principle private financial institutions (EPFIs), or by other private developers and lenders potentially less concerned about E&S standards and reputational risk; or (b) not pursued at all.

Perspectives of private developers and investors

Dialogue suggests that private developers and investors would welcome targeted actions and incentives to improve capacity and resources for E&S risk assessments, particularly during the upfront project-preparation stages. Otherwise, steps to include the incremental costs of improved E&S standards in project lending **and** revenue streams were of broader interest.

The allocation of E&S risk and responsibility between the public and private sectors, and how risk shifts over time on infrastructure projects was of particular interest, recognising that:

1. At the **preparation stage**, private developers are wholly responsible for all ESIA spending to identify appropriate avoidance, mitigation and enhancement measures according to national laws (and lenders standards if higher), and to factor these costs into candidate projects' investment plans. Given that these costs are generally not recoverable if a project does not proceed to implementation, private developers have a financial interest in limiting spending to the legal minimum so they reduce such exposures.⁵¹

⁵¹ Incremental costs may present a hurdle to adopting improved E&S practices, though some responsible developers argue that offering higher E&S standards is (or can be) part of their business model and comparative advantage.

2. At the **construction stage**, where improved E&S standards are implemented and incremental costs (ideally) have been incorporated into project lending, E&S risks are lower for developers **and** governments alike. At this stage it is also harder to introduce new spending for higher E&S standards not included in commercial project lending, or the original project-viability assessments and investor calculations of ROE.
3. At the **operation stage**, where the project licence or concession agreement govern E&S commitments, from the private developer/owner's perspective, financing of incremental E&S measures over time should look at using government revenue from the project (ie from hydropower taxes, royalties, water use fees, etc).

Given that the money that private developers spend upfront is not recoverable unless the project is fully implemented, this limits how much developers may be willing to spend on upfront project preparation studies beyond what is immediately required, including ESIA's, related baseline surveys and risk assessments. It invariably leads to risk-based trade-offs; for example, how much developers will spend on ESIA's versus on-site drilling programmes to prove the geotechnical conditions that affect dam construction costs and thus financing and borrowing.

At the same time, it is acknowledged that the incremental costs of meeting higher E&S standards is often small in relation to total project costs and may be easily incorporated into the financing plans of candidate projects; but only if those incremental costs are known before the key project agreements are finalised, such as the PPAs and concession agreements, and financial closure is sought for equity and loan arrangements.

A further consideration is private developers' own assessments of what E&S risks to take on themselves or share. This can influence their main decision whether to invest, and whether a successful negotiation is ultimately achieved with government authorities on project agreements.

Perspectives of other stakeholder interests

Dialogue confirms that multilateral and private lenders broadly welcome practical steps that reduce critical E&S risks. Nonetheless, MFIs and EPFIs suggest that clarity, if not consensus, is needed on the actual 'problem' to be solved by the actions and incentives initiative.⁵²

Moreover, gaps in existing MFI support for private infrastructure development and opportunities to improve E&S performance should be filled. Having said that, MFI support triggers standard (and non-negotiable) safeguarding policies that may go further than some private-sector developers may be willing to accept, particularly if no steps are taken to factor the incremental costs into project lending and revenue streams.

Others felt scope existed to offer private-sector regulators help to improve their E&S assessment capacity and processes that inform government decisions on which river sites to call for private-sector (IPP) participation, and also the licence terms to negotiate with private developers. This was especially the case with managing risks where there was a potential for overlap in responsibilities of the project (private developers/operators) and government agencies, such as mitigating the cumulative impacts of multiple projects in a river basin or to optimise long-term local development opportunities. A broader view was that emphasis would be welcome on active steps to close the gap between national E&S and MFI/EPFI standards. This would help to reduce E&S uncertainty and risks for all parties, including local communities, and thus potentially improve the quality and public acceptance of projects, and by extension private investment conditions.

Initial dialogue with UK/EU Government and multi-stakeholder networks suggests there are pragmatic questions for the actions and incentives initiative to take on board, such as: (a) what additional private infrastructure investment and related development may be leveraged; (b) what tools will show evidence of improved E&S outcomes; (c) to what extent will private-sector competitiveness be improved, or the field levelled for responsible investors; and (d) would any 'actions and incentives' be seen as a subsidy for private investors in hydropower.

Key issues for future actions and incentives to consider

Investment in hydropower has accelerated in the past decade in many **developing** countries for multiple reasons, as noted in the accompanying IIED Policy Briefing 'Renewed hydropower investment needs social and environmental safeguards' (IIED, 2014). The private sector now accounts for an increasing proportion of these investment flows, whereas MFIs are involved in no more than 5–10 per cent of new hydropower projects worldwide.

⁵² There are different views and points of emphasis on the 'problem' this Actions and Incentives initiative should address. Some felt the main problem was to remove barriers to increasing the flow of private-sector investment for hydropower. Adopting higher E&S standards was part of the solution to improve conditions for private investment. Some felt that improving the E&S quality of projects that the private sector developed and operated was the primary problem to address, whether that led to more private investment or not. And others, including MFIs and EPFIs, suggested the challenge was to improve the quality and supply of private-sector investment for hydropower that would support the national development framework.

The initial feedback suggests that key issues for the actions and incentives dialogue to address boil down to: first, how to encourage companies to invest more or 'go the extra mile' to improve the scope and quality of the upfront E&S risk assessments, enable developers' E&S staff to make a business case for investing in higher standards, and ensure costs of implementing improved E&S standards are included in project lending; and second, establish what the scope is for actions and incentives to improve implementation, monitoring and compliance during construction and operation phases, and to improve clarity on the allocation of E&S risk between public- and private-sector actors in private infrastructure development.

A new finance facility or 'window' on an existing facility may encourage better risk assessments and potentially leverage existing project-financing and revenue streams to improve E&S practices over the project cycle. These assessments include — but are not limited to — the four sustainability assessments offered by the HSAP, namely the Early Stage, Preparation, Implementation, and Operation Assessments.

Is there a business case for voluntary improvement of environmental and social risk management on private hydropower in developing countries, beyond national standards and private lender requirements? Or should national regulators simply adopt best-practice safeguards required by multilateral financial institutions?

This paper explores the practical reality where government regulators, public entities, commercial lenders and private developers all play roles in reaching decisions about responsible private investment and managing risk. It also proposes aligning international public financial support through bilateral and multilateral channels, where public- and private-sector roles in delivering sustainability are intertwined.

In essence, when hydropower is part of the development framework and infrastructure-provision strategy, public funds should help leverage sustainability in the public interest, while private investment is mobilised to seek profitable investments.

IIED is a policy and action research organisation.

We promote sustainable development to improve livelihoods and protect the environments on which these livelihoods are built. We specialise in linking local priorities to global challenges. IIED is based in London and works in Africa, Asia, Latin America, the Middle East and the Pacific, with some of the world's most vulnerable people. We work with them to strengthen their voice in the decision-making arenas that affect them — from village councils to international conventions.



International Institute for Environment and Development
80-86 Gray's Inn Road, London WC1X 8NH, UK
Tel: +44 (0)20 3463 7399
Fax: +44 (0)20 3514 9055
email: info@iied.org
www.iied.org



This research was part-funded by UK aid from the UK Government, however the views expressed do not necessarily reflect the views of the UK Government. This document has been produced with the financial assistance of the European Union. The contents of this document are the sole responsibility of IIED and can under no circumstances be regarded as reflecting the position of the European Union.



Knowledge
Products