ENVIRONMENTAL CONSIDERATIONS FOR SUSTAINABLE HYDROPOWER DEVELOPMENT IN THE MEKONG REGION – A JOINT ADB, MRC AND WWF INITIATIVE[1]

Jeremy Bird, CEO, Mekong River Commission Secretariat, *jbird@mrcmekong.org*
Marc Goichot, Sustainable Infrastructure Senior Adviser, WWF Greater Mekong Programme, *marc.goichot@wwfgreatermekong.org*
Ian Makin, Senior Water Resources Specialist, Asian Devemopment Bank, *imakin@adb.org*
Keu Moua, Snr. Environment Specialist, Mekong River Commission Secretariat, *moua@mrcmekong.org*
Pradeep Perera, Senior Energy Specialist, Asian Development Bank, *pperera@adb.org*

Abstract:
The significant hydroelectric potential of the Mekong and its tributaries remains largely untapped. To date, about 10% out of an estimated potential of 30,000 MW has been developed in the Lower Mekong Basin (LMB). Over the next 10-15 years a significant proportion of this potential is likely to be realized. The opportunities and potential risks of such interventions have been well documented in past years. In response, the Asian Development Bank (ADB), Mekong River Commission (MRC) and World Wide Fund for Nature (WWF) started formulating a joint project on Environmental Considerations for Sustainable Hydropower Development (ECSHD) in 2006. The overall objective is to ensure that hydropower development in the Mekong Region is sustainable, which will require minimal adverse social and environmental impacts, while remaining a viable, profitable and source of renewable energy supporting the region's economic development. The aim of the ECSHD initiative is to develop a sustainability assessment tool for hydropower development that can be integrated into existing planning procedures and processes and move the input of sustainability considerations to earlier stages of the development cycle. The initiative will assist in energy master planning, water resources planning, economic development planning. Prominent examples of such tools are the Sustainability Guidelines and Sustainability Assessment Protocol of the International Hydropower Association (IHA). Development of ECSHD and its pilot testing will be closely coordinated with IHA's ongoing global process to improve their guidelines though a Hydropower Sustainability Assessment Forum with the ultimate goal of developing a uniform approach that incorporates issues specific to transboundary water resources projects and basin-wide assessments that can be integrated into country systems and processes, including Strategic Environmental Assessment.

Keywords: Sustainable Hydropower, Mekong, Water Resources, Environment.

1 Hydropower and the Mekong context

Although the considerable hydropower potential of the Lower Mekong River Basin (LMB) has been discussed over the past 40 years, it remains largely undeveloped. To date, about 3,200 MW or 10% out of an estimated potential of 30,000 MW has been put into operation in the LMB. The situation is now changing rapidly with a further 3,200 MW under construction and more than 50 memoranda of understanding signed with private developers to study the feasibility of implementing other projects over the next decade.

This rapid hydropower development will generate both positive and negative impacts on ecosystems, and the social and economic opportunities of affected communities. The opportunities and potential risks of such interventions have been well documented in past years and this paper outlines an

[1] The views expressed in this paper are those of the authors. They do not necessarily reflect the views and policies of the Asian Development Bank, or its Board of Governors or the governments they represent.

ongoing initiative designed to minimize those risks. In 2006, the Asian Development Bank (ADB), Mekong River Commission (MRC) and World Wide Fund for Nature (WWF) started formulating a joint project named 'Environmental Considerations for Sustainable Hydropower Development' or ECSHD. A technical report that sets out the current development status in the region, the planning context and regulatory frameworks in the Mekong countries, and the extent of available frameworks for assesssing the sustainability of projects was produced as a background paper for the initiative, (King et al, 2007).

Hydrological and geomorphological conditions in the Lower Mekong Baisn (LMB) will change as a result of upstream hydropower projects being built on the Lancang River in Yunnan Province of China. As storage volumes exceeding 20 billion cubic metres are created upstream over the next five to ten years, it is predicted that dry season flows in the LMB will increase, early flood season peaks will reduce and there will be a recution in sediment flows. These changes are currently being assessed by MRC's Basin Development Plan (BDP) Programme as part of its analysis of a range of future development scenarios for the LMB over the next 20 years, including the expansion of hydropower development, realisation of irrigation potential, population and urban growth, and the effects of climate change.

2 Why is a sustainability tool necessary?

There is already a relatively advanced policy framework for assessing economic, environmental and social aspects of such developments in the countries of the region. However, there is a lack of an integrated framework that focuses explicitly on sustainability issues. Globally a number of such frameworks have been suggested and these will be used as a starting point for developing an approach suitable to the Mekong context.

The aim of the ECSHD initiative is to build specific guidance tools into existing planning procedures and processes that will help Mekong countries adopt a more uniform approach to determining the sustainability of hydropower development proposals. It needs to incorporate broad-based stakeholder participation and move the consideration of sustainability issues into energy master planning, water resources planning, and economic development planning. These considerations will also help in the formulation of MRC programmes to support development in the LMB that is consistent with the Mekong Agreement signed by the four LMB countries in 1995. In doing so, ECSHD will provide an opportunity to identify key issues at an earlier stage where there is more flexibilty to identify alternative options and to implement solutions. At the same time, it will need to complement current procedures for environmental impact assessment (EIA) and social assessment at the individual project level and the wider set of planning policies in member countries. Beyond the planning and design stage, it will also be important to build such sustainability considerations into the operational regime of hydropower projects.

At the centre of the initiative is the development of a sustainability assessment tool through incorporation and adaptation of the recommendations from a range of international processes focusing on this theme. Prominent examples are the Sustainability Guidelines and Sustainability Assessment Protocol of the International Hydropower Association (IHA). Other guidance material that will inform the process include the recommendations of the World Commission on Dams (WCD), and various regional and national initiatives related to low-impact or 'green' certification of hydropower. More information on these is provided in the initial Technical Report of ECSHD. Development of ECSHD and its pilot testing will be closely coordinated with IHA's ongoing global process to improve their guidelines though a Hydropower Sustainability Assessment Forum (HSAF).[2]

Benefits of introducing a more rigorous approach to sustainability assessment can be seen from the perspective of a number of stakeholder groups. Those for the industry itself, government agencies, for

[2] http://www.hydropower.org/sustainable_hydropower/HSAF.html accessed 24 October 2008

financing institutions and for NGOs and the community interests they represent are briefly summarised below.

Hydropower Industry

- If a more integrated approach to "upstream" planning can identify which hydropower projects all parties could support and, conversely, which projects on which rivers are the least favoured, then industry could save considerable financial resources and avoid wasted effort on proposals that will ultimately not proceed to development stage.
- Environmental criteria that are accepted by all parties will bring into the industry a much higher level of certainty and confidence to proceed with concessions that are allocated to specific companies and reduce reputational risk and financial risk associated with disputed projects.
- Environmental criteria will also help to identify best practice expectations for operational hydropower plants, to improve sustainability performance and community relationships.
- Sustainability frameworks could ultimately lead to some form of 'certification' system for the industry thereby unlocking opportunities for innovative financing arrangements related to carbon credits and ultimately, in a more advanced and de-regulated energy setting, to provide a competetive advantage to 'sustainable providers' by influencing consumer choice of electricity supplier.

Government Agencies

- For national planning agencies, the main attraction will be increased confidence that sustainability considerations are incorporated into national planning processes which in turn could attract additional resources for national, sector, and basin-level development.
- For energy and environment agencies, the main attraction will be that environmental issues can be largely addressed at a sector or basin planning level which should then avoid major issues being brought up at the later stages of project specific EIA which would then lead to delays.
- For water resources agencies, the primary advantage will be seen as helping to implement an integrated approach to river basin planning and consideration of cross sector and cross-border issues and a focus on multi-purpose rather than single purpose dams.

Financing Institutions

- Opening of the power sector to new financing models is fundamentally changing the way hydropower projects are planned and implemented. Financial institutions, especially the increasing number committed to the Equator Principles, should be eager to see a harmonised approach for all developers to follow, including environmental criteria.
- Harmonization of environmental criteria will minimize risk and uncertainty from all perspectives, governments, investors and other stakeholders, but especially for financial institutions in their due-diligence related to financing requests.

Non-governmental Organizations

- NGOs often feel that their interventions in decision-making regarding hydropower projects comes at a relatively late stage once project proponents are well advanced and there is little room to bring their experience to the discussions and thereby influence the outcomes. This can lead to needless confrontation. NGOs would welcome a more systematic approach to sustainability considerations at an earlier stage of planning to help promote those projects that will have the least environmental and social disruption.
- Conservation NGOs will see advantages in finding ways to incorporate knowledge regarding ecosystem functions, biodiversity conservation, and natural resources management into sector and basin-level planning processes.
- Social NGOs will be more interested in the social implications of environmental changes caused by hydropower projects, especially the nexus between ecosystem change and livelihoods, which will affect both upstream and downstream communities. Social NGOs will

also be interested in environmental criteria for managing reservoir fisheries and resettlement sites.

Developing and applying ECSHD has the potential to improve the economic benefits of hydropower development. Hydropower developments require significant initial outlays for project planning. Consider for example:

- The typical cost of preparing a large hydropower project is $10 to 20 million over 8 to 14 years.
- A World Bank review of 66 hydropower projects found an average cost overrun of 27%. Social and environmental issues were often a significant part of this.
- A number of planned large hydropower projects have not proceeded, incluidng those interrupted at a late stage, meaning significant capital outlay for no return. Environmental and social issues were often significant in causing delay or stoppage.
- Some hydropower facilities that have been built have not achieved their design full generating capacity due to environmental/social constraints imposed after construction. Had such constraints been identified earlier, more cost effective designs may have been possible.

The partners to the joint ECSHD initiative believe that a more integrated approach will assist countries in the Mekong Region in environmentally sustainable planning for future hydropower resources and advance the capacity to balance economic, environmental and social dimensions in the interest of sustainable development. They consider that adoption of environmental criteria relevant to the context of the Mekong Region will emphasize the clear benefits of hydropower in meeting energy needs of the Region within an acceptable level of environmental and social impact. To do so will require the ECSHD guidance to be adopted into country planning systems and procedures.

Under the 1995 Mekong Agreement, the MRC was mandated as the body for regional cooperation in managing water and related resources of the Mekong River Basin. Detailed procedures have been established for implementing the Agreement and consultation among the member states. ECSHD is in line with its overall goal: '*more effective use of the Mekong's water and related resources to alleviate poverty while protecting the environment'*.

ADB similarly promotes regional cooperation in the Greater Mekong Subregion and is actively supporting both policies for and development of renewable and clean sources of energy to help meet the electricity needs of the region at reasonable cost and in a manner that minimizes environmental and social costs.

For WWF, the initiative complements its Greater Mekong Programme and achievement of its sustainable infrastructure objective, to see that, '*the ecosystemic integrity of the Mekong region is maintained and natural resources are managed sustainably for the benefit of local communities, national states, and the region as a whole'* and promoting integrated river basin management from a conservation perspective.

3 Elements of sustainability to consider

In implementing hydropower development, three aspects of sustainability need to be taken into account, environmental, social and economic. Applying environmental considerations in the early stages of hydropower sector planning is necessary for improving the economic benefits of hydropower development and reducing subsequent project preparation time – it is not seen as a barrier to hydropower projects.

Hydropower development can often be controversial and lead to confrontations which undermine the willingness of potential investors to get involved, leading to delays and additional costs. We argue that a common approach to environmental issues will minimize both financial and reputational risks for developers and investors. Addressing potential impacts earlier in the project cycle can avoid 'last–

minute' problems that in the past have led to conflict (locally and internationally), additional costs and delays.

At a macro-level, ECSHD will lead to greater integration of a government's environmental commitments in national economic planning and provide a uniform framework under which diverse private sector interests can operate. At a micro-level, it offers an opportunity to reduce environmental impacts and thereby foster a higher degree of acceptability for hydropower projects among stakeholders.

From an environmental perspective, attention to environmental considerations will:

- provide more time to identify sustainable financing mechanisms for environmental services that protect the hydropower investment, for example community-oriented watershed management programs that help to reduce reservoir sedimentation,
- avoid unnecessary impacts and the expensive and potentially disruptive measures needed to mitigate them, and
- help avoid irreversible environmental outcomes and protect natural resources for future generations, including those that support peoples' livelihoods such as capture fisheries.

Applying sustainabilty considerations promotes a recognition of the strong linkage between environmental and social impacts of hydropower projects. Identifying potential social impacts at preliminary project scoping stages will facilitate consideration of alternative design options and viable livelihood development programs through a more participatory approach by avoiding the time pressures associated with the latter stages of project appraisal process and financial closure. For many years the social issues surrounding resettlement from resevoir areas has been recognised as a major concern. More recently the wider group of communities living upstream and downstream of projects is recognized as among the directly-affected people as a result of changes to flow regimes and aquatic ecosystems brought about by dam construction.

Application of ECSHD will result in outcomes more acceptable to affected communities resulting in a higher likelihood they will support the project and minimizing what has in the past been a frequent source of opposition amongst the public and the media.

Currently the LMB countries are net importers of fossil fuels, therefore hydropower projects would bring significant macro-economic benefits by reducing dependency on energy imports from outside the region. Measures to combat climate change may also be expected to include a greater dependence on hydropower as a renewable source of electricity and raises a major sustainability issue of global importance.

Use of Environmental Criteria for Sustainable Hydropower Development will not represent an additional step in the project cycle nor replace EIA, but would:

- provide a key tool for Strategic Environmental Assessment procedures which are now being utilized more widely in the region in sector planning and the comparison of project alternatives,
- help streamline the EIA process by focusing scarce resources on the investigation and analysis of key parameters central to the viability of a project, and
- help address cumulative impacts and benefits.

A harmonized set of environmental criteria would reduce the transaction costs of developers that currently have to satisfy a wide range of environmental safeguard procedures of the individual investment and development banks and credit guarantee agencies. It will present a common standard on which competing proposals can be assessed.

4 Objectives and approach

The overall objective of the ECSHD is to ensure that hydropower potential in the Mekong Region is sustainably developed, which implies achieving minimal adverse social and environmental impacts, while remaining a viable, profitable and source of renewable energy supporting the region's economic development.

The immediate objective of the project is to build into existing planning tools and processes a set of processes that will help move the Mekong countries towards adopting an agreed guidance system for sustainable hydropower development. This guidance should incorporate broad-based stakeholder participation and move the input of sustainability considerations to earlier stages of power master planning, water resources planning, economic development planning and MRC programmes.

Decision-making on selection of hydropower projects will remain firmly with the riparian governments. The initiative will not produce a list of ranked dams or present recommendations on specific river basins. It will propose a method and process for assisting governments assess proposed projects within a more integrated planning context.

Application of such a sustainability tool to the Mekong region naturally has many similarities to hydropower more generally and therefore there is an expectation that much of the work undertaken in developing the IHA's Sustainability Assessment Protocol will be relevant. However, there are particular aspects related to the regional and transboundary nature of the projects in the LMB that need special attention and this will provide a strong focus to the work of the ECSHD initiative, to specifically identify how such sustainability frameworks can be applied in a transboundary context. It aims to provide an objective assessment framework within which discussion of issues is undertaken, joint assessments are made and conflicts are prevented and resolved.

The Mekong is among the 12 largest river basin in the world and has one of the most diverse aquatic ecosystems estimated to support the world's biggest inland fisheries, worth between $2 to $3 billion per year, for which the main beneficiaries are millions of rural people in the lower part of the basin. Natural changes to the flow regime are fundamental to supporting this unique fishery, partcularly the timing and magnitude of the reverse flow from the Mekong to the Great Lake in Cambodia during the flood season. At the lower end of the basin, the Mekong Delta is the main rice growing area of Vietnam and is at considerable risk from rising sea levels and increasing levels of salinity due to the effects of climate change. At the same time, the LMB has significant hydropower potential described earlier that can be developed not only to provide energy, but also to foster regional integration and economic development by realizing foreign exchange earnings.

The perspective of ECSHD is therefore to develop a sustainability assessment tool that takes into account these cross-sectoral interests and moves beyond considerations of sustainability from an energy sector or project level. It needs to take a broader integrated basin perspective taking into account these interests and their complex inter-relationships. In doing so it will need to address issues at a range of scales, for instance at community, project, district, province, natonal and regional levels.

As the proposed developments in the LMB are at very different stages of planning and design, there will be a need to carefully consider the entry points to ensure relevance in the basin and acceptance by LMB member countries. Existing country systems also need to be considered carefully to ensure that ECSHD adds value to country regulations and guidelines and overlap is avoided.

Project identification was completed in mid-2007 following discussion among the four member countries of MRC and in China on the background technical report and outline of a process for implementation. Further national consultations were undertaken in mid-2008 and implementation is planned to start in November 2008 with an updated assessment of the available sustainability frameworks. In particular, attention will be focused on identifying any addional elements to add into

the IHA's Guidelines and Sustainbility Assessment Protocol, particularly related to transboundary assessment and taking a more integrated basin-wide perspective.

Project implementation is divided into two stages. Stage 1 "Contextualization of Sustainability Guidelines and Testing" will be carried out over a 6 to 12 month-period from October 08. The main focuses of Stage 1 include:

- Contextualizing IHA guidelines for application in Mekong countries: The IHA Sustainability Assessment Protocol is undergoing a major global review process guided by a multi-stakeholder forum, the Hydropower Sustainability Assessment Forum (HSAF). ECSHD will therefore contribute to this review process including a consideration of relevant elements from other 'sustainability assessment frameworks' proposed for dam projects. Tests will be made of the modified guidelines to demonstrate the value of such amendments within the prevailing local planning environment. Contextualization for the LMB will include a major focus on transboundary and basin-wide aspects. Although some differences may be identified during the process, the close relationship envisaged with HSAF is intended to ensure that a single appropriate framework is produced as a final outcome, thereby avoiding the problems and potential confusion of a proliferation of assessment systems.

- Testing the sustainability assessment tool: The modified assessment tool will be tested against at least two case studies in the Mekong region, especially through an SEA of the Sekong-Sesan-Srepok (or 3S) basin and a planned SEA for hydropower development on the mainstream of the lower Mekong River Basin. Discussions are underway with the IHA on the process of interaction with the HSAF process to ensure that lessons learned will be documented and conveyed to the wider global process as well as among the national working groups and key stakeholders in the Mekong region.

Stage 2 of the initaitive involves consolidation and capacity building and will be implemented over the subsequent 18 month-period up to September 2010. The main activities will include:

- Preparation of sustainability guidelines for national and regional acceptance – Based on the output from Stage 1, the HSAF and subsequent testing in the MRC and ADB programmes in the Mekong region, an updated version of the sustainability assessment tool would be prepared for national and regional acceptance.

- Options for adoption of the tool range from voluntary commitments of government agencies and developers to a broader region-wide agreement or protocol that incorporates use of the ECSHD guidance into national regulatory frameworks. The extent to which countries are prepared to move in the direction of the latter option will in part depend on how successful the sustainability guidelines have proved in tests associated with this project and elsewhere.

- Capacity strengthening and training of staff within member countries will be a significant emphasis of the final stage of the initiative using national working groups as possible trainers to pass on their considerable knowledge and experience accumulated during the development phase.

Potential entry points are that: (i) ECSHD outputs should be applicable to existing impact assessment tools like Initial Environmental Examinations (IEE), Environmental Impact Assessments (EIA), Strategic Environmental Assessments (SEA) and Cumulative Impact Assessment (CIA).

Further information on the implememtation of ECSHD will be made available on the MRC's webpage, www.mrcmekong.org

Acknowledgements

This paper also draws on many of the ideas developed by the resource persons, Peter King and Larry Haas. The contributions of staff from ADB, MRC and WWF involved in the initial stages of formulating the ECSHD initaitive are also much appreciated together with the financial support of the Governments of Finland and Japan for MRC's wider Hydropower Programme through which the initial stages of ECSHD have been partly financed and Germany for activities undertaken through WWF.

References

[1] P. N. King, J. D. Bird and L. J.Haas. Environmental Criteria for Hydropower Development. Technical Report prepared for ADB, MRC and WWF. March 2007.