2 EXECUTIVE SUMMARY

Multipurpose hydropower reservoirs are designed and/or operated to provide services beyond electricity generation, such as water supply, flood and drought management, irrigation, navigation, fisheries, environmental services and recreational activities, etc. While these objectives (renewable and power services, water quantity management, ecosystem services, economic growth and local livelihoods) can conflict at times, they are also often complementary.

A major challenge with multi-purpose reservoirs is sharing water amongst competing users. Although there are no universal solutions, there are principles that can be shared and adapted to local contexts. Indeed the development and/or operation of such multipurpose hydropower reservoirs to reach sustainable water management should rely on the following principles:

- **Shared vision, Shared resource, Shared responsibilities,**
- **Shared rights and risks, Shared costs and benefits**

Sustainable development requires attention to a wide range of economical, social and environmental objectives. Energy and water for sustainable development depends not only on supply choices, but also on how these choices are implemented. The intent for multipurpose water uses of hydropower reservoirs is to ensure that positive aspects are maximised and negative impacts avoided, minimised, mitigated or compensated.
Addressing sustainability of multipurpose hydropower reservoirs could be categorised in five value propositions:

1 – **Sustainability approach for all users**: The degree to which multipurpose hydropower reservoirs can advance sustainable development objectives depends on careful planning, construction, operation, management and governance. It is important to implement an adequate governance model that fosters equity across water reservoir users and ecosystems in line with agreed sustainability objectives. There are no one-size-fits-all solutions as each project is site specific and as water governance is place-based and context-dependent. It is therefore essential to customise the governance model to local conditions. The Hydropower Sustainability Assessment Protocol for those multipurpose reservoirs creates a common language among stakeholders and provides a measurement of the sustainable profile of the project and guidance for continuous improvement. In addition governance mechanisms are vital tools for achieving equitable access to, and provision of, ecosystem services.

2 – **Higher efficiency and equity among all sectors**: Economic data and innovative financial mechanisms are crucial for equitable and efficient around hydropower reservoirs are currently not recognised or monetised. Putting a value for all benefits is necessary to allow discussions and negotiations between different water users to find optimal and efficient solutions. In addition it is essential to have such values to bridge the gap between financial and economical viability. Many additional purposes of hydropower reservoirs may not be financially motivated in the short-term, but would give more equitable long-term benefits that are not reflected in the financial analysis. Trying to assess the economic value of all services is important for investors this is also a good way to bring stakeholders around the table to put a value collectively for water but also energy. Innovative financial mechanisms will be essential to address this gap between financial and economic feasibility, especially since hydropower reservoirs comprise such large up-front capital intensive infrastructure. The challenge is to find ways of framing long-term strategies, securing long-term finance sources and shielding them as effectively as possible from short-term exigencies. In the developing world, funding and guarantees from bi-lateral or multilateral development banks are important financing instruments that can provide low-cost financing over long repayment periods, and function as a catalyst for other investors. Pension funds are another example of financing with long time perspectives, which may unlock private sector capital to invest in long-term sustainable infrastructure, such as multipurpose hydropower dams.

3 – **Adaptability for all solutions**: It is essential to provide greater flexibility and adaptability in the way water is allocated among users during the entire lifetime of the reservoir. History has clearly shown that multipurpose reservoir developments are long-term investments that can benefit various generations, and new purposes, demands or preferences may appear during this long lifetime due to the evolution of social and environmental values and requirements. In recognition of the significant uncertainty associated with future changes in climate, economies and demographics, there is a need for the physical design and governance systems of hydro reservoirs to be able to respond to these changes. The multiple dimensions of projects as they emerge over time should be more explicitly addressed in the institutional management and operation arrangements. Hydropower as a renewable energy plays a key role in climate change mitigation. In addition the stored water in the reservoir could help adapt to climate change; hydropower is climate-sensitive and it is also very important for the energy security and economic development of countries. River flows are vital for healthy ecosystems and their services. The mitigation of reservoir sedimentation should be addressed with a multi-stakeholder approach from the early stages of project planning through to operation.
4 – River basin perspectives for all: An integrated approach is essential to reach a holistic view of the river basin. An important over-arching framework for sustainable hydropower reservoir development is Integrated Water Resource Management (IWRM) and basin development planning. Many hydropower projects are evaluated in isolation of an overall basin planning framework, and issues arise due to competing or conflicting needs and uses of the basin resources. The creation and effective functioning of transboundary river commissions (e.g. the Danube, Rhine, Mekong, Senegal rivers, etc.) with the purpose of enabling information exchange and better transboundary cooperation with water infrastructure development and operation is essential for upstream and downstream countries or those that have the same river as a national border. However some river commissions are not operating as intended. River basin organisations need political commitment to address the very sensitive discussions around dam/reservoir projects, a broad representation of stakeholders and should also be equipped with capacities related to staff, finance, expertise, skills, know-how, infrastructure etc. in order to carry out their duties effectively. Cross-sector coordination should be foreseen for greater policy coherence and consistency of multipurpose reservoirs uses. Water allocation in river-basin planning is a very important step forward to achieve sustainable use of stored water among users. In addition stakeholder initiatives may also provide interesting opportunities for better integration of the different reservoir water users.

5 – Engaging all stakeholders: Stakeholder engagement is critical for success in multipurpose reservoir management in terms of sustainability and efficiency. It is very necessary to identify all stakeholders likely to influence or be impacted by decisions on the reservoirs, and engage them in the early stages to participate on a voluntary basis to the dialogue. It is important that the groups need to see there is a reason for them to engage, i.e. that they can influence decisions and outcomes that would be better than if they had not participated. It is crucial to understand early in the process stakeholder interests and power relations between these stakeholders. Most of them may not know or understand the perspective of the other stakeholders involved; it is therefore important to raise awareness among them. Leadership within the community and across stakeholders is key for success. Equity, transparency and accountability should drive the solutions. Different viewpoints generate alternative priorities and highlight different challenges among stakeholders. Coordination and capacity improvements are required to manage multipurpose water uses issues between different stakeholders. Policy makers should increase their engagement with all stakeholders to improve their understanding of issues and better communicate their impacts. Communication and diplomacy will be essential. Policy makers should also provide the enabling environment for result-oriented stakeholder engagement, and strive to include the inputs of engagement processes towards improved decision making. The quality of the data sources and availability of information vary considerably at the local and state levels; making this information accessible, timely, understandable, usable and useful is the challenge. Strengthening partnerships and mobilizing resources remain essential to achieve effective multipurpose reservoir management.

The SHARE concept

Therefore a sustainable development and operation of multipurpose hydropower reservoirs should rely on “shared vision, shared resource, shared responsibilities, shared rights & risks, shared costs & benefits” principles. These principles and acknowledgement of joint sharing among all the stakeholders are key to successful development and management of multipurpose hydropower reservoirs, and should frame all phases from early stage to operation.
The **SHARE concept** also gives guidance through being an **acronym** for: **S**ustainability approach for all users, **H**igher efficiency & equity among sectors, **A**daptability for all solutions, **R**iver basin perspectives for all, and **E**ngaging all stakeholders, which correspond to the above five value propositions. Using the SHARE concept for multipurpose water uses of hydropower reservoirs both as an overarching principle and as a reminder of the five value propositions can help in making these reservoirs more sustainable and equitable.

As each project is always site specific in terms of technical, economical, social, environmental and other regulation issues, this SHARE concept provides basic principles that should be adapted to local conditions. Good practises presented in this report and annexes may help addressing this issue.

![The multipurpose water uses of hydropower reservoirs](image)

**The multipurpose water uses of hydropower reservoirs**

*Shared vision, Shared resource,*

*Shared responsibilities, Shared rights and risks,*

*Shared costs and benefits*

Future investments in and operation of **hydropower projects should embrace the SHARE concept and take a multipurpose approach where appropriate** together with the co-financing necessary to make it work. In the coming decades it is important that there is **sustained and steady focus on utilization of multi-purpose opportunities for investment and operation**, firstly on existing infrastructures in multipurpose hydropower reservoirs with dams. The way forward for each developer/ sponsor is to work out a reasonable decision making process that meets these objectives with a duration that is predictable and compatible with the urgency of the needs to be met.