

Whose Hydropower?

From Conflictual Management into an Era of Reconciling Environmental Concerns through Win-Win governance?

Hydropower has been core in the nation-building process of several countries. This includes Sweden in which it currently supplies around 50% of the electricity and particularly Norway where almost all electricity is generated from hydropower. In these countries, as well as many others, the provision of hydroelectricity enabled urban and rural development, industrialization and other core value-added activities. However, it was realized with significant environmental costs, particularly at the local level. Traditionally, there has been a divide in perceptions on hydropower production, in which stakeholders tend to box it either as an environmental hazard or as a socio-economic benefit. During the last century, these diverging perspectives have influenced political and regulatory approaches as well as the perceived role of hydropower at large. Different attempts to bridge this divide have been made. This is not least true today, considering the role of hydropower as a low-carbon solution, and a potential capacity to balance increased intermittency from other renewables. These features of contributing to the global good of mitigating climate change need to be assessed against the potential negative environmental impacts on habitat loss and biodiversity, diverse recreational use and landscape perceptions at large. These concerns triggered social mobilization and even became instrumental in establishing environmental NGOs with the core focus of protesting against hydropower projects. Contrasting and often conflicting opinions are still prevailing, as exemplified with the implementation of the EU Water Framework Directive (WFD). However, there are current signs and new knowledge available suggesting that we are moving into a new era of hydropower governance.

Photo: Ånund Killingtveit



A potential reconciliation of contrasting perceptions is pending, but there is strong inertia to change. We argue that the understanding of past political modes and regulatory approaches are essential to develop more sustainable hydropower governance systems fit for future societal and environmental needs. We currently have the benefit of drawing on lessons learned. This provides an opportunity to shape new governance systems that are more balanced in a way not experienced before.

Hydropower was instrumental for the industrialization processes both in Norway and Sweden, but un-mitigated impacts of hydropower on ecosystems was the consequence. This is in the figure referred to as the "Exploitive" governance era. Public concern for the environment was growing. This was also channeled into formulations of laws and regulation as part of the "Eco-centric" governance era. The integrated approaches to manage competing needs for water was emerging during the 1970s. The concept of Integrated Water Resource Management (IWRM) was developed and eventually merged into major key regulatory frameworks on water resources management with implications for hydropower governance.

Challenges in the eco-centric era

The IWRM opens up for more comprehensive management procedures, but it poses several questions to how this can be achieved practically. In parallel to the acceptance of the IWRM concept as the main global methodology to manage water resources, a major water management framework was being developed and consequently enacted across the EU. The Water Framework Directive (WFD) is considered by many as the great European IWRM implementation effort. The WFD is an interregional water management framework implemented in all EU member states as well as in Norway.

Elements that are recognized from the more comprehensive IWRM still include a perceived rule of specific ecological quality standards being the principle factor from where other values should be assessed. The integration component key in IWRM, is also present in the WFD. The WFD, identical to prescriptions in IWRM, seeks to factor in other goods that utilizes or are affected by water resources into its frame of analyses. A third familiar concept from IWRM into the WFD, is the setup of river basin authority RBA to guide the IWRM development process in relation to specific delineated areas of mandate which are often corresponding to river basins in some way. Other typical measurement parameters characterizing the status of water resources in Eco-centric evaluation methods, are the presence of specific flora and fauna or in other words types of biological quality elements. These are algae (phytobenthos), macrophytes, macroinvertebrates and fish.

Analyses based on an IWRM orientation consequently pose a series of outstanding difficulties with direct relevance for hydropower governance when moving from plan to practice. This is related to three different reasons concerning the approach, the scale and decision-making body:

- IWRM is in its core a process oriented approach with a set of pre-decided measures and principles that needs to be executed to address water related issues regardless of context. This can be contrasted to outcome oriented approaches where the desired results in addressing a specific problem may govern the way actions are taken.
- The river basin as a unit, further delineated into water bodies in the WFD, making it more difficult to assess other goods and services from water utilization beyond this unit which cannot easily be quantified. This is in contrast to associated impacts that can normally be measured within the local basin unit. The overriding weight of local parameters chosen based on the "eco-centric" characteristics active at river basin scale, may dominate other socio-economic goods generated from water resources.
- The requirement of establishing RBAs often imposes a supernatural function of influence with vague mandate. Recommendations coming from RBA to support the implementation of IWRM/WFD requirements are often received at another level of governance, beyond municipalities and counties. They in turn traditionally operate with other systems of planning and norms of implantation, risking confusion at the implementing stage.

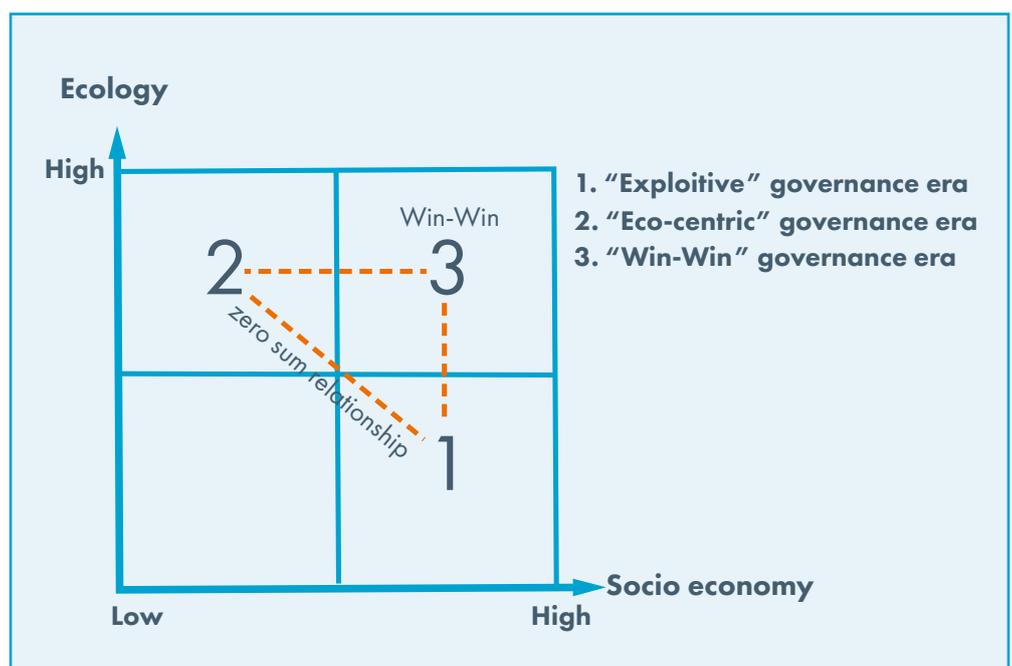


Figure. Defining "win-win" scenarios in a new hydropower governance era

A need for new solution

New priorities might again be emerging on the global level putting a renewed focus on hydropower and its value, this time as a renewable energy source. A perceived shift in priorities and a possible move towards a new era of hydropower governance brings opportunities. As previous governance eras might have been characterized by being a reaction to the other possibly cementing zero-sum thinking between the two, a new era might negotiate and encompass priorities from both previous periods.

Consequently, it can easily be deduced that, among the currently available technology options at scale, hydropower is crucial in any transition towards low carbon energy solutions. Realizations tied to identifying the emergence of a new policy era with relation to hydropower, can possibly be formulated in the following statements:

- Addressing local environmental issues means jointly addressing global challenges particularly the overriding issue of climate change.
- Addressing climate change means system change with societies fueled and operated by renewable energy systems.
- Hydropower is not only one of the largest source of renewables, near fossil free electricity; it is also currently crucial in order to in order to facilitate the incorporation and expansion of other sources of renewable energy sources that are intermittent in character.

Changing perspectives on the benefits from hydropower production might also mean that the perception of acceptable trade-offs from hydropower generation is changing. The new era suggests that there are several connected dimensions in play, spanning global to local and affecting development outcomes.

We need to find a suitable method of assessing the current role and value of hydropower. This needs to encompass both local and regional aspects through quantitative and qualitative approaches. Politics are changing, but still we need improved knowledge of how to reconcile economic, social and environmental concerns related to hydropower.

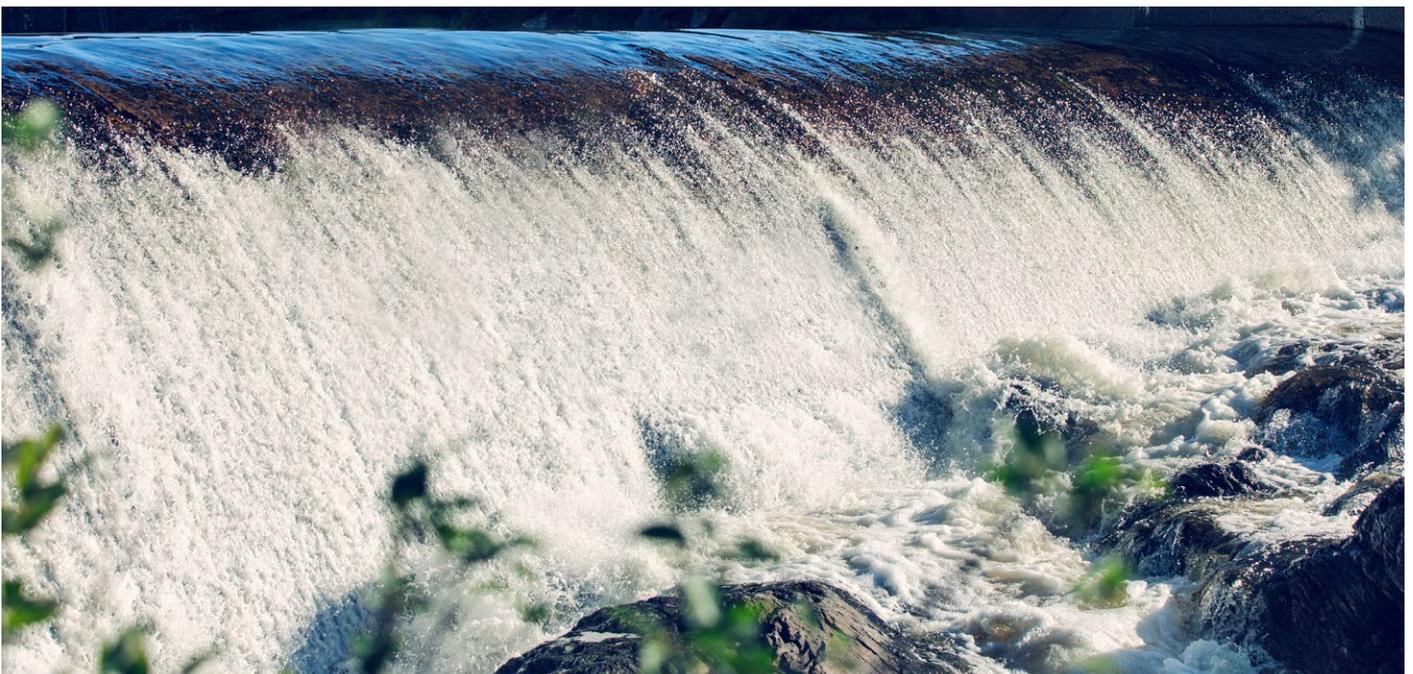
However, in order to achieve solutions that could be perceived as delivering positive outcomes for a broader set of interests and concerns, certain issues in relation to any intervention approach or governance framework must be considered. Following that, there are different tools at disposal in order to achieve political targets. Therefore, there are some characteristics that should be inherent to any management and decision-making system in what we refer to as “the new policy era” of hydropower governance.

Characteristics of the new policy era

Output more than process: In order to shape any approach with the aim of producing balanced decisions leading to win-win solutions, the desired outcomes of any taken action must be clear. This would constitute a perceived break with the approach of dominating governance frameworks of the eco-centric era that can be said to be more process oriented in nature.

Open for adaptation and adjustment: We argue that hydropower is core to reconciling the satisfaction of covering economic, social and environmental needs—both for current and future generations. However, hydropower has caused significant environmental impacts. Nevertheless, new scientific evidence indicate quite clearly that hydropower is part of the solution—and through new operational and environmental designs in the way hydropower plants and reser-

Photo: PKFoto



voirs are managed, even local environmental concerns can be partly or fully mitigated. However, it assumes that core stakeholders are willing to seek the best solutions in the long run.

Need to manage path-dependency

Currently, hydropower governance is strongly impacted by the eco-centric era, but the challenges and often disputes of implementing the WFD in rivers impacted by hydropower indicate quite clearly that new approaches must be sought. These approaches need to be able to address hydropower from a broader development perspective than current systems, such as the WFD, allows. We argue that these must be science based, more outcome oriented and adaptable to suit core concerns and context specifics. Developers and producers feel these requirements, but new solutions are implemented through environmental design approaches of identifying better win-win solutions. A major challenge, however, is the prevailing inertia in the governance framework.

There is now the opportunity to build on experiences from two preceding governance eras that generated both positive and negative lessons. In addition, the amount of scientific knowledge and general awareness has probably never been higher.

This requires, however, that decisions are robustly supported by information that everybody can understand and trace to relevant sources and doing so in an equal, non-biased manner. Hydropower is neither good nor bad per se, but services and provision enabled by hydropower should be better appreciated when impacts and outcomes are assessed.

Outcome oriented approaches also seems to hold advantage compared to process oriented ones that currently still dominates thinking on how to manage resources in relation to hydropower. The slow implementation of these systems suggests that pre-defining systems for water resources management is functional in a theoretic environment, but challenges often arise when being confronted with realities on the ground. This brings the argument to a third crucial element of a new era styled management approach; the feature of adaptability. Changes in thinking and knowledge can occur fast, but management systems, connected laws and implemented regulations can be more static due to the path-dependence. Governmental regulation may provide inertia to change that even can represent a commercial risk for industry. This is happening despite innovative efforts promoted by some hydropower producers.

Read more:

Lindström, A. & Ruud, A. 2017. **Whose Hydropower? From Conflictual Management into an Era of Reconciling Environmental Concerns; A Retake of Hydropower Governance towards Win-Win Solutions?** Sustainability 2017, 9(7), 1262, electronically available: <http://www.mdpi.com/2071-1050/9/7/1262/htm>

Facts about the SusWater project:

SusWater - Sustainable governance of river basins with Hydropower production. The project aims to look at different ways towards improved water resources management in regulated watercourses that can be accepted both locally and nationally.

Project duration: 2015-2018;

SusWater has a budget of 17 Mill. NOK and is financed by the EnergiX-programme in the Norwegian Research Council, the hydropower industry and public administration.



Photo: Anders Finstad

CEDREN website: <http://www.cedren.no/>

SINTEF Energy Research

Postal address: P. O. Box 4761 Torgarden, NO-7465 Trondheim

Office address: Sem Sælands vei 11, NO-7034 Trondheim

Telephone: +47 73 59 72 00

Contact CEDREN/SusWater

Atle Harby, atle.harby@sintef.no

Audun Ruud, audun.ruud@nina.no

Website: <http://www.cedren.no/Prosjekter/SusWater>

