WG 3 – Protecting Aquatic Ecosystems & the Sustainable Development of Hydropower.

EPI WATER

Evaluating Economic Policy Instruments for Sustainable Water Management in Europe

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Session V- WG 3 Protecting Aquatic Ecosystems & the Sustainable Development of Hydropower.

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The EPIs discussed (1)

- **Lower Ebro (Spain): Voluntary agreement for river regime restoration services (CS2)**

EPI induced the implementation of flushing flows for controlling excess of macrophytes from the river channel.

- **Green Hydropower in Switzerland (CS15)**

Swiss Green Hydropower label aims at the broader impact of hydropower use on ecosystems and landscapes(improve local river conditions by setting an incentive to develop sustainable hydropower)

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The EPIs discussed (2)

- **Subsidies for ecologically friendly hydropower plants through favourable electricity remuneration in Germany (SC18)**

German case, linking increased remuneration for hydropower electricity to ecological criteria (WFD) (in particular establishing the biological passability upstream, and providing the ecological minimum flow.)

- **Green energy certificates and compliance market (Italy) (CS17)**

The Italian green energy certificates and compliance market to foster renewable energy. The emphasis in terms of environmental impacts targeted is hence laid the renewable and low carbon-dioxide character of hydropower generation ≠ impact of the technology on the water ecosystem.

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Specificities of the hydropower sector

- Long concessions periods (exceptional timeframe) and dynamics with the renewable of concession
- Question about the level of additionality of any EPI in this context when developed within a WFD regulatory environment
- Examples Switzerland & Germany: EPI provides incentives to comply more rapidly with future regulation (or current regulation that will be relevant in the future when concessions are renewed)
- Uncertainty about ecological effectiveness of measures applied
- Lack of monitoring and possibility of revocation of label/preferential tarifs (Link to institutional context)

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Specificities of the hydropower sector

- Transferability
- Distributional effects: benefits for the hydropower plant operators and and costs apportioned to a large number of electricity consumers?
- Cost-efficiency of measures - activities where economically feasible and not where ecologically most needed
- Link regulation-EPI , scope of the instrument, marginal effects → policy mix – EPI only to make the regulation more acceptable (in case of subsidies)

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More general lessons

- Successful instruments? - Level of uptake as criteria for success?
- More use of proxies in situations of missing information

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Economic assessment 1

The assessment of ECONOMIC policy instruments faced an irony as not many clear messages could be provided by the reviewed cases.

- The focuses of the case study analyses under the economic assessment criterion depend very strongly on the available data.

On economic efficiency only little information was provided with hits at welfare improvement identified in the CS2 case.

- flushing flows improve the ecological status at reasonable costs with welfare gains for society justifying compensations payments.)

No sound judgment on whether the **least-cost alternative** has been chosen could be provided in any of the cases.

However, hits were provided with respect to cost effectiveness were provided (CS2 and CS15). The implication of the private sector which we can assume as profit maximizing implied that in a CBA perspective , the instruments were acceptable (voluntary)

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Economic assessment 2

Incentive effect:

- CS18: The effect of incentives is higher the larger the hydropower plant is because of the fixed costs associated to the improvements. Incentives are in particular not high enough for small hydropower plants (<100 kW) but which are particularly problematic as they are often situated on smaller, rather natural rivers

  =promotes environmental improvements where they are economically viable, and not where they would be most needed from an ecological point of view.
- However→ dynamics from future Regulation?

- CS 15: Green certificate allows for an opportunity to better market green electricity. However, the low uptake rate of the EPI leads to think that the incentives provided by the instrument are not high enough to find a broader applicability.

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Distributional Effects and Social Equity

According to the results of the case study analyses, distributional effects and social equity do not represent an barrier to the development for the development of EPIs targeting the hydropower sector.

→This might be mainly due to the widely voluntary character of the EPIs.

- The main issue mentioned under this assessment criterion in one of the case studies concerns the distribution of the location of hydropower plants, which provokes negative impacts in their direct proximity, but provides benefits to parts of the population far beyond this geographical area. (CS17, and potentially CS18)

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Institutions

- The spheres of **energy generation** and **water management**, as such they are subject to the direct influence of two regulatory frameworks (i.e. a major evolution of the energy regulatory framework has been the liberalization of the sector in the EU).
- At a higher institutional level, they are also subject to the evolution of the values of society and subsequent debates, particularly around the desirability of a mature technology such as hydropower generation (the Italian and Swiss cases - CS 17et CS 15, respectively- were clearly influenced by these evolutions).
- The structure of property rights (i.e. concessions) has implications (opportunities and risks)
- A new institution was created by the development of the schemes in Italy with a green certificate market. (Potentially, the new remuneration scheme introduced could be said to be a new institution in the Spanish case). For the other cases, adaptation of existing institutions is more likely to have developed with the creation of a standard in Switzerland and the amendment of legislation in Germany.

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Transaction cost

- TCs are not considered as no systematic and purposely designed assessment was available for any of the cases.
- However, some experiences can stand out as probably having lower costs associated with exchange and implementation: German EEG (CS 18) → piggy back on existing legislation.
- The other cases (CS 2, 15 and 17) seemed to have required more had hoc efforts for negotiation and monitoring, probably rising their respective TCs, compared to the CS18.
  - → Lower Ebro CS2 developed a framework and a knowledge base exclusively for i) three hydropower dams on a section of the Ebro and ii) engaged in an innovative partnership between higher education, the regulator and the private sector which required important coordination efforts.
- (AS EXPLAINED ABOVE Mechanisms are implemented at the intersection of the spheres of water and energy.
  - →if debate is important on energy policy, this translates into higher negotiation costs on the development of a hydropower related water management EPIs. Conversely, in a more stable energy policy background, piggy backing opportunities may be harnessed to control for such costs.

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Policy implementability 1

- EPIs relate to both the spheres of **energy generation** and **water management**, as such they are subject to the direct influence of two regulatory frameworks.

- Synergies:

The cases presented highlight the synergies between renewable and sustainable energy targets and ecological targets that come with this association. This is clearly the case for the most highly modified water bodies, as highlighted in the Spanish scheme (CS 2). Moreover, such synergies can also benefit from piggy backing on existing energy-related schemes to lower their implementation costs (CS 18).

However, if policies are unstable (debated, changed rapidly) on energy issues, the synergy can become a barrier, as partially being the case for the CS 17.

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Policy implementability 2

- The role of shared values:

This requires that major stakeholders are involved upstream and downstream of the project. An example are the popular involvement and close collaboration between private, public and civil society organization in the design of the EPI in Switzerland (CS 15) and its implementation, an innovative collaborative effort between the private sector, the regulator and higher education in the Spanish case (CS 2).

A more conflictive situation seems present in the Italian case because of mistrust with respect to the managers of hydropower technology in the case study area (CS17).

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Uncertainty

- Questions as timeframes (CS2) and quantified targets (CS 15 and 18) are not clearly stated. The CS 17 is clearer
- Measurement of achievements vary between cases. Results are not very clear for CS15 and CS18

- Lower uncertainty for the Spanish hydropower case (No.2) and only to a lesser extent in the Italian case of the energy certificates market (No.17)

- the Swiss (No.15) and German (No.18) cases experience more uncertainty. In both cases, the EPIs are in general being considered as successful, but considerable uncertainties persist regarding the actual environmental improvements, and hence their actual effectiveness.

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Questions

- To which extent EPIs aimed at hydropower activities allow to reconcile energy generation and ecological objectives?

- What appear to be key conditions for effective EPIs aiming at the hydropower sector?

- Are these transferable lessons and instruments?

- What are the future research opportunities around the synergies between hydropower and water management through EPIs?

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Thank you.

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