



Evaluating Economic Policy Instruments for Sustainable Water Management in Europe

Economic Instruments in the Hydropower Sector

– Illustration on the German bonus system –

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Introduction: Hydropower and sustainable water management

- Hydropower is an important source of renewable energy: emission free, decentralised, reliable!
 - But: Hydropower imposes important pressures on river water bodies:
 - Barrier for fish migration (upstream and downstream)
 - Alteration of flow conditions
 - Loss of riverine habitats, etc.
- Hydropower production represents a potential area of conflict between the promotion of renewable energy sources and sustainable water management!

Economic Policy Instruments applied in the hydropower sector

– Outcomes of the EPI-Water project –

EPI = Economic Policy Instrument



Four instruments on hydropower have been looked at in the project:

- Voluntary agreement for river regime restoration services (Lower Ebro, Spain)
- Green Hydropower Label (Switzerland)
- Green energy certificates market (Italy)
- Subsidies for ecologically friendly hydropower plants through favourable electricity remuneration (Germany)

There are also other EPIs applied in the hydropower sector, which were not analysed in detail in the EPI-Water project:

- e.g. water abstraction fees for the water abstracted by hydropower plants (existing for example in Italy)

Particularities of EPIs applied in the hydropower sector

- Sector characterized by very long concession periods (several decades) which provide legal security – difficult to impose new environmental regulations (e.g. regarding environmental improvement of water bodies)
- Application of new regulations at the renewal of concessions → EPIs to comply with requirements earlier in time!
- Actual environmental impact of ecological improvement measures on hydropower plants remains unclear – monitoring of the effects needs to be strengthened

Particularities of EPIs applied in the hydropower sector

- Hydropower is at the interface between two different policy objectives: promotion of renewable energy sources and sustainable management of aquatic ecosystems – this needs to be taken into account by the EPIs applied
- The case for the environmental certification scheme as applied in Switzerland – and the bonus applied in Germany
- In both cases, the EPI provides incentives for the ecological improvement of existing hydropower plants – without deteriorating the economic situation of the sector!

Illustration on the German bonus for ecologically friendly hydropower plants

German bonus for ecologically friendly hydropower plants

Background

- Main policy instrument to promote renewable energy sources (incl. hydropower) in Germany: The German Renewable Energy Sources Act (EEG 2000)
 - Guaranteed tariffs paid for electricity produced with renewable energy sources (depending on plant size)
- Awareness of the mentioned conflict of interests (renewable energies vs. water environment protection) led to the introduction of the EPI

German bonus for ecologically friendly hydropower plants

Description of the EPI

- Amendment of the EEG in 2004 (2009,2012): Increase of tariffs for hydropower plants in case of substantial improvement of ecological status

- Criteria:
- storage capacity and management,
 - biological passability,
 - minimum water flow,
 - solids management,
 - bank structure,
 - or shallow water zones have to be established or abandoned channels or branches have to be connected.



German bonus for ecologically friendly hydropower plants

Description of the EPI

- Consideration of the double objective: remuneration per kWh – the more energy produced, the higher the incentive for ecological improvements

Modernisation of plants < 5 MW - share in production capacity	EEG 2009	Average increase of remuneration
	AMD/kWh	
Up to 500 kW	60	+ 50 %
500 kW to 5 MW	44	between + 33% and + 60%

- For bigger plants, only the increased share of the production capacity is remunerated

German bonus for ecologically friendly hydropower plants

Description of the EPI

- Voluntary – no loss of former remuneration
- Remuneration guaranteed for 20/30 years
- Tariffs apportioned to the electricity consumers
- Measures approved on site from the responsible water authority



German bonus for ecologically friendly hydropower plants

Evaluation

- Well accepted by the hydropower sector (voluntary)
 - Only a minor part of the electricity bill of the consumers
 - Once the status improvement is approved and the higher remuneration accorded, this decision cannot be canceled
- provides legal security for the hydropower plant operators (high investments) – but causes problems in case of non-compliance



German bonus for ecologically friendly hydropower plants

Evaluation

- Flexibility foreseen in the design of the EPI:
 - a) Evaluation leeway of the water authority: consideration of local conditions for judging status improvement
 - b) Regular reports of experiences of the EEG - basis for amendments to the EPI
- Easy to integrate in the existing institutional framework: introduced as an amendment of an existing law, no monitoring and enforcement costs



German bonus for ecologically friendly hydropower plants

Conclusions

- Targeting a major reason for not reaching good status, while promoting the use of renewable energy sources
- Well adapted to existing institutions, low transaction costs
- Widely accepted by the hydropower sector
- Correct steering effect – main ecological deficits are targeted by the measures applied



Anderer et al. 2011,
in print

German bonus for ecologically friendly hydropower plants

Conclusions

- Ecological improvements are taking place where they are economically feasible, and not where they would be ecologically most effective
- In the German case, incentives working for bigger plants, but would need to be much higher to work for smaller plants



Potential application in Armenia?

- Promoting sustainable water use without negative impacts on the hydropower sector → compatible with the current policy to promote hydropower use
 - Current remuneration system for hydropower plants would need to be adapted → higher bonus specifically for companies complying with the ecological conditions
 - Some work would need to be done beforehand, e.g.:
Prior investigations regarding the current impact of hydropower plants and estimations of costs of improvements
- **More investigations are necessary to judge the potential applicability of the instrument in Armenia – some reflections are included in the Debed report**



Thanks!

For more information please visit our project website:

<http://www.feem-project.net/epiwater>

(only available in English)

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