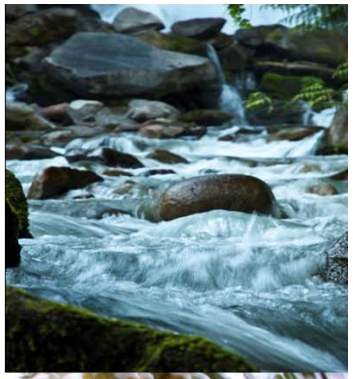
Striking the Right Balance

Hydropower in the Context of the Water Framework Directive and the Renewable Energy Directive



Jonida Abazaj

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CEDREN

Centre for Environmental Design of Renewable Energy

CENTRE FOR ENVIRONMENT-FRIENDLY ENERGY RESEARCH

Outline

- Context & motivation
- Purpose of the research
- Methodology
- Perception of the impact on the HP sector
- Conclusions
- Further research

Context & Motivation

- Abundance of legal instruments at EU level
- Delicate balance between conflicting needs
- Energy-Water interactions
- Painful co-existence (national and EU goals)
- Link regulation&policies - business
- Need to address the issue openly

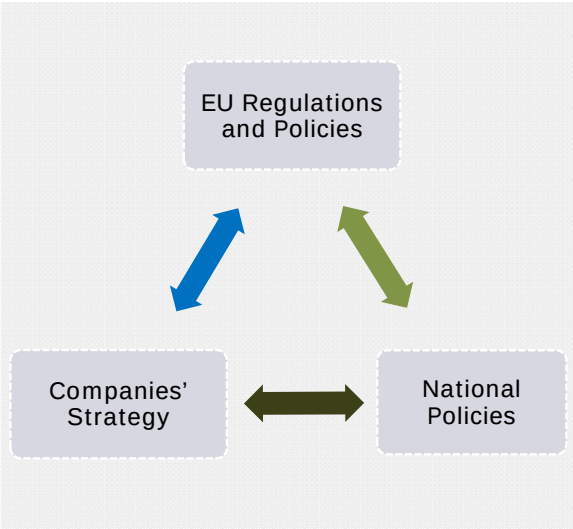
Purpose of the research

In thinking about energy-water interactions, there are three driving questions:

1. **How the actors involved perceiving the goals behind the directives and how are they approaching the issue?**

2. How to avoid losing renewable power production and flexibility in the electricity system, while aiming at adequate protection of the acquatic environment?

3. How can government and industry best manage energy-water interactions and *exploit synergies* in their policy and investment decisions?



Methodology

- Document analysis of the EU directives and related documents

- Meta-analysis

In order to:

- Enhance the understanding of the percieved conflicts between the goals of the EU directives;

- Reflect upon the possible impacts of these frameworks on the HP production and future development.

Goals of the Directives

Renewable Energy Directive: achieving 20 % RES of total net energy consumption in the EU by 2020 (10 % for the transport sector).

- **Hydropower as one the renewable energy sources**

Water Framework Directive: protection and restoration of the GES of all water courses

- **GES, GEP and the Exemptions (Article 4)**

EU MS - about 20% of water courses as HMWB

Perception of impacts on the HP sector

- Actual and future impact on the HP sector and the remaining HP potential

The WFD requires the introduction of further regulations, protocols, criteria catalogues and MS have to:

a) define the rules for HP development and operation in European waters, e.g. ‘no-go’ areas;

b) delineate specific environmental mitigation measures for existing and future HP/ dam schemes.

- investment costs for refurbishment and modernization
- losses in base load generation
- losses in peak load generation/ ancillary services

Perception of impacts on the HP sector (cont.)

- Need of increased flexibility in the system
- Imperative use of restoration and mitigation measures as a consequence of acknowledgement of the environmental impacts caused by HP.
- Fear of **energy losses** because of ecological improvements required by the WFD (up to **8-9 TWh or 2.3 – 2.6% of total HP production (**Austrian Case**))**
- The “Overriding Public Interest” issue : the benefits of the new infrastructure could outweigh the benefits of achieving the WFD environmental objectives ….
- Gaps and need for further cooperation

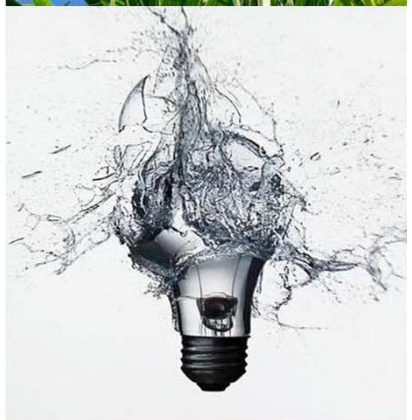
Conclusions

- Successful implementation of directives requires
  - properly integrating energy and water policy
  - Involvement of all the interests at stake
  - Joint implementation of WFD and RES by concerned authorities

- Difficult establishment of general measures (case-by case approach).

What does reconciliation implies in reality?
Integration or striking the right balance

- It is possible to Balance the requirements of the directives
  - need for strategic planning (at the river basin level),
  - Early and continuous involvement of all **stakeholders** and the **public!!!**



Thank you for listening!

Jonida Abazaj

jonida.abazaj@iot.ntnu.no

Norwegian University of Science and Technology (NTNU)
Alfred Getz veg 3, SB II - 4. etasje, 7491, Trondheim, Norway.
Tel. +47 73 59 37 11. www.ntnu.no

Centre for the Environmental Design of Renewable Energy (CEDREN)
www.cedren.no

CEDREN (GOVREP Project)

The main objective of **CEDREN** is to develop and communicate design solutions for renewable energy production that address environmental and societal challenges at local, regional, national and global levels.

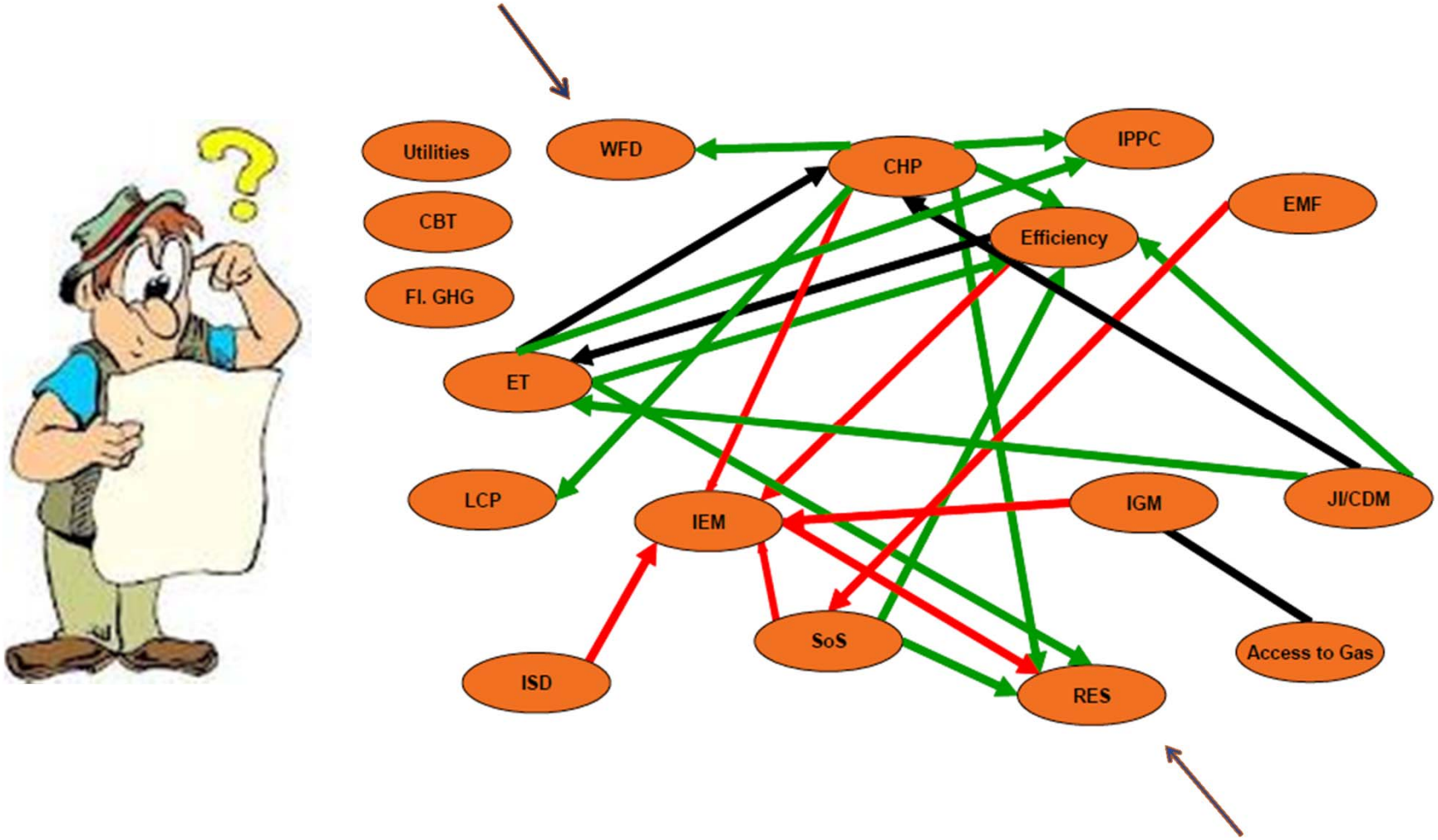
Further Research

By following the development of this process….

1. How are MS implementing and integrating the objectives behind the directives? Which are the implications for policy design at the national level.
   Is the goal realistic and achievable?

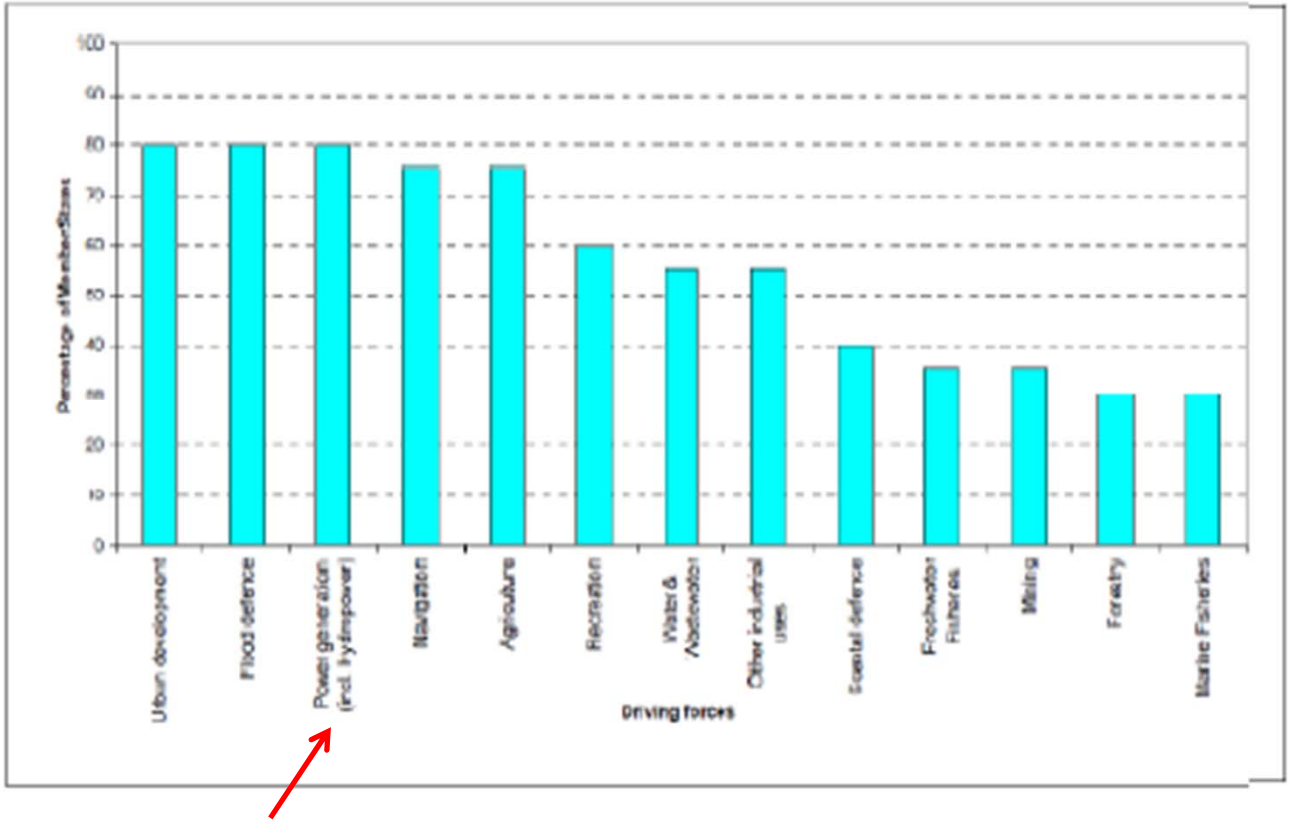
2. How are companies managing the complexity? To which extend does the regulatory activity affect the attractiveness of different investments & the motivation to invest in new technology options?

The Web of EU Directives



Source: Eurelectric (2005:18), Consistency and Coherence of EU Directives and Regulations

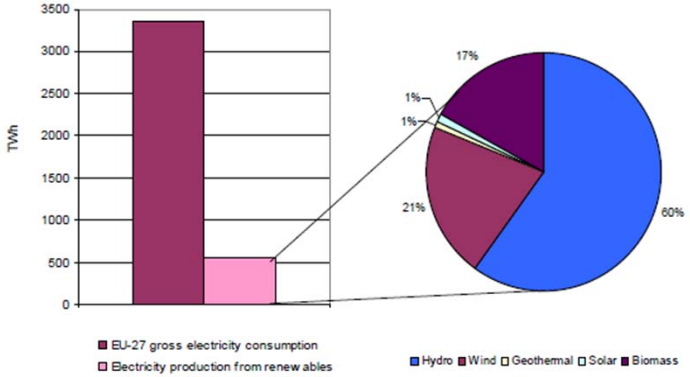
Hydromorphological pressures and HMWB



Percentage of 20 Member States indicating a driving force related to hydromorphological pressures as significant (European Commission, 2007)

Role of HP

Gross electricity consumption and electricity production by renewable sources (EU-27, 2008)

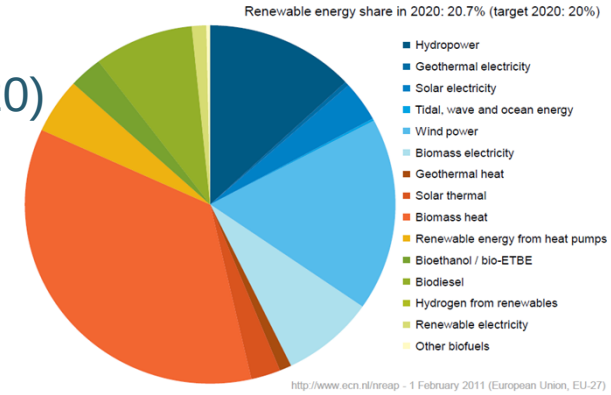


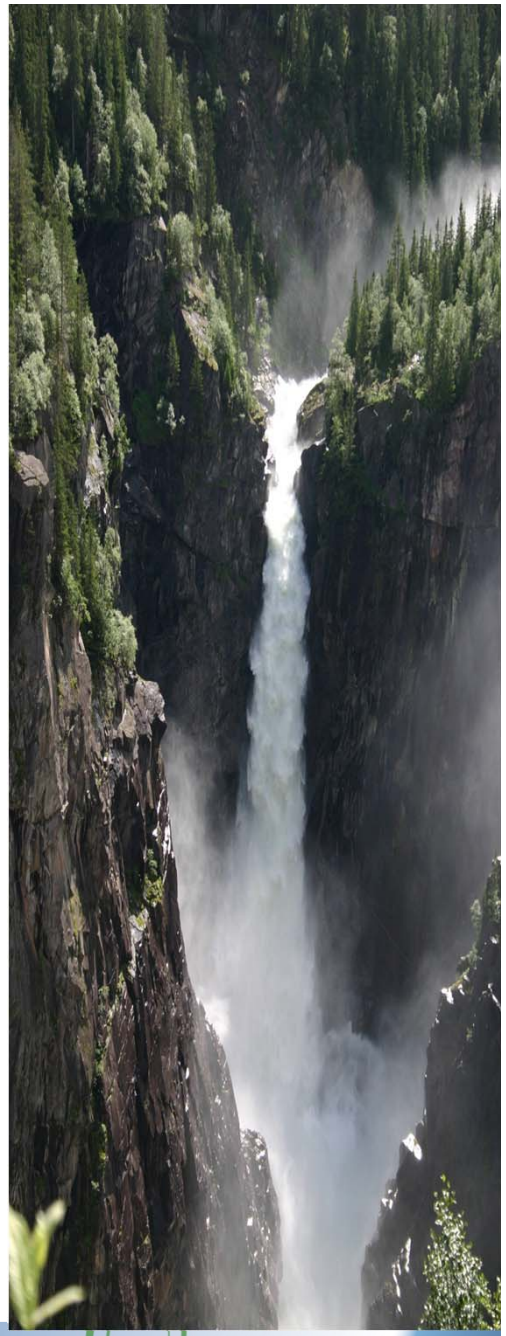
Source: EUROSTAT, Statistics in focus 56/2010

Projection of the NREAPs (2020)

Wind – 40.6% of all RES-E

Hydro - 30.4%





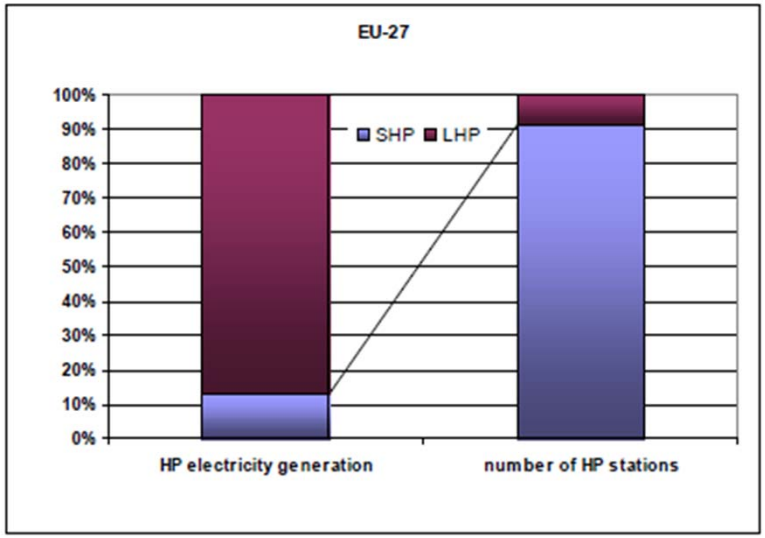
Large versus Small

Table 2: Number of small and large hydropower plants, no data on LHP for FI and TR available (sources: SHP – SHERPA 2006; LHP – ENTSO-E statistical yearbook 2009, Melin (SE), NVE (NO), BFE (CH) and EURELECTRIC*)

		Number of HP plants		
		total	SHP	LHP
EU-27	2006 / 2008 (SHERPA, ENTSOE, EURELECTRIC, others)	22920	20953	1967 (1978*)
	2020 (NREAP)	28607	26392	2215
EU-27, candidate, associated countries, CH		25259	22702	2557

10 times more small (SHPP, P<10 MW) than large HP plants (LHPP, P>10 MW).

Figure 2: Proportion of electricity generation and number of hydropower stations for SHP and LHP in the EU-27



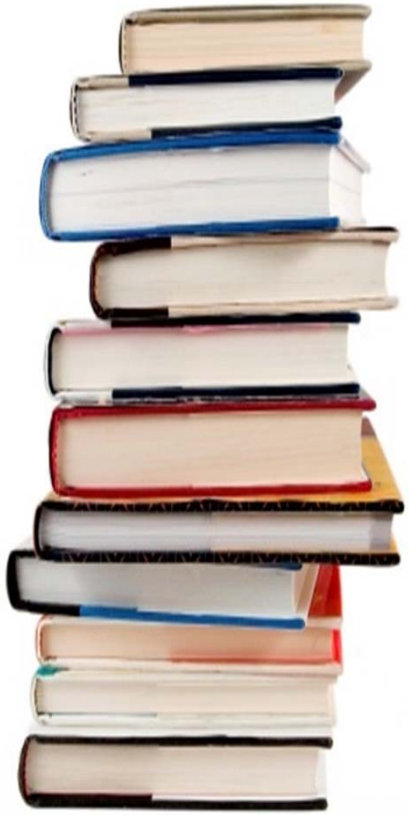
SHPP = 13% of the total generation of HP stations.
LHPP = 87% of HP generation with only 9% of the stations.

2050 (NREAP): increase of LH stations by 10%, SHPP by 25% (with a rise in electricity generation of only 11%).

Theories…

- Environmental Policy Integration (EPI)

- Policy Coherence Theory: discussion on policy coordintion, cohernece and consistency.



Johnes (2002) - Coherence as a systemic promotion of mutually reinforcing policy action across government departments, agencies etc.

Winship (2006) – It's not about choosing between different conflicting aims but enaibling a process by which both aims and means can be redefined and cerate win-win situations.