Hydropower in the Energy Union

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Renewable Energy within the Energy Union
"We need to strengthen the share of renewable energies on our continent. This is not only a matter of a **responsible climate change policy.** It is, at the same time, an **industrial policy imperative** if we still want to have affordable energy at our disposal in the medium term. I therefore want Europe’s Energy Union to become the **world number one in renewable energies.**"

*President Juncker, European Parliament, July 2014*
European Council: Headline targets

2030 Climate and Energy Framework

2020

-20% Greenhouse Gas Emissions

20% Renewable Energy

20% Energy Efficiency

≥ 40% Greenhouse Gas Emissions

≥ 27% Renewable Energy

≥ 27% Energy Efficiency

2030

10% Interconnection

15% Interconnection

New governance system + key indicators
The Energy Union

Where we want to go:
Secure, sustainable, competitive, affordable energy for every European

What this means:
Energy security, solidarity and trust
A fully integrated internal EU-wide energy market
Energy efficiency as an energy source in its own right
Transition to a low-carbon society
Research, innovation and competiveness

How we want to reach it:

5 GUIDING DIMENSIONS
15 CONCRETE ACTIONS
43 INITIATIVES
Why does the Energy Union need renewable energy policies?

**Sustainability**
- Reduction of emissions
- Reduction of energy consumption
- Development of alternative energy sources

**Security of energy supply**
- Diversification of energy sources, supply countries and routes
- Grid Stability
- Adequate energy infrastructures

**Competitiveness**
- Affordable and competitive prices
- Promotion of new technologies, growth and jobs
- Improved energy efficiency
Renewable energy: where do we stand?

- **2014 final energy consumption**
  - Heating and cooling: 46%
  - Transports*: 30%
  - Electricity: 24%

- **2020 RES goals in final energy consumption**
  - 21% (109 Mtoe)
    - 2014: 17% heating & cooling
    - 2014: 6% transports
    - 2014: 26% electricity

- **2020 RES target**
  - 20% heating & cooling
  - 15.3% total energy consumption

*with aviation correction in accordance with the RED*
Hydropower within the Energy Union
What is (small) hydropower?

- No clear limit between large and small hydropower
- 10MW total is however becoming accepted
Hydropower benefits...

- **low-carbon** electricity
  - wind onshore: 12 geq CO2/kWh
  - hydropower: 24 geq CO2/kWh
  - biomass-E: 230 geq CO2/kWh
  - coal: 820 geq CO2/kWh

*IPCC WGIII – Mitigation of Climate Change, Annex II., 2014*

- **low-cost** electricity (...but other technologies are catching up !)

- in a **worldwide** market
  - 2030: 527 GW to be built
  - + 1085 GW to be modernized

*IEA, world energy outlook 2014 New Policies Scenario*

*Ecophys report on energy costs and subsidies for EU28, 2014*
... and challenges

- Refurbishment: increased efficiency of turbines and generators – i.e. more renewable electricity

- More flexible operation – more value from each litre of water by producing when prices are the highest

- **BUT** environmental requirements: WFD, N2000

- **BUT** – operators might downsize refurbishment of fear of more stringent ecological requirements if new concessions are needed
Hydropower generation trends – UE28

2010-2020 trends

• Moderate increase in hydropower: +25 TWh (8%), of which:
  • 17.5 TWh large hydro
  • 6.0 TWh medium
  • 1.5 TWh small

• BUT increased pumping
  • +8.6 TWh (+35%)
  • Expected as a response to more variable power production and prices
  • Part of this will be refurbishment of old installations

Ref: NREAPs
Hydropower tackling new challenges

Projected renewable electricity deployment in the EU (% of net generation)

- Other renewables (tidal etc.)
- Solar power
- Wind off-shore
- Wind on-shore
- Hydro (pumping excluded)
- Thermal power (including biomass and geothermal)
- Nuclear energy

Source: PRIMES EE27 scenario
Hydropower tackling new challenges

• x 2 Variable RES power in 2020 will require
  
o  More interconnections
  o  More storage
  o  More flexible generation
  o  More demand side management

...and new market design
Conclusions

- Hydropower is an major source of renewable electricity in the EU today and will still play a crucial role in the future.

- Limited increase in total production (8%) towards 2020, but different operations and pumping increase (35%).

- Refurbishment offers important opportunities to combine ecological mitigation and increased hydropower production.

- Hydropower offers generation flexibility and large scale energy storage, which is all the more important with a diversified mix on an integrated market.
Thank you for your attention