



SOCIAL ACCEPTANCE OF THE VISION OF NORWAY AS A GREEN BATTERY FOR EUROPE – Insights from the case of Tyin - a potential pumped storage hydro power plant

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Background I

- Growth in intermittent energy (solar, wind), creates need for balancing services aka. flexibility
- Alternatives: Interconnectors, Backup generation, DSM and Storage
- Storage: large – micro scale
- Hydro-reservoirs (pumped) is (currently) one of the few large scale opportunities for electricity storage
- Norwegian HP: Many reservoirs/storage units near existing and planned interconnectors across the North Sea
- Pilot study: 12 Norwegian HPP can provide effect of 11000 MW
- NORWAY AS A GREEN BATTERY FOR EUROPE!?



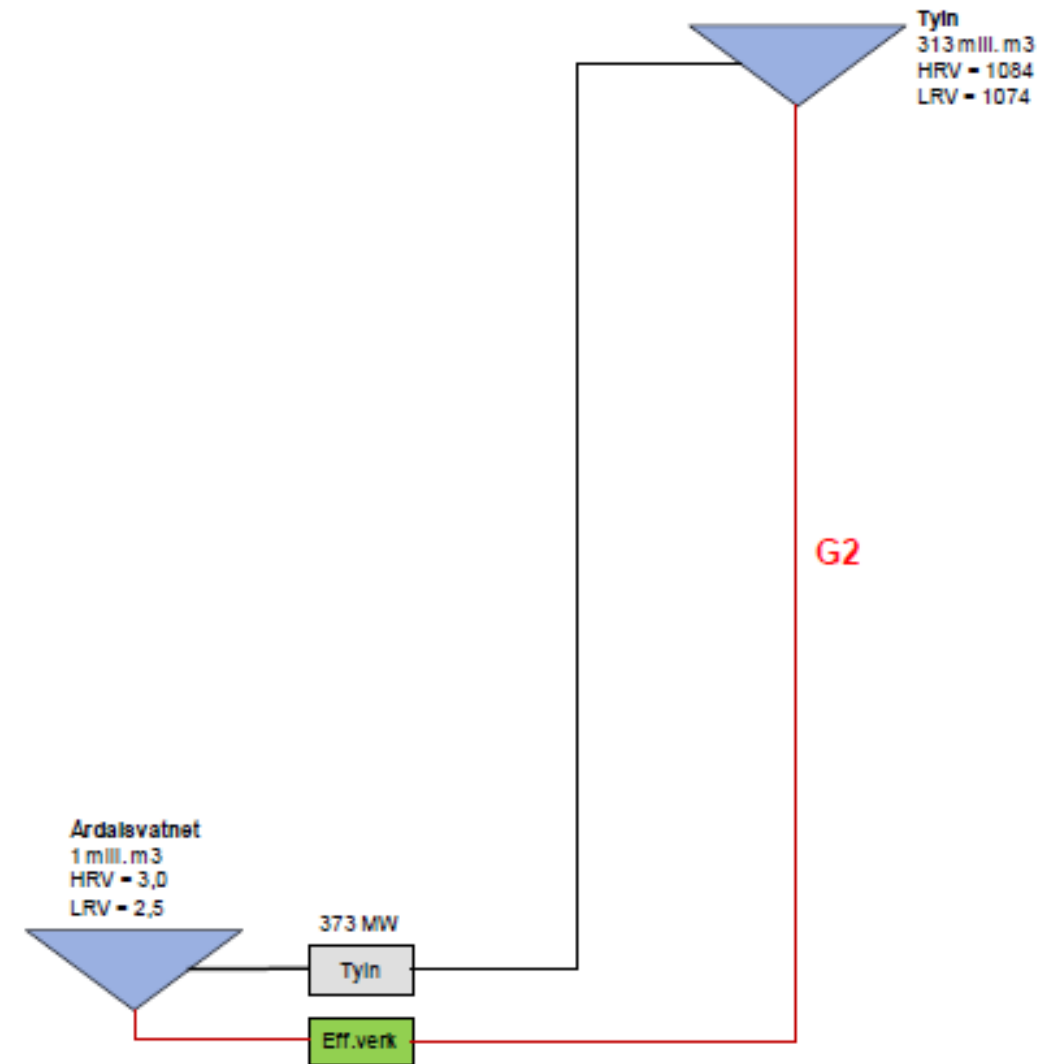
A North Sea supergrid...?

Background II

- Large, growing surplus of renewable energy in Scandinavia
- (Very) low electricity prices
- Need for maintenance and upgrading of hydro power plants and grids in Norway
- Norway preparing (with fear) for a future without being a “petroleum superpower”



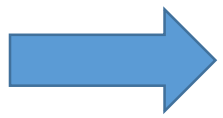
- Search for new markets and increased prices as seen from the view of the energy companies and grid operators, as well as energy authorities
- A REVITALISATION OF THE HYDROPOWER INDUSTRY IN NORWAY?



Figur 2.16: Case G2 Tyin.

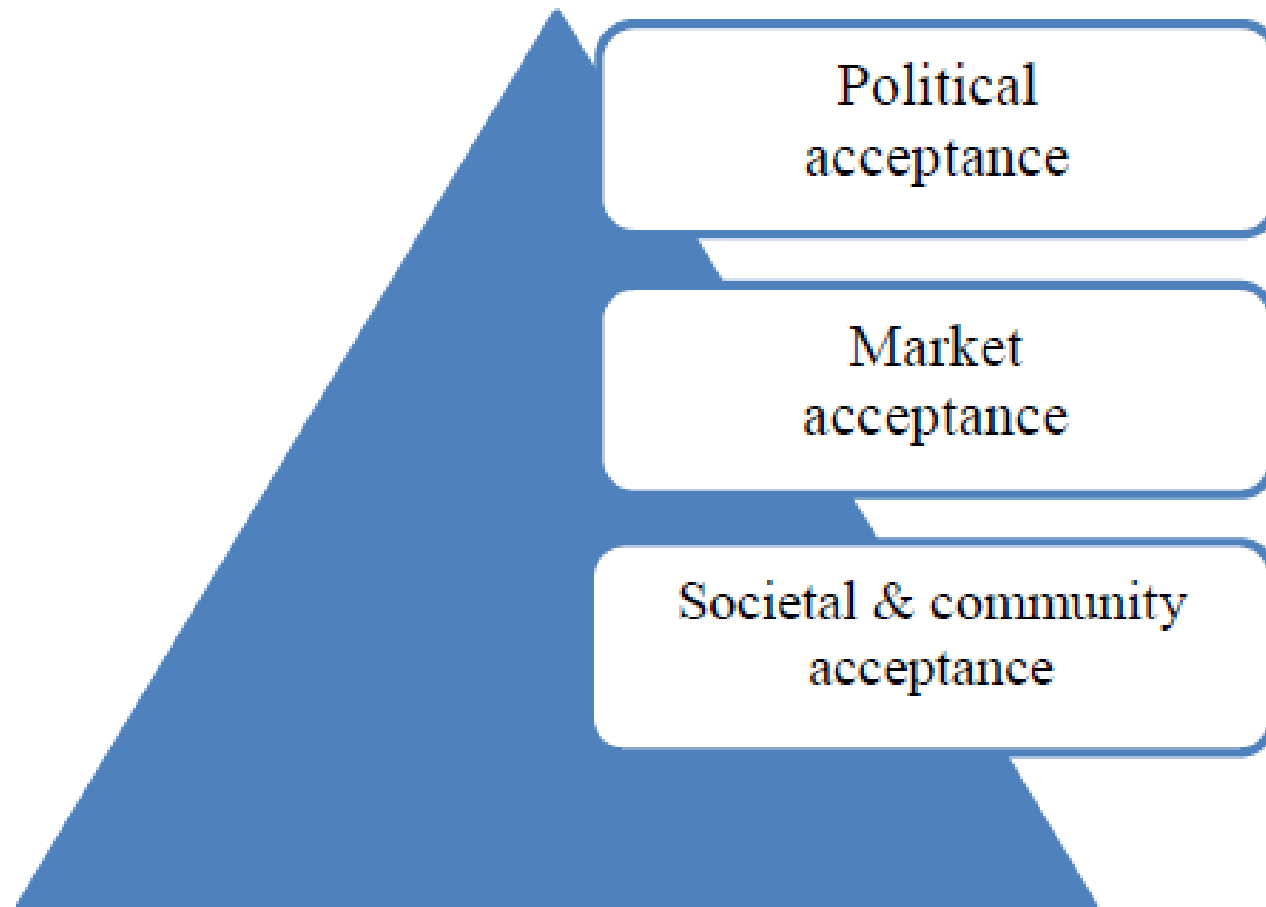
Challenges and objective

- From production focused on base load - security of supply to max effect over short periods of time
- Reconstruction to increase plant capacity flow, larger (reversible) turbines (=pumps) – i.e. pump for storage when surplus of electricity
- From slow-stable annual tapping of reservoirs during late autumn - late spring, to faster, fluctuating water levels throughout the year?
- From using electricity locally to selling electricity far away in a European market?



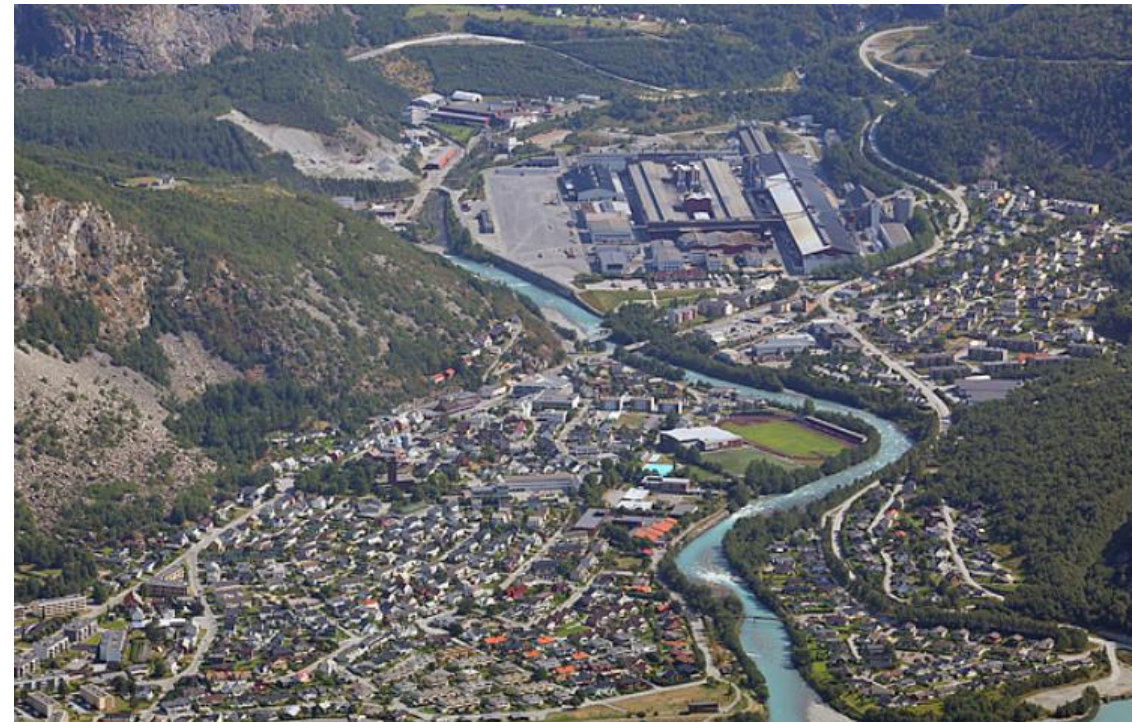
How do key stakeholders respond to the IDEA of Norwegian Hydropower as a GREEN BATTERY for Europe and the assumed consequences at the reservoir Tyin and the recipient industrial community of Årdal?

Three dimensions of social acceptance (Wustenhagen 2007)



Study area and methods

- Political and market acceptance at the national level
- Community acceptance studied in the hypothetical (Pumped) Storage plant of Tyin-Årdal of 700 MW, which is currently run as a regular Norwegian powerplant focusing on base-load security of supply (annual production 1600 GWh)
- Individual and focus group in-depth interviews with decisionmakers, business and environment NGOs at national and local levels
- 1 local focus group and appr. 20 individual interviews among national and local stakeholders



Results – political acceptance

- Recent White paper on Energy (= electricity) discusses balancing services without clear conclusions yet recognizing its future importance
- Uncertainty on interconnector capacity and how to finance them
- Uncertainty on the consequences for local use of cheap hydropower in high-tech energy-intensive industries at remote industry-specialized communities – a traditional way of utilizing excess Norwegian hydropower
- Norwegian MPs (government parties as well as main opposition party): Concerned for energy intensive industries as well as for the Norwegian public's expectations of cheap electricity

Using the term “green battery” is pretty stiff, but it [pumped storage] might contribute. (Norwegian MP from Conservative Party)

Results: Market acceptance

- EU and key countries express interest in Norwegian balancing services
- Main Norwegian state companies (Statkraft and Statnett) as well as the organisation for Norwegian electricity producers see an interesting future role for balancing services from Norway in the North Sea region, not the least to achieve higher electricity prices
- Federation of Norwegian Industries are sceptical and support local use of electricity as a more clever way to use surplus energy and reach emission reduction targets

“Unless we have predictable, long-term regulatory frameworks for electricity in Norway, all domestic energy-intensive industries will disappear.” (CEO, Federation for Norwegian Industry)

Results: Community acceptance

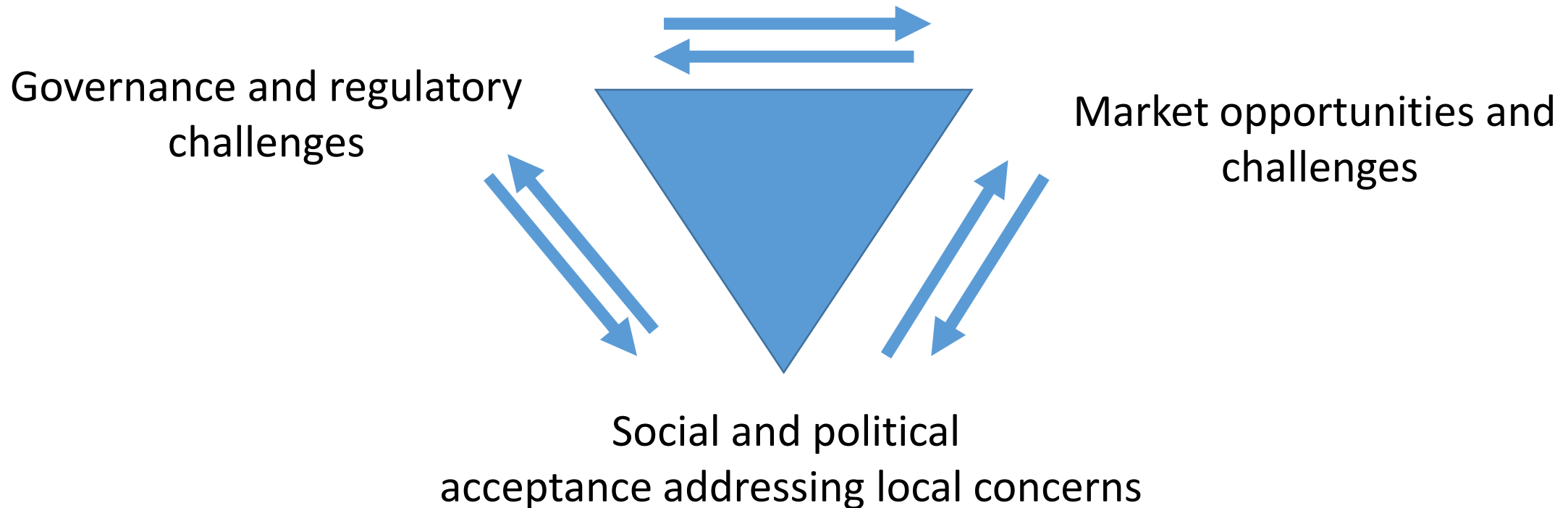
- Tourism businesses, second home entrepreneurs and landowners as well as the aluminum industry cluster in Årdal is not willing to carry the costs alone of providing climate friendly energy to Europe without fair compensation
- Concerns exist for a range of local interests: Jobs, municipality incomes (i.e. taxes, concession power), biodiversity and fisheries, visual/esthetic impacts in the reservoir and recreation/transportation safety (unsafe icecover)
- Uncertainty over potential impacts prevails and makes early involvement and clarification of consequences imperative

Pumped storage and multiple water fluctuations might ruin some of the skitracks since the ice might be unsafe. (Landowner/tourism host, Tyin)

Discussion

- No clearcut conflict, for instance between central and local stakeholders or between environmental and business/industry stakeholders
- Instead, uncertainty prevails and call for clarifying consequences at several levels and for multiple interests
- Host community revenues of providing balancing services must be clarified in assessing and renewing regulatory aspects of hydropower in light of pumped storage
- Grid infrastructure challenges related to interconnectors must be addressed more systematically, also to avoid escalating local conflicts
- The challenges at Tyn is very much solved beyond the local level
- But these decisions should still reflect local concerns and priorities
- Early involvement is crucial (as always)

Conclusion and future research





Renewable Energy Respecting Nature

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