Small scale hydro in Norway
A developers experience

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Blåfall

- Established in 2006, owned by Finnish Kymppivoima and two Icelandic companies, Horn Fjarfestingarfelag and RED (Rarik Energy Development).

- Involved in the complete value chain (from green field ident. through operation phase).
  - The landowner provides the rights
  - Blåfall provides capital and competence

- The largest NON public owned developer in Norway.
  - Three plants in operation, three under construction.
  - Medium term target 0,5 TWh annual production
Hydropower in Norway

- Electr. prod. 137 TWh
- Inst. effect hydropower 29 030 MW (699 plants above 1 MW)
- Potential for small scale hyfro (<10MW) is appr 25 TWh
- Revenues consist of electricity price and green certificates. (Market prices – 50 to 80 Euro/MWh)
- Development cost however increased sign
- 3-5 years for concession
- Grid access challenging
Expected climate change effects on precipitation

Forventede klimaendringer i Norge - Nedbør

Endring i nedbørmengde

Lite i innlandet (Sør-Øst Norge)
Opp mot 30% enkelte kyststrøk

Typisk 10-20% i store områder

(kilde: senorge.no)
The «cranberry map»
Small hydropower plants in Sogn- og Fjordane, 6196 GWh
Some of our projects

- Northern Norway
  - Austpolldalen
  - Grønlielva
  - Gårdsdalen
  - Løvdalselva
  - Mjeldeelva
  - Rismålelva
  - Sivertelva
  - Savåga
  - Breivikelva

- West coast/southern Norway
  - Smøråa
  - Ryddølsåa
  - Stokkelva
  - Voldsetelva
  - Breidsete
  - Stølsdalselva
  - Hovda
  - Vikaåne
  - Nonstadgilet
  - Fjellstølen
  - Langedalselva
  - Krossdalselva
  - Vassenelva
  - Måge
The Norwegian regime

• The right to the waterfall is linked to the landowner and his right to the land. So if there are no other agreements the landowner normally has the right to use the water for energy production.

• Konsesjon (license) is required before you can start developing. Norwegian Water Resources and Energy Directorate will use some three to five years for processing the application due to heavy workload.
  
  • The application is comprehensive and requires competence on environmental/biology as well as engineering areas.
  
  • There are numerous requirements to be met, vast areas are classified as protected. All kinds of NGOs and stakeholders are involved.
The Norwegian concept

- The landowner will develop himself, or the developer (Blåfall) will hire the right to use the hydro for energy production from the landowner for a number of years (30-50)
  - The landowner will always OWN the rights himself!
  - The landowner will be paid an annual amount for hiring this right to the developer
- Access to grid is secured by law, but could be costly!
- The el market provides a sound basis for future revenue expectations.
  - Elcert and UK LEC etc in addition
- Competition between developers means the landowner will in principle receive the «correct» price for the hire of his rights!
The development of the agreement with landowners

- From 2000 onwards, low competition and lack of information to landowners resulted in agreements that gave close to nothing to the landowners!

- Gradually increased competition, today some 5-6 national companies like Blåfall

- Initial contract format was based on shared ownership and 50/50 split of profit (and loss!)

- Typically 90/100 year duration

- Today contracts based on share of revenues with no loss risk for landowners

- Duration today typically some 30-50 years
The «Blåfall-model»

- Hire the right to use the hydro for energy production from the landowners for typically 30-50 years
  - When the agreed period is over the landowners will receive the plant free of charge.
- Blåfall pays annual lease to the landowners
  - A percentage of the total revenues will be paid to the landowners together. Then split between the landowners according to their share of the land(head).
  - Normally the percentage received by the landowners is dependent on the electricity price.
- Blåfall takes care of the complete chain of events
  - Conceptual engineering and application for concession.
  - Tenders for supply of long lead items and construction, detail engineering.
  - Equity and bank loan (financing)
  - Operation of the plant
The Norwegian tax regime

- Company tax 28% of profit

- Property tax varies somewhat locally, but in principle 0.7% of the balance.

- Resource tax applied on plants above 5 MW installed capacity.
  - Means there are no plants developed between 5 and 10 MW....
  - Represents some 20% of revenues!
Typical case

• A typical plant is 10 GWh annual production

• This will typically give an annual turnover of 5 MNOK

• The landowners will receive in the order of 15% of the turnover, that is 0.75 MNOK annually.

• When the lease period is over the landowners will take over the plant and as most loans then should be repaid, they will have some 4-5 MNOK to share!
Cost-structure for a typical hydro power station
A Norwegian/Icelandic comparison

• Apart from local labour for design and construction work, most of the cost will be the same!

• Labour cost would be in total some 50%

• Assume labour cost in Norway is 30% higher than Iceland
  • Means total cost some 15% higher in Iceland

• El prices in Norway appr 0,5 NOK/kWh, appr 100% higher than Icelandic level

• Given the same head and landscape (and cost of finance etc…), 1 M3 of hydro in Norway would be worth 2/1,15=1,7xthe value in Iceland!