



Norwegian Energy Market in relation to EU – part 2

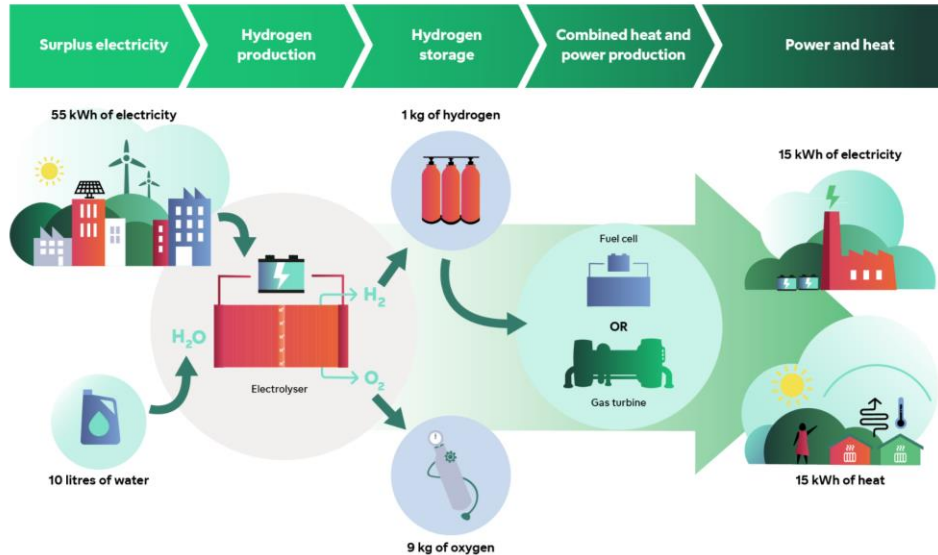
17.11.2020 – Toril Christensen, Head og Analysis in BKK Produksjon AS



Agenda

- EU and politics
- Electrification
- Hydrogen
- Offshore Wind

Fortum – «The hydrogen economy is coming»



https://www.fortum.com/about-us/blog-podcast/forthedoers-blog/hydrogen-economy-coming-sooner-or-later?utm_source=twitter&utm_medium=organic&utm_campaign=vetyblogi

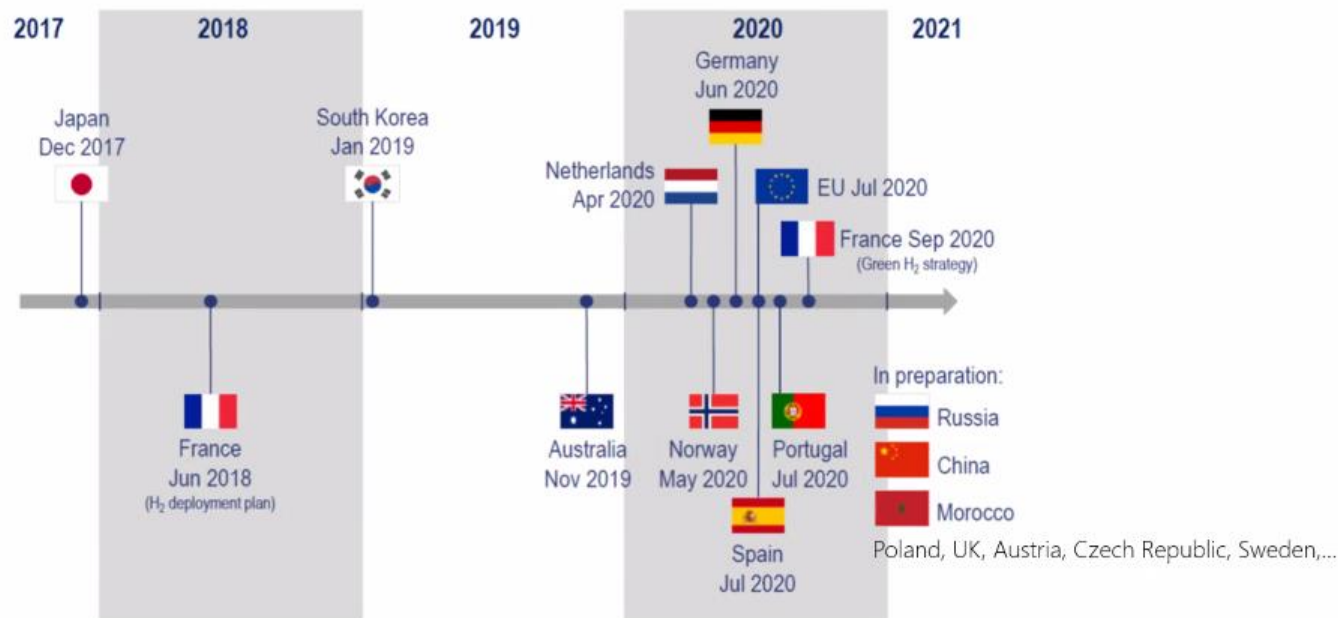
EU launches hydrogen strategy, taking a global leadership in green hydrogen

Towards a hydrogen economy in Europe

- European Commission announced new European hydrogen strategy on July 8, hydrogen will be part of the Covid-19 recovery plan
 - Phase 1 (2020-24) goal of 6 GW
 - Phase 2 (2025-2030) goal of 40 GW
 - Phase 3 (~2050) large-scale use of hydrogen
- Maximize use of green hydrogen, blue hydrogen will play a transitional role, NO grey hydrogen
- Production price for grey hydrogen (EUR 1.5/kg) benchmark for green hydrogen
- Cost target will be reached in a few years



The "Hydrogen Decade" starts in 2020



Source: World Energy Council, LBST <https://www.weltenergierrat.de/international-hydrogen-strategies/>

Different agendas for hydrogen strategies but all are related to reducing emissions and creating value!

The dream with regard to energy purposes is for hydrogen to become the link between different sectors

Different focus in Norway and in Europe. For Europe hydrogen to flexibility purposes is important.

In Norway it is the industry itself that is interesting. For the gas industry to have a market for the natural gas, for the energysystem to have offtake of renewable energy.



Ambitious policies are accompanied by large funding schemes for scale-up



NVE - The Norwegian Water Resources and Energy Directorate

«Hydrogen is the worlds smallest atom, but can play a huge role i the energysystem of the future»

«Hydrogen has been the energycarrier of the future for a long time, but now it seems that the future is closing up fast»

In NVE's latest longterm markedanalysis they have adressed hydrogen as the «joker», that can turn out to be an important part of the energysystem through emission cuts and energy demander

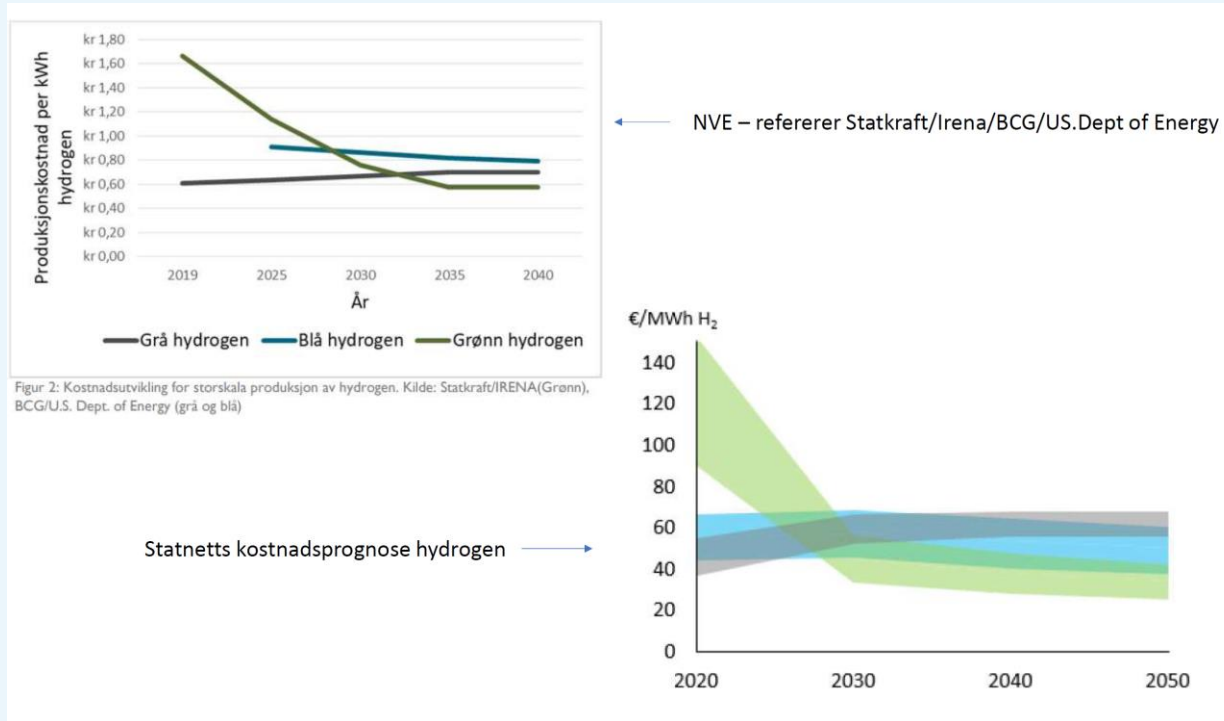
- <https://www.nve.no/nytt-fra-nve/nyheter-energi/hydrogen-er-verdens-minste-atom-men-kan-spille-en-stor-rolle-i-fremtidens-energisystem/>
- http://publikasjoner.nve.no/faktaark/2019/faktaark2019_12.pdf

Green versus blue hydrogen – the CCS question

- Northern Lights + longship CCS = Blue Hydrogen?
- Does Europe want that?
 - For transition?
- Maybe the market needs both
- Everyone agrees that in the long run it will be green hydrogen



Costreduction is needed for both green and blue hydrogen

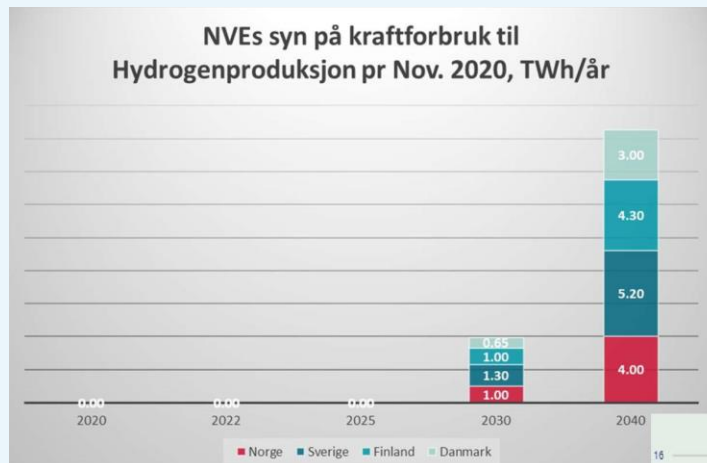
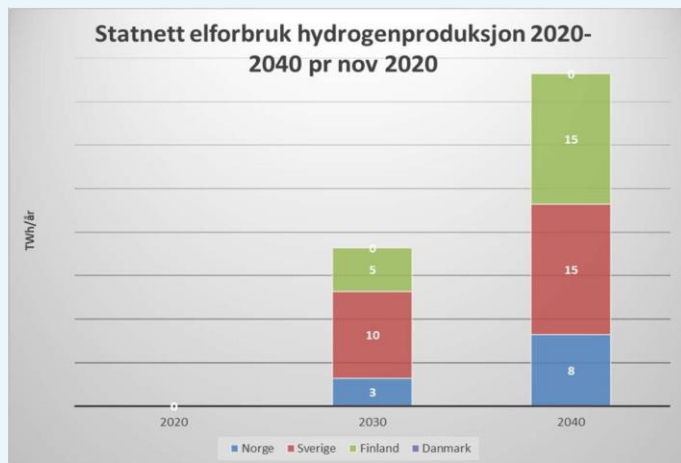


What is the need for electricity for green hydrogen production in Norway?

Transport – starting with maritime
 Industry – chemical, iron and steel
 Heating purposes



Figur 1-1: Estimert etterspørsel etter hydrogen i Norge i 2030 per kundegruppe.



Why has the debate around offshore wind escalated again?

- From oil- and gas to larger energy companies
- Covid-19 and rescue-packages
- Alternative to onshore wind
- Increased demand for power
 - most marketparticipants, industries and analyses have in their base increased demand for power in Norway especially from electrification. From 2020-2040 the different forecasts show from 20-40 TWh increase.
- Not the same NIMBY effect
- A good match for the hydrogen discussions – especially on the continent

Decarbonizing the North Sea



Cost

- Difference in opinion on subsidies or not
- Norgesgruppen – 1400 MW – 37 milliarder kroner.
- Two other industry partners
- The idea is to build without subsidies



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Hafslund Eco og Fred. Olsen går sammen om havvind

(Montel) Hafslund Eco og Fred. Olsen Renewables har inngått en samarbeidsavtale om utvikling av havvindprosjekter.

Selskapene skal sammen jobbe med å søke konsesjoner for utvikling av havvind på norsk sokkel, kommer det frem i en børsmelding.

Hafslund Ecos kompetanse innen fornybar kraftproduksjon og infrastruktur, i tillegg til Fred. Olsen Renewables kompetanse innen vindkraft og installasjoner til havs, gir partnerskapet en unik mulighet til å bidra til å realisere en havvindindustri i Norge, ifølge meldingen.

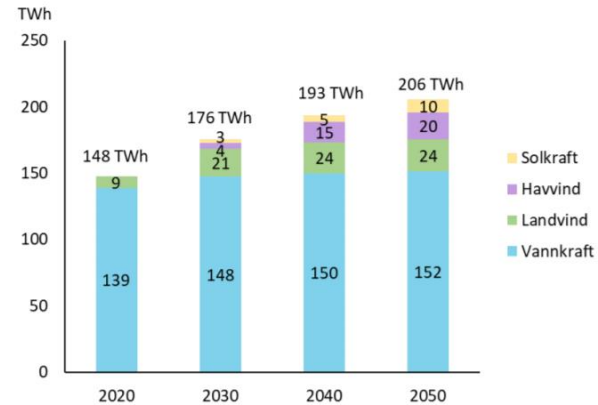
Regjeringen vil ved kommende årsskifte åpne områdene Utsira Nord og Sørlige Nordsjø II for havvindutbygging på til sammen 4,5 GW.

Partnerskapet eies likt av de to partene og vil søke konsesjoner for utvikling av havvind i begge områdene.

En rekke selskaper har den siste tiden varslet interesse for havvindutbygging i områdene som skal åpnes for havvind.

Statnett

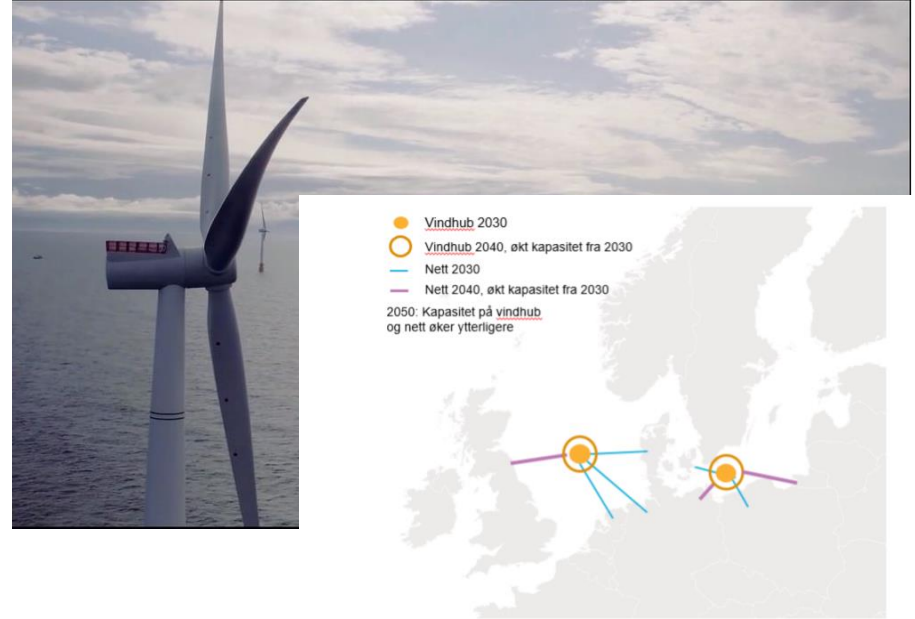
- Offshore wind is not profitable today
- Large sums of subsidies needed
- The technology evolves fast
- Two areas for offshore wind in Norway



Figur 11-3: Norsk kraftproduksjon i et normalår fra vår basisprognose

Where does the generation from offshore wind go?

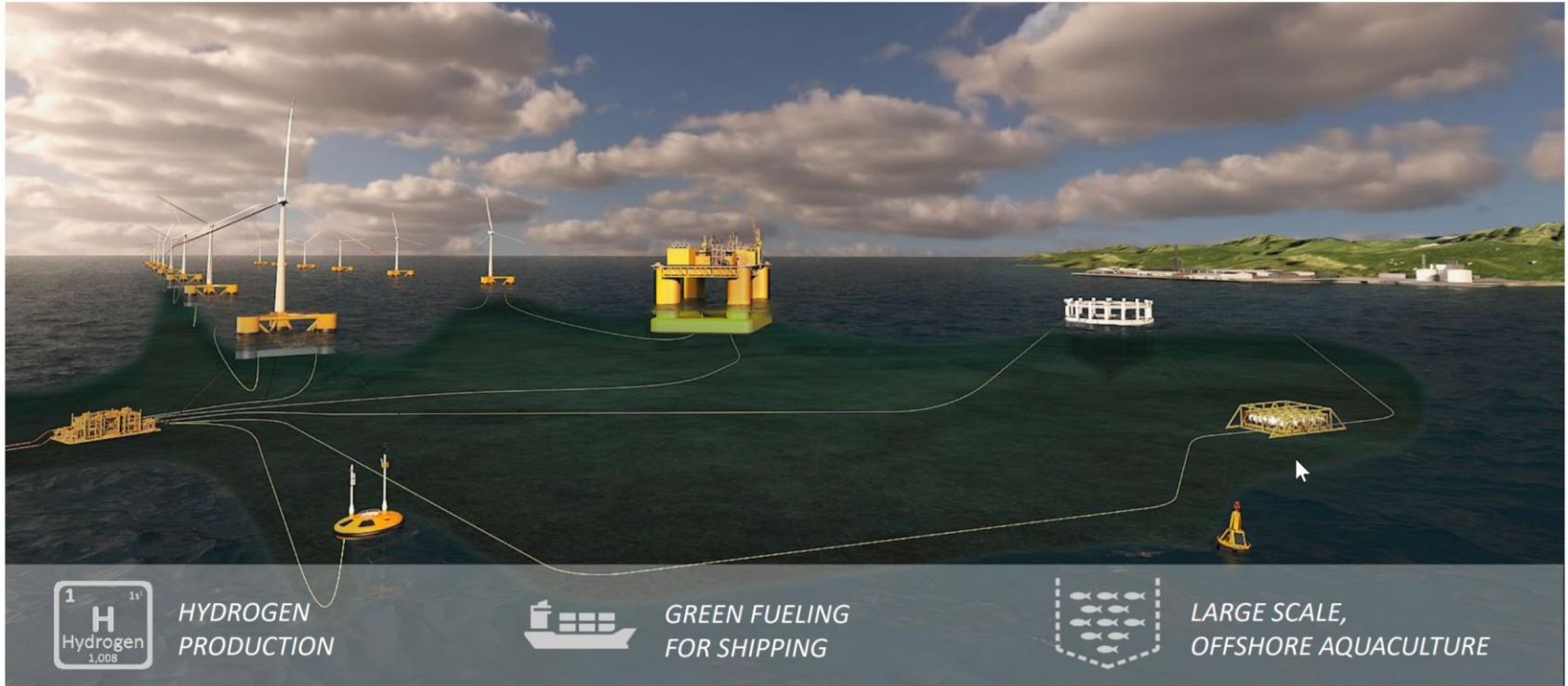
- Into the onshore grid?
- Via energyhubs?
- Big difference in power prices
- Statnett is active in planning offshore grids and offshore energyhubs



- <https://www.tu.no/artikler/statnett-deltar-i-planleggingen-europa-ma-bygge-offshore-nett-og-havvind-huber/501578>

Figur 7-9: Illustrasjon av modelleringen av vindhub'er i Nordsjøen og Østersjøen

A sustainable ocean economy



Thank you for your attention!



Hydropower plants

38

Grid customers

245 000

Employees

1 300

District heating
buildings

1000

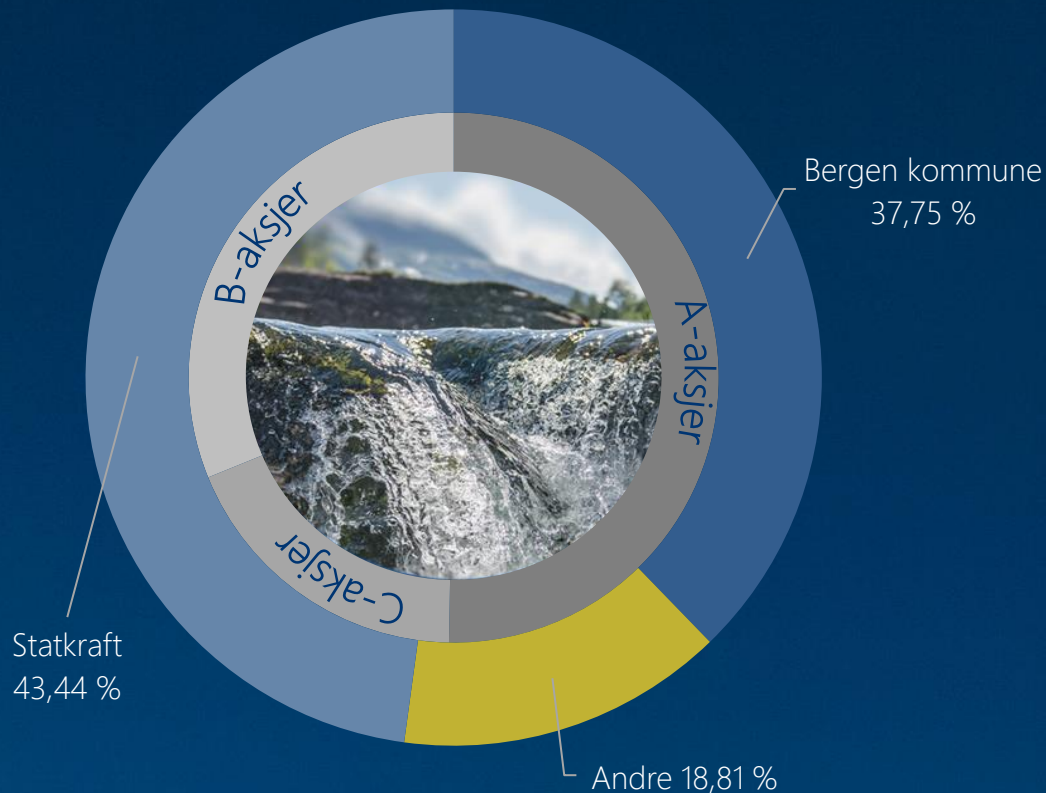
Customers fast charging

95 000



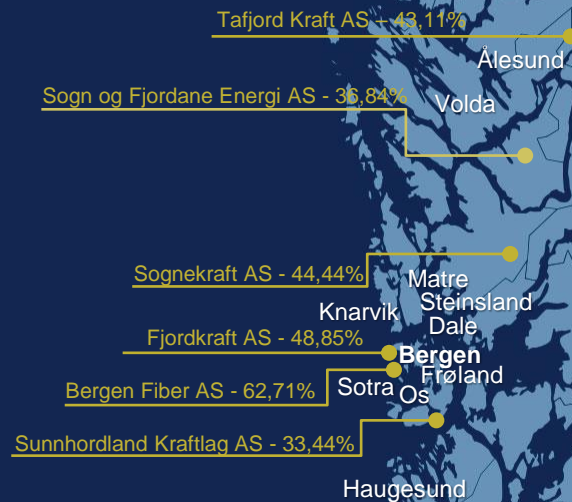
BKK

Owners



Alver kommune	3,45%
Øygarden kommune	3,43%
Askøy kommune	2,48%
Sunnfjord kommune	2,27%
Tynes Kraftlag AS	1,70%
Kvinnherad kommune	0,91%
Kvam herad	0,90%
Voss herad	0,67%
Fjaler kommune	0,61%
Austrheim kommune	0,43%
Hyllestad kommune	0,38%
Vaksdal kommune	0,37%
Etne Elektrisitetslag AS	0,35%
Gulen kommune	0,27%
Solund kommune	0,24%
Fedje kommune	0,12%
Høyanger kommune	0,12%
Masfjorden kommune	0,10%

Local ownership and presence



Hydropower

– more than renewable

- Can be stored for prolonged periods
- Can be produced on demand, and is quickly adjusted
- Easy to adjust in line with consumption
- The reservoirs suppress flood peaks

