Unlocking Large Scale Battery Cell Supply In Europe
FREYR In A Nutshell
32+2 GWh Battery Cell Factory & 600 MW Wind-park Creating Carbon Positive Low Cost Storage Solutions

- **40 Billion NOK Investment**
  The largest Investment Program in Northern Norway in this Millennium

- **>600 000 Electric Vehicles per year**
  32+2 GWh of Battery Cells Will Power Europe’s Growing Appetite For Batteries

- **2,500 Direct Job Creation**
  Material Increase In Arctic Development With Substantial Ripple Effects

- **>4.0 million tons CO₂ per year**
  Material Catalyst For Norway’s ‘Green Shift’ Ambitions
Macro Backdrop – Urgency and Opportunity

Increasingly urgent need to decarbonize industry, transportation and other ‘hard to abate’ sectors offers huge opportunity for low-cost renewable energy.

- Current Climate Mitigation Trajectory Is **Nowhere Near** What Is Required
- Countries Paris Climate Accord Commitments (INDC) **Is Not Enough**
- More Than **25 Gt CO₂e** Will Have To Be Reduced On Top Of The INDCs
- This Is **More Than 50%** Of Current Annual Man-made CO₂e Emissions
- This Reduction Needs To Be Removed From The Trajectory **By 2030**

Source: Energy Transition Commission, SYSTEMIQ, ETC
The Nordic Region can provide all raw-materials for material battery cell supply

Some High Level Strategic Considerations:

• The Nordic region has proven and sufficient raw-materials for all planned battery-cell production in the near term

• Norway’s experience in raw-materials and metals and mining industries provides deep perspectives for added resources

• Recent mapping of e.g. Mohnsryggen shows large presence of Cobalt, Zinc, Copper, Manganese in the Norwegian Sea

Source: National Renewable Energy Laboratory (NREL; US); NTNU; Global Wind Atlas (World Bank); FREYR SINTEF, FREYR, www.mining-technology.com; Metallic mineral deposits in the Nordic countries
Norway has superior conditions to supply energy intensive products to Europe

Energy and energy intensive industrial heritage with proven track record in up- and downstream industrial cluster development

Some High Level Strategic Considerations:

- Norway’s energy potential & industrial heritage provides an unprecedented opportunity to supply European demand
- With a proven track record in up and downstream energy development, Norway can create a new energy adventure
- Realizing +/-1% of Norway’s Potential Could Unlock ca 100,000 High Skilled Jobs & GDP impact of ca >100 BUSD/yr

Source: National Renewable Energy Laboratory (NREL; US); NTNU; Global Wind Atlas (World Bank); FREYR

**Assuming 5% of technical wind energy potential can be used for battery cell production

Norway produces roughly 130 TWh in a normal year.

96 % of power production in Norway stems from hydropower.

A large share of the production capacity is flexible; hydropower storage possibility is 85 TWh.
Why Electric Vehicles will outcompete ICE (petrol and diesel)

<table>
<thead>
<tr>
<th></th>
<th>EL VEHICLES</th>
<th>ICE VEHICLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Parts</td>
<td>2,500</td>
<td>&gt;20,000</td>
</tr>
<tr>
<td>Moving Parts</td>
<td>70-90</td>
<td>&gt;1,000</td>
</tr>
<tr>
<td>Production Time</td>
<td>11 hours</td>
<td>33 hours</td>
</tr>
<tr>
<td>Energy Efficiency</td>
<td>&gt;80%</td>
<td>&lt;20%</td>
</tr>
</tbody>
</table>

Source: FREYR
EV Adoption – All concerns for adoption are about to be met

- Current range satisfies >90% of market
- Low and high cost models well below ICE alternatives
- > 8000 EU charging stations with double digit growth
- 20 mins charge already delivers relevant distance
- Mainly concern in Asia, handled via modern modules
- > Multiple EV/PHEV types across all segments by 2025
- > 300 brands planned across all OEMs by 2025

Source: Deloitte Global Automotive Consumer Survey 2018

Source: EBA, InnoEnergy
Battery Cell Market – Predictions are consistently wrong and revised upwards

- The most credible estimates underlines that battery cell demand is currently under double exponential growth.
- This implies multiple tipping points in demand driven by existing (EV) and emerging (Marine, Stationary) market verticals.
- Current best guestimates assume global demand in excess of 1,000 GWh/year by 2025 and >400 GWh in Europe.
- By 2030 total predicted demand could be well in excess of 3X these numbers requiring 100 gigafactories globally.
- The main bottleneck in these markets will not be demand but timely, and sustainable supply.

Source: FREYR; EBA, InnoEnergy, BNEF, EIA, OPEC, Exxon
FREYR - An integrated industrial power & battery plant

The only Giga-Factory development project in Norway which can supply the European market at scale produced by CO2-free energy

- Building a 32+2 GWh battery-cell factory and 600 MW wind-park, in an ideal location in Northern Norway balanced by low cost Hydro power
- Producing a continuously expanding array of Best Available Battery cells, based on proven technology and CO₂ free energy
- Producing battery cells for the EV, Maritime and Stationary storage segments in Europe (and Norway)
- Since Q1-19 FREYR has been in select strategic, industrial & financial partner dialogues to write the next chapter in Norway’s energy intensive industry development

Source: FREYR
A Circular, Renewable Value Chain
Flexible value chain approach leveraging the key Norwegian competitive edges of low cost, green power and process industry/automatization expertise

- FREYR’s business model is to license in best available battery cell manufacturing technology
- FREYR’s presence along the value-chain is initially focused on leveraging Norway’s energy intensive industry competence
- This secures maximum utilization of Norway’s competitive edge on low-cost renewable energy
FREYR – Sjonfjellet Windpark – Agreement with Landowners secured in 2018

1st quartile wind-park project

Source: Meventus
Summary of UN Report: Clean Energy Choices (2016)

Source: FREYR
The core strategic challenge for a battery cell producer – Size matters

- Economies of scale is critical to drive down unit costs (32 +2 GWh)
- Continuous improvements and learnings through best practice sharing in multiple plants (Licensing)
- Additional cost advantages through leveraging regional benefits (Norwegian low cost energy)
- Allow for flexibility in production system to rapidly deploy new solutions for anodes, cathodes and electrolyte (2 GWh ‘Industrial scale up unit’)
- Drive down labor, capex and energy footprint through deep collaborative approaches (SINTEF)

Battery pack price (real 2018 $/kWh)

Source: BloombergNEF
FREYR – Norway Context

Norway is in an ideal situation to create a globally leading battery manufacturing, development and a supply cluster of low carbon battery cells

- One of the leading countries in the world on sustainable development with 100% renewable energy (hydro and wind) at ultra-low cost
- Leading the world in adoption of electrification solutions as more than 50% of new vehicles sold are now electric models
- Highly skilled and efficient labor force, with low top-management salaries partly offsetting generally high labor costs
- World leading track-record in energy and energy-intensive industries, based on solid scientific clusters coupled with stable, clean, ultra-low energy costs
- With its Nordic neighbors emerging access to all commodity based raw materials required for best available battery cells at globally competitive costs

Source: EuroStat 2018, RYSTAD ENERGY
FREYR Feasibility – Leveraging Norway’s Competitive Advantages

In partnership with SINTEF and NTNU optimize battery cell manufacturing in Norway to gain a lasting competitive advantage.

- Material costs is the largest cost pool in battery cell production
  - Global markets limit ability to impact feedstock costs
    - Cost advantages driven by best battery cell technology

- Energy, labor, capex and other costs comprise ~25% of total costs
  - Processes can be optimized for energy, capital and labor
    - Cost advantages driven by leveraging regional benefits

- FREYR is currently in advanced discussions on licensing in battery cell process technology solutions

- FREYR is currently performing advanced techno-economic feasibility studies with SINTEF to optimize battery cell production solutions based on Norwegian low cost energy

Initial high cost drivers identified by SINTEF where Norwegian industrial expertise could improve performance.
Norway’s (and the Nordics) relatively permanent competitive advantage documented

Energy cost and CO2 content should be highlighted more as key drivers of competitive edge in the initial positioning of battery cells from the Nordics

- The energy cost and carbon content of the energy is likely becoming an increasingly stronger competitive advantage over time
- Key to the competitive advantage will be cost of energy and price on CO2
- A relatively permanent advantage of +/- 15 USD/KWh can be argued

* Carbon credit benefit assuming a CO2e price of 40-80 USD t/CO2e relative to battery cells produced with high carbon content energy mix (US/China & EU vs Nordics)
FREYR – Battery Factory Location – Site Selected and Formal Regulation Process Initiated

FREYR is the only giga-factory project under development in Norway which can supply the European market at scale in the near term (2022 onwards).
Northvolt Announcement June 12

Very strong momentum building around Nordic Battery Cell Supply against an increasingly strong demand backdrop

Northvolt completes equity capital raise to enable Europe’s first homegrown gigafactories for lithium-ion batteries

June 12, 2021 13:24 CET

- Volkswagen Group and Goldman Sachs Merchant Banking Division lead a $1 billion equity capital raise in Northvolt alongside BMW Group, AMF, Folksam Group and IMAS Foundation.
- With the European Investment Bank and additional lenders set to provide debt financing as a part of the total funding, the establishment of the initial 16 GWh of lithium-ion battery cell manufacturing capacity at the gigafactory, Northvolt Ett, in Sweden is enabled. Building construction will commence in August.
- After entering a number of supply agreements, a significant share of the production volumes from Northvolt Ett has been sold to key customers, amounting to a combined order value of over $13 billion through 2030.
Timing is Everything – FREYR announcement June 18

Very strong momentum building around Nordic Battery Cell Supply against an increasingly strong demand backdrop
Freyr AS, a startup planning to build one of Europe’s first battery gigafactories in Norway, has a bigger vision for the region: a “Nordic Battery Belt.”

The Norwegian company is still gathering approvals, technology licenses and funding for its initial, 40 billion-krone ($4.5 billion) project in northern Norway. But it already sees the scope for as many as four more factories in its home country, and said battery producers could develop at least twice as many across the Nordic region, home to plenty of empty space and clean energy, within the next two to three decades.

“Our dream would be raw materials coming from Finland, technology from...
Wind Energy and Battery Cell Production – Mutual Catalysts For Industrial Development

Deep Synergies Across Multiple Verticals Provide Superior Fundamentals To Write Multiple New Chapters In Norway’s Industrial History

- Can provide 2.5 TWh of low cost, greener energy to catalyze industrial development
- One of Norway’s best undeveloped wind-parks with superior wind-conditions
- Industrial European partners provides material equity for the battery facility
  - Unlocks 1000 new industrial jobs per 1 TWh generated

600 MWh Windpark at Sjonfjellet in Rana/Nesna

Generates ca 2.5 TWh/year

Requires ca 2.5 TWh/year

32+2 GWh battery cell plant in Mo I Rana

- 32+2 GWh battery cell manufacturing facility requiring 75-100 Kwh/Kwh battery cell
- 35 BNOK investment generating 2,500 direct jobs with significant multiplier effects
- Energy storage requires greenest energy possible to accelerate GHG impact
  - Norwegian Text Book Example Roadmap: ‘Green Industry From Green Energy’

Source: FREYR
FREYR’s Relevance

Exponential Growth In Demand For Batteries To Support The Accelerated De-Carbonization Of The Transportation and Power Sector

>10X Growth In Demand
Exponential Demand Growth For Batteries in Europe and Globally

Limited Current Supply
No Current Large Scale Battery Cell Supply in Europe Against A Need Of 300 GWh By 2025

Norway As Ideal Location
- Deep Industrial Experience In Energy Intensive Industry
- Substantial Untapped Low Cost Green Energy
- Leading The Adoption Of Electric Vehicles
- Tradition For Cluster Developments

The Future Is Electric
Adoption Of Electric Solutions Picking Up Pace Beyond Passenger Vehicles