FREYR
Renewable energy storage

A competitive solution to the accelerating demand for green batteries

Norwegian opportunities within Lithium-ion batteries
December 11 - 2019

Why FREYR now

PROBLEM

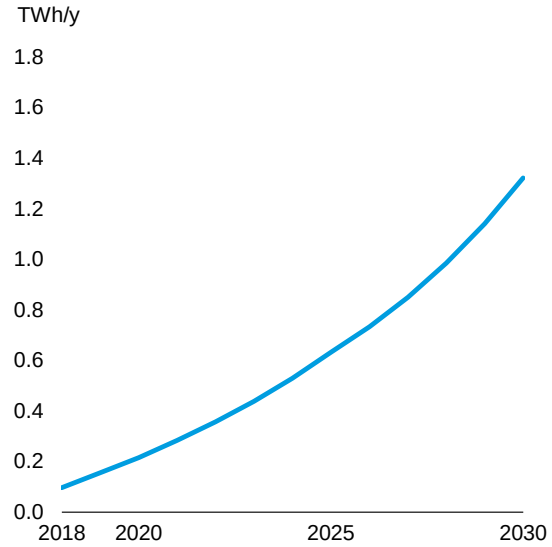
To avoid potential disasters, **CO2 emissions must be reduced** by 40-60% by 2030[1]

SOLUTION

Replacing fossil fuels with **green electricity** could deliver 75-90% of reductions required[2]

EFFECT

Battery demand: 42 x 32 Gwh needed



FREYR CONTRIBUTION

Green battery cells produced in Norway
2 GWh from 2021/22
16 GWh from 2023/24
16 GWh from 2025

Competitive model

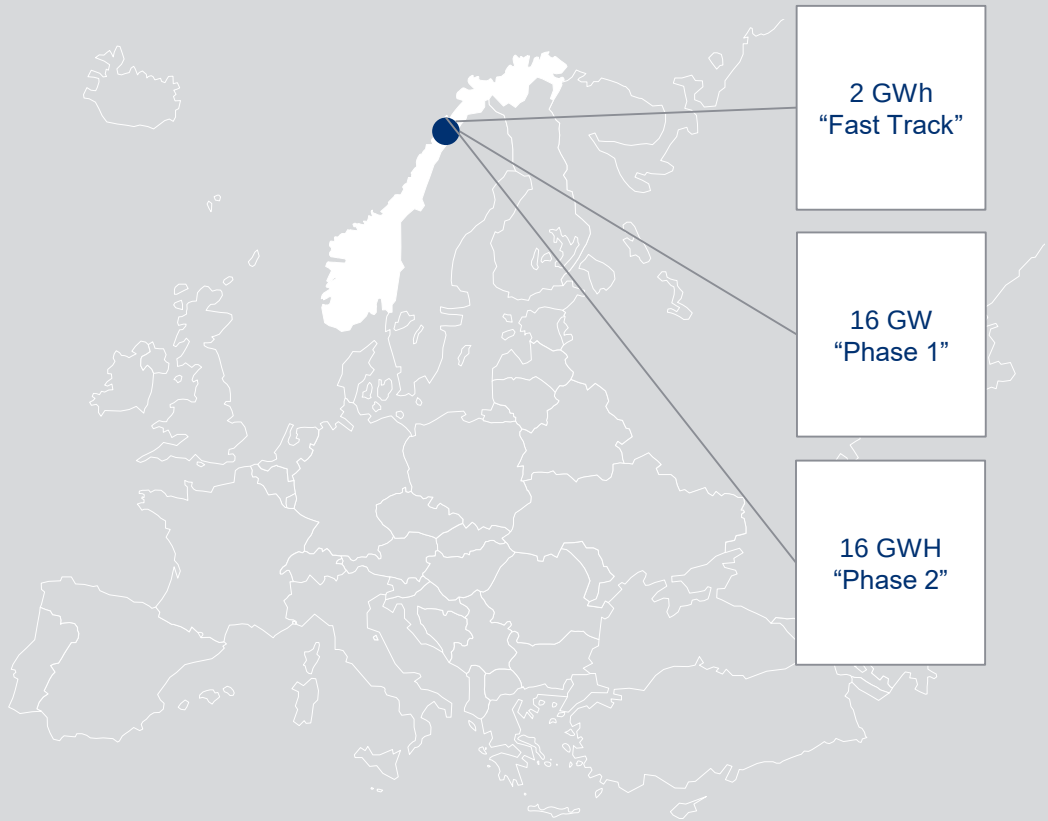
Multiple partnerships across the entire value chain

Ideally located in Norway

Sources: IPCC [1] , IRENA[2]

One of the most advanced battery cell projects in Europe

FREYR, Mo i Rana, Norway



Access to low cost energy from 100% renewable sources

Leveraging Norway’s energy intensive industry competence

Part of the emerging Nordic battery cluster and Norwegian industrial ecosystem

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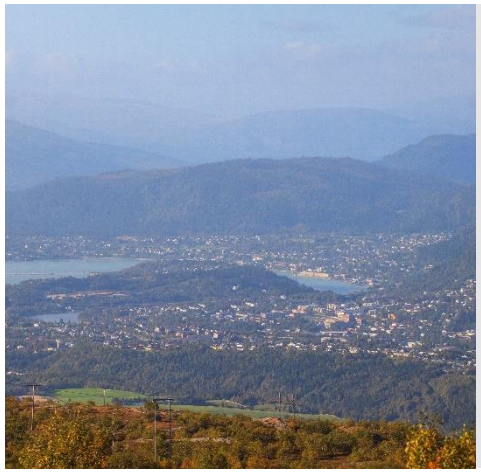
Key highlights

1. The right timing

- Accelerating demand, currently driven by electrification of vehicles
- FREYR is one of the most advanced battery cell giga-factory projects in Europe after Northvolt
- Northvolt closed project financing; InnoEnergy committed €7.25 million in FREYR during June ‘19

2. The right model

- Advanced 2 GWh pilot project and 32 GWh giga-factory in 2 phases
- Flexible and phased developments based on licensing in best available technologies providing cost leadership over time
- Possible to replicate FREYR’s initial project in 3-4 well suited locations already identified in Norway



3. The right location

- Access to low cost energy from 100% renewable sources
- Leveraging Norway’s energy intensive industry competence
- Part of the emerging Nordic battery cluster and access to European battery value chain at attractive terms

4. Robust value creation

- Gross margins for battery production projected to stay healthy driven by favorable market dynamics
- 1,250-2,500 jobs created with substantial positive economic impact

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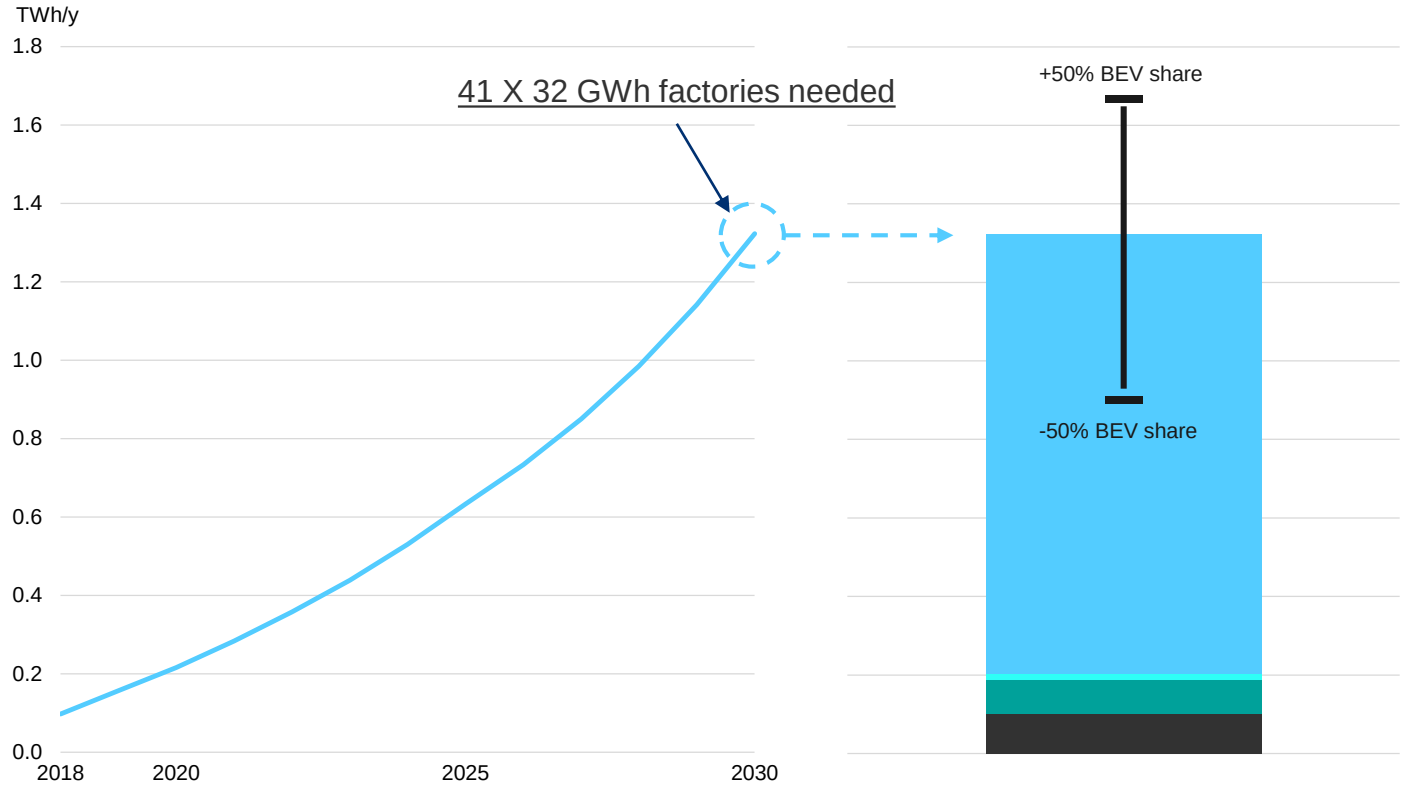
EVs drives global demand for batteries, requiring significant rollout of battery gigafactories

Global Battery Capacity Demand per year



Global Battery Capacity 2030 Split

- Based on the assumed future EV sales the additional global EV battery capacity is estimated to grow 13X from 2018 to 1.3 TWh/y in 2030.
- Estimates Have Consistently Been Revised Upwards As Costs Have Come Down >85% Since 2010
- Core To Fulfilling Demand Projections Will Be Stable, High Quality Supply
- Main Competitive Driver Is Cost Competitiveness Vis A Vis ICE
- Batteries Are The Main Cost Driver for EV's

Battery capacity projections are based on estimated EV sales and region-specific EV battery capacity. For cars, battery capacity ranges progress to 70-80 kWh in 2030 for BEV and to 10-15 kWh for PHEVs. For LCVs, battery capacity increases to 90-100 kWh in 2030 for BEVs and to 15-19 kWh for PHEVs. Higher values are applied mainly in North America and the Middle East. Buses are assumed to use batteries of 250 kWh; two-wheelers use batteries of 3-4 kWh. Battery packs are assumed to have capacities of 150 kW for medium trucks and 350 kWh for heavy trucks.

Source: IEA Mobility Model (IEA, 2019a).

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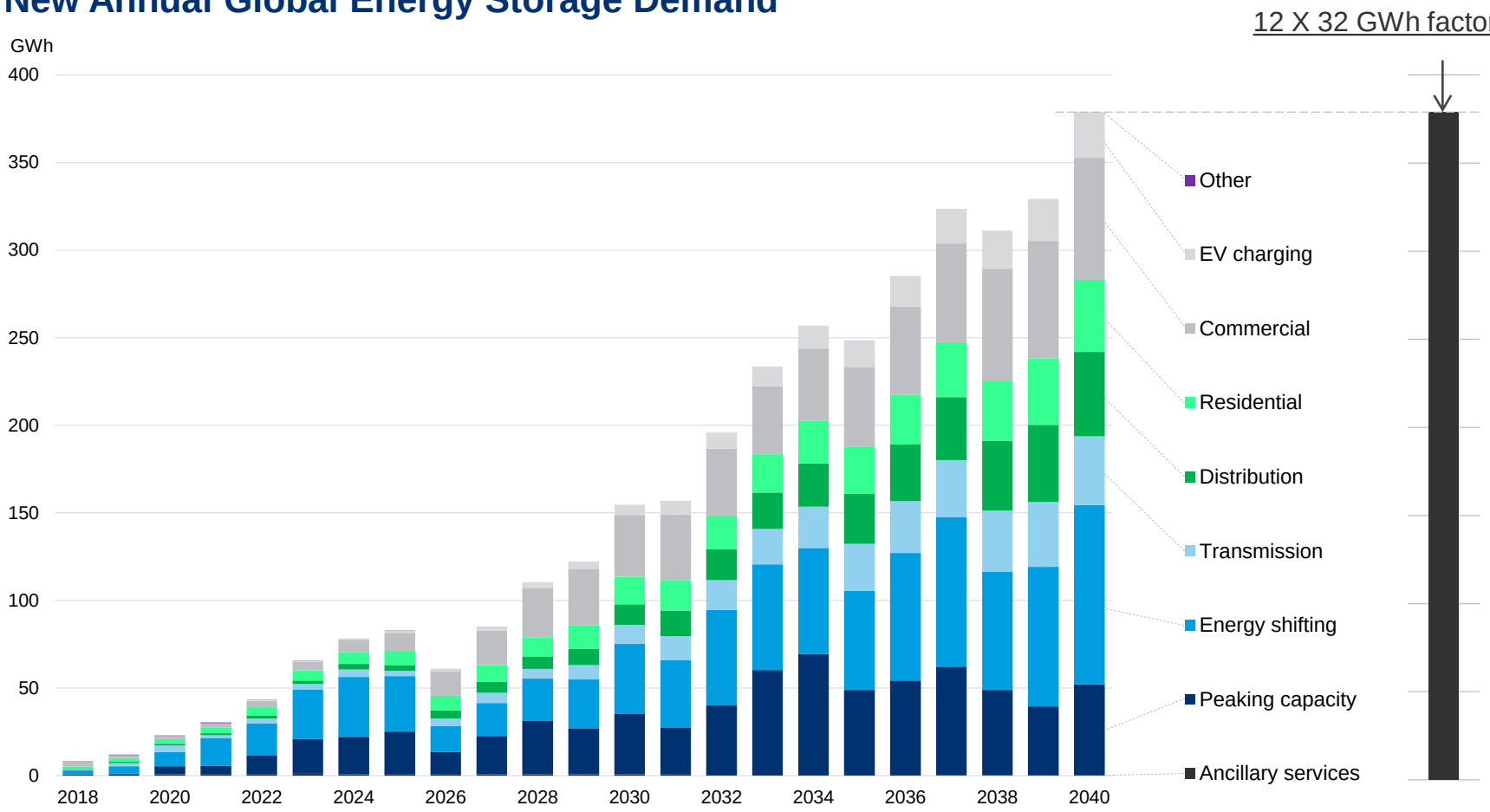
Emerging global market market for energy storage adds to battery demand

New Annual Global Energy Storage Demand



- Today, energy shifting – increasingly from storage paired onsite with renewables – is the key application for energy storage.
- Peaking capacity begins to gain traction in the early 2020s.
- Renewables – plus – storage is becoming commonplace These co-located projects offset the need for new-build gas capacity, depending on their utilization and typical peak duration.

Source: Bloomberg New Energy Finance

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Megafactory pipeline in Europe: FREYR one of the most advanced projects

Announced

1 TERRA E BMZ THE INNOVATION GROUP
4 GWh Production 2020
8 GWh Production 2022

2 FARASIS
6 GWh Production 2022

3 FREYR
2 GWh Production [2021]
18 GWh Production [2023]
34 GWh Production [2025]

4 CATL
14 GWh Production 2022

5 TESLA
Capacity unknown 202x

6 northvolt
16GWh Production 2024

7 BYD
Capacity unknown 202x

Under construction

8 SK innovation
7,5 GWh Production 2020
15 GWh Production 2021

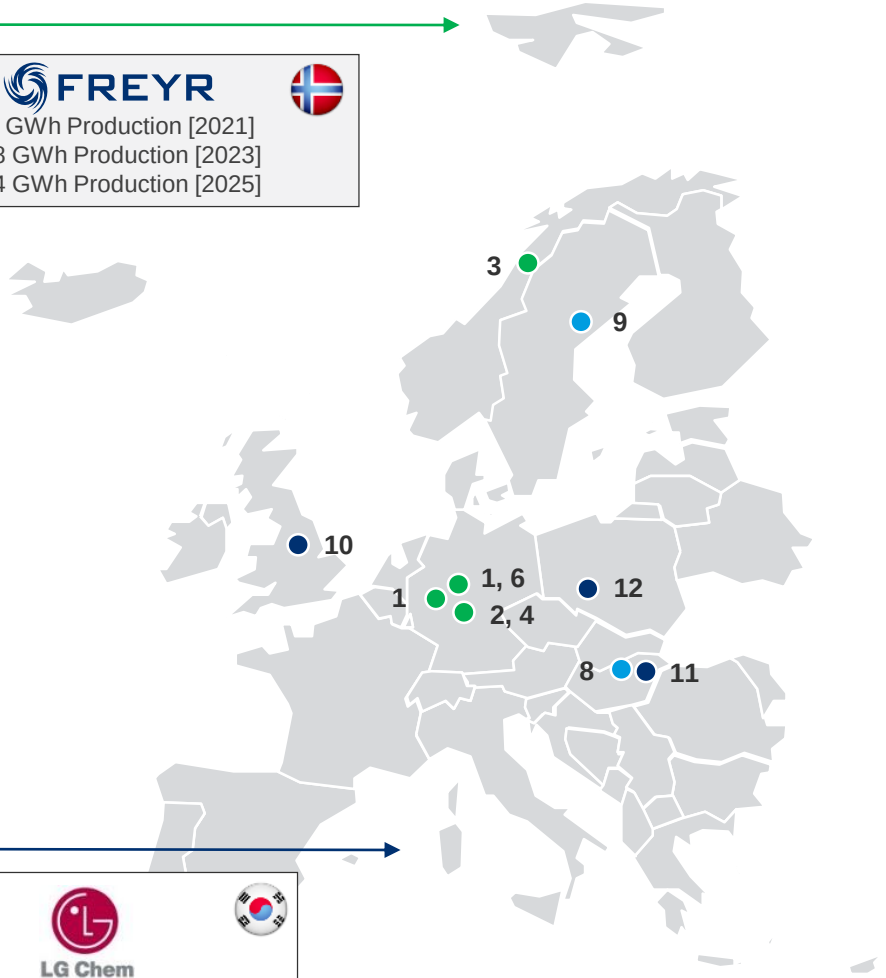
9 northvolt
16 GWh Production 2021
32 GWh Production 2024

Under construction

10 Envision
1.9 GWh fully commisioned 2013

11 SAMSUNG
3 GWh Production 2018

12 LG Chem
10 GWh Production 2019



- Batteries are considered strategically important for European industry and security
- OEM's in Europe face EUR 34 billion in penalty payments at current emission levels
- Projected European demand to reach 1.2 TWh annually by 2040 – 5x currently confirmed projects in Europe[1]

Note: For plants not yet commissioned, the commission date is an assumption
1) McKinsey Recharging Economies. The EV-battery manufacturing outlook for Europe. Source: Bloomgberg New Energy Finance

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Unlocking Norwegian Battery Cell Supply

Requirements

- Market Short Environment
- Best Available Technology
- Economies of Scale
- Competitive Raw Material Supply
- Flexible Business Model
- Rapid Scaling Of Innovation
- Norway's Comparative Advantages

Phase 1+2 32 GWh - Stormoen
Construction Start 2021/22 Phase 1

Sjonfjellet - 600 MW Windpark
Construction Start 2021/2022

Pilot 2 GWh – Mo Industrial Park
Construction Start 2020/21

Norway: an attractive location for green energy intensive industries

Clean low cost energy

Installed base of ~130 TWh hydropower available and a very active development of world-leading wind resources

[>98%] of electricity production in Norway come from renewable energy sources

Materials access

Europe 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 robus perspectives

World leading project execution and process industrial skills

Leveraging existing competence from existing scientific clusters and existing process industry

Highly skilled and efficient labor force, with low management salaries and expertise in automatisation offsetting generally high labor costs

Low regulatory risk

Norway is AAA rated and recognized as a stable and reliable regulatory regime

Political support for factory site in Mo, with three more attractive options being explored

Distance to market

Time and distance to market greatly reduced compared to exporting from east Asia

Significant reducing costs and carbon footprint

1) Source: Sintef, FREYR internal estimates, Assumes 32 GWh/year plant


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Renewable energy storage
«As a society, we must substantially accelerate our efforts to reduce CO2 emissions at scale the next ten years. Electrification and batteries are instrumental parts of the solution»
The FREYR Team