

22. October 2020

MORROW

**Accelerating the green
energy transition**

Introduction to Morrow

Mission

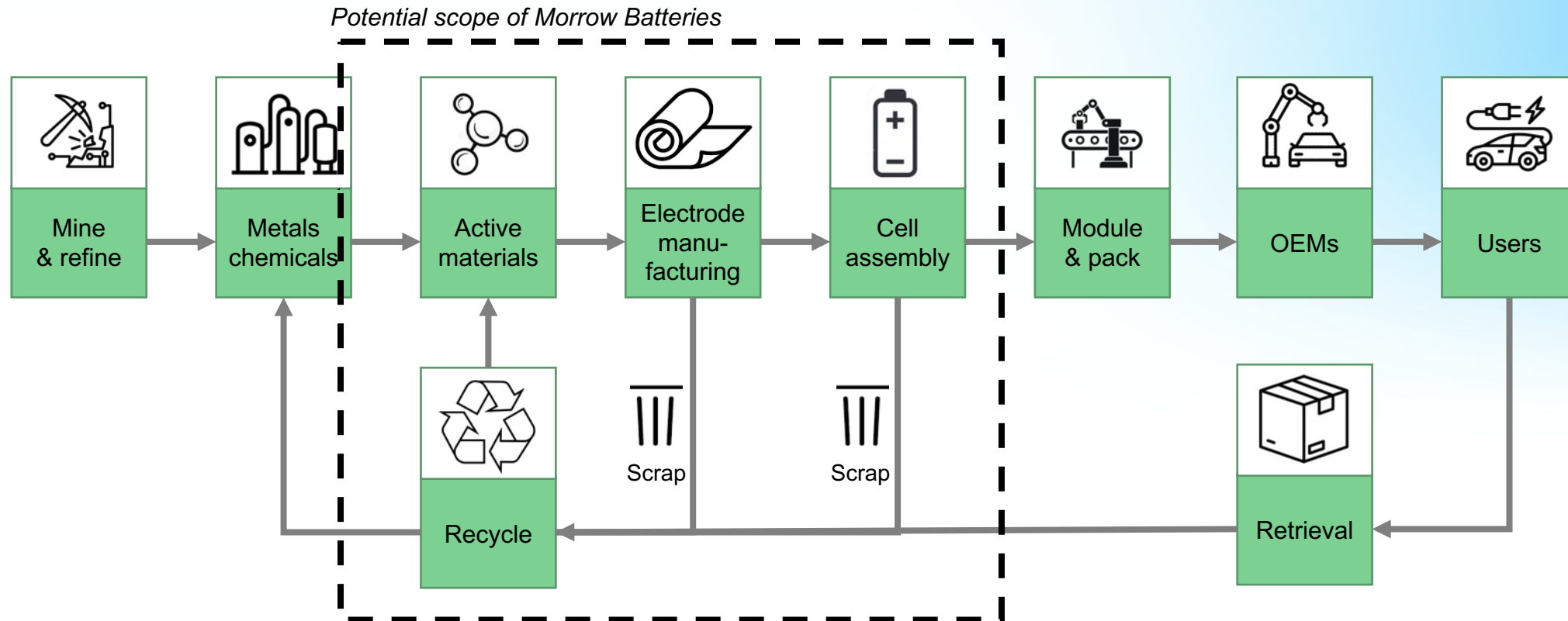
Develop and manufacture the most sustainable, innovative and affordable batteries in the world.

Building a giga battery cell factory in the south of Norway

Developing and industrializing new battery technology

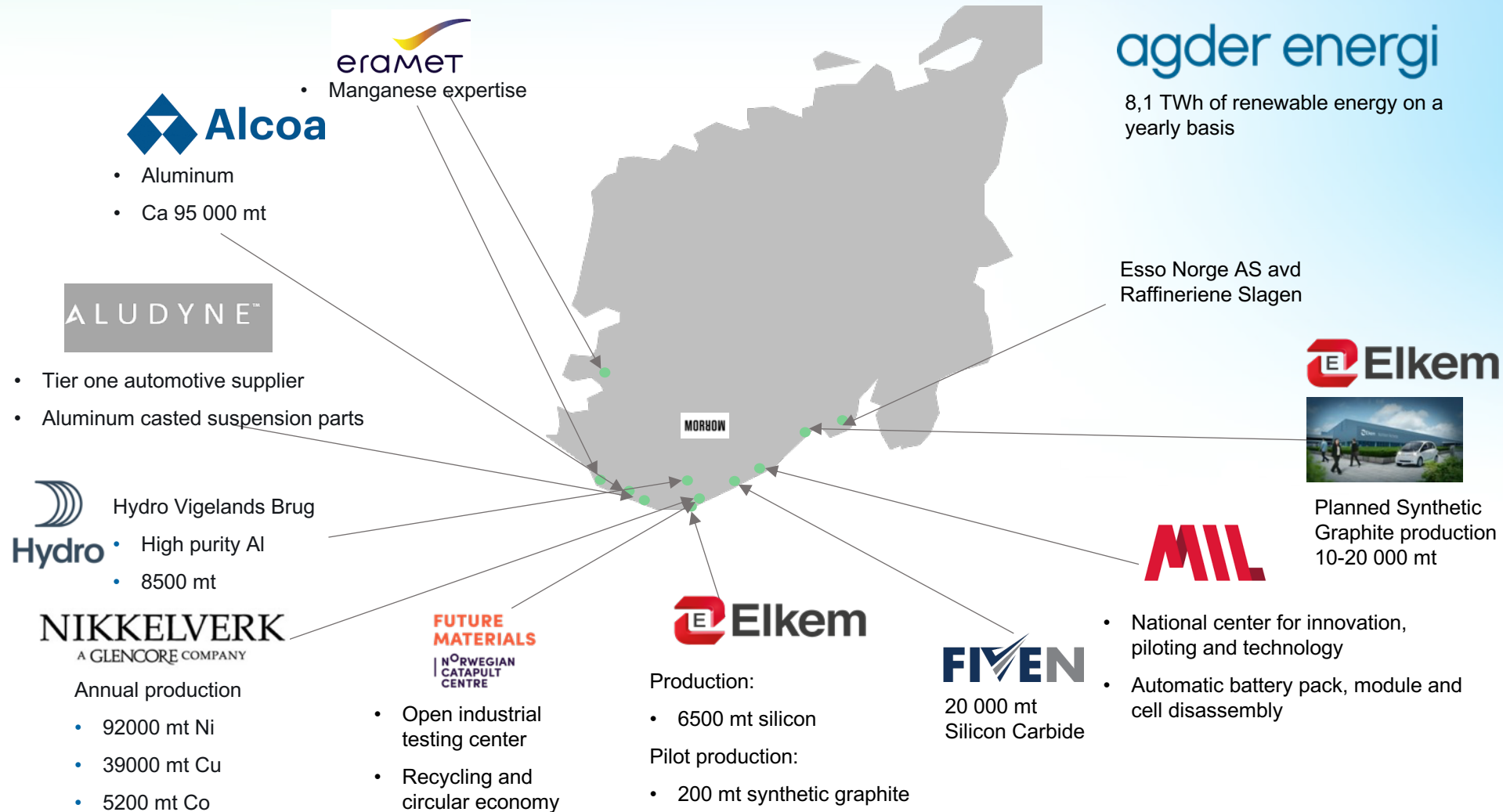
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Morrow is currently assessing **vertical integration** opportunities with potential partners



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Morrow will be strategically located on the «Battery Coast»



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Morrow will build a battery industrialization center and a **giga-scale battery cell factory**

Morrow Industrialization Centre



Illustrative example: Northvolt Labs

- ▶ A multi-site infrastructure for industrialisation of technology and small scale manufacturing
- ▶ A set of labs, test facilities and pilot factories for cell manufacturing and manufacturing of active materials
 - Cell manufacturing: >0,5 GWh
 - Precursor/ CAM manufacturing: 20 mt/y
 - Located to close to high tech industry and attractive to foreign experts

Morrow Giga Factory



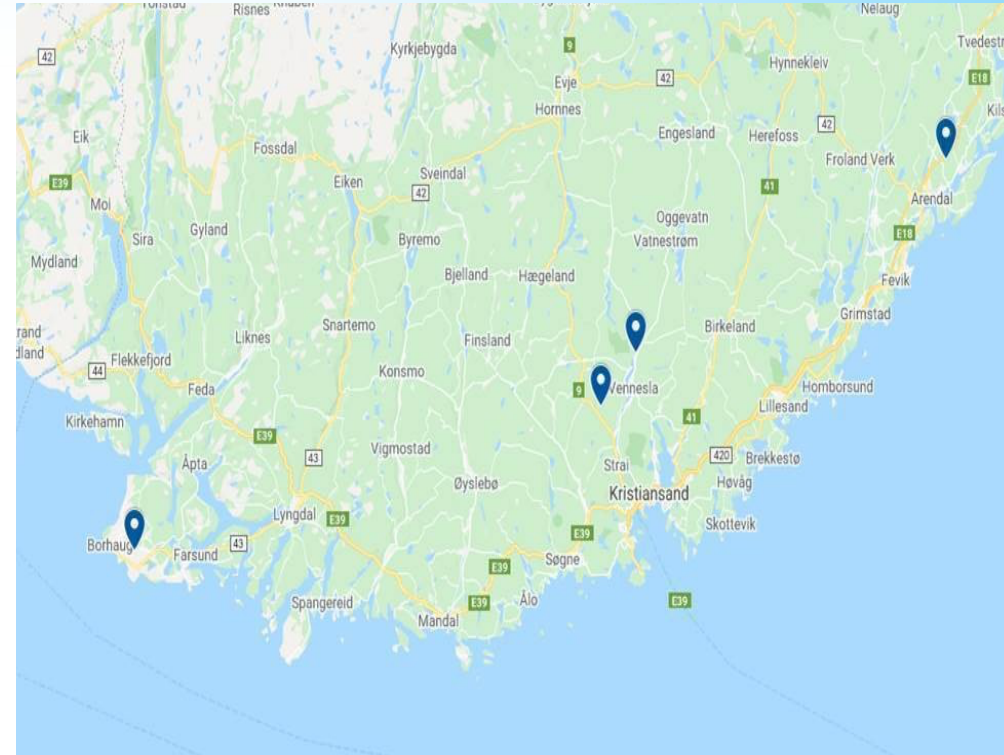
Illustrative example: Giga Lib concept design sponsored by German government

- ▶ 4x8 GWh with potential for expansion
- ▶ Vertically integrated (including CAM and potentially PCAM)
- ▶ Located in Agder

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Update on Morrow Giga Factory

- ▶ We are currently evaluating alternative locations and:
 - Sept. 1: Received 19 RFI's
 - Oct. 5: A shortlist of 4 potential sites was presented
 - We expect to take a decision by the end of 2020
- ▶ Initial concept studies initiated; dialogue with potential technology partners and equipment providers initiated.
- ▶ MOUs with Glencore, Elkem and Agder Energi in place
- ▶ We aim to start cell manufacturing in our giga-scale battery cell factory by the end of 2024.

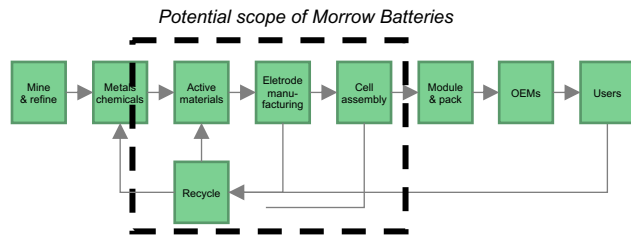


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A combination of factors will enable Morrow Batteries gigafactory to be cost competitive

Competitive raw materials and vertical integration

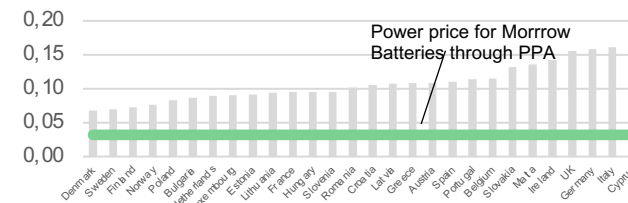
- Vertical integration to secure access to raw materials and leverage in pricing
- Long term agreements
- Take advantage of recycled material



Renewable energy at competitive prices

- Southern Norway has significantly lower energy prices than continental Europe
- Vertical integration enables Morrow Batteries to take extra advantage of competitive energy prices

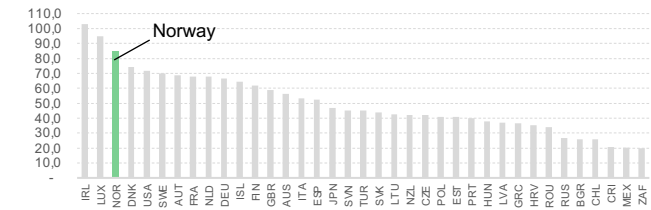
Sum of electricity prices non-household in Europe (2nd half 2019)



Very productive labor force

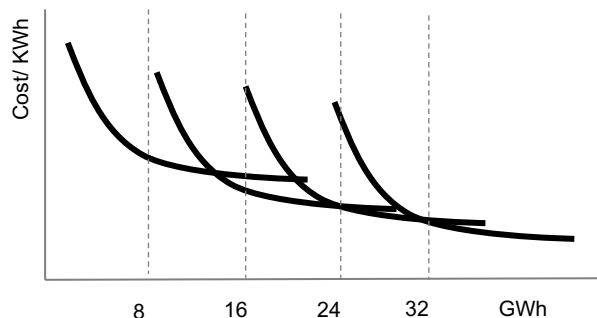
- Combination of Industry 4.0 and work culture results in a very productive labor force
- Lean manufacturing and agile tech
- Direct labor cost less than 5% of total

GDP pr hour worked – OECD - 2019



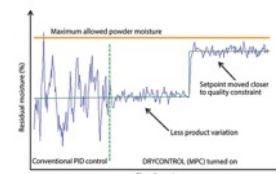
Adequate and modular scale

- A gigafactory at 32 GWh scale built in 8 GWh intervals to secure optimal scale and utilisation



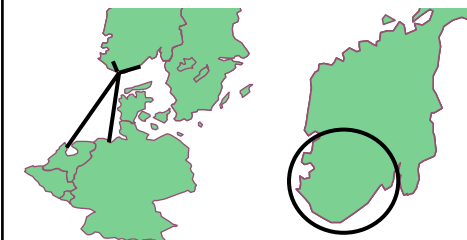
High yield and asset utilisation

- State of the art technology, industry 4.0 and automated processes (supported by Morrow Industrial Center)
- Vertical integration secures control of quality of raw materials
- Strong process industry skill base in the region



Compact supply chain and outbound logistics

- Very compact raw materials supply chain
- Very close to key markets and harbors for outbound logistics



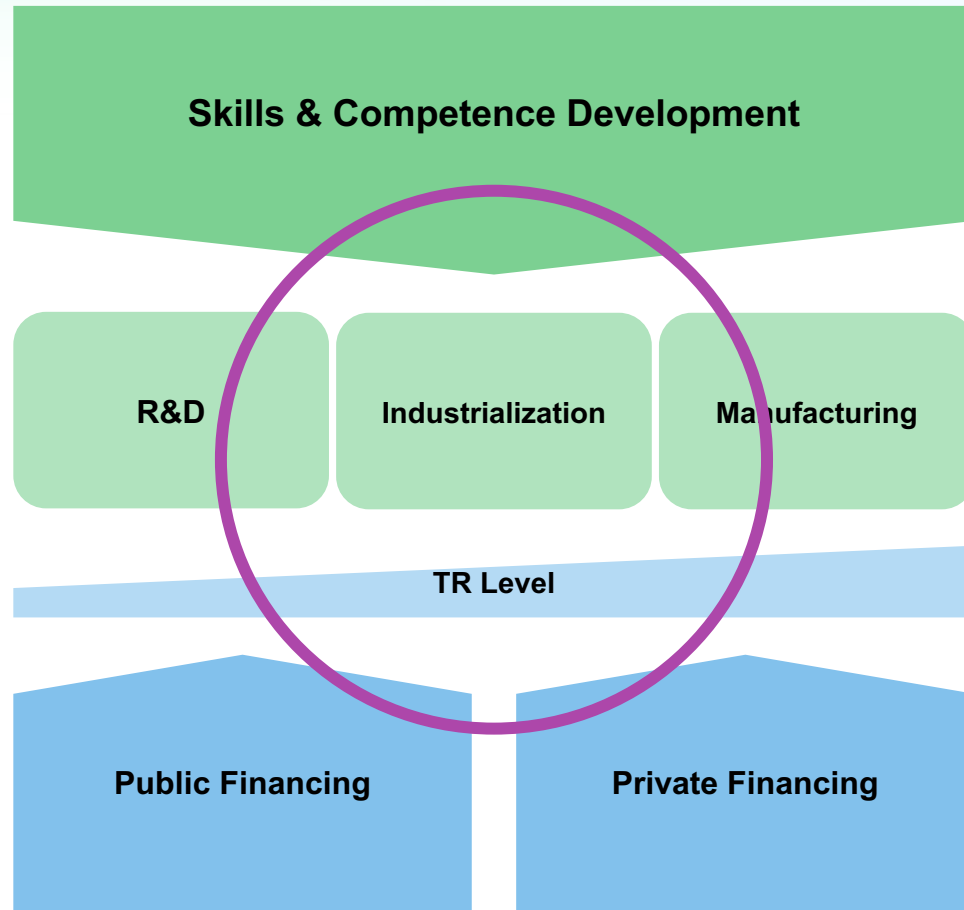
"The Battery coast" for raw materials:

- Nickel
- Cobalt
- Graphite
- Manganese?
- Copper?
- Aluminium?

Short distance to key ports

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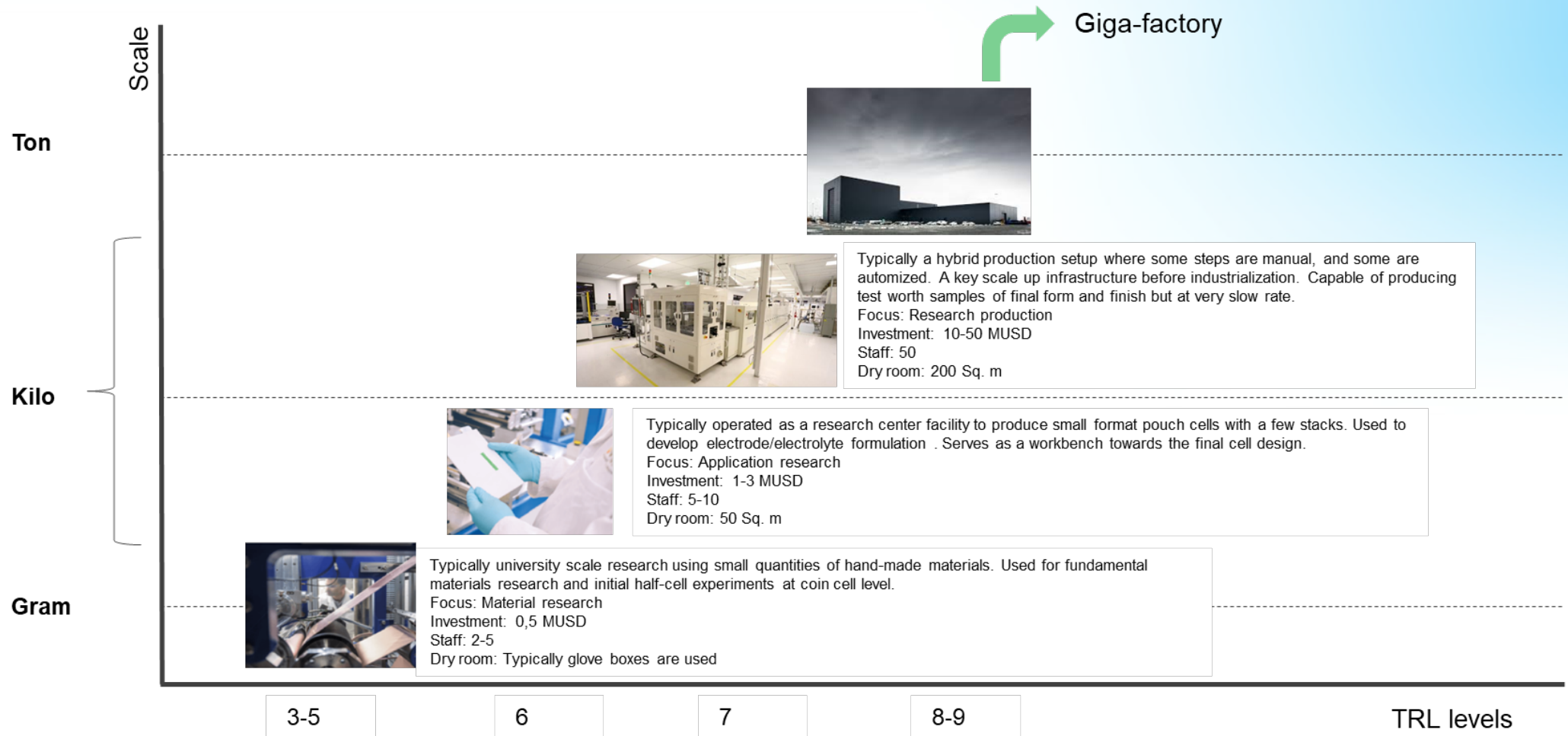
Morrow Industrialization Center (MIC) will support our strategy as a world class manufacturer of high performing batteries



Scope of MIC

- ▶ Need for development and test production capabilities to qualify as suppliers for OEMs
- ▶ Fast track for industrialization of new battery technologies and manufacturing equipment/concepts
- ▶ Build critical skills and competence in battery development and manufacturing
- ▶ Create a hub in the Norwegian battery industry ecosystem – Battery coast

MIC provide a complete path for scaling and industrialization



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A modular pilot mimicking full giga scale production required for A/B samples and final stages of industrialization is critical



Construction start: Winter 21 / spring 22

Size: 15 000 – 20 000 m²

Capacity : 300 - 500 MWh

Formats: Cylindrical, prismatic and pouch

Largest dry room: 1000 m²

Employees: 100-150

Cost: 100-150 MUSD

Location: To be decided

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