## Agder Batteri - Delingsarena



09:30 - Velkommen ved Stephen Sayfritz (Agder Batteri/Eyde-klyngen) og Gøril Hannås (UiA)

09:35 - Electric region Agder - Trond Kristiansen (Agder FK)

09:45 - Batteriverdikjede og Elkems prosjekter - Gunstein Skomedal (Elkem)

- 10:05 Morrow Batteries Terje Andersen (Morrow Batteries)
- 10:20 Pause
- 10:35 Invest in Norway Agder Nora Rosenberg Grobæk (Invest in Norway Agder)
- 10:45 Batteriforskning hos UiA Bernhard Fäßler (UiA)
- 10:55 Batteriløsninger fra BTG Trygve Raen (BTG AS)
- 11:05 Lydløs Ståle Almenning (Innoventi)
- 11:15 LIBRES gjenvinningsprosjektet Martin Choux (UiA)
- 11:25 Oppsummering Stephen Sayfritz (Eyde-Klyngen)



















### NMC 811



## Metals and materials demand from lithium-ion battery packs in passenger EVs

Thousand metric tons





Source: European Commision JRC

## Materialer for en fornybar fremtid produseres i Kristiansand!

Nikkel og kobolt til batteri Kobber til kabler Elkem Teknologi: Forskning på "Future Materials" Elkem Carbon: Grafitt til batterier

REC Solar: Silisium til solceller

## ELKEM'S NORTHERN RECHARGE PROJECT

Elkem Fiskaa, 13 oktober 2020





# **Elkem** More than 115 years of history as a technology, advanced materials and solutions provider

**Founded** in 1904 by Sam Eyde Listed on **Oslo Stock Exchange** since March 2018





## Elkem's role in the lithium-ion battery value chain



## The world needs batteries and it needs lots of them

...produced in a sustainable way





#### Other<sup>1</sup> ESS<sup>2</sup> 3,114 2/3 Wheelers Commercial vehicles (non-PEV)<sup>3</sup> 2,608 Personal EVs (PEV) World Economic Forum 2,170 (base case) World Economic Forum 1,792 (target case) 1.452 1.179 930 691 351 221

Global Li-ion battery cell demand by sector, GWh

1. Includes Aviation, Marine, Consumer electronics, etc

21

2. Electricity Storage System based on both Industrial storage and distributed storage

22

23

24

25

26

27

28

29

2030

3.Includes trucks, buses, and LCVs

2019

4. Total Cost of Ownership (TCO), Battery Electric Vehicle (BEV)



20

# Europe is waking up – extensive plans for establishing new battery cell manufacturing capacity

...but production of critical materials is dominated by Asian players



## Current plans of more than 600 GWh by 2030 in Europe and US

...requiring up to around 0.5 million tons of anode graphite annually by 2030





15

## Elkem graphite anode material near zero CO<sub>2</sub> emission from manufacturing

driven by energy efficient process and clean Norwegian hydropower



All data based on Elkem analysis. Benchmark data is an estimate of a typical Acheson process.

#### ACHESON FURNACES IN CHINA



Today's production in Acheson furnaces comes with a severe environmental footprint.



# Making battery production greener

Renewable hydro power

1

Raw materials by land and sea

Elkem's Northern Recharge anode material plant





Battery cell manufacturing plant

















# Making battery production greener

Renewable hydro power

1

Raw materials by land and sea

Elkem's Northern Recharge anode material plant





Battery cell manufacturing plant

5





## From pilot to industrial production



### Industrial Pilot\*



200 tons per year

Under construction, operational beginning 2021

All process steps. Industrial scale equipment.

Kristiansand, Norway

### Industrial Plant



Large scale

In planning. Phase 1 SOP: 2023 Phase 2 SOP: To be decided

Modular design for rapid expansion

Herøya Industrial Park, Norway



## Elkem Northern Recharge – Herøya site



## Elkem Northern Recharge – Herøya site

**BEIkem** Northern Recharge





## DELIVERING YOUR POTENTIAL



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