Electrification of construction sites

Bergen Energy Lab, 28.09.21, Camilla Moster


We create a sustainable future
7,5 TWh
hydro power production
1.400
employees
38
hydro power plants
400
fast chargers
260.000
grid customers
1000
district heating buildings
BKK


2025
GRUPPEN

What is a zero emission construction sites

Marked driven by the Norwegian government

- 2 million tonns CO2 yearly in direct emissions from construction sites
- Cities/municipalities with goal of all construction sites to be emission free by 2025
- Distribution grid with low capacity

Innovation and collaboration along the value chain to enhance the transition to zero emission technology

Pilot-E – Energy partner

3 year R&D project with 9 partners,
14 mill. kr. in Pilot-E funding.
Several pilots testing equipment
+ digitalisation of grid connection process
+ Energy and power calculator
+ Energy partner role

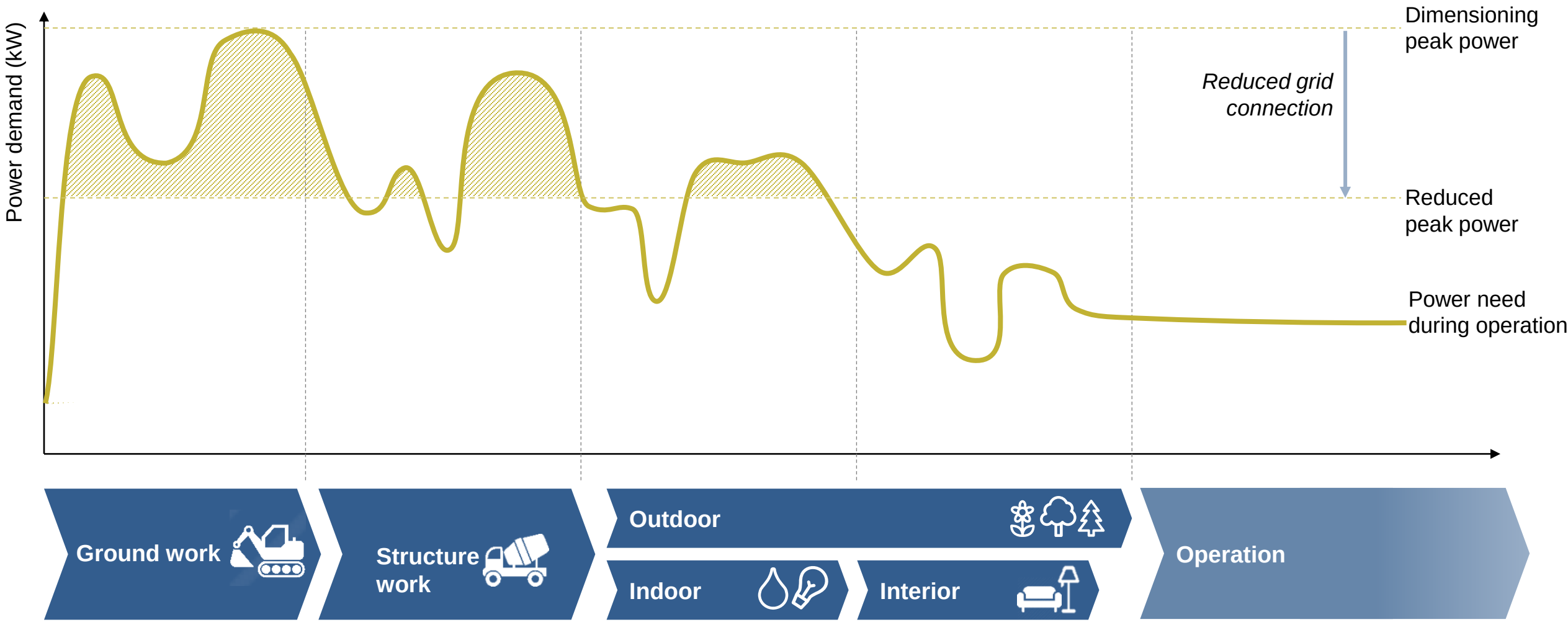
Bergen kommune

R&D with Bergen municipality for developing framework for zero emission construction sites + 2 pilot projects

Enova – Mobile charging

3 year R&D project with 15 mill. kr. in Enova funding. Develop and test mobile charges and batteries for electrical heavy machinery. "Digital twin" of the electrical infrastructure.

Power and energy demand varies between construction phases and battery technology can be used to peak shave



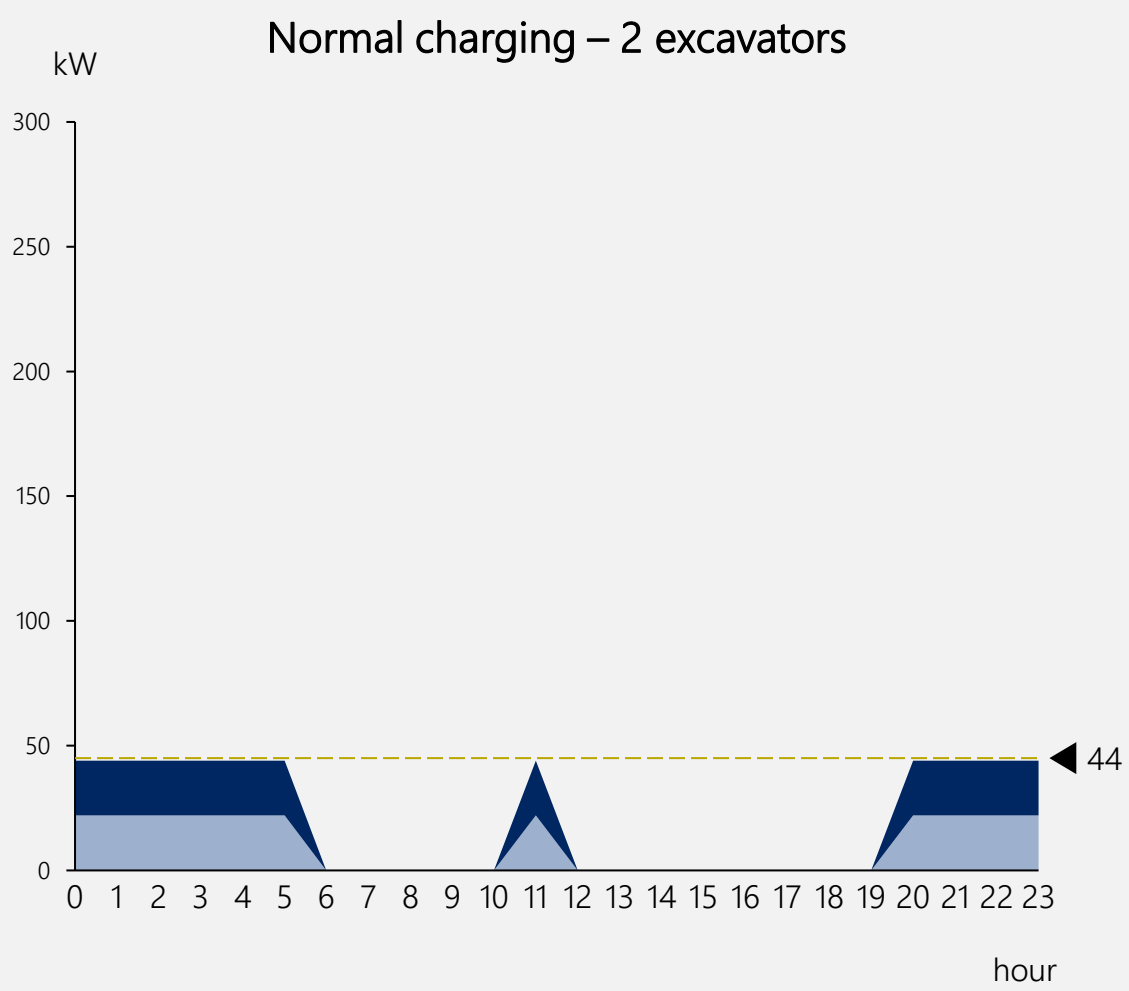
Factors that impact capacity and efficiency of zero emission construction sites

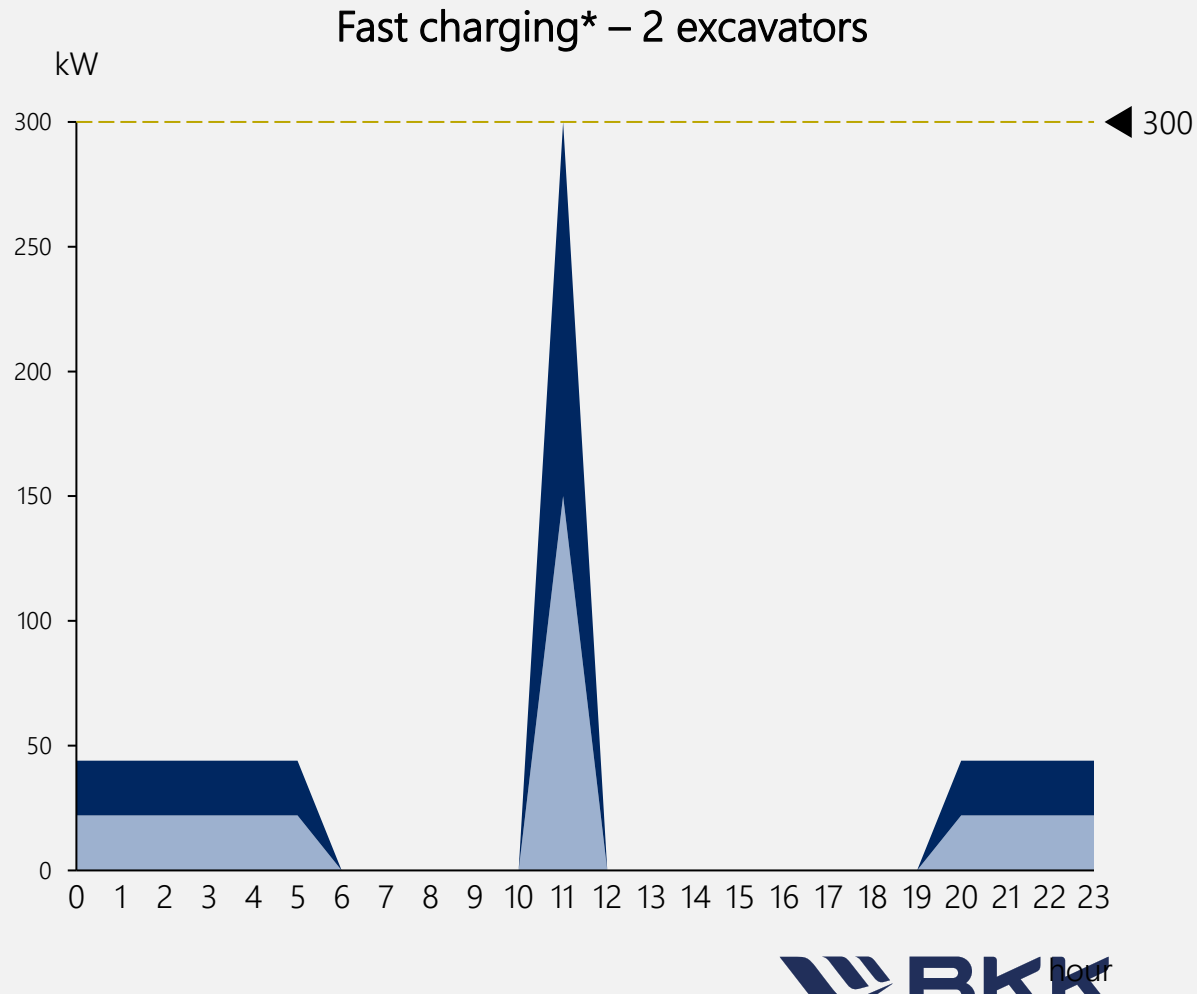
Grid capacity

Charger

Intake

Charge profile for one day – Battery electric excavator ca. 10 t



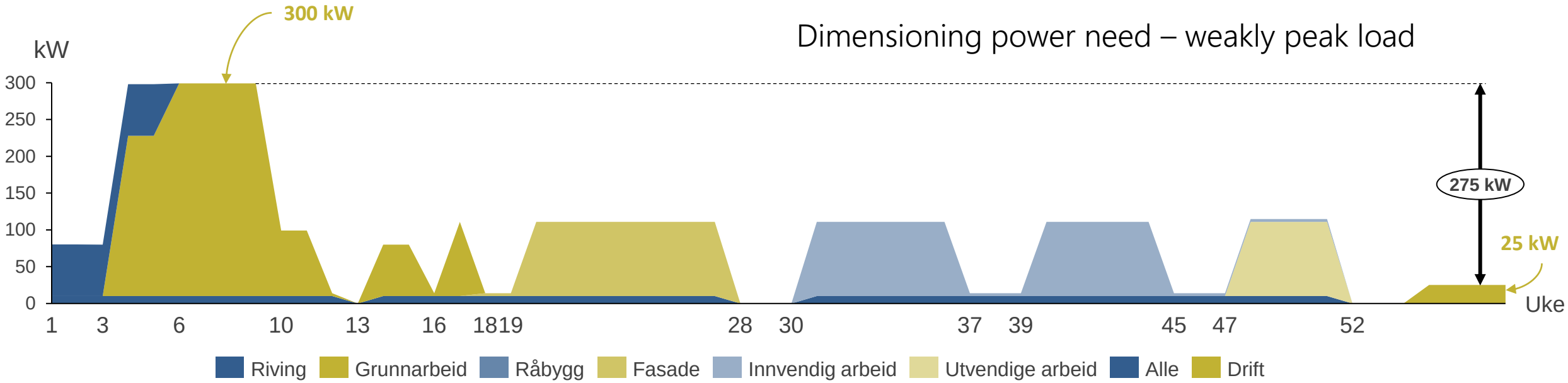


Excavator A charging Excavator B charging

* Begrenses av kapasitet til maskin, lader eller tilgjengelig effekt

* source: Sintef, BKK

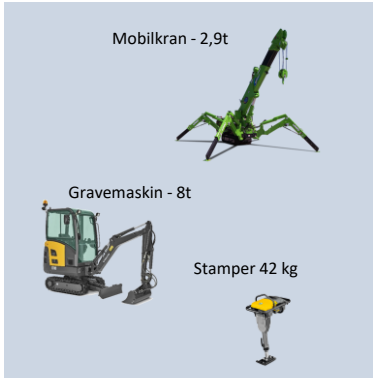
Dimensioning power and energy need during construction



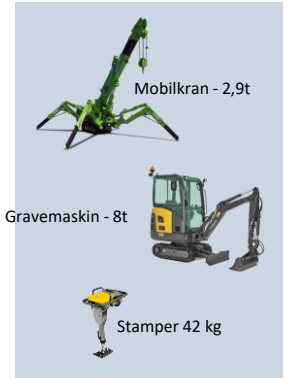
Riving

Grunnarbeid

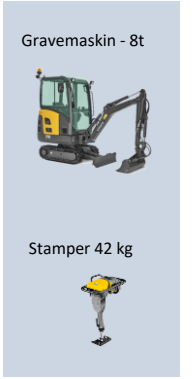
Råbygg og fasade



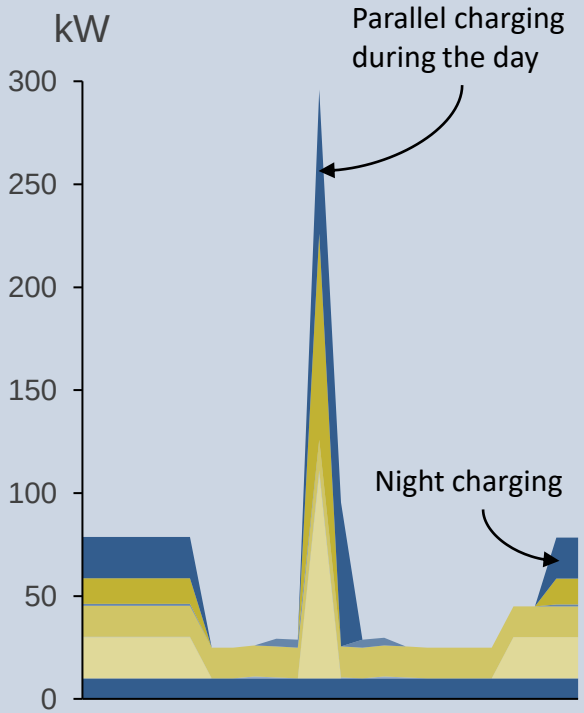
Innvendig



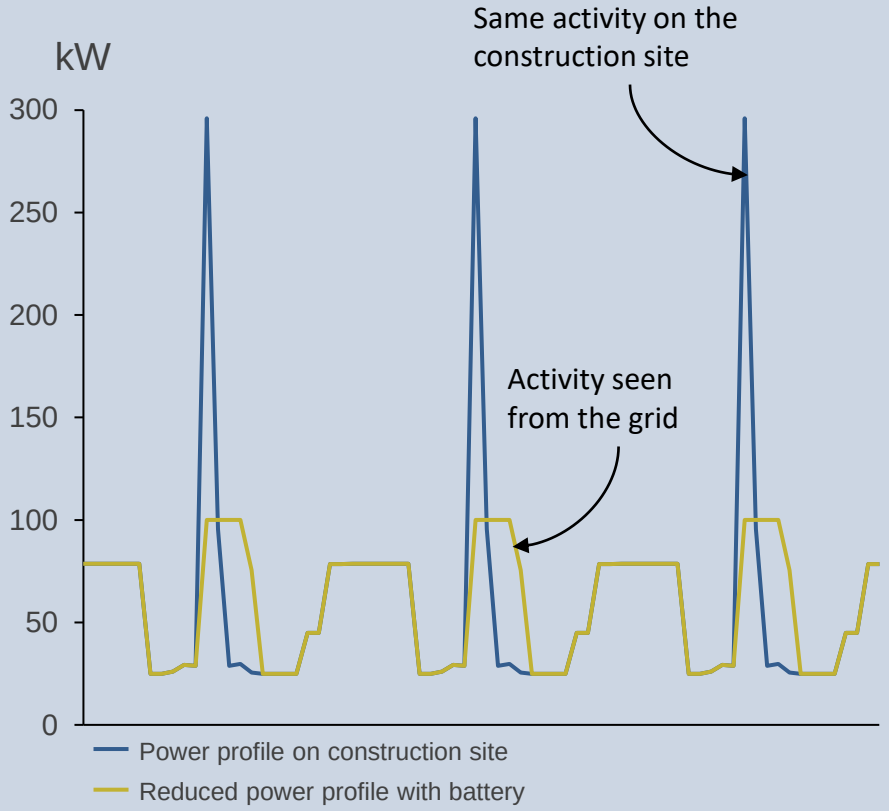
Utvendig



Measures to reduce dimensioning power need and potential cost savings

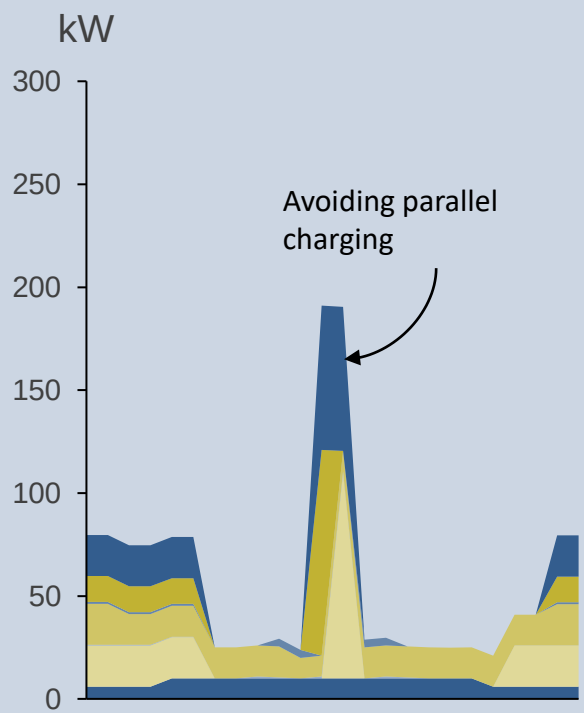


No measures



Battery

Ca 50 % reduction in grid rent cost + avoid upgrade in trafo



Planning of activities

Ca 20 % reduction in grid rent cost + avoid upgrade in trafo

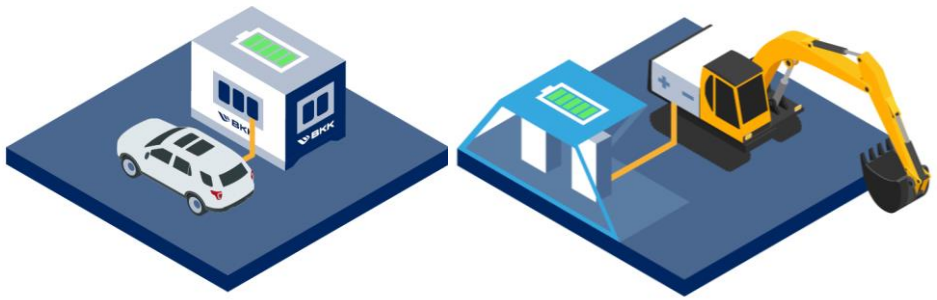
Challenges and barriers

- Grid capacity often weak
- Grid connection process
- Availability of electrical machines and equipment
- Long delivery times
- High cost of electrical equipment and infrastructure
- Low degree of standardisation (communication and charging)

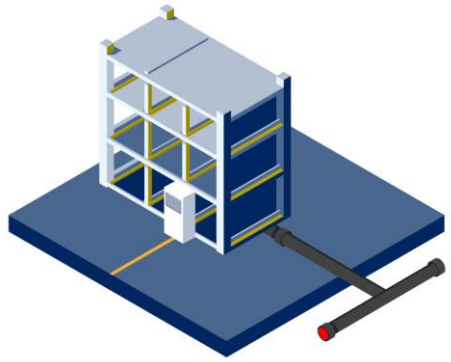
Energy solution tailored the need on the construction site

Mobile, scalable and modular energy solution

Mobile batteries
alone or in parallel with the grid
(50kWh – 1,4 MWh)



Mobile chargers
(fast chargers and normal chargers)



Heating solutions

Developing and testing mobile energy solutions

Test of excavator running only on batteries (off grid)

Battery as integrated part of construction energy solution


Fast chargers (DC) in containers

Normal (AC) charging of excavator

BKK

Thank you

Camilla Moster
Leder Mobil energi
camilla.moster@bkk.no
984 884 58