



ENERGY INTEGRATED

Home Page: <https://enico.fi/>

Sähköisten työkoneiden lataus työmailla - Ennakoiva markkinavuoropuhelu



EMODULE – Modular BESS solutions

Our value corner stones

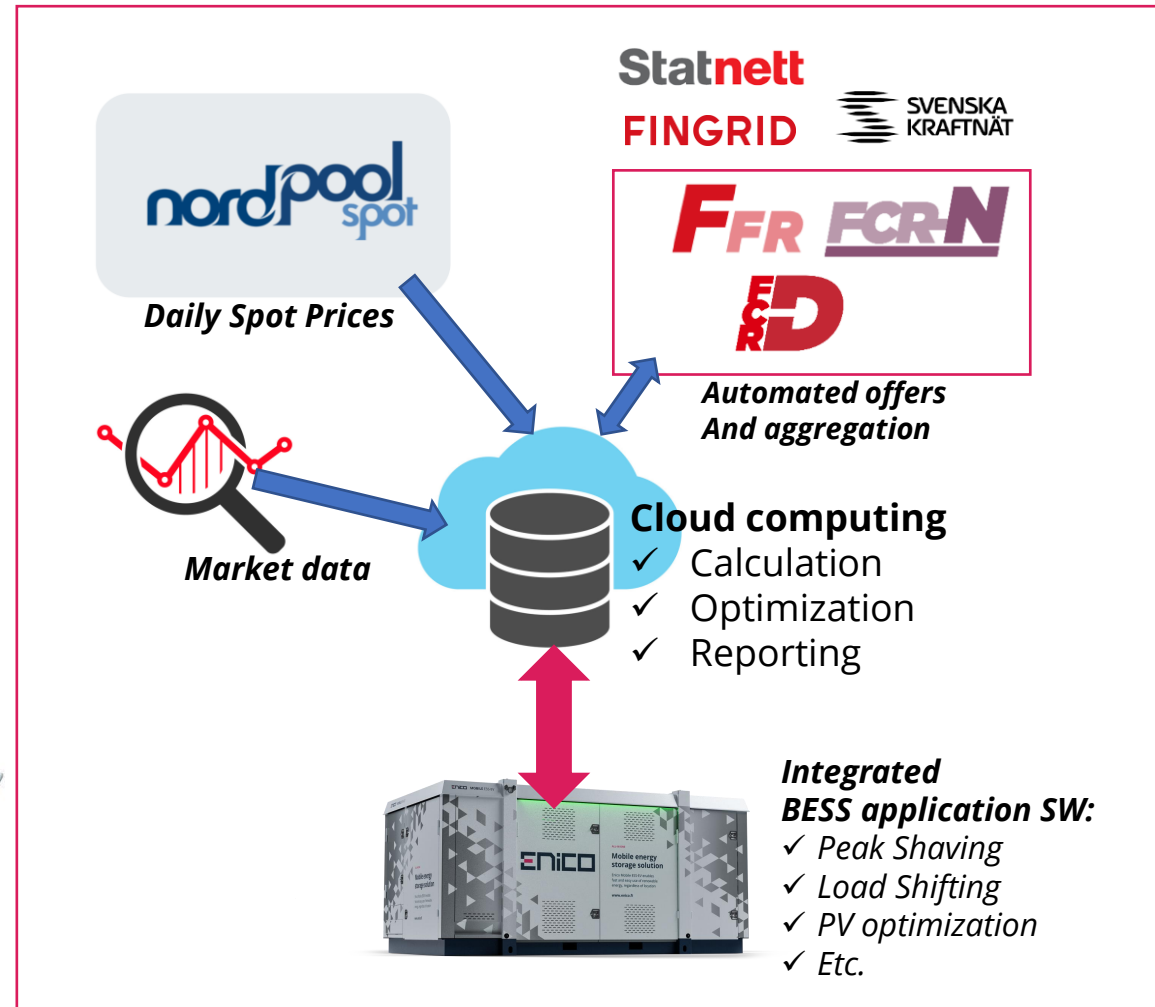
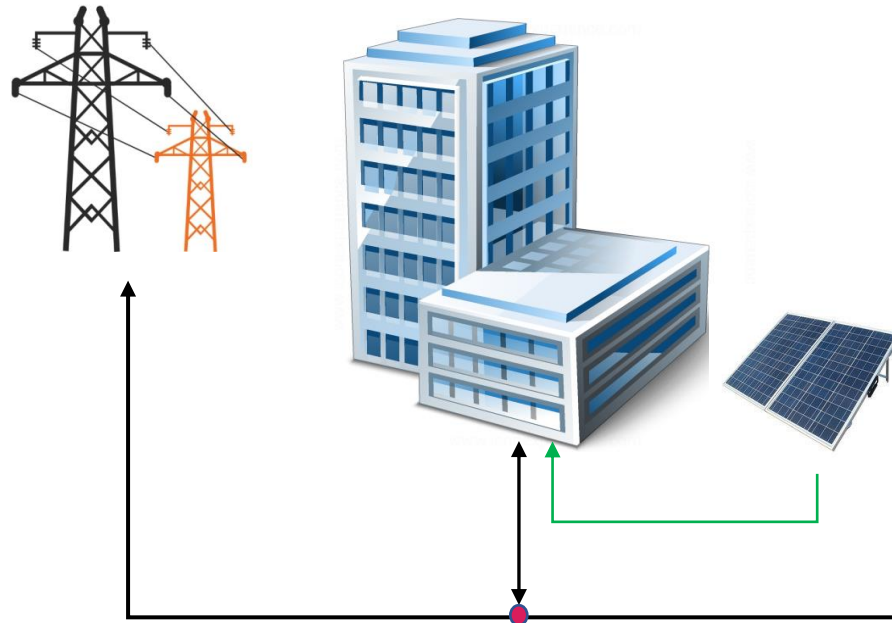
- ▶ Compact All-Inclusive solutions
- ▶ High quality technology integration
- ▶ Total efficiency top in the Market
- ▶ Superior usability in almost all energy storage applications
- ▶ Fast and efficient manufacturing
- ▶ Deployment made super fast and easy. “Plug and play”.
- ▶ Designed for harsh Nordic conditions
- ▶ Industrial but stylish design that sounds with urban city scene



*"With **EnicoEMS** a user of BESS can create a multipurpose tool from the energy storage that enables multiple sources of revenue simultaneously..."*
(Anssi Seilo, Head of Automation, Enico Oy)

Optimizes the value of BESS by Application Stacking:

- ✓ **Energy arbitration**
- ✓ **Spot price optimization**
- ✓ **Participation TSO Grid frequency response market**
- ✓ **Optimization of PV energy**
- ✓ **Peak power tariff optimization**



MobileESS

- The All-in-One mobile energy storage solution enables fast and easy use of renewable energy, regardless of location.

Public and Private Construction Sites

- *Replaces the use of diesel generators on construction sites*
- *No need for major excavation work and opening of streets to build a large electricity connection to the construction site*
- *Enables the of temporary charging stations for the duration of the construction site for mobile construction machinery and EV's.*
- *Emission-free temporary electricity distribution at events, fairs, festivals*
- *Localized grid support for areas where seasonal or temporary grid support is required*
- *Disaster relief and critical infrastructure support*

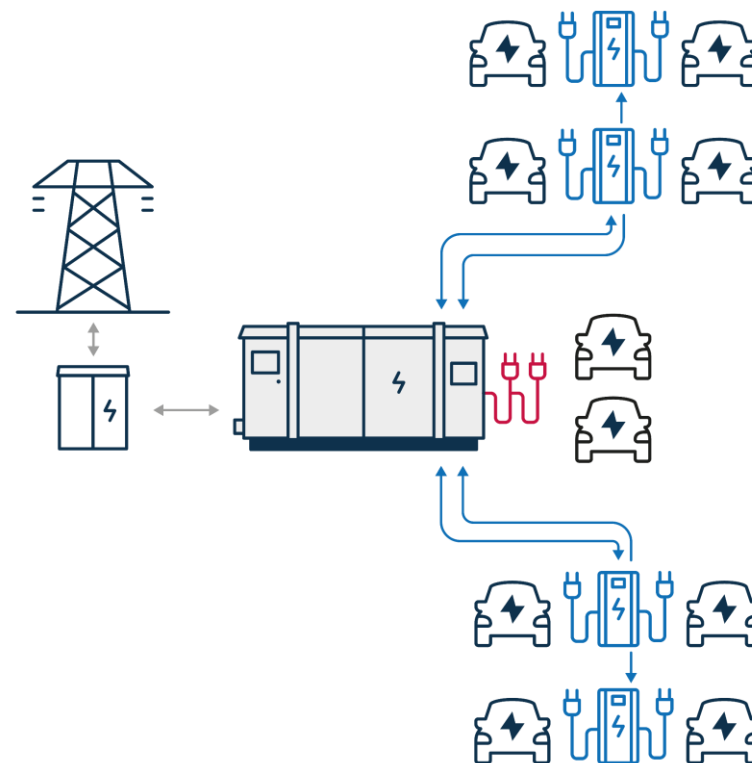




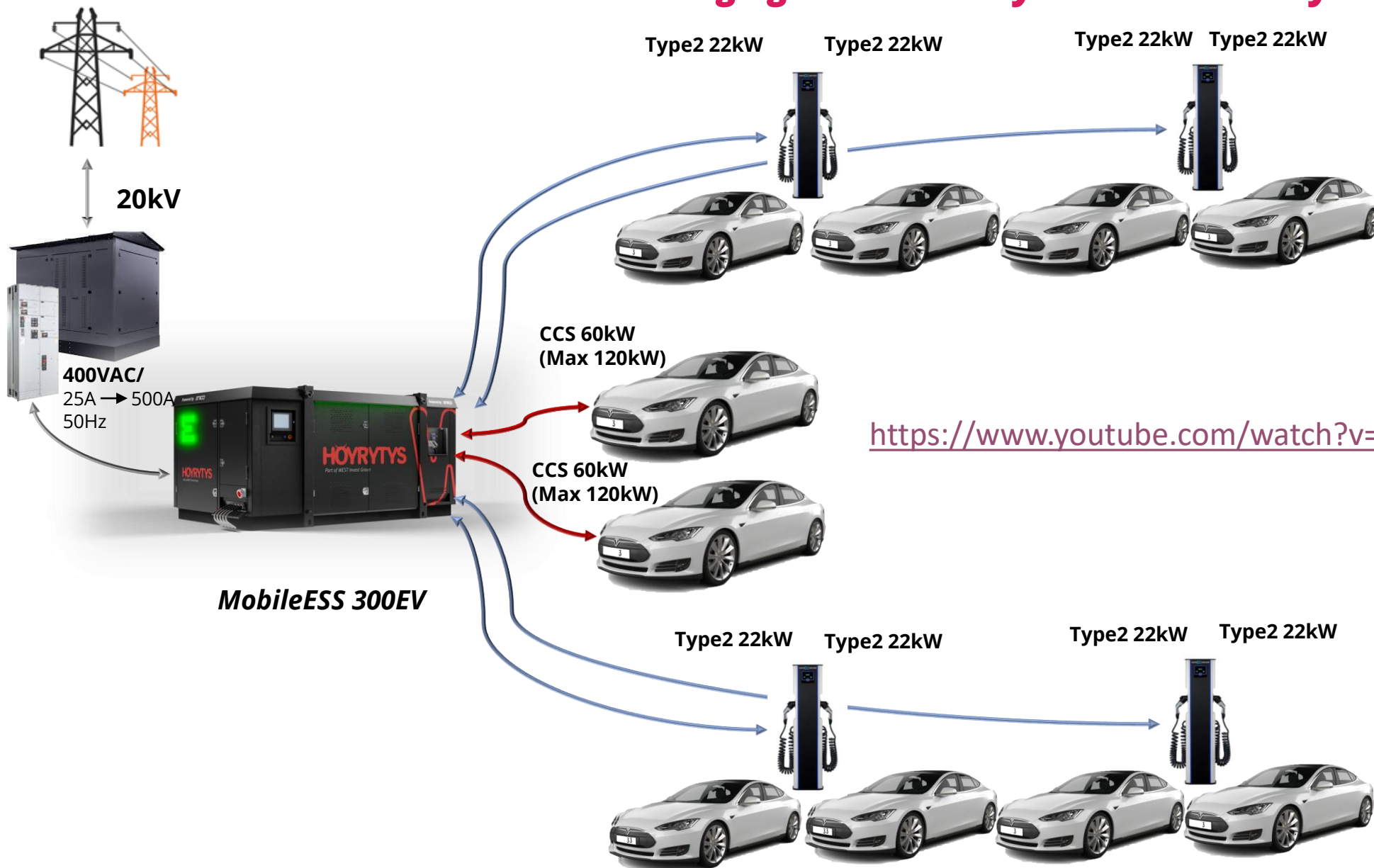
Energy Storage Highlights 2022

MODULE *MobileESS EV*

- ▣ Continuous Power & Energy density : 300kW/416 - 624kWh
- ▣ Transportable. Commissioning within 1 hour
- ▣ Can be connected to normal 400VAC/50Hz low voltage connection (min. 400VAC/ 25A)
- ▣ Including: 2 pcs CCS charging units integrated + several supply outlets for satellite EV charging units
- ▣ All inclusive application package including ancillary and energy arbitrage services



Full Scale EV charging station to anywhere within a day



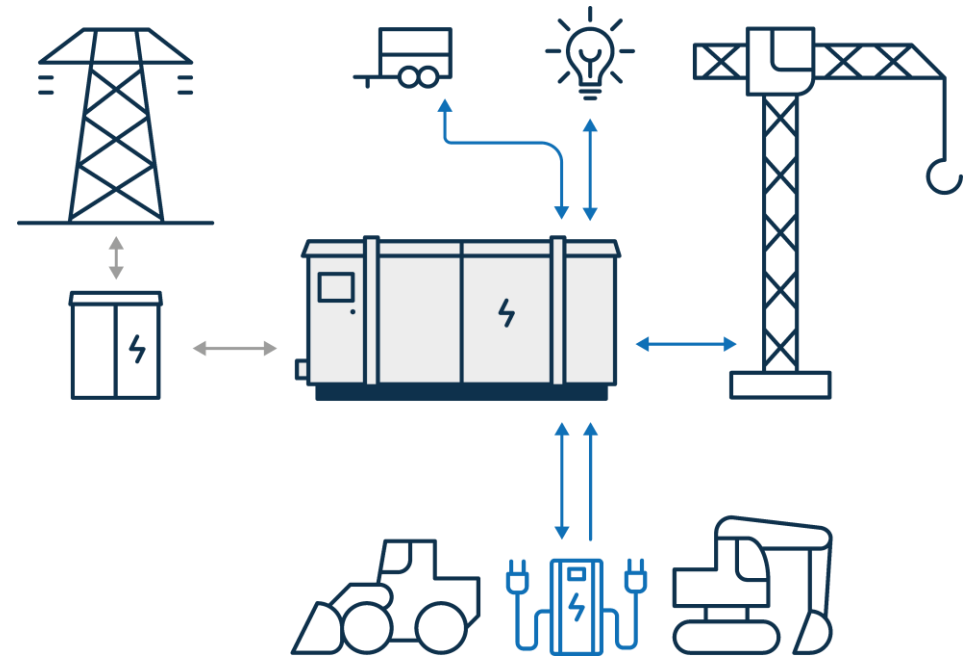
<https://www.youtube.com/watch?v=W1C-rD2Mlj0>

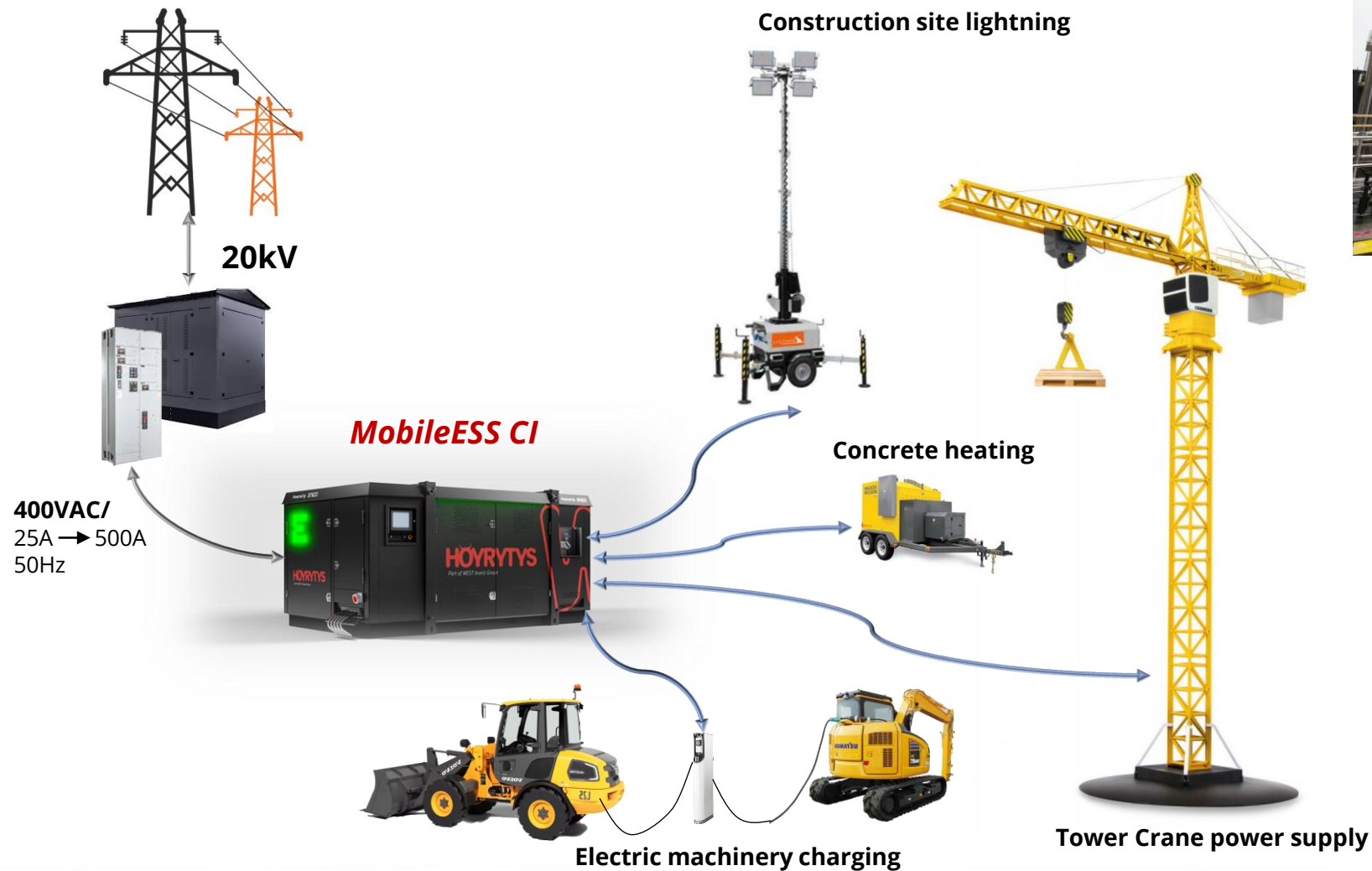


Energy Storage Highlights 2022

ENICO MODULE *MobileESS CI*

- ❑ **Continuous Power & Energy density : 300kW/416 - 624kWh**
- ❑ **Transportable and can be commissioned within 1 hour**
- ❑ **Can be connected to normal 400VAC/50Hz low voltage connection (min. 400VAC/ 25A)**
- ❑ **Including: 500A/400VAC distribution switchgear with multiple electricity feeders and plug-in slots**
- ❑ **All inclusive application package including ancillary and energy arbitrage services**







Diesel GenSet

- ❖ Burns fossil fuel
- ❖ High Emissions
- ❖ High noise level
- ❖ Expensive to generate electricity
- ❖ Black Start
- ❖ Back-Up Power
- ❖ Peak Shaving



Portable Energy Storage Systems

- ❖ No Emissions
- ❖ Low Noise level
- ❖ Plug-n-Play?
- ❖ Back-Up Power
- ❖ Peak Shaving
- ❖ Energy time shifting



MODULE MobileESS

Multitool of Energy Storage

- ❖ No Emissions
- ❖ Low Noise level
- ❖ Plug-n-Play in one hour
- ❖ Back-Up Power
- ❖ Peak Shaving
- ❖ Energy Arbitration
- ❖ Optimization of renewable energy sources
- ❖ Support for Ancillary services
- ❖ Build-In Virtual Power Plant service platform
- ❖ Integrated CCS EV charging station
- ❖ Integrated 400VAC/500A power distribution center



CASE – Construction Site electrical load support

Diesel GenSet vs. Energy Storage

300kW Peak Shaving/Load balancing at construction site for 5 hour per day /200 days a Year
1500kWh/day total electricity generated / distributed

Diesel GenSet

- ❖ Average consumption at full generator power 200g/kWh
- ❖ Diesel specific gravity EN590, density 0.80 kg / litre
- ❖ 1 litre produces (max) 4kWh of electricity. 300 kWh consumption per hour consume 75L of Diesel
- ❖ 300 kWh production costs 77 € (January 2022 Prices)
- ❖ **1500kWh production costs 425 € /day (per 375L diesel)**

CO2 Emissions (day and per year):

- ❖ **gCO2 375litres x 2646gCO2/litre = 992,25 kgCO2/day**
- ❖ **Annual amount of gCO2 (tonnes) 198 Tons CO2/200 days**



Taulukko 23. Polttoaineiden kansallisia lämpöarvoja ja ominaispäästökertoimia. [22]

Polttoaine			Lämpöarvo		Päästökerrin		
suomeksi	ruotsiksi	englanniksi	MJ kg _{fuel}	kWh kg _{fuel}	g(CO ₂) MJ	g(CO ₂) kWh	g(CO ₂) kg _{fuel}
Moottoribensiini	Motorbensiin	Motor gasoline	43,0 (31,8 MJ/L)	11,94 (8,8 kWh/L)	72,9	262,4	3135 (2320 g/L)
Dieseliöljy	Dieseliölja	Diesel oil	42,8 (36,0 MJ/L)	11,89 (10,0 kWh/L)	73,6	265,0	3150 (2646 g/L)
Kevyt polttoöljy	Lätt bränsolja Tunn eldriingsolja	Light fuel oil Heating fuel oil	42,7 (36,7 MJ/L)	11,86 (10,2 kWh/L)	74,1	266,8	3164 (2721 g/L)
Raskas polttoöljy, rikkipitoisuus alle 1 %	Tung bränsolja Tjockolja	Heavy fuel oil	41,1	11,42	78,8	283,7	3239
Kivihiili, bituminen	Stenkol	Hard coal	24,6	6,83	94,6	340,6	2327
Maakaasu	Naturgas	Natural gas	36,0 MJ/m ³ (90,0 MJ/kg)	10,0 kWh/m ³ (13,9 kWh/kg)	55,04	198,1	1981 g/m ³ (2752)
Jyrsinturve	Frästerv	Milled peat	10,1	2,81	105,9	381,2	1070
Palaturve	Stycketerv	Sod peat	12,3	3,42	102,0	367,2	1255
Turvepelletit ja lanketit	Torvpellets och bränsletter	Peat pellets and lignettes	18,0	5,00	97,0	349,2	1746
Kiertäys-polttoaineet	Återvinningsslämnan	Recovered fuels	20,0	5,56	31,8	114,5	636

Tilastokeskuksen polttoaineluokituksessa ominaispäästökertoimet on esitetty polttoaineen alemman lämpöarvon suhteutettuna (g/MJ). Taulukoissa esitetyt massan suhteutetut päästökertoimet on laskettu kertomalla päästökerron polttoaineen lämpöarvolla. Suluisia esitetyt arvot eivät ole oia Tilastokeskuksen polttoaineluokituksista: ne on laskettu oletamalla polttoaineen tiheys. Moottoribensiinin tiheys on käytetty arvona 740 kg/m³ (NESTE-BENSIINI 95, tyypillinen tiheys, 15 °C), dieseliöllyn 840 kg/m³ (NESTE-DIESEL 5-15, tyypillinen tiheys, 15 °C), kevyen polttoöllyn 860 kg/m³ (NESTE-SÄHMITYÖLJY -3, tyypillinen tiheys, 15 °C), maakaasun ominaisuudet on esitetty Tilastokeskuksen polttoaineluokituksessa lämpötilassa 0 °C ja paineessa 101325 Pa (tiheys noin 0,72 kg/m³). Alueindeksi ja vilataan polttoaineen massaan.

<https://www.ymparisto.fi/download/noname/%7BA6ABCFF7-55FA-412C-A0C7-FEE5CC0A2F24%7D/30744>



<https://www.fingrid.fi/sahkomarkkinat/sahkomarkkinainformaatio/co2/>

Mobile Energy Storage

Through the energy storage SPOT optimized electricity per day 750kWh (2.5 full cycles / 750kWh). The remaining 750kWh of average SPOT priced electricity.

- ❖ 750kWh average SPOT purchase (0.08 € / kWh) cost is 60,00€
- ❖ 750kWh Reduced SPOT purchase through electricity storage: (0.03 € / kWh), cost is 22,50€
- ❖ **1500kWh production costs 82,50 € /day**
- ❖ **5x Savings of Electricity production cost**

CO2 Emissions (day and per year):

- ❖ 1500kWh x 85 gCO2/kWh = **127,50 kgCO2/day**
- ❖ **Annual amount of gCO2 (tonnes) 19,8 Tons CO2/200 days**
- ❖ **gCO2 emissions almost 10 times less vs. similar Diesel GenSet**
- ❖ **CO2 emission savings are Equivalent of approx 62 Passenger car norm gCO2 / emissions per year**



LATEST Reference:

Emodule AI, Shopping Centre in Southern Sweden



E MODULE 500kW/624kWh

- **Customer: Siemens AB**
 - End Customer: Väla Shopping Centre in Helsingborg, Sweden.
- **Application: Virtual Power Plant**
 - Grid frequency support
 - Ancillary services: FCR-D and FFR
- **Commissioned: October/2022**



LATEST Reference:

MobileESS EV, mobile energy storage system for *Höyrytys Oy*

mobileESS EV with integrated EV charging solution

- 300kW/442kWh Energy storage with 2 x 120kW CCS EV fast charging station integrated.
- Enable unique EaaS business model
- Handed over to Customer: October 2022

