COREALIS
THE PORT OF THE FUTURE

Energy Assessment Framework

Sven De Breucker - Dynniq

23/04/2021

Green Cookbook: Energy Assessment Framework

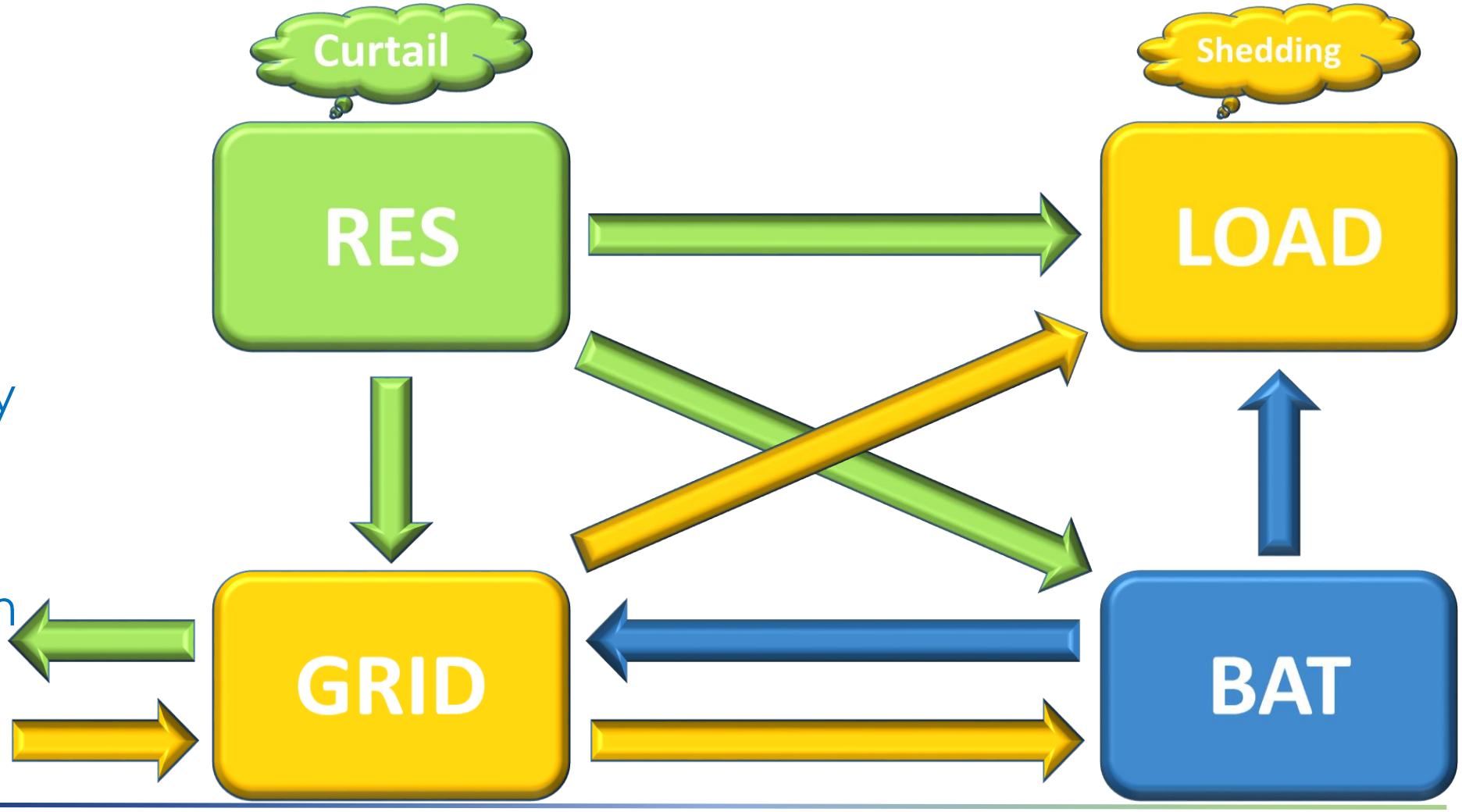
Scope

- RES integration
- Storage integration
- CO_2-reduction
- Cost effective

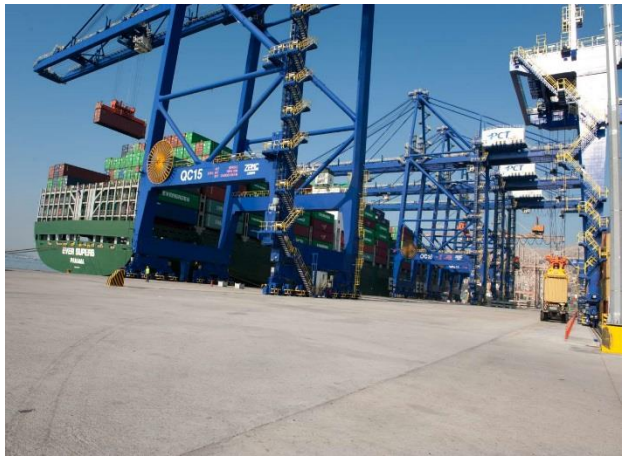
Simulation environment

Model
- Powerflows
- Constraints

Objective optimization
- Self sufficiency
- Peak shaving
- Cost
- CO_2-reduction



Current PCT load (scenario 1)



6,7 MW_{pk}
40 GWh

- Quay Cranes: 17 GWh
- Reefers: 11 GWh
- Yard Cranes: 8 GWh
- Buildings + light: 4 GWh

Electrify 140 Yard Vehicles (scenario 2)

2,5 million liter diesel/year

ROI: 4 years

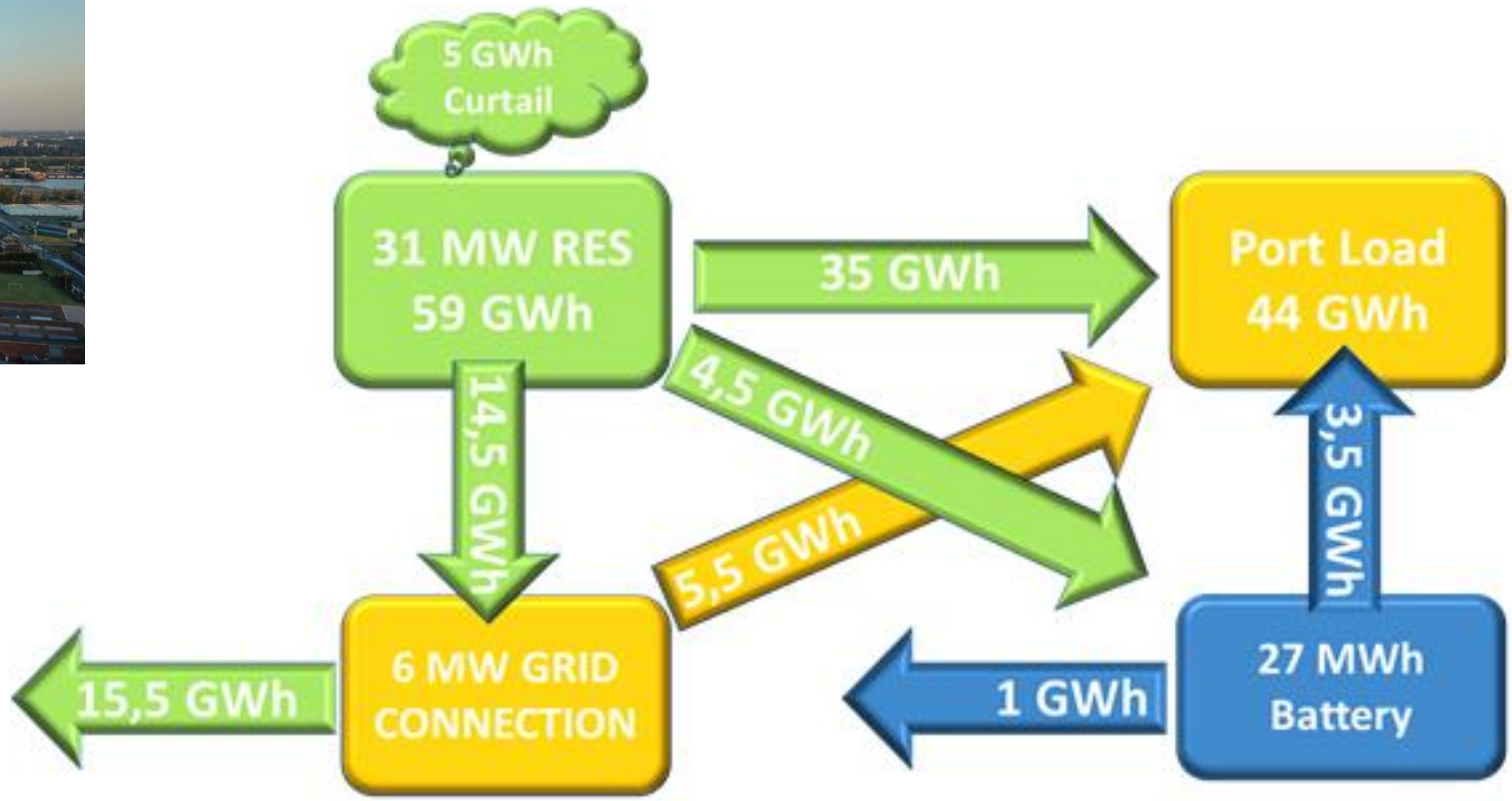
- Stop&Go
- Low speeds

4 GWh EV (10 % load)

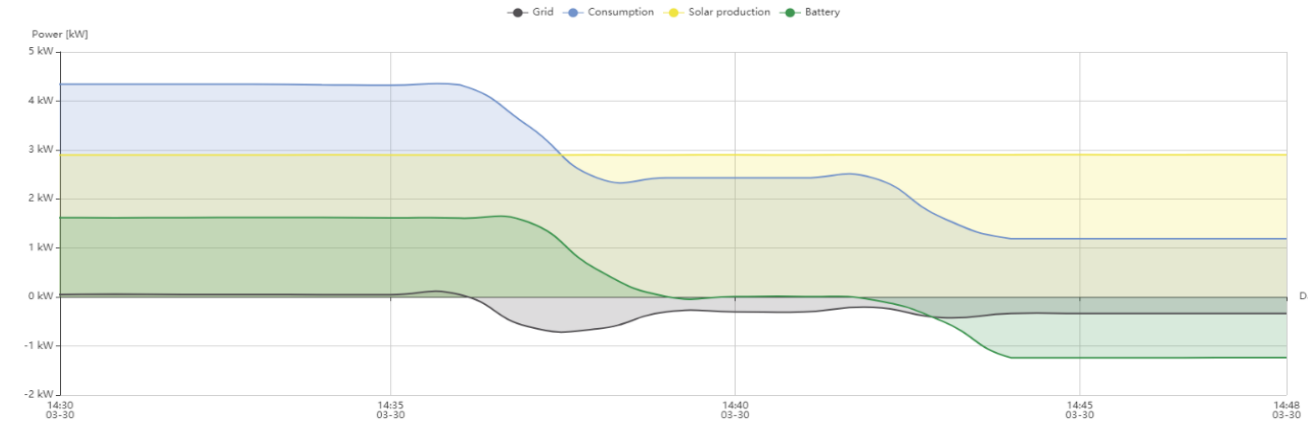
- 50 % less curtail
- 25 % load-match
- 25 % Import

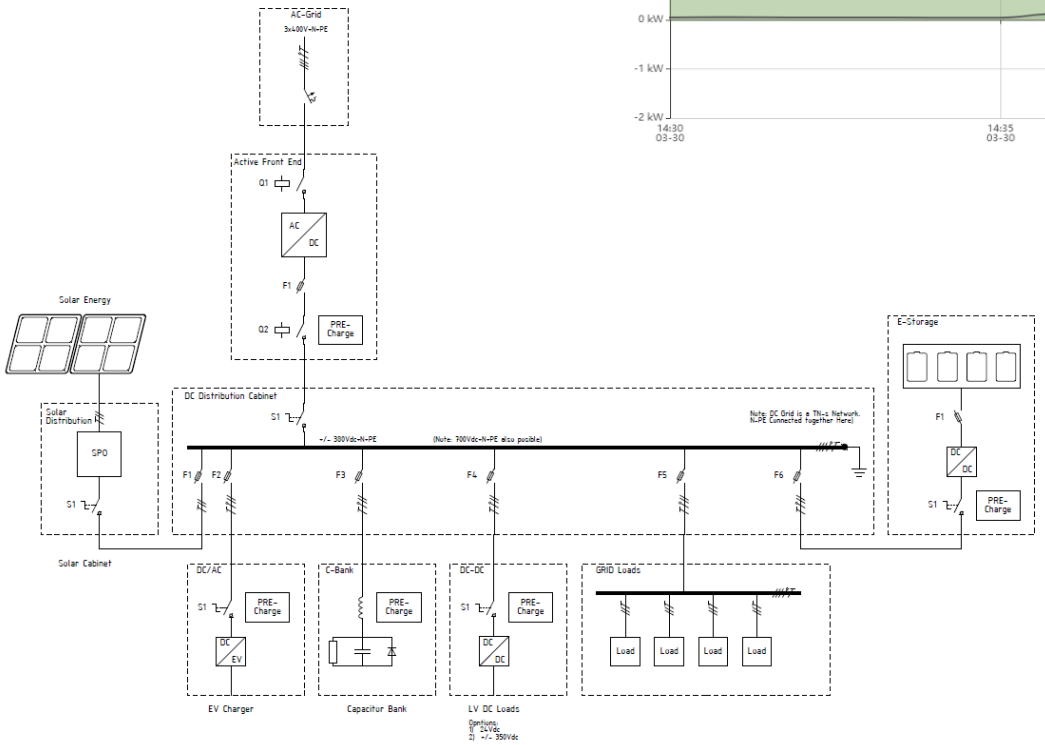
9 ktonnes CO_2/yr

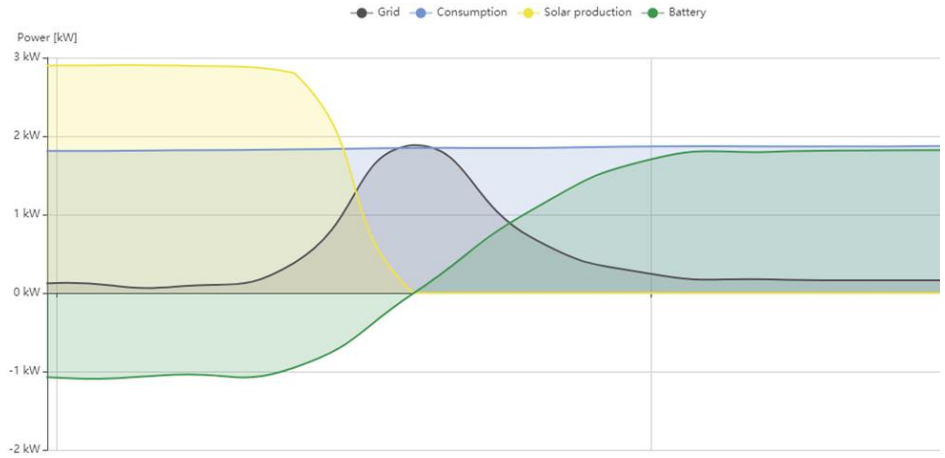
RES coverage & Energy Flow



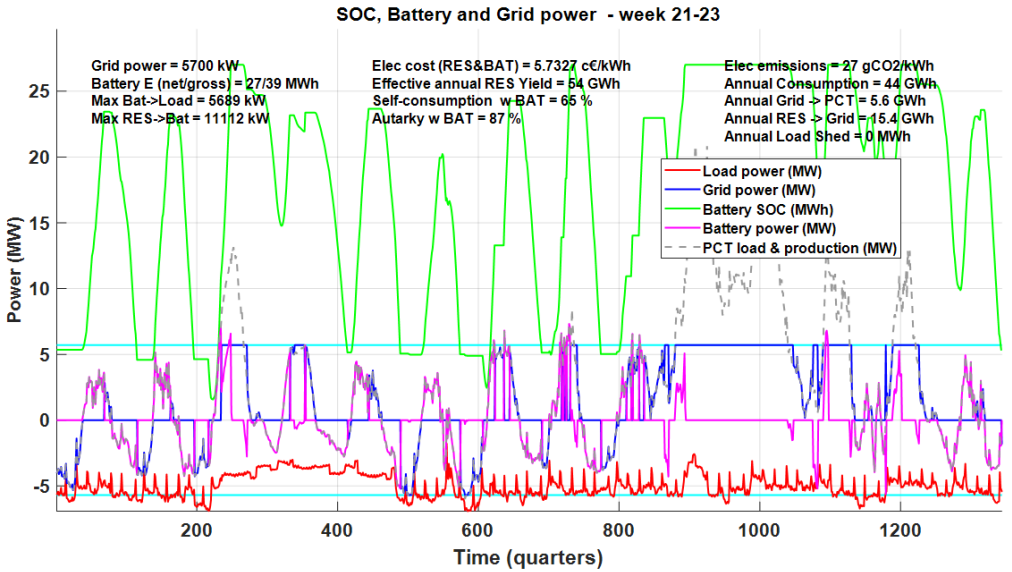
RES Energy Flow implementation (WP5)



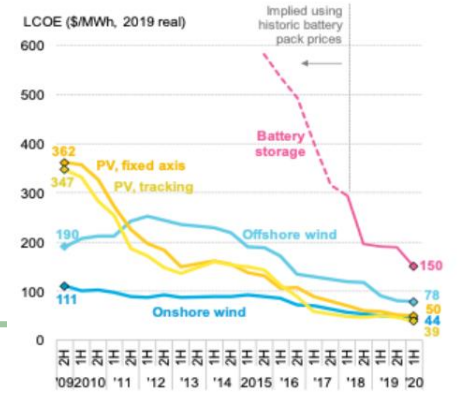




RES coverage results

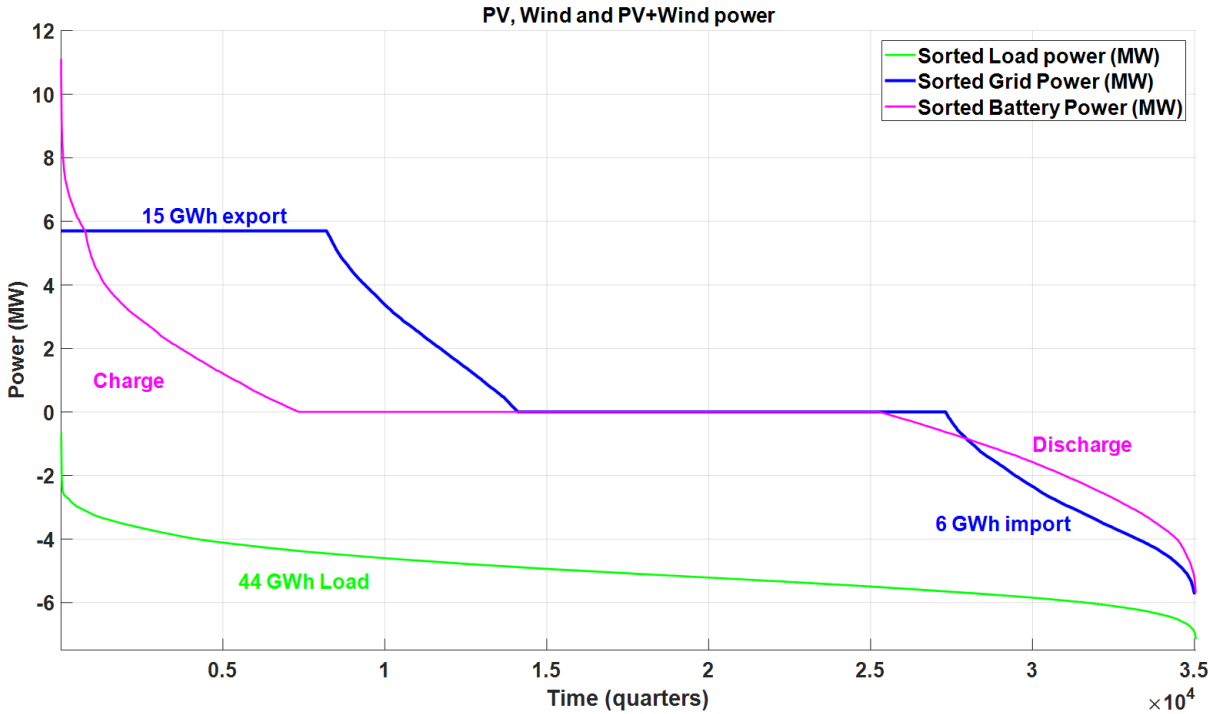


- 87 % self-sufficiency (79% w/o BAT)
- 6 GWh Im / 16 GWh Ex => Renewable energy exporter!
- < 60 €/MWh



Source: BloombergNEF. Note: The global benchmark is a country weighted-average

Grid & Battery Impact

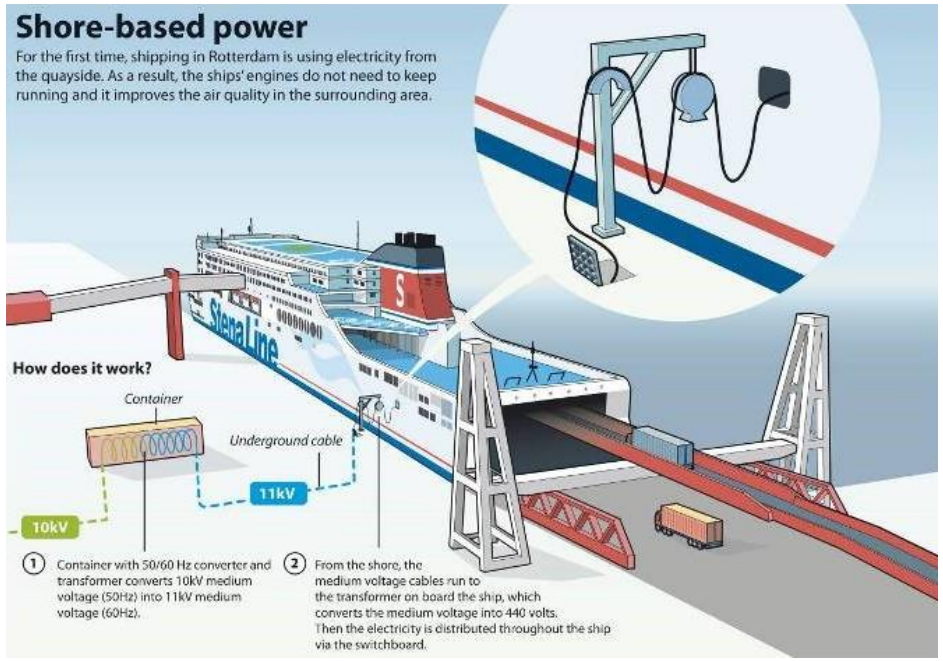


- Grid: 40 % export, 40 % idle, 20 % import
- Battery: 20 % charging, 50 % idle, 30 % discharge

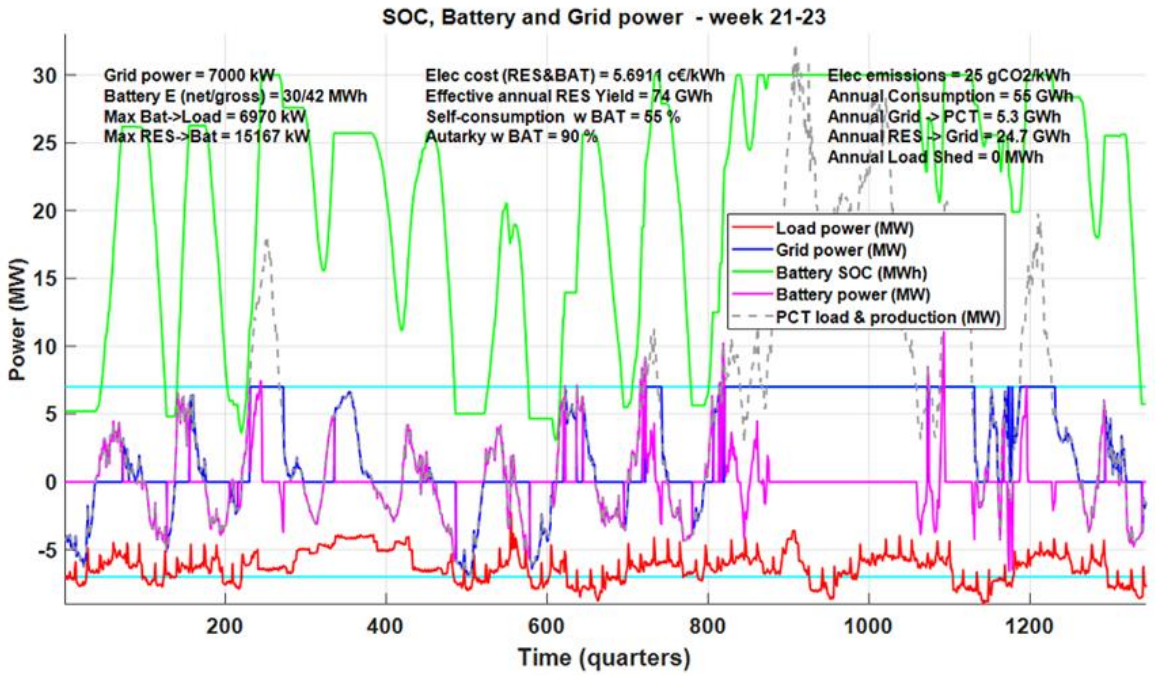
Results of the energy assessment

- Self sufficiency: ± 90 % in all scenarios
- Peak shaving: 7,2 MW with 6 MW connection
  - => Cost savings on peak power! (100 k€/yr)
  - => Grid reinforcement deferral
- Cost savings
  - => Net exporter of RES: 16 GWh/yr
  - => ~~Fossil E @ 75 €/MWh~~ => RES @ 60€/MWh (500 k€/yr)
  - => Electric Terminal Tractors fuel cost: ~~15 k€~~ → 1,5 k€ (*140)
- **CO_2-reduction: 1000 ktonnes over 15y** ~ 5500 coal cars

Onshore Power Supply: 500 ktons/15 years



- 90 % self-sufficiency
- 20 GWh Renewable energy exporter



11 GWh OPS

- 5 extra WT & 7 MW grid
- 90 GWh RES => 18 % Curtail

COREALIS
THE PORT OF THE FUTURE

www.corealis.eu
corealis_eu
COREALIS EU Project
Corealis_eu
info@lists.corealis.eu

THANK YOU FOR YOUR ATTENTION

dynniq energising mobility

Sven De Breucker

Sven.deBreucker@dynniq.com

This project has received funding from the European Union's horizon 2020 research and innovation programme under grant agreement No. 768994