PÖYRY

# STORAGE CONCEPT

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# ORIGINAL MISSION FOR THE STORAGE CLUSTER

- Storage system
  - 100 % RES
  - Autonomous (no interconnection to SWE and FIN)
  - 2030 ~400GWh, 80MW maximum load, largest periods of no wind no sun: 3 x 7 days ~21-23 GWh (5 % of total demand in 6 % of the time)

- Annual consumption 400 GWh
  - Split into intermediate consumption and time shift (storage and load following production with biomass)

  →Appropriate storage architecture

  →Levelised cost of electricity

# STATUS OF THE STORAGE CLUSTER SUB PROJECT

- At present finishing input to CLIC report
- Agreement with Flexens on 2019 work: Amanda's M.Sc. Thesis at Aalto University
- Detailed solution requires simulations (Pöyry's BID3 software, part of M.Sc.)
- Input concerning planning for installed base needed from Flexens by March (details will follow)

# OUR CONTRIBUTION TO CLIC REPORT

- ~10 pages
- Storage technology overview: short, mid and long term
- 3 non-simulated storage architectures for 2 scenarios without cables, 1 with cable
- LCOE estimation for 3 architectures
- Potential finance plan and investors
- Draft submitted by 20th of January in cooperation Pöyry with Teraloop

# 400 GWH ANNUAL CONSUMPTION ON ÅLAND

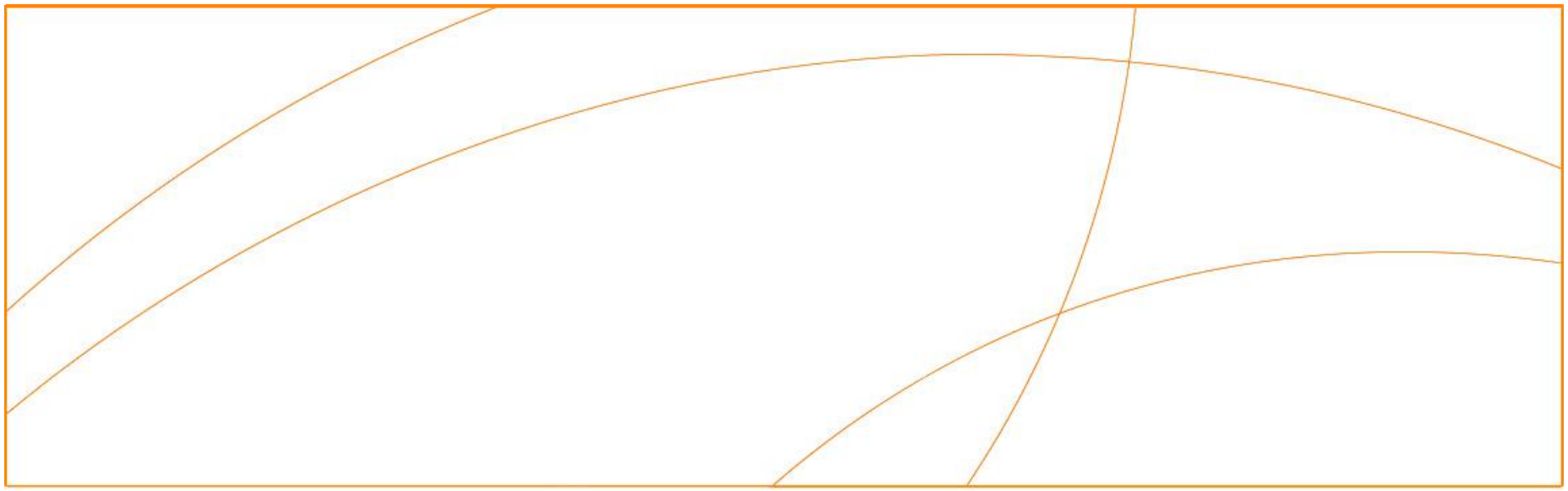
**→200 GWh used when produced (driven by weather)**

**+ 200 GWh consumed with a temporal shift of energy consumption[1]**

| | Scenario no biomass | Scenario biomass |
|---|---|---|
| | [GWh] | [GWh] |
| Wind | 575 | 375 |
| Solar | 25 | 25 |
| **Production total V-RES** | **600** | **400** |
| Consumed when produced | 200 | 200 |
| **Production temporally shifted** | -400 | -200 |
| Biomass production for consumption | - | 100 ¦ 100 |
| Storage output for consumption | 200 | 100 |
| Storage input with 50%[2] efficiency | 400 | 200 |
| **Sum RES System input** | **600** | **500** |
| **Sum consumption** | **400** | **400** |

[1] Assumption based on Pöyry estimate

[2] Assuming storage efficiency of 50%: Power to gas to power efficiency of 33 %, Battery & Flywheel ~80 % → average of 50 %



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