

Biogas 2030: Snapshots of Tomorrow

AD as part of an integrated energy solution for Net Zero islands



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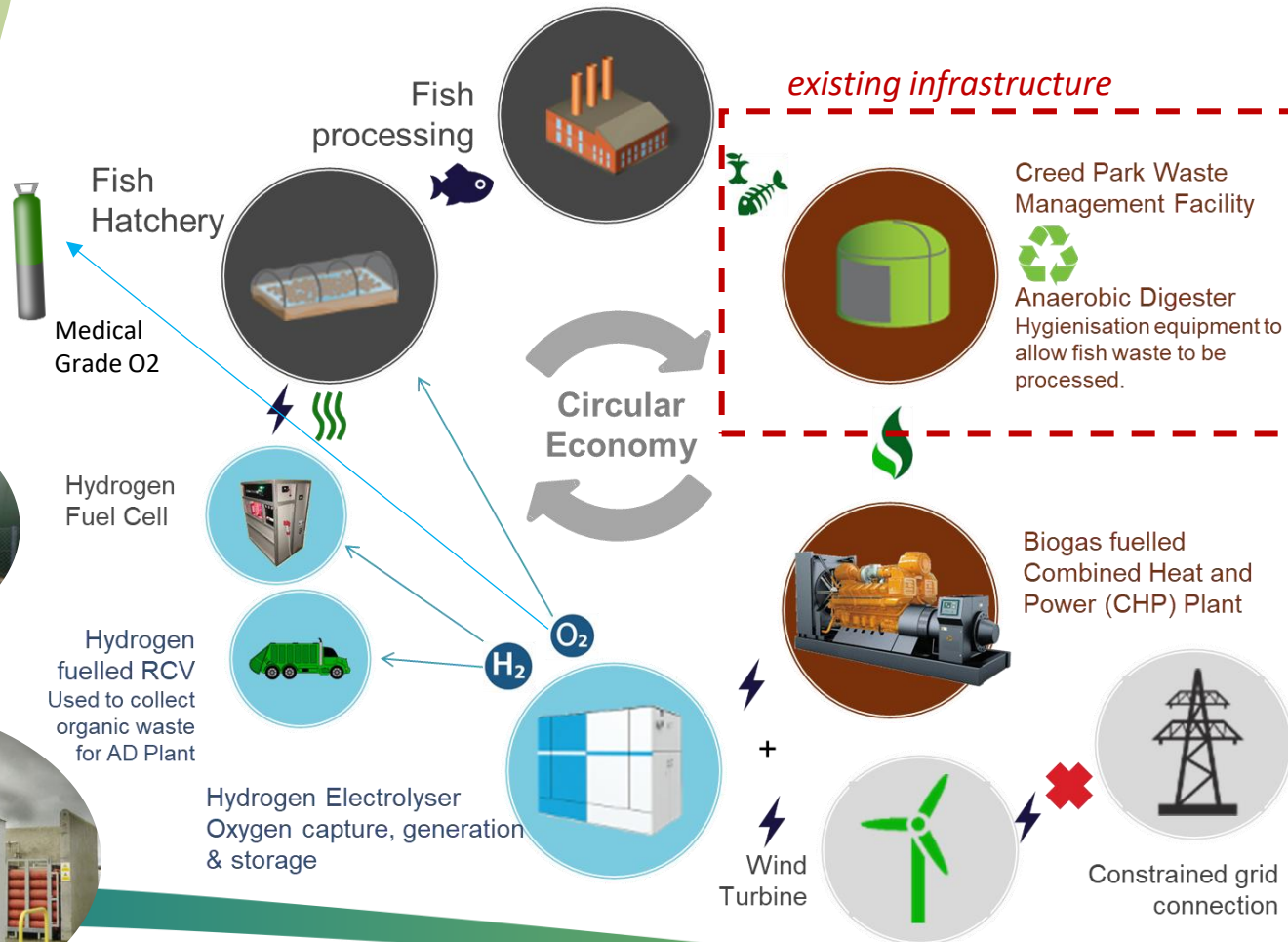
Background: Outer Hebrides Local Energy Hub (OHLEH)



- OHLEH was developed to maximise the potential of constrained electricity generation by utilising the existing infrastructure at Creed Park Waste Management Facility, developing green disposal routes for local sources of organic waste
- OHLEH demonstrates how different renewable energy technologies can be integrated to support local energy economies and circular supply chains
- Creed Park Waste Management Facility is the first Anaerobic Digestion (AD) plant in the UK to use 'dry' AD technology to treat municipal organic waste, designed with extra capacity for potential treatment of fish waste from the local salmon farming industry
- Combined Heat and Power (CHP) system used to generate electrical energy and heat from biogas from the Anaerobic Digester

Here, you can put funding details, or just a white rectangle covering the ROBINSON-related details

Background: Outer Hebrides Local Energy Hub (OHLEH)



Highlights:

- Outer Hebrides Local Energy Hub delivering circular economy
- Partnership with Local Authority and local fish farm and fish processing industries
- First electrolyser to combine oxygen and hydrogen capture



Outer Hebrides engaged as ROBINSON follower islands

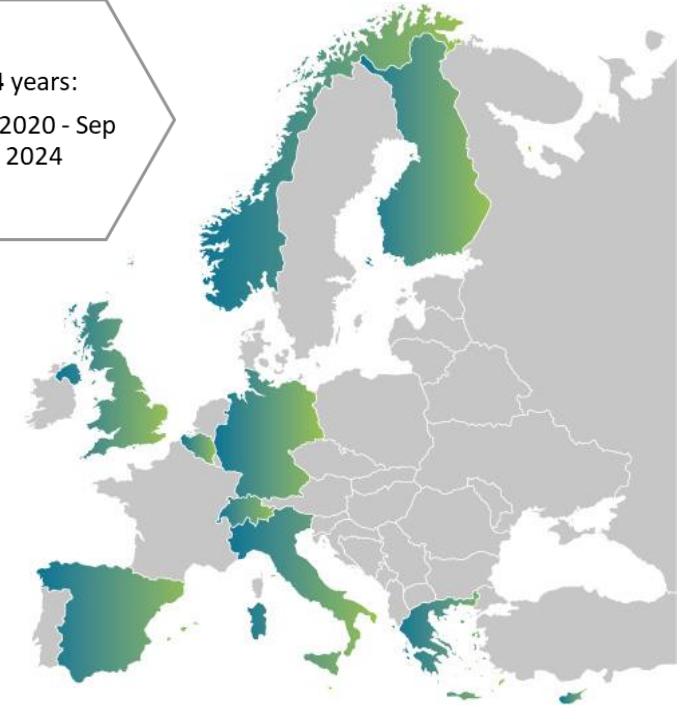
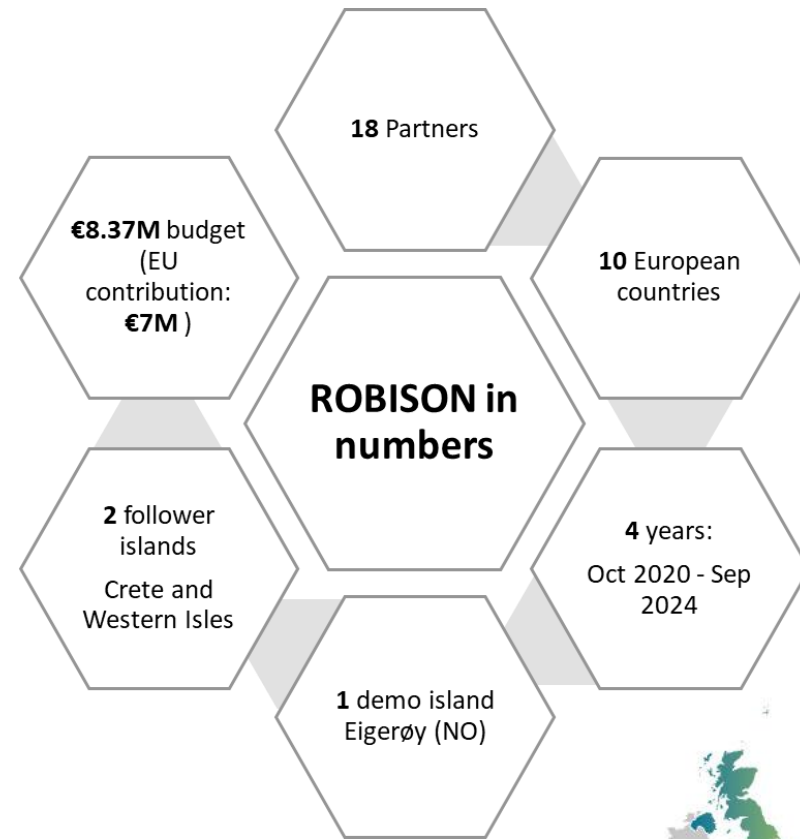


- The biggest legacy of a project like OHLEH is gaining and sharing knowledge
- OHLEH has not been without technical challenges but every challenge provided a new learning opportunity
- Despite (or perhaps because) the AD plant operating in a stable manner for over nine years, the addition of a relatively small amount of fish waste was enough to upset the biomass
- The Creed AD Plant operates at Thermophilic temperature (58°C), this is efficient but stability is difficult to maintain
- To maximise potential to process fish waste a change to Mesophilic (mid-30°C) is inevitable
- The case-study of OHLEH was detected by **ROBINSON** project (Smart integRation Of local energy sources and innovative storage for flexiBle, secure and cost-efficient eNergy Supply ON industrialized islands) as virtual replication island scenario with Biogas production at the heart of the system.

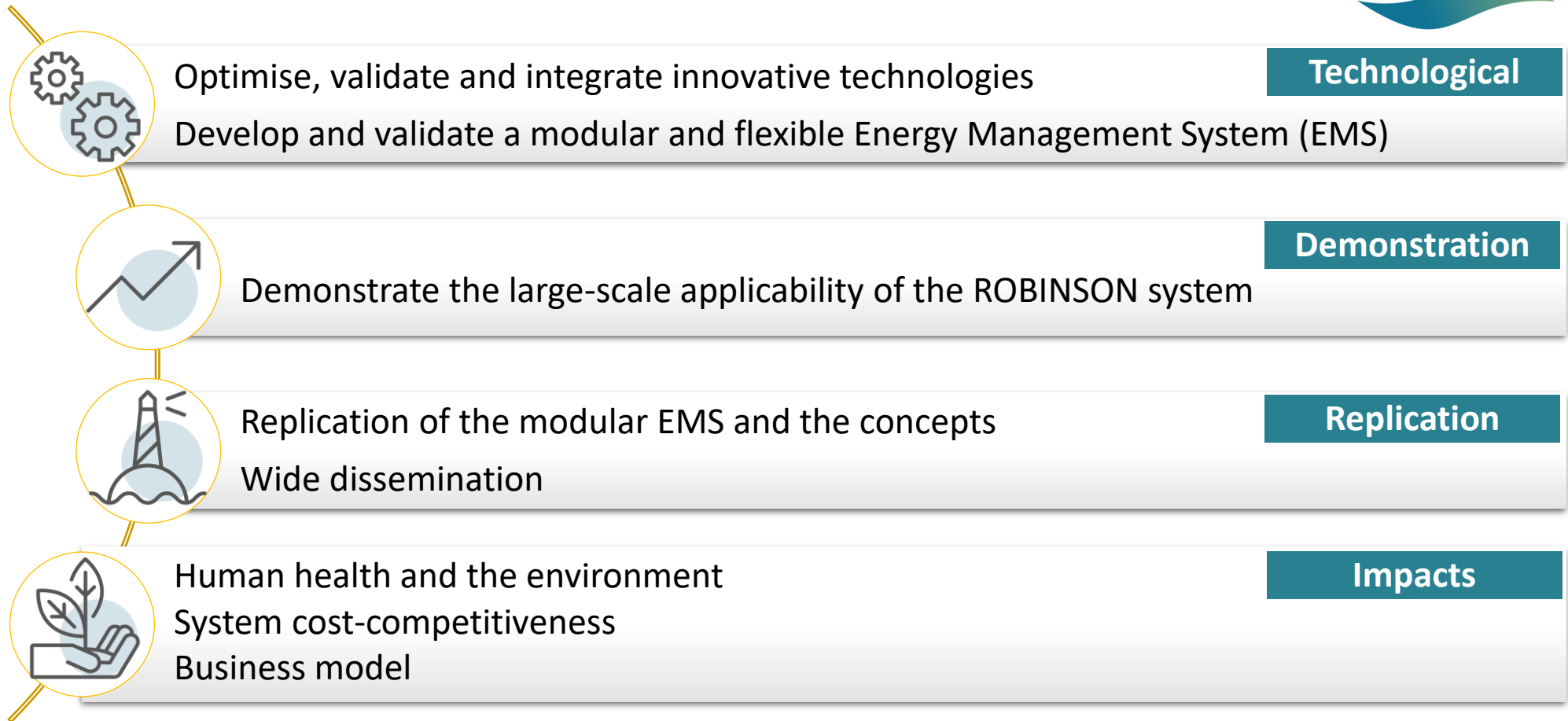


ROBINSON in a nutshell

- ROBINSON aims to help **decarbonize (industrial) islands** by developing an intelligent, robust and flexible energy management system that **integrates technologies across different energy vectors (electricity, heat and gas)**.
- The ROBINSON system will be **demonstrated on the island of Eigerøy, Norway**.
- **Virtual demonstrations** will be conducted for **Crete (Greece) and the Western Isles (Scotland)**.



Project objectives

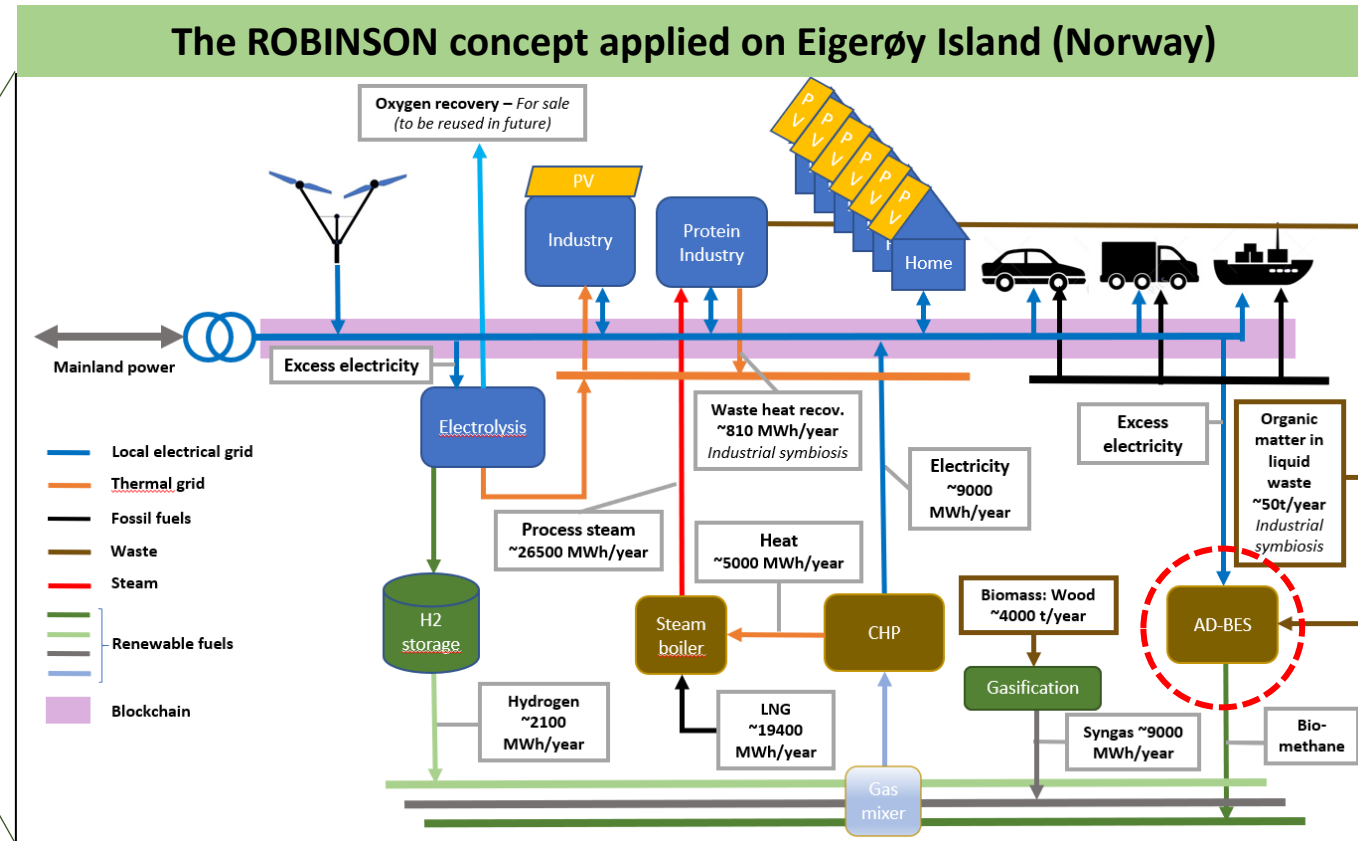
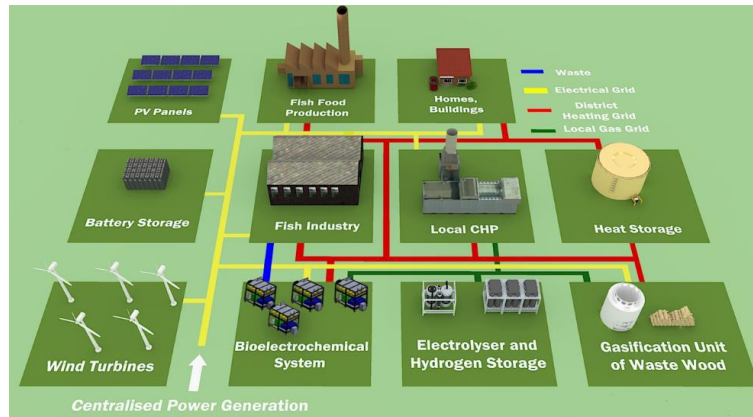


Project concept



Keywords

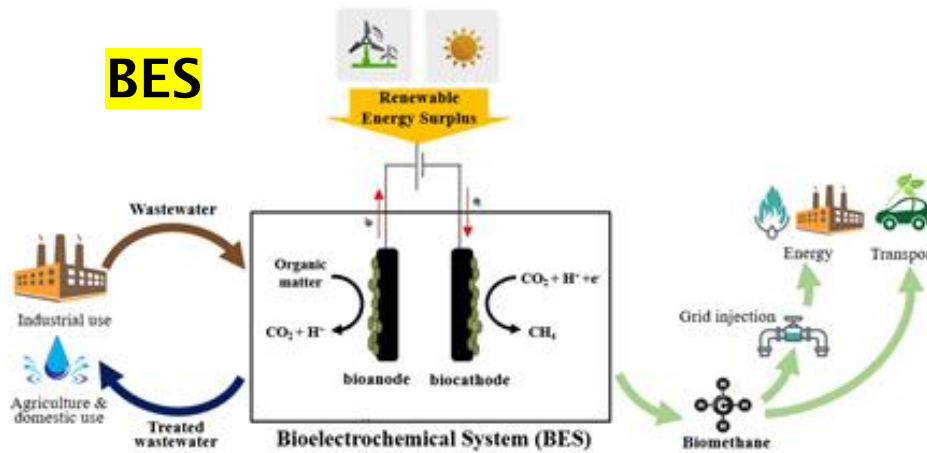
- Energy management system (EMS)
- Different energy vectors
- Islands decarbonization
- Industrial symbiosis
- Waste valorisation



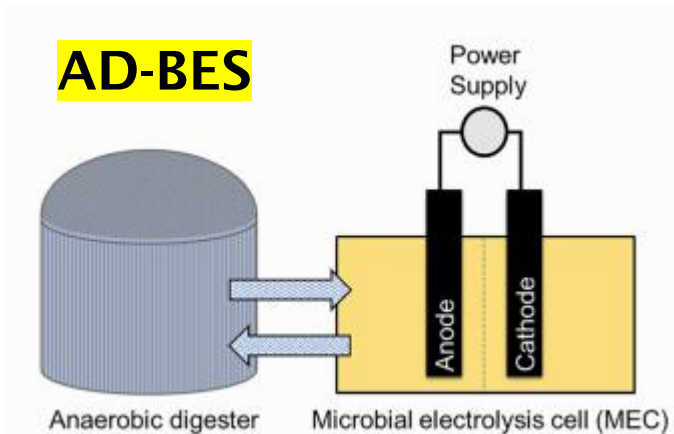
Thanks to ROBINSON, Eigerøy will move from being fully dependent on mainland and fossil fuel to an integrated, independent and low-carbon energy system!



Bioelectrochemical improved Anaerobic Digestion (AD-BES)



- Bioelectrochemical system
- Electro-active bacteria
- Wastewater treatment
- Storage of renewable energy surplus
- Potential improvement of fermentation processes



- Improving anaerobic digestion process
- Reduction of CO_2 emissions related to waste treatment
- Production of biomethane as energy vector
- Technology integration into ROBINSON EMS

Huang et al., 2020

Laboratory development and technology upscaling



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 957752

Conclusions



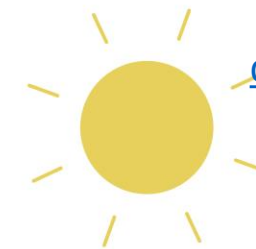
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Thank you!

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