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Distributed dispatchable generation for energy security: Experience and recommendations

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Wärtsilä

Ukraine's energy future is decided now

Energy Challenges:

- Resilience of power system
- Reconstruct or Rebuild?

Response:

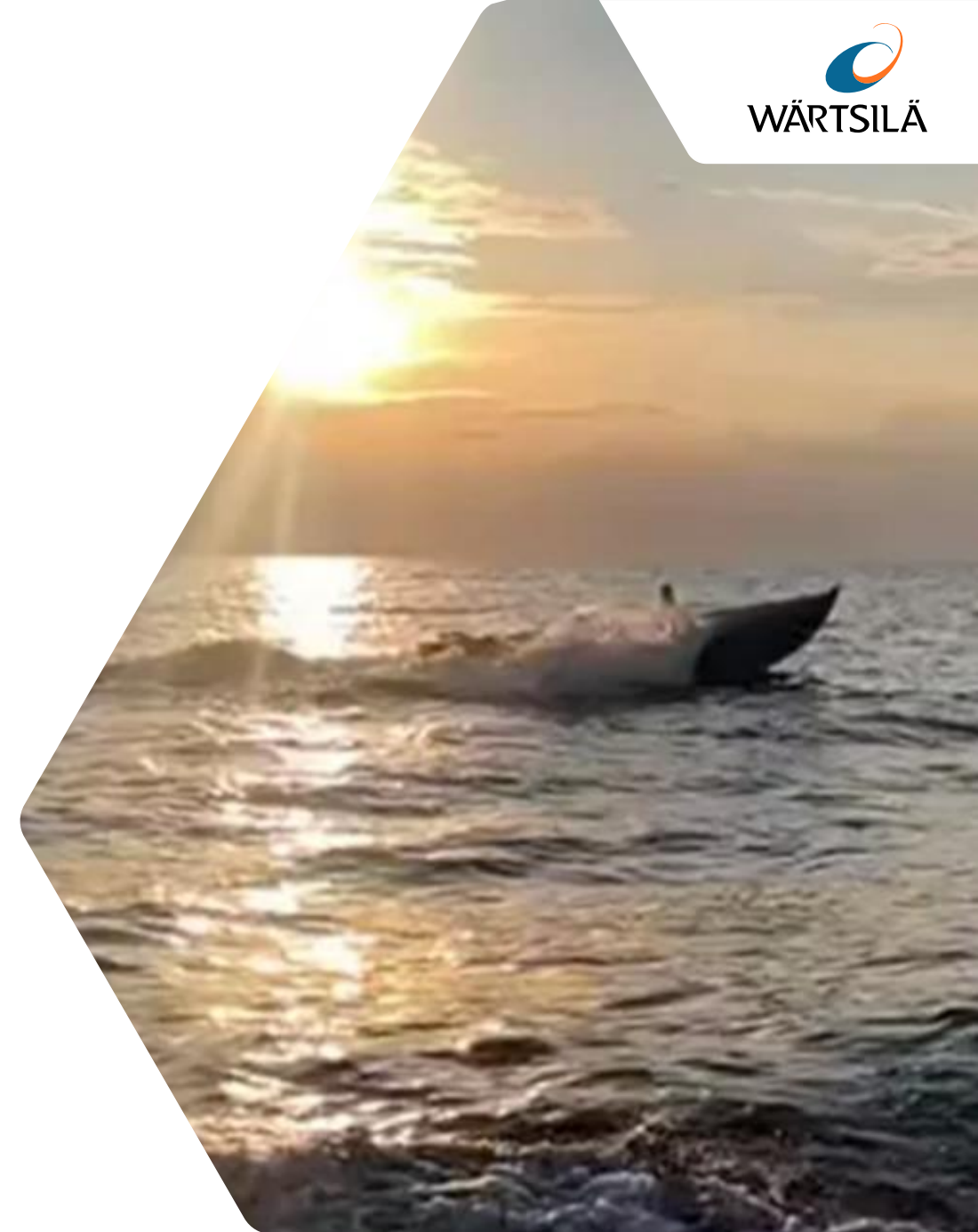
- Distributed generation
- Future-proof solutions

How to make right decisions?

Sea Baby approach - Resilience

- Not an easy target: small and agile
- Numerous
- Controllable
- Powerful

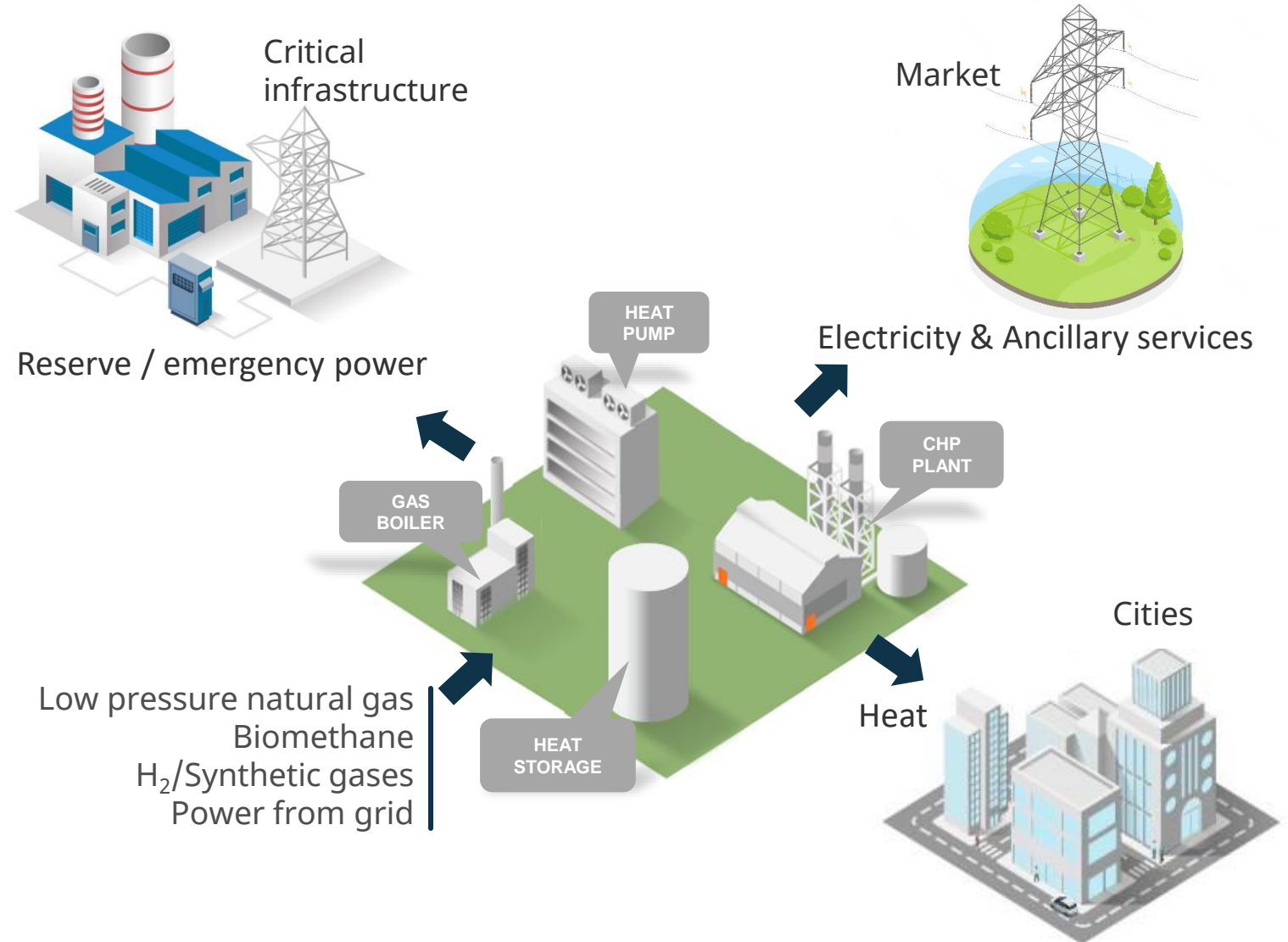
Effective and cost-efficient solution



Flexible District Heating:

- Dispatchable capacity
- Black Start capability
- Multi-fuel technology
- Highly flexible
- 48% Electrical efficiency
- >90% Total efficiency
- Future-proof (H2)

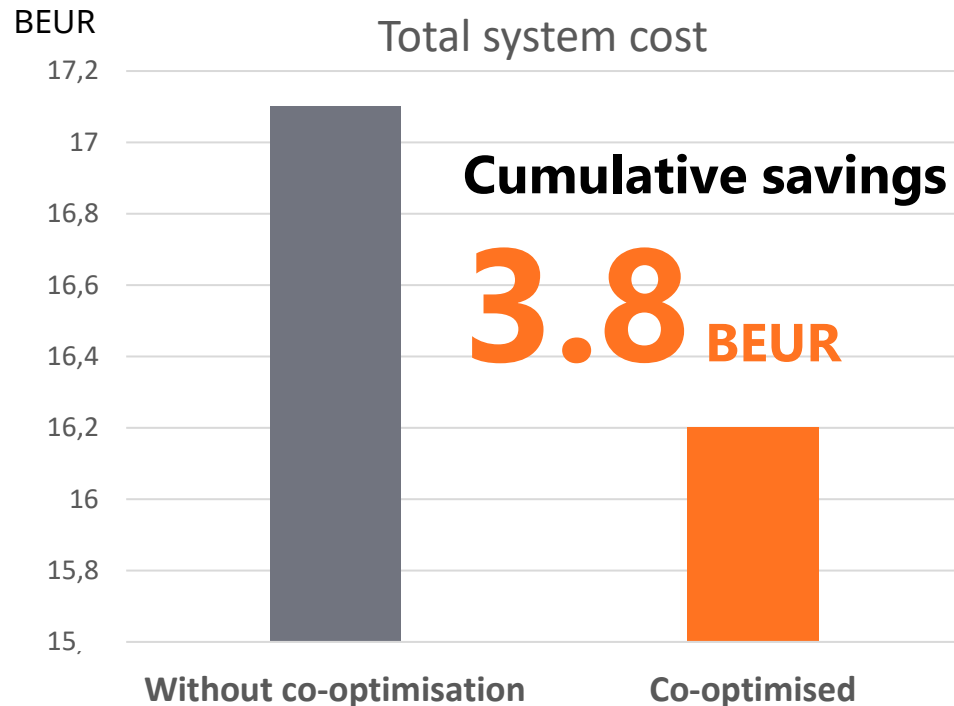
Resilient power system and reliable heat



Poland: Flexible District Heating makes financial sense

and helps decarbonize two sectors

Plexos modelling: co-optimisation of power system and district heating 2023-2032



Share of coal in power sector:

from **70%** to **26%**

Share of coal in district heating:

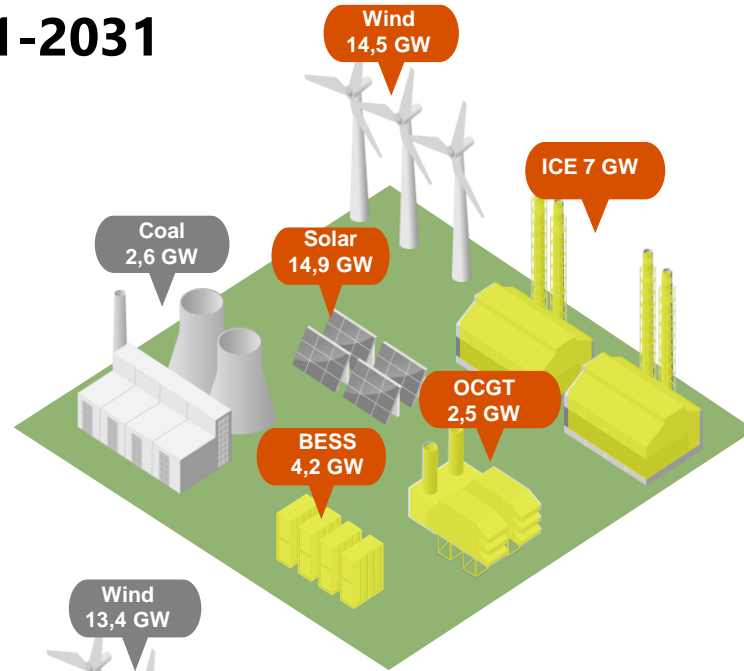
from **80%** to **8%**

Ukraine: Coal scenarios 2021-2031

Coal Replacement

System cost **\$7,7bn / year**

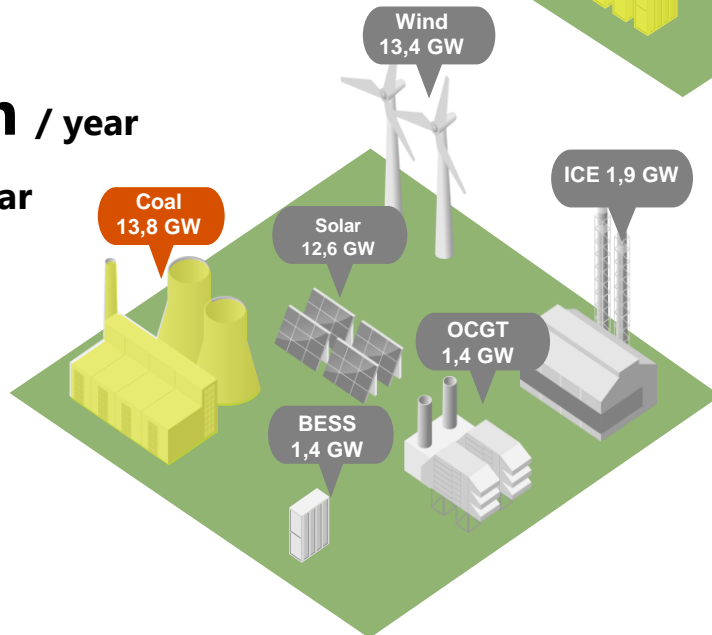
CO₂ **14,7m ton / year**



Coal Modernization

System cost **\$8,3bn / year**

CO₂ **24,7m ton / year**



Nuclear, Hydro and CHP not changing and not shown

Replacement of coal by
distributed capacities
more beneficial than modernization

Difference over 10 years:

- \$6,4 bn system cost
- 24% CO₂

Implementation of recommended solution

Political support

Resilience
Social impact

Financing

Carbon footprint
Feasible investment

Execution

Standard solutions
Short execution time





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