



2026

Frédéric
Bless



Reflection on Steam-Generating Heat Pump: drying and steam storage

High-Temperature and Steam- Generating Heat Pump

Reflection on 2026 drying symposium

Mention of Heat Pump:

2 Posters / 116 → 1.7%

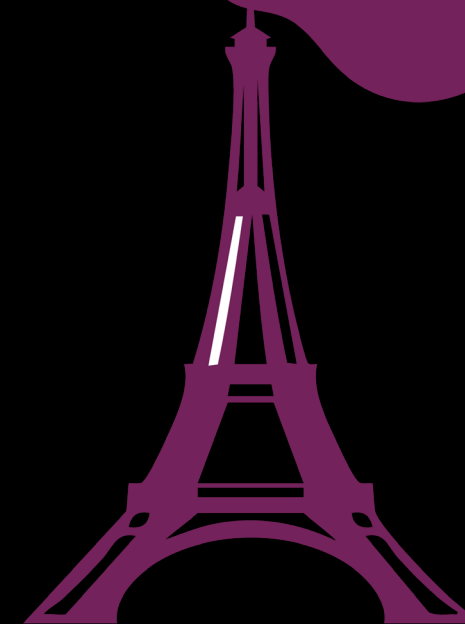
5 Presentations / 136 → 3.7%

IDS'26

Paris | 24th
International
Drying
Symposium

25 > 28 August 2026

Paris-Saclay | France
CentraleSupélec



Mention of Heat Pump @ IDS2026

Paper 13 - Novel Compressor and Expander Enabled **Heat Pump** for Applications in High Temperature Drying

OLEDZKI Jan, **LAGARDE Jérémie**, DOLE Alexis

Paper 23 - From Waste Heat to Value: Pinch Analysis, Process Integration and **Heat Pump** Design in Super-Absorbent Polymer Drying

ASTOUR Antoine, **MAARI James**

Paper 234 - High Efficiency Drying of Ceramic Products using Superheated Steam with **heat pump**

RAYMAEKERS Geert, DE WINTER Maarten

Paper 24 - The Automated Multi Commodity **Heat Pump** Dryer: Accessing Meager Communities over Hearty Handling-Out Derivatives and Products

TACLAN Lorcelie, TACLAN Emson

Paper 244 - **Heat Pumps** for Industrial Drying Processes – Methodology to Select Optimal Cycle Designs Exemplified by Case Studies

BLESS Frédéric, ARPAGAU Cordin , GSTÖHL Daniel, BERTSCH Stefan

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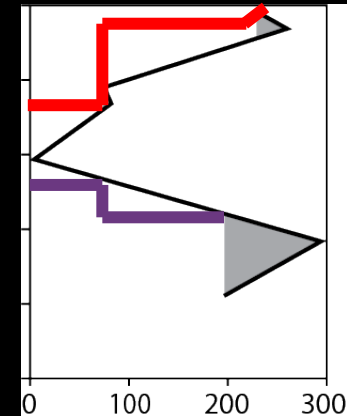
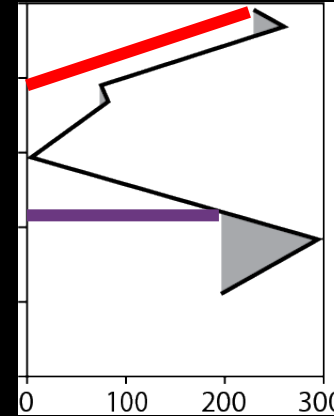
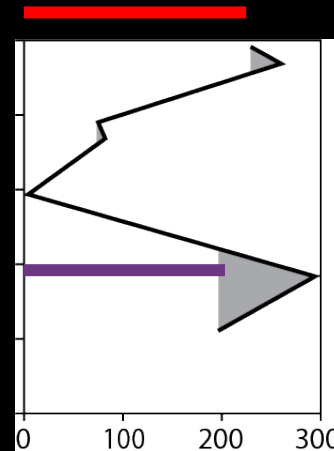
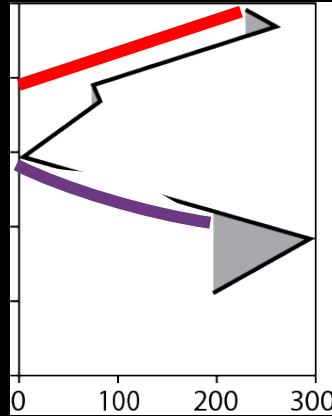
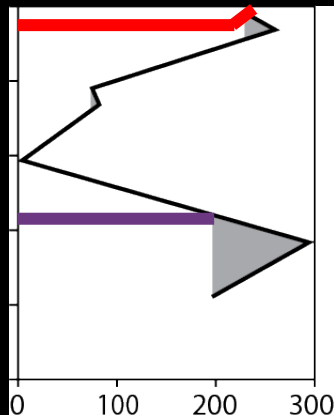
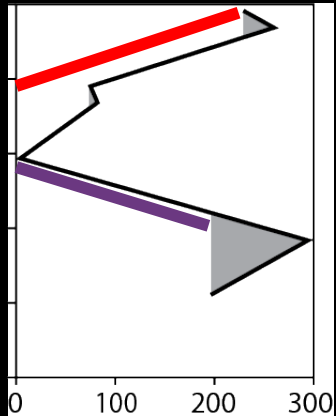
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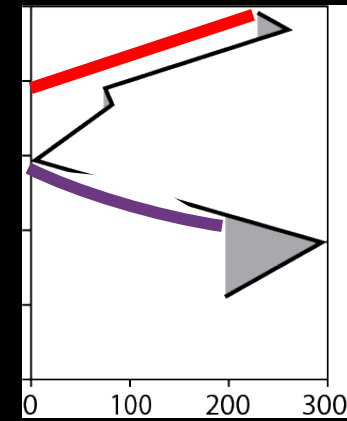
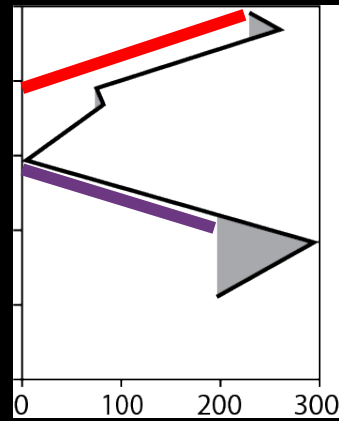
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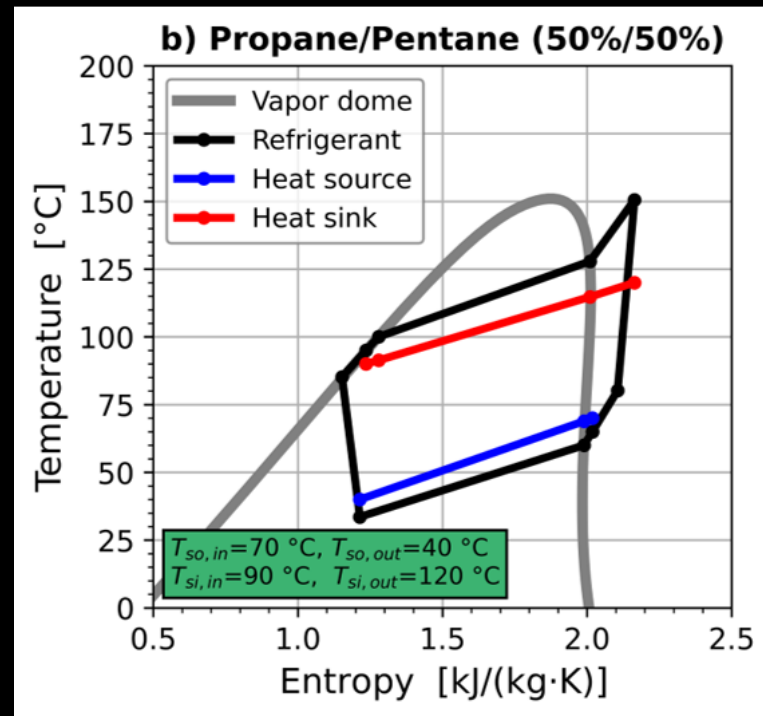
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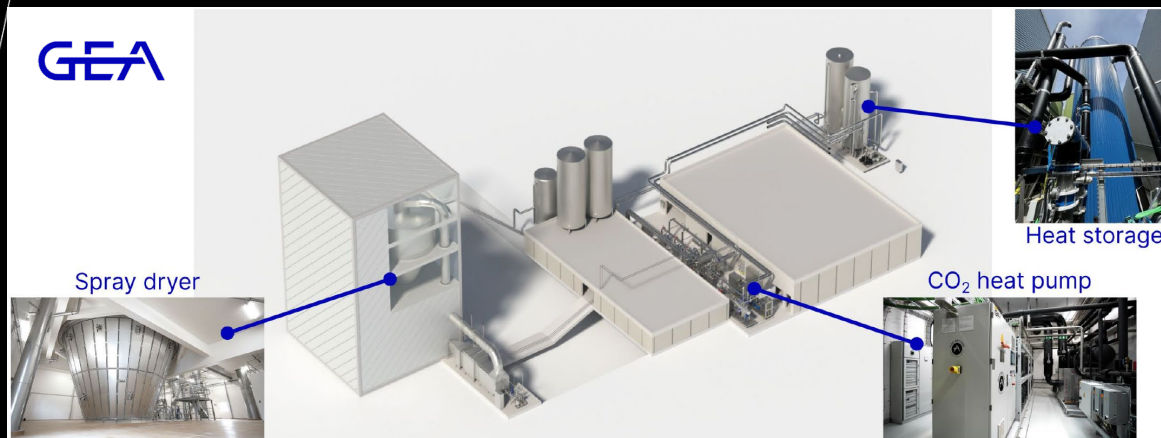
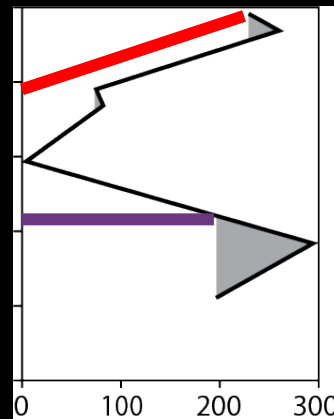
Different heat pump systems means optimisation potential

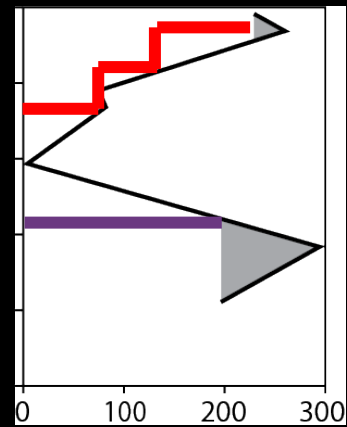




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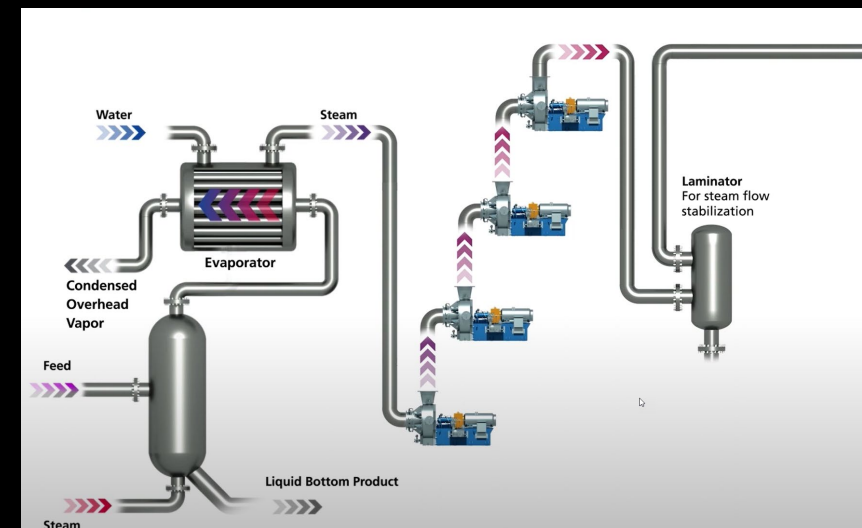


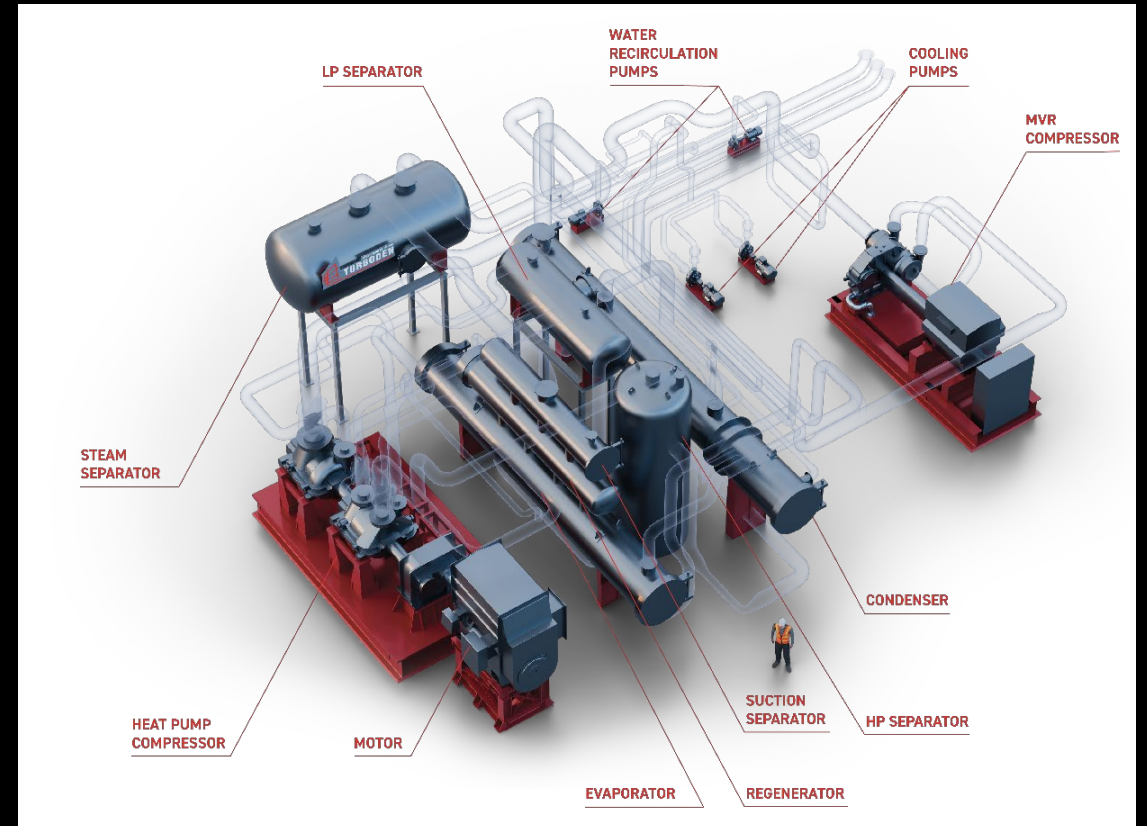
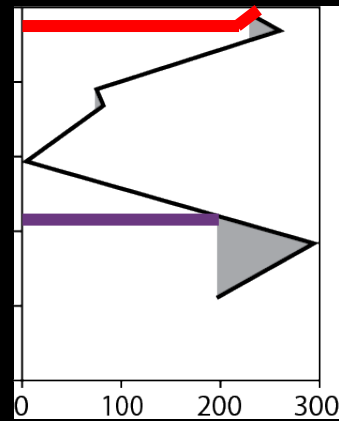


ANEO




PILLER





High-Temperature and Steam- Generating Heat Pump Reflection on steam storage

2026: Project funded by SFOE

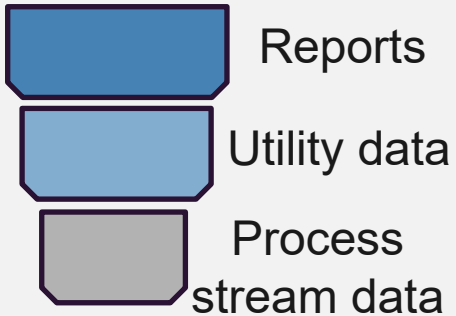
HSLU Hochschule
Luzern



PHPSSS - Potential of HTHP-Steam- Storage-Systems for accelerated decarbonization of process heat in Switzerland

1) Real steam demand estimation

Data Classification



~49% contain process steam data

46 reports with readily extractable streams

Steam interpretation



Utility steam



Process steam

HP/SGHP screening



Using Pinch Analysis based targeting

Feasible heat source-sink matching

COP

Sector Extrapolation



Combine bottom-up screening with top-down energy statistics

Derive sectoral ranges and national total

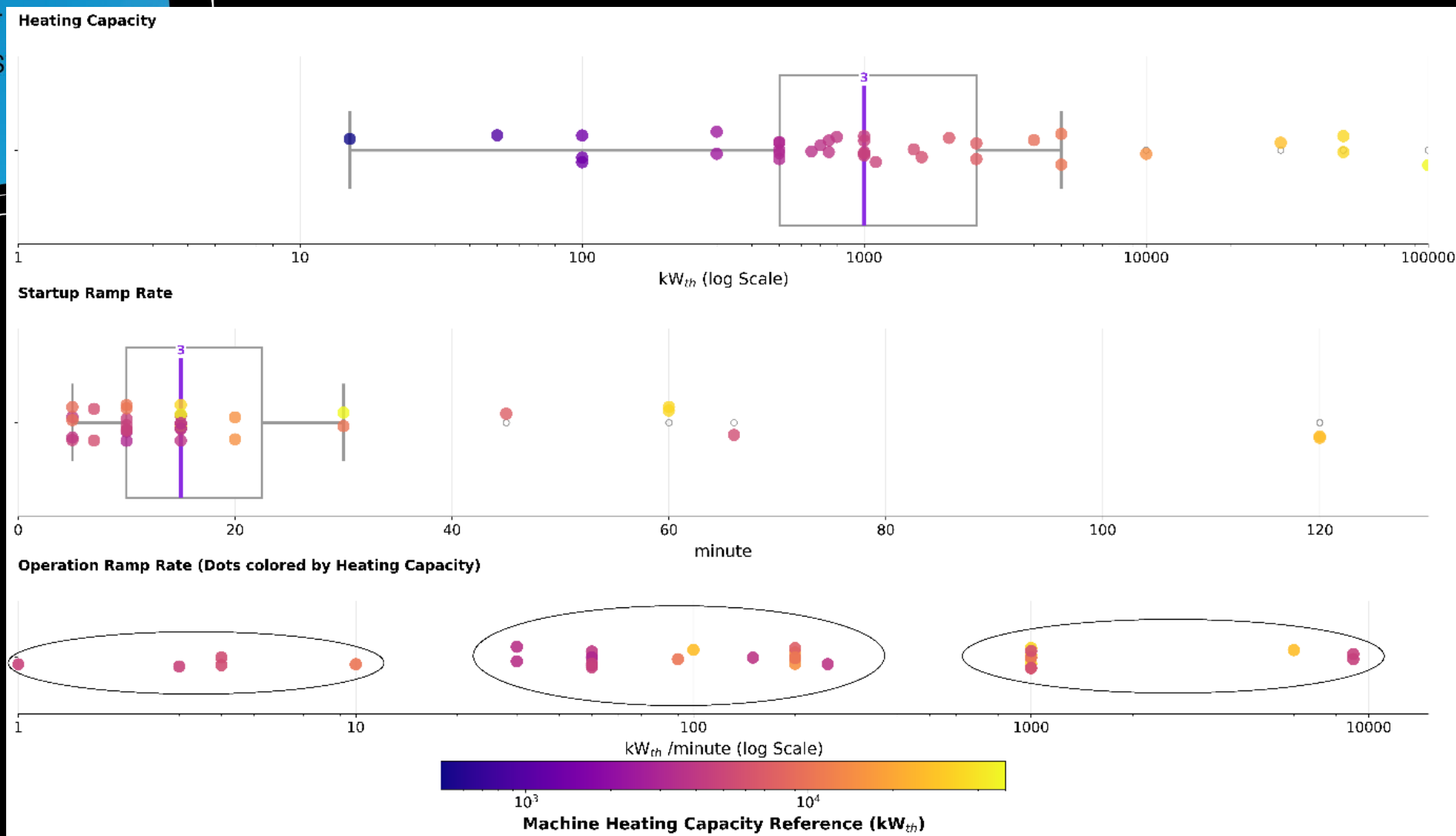
Identify priority sectors for follow-up



1) Real steam demand estimation

Sector	Relative potential	Confidence Level	Key processes
Paper & cardboard	35 – 60 % of 1,505 GWh/a	High	Paper drying Paper machine
Food & Beverage	20 – 35 % of 2,506 GWh/a	Medium-High	Evaporation, concentration, drying, cooking...
Textile	15 – 30 % of 156 GWh/a	Medium	Drying, printing, dyeing, washing and wet treatment
Chemical & Pharma	5 – 20 % of 4,354 GWh/a	Medium	Evaporation, extraction, rectification, batch vessels
Other sectors	5 – 15 % of 3,797 GWh/a	Low	Drying, washing, cooking, extraction, batch heating processes
Total	10 – 25 % of 12,318 GWh/a	Medium	

2) SGHP - State of the art



3) Steam Storage - State of the art

KPI	SGHP no storage 	SGHP + Steam storage 	SGHP + Water buffer + flash tank 	SGHP + PCM storage 	Woodchip 	Biogas 
 Usable temperature level	Good	Excellent	Good	Fair	Excellent	Excellent
 Minimum and maximum pressure	Good	Good	Good	Fair	Excellent	Excellent
 Discharge power	Not applicable	Excellent	Excellent	Fair	Not applicable	Not applicable
 Charge power	Not applicable	Excellent	Excellent	Fair	Not applicable	Not applicable
 Ramp rate	Fair	Excellent	Excellent	Fair	Poor	Good
 Round-trip efficiency	Not applicable	Good	Good	Good	Not applicable	Not applicable
 Specific investment costs for purchase	Fair	Good	Good	Poor	Fair	Good
 Specific investment costs for installation	Good	Fair	Fair	Poor	Poor	Good
 System integration	Fair	Good	Fair	Poor	Good	Good
 Operation flexibility	Fair	Excellent	Excellent	Good	Fair	Good
 Safety & regulatory complexity	Good	Fair	Fair	Fair	Fair	Fair
 Lifetime	Good	Excellent	Excellent	Fair	Good	Excellent
 Specific dimension or footprint	Excellent	Poor	Poor	Good	Poor	Excellent
 Uniformity in storage temperature	Not applicable	Good	Good	Excellent	Not applicable	Not applicable
 Material	Fair	Good	Good	Fair	Fair	Fair
 Special regulation	Fair	Poor	Poor	Fair	Poor	Poor
 Maintenance	Good	Good	Good	Fair	Poor	Good

 Excellent
 Good
 Fair
 Poor
 Not applicable

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**More info on this project will be
available soon**



2026

Thank you
If you have any questions



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