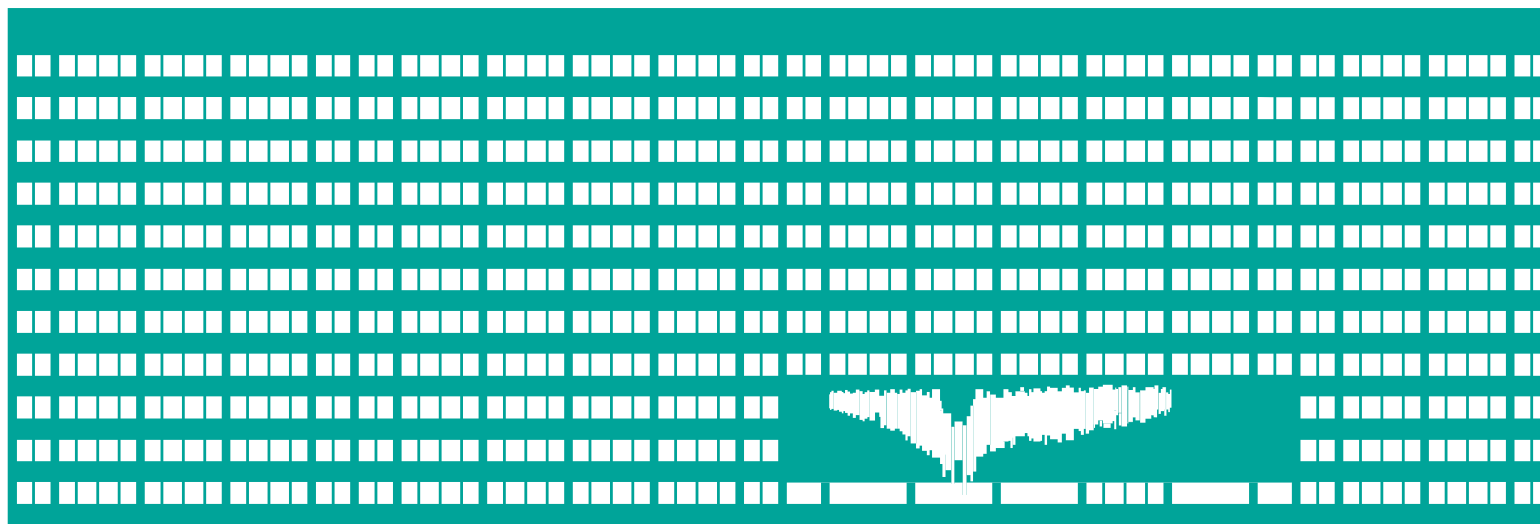


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T A
Č R

Project TK03030037 New type of pumped-storage hydroelectric power plant is co-financed from the state budget by the Technology agency of the Czech Republic under the THÉTA 3 Programme.

TK3030037

New type of Pumped-Storage Hydropower Plant AVE

Ing. Roman Lukeš

Team Members:

Ing. M. Balco, Ph.D., Assoc. Ing. M. Bojko, Ph.D., Ing. et Ing. P. Čambala, Ing. O. Černý, J. Gadula, Prof. Ing. S. Honus, Ph.D., Ph.D, Assoc. Ing. V. Křivý, Ph.D., Ing. R. Lukeš, Ing. D. Mikolášek, Ing. P. Mynarčík, Ph.D., Ing. M. Pešek, Ph.D. MBA, Ing. Jiří Ptáček, Ph.D, Ing. Jan Toufar, Ph.D

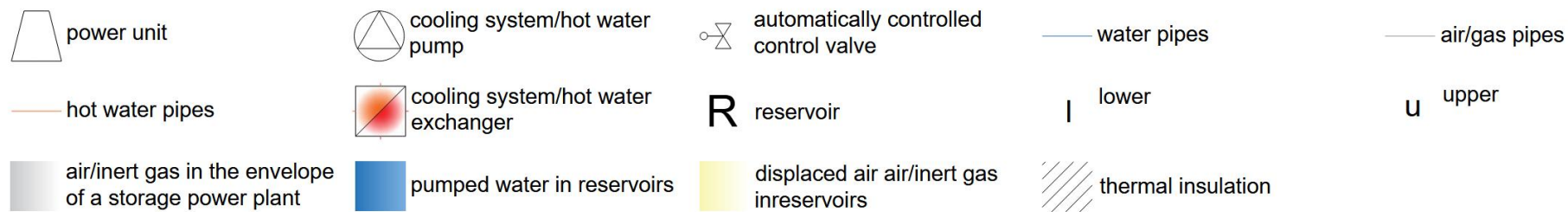
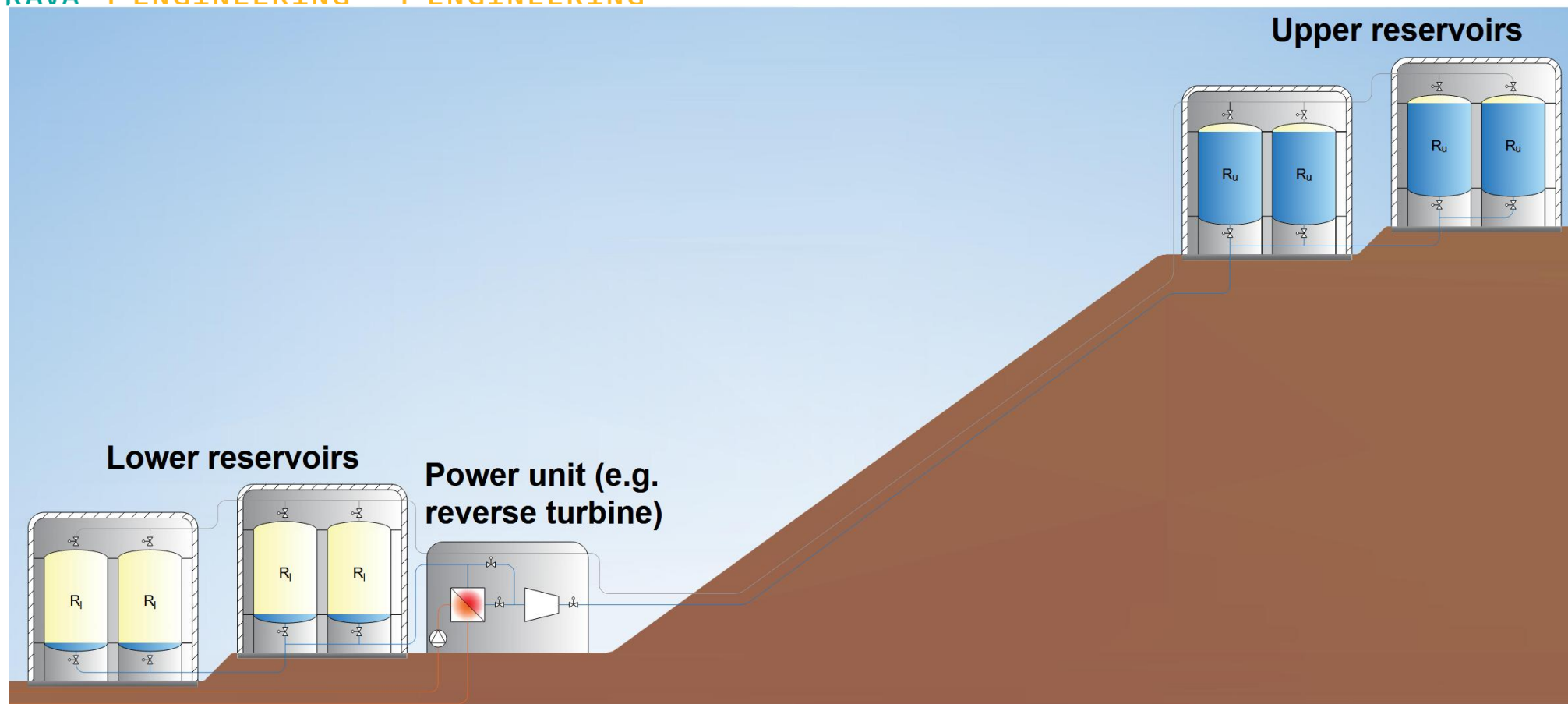
Presented Concepts

MPHES-2R – Modular Pumped-Storage Plant with Floating Reservoirs

MPHES-FR – Modular Pumped-Storage Plant with Fixed Reservoirs

MPHES-SFR – Modular Pumped-Storage Plant with Separated Fixed Reservoirs

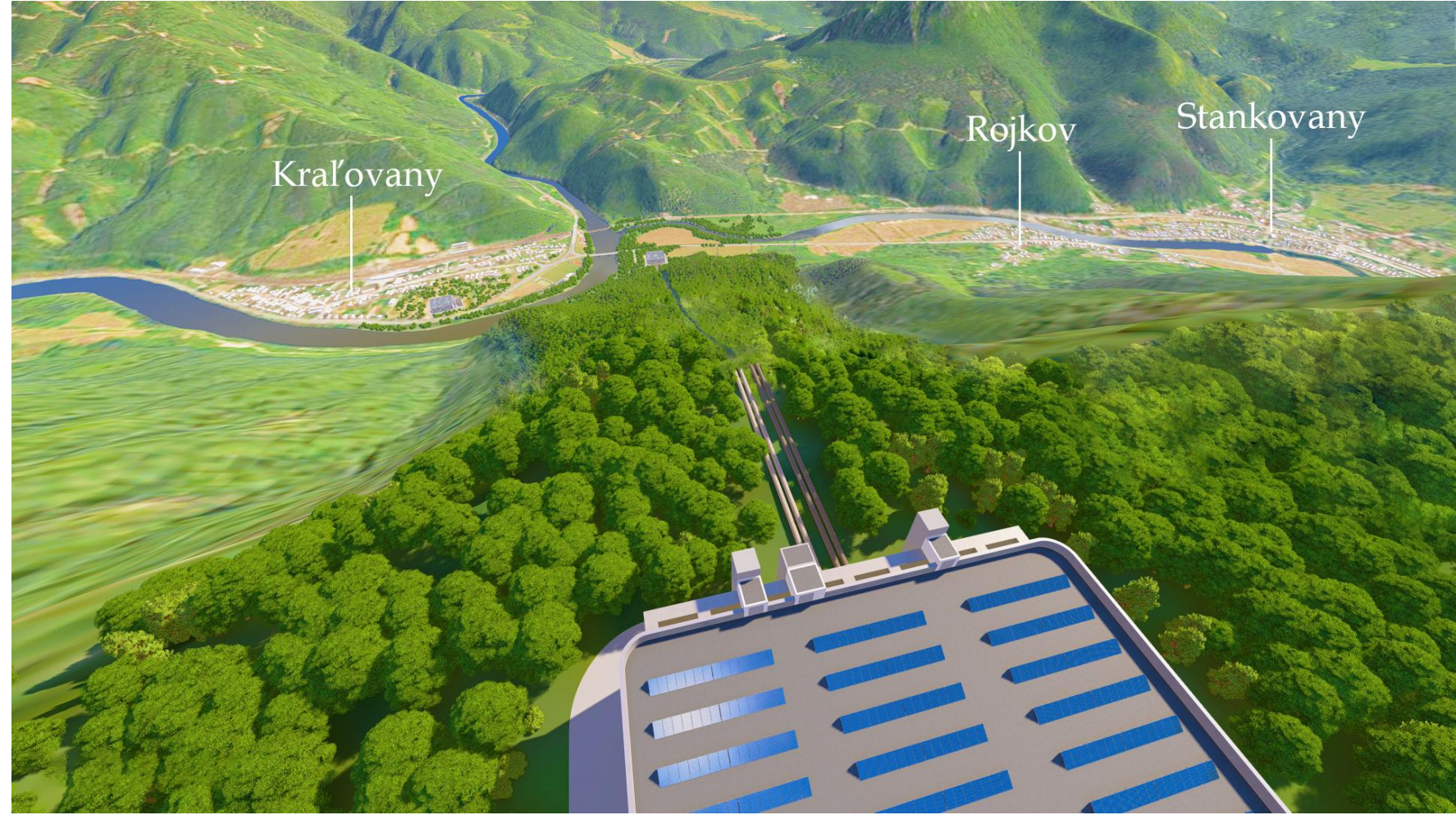
MPHES-SFR



AVE

Visualization – MPHES-SFR

- **Footprint:** 60 × 60 m
- **Tank height:** 15 m
- **Head:** 700 m
- **Storage capacity:** 76 MWh
- **Electric output:** 6.3 MWeI
(peak 12.6 MWeI)
- **Thermal output:** 0.34 MWt
(for 590 apartments)
- **Total efficiency:** 88%
- **Investment cost:** CZK 480 million
(CZK 6,350/kWh), €19 million
(€252/kWh)



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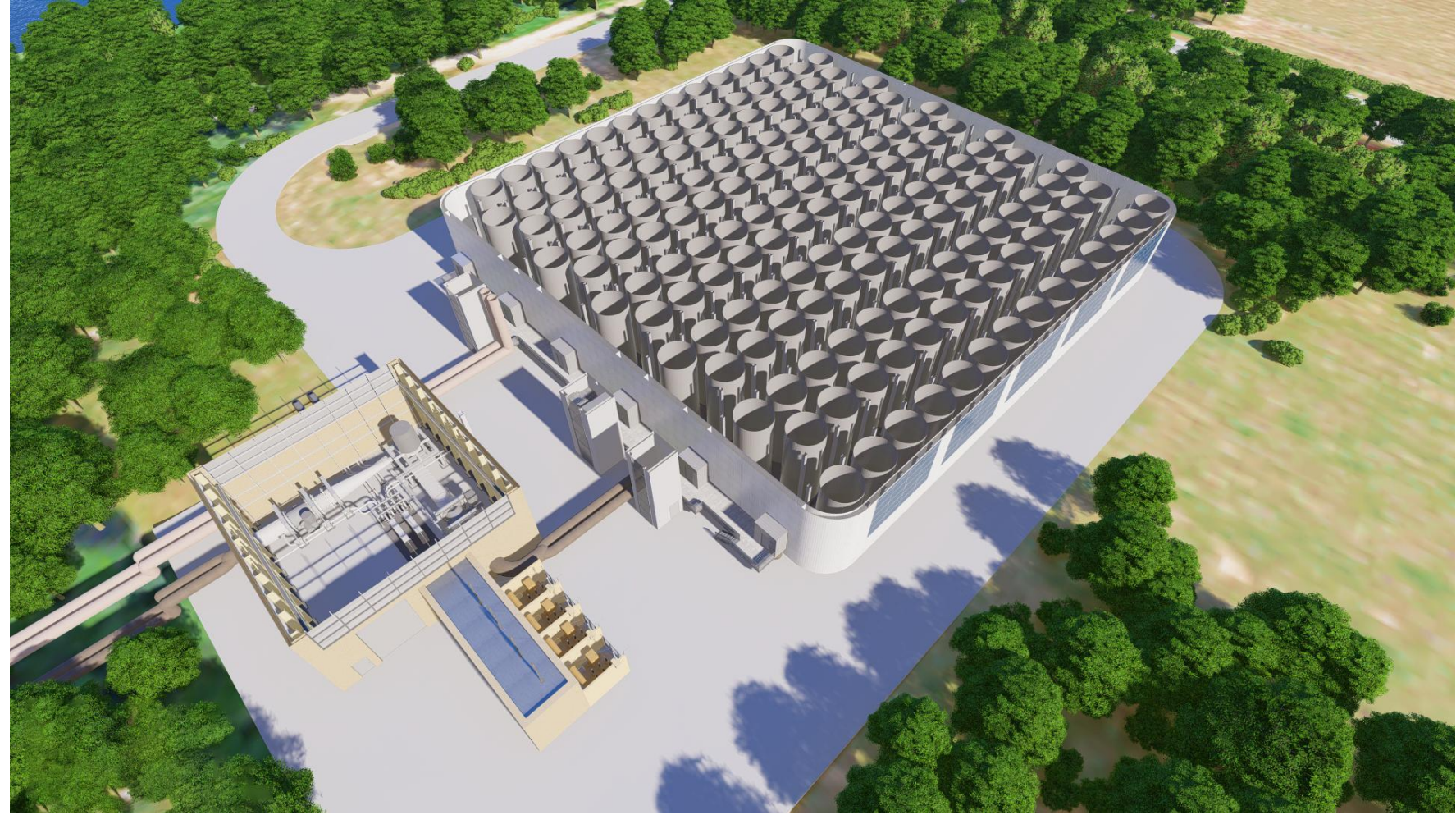
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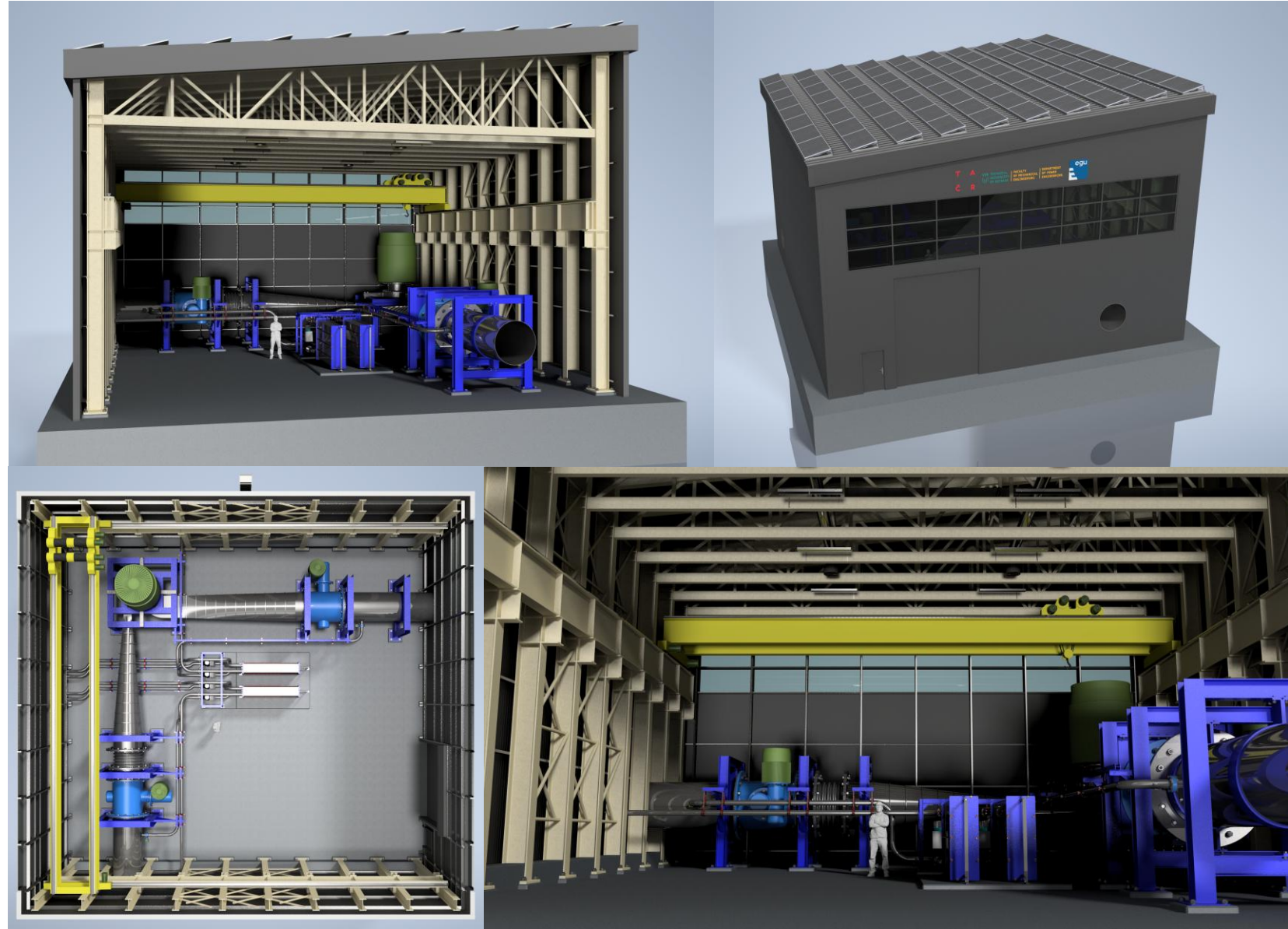
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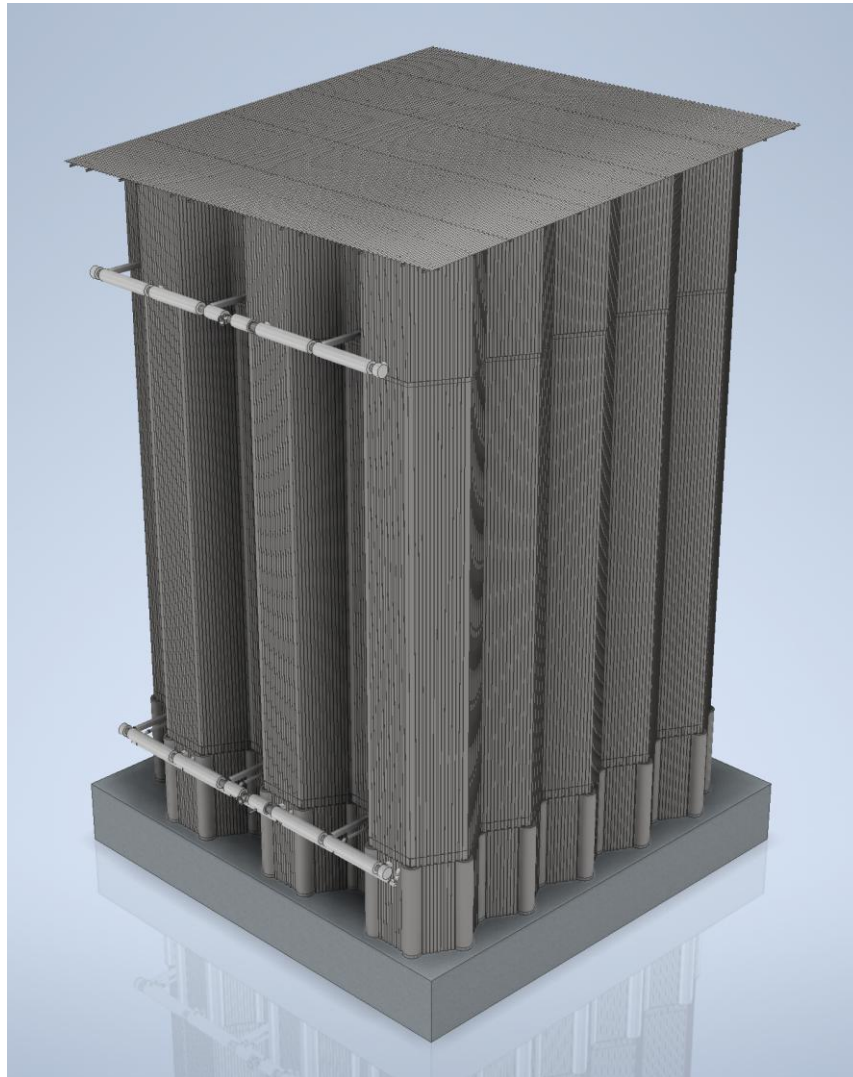
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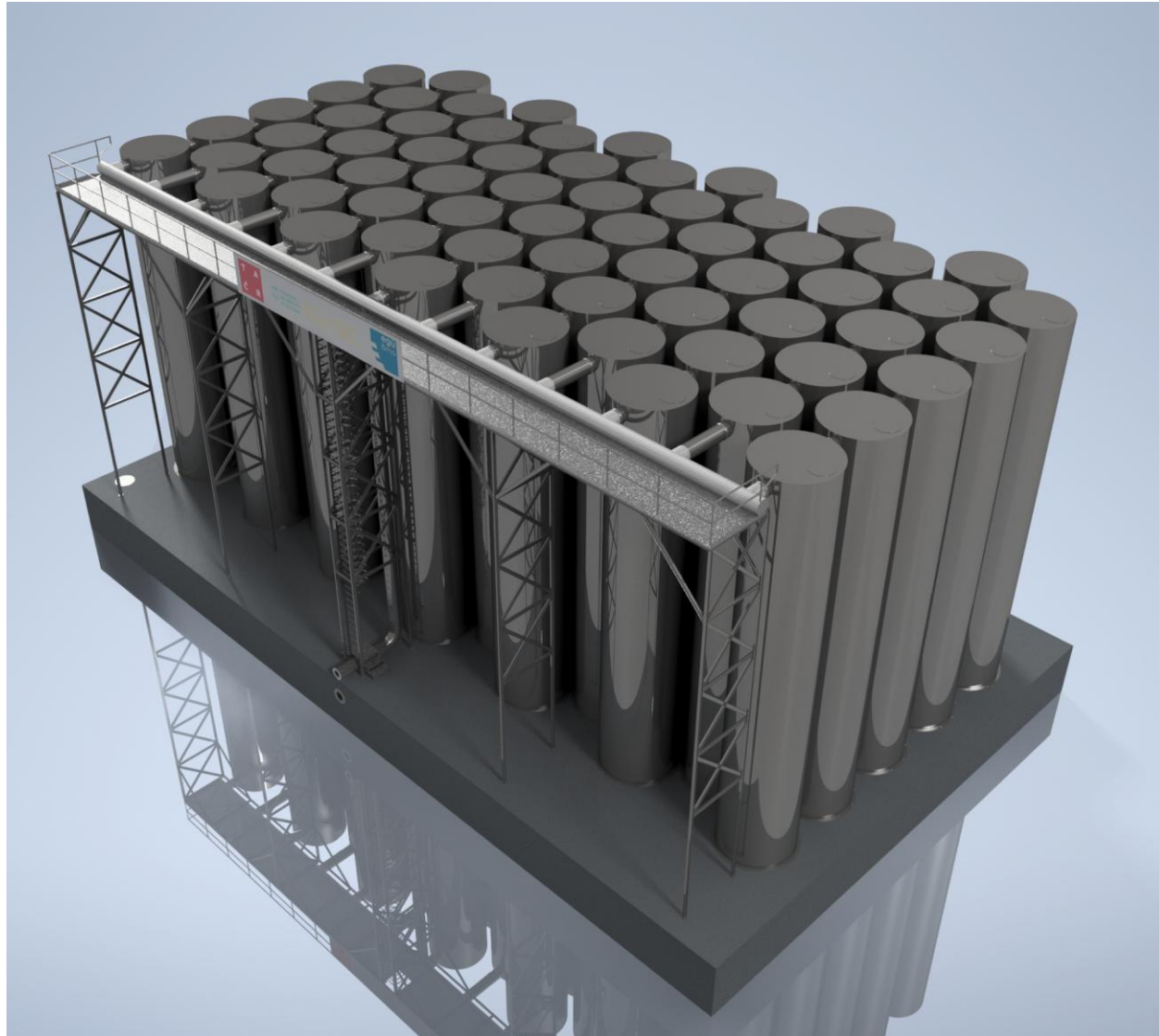


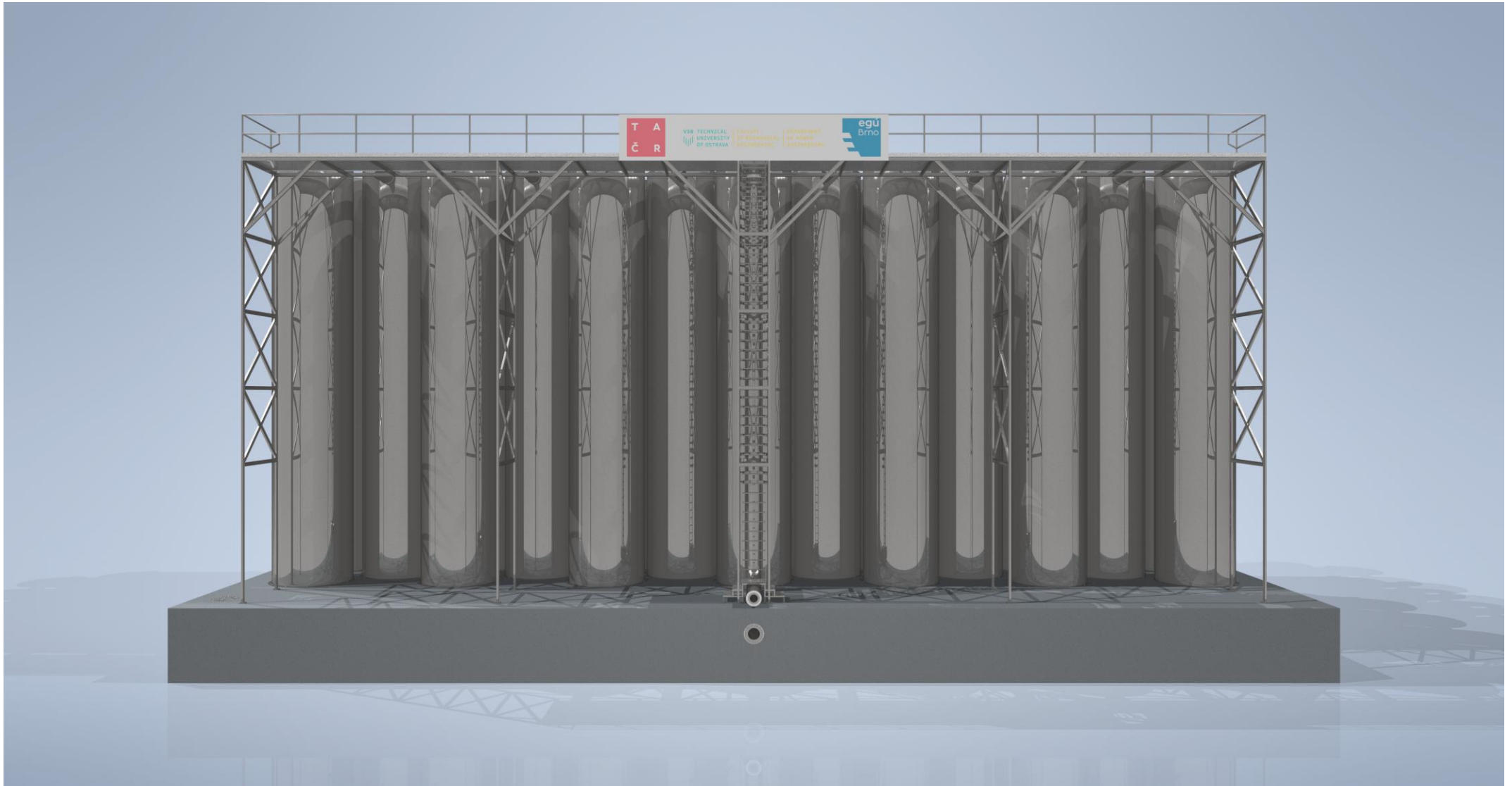
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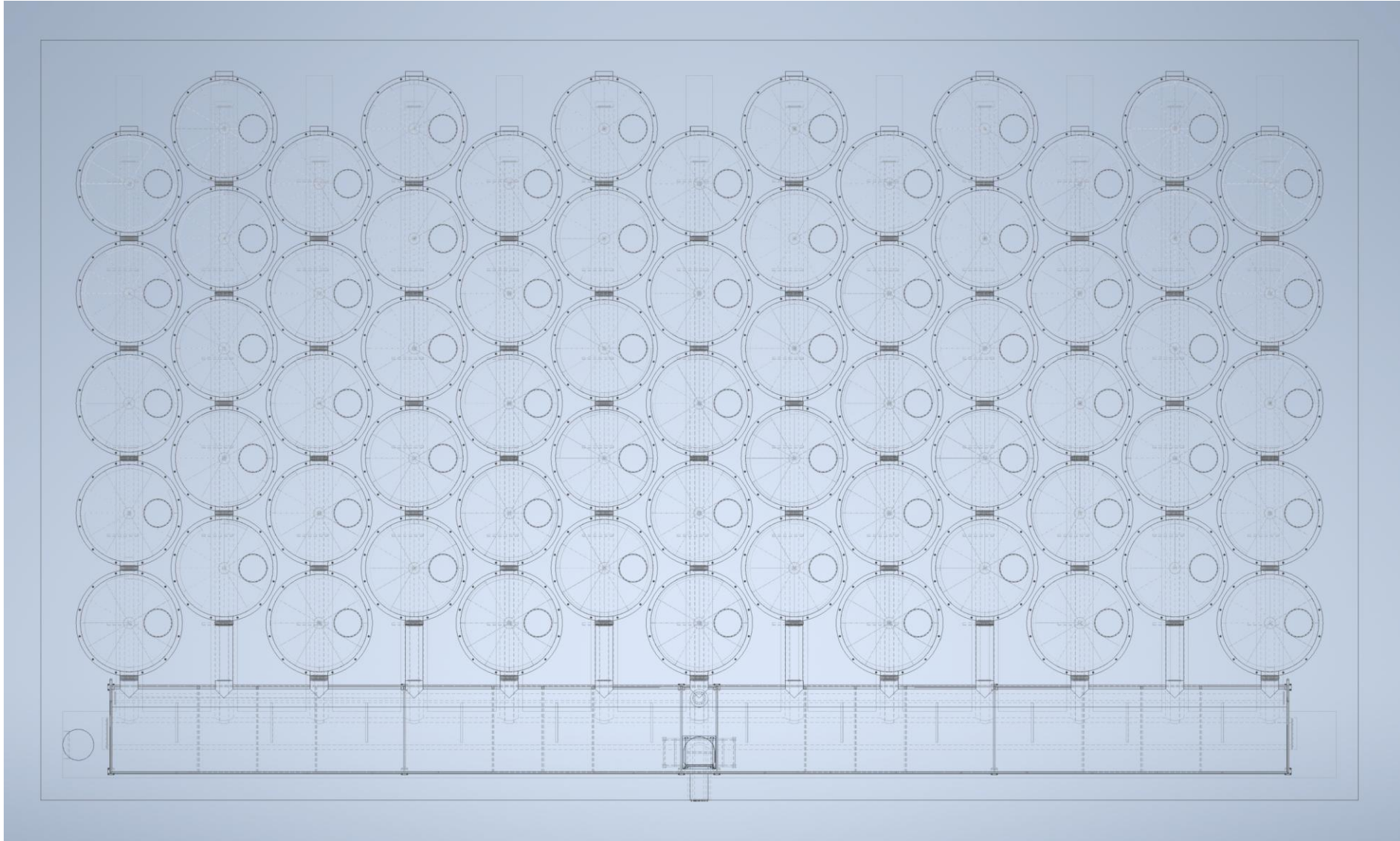
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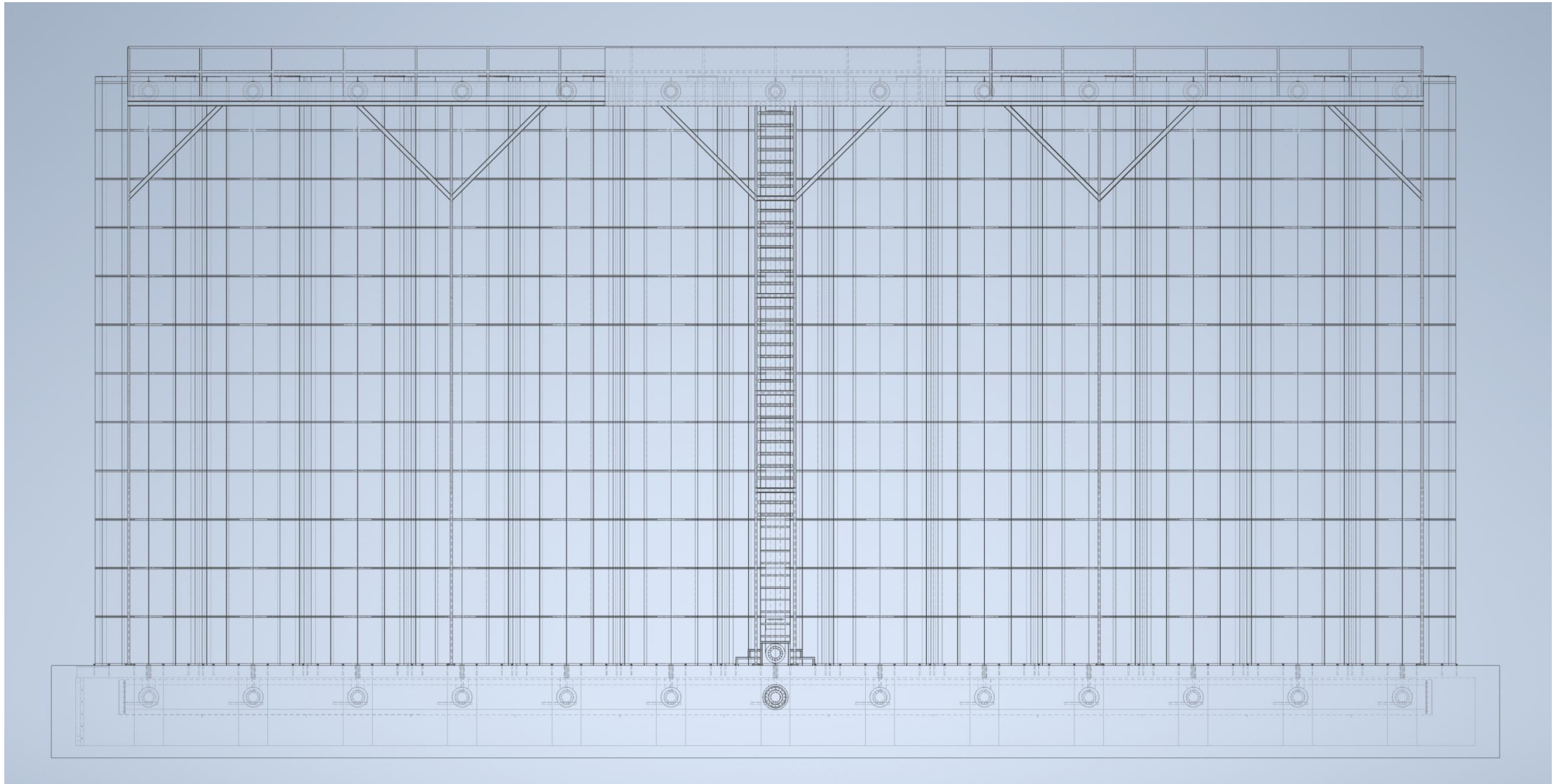


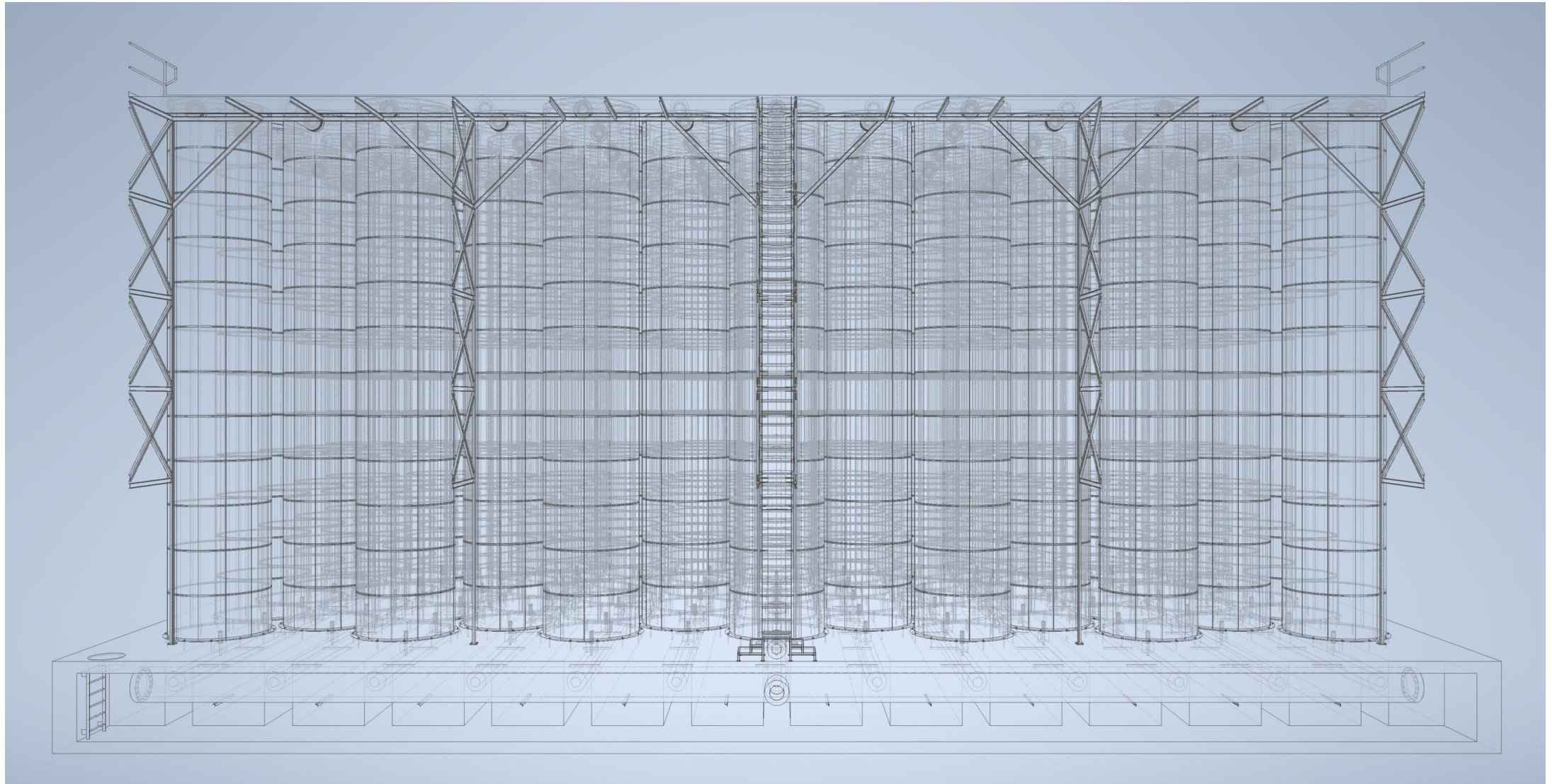




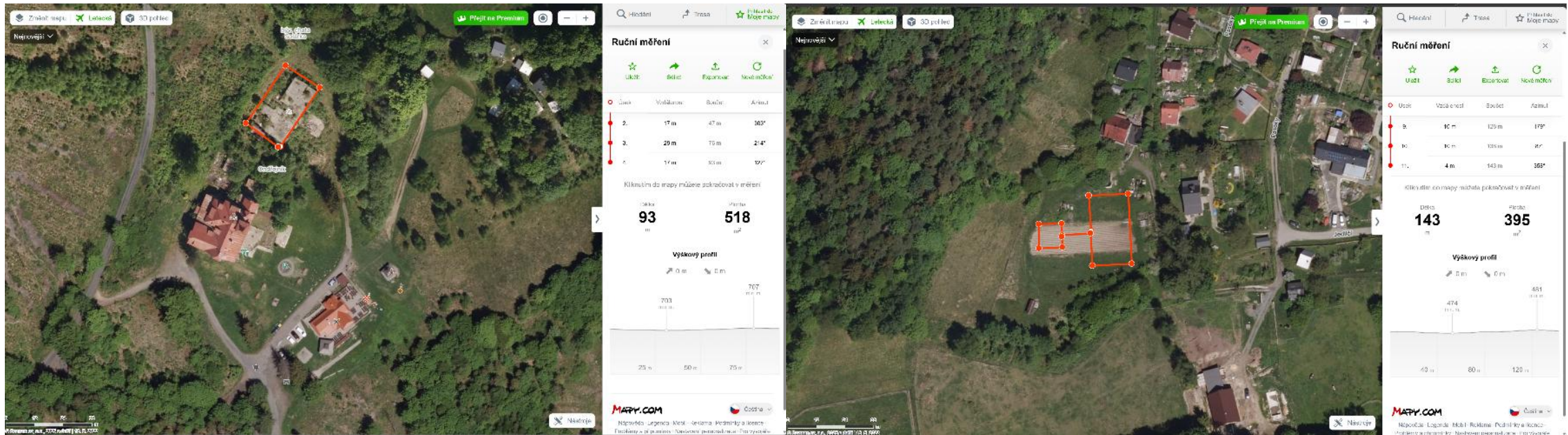






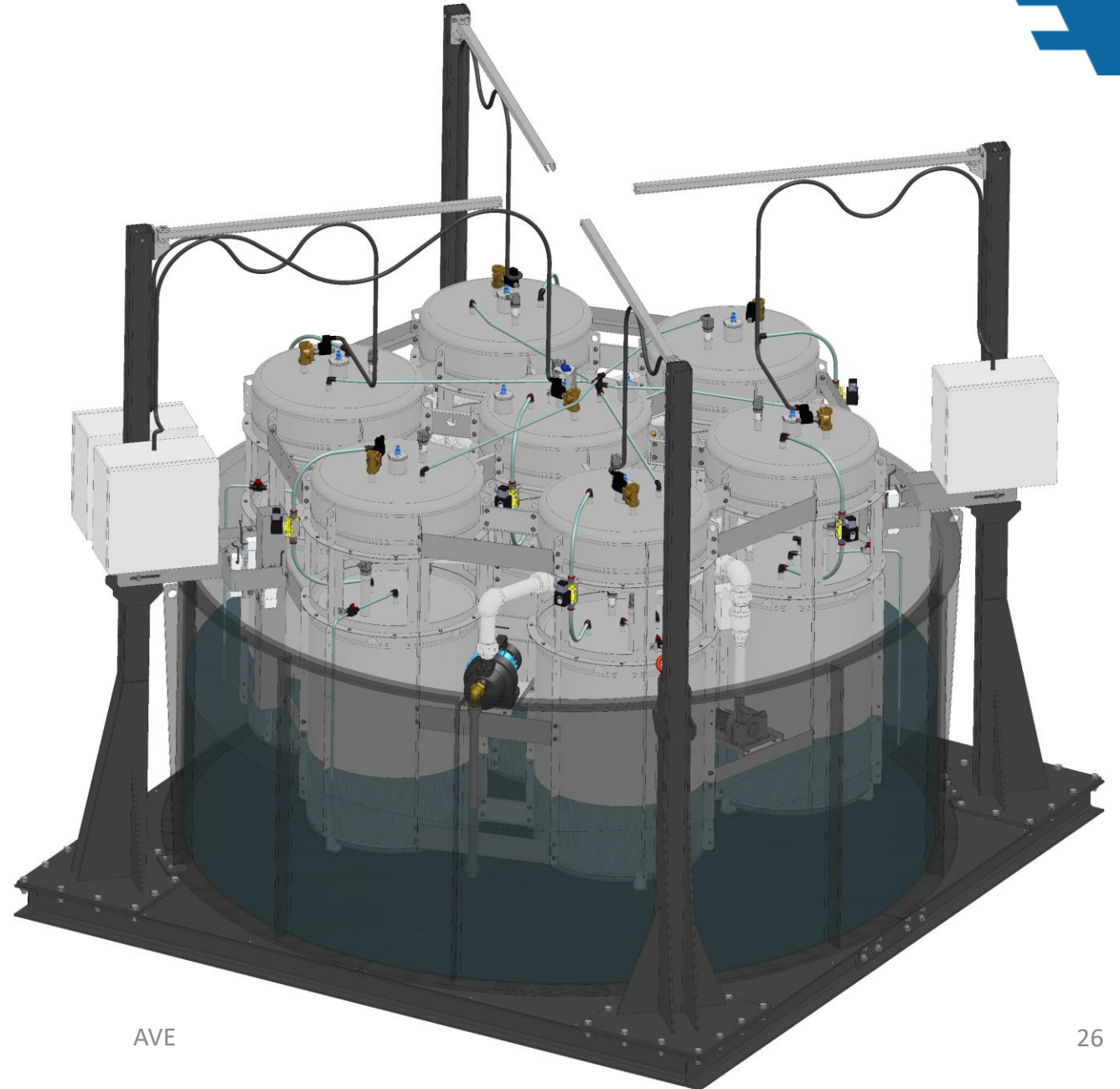






Laboratory model MPHES-1R

- Small testing facility for evaluation of the stabilization system
- Built with intentionally unstable structure to simulate challenges
- Control software and regulation components reliably manage charging and discharging while maintaining safe and stable positioning
- Safety systems are designed for the most extreme operational and failure scenarios





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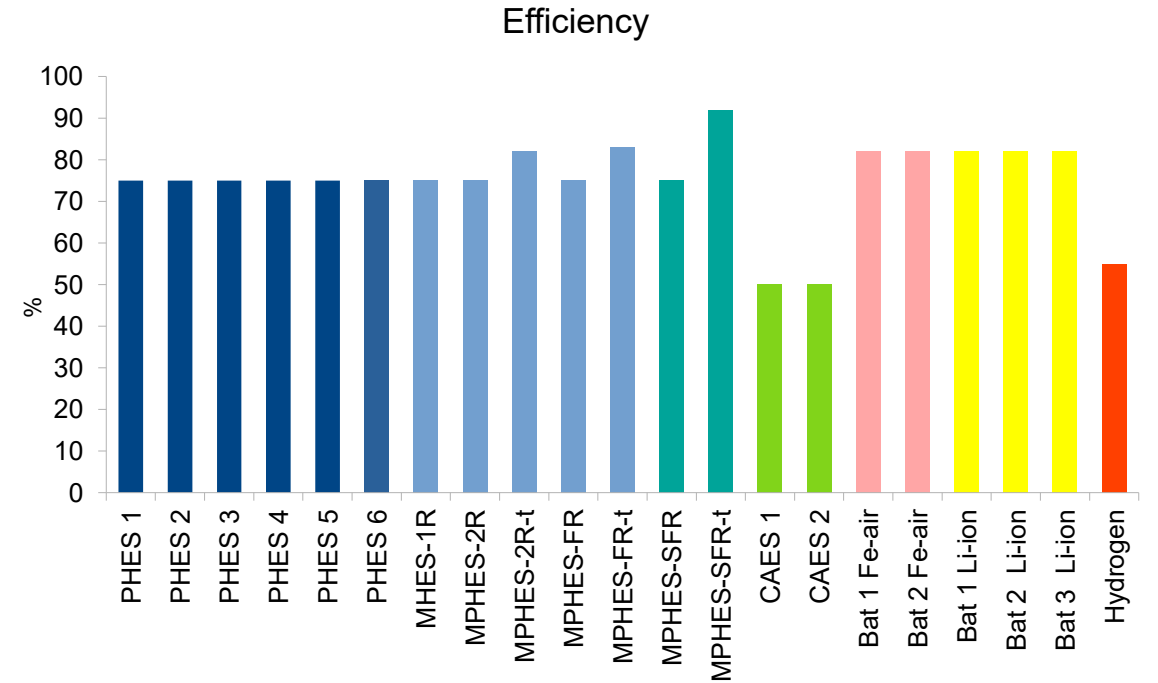
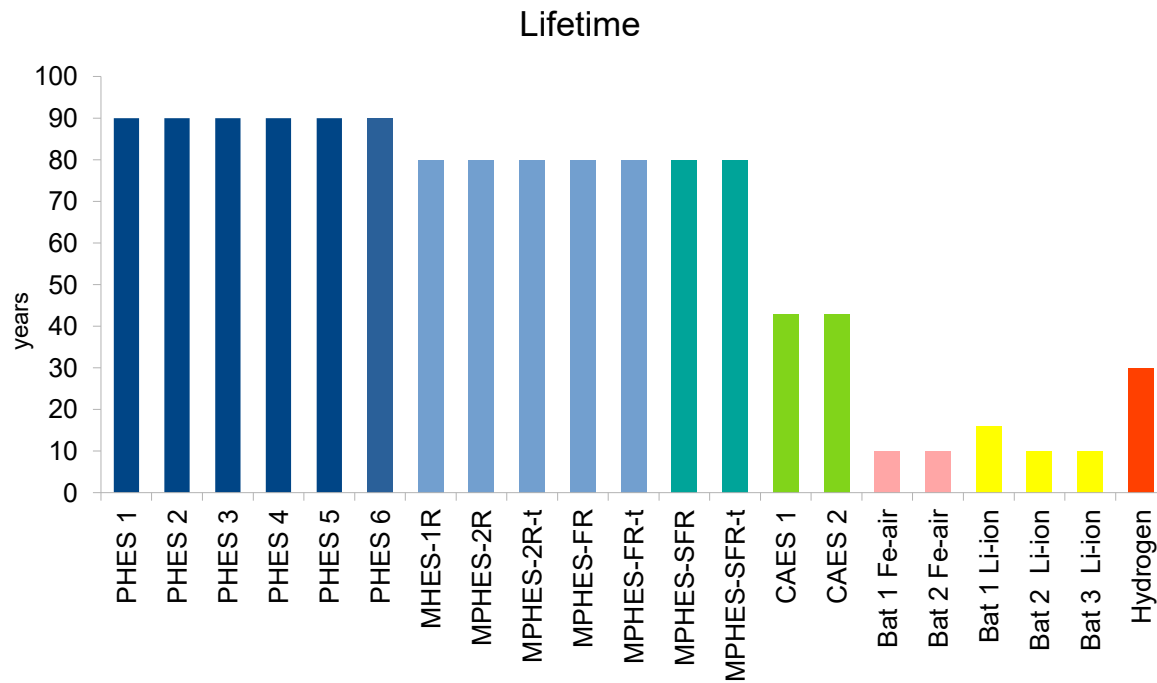
Outdoor Model MPHES-2R



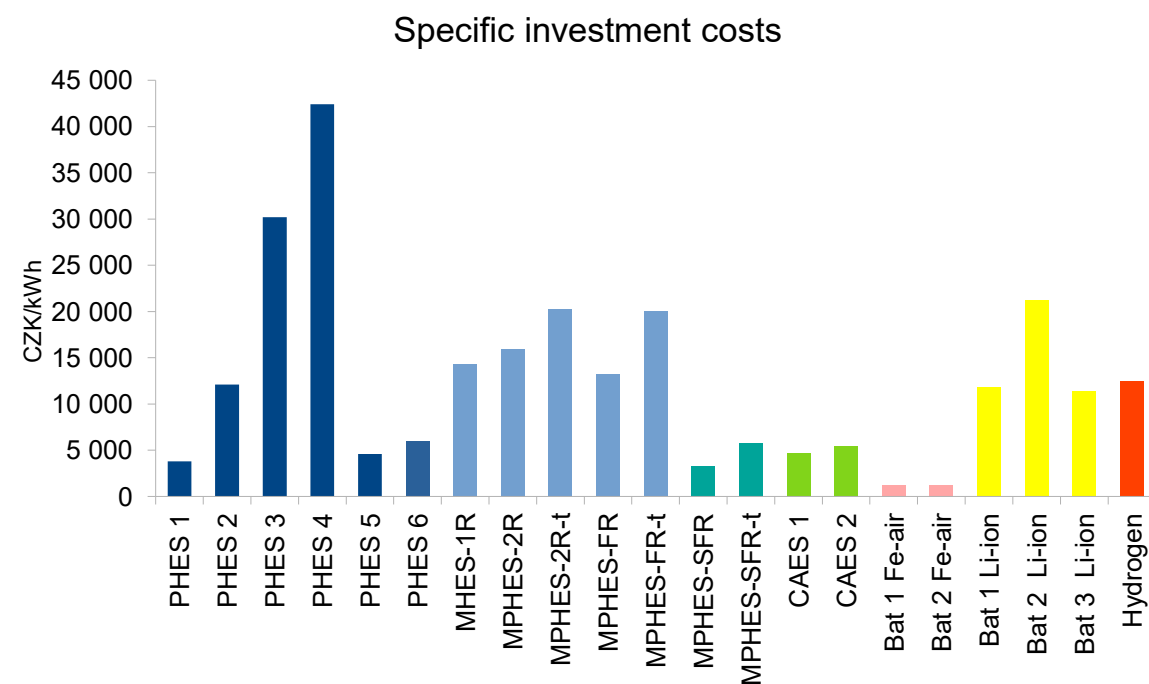
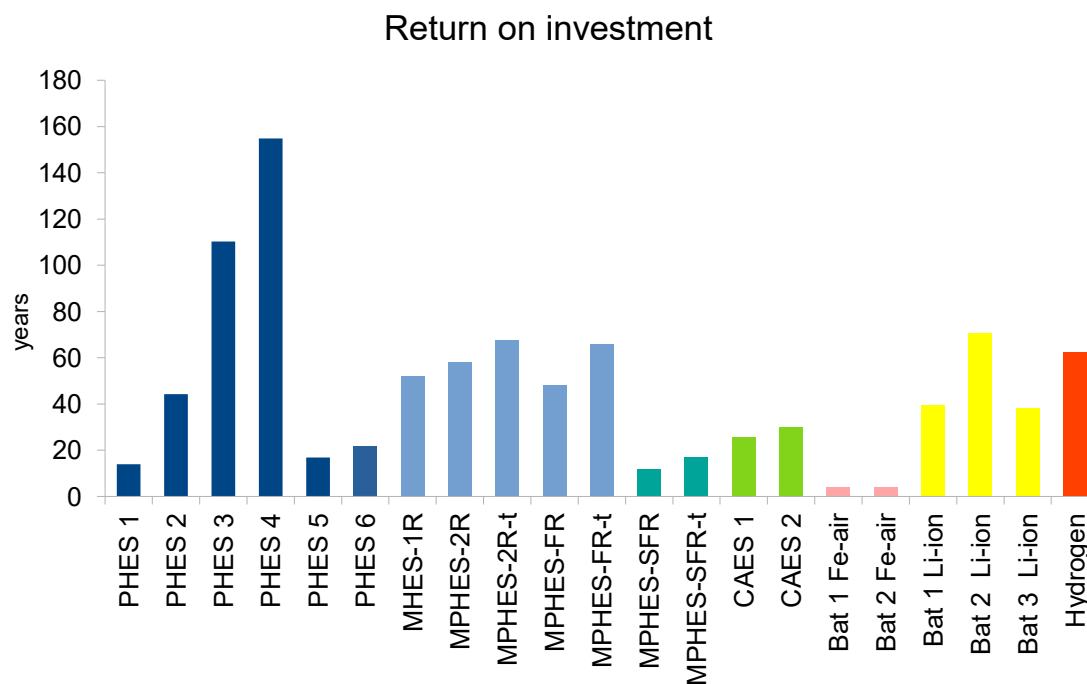
- Dimensions 11 x 9 x 5.2 m
- Power output: 0.9 kW (0.5 h...0.45kWh)



Comparison with Competing Technologies

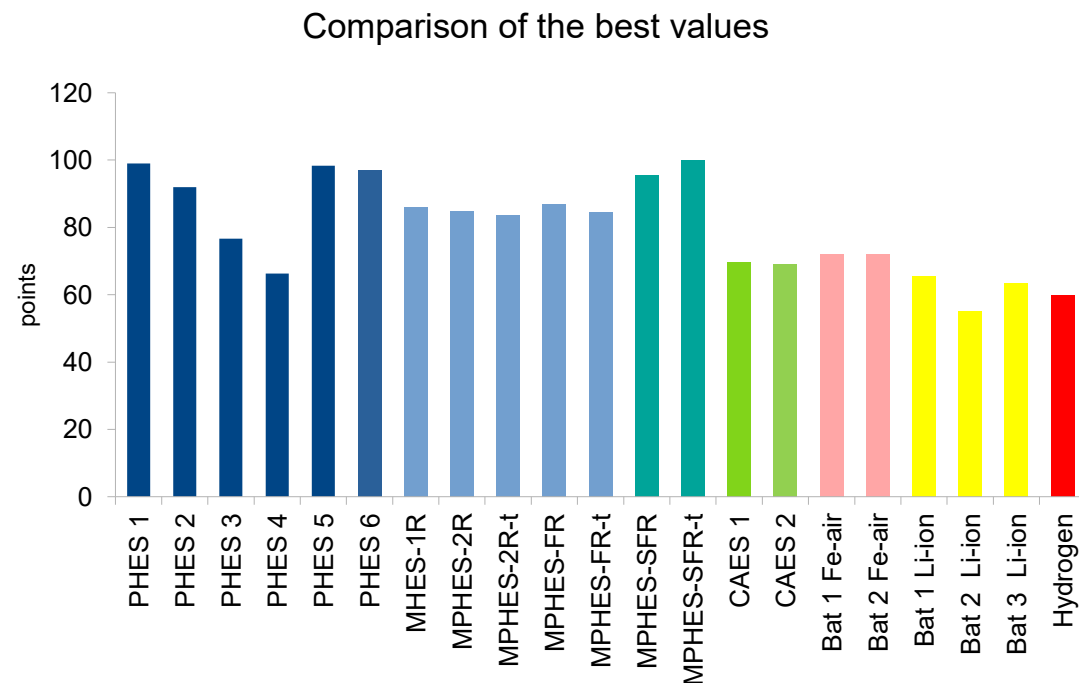
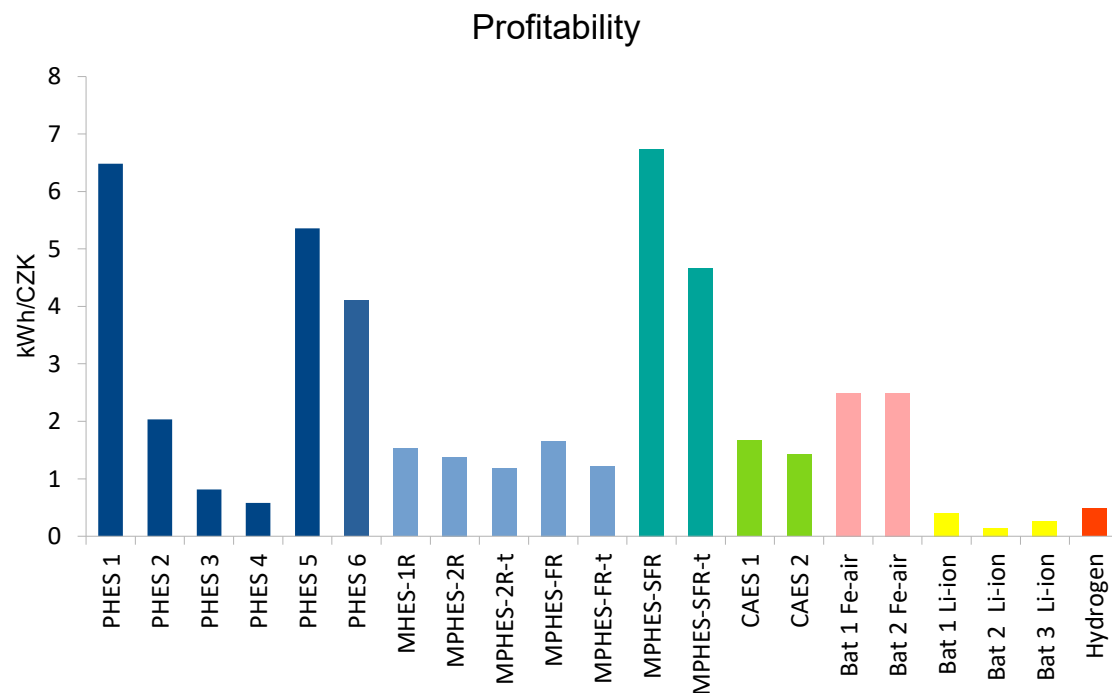


Comparison with Competing Technologies



Payback and Profitability Calculated at Electricity Price of **CZK 1/kWh (€0.04)**

Comparison with Competing Technologies



Payback and Profitability Calculated at Electricity Price of **CZK 1/kWh (€0.04)**

Acknowledgments

- This study was written in connection with the project *New Type of Pumped-Storage Hydroelectric Power Plant* (Reg. No. TK03030037), financed by Technology Agency of the Czech Republic and *REFRESH – Research Excellence For Region Sustainability and High-tech Industries* (Reg. No. CZ.10.03.01/00/22_003/0000048), financed by EU structural funds.
- This presentation was created in connection of the project: SP2025/100 - Specifický výzkum v oblasti zvyšování efektivity vybraných energetických procesů

Thank You for Your Attention

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