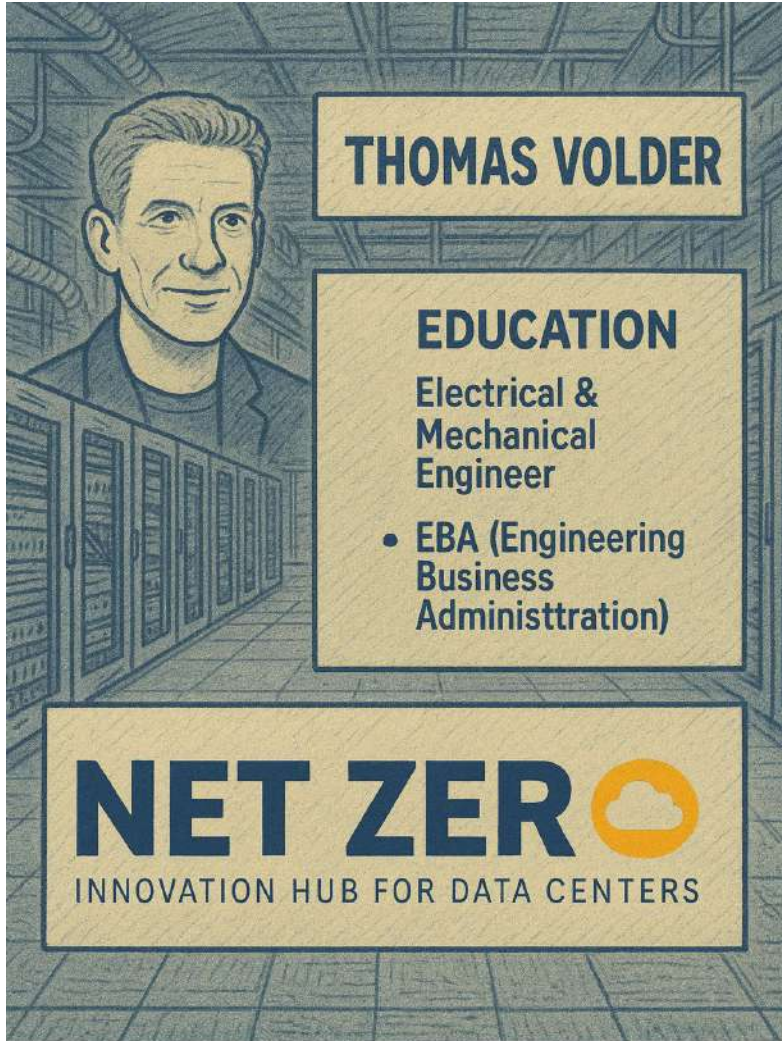




Net Zero Innovation Hub for Data Centers



**Let's in
Connect**



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**Cross-sector collaboration on innovative, ready-to-market solutions for
the European data center industry**

Board Partners



Microsoft



WWW.NETZERODATACENTERS.COM

*Leaders of the Data Center industry created the HUB as
the **collaborative place** to execute projects which **de-risk innovations** and
accelerate their GW-scale deployment.*



Industry Engagement & Thought Leadership

Selected Upcoming Speaking Engagements



September 17
DCD London



September 24
Data Center Forum Copenhagen
Thomas Volder



September 28
Future Grid & AI Data Centers
Europe



October 12-15
OCP Global Summit



October 26-30
European Hydrogen Week



October 28
DaCES event on Energy (storage)
solutions for Datacenters



November 24-26
HEATEXPO



November 24-27
Horizons Clean Energy Expansion
Week

September update at a glance

Ecosystem Growth

- Five new Project Members and one new Executive Partner



Project Updates & Innovation Pipeline

- Aluminum-air module validation confirmed with **Phinergy** – testing planned
- Heat-to-X Data Center validation with **AirJoule Datacenter Test**
- MW-scale testing site secured with microgrid and Data Center
- More than 45 applications received for the **Start-Up 2027**



Industry Engagement & Thought Leadership

- “Hydrogen Infrastructure for Europe’s Data Centers”** – publication with Hydrogen Europe, 28 October (European Hydrogen Week)
- 8 speaking engagements** confirmed Sept.–Nov.: DCD London, Copenhagen, OCP Global Summit, HEATEXPO and more



Net Zero Start-up Hub

Pilot Activities 2025-2026

- **Startup Call:** Announced Q2 2025
- **Pitch Event:** Held 24 September 2025 in Fredericia
- 11 participating startups, 6 selected, 3 awarded cash prizes (google)



Solution: heat reuse Sorption technology extracting water from air + reducing HVAC energy demand by up to 60%.
Country: USA
Stage: Pilot/Pre-commercial



Solution: Copper flow battery (CFB)
Country: Finland
Stage: Prototype/MVP

NEOCARBON

Solution: Direct Air Capture using low-grade waste heat, also acts as secondary cooling.
Country: Germany
Stage: Pilot/Pre-commercial

ShipTown

Solution: Reversible Hydrogen Batteries alkaline fuel cell for power-to-hydrogen and hydrogen-to-power
Country: Denmark
Stage: Pilot/Pre-commercial

sperra

Solution: Floating modular data centers fabricated with 3D concrete printing, co-located with offshore renewables
Country: USA/Denmark
Stage: Idea/Concept

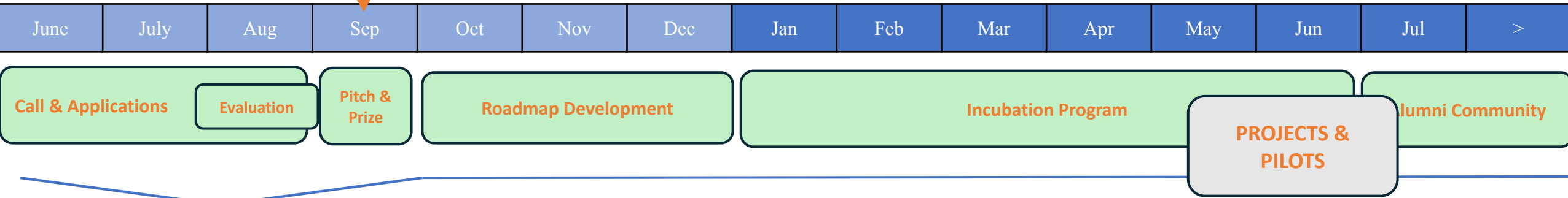


Solution: Power Expander improving efficiency of large heat pumps and chillers.
Country: Denmark
Stage: Prototype/early pilot

Next steps

- Second Round is kicked off 22.09.2026

Status: Start-up Hub 2026-2027



June: Call issued



The new cohort focuses on power and energy, heat reuse and Heat-to-X, and AI-driven energy efficiency.

August 31 Deadline

46 submissions
(more than double the amount from last year)

19 countries
Median TRL 6

Technology:

29 within Power
11 within efficiency
4 within cooling
9 within heat reuse
3 within Digital/sftwr

Initial Evaluation

Applications assessed using the Hub's TARL evaluation framework, which covers innovation, technical maturity, market relevance, adoption readiness, team strength and strategic fit.

NET Zero Start-Up Hub 2027 - TARL Evaluation: Ranking Summary

Rank	Company	Country	Technology Area	TRL	Novelty	Technical Maturity	Market Relevance	Adoption Readiness	Team Strength	Strategic Fit	Overall Score	Priority
1	Company A	Country A	Technology A	7.0	9.0	8.0	7.0	8.0	9.0	8.0	8.0	High Priority
2	Company B	Country B	Technology B	6.0	8.0	7.0	6.0	7.0	8.0	7.0	7.0	High Priority
3	Company C	Country C	Technology C	5.0	7.0	6.0	5.0	6.0	7.0	6.0	6.0	High Priority
4	Company D	Country D	Technology D	4.0	6.0	5.0	4.0	5.0	6.0	5.0	5.0	High Priority
5	Company E	Country E	Technology E	3.0	5.0	4.0	3.0	4.0	5.0	4.0	4.0	High Priority
6	Company F	Country F	Technology F	2.0	4.0	3.0	2.0	3.0	4.0	3.0	3.0	High Priority
7	Company G	Country G	Technology G	1.0	3.0	2.0	1.0	2.0	3.0	2.0	2.0	High Priority
8	Company H	Country H	Technology H	0.0	2.0	1.0	0.0	1.0	2.0	1.0	1.0	High Priority

Company: Reversion
Solution / Technology: SOFC / SOE Reversible Fuel Cells for power generation and long term duration storage
Date: 2026-08-31
Assessment by: [Name]
Confidentiality / Information: to clarify TRL and pilot

This summary is calculated from the information in the regular website:

Metric	Score
TRL	7.0
Novelty	9.0
Pilot potential	8.0
Company rating	7.0
Market Relevance	7.0
Overall score	8.0
Risk Distribution	8.0
Team	9.0

September 22

8 Companies Shortlisted to pitch to an industry jury in Fredericia on 22 September.

Google
Pitch Prize.

Net Zero Start-up 2027



ATOCO

Carbon Clean

CMBLU Energy

Ionate

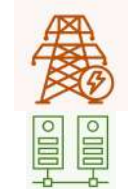
Loadwise

Kvasir

Neg8 Carbon

Reverion

Current Hub Workstreams and Projects:

Workstreams	Projects
 Clean Power	ICE+Hydrogen (short term) PEM+Hydrogen (mid term) AI-air battery generators
 Heat Reuse	Heat-to-X (w/o district heating) X = Water, Biomass, Power, Cooling, DAC, ... Heat Reuse Platform (Matchmaking for District Heating)
 Grid Integration	Grid Integration and Flexibility
 Water	<i>Potential new topic</i>

Plan 2027 preparation:

Net Zero Innovation Hub – Clean Back up ICE-Hydrogen testing team



JENBACHER



**Bartłomiej
Czechowski**



Afshin Majd



Lilian Moinard



**Sebastien
Cruz-Mermy**



Luka Majic



Thomas Seeber



PROJECT LEAD



Thomas Volder

100% Hydrogen ICE MW-scale testing



INNIO and Net Zero Innovation Hub Deliver World-First 3 MW Demonstration of 100% Hydrogen Backup Power for Data Centers

23.4.2026 14:45:00 CEST | [Business Wire](#) | Press release



Clean Back-up –100% H2-ICE testing - Jenbacher



Goal

Validate the performance of ICE with H2

Next steps

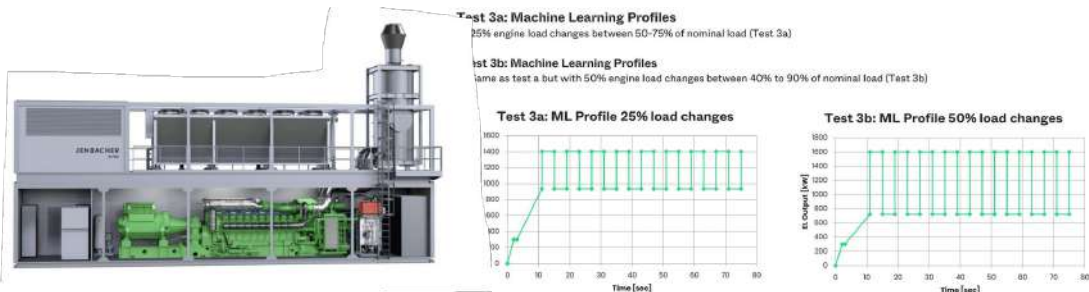
Status



- ✓ Test completed
- ✓ Results presentation distributed

From the test de-briefing:

- Simulation of behaviour in an integrated system are required (and potentially test in integrated environment)



Heat-to-Water ALOE Pilot



Goal

Validate AirJoule A1000 Module integrated in a Datacenter in operation.

Status



Next steps

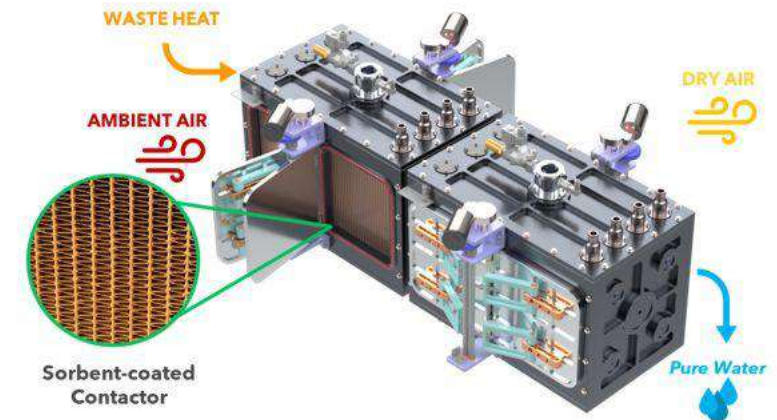
- Final confirmation of timing and validation-day planning
- Test execution
- Use cases evaluation
- Technology benchmarking



Heat-to-X Technology Options

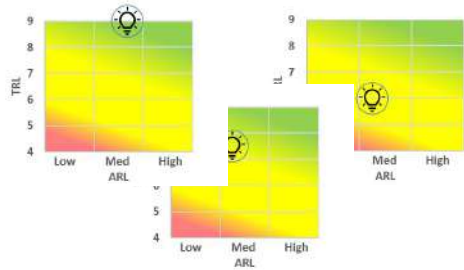
Technology Options	Heat-to-Biomass	Heat-to-Water	Heat-for-Carbon Removal (DAC)	Heat-to-Power
<u>Innovation Pipeline</u>				

Project proposal: Heat to Water



Delivering Innovation with Collaborative Projects

Technology + Adoption Readiness Framework



Technologies selection

Solutions portfolio



Pilot projects



Scale-up Projects



Joint requirements

Cross-company technical teams

Collaborative Projects



Clean Back-Up



Heat Reuse



Grid Integration



**Deliver de-risked solutions
ready for the next data center project**

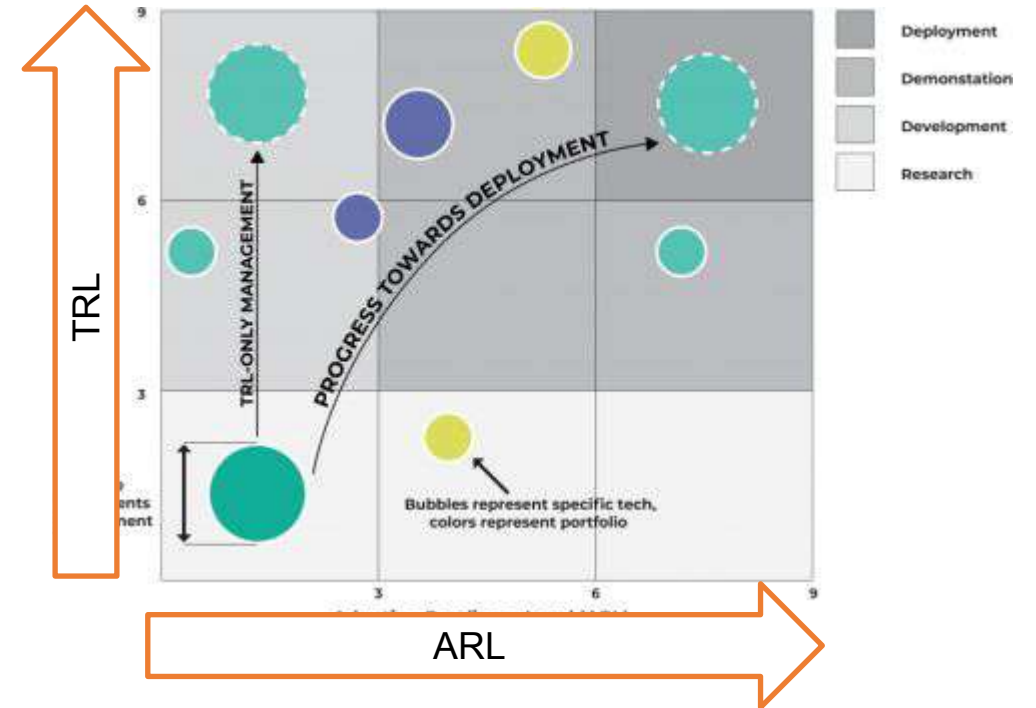
- ✓ Technical
- ✓ Commercial
- ✓ Regulatory
- ✓ Financial

Implementing Adoption Readiness Level: ARL

The ARL framework was developed by the U.S. Department of Energy's Office of Technology Commercialization (OTC) in partnership with industry stakeholders to enable technology commercialization

The ARL framework is a tool to assess the commercialization risks facing a technology as it crosses the Research, Development, Demonstration, and Deployment (RDD&D) continuum to reach successful commercialization.

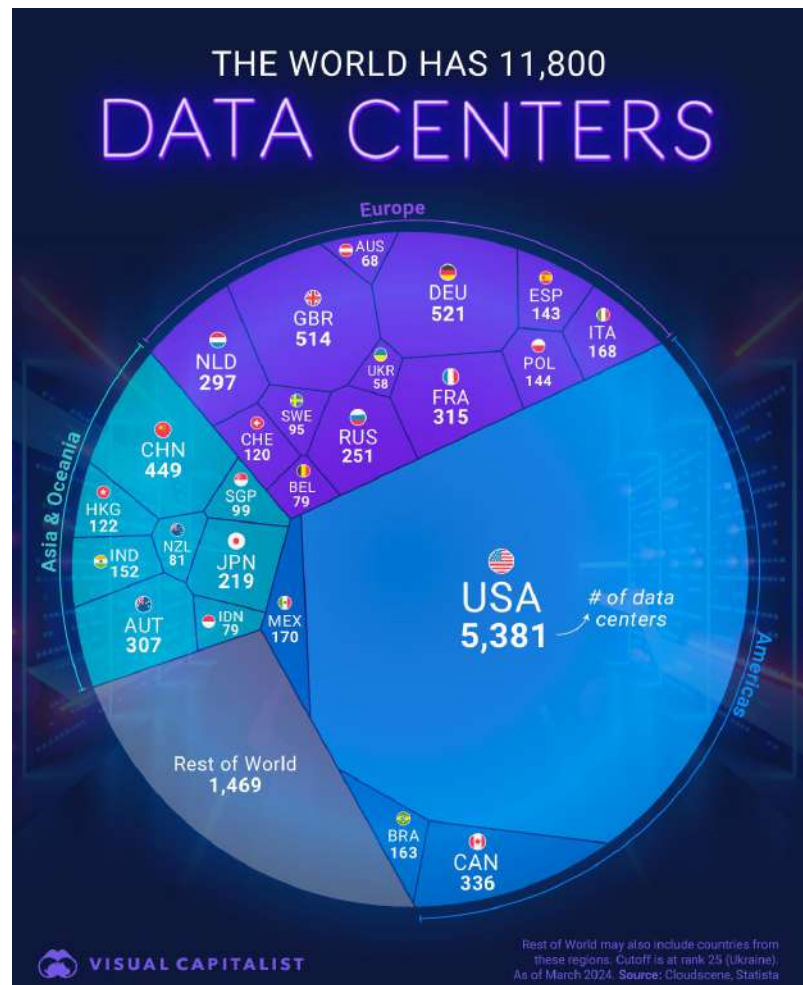
Adoption Readiness Levels (ARL) Framework | Department of Energy



The solution assessment will be completed by the Hub/Technical teams

Europe position in Data Center infrastructure

number



Power consumption

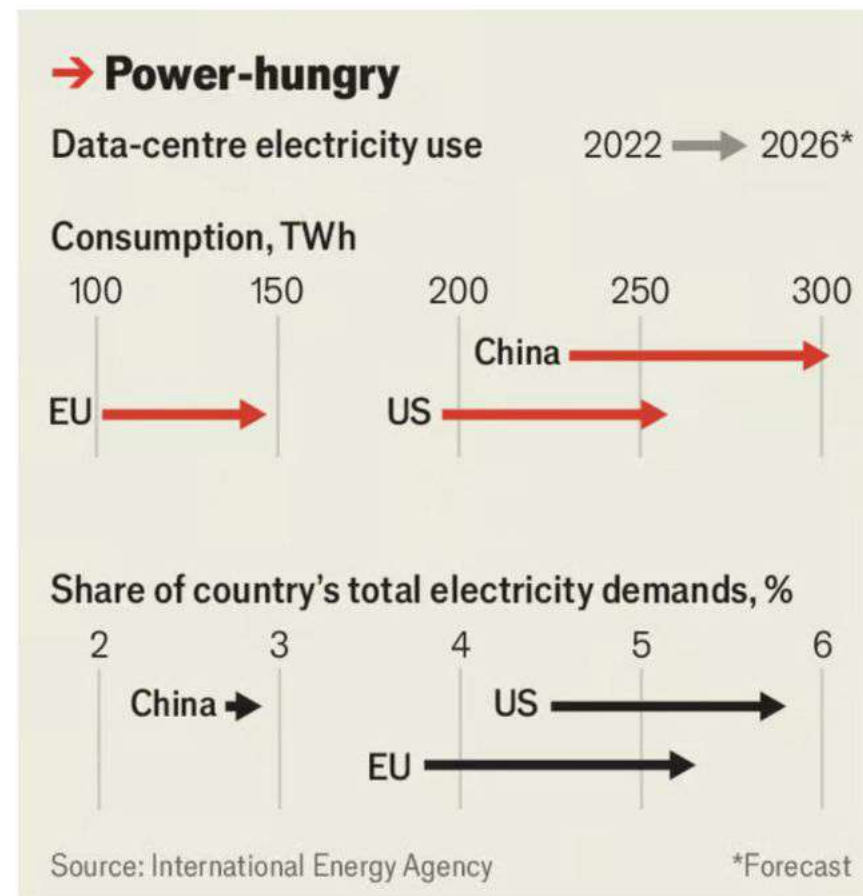
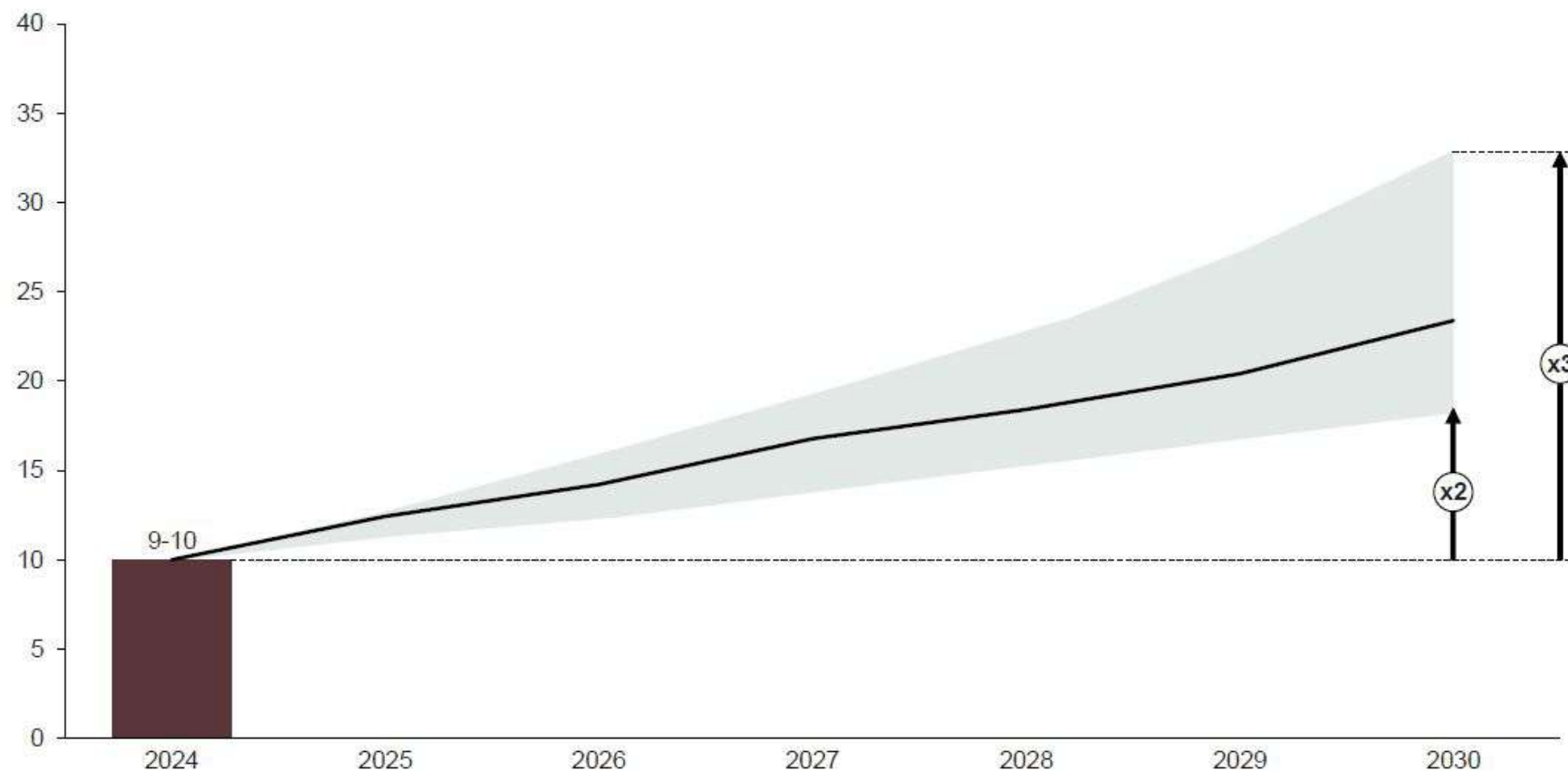


CHART: THE ECONOMIST

European Data centre capacity needs to increase significantly to ensure competitiveness and meet future needs – especially those arising from AI

Installed IT capacity in Data centres in Europe

GW



- Analysts expect Europe's data centre capacity to double or even triple by 2030 to meet future demand, with 25-30% of capacity allocated to AI compared to less than 5% today.
- According to the European Commission, however, projections indicate a gap between available capacity and what is needed, especially to meet AI-driven demands.
- In addition, Europe's data centre industry is expected to fall behind the United States and China by 2030.
- The expansion of data centre capacity in Europe also contributes to digital sovereignty, i.e. a digital ecosystem of control, choice and security in Europe.
- If Europe fails to scale up data centre capacity to meet demand, its companies risk falling behind regions where capacity is expanding significantly, which could hinder innovation, economic growth and job creation.

DATA CENTERS: THE FACTORS OF THE DIGITAL AGE

EVERYTHING RUNS ON
DATA
AND DATA RUNS ON
ENERGY



FROM ENERGY CONSUMER
TO SYSTEM PLAYERS

The paradox:

- Driving digital progress
- Increasing energy pressure

- Grid flexibility
- Energy storage
- Heat re-use
- Integration with energy system

Request For Innovation:
Net Zero Data Center
Back-up Power Solutions

Net Zero Innovation Hub

Aluminum Air Battery - Phinergy Test team

Solutions Providers

				
Vertiv	Schneider	Phinergy	Phinergy	Phinergy
				
Luka Majic	Sebastien Cruz-Mermy	Emmanuel Levy	Judith Yavniely	Avi Yadgar

Operators

				
Google	Google	Microsoft	Data 4	Data 4
				
Bartlomiej Czechowski	Doron Kapitulnik	Ehsan Nasr	Linda Lescuyer	Lilian Moinard



INNOVATION HUB FOR DATA CENTERS

PROJECT LEAD



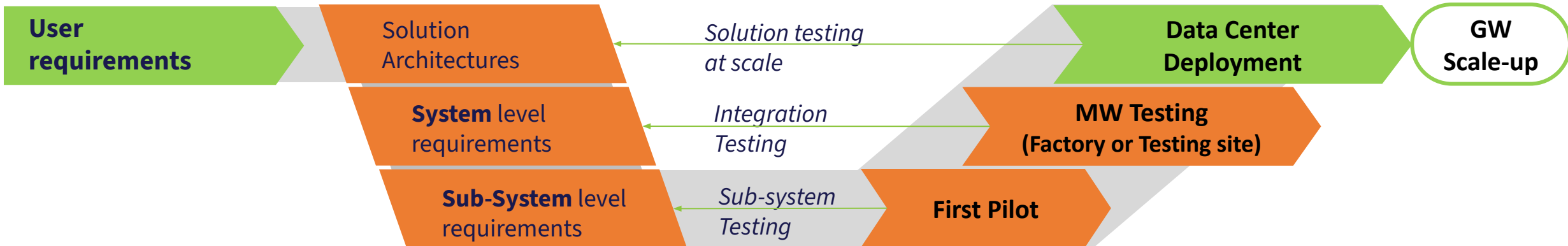
Thomas Volder



Alberto Ravagni

Path-to-Scale

Path to GW-Scale follows a system engineering approach



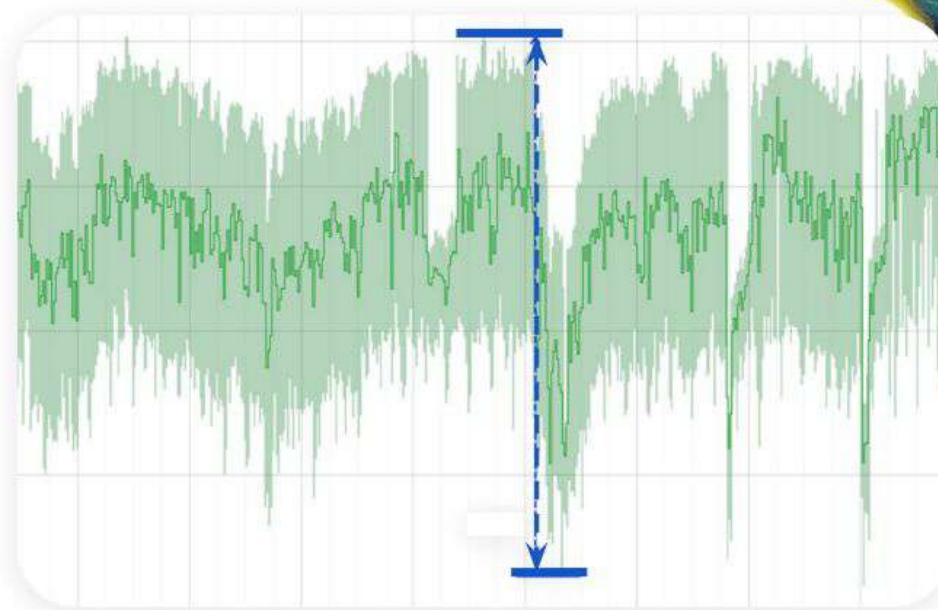


Compute vs AI Patterns

Non-AI Workloads



AI Workloads



AI is **synchronous**, creating **Quality & Reliability** challenges from chip to grid

Testing profiles - Examples

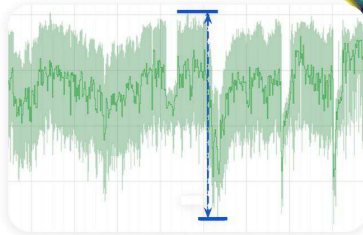
Google Cloud

Compute vs AI Patterns

Non-AI Workloads



AI Workloads



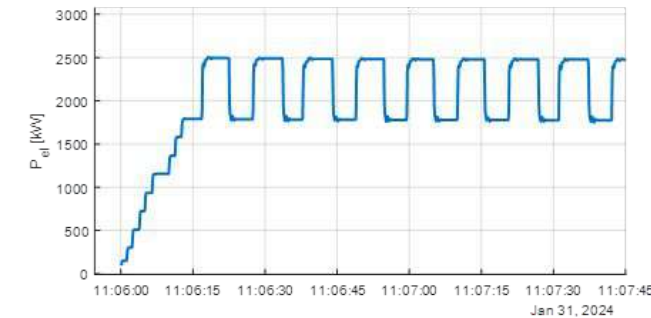
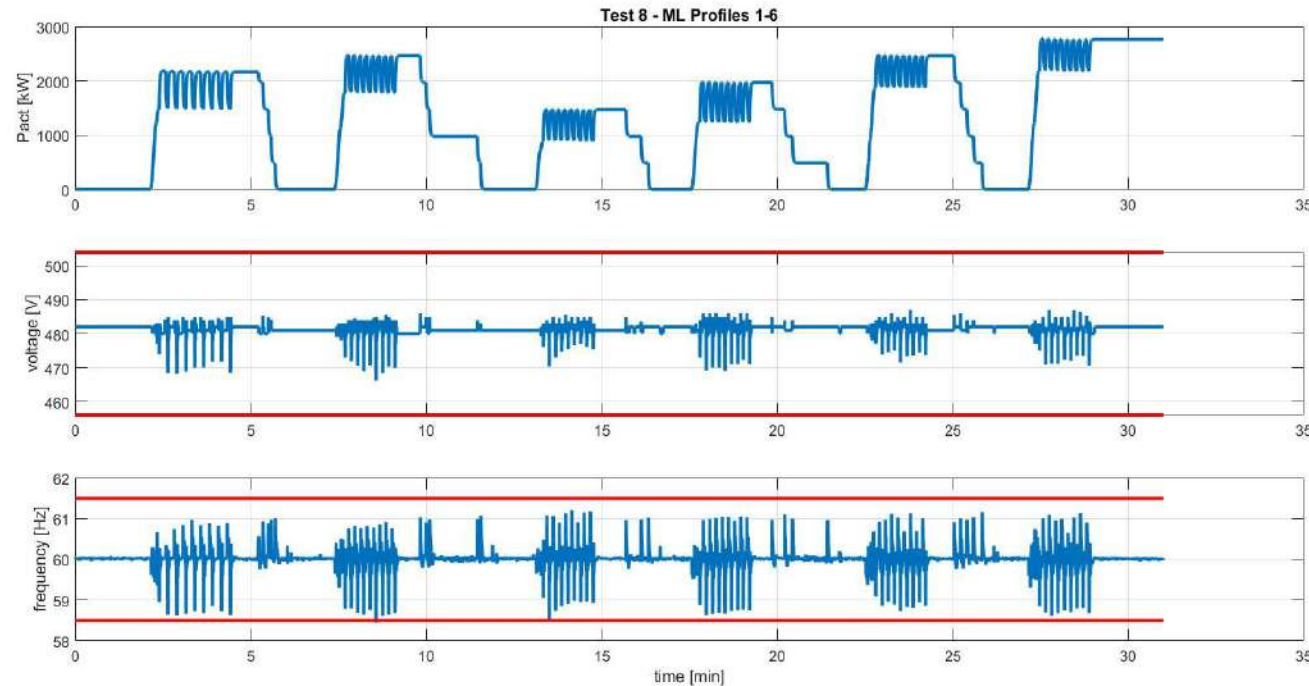
AI is **synchronous**, creating **Quality & Reliability** challenges from chip to grid

“Standard testing” Worth case scenario

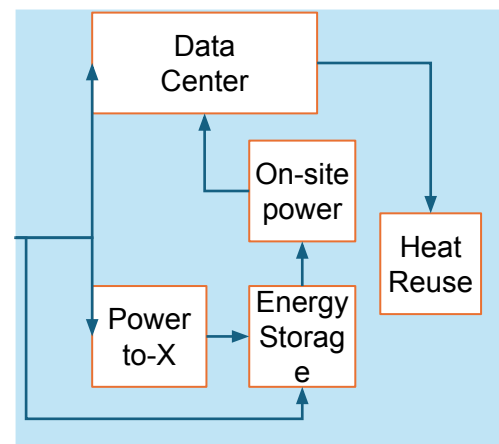
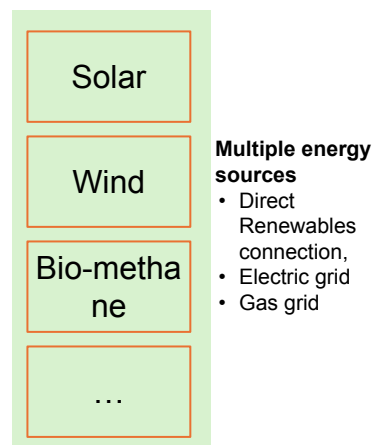
Positive testing means that we are okay so sign off of on max start time, max frequency deviation and max voltage deviation during load changes.

Example: first load acceptance 20 seconds after engine start and reaching full load in additional 40 seconds. Max allowed frequency deviation of 5% and max voltage deviation of 10% for 25% load addition steps.

Advanced testing profiles (examples)

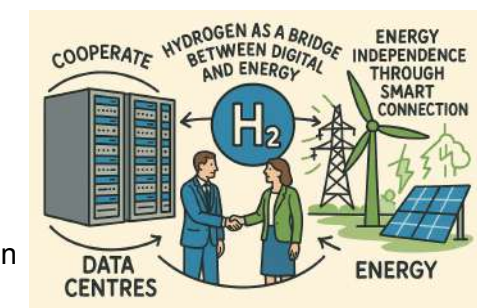


Net Zero Digital Energy Hubs



HUB Exports,

- Clean, dispatchable power to the grid,
- Grid Services, flexibility
- Clean Gases, Hydrogen
- Renewable Heat



Data Centers Benefit:

- Competitive, Clean Energy Input
- 99,999+ Reliability, Resilience
- 24/7 CFE
- Connection Acceleration

Energy Systems Benefits :

- Grid infrastructure savings through shared investments
- Accelerated renewable penetration

Investors and Developers benefits:

- Attractive returns on 24/7 CFE power for data centers
- De-risked off-take for power, hydrogen, grid services

HYDROGEN IN DATA CENTERS – ENERGY ECOSYSTEMS

HYDROGEN ECOSYSTEM

PROMISE & BARRIERS

Access & supply

Hydrogen availability is still limited

Price

Green hydrogen remains several times more expensive than fossil fuels

Security of delivery

Uninterrupted energy supply is critical

Transportation & storage

Infrastructure is still immature and security risk remain

Certification

Need for verified green hydrogen, not just low-carbon claims

FROM PARALLEL PATHS TO A SHARED ENERGY ECOSYSTEM

Co-location

Build hydrogen production near data centre clusters

Joint infrastructure

Shared storage, transport systems and connection to the grid

Strategic partnerships

Between data centre operators and energy providers

Market innovation

Long-term offtake agreements for green hydrogen

Thank You!



*Tomorrow's data centres will not only power the internet
— they will power the green transition itself.*



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