TECHNOLOGY CENTRE MONGSTAD

– catching our future

TCM's Work Process for Test Campaigns

Presented by:
Rouzbeh Jafari, Business Development Manager
Rouzbeh.Jafari@tcmda.com

TCM Impact on Technology Maturation of Emerging Technologies

- **MTR**, membrane-based technology, conducted extensive pilot tests at the Technology Centre Mongstad (TCM).
- **TDA**, a sorbent-based CO_2 capture company, has been testing its innovative hybrid system at the Technology Centre Mongstad (TCM).

1. Key campaign achievement at TCM:

- **Real-World Validation**:
  - Test the system under realistic flue gas conditions, including variations in temperature, pressure, gas composition.
  - Demonstrate stable and reliable performance over extended periods.
- **Validate Performance**:
  - Achieve high CO_2 capture rates
  - Prove the system's ability to handle real-world flue gas impurities (e.g., SO_x, NO_x, and particulates).
- **Assess Scalability**:
  - Verify that the technology can be scaled up from lab or bench-scale units to industrial-scale applications.
  - Gather data to support the design of larger commercial systems.
- **Reduce Costs**:
  - Explore process modifications to lower both capital expenditures (CAPEX) and operational expenditures (OPEX).
  - Demonstrate energy efficiency improvements compared to conventional amine-based systems.
- **Technology Maturation**:
  - Identify and mitigate gaps in technology readiness for commercial deployment.
  - Optimize the system for integration with industrial processes and CO_2 storage/utilization infrastructure.

TECHNOLOGY CENTRE MONGSTAD

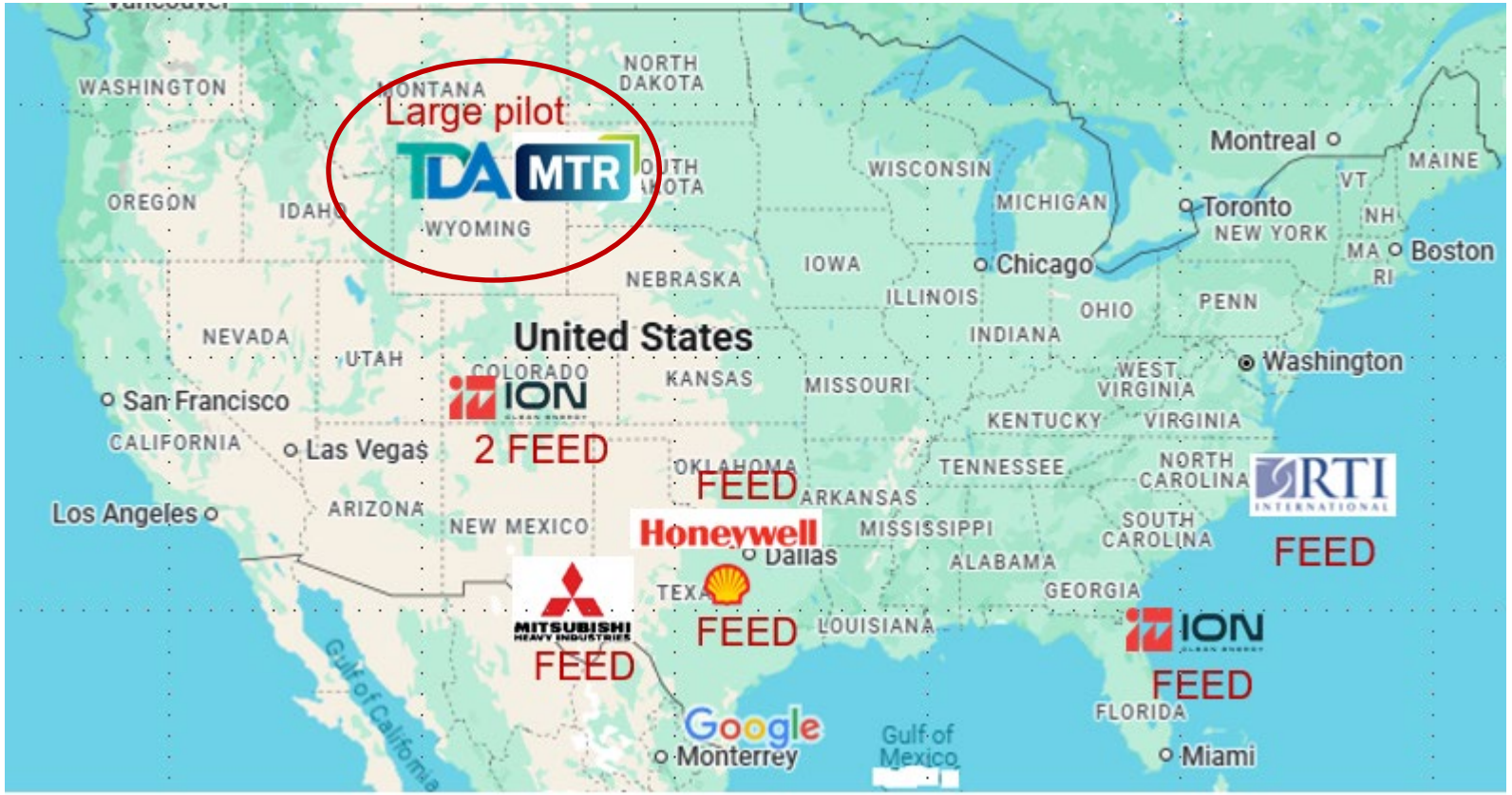
TCM Impact on Technology Maturation of Emerging Technologies

2025 >

Start 2020

Emerging Technologies

MTR · TDA · SAIPEM ACCSESS · PROSPIN ACCSESS · MOF4AIR · InnoSepra · Svante



TECHNOLOGY CENTRE MONGSTAD

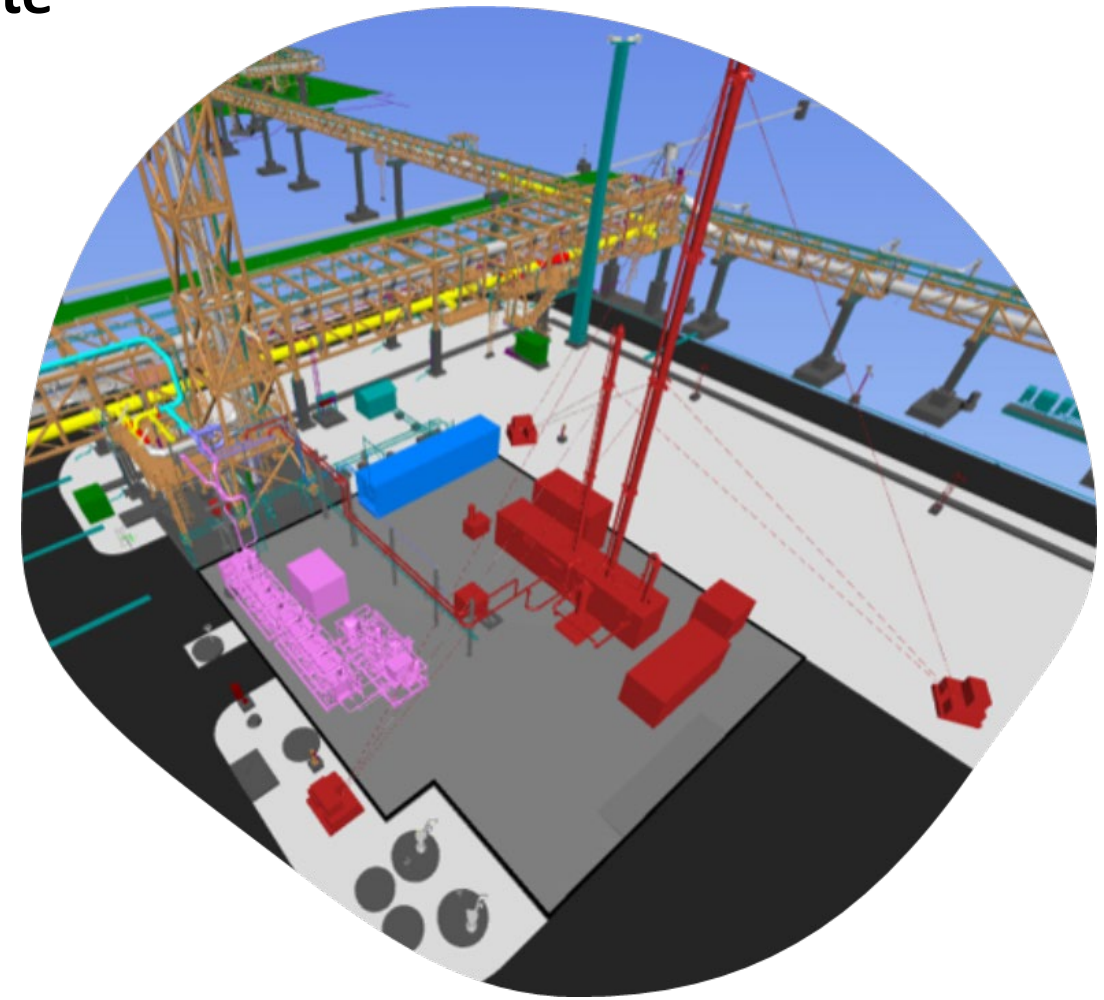
IS YOUR TECHNOLOGY ready for Commercial Deployment?

List of some important KPIs

- CO_2 capture rate and CO_2 product purity
- Energy consumption
- Chemical consumption
- Emission and environmental impact
- Effluents and waste management
- Availability and Operate-ability
- Tools and model improvements
- Startup and shutdown learnings
- Corrosion, Precipitation, Foaming, Flashing
- Safety and material handling
- Levelized cost of electricity (power sector) / cost CO2 captured

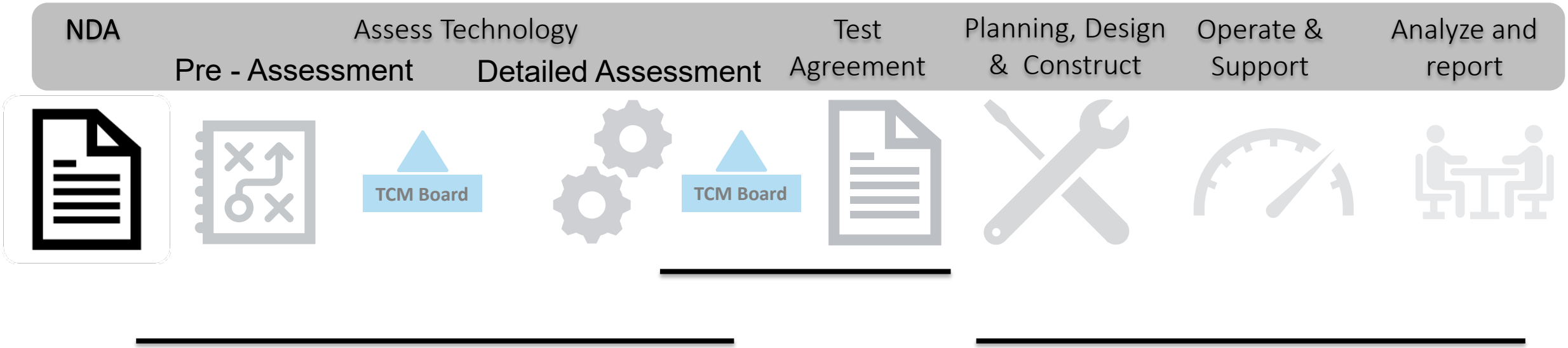
Tie-in List and 3D Model of the 3rd Site

Tie-in
Flue Gas
Cooling Water
LP Steam
Instrument Air
Demin Water
Electricity
Selected Chemicals



TECHNOLOGY CENTRE MONGSTAD

TCM WORK PROCEDURE



- Pre-assessment to capture risks and define focus areas
- Detailed assessment to mitigates risks

TECHNOLOGY CENTRE MONGSTAD

Site for Emerging Technologies, Assessment Phase

- Detailed HSE assessment
  - Active material (solvent/sorbent) handling, Dispersion modeling, Atmospheric chemistry
  - compliance with emission permit,
- Engineering
  - Tie-in, 3D mock-up and site preparation requirements
  - Maintenance strategy
  - Skid design assessment (FAT and SAT plan, codes and standards and deliverables review)
  - Installation, Lifting and commissioning requirements
- Operational and Data acquisition strategy
  - Lab method development, Analyzer preparation and calibration timeline
- Campaign schedule, cost and commercial term offering

TCM AMINE PLANT WORK PROCESS

NDA | Assess Technology: Pre - Assessment, Detailed Assessment | Test Agreement | Planning, Design & Construct | Operate & Support | Analyze and report



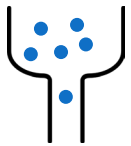

- TCM executes the campaign as agreed
- Daily communication with the client's representative
- Access to IP21 to monitor plant remotely/online and for data extraction
- Lab data dump by TCM
- Daily News and weekly report by the client
- Monthly report by the client
- Lessons learned workshop at the end of the campaign


- catching our future

TCM

ADVISORY SERVICES OFFERINGS

Scientific Papers



Important knowledge for emitters

Generic learnings

- Support on understanding requirements for Flue Gas Characterization.
- CO_2 capture Licensor Assessment: Tender questions, KPIs & Guarantees.
- Guidelines and recommendations for establishing an emission permit.

Plant design learnings

- Guidelines and recommendations for absorber design.
- Guidelines and recommendations for thermal reclaimer design.
- Guidelines and recommendations for heat exchangers design.

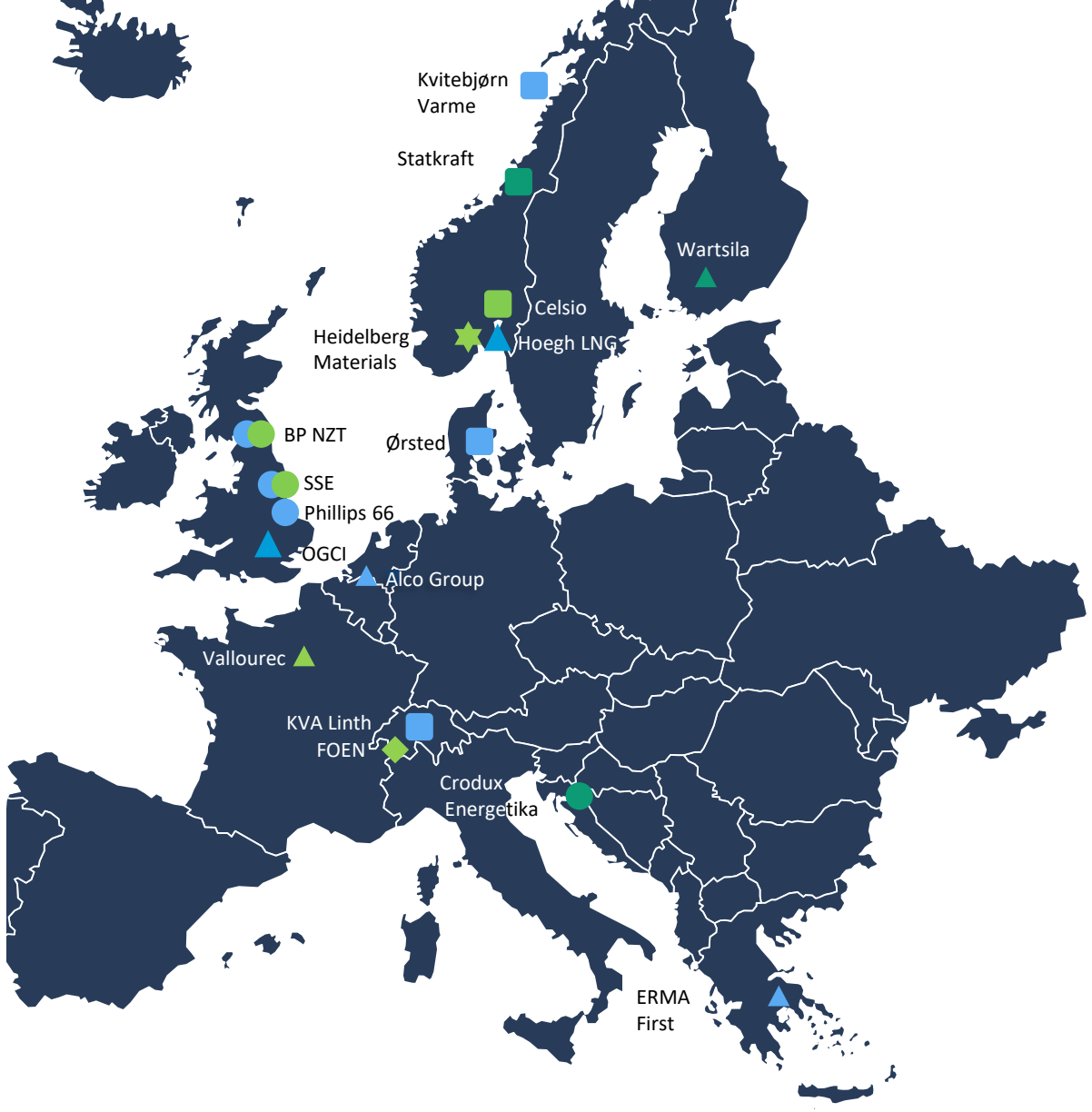
Operational learnings

- Key lessons from TCM on solvent and waste handling.
- Key lessons from TCM maintenance.
- Key lessons from TCM operation on thermal reclaimer.

Process Simulations

- Material & heat balance.
- Preliminary design.
- Sensitivity analysis.

TECHNOLOGY CENTRE MONGSTAD



TCM SUPPORT PROJECTS

with its advisory services

Supporting global decarbonization paths towards 2050

Advanced development of storage in North Sea driving TCM Advisory Services strategy

- Power
- Waste to energy
- Cement
- Regulator
- Other

GREEN1: Tailor-made

GREEN2: Simulations/Design

BLUE: Standard offerings (design, operational and generic learnings)

TECHNOLOGY CENTRE MONGSTAD