



- catching our future

Technology Centre Mongstad

The role of TCM in Carbon Capture
Technology Commercialization

Muhammad Ismail Shah



“SAFETY is
our top priority”

Technology Centre Mongstad

TCM

The world's **largest** and most flexible **test centre** for developing **CO₂ capture** technologies and a leading **competence centre** for carbon capture.



Our OWNERS



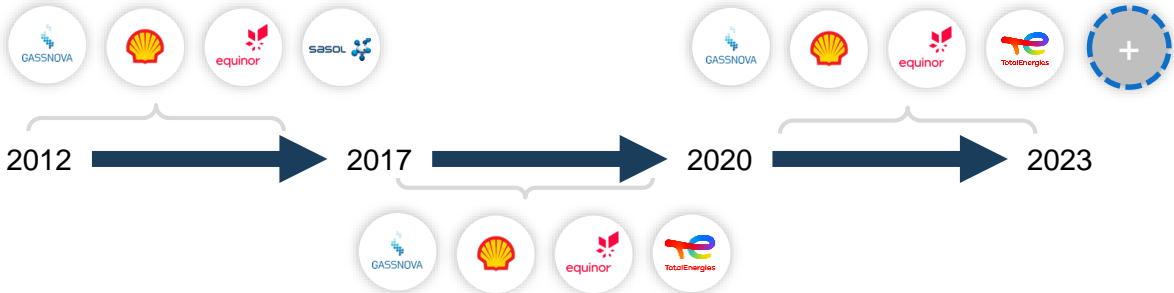
GASSNOVA



equinor

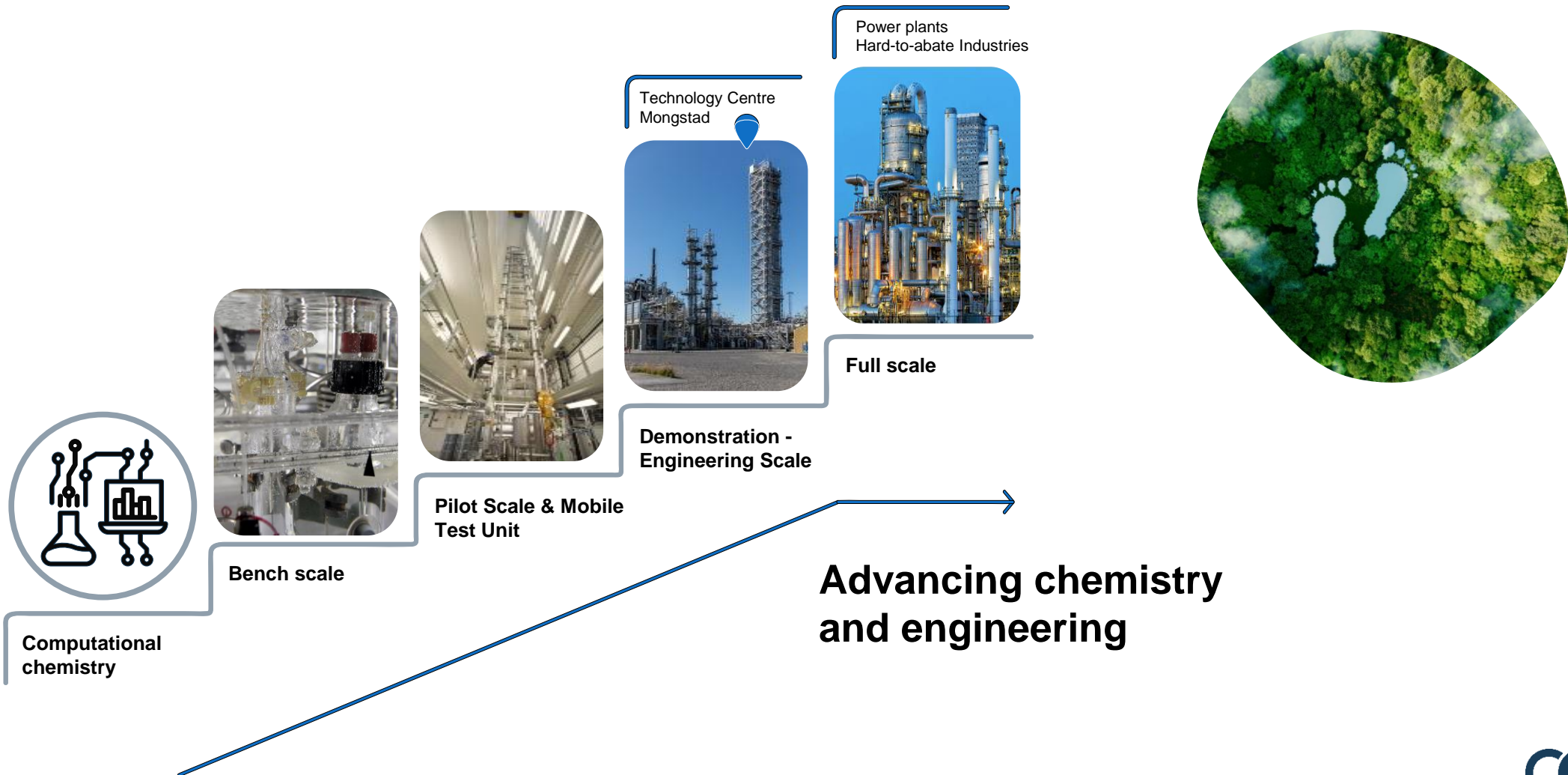


TotalEnergies



TCM

– Last step before **COMMERCIALIZATION**





Mongstad

Northern Lights

Bergen

Oslo

Conducted TEST CAMPAIGNS

 **> 28.000 hrs**
Proprietary Campaigns

Solvent Technologies

Start 2012



Start 2020

Emerging Technologies



Sponsored by TCM Owners, EU and CLIMIT

 **> 20.000 hrs**
Non-proprietary Campaigns  **> 60**
Scientific publications

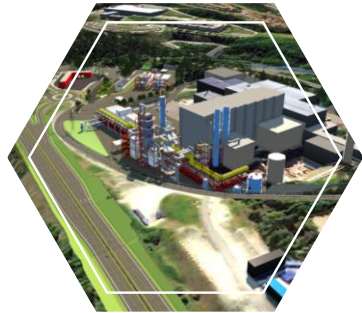


2013



TCM crucial in commercialization of CC technologies







Most major projects in Europe selected technologies tested at TCM



Waste to Energy
400 kTPA of CO₂ capture
Start-up date 2026

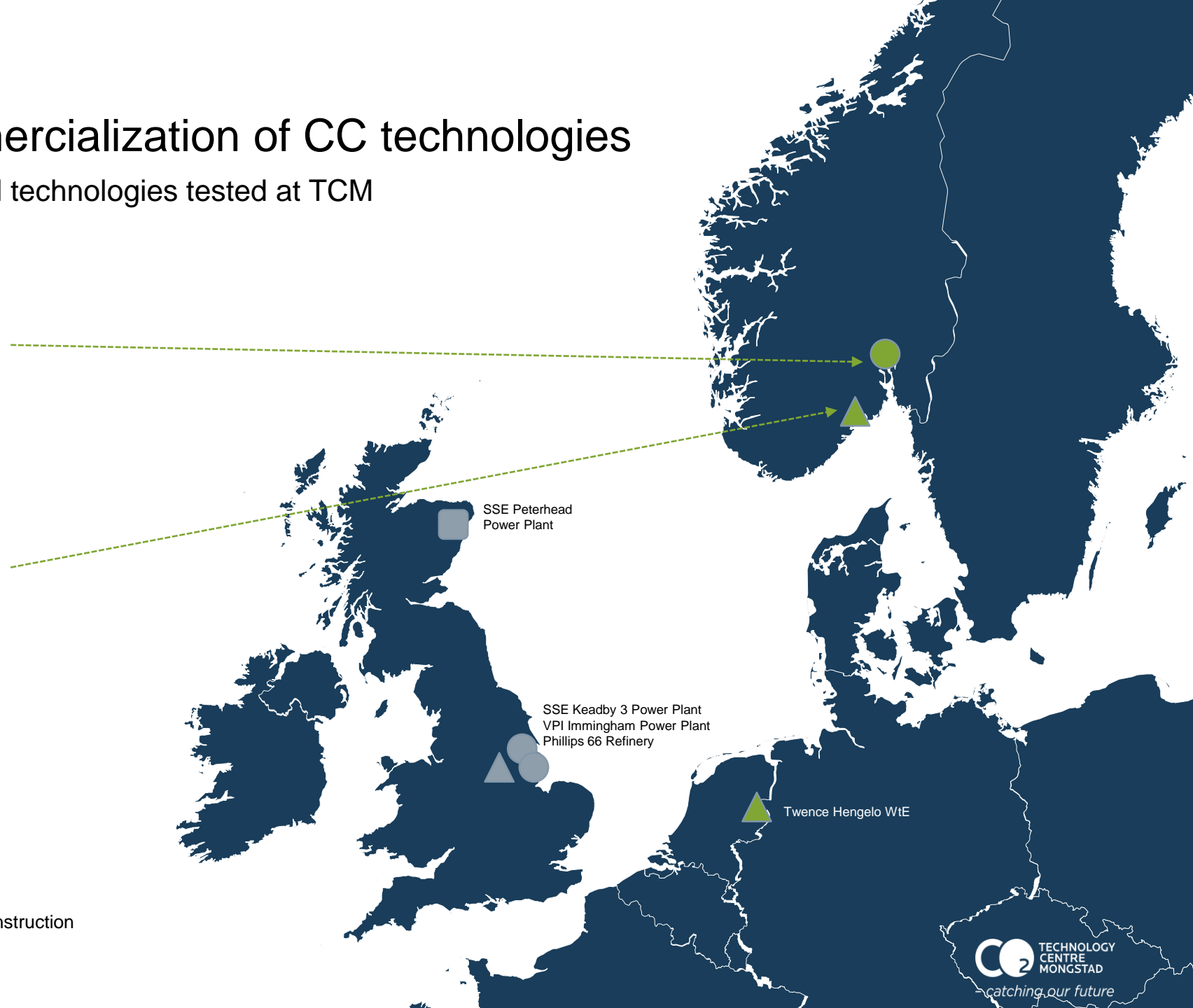


Cement plant
400 kTPA of CO₂ capture
Start-up date 2025

-   Aker Carbon Capture
-   Shell CANSOLV
-   MHI ENG

Grey FEED

Green Under construction



TCM

Advisory Services Offerings



Scientific Papers



Important knowledge
for emitters



Generic learnings

- Support on understanding requirements for Flue Gas Characterization-General.
- CO₂ 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



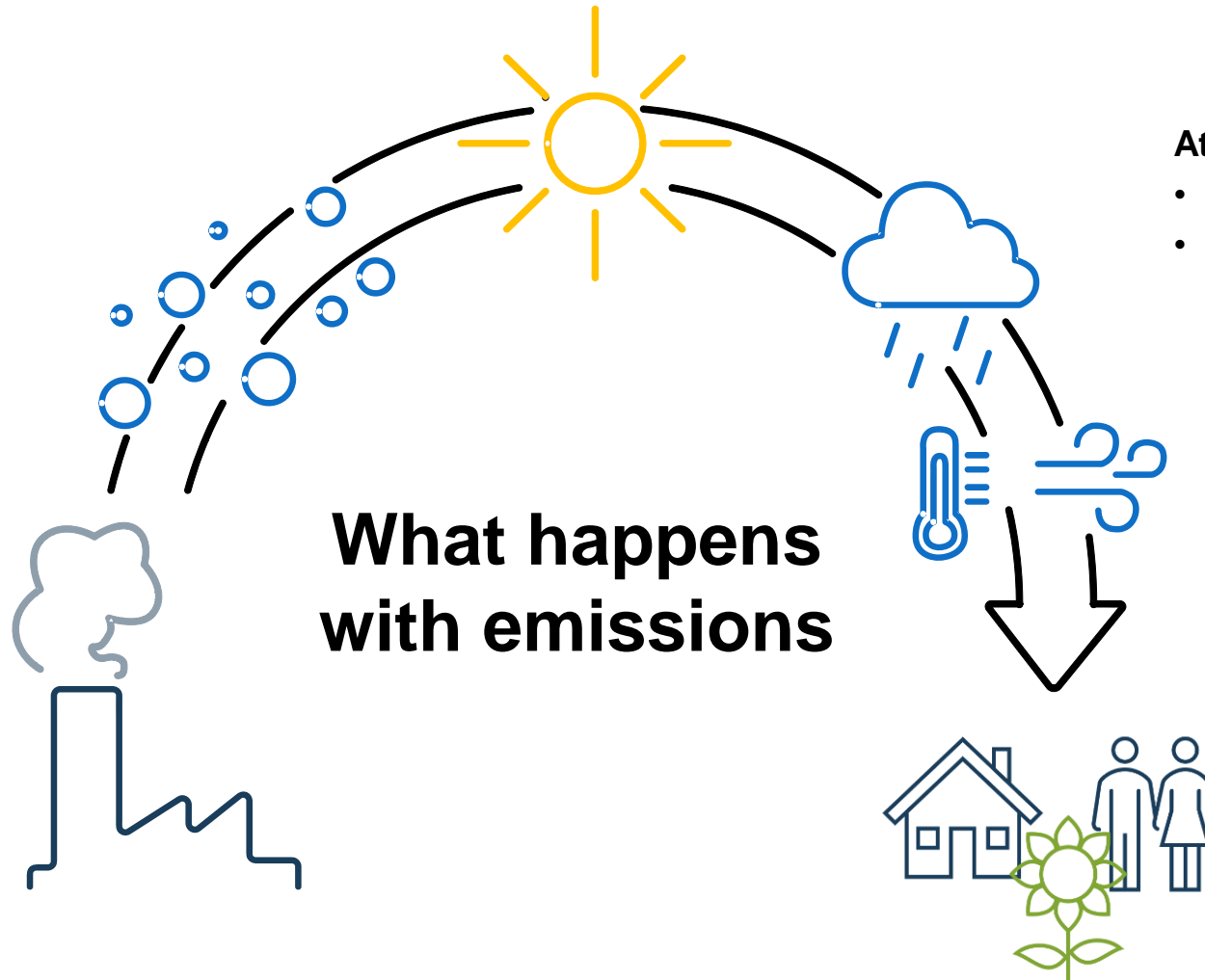
Emission Monitoring & Permit

Dispersion modelling:

- Dispersion of amines
- Photochemical reactions
- Predicting air and water concentrations

Emission:

- Sampling system
- Online-monitoring
- Lab measurements



What happens with emissions

Atmospheric chemistry:

- Scientific research,
- Experimental and modelling approach

Dispersion effects and impact:

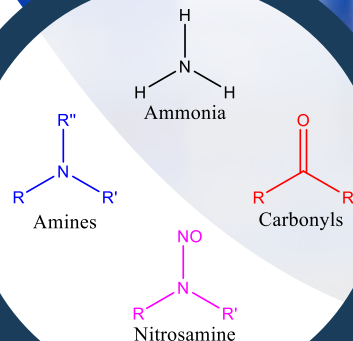
- Baseline study and environmental monitoring.

Treated Gas EMISSIONS monitoring – Defining Industry's Needs

Finding what you are looking for is easy...

TCM measures components based
on the solvent technology:

- FTIR:
Amines, Aldehydes and ammonia 0.5-50 ppm
- IMR-MS:
Amines and specific VOC 10 – 300 ppb



...Discovering the unexpected is hard!



Takeaway!

- TCM has proved instrumental for commercial deployment.
 - First generation Post-Combustion Capture is ready for deployment.
 - Pace of deployment needs to be expedited.
-
- Cost of CO₂ capture should be reduced in parallel to deployment of 1G.
 - TCM is, and will remain, an important arena for de-risking and expediting upscaling Carbon Capture technology.





Contact: C.martavaltzi@tcmda.com