



RETURN - Reusing depleted oil and gas fields for CO₂ sequestration

Pierre Cerasi and PMT

Return-act.eu

CCUS Conference
Rotterdam,
9 June 2022



RETURN – an ACT 3 project

- Primary objective:
 - Enable safe and cost-efficient long-term CO₂ storage in depleted O&G reservoirs by understanding and handling cooling and CO₂ phase change effects during injection.
- Total budget: ~7.4 M€
- 6 participating countries, 18 project partners :
- NO, NL, UK, Germany, Canada, (Italy)
- N-3; NL-5; UK-4(5); D-3; CDN-3; I-1(0)





Participants

- Universities:



Utrecht



Freiberg



- Research Institutes:



- Industry:



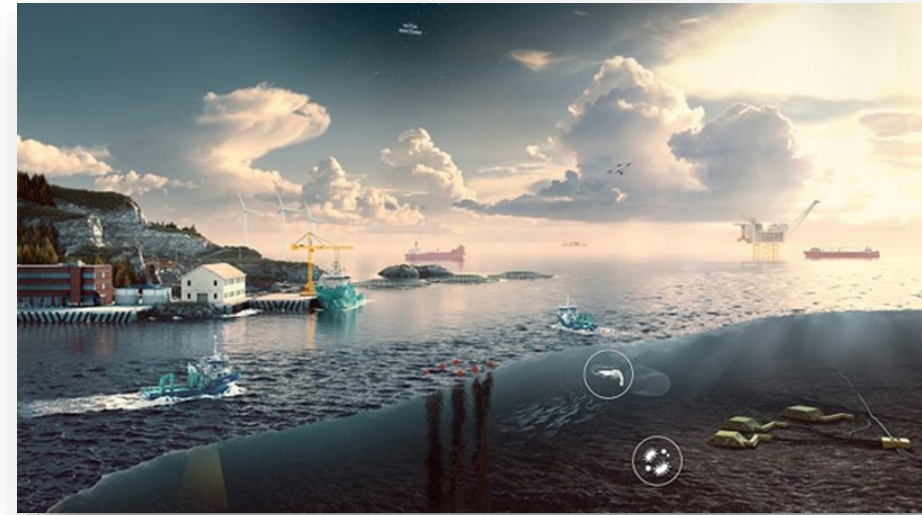
wintershall dea





Depleted reservoirs

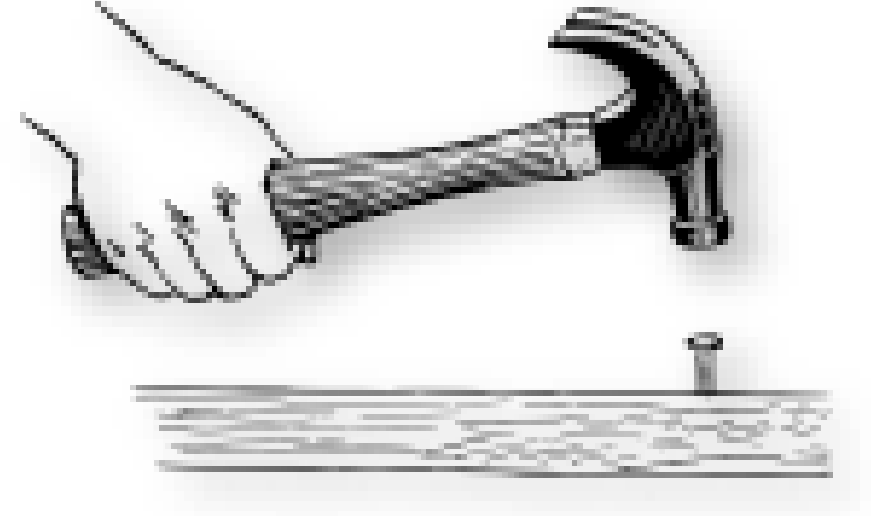
- Most pilots, demonstrations and large-scale CO₂ storage operations target aquifers
- In process of changing with Porthos e.g.
- Advantage of depleted reservoir:
 - Large capacity due to "empty" pore room
 - Refilling will only bring pore pressure back to close to original pressure
- Drawbacks:
 - Depletion process not uniform (stress concentration)
 - JT effect may lead to thermal stress associated fracturing





Project impact

- Enable "cold CO₂ injection" into depleted reservoirs
 - by offering operators recommendations on controllable parameters such as operational patterns and well designs
 - This will reduce costs and increase safety
 - The project will also have a strong communication focus.



Project key targets

- Increase available storage space for CO₂ by several hundred Gt
- Increase confidence in safe large-scale CO₂ storage
- Reduce CCUS project costs:
 - Avoid new infrastructure
 - Minimise storage qualification costs
 - Reduce injection-related costs



- WP2: Initial calculations made on operating window of well avoiding freezing of well fluids and formation of hydrates
- WP3: Planning of lab campaigns, purchase of outcrop sandstone and field trip to Whitby to take shale outcrop cores. First CO₂ hydrate formation tests at TUBAF
- WP5: Gathering of field cases from which constraints on lab testing will be made and synthetic model generated



The Guardian, Pixabay



Thank you for your
attention!

www.return-act.eu