ACT KNOWLEDGE SHARING WORKSHOP 2020

REX-CO_2 Re-using Existing wells for CO_2 storage operations

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REX-CO_2 re-using existing wells

Accelerating CCS Technologies

This project has received funding from ADEME (FR), RVO (NL), RCN/CLIMIT (NO), UEFISCDI (RO), BEIS (UK), and DOE (USA), under the EU Horizon 2020 programme ACT, Project No. 299681. The contents of this publication reflect only the author's view and do not necessarily reflect ERA-NET ACT's position. ERA-NET ACT is not liable for any use that may be made of the information contained here.

Motivation

- Many hydrocarbon fields approach their **end of life**. Existing infrastructure needs to be decommissioned with tremendous efforts and at high costs
- Substantial **savings** could be realized by re-using these wells
- Existing wells in these assets present both **opportunities and challenges**
- For the the potential re-use of wells, **knowledge is limited** and key infrastructure is at risk of being decommissioned

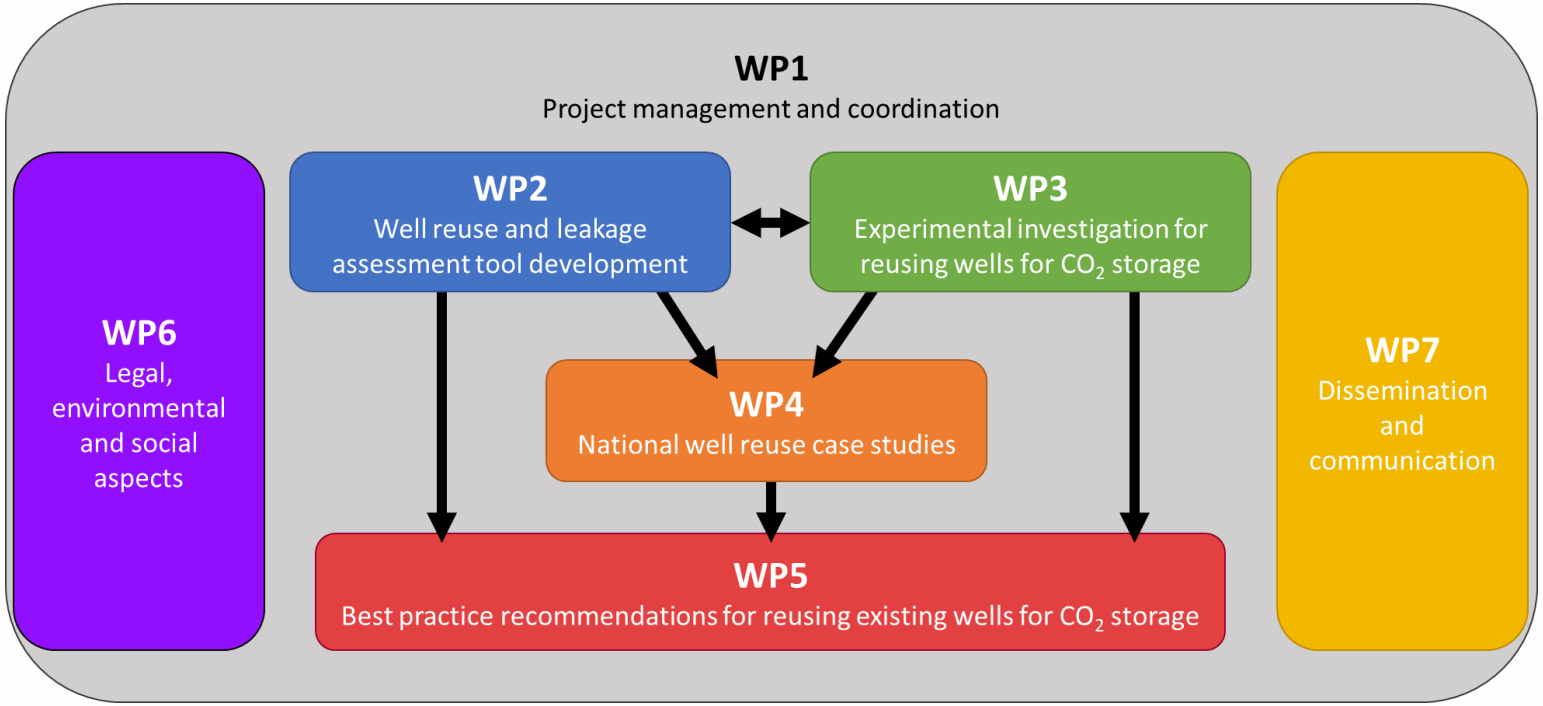
- We need a (automated) **qualification process**

REX-CO_2 Objectives

The overall objective of REX-CO_2 is to provide decision makers with mechanisms and information to evaluate re-use potential of existing oil and gas well infrastructure

- Development of a well re-use assessment and **screening-tool** (WP2)
- Determining the **impact of previous well operations** on wellbore materials and workover or remediation actions required for reuse (WP2-4)
- New **well remediation technologies** and assessing the impact of well re-use on material properties through laboratory experimentation (WP3)
- **Demonstrate** potential value of well re-use applications by performing assessments on multiple storage sites (WP4)
- Develop **recommendations for re-using** existing wells' (WP5)
- **Regulatory, environmental and public acceptance** aspects of well re-use for CCUS (WP6)

Project structure



Leads:

- WP1 TNO: Jan Hopman
- WP2 LANL: Rajesh Pawar
- WP3 SINTEF: Torbjorn Vralstad
- WP4 TNO: Kaj van der Valk
- WP5 BGS: John Williams
- WP6 GEOECOMAR: Alexandra Dudu
- WP7 TNO: Logan Brunner

The consortium

No.	Organisation	Country	Type of organisation
1	TNO (coordinator)	Netherlands	R&D
2	SINTEF	Norway	R&D
3	ReStone AS	Norway	Industry, SME
4	LANL	USA	R&D
5	Chevron	USA	Industry, O&G operator
6	BGS	UK	R&D
7	IKON	UK	Industry, SME
8	GeoEcoMar	Romania	R&D
9	CO_2Club	Romania	NGO
10	IFPEN	France	R&D
11	Equinor AS	Norway	Industry, O&G operator
12	BP	UK	Industry, O&G operator
13	Wintershall	Netherlands	Industry, O&G operator
14	NAMR (stakeholder role)	Romania	National Authority for CO_2 geological storage
15	Oil & Gas Authority-OGA (stakeholder role)	UK	National Authority for CO_2 geological storage
16	IRO (stakeholder role)	Netherlands	Branch Organization of O&G service companies
17	EBN (stakeholder role)	Netherlands	Industry, O&G operator

- 13 research partners
- 4 stakeholder parties
- 6 Nations

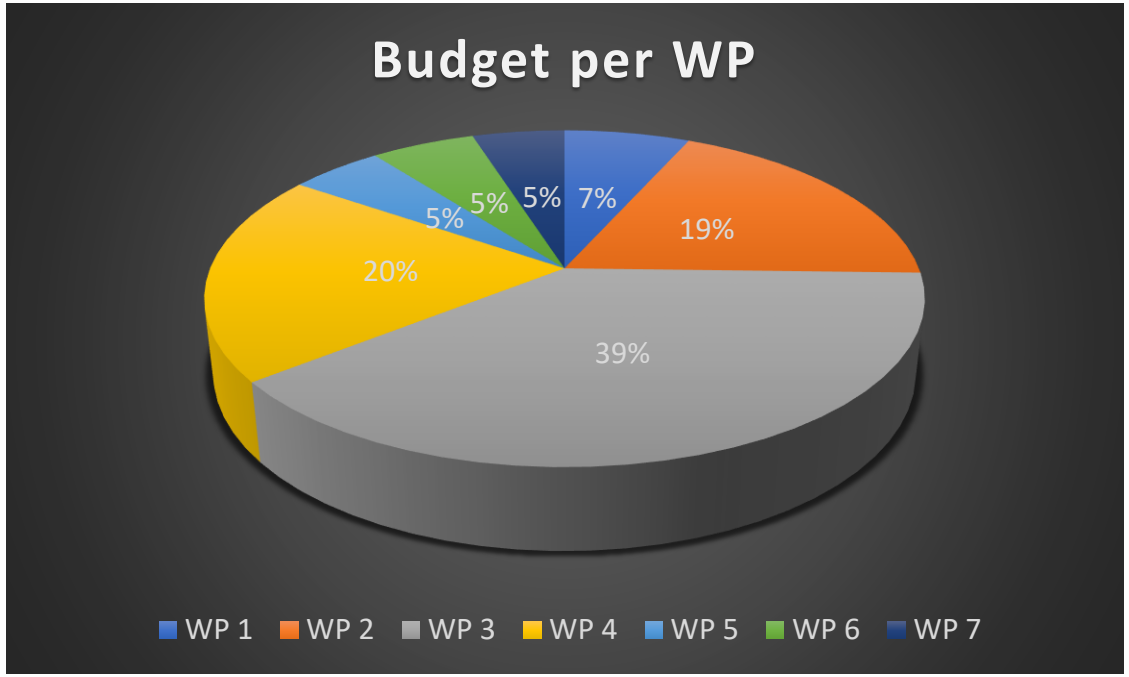
- 6 R&D organizations
- 2 SMEs
- 2 national authorities
- 1 branch organization
- 1 NGO
- 5 operators

Project information

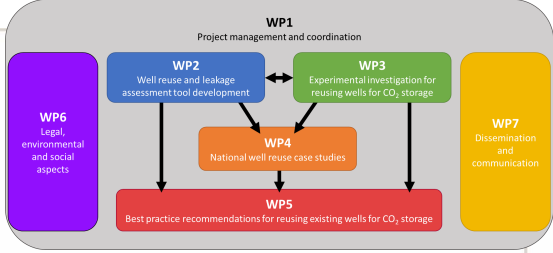
- Project duration: September 1st 2019 – August 31st 2022

- Total budget: €3.525.468
- ERA-ACT Funding: €2.533.121

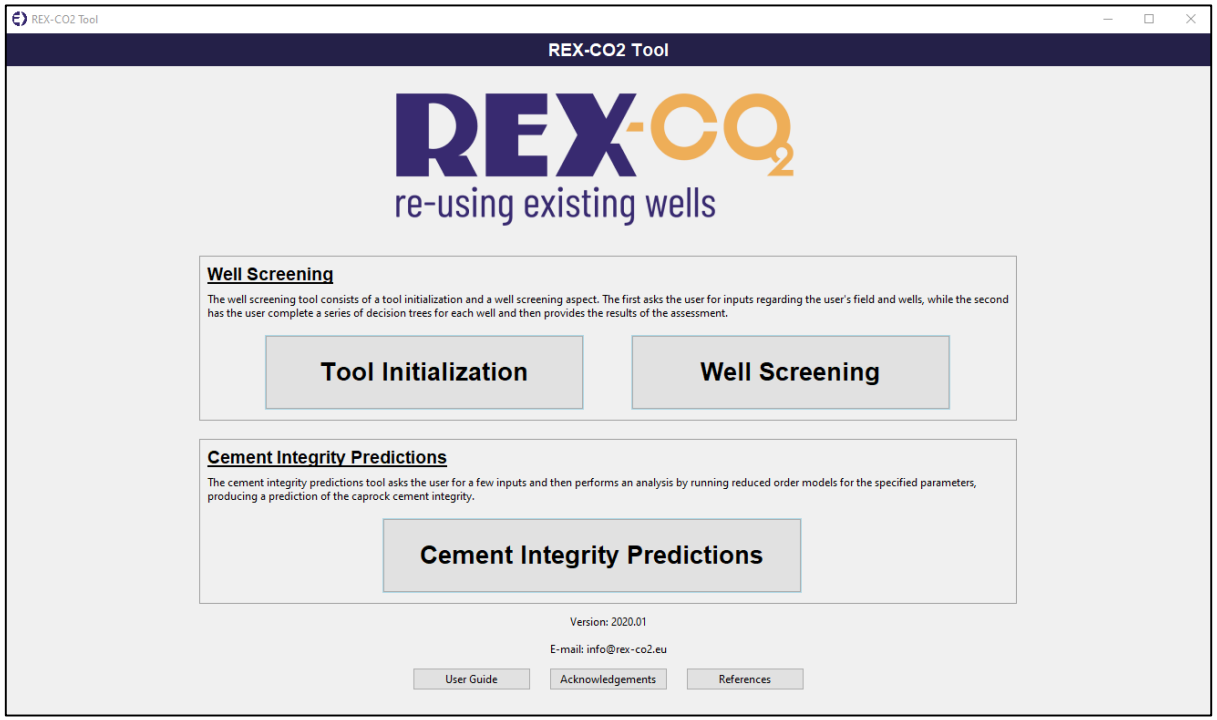
- 33 Deliverables
- 19 Milestones



WP2 REX-CO_2 Tool



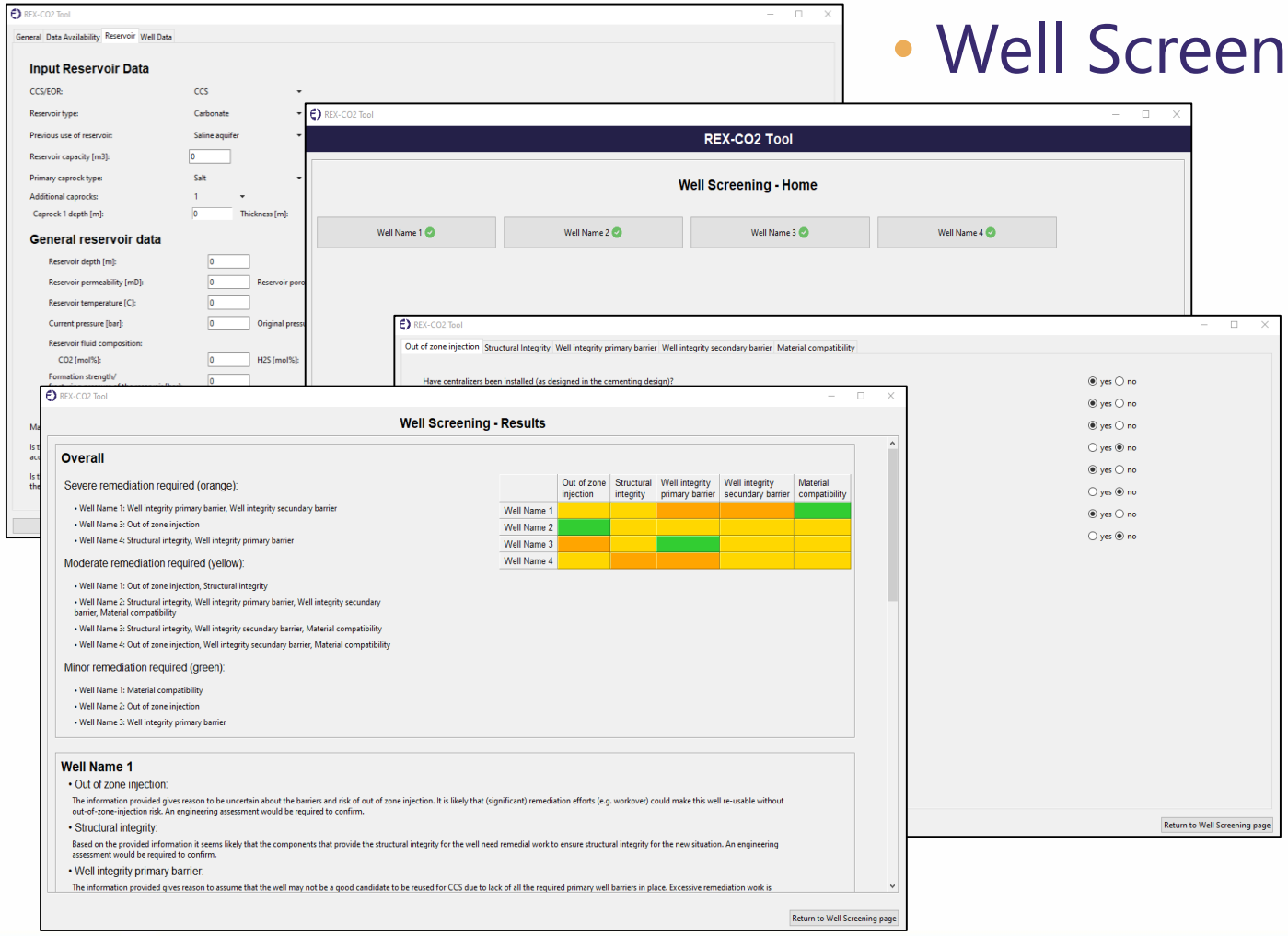
- 2 parts of the tool:
  - Well Screening
    - User input and series of decision trees
  - Cement Integrity Predictions
    - Quick geomechanical model and leakage model are run



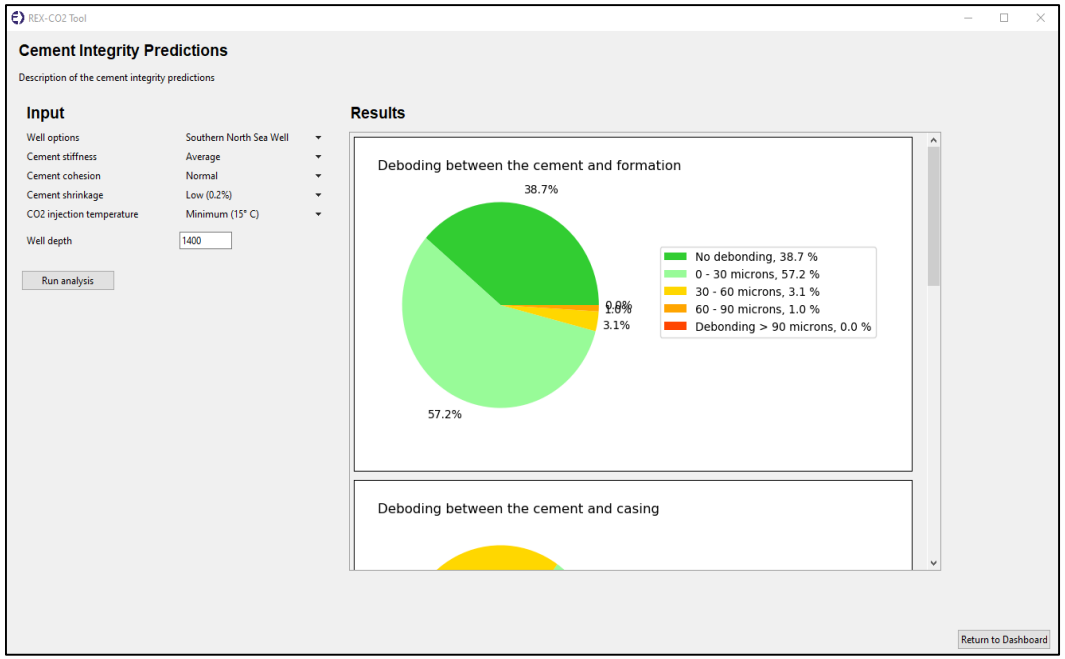
- First version is being tested internally on WP4 national case studies

WP2 REX-CO_2 Tool Input and Results

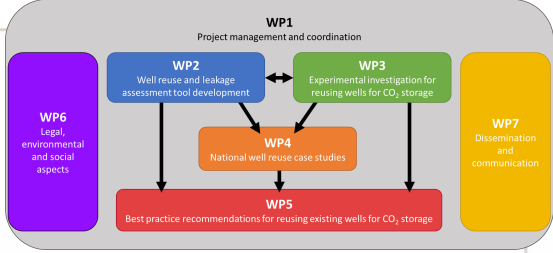
- Well Screening – input and results



- Cement integrity predictions – input and results

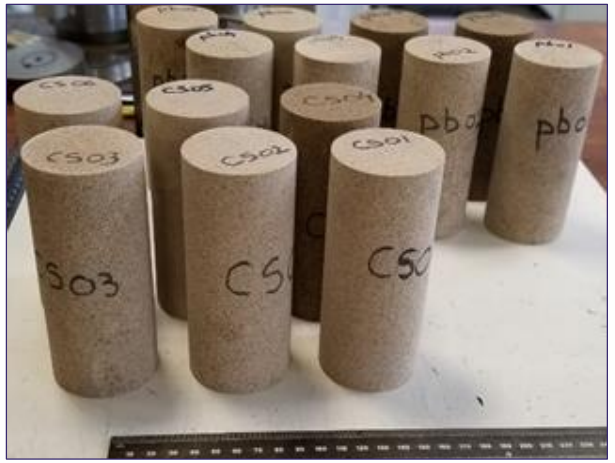


WP3 Experimental investigation for re-using wells for CO_2 storage

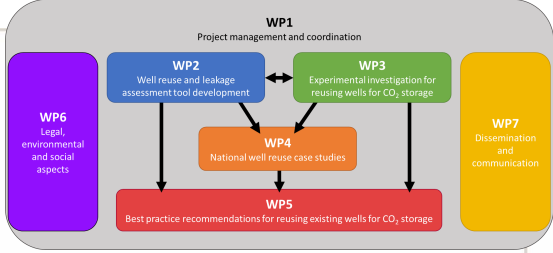


- Preparation of experimental work
- Webinar to align WP3 in April 2020
- Start-up of laboratory investigation:
  - Radial crack and microannuli development and remediation,
  - Characterization of cement interfaces,
  - Bio-remediation to seal porous materials, and
  - State of stress in cement
- (some delays from COVID-19)

Push-out mould with sandstone and cement slurry for shear bond tests at IFPEN

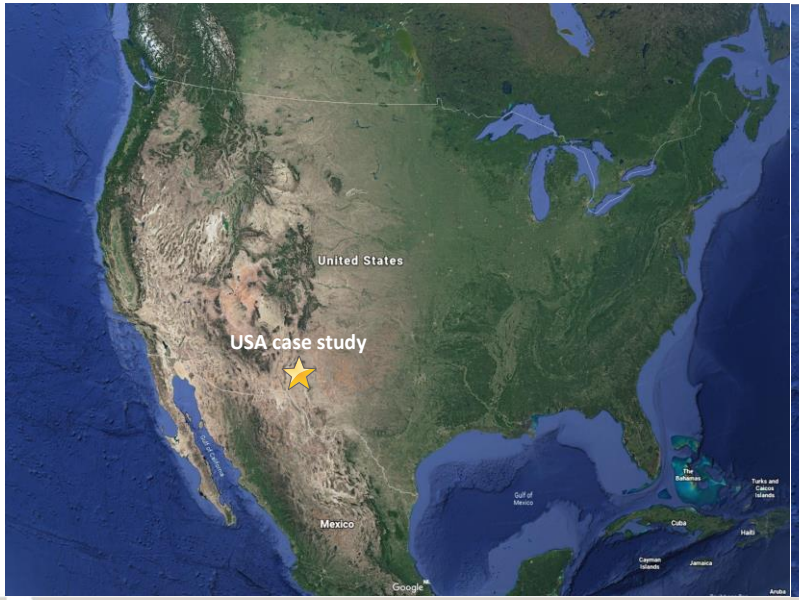


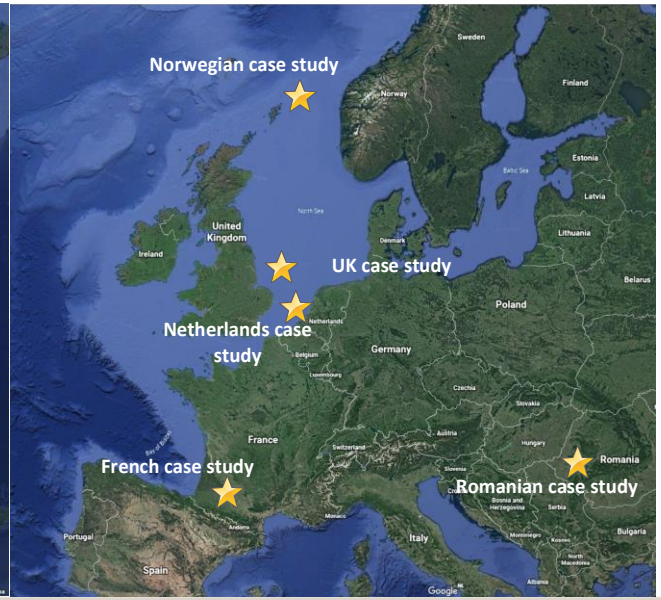
Rock samples to be tested for mechanical properties at BGS



WP4 Well re-use case studies

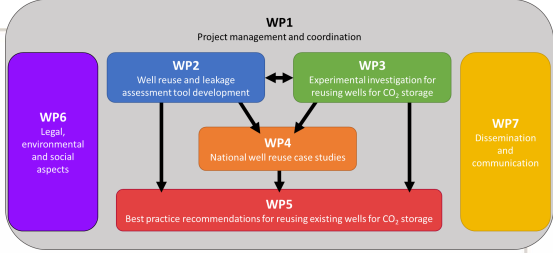
- Defined case study selection criteria
- Selected case studies with industry partners
- Gather data for assessments
- Currently doing dry run assessments with tool (1-2 wells per country)





- Location: on- and offshore
- Applications: CCS and CO_2 EOR
- Depths: 1400 – 5000 m
- Reservoir rock: Sandstone and carbonate
- Reservoir type: Gas field, oil field, aquifer
- Reservoir capacity: 37 – 280 Mt CO_2
- Number of available wells >100

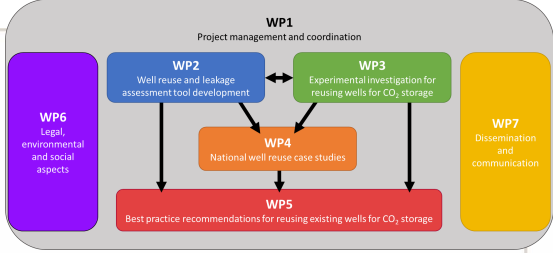
WP5 Recommendations for re-using existing wells



- Some initial activities

- Main effort depends on WP3 & WP4

WP6 Legal, environmental and social aspects



- Non-technical aspects that influence the implementation of well re-use application, from regulatory (legal) aspects to public acceptance
  - Assessment of national legal frameworks (D6.1)
  - Sample application (workshop with a.o. regulators)
  - Guidelines for permitting process

  - Public perception and acceptance of well re-use for CCS

Conclusion

- Project on track
- Case studies selected (with industry stakeholders)
- Wintershall joined REX-CO_2
- REX-CO2 screening tool operational

REX-CO2

re-using existing wells

Thank you for your attention

https://www.rex-co2.eu

This project has received funding from ADEME (FR), RVO (NL), RCN/CLIMIT (NO), UEFISCDI (RO), BEIS (UK), and DOE (USA), under the EU Horizon 2020 programme ACT, Project No. 299681. The contents of this publication reflect only the author's view and do not necessarily reflect ERA-NET ACT's position. ERA-NET ACT is not liable for any use that may be made of the information contained here.