EAGE

2026 EAGE ANNUAL
87TH CONFERENCE & EXHIBITION
ABERDEEN | UK

MMV - FROM CONFORMANCE TO APPRAISAL - TURNING MEASUREMENT INTO EVIDENCE

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Affiliations:*Equinor ASA [Δ]Equinor UK

HOSTED BY bp

MAXIMIZING RECOVERY
UNLOCKING VALUE THROUGH TECHNOLOGY AND PARTNERSHIPS

Outline

Low Carbon Solutions in Equinor

Purpose of MMV

Technology in focus

Collaboration with regulators

Our CO_2 storage portfolio

10,858 days of safe CO_2 storage*
287 days since Northern Lights operational*
12(+2) licence positions globally
3 projects in operations
1 in execution phase

- CO_2 storage sites under development / licenses
- CO_2 storage sites in operation

*days since start-up to today (8th June 2026)

Recent and current activities

Northern Endurance Partnership

CO_2 Storage Kalundborg

A project by Equinor, Ørsted & Nordsøfonden

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The purpose of MMV

Why?

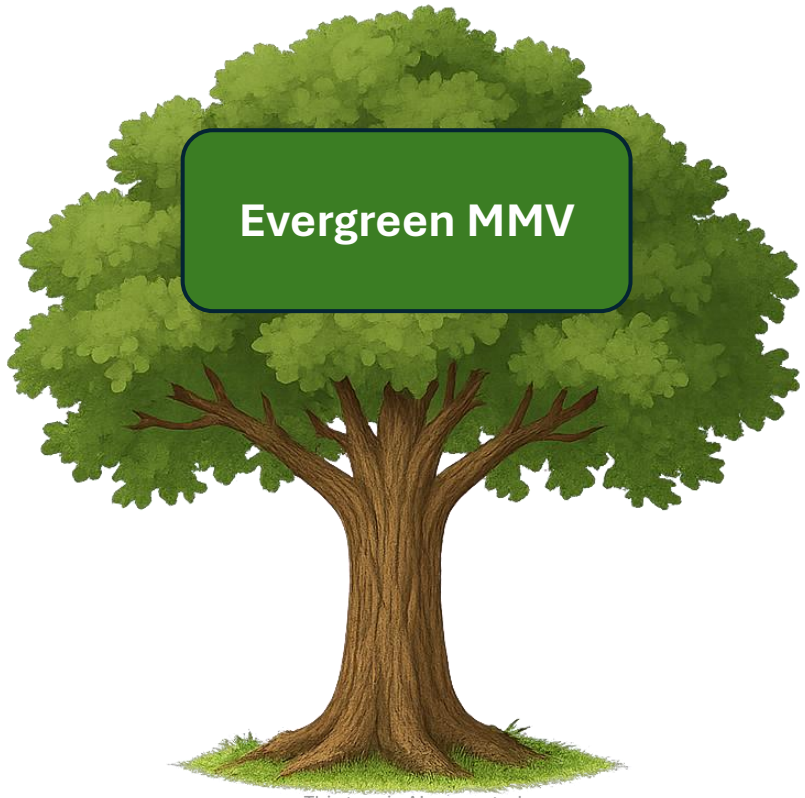
Ref ISO 27914:

1. Manage risk
2. Demonstrate storage performance
3. Provide confidence in containment

From conformance to appraisal

1. Shared pressure spaces
2. Updating site capacity estimates
3. Adaptable to future technologies

Regulations | Site assessment | Psychology



This tree is AI generated

Co-location | Site capacity | Flexible

The purpose of MMV

Who's job is it? Somebody!

It's not '*just*' geophysics...

...but a team effort

Subsurface

Facilities

Drilling and completions

Communications

Regulatory and advocacy

Commercial

HSE specialists

Economic analyst / valuations

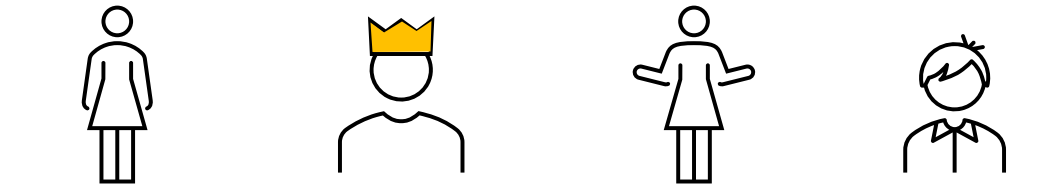
...

A non-exhaustive list

Technologies
Time-lapse 2D seismic
Time-lapse 3D seismic
Permanent seismic receivers
Retriveable seismic nodes
Permanent seismic sources
Crosswell seismic
VSP (geophones)
VSP (DAS)
Spot light
Crosswell ERT
DAS at surface/seabed
Crosswell EM
Gravimetry
Repeated logs
In-well P gauges
In-well T gauges
In-well DAS
In-well DTS
Surface ERT
Tracer injection
Monitoring well(s)
Insar
Tilt-meters
GPS
CSEM
Chemical sampling
Atmo-spheric
Sonar/ echo beam

The purpose of MMV

Who's job is it?



Everybody was asked to do it; Everybody was sure Somebody would do it. Anybody could have done it, but Nobody did. Somebody got angry because it was Everybody's job. Everybody thought Anybody would do it…

…Everybody blamed Somebody when Nobody did what Anybody could have done

Technology in focus

Fibre enabled

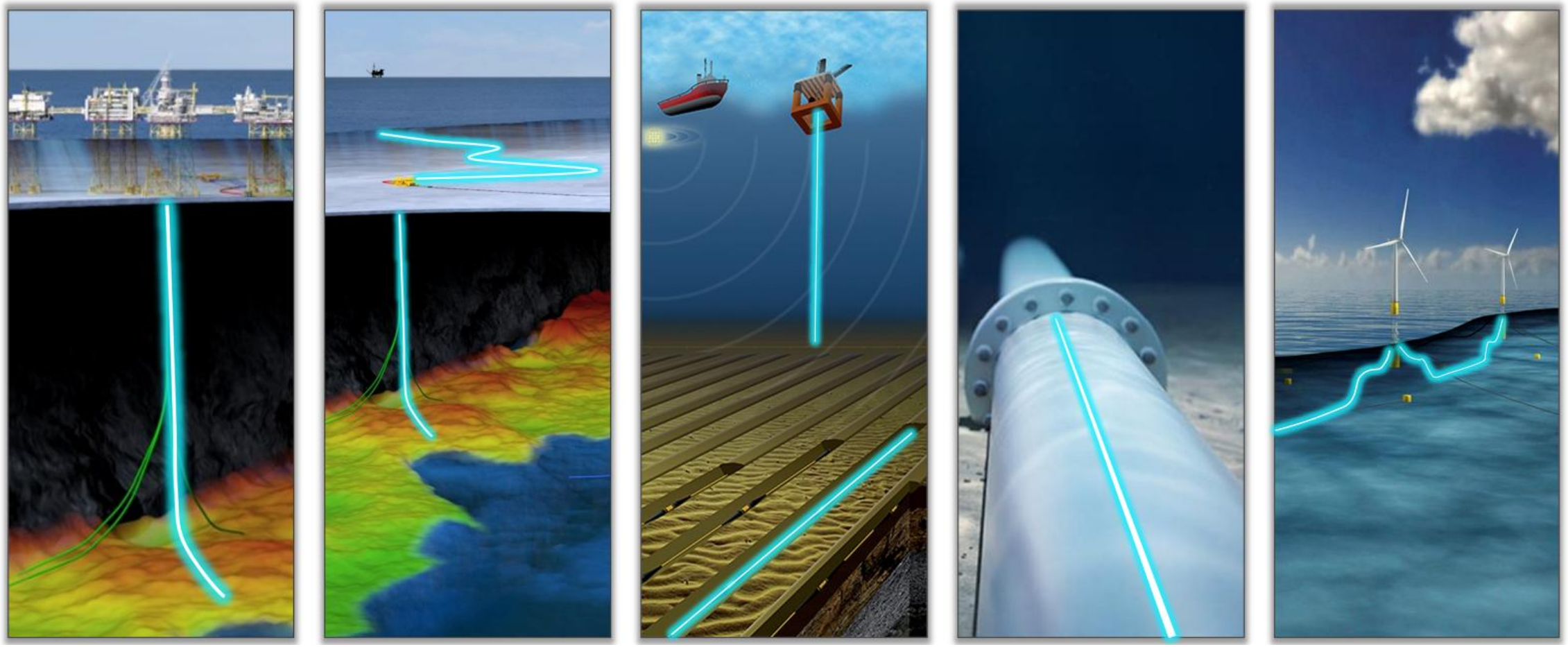
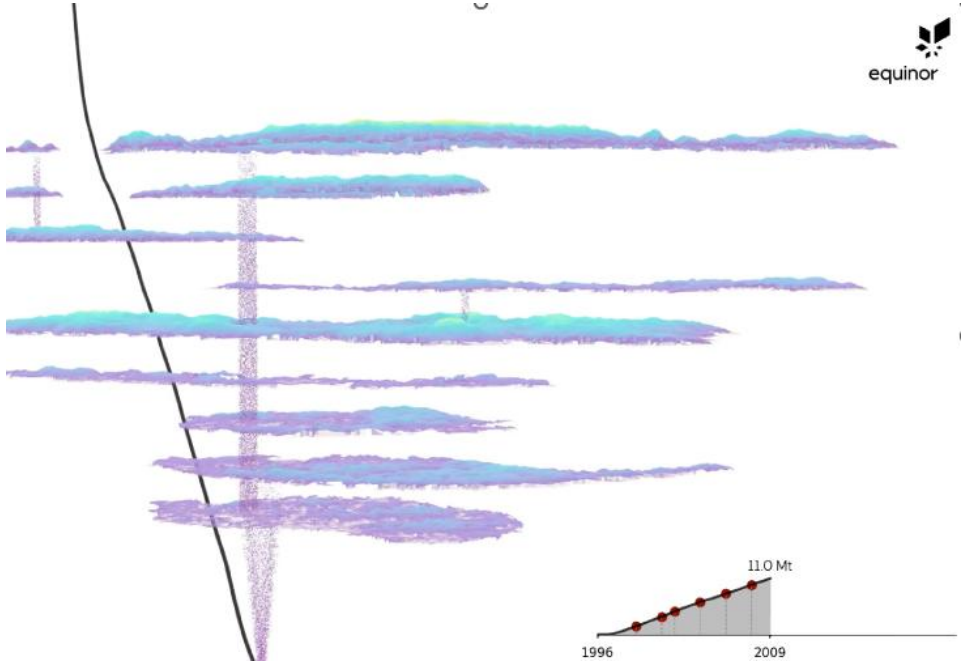


Image from Richard Tøndel et al.

The first mover anchor bias

Evidence of learning



- ✓ **Seismic acquisition every ~2.5 years**
  - ✓ 1 3D per ~ 2 Mt stored
- ✓ **~90 publications**

BUT

Sleipner MMV plan can't be the baseline?

How can learnings from early movers be applied to projects later in the funnel?

Monitoring technologies	1994	1999	2001	2002	2004/ 2005	2006/ 2007	2008/ 2009	2010/ 2011	2012/ 2013	2014/ 2015	2016	2020	2021	2022	2023	2024	2025
Seismic	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓					
Gravimetry				✓	✓		✓		✓								
CSEM						✓											
Short streamer												✓	✓	✓			
OBN test															✓		

Furre, A.-K., Warchol, M.J., Alnes, H. and Ponten, A.S.M., 2024. Sleipner 26 years: how well-established subsurface monitoring work processes have contributed to successful offshore CO2 injection. Geoenergy, v.2, geoenergy2024-015
https://www.tgs.com/seismic/multi-client/europe/north-sea/sleipner

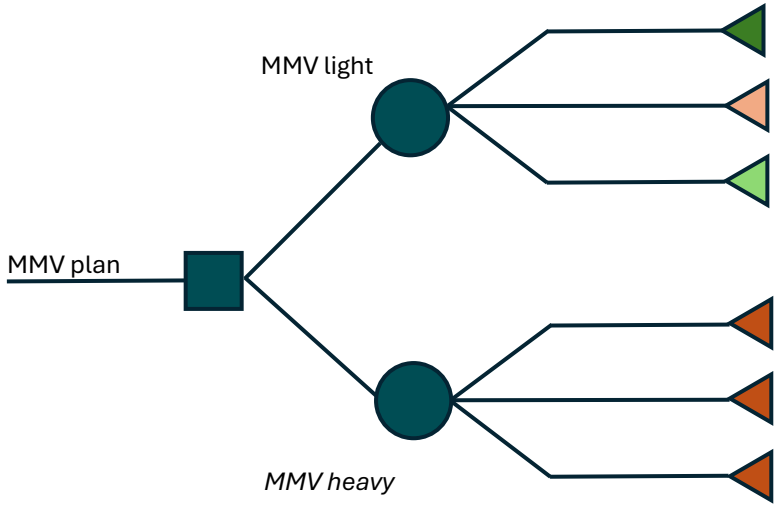
Working with authorities

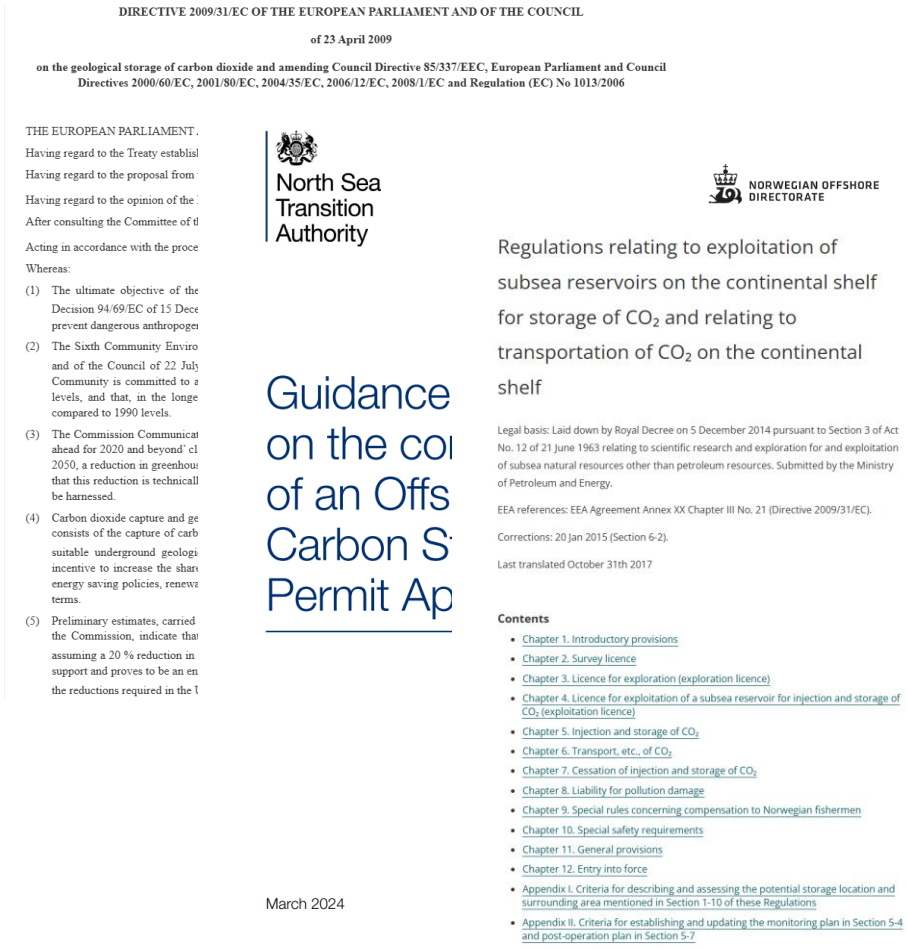
MMV must include the *non-negotiables*;

Built upon risk assessment & provide meaningful and reliable information, supported by a response plan

MMV should be;

Compliant, whilst fostering innovation. Considered a form of appraisal and therefore demonstrate positive value to the project.





DIRECTIVE 2009/31/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 23 April 2009

on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006

THE EUROPEAN PARLIAMENT,

Having regard to the Treaty establis

Having regard to the proposal from

Having regard to the opinion of the

After consulting the Committee of t

Acting in accordance with the proce

Whereas:

(1) The ultimate objective of the Decision 94/69/EC of 15 Dece prevent dangerous anthropoge

(2) The Sixth Community Enviro and of the Council of 22 July Community is committed to a levels, and that, in the longe compared to 1990 levels.

(3) The Commission Communicat ahead for 2020 and beyond' cl 2050, a reduction in greenhou that this reduction is technicall be harnessed.

(4) Carbon dioxide capture and ge consists of the capture of carb suitable underground geologi incentive to increase the shar energy saving policies, renew terms.

(5) Preliminary estimates, carried the Commission, indicate tha assuming a 20 % reduction in support and proves to be an en the reductions required in the

North Sea Transition Authority

Guidance on the co of an Offs Carbon S Permit Ap

March 2024

NORWEGIAN OFFSHORE DIRECTORATE

Regulations relating to exploitation of subsea reservoirs on the continental shelf for storage of CO_2 and relating to transportation of CO_2 on the continental shelf

Legal basis: Laid down by Royal Decree on 5 December 2014 pursuant to Section 3 of Act No. 12 of 21 June 1963 relating to scientific research and exploration for and exploitation of subsea natural resources other than petroleum resources. Submitted by the Ministry of Petroleum and Energy.

EEA references: EEA Agreement Annex XX Chapter III No. 21 (Directive 2009/31/EC).

Corrections: 20 Jan 2015 (Section 6-2).

Last translated October 31th 2017

Contents

"The objective of any investment is to create additional value; it is not an objective to reduce uncertainty per se"

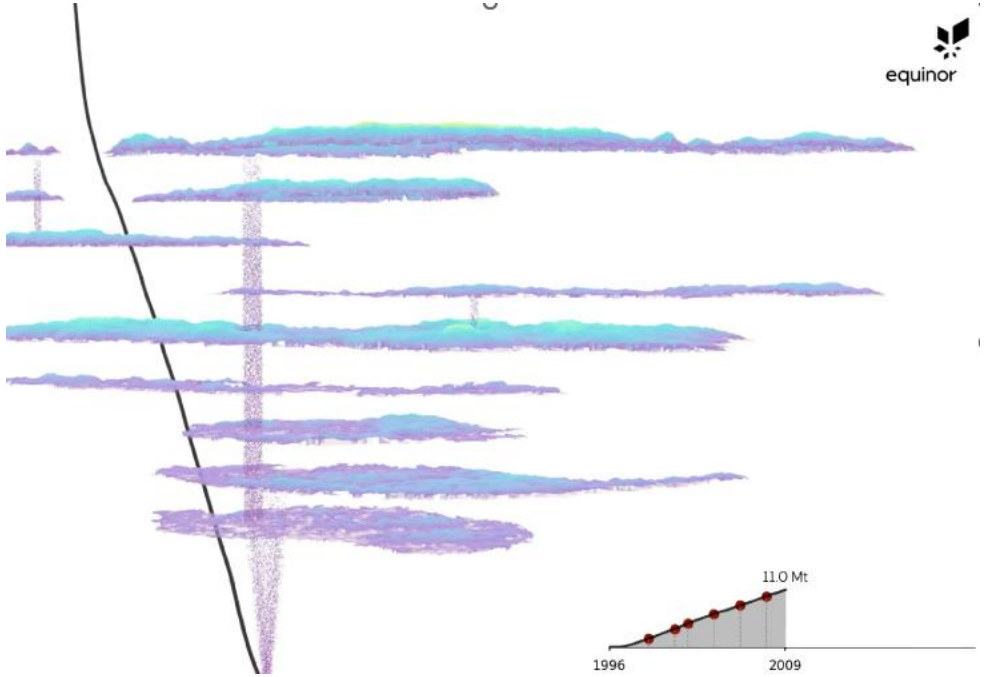
Conclusion & discussion points

How to move MMV forward

- Regulator engagement
- Vendor forums
- Toolbox conclusion – no one size fits all
- Cost effective toolbox is an area to develop
- Opportunities for funding for technology development
- Collaboration with Academia
- Pragmatic decision making

From conformance to appraisal – turning measurement into evidence

Sleipner CO_2 storage



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Opportunities to hear more CCS related presentations from Equinor

Karim Souissi - Lessons Learnt from a CCS 3D Land and Transition Zone Seismic Survey in Denmark | Acquisition Geometries & Hardware | **Thurs 11th 08:50-09:10**

Emma Dawson – CCS Risk and The Energy Transition | DS09 – CCS Across Sectors | **Thurs 11th 09:10-09:30**

Willemijn Ogg – Panel discussion | *Maintaining transition momentum* | **Thurs 11th 11:45-12:45**

Sondre Torset- Testing surface distributed acoustic sensing in Denmark: Experimental overview and initial results | CCS: Site Operations & Monitoring -2 | **Thurs 11th 16:10-16:30**