



NCCS

NORWEGIAN CCS RESEARCH CENTRE
Industry-driven innovation for fast-track CCS deployment

NCCS kick-off

2016-11-04

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Industry-driven innovation for fast-track CCS deployment



CENTRE FOR
ENVIRONMENT-
FRIENDLY ENERGY
RESEARCH

The Research Council of Norway

Outline

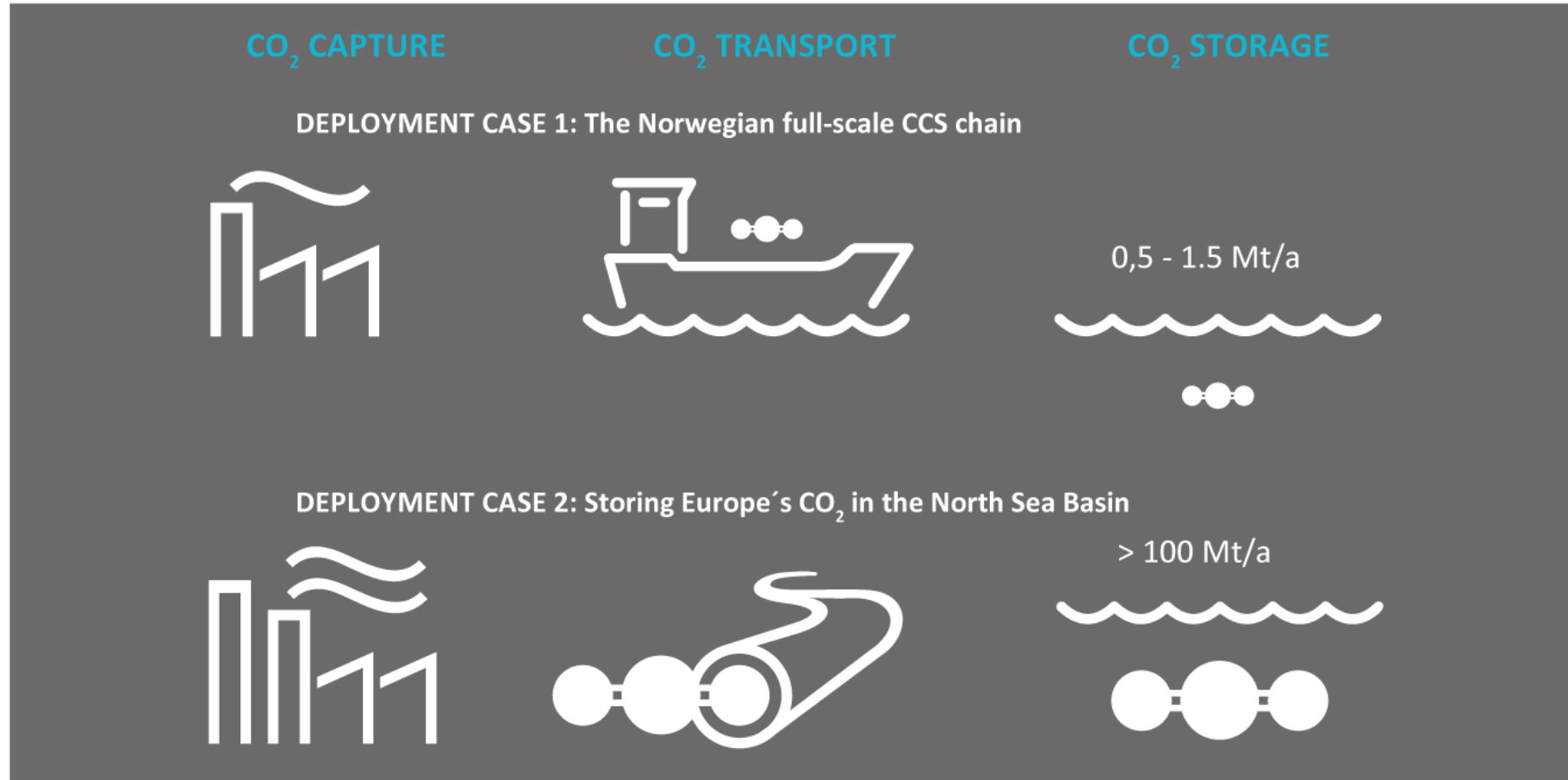
- Vision
- Deployment cases
- High-performing education
- A world-leading partnership
- An innovation platform



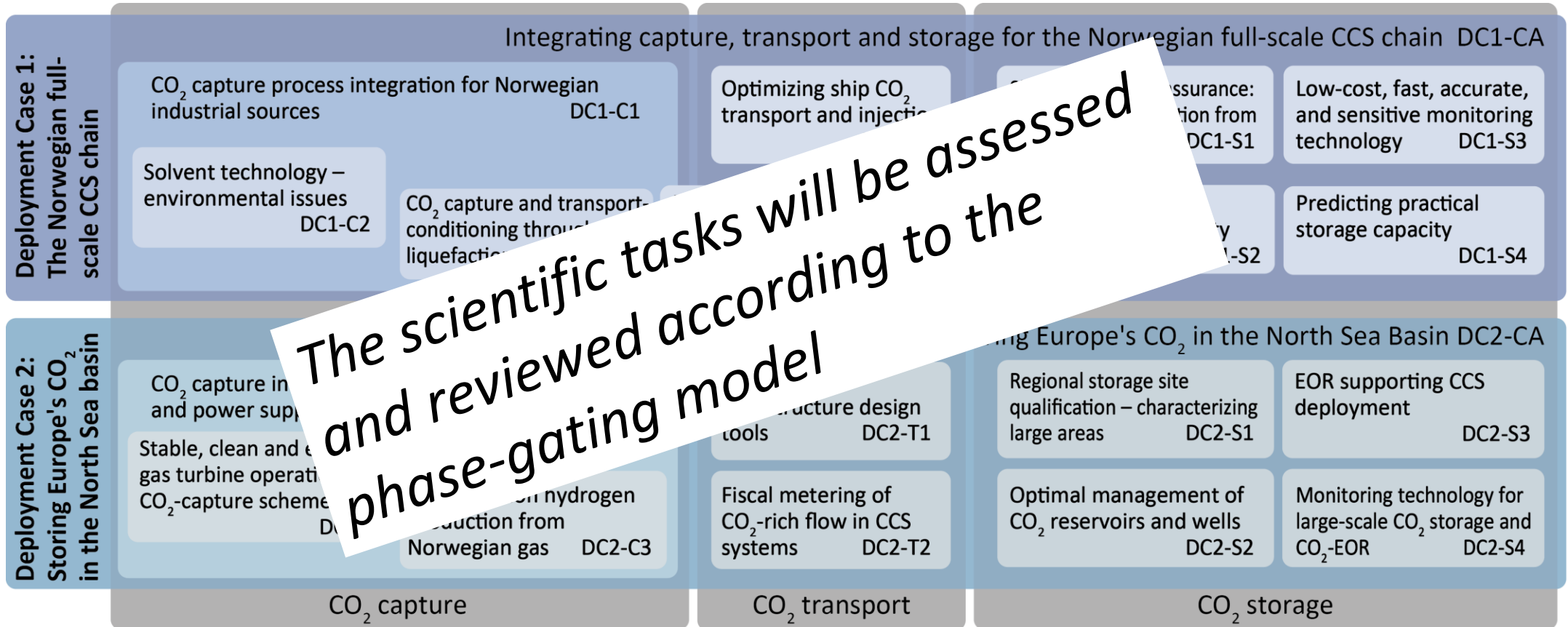
Vision

NCCS will enable fast-track CCS deployment through industry-driven science-based innovation, addressing the major barriers identified within demonstration and industry projects, aiming at becoming a world-leading CCS centre

Approach - Deployment cases



Research tasks



The scientific tasks will be assessed and reviewed according to the phase-gating model

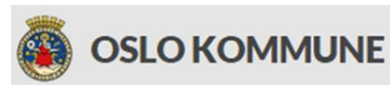
High-performing education



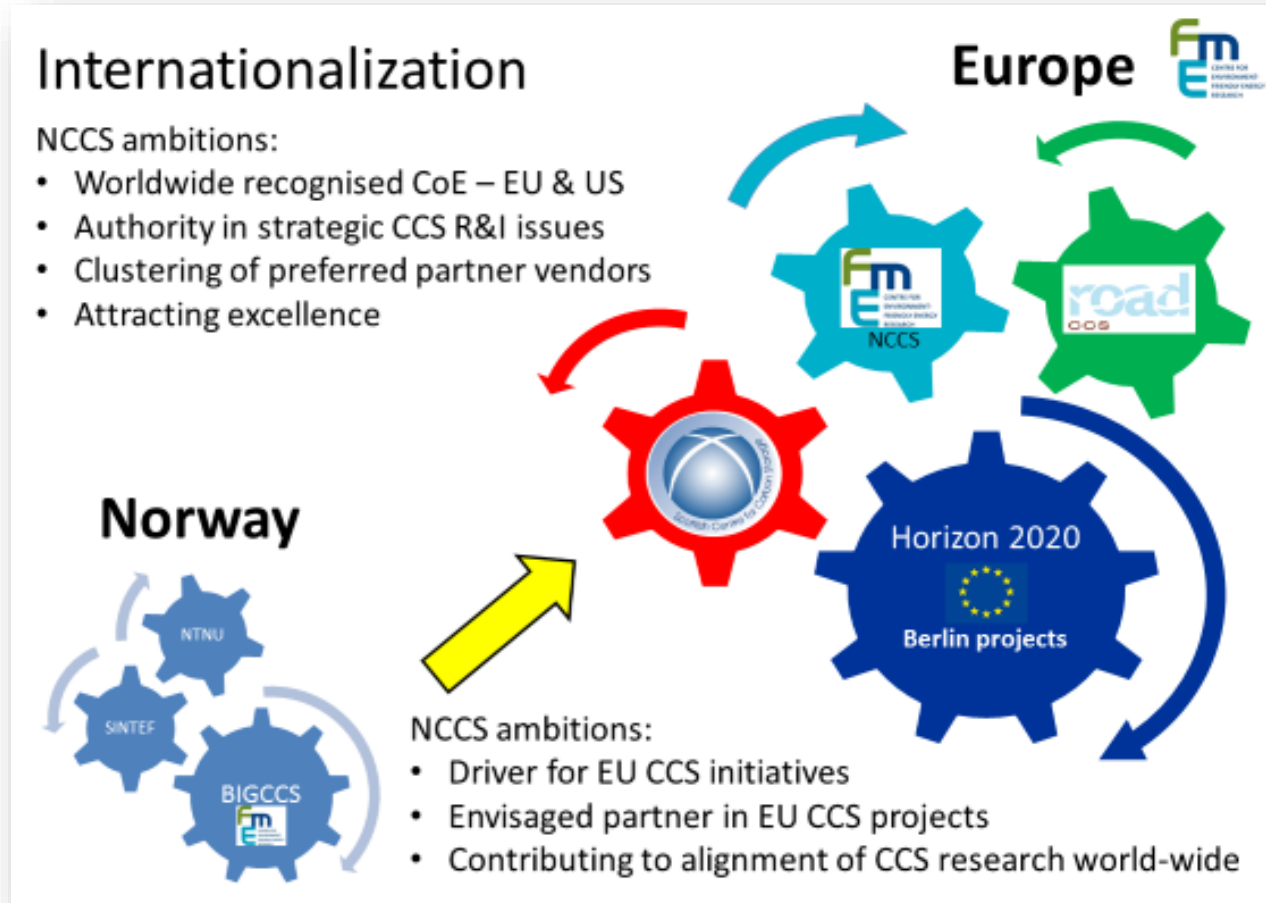
NCCS Centre	Phase I		Phase II		Phase III		Phase IV		Milestone title
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	
Roadmaps for Deployment Case 1 and 2	◆	◆		◆					Alignment Measures for fast-track CCS Targeted actions Deliver solutions for large-scale CCS
Expected mid-term eval.					◆				
Conferences		◆			◆			◆	TCCS 9, 10, 11 & 12 (2017, 2019, 2021, 2023) & GHGT 15 (2020)
Task Name	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	Milestone title / Short PhD title / Supervisor
DC1-CA Chain assessment							PhD		Multi-criteria evaluation of performance of case, Prof Tomasgard
DC1-C1 Capture proc. int.			◆	◆					Compl. screening (Y3), low temp. and solvent tech. int.(Y4) and capt. design (Y5)
DC1-C2 Solvent tech - environ.		◆	◆	◆			PhD		Mist formation, Prof Knuutila, Hoff & Einbu Online cont. characterization of liquid phase, Prof Knuutila, Hoff & Einbu
DC1-C3 Capt. through liquef.			◆		◆				Completed detailed design (Y3) and exp. Campaign (Y5) in ind. scale pilot
DC1-T1 Ship CO ₂ transp.					◆				Optimized ship design (Y3), sim. tool for injection systems to partners (Y4)
DC1-T2 Thermodynamics		PhD			◆				VLE meas. and parameter fitting rel. for CCS, Prof Solbraa, Løvseth & Stang CCS mixture reference EOS development, Profs Span/Lemmon
DC1-S1 Site cont. assur.			◆	◆	◆		PhD		Acoustic emission localisation and moment tensor inversion, Prof Holt
DC1-S2 Wellbore integr.				◆				Postdoc	Sensitivity of cement logging tools, Prof Bauer
DC1-S3 Monitoring tech.				◆				PhD	Novel methods for quant. of rock and fluid param. based on geophys. data
DC1-S4 Storage capacity		PhD Postdoc							Site invest., incl. reservoir descr. and caprock risking, Prof Braathen Fluid vs storage program, Profs Hellevang/Braathen Validation of Norwegian storage regulative, Profs Banet/Bjørnebye/Bugge Tight reservoir storage validation, Prof Olaussen
DC2-CA Implem. strategies		Postdoc						PhD	Design & optim. of large-scale transp. & injection netw., Prof Tomasgard Large-scale CCS within the EU's Energy Union, Prof Tomasgard
DC2-C1 Capture proc. int.									Optimized H ₂ prod. concept, and dynamic GTCC operation in Europe
DC2-C2 Gas turb. oper.		PhD		◆				PhD	Exp. investigations into forced and self-excited azimuthal modes, Prof Dawson Effect of flame-flame interact. and fuel blends on transfer functions, Prof Dawson Thermo-acoustic resp. in can-annular combust. syst., Prof Sattelmayer Char. of acoustic prop. in can-annular combust. syst., Prof Sattelmayer
DC2-C3 Low-em. H ₂ prod.			◆		◆				Proved mat. stab > 5000h (Y3), Dem. long term stable oper. > 2000h (Y5)
DC2-T1 Pipeline tools		PhD						PhD	Mod. & exp., depres. of multicom. CO ₂ -mixt. in pipes, Prof Müller, Munkejord Large-scale transient behaviour of CO ₂ -transp. pipel., Prof Müller, Munkejord Mod. & num. methods for multicom. CO ₂ mixt. in pipes, Prof Abgrall Dyn. ductile fracture propag. and arrest in CO ₂ pipel., Prof Wierzbicki, Nordhagen
DC2-T2 Fiscal metering			◆		◆				Prototype testing of flowmeters and benchmarking of technologies
DC2-S1 Storage site qual.		PhD						PhD	Oligocene-Quat. as near-surf. Barr.; reg. anal., Profs Midtkandal/Faleide/Braathen Methodology for fault descr. and mod., Profs Braathen/Faleide/Skurtveit EU CO ₂ storage regulative, Profs Banet/Bjørnebye/Bugge CO ₂ cross-boarder transport regulative, Prof Banet
DC2-S2 Mng. CO ₂ res. & wells				◆					Prototype guideline tool and software (Y4) and recom. for opt. storage cap. (Y5)
DC2-S3 EOR sup. CCS depl.					◆				Mobility ctrl. of CO ₂ , recom. based on exp. and modelling activities
DC2-S4 Monitoring techn.			◆	◆					Geophysical imaging/inversion tools for a multi-well large-sc. CO ₂ storage scenario



A world-leading partnership

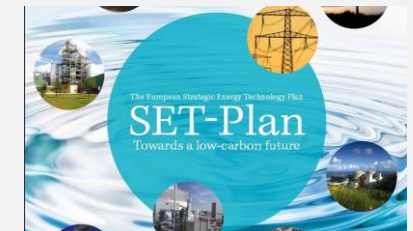


An innovation platform



MISSION INNOVATION

Accelerating the Clean Energy Revolution



US - NORWAY
COLLABORATION ON CCS/CCUS



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Thank You!