

OG21 - NORWAY'S OIL AND GAS TECHNOLOGY STRATEGY FOR THE 21ST CENTURY

Subsea Innovation Day April 28th 2020 Kjetil Skaugset, Head of OG21 TTA4 – Production, Processing and Transport

OG21 A COLLABORATIVE EFFORT ACROSS THE INDUSTRY



OG21'S VISION: TECHNOLOGIES AND INNOVATION FOR A COMPETITIVE NORWEGIAN PETROLEUM SECTOR

Government

bodies

OG21 INFLUENCE RESEARCH AND TECHNOLOGY DEVELOPMENT

- Forms basis for publicly funded R&D
- Stimulates industry R&D through:
 - Cooperation
 - Network
 - Communication



THE WORLD STILL NEEDS PETROLEUM...



Sources: IEA WEO 2018, NPD 2019

GREAT POTENTIAL ON NCS, BUT WE NEED A ROBUST STRATEGY THAT STANDS THE TEST IN TIMES OF VOLATILITY



We need to be: FASTER – CHEAPER - CLEANER

MARKET VOLATILITY



From Oslo Stock Exchange: ose.no

NCS COMPETITIVENESS



* Average lead time from final investment decision to production start up, in years.

Cheaper

Cleaner

Sources: Rystad Energy, OG21

WORKING UPHILL

Average lifting cost for NCS Opex per boe produced*



Kilder: Rystad Energy, OG21

-40% in 2030 zero in 2050

OG2

KonKraft report 2020

THE ENERGY INDUSTRY OF TOMORROW ON THE NORWEGIAN CONTINENTAL SHELF

CLIMATE STRATEGY 2030 TOWARDS 2050

Technologies to improve NCS competitiveness

Final report 08.10.2019

This document is the property of Rystad Energy. The document must not be reproduced or distributed in any forms, in parts or full without permission from Rystad Energy. The information contained in this document is based on Rystad Energy Sobial oil & gas database UCUBE, public information from company presentations, industry reports, and other general research by Rystad Energy. The document is not intended to be used on a stand-advectible basis but in comitation with other amentation in this document. The document is adjusted to revise and start start and the master of intendet and the based on information in this document in this document.

NO «SILVER BULLET» – MOST COST REDUCING TECHNOLOGIES HAVE MODEST EMISSION EFFECT

		Technology area	Target volumes [Billion boe]	Lead time [Years]	Volume effect [Million boe]	Cost effect [Billion USD real 2019]	Emissions effect [Million tn CO ₂]
	and environment	Offshore wind for offshore facilities		3-4 years	Neutral	16.0	
		Optimized gas turbines	8.4 (24%)	1-2 years	Neutral	-1.4	
		Power from shore technologies	10.8 (31%)			24.7	-137
		Compact CCS for topsides	7.2 (20%)	2-4 years	Neutral		-61
		Water diversion	18.5 (52%)	1-2 years	1850	18.6	-11
		CO₂ for EOR	18.5 (52%)				
		Field model optimization	10.4 (29%)	2-4 years	560		
		Big data exploration analytics			1900		-0.7
		Wired pipe technologies	16.1 (45%)		322	0 -14.3	-1.1
		Slot recovery technologies	11.5 (32%)	6-12 months			-0.4
		Automated drilling control	16.1 (45%)			-21.2	-3.1
Dilli	and	Smarter smart wells	11.5 (32%)	6-18 months	580	Neutral	-12
ing		Predictive maintenance	35.3 (100%)	1-2 years	1490	-42.9	-1.8
Cess	bort	Unmanned platforms	7.9 (22%)	2-4 years	335	-50. <mark>0</mark>	-4.7
TTA4	and trans	Standardized subsea satellites	10.4 (29%)	1 year	1500	-14.0	Neutral
luctio		All electric subsea	10.6 (30%)	2-3 years	450	-12.0	-0.5
Prod		Flow assurance	2.3 (6%)	2-3 years	Neutral	-14.1	Neutral
S	See a	appendix of Rystad Energy re	port for detailed assum	ptions and technology	evaluations	Short term (2020-2025) Long terr	m (2025-2050)

«NO SILVER BULLET» – NEED VARIETY OF NEW TECHNOLOGIES TO STAY COMPETITIVE

Photos, illustrations: AkerSolutions, Equinor, AkerBP, Schlumberger, IntelliServ, GettyImages, WESTGroup, InflowControl, DNV GL, Ramboll, Shutterstock

OG21 RECOMMENDS: CONTINUE AND STRENGTHEN TECHNOLOGY PRIORITIES

OG21 RECOMMENDS: INCREASED EFFORT ON LOW EMISSION TECHNOLOGIES

+ Evaluate stronger financial incentives

OG21 STRATEGY: TTA4 PRIORITIES

Main topics of Subsea Innovation day 2020:

- autonomy and robotics
- communication and underwater internet of things
- sensing, advanced data analysis, survey and inspection

OG21 VISION: TECHNOLOGIES AND INNOVATION FOR A COMPETITIVE NORWEGIAN PETROLEUM SECTOR

STRATEGIC OBJECTIVES:

- × Maximize resource utilization
- × Minimize environmental impact
- × Improve productivity and reduce costs
- × Develop innovative technologies
- × Attract, develop and retain the best talents

TTA4 - PRODUCTION, PROCESSING AND TRANSPORT: PRIORITIZED TECHNOLOGY NEEDS

Life extension of fields	Produced water handling	Unmanned operations	Efficient marine operations	Integrated monitoring
Lean stand-alone field development concepts	Flexible field development concepts	Cost-efficient utilization of host platform by subsea developments	Autonomous components, systems and decision support	Energy generation and management
Process simulation and optimization	High North flow assurance	High North shallow reservoirs, subsea facilities incl. subsea compression		

OG21 DEEP-DIVE 2020: MACHINE LEARNING IN THE PETROLEUM INDUSTRY

Project objective :

Describe how Machine Learning could improve value creation and reduce emissions on the Norwegian Continental Shelf.

Key questions:

- 1. How big is the opportunity related to ML on the NCS in terms of increased volumes, reduced costs and reduced environmental footprint?
- 2. To which extent is the Norwegian petroleum industry currently capable of developing and deploying ML to improve value?
- 3. How could ML be developed and adopted faster on the NCS?

Deep-dive from the OG21 archives:

PACKAGES: INCREASED FUNDING OPPORTUNITY

- Petromaks 2: 50 MNOK increase (300 MNOK total)
- Demo2000: 80 MNOK increase (150 MNOK total)
- Details: Presentation later today
 - <u>https://www.forskningsradet.no/</u>

Koronaviruset. Ny søknadsfrist, håndtering av prosjektendringer og andre tiltak (oppdatert 14. april)

Les saken

Hotel Scandinavia, 11.november 2020

Teknologispranget TENKE DET // VILLE DET // GJØRE DET

Keel

Hvordan digitale løsninger tar oss gjennom bølgene

Thank you for your attention

Reports available on www.og21.no

