

The Need for Innovation In the Oil and Gas Industry

- and the challenges to be overcome

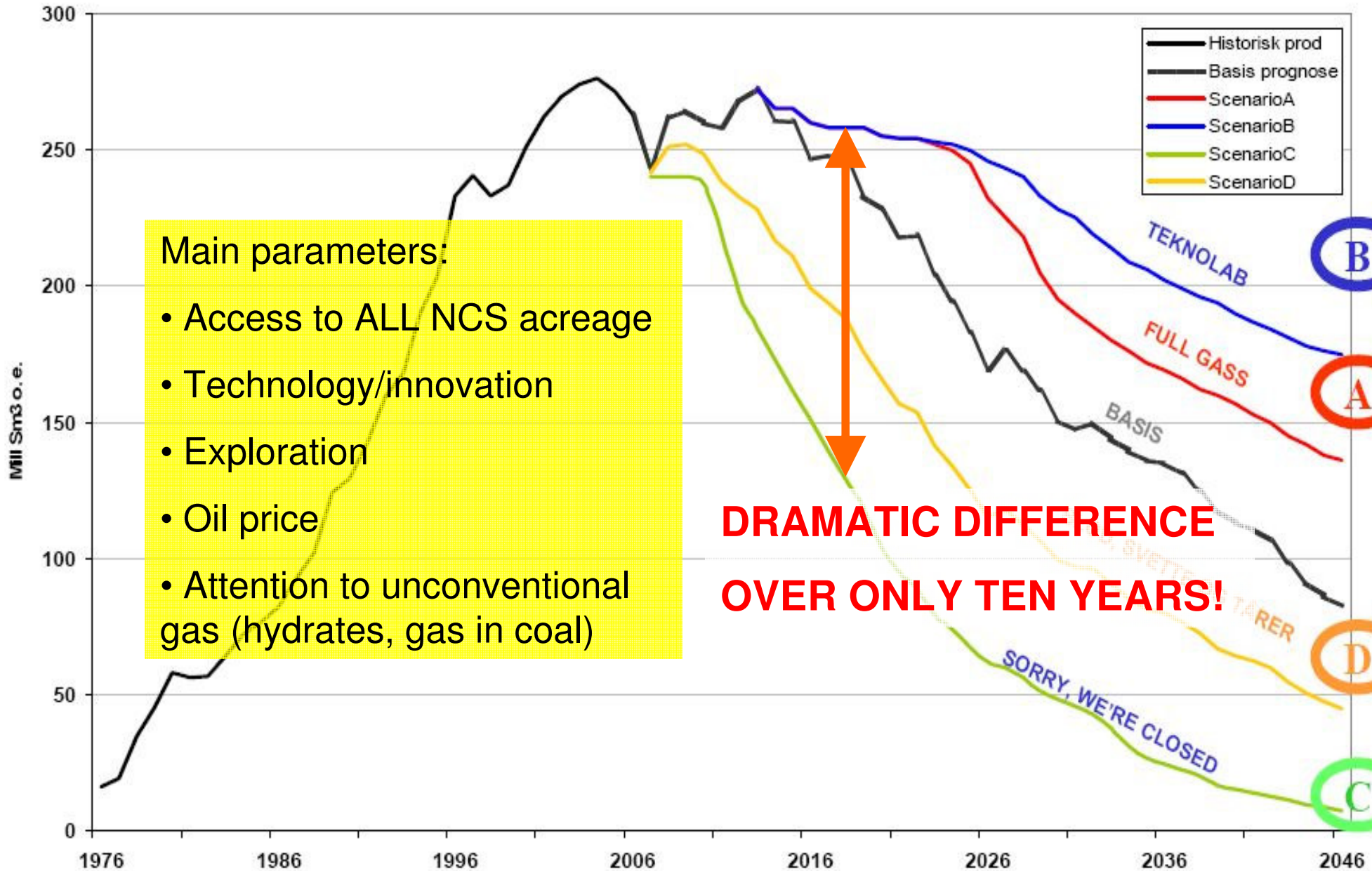
Hans Henrik Ramm

Ramm Kommunikasjon

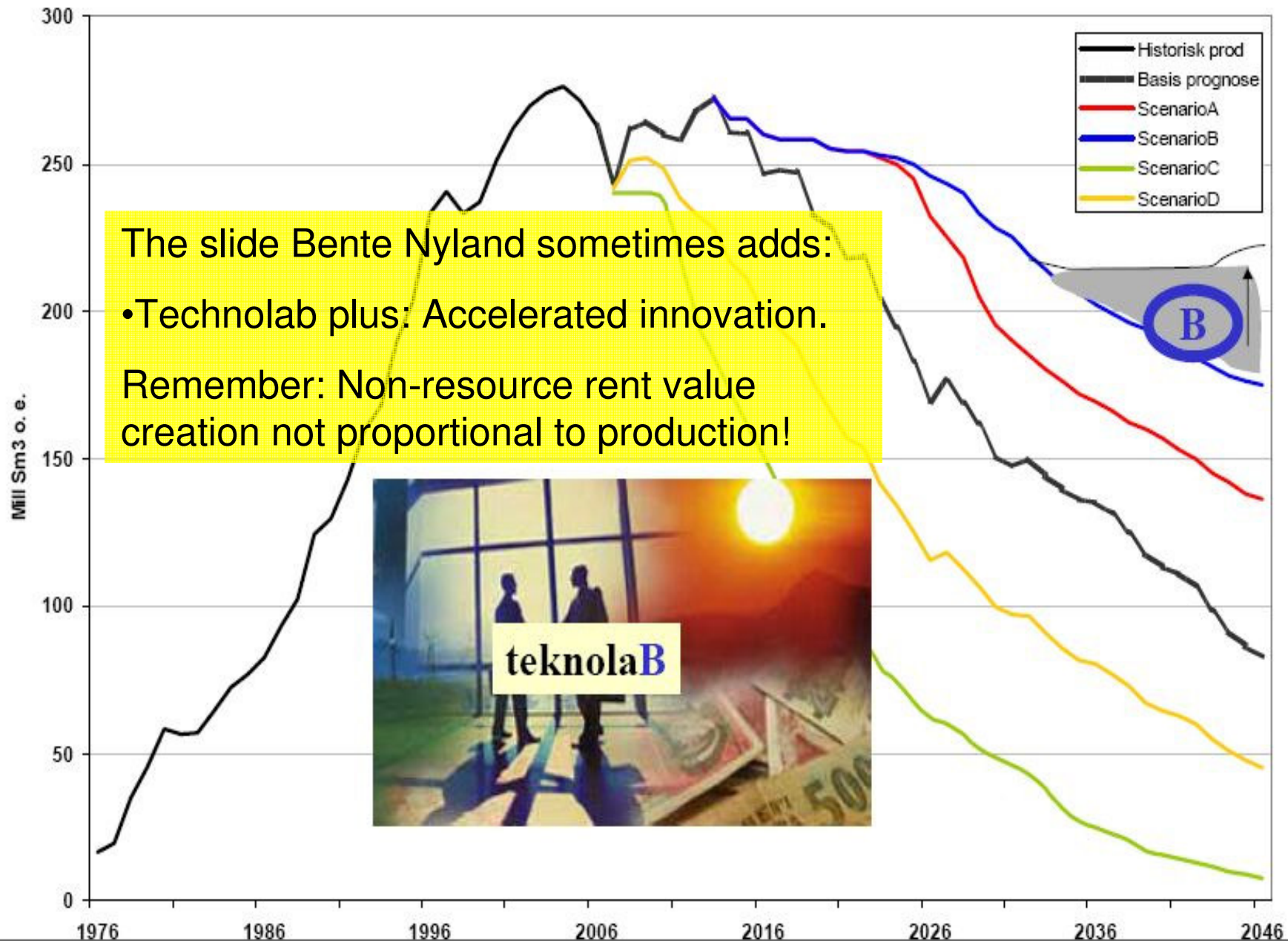
PGS Ramform Sovereign Christening

12 March, 2008

The NPD's Resource Report 2007: Four Scenarios.



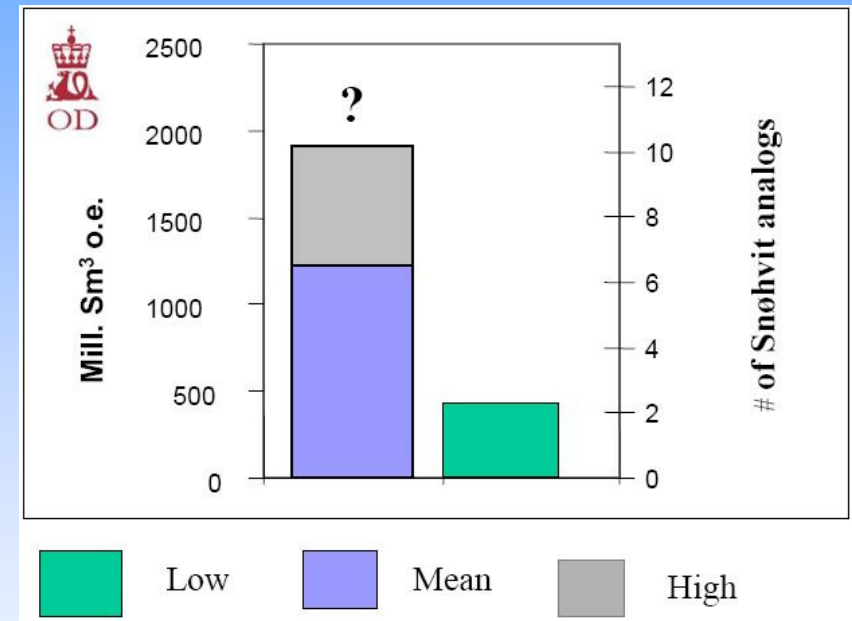
Scenario B: TeknolaB



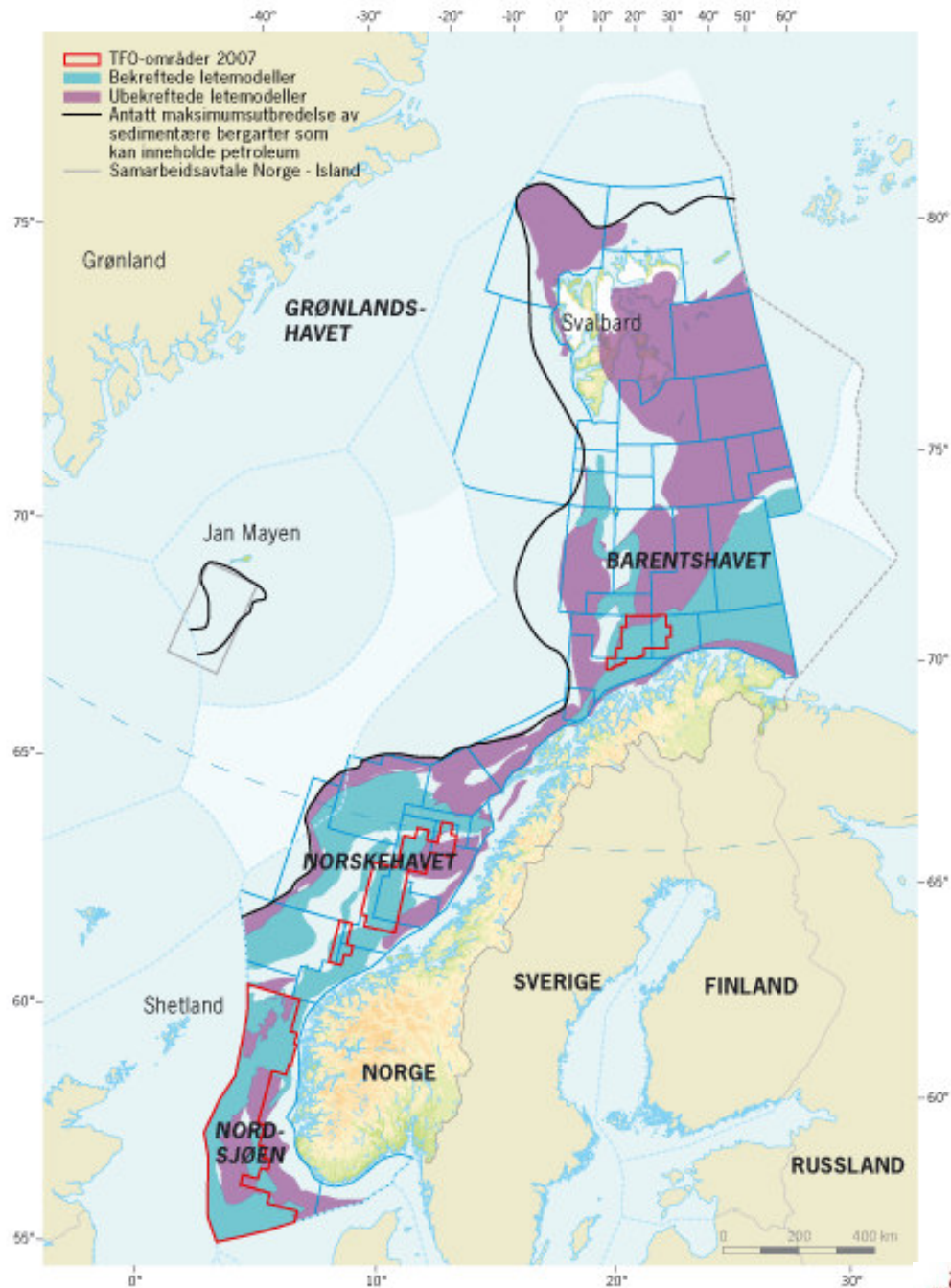


The NCS adventure may have just started:

- Huge unopened acreage
- Large uncertainty about yet-to-find resources (Barents:)

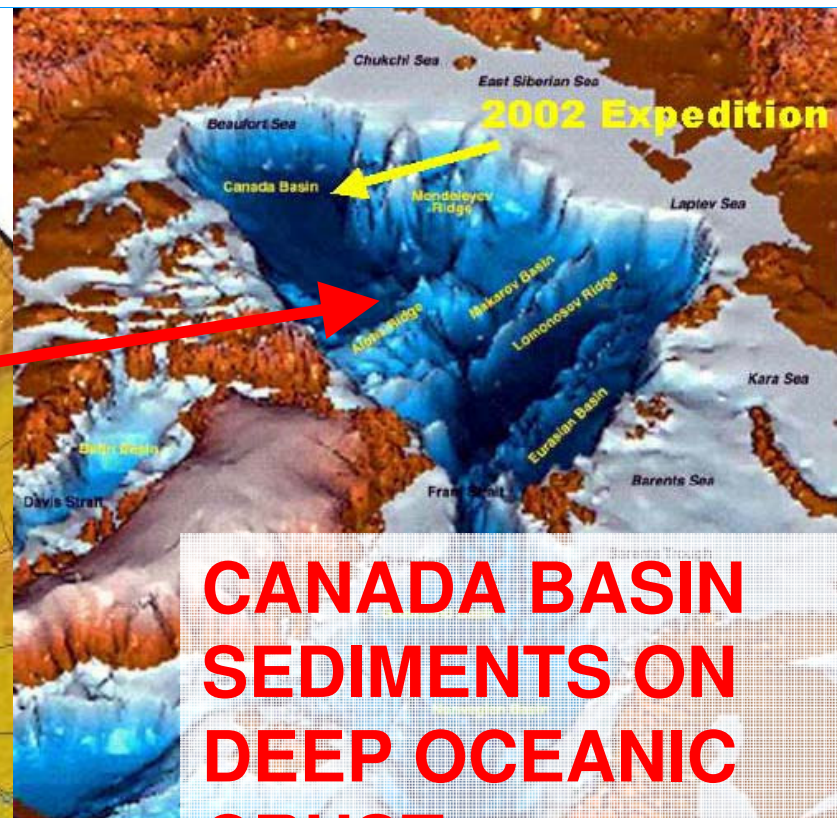
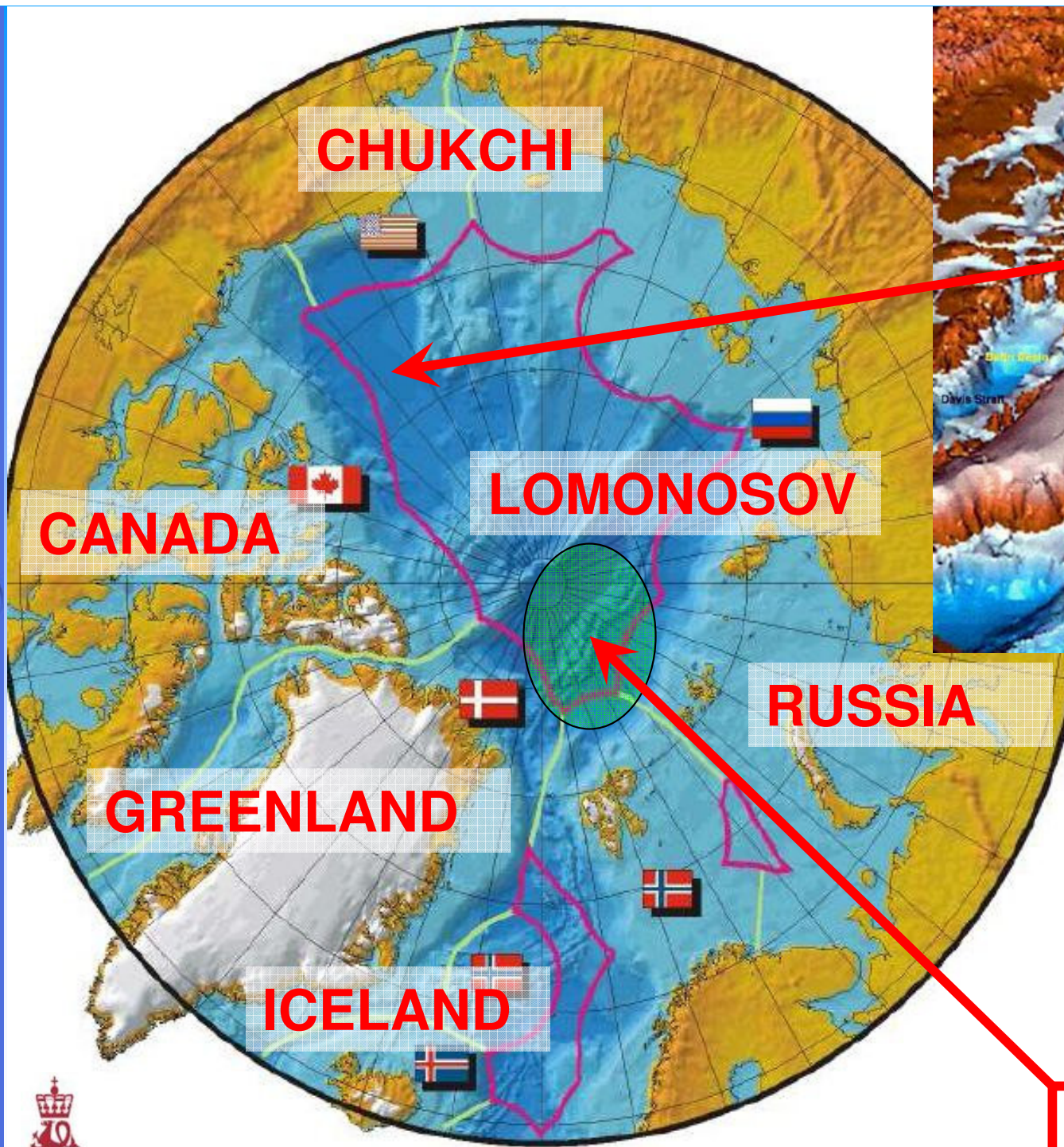


- Jan Mayen and contested area not included in NPD estimates
- Is the “assumed border for sediments that may contain petroleum” end of story?



NPD: Plenty of unconfirmed exploration models – even in the North Sea!

- and many regions have none at all!



**CANADA BASIN
SEDIMENTS ON
DEEP OCEANIC
CRUST** (Map: NOAA)

**Unlimited
opportunities for
Norwegian cluster
in other Arctic
regions!!!**

Something for Norway
even in deep Arctic?



(base map only)



11.08.2006

Siste nytt: (00:16) Berger svenske fjellklatrere

» forside | nyheter | økonomi

► Nyheter

► Næringsliv

► Olje/energi

► Børsen

► Politikk

► Kommentarer

► Propaganda

► imarkedet

Reklame:

Det Lille Ekstra.

Publisert 18.12.2005 - 22:27 | Endret: 03.01.2006 - 11:24

Fant 3000 mrd. tonn kull på sommerjobb

De fire NTNU-studentene hadde sommerjobb hos Statoil for å kartlegge kull på norsk sokkel.

Tekst: JOHN BORTEN

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Studentene fant tre ganger mer enn alt kjent, utvinnbart kull i verden - og brorparten ligger utenfor Midt-Norge.

Statoil, ville tilfredsstille sin nysgjerrighet angående kullforekomstene selskapet visste eksisterte på norsk sokkel, og satte de fire siv. ing-studentene på jobben.

Da prosjektet var i land etter åtte uker, hadde Trond Kristian Kalstø, Helene Wendelbo, Kari Faksvåg og Halvor S. Bunkoldt Sæter kartlagt 3000 milliarder tonn kull som ligger mellom 1500 og 4000 meter under havbunnen.



Foto: HALFDAN CARSTENS

De fire siv. ing-studentene ved NTNU kan ha vært med på neste generasjons norske

nyheter

trondheim
sør-trøndelag
nord-trøndelag
møre og romsdal
innenriks
utenriks
økonomiadressa
været

aktuelt

jakt
student
RBK

FINN

Jobb	9584
Eiendom	62093
Torget	56934
Bil	45177
MC	5622
Båt	14598
Reise	11640

[Sett inn annonse](#)

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UNCONVENTIONAL GAS I:

- Students working with Statoil's well data discovered three times all the world's known coal resources offshore Middle Norway.

- The NPD includes a pilot project for gas from offshore coal in 2025 in Scenario B.

- Earlier in B+?

SOKKELSPEILET

NORSK OLJETIDSSKRIFT



Objektorkolal - Nummer 2 - 2003



UNCONVENTIONAL GAS II:

- NPD includes pilot project for gas hydrates from 2035 - also earlier in Scenario B+?
- India plans for production in only few years.
- New Norwegian technology emerging for safe production based on CO2 injection.
- To be tested in Alaska – or here?



No commercial exploration yet

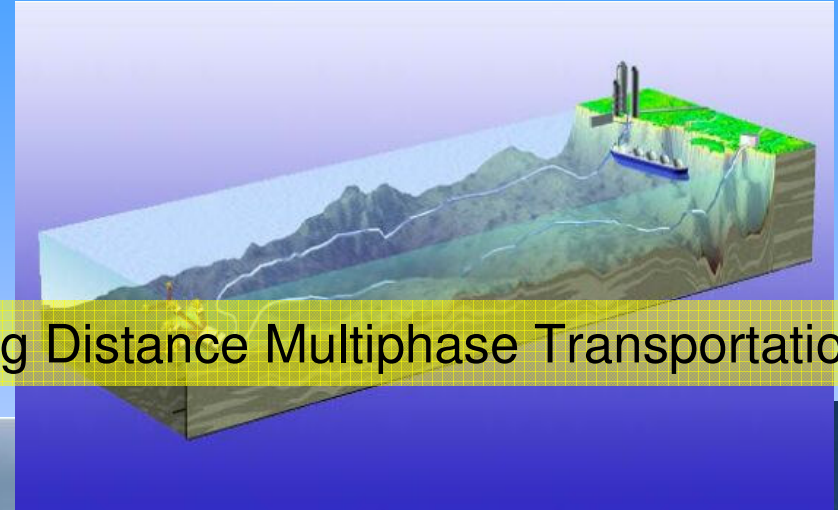
ISKALD ENERGI FOR FRAMTIDEN

Gasshydrater kan vise seg å bli både en økonomisk velsignelse av verdensformat og en sikkerhet offshore.

Arve Johnsen's Proposals for Intensified Arctic R&D Efforts under Barents 2020:



Subsea Drilling & Production



Long Distance Multiphase Transportation



Operations In Ice Covered Waters



Cross-Sector Surveillance

Government follow-up very limited.



Joint HSE Policies

Other Vital Innovation Focal Areas:

- **Co-existence with fisheries (including seismics as well as technological/commercial synergies).**
- **Improved safety after Statfjord leak experience (probably mostly organizational innovation).**
- **Electrification, offshore wind power, carbon capture – for the duration of the climate paradigm.**
- **Improved oil spill protection technology, in particular along the coast, as well as new and creative organization.**

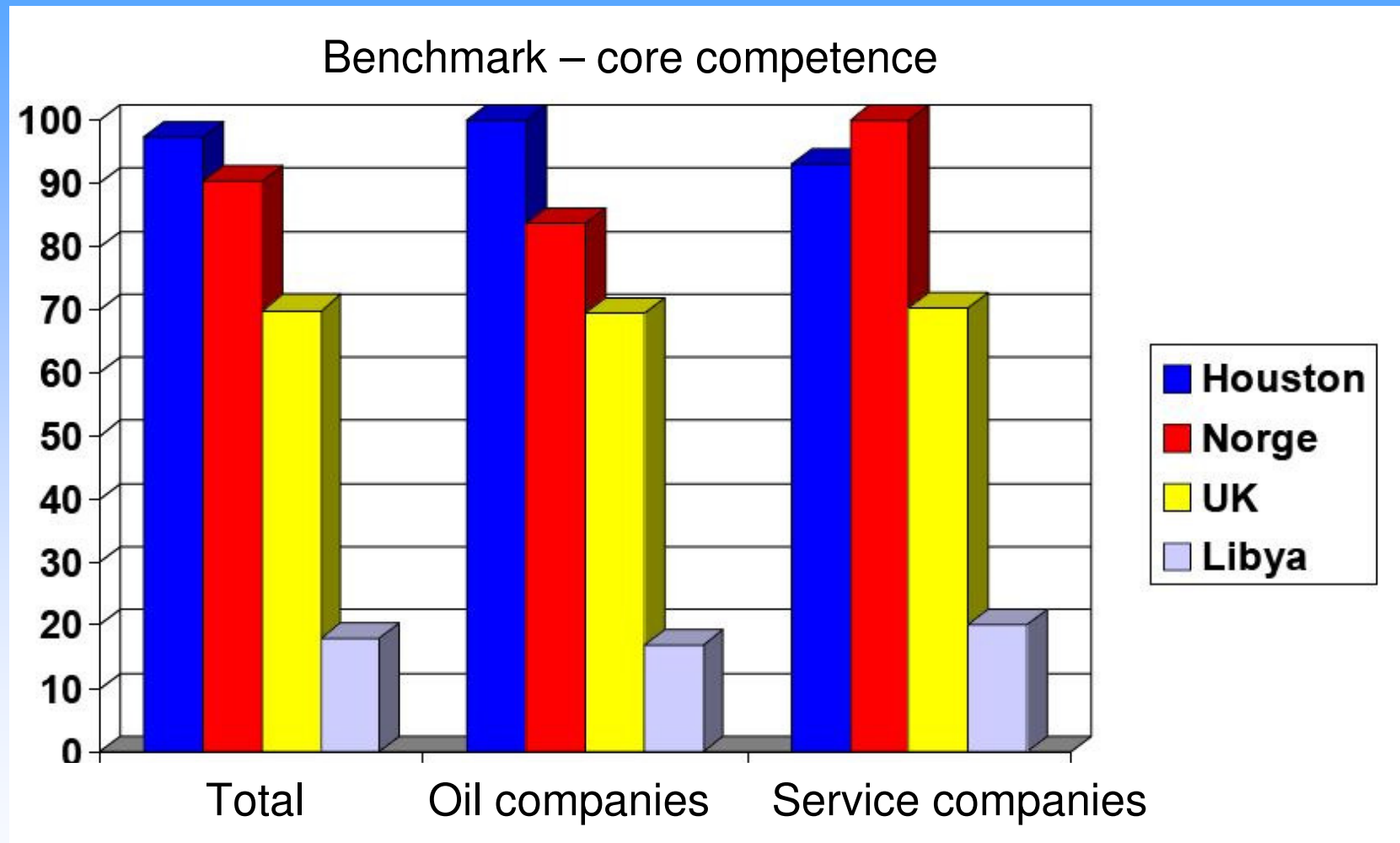
Challenges for Innovation in the Norwegian Cluster:

- **Lack of political support and political visions.**
- **Lacking understanding for connection between cluster's knowledge capital and innovative capabilities and Norway's productivity and future value creation.**
- **We are good at implementation of new technology – but we could be even better.**
- **Loss of diversity and competition after StatoilHydro merger.**
- **Deteriorating Government governance policy for StatoilHydro.**
- **Wrong treatment of knowledge rent in petroleum tax system and capital returns tax.**
- **Risk of losing emerging venture firms before they are imbedded in cluster (related to capital taxation etc.)**
- **State financed R&D steered in politically correct directions.**

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Huge Knowledge Capital in the Norwegian Petroleum Cluster:

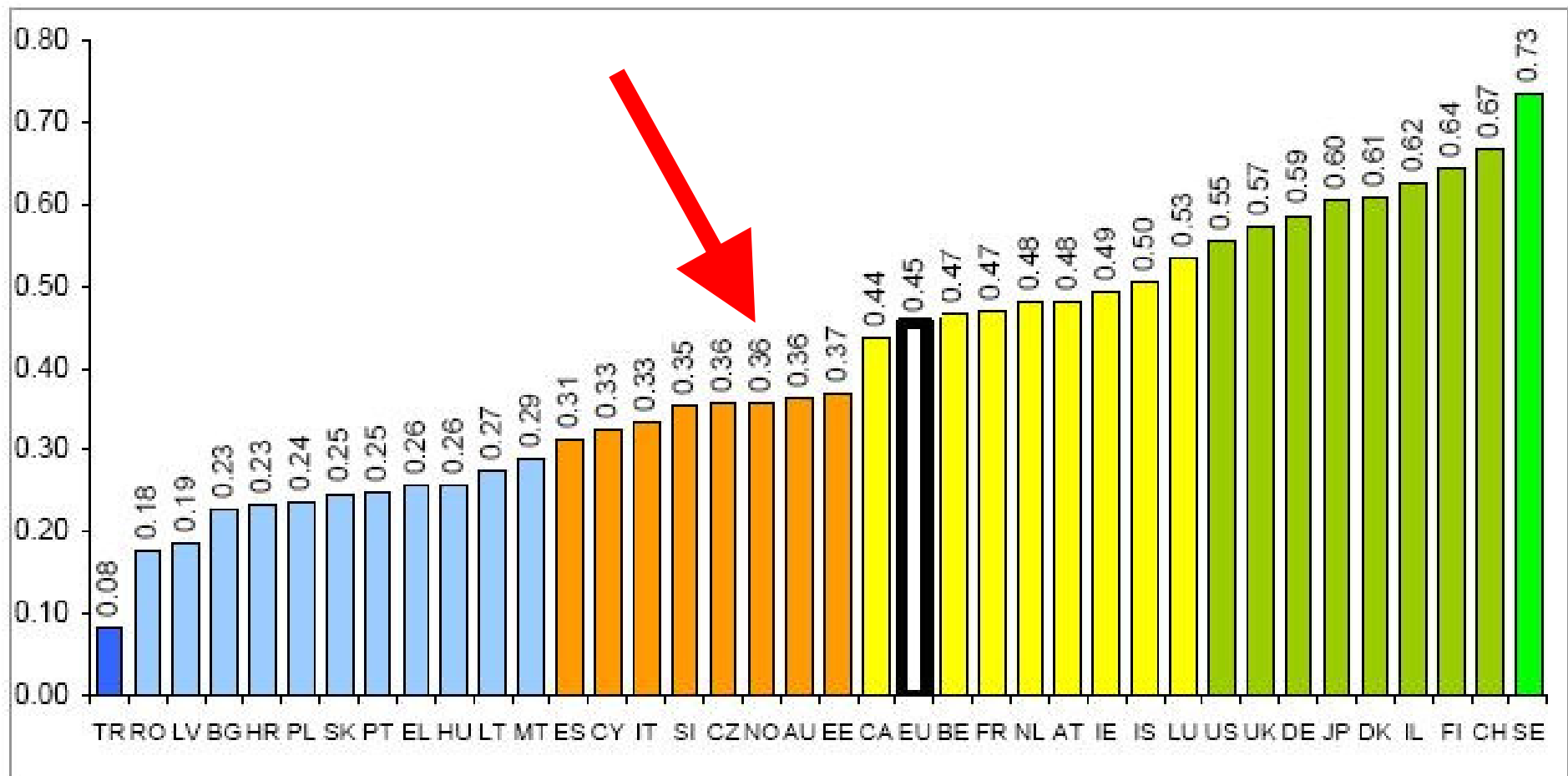


Source: AFF/NHH IC evaluation for Kon-Kraft 2003.

Also in maritime and marine clusters!

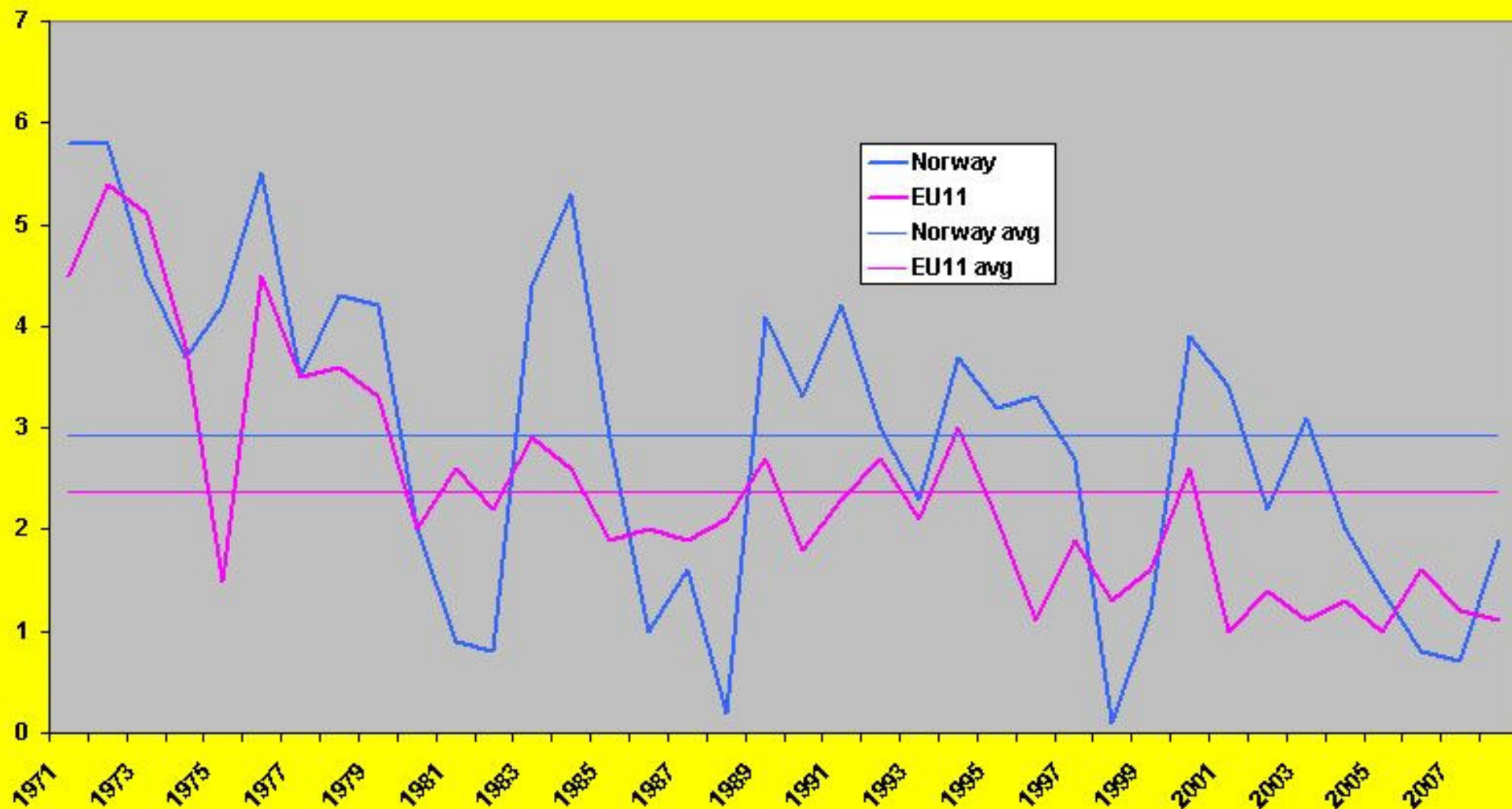
Why, then, does Norway score so poorly on the European Innovation Scoreboard and other benchmarking indexes?

FIGURE 1: THE 2007 SUMMARY INNOVATION INDEX (SII)



...when we actually have a much better productivity record than EU average?

Annual Labour Productivity Growth Norway and EU 1971-2008



(Sources: 1971-2006 OECD historic, EU = EU11. 2007-2008: OECD Economic Outlook forecasts, EU = Euro Zone.)

The Norwegian Paradox Unravelled:

THE NACE SECTORS THAT INCLUDE THE MOST IMPORTANT NORWEGIAN CLUSTER INDUSTRIES

05	Fisheries and fish farming
11.1	Oil and gas E&P
11.2	Maritime and other oil and gas services
15	Seafood industry
35.1	Shipbuilding etc
35.1	Construction of oil platforms etc
61	Shipping
63.2	Offshore supply
63.2	Maritime services
63.4	Ship brokers etc
74.203	Geological surveys etc

	Included in relevant EIS indicators
	NOT INCLUDED!!



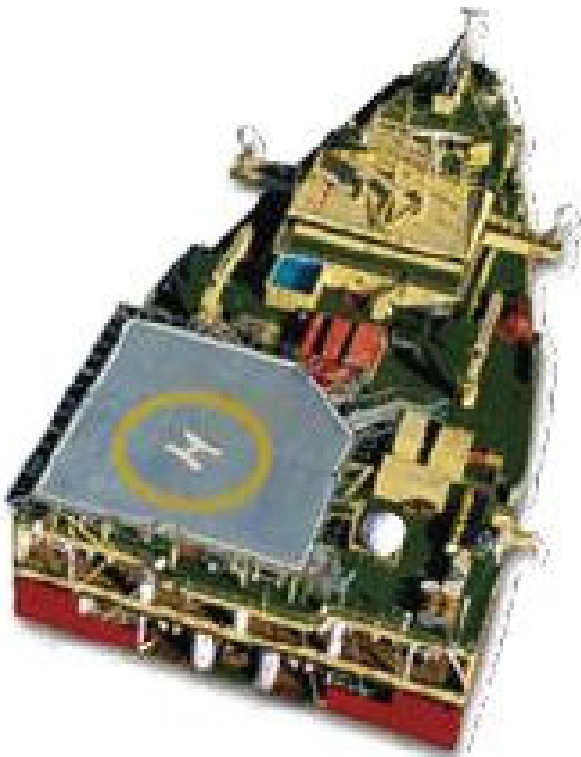
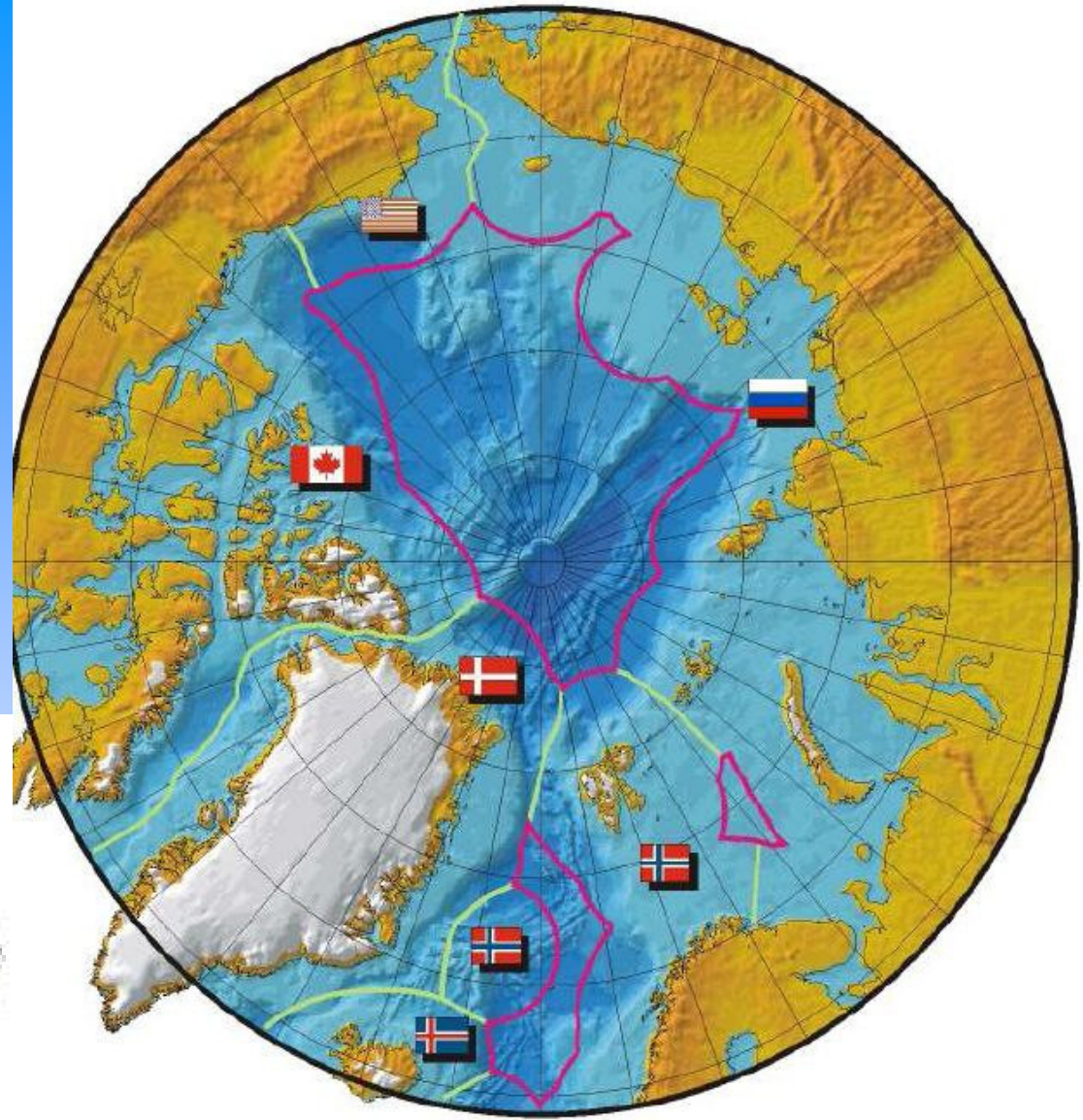
Main explanations:

- Most innovative sectors in three Norwegian clusters **DEFINED OUT** of relevant indicators!
- Typical cluster innovation non-R&D processes not covered by any indicators (informal on-the-job innovation, tacit knowledge production)
- **Same mistake is made in Norway's own innovation strategy documents!**



**Much of the
required
innovation is
political and
socio-economic!**

**We can
pull it
off!**



CONGRATULATIONS!