



Klima- og  
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# Regulating VOC emissions from loading of crude oil – flexible implementation

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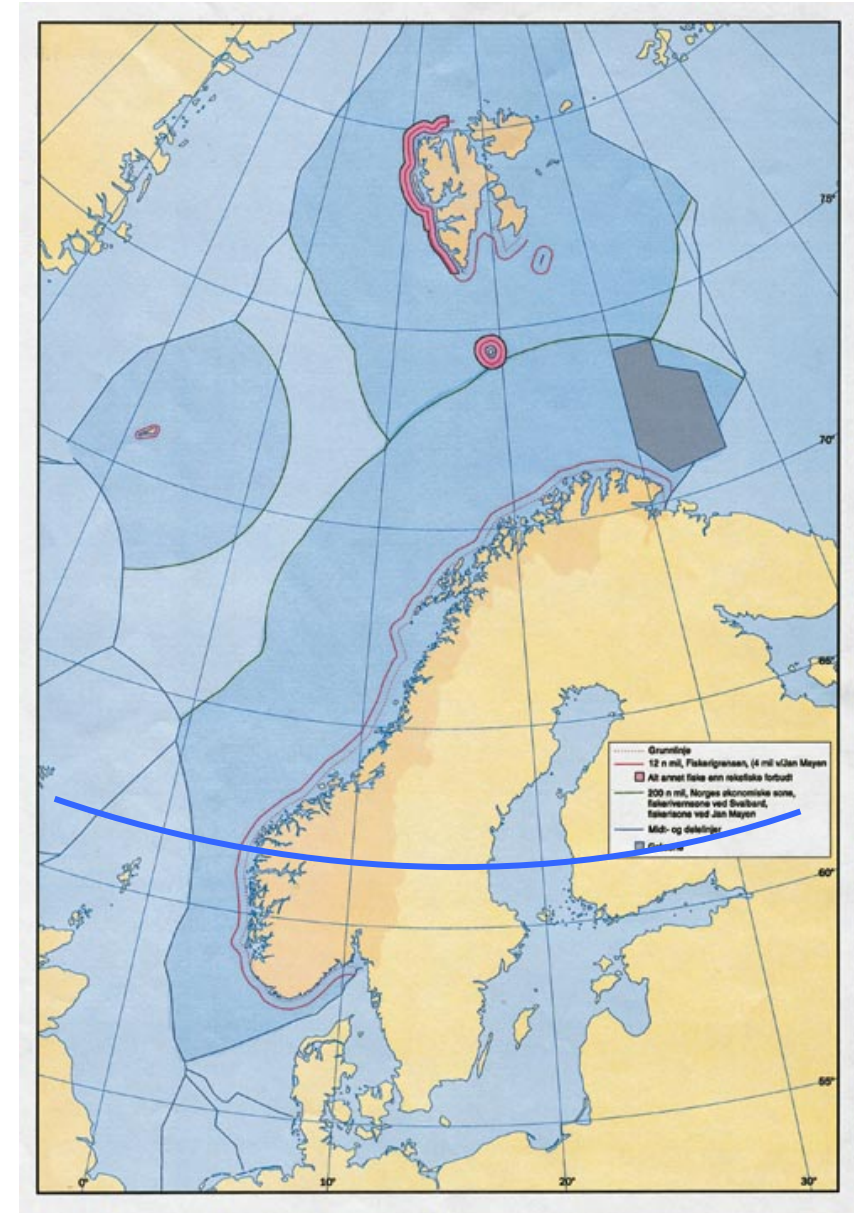
# Norway's obligations under the 1991 VOC Protocol

By 1999:

- 30% reduction of 1989 emissions within TOMA\*
- Total national emissions not to exceed the 1988 level

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\* mainland Norway and the exclusive economic zone south of 62°N latitude



# Non-compliance - Why?

- Growing petroleum sector, transport of oil by ships
- Large emissions from loading of crude oil
- Underestimated base-year (1988 and 1989) emissions
- Underestimated emission projections
- Development of new emission abatement technology was delayed



# Application of new policy measures needed

- A large number of licence holders (> 20) and oil field operators
- Failed to conclude on a voluntary agreement with the petroleum industry (1999)
- Emission permits regulating offshore emissions issued in 2000 (final 2001)

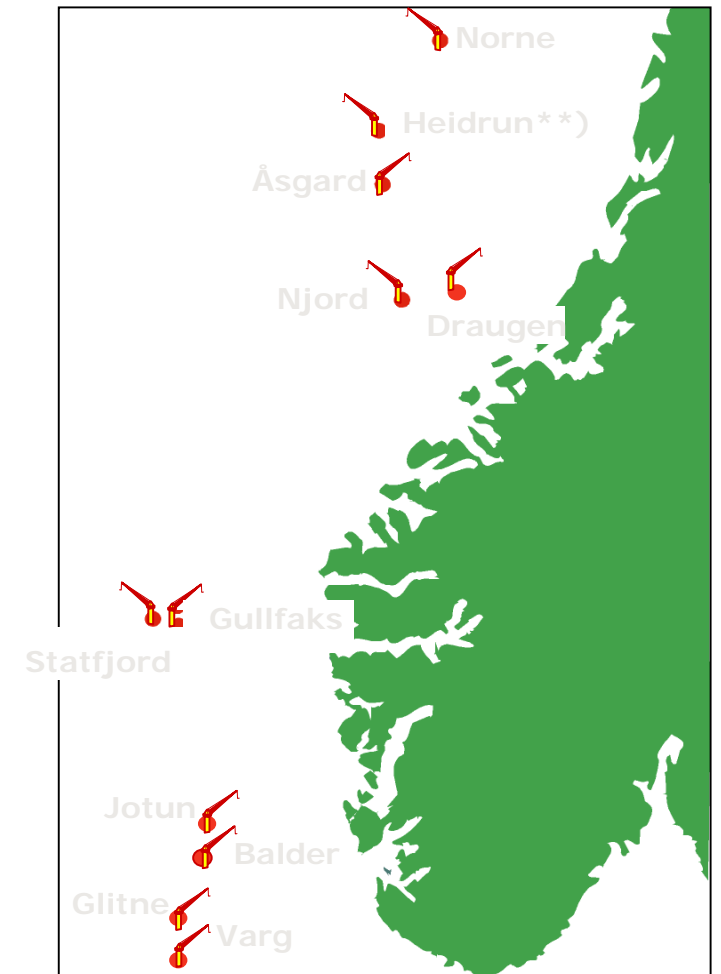
# Abatement measure installed on ships

- VOC recovery units to capture and recover nmVOC have been installed on shuttle tankers
- Various technologies available; "active" and "passive"
- Recovering 80-100 % (active) or 50 % (passive) of nmVOC emissions



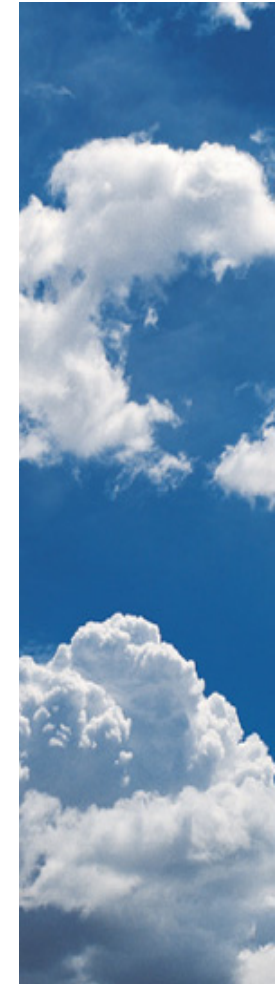
# Emission permits – Flexible implementation

- Individual emission permits were issued to operators of 11 oil fields
- Identical emission limits set for all fields
- Compliance with emission standards is considered met for each field if the annual average emission from all loading operations are below the emission limits.



# The VOC Industry Cooperation (VOCIC)

- Cooperation between > 20 companies holding licence to extract oil and the operators
- Formalized through the "VOC Agreement for outfitting NMVOC Plants on shuttle tankers serving Norwegian offshore loading oil fields"
- VOCIC coordinates negotiations of contracts with ship owners and the installation of VOC emission abatement technology and monitoring equipment on shuttle tankers
- VOCIC also coordinates monitoring, reporting etc.



# Emission reductions

The 1991 VOC Protocol:

- Non compliance for 6 - 7 years
- New technical measures developed
- Emissions reduced by 60 % (Norway) and 80 % (offshore) from 2002 to 2015
- In compliance with the 1991 VOC Protocol obligations from 2005 (Norway) and 2006 (TOMA)

The Gothenburg Protocol:

- Reached compliance with the 2010 emission ceiling by 2008

