OG21 – THE NATIONAL TECHNOLOGY STRATEGY FOR THE PETROLEUM INDUSTRY

Force seminar, February 2-3, 2016

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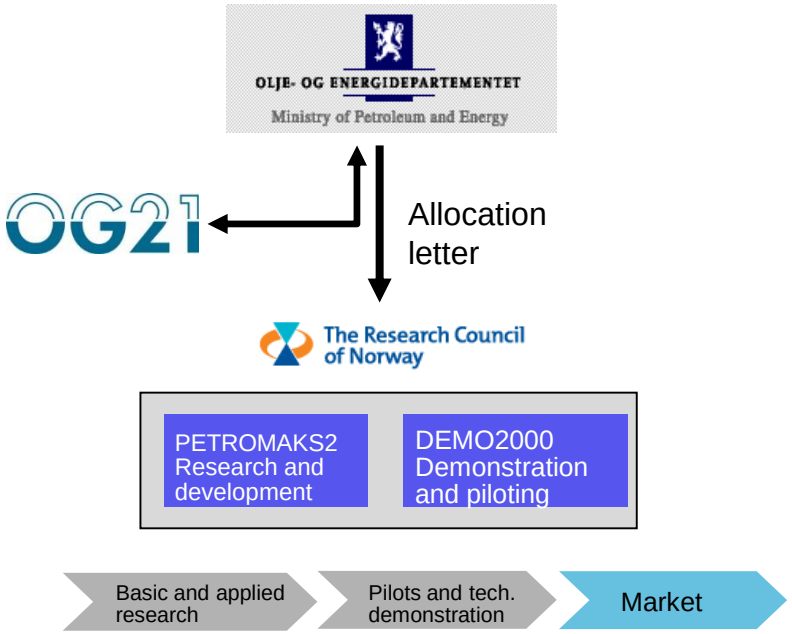
TOPICS

- OG21 – a collaboration effort to develop the national petroleum technology strategy
- Strategy to be revised in 2016
- Increased oil recovery important part of value creation on the NCS

OG21 – THE NATIONAL TECHNOLOGY STRATEGY FOR THE PETROLEUM INDUSTRY



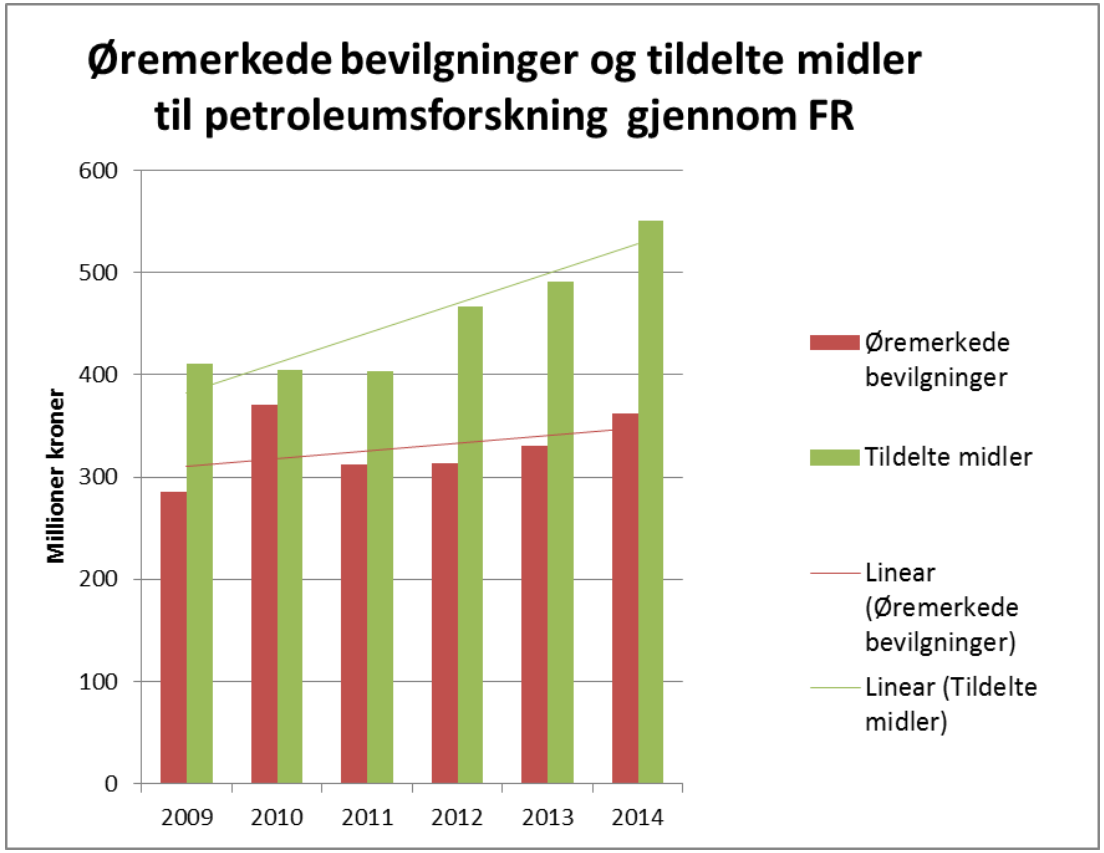
OG21 DELIVERABLES

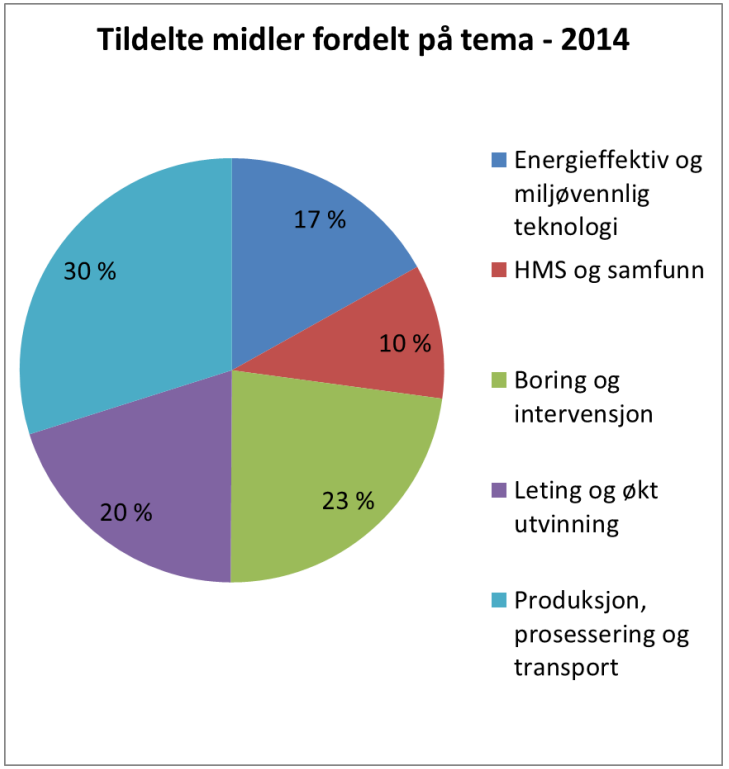
Long term strategy

Annual deep dive analyses

Communication

OG21 INFLUENCES PUBLIC R&D-INVESTMENTS





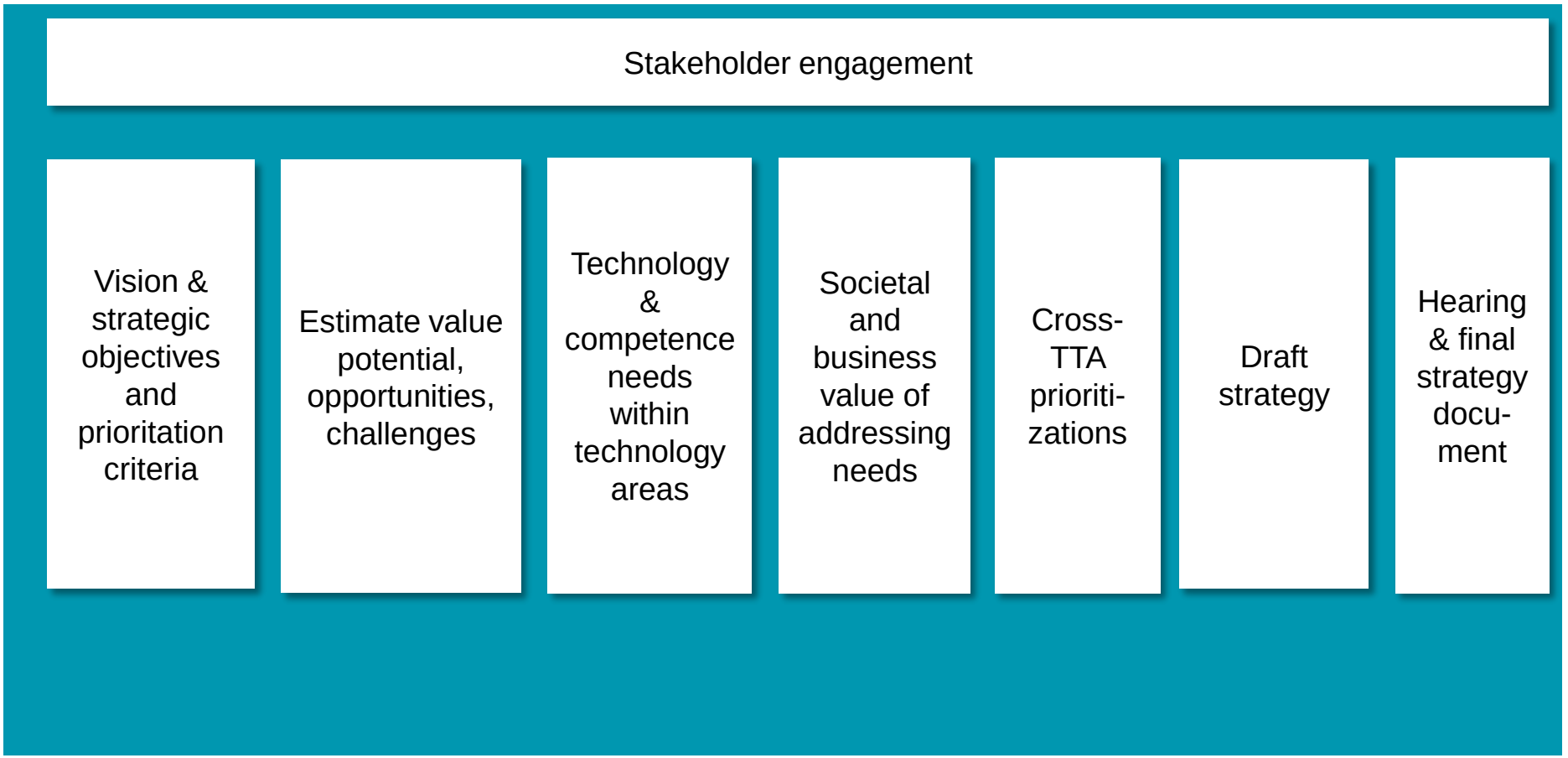
STRATEGY TO BE REVISED IN 2016

- Purpose and objectives:
  - Technology to create value and make the NCS competitive
  - International opportunities for Norwegian competence suppliers
  - World-class environmental performance
- Deliverables:
  - *Clear guidance on public R&D funding and priorities whilst limiting negative impact on on-going R&D programmes, and*
  - *A sound basis for influencing coordinated industry R&D efforts as well as industry technology adoption.*

WITHIN SCOPE

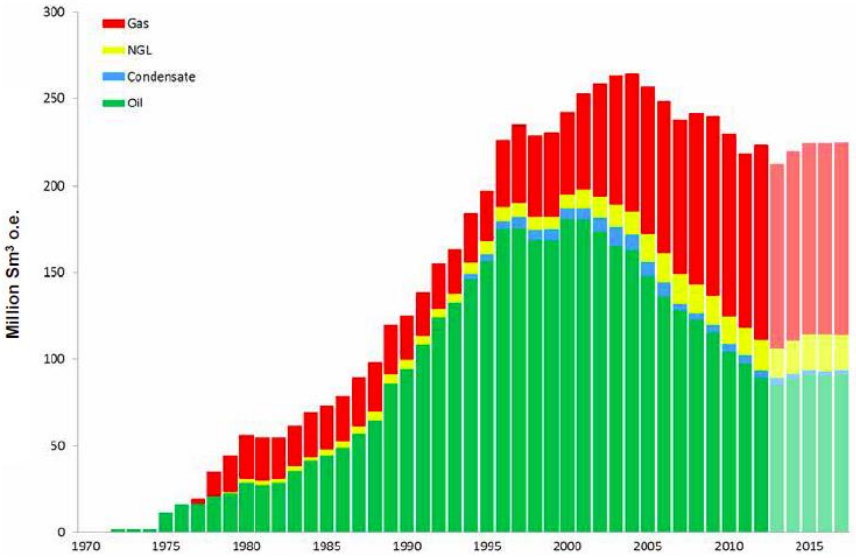
- Norwegian petroleum R&D and competence and the global trends:
  - Opportunity and role of Norwegian oil and gas in the global energy mix
  - Climate change and Norwegian obligations
  - Digitalization and automation
- From ideas to deployment:
  - Technology development
  - Technology adoption
  - Competence to develop and adopt
- Prioritized R&D and competence needs:
  - Cost-efficient realization of NCS resources
  - International opportunities for Norwegian technology and competence providers
  - Short term (1-10 yrs) and long-term (10+ yrs.)
- Funding of R&D:
  - Need for public investments
  - Stimulate private investments
  - Industry responsibilities
- Barriers to technology implementation and adoption

TIME SCHEDULE



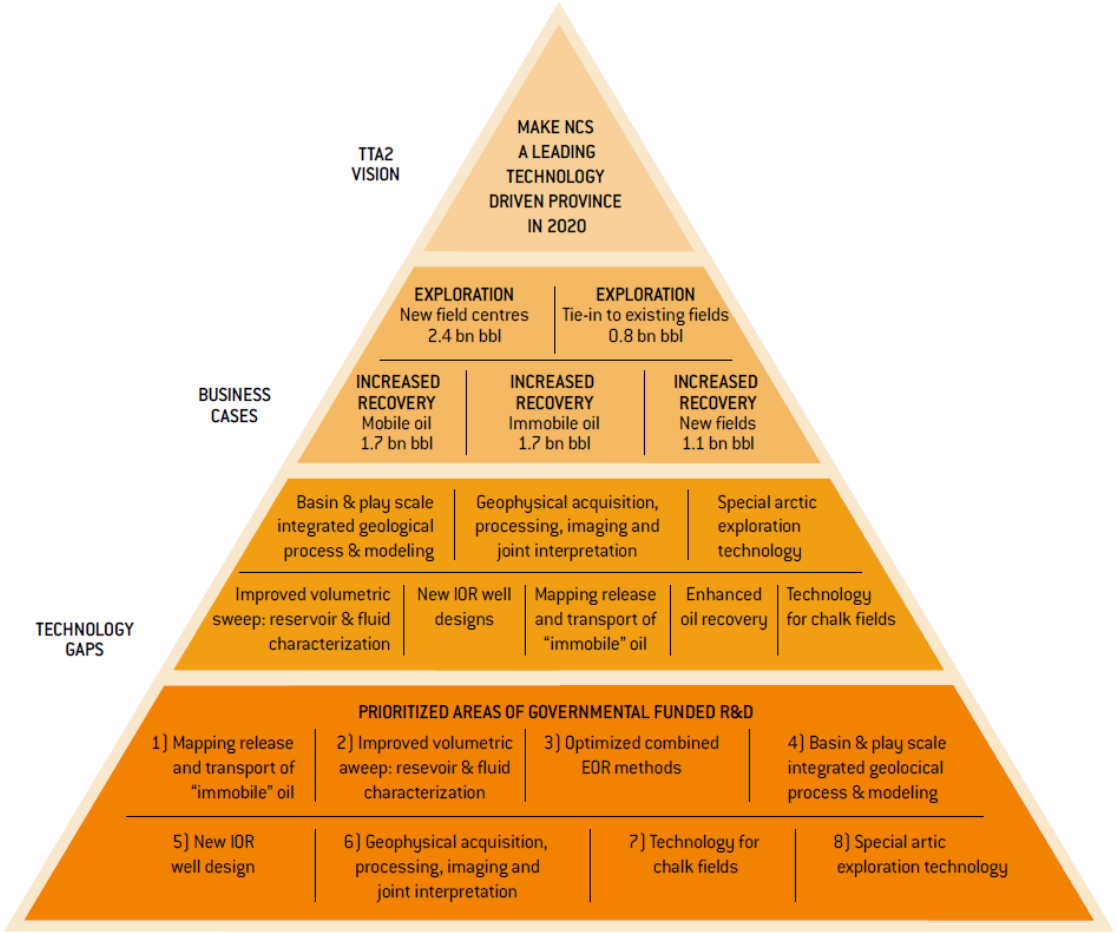
THE NATIONAL OPPORTUNITY – MAINTAIN PRODUCTION OVER TIME

- Today's oil production half of peak in year 2000
- To some extent compensated by increased gas production
- Maintaining production over time dependent on:
  - Resources
  - Technology development /implementation
  - Competence and knowledge
  - Costs
  - Participants / companies
  - Political frame conditions
  - Price of oil and gas



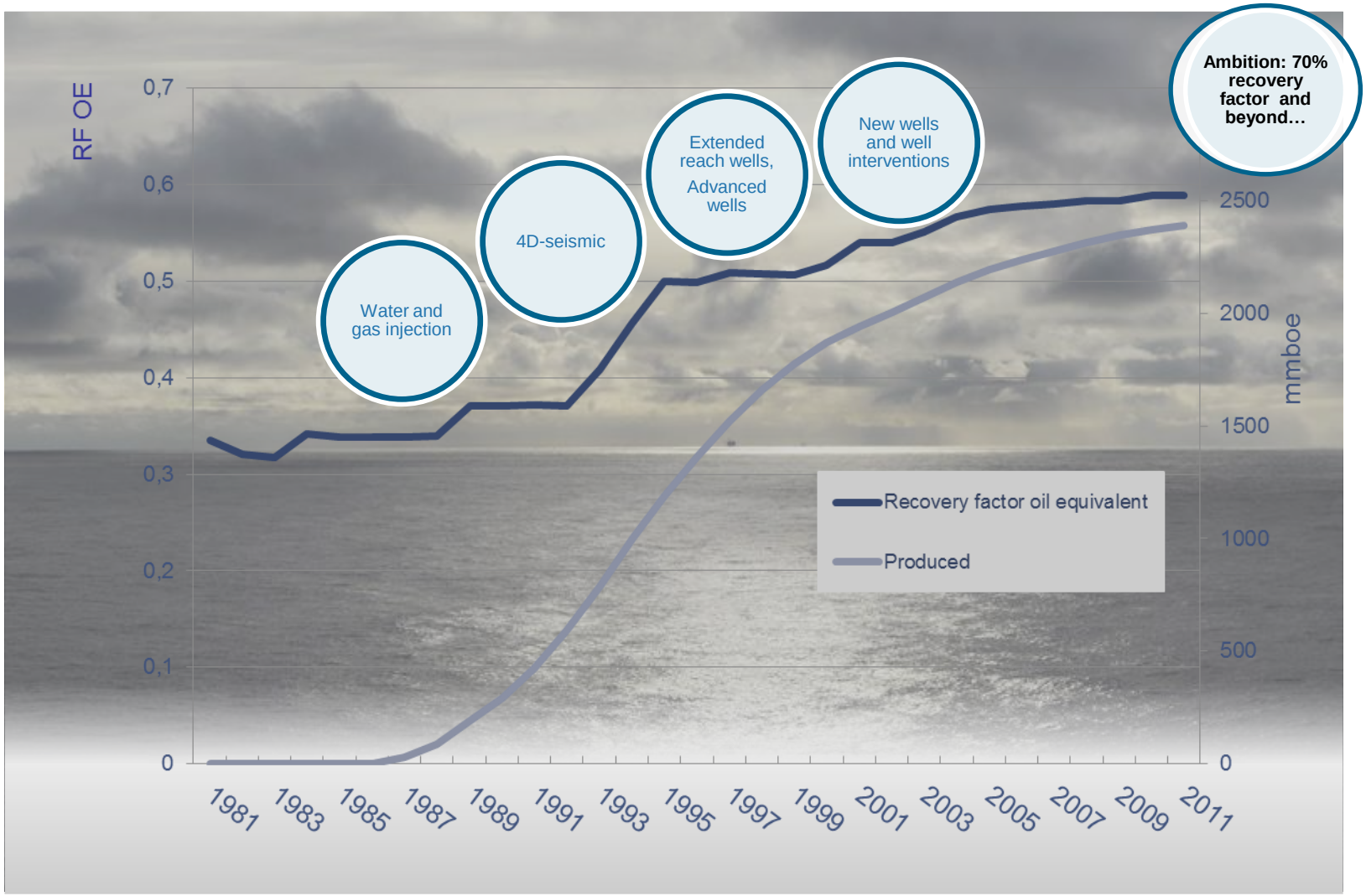
Source. NPD

TTA2 TECHNOLOGY STRATEGY



FIELD EXAMPLE GULLFAKS

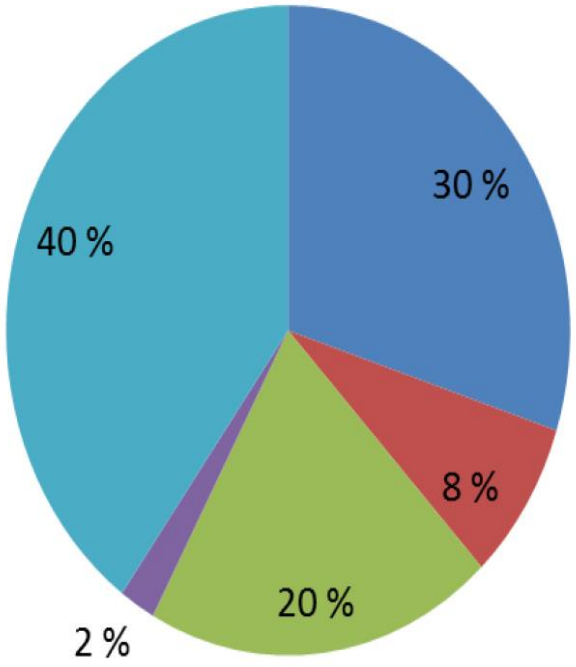
SUBSURFACE & ENHANCED RECOVERY



Source : Statoil

EOR COST (PASF NORTH SEA)

SUBSURFACE & ENHANCED RECOVERY

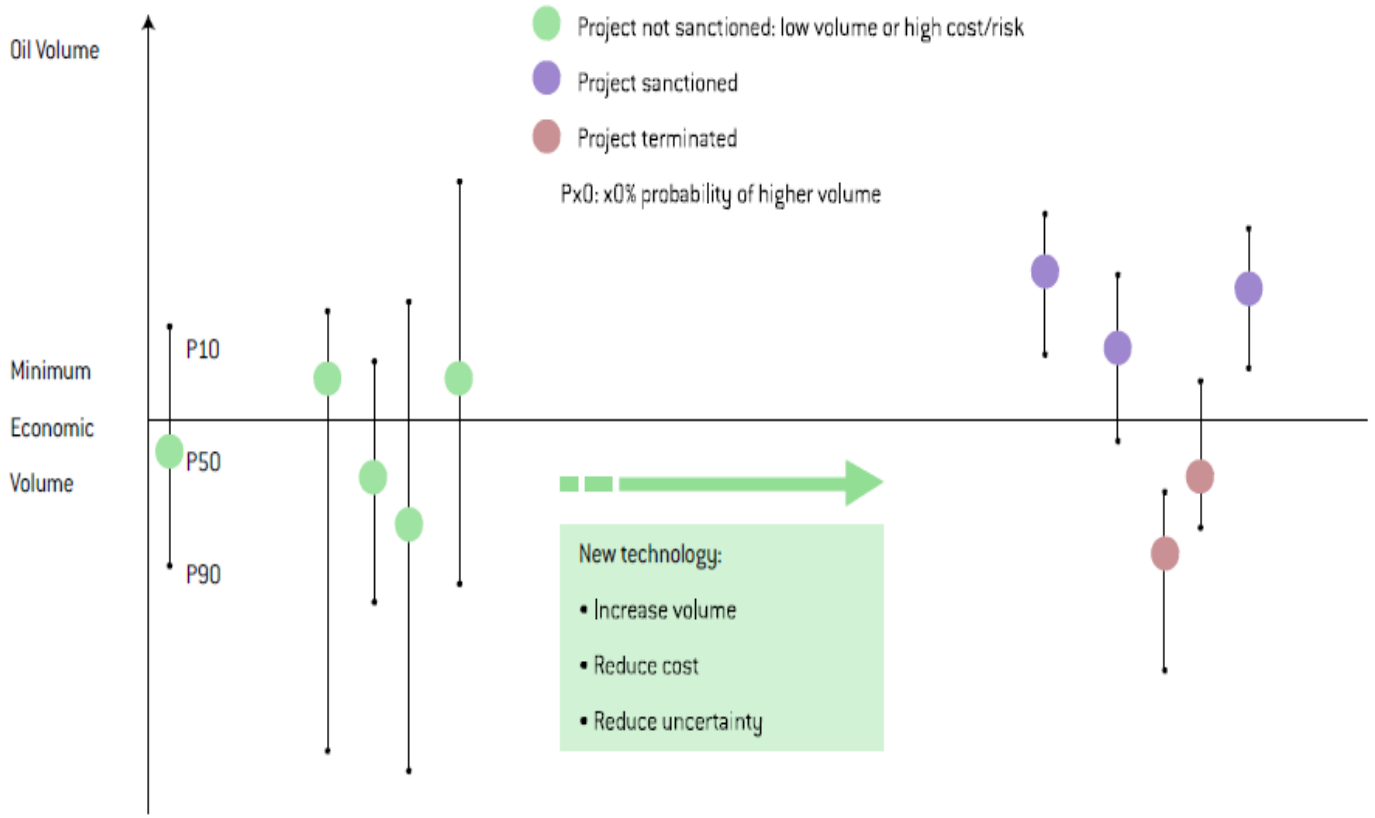


- Boat and Platform Modifications (CAPEX)
- Process CAPEX
- Operational Cost (5 year)
- Energy Cost (5 year)
- Chemical Cost (5 year)

Source : Konkraft/Statoil

IOR TECHNOLOGY BARRIERS

SUBSURFACE & ENHANCED RECOVERY



Source : OG21 TTA2 Technology Strategy

SUMMARY

- OG21 – a collaboration effort to develop the national petroleum technology strategy
- Strategy to be revised in 2016
- Increased oil recovery important part of value creation on the NCS

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