E&P opportunities & activities in the Netherlands

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Outline of the presentation:

› Look back 2014

› Resources

› Opportunities

› Conclusions
Present day E&P map

- Licence situation: nothing much changed.
- Still have the 9th open licencing round
- Shallow water < 50m
- Excellent infrastructure.
- Close to coast / market
Seismic acquisition
from 2011 onward

- Notable activities in 2014:
  - Sterling shot 1st Broadband survey
  - Hansa: 1st continuous line acquisition survey in NL
  - Planned onshore survey by Vermilion
Exploration drilling 2000-2014

Graph showing the number of offshore and onshore exploration wells from 1998 to 2016.

- Number of offshore exploration wells (blue diamonds)
- Number of onshore exploration wells (red squares)
Exploration activity 2014

› Wells started in 2014
On- and Offshore creaming curve
Intermediate summary: What do we see

› High exploration activity:
  › 17 exploration wells in 2014
    › high success rate (approx. 60%)
  › Successful mix of near field and frontier exploration
  › Secures (life) extension of infrastructure

› Large seismic surveys shot last couple of years
› High volume of seismic reprocessing
Dutch resources

Exploration ambition:
- Need to tap sizable reserves
- New plays in under-explored areas
- New techniques

Prior condition:
- Extend life end of offshore infrastructure
- Secure exploration drilling activity

Today

- Exploration ambition:
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  - Extend life end of offshore infrastructure
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Graph showing the decline of Groningen field and prospects.
Offshore Prospects in Proven gas plays

Exploration potential MEA annual review 2012 & 2013

"Risked" Volume (billion Sm³) vs. MSV class (billion Nm³)

- Portfolio 2014 fingerprint in MSV-classes
- Portfolio 2013 fingerprint in MSV-classes
- Number of prospects 2014 Continental Shelf
- "Number of prospects 2013 Continental Shelf

Mid-value
Onshore: 99
Offshore: 150
Fingerprint of Prospect portfolio within Proven Play

Circle size relates to productivity
Underexplored areas require exploration studies

EBN studies:
- DEFAB prospectivity screening
  - Volpriehausen Set play
  - Zechstein-2 Carbonates play
  - Chalk prospectivity; structural traps and intra-Chalk seal traps
- Dinantian Carbonates play in the SNS
- Lower Triassic petroleum play in the Roer Valley Graben
- Brabant Limestone reservoir distribution
- Salt induced stress anomalies (SISA) affecting gas production
- Shale oil potential of the Posidonia in the Netherlands

projects by TNO:
- (Pre-)Permian Dutch Northern Offshore
- Jurassic-Cretaceous projects
- Tertiary shallow gas
Rotliegend Play: exploring the fringe

Check out the presentation: The Geldsack- old play, new prospects, unlocking a basal Rotliegend portfolio, offshore Netherlands and Germany by Joel Corcoran, Hansa Hydrocarbons
New petroleum systems in the Dutch Northern Offshore
Revision of distribution of pre-Zechstein reservoir and source rocks

- Resolve the question marks on the old maps
- Large partner group; Study almost finished.
- Regional analysis of reservoir and source rock distribution
- Resulted in large revision of pre-Zechstein
Triassic in the Northern Offshore

- Second largest play in the Netherlands under-explored in Dutch Northern Offshore
- Northernmost Triassic gas field: F15-A
- Play-elements studied: charge and reservoir distribution
- 18 leads identified in study area
Missed Plays
NUTECH study on Broad Fourteens Basin
Oil in the Netherlands
Historic and future oil production from existing fields

![Chart showing historic and future oil production in the Netherlands](chart.png)

- Expected oil production from developed accumulations
- Expected oil production from non-developed accumulations
- Historical oil production

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Oil in the Netherlands

- Proven oil play:
  - Source Jurassic Posidonia shale
  - Reservoir: Upper Jurassic, Lower Cretaceous sandstones & Chalk

- Recent developments:
  - F17-oil discovery in 2012
  - Q13-Amstel stranded field on stream
  - Schoonebeek re-development

- Oil shows outside Posidonia occurrence:
  - Long distance migration
  - Zechstein source
  - Carboniferous source
Carbonate plays

- **Northern offshore Zechstein Carbonates**
  - Proven gas in the Dutch onshore
  - Proven oil play in Poland

- **Chalk**
  - Proven but under-explored
  - Re-emerging oil play

- **Southern offshore Dinantian limestones**
  - Target = fractured / karstified carbonate
  - Charge?
Reliable & stable E&P investment framework

which constantly improves

› Small fields policy (long standing successful strategy)
  › Guaranteed offtake (GasTerra)
  › Guaranteed transport (GasTransport-Services)

› State Participation through EBN in exploration & production


› Marginal fields and prospects incentive (2011)

› Fallow acreage incentive (2011)

› Research & development incentive (2012)

› Excellent access to Subsurface Data and other E&P information =>

www.nlog.nl
Conclusion

› Step up in creaming curve feasible; opportunities in:
  › Underexplored areas & new plays
  › Exploration in existing licences to extend life infrastructure
  › Underexplored oil plays in a gas country

› Chalk oil play is hot:
  › exploration & appraisal wells planned,
  › 3D seismic reprocessing

› Attractive E&P country
  › State of the art exploration studies available
  › Stable fiscal and regulatory environment
  › Tax incentives for marginal fields
  › Extraordinary data accessibility (also for new parties!)