O&G opportunities in the Netherlands
A Dutch exploration initiative in a mature basin
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O&G opportunities

• The need for exploration

• The role of EBN

• The Dutch potential
  • Business case for Dutch exploration
  • Your gateway to Dutch data and data analysis

• Key take-aways
The need for exploration

The energy gap

Forecast of gas production and demand in the Netherlands (Mboe)

Source: EBN; Monitor Deloitte analysis

Demand/Supply Gap

DEPENDING ON FUTURE DUTCH POLICY

Production forecast

The Netherlands
The role of EBN
The Netherlands

EBN
EBN is a company investing on behalf of the Dutch State in E&P. All shares are held by the state.

State supervision of Mines (SSM)
SSM supervises on behalf of the minister the exploration, production, transportation and storage of mineral resources.

TNO-AGE
TNO-AGE is advisor to the minister on use of the deep subsurface.
EBN as your partner

- Industry partner & co-investor in Oil, Gas and Geothermal
- Non-operating partner in exploration and production (40%)
- Shares held by the Dutch State

EBN facilitates the transfer of knowledge of the subsurface, facilities and economics
EBN as your partner

By jointly investing in E&P, stakeholders share financial risks, thereby lowering the overall risk profile of their investment portfolio.

Required partners

- Local knowledge
- Local experience
- Financial capabilities
- Risk attribution

Optional partners

- Financial capabilities
- Management capabilities
- Risk attribution

- E&P capabilities
- Financial capabilities
- Risk attribution

- E&P infrastructure
- Financial capabilities
- Risk attribution

- Financial capabilities
- Management capabilities
- Risk attribution
The Dutch exploration potential
The Dutch exploration potential

In addition to its existing reserves, contingent resources and stranded fields, the Dutch subsurface includes large underexplored areas offshore.

### Dutch Hydrocarbon pool (2016, Mboe)

<table>
<thead>
<tr>
<th></th>
<th>Oil</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing reserves</td>
<td>5,323</td>
<td>5,209 (841 Bcm)</td>
</tr>
<tr>
<td>Contingent resources</td>
<td>512</td>
<td>427 (69 Bcm)</td>
</tr>
<tr>
<td>Stranded fields</td>
<td>747</td>
<td>496 (80 Bcm)</td>
</tr>
<tr>
<td>To be drilled</td>
<td>85</td>
<td>427</td>
</tr>
</tbody>
</table>

EXAMPLE LEADS AND PROSPECTS

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Source: NLOG; EBN Focus 2017; Monitor Deloitte analysis
The Dutch exploration potential

Creaming curve of the Dutch HC reserves

Source: EBN; TNO
The Dutch exploration potential

The size of the price

Initial inventory of largest underexplored area

- **Chalk:**
  >55 untested closures sizes varying between 1.5 and 50 bcm
- **Triassic:**
  >50 closures, 29 leads, 80 bcm unrisked
- **Zechstein:**
  7 leads
- **Carboniferous:**
  20 leads/structures, 70 bcm un-risked

Distribution of field sizes (Bcm)

- **Chalk:**
  Typical field sizes are 0.5-10 Bcm

More studies to come

The Netherlands

Source: NLOG; EBN; Monitor Deloitte analysis
The Dutch exploration potential

Routine EBN studies

Plays, reservoirs:
- Tertiary - Shallow gas
- Chalk
- Upper Jurassic - Lower Cretaceous
- Triassic
- Rotliegend
- Carboniferous - Lower Carboniferous & Dinantian

Other:
- Structural Development
- Source rock
- Dual play

Further Initiatives:
- Reprocess/reshoot old surveys
- Investigate to shoot seismic

Examples of Dutch plays

Source: EBN; Monitor Deloitte analysis
Business case for Dutch exploration
Business case for Dutch Exploration

Shallow water depths

The underexplored areas are located in the Southern North Sea, typically in water depth of 20-50m and 2-4km below the surface.

Source: NLOG; EBN; Monitor Deloitte analysis

Bathymetry of the Southern North Sea

Sub surface depth of Dutch offshore gas reserves

83% of reserves are located 2-4km below the surface.
Business case for Dutch Exploration

Favourable investment climate

- EBN will invest 40%
- For tax reduction purposes costs are subject to a 10% uplift
- Marginal Field Allowance: 25% gross tax deduction

Deduction scheme reduces operator investment to 32.5% of the operator share, meaning 19.5% of total investment

Cost sharing for exploration activities
Business case for Dutch Exploration

The Dutch success rate is high

Examples of high quality data sharing

Intensity of SNS exploration

Exploration & appraisal wells Southern North Sea 2007-2017

The Netherlands

exploration@ebn.nl
Business case for Dutch Exploration

Exploration success

Basal Rotliegend sands

Stacked pay exploration

Shallow gas

Hansa Hydrocarbons confirms an important discovery on its GEM licences, offshore Netherlands

Biggest gasfind north of Schiermonnikoog in years

Hansa, ONE open Rotliegend gas play in the Dutch North Sea

Tulip Oil awarded Production Licences for the Q7/Q8a blocks. Tulip Oil, Netherlands Offshore BV (‘Tulip Oil’) has been awarded a production license to the Q7/Q8a Blocks, the site of what is considered to be the largest gas discovery offshore the Netherlands in fifteen years.

Tulip Oil will now proceed with the development plan for the field, which is expected to produce at a planned rate of 3 million cubic meters a day. The output is seen as an important contributor to the Dutch economy and will contribute to offset production reductions from other assets in the Netherlands, and is a result of the successful Dutch Small Field Policies.

Shallow gas production 2005-2017

The Netherlands

exploration@ebn.nl
Your gateway to Dutch data
Your gateway to Dutch data

Subsurface data available free of charge on NLOG.nl (TNO)

- Well data (older than 5 years)
- Seismic data (3D & 2D data older than 5 years)
- Production data
- Production plans
- Gas/oil fields and geothermal data
- Regional porosity & permeability maps
- Interpretations, reports
- Background references
- Legislative procedures
Your gateway to Dutch data

3D Seismic data

• Data >5yr publicly available
• EBN
  • Reprocessing of existing 3D
  • Re-shoot of 3D data

• Use of 3D data is a “best practice” during exploration license evaluation
• Removes need for operators to tender, acquire and process seismic
• Reduce time to “drill or drop” by up to 2 years
Data analyses by EBN

Geo-Drilling Events database

This database provides information on drilling events from existing wells.

- Improving well safety and reducing NPT & well costs
- A better understanding of geological drilling hazards in NL
- Learning from past geological incidents by analyzing public data
Key take-aways: Why explore the Netherlands?

- The Dutch North sea has several underexplored areas
- Remaining offshore potential estimated at ~300 bcm.
- EBN performs geological and geophysical studies, locating new resources
- Subsurface data available free of charge on NLOG.nl and via EBN

- Efficient and extensive infrastructure for HC transport and processing in place
- EBN co-invests in E&P, with a 40% investment stake which reduces financial exposure and risk
- Favourable investment climate
  - Good market & tax conditions
  - Stable and internationally oriented investment climate
  - Marginal Field Allowance: 25% gross tax deduction
The Netherlands
- Revitalizing exploration -

Booth 47
For posters, presentations and demo’s

Thank you for your attention
EBN, the Netherlands