

Tomorrow's Gas and the role of EBN



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KNGMG-Noord 21-2-2012

Tomorrow's Gas

- Role of EBN
- Gas Matters
- EBN in Control
- Roadmaps for Tomorrow's Gas
- Q&A

EBN: who, what, where?



~75 employees

- Large E&P player in NL
- Focus on oil & gas production
- Optimise use of assets & knowledge of subsurface
- Generate net gain: financial, clean, reliable
- 100% owned by EL&I ministry
- Serve the interest of society



EBN key figures

amounts	2009	2010
Sales volume, EBN share (bcm)	29	33
Sales (mil €)	6387	6486
Investments (mil €)	550	664

EBN participates in:

- 254 gas fields
- 3 oil fields
- 126 production licenses
- 48 exploration licenses
- 5 offshore gas transport pipelines
- 4 gas storages (1 under construction)

EBN tasks

Role of EBN as per 2008 mining law:

- Facilitate oil & gas exploration and production by participation.
- participate in production related activities including the sale, transport and storage of natural gas and oil
- carry out tasks in connection with Groningen production incl. participation in GasTerra
- carrying out additional tasks as instructed by the Minister of Economic Affairs incl. role of advisor

More information: www.ebn.nl

From gasfield to gasburner

Exploration
& production



Sale



Transport



Distribution



Usage



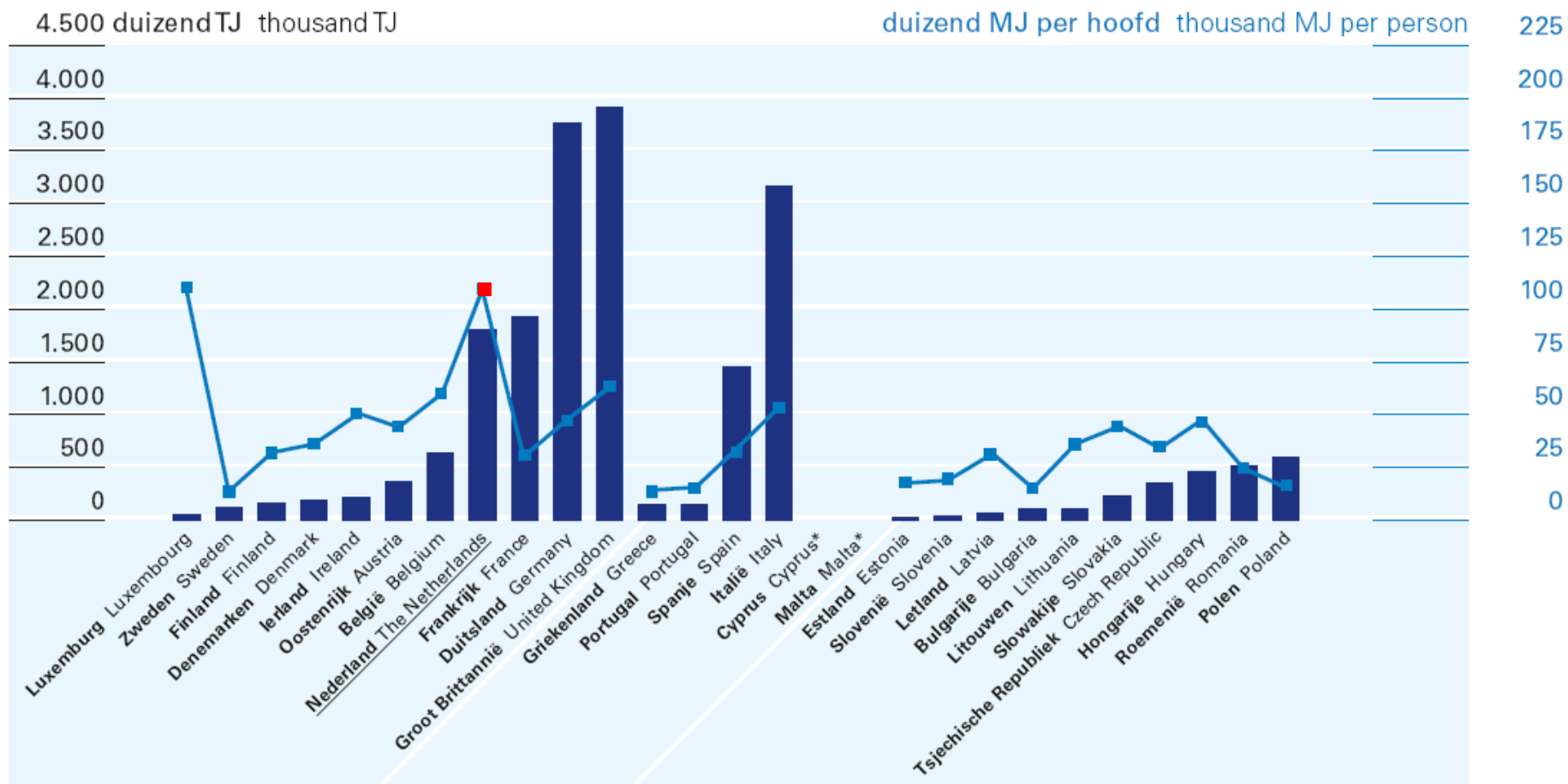
Reliable Gas

Any one customer can expect to experience a failure in gas supply once in 200 years.

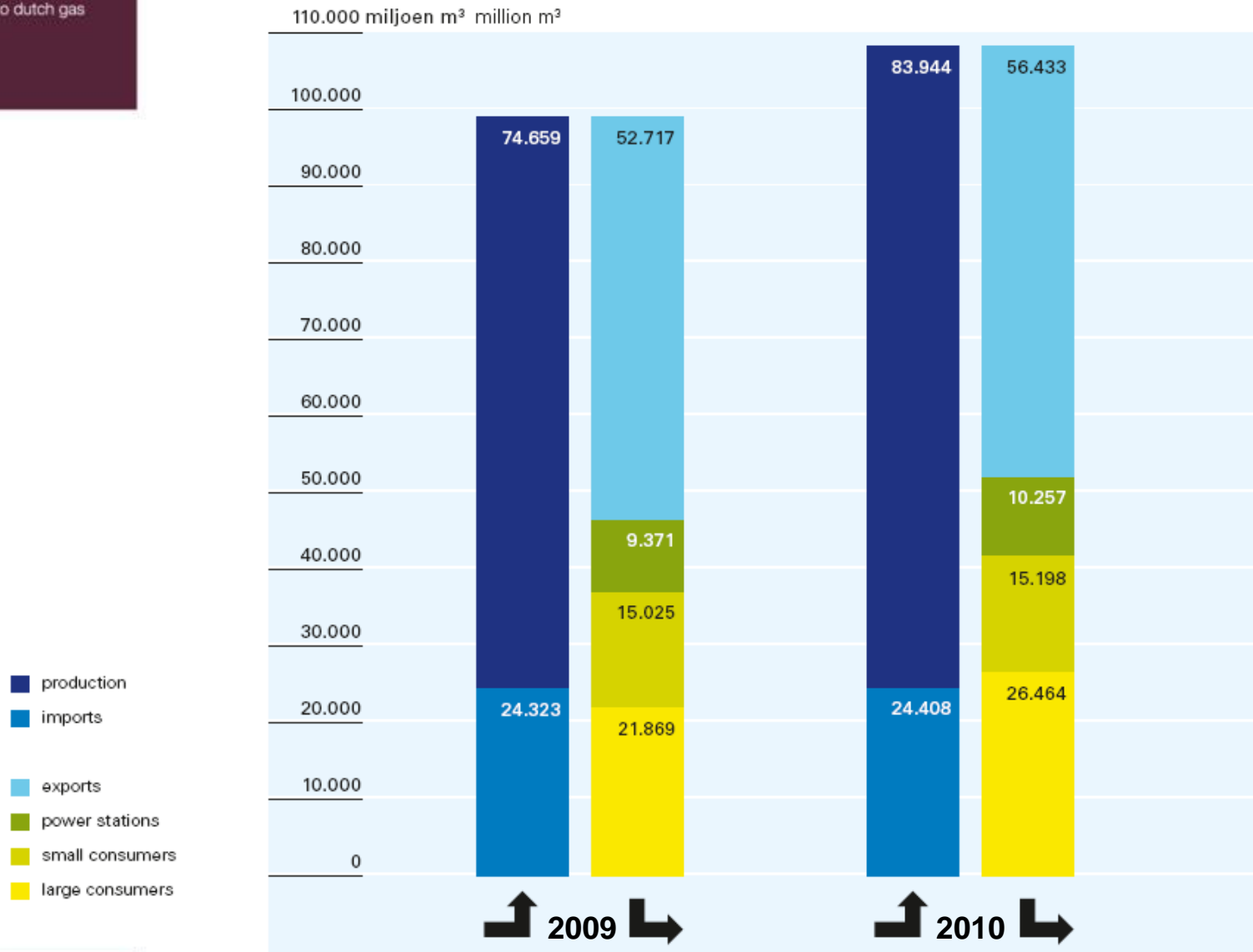
The annual duration of gas failure, i.e. the time per customer per year that gas cannot be supplied, is 29 seconds.



EU gas consumption

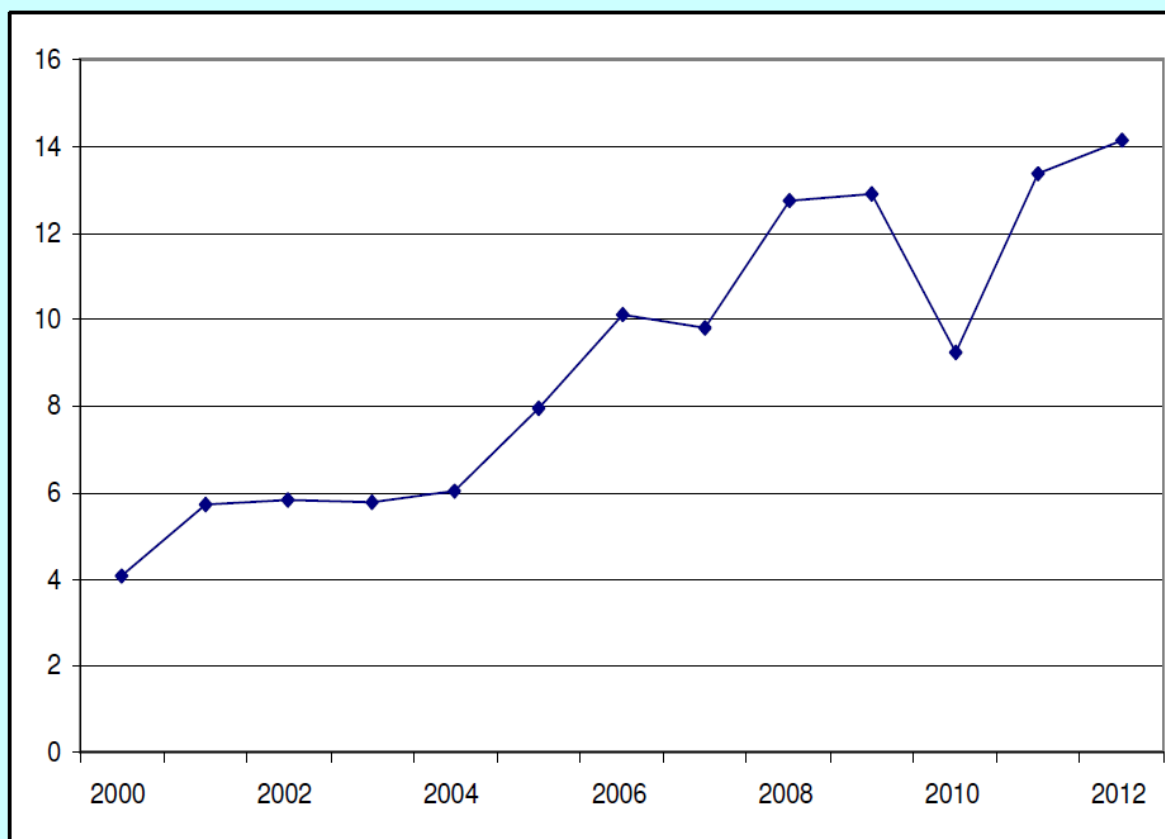


NL gas balance



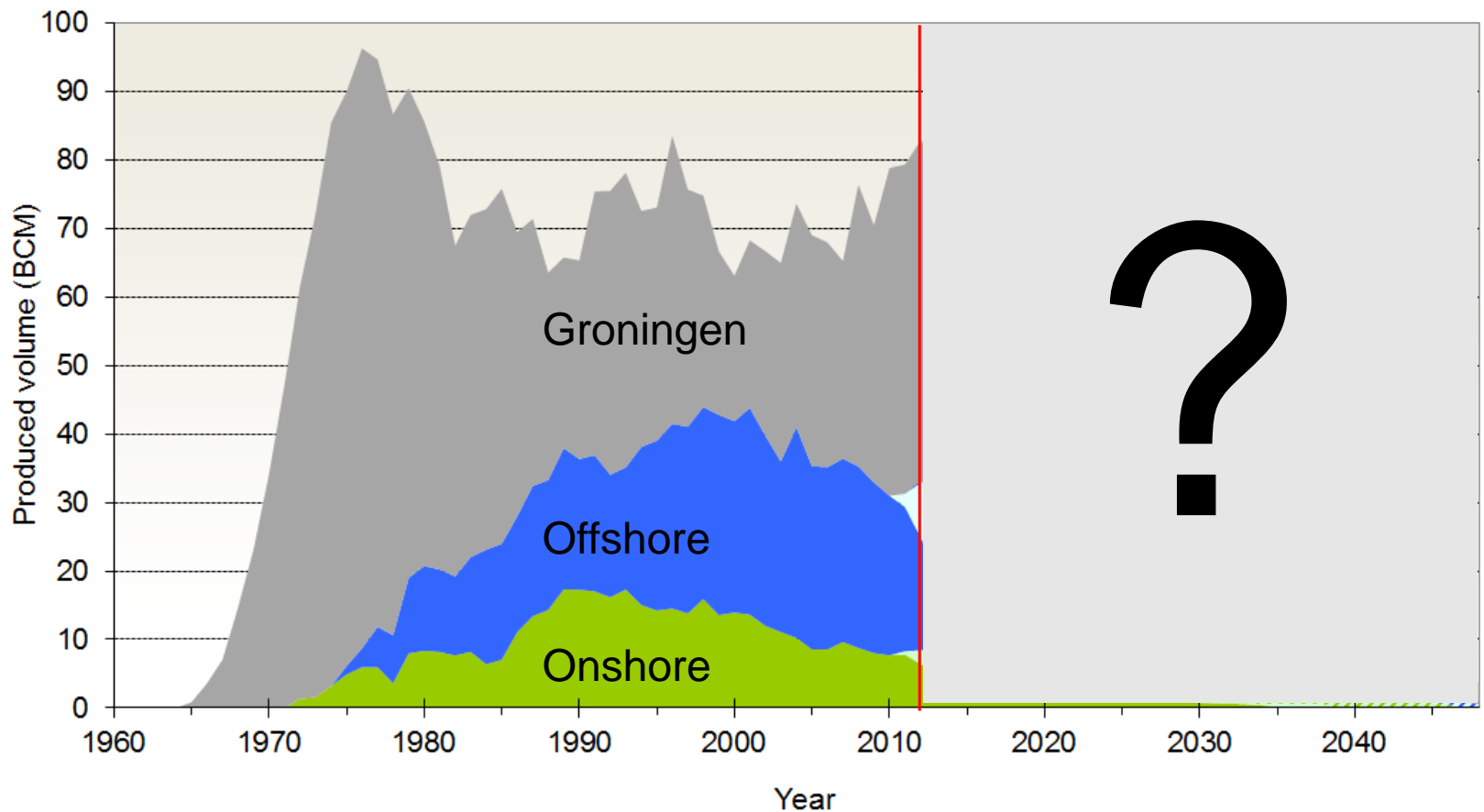
Gas Matters

Aardgasbaten (inclusief vpb) in mr. euro. Realisaties 2000-2010, ramingen 2011-2012



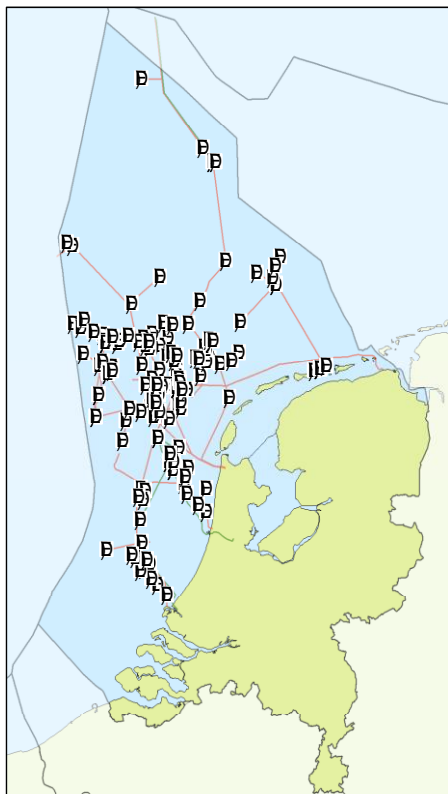
What's ahead?

Historic Production and Forecast



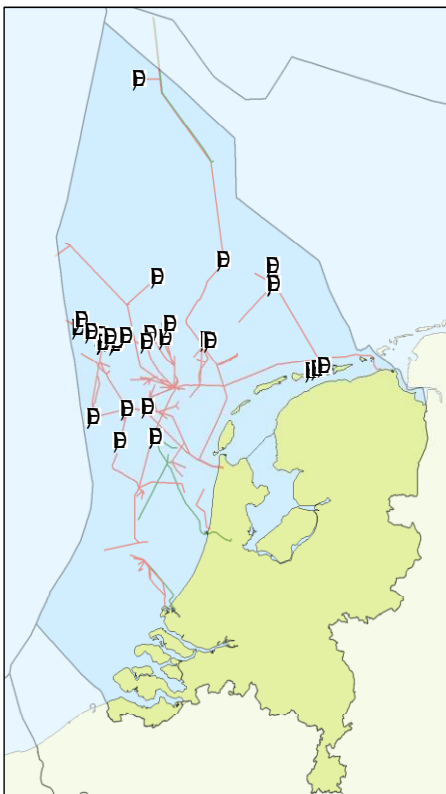
Infrastructure: Window of Opportunity is closing

Netherlands - Offshore Facilities 2009



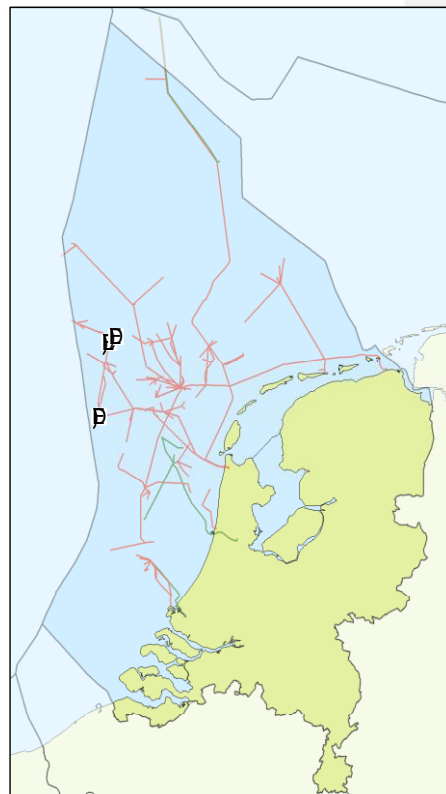
2009

Netherlands - Offshore Facilities 2020



2020

Netherlands - Offshore Facilities 2030

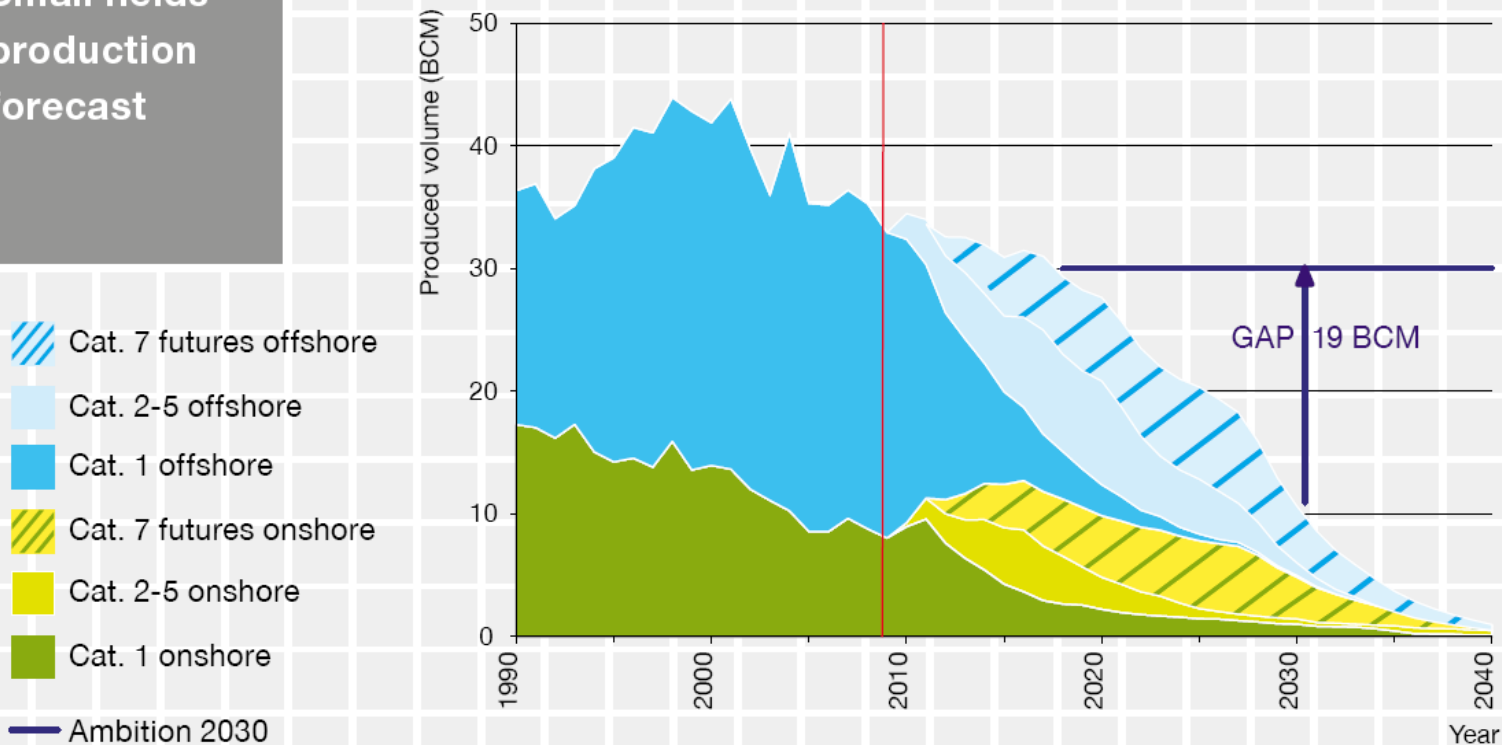


2030

Offshore infrastructure disappearing with time

EBN Ambition 30/30

Small fields production forecast

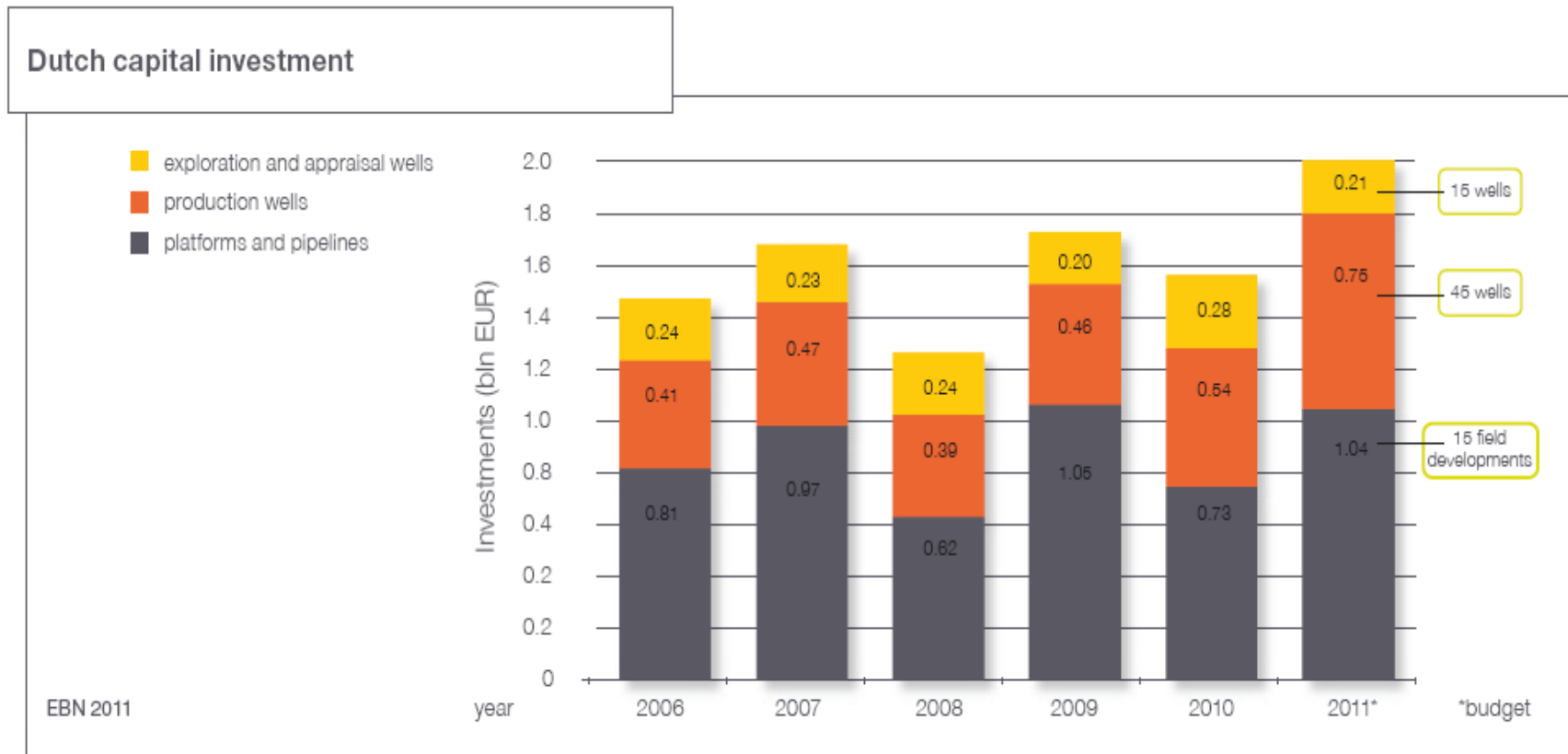


- Ambition to keep current production level of 30 Bcm/y until 2030 (outside Groningen).
- Current prognosis NFA + Futures: 11 Bcm i.e shortfall: 19 Bcm!

Tomorrow's Gas

- Role of EBN
- Gas Matters
- **EBN in Control**
- Roadmaps for Tomorrow's Gas
- Q&A

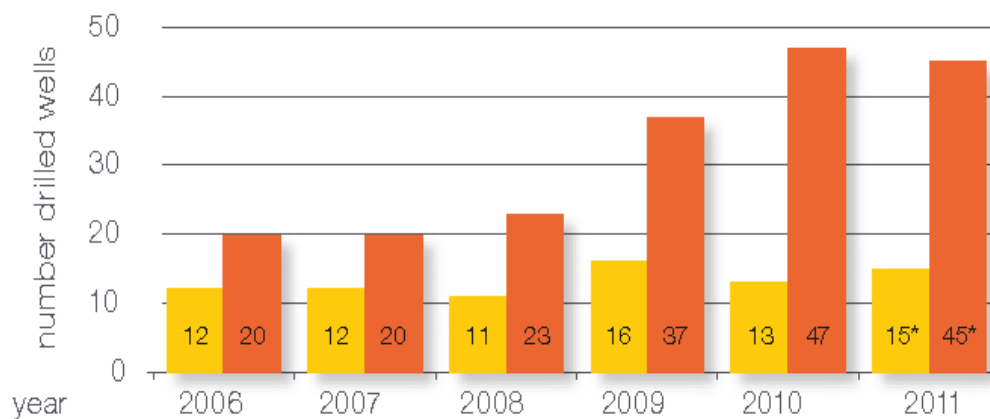
upstream capital investments



Drilling activity

Drilling activity

- exploration and appraisal wells
- production wells



EBN 2011

Exploration success

Exploration well successratio

- number of exploration wells
- succes %
- - 5 years average succes %



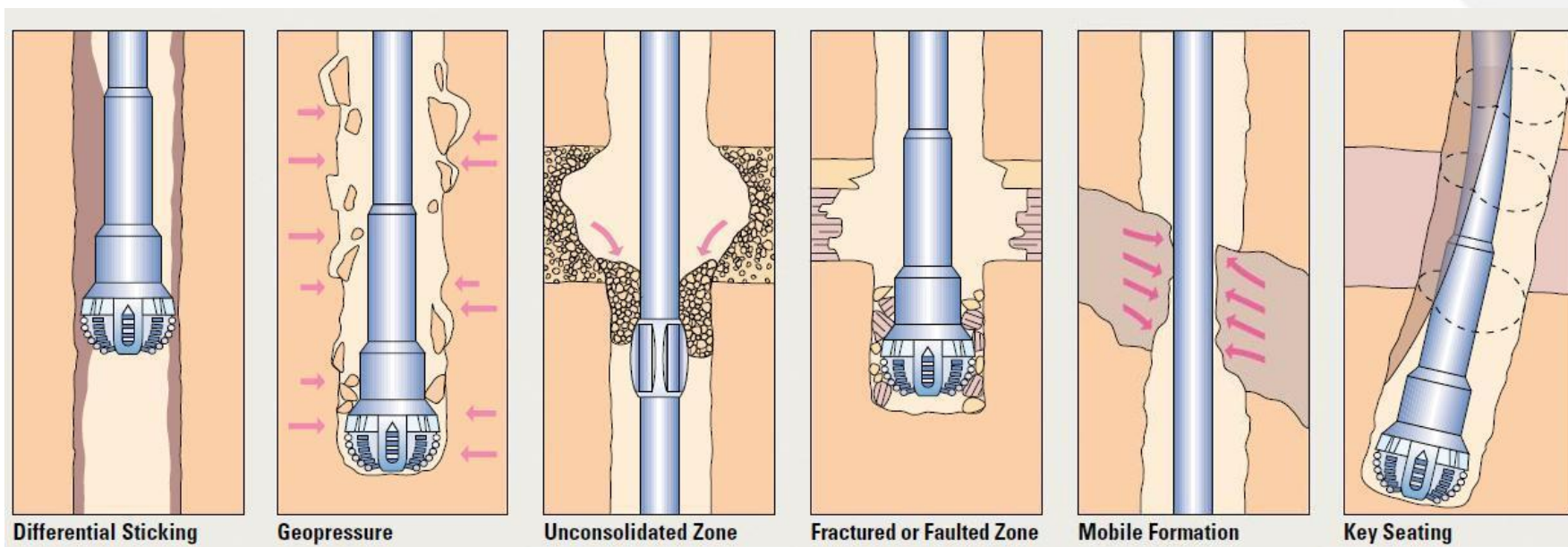
EBN 2011

Well After Action Reviews

Well	Operator	type	Target form.	Summarized results	Techn .	Reser voir
Confidential		E	Volprie sst.	water bearing; P&A		
		E	ROSLU	ROSLU within range; ROSLL water bearing		
		E	ROSL	delayed due to coring & high gas levels in Volprie; logged behind casing due to obstructed WL		
		E	Z3 Carb.	Z3 is tight; Z2 has over 500 ppm H2S; Vlieeland is tight, but fraccable; SL column is small		
		E	ROSL	small column; tight reservoir; P&A		
		E	ROSL	severe mud losses in Volprie; high pressure; tight reservoir; P&A		
		E	Bunter	small column; tight reservoir; P&A		
		E	Tersch.	reservoir within expectation range; reservoir damage after re-completion		
		E	RO	results in low-mid case range		
		E	Bunter	total losses in Chalk; results around mid-case		
		A	Bunter	unforeseen casing mid NS; low perm reservoir		
		A	ROSLU	depleted reservoir: formation pressure = 78 bar; will be produced		
		P	ROSLU	sidetracked 2X: [1] minor ST in NS. [2] cemented tool in reservoir; shallow ST with kick off in NS; section drilled, expandable casing stuck; well suspended		
		P	ROSLU	water bearing; suspended for future sidetrack		
		P	ROSLU	results within expectation range		
		P	ROSLU	60 bar depletion; results within range		
		P	ROSLU	economic development; no H2S produced		
		P	ROSLU	sidetracked 3X in NS; unconsolidated formation; operational issues; disturbed drilling area; plugged		n.a.
		P	Carbon.	results within expectation range		
		P	Carbon.	results within expectation range		
	P	ROSL	TDS failure: 1 week delay; Stuck tool & pipe due to depleted reservoir: 1 week delay; results within expectation range			
	P	ROSL	operational incident with upper racking arm; no injuries; fraced well; results within range			

Wells results: reviewing operations and reservoir delivery

After Action Review: *drilling hazards statistics*

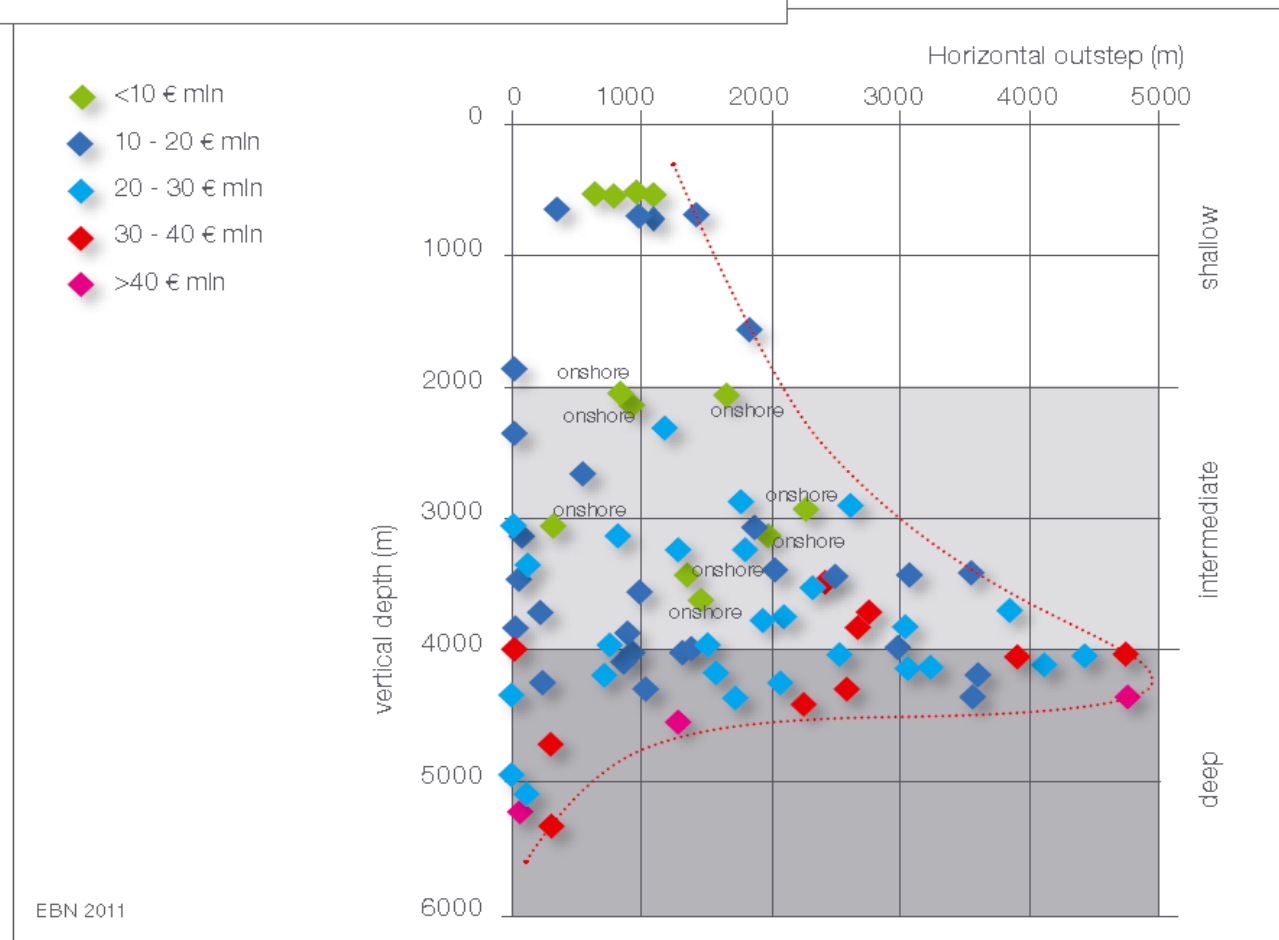


Examples of Geo-Drilling Hazards

➔ Drilling Hazard Database being developed (TNO JIP)

After Action Reviews: *ERD statistics*

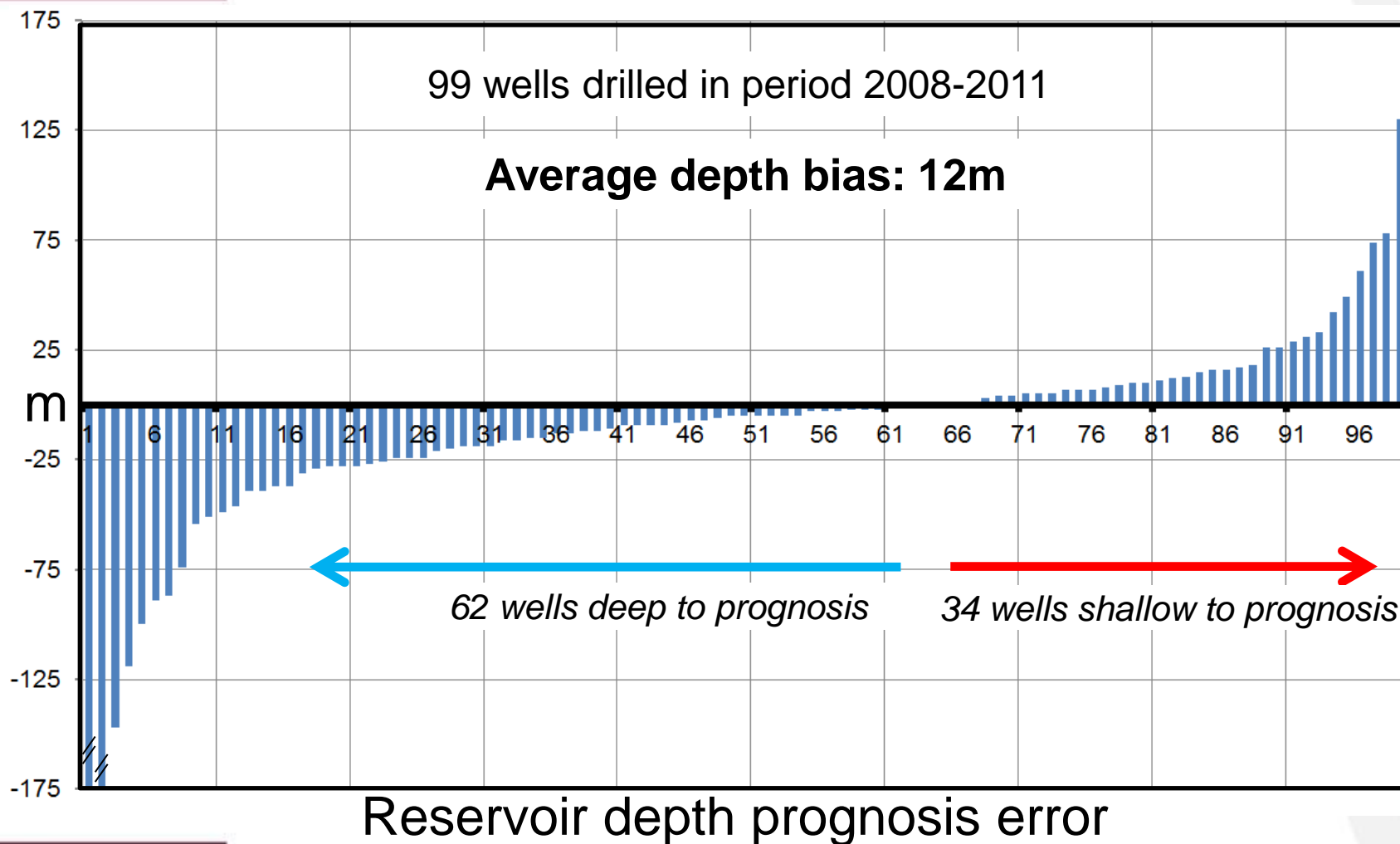
Drilling activity in The Netherlands 2008 - 2010



Noseplot: describes operating envelope for Extended Reach Drilling

Source: Focus on Dutch Gas EBN

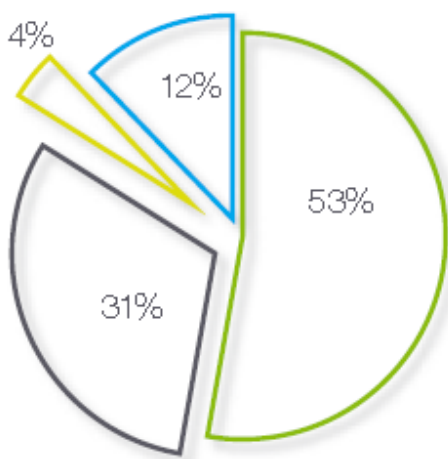
Analysing prediction bias



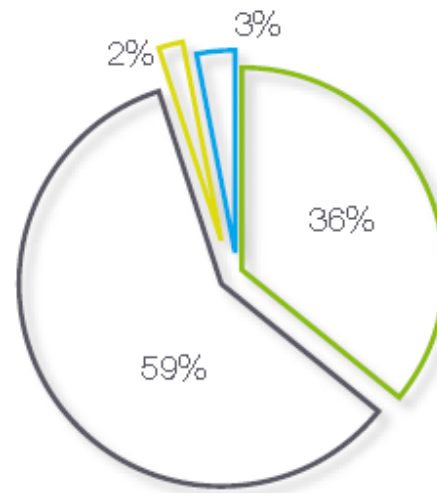
Planning abandonment costs

Platform types

percentage to total number of platforms



percentage to total reserved abandonment costs



- subsea
- monopile
- satellite / wellhead platform
- integrated platform

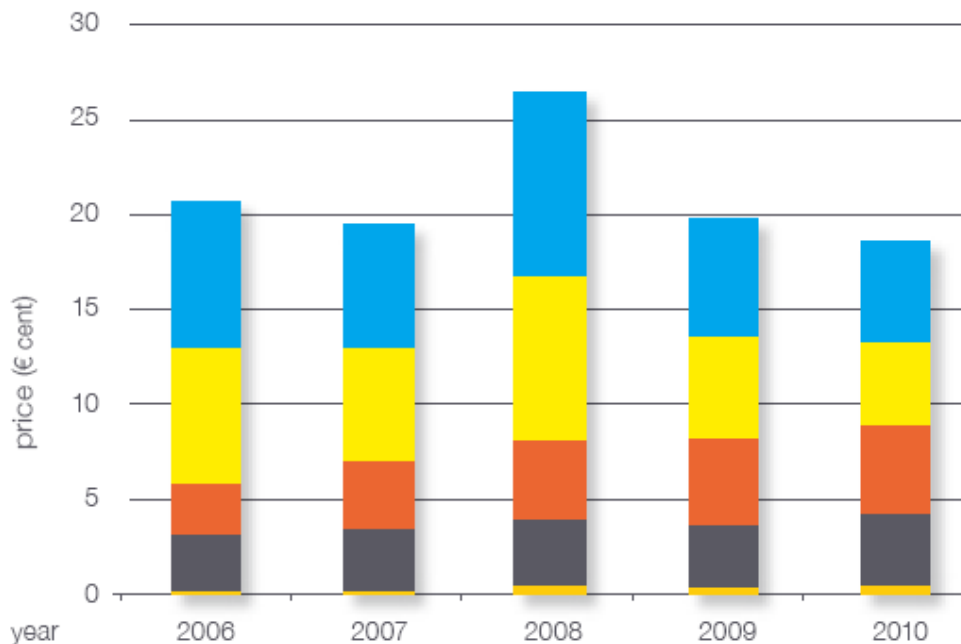
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Exploring synergies across operators

Tracking profitability

Margins of small field production

- net profit
- tax
- production costs
- depreciation
- finding costs



EBN 2011

Roadmaps in EBN

So, Where are we exactly ?



Good maps do pay off !

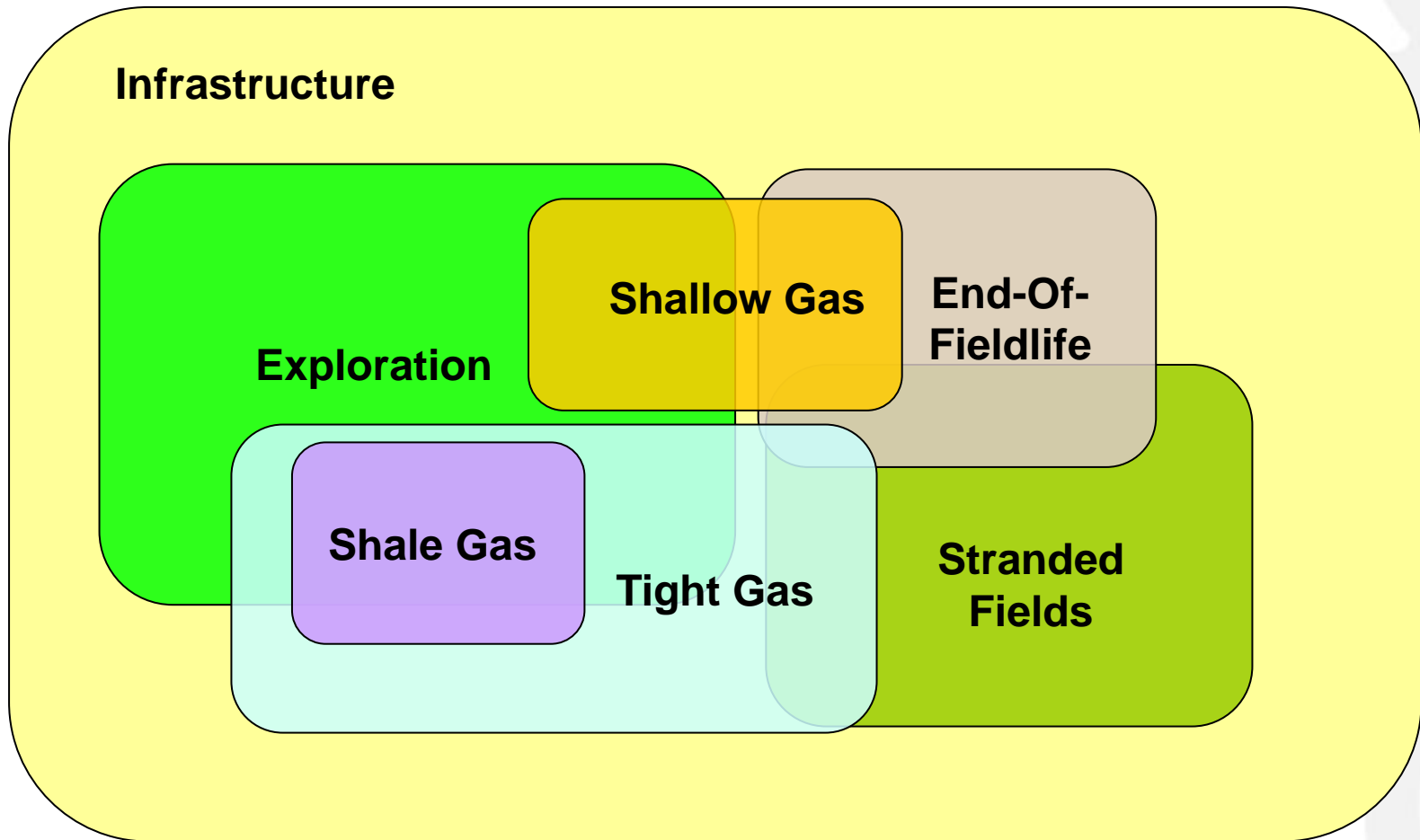
Roadmap Approach

7 Themes selected for stimulation

1. Exploration
2. Tight Gas
3. Shale Gas
4. Shallow Gas
5. Stranded Fields
6. End-of-Field life
7. Infrastructure

*Tough reservoirs
= unconventionalals*

Roadmaps: overlapping themes



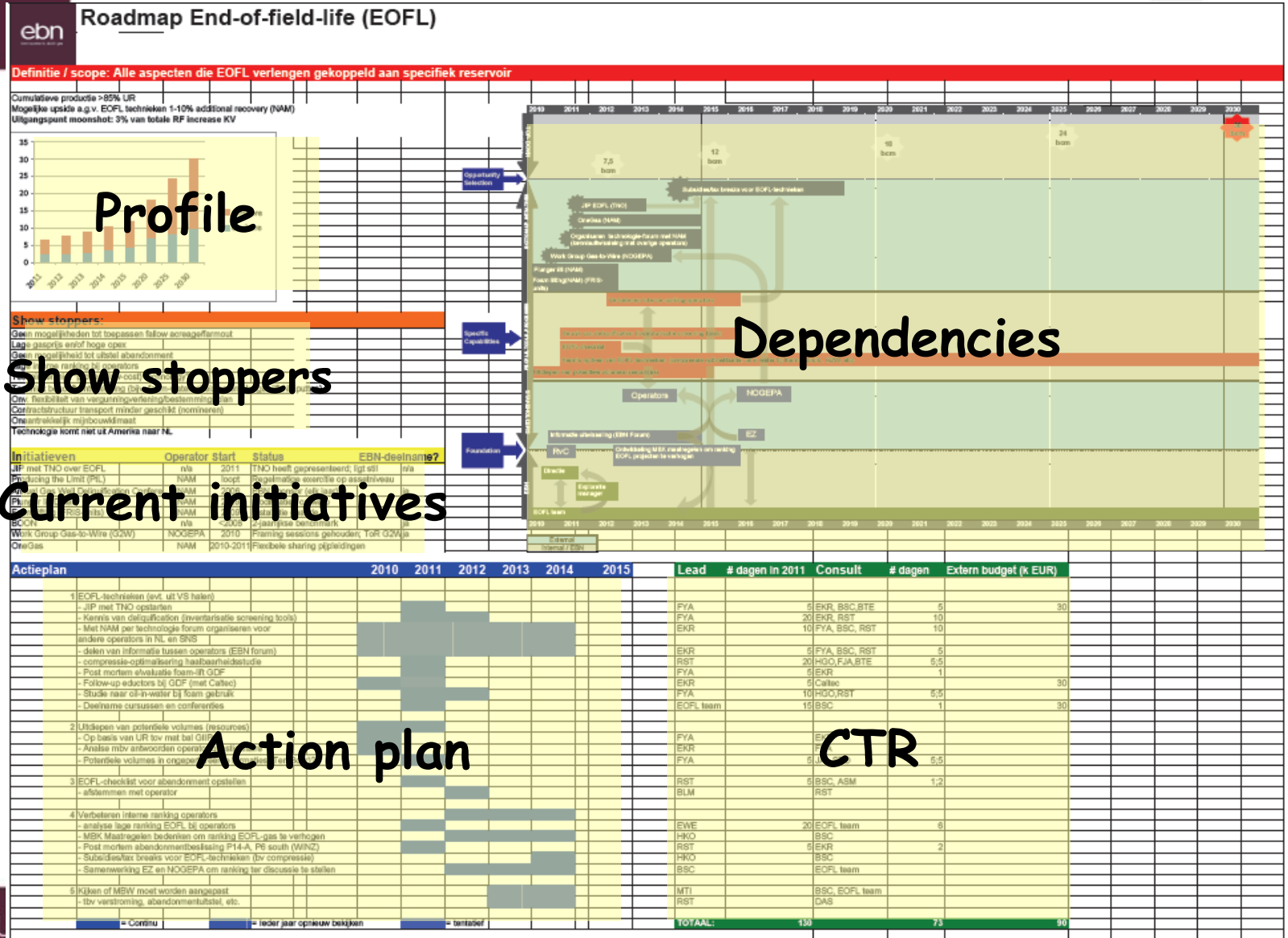
Open mind for roadmap synergy!

Roadmaps in EBN

For each Theme:

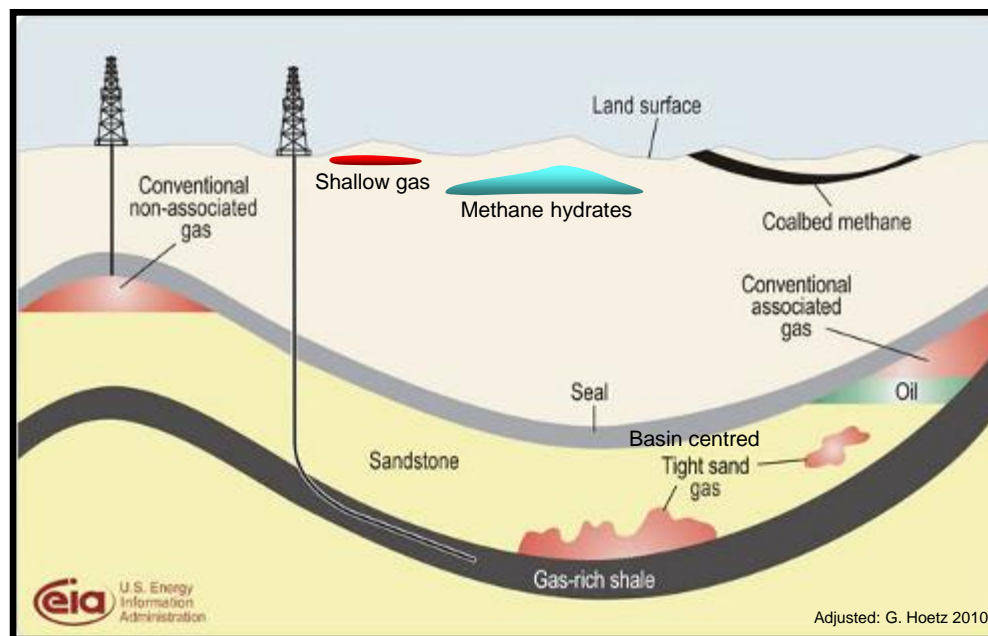
1. *Moonshot* definition via workshops
2. Identify *bottlenecks* for progressing volume maturation
3. Structured set of projects addressing *bottlenecks*
4. Define *innovation* requirements
5. *Timeline* and resources defined
6. *Multi-disciplinary* teams
7. *Single point responsibility* for project delivery
8. Regular progress *meetings & milestones*
9. *Sharing knowledge & facilitating* EP activity in NL

Roadmap structuur



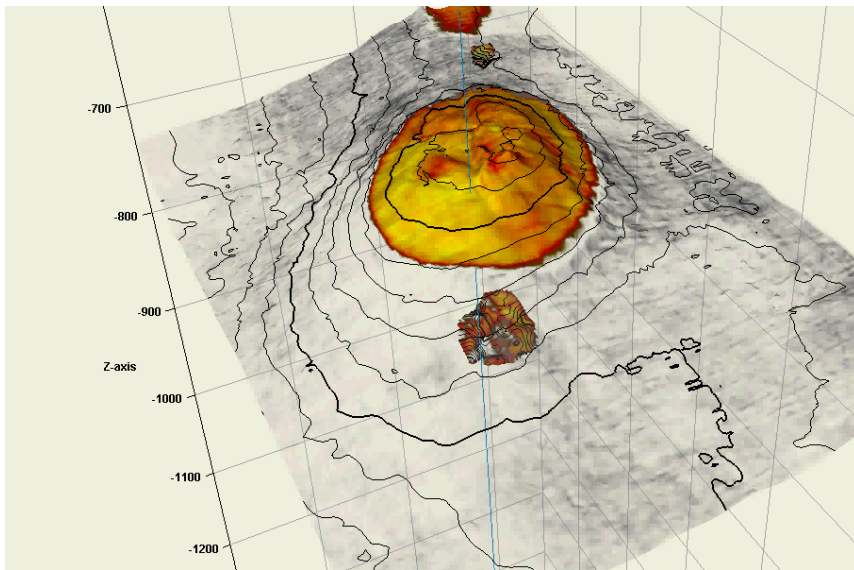
Unconventionals: *Gas from Tough Reservoirs*

<i>Gas types:</i>	conventional	Shallow gas	Tight gas	Shale gas	Basin-centred gas	Coalbed methane	Methane hydrates
rock	any (Sst, Lst)	Unconsolidated (sand)	any	shale	any	coal rich	Any (Sand)
permeability	> 1 mD	> 1 mD	< 1 mD	<<1mD	< 1 mD	< 10 mD	> 1 mD
Trap type	Buoyancy trap	Buoyancy trap	Buoyancy trap	Auto trap	Rel perm trap	Adsorption trap	Absorption (+buoyancy trap)

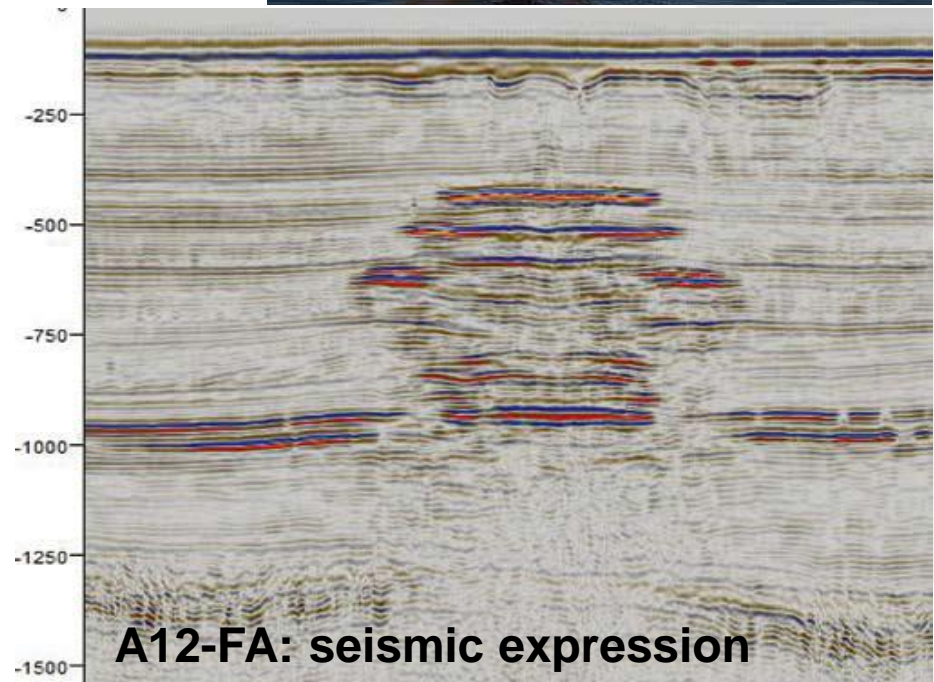


Shallow Gas delivers!

A12-FA platform



Bright Spot: F16



A12-FA: seismic expression

Shallow Gas

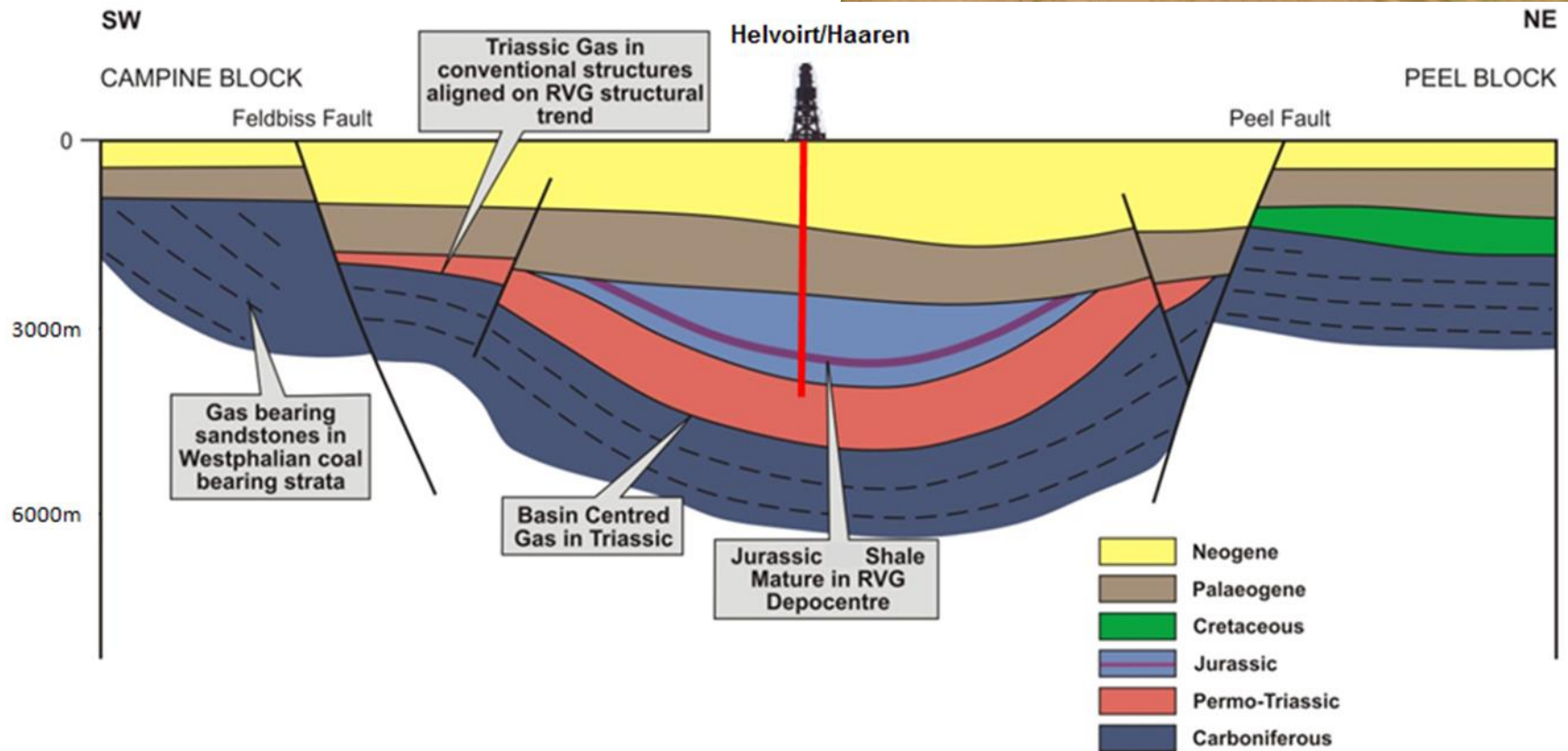
- Building SG exploration portfolio
 - Regional Bright Spot mapping ✓
 - Workflow for volumetric assessment ✓
 - Rock properties constrained via TNO JIP ✓
- Understanding critical issues e.g:
 - Gas saturations ✓
 - sand production ✓
 - Low pressures ✓
- Promoting prospects in Open Acreage ✓

Shale Gas



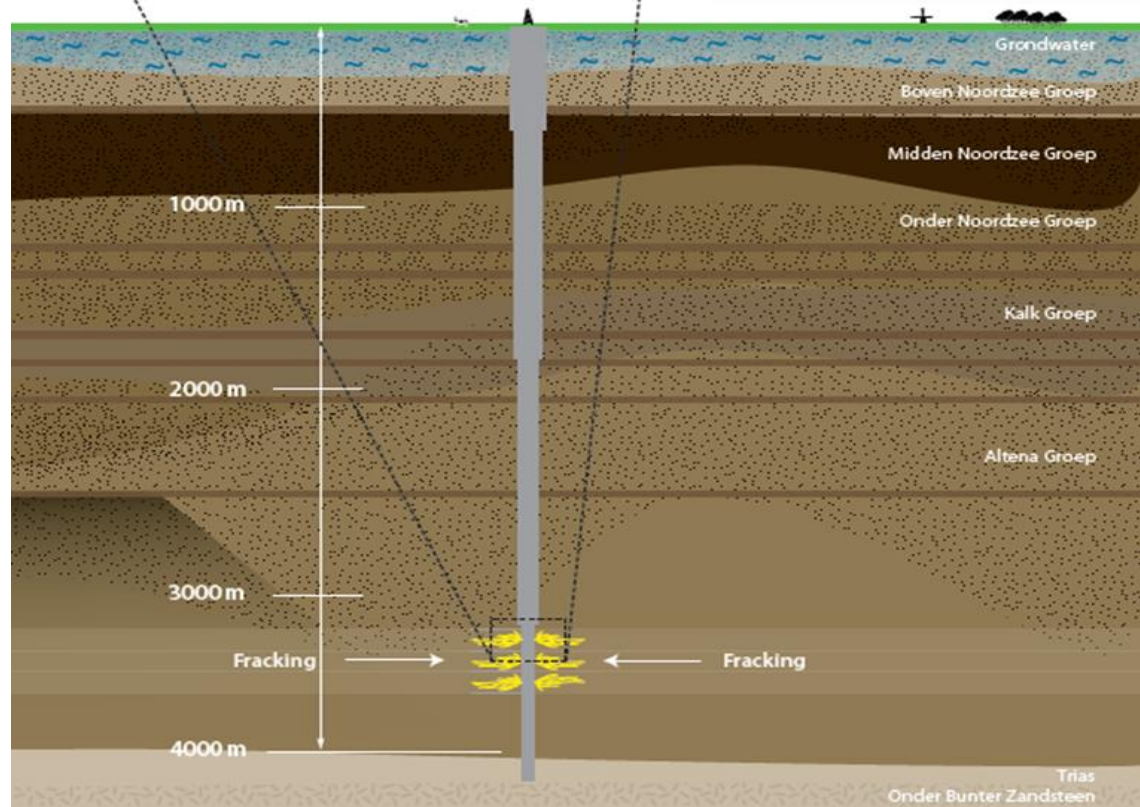
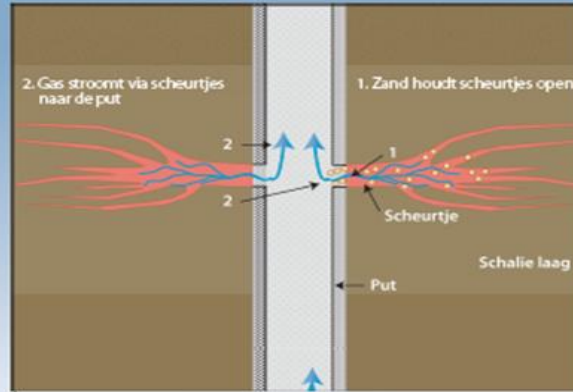
Cuadrilla, Blackpool 2011

Boxtel/ Haaren:
first dedicated shale gas exploration



ebn

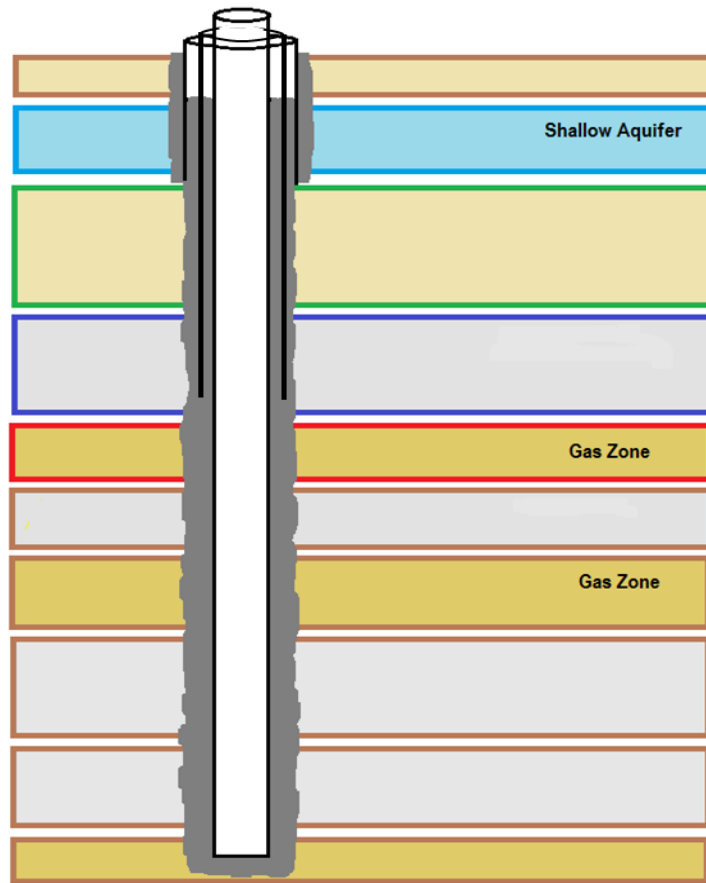
best access to dutch gas



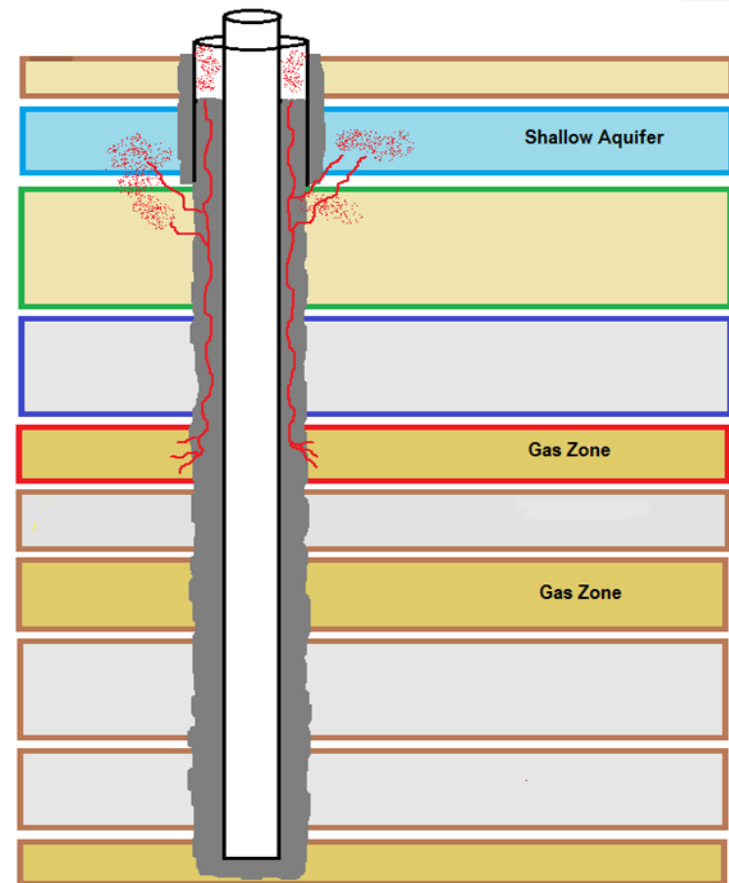
Shale gas
requires fracking

resourceful

Well design



Effective casing scheme



Inadequate casing scheme

Shale Gas

Vrees voor schadelijk schaliegas

Verzet tegen proefboring schaliegas groeit

ANP/Redactie - 27/10/11, 10:52

B en W Haaren tegen (proef)boringen naar schaliegas

Laatst gewijzigd: donderdag 19 januari 2012 - 13:41 | Auteur: [Hans Janssen](#)



2.112 ondertekeningen

Stop schaliegaswinning in Nederland

Wij willen verhinderen dat er in Noord-Brabant en Nederland verkeerde beslissingen worden genomen omtrent het winnen van gas uit schaliegesteente. Zeker als er risico's zijn voor mens en milieu.

Mocht u nooit van schaliegas gehoord hebben, steun ons met uw stem om ervoor te zorgen dat we eerlijk worden geïnformeerd. Doe mee!

Fracking voor schaliegas verwoest milieu
2011-09-11 | Bron: iNSnet |

Angst voor schaliegas

SCHALIEGAS

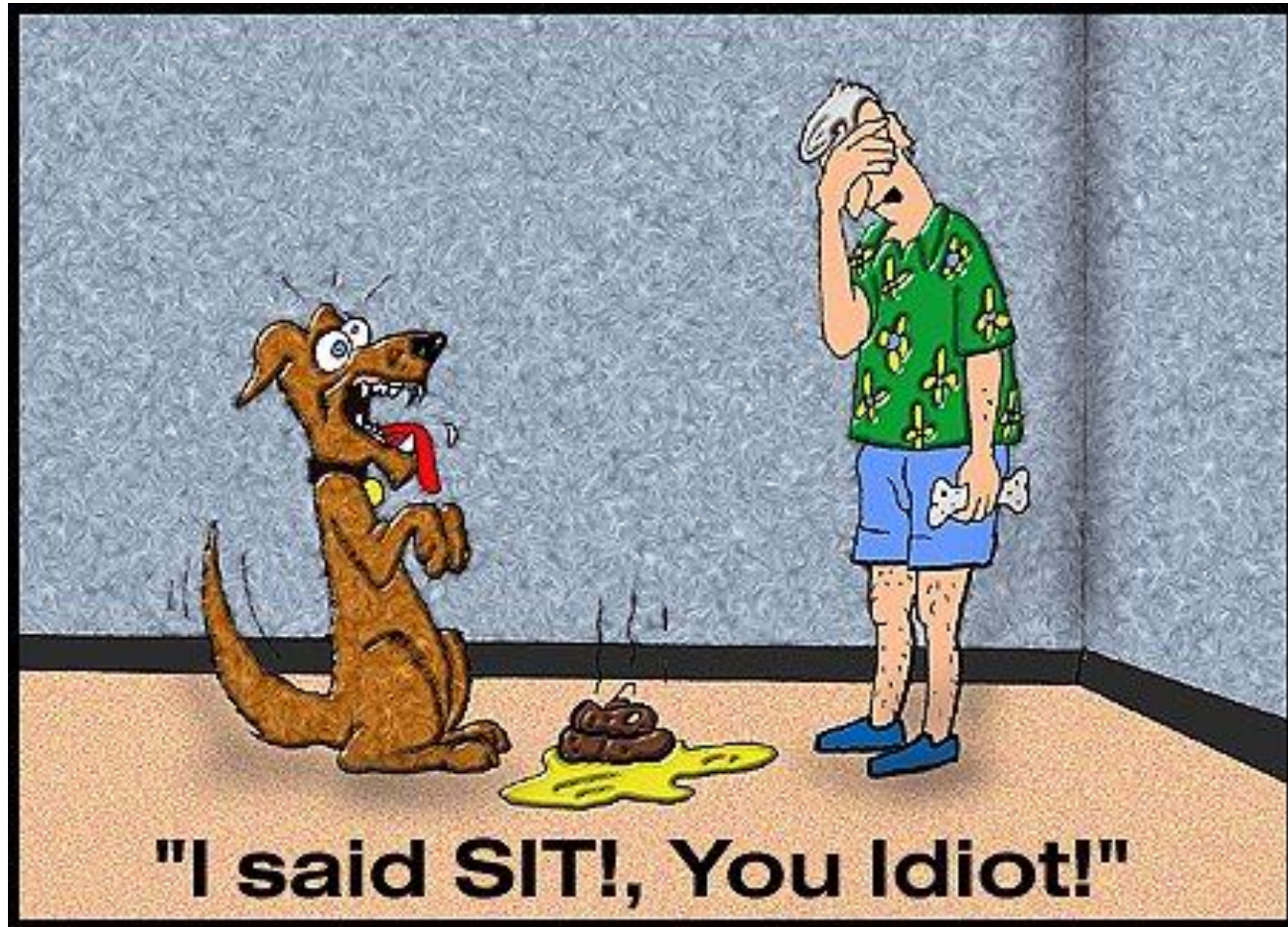
LAAT MAAR ZITTEN

Loesje

Schaliegas, een lelijke vorm van energiewinning

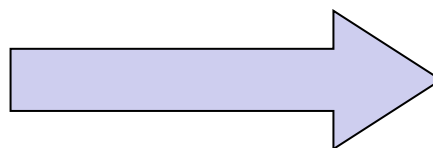
Waarom overwegen we deze vorm van gaswinning toe te staan in Nederland?

Discussing Shale Gas: communication is key...

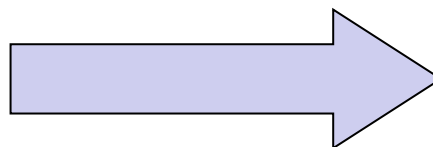


Public concern – Key environmental issues

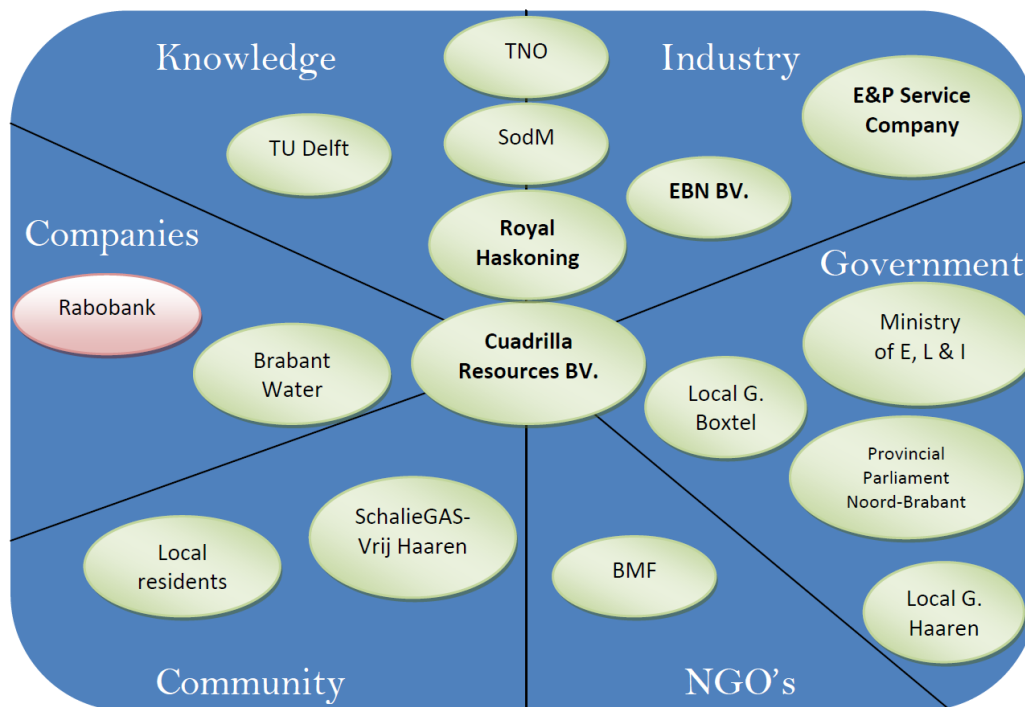
- Earth tremors
- Contamination of groundwater
- Emissions of greenhouse gases
- Water management
- Land use and visual impacts
- Logistics



Professional stakeholders

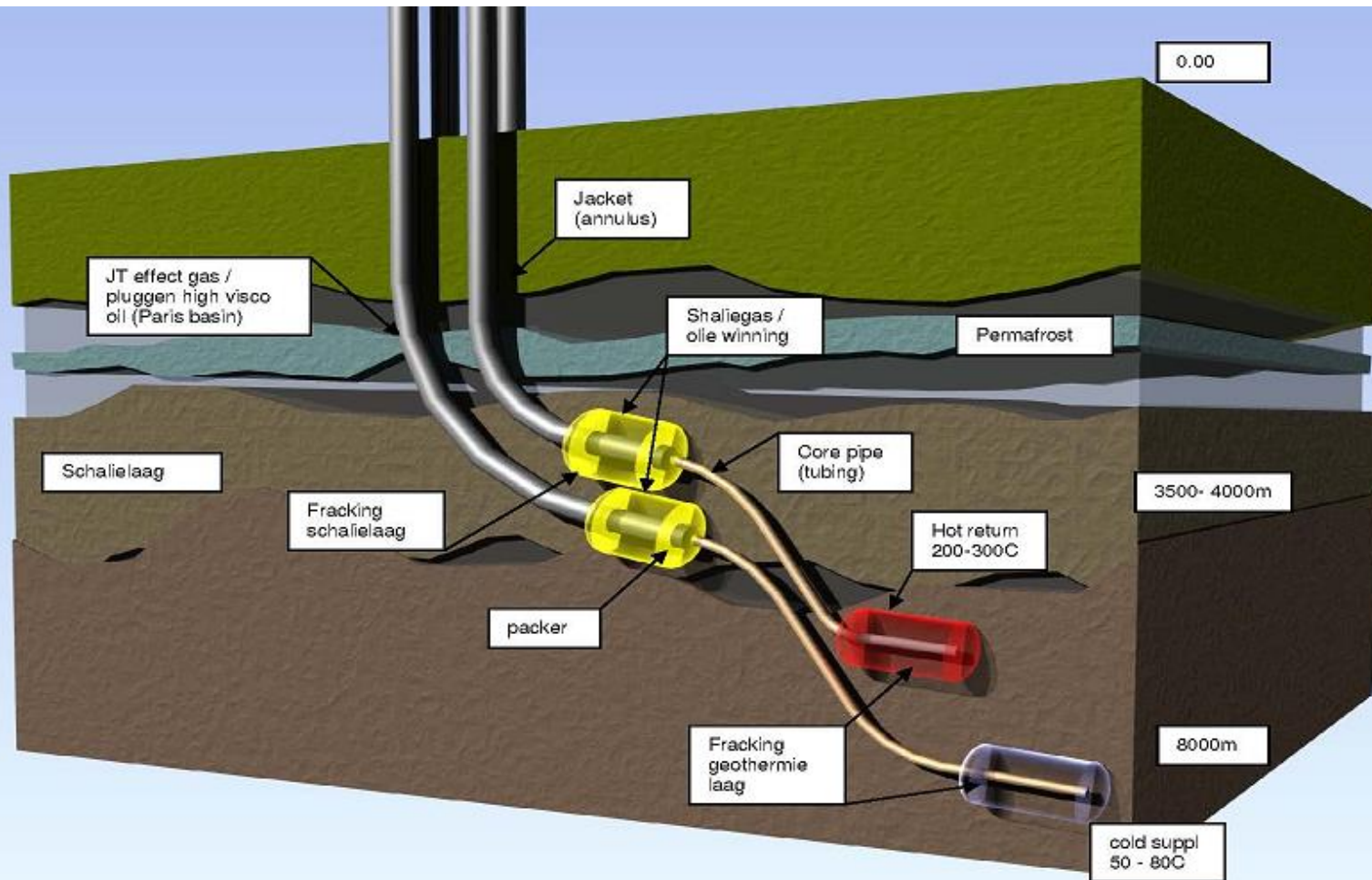


Non-professional stakeholders



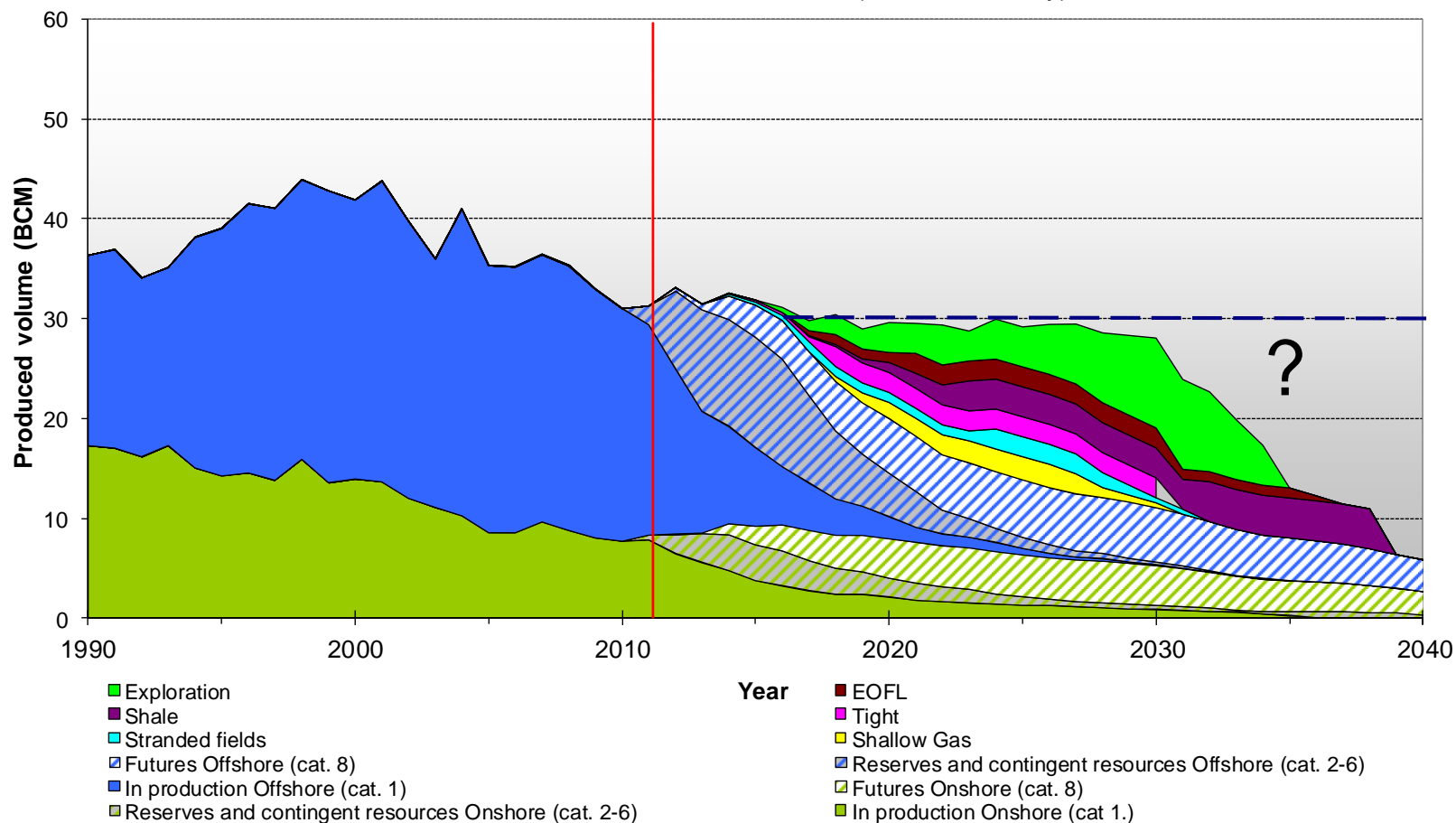
Crazy ideas?

Shale gas & Geothermal energy

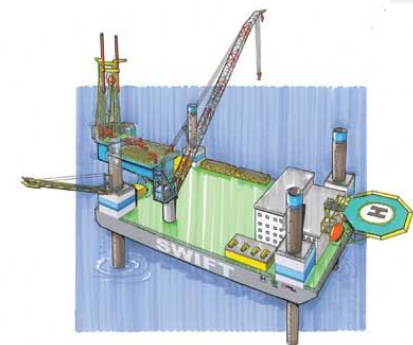
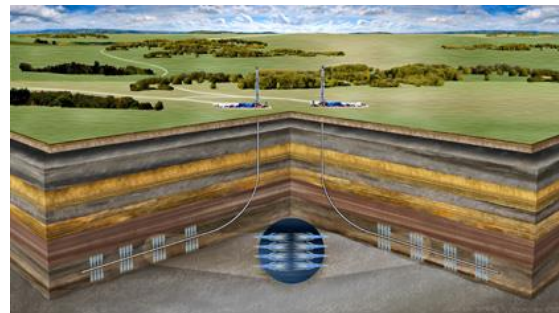
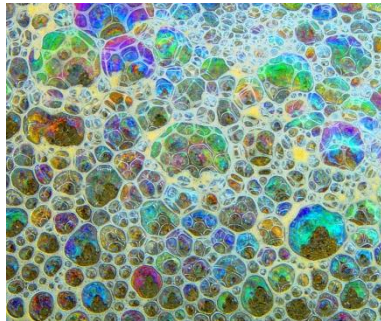


Ambition: contributions from different themes

Production: Historic and 30/30 Ambition (small fields only)



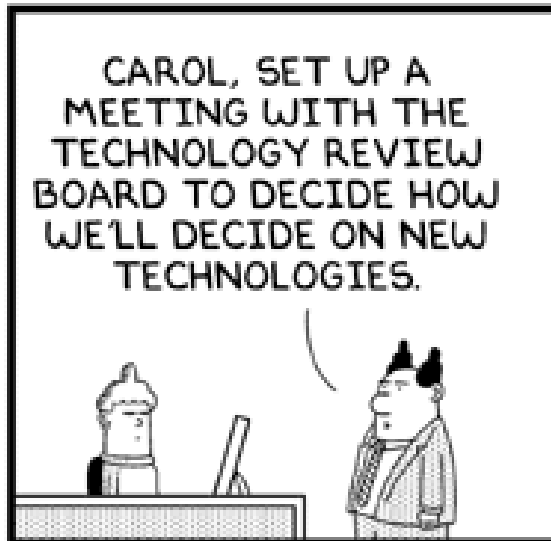
Do we have the Technology?



What do we need?

- **Companies eager to:**
 - develop technology
 - apply new technology
 - create profitable showcases
 - communicate & cooperate
- **Bright People keen to enter E&P**

Q&A



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www.dilbert.com



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