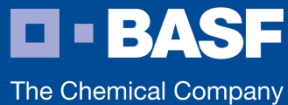


BASF and Shale Gas



Roland Merger, GRD/B

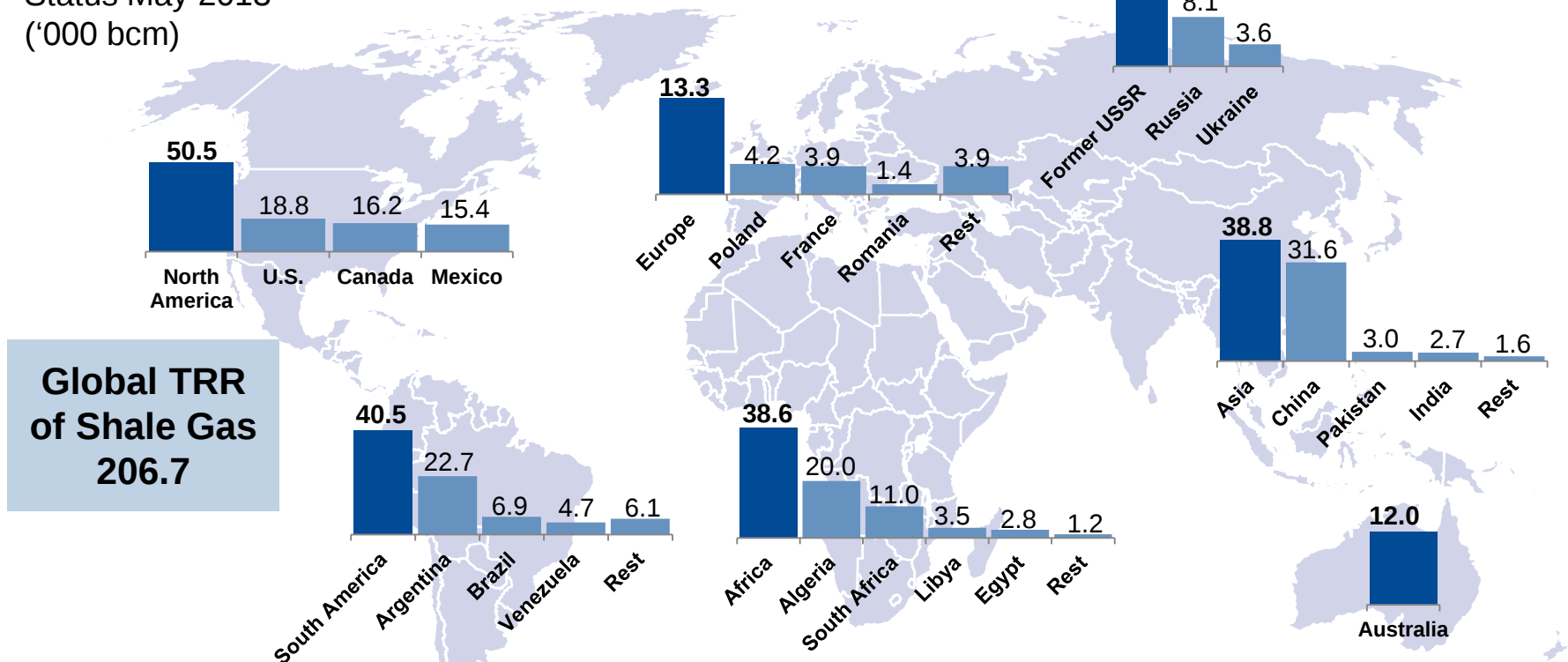
Global Shale Gas Resources

There is plenty of shale gas

Technically recoverable resources (TRR) of shale gas

Status May 2013

('000 bcm)



- Estimates of shale gas resources are often uncertain and changing
- TRR of shale gas does not mean that the resources are also economically feasible to recover

* Middle East only includes assessment of Turkey and Jordan; other Middle East & Caspian countries are excluded, but could hold significant resources.

BASF segments



Chemicals

Petrochemicals

Monomers

Intermediates



Performance Products

Dispersions & Pigments

Care Chemicals

Nutrition & Health

Paper Chemicals

Performance Chemicals



Functional Materials & Solutions

Catalysts

Construction Chemicals

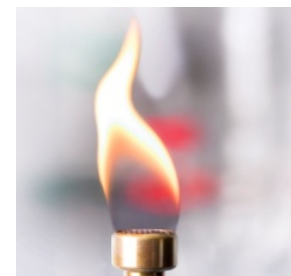
Coatings

Performance Materials



Agricultural Solutions

Crop Protection



Oil & Gas

Oil & Gas

BASF segments and shale gas



BASF
is a consumer
of natural gas

Chemicals

Petrochemicals

Monomers

Intermediates

**BASF products
are used
in shale gas production**

Performance Products

Dispersions &
Pigments

Care
Chemicals

Nutrition &

Functional Materials & Solutions

Catalysts

Construction
Chemicals

Coatings

Performance
Materials

Agricultural Solutions

Crop
Protection

Oil & Gas

Oil & Gas

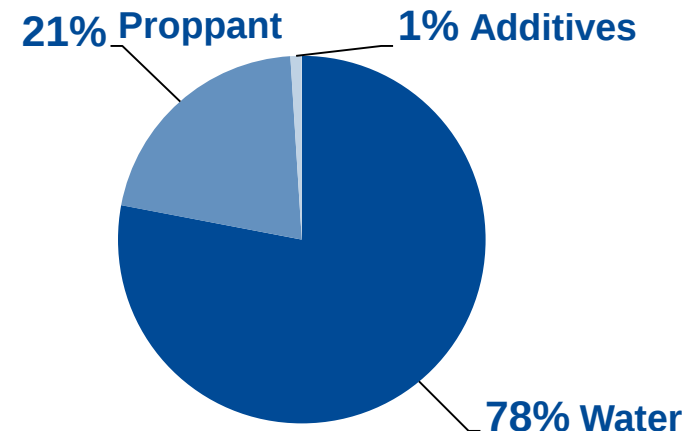


BASF
is a supplier
of natural gas

BASF as a seller of chemicals

- BASF supplies chemicals into oil field service companies engaging in fracking
- BASF supplies single components:
 - Friction modifiers
 - Thickeners
 - Surfactants
 - Scale inhibitors
 - Biocides

Components of fracking-fluids



These are used for the manufacture of fracking fluids.

BASF as supplier of Natural Gas

- E.g. Germany: 12% of natural gas from domestic production (declining)
- Assumed shale gas resources worth exploring
- Research whether shale gas production in Germany is feasible should be supported
- Hydraulic fracturing is well-established in conventional production 1/3 of conventional gas production requires fracking.
No approvals in Germany since 2011, gas production is declining.
- **Wintershall** has 30 years of experience in hydraulic fracturing in Europe, Russia and Argentina

Wintershall Set for further growth upstream

 **BASF**
The Chemical Company



Wir fördern Zukunft.

Wintershall Set for further growth upstream

A subsidiary of BASF – The Chemical Company

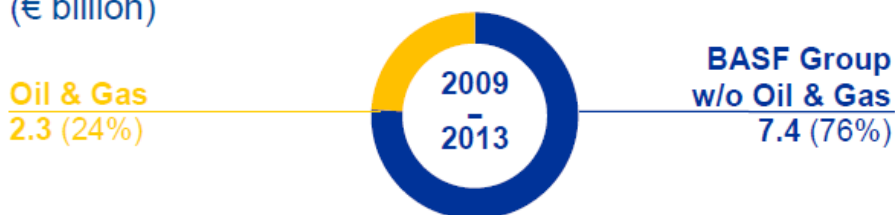
Share of Oil & Gas in BASF portfolio

Overview

Share of Oil & Gas in BASF portfolio



Average EBITDA* 2009-2013 (€ billion)



Cumulative capex** (plant, property, equipment) (€ billion)



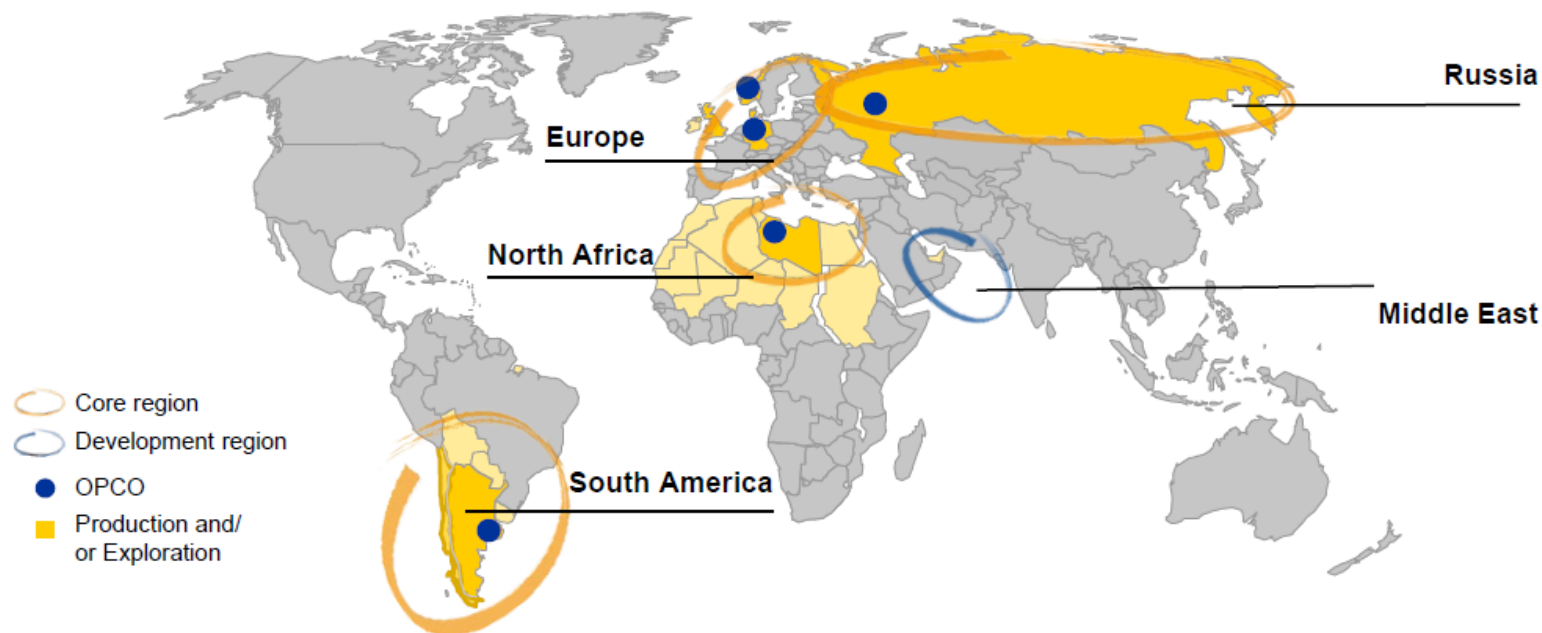
Key facts

- 2009-2013:
 - Oil & Gas: Solid profit contributor to BASF Group
 - Oil & Gas accounted for 31% of BASF Group capex
- EBITDA share of Oil & Gas in BASF's portfolio expected to remain in the same order of magnitude in the upcoming years
- Capex share of Oil & Gas business in BASF portfolio will slightly decline

A subsidiary of BASF – The Chemical Company

Focus on Core regions

Exploration & Production: Clear regional focus Focus on Core regions



Increased security of supply for Europe

Nord Stream

Increased security of supply for Europe

Nord Stream offshore pipeline

- **Pipeline capacity:** 55 billion m³ per year via two 1,220 km subsea pipelines
- Successful gas deliveries since November 2011
- JV between Gazprom 51%, BASF/Wintershall and E.ON* 15.5% each, Gasunie* and GDF SUEZ* 9% each
- Total **BASF investment:** €1.15 billion

Nord Stream onshore

- System expansion: OPAL (October 2011), NEL (October 2012)
- Increased transportation capacity to NL, B, F, CZ through system upgrade including storage Jemgum
- Germany as distribution hub for Europe
- Total **BASF investment:** €1.15 billion

* Indirect through subsidiary companies



Securing the supply of South Europe

South Stream

Securing the supply of South Europe



Key facts

- Wintershall acquired 15% stake in South Stream
- South Stream consortium to develop, construct and operate the offshore section of South Stream
- First direct connection of Southern Europe to the world's largest natural gas reserves in Russia
- **Total investment (offshore):**
~ € 10 billion
- **Planned capacity:**
63 billion m³ p.a. via 4 parallel pipelines each ~ 930 km
- **Start-up:** End of 2015 earliest

BASF as supplier of Natural Gas

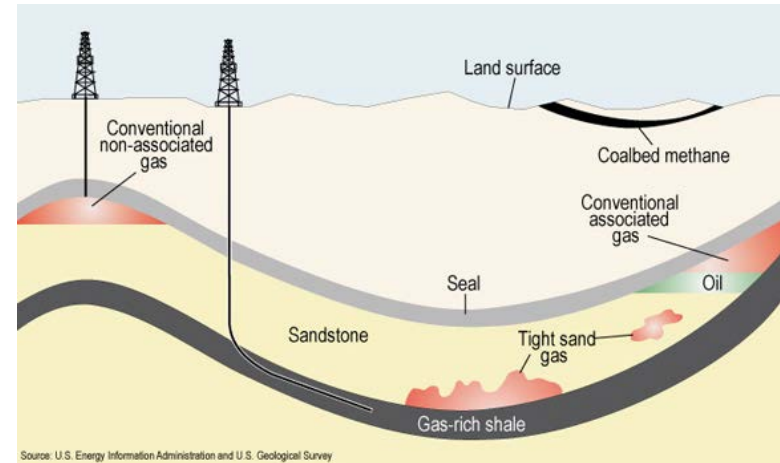


Shale Gas in Germany

- Resource estimates: 700-2300 bcm
- Equivalent to 13 years of German demand or :
- Keep current domestic production level for another 100 years

Shale gas production techniques and possible environmental hazards

- Combination of two established technologies: **horizontal drilling** and **hydraulic fracturing**.
- Shale reservoirs are generally deep below surface and groundwater layers.
- Water, sand and additives are pumped at pressure into the shale, opening up hairline fractures that allow gas to flow.
- Thousands of meters of impermeable rock separate fractures from drinking water aquifers.
- Fractures cannot propagate to the surface.



Wintershall is acting responsibly

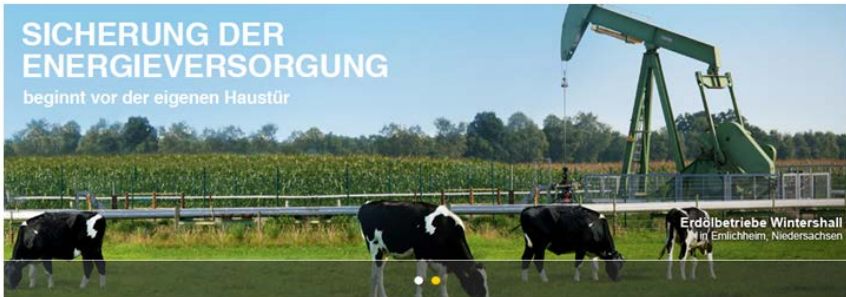


Suche

Wintershall in Deutschland

Startseite Blog Energie aus Deutschland Tight Gas in Niedersachsen Vorkommen von Schiefergas in NRW Forschungsprojekt in Bookstedt Erdöl und Erdgas sicher fördern Umwelt & Nachhaltigkeit FAQ

SICHERUNG DER ENERGIEVERSORGUNG beginnt vor der eigenen Haustür



Blog

Heimische Förderung

7. Juni 2013 | Keine Kommentare



Forsa-Umfrage: Klares "Ja, aber" zum Fracking

Nach einer Umfrage des Meinungsforschungsinstitutes forsa hält jeder zweite Deutsche Fracking für eine Option, wenn strenge Regeln zum Schutz der ...

3. Juni 2013 | Keine Kommentare

Wintershall verlängert Kooperation mit Gymnasium Lohne

Wintershall hat die Kooperation mit dem Gymnasium Lohne um zwei weitere Jahre verlängert. Ziel ist es, das Interesse an Naturwissenschaften

Förderung in Deutschland

Sicherung der Energieversorgung beginnt vor der Haustür

Für die sichere Energieversorgung Deutschlands leistet heimisches Erdgas nach wie vor einen wesentlichen Beitrag: Etwa 13 Prozent des nationalen Bedarfs werden in Deutschland selbst gefördert. Das entspricht dem Jahresverbrauch von mehr als 6 Millionen Einfamilienhäusern.

[weiterlesen >](#)

Tight-Gas-Bohrung "Düste Z10"



Die Erwartungen haben sich bestätigt: Die geologischen Untersuchungen der Bohrkörner aus der Bohrung Düste Z10 im niedersächsischen Barnstorf (Landkreis Diepholz) haben gezeigt, dass Erdgas in der Lagerstätte

Vorkommen von Schiefergas in NRW



Für den Erkundungsprozess von möglichen Schiefergasressourcen hat Wintershall von der Bezirksregierung Arnsberg die Erlaubnis zu geologischen Erkundungen in NRW erhalten. Die Konzessionen "Rheinland" und

Umwelt und Nachhaltigkeit



Die Exploration, Produktion und der Transport von Erdgas und Erdöl ist immer ein Eingriff in gesellschaftliche und natürliche Bereiche. Wir prüfen schon vor Beginn unserer Aktivitäten mögliche Auswirkungen auf Mensch und

- Information on all projects on „www.heimische-foerderung.de“
- Self-Commitment to Maximum of Transparency and Safety

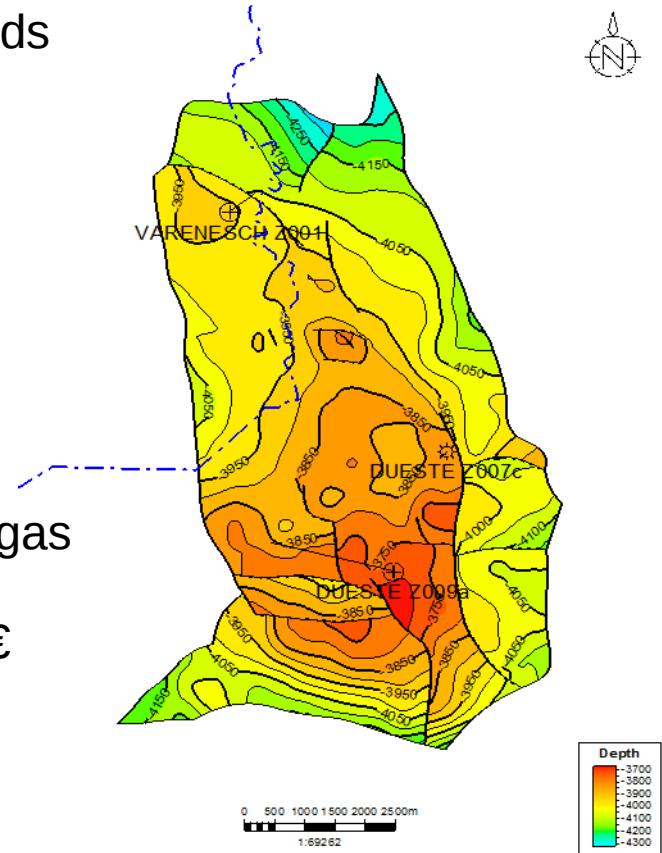
Wintershall Selbstverpflichtung für heimische Förderung

Wintershall ist Deutschlands größter Erdöl- und Erdgasproduzent. Wir fördern seit mehr als 80 Jahren Energie. Wir verpflichten uns generell, die Auswirkungen unserer Tätigkeit auf Menschen und Umwelt kontinuierlich zu minimieren. Um auch als Betriebsführer bei der Förderung insbesondere aus unkonventionellen Lagerstätten ein Höchstmaß an Sicherheit zu garantieren, bekennen wir uns mit der 2011 verabschiedeten Wintershall Selbstverpflichtung zu einem Maximum an Transparenz und Umweltschutz. Für uns gilt: Wirtschaftliche Interessen haben keinen Vorrang gegenüber Gesundheits-, Arbeits- oder Umweltschutz.

Düste Z10

The model project

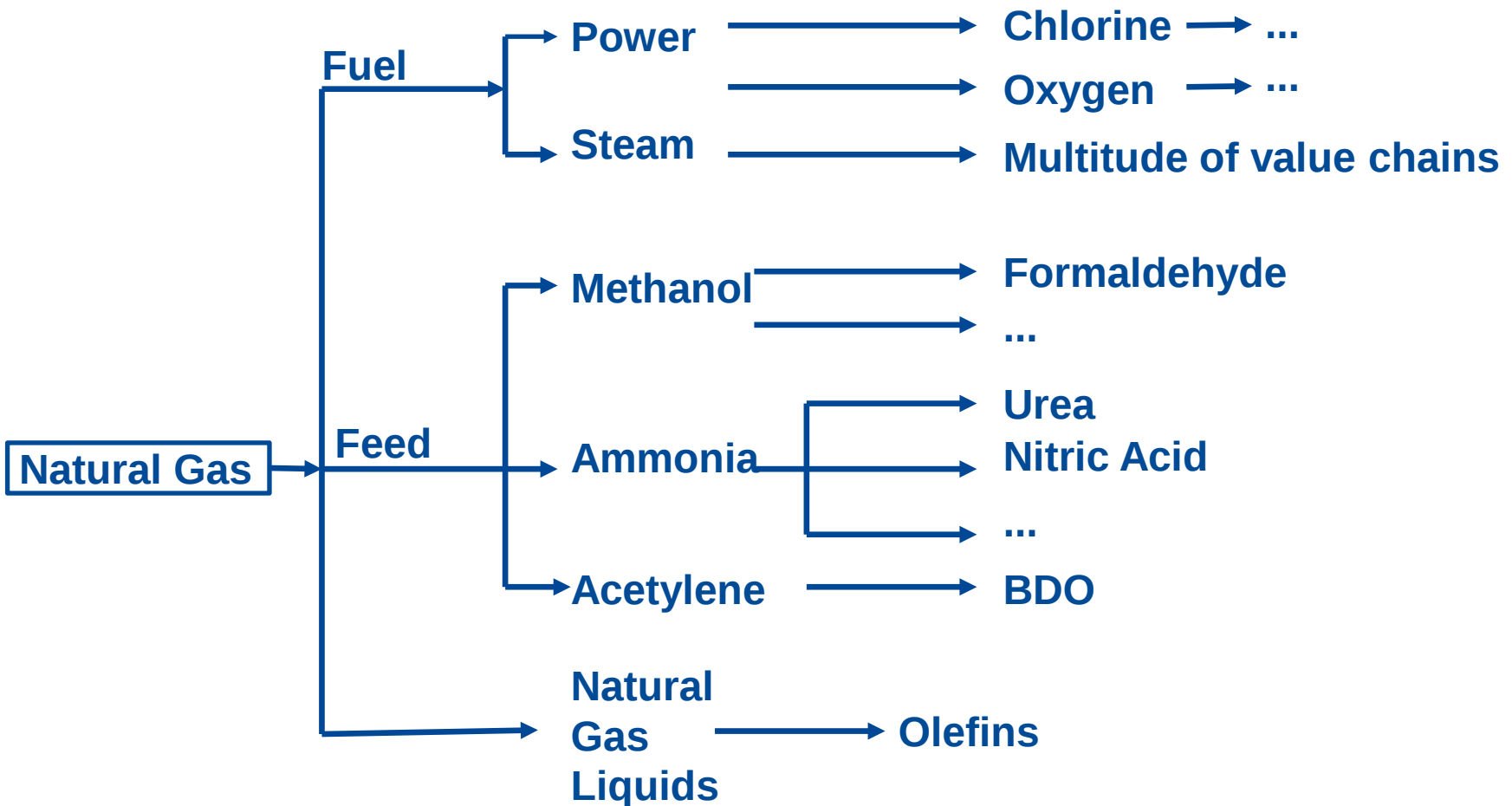
- **Geological target:** carboniferous tight gas sands
- **Realization:**
 - 4380 m of vertical drilling
 - Extensive data collection
 - Fracking required
- **Potential Z10:** up to 870 mil m³ of natural gas production,
investment approx. 30 mil €
- **Total potential „Düste Karbon“:** 20-40 bcm natural gas
thereof 25% recoverable
(best case)



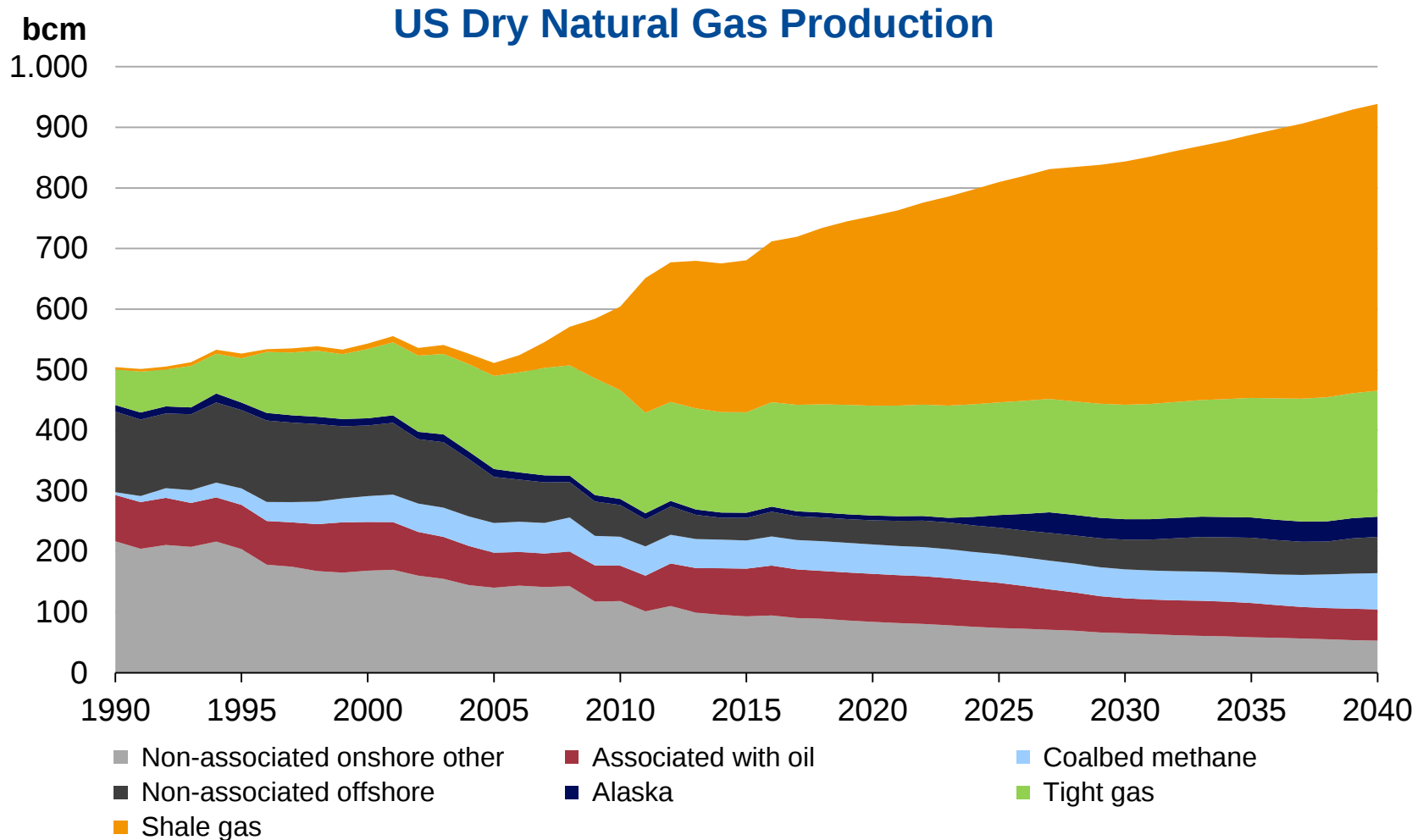
BASF as a Natural Gas Consumer

- natural gas is the basis for a multitude of chemical value chains
- investment decisions in the chemical industry largely depend on raw material situation
- low natural gas cost in US support C1-based and energy-intensive value chains

BASF as a Natural Gas Consumer



What is BASF doing in the US?



Geismar, LA

2012: **New Methylamine Plant** Geismar, LA

2014: World scale **Formic Acid plant** Geismar, LA



Port Arthur, TX

2013: **Revamp of steam cracker** Port Arthur, TX
(ethane processing and addition of 10th furnace, now > 1 mil t/a ethylene)

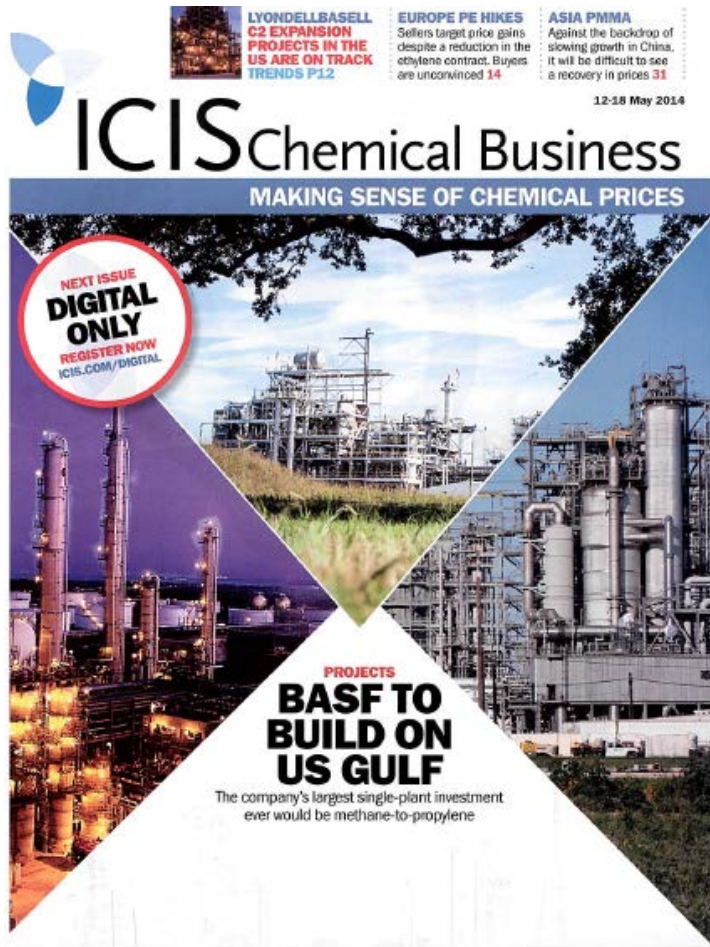


Freeport, TX

Announced: **Ammonia JV** with Yara



US Gulf Coast



Methane to Propylene plant,

US gulf coast;

largest BASF single-plant investment to date

Effects on US Economic Growth



Until 2020 cheap natural gas in the US will result in huge growth:

- 46,000 new jobs in the chemical industry
- 72,7 bn USD investments in the chemical industry

BASF views shale gas as an opportunity

We therefore

- support **research on shale** gas also in Europe
- use the fracking application as a new **market for chemicals**
- take advantage of the low energy prices in the **US for new investments**

Hydraulic Fracturing - Grundwasserschutz

Wintershall - Selbstverpflichtung



- Freiwillige Prüfungen auf Verträglichkeit für Umwelt und Wasser



- KEIN Hydraulic Fracturing in Trinkwasserschutzgebieten



- Regelmäßige Prüfung der Bohrung auf Unversehrtheit



- Fachgerechte Entsorgung der anfallenden Wässer



- Offene und transparente Kommunikation



The Chemical Company