Turkish Natural Gas Market Outlook
&
Policy Recommendations in Light of US Shale Gas Revolution

Gas to Power Turkey
November 6, 2013 – Ankara

Orhan Duran
Chairman of the Board

About PETFORM

Established in 2000, PETFORM has played a crucial role in the transfer of private sector views to the public authorities regarding to Turkish energy legislation amendments. Member companies mainly have activities in 2 sectors:

- Exploration & Production Sector
- Natural Gas Market

Member Companies

- AKENERJİ
- AKFEL
- AKSA
- ALADDIN MIDDLE EAST
- ANATOLIA ENERGY
- ANGORAGAZ
- ATTİLA DOĞAN İNŞAAT
- AVRASYA GAZ
- AYGAZ
- BATI HATTI GAZ
- BM HOLDİNG
- BOSPHORUSGAZ
- BP
- ÇALIK ENERJİ
- DEMİRÖREN EGL
- DOĞAL ENERJİ
- DOĞAN HOLDİNG
- EDISON
- EGEGAZ
- ENEL
- ENERCO ENERJİ
- ENERJİSA
- ENI
- ERDGAZ
- EWE ENERJİ
- EXXONMOBIL
- GDF SUEZ
- GENEL ENERGY
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- HATTUŞA ENERJİ
- IBS RESEARCH
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- MARSA ENERGY
- MEDGAZ
- NATURGAZ
- OMV
- PALMET ENERJİ
- PERENCO
- PETRAKO
- POLMAK
- POZİTİF DOĞALGAZ
- SHELL ENERJİ
- SOCAR
- STATOIL
- TBS PETROL
- TEKFEN İNŞAAT
- THRACE BASIN
- TIWAY
- TOTAL
- TRANSATLANTIC PETROLEUM
- TURCAS
- VALEURA ENERGY
- VALVITALIA
- ZMB GAZ DEPO
- ZORLU ENERJİ

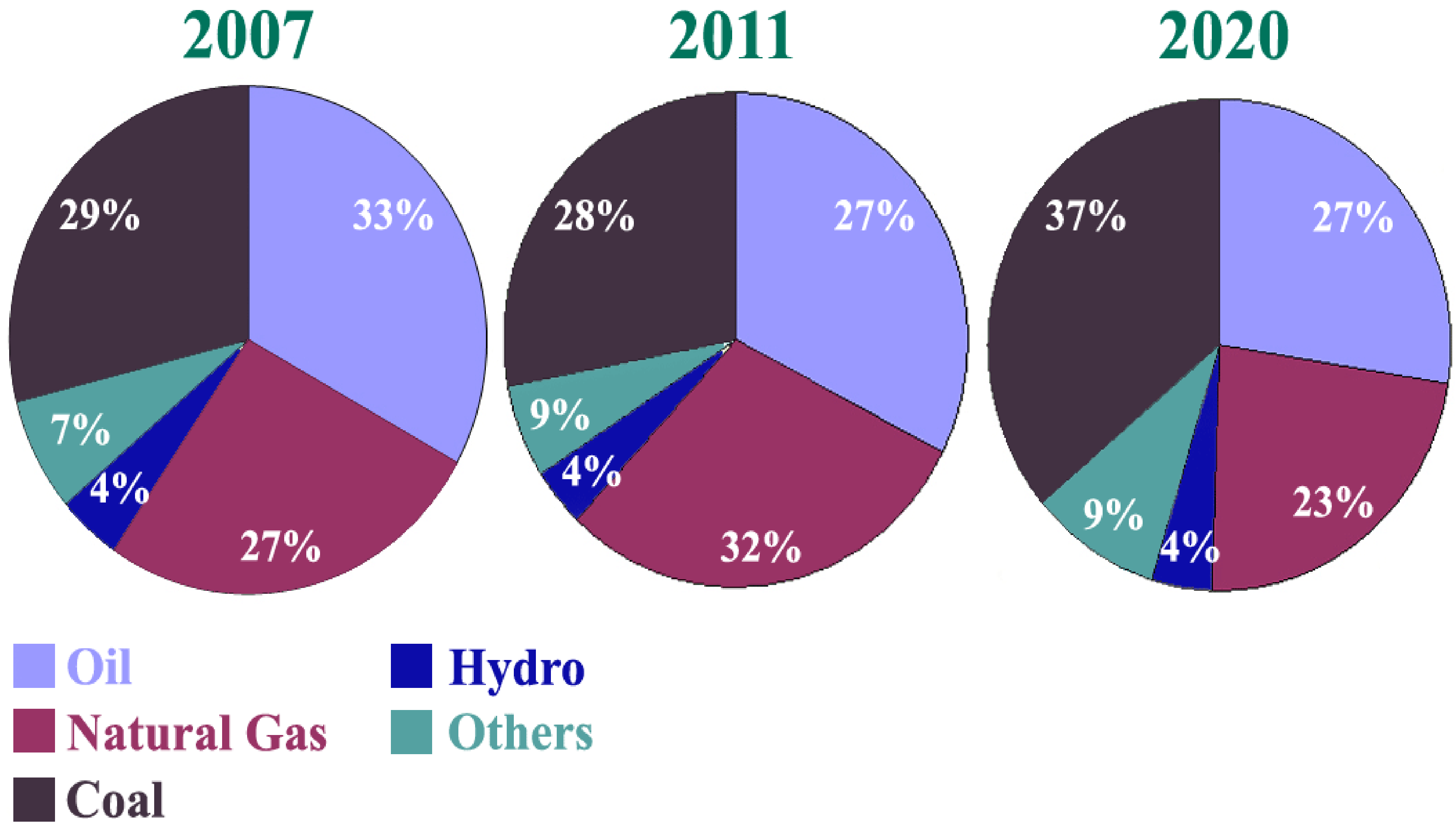
Turkish Natural Gas Market

Turkey's Overall Energy Balance (1990 – 2011)

	1990	2011	Change
Total Energy Demand *(million toe)*	52.9	114.4	↑ 116% ↑
Total Domestic Production *(million toe)*	25.6	32.2	↑ 26% ↑
Total Energy Imports *(million toe)*	30.9	90.2	↑ 192% ↑
Coverage of Domestic Production to Total Consumption	48%	28%	↓ - 42% ↓

Source: MENR

Energy Consumption by Source (2007 – 2011 – 2020)



Source: Ministry of Energy and Natural Resources

Share of Energy in Turkey's Total Imports (2009 – 2012)

PETFORM

(billion USD)	2009	2010	2011	2012
Crude Oil & Petroleum Products	14,9	20,6	29,2	31,5
Natural Gas	11,6	14,1	20,2	23,2
Coal	3,1	3,3	4,1	4,6
Total Energy Imports	29,9	38,5	54,1	60,1
Turkey's Total Imports	140,9	185,5	240,8	236,5
Share of Oil & Gas in Turkey's Total Imports	%18,8	%18,7	%20,5	%23,1

Source: Ministry of Economy

Gas Purchase Agreements

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Contract	Date of Signature	Date of Operation	Duration (Years)	Volume (Plateau bcma)	Date of Expiration
Russia (West)	Feb 1986	Jun 1987	25	6	2012
Algeria (LNG)	Apr 1988	Aug 1994	20	4	2014
Nigeria (LNG)	Nov 1995	Nov 1999	22	1.2	2021
Iran	Aug 1996	Dec 2001	25	10	2026
Russia (B.Stream)	Dec 1997	Feb 2003	25	16	2028
Russia (West)	Feb 1998	Mar 1998	23	8	2021
Azerbaijan	Mar 2001	Jul 2007	15	6.6	2022

Source: Energy Market Regulatory Authority

Gas Imports by Source Country (2010 – 2011 – 2012)

<table>
<tr><th>(bcm)</th><th>2010 (EMRA)</th><th>2011 (EMRA)</th><th>2012 (BOTAŞ)</th><th>Share in Total (2012)</th></tr>
<tr><td>Russia</td><td>17.576</td><td>25.406</td><td>26.550</td><td>59.2%</td></tr>
<tr><td>Iran</td><td>7.765</td><td>8.190</td><td>8.347</td><td>18.6%</td></tr>
<tr><td>Azerbaijan</td><td>4.521</td><td>3.806</td><td>3.228</td><td>7.2%</td></tr>
<tr><td>Algeria (LNG)</td><td>3.906</td><td>4.156</td><td rowspan="3">6.719</td><td rowspan="3">15.0%</td></tr>
<tr><td>Nigeria (LNG)</td><td>1.189</td><td>1.248</td></tr>
<tr><td>Spot LNG</td><td>3.079</td><td>1.069</td></tr>
<tr><td>Total</td><td>38.036</td><td>43.874</td><td>44.844</td><td></td></tr>
</table>

Source: Energy Market Regulatory Authority & BOTAŞ

Private Players' Entrance into the Market

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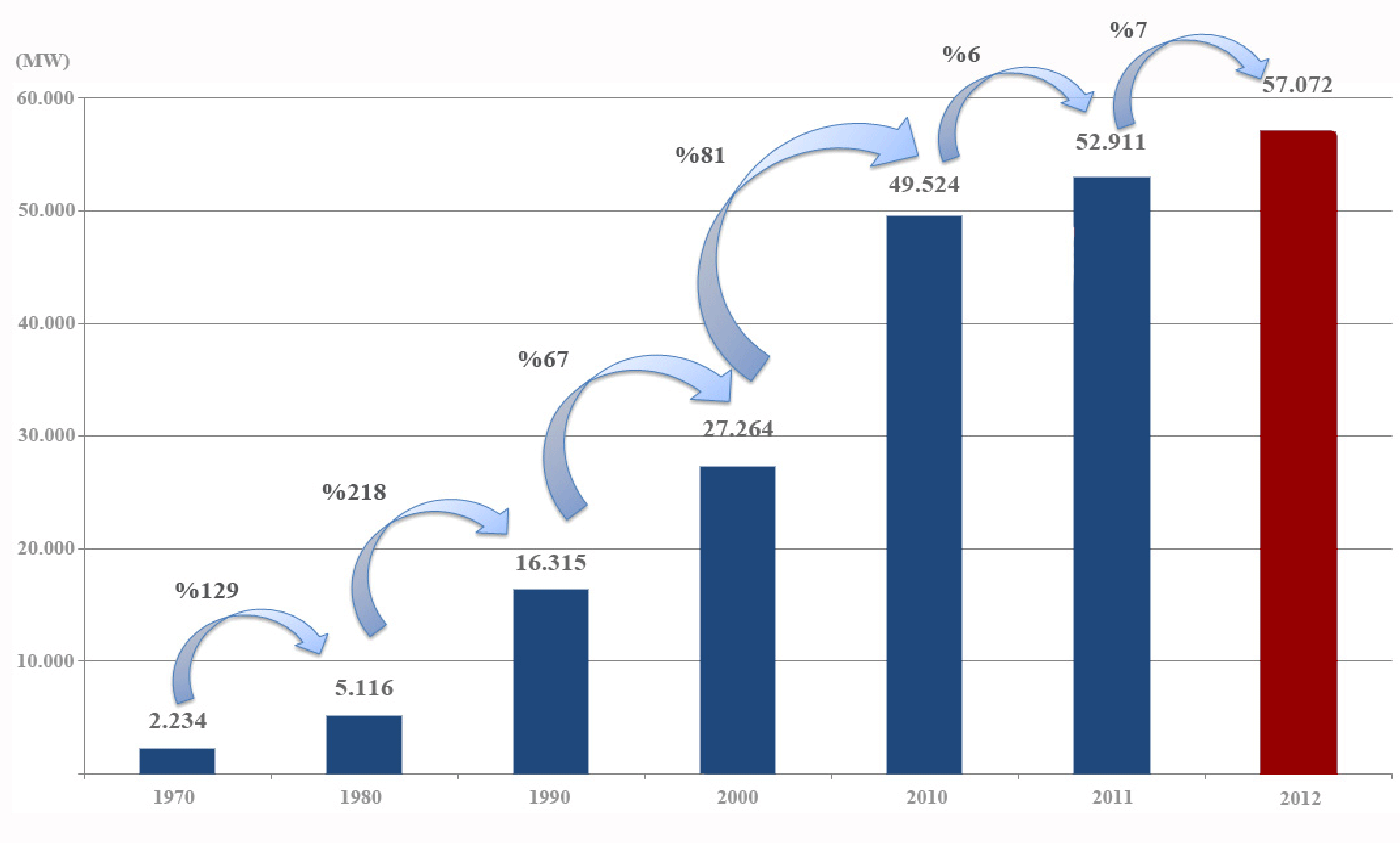
Contract Release (2007)		Contract Renewal (2013)	
Enerco Enerji	2.50	Akfel Gaz	2.25
BosphorusGaz	0.75	BosphorusGaz	1.75
AvrasyaGaz	0.50	Kibar Enerji	1.00
Shell Enerji	0.25 +	Batı Hattı	1.00 +
	4 bcm		6 bcm

TR – AZ Agreement (2013)

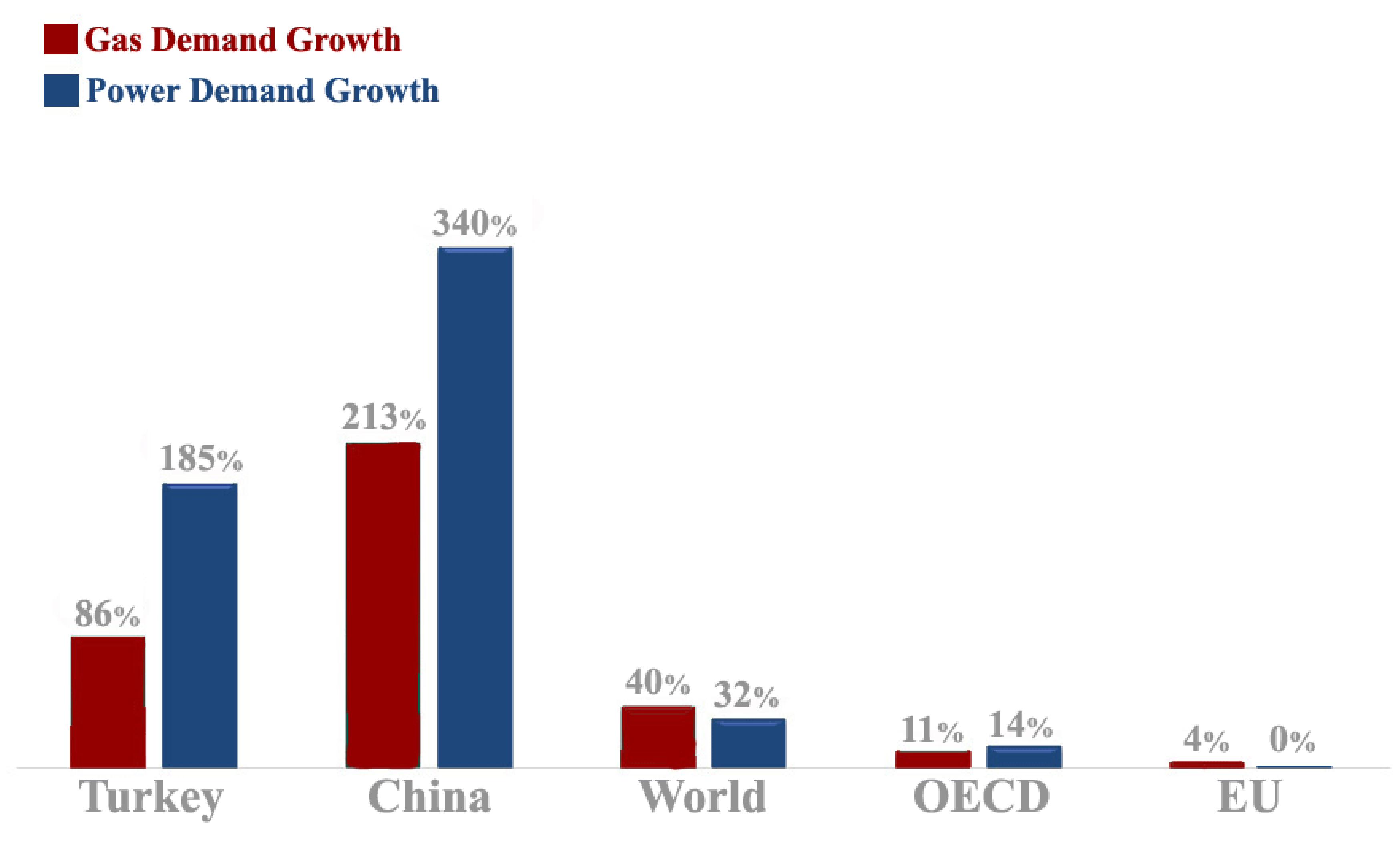
SOCAR	1.20

Installed Capacity (1970 – 2012)



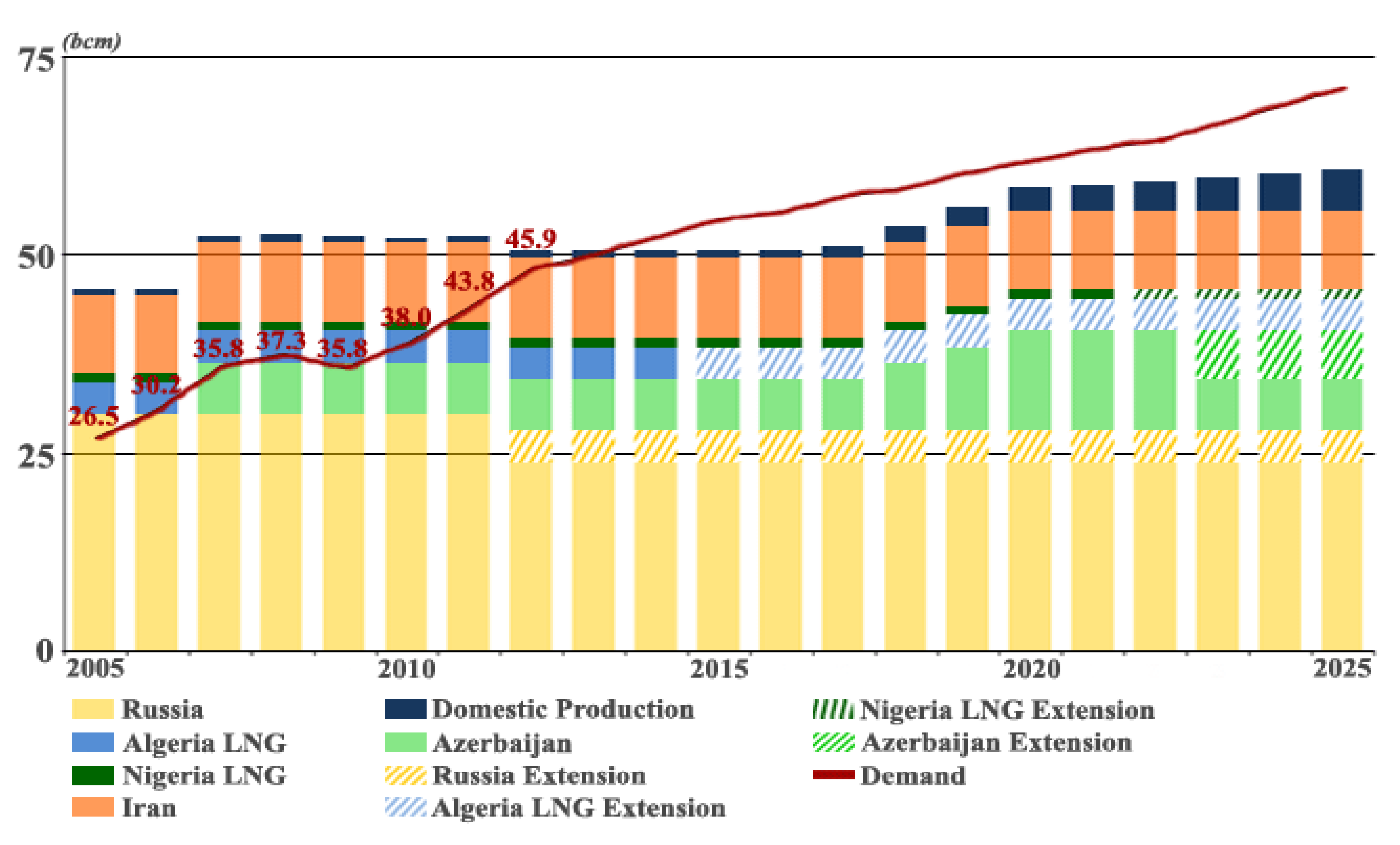
Source: TEİAŞ

Gas & Power Demand Growth (2001 – 2011)



Source: EMRA

Natural Gas Demand vs Supply (2005 – 2025)



Source: BP

Potential New Gas Suppliers

Potential New Gas Suppliers

- Shah Deniz II & New Fields in Azerbaijan
- Northern Iraq / Iraq
- Eastern Mediterranean Offshore
- Black Sea Offshore
- Shale Gas / Oil

Shah Deniz II & New Fields in Azerbaijan via TANAP

Northern Iraq / Iraq
Current & Potential Reserves

Ranking by Proven Reserves :

1.Saudi Arabia	265.9 bbl
2.Iran	157.0 bbl
3.Iraq	150.0 bbl

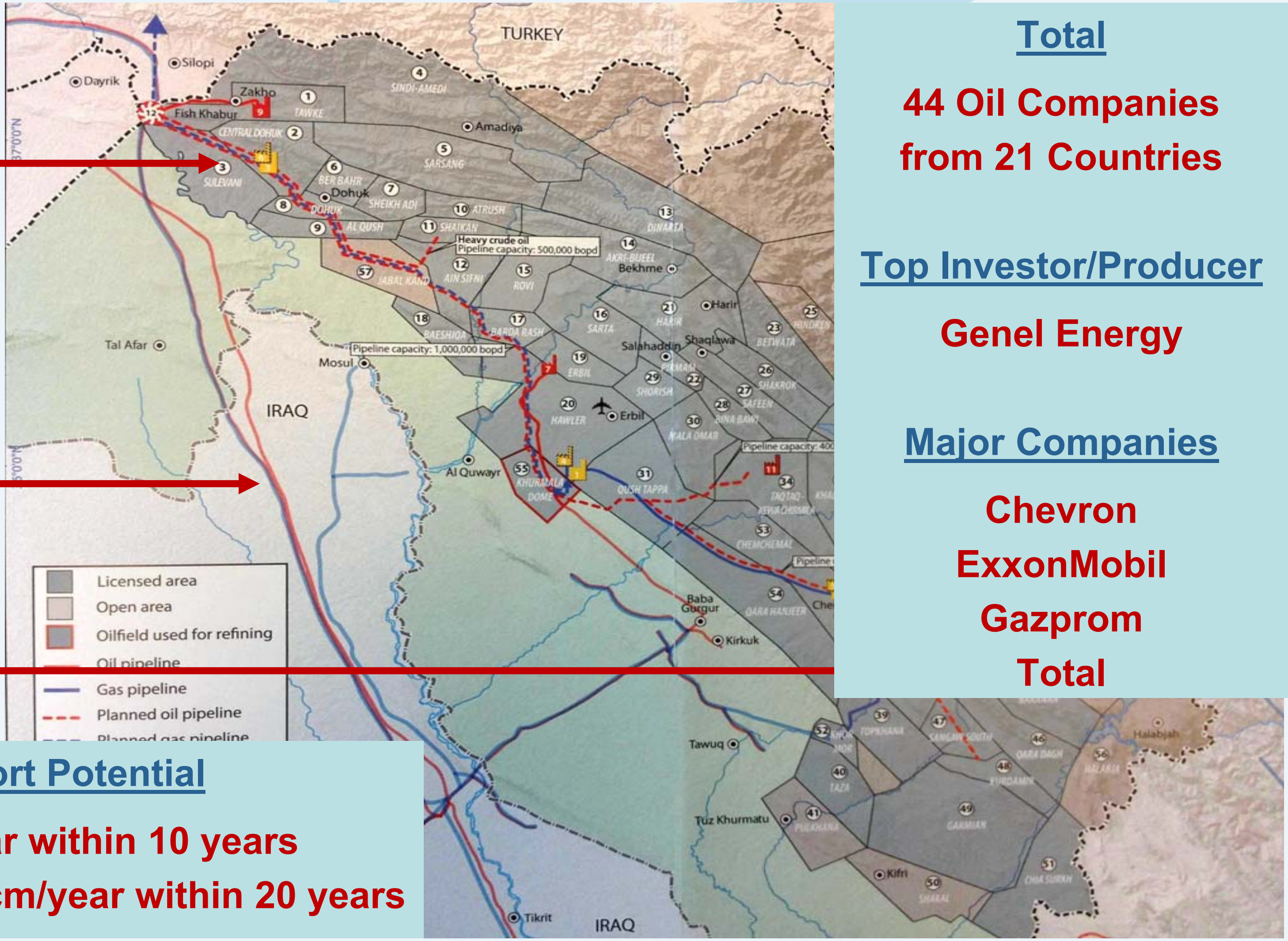
Potential Reserves :

Iraq → 250 bbl oil & 3.2 - 5 tcm gas

N.Iraq → 40 - 45 bbl oil & 1 - 2 tcm gas

Source: BP & USGS

Northern Iraq
Current & Projected Pipelines



New oil & gas pipelines

Kirkuk – Yumurtalik Oil Pipeline

Khor Mor Gas Pipeline

Total

44 Oil Companies
from 21 Countries

Top Investor/Producer

Genel Energy

Major Companies

Chevron
ExxonMobil
Gazprom
Total

Export Potential

10 – 15 bcm/year within 10 years
Up to 20 – 25 bcm/year within 20 years

Source: Genel Energy

Eastern Mediterranean
Israel & G.Cyprus Offshore

Leviathan	18 tcf
Tamar	10 tcf
Cyprus Aphrodite	5 tcf
Noa + Mari-B	1.1 tcf
Dalit	0.5 tcf

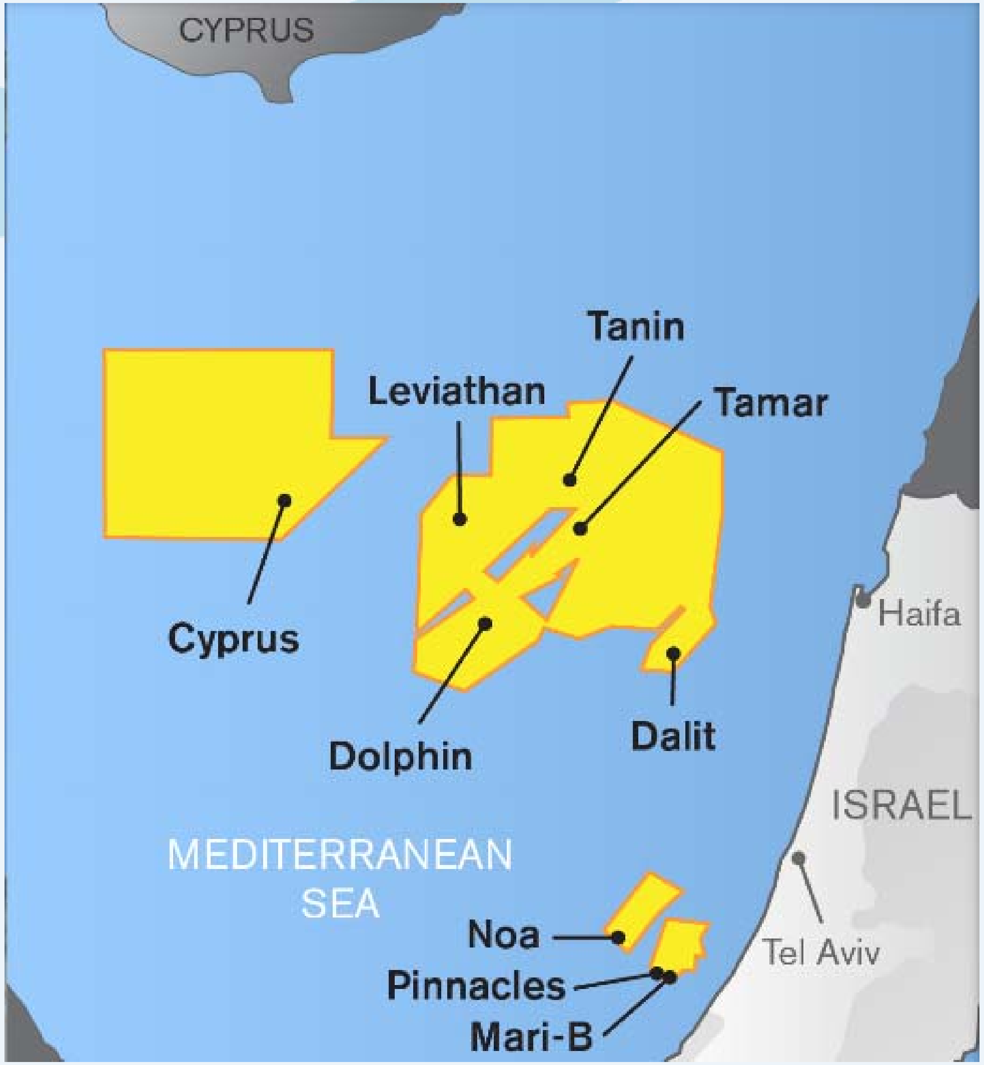
	34.6 tcf

➢ **Export Capacity**

10 - 12 bcma in 10 years

➢ **Most Feasible Route**

Israel - Turkey Pipeline



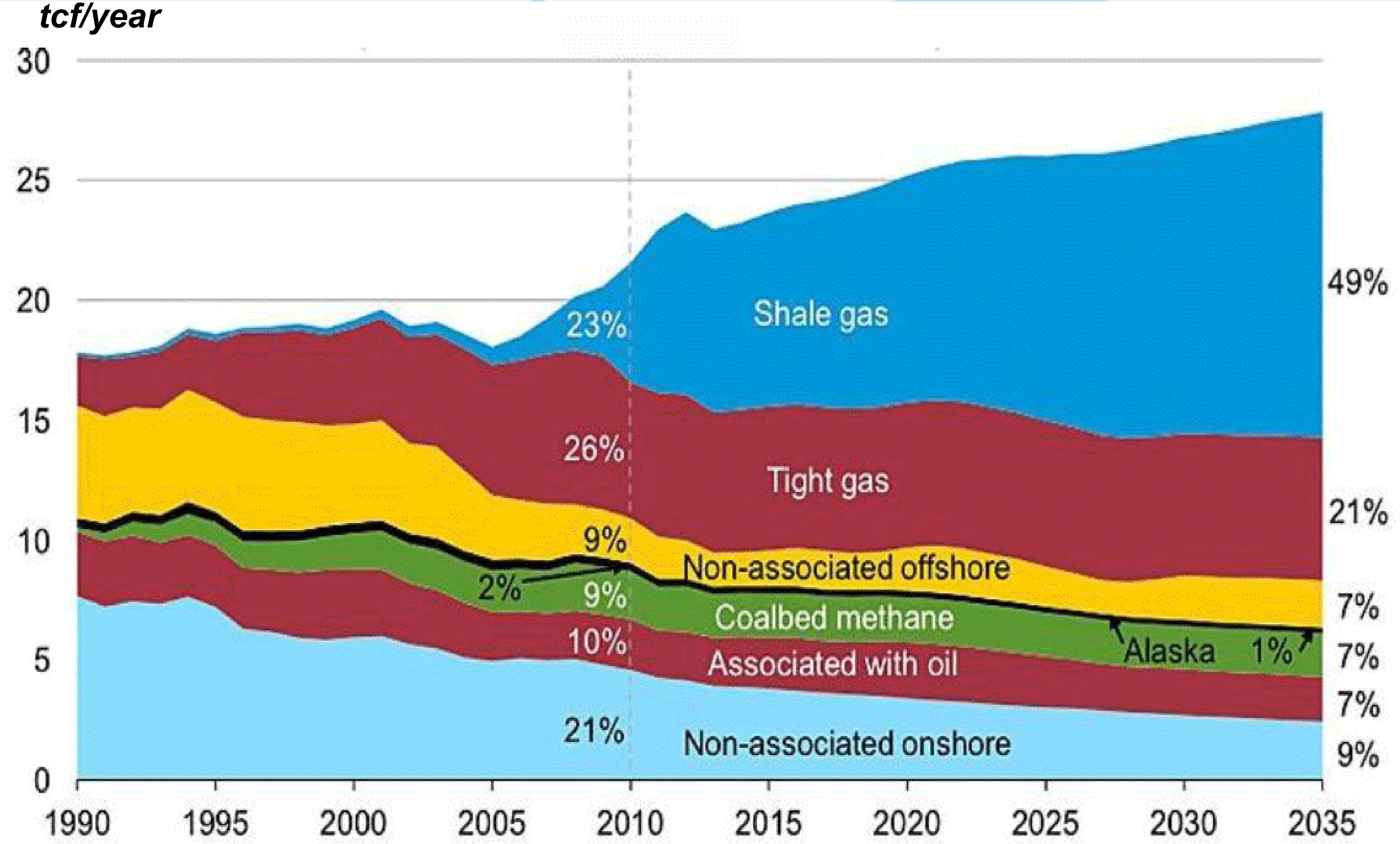
Source: Noble Energy

US Shale Gas Revolution

Regional Gas Price Trends (1995 – 2012)

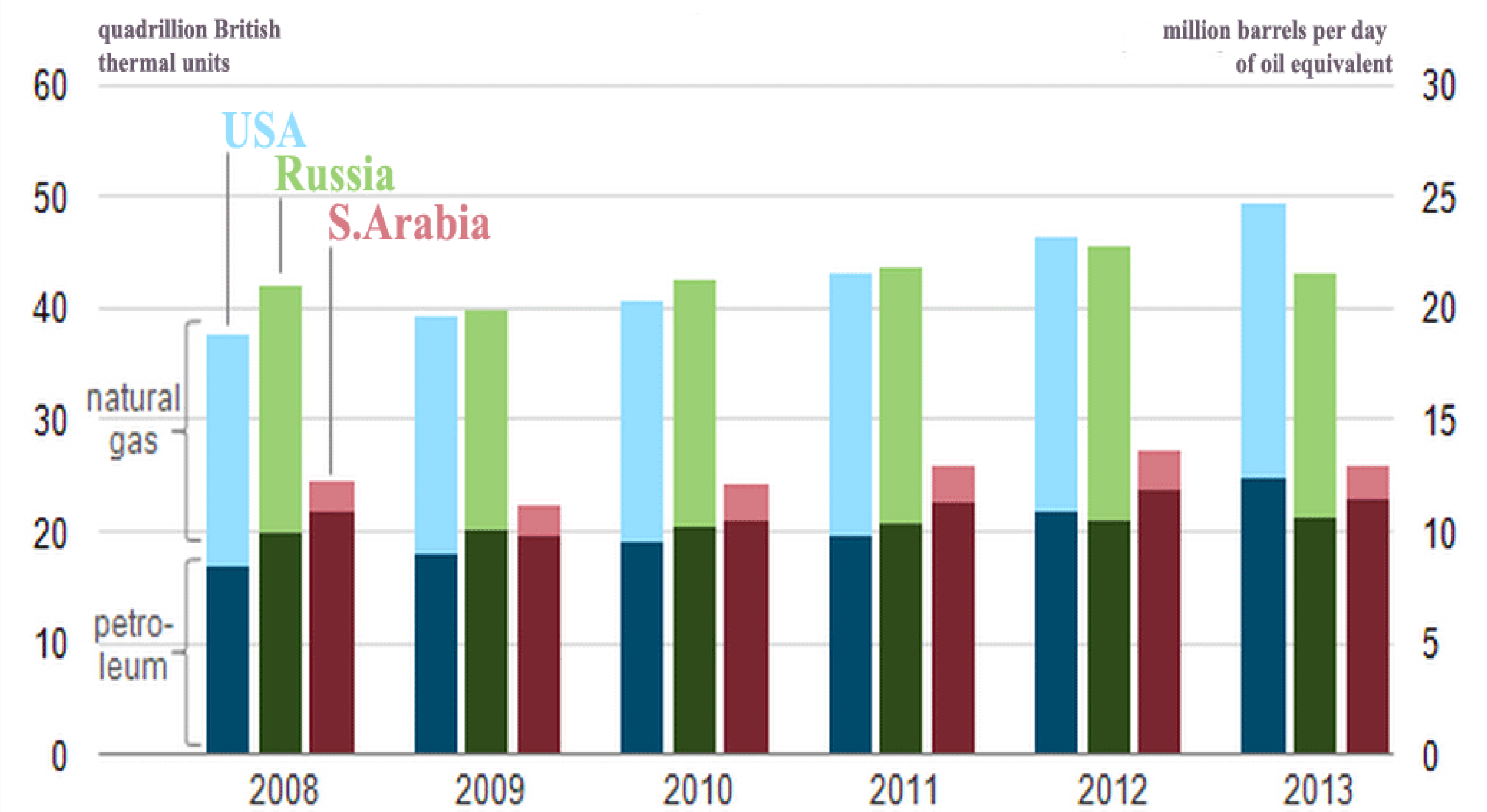
Source: BP

US Unconventional Gas Production (1990 – 2035)



Source: EIA

Result: Saudi America



Source: EIA

Main Drivers of the US Shale Gas Revolution

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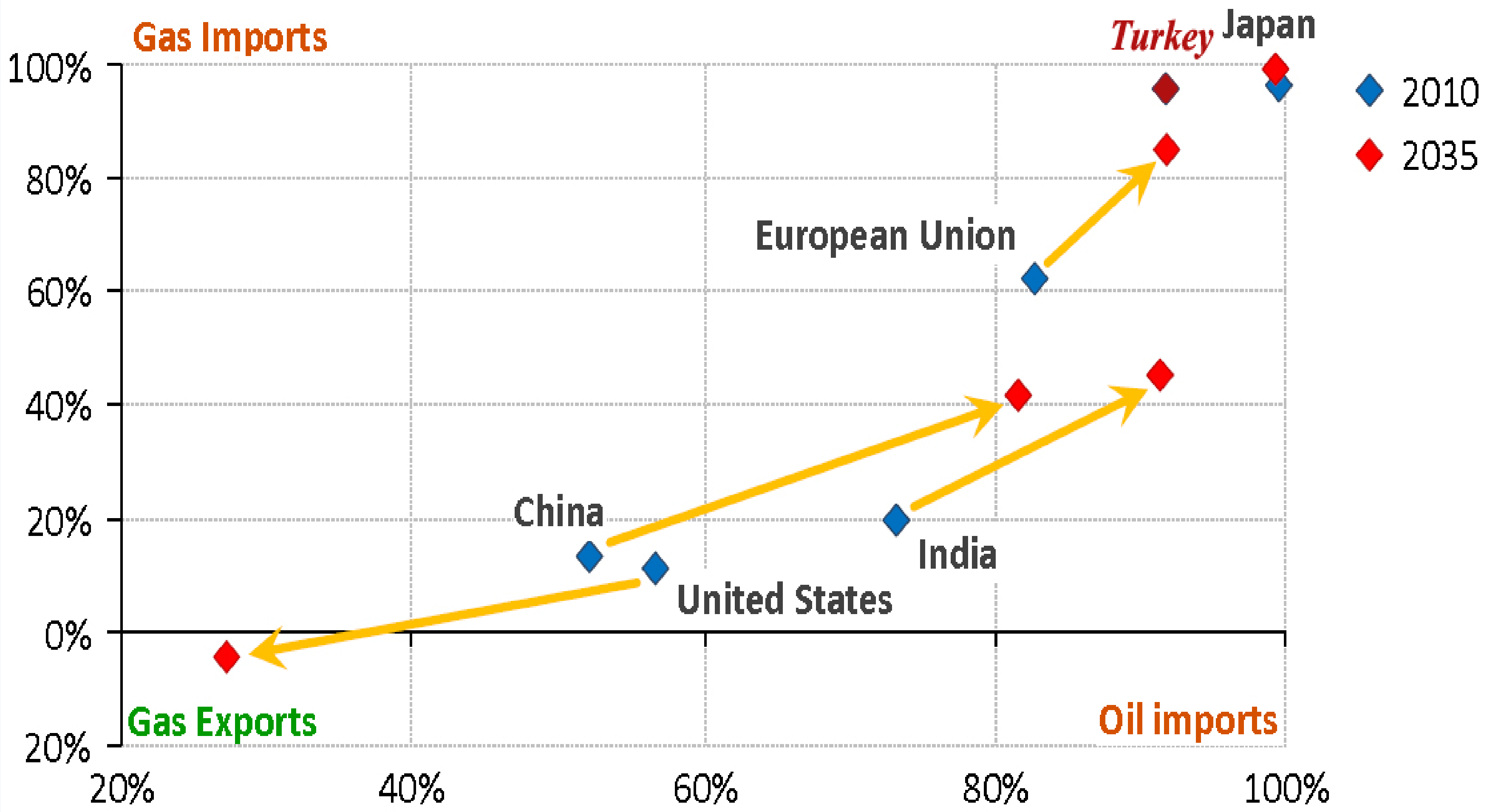
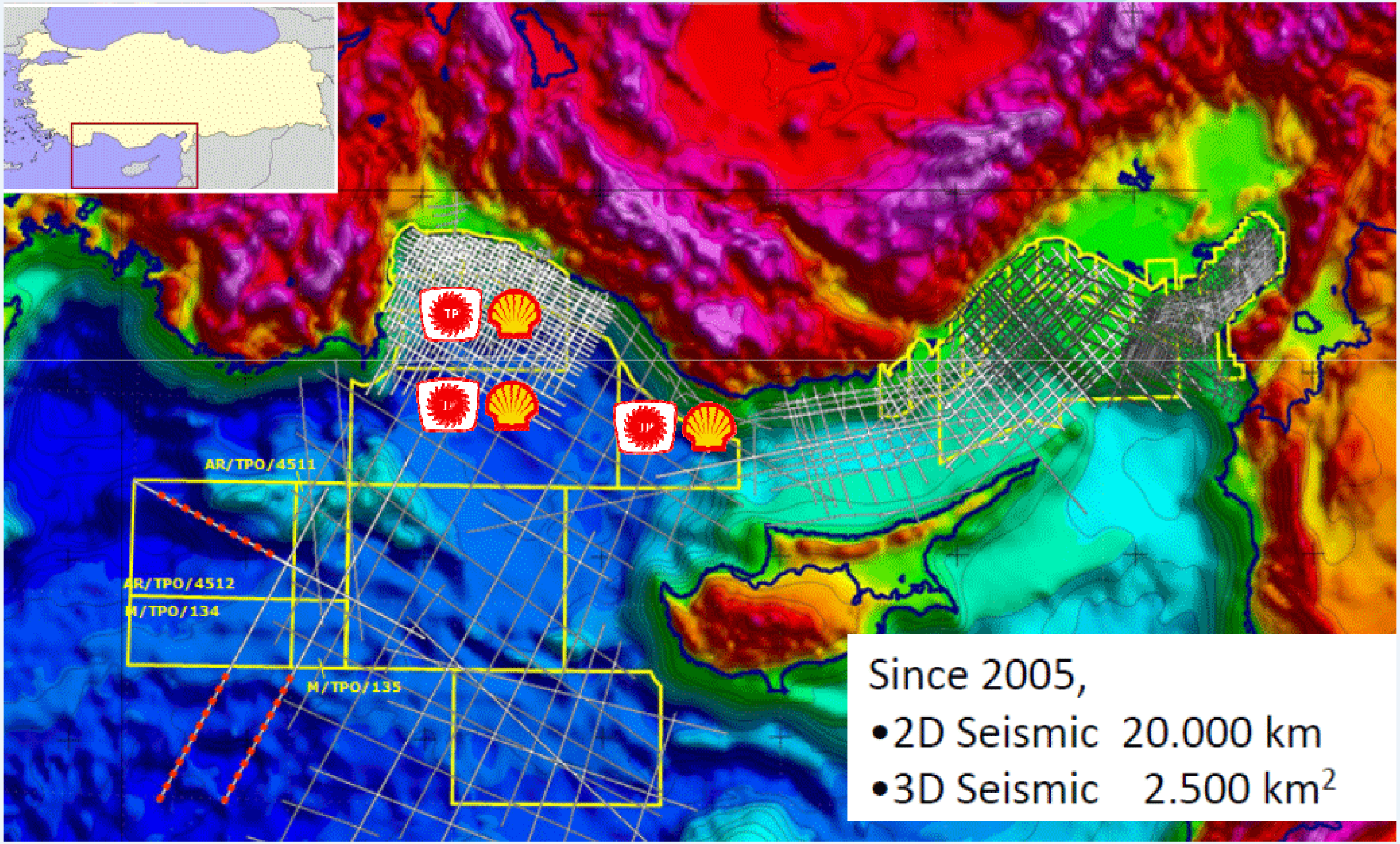
- Capital accumulation
- Sectoral know-how
- Long term R&D investments
- Transparent, rational, predictable legal background
- Fully liberal, liquid, deepened market mechanism

Oil & Gas Import Dependency (2010 – 2035)



Source: IEA

Eastern Mediterranean
Turkey & TRNC Offshore

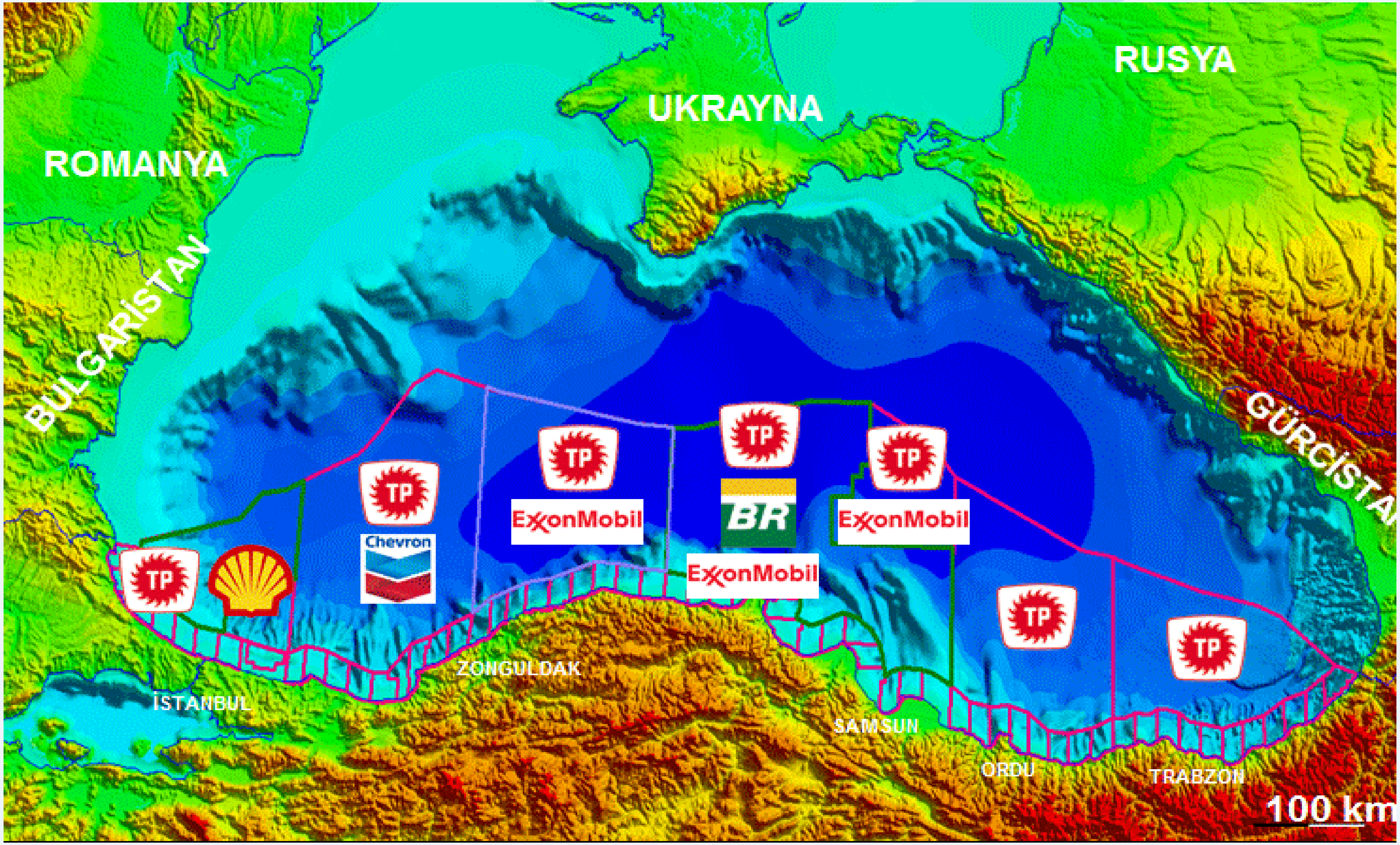


Since 2005,

- 2D Seismic 20.000 km
- 3D Seismic 2.500 km^2

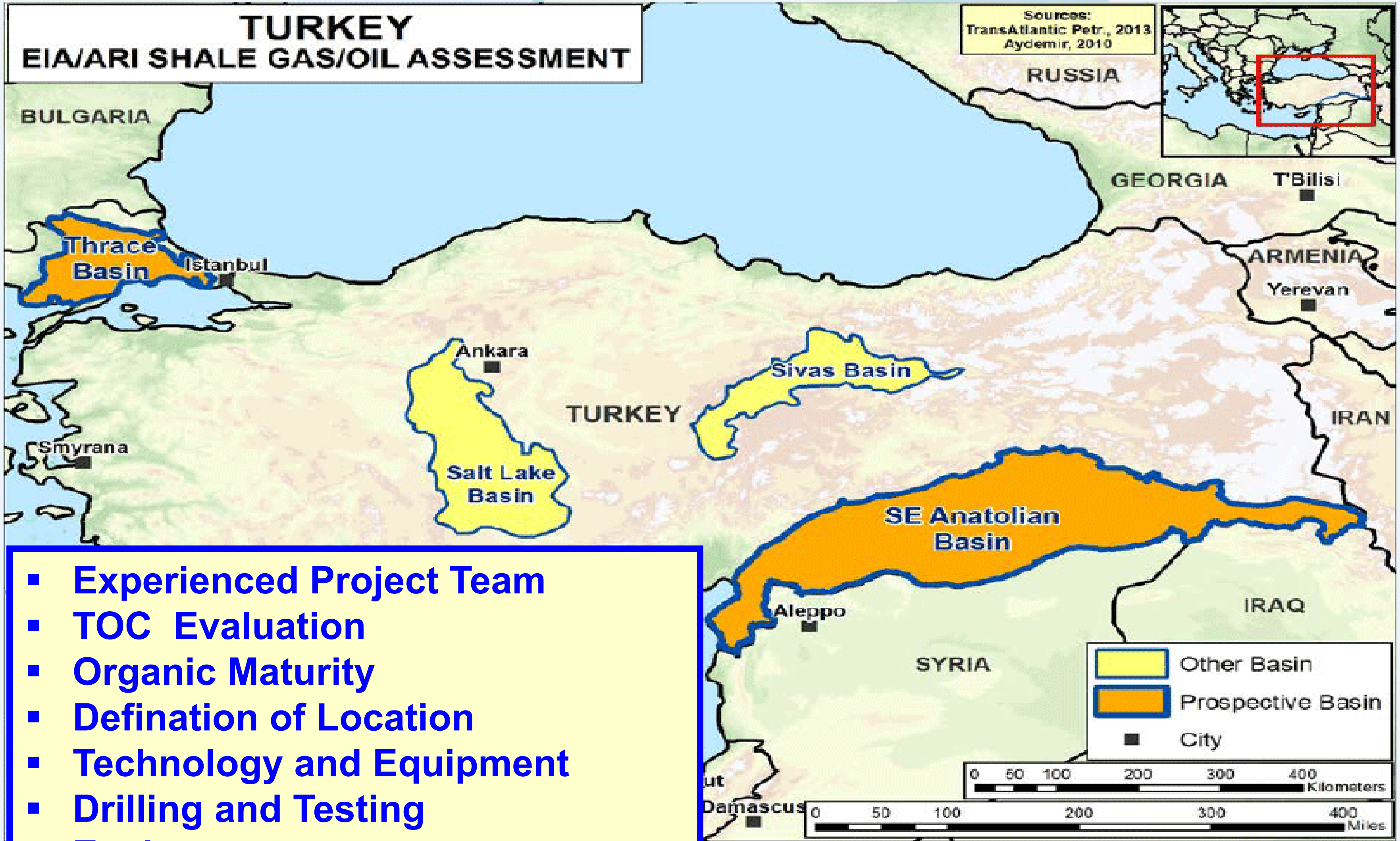
Source: TPAO

Black Sea Offshore



Source: TPAO

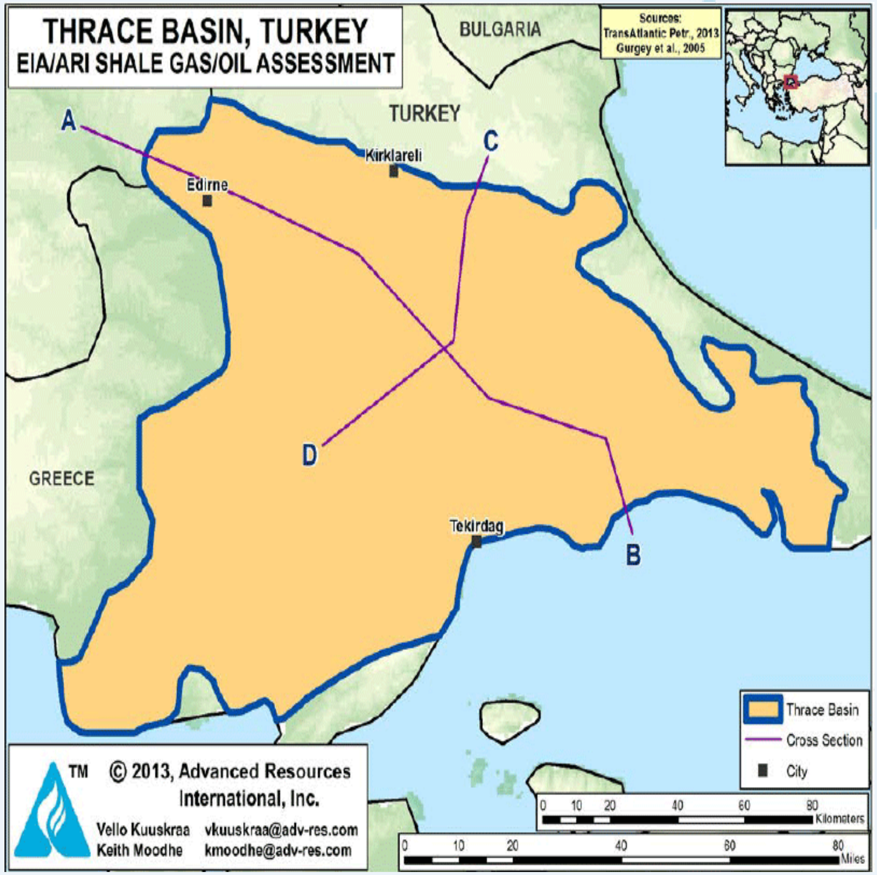
Shale Gas / Oil in Turkey Potential Basins



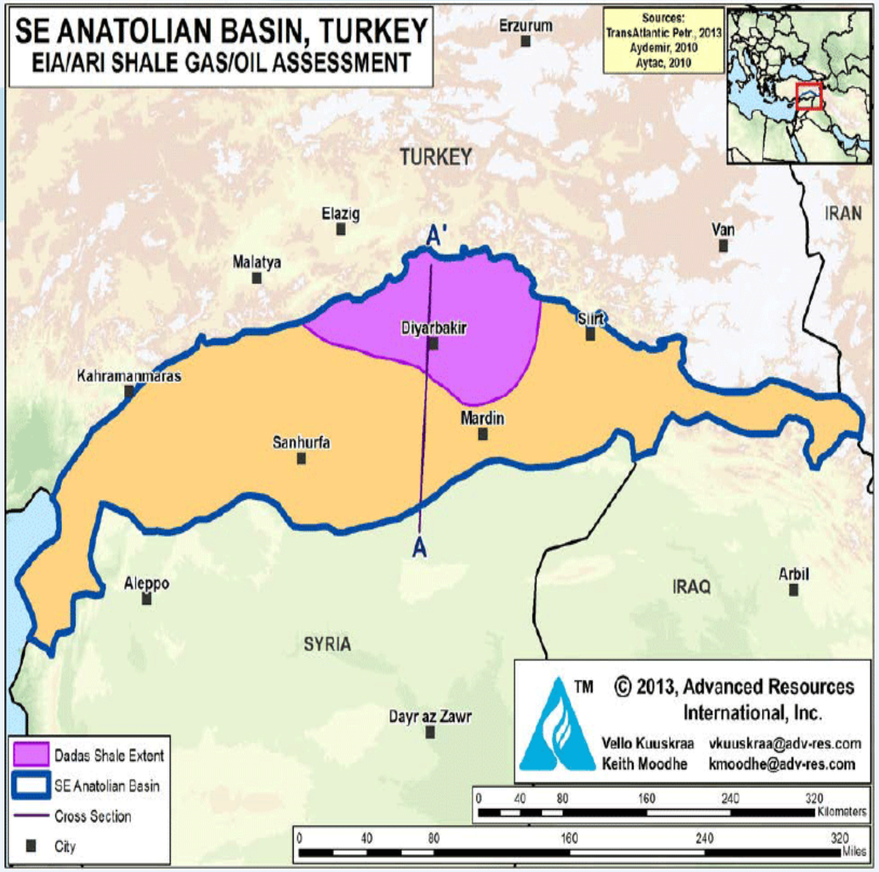
- Experienced Project Team
- TOC Evaluation
- Organic Maturity
- Defination of Location
- Technology and Equipment
- Drilling and Testing
- Environmet

Source: US Energy Information Administration

Shale Gas / Oil in Turkey Potential Reserves



Hamitabat
6 tcf gas + 0.1 Bbbl oil



Dadaş
17 tcf gas + 4.6 Bbbl oil

Source: US Energy Information Administration

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Policy Recommendations

Policy Recommendations (I)
Natural Gas Market

1. Removal of subsidies and cross-subsidies
2. Application of based-price mechanism
3. Removal of restrictions for private sector's imports
4. Legal unbundling of BOTAŞ
5. Completion of IT (EBB & Scada) and infrastructure investments
6. Legal and commercial ground for Gas Hub

OBJECTIVE → FORMATION OF A TRANSPARENT, LIBERAL AND COMPETITIVE GAS MARKET

Policy Recommendations (II)
E&P Sector

1. Classification and digitalization of all technical data for all sedimentary basins, increase exploration activities and investment, particularly SE Anatolia and Trace Basin,

2. Promotion of new drilling investments through effective implementation of the new Turkish Petroleum Law

3. Political and economical support for Turkish oil companies investing particularly in Iraq and help solving oil sharing and all other political problems between Baghdad and Arbil

4. Full support to TPAO's offshore exploration projects with major oil companies

OBJECTIVE→REDUCTION OF OIL AND GAS IMPORT DEPENDENCY

Policy Recommendations (III)
Energy Sector in General

1. Implementation of new policies in order to increase the share of domestic resources in total energy consumption and to promote energy efficiency
2. Preparation of a comprehensive plan and projects in order to examine the shale oil/shale gas potential of Turkey
3. Promotion of alternative energy resources,
4. Construction of nuclear energy plants
5. Sensibility on implementation of environment-friendly energy strategies

OBJECTIVE → REDUCTION OF ENERGY IMPORT BILL AND CURRENT ACCOUNT DEFICIT, EFFICIENT USAGE OF ENERGY AND DIVERSIFICATION OF ENERGY RESOURCES

THANK YOU…