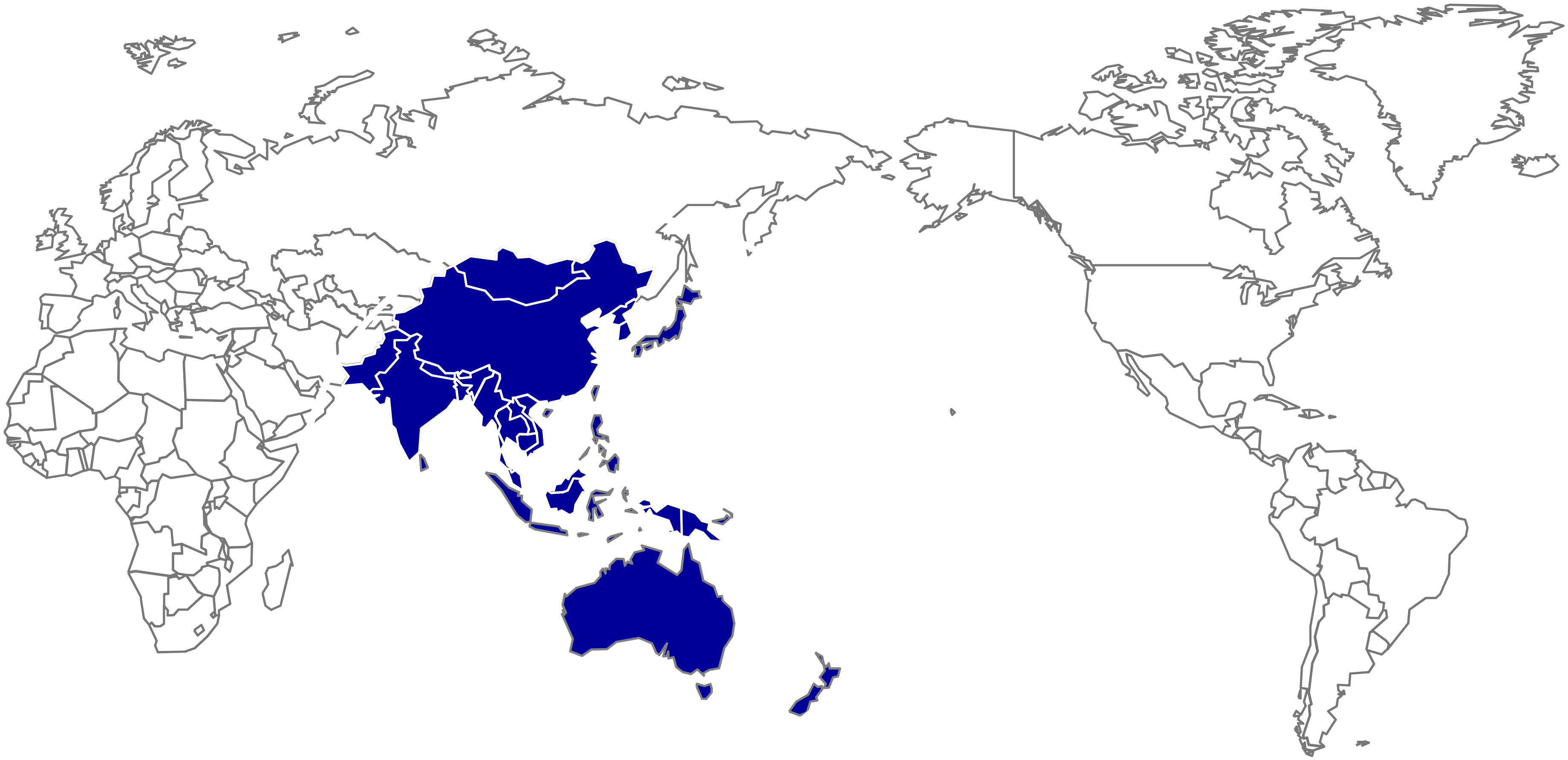
Challenges and Opportunities in Asia's Oil & Gas Sector

Offshore Technology Conference 2009

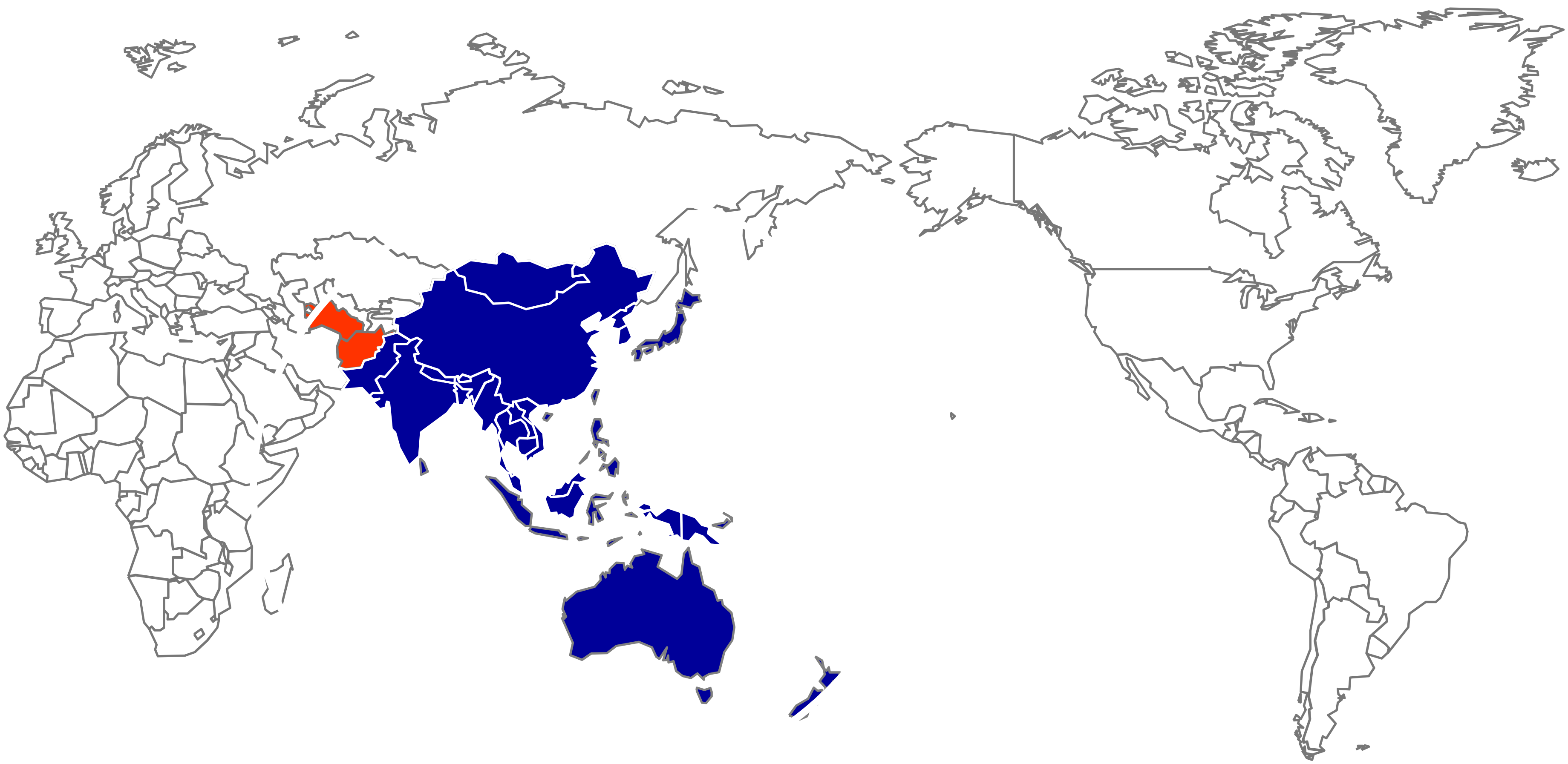
Bill Cline, Chief Executive
Gaffney, Cline & Associates (GCA)

An international, multi-disciplined energy advisory group established in 1962

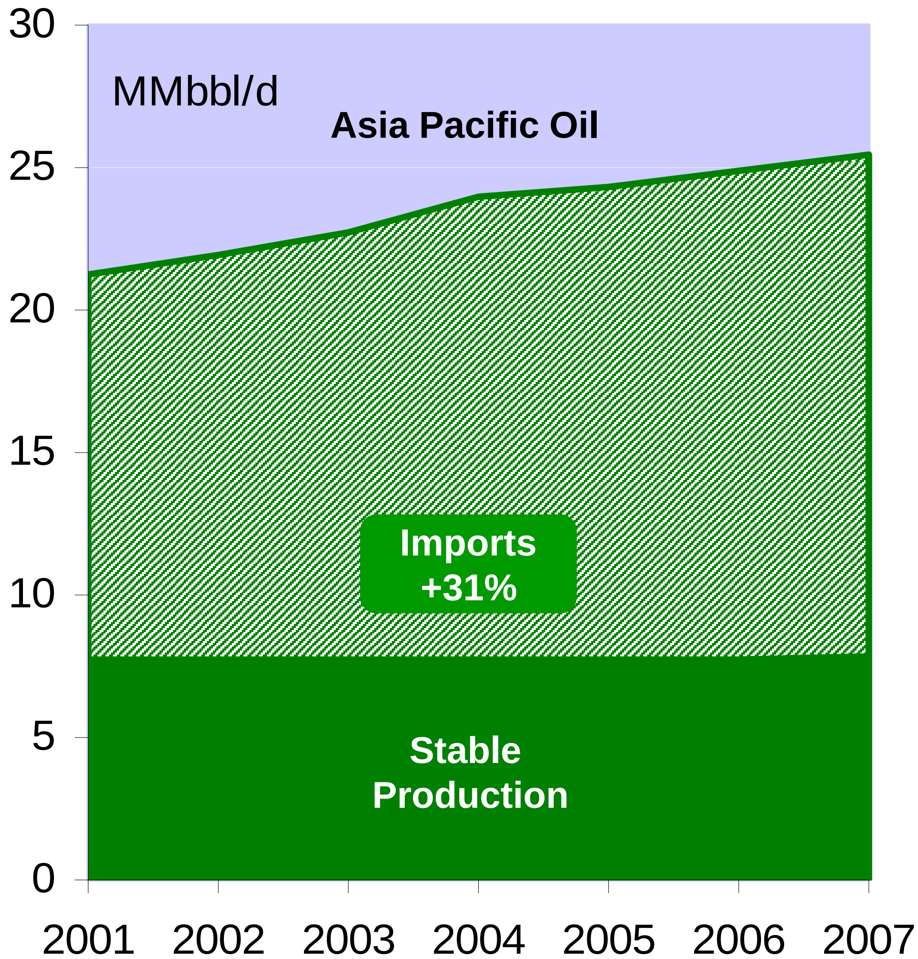
Challenges & Opportunities



Challenges & Opportunities



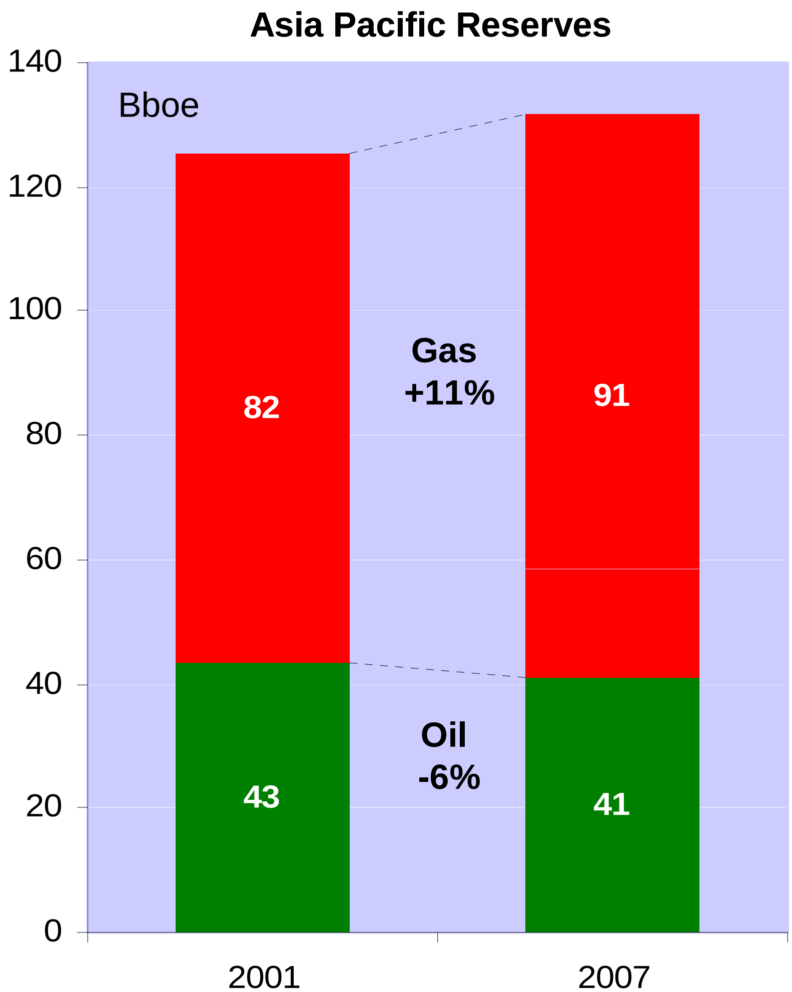
Reducing Reliance on Imports



Source: BP

- Oil consumption increased by 20% from 2001 to 2007
- Oil production in the Region has stagnated and reserves have remained constant, maintaining the oil R/P at 14 years
- China's oil imports have increased by 160% despite its 13% oil production increase
- Indonesia's oil production has dropped by 30%

Monetizing Gas Reserves



Source: BP- 2007 data

- Top 4 hold 70% region's gas reserves...
  - Indonesia 106 Tcf
  - Australia 89 Tcf
  - Malaysia 87 Tcf
  - China 67 Tcf
- ...and produce 60% of Asia's gas:
  - China 6.7 Bcfd
  - Indonesia 6.5 Bcfd
  - Malaysia 5.9 Bcfd
  - Australia 3.9 Bcfd
- Significant production increase potential based on gas R/P:
  - Australia > 63 years
  - Indonesia, Malaysia > 40 years

Reducing Imports by Curbing Regional Oil Demand…

- Eliminating/reducing oil subsidies
  - China
  - Indonesia
  - Malaysia
- Shifting from oil to gas for power generation
  - Philippines Malampaya
- Promoting CNG for taxi and bus fleets
  - Thailand
  - Malaysia
  - Singapore

… and Increasing Oil Supply.

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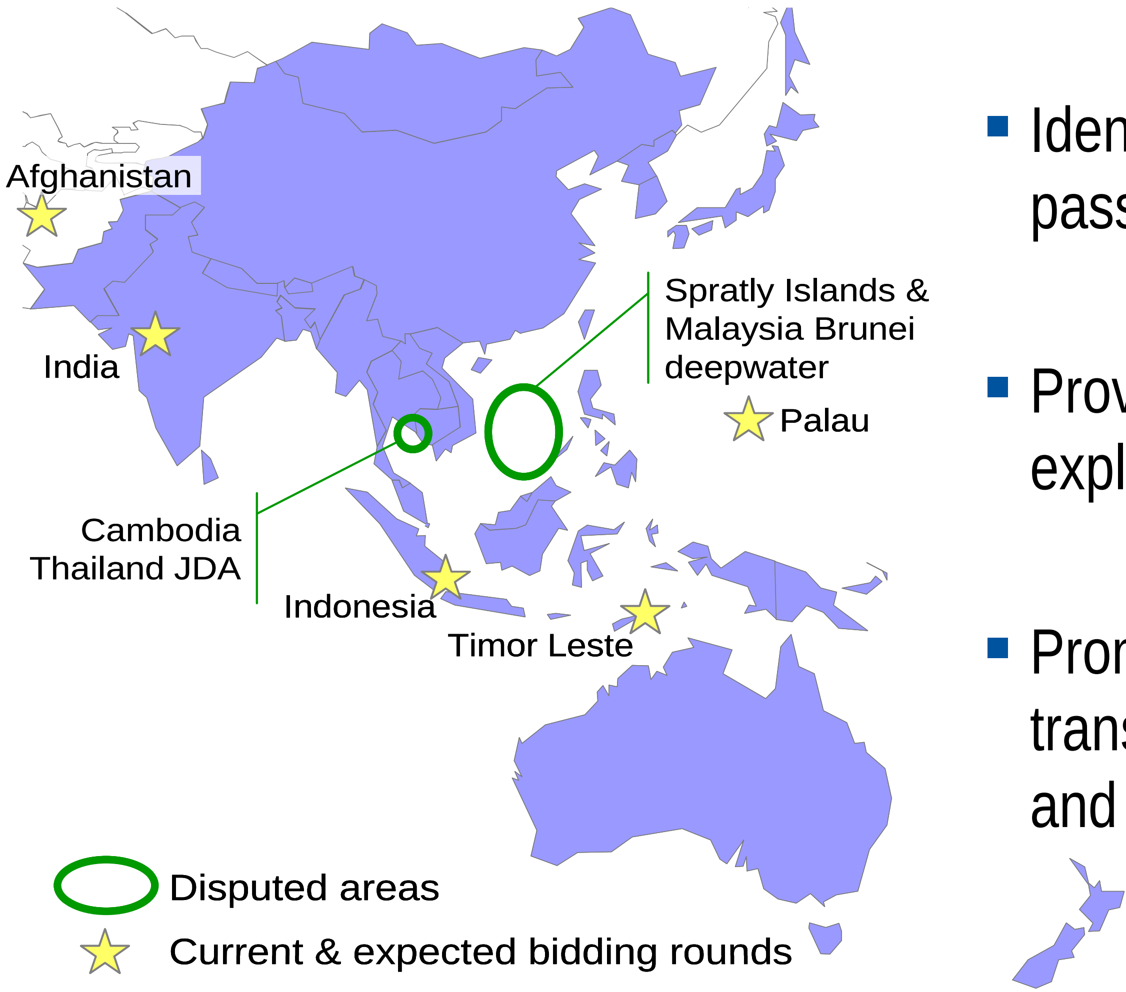


- Identifying and producing by-passed pay in mature fields
- Providing access to lightly explored disputed areas
- Promoting investment through transparent licensing rounds and balanced contract terms

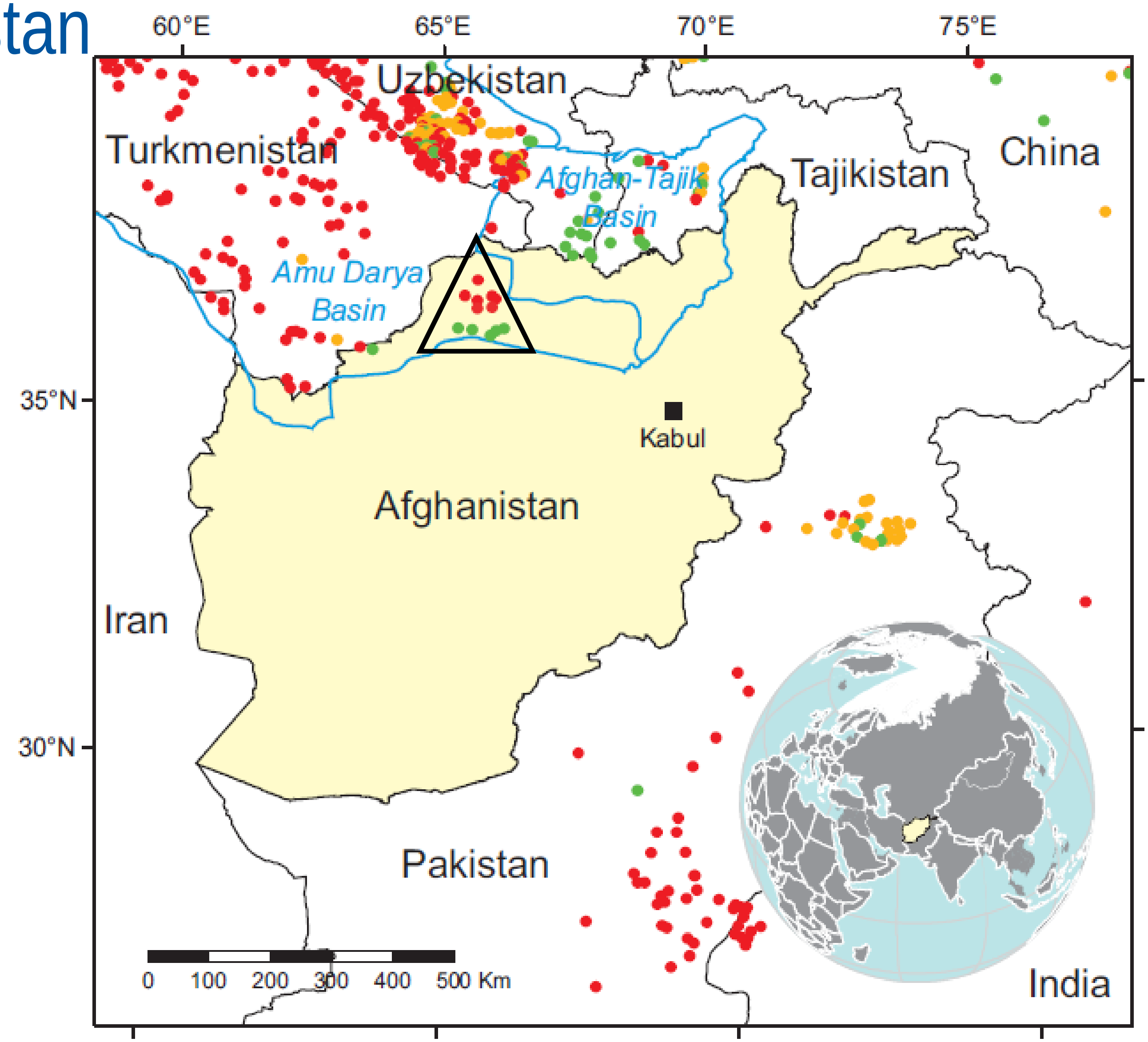
Developing Small / Remote Gas

- Floating liquefaction technology
  – INPEX Abadi in Indonesia
  – Shell Prelude development in Western Australia
- LNG Hubs in Western Australia
  – Common processing with NWS and Pluto LNG
  – Opportunity for a Kimberley LNG Hub
- Short haul LNG / Trans-ASEAN Gas Pipeline
  – Kalimantan to Java
  – Natuna D Alpha
- Development of residential and commercial gas distribution (Bangkok, Jakarta for example)

NOC & IOC Dynamics

- Asian NOCs are becoming stronger…
  - Malaysia's PETRONAS in over 20 countries
  - Thailand's PTT acquisition of Coogee Resources in Australia
  - Indonesia's Pertamina claiming Natuna D Alpha from Exxon Mobil
  - PetroVietnam expansion in Algeria, bidding in Iraq
- …and more involved in operations
  - NOCs taking over field operation at IOC contract expiration
  - NOCs relying on service companies for integrated operations in brown field production
- What will the future role of IOCs be?

Afghanistan



Available blocks

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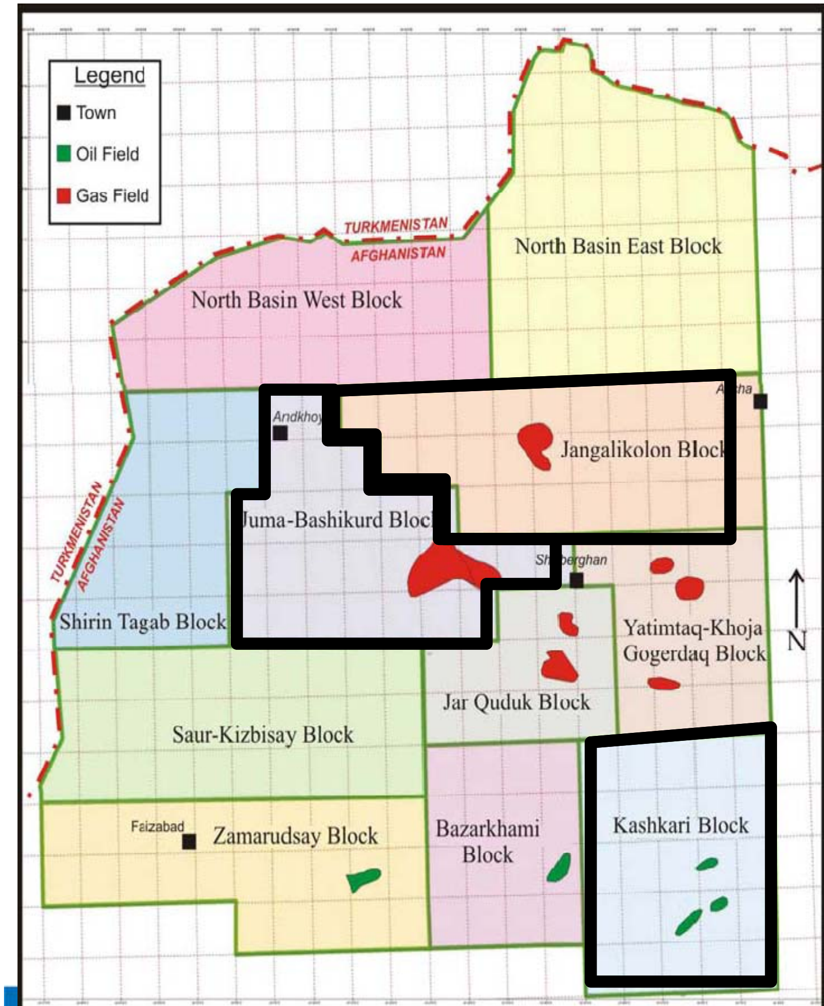

Field	Kashkari oil	Juma gas	Jangalikalan gas
	MM Bbl	Bm^3	Bm^3
Reserves	*64.4*	*33*	*19+*
Resources	*143.8*	*Not yet estimated*	*Not yet estimated*
TOTAL	208.2	33+	19+
Surface Km²	*1,723*	*1,861*	*1,999*

Source: MoM

Turkmenistan

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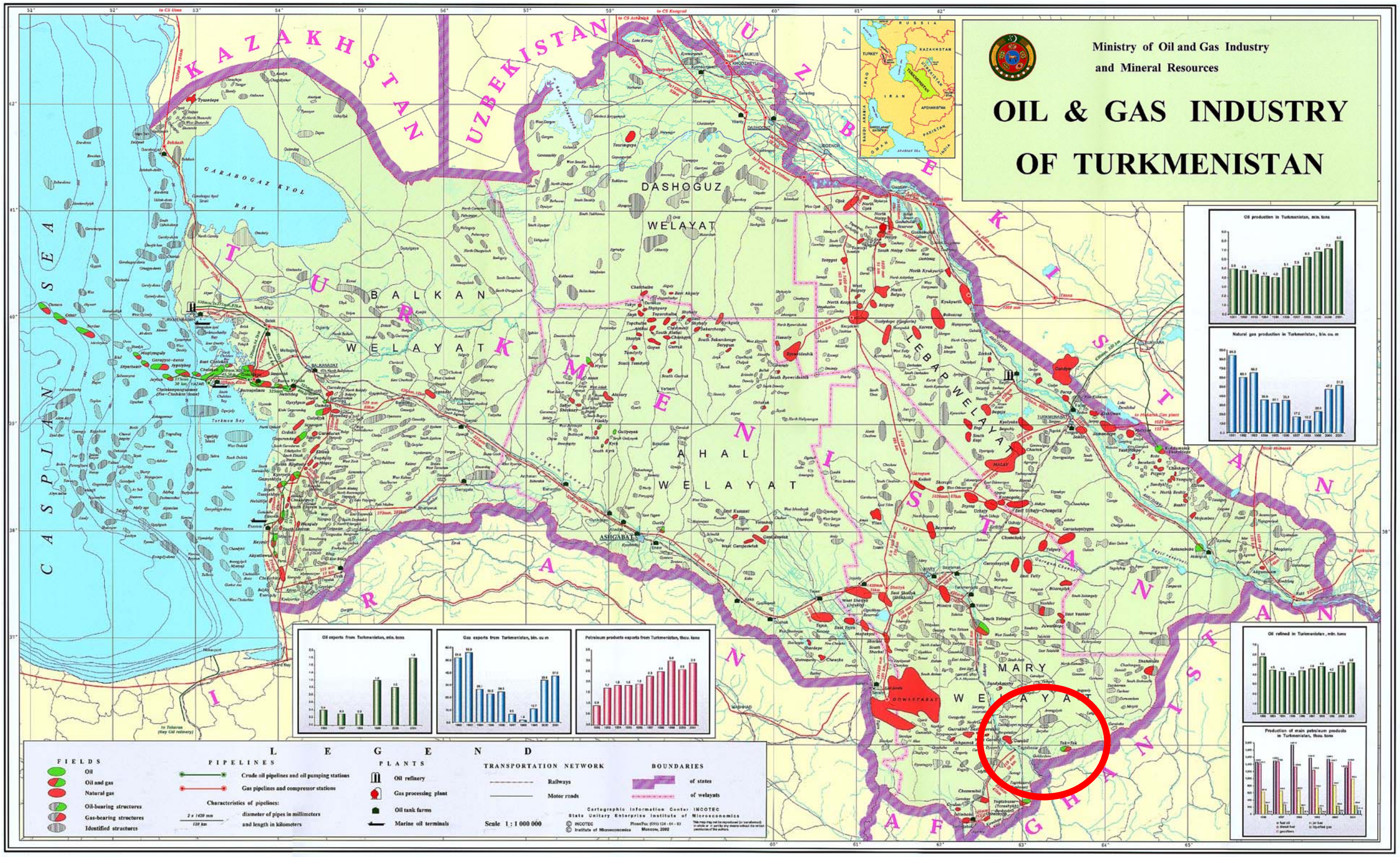

Overview of the Turkmen Gas Province

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- Predominantly mature fields that supplied the Soviet Union for 20+ years
  - Peak flows at 80+ BCM/year in late 1980's
  - Fell in the 1990s but now back to ~73 BCM
- Considerable work is now in progress to:
  - Redevelop and expand existing fields
  - Develop new fields
  - Refurbish and expand the export system
- Most developed gas is sweet or low H_2S, but much of the remainder is not

What's being discussed now

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- The Government's stated E&P approach is:
  - Develop the Caspian offshore (mainly oil) with foreign operators under PSAs
  - Develop the onshore (mainly gas) using the Turkmen State Concerns (and with Contractors as necessary)

- The stated gas export plans are:
  - Expand capacity to Russia
  - Continue exports to Iran (expand?)
  - New line to China (now well in hand)
  - Various options to Europe (and Afghanistan?) but how and in what timeframe?

Considerable Current Interest in Turkmen Gas

- Future Field Developments
  - East Bank Amu Darya fields (CNODC)
    - 20+ fields, 1-3% H_2S
    - Mostly still to be developed, except 1-2 shared with Uzbekistan
  - Large pre-salt carbonate discoveries
    - Recent drilling and 3D seismic
    - Full extent still to be defined – but large
    - Significant development challenges (deep, HPHT, sour)
  - South Yolotan/Osman and Yashlar in Eastern Turkmenistan are now scheduled for development by Turkmengaz.

Summary of S. Yolotan/Osman

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- S. Yolotan/Osman is a ‘Super Giant’ field in all respects:
  - Geographical size: 75km x 35 km
  - Gas Column: >500m
  - GIIP: 4-14 TCM (140-490 Tcf)
  - Yashlar more “modest” with GIIP 11-15 Tcf
- Significant development challenges (H_2S, CO_2 , HP/HT)
- Development will be of ‘world scale’, complexity

Existing Production & Export Plans

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- 2007 & 2008 Gas Production: ~70 BCM (~2.5 TCF)
  - (approximately 50 BCM was exported)
- Forward gas export plans (next few years):
  - Russia: ~ 70-80 BCM
  - Iran: ~ 10 BCM
  - China: ~ 30 + 10 BCM
  - Domestic: ~ 20 BCM
- Approx Total: ~150 BCM (5.3 TCF) per year

NB: The above volumes make no allowance for any supply to the TAPI and/or NABUCCO lines

Firm Gas Export Lines

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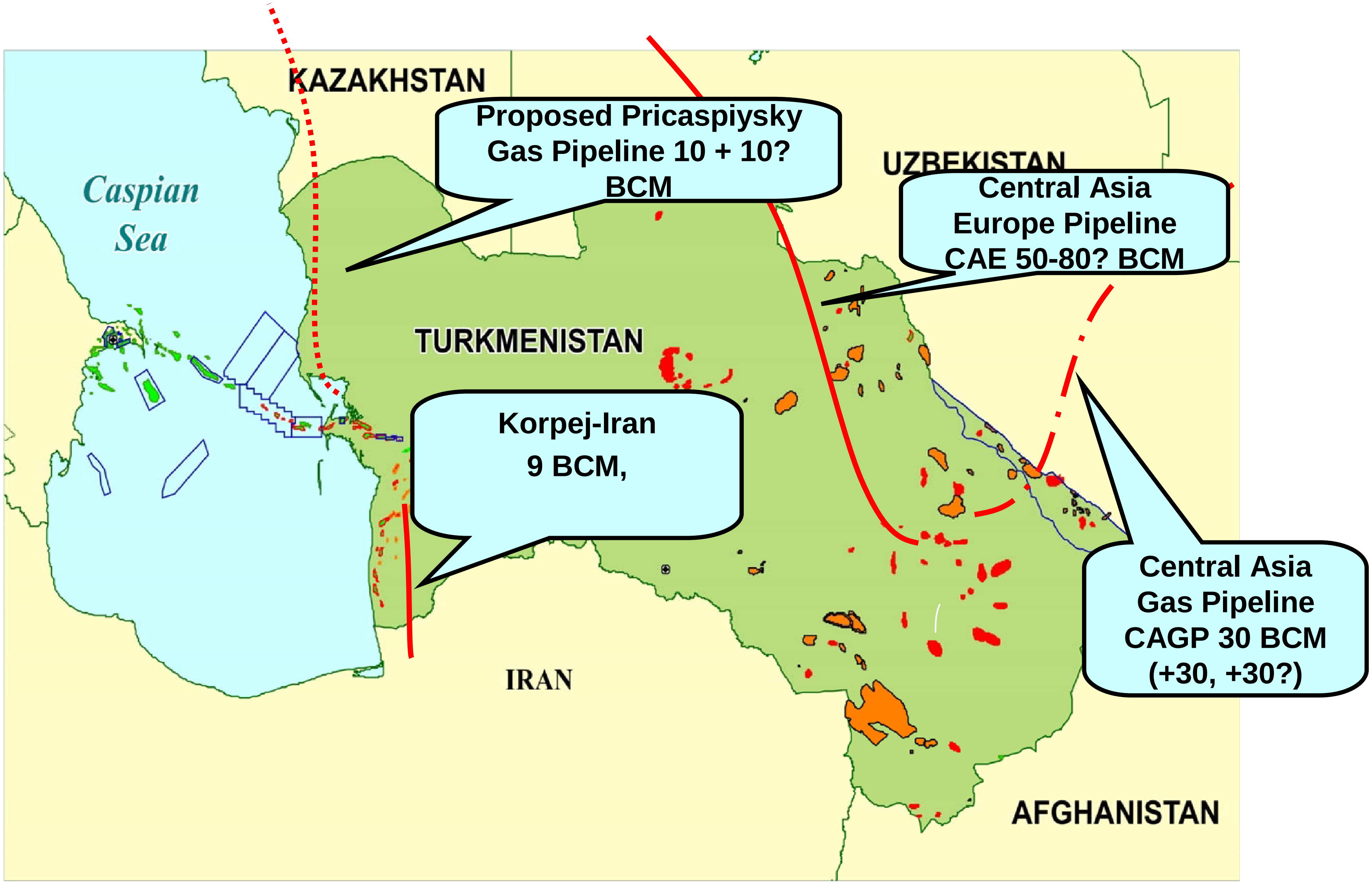

Potential Nabucco Pipeline

PLANNED NABUCCO GAS PIPELINE

An 'initial agreement' for Turkmenistan to supply 10 BCM/yr.

However, no firm commitment on the route or the gas supply, but nominally from 'the Caspian' (Shah Deniz II? Turkmenistan?)

What Price for Turkmen Gas?

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- Two-three years ago it was $40/MCM to Russia & Iran
- Then $60-75/MCM looked like a good deal
  - Most targeted at Ukraine and CIS customers
- China then offered $95-100/MCM in 2007
  - Russia countered with $100/MCM for 2008
  - Iran eventually matched this
- China is reported as signing for $195/MCM
  - First gas in 2011-2012 ?
  - Gazprom reportedly countered with $130-150/MCM
- Can Nabucco or Afghanistan compete at these prices?

Structure of S.Yolotan/Osman

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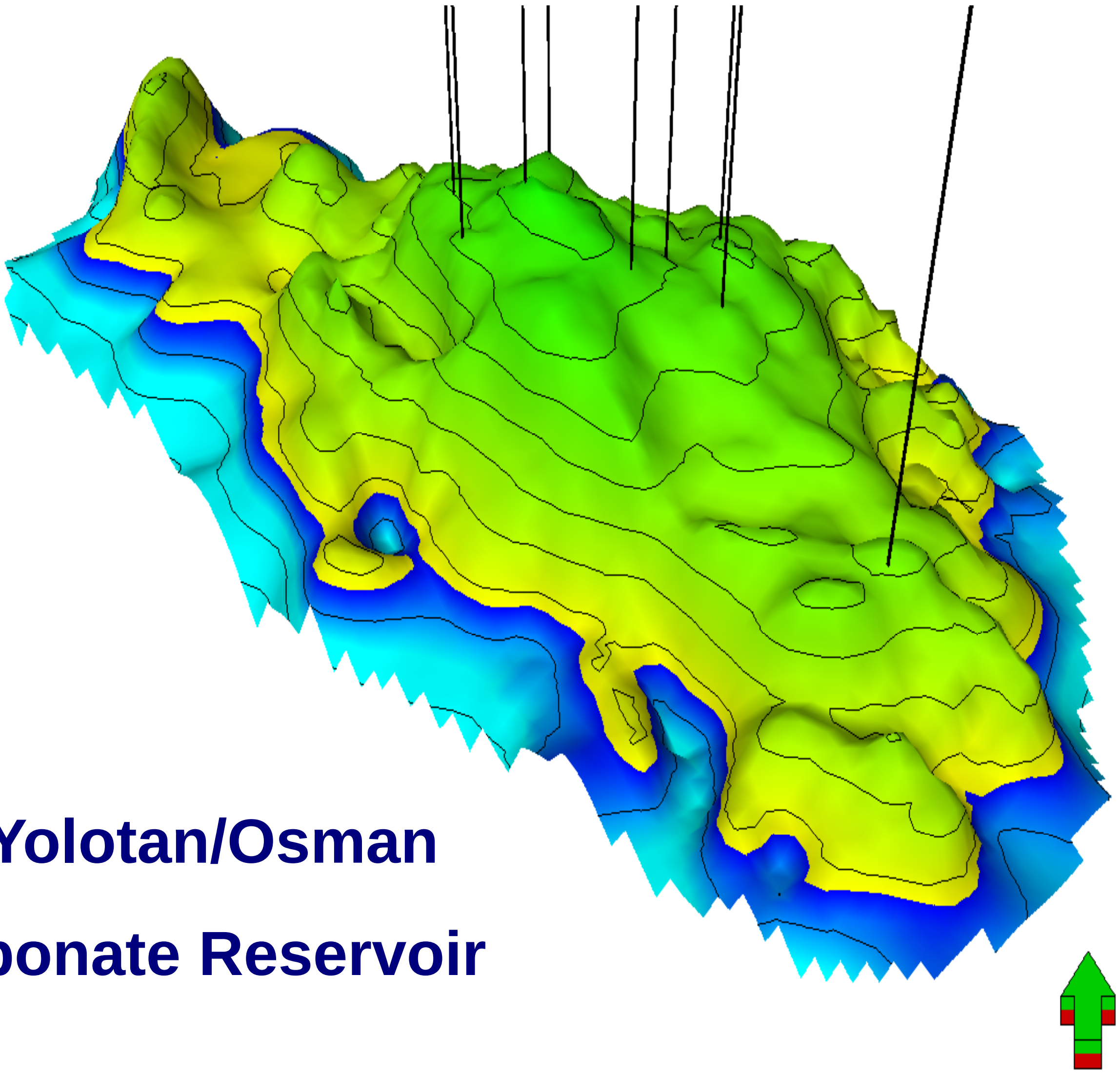
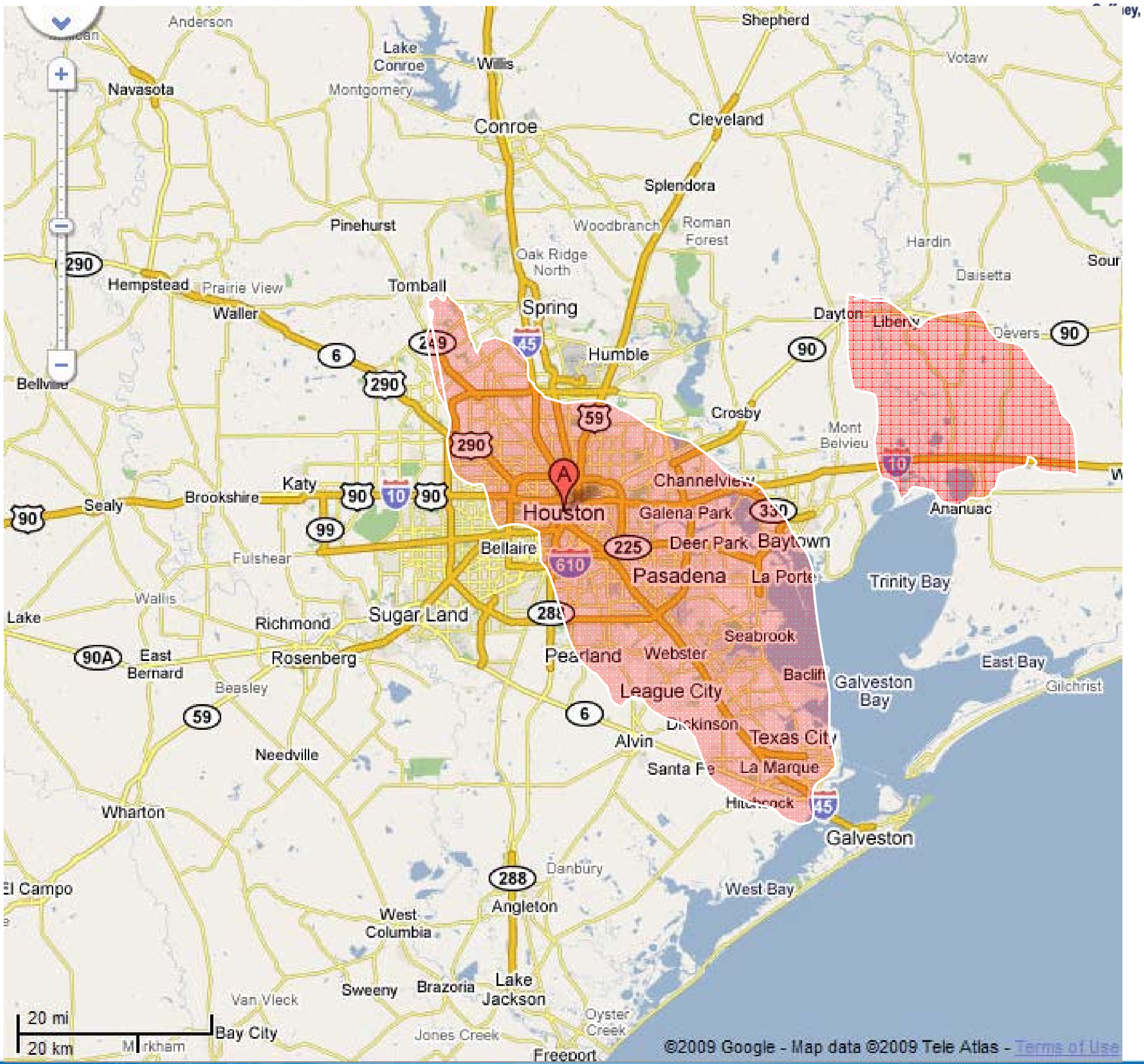


South Yolotan/Osman

Top Carbonate Reservoir

Perspective



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