

Overview of the Natural Gas value Chain and Infrastructure and BEE Opportunities

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iGas Presentation
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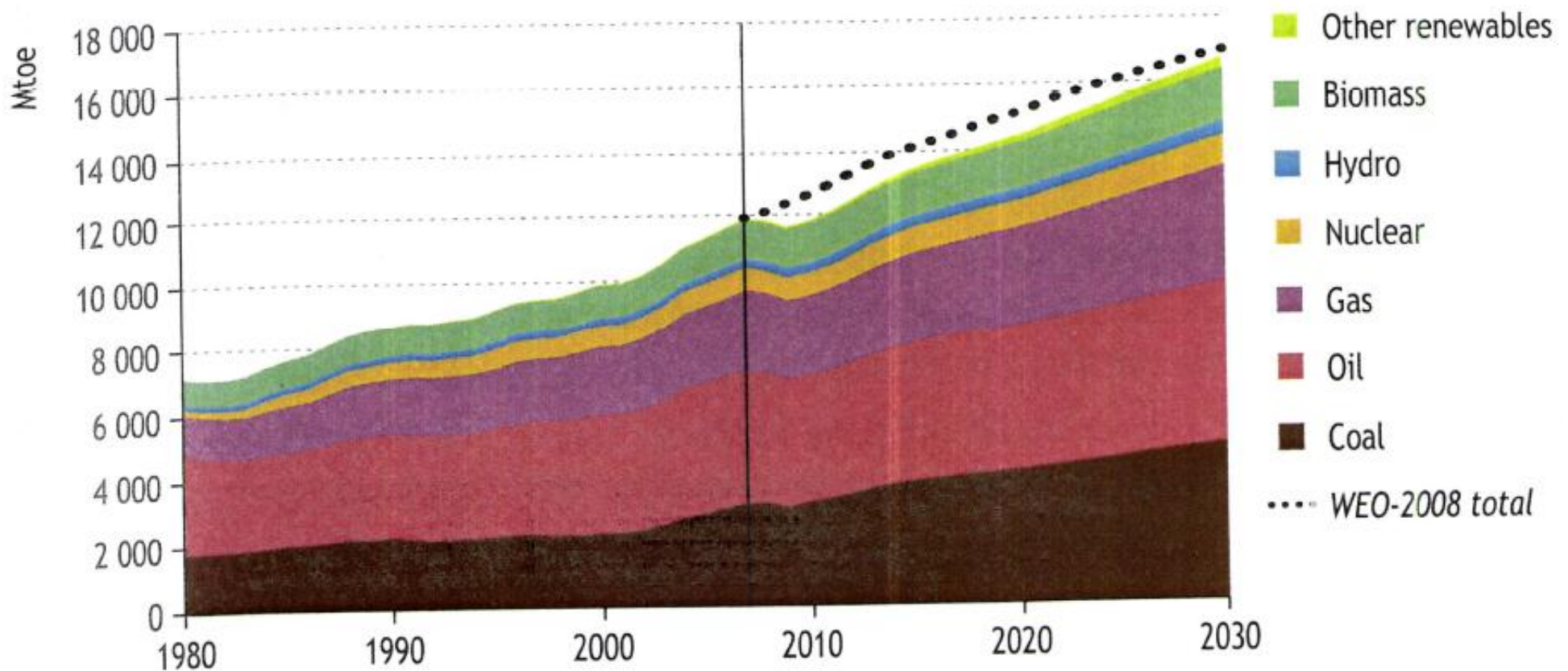
- Primary Energy Usage in South Africa
 - THE PREDICTED WORLD WIDE ENERGY USAGE
- Energy and Gas infrastructure (Present and Future)
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Primary Energy usage in South Africa

	Coal	Oil/ Refined Products	Nuclear	Hydro	Natural Gas	Biomass	PJ/yr
2000	72%	17%	1%	0,1%	1%	9%	4230
2001	72%	16%	1%	0,1%	1%	9%	3965
2002	71%	16%	5%	0,1%	1%	9%	4629
2003	72,7%	13,7%	3,1%	0,1%	1,1%	9,4%	4507
2004	68,2%	19,4%	2,8%	0,1%	1,6%	8,0%	5240
2005	69%	19%	2,8%	0,1%	2,0%	8%	5078
2006	67,2%	20,2%	2,9%	0,2%	2,0%	7,6%	5536
2007	67%	19%	2,8%	0,1%	3,0%	8%	5500
2008	65,6%	20%	2,8%	0,1%	3,5%	8%	5400
2011	~68%	~19%	~2%	~0,1%	~2,9%	~8%	~5500

Predicted World Energy Usage (IEA October 2009)

Figure 1.1 ● World primary energy demand by fuel in the Reference Scenario

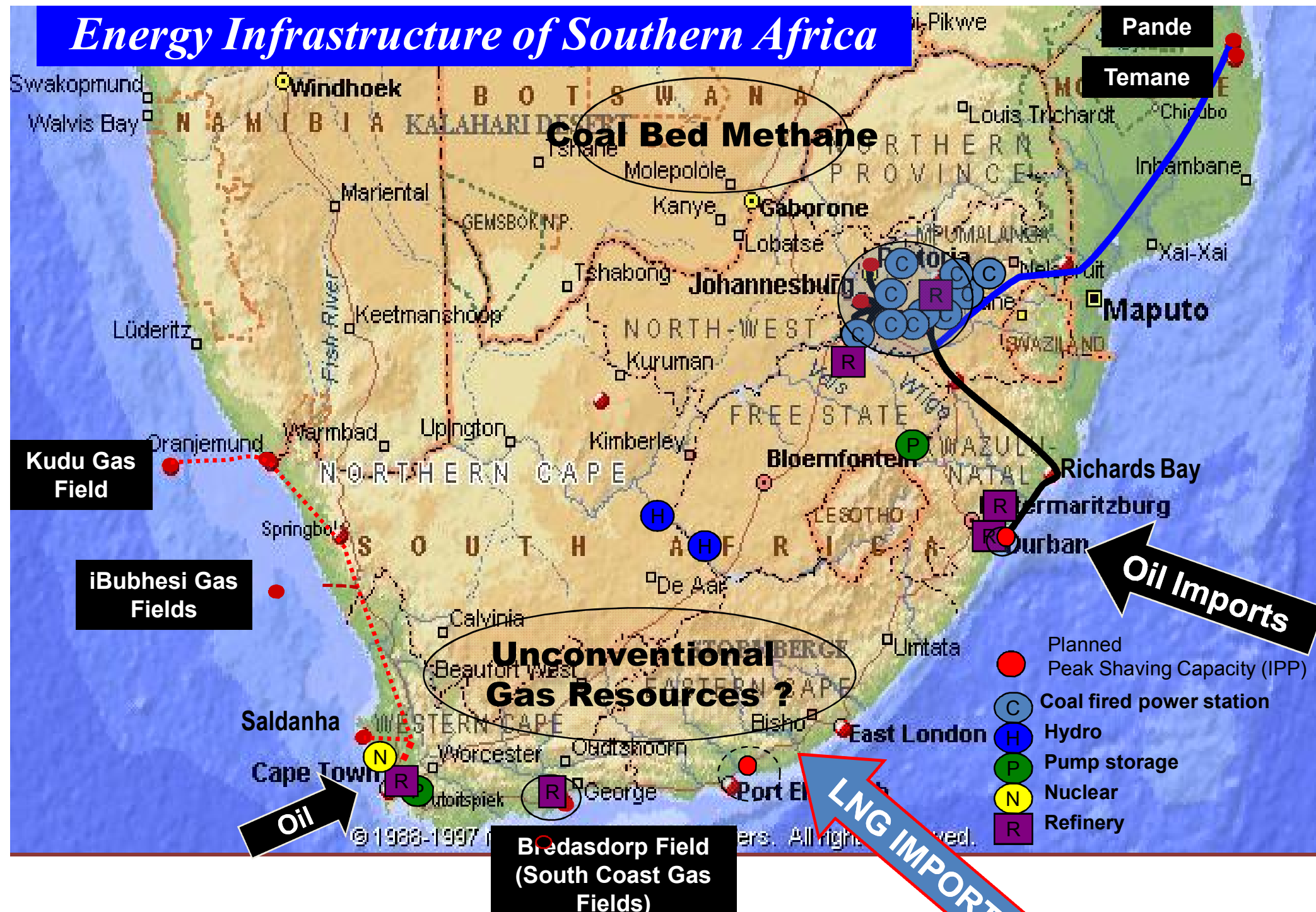


From : "World Energy Outlook"
IEA 2009
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World Trends

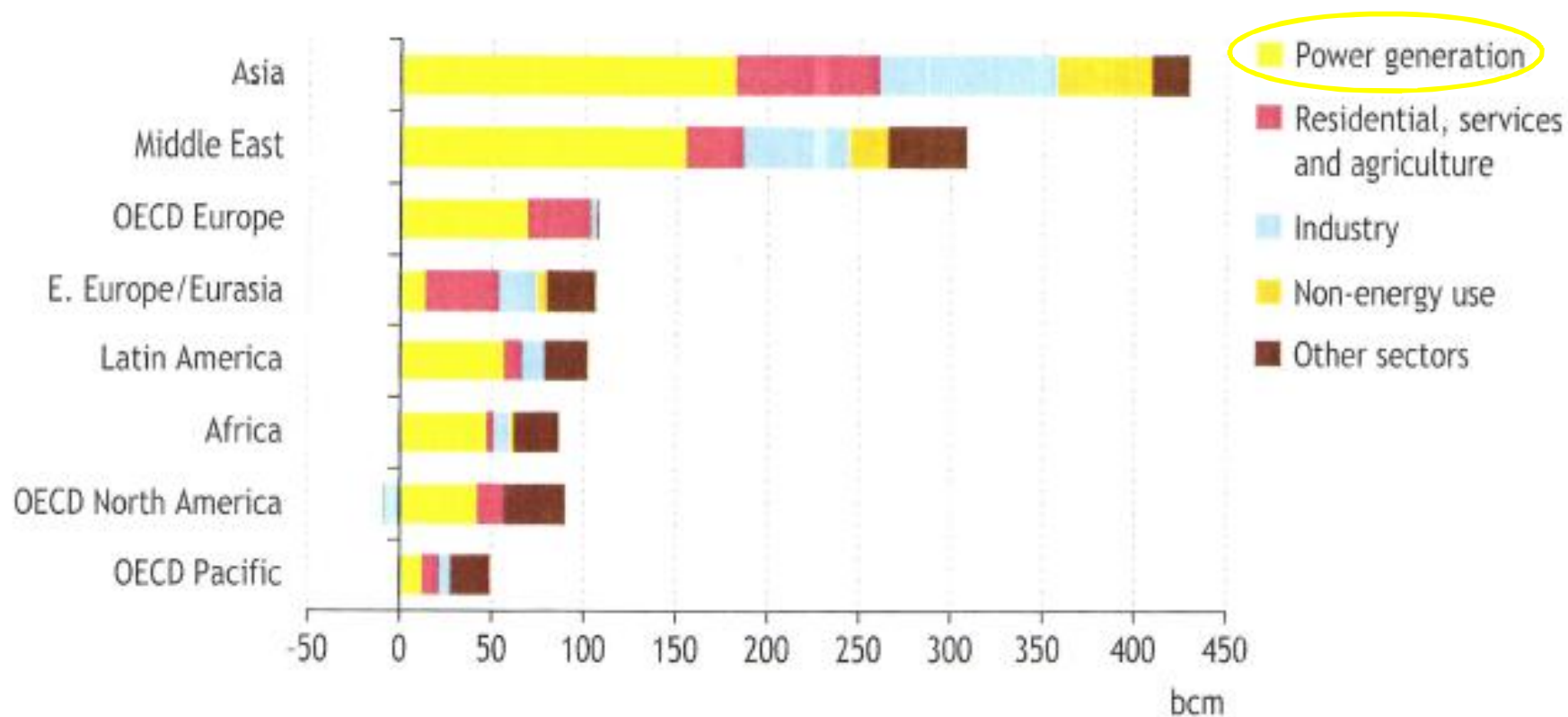
- Continuing need for oil and coal as the backbone for development.
- Large pressure (social and political) to move towards cleaner energies. Outcome of Copenhagen still uncertain. However on a regional level the following is still true;
 - Europe is committed to decreasing greenhouse gases
 - USA(federal) requires environmental responsibility to have commercial soundness
 - Russia is growing in strength in gas resources.
 - China and India is moving towards industrialisation underpinned by energy use (indigenous coal, imported oil and gas). China has primary energy demands similar to South Africa (although of a magnitude higher):
 - ❑ ~70% Coal
 - ❑ ~19% Oil
 - ❑ ~3% Nuclear
 - ❑ ~3% Natural Gas, Rest hydro-electric

Energy Infrastructure of Southern Africa



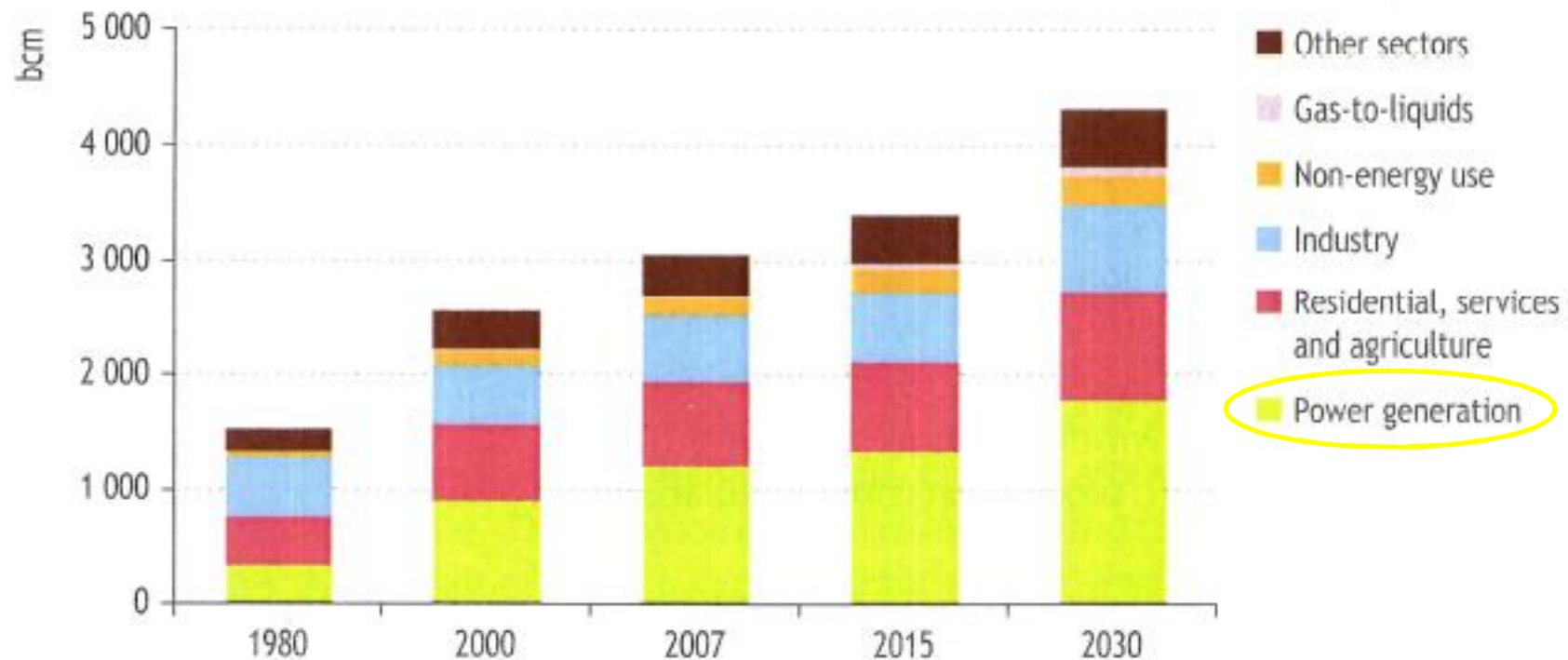
Natural Gas Markets

Figure 10.4 • Incremental primary natural gas demand by region and sector in the Reference Scenario, 2007-2030



SECTORIAL GROWTH

Figure 10.3 • World primary natural gas demand by sector in the Reference Scenario

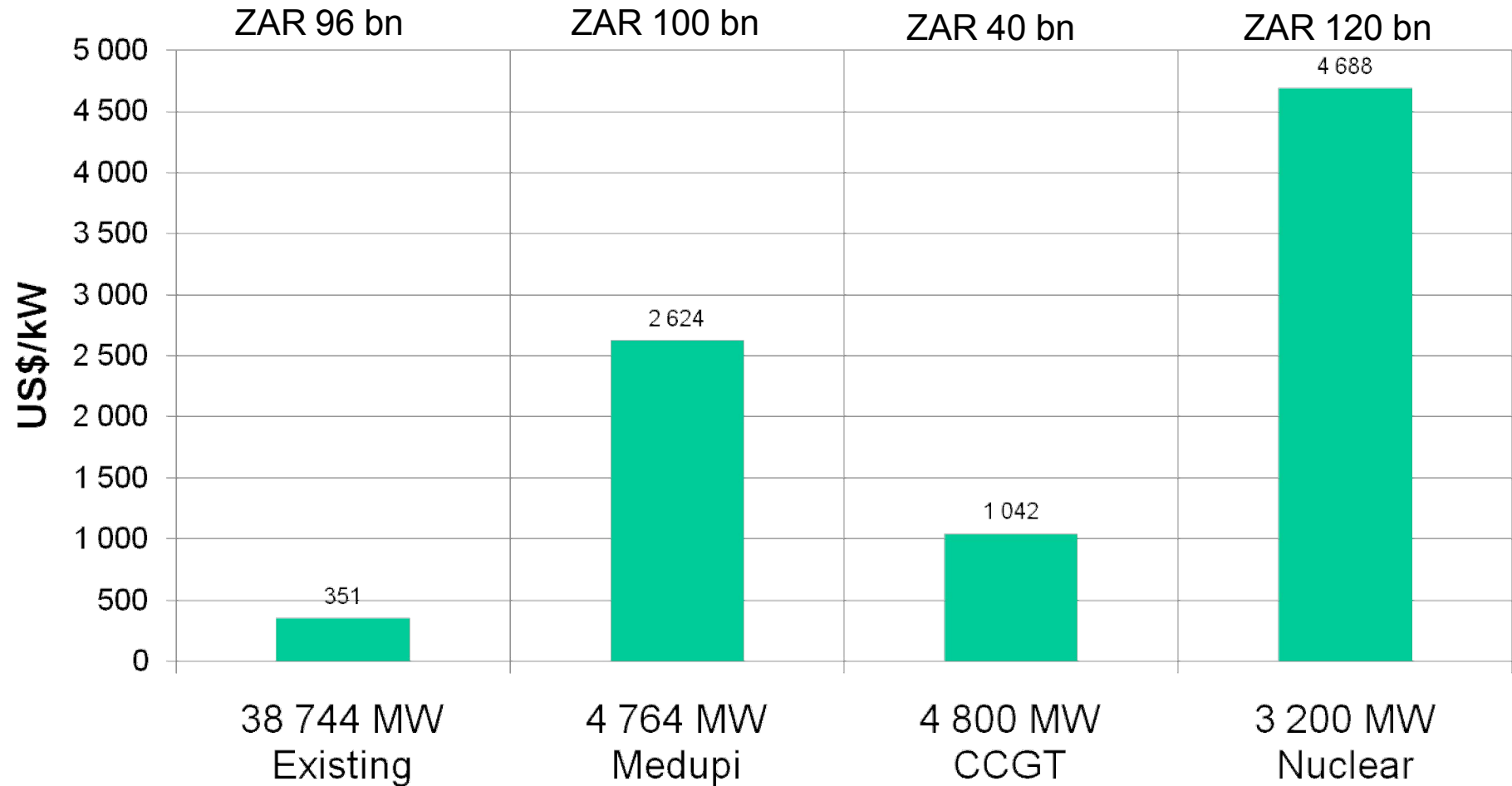


IEA 2009

Benefits of Natural gas

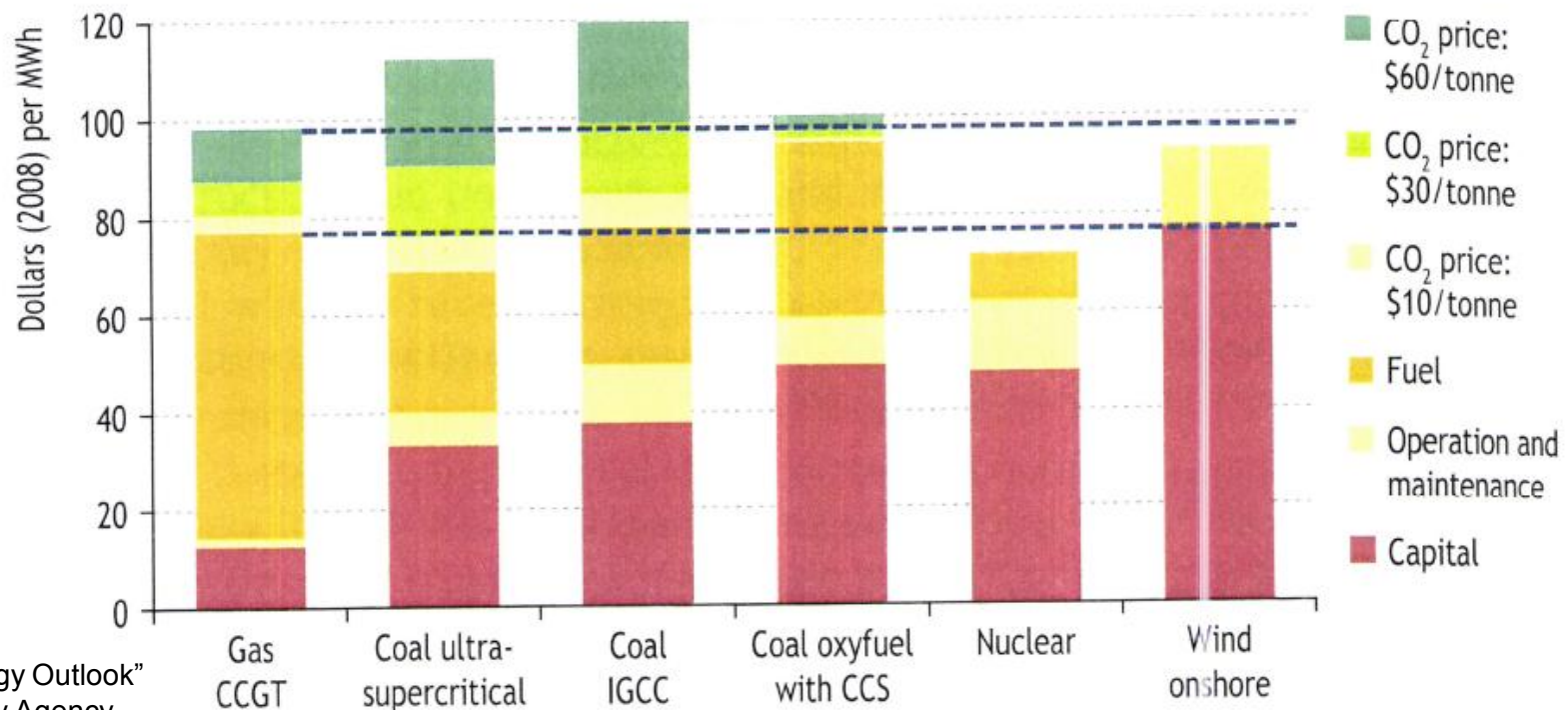
- Gas Turbines fuelled with natural gas have half of the CO₂ emissions compared to coal fired power generation.
- Gas turbines for power generation have an efficiency of 58% to 59%; Coal Power generation efficiency is 35%.
- Gas turbines can easily perform load following; at present there is no practical way of performing load following for large power demands.
- Direct combustion of natural gas is the most heat efficient option for industries and commercial businesses.

Approximate Comparative Installed Capex Costs



IEA Comparative Power Production costs

Figure 10.10 • Long-run marginal cost of generation for gas-fired CCGT power plants compared with other technologies and fuels in OECD countries in 2015-2020



Elements of the Gas Value chain

Risk & Rewards in the Gas Chain

High Risk
High Capital

Gas Field :
Upstream

Gas Distribution &
Market :
Downstream

Lower Risk
High Capital
Low Reward

Gas Transmission : Midstream

Lowish Capital
High Reward
Market Risk

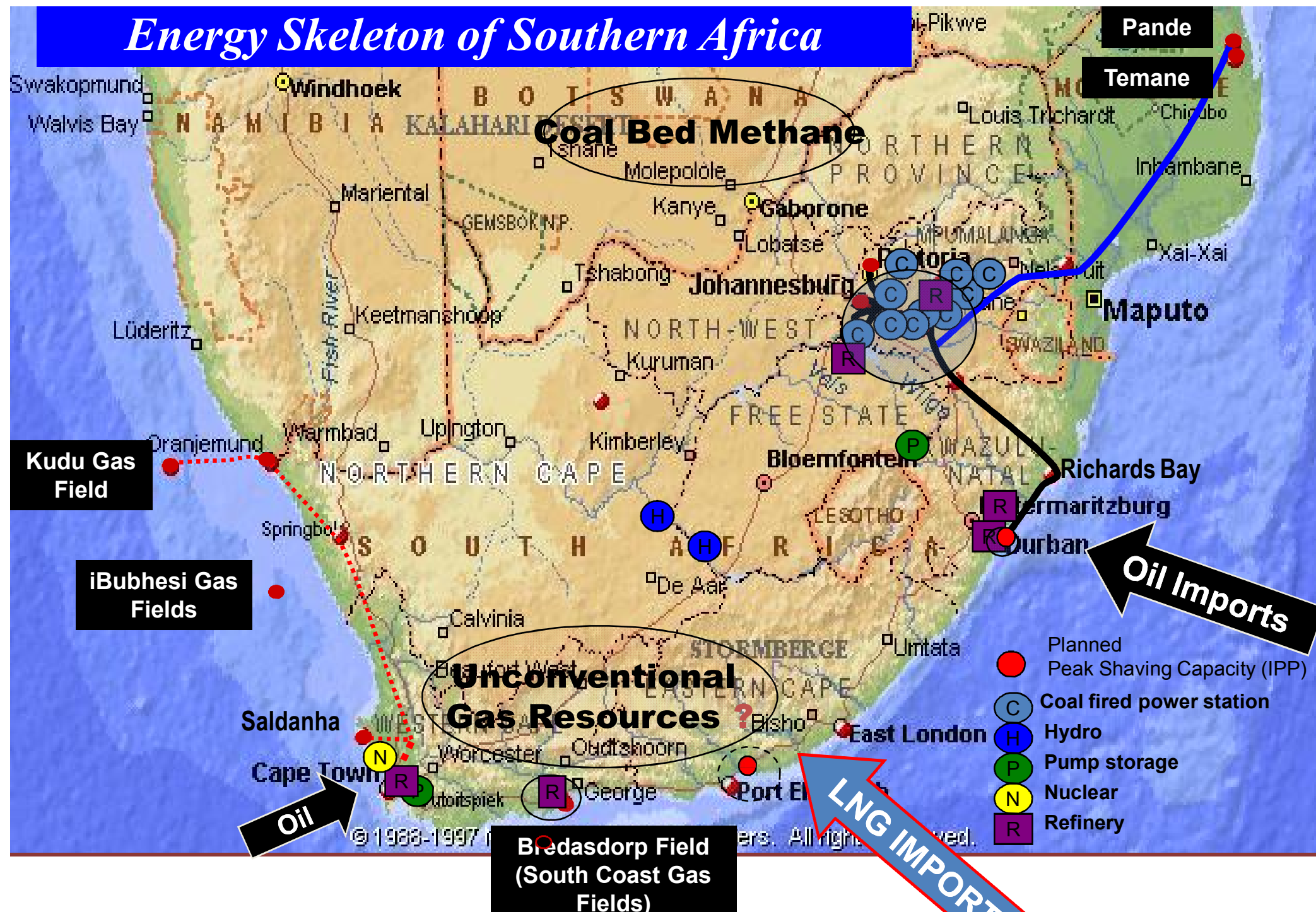
- (C) Coal fired power station
- (H) Hydro
- (P) Pump storage
- (N) Nuclear
- (R) Refinery

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BEE in the Gas Chain

- Contractors for construction
 - Civil engineering
 - Project engineering
 - Welding services
- Equity providers in partnerships
- Operators in distribution gas lines (future)
- Project developers for distribution of gas
- Marketers of Gas

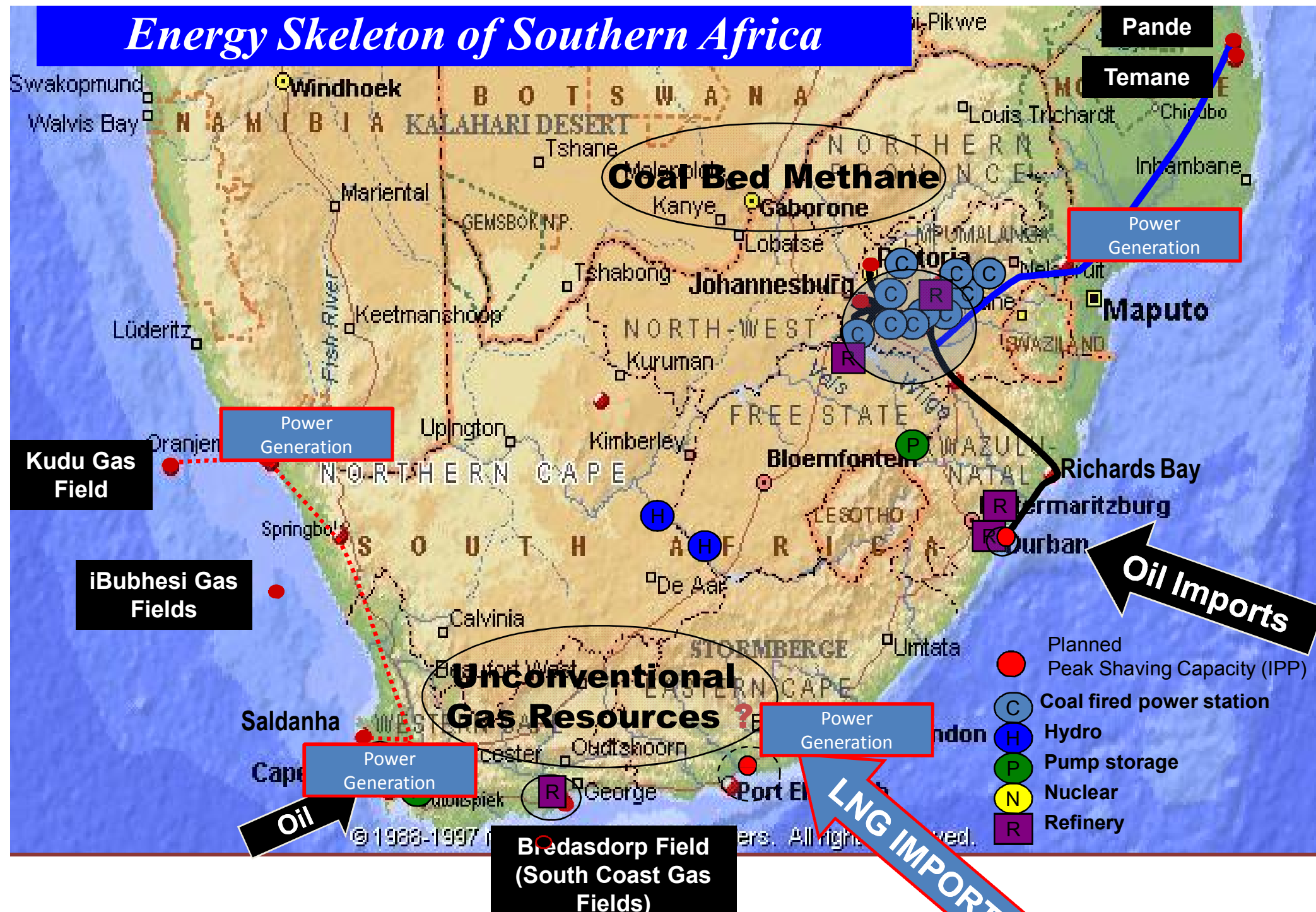
A map of the study area in the northern part of South Africa. It shows the location of Pikwe, Pande, and Temane. Pande and Temane are marked with red dots and labeled in black boxes. A blue line indicates a route or boundary. The map also shows a river and some topographical features.



IRP2 Process

- Integrated Resource Plan for National Electricity Generation.
- This round (number 2) aims at determining the appropriate mix of generation technologies to meet government's constraints, for the long term.
- A cost effective mix of technologies will be chosen.
- Expected decisions end September 2010

Energy Skeleton of Southern Africa



New Shale Gas Territories

Figure 11.6 • United States shale gas plays

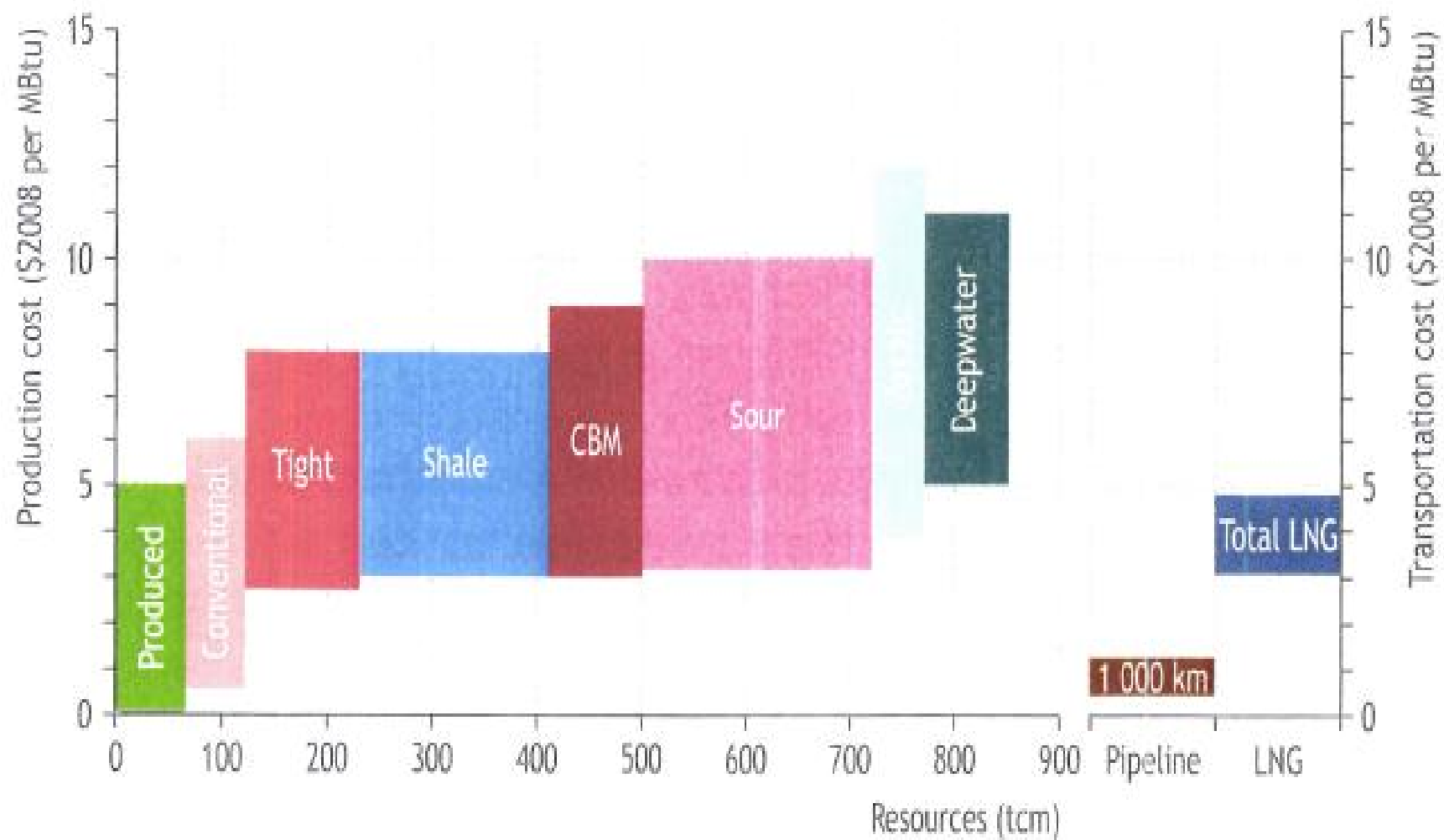


The boundaries and names shown and the designations used on maps included in this publication do not imply official endorsement or acceptance by the IEA.

Note: Devonian, Marcellus and Utica are stacked shale plays in the Appalachian basin.

Source: DOE/EIA (2009).

Figure 11.15 • Long-term gas-supply cost curve

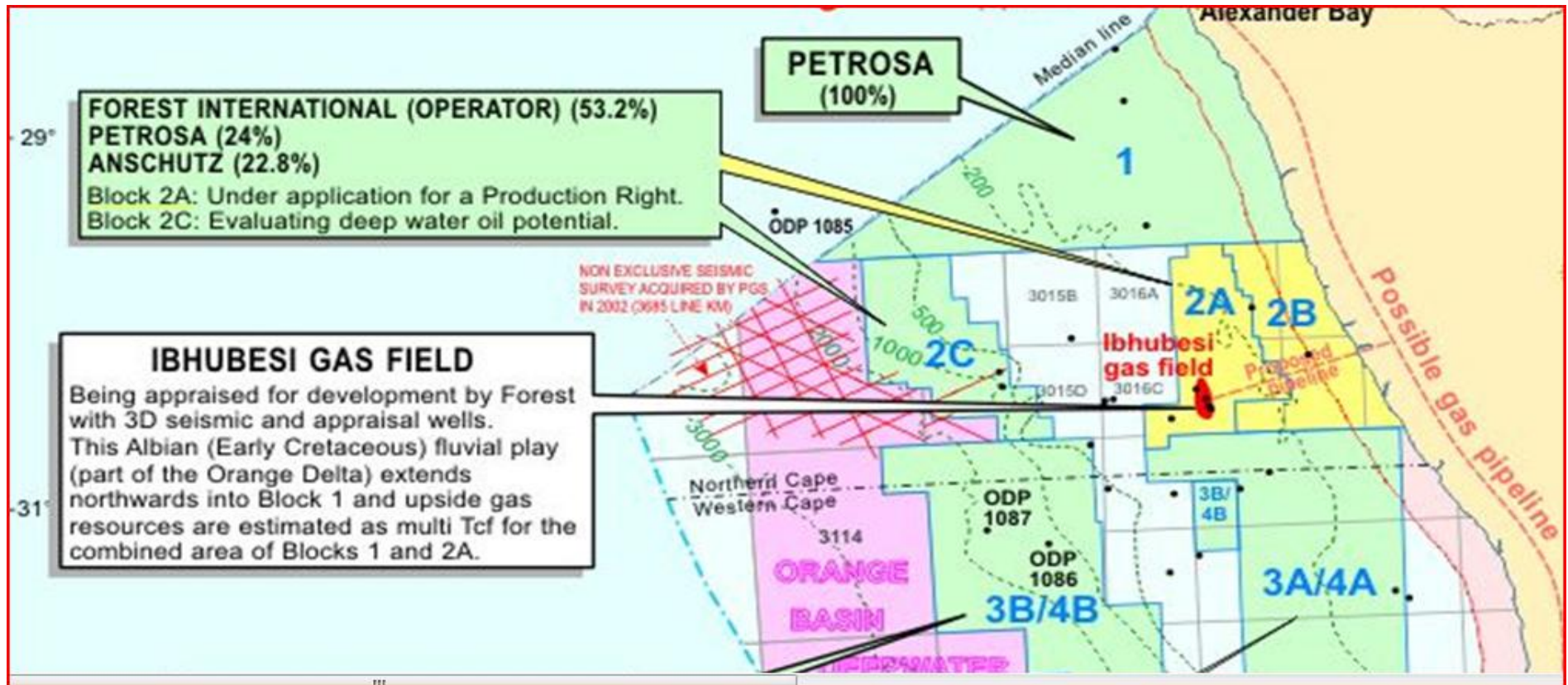


IEA 2009

THANK YOU

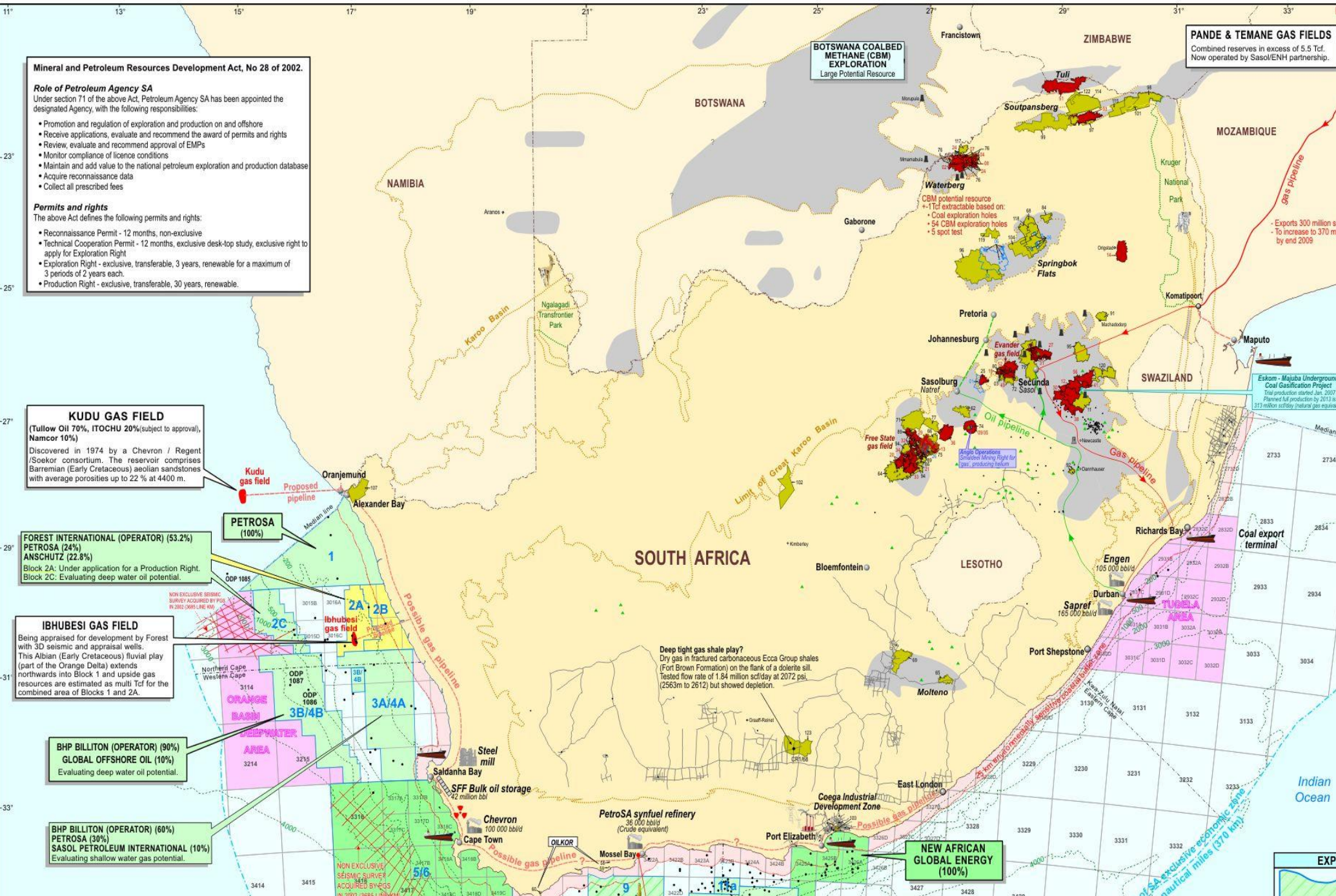
Background Slides

iBhubesi Gas Field on the South African West Coast



Source: Petroleum Agency of South Africa 33333

PETROLEUM EXPLORATION AND PRODUCTION ACTIVITIES IN SOUTH AFRICA



Kudu Reserve

Kudu: an important year for commercial progress



Kudu Opportunity

- Tullow operated asset
- 90% working interest
- Reserves potential up to 9tcf

Phase 1

- Gas to power (800MW)
- FEED study completed
- GSA and PPA negotiations under way
- First gas ~2010

Phase 2

- Two well appraisal programme
- Rig secured 1Q 2007
- Ongoing concept studies (Gas to Power, Modular LNG, gas export)