



Shell Global Scenarios

Energy Implications for the US

Presentation to the USAEE Annual Conference

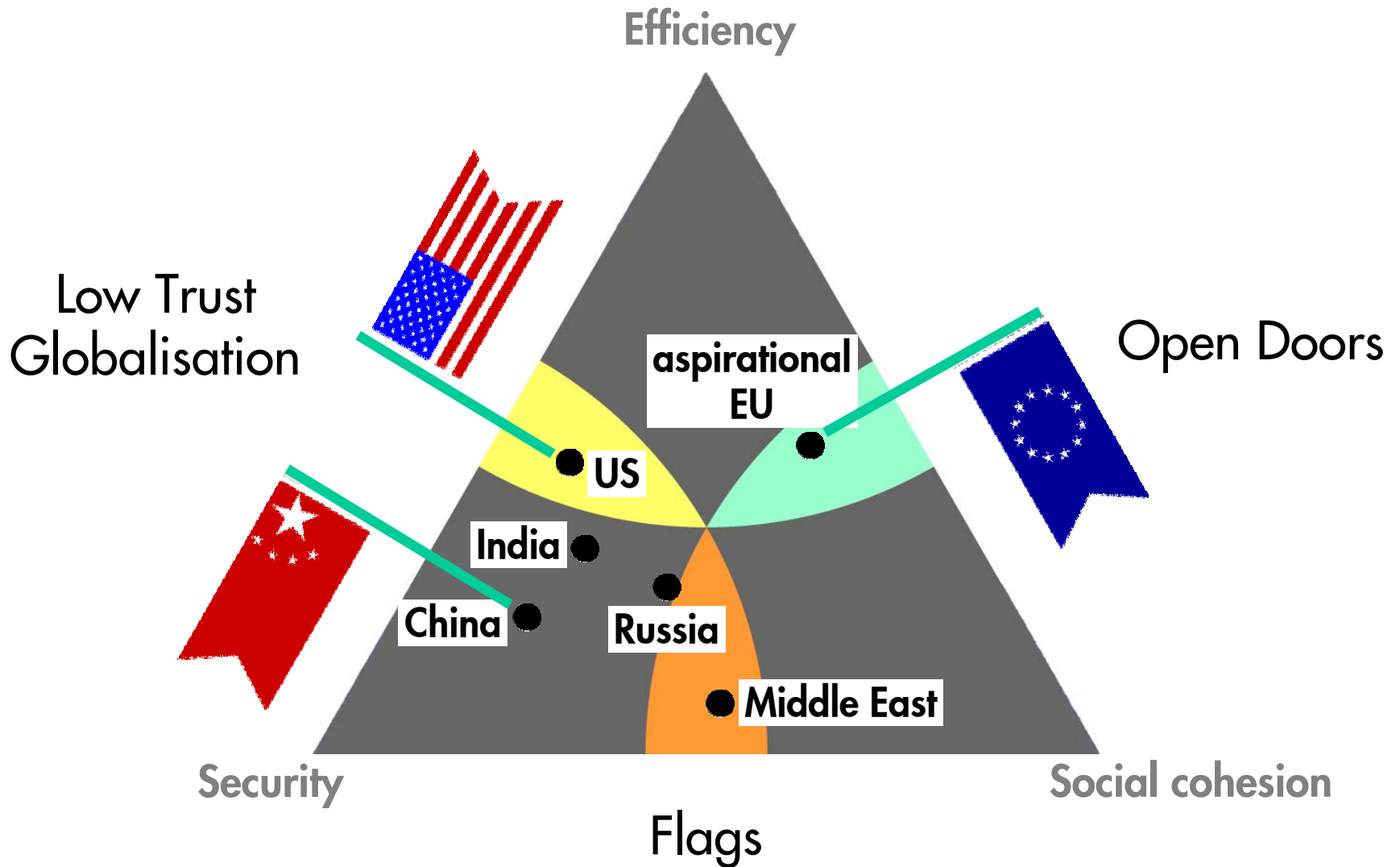
Denver, September 19th 2005

Andrew Slaughter

Shell – Global Business Environment



The US – on an LTG path?





Low Trust Globalisation

The scenario in a nutshell: “Carrots and Sticks”

- ▶ A legalistic “prove it to me” world of courts, lawyers, auditors, and Chinese walls
- ▶ Security through intrusive checks & controls
- ▶ High degree of both government and market-based regulation (e.g. ISO)
- ▶ Strong states seek further globalisation on their terms
- ▶ Governments drive energy diversity
- ▶ NGOs seek to overcome a more limited clout through alliances with investors and/or states

Manage regulatory change and compliance risk

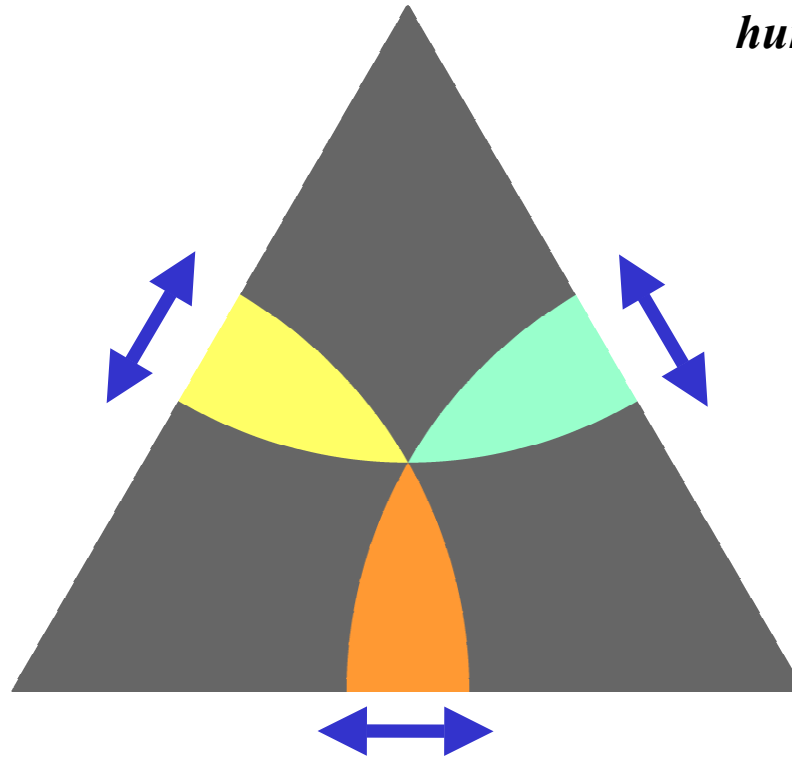


Energy challenges in LTG – what will be the impact on North America?

energy intensive growth

How will NA compete globally for energy resources versus growing energy-hungry economies?

security of supply



carbon

Will the US join growing international actions to limit carbon emissions?

What is the right mix of incentives for domestic energy versus international cooperation?



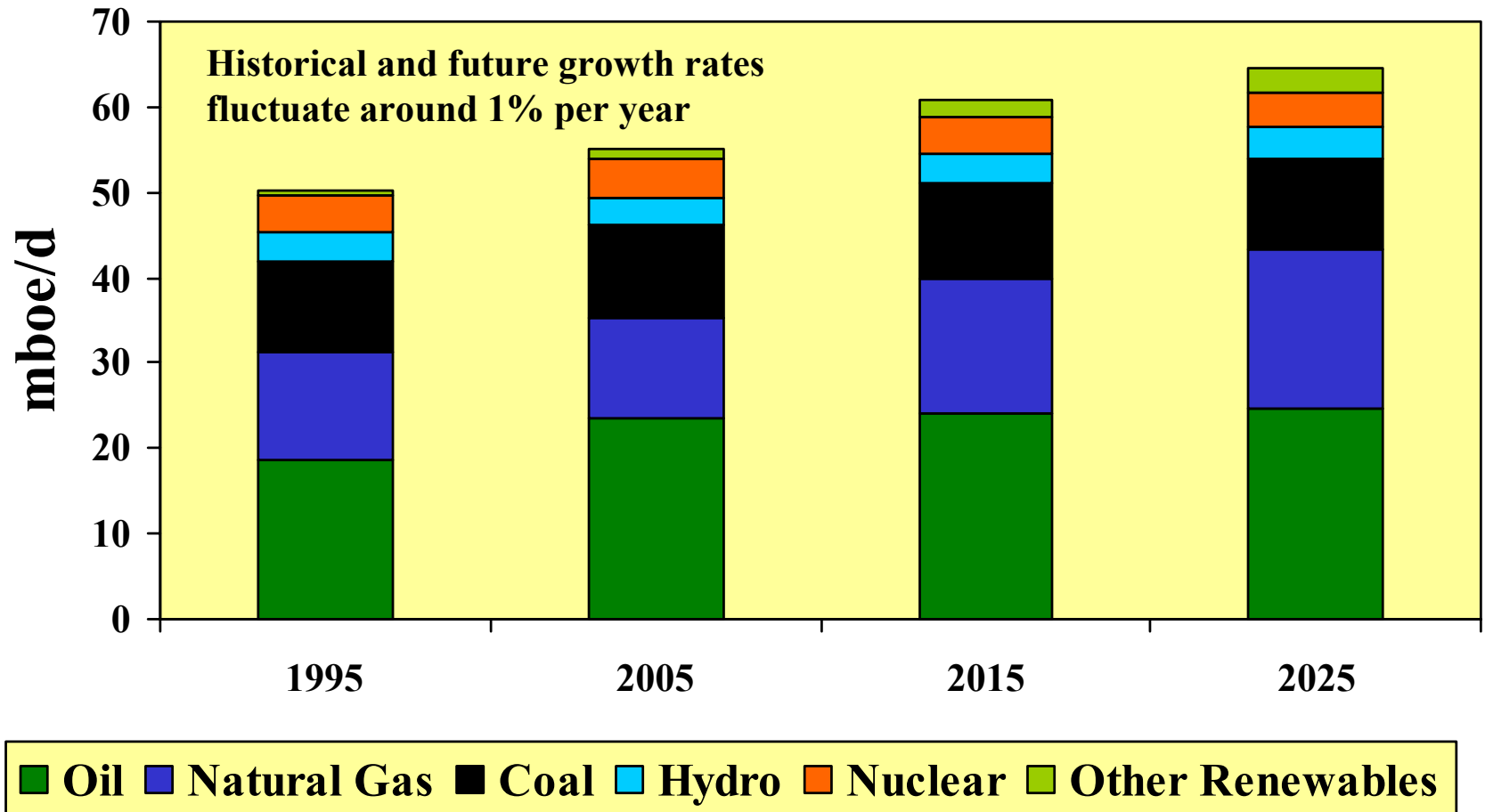
Which way for US Energy Policy in LTG?

	Supply	Demand
Security of supply	<p>Diversity of Supply</p> <ul style="list-style-type: none">- Geographical- Fuel mix (inc unconventional and renewables) <p>Critical infrastructure (but tempered by safety and environmental concerns)</p>	<p>Efficiency standards</p> <p>Taxation</p> <p>Federal and local rules</p>
Energy Intensive Growth	<p>Selective trade and investment protocols</p> <p>Favourable fiscal and access regimes for domestic energy sources</p>	
Carbon	<p>Renewables, accelerated research into hydrogen and carbon sequestration</p>	<p>Growing patchwork of state and local targets</p> <p>No national consensus</p>



North American energy outlook in LTG

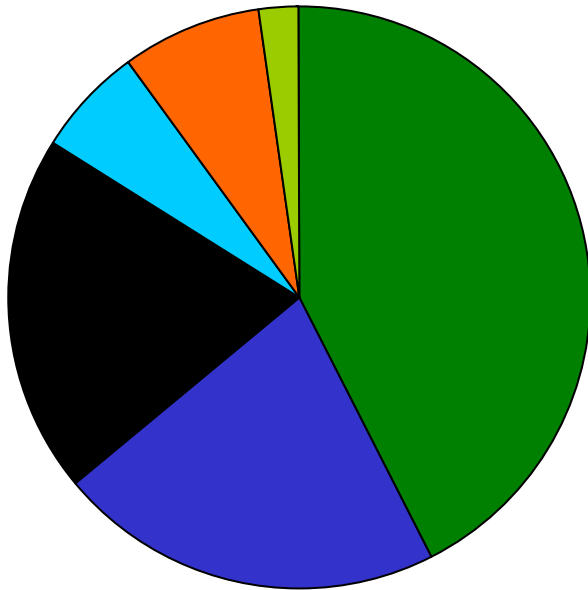
NA Primary Energy Demand



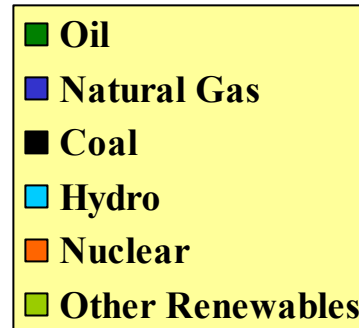
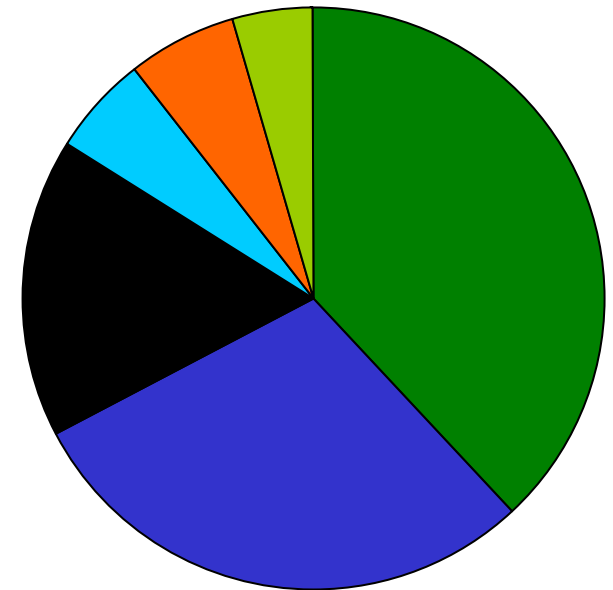


North American energy outlook in LTG

2005 % Shares



2025 % Shares



In a mature energy market, the structure of demand takes a long time to shift



Could North America move to an Open Doors world...?

• Trade

- success of CAFTA, reinforcement of NAFTA
- Boeing/Airbus dispute amicably settled
- China revaluations continue, improving terms of trade

• Global Security

- continuous improvement in anti-terrorism measures reduces threat to more manageable levels, effective international cooperation is achieved
- stabilisation of Iraq

➤ *Energy Impacts*

- *strongest overall energy demand growth*
- *open market for LNG infrastructure development and imports, unfettered by restrictive energy security concerns*
- *renewables and unconventional fuels driven by improving technology and economics, and pulled by growing consumer acceptability – policy takes a back seat*
- *CO2 emissions addressed by market-based allowance trading*



Or Flags?

• Trade

- continuing trade tensions US/Europe, US/China, US/Canada etc....
- competitive protectionist escalation

• Global Security

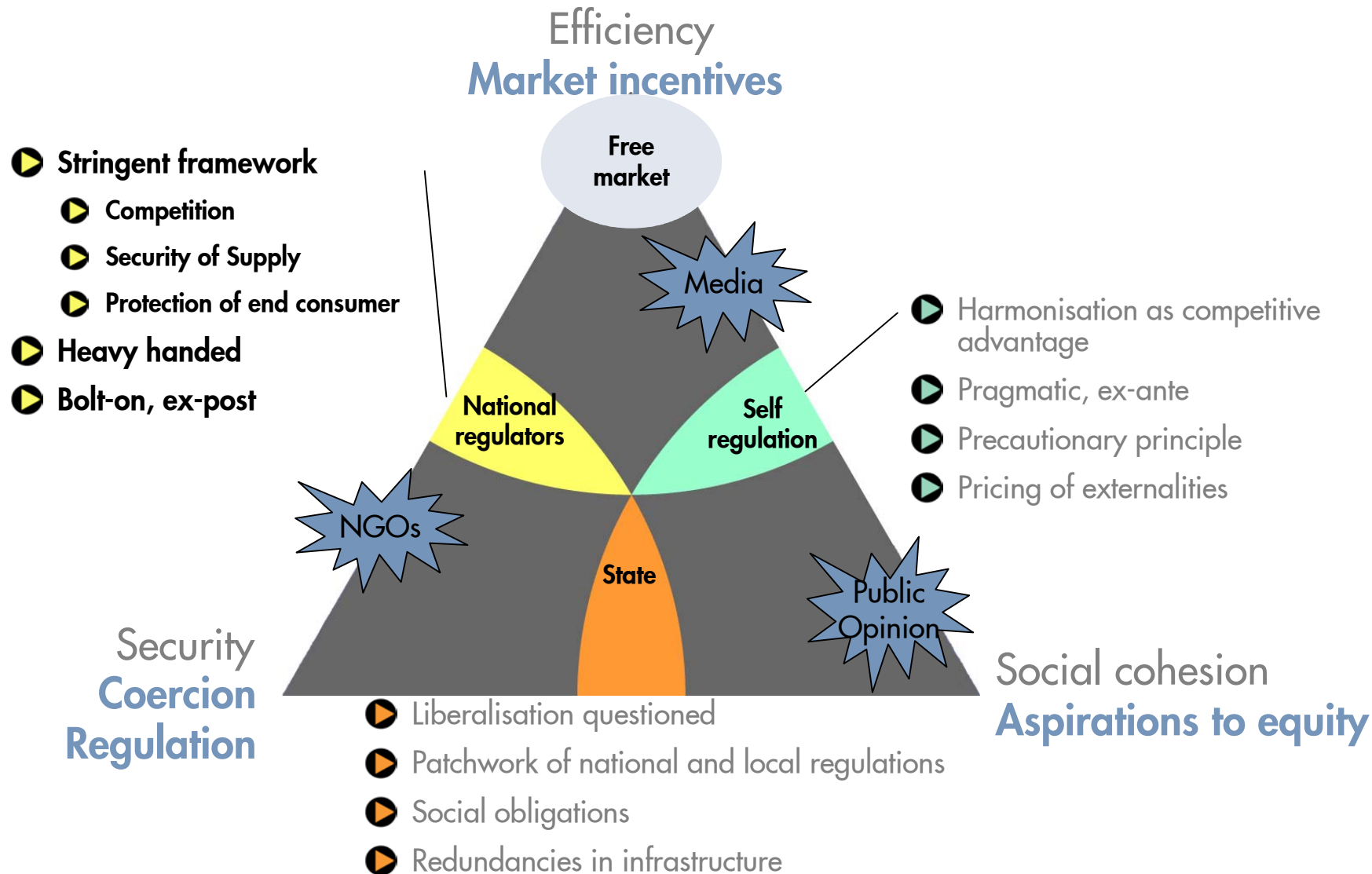
- no relief from outbreaks of terrorist activity, in North America and internationally
- increased focus on security requires step-up in funding and government attention, but inhibits economic activity

➤ *Energy Impacts*

- *weakest overall energy demand growth*
- *domestic energy supply source favoured with strong legislative and regulatory support: access to hydrocarbons; renewables credits and targets; unconventional fuels programmes*
- *international energy supply refocussed on hemispheric (“friendly”) supply sources*
- *potential for regulated demand side management if energy balances are tight*



Market trust & regulation: different worlds develop different tools...





... and patterns of influence could shift

Low Trust Globalisation

Prove it to me

Regulators are law enforcers
Bureaucrats & lawyers

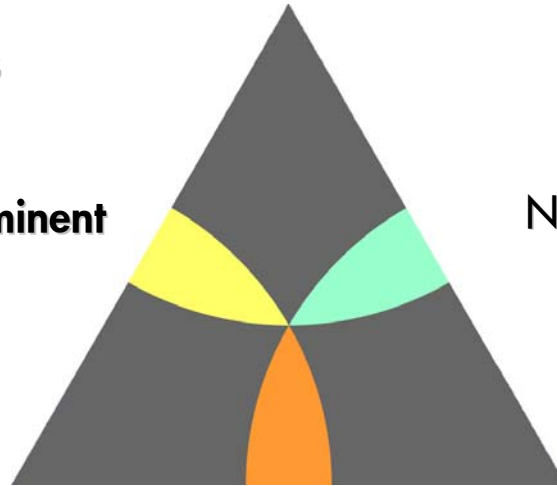
Pro-business NGOs are more prominent
Media are businesses

Open Doors

Know me

Regulators are facilitators
"rating value-chains"

NGOs are voices of endorsement
Media are iconoclasts



Flags
Follow me

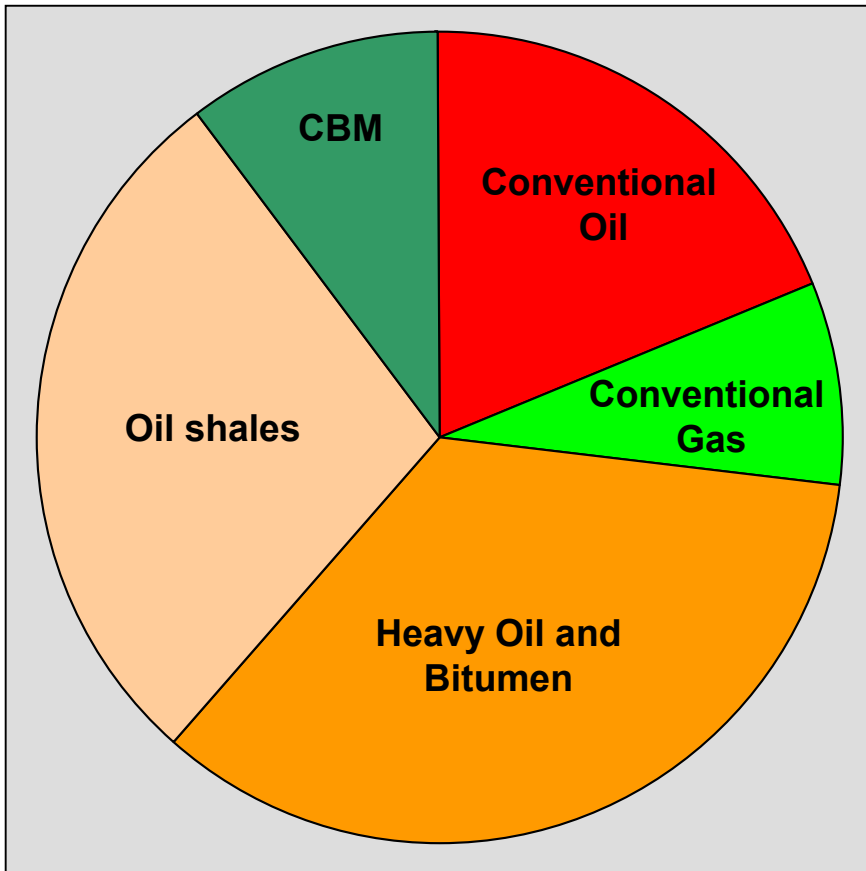
Populist political leaders
Trade unions & dominant constituencies

NGOs are voices of public discontent
Media are part of establishment



Hydrocarbon resources are shifting towards the unconventional

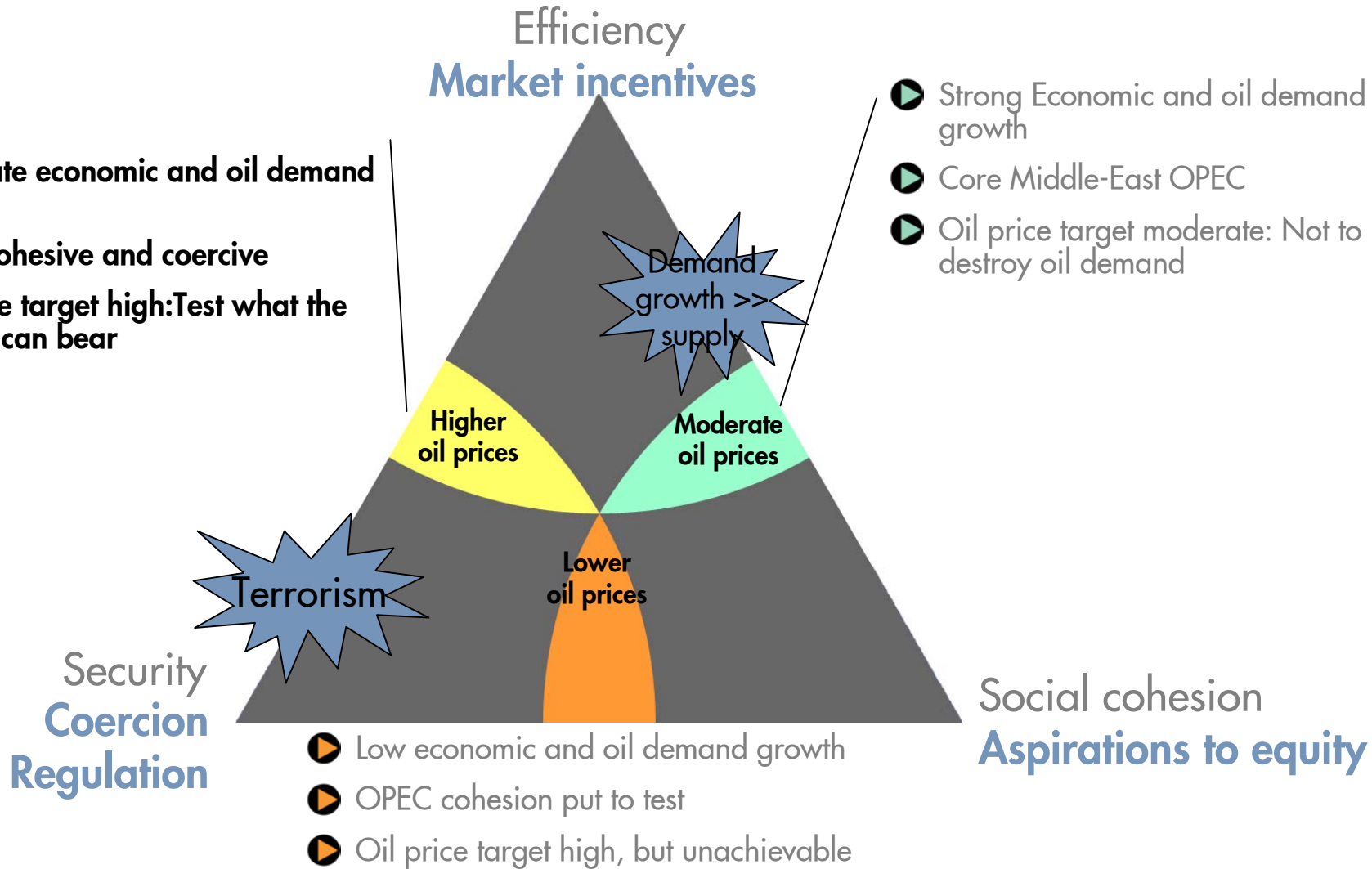
Estimated Global Fossil Fuel Resources



- **Unconventional hydrocarbon plays have great potential relative to conventional plays**
 - **and the North American unconventional endowment could be huge**
- **Growing development of these plays is an important contribution to North American energy security**
- **Economics should continue to improve with technology and scale**



Long Term Oil Price Drivers

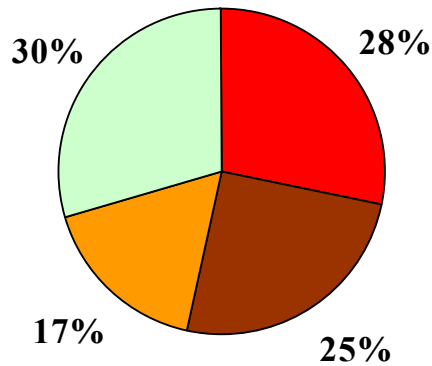




Turning to natural gas...

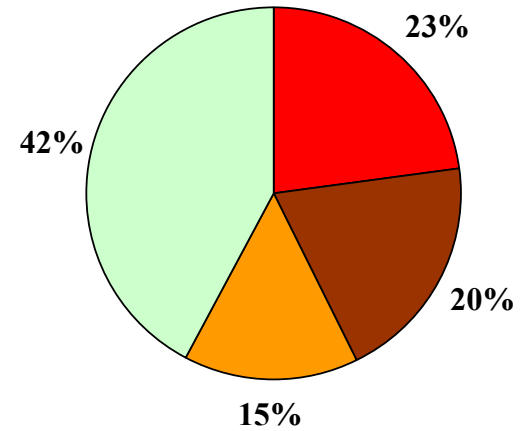
North America will remain the major gas market globally

2000



■ N. America ■ FSU ■ OECD Europe ■ Other

2025



■ N. America ■ FSU ■ OECD Europe ■ Other

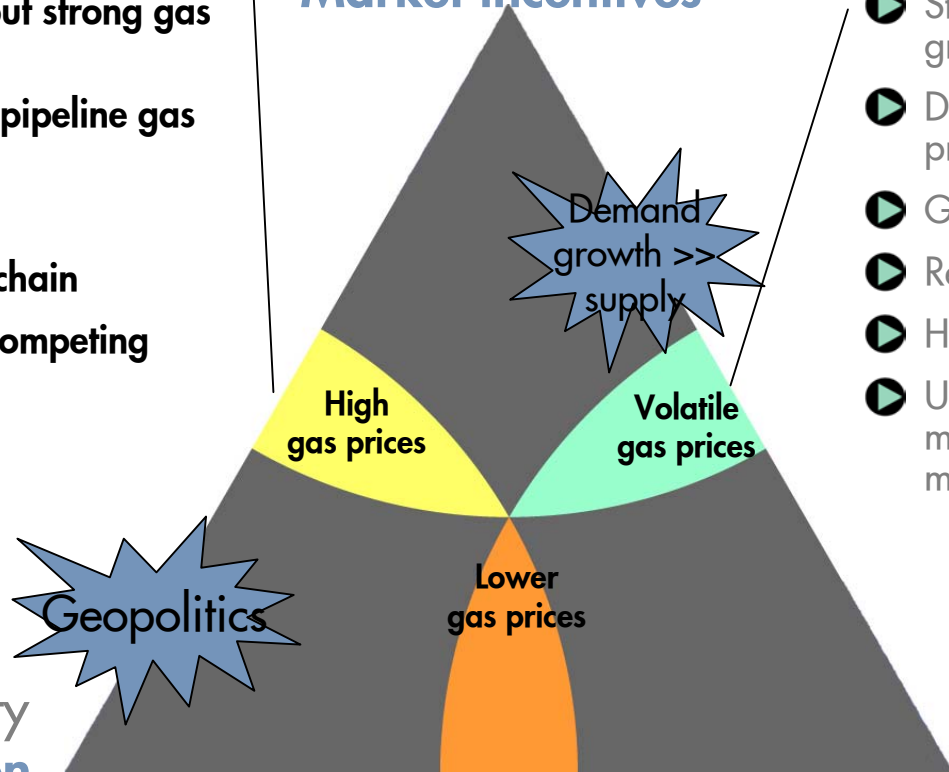


Long Term Gas Market Drivers

- ▶ Moderate economic but strong gas demand growth
- ▶ Regional markets for pipeline gas and LNG
- ▶ 'Lock-in' of supply
- ▶ Vertical linked value chain
- ▶ Gas prices linked to competing fuels.
- ▶ Heavy regulated.

Efficiency
Market incentives

- ▶ Strong Economic and gas demand growth
- ▶ De-linking of value chain and pricing
- ▶ Global market
- ▶ Regulatory convergence
- ▶ Horizontal integration
- ▶ US LNG set prices in AB and AP markets. Spill over in pipeline markets.



Security
**Coercion
Regulation**

Social cohesion
Aspirations to equity

- ▶ Low economic and steady gas demand growth
- ▶ Bilateral agreements
- ▶ Local markets



Low Trust Globalisation

Gas Markets in North America

- ▶ Rising gap between demand and indigenous supply.
- ▶ Strong opposition remains to opening up federal lands and offshore moratoria areas for drilling. Alaska gas pipeline developed post 2015
- ▶ Competition from ‘clean’ coal and renewables erodes the gas share of new power generation capacity in some regional markets.
- ▶ LNG imports rise, market share grows steadily, from 2% in 2004 to 15% by 2025.
- ▶ Prices are pulled up by rising indigenous cost of supply and lack of demand flexibility (in all scenarios).
- ▶ LNG is a price taker relative to the overall market, but may cause local price depression if takeaway infrastructure is bottlenecked.



Open Doors

Gas Market North America

- ▶ Wider gap between demand and indigenous supply driving imports and prices.
- ▶ More favourable political climate for the development of LNG import facilities, as companies earn their license to operate by demonstrating safe operations and access to a diversity of supply sources – but market mechanisms determine the location, timing and scale of import terminals
- ▶ The Alaska natural gas pipeline receives no government support and does not compete for capital with LNG
- ▶ Off-limits areas for domestic drilling are not opened up as confidence in open international trading grows
- ▶ The US market share of LNG grows rapidly, reaching 30% by 2025.



Flags

Gas Markets North America

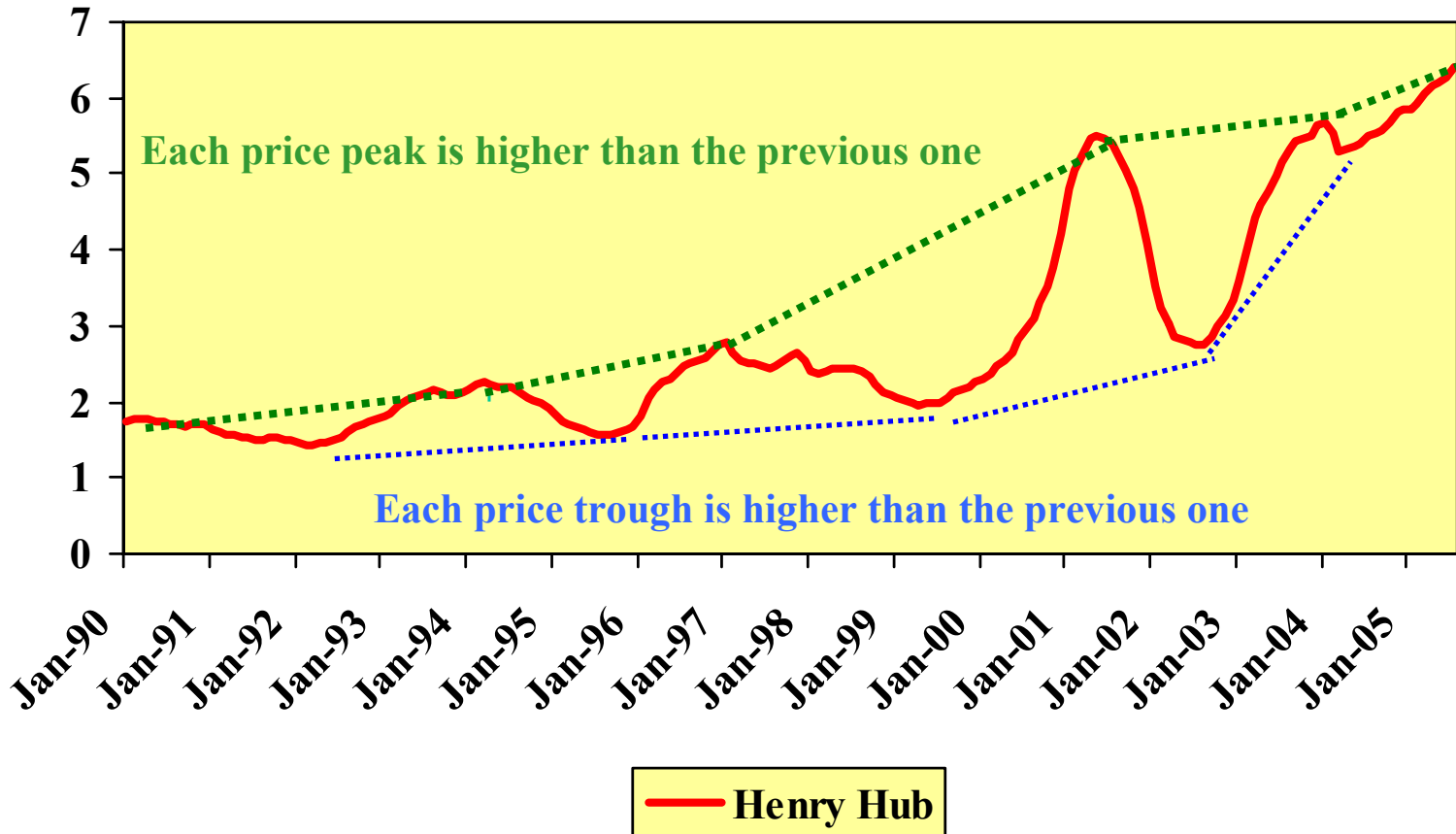
- ▶ Opening to new drilling of off-limits areas on federal lands and offshore, despite only lukewarm public acceptance
- ▶ Indigenous supply responds, reducing need for imports.
- ▶ Federal and state guarantees enable development of Alaska natural gas pipeline by 2015, also unlocking further Arctic gas development potential
- ▶ Prices are pulled up by rising indigenous cost of supply and lack of demand flexibility (in all scenarios).
- ▶ US market share of LNG grows slowly to around 12.5% by 2025.



NA Natural Gas Prices have been on a clear rising trend since 1990

NA Gas Prices 1990-2005
12 Month moving average

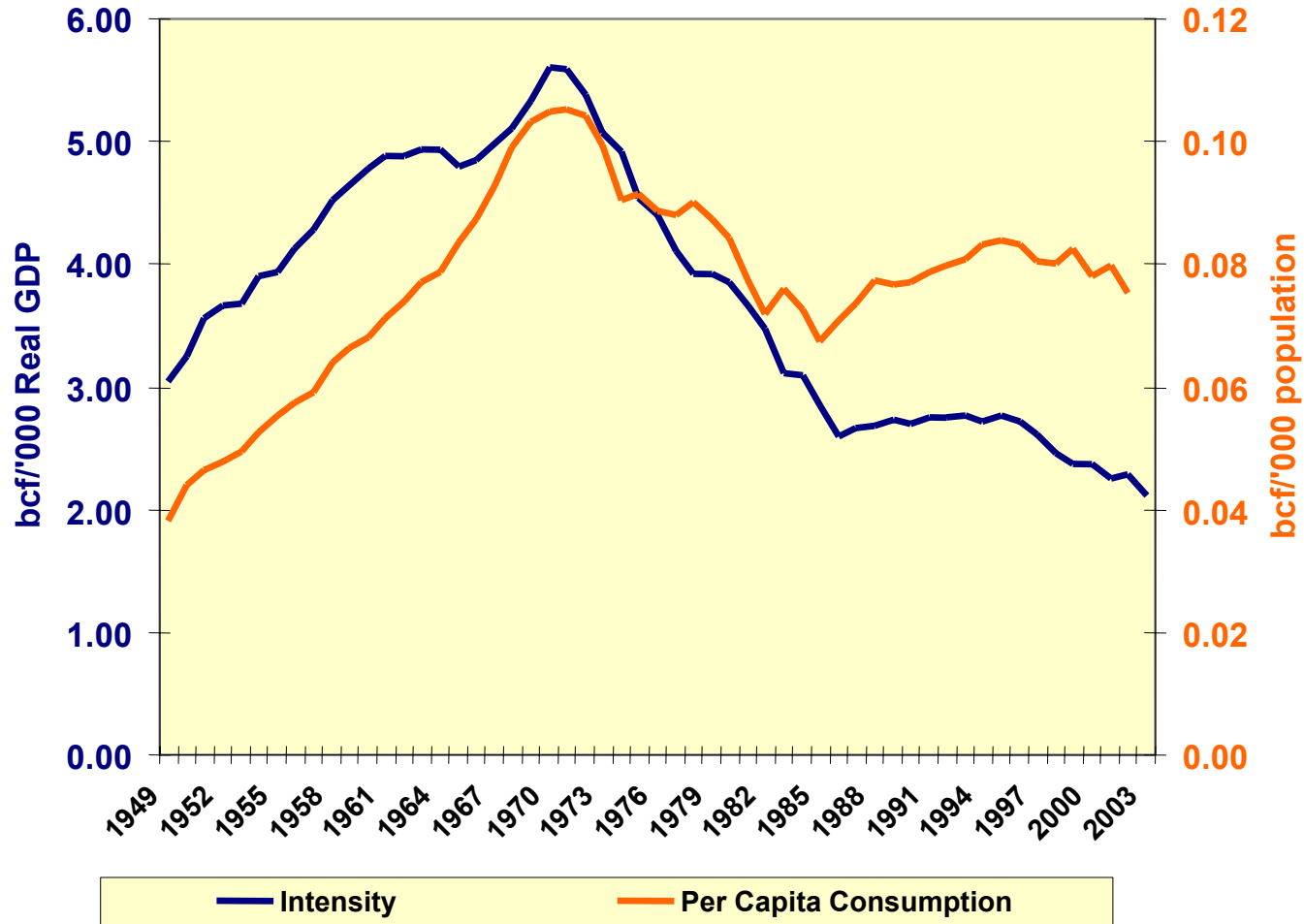
\$/MMBtu - Henry Hub Cash Monthly
Moving Average





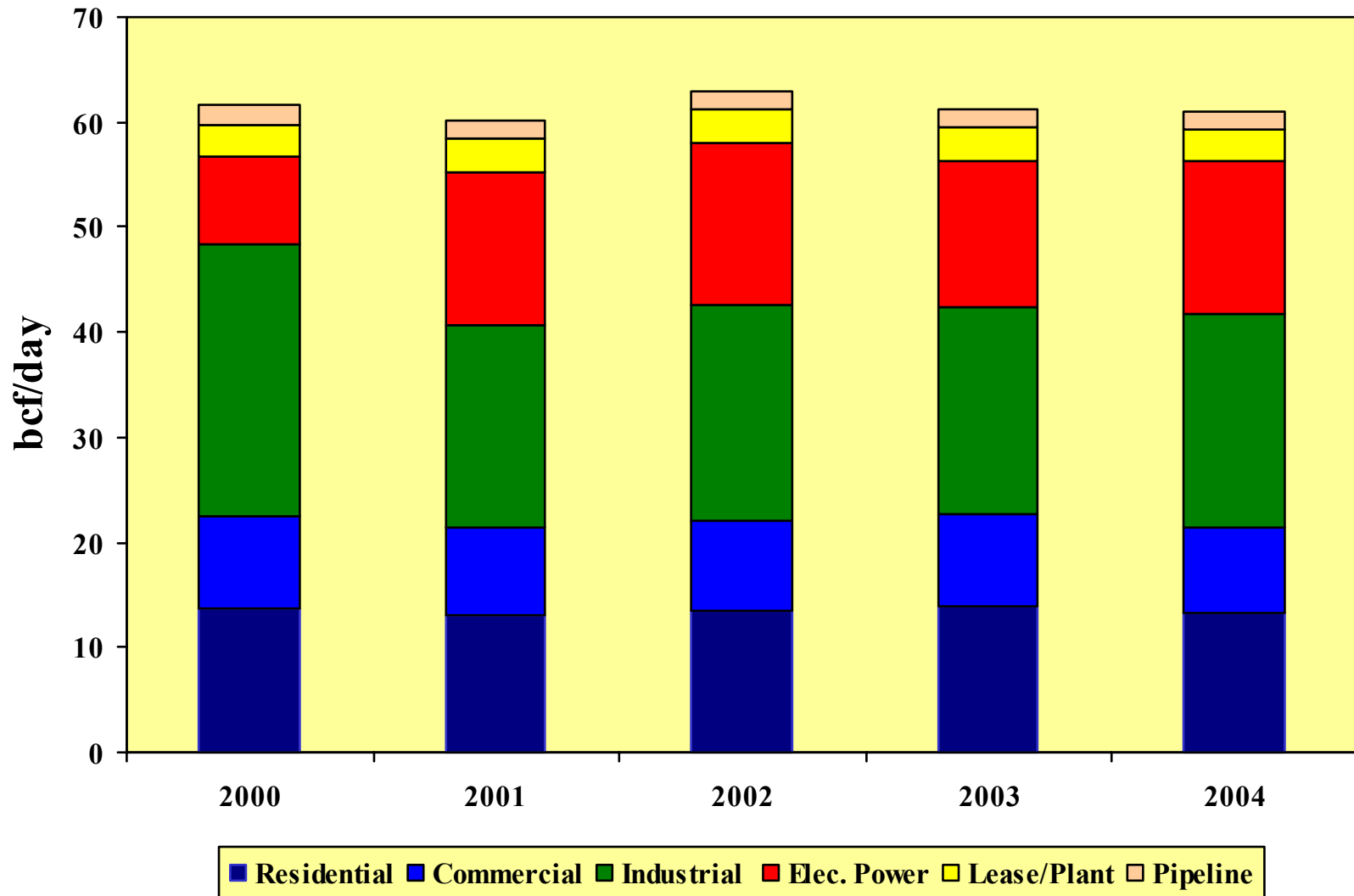
Gas intensity is declining

Natural Gas Demand Trends



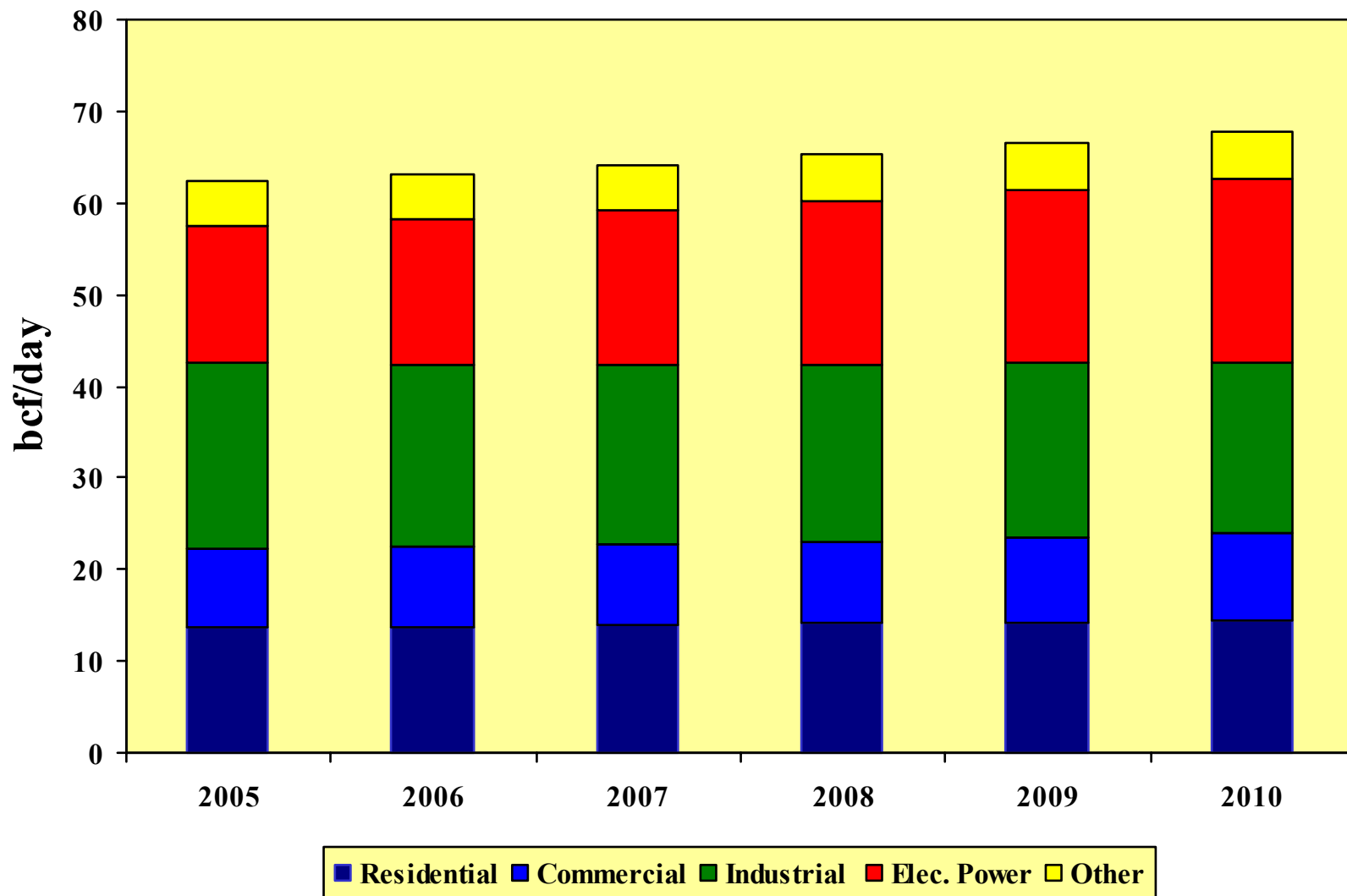


Despite higher prices, US demand has been close to flat this decade...



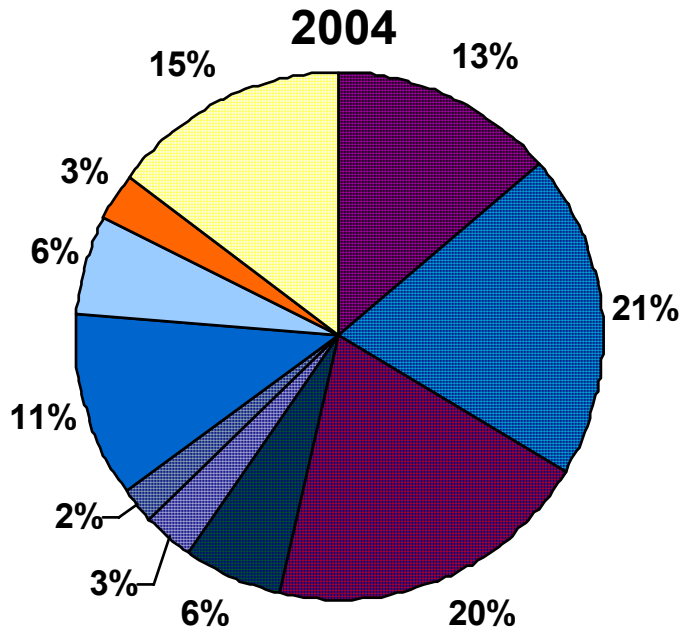


Improved load factors in electric power embed steady, moderate demand growth

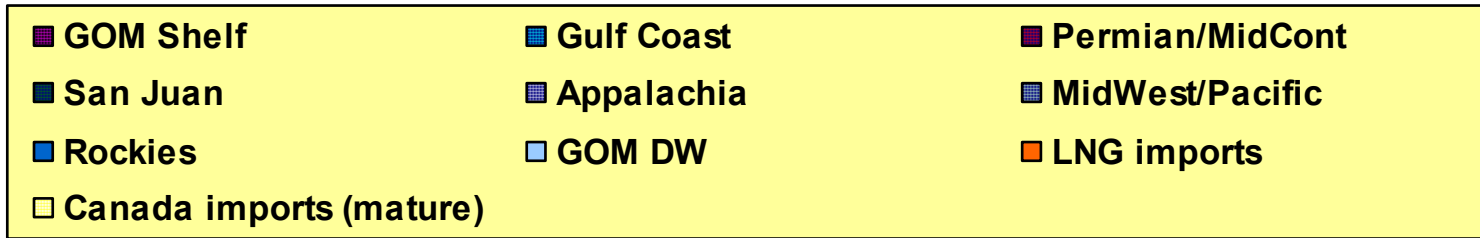




Mature producing areas still dominate gas supply to the U.S.

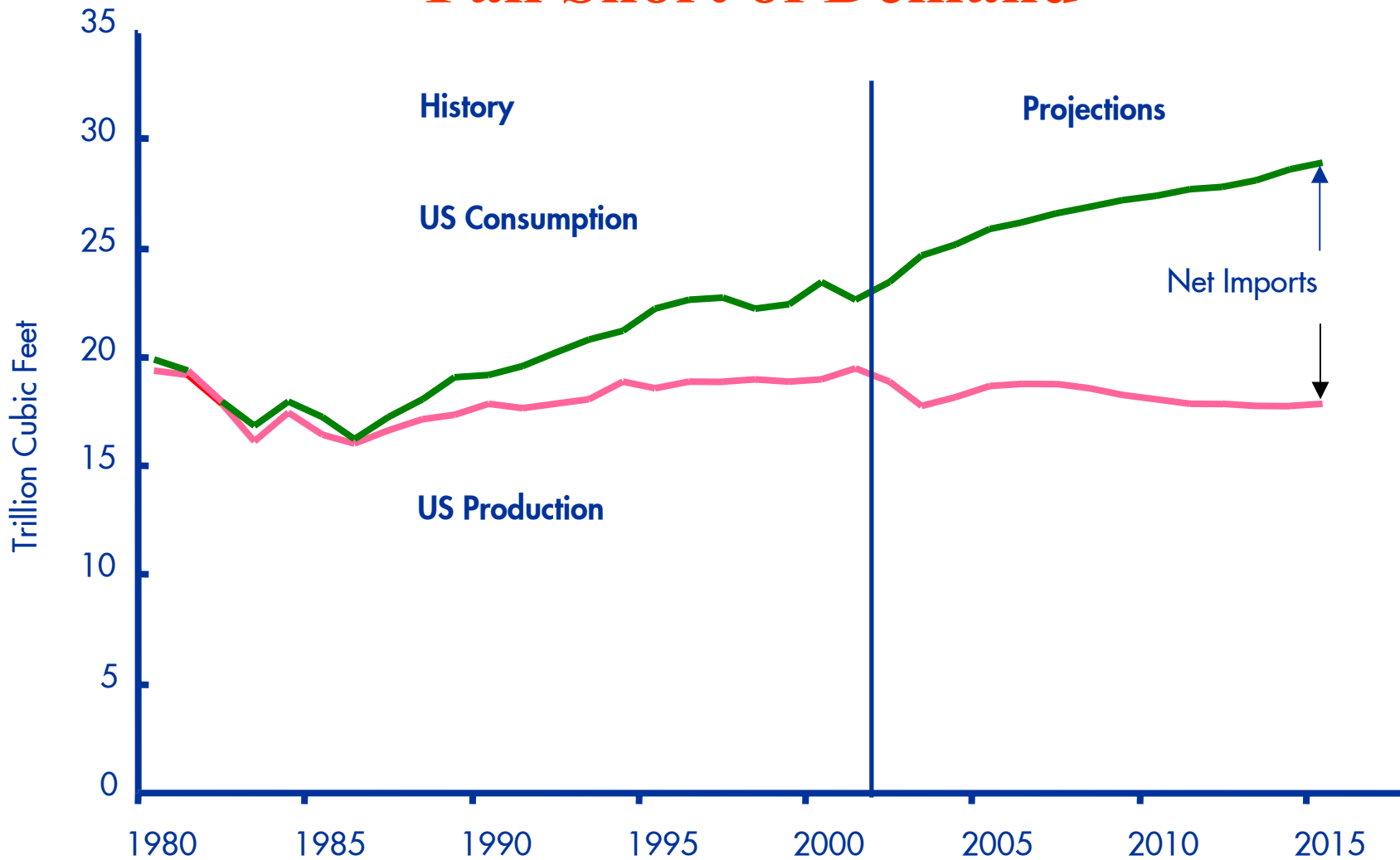


Mature: ~ 80% (hatched areas)
Growth/Frontier: ~ 20% (clear areas)





US Domestic Production Will Increasingly Fall Short of Demand





Where strategy ends...

*“Knowing is not enough: we must apply.
Willing is not enough: we must do”*

(Goethe)

In the end, we must act