

The forest for the trees: Chicken Little doesn't live here anymore

Trends in US energy markets and policy for the next decade

**The 2006 Energy Marketplace
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London Economics has extensive experience in energy and infrastructure economic analysis and regulatory support

- We have advised on projects in the US and abroad, in both a regulatory and economic appraisal capacity
- Our client list includes ongoing valuation and advisory support for projects in the US, Canada, Central America, Hong Kong, Japan, and Saudi Arabia, all from our Boston base
- Unique set of tools include models of production costs, strategic bidding behavior, and real options analysis
- Work extends from valuations for initial bid through to writing FERC testimony related to the acquisition
- Also advising stand-alone private equity venture

Representative clients

Utilities and IPPs

*AltaLink
AES
Brascan Power
Bruce Power
El Paso
Emera
ENEL
Exelon
FirstEnergy
Hydro Quebec
J Power
Osaka Gas
PG&E
Tohoku Electric
TXU
TransAlta*

Market institutions/regulators

*Alberta Department of Energy
California Energy Commission
ENRE (Argentina)
Hong Kong government
NEMMCO (Australia)
New England ISO
Ontario Energy Board
Saudi Arabian government*

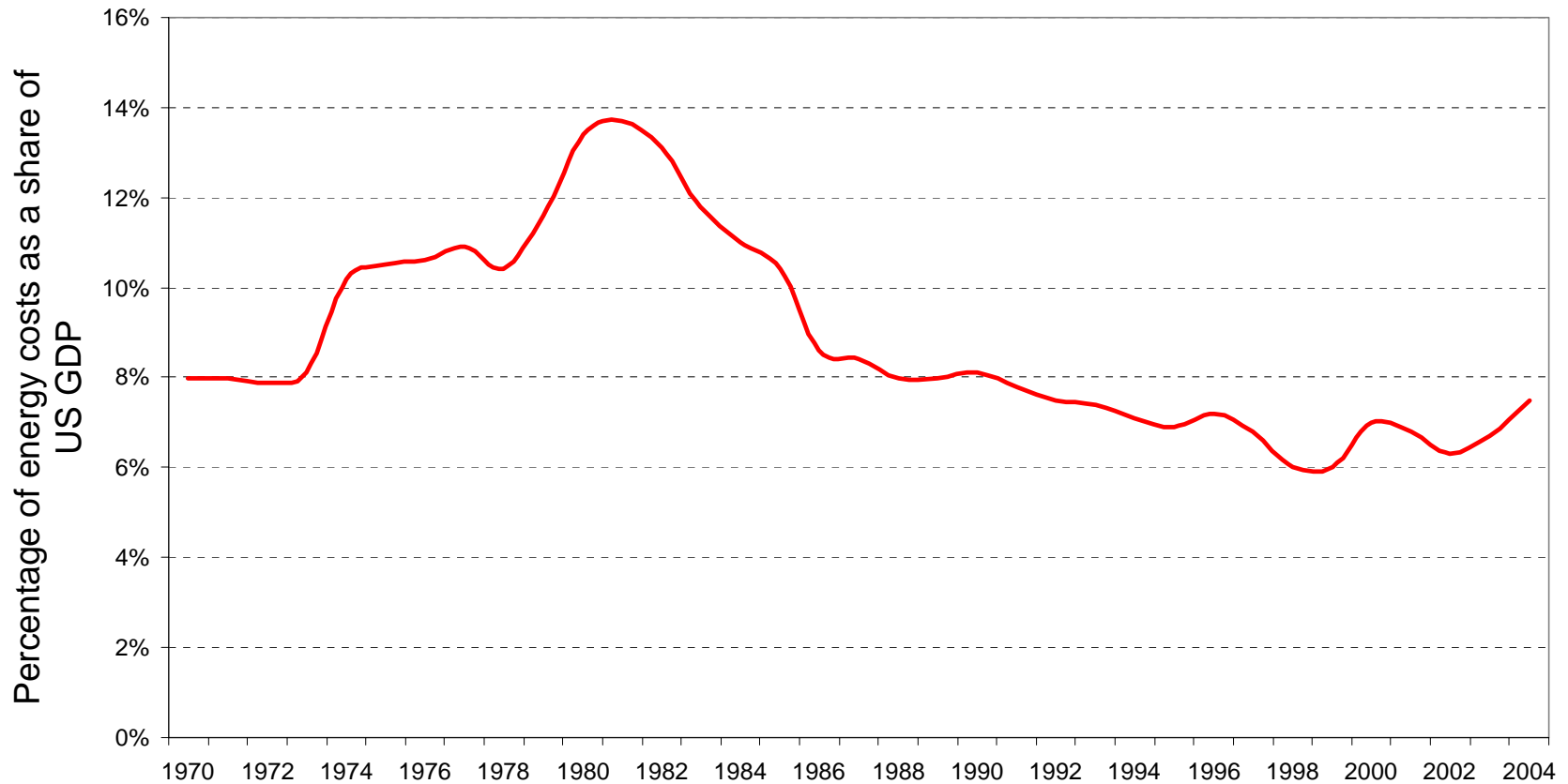
Financial institutions/law firms

*Akin Gump Strauss, Hauer & Feld
AIG
Development Bank of Japan
GE Capital
John Hancock
Macquarie Bank
Williams and Connolly*

Key points

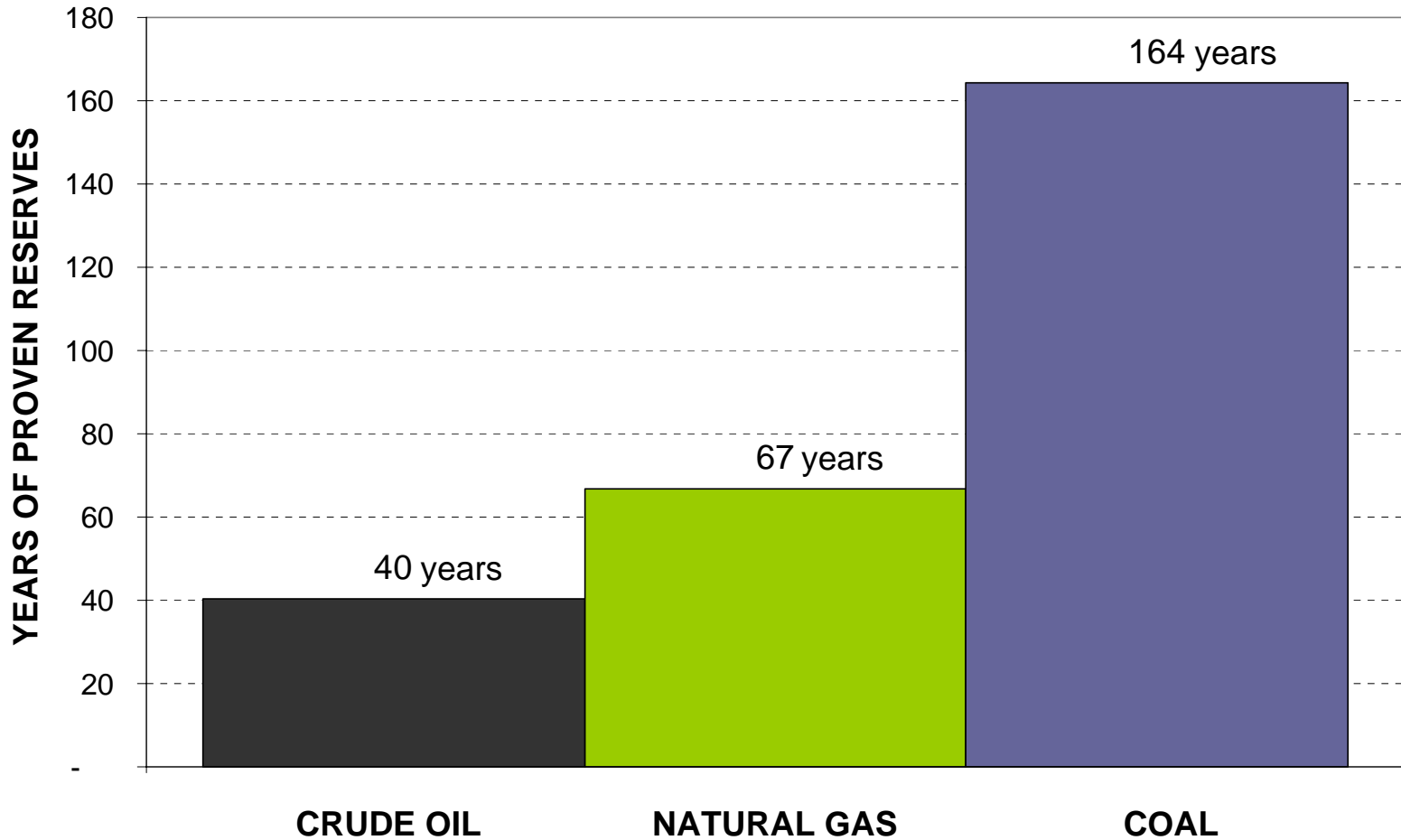
- US energy policy essentially one of “*throw money at it and hope the problem goes away*”; benign neglect is probably the best we can hope for
- Best policy would be *full reliance on market forces*, with lifeline support for low income families through vouchers – sadly, not likely to happen
- Energy prices *not yet at levels which would produce structural changes* in US consumption patterns, with the exception of some chemicals industries
- Failure to price emissions properly and *massive highway subsidies contribute to today’s energy usage patterns* – when will London-style road pricing come to New York?
- Construction (without subsidies) of *new rail, port, and pipeline infrastructure possibly more critical* to bringing down prices than is finding new supply

Energy costs as a share of US GDP have been declining since 1980



Source: Energy Information Administration, US Department of Energy

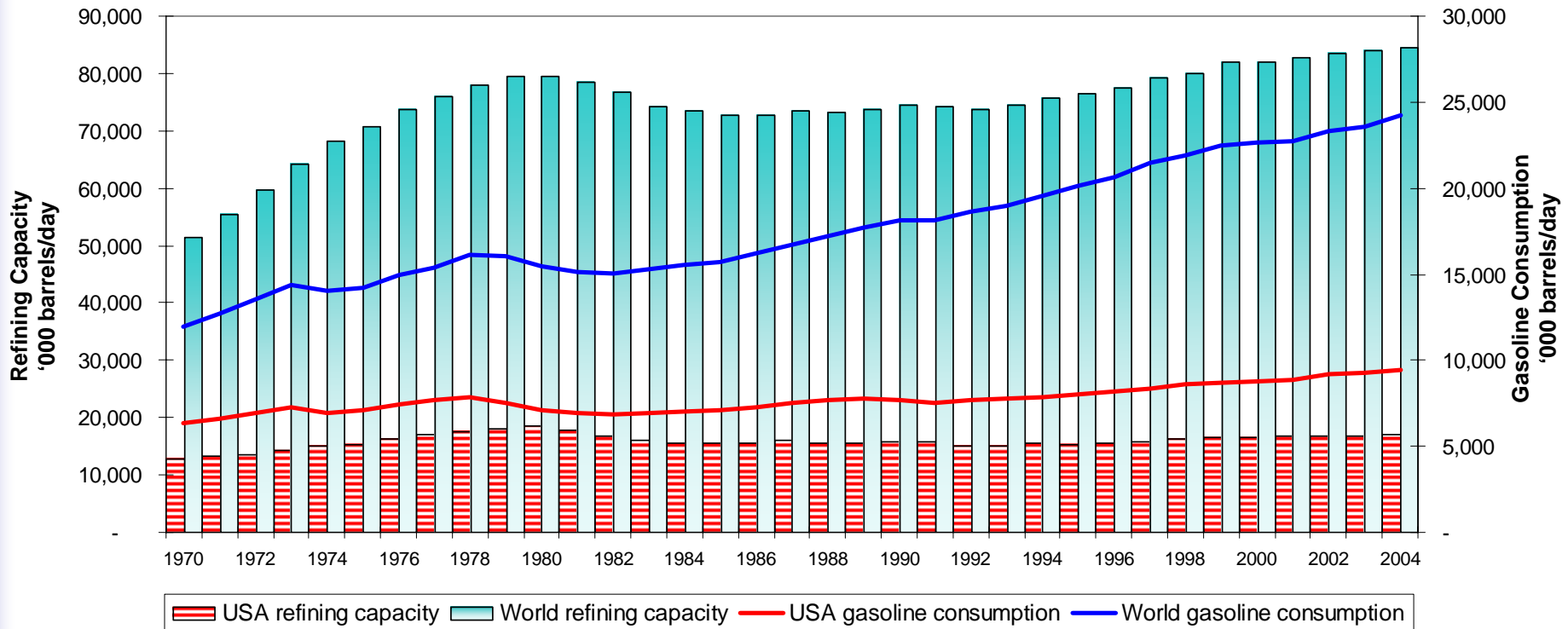
There is no energy supply crisis...



Source: *Statistical Review of World Energy 2005, BP PLC*

...but there is an energy conversion crisis

Refining Capacity vs Consumption



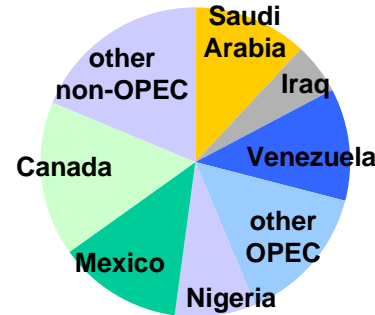
Source: Statistical Review of World Energy 2005, BP PLC

Next decade will be as much about finding ways to convert abundant resources (coal, stranded gas) into scarce resources (oil, delivered natural gas) as it is about finding new scarce resources

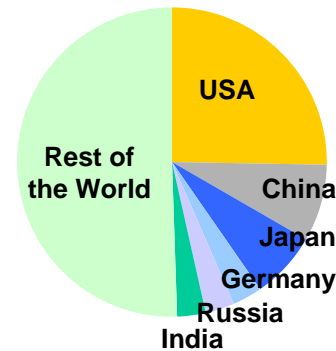
US has a skewed geopolitical focus when it comes to energy

- Ongoing battles over softwood lumber, route of Arctic pipeline show that we fail to view Canada as an equal partner in meeting our energy supply needs
- Response to Chinese bid for Unocal exposed hypocrisy of US attitudes towards foreign ownership (do we really mean Venezuela good, China bad?)
- Playing constructive role in Southern Cone gas disputes could provide long term benefits
- Likewise, working to find creative responses to Mexican constitutional challenges would help enable Pemex to exploit its large potential

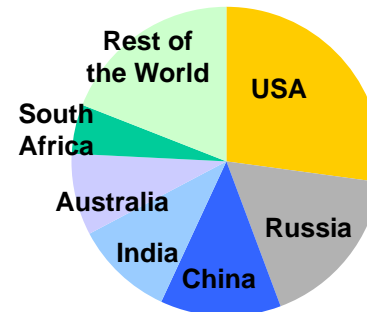
US Petroleum Imports 2004



Global Petroleum Demand 2004



Proven Coal Reserves 2004



Proven Gas Reserves 2004



Source: Statistical Review of World Energy 2005, BP PLC

Energy Information Administration, US Department of Energy

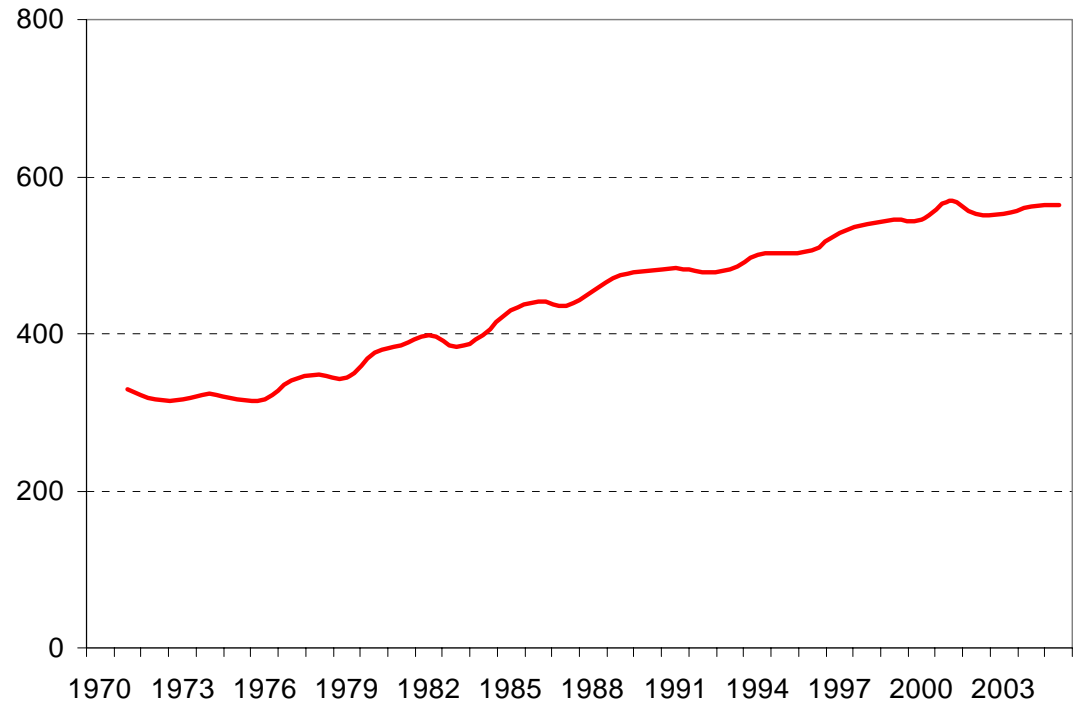
Irrational NIMBYism is coal industry's main challenge

Proposed Coal-Fired Plants in the US, 2005-2025

US Region	Plants	MW	US\$, million
East North Central	26	16,278	22,405
Mountain	29	14,427	21,346
South Atlantic	17	10,040	13,605
West North Central	15	7,726	11,555
Pacific	6	6,400	6,621
East South Central	10	6,386	7,857
West South Central	8	5,750	7,000
Middle Atlantic	6	2,610	3,565
New England	-	-	-
Undecided	7	3,350	5,300
	124	72,967	99,254

Source: Office of Fossil Energy, US Department of Energy

Coal Consumption in the US (million tones of oil equivalent)



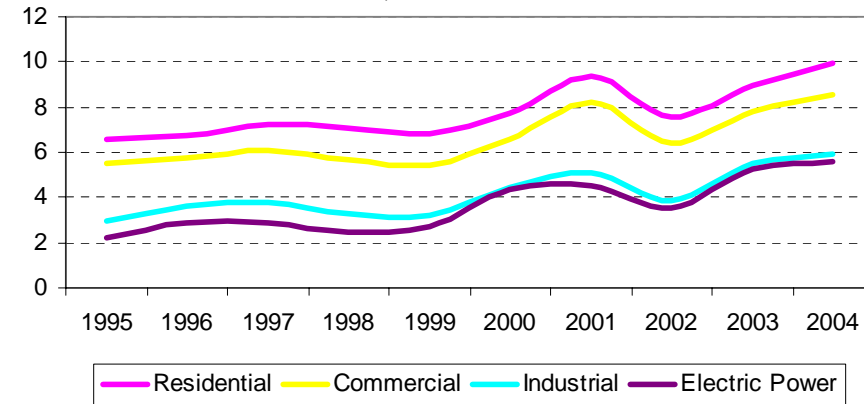
Source: Statistical Review of World Energy 2005, BP PLC

Industry needs to get voters focused on outputs, rather than inputs; coal plant meeting existing environmental standards may be as "healthy" as one using other fuels, the views of Ontario and California politicians notwithstanding

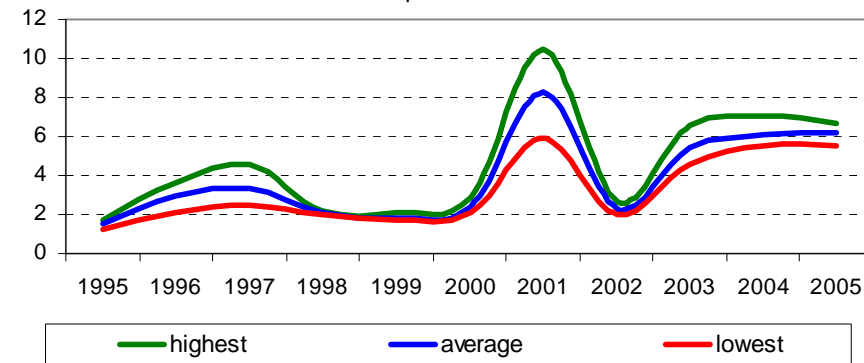
High US gas prices may result in ill-advised political interference

- Prohibiting electricity generators from selling gas in peak winter periods is like saying “it’s OK to freeze to death, as long as you don’t do it in the dark”
- Need to resist cries of industries which appear to have forgotten the harm caused by the old Natural Gas Act; sad truth is that economics may dictate that chemicals industries should move offshore
- Should make a concerted effort to remove barriers to use of dual fueled facilities, while remaining compliant with relevant environmental laws
- Regulators should resist the temptation to rely on deferral accounts, and encourage real-time price signals

Gas Prices, US\$/'000 cubic feet



Henry Hub Natural Gas January Spot Prices, US\$/MMBTU



Source: Energy Information Administration, US Department of Energy; Bloomberg LP

US continues to take baby steps towards the ideal market design

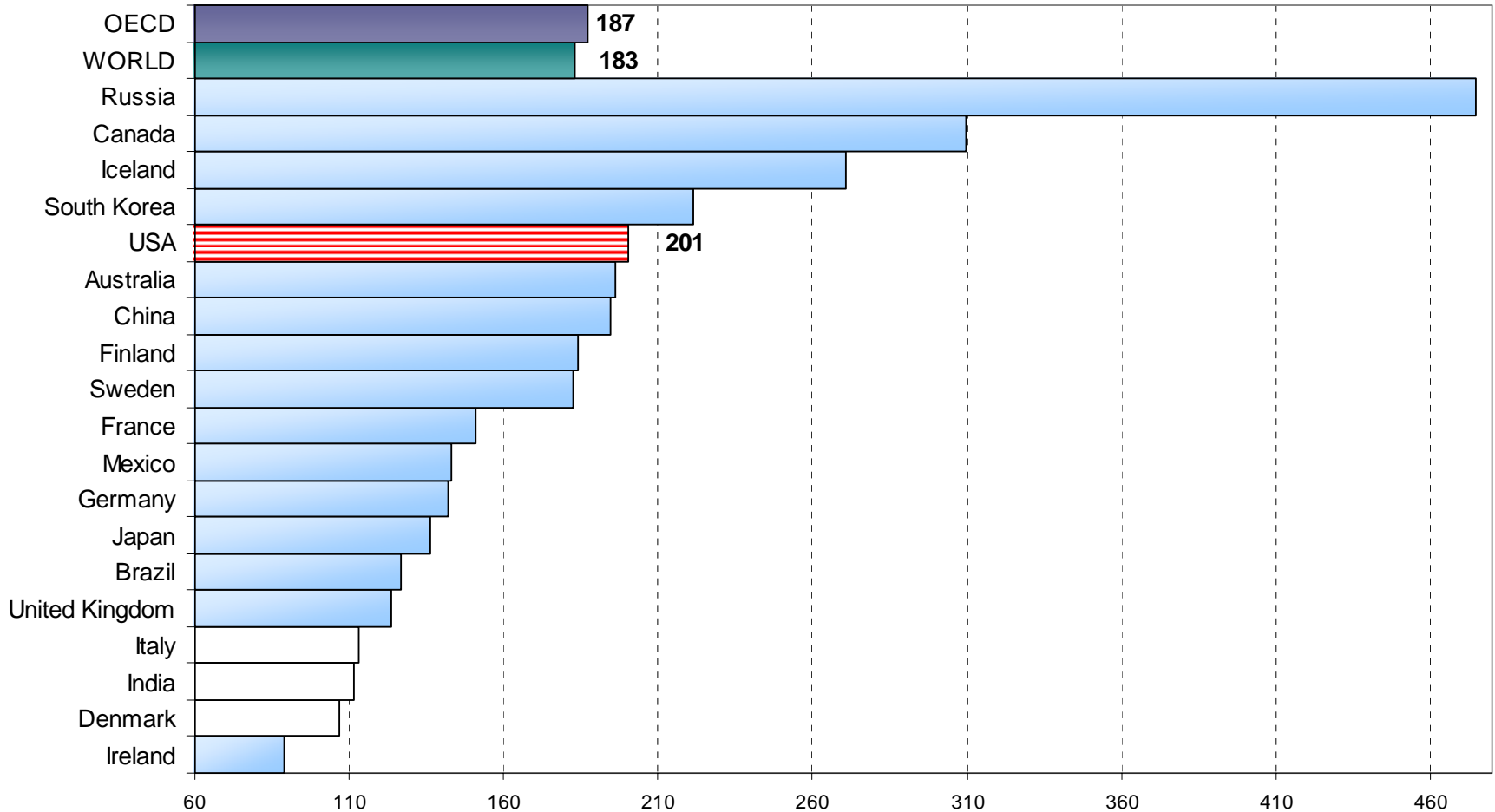


- We need true, ***independent transmission companies***, not arm's length monitors
- Not a single megawatt of new capacity should be build under ratebase – in non-liberalized jurisdictions, ***all new build should be subject to level playing field RFPs***
- ***Default supply should be based on spot price pass-through*** or New Jersey-style auctions
- ***Smart meters and demand response*** need greater encouragement
- Both capacity markets and ***price caps should be completely eliminated***; small customers can be protected through the design of the default supply auctions
- Federal market power guidelines should bear some relationship to ***actual measures of market power***

We have barely scratched the surface of energy efficiency potential



Energy Consumed per dollar of GDP, 2004 (grams of oil equivalent)

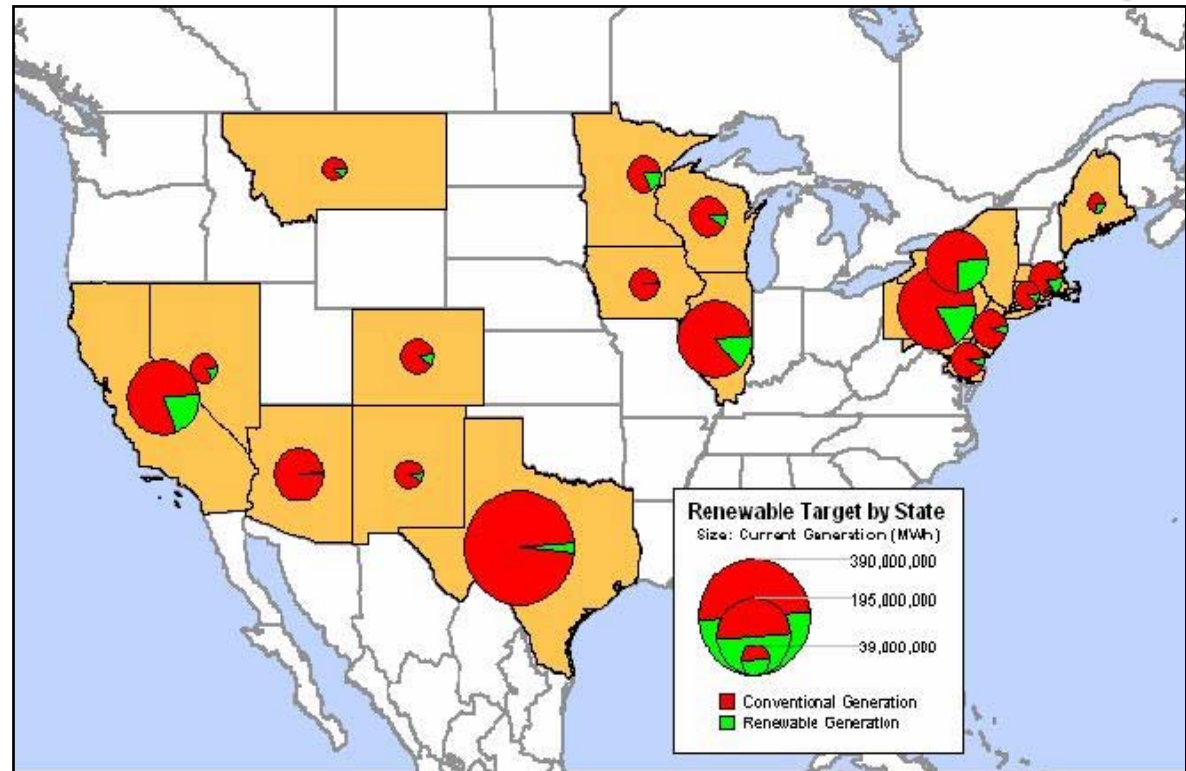


Source: Statistical Review of World Energy 2005, BP PLC

World Bank

RPS mandates are inconsistent with customer choice

- Current mandates appear to be based neither on customer willingness to pay nor on environmental impact studies
- Better approach would be to make renewables purchases purely voluntary, but easy for the customer to make
- Current plans will have marginal emissions impact – end up backing down gas, not coal
- Better approach would be tradeable emissions credit system, nationwide, including carbon



Concluding remarks

- US *benefits from inertia* – at least we don't have any plans for a “National Power Authority” or “FEMA Oil and Gas Exploration and Production”; muddling through is far from the worst response to high prices
- Except for mandatory reliability standards, recent *energy bill was largely irrelevant*
- Declining relative US world power may impact future energy supply costs – *what happens when oil is denominated in yuan?*
- If US *nuclear industry fails to adopt a standardized design*, and operates under ratebase, we risk repeating the mistakes of the past
- *We need a new Enron* – just one that manages to champion markets without abusing accounting rules!