U.S. Energy Policy: 
The Burdens of the Past and Moving Forward

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BROOKINGS MOUNTAIN WEST - UNLV
Challenges of US Energy Policy

- National Security
- Environmental
- Economic
- Market-driven
- Regulatory-driven, Public investment
- Fossil fuels
- Alternatives
- Efficiency & Conservation
- Supply / Demand Options
- Role of Government

U.S. ENERGY SECTOR: POLICY CHALLENGES
Natural Gas – RISING ROLE OF SHALE GAS

US Natural Gas Production, Consumption, Imports – 1990 -2035 (tcf)

Source: US EIA  Annual Energy Outlook, June 2012
Enormous Shale Gas Resource (USG estimates)

Most estimates of total range from 1,800 to 2,500 tcf

US current consumption: total of @ 23 Tcf (or 62 bcf/d)

Source: EIA, Annual Energy Outlook 2011 and earlier editions
Natural Gas – RISING ROLE OF SHALE GAS

US NATURAL GAS PRODUCTION – 1990 -2035 (tcf)

Source: US EIA 2012 Early Release, Jan 2012
OIL: US Production Up - Imports Down

Figure 3. Total U.S. petroleum and other liquids production, consumption, and net imports, 1970-2035
(million barrels per day)

Source: US EIA
Figure 112. Domestic crude oil production by source, 1990-2035 (million barrels per day)

Source: US EIA Annual Energy Outlook, June 2012
CitiGroup: Big Potential for US Shale Liquids Production

Figure 14. US shale liquids projections could see +3.8-m b/d of growth by 2020

Source: CitiGroup Report, April 2012, page 17.
CitiGroup: US Production Could Overtake Saudi & Russia

Figure 8. US production could overtake Saudi Arabia and Russia's this decade

Source: CitiGroup Report, April 2012, page 13
FIGURE 7: INVESTMENT BY COUNTRY AND SECTOR, 2011 (BILLIONS OF $

US Clean Energy Market

Renewable Electricity Generating Capacity by Source (excluding hydropower)

U.S. DOE, 2010 Renewable Energy Data Book (September 2011).
Shale Gas and Tight Oil

**National Security**
- Gas to back out oil in transportation
- Exporting gas as LNG = geopolitical benefits
- Domestic oil can reduce imports, provide geopolitical benefits

**Economic**
- Boost economic growth
- Create jobs
- Promote re-industrialization
- Gains are overstated
- Exporting LNG will raise domestic gas prices

**Environmental**
- Carbon-based fuels
- Fracking concerns
- Cheap gas is making low-carbon options uncompetitive

Supply vs. demand
- Use domestic supplies
- US still subject to global oil market price dynamics
- Gas penetration in passenger vehicles is limited

Role of Government:
- More vs. less regulation
- Who should regulate?
Shale Gas & Tight Oil – Environmental Concerns

NYC DEC Hearing - 11-30-11 (photo: J Banks)
Shale Gas & Tight Oil – Environmental Concerns

New York City – June 5, 2012 (photo: J Banks)
## Shale Gas Environmental / Regulatory challenges

### WATER
1. **Quality**
   - Surface water contamination
   - Aquifer contamination

2. **Volume**
   - Water use at scale

3. **Disposal**

### GHG Emissions
- Natural gas leaks, venting, flaring

### Pollution
- Air
- Noise
- Surface disruption

### Other
- Seismic
Coal Plant Retirement Projections

Projected retirements of coal-fired generators through 2020 (gigawatts)

- Rest of U.S.
- Southeast
- Mid-Atlantic & Ohio River Valley

http://www.realclearenergy.org/charticles/2012/07/30/coal_retirements_2012-2016.html
Nuclear: Lack of Cost Competitiveness is Hurting

From Jeffery Immelt, CEO of GE (July 2012)

- It’s just hard to justify nuclear, really hard. Gas is so cheap and at some point, really, economics rule. So I think some combination of gas, and either wind or solar … that’s where we see most countries around the world going.”
Electricity Generation Trends – 2010-2035

Capacity Additions by fuel type – 2011-2035 (GW)

Source: US EIA Annual Energy Outlook, June 2012
Colorado:
- Shale gas
- Wind

Iowa:
- Wind
- Ethanol

Ohio:
- Shale Gas
- Coal

Florida:
- Offshore drilling

North Carolina:
- Offshore drilling

Virginia:
- Offshore drilling

Nevada:
- Nuclear
- Renewables

TOTAL ELECTORAL COLLEGE VOTES SHOWN: 96

Colorado: 9
Iowa: 6
Ohio: 18
Florida: 29
North Carolina: 15
Virginia: 13
Nevada: 6
The End
OIL: US Production Up - Imports Down - Prices?

US Oil Production, Imports & Gasoline Prices - 2000 - 2011

Source: US EIA
CHANGING ECONOMICS OF POWER SECTOR

Annual share of fossil-fired electric power generation, 1950 - 2012*

- Coal
- Natural gas
- Petroleum

Low oil prices during 1960s, combined with smog concerns, spur new additions to petroleum-fired capacity.

Rapidly rising oil prices lead many generators to switch oil-fired peaking capacity to natural gas.

Oil price shocks during 1970s lead to increased utilization of coal-fired capacity for baseload generation.

Historically low natural gas prices lead to increased utilization of combined cycle plants at expense of coal units.

*2012 reflects Jan to Apr data


U.S. ENERGY SECTOR: POLICY CHALLENGES
Keystone XL Pipeline
Keystone XL

- Canada is a reliable ally; source is secure
- Reduces dependence on Middle East
- If we don’t import it, China will take it
- Better than importing supplies from places with less rigorous environmental regulations

- We don’t import that much from ME anymore
- US still subject to global oil market price dynamics
- Prolongs dependence on oil & imports
- Boost economic growth
- Create jobs
- Additional supplies = downward price pressure
- Job creation relatively small, temporary
- High life-cycle CO2 emissions
- Pipeline spills

Supply v. demand
Use available supplies

Role of Government:
More v. less regulation