Challenges of US Energy Policy

National Security

Efficiency & Conservation

Fossil fuels

Alternatives

Supply / Demand Options

Market-driven

Role of Government

Regulatory-driven, Public investment

Economic

Environmental
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.
Figure 8. US production could overtake Saudi Arabia and Russia's this decade.
FIGURE 7: INVESTMENT BY COUNTRY AND SECTOR, 2011 (BILLIONS OF $)


U.S. ENERGY SECTOR: POLICY CHALLENGES
U.S. ENERGY SECTOR: POLICY CHALLENGES

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

US still subject to global oil market price dynamics
Gas penetration in passenger vehicles is limited
Boost economic growth
Create jobs
Promote re-industrialization
Gains are overstated
Exporting LNG will raise domestic gas prices

Economic

Gas to back out oil in transportation
Exporting gas as LNG = geopolitical benefits
Carbon-based fuels
Fracking concerns
Cheap gas is making low-carbon options uncompetitive

National Security

Gas to back-out coal in power generation
Domestic oil can reduce imports, provide geopolitical benefits

Environmental

U.S. ENERGY SECTOR: POLICY CHALLENGES
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

- High
- Reference gas price cases
- Low

Rest of U.S.

Southeast

Mid-Atlantic & Ohio River Valley

http://www.realclearenergy.org/charticles/2012/07/30/coal_retirements_2012-2016.html
CHANGING ECONOMICS OF POWER SECTOR

Electric capacity additions by half-year, 2010-2012
megawatts (MW)

Source: US EIA. http://www.eia.gov/todayinenergy/detail.cfm?id=7610&src=email
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

Nevada:
- Nuclear
- Renewables

Total Electoral College Votes Shown: 96

Virginia:
- Offshore drilling

North Carolina:
- Offshore drilling

Florida:
- Offshore drilling

U.S. Energy Sector: Policy Challenges
The End
OIL: US Production Up - Imports Down - Prices?

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

Source: US EIA
Crude Prices and Gasoline Prices

Oil and 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

100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%


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

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

High life-cycle CO2 emissions
Pipeline spills

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

Economic

Environmental

National Security

Supply v. demand
Use available supplies

Role of Government:
More v. less regulation