The Future Role of Natural Gas in the U.S.

R. Skip Horvath
President & CEO

Harvard Electricity Policy Group

June 2, 2011

Washington, DC
Decade of Growing Natural Gas Infrastructure

Working storage capacity grew 22% 2006–2010


Key
- Salt
- Non-Salt
How Shale Produces Natural Gas

Source: Energy Tomorrow
Technology’s role:
Finding the Source Rock

Fracture stimulation 5,000’ – 15,000’ below the surface

- Impermeable sealing layer
- Hydrocarbon Trap
- Shale--organic rich source layer
- Porous and permeable reservoir layer
- Migrating hydrocarbons
- Frack

Technology's role:
Finding the Source Rock

Fracture stimulation 5,000’ – 15,000’ below the surface

- Impermeable sealing layer
- Hydrocarbon Trap
- Shale--organic rich source layer
- Porous and permeable reservoir layer
- Migrating hydrocarbons
- Frack
Natural Gas Water Use Lowest among Combustion Fuels

MM Gal/1000 Households

- Biomass (waste)
- Coal
- Biomass (wood)
- Geothermal
- Natural Gas
- Solar
- Wind

Water used in the production of natural gas from shale
Future U.S. Fuel Mix (Electricity) Thought Experiment

- Start with today’s fuel mix, then incorporate demographic trends
- U.S. Census Bureau: Population grows 16% by 2035 (to 360 MM people)
- Per capita use in 2035 after 1% efficiency gains factored in: 10,920 kwh/person (EIA)
- Needed by 2035: Fuel to generate electricity for 50 million people (≈ 546 billion kwh)
Power Generation Fuel Mix If All New U.S. Population Uses Only Renewables

2010
- Coal: 48%
- NatGas: 20%
- Nuclear: Renewables 10%

15% of coal generation converts to natural gas because of CAA

2035
- Coal: 41%
- NatGas: 22%
- Nuclear: 17%
- Renewables: 24%

19% of coal generation converts to natural gas because of CAA
Resource Decisions

- We need all our fuels
- Most Confident: Let competitive market determine supply mix—guided by appropriate regulations
- Of Concern: As renewables grow market share, grid operators challenged to maintain reliability
  - Ancillary service markets not competitive
  - Generators not motivated to invest
- Nat Gas Challenge: Address public perception of environmental concerns with hydraulic fracturing