

# Financing New Nuclear: The Government's Role in the Nuclear Renaissance

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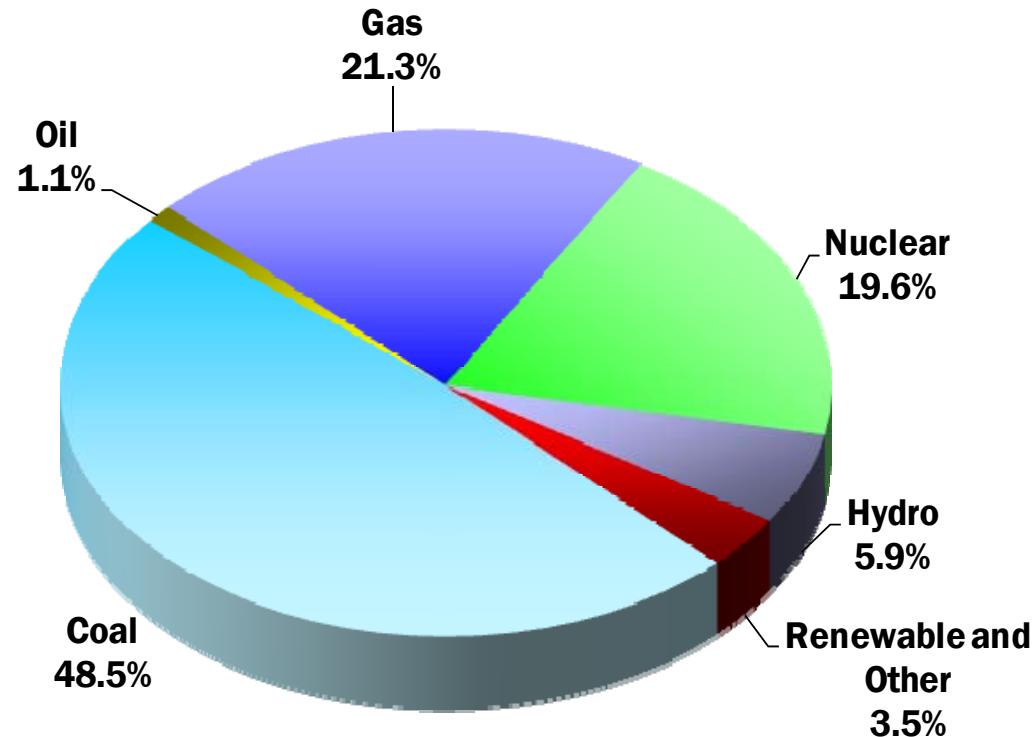
August 5, 2009

# Introduction

- Background
  - Nuclear Energy
  - Electric Power Industry
- Looking Ahead to 2030
- Economics
- Government's Current Role in Financing
- Current Legislation
- Recommendations
- Questions

# Background: Nuclear Power

- Currently in U.S. 104 reactors produce about 100 GWe
- 20% of total electricity
- Over 70% of low-carbon electricity
- No new plants have been ordered in over 30 years

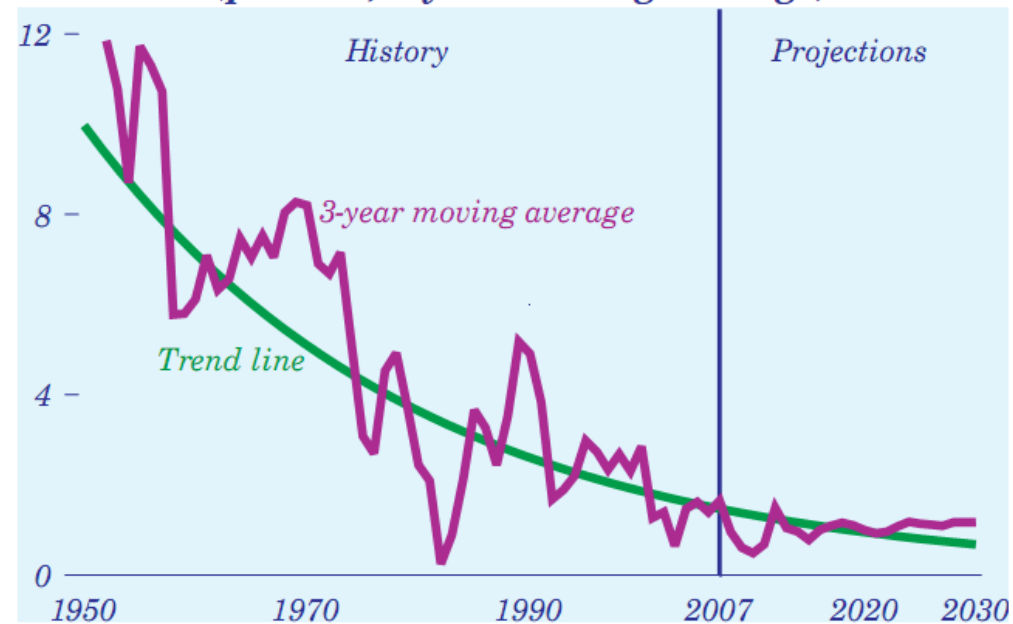


Source: Nuclear Energy Institute

# Background: Electric Power Industry

- Nuclear plants built in 1960's and 1970's
- Factors that discourage large scale investment projects today:
  - Demand
  - Relative size of utilities (largest: \$36 billion)
  - Deregulation

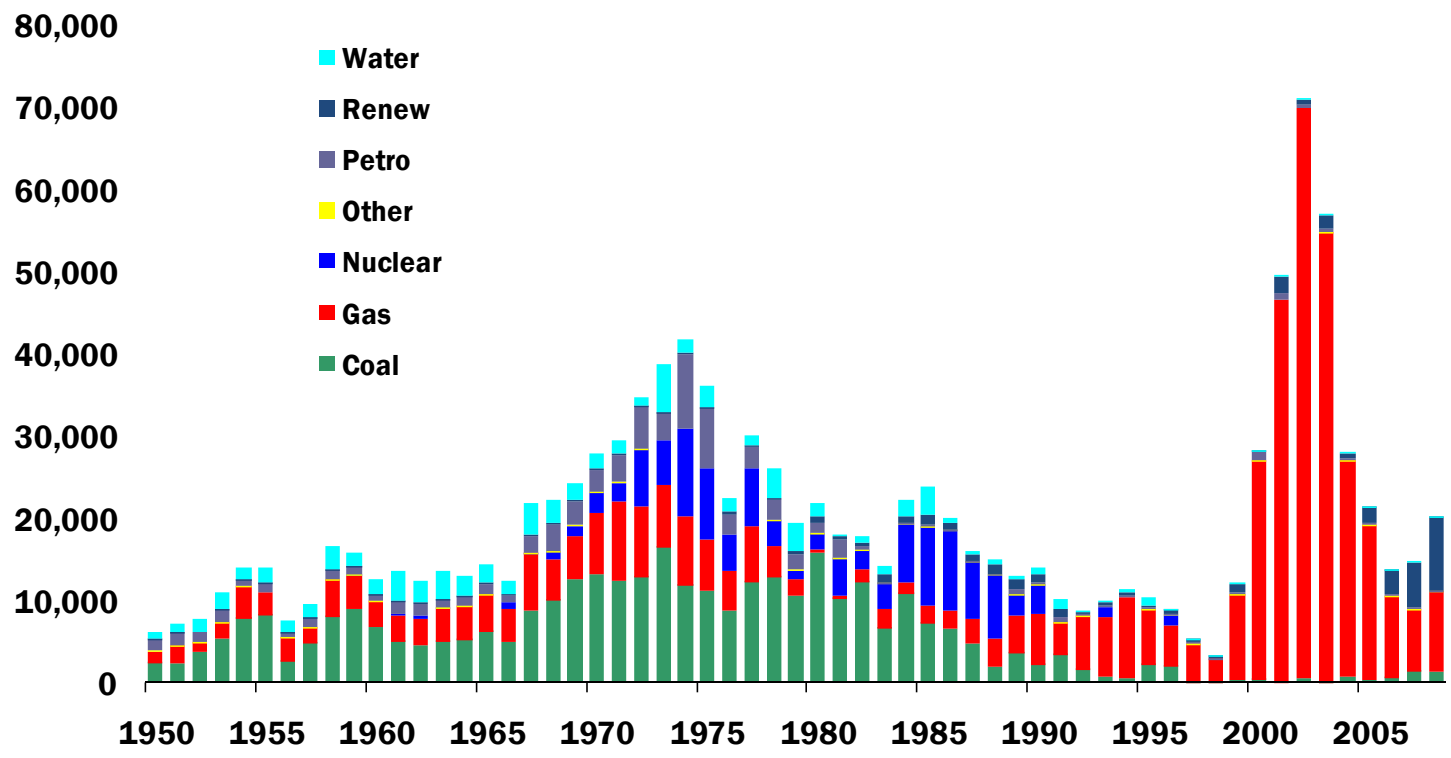
*Figure 54. U.S. electricity demand growth, 1950-2030 (percent, 3-year moving average)*



Source: Energy Information Administration

# Capacity Brought Online by Fuel Type

1950-2008 (Nameplate Capacity, MW)



Source: Nuclear Energy Institute

# Looking Ahead to 2030

- Electricity demand :
  - expected to rise 26% to 36% by 2030
- Aging capacity:
  - nearly 40% of capacity over 30 years old
- American Clean Energy and Security Act (ACES):
  - reduction in CO<sub>2</sub> emissions of 42% by 2030
- Investment Required:
  - \$1.5 trillion to \$2 trillion

# Economics

- “Technology choices for new generating capacity are made to minimize costs while meeting local and Federal emissions constraints” (EIA)
- So the question is: How do we minimize costs?

# Economics of Nuclear Power

- A 2009 MIT study gives the following LCOE estimates:
  - Coal: 6.2 ¢/kWh
  - Natural Gas: 6.6 ¢/kWh
  - Nuclear: 8.4 ¢/kWh

# Economics of Nuclear Power

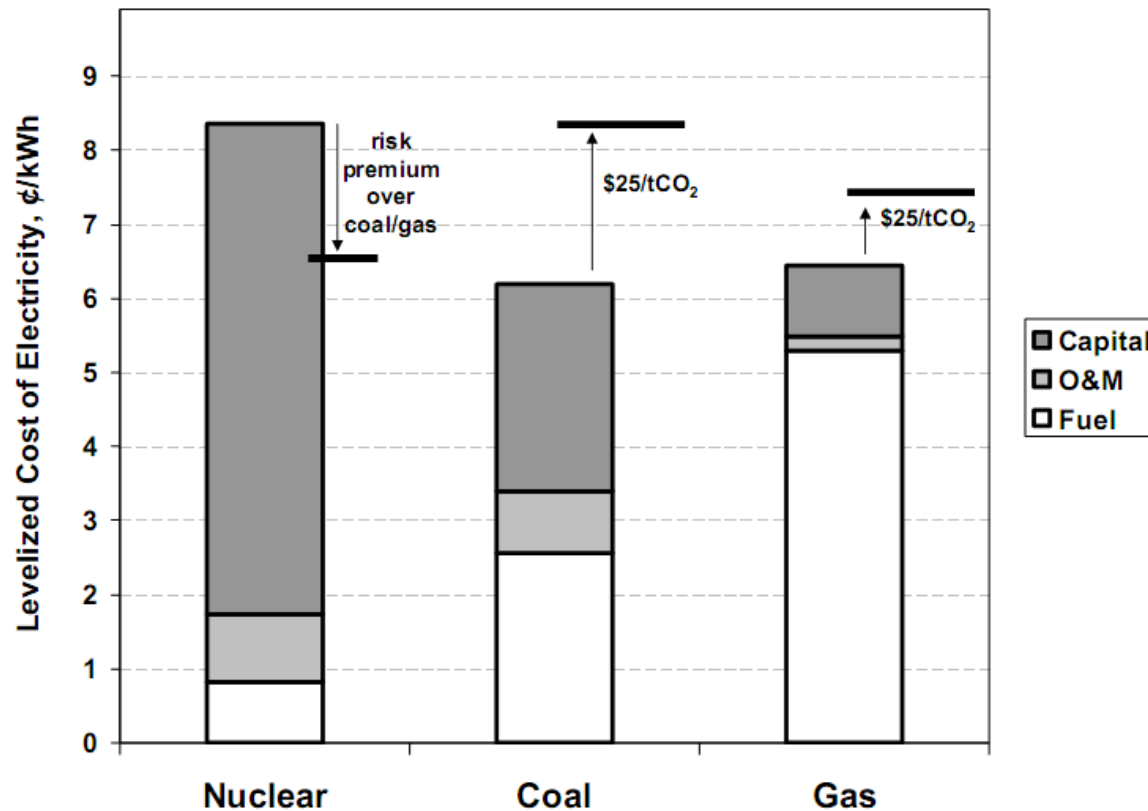
- A 2009 MIT study gives the following LCOE estimates:
  - Coal:  $6.2 + 2.1 = 8.3$  ¢/kWh
  - Natural Gas:  $6.6 + 0.9 = 7.5$  ¢/kWh
  - Nuclear:  $8.4$  ¢/kWh
- Add in a carbon tax of \$25/tCO<sub>2</sub>

# Economics of Nuclear Power

- A 2009 MIT study gives the following LCOE estimates:
  - Coal:  $6.2 + 2.1 = 8.3$  ¢/kWh
  - Natural Gas:  $6.6 + 0.9 = 7.5$  ¢/kWh
  - Nuclear:  $8.4 - 1.8 = 6.6$  ¢/kWh
- Add in a carbon tax of \$25/tCO<sub>2</sub>
- Finance nuclear at rate comparable to coal and natural gas

# Levelized Cost of Electricity

¢/kWh



# Economics of Nuclear Power

- Is this the end of the debate?
- Price of carbon emissions
  - Cap-and-trade system will result in a comparable price of around \$25/tCO<sub>2</sub> by around 2020 (EPA)
- Price of financing
  - Federal and state incentives
  - Risk premiums should decrease as first wave of plants is proven

# Government's Role in Financing

- **Production Tax Credit**
  - 6000 MW
  - \$18/MWh
  - 8 years
- **Standby Support**
  - Covers licensing and litigation delays
  - First six plants
  - \$250-500 million per plant

# Government's Role in Financing

- **Loan Guarantees**
  - \$18.5 billion in the first offering
  - Not a direct subsidy
  - Provides access to affordable financing
  - Applicant pays all associated fees, and costs associated with risk of default

# Government's Role in Financing

- Loan Guarantees
  - \$18.5 billion
    - SCANA Corp.
    - Southern Co.
    - UniStar
    - NRG Energy
  - Total of 7 reactors

# Current Legislation

- Pricing Carbon
  - Cap and Trade
- Financing
  - Clean Energy Deployment Administration (CEDA)
  - Part of DOE
  - “Green Bank”
  - Essentially expands on loan guarantee program, gives additional powers to help finance “clean energy” technologies

# Recommendation #1

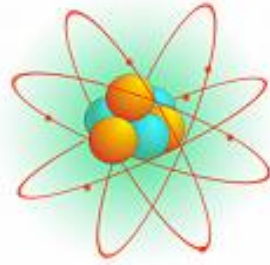
- **Expand loan guarantees to \$40 billion**
  - Allows each reactor sufficient financing
  - Reduces burden on rate-payers and reliance on foreign investors
  - Allows first wave every opportunity to succeed

## Recommendation #2

- Include nuclear energy in “clean energy” provisions in energy bill
  - Nuclear power is already in position to be competitive with coal and natural gas
  - As the largest provider of low-carbon energy in the United States today, we cannot afford to ignore nuclear power and its potential role in further decreasing carbon emissions

## Recommendation #3

- Establish permanent federal financing structure for energy
  - CEDA, or similar structure
  - The electric power industry cannot invest the required \$1.5 - \$2 trillion without assistance
  - All manner of clean energy technologies needed



# What questions do you have?

- **Thank You:**
  - ANS, NEI, WISE
  - Dr. Alan Levin, Dr. Dan Deckler, Melissa Carl, Erica Wissolik, Richiey Hayes, and many more
  - Also thank you to the rest of the WISE interns

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