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INVESTMENT IN GENERATION FROM THE PRIVATE SECTOR PERSPECTIVE

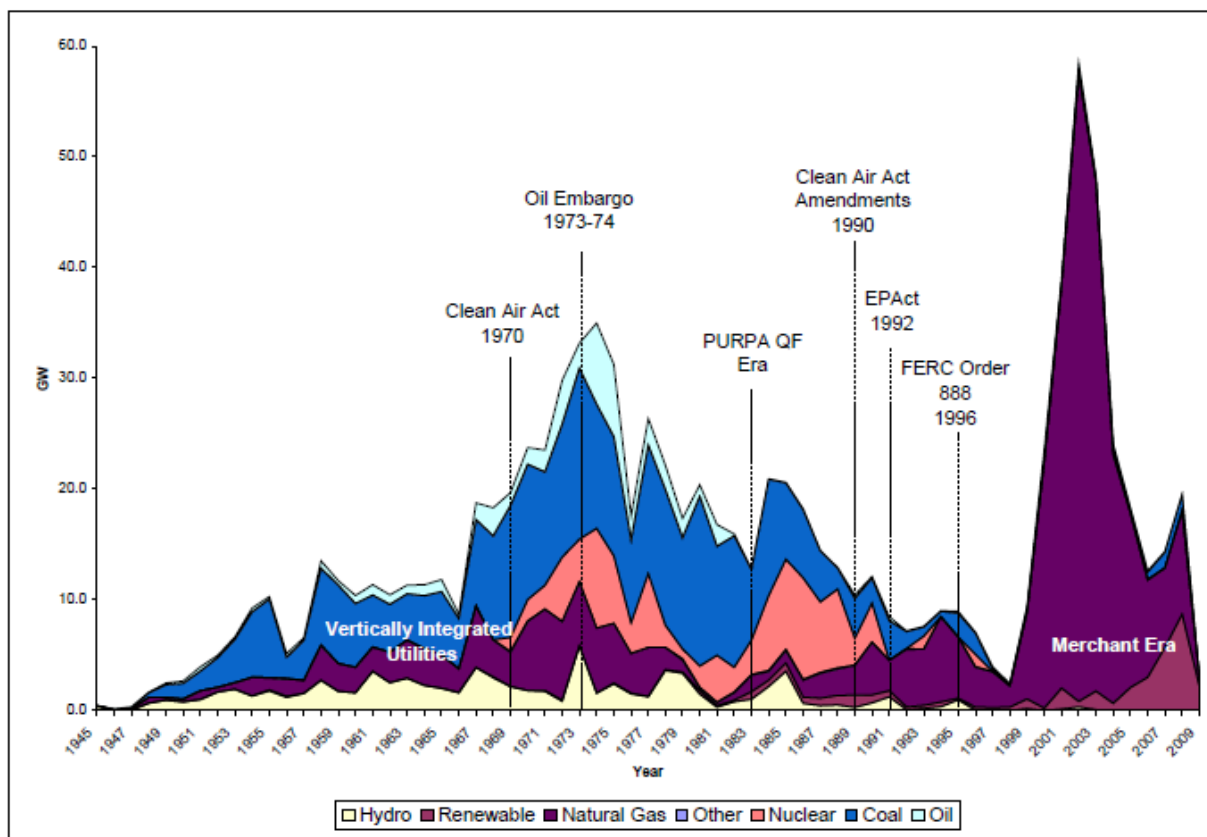
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MAINE PUBLIC UTILITIES COMMISSION

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PRIVATE SECTOR INVESTMENT IN GENERATION

- Private sector entities that invest in generating resources
 - Regulated Utilities
 - Independent Power Producers/Merchant Generators
 - Public Power Authorities
 - Others
 - Industrial Users
 - Individuals and Communities (e.g. distributed generation)

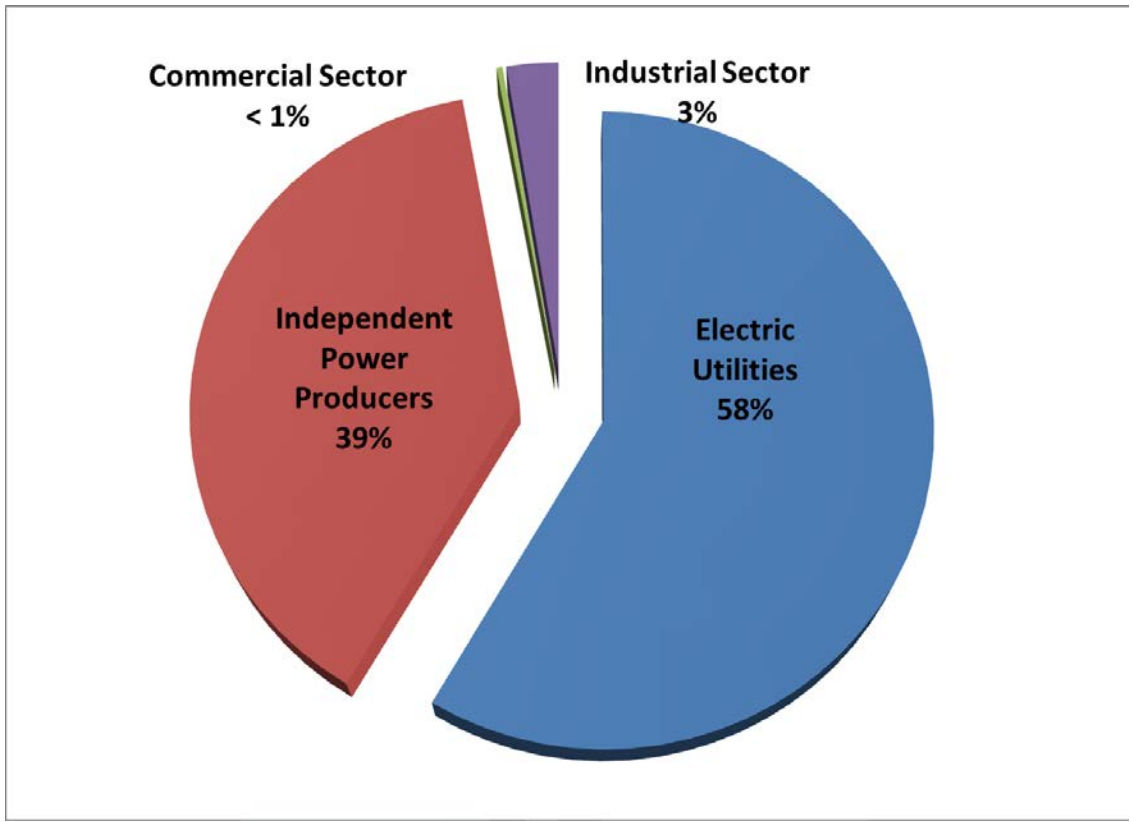
Generation Capacity Additions: 1945-2008



Source: Energy Velocity Database, Ventyx 2009

Existing Capacity by Producer Type, 2012

Source: EIA



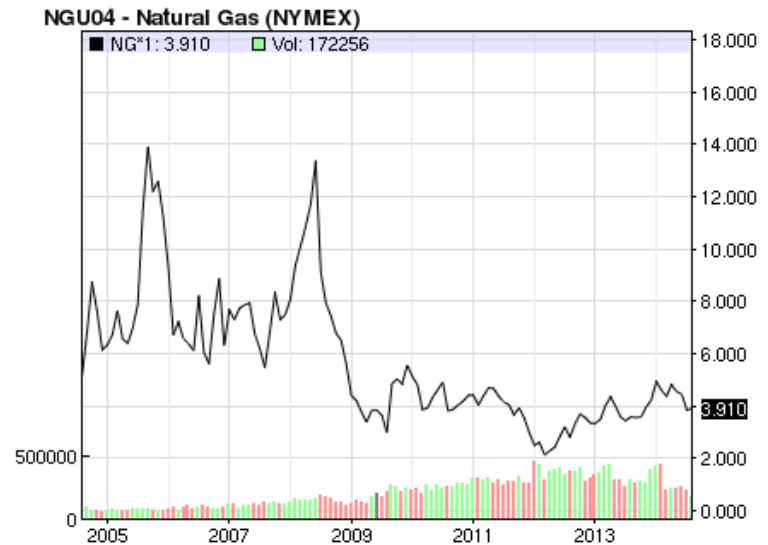
Risk Factors Applicable to All Investors

- Cost and security of fuel source, especially natural gas and oil
- CO₂ Regulation, Environmental Impact and Externalities
- Renewable Portfolio Requirements
- Capital Costs and Financing
- Demand, Distributed Generation and Demand Side Management
- Transmission Infrastructure and Investment, e.g. ensuring access to customers and markets

Risk Factors: Cost and Security of Fuel Sources

- Fuel Price Volatility Risk
 - Fuel cost comparison, e.g. natural gas versus coal
 - Impact of domestic supply
 - Impact of environmental regulations
 - Regulatory treatment

National Average Natural Gas Price (\$/MMBtu)



Risk Factors: CO₂ Regulation, Environmental Impact and Externalities

- Currently no federal carbon market, regional markets exist including Regional Greenhouse Gas Initiative (RGGI) covering nine northeastern states and California cap and trade program
- Environmental Protection Agency (EPA) proposed CO₂ regulations
- Siting concerns and jurisdiction
- State and local regulations, land use restrictions and process

Risk Factors: Renewable Portfolio Requirements

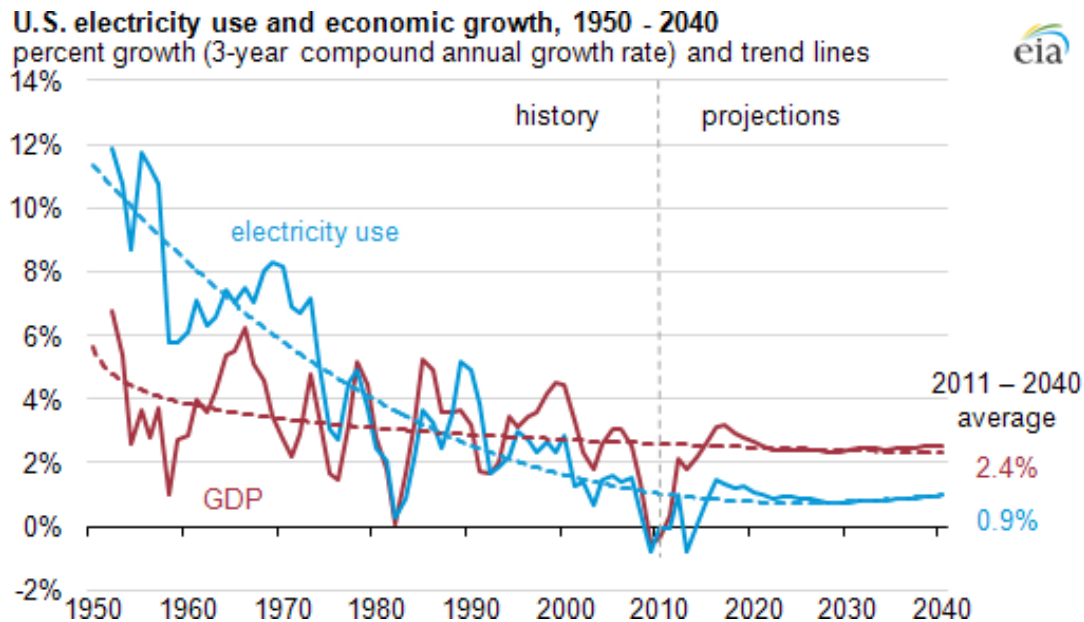
- Prospects for a federal renewable portfolio requirement are not robust
- Twenty-nine states have renewable portfolio standards with variety of policies and requirements
- Differing policies result in pricing variability by state for renewable energy certificates (REC)
 - RECs from a biomass generator located in Maine may sell for \$6 per MWh in Maine and \$60 per MWh in Rhode Island
 - Supply and demand and criteria for qualification determine pricing

Risk Factors: Capital Costs and Financing

- Cost of equity and debt capital
 - Financial market volatility
 - Interest rate trends and projections
- Project cost escalation
 - Duke Energy Carolinas in 2004 estimated the cost for two-unit coal fired Cliffside project at approximately \$2 billion. The project was subsequently reduced to one unit when the North Carolina Utilities Commission refused to permit. By the start of construction in 2008, Duke estimated the cost of the remaining one-unit project at \$1.84 billion, an 84% increase over four years.
 - LS Power projected the cost of a 1,600 MW coal-fired plant in 2004 would range between \$600 million and \$1 billion. By the time the plant was cancelled in 2009, estimated costs had tripled.

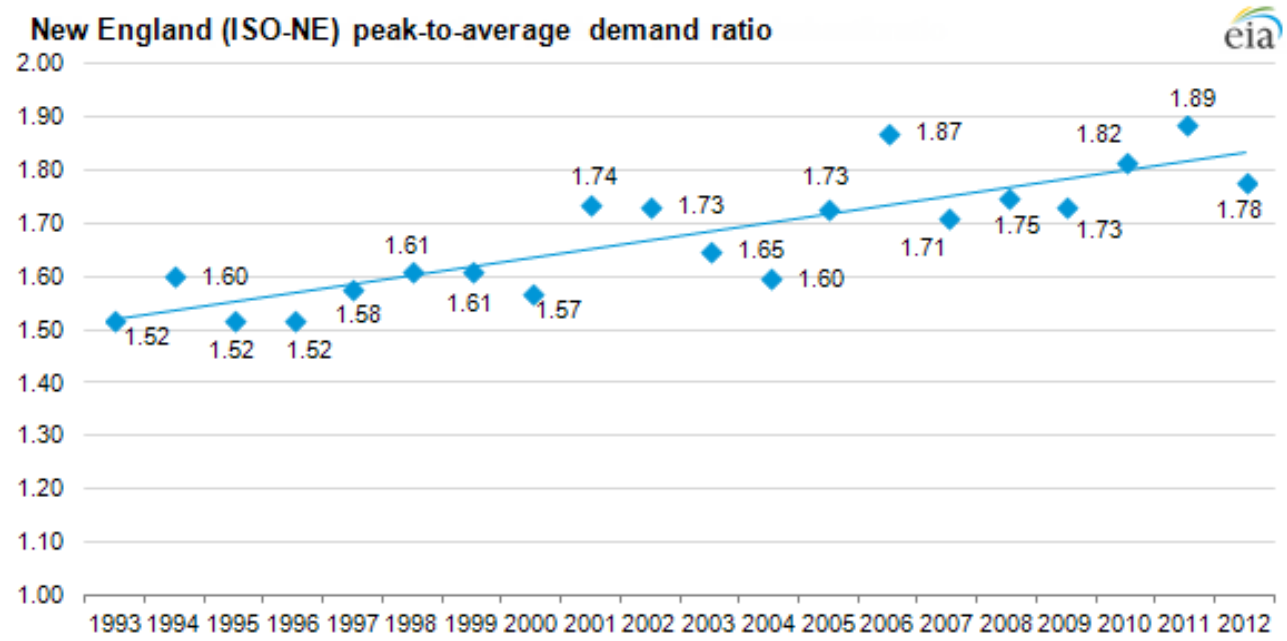
Risk Factors: Demand, Distributed Generation and Demand Side Management (continued)

- Overall demand growth and recessionary pressure



Risk Factors: Demand, Distributed Generation and Demand Side Management (continued)

- Peak-to-average demand ratio



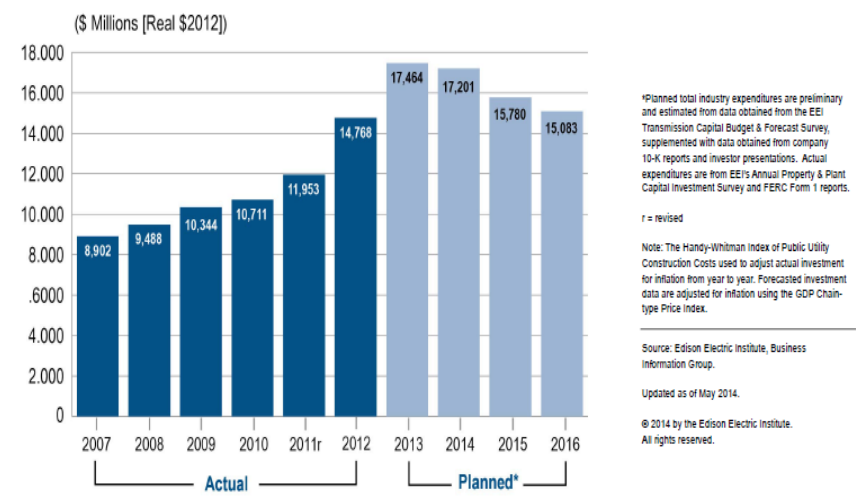
Risk Factors: Demand, Distributed Generation and Demand Side Management (continued)

- **Distributed generation**
 - A method of generating electricity on a small scale from renewable and non-renewable energy sources located close to where the electricity is being used
 - Increases reliability of the grid, can be configured to match customer demand, diversifies the range of energy sources used, and reduces the need to build transmission
- **Demand side management**
 - Includes energy efficiency and demand response (DR), pays energy users to reduce consumption.

Risk Factors: Transmission Infrastructure and Investment

- Location of generation resources versus load centers
- Transmission infrastructure required to access customers and markets
- Significant investment in transmission planned in near future

Actual and Planned Transmission Investment By Investor-Owned Utilities (2007-2016)



Risk Factors Specific to Regulated Utilities

- Fuel price volatility and cost recovery (fuel adjustment clause)
- Regulatory Risks
 - Delay in implementing required rate increases (regulatory lag)
 - Allowed return on invested capital
- Competing demands for capital (investment in generation versus investment in transmission or distribution infrastructure)
- Possible Prudence Review

Risk Factors Specific to Independent Power Producers

- Electricity price risk
 - No fuel adjustment clause
 - No captured ratepayers
- Financial Risk Factors
 - Cash flow stability and predictability
 - Power purchase agreement (PPA risk)
 - Market competitiveness of the project (production costs)
 - Technical and operating risk

Investment Valuation Concepts and Methodologies

- Utilities
 - Integrated resource planning
 - Present Value of Revenue Requirement Minimization
 - Present Value of Revenue Requirement at Risk
 - Levelized Cost
- IPP
 - Discounted cash flow analysis
 - All sources of revenue including energy sales, capacity value, value of renewable characteristics
 - Proforma projections (for lenders and investors)

Limited Risk Mitigation Strategies

- Fuel Price Volatility
 - Hedging strategies
 - Fuel adjustment clauses
- Electricity Price Risk
 - Hedging strategies
 - Power purchase agreements
- Demand, Distributed Generation, Demand Side Management
 - Revenue decoupling mechanism

Questions?

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