

# Electricity Markets and Storage

## How Public Policy Affects the Storage Technology Value Chain

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# Market Impact of Public Policy

- Purposes
  - Promote the use of new technology
    - Give new technology a boost
    - Be technology neutral
      - Market place determine winners and losers
  - Remove regulatory barriers
- Disadvantages

# Types of Public Policy

- **Jurisdiction**

- Federal
- State

- **Entity**

- Legislators → Laws (e.g., tax incentives, mandates)
- Departments → Grants & Loans
- Regulators → Regulations

# Federal Laws – 2005

- Energy Policy Act of 2005 (P.L. 109-58)
  - **Public Buildings**
    - Photovoltaic solar electric systems and associated storage capabilities
  - **Department of Energy:**
    - Accelerate efforts to improve rechargeable energy storage systems for hybrid vehicles
    - R&D for electric energy generation, transmission, and storage
    - R&D for energy storage technologies, including pumped hydro, compressed air, superconducting magnetic energy storage, flywheels, and batteries
    - R&D for secondary use of electric vehicle batteries

# Federal Laws – 2007

- Energy Independence and Security Act of 2007 (P.L. 110-140)
  - **Department of Energy:**
    - R&D for thermal energy storage
  - ***United States Energy Storage Competitiveness Act of 2007***
    - Dept. of Energy: research, development, and demonstration program to remain globally competitive in energy storage
    - Authorized \$295 million per year
    - 5-year plan
  - Storage included under **Smart Grid** provisions

# Federal Laws – 2009

- American Recovery and Reinvestment Act (ARRA) of 2009 (P.L. 111-5)
  - Dept. of Energy: \$4.5 billion for activities to modernize grid
    - Including energy storage research, development, demonstration and deployment
  - 30% Investment Tax Credit for Advanced Energy Projects
    - Energy storage systems for use with electric motor vehicles
    - Electric grids to support the transmission of intermittent sources of renewable energy, including storage of such energy

# Federal Legislation

- 111<sup>th</sup> Congress: STORAGE Act
  - S. 1091 – Storage Technology of Renewable and Green Energy Act of 2009 (Wyden *et al.*)
  - H.R. 4210 – STORAGE Act (M. Thompson, CA)
  - S.3617 – Storage Technology for Renewable and Green Energy Act of 2010 (Bingaman, Wyden, Shaheen)
- Provisions:
  - Grid-Connected Storage Systems
    - 20% Investment Tax Credit
    - Clean Renewable Energy Bonds (CREBs)
  - On-Site Storage Systems
    - 30% Investment Tax Credit

# Department of Energy

- ARRA (Stimulus Grants)
  - Total: \$4.5 Billion
  - Energy Storage Demonstration Grants
    - \$620 million + \$1028 cost share  
= \$1648 total project value
    - 32 recipients
    - 24 states
  - Demonstration Areas
    - Battery storage
    - Frequency regulation
    - Distributed energy storage
    - Compressed air energy storage
    - Promising energy storage technologies



# Department of Energy

- Advanced Research Projects Agency – Energy (ARPA-E)
  - Total:
    - \$359 million
    - 123 recipients
  - Energy Storage
    - \$100 million
    - 30 recipients

# Federal Energy Regulatory Commission

- Views:

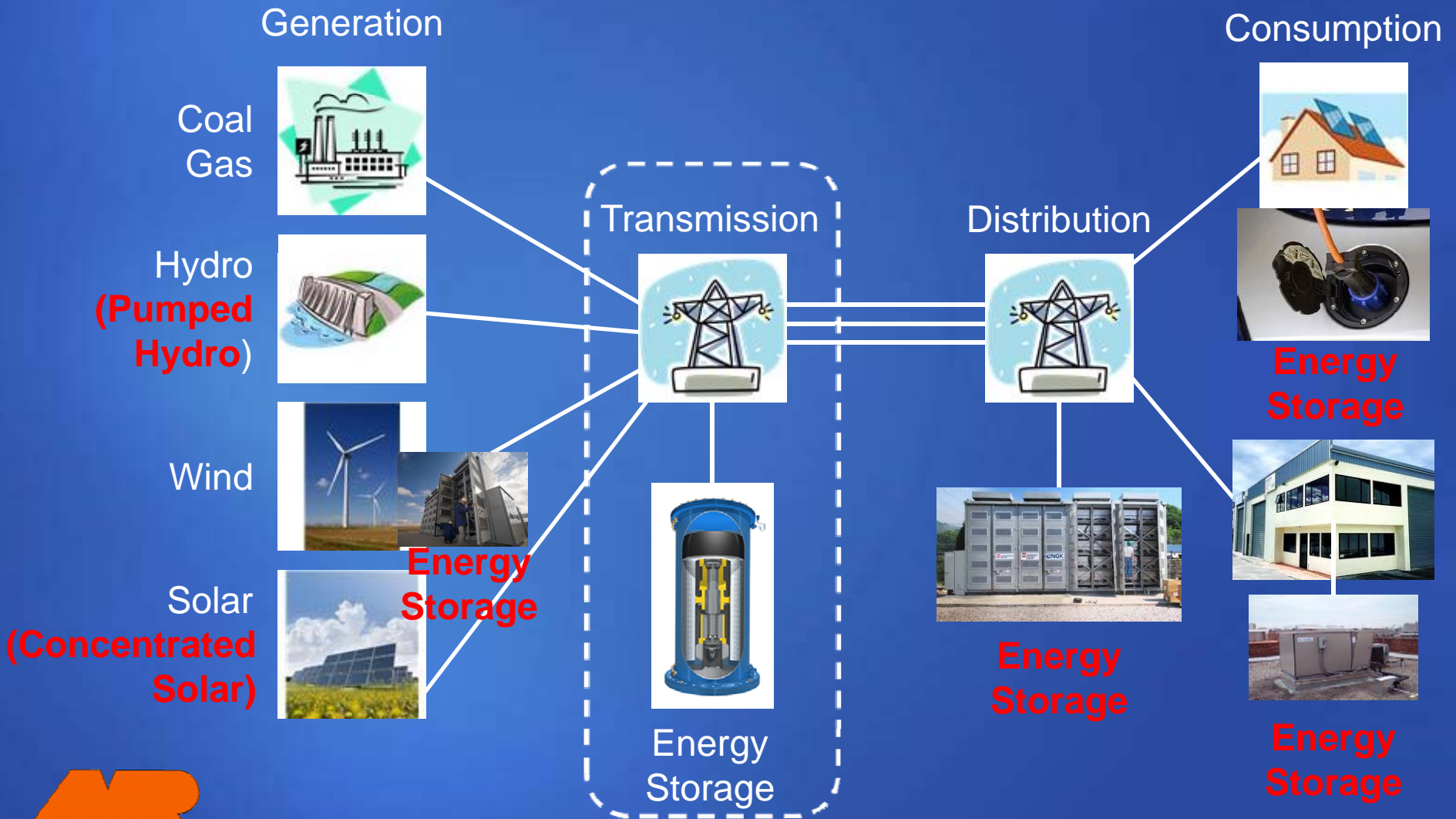
- **Wellington:** Energy storage on the agenda for 2011 (November, 2010)
- **Moeller:** “Energy storage is a matter of when, not if. ... Our overall view is that energy storage is unique and doesn't fit neatly into the distribution or transmission box. ... Each project has to be treated somewhat differently.” (January, 2011)

# Federal Energy Regulatory Commission

## ● Actions:

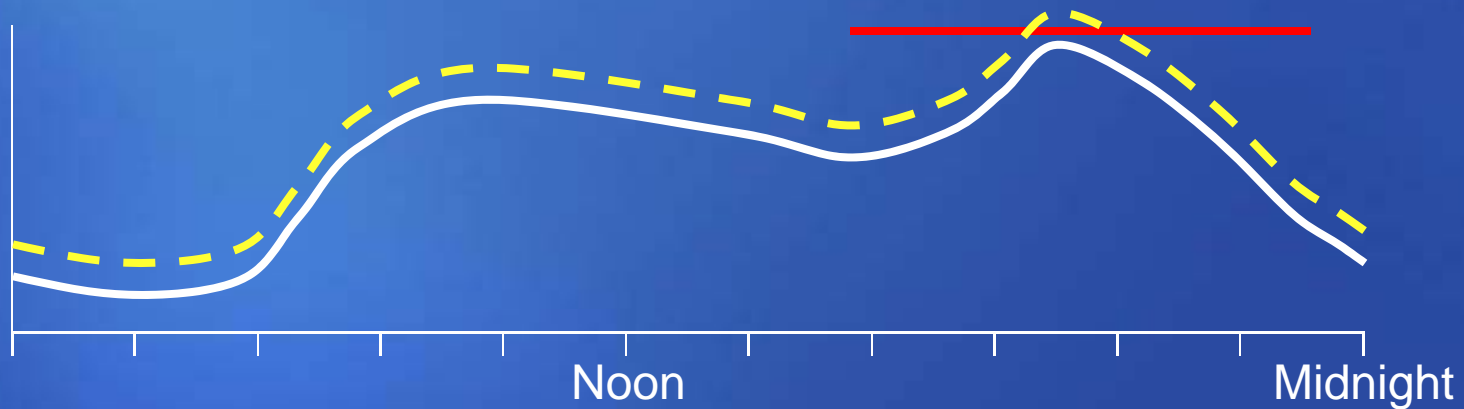
- Classified energy storage devices as wholesale transmission facilities (Western Grid Development LLC, Jan. 21, 2010)
  - CAISO avoids transmission upgrades, increases reliability
- Classified AES “battery-for-hire” as power generation (AES ES Westover, LLC, Apr. 5, 2010)
  - AES is exempt wholesale generator (EWG)

# FERC Storage Issues



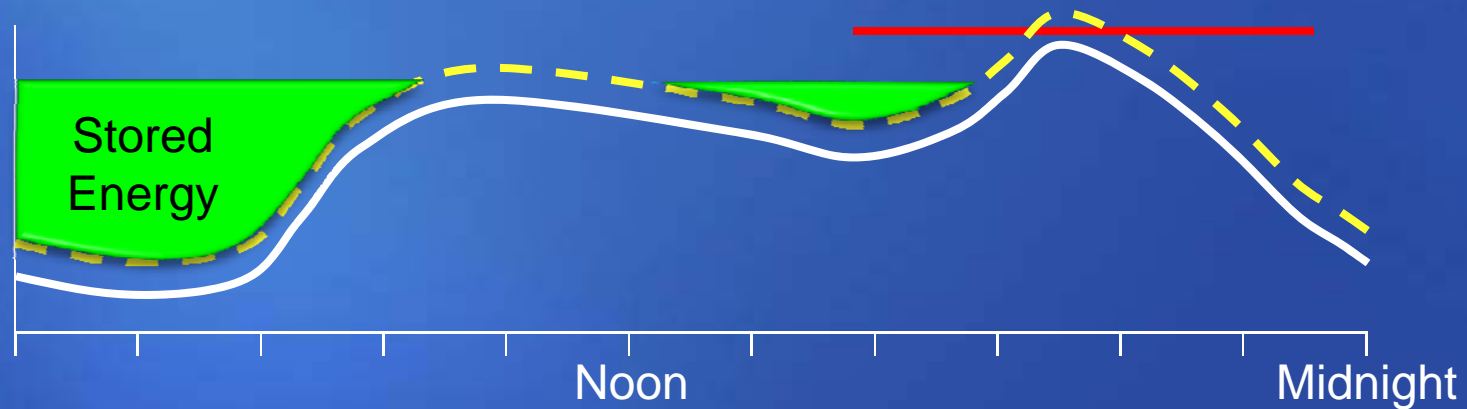
# Federal Energy Regulatory Commission

- National Action Plan on Demand Response (June 17, 2010)
  - Required by EISA 2007
  - Method for lowering peak demand for electricity



# Federal Energy Regulatory Commission

- It is time to consider energy storage
  - Meet future energy needs
  - Increases generation efficiency
  - Does not require customers to curtail their use of electricity
  - Expands consumer choices



# North American Electric Reliability Corp.

- “2009 Long-Term Reliability Assessment, 2009-2018,” Oct., 2009
  - Energy storage identified as an emerging issue for NERC risk assessment
  - Increases bulk power system reliability
  - Increases reliability of distribution grid

# Electricity Storage Markets

- Public Policy will help shape the market
  - Laws
  - Regulations
  - Other government actions
- Federal level:
  - Congress
  - Department of Energy
  - Federal Energy Regulatory Commission
- Issue: Uncertainty in laws and regulations may hinder investment decisions