EDISON ELECTRIC INSTITUTE

Water, Efficiency, Market Opportunities and our Electric Future

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Sustainable Water Resources Roundtable

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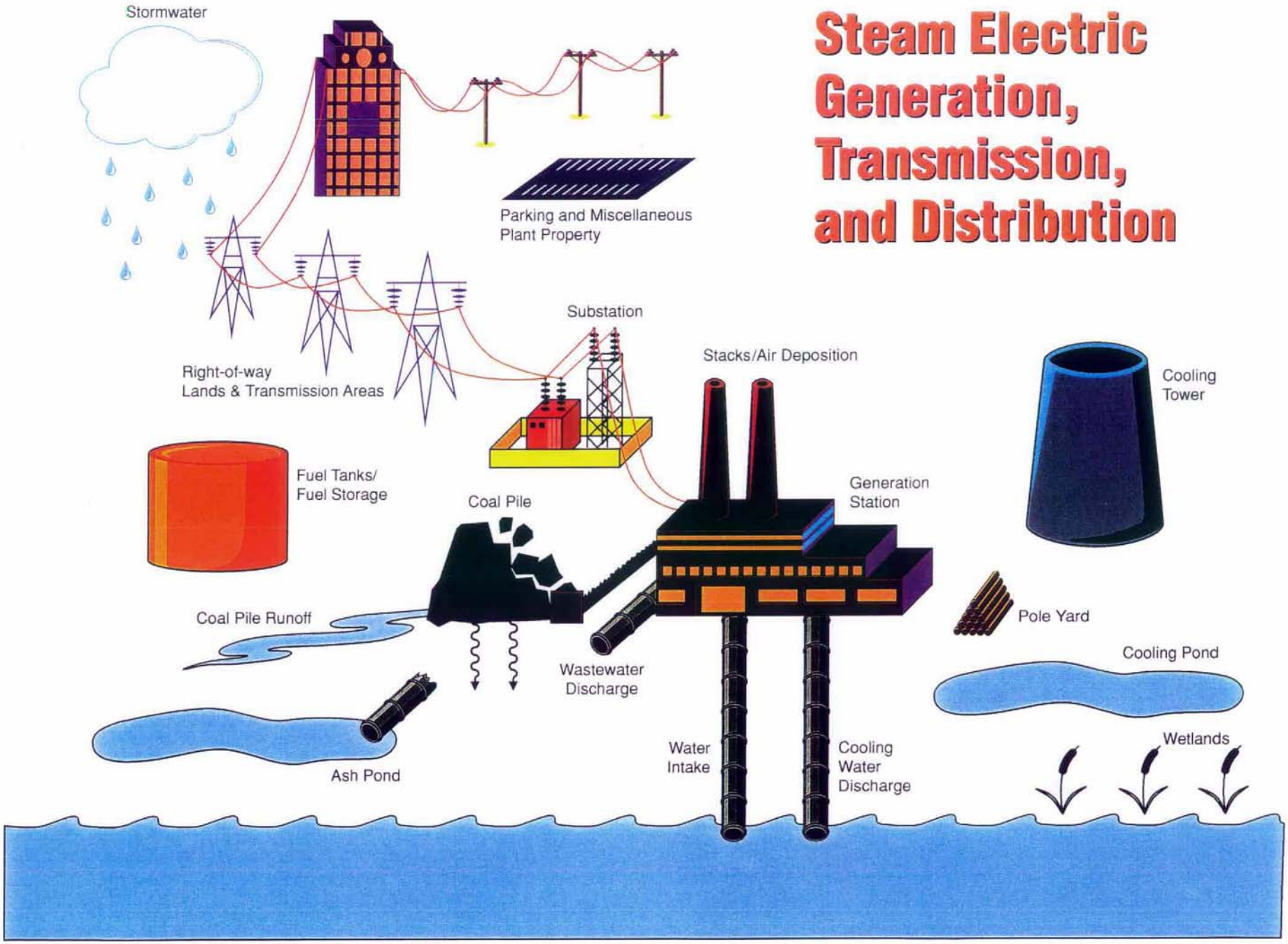
Steam Electric Generation, Transmission, and Distribution



Energy Challenges Are Plentiful

- Balancing energy demand and supply
  - Energy use projected to increase dramatically by 2030
  - Demand is increasing; supply margins are declining
- Providing energy security and availability
  - Politics and planning
- Significant need for infrastructure investment
- Emphasis on energy use, efficiency & environment
  - Increased electric use; reduce footprint
- Lead times on permitting and construction are longer
- Need to developed and commercialize new technologies

Electric Utility Water Use

- U.S. coal, gas, and nuclear plants use 136 billion gallons of fresh water daily to generate electricity
  - Withdrawal v. consumption
  - Approx 3% of water consumed
- Electricity production also affects water quality (stormwater, waste disposal, fuel storage, etc)
- Power generation competes with other vital water uses (*e.g.*, agriculture, drinking, sanitation, ecological)
- Markets are increasingly "aware" of the need for more "water-efficient" power plant designs
  - Including processes that reduce water quality impacts

Electricity – Water Link

- Water supply and reclamation consumes 4 percent of U.S. electric power generation
  - Approx 42 GW or 32 million homes
  - Almost half the cost of desalinization is for energy
- 75 % cost of municipal water processing and distribution is for electric power
- 20% of electricity consumed in CA is used for water infrastructure
- Throughout country water shortages exist, 36 states anticipate water shortages from 2003 through 2013
  - Not enough water to meet competing needs

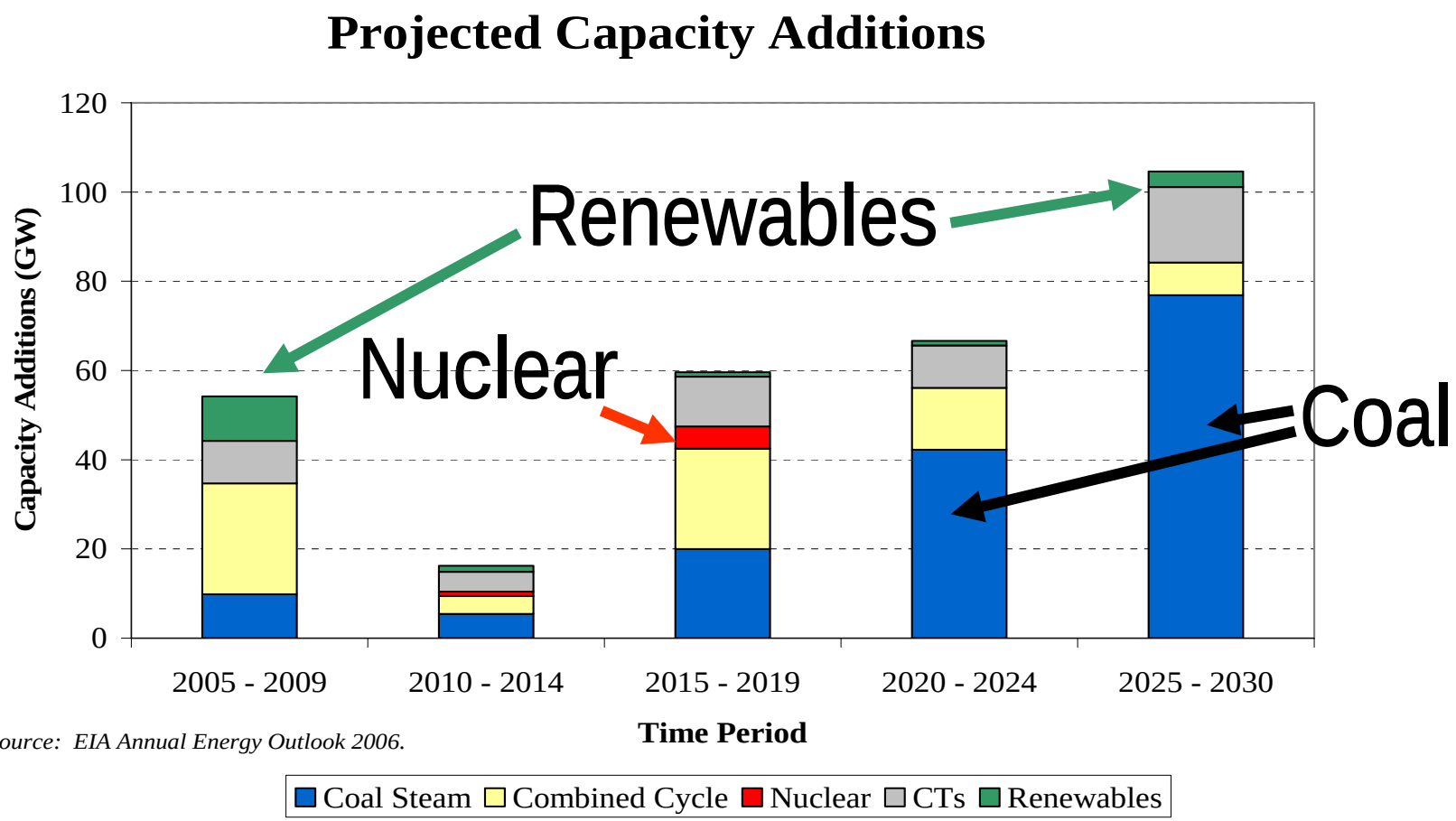
Challenge: New Generation Needed

- Energy demand expected to increase nearly 30% over next 25 years
  - Population growth
  - Per capita use
  - Electrotechnology applications

- 292 GigaWatts of new capacity will be needed by 2030 (EIA)
  - Approximately 160 GigaWatts of new coal capacity will be needed
    - Current installed capacity is 1,060 GigaWatts
    - 1 GigaWatt (1,000 MegaWatts) = 773,000 homes

Challenge: Needed Generation Investment

- $275 billion needed for new capacity
- Energy Efficiency and DSM may reduce need by up to 50%



Source: EIA Annual Energy Outlook 2006.

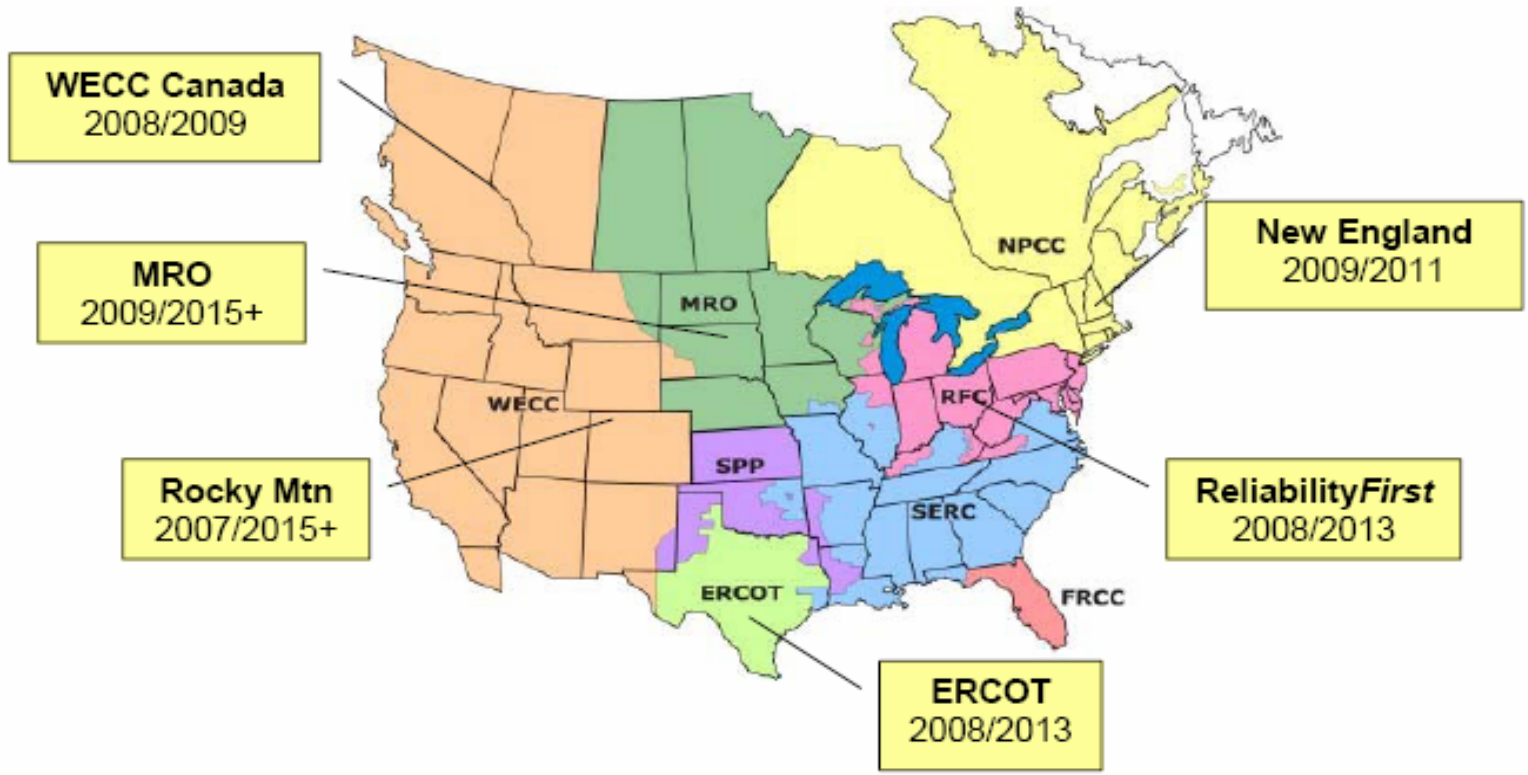
Challenge:
Transmission/Distribution Costs Increasing

- TRANSMISSION
- $23 billion invested since 2000
- $31.5 billion planned investment (2006-2009), nearly a 60% increase over 2002-2005

- DISTRIBUTION
- Average of $14 billion per year over next 10 years

Challenge: Urgent Need For Infrastructure

Electricity Supply Margins
Projected to Fall Below Minimum Target Levels
in Some Areas of North America in Next 2–3 Years



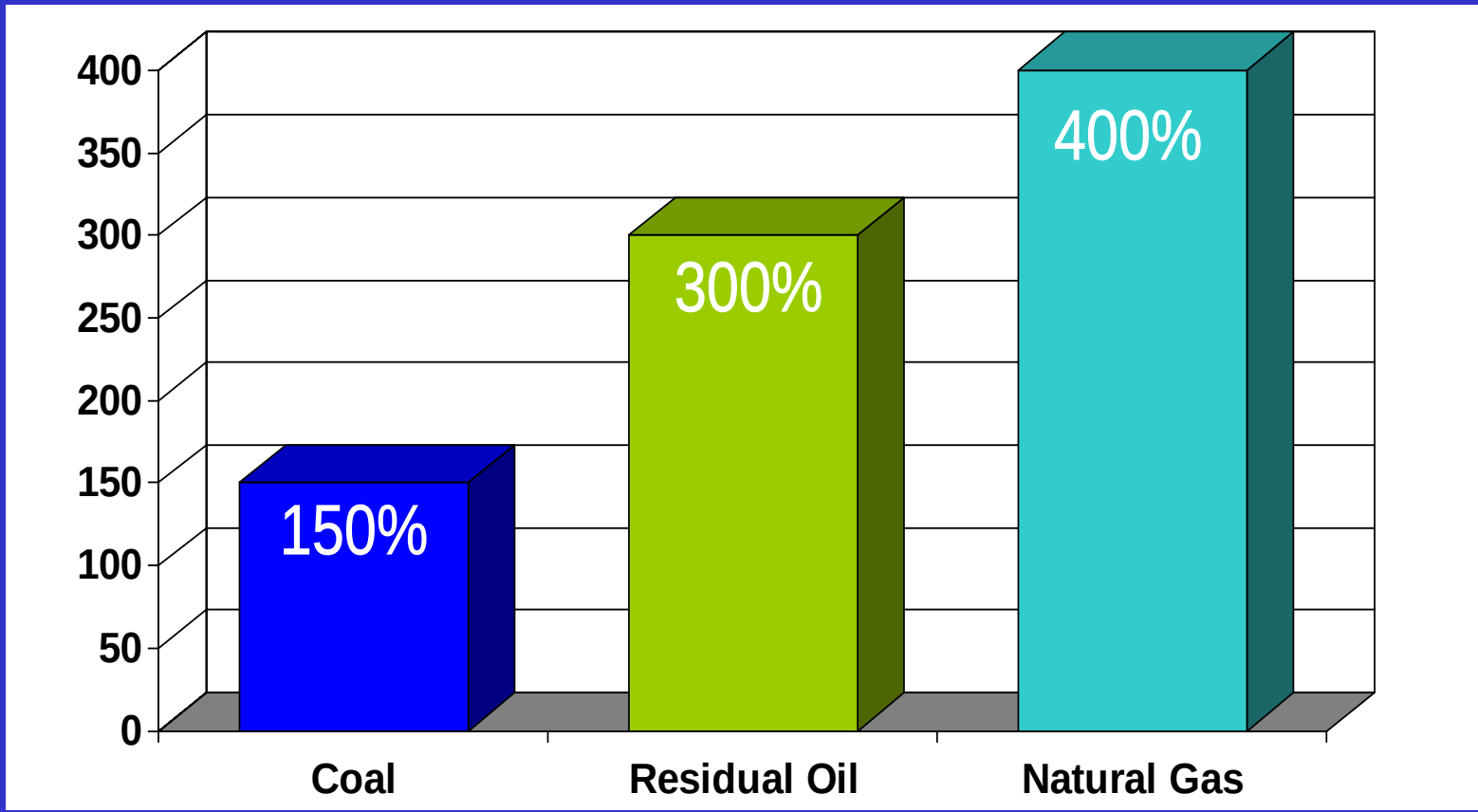
Source: NERC's *2006 Long Term Reliability Assessment*

Challenge: Environmental Costs Increasing

- $24 billion on compliance with federal environmental laws (2002-2005) – more than the annual GDP of 2/3 of the world's countries
- $47 billion projected 2007-2025 for NO_x, SO_2 and mercury
- Regulation of carbon – possible in next 3-5 years?
  - impacts on power generation ($70B - $300B)

Challenge:
Fuel Costs Increasing Dramatically

Percentage increase 1999 – 2005



Source: **U.S. DOE/Energy Information Agency & U.S. DOL/Bureau of Labor Statistics (January 2006)**

Challenge: Siting and Public Acceptance

- Virtually all types of new generation are opposed by some public organization
- The actual siting and licensing of new generation and infrastructure remains a complex, lengthy, and costly process.
- Access to needed facilities is constrained (*i.e.*, water, rail, transmission).

Solutions

- The utility industry aggressively pursuing new initiatives to encourage increased energy efficiency
  - Efficiency and DSM as part of energy portfolio
  - Smart and Efficient Buildings
  - Smart Appliances & Equipment
- The challenge – Sustainability - to create business opportunities and appropriate public policy that encourage and reward electric utility and customer collaboration on innovative and improved water resources management
  - Value of water
  - Responsibility Shared with Electricity Customer
  - Stewardship
- As we expand our portfolio of resource options to meet the country's growing appetite for electricity, what opportunities exist to meet the country's growing need for adequate and high quality water?
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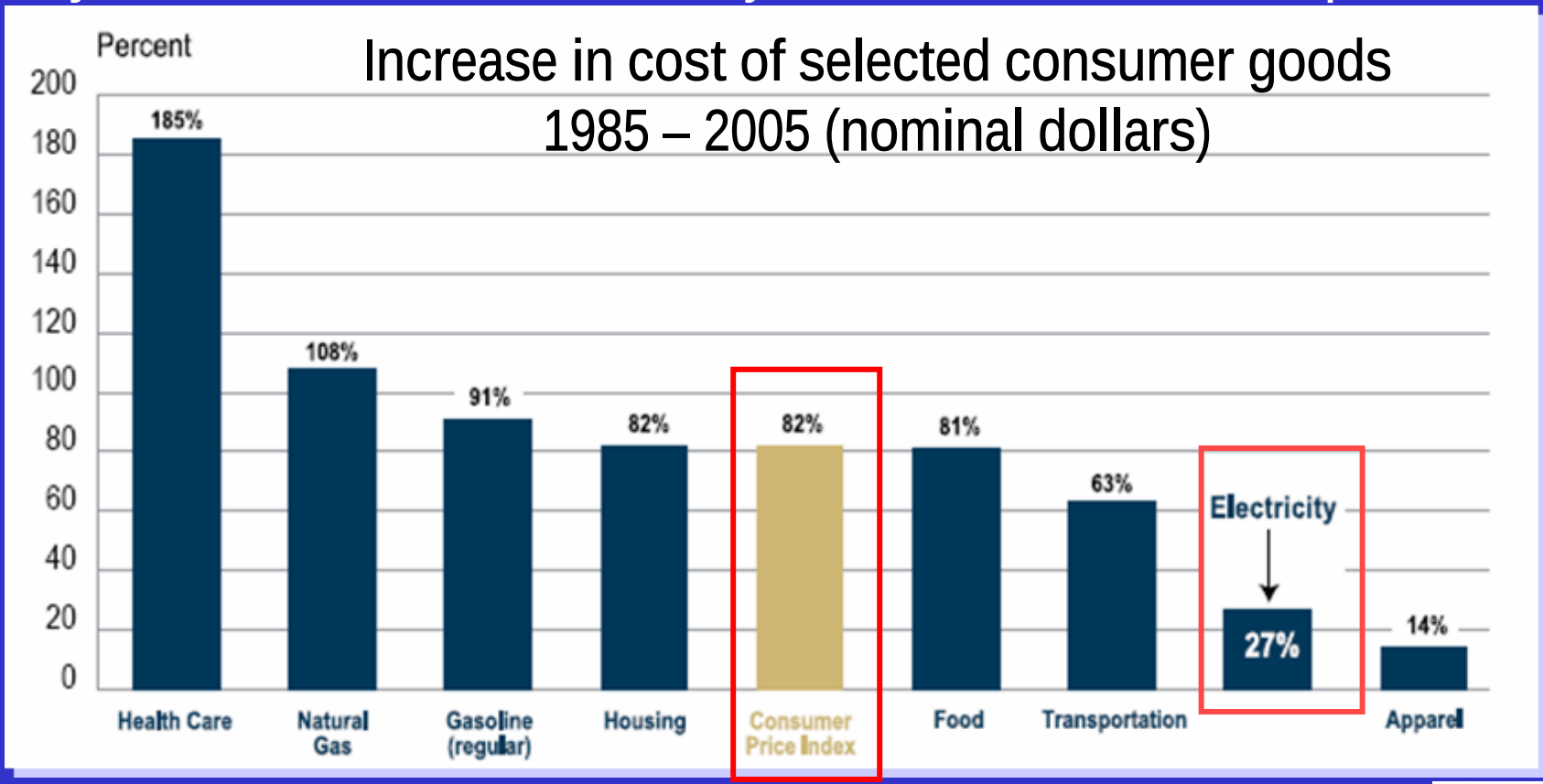
Electricity: A Great Value

- Despite recent price increases, electricity prices are comparable or lower than other important consumer goods
- Adjusted for inflation – electricity cost is lower than 1980 prices



Sources: U.S. Department of Labor, Bureau of Labor Statistics, and U.S. Department of Energy, Energy Information Administration (EIA)

Response

- Challenges demand prioritized response, collaborative efforts
  - Maintaining “value” is mandatory
- Achieve balance between the cost of industry water-related investments and their benefit
  - Placed in perspective with other needed investments
- Market-based approaches can provide long-term encouragement to drive action and results to address water management challenges
  - Business opportunities, incentives, tax benefits, rate plans, etc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