Emerging Issues & Basic Concepts

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Emerging Issues

1. Rate Case Trends
2. Demand Side Management (DSM)
3. Decoupling
4. Renewable Portfolio Standards
5. Climate Change/Greenhouse Gases
6. Interruptible Credits
7. Riders/Automatic Price Adjustment Clauses
8. Nuclear Generation
9. Other Issues

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Rate Case Trends

- Large capital investments by utilities
- Increasing fuel costs
- Smart grid cost recovery

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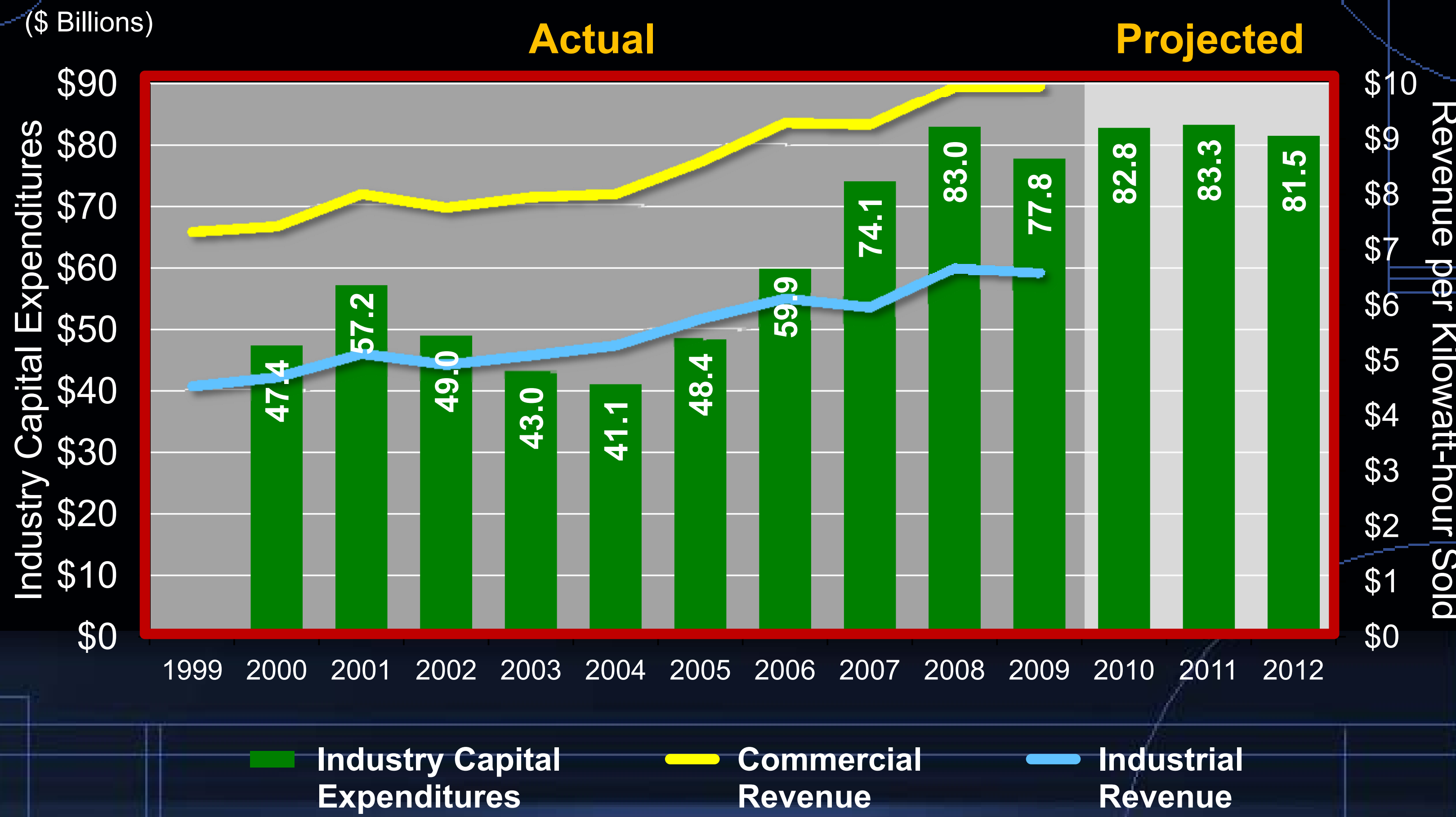
Capital Investment Cycle

U.S. Shareholder-Owned Electric Utilities



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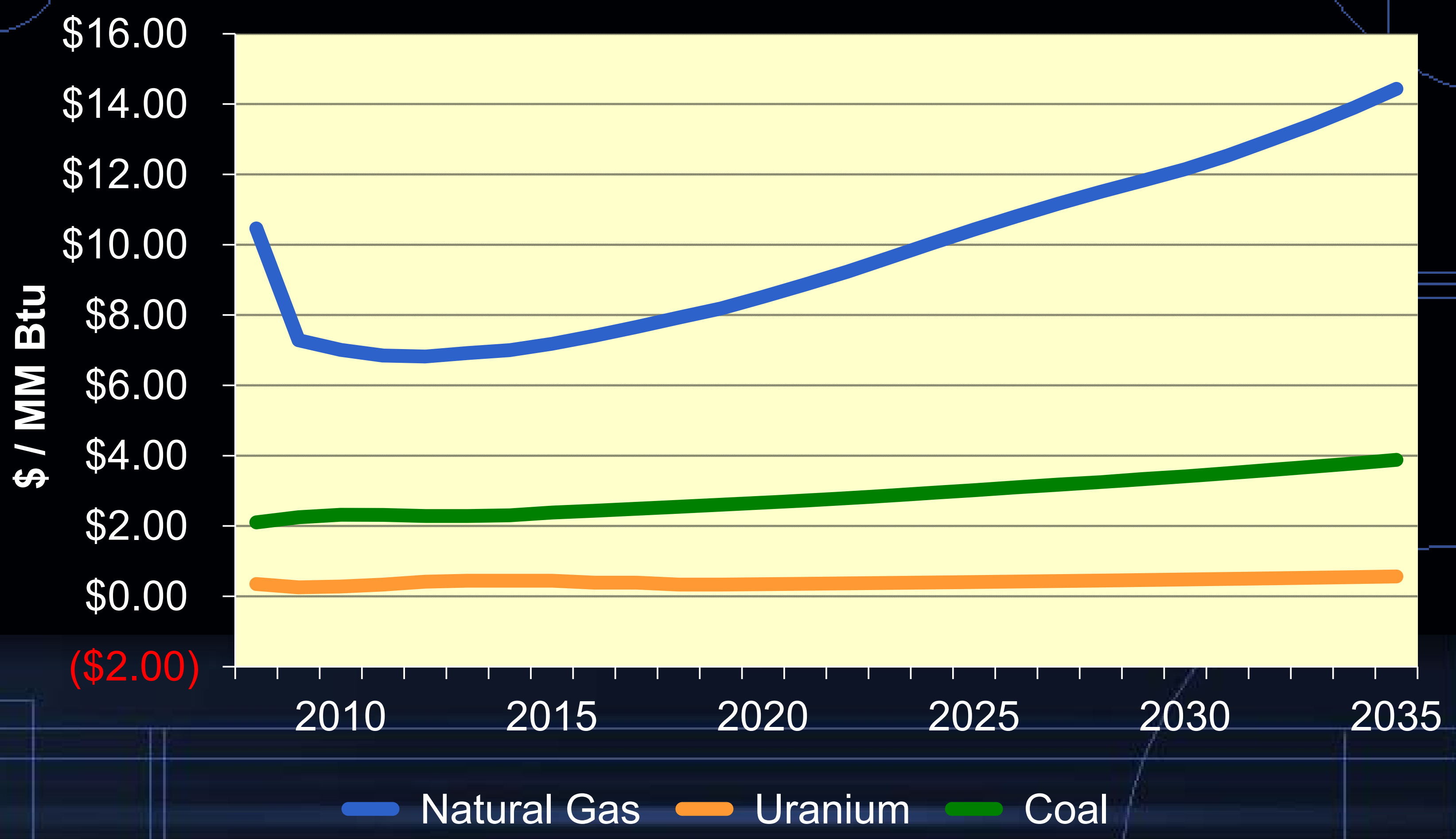
Fuel Price Forecasts



Source: 2011 EIA Annual Energy Outlook

Smart Grid

- Transmission plant upgrade
- Smart metering
- Information back and forth between the generator and the user
- Not fully developed
- Objective -- maximize efficiencies in generation and usage
- Rate Impact → $

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Demand Side Management (DSM)

- Changes on customer side of the meter that reduces utility consumption costs
- Utility sponsored and funded
- Customer peak use and costs

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Demand Side Management Pros and Cons

FOR

- Market imperfections
- Knowledge of customers
- Central planning preferable to free market

AGAINST

- DSM is not a monopoly, therefore no need to regulate it
- Utilities may have conflicted incentives
- Free Riders
- More Overhead

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Decoupling

- Fundamental rate setting change
- Revenues of utility are made independent of sales levels
- Rate change not tied to cost change

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PROS and CONS of Decoupling

PROS:

- Removes disincentives for utility to pursue DSM
- Increased stability
- Lower risk for utility
- Moderates impact of abnormal weather for residential customers

CONS:

- Utility has less interest in providing good service
- Removes incentive for customer to conserve
- Erodes correct price signal to customers
- Shifts risk from utility to customers

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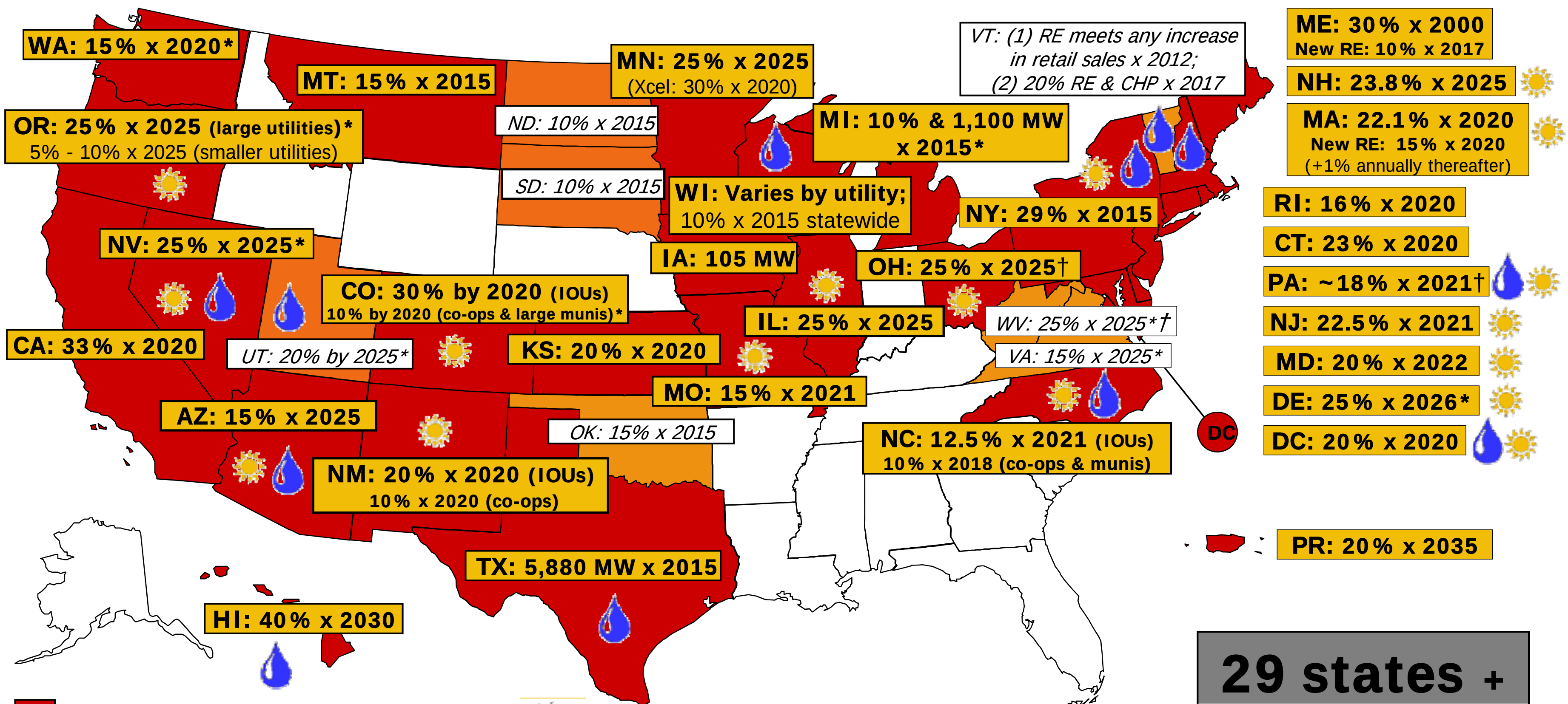
RPS Policies



Renewable portfolio standard

Renewable portfolio goal

Solar water heating eligible

Minimum solar or customer-sited requirement

* Extra credit for solar or customer-sited renewables

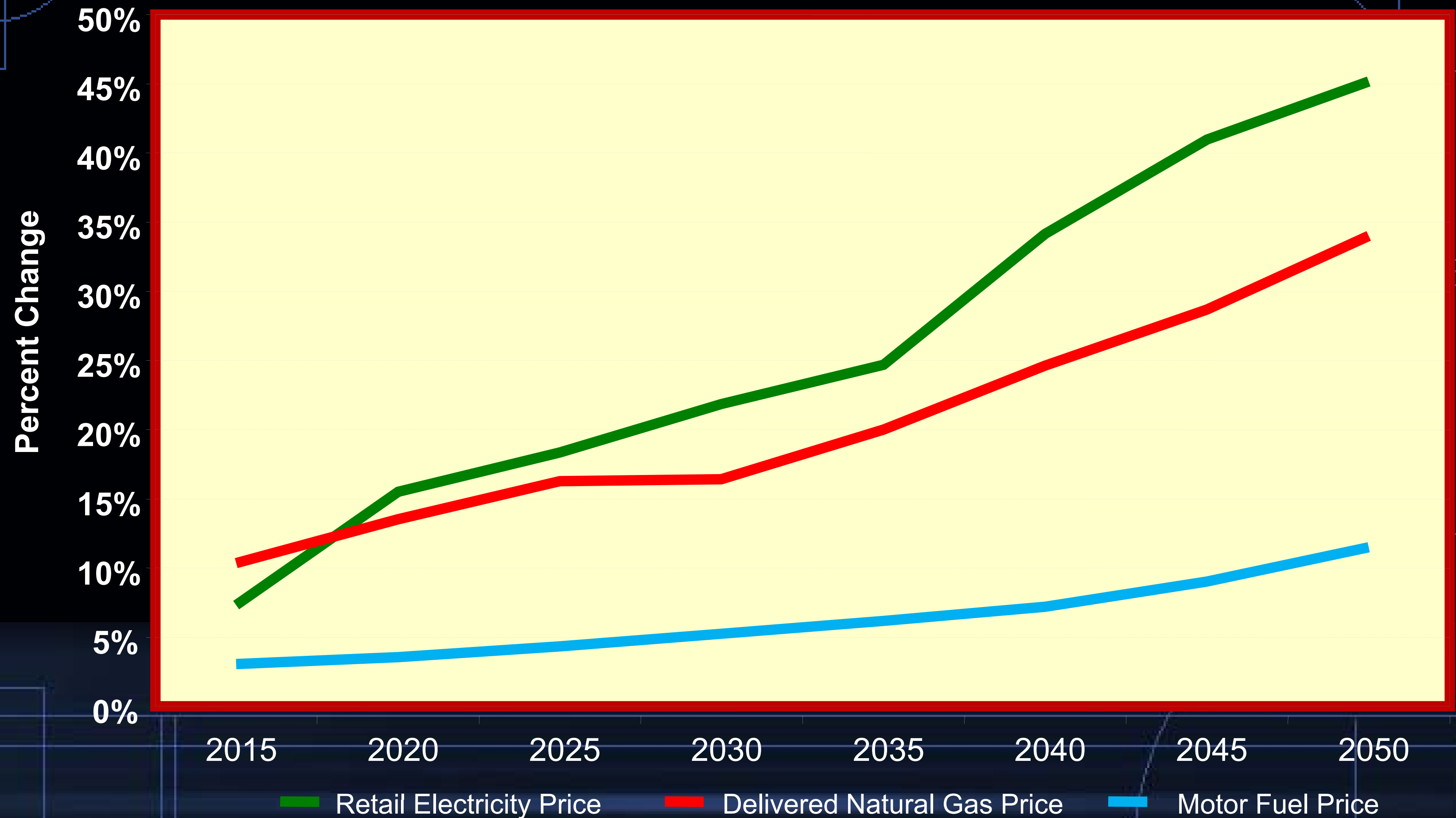
† Includes non-renewable alternative resources

29 states + DC and PR have an RPS
(7 states have goals)

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy
IREC Interstate Renewable Energy Council
North Carolina Solar Center

www.dsireusa.org / April 2011

Green House Gas Price Impact on Electricity Natural Gas and Motor Fuel at the Pump



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Source: Southern Company

Interruptible Credits

- Recent trend among utilities to under-value credits paid to interruptible load
- Long term avoided resource costs vs. short term avoided costs of market purchases
- Short term valuation does not properly reflect capacity value of interruptible load
- Short term approach may be appropriate in certain circumstances
- One reasonable approach to long term valuation is the cost of a combustion turbine peaking unit

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Riders/Automatic Price Adjustment Clauses

- Riders are designed to track changes in only a single cost item
  - Most common riders: fuel and purchased power adjustment mechanisms
  - DSM costs and/or lost revenues are becoming more common for rider recovery
- Intended for significant, volatile cost items beyond utilities' control
- Riders often misused by utilities
- Utilities attempt to shift risk to customers

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Rider Advantages / Disadvantages

ADVANTAGES

- Matches cost with revenue of covered item
- Can reduce the need for frequent rate cases

DISADVANTAGES

- Constitutes single-issue ratemaking
- Can increase utilities revenues
- Provide no incentive for cost control

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Automatic Price Increase

- Proposed Illinois Legislation
  - House Bill 14
  - Formula ratemaking allows for automatic yearly price increase
  - Less oversight than current regulatory process
  - After-the-fact review shifts burden of proof to consumers

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Nuclear Generation

- Provides approximately 20% of electricity in U.S.
- U.S. has not approved new nuclear plant in 30 years
- Large capital costs vs. low fuel costs
- Recent legislation proposed in Iowa for recovery of costs for construction work in progress (CWIP) for nuclear generation
- Nuclear generation's future - ???
- Small modular reactors (SMR)

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Other Issues

- Allocation of wind direct costs
  - Capital cost and fixed O&M
  - Energy resource vs. traditional fixed cost
  - Energy resource basis penalizes large users of electricity

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Other Issues

- FERC Order 745
  - Demand response resources compensated for services provided to energy market at market price for energy or locational marginal price (LMP)
  - Helps to ensure competitiveness of organized wholesale energy markets and remove barriers to the participation of demand response resources, thus ensuring just and reasonable wholesale rates.

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Emerging Issues

Questions

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Basic Concepts

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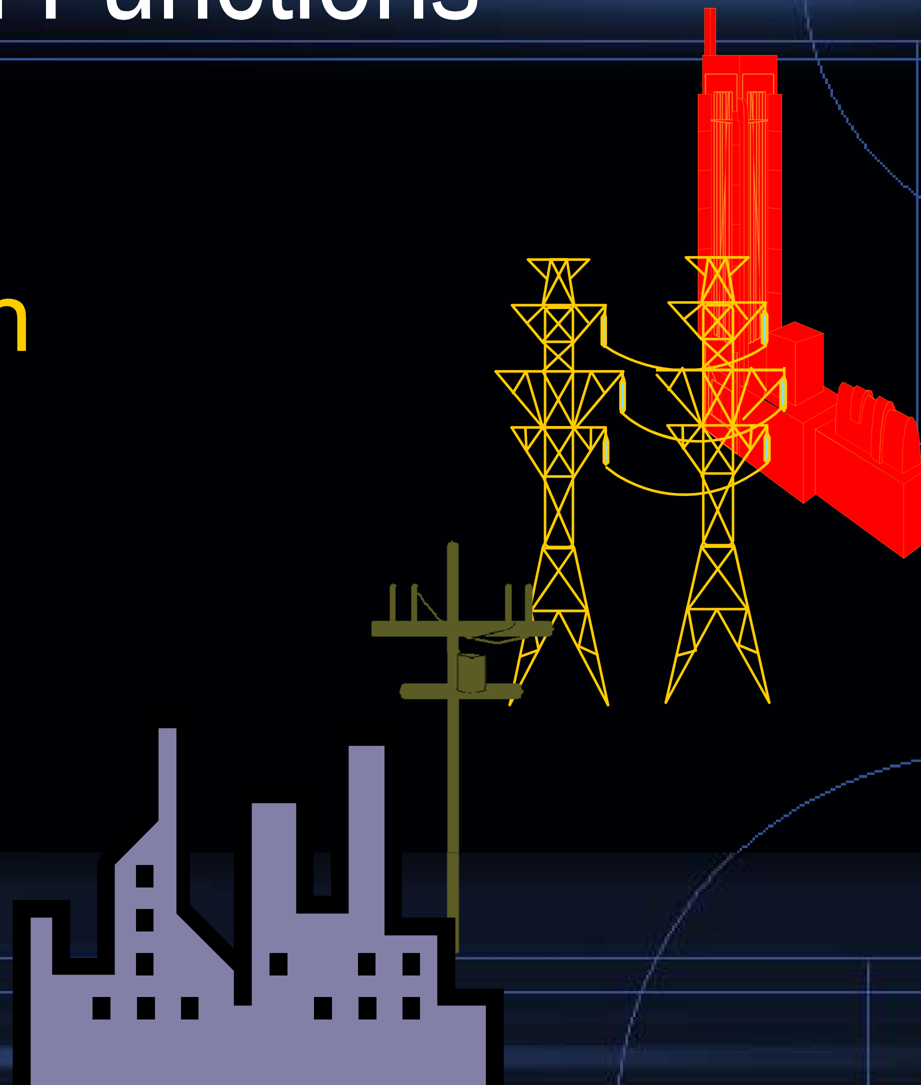
Electric System Functions

- Generation
- Transmission
- Distribution
- Customer



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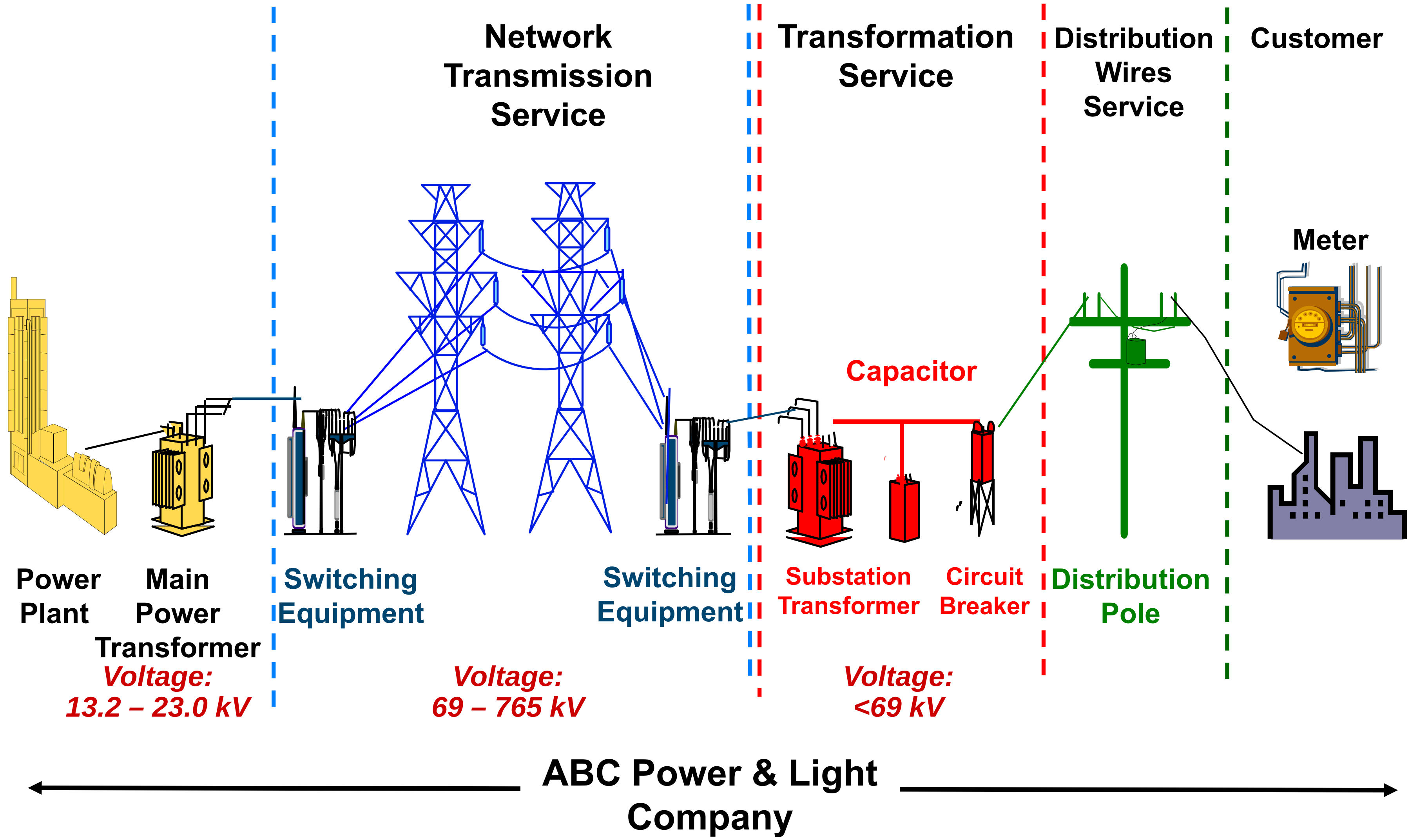
Electric System Functions

Functional Components of an Integrated Electric Utility Company



Energy vs. Demand

- Energy = Work (light, heat, motion)
- Demand = Rate of Work
- Energy ~ Distance
- Demand ~ Speed
- Energy = Demand Summed (integrated) over time

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Measuring Energy

- 1,000 watt-hours = 1 kilowatt-hour (kWh)
- 1,000 kWh = 1 megawatt-hour (MWh)
- 1,000 MWh = 1 gigawatt-hour (GWh)

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Measuring Demand

- 1,000 watts = 1 kilowatt (kW)
- 1,000 kW = 1 megawatt (MW)
- 1,000 MW = 1 gigawatt (GW)

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Do Not Confuse the Two

- Energy in Megawatthours
- Billed no matter when you use it.
- Demand in Kilowatts
- Billed based on Peak (maximum) demand in month

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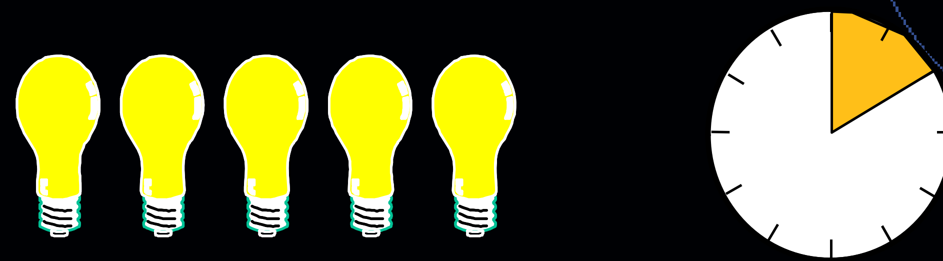
Relationship Between Energy and Demand



Energy: 500 watts x 2 hours = 1000 watthours = 1.0 kWh
Demand: 500 watts = 0.5 kW

Energy: 200 watts x 5 hours = 1000 watthours = 1.0 kWh
Demand: 200 watts = 0.2 kW

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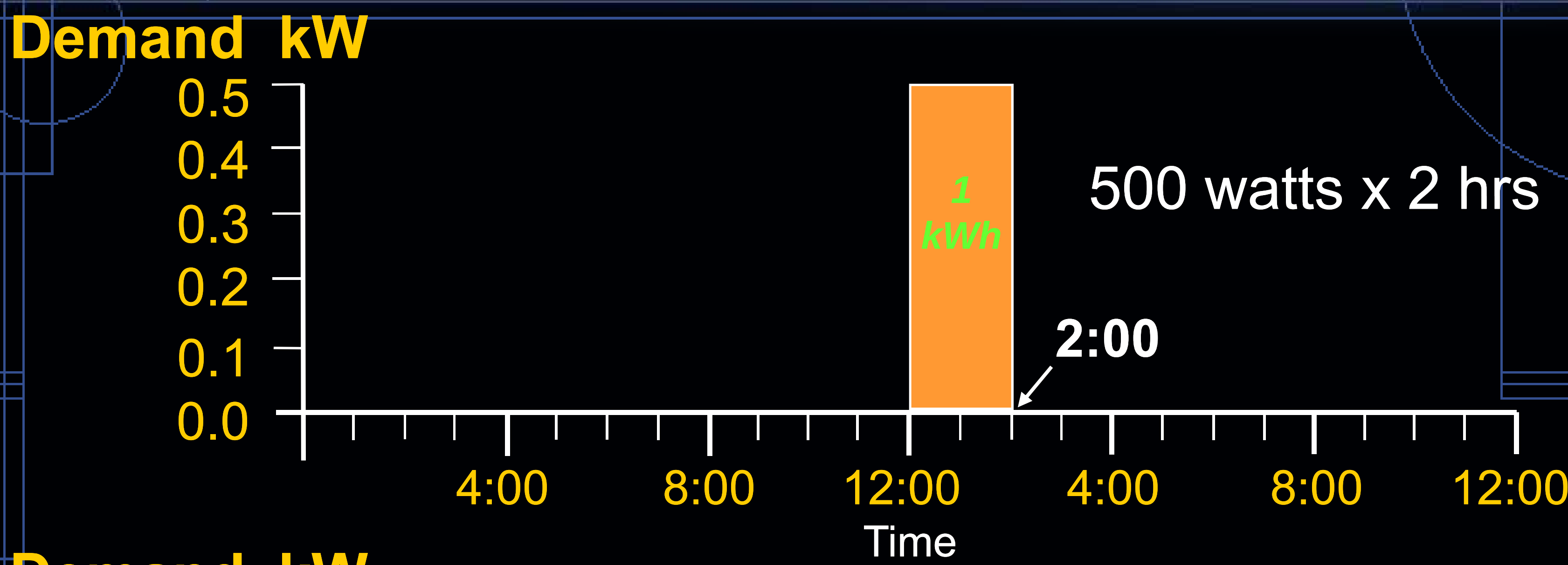
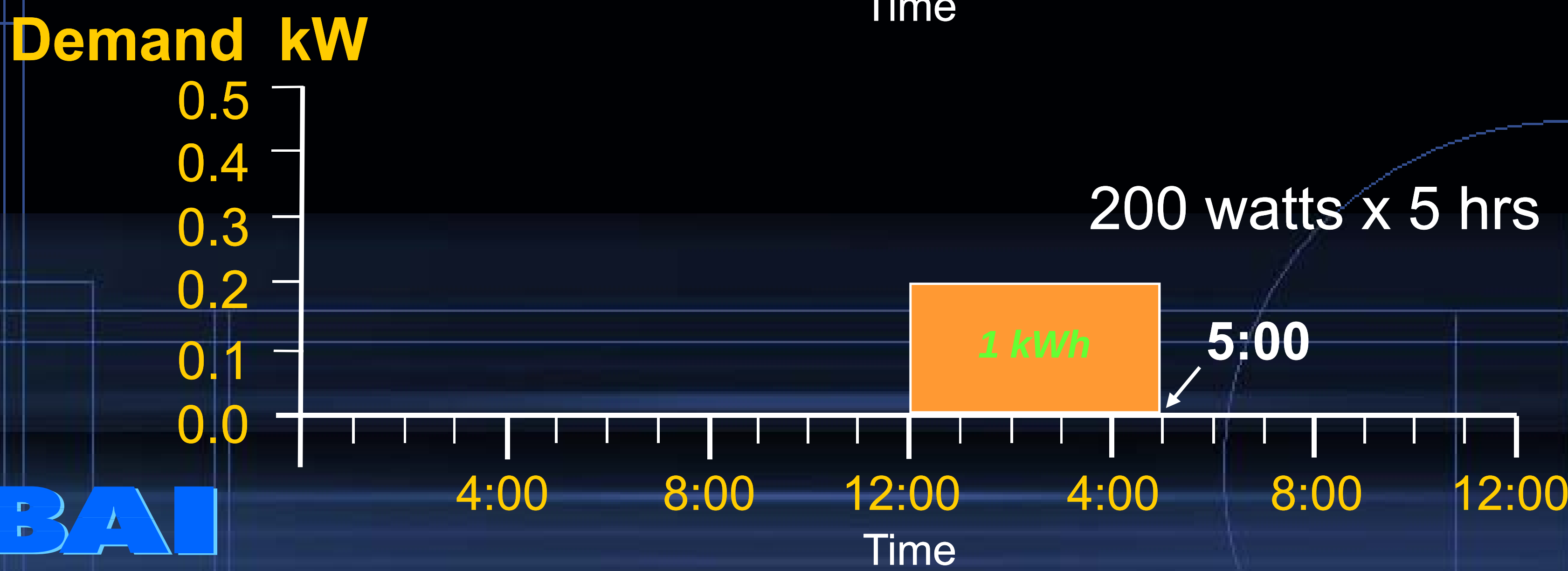
Daily Demand Pattern





Load Factor

- Relationship between demand and energy usage
- Measures how efficiently you are using your electricity
- Average Demand / Peak Demand
- Average Demand = Energy Usage / Time of Consumption

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Load Factor

$$\text{Monthly LF} = \frac{\text{kWh consumed in } \textit{month}}{\text{Peak kW of Month x \textasciitilde 730 Hours}}$$

$$\text{Annual LF} = \frac{\text{kWh consumed in } \textit{year}}{\text{Peak kW of Year x 8,760 Hours}}$$

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Why is Load Factor Important?

- Load factor measures how efficiently a class utilizes facilities installed to meet maximum demand
- Most fixed costs related to demand
- In general, a higher load factor suggests more energy is taken off-peak

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It Costs Less (per MWh) to Serve a High Load Factor Customer!!!

- High Load Factor customer spreading fixed costs over a larger number of MWh

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Two Measures of Demand

- Coincident vs. Non-Coincident
  - Depends upon time of peak demand
  - Coincident demand looks at time when system is peaking (monthly or annually)
  - Non-Coincident looks at individual customer or class

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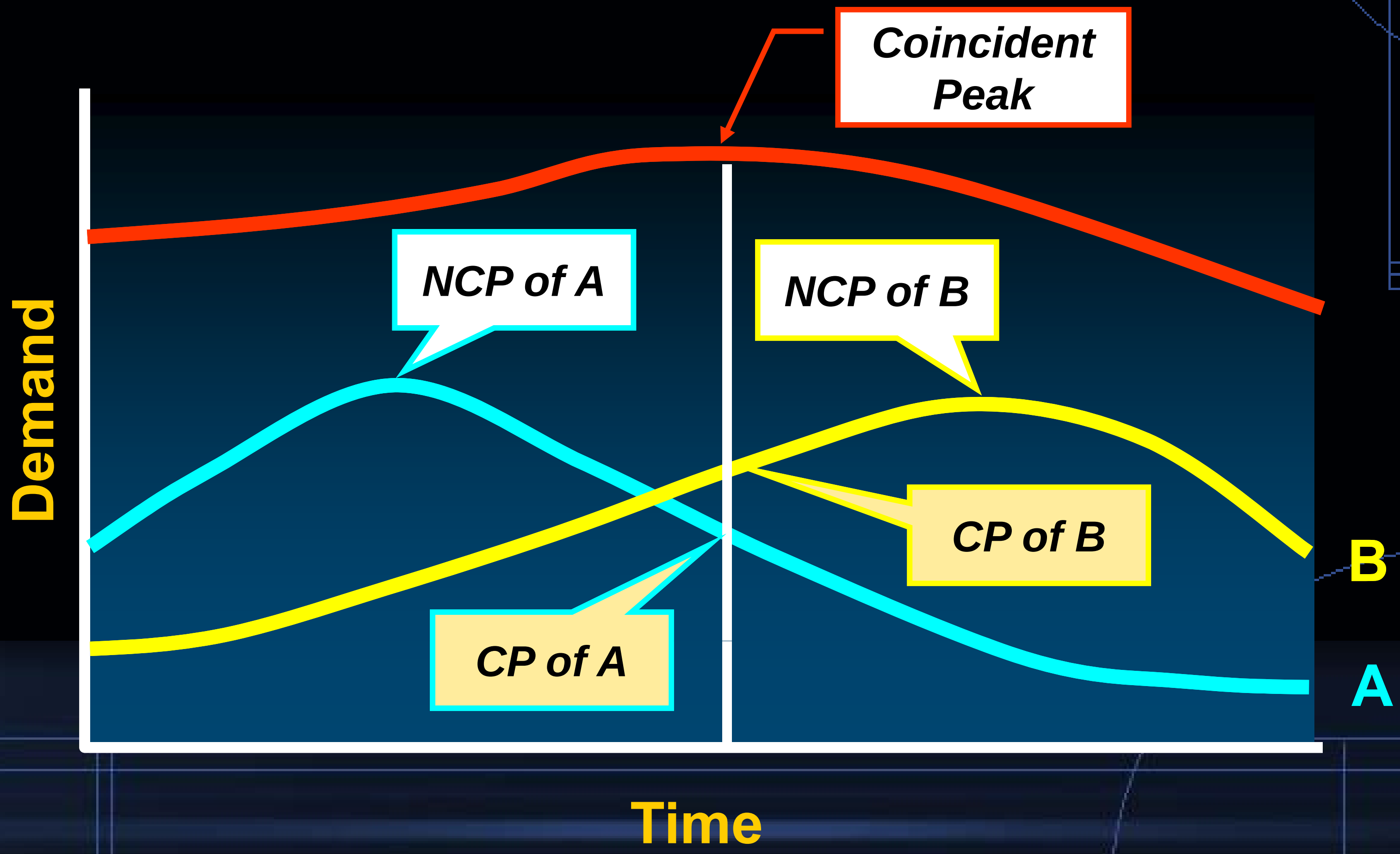
CP and NCP Demands



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Reactive Power

- Occurs when voltage and current are out of phase
- Real power (kW) flows from generator to load
- Reactive power (kVAR) flows back and forth and supplies no energy
- Reactive power has a cost and contributes to losses

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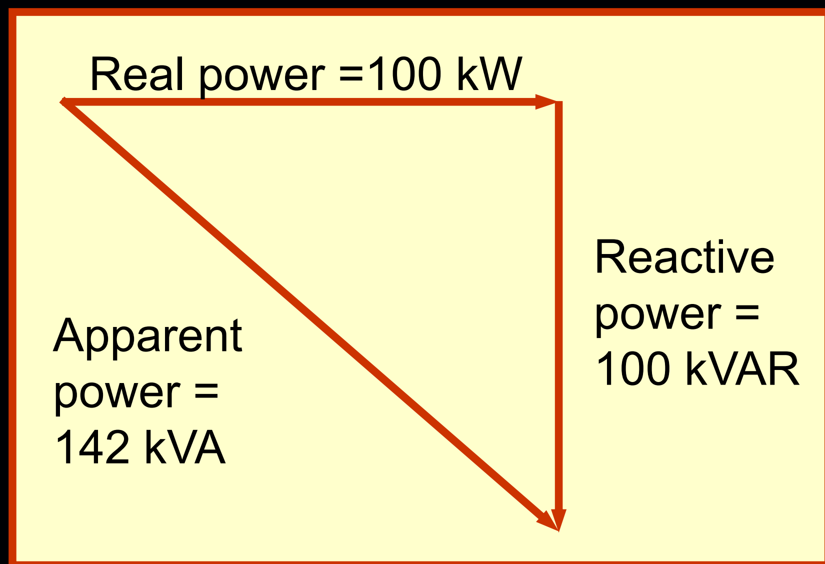
Power Factor Triangle



Real power = 100 kW

and

Apparent power = 142 kVA

then

Power Factor = 100/142 = 0.70 or 70%

Why Improve Your Power Factor?

Utilities usually charge a penalty for power factors less than 0.95 or 95%

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QUESTIONS?

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