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# *Fundamental Basis for Determining Value and Direction in the Electric Energy Industry*

IREC Presentation
May 21st 2021

# Price to Utility Customers via Tariffs

- Utility Tariffs provide recovery of costs incurred by Utilities
- Costs include:
  - Fixed Costs of "**Prudent**" Investments over Useful Life
    - Return of investment (depreciation)
    - Return on investment (interest, equity return)
    - Income taxes
    - Property taxes
    - Maintenance
  - Variable Costs
    - Accumulated Power Costs
      - Fuel costs specific to owned plant operation
      - Purchased energy when deficit
      - Less Sale of Energy beyond domestic load
    - Operating Costs
  - Utility operating costs
- Allocated to customer groups based upon relative "Cost of Service"

# Determination of Economic "Prudence"

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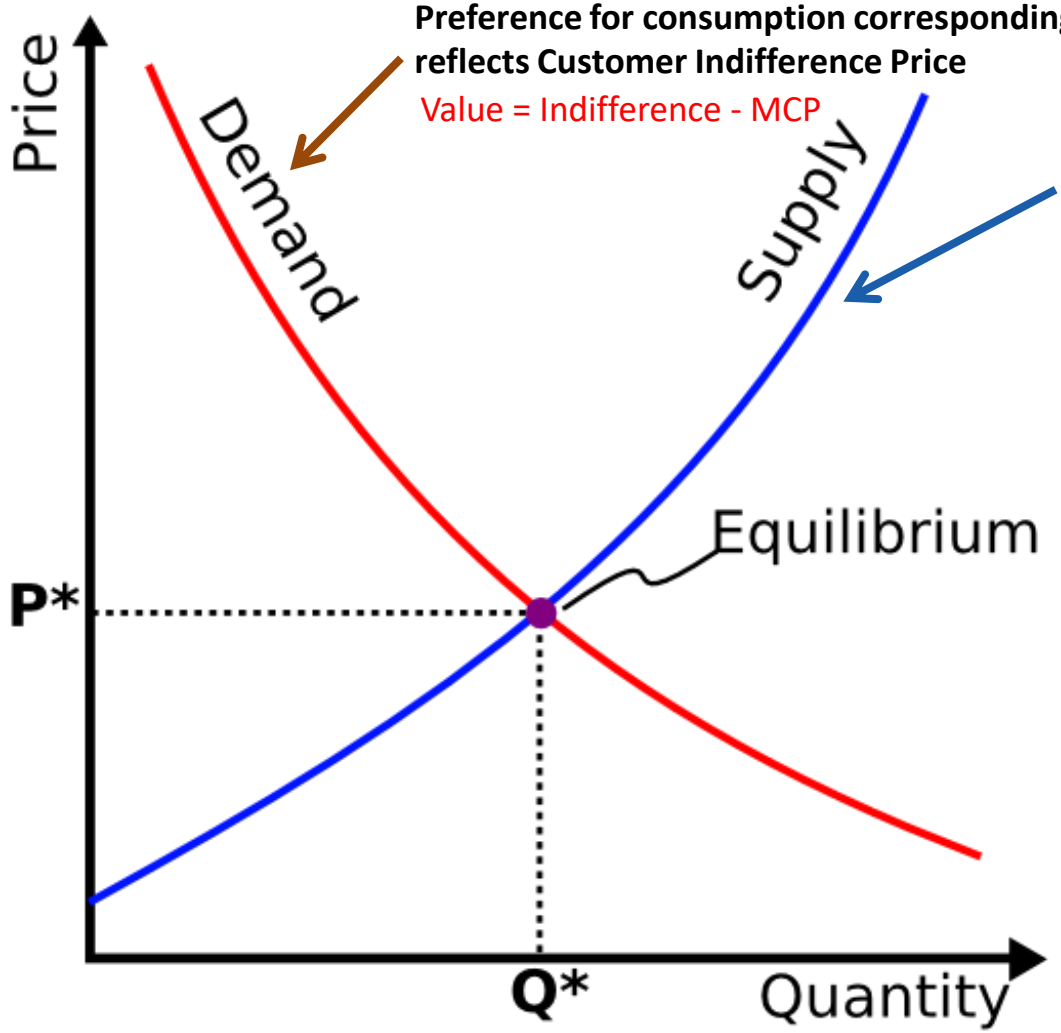
- Prudence is determined by the regulatory authority to allow for cost recovery
- Consistent with the intent to minimize customer costs – hence the lowest cost alternatives to satisfy customer demands (termed least cost revenue requirement)
- Historically, anticipated customer energy that required supply was assumed to be unaltered by price (inelastic) ← Not Valid Today
- Given the lowest cost of serving customers was achieved and customer consumption is indifferent to price, the greatest customer value was achieved

# Customers Become Involved

- Technology is changing the landscape
  - Information flow and Communication
  - Development of devices that can react to prices
- Supply options and volatility of clearing prices resulting from mix of supply
  - Renewables
  - Distributed generation
  - Supply alternatives
- General acknowledgment and adoption of customer choice

# *Industry Approaches Market Fundamentals*






**Preference for consumption corresponding to price – reflects Customer Indifference Price**

Value = Indifference - MCP

**Incremental cost of supply**

- Near-term >variable costs; positive value contribution
- Long-term - incented by positive cash flow to investors

**Market Clearing Price (MCP)**

*Level at which cost of incremental supply equals price level of indifference to higher demand*

# The Basics - "Why It Matters"?

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**Customer is King! Decisions are made corresponding to his demands**

**Supply Options?**

**Distribution options?**

**Demand Response Actions?**

**Transmission Options?**

**Prices; tariffs, incentives?**

# Utility Planning Aligns with Market Perspective

- Aligned - both address forward looking costs and attempt to establish the most competitive method of serving customer demands

- Utility planning, historically has assumed demand unaltered by price, but as previously described is out of touch with current reality

- Market prices are the equivalence of true “avoided costs” that include the volatile timing of supply and demand options; hence inclusive of incremental cost or opportunity value

# Supply/Demand Equilibrium in the Electric Energy Industry

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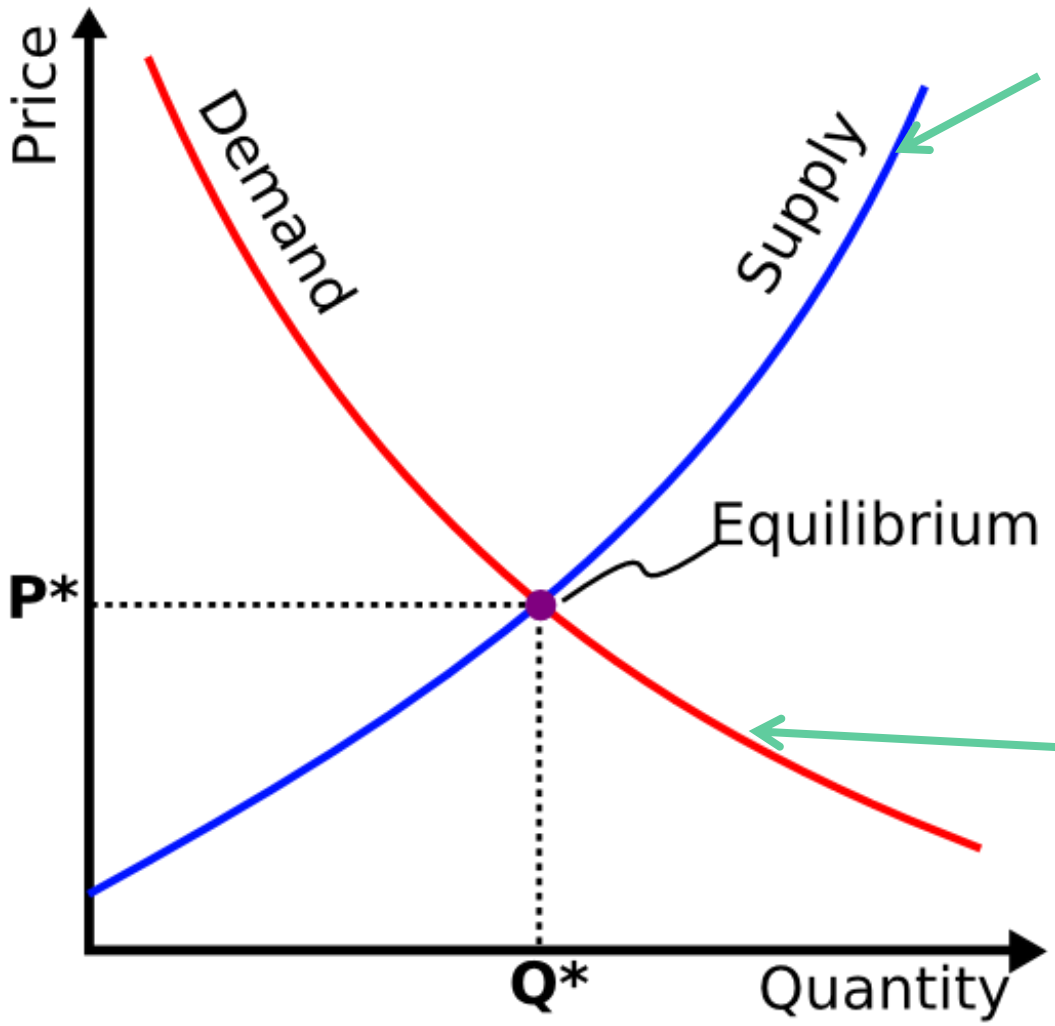



**Resource Supply Stack**

- Increasing cost of supply
- Near-term ~Marginal Variable Operating Cost
- Long-term supply incented by cash flow

**Market Clearing Price (MCP)**
(alias: opportunity cost,
utility avoided cost)

**Consumer Consumption**:

- Non-discretionary load
- Discretionary Load
  - Consume/Decline
  - Defer Consumption

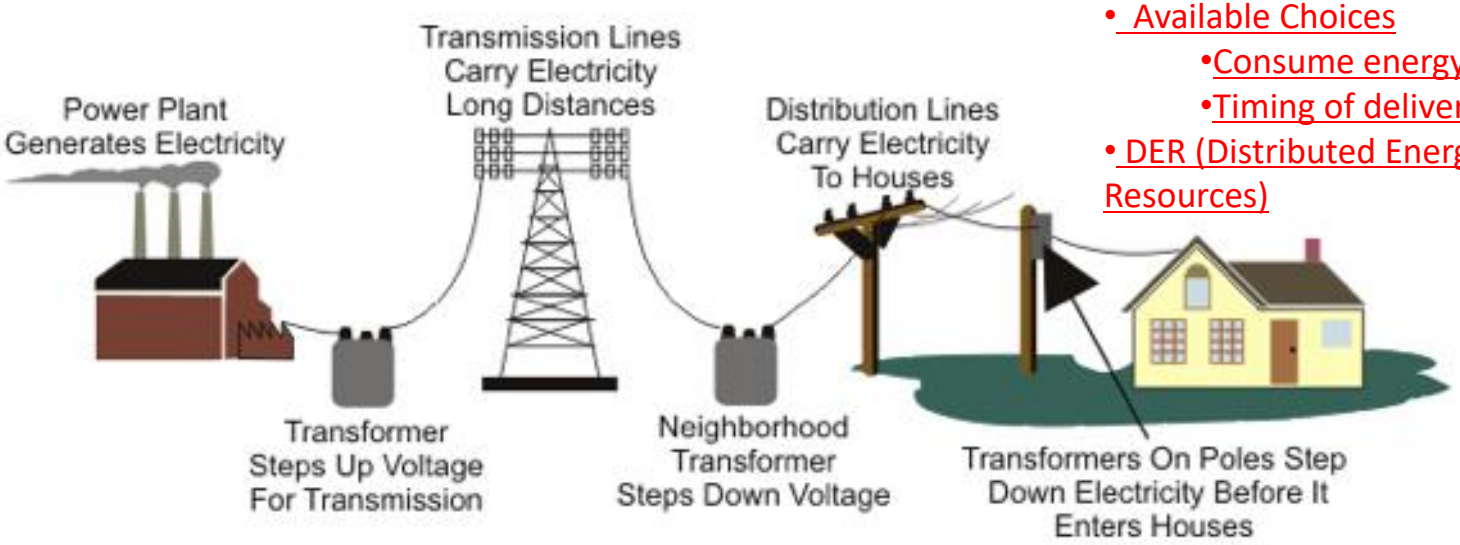
# Decisions Needing Market Perspective

**Regulated Utilities**

- Existing investments
- Rates based upon regulated tariffs
- Future supply decisions
  - Generation/Distribution/Control

**Customer Loads and Options**

- Many diverse uses
- Available Choices
  - Consume energy
  - Timing of delivery
- DER (Distributed Energy Resources)



# *The Basis for Decisions that Optimize "Value"*

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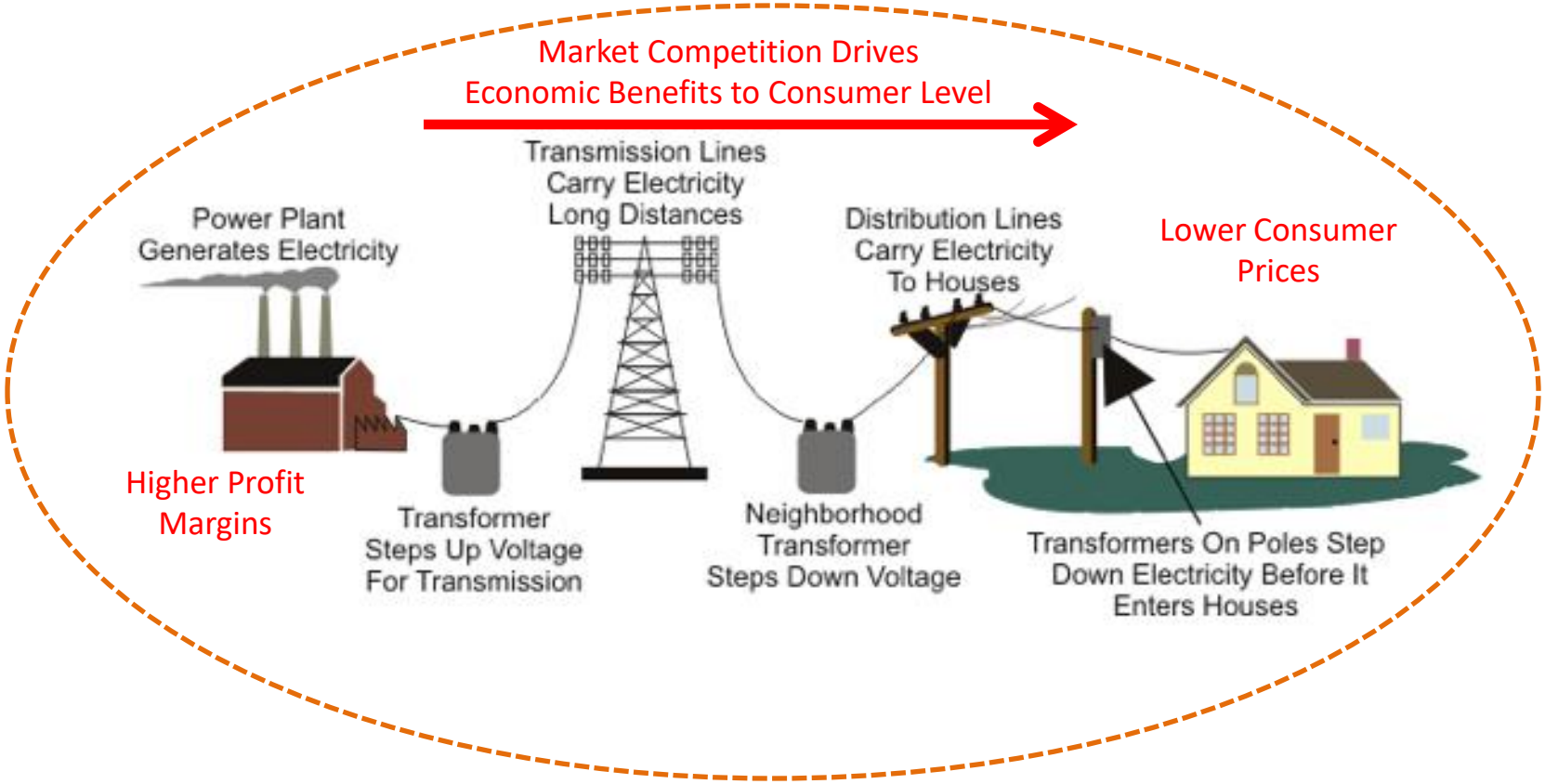
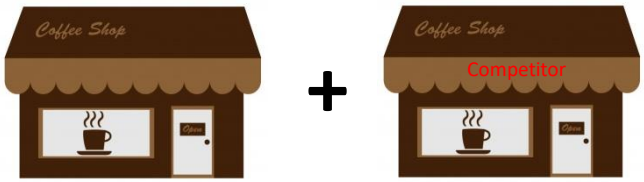
**A *single* metric to apply to *all* decision making**



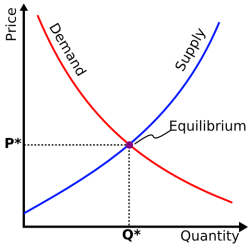
# Dynamics of Metric Providing Industry Direction

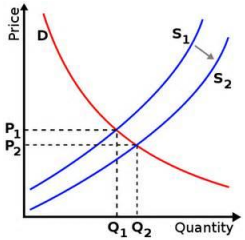


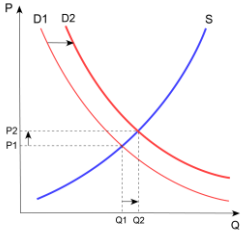



or

**Profitable Venture**




- Election of Alternatives ***Dynamically*** changes Prices and Value of Potential Alternatives
- Important to adopt the “low hanging fruit” ahead of less effective alternatives
- As adoption occurs, the market will saturate, whereas continued development is diminished


# Walking Through the Mire

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***The Good***

- Adoption of market price incentives aligns supply and demand, providing value to both customers and comparative basis for supply
- Avoids election of non-economic alternatives
- Provides added value for renewables – increases demand corresponding to increased supply; hence higher prices than without change in demand

***The Bad (hurdles)***

- Problematic issues facing Electric Energy Industry to adopt open, transparent market (price determination, communication, volatility, grid stability etc.,)
- Current Utility pricing to customers is far from providing appropriate economic signals to incent customer behavior

***The Ugly (obsticles)***

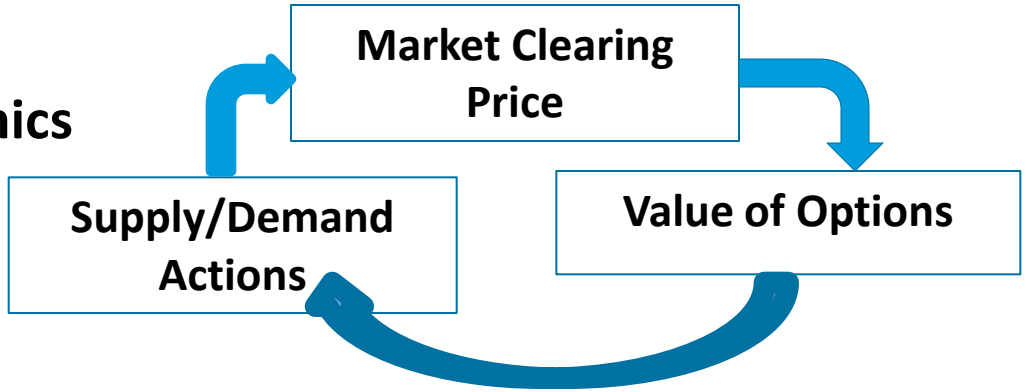
- Market pricing re-aligns value to investors of existing infrastructure investment

# Concluding Remarks



- ✓ ***Greatest value*** achieved when supply/demand options selected based upon ***clearing price metric***

- ✓ **Dynamics**




- ✓ **Current Wholesale Clearing Prices**
  - ✓ Current prices communicated in some wholesale markets
  - ✓ Future prices forecast using ***Market Simulation Models*** that include supply/demand alternatives.

# THANK YOU

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**Dave LeVee**
PwrCast
Dave.pwrcast@gmail.com
503-970-1073