North Carolina
Electric Membership Corporation

Price Formation in Energy and Ancillary Service Markets Operated by Regional Transmission Organizations and Independent System Operators
Docket No. AD14-14-000

Scarcity and Shortage Pricing, Offer Mitigation and Offer Caps Workshop
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Panel 4: Impacts of Offer Price Caps and Market Power Mitigation

Price Caps

- Price Caps are necessary in RTOs and ISOs to mitigate market power and to protect customers from unreasonable prices during periods of capacity deficiency or emergency.

- Removing price caps to increase demand response should not be done at the expense of customers who incur substantial cost increases for minor increases in generation.

Mitigation Rules

- Mitigation rules are designed to ensure that resources are able to bid their marginal costs, but not able to exercise market power.
- Mitigation procedures are based on the premise that in a competitive wholesale electricity market, a resource's offer will be approximately equal to its short-run marginal cost (including opportunity costs).

Background

- FERC Order 719 required RTOs and ISOs to reform their market rules to ensure that energy prices, during an operating reserve shortage, will appropriately reflect the value of energy.
  - Fixed prices seen by retail customers do not reflect the true value of energy; therefore retail customers are not able to react to changes in the wholesale market.
  - Lack of a price signal to retail customers leads to over consumption during shortages.

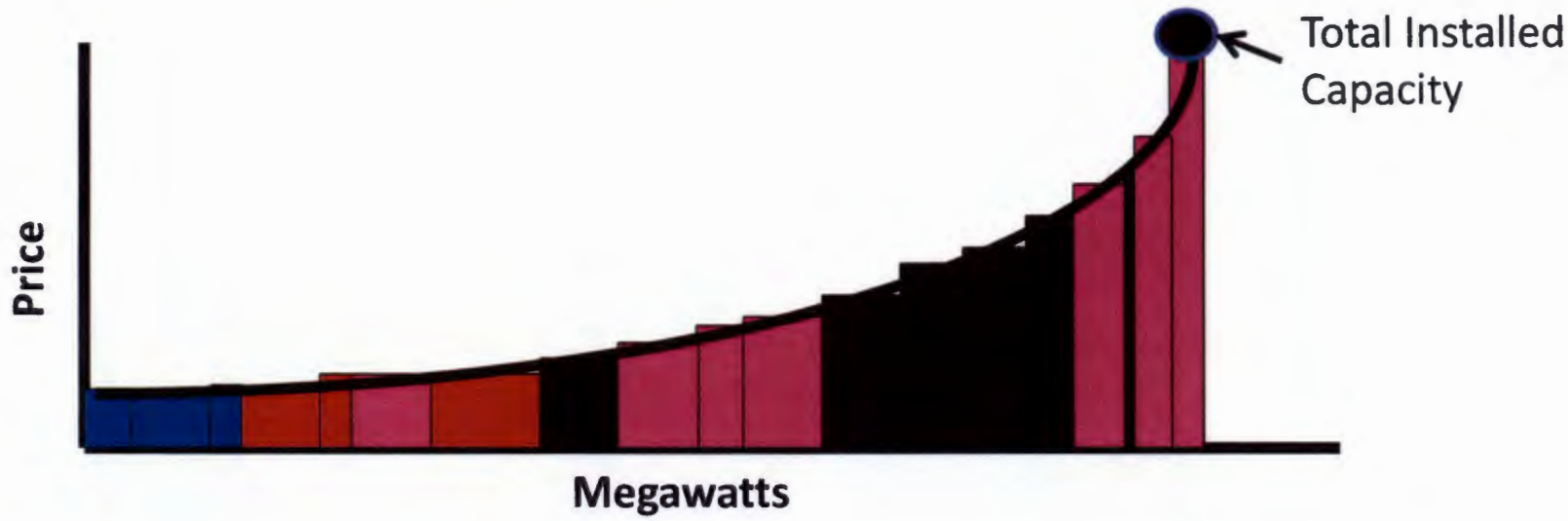
- FERC Order 719 expressed the view that the wholesale electric power market works best when **demand can respond to the wholesale price:**
  - The vast majority of demand can not see the real price of electricity during shortages causing overconsumption and dramatic wholesale price spikes.
  - Where demand response received incentive compensation, the true cost to all consumers of demand response provided by some consumers exceeds the compensation required for a manufacturer to stop production and is far in excess of what any consumer would pay for electricity if they saw the true incentive price.

Intersection of the Free Market and the Regulated Market

	Market	Regulated
Price	Invisible Hand	Regulated, Cost of Service
Quantity	Invisible Hand	Regulated, Certificates of Convenience and Necessity

- Price spikes and scarcity prices are a result of the relation between market based prices established in the wholesale market and fixed prices that are set in the retail market:
  - Prices vary in the wholesale market as supply and demand varies.
  - The retail market has regulatory determined fixed prices that remain for months or years.
- Inability of retail demand to see the wholesale price signal feeds back into the wholesale market in the form of higher demand:
  - The effect of this feedback is more pronounced during shortages caused by extreme weather events.
  - Retail rates established by states.

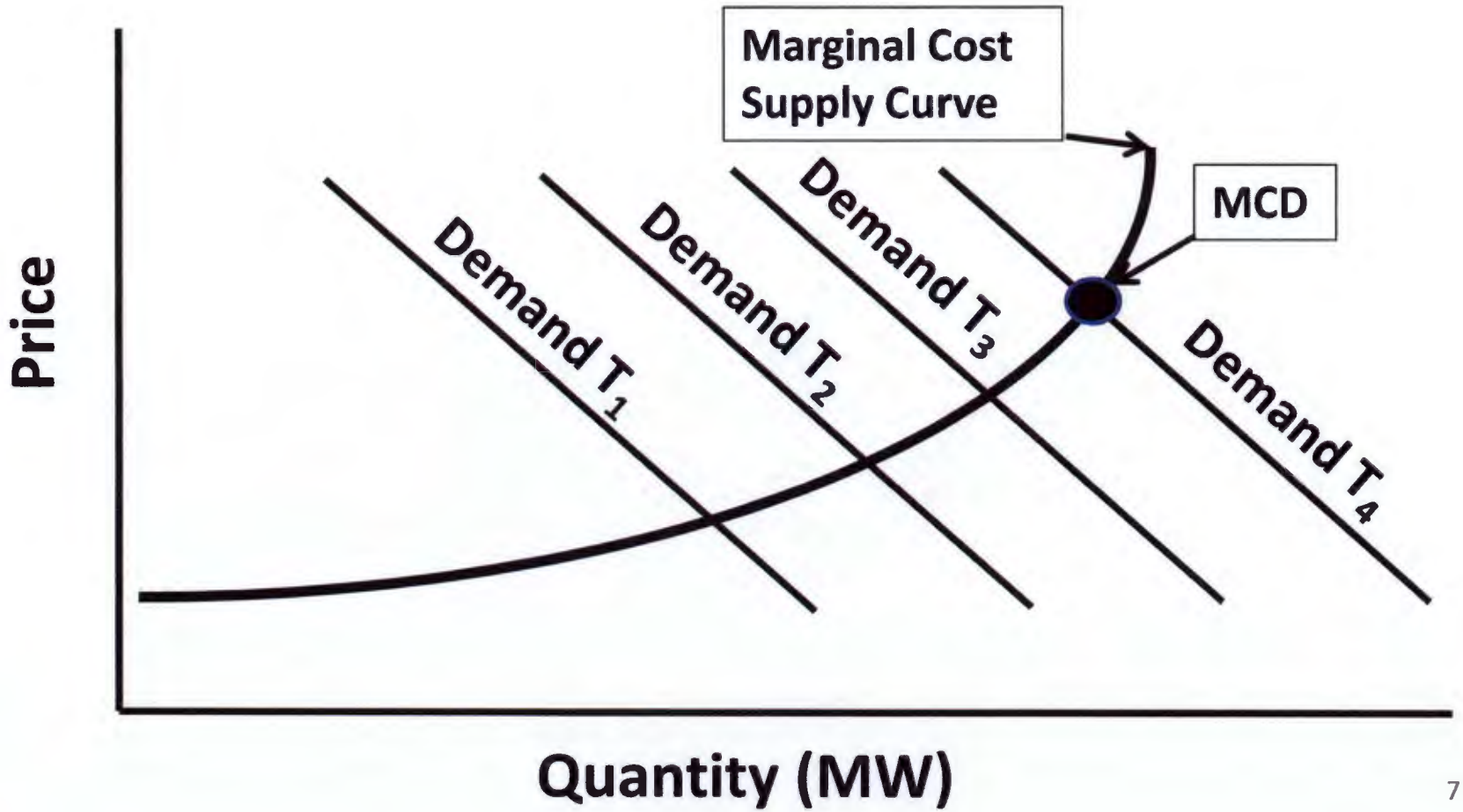
Supply Curve



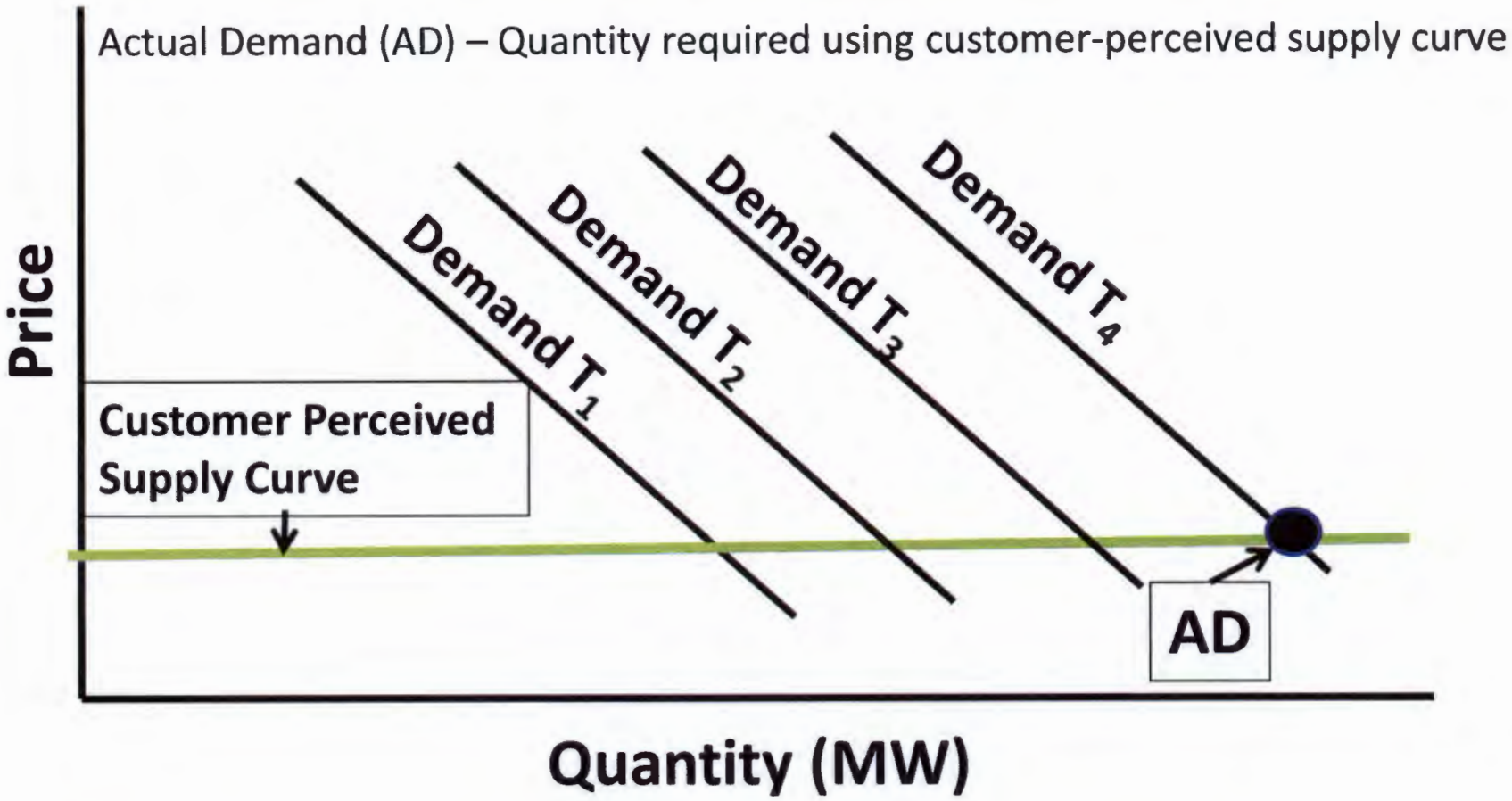
- The supply curve is the marginal cost of generation.
- At "Total Installed Capacity" all generation is running:
  - There is no additional generation available at any price.

Theoretical Supply and Demand

- Demand curves are a function of Price, Time-of-Day, Temperature, etc.
- Market Clearing Demand (MCD) –Theoretical price and quantity in a "market"

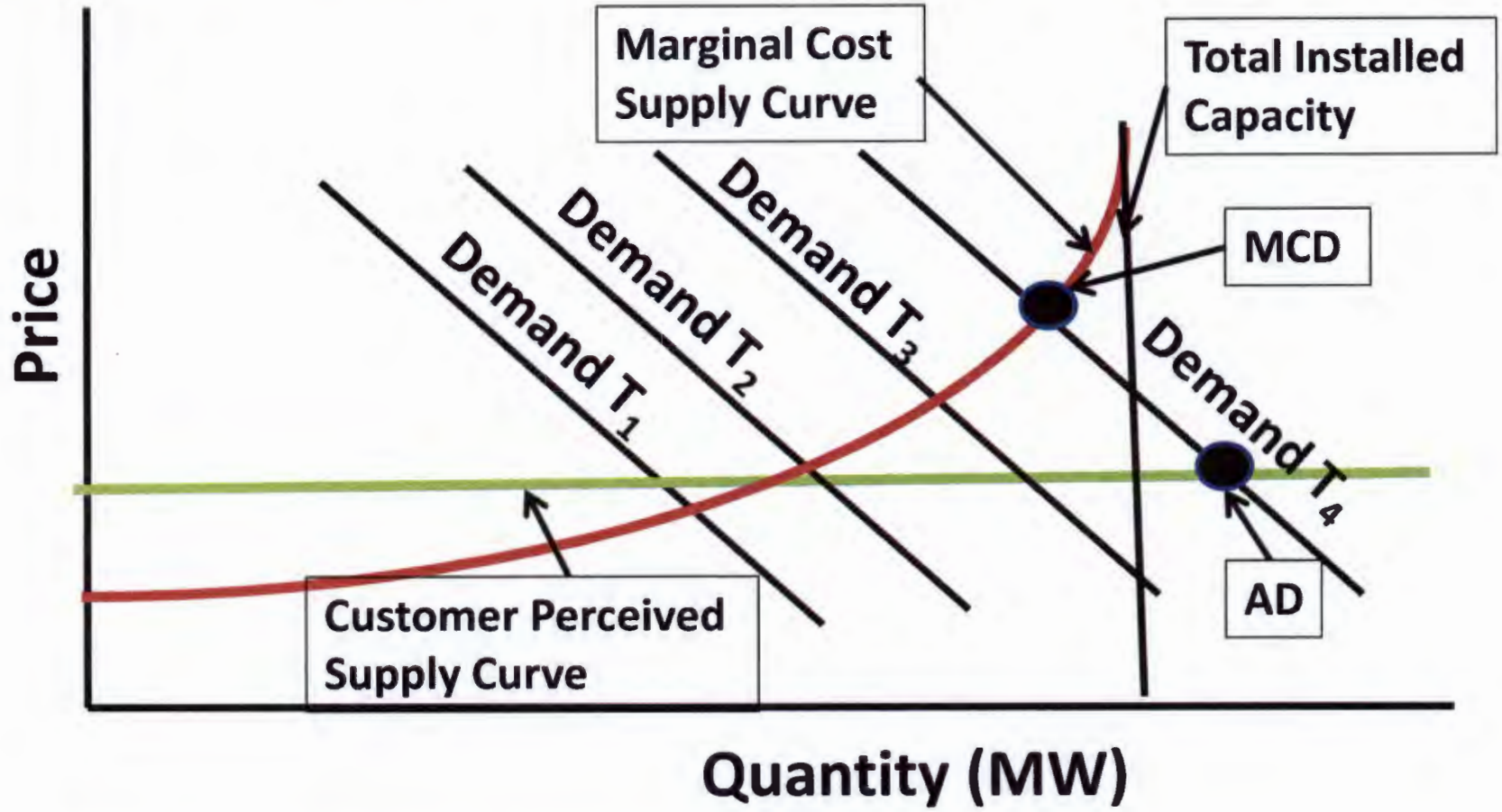


Actual Supply and Demand



- Customers with fixed rates see a flat demand curve with unlimited supply.
- Customers will consume a quantity equal to actual demand .

Actual Demand vs. Theoretical Demand



- MCD – Customer theoretical demand
- AD – Customer demand under the regulated market
- Because Actual Demand exceeds the total installed capacity, supply cannot meet demand

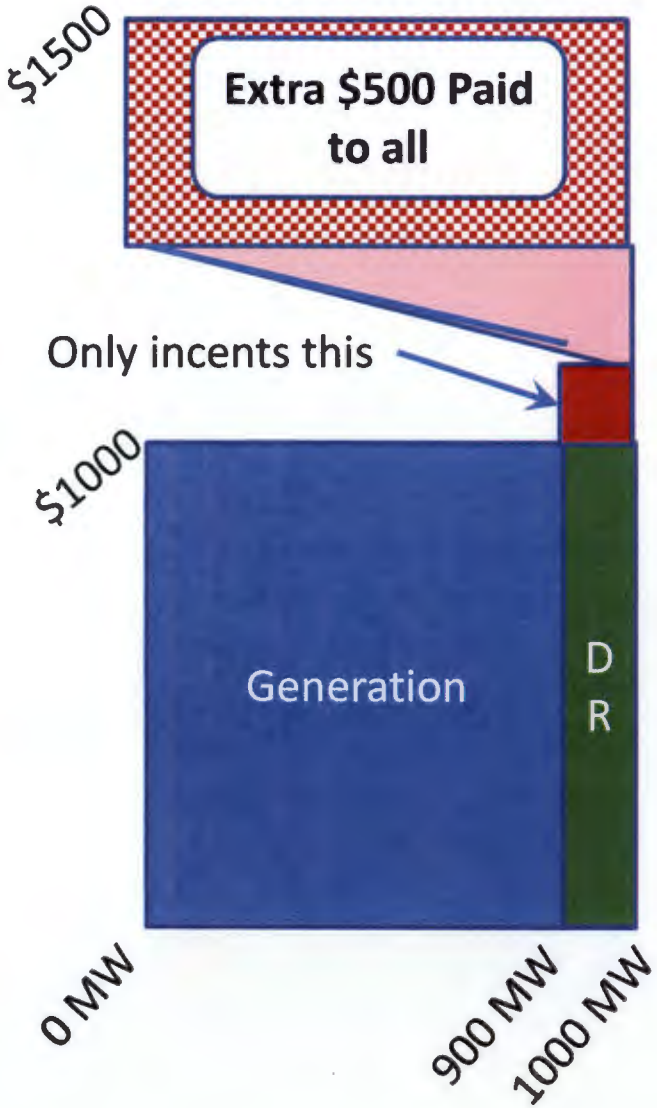
Market Construct Failures

- As demand approaches and exceeds the total installed capacity, wholesale price spikes occur:
  - Consumers see a flat supply curve; there is no incremental price for the next unit, resulting in undiminished demand.
  - However, as the installed capacity limit is approached, generation becomes more expensive and inelastic, meaning dramatically higher prices are needed to get this generation to produce.
  - Over-consumption, uninformed by price signals, either creates or dramatically exacerbates the shortage.
- Once the total installed capacity is surpassed, no price will incent additional generation.

Price Caps

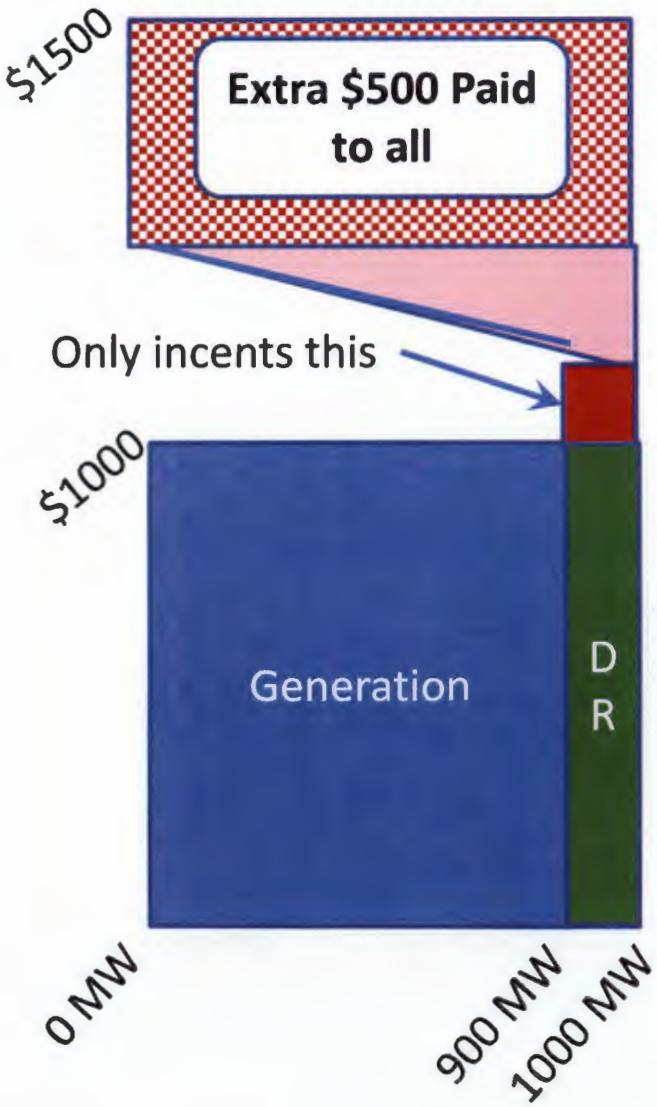
- Market price caps should not exceed MCD, the price that would be obtained if consumers saw the actual price:
  - Any increase in price above MCD only rewards producers who would not obtain a higher price if the market functioned properly, and generators would get a monopoly rent solely as a function of the improper price signal.
  - Once the installed capacity limit is reached, no additional price will result in more generation, so customers should not pay more for a phantom benefit.
- Removing price caps to incent demand response would overcompensate demand response and effectively set a rate for supply that no consumer would be willing to pay:
  - Price caps should be based on fuel units and not on demand response prices because increased prices associated with demand response provide no additional incentive for fuel units to operate.

High Prices Induce Additional DR, With No Additional Generation



- Consider the combination of Generation and DR:
  - 90% of generation is supply side generation.
  - 10% is demand response.
- Assume that the <u>last</u> supply side generator produces when the price reaches $1000/MWH (i.e. no more is available) and no demand response enters the market before this point.
- Assume that in order to incent demand response, prices have to raise to $1500/MWh.
- Although the clearing price is shared by all producers, the only effect is to incent demand response:
  - All supply side generation is running at $1000.
- This results in an unrealistically high price just to incent DR:
  - 1000 MW * $1500/MWh = $1,500,000.
  - $1,500,000/100 MW of DR = $15,000/MWh just to incent the last 100 MW which can only be provided by demand response.

High Prices Induce Additional DR With No Additional Generation



- $15,000/MWh for demand response:
  - All of the increase is attributable to the DR megawatts making its effective price/MW 10 times that of generation.
  - Market Participants are paying to have 100% of the generation increased, but only receive a 10% increase in "supply."
- The more demand response that is consumed the less remains, making it more inelastic; thus paying higher and higher prices will produce less and less supply.
- Removing price caps to incent demand response hurts customers:
  - Customers would not pay the effective rate of demand response if they saw the true price (as previously shown this rate is much higher than demand response should be paid).
  - Once installed capacity is reached, higher prices simply produce "phantom" profits for producers, i.e., higher prices with no incremental service or benefits.

Need for Market Mitigation

- FERC Staff Analysis of Energy Offer Mitigation found that over half of all resource offers have no markup above reference levels:
  - However, markups of the highest ten percent of offers are substantially more than marginal cost (roughly 60 percent in ISO-NE and 177 percent in CAISO).
  - The mean markup of resources in the most expensive part of the supply curve is also substantially greater than marginal cost.
- The highest ten percent of offers, when substantial markups occur, coincides with shortages:
  - During these occurrences market power exists since generators are bidding substantially above their marginal cost.
  - Mitigation measures and offer caps are required during these times to ensure that customers are protected from abuse of market power.

Roles of Offer Caps in Ensuring Just and Reasonable Rates and Consumer Protection

- Price Caps occur because of clash of two regulatory practices: the decision to not impose real-time prices retail markets, which leads to high demand, and the utilities' duty to serve, which requires them to buy at any price.
- Clearly $5,000/MWh is far in excess of the societal value of energy to almost any consumer, yet utilities continue to buy at that price if necessary.
- Where markets fail and cannot deliver an acceptable outcome regulation is needed.
- FERC should continue to impose price caps to protect consumers; high prices generate higher bills and higher profits, but provide little if any extra electricity as anytime price is above $1,000/MWh offer cap, all units are running.

Will High Prices Induce More Generation and Demand Response?

- Shortage pricing should not have any effect on the construction of new generation since it happens so infrequently:
  - The FERC Staff Analysis of Shortage Pricing in RTO and ISO Markets states that PJM did not have any reserve shortage events or shortage pricing during 2010, 2011, or 2012.
    - In 2013 PJM experienced shortage pricing on 3 different days.
  - Generation construction is based on steady revenue streams over a long period of time, not the possibility of high prices a few times a year.
  - Generators also have a disincentive to build where construction would reduce LMPs for their existing generation.
- If shortage prices do provide an incentive to build generation, they likely incent only peaking generation.

Do Offer Caps Allow Generators to Reflect their Costs in Offer Bids?

- Under normal conditions generators should be able to recover all of their costs through offers below the price cap threshold:
  - Only during extreme events does cost of electricity exceed $1000/MWh offer cap.
- During these extreme events, if the actual price of generation exceeds the price cap, then the generator should be allowed to recover all of its costs through uplift payments:
  - The generator should not be allowed to set the market clearing price because price increase in these extreme events are caused by market inefficiencies.
  - Prices should remain capped at the $1,000 offer cap.

Conclusions

- The market cannot be used as a band aid to solve regulatory problems; it must have price transparency/discovery on the demand side as well as on the supply side to work.
- Prices caps should limit the amount customers pay and producers (including demand response) earn to the amounts the market would determine in the absence of regulatory-induced false price signals.
- So long as retail customers cannot receive and act on wholesale price signals from the supply side, administrative pricing and allocation of recovery of supply's cost is unavoidable.