

Economics of Government Intervention

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Economic regulation (not exhaustive)

- Occupational regulation (min wages, advertising bans) and licensing
- Health & safety
- Environmental
- **Antitrust/competition policy**
- **Natural monopoly regulation**

Freedom of innovation
and market entry

Monopoly

- Do markets tend toward monopoly?
 - Negative effects of monopoly: high prices, deadweight loss, bad for consumers
- If monopolies do arise in markets, do they persist? If so, why?
 - “Secret recipe”, some particular skill or technology, ownership of a natural resource
 - Government entry barriers: patents, regulation, etc.
- If so, is there justification for government intervention?

**Disciplining monopoly: consumer
demand, competition, innovation**

Dynamics of competition

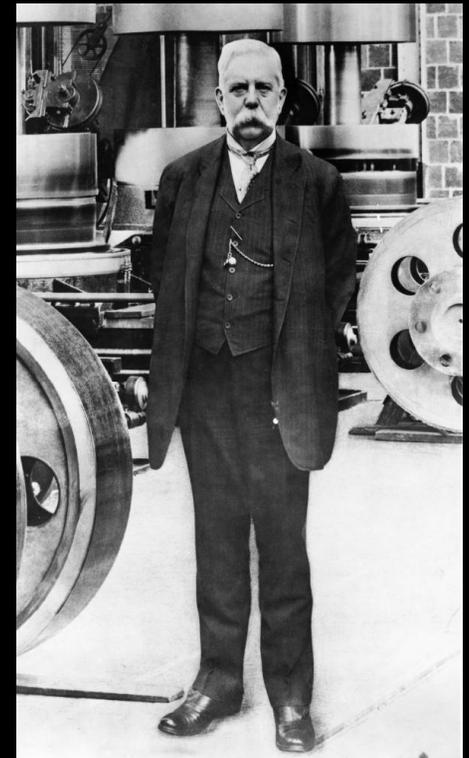
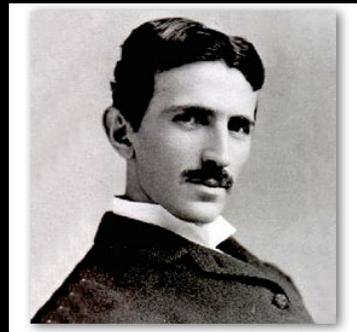
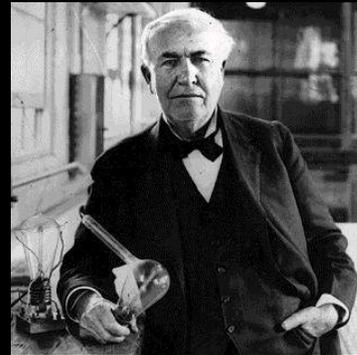


- Joseph Schumpeter
- Monopoly profits are the carrot that induces innovation: new products, new production techniques, new modes of organization
- Competition for market dominance
- Dynamism erodes the monopoly and renders it temporary
- “... the perennial gale of creative destruction”

A hard case: the “natural
monopoly”

A whirlwind history of the electricity industry

- Whale oil?
- Edison/Tesla/Westinghouse “War of Systems”
- Late 19th c.: cities granted franchises to vertically-integrated utilities, initially rivalrous markets
- High fixed costs/capital costs, debt & equity funding
- Vertically integrated supply chain: generation, transmission, distribution, (lighting fixtures), retail

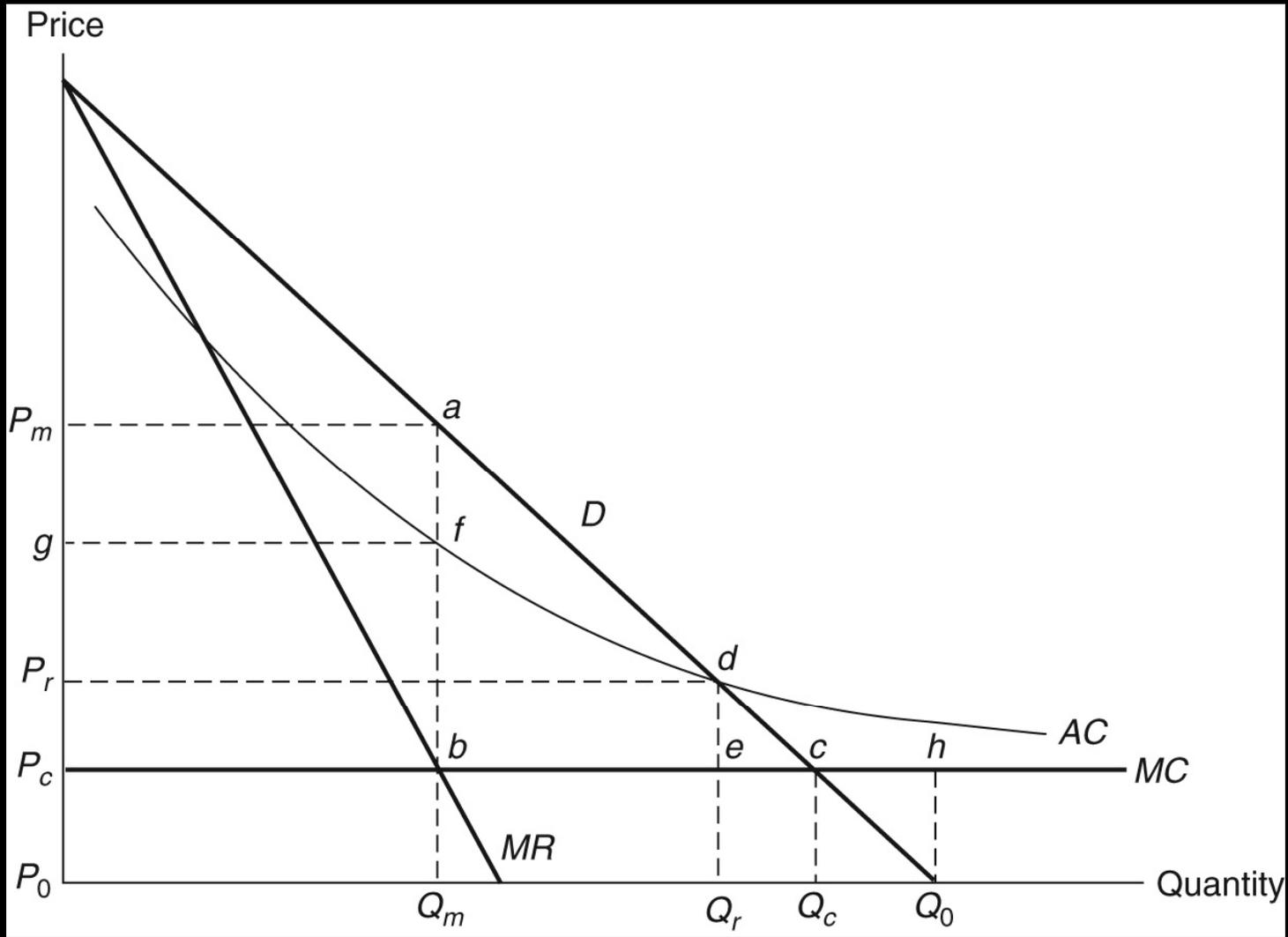


Tesla's turbines, Niagara Falls, 1895



Why regulate?

- Public interest argument
 - Conceptual and common law precedents: Aquinas “just price”, common-law regarding “essential services”, Munn v. Illinois (1887)
 - Populist era culture of suspicion of large companies
- Public choice theory argument
 - Institutional bargaining between industry and policymakers
- Economic theory argument
 - High fixed costs => economies of scale over the range of consumer demand



“Standing in for competition”

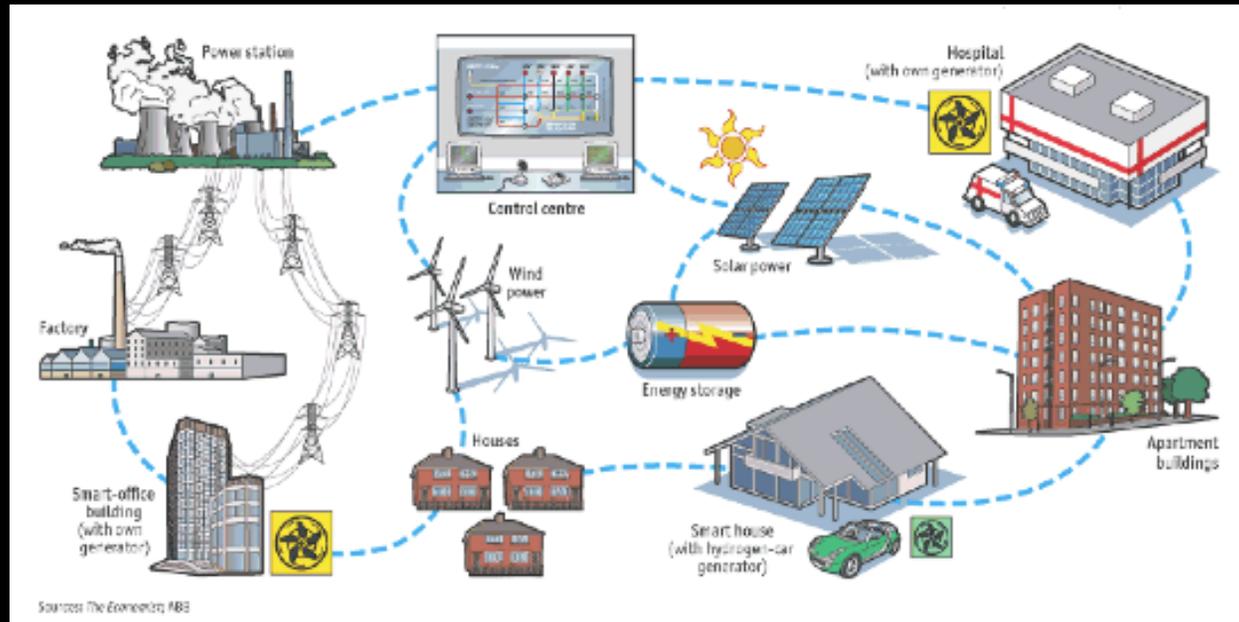
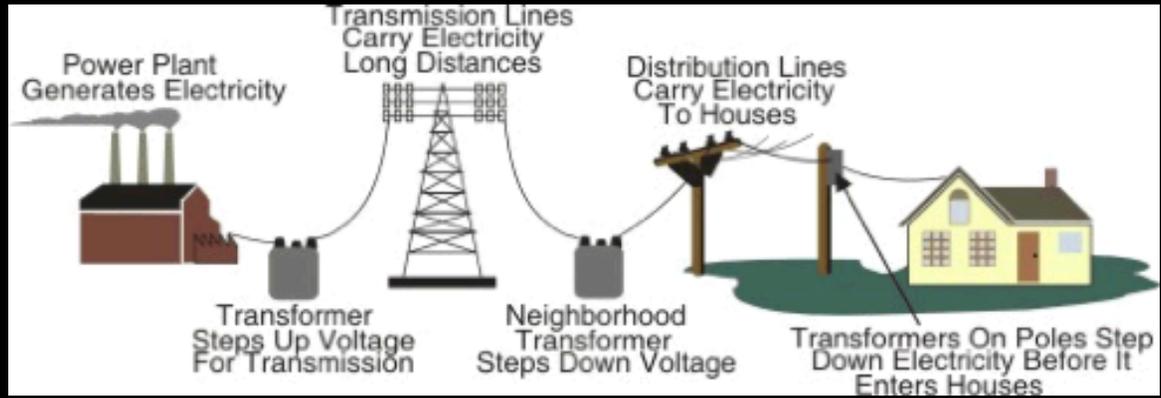
Some critiques of regulation

- Did achieve low, stable prices and universal electrification ... but at a high cost
 - Static market/product definition necessary
 - Stifles innovation
- Asset investment incentive problems
 - Incentive to overinvest and overbuild capacity
 - Incentive to invest in “iron in the ground” reinforces lack of innovation
- Lack of cost management incentive problems
- Based on a static neoclassical model in a dynamic, and increasingly complex, environment

What's next? Smart grid.

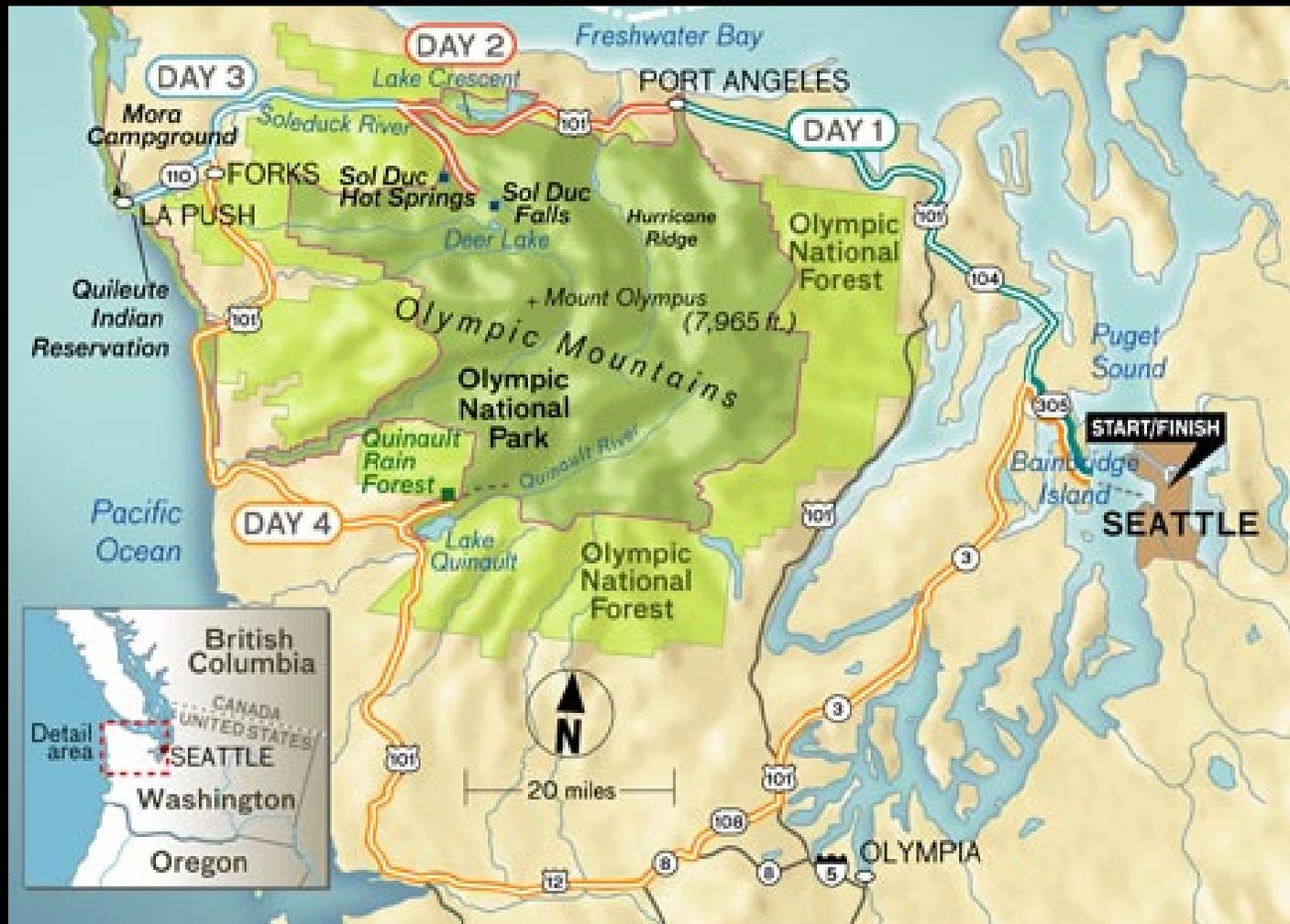
Smart grid technology & economics

- Sensing, embedded computing capability and two-way communications in the electric power network' physical infrastructure
- Smart grid as a “network of networks”
 - Transmission
 - Distribution
 - Wholesale power markets
 - Distribution local area network
 - Consumer's home area network (HAN)
- Wide variety of technologies and capabilities through the network
- Digital technologies enable a paradigm shift from centralized control to decentralized coordination



**A smart grid is a transactive
network**

Case study: GridWise Olympic
Pensinsula project

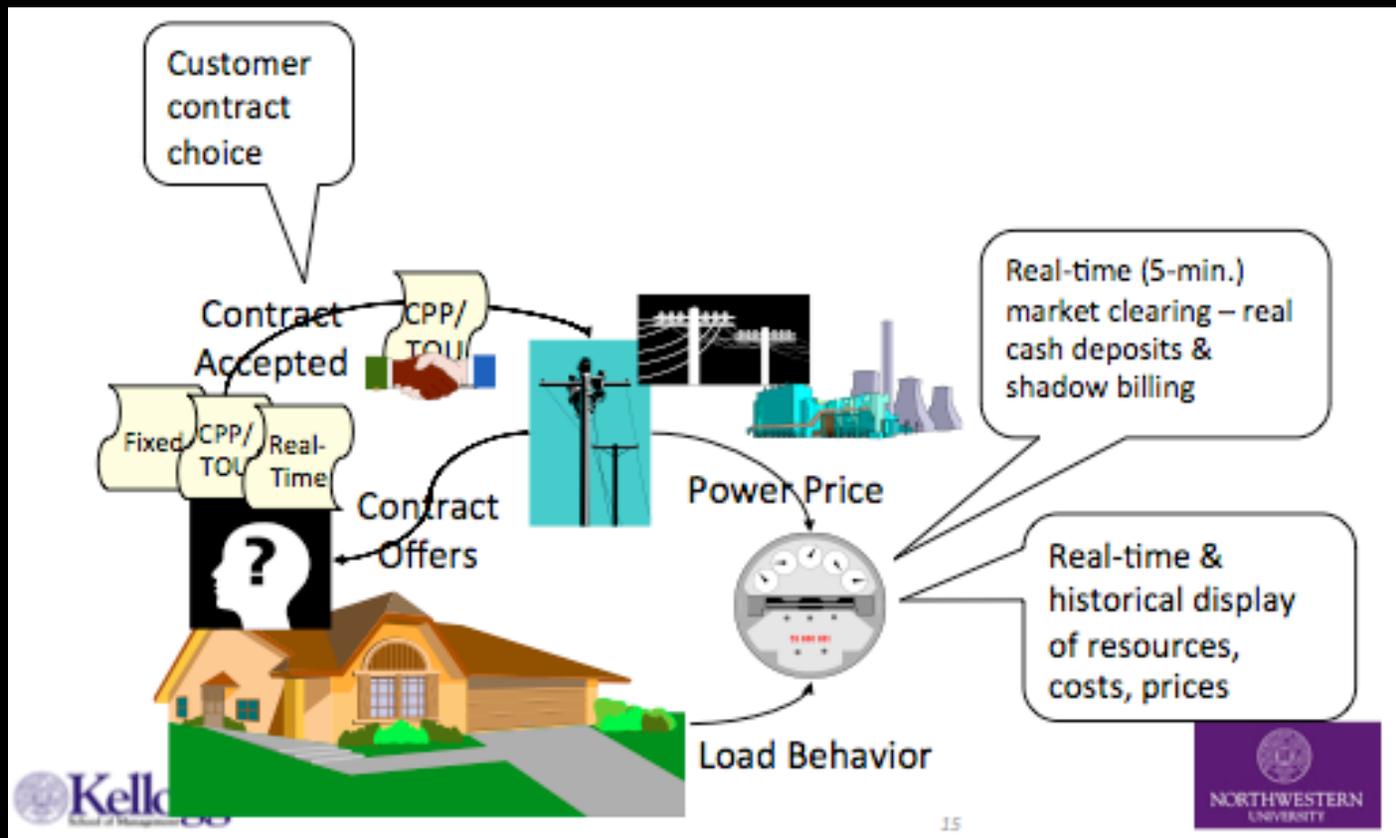




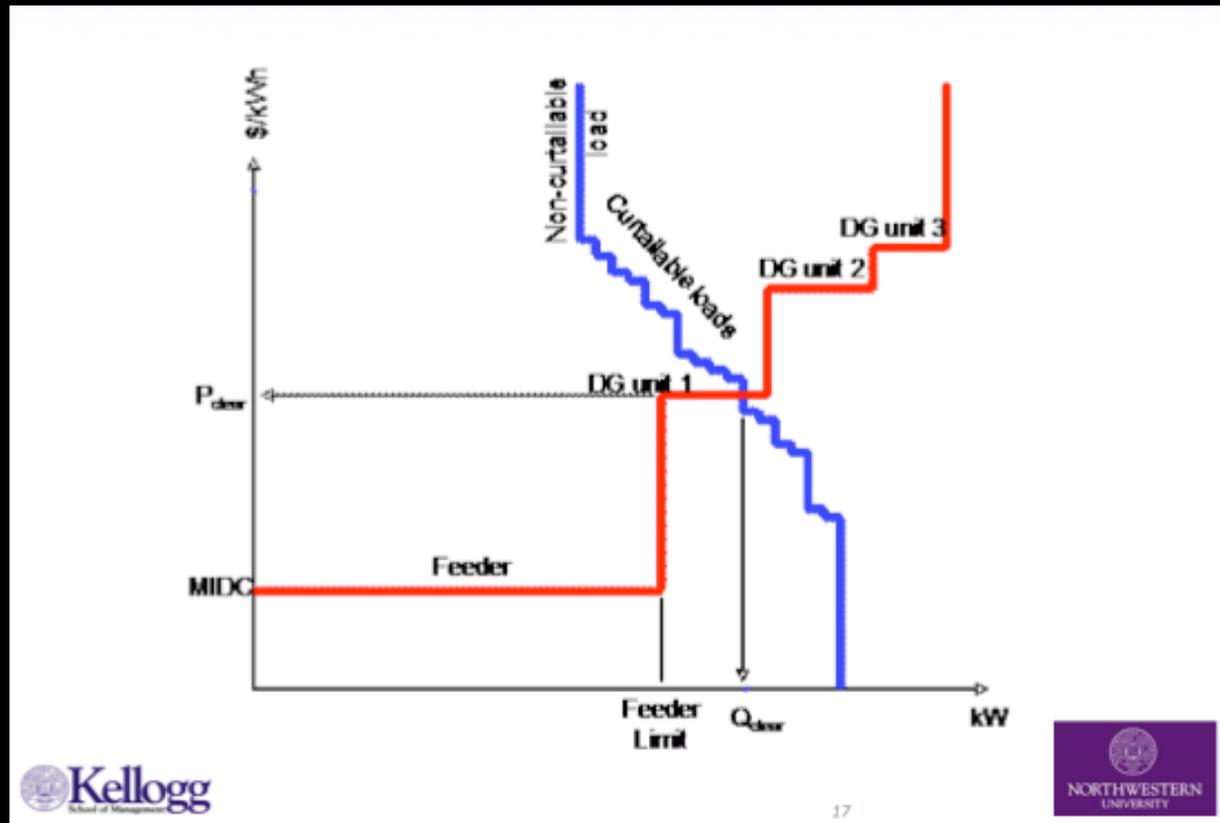
Project summary

- 2 hypotheses to test
 - Does the tech/pricing combination change consumer energy use patterns (and therefore system)?
 - Do consumers automate their responses?
- Participants chose among three contracts: Fixed, Time of Use (TOU), Real Time Price (RTP)
- RTP market clearing
 - 5-minute intervals, with price-responsive appliances & ability to automate decisions
 - Designed as a double auction
 - First ever use of a double auction in a residential retail electricity market

Testing market-based consumer incentives in a transactive network



Real-time retail double auction



Overall project results

- Automation reduced transaction costs and increased responsiveness to price signals
- Consumers saved money: 10% on average, highest for RTP
- Reduced overall consumption
- Reduced peak demand took strain off of infrastructure
- Implied reduction in wholesale electricity prices
- If extrapolated nationally, could lead to avoided investment in “iron in the ground” of \$70 billion over 20 years

Competitive retail markets are more likely to create and deliver such benefits than regulated utilities

The knowledge problem and the value of retail competition



“The economic problem of society is thus not merely a problem of how to allocate “given” resources ... it is rather a problem of how to secure the best use of resources known to any of the members of society, for ends whose relative importance only those individuals know.”

F.A. Hayek



“Civilization advances by
extending the number of
important operations
which we can perform
without thinking of them.”

Alfred North Whitehead