Making Electricity Markets Work

The Importance of a Demand-Side Market Response

Presentation to the Montana Environmental Quality Council
December 10, 2001
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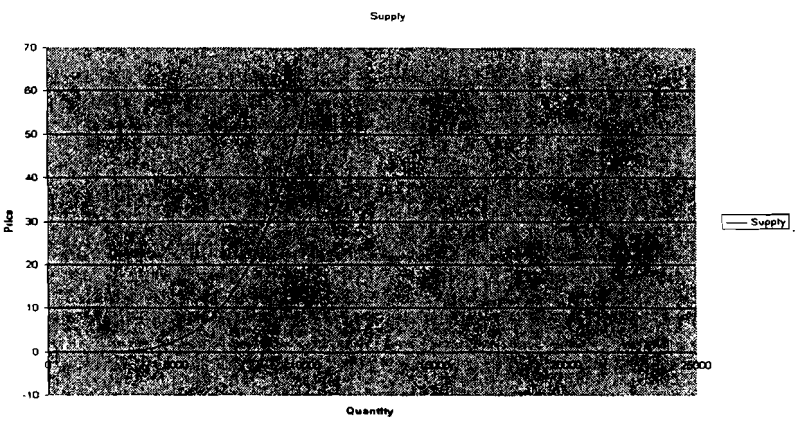
Summary

- Malfunctioning markets can cause big problems. Both sides of the market have to work.
- Markets don't work if there is no demand side response to prices
- There can be no demand side response if customers don't see prices

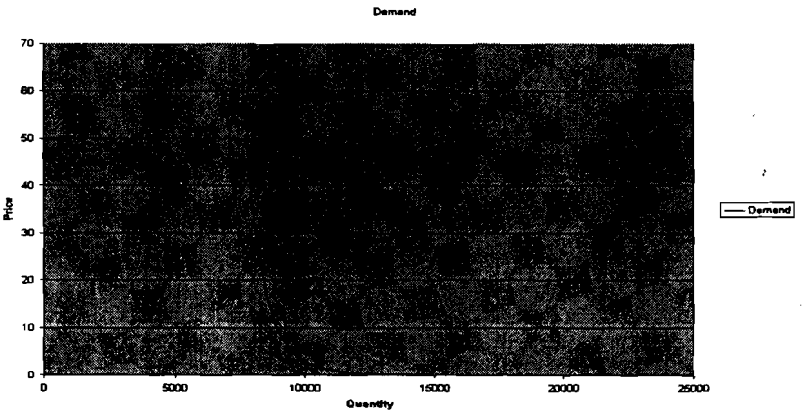
Economics 1 Refresher Course

- Markets have two sides - supply and demand

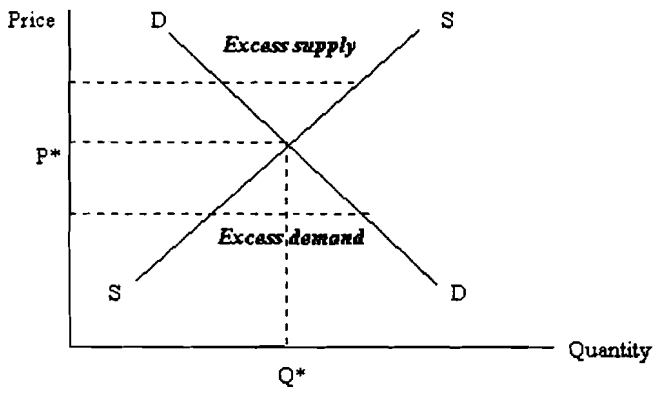
Supply



Demand



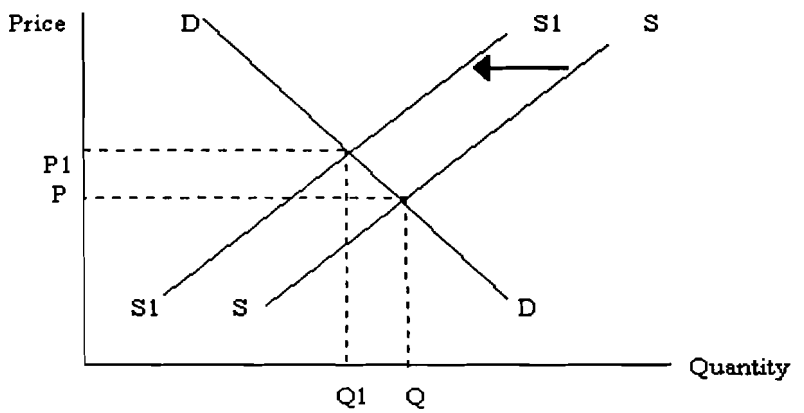
Market outcome



An aside: what are prices?

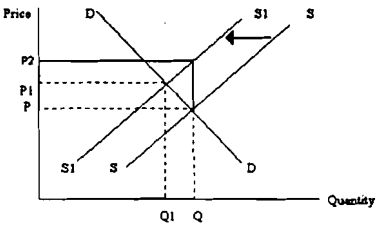
- Prices serve key functions -
  - They allocate scarce goods to those who value them most
  - They signal what goods are worth
  - They signal when new investment is worth doing
- But they also transfer income

Adjustment to changes in supply



What happens if consumers don't see price increases?

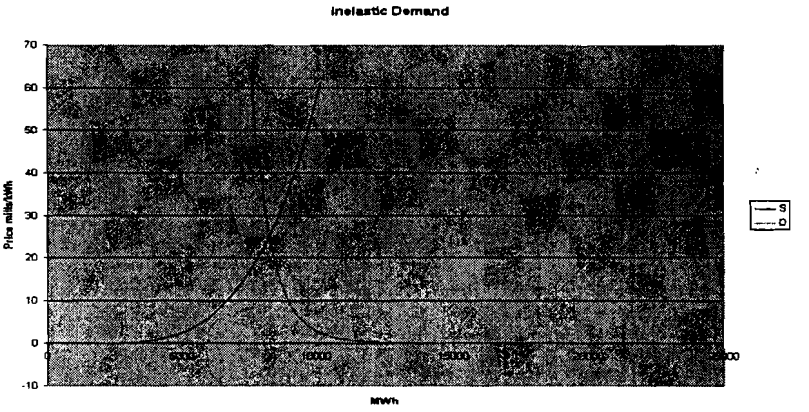
- Supply must be forced or subsidized
- Greater price rise
- Who pays?



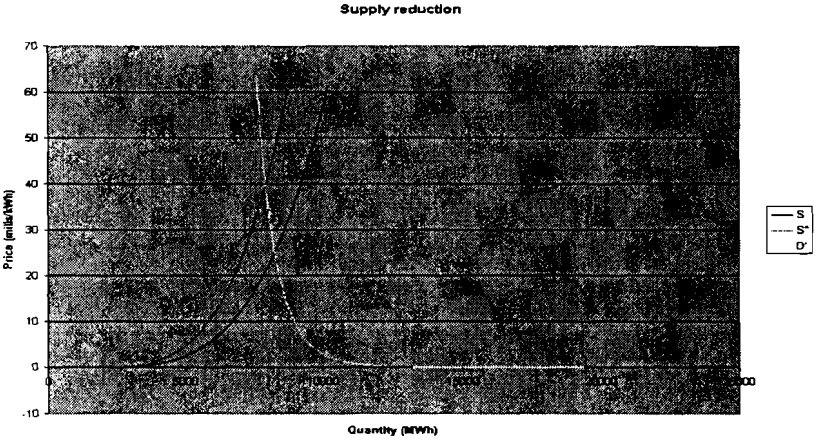
Is this applicable to electricity?

- "Electricity isn't storable"
- "Electricity is a necessity"
- "Electricity has no substitutes"

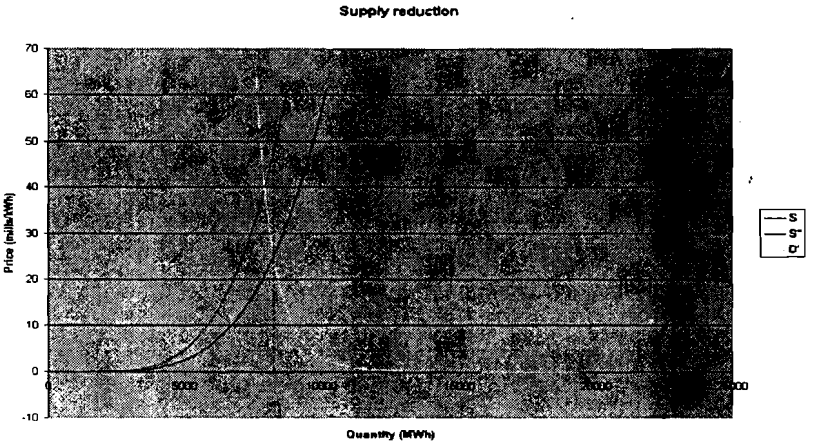
Application to electricity



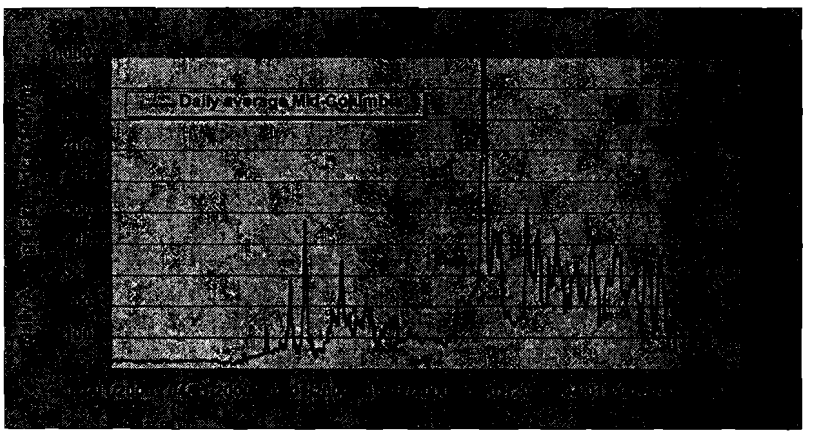
Electricity market with reduced supply



Electricity market with reduced supply - California model



Mid-C Power Prices Jan 1, 2000 - Aug 1, 2001



Historic retail rate regulation of electricity

- Utilities supplied all loads at average cost
- Guaranteed return on investment
- Prudent planning and acquisition of generating resources to serve forecasted load growth

Wholesale deregulation

- Mixed wholesale market - utility generation and unregulated IPP generation
- Wholesale markets can adjust to changes in supply and demand

Continued retail regulation

- Wholesale price changes cannot be passed through to retail customers
- Retail utilities must buy to meet unchanged retail loads
- Price increases absorbed by retail utilities

Partial retail deregulation

- Wholesale price increases seen only by deregulated retail customers
- Full market adjustment borne by deregulated segment
- Montana exposure: most former MPC large industrial customers, plus ASIMI and Express Pipeline (total served by MPC wires 237 MW) and CFAC (342 MW)

Montana demand reductions

- Voluntary conservation
- Curtailed industrial load (around 100 MW) plus onsite temporary generation (under 100 MW)
- BPA CFAC buybacks - 171 MW
- Montana total estimate?

NW Regional demand reductions

- Voluntary conservation
- Price-induced conservation
  - Industrial curtailments and temporary generation - 500 MW
  - Other?
- Irrigation buybacks - 300 MW
- DSI buybacks and cutoffs - 2500 MW
- Regional totals - 4000 MW (10% of loads)

California load reductions

Month	Expected MW	Impact MW	Percent Reduction
January	33,743	-2,091	- 6.2%
February	32,195	-2,578	- 8.0%
March	32,233	-2,967	- 9.2%
April	31,888	-2,866	- 9.0%
May	34,657	-3,595	-10.4%
June	39,637	-5,570	-14.1%
July	41,599	-4,455	-10.7%
August	42,528	-3,796	- 8.9%
September	39,480	-3,163	- 8.0%
October	35,356	-3,106	- 8.8%

West-wide demand reductions - Summer 2001

- Partial westwide total
  - PNW 4,000
  - California 5570 (June reduction)
  - Total PNW+CA 9570
  - Summer peak PNW+CA 101,000 MW
  - Summer reduction 9.5%
  - AZ/NM/So.NV ?

Westwide summary

- Supply shortfall - in 5 percent range
- Price spikes - more than 10-20 fold increases -
  $30/MWh to over $500/MWh
- Efficient market price rise - approx 50 percent - $30/MWh to $45/MWh with demand elasticity of 0.1

Westwide summary (con't)

- Causes - market design
- Causes - no price signal to most consumers
- Causes - lack of demand response

Conclusion

- Demand response is crucial to proper functioning of the market
- Consumers must be allowed to respond to price signals
- Consistent with continued regulation or with retail deregulation.

How to convey prices to retail consumers

- Method 1 - retail deregulation.
  - Real time spot prices; risk borne by customer
  - Mid- to long-term contracts; risk borne by supplier.
- Method 2 - continued regulation.
  - tail block rates adjusted to average market prices; risk sharing determined by PSC.

How to convey prices to retail consumers (cont'd)

- Method 3 - continued regulation
  - demand exchange programs.
  - partial or total load buyback.
- Method 4 - continued regulation
  - load management and conservation programs
  - not a price response by consumers, but a utility-managed load reduction or interruption.