Achieving a Robust Market on the Distribution Grid
by Mark B. Lively

Second Carnegie Mellon Conference in Electric Power Systems:
Monitoring, Sensing, Software and Its Valuation for the Changing Electric Power Industry
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“People worked harder for a reward, especially one that coincided with patriotism.” Tom Clancy, *Without Remorse*.

“Producers work harder for a reward, especially one that coincides with reliability.” Mark Lively, in explaining WOLF.
Achieving a Robust Market on the Distribution Grid

• Market Examples
• Market Theory
• Electric Applications
Market Examples

• Cantina D’Italia
• Leon Walras
• Walrasian Auctions
• Hurricanes Katrina & Rita
Basil Stuffed Veal Chops

Date

Time Last Sold

12:00 AM
11:00 PM
10:00 PM
9:00 PM
8:00 PM
7:00 PM
6:00 PM

$18

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27

Date
Basil Stuffed Veal Chops
Basil Stuffed Veal Chops
Demand Curve

Dinner Charge

Potential Sales
Market Examples

- Cantina D’Italia
- Leon Walras (1834-1910)
- Walrasian Auctions
- Hurricanes Katrina & Rita
Market Theory

• Supply and Demand
• Feedback Loops
• Quantifying the Quality of Public Goods
Wide Open Load Following
Dynamic Economic Theory

Price
($/MWH)

Demand

Supply

Equilibrium Price

Nominal Price

Price Pressure

Power
(MW)

Shortage

Formula

Not Found
Wide Open Load Following Control Theory

Quantity When We Run Out of Veal Chops

Target + Cost

$
Wide Open Load Following Control Theory

target

+ $ \rightarrow \text{Quantify Power Quality}

- cost


Electric Applications

- Public Goods
  - Frequency/ACE
  - Line Loading
  - Voltage
  - Harmonics
  - Satisfied Diner

- Commodities
  - Energy
  - Location
  - Reactive power
  - Harmonics
  - Veal Chops
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