EXHIBIT NO.

SNO-84

PUBLIC VERSION

Profit Maximization Under UK and US Deregulation

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Enron
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Agenda

- Background on Companies, Capabilities and Offerings
- Strategic, Tactical, and Operational Gaming in the UK
- Using California PX/ISO and FERC Rules to the Best Advantage
- A Real-Time System for CA, WSCC, US, UK & Elsewhere
- What We Can Propose

Policy Assessment Corporation

- US for DOE Oil and Gas Deregulation
- 1986 US Electric Deregulation Analysis
- 1995/1995 UK Deregulation and Prognosis
- Australian, South American, & US Deregulation Validation
- 50+ State and Province Energy Suppliers and Regulators
- CIGMOD Training for Utilities and Commission
- North American Deregulation Analysis
- Eastern Europe Deregulation & Planning
- US EPA and Canadian Kyoto Support (Regional Macroeconomic, Energy, and Environment Policy Impacts)
- Brazil Deregulation

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- Capabilities, Experience and Offerings

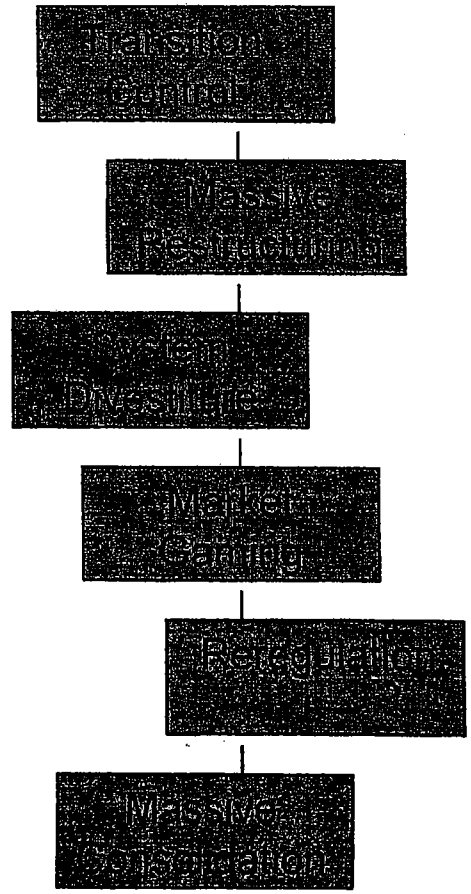
Overall Need

- Long Term:
  - Alliances & Acquisitions
  - Generation Plant Inventory
- Mid Term:
  - Financial Instruments
  - Rule modification
- Short term: Hourly, Day-Ahead, Bid Resources
  - Bidding strategies
  - Supply and demand decisions
  - Deal with noise, uncertainty, and possible hidden behavior of competitors

Dynamic Phases of Deregulation

- Transition Control
- Massive Market Deregulation
- System Divestiture
- Market Gaming
- Reregulation
- Massive Consolidation

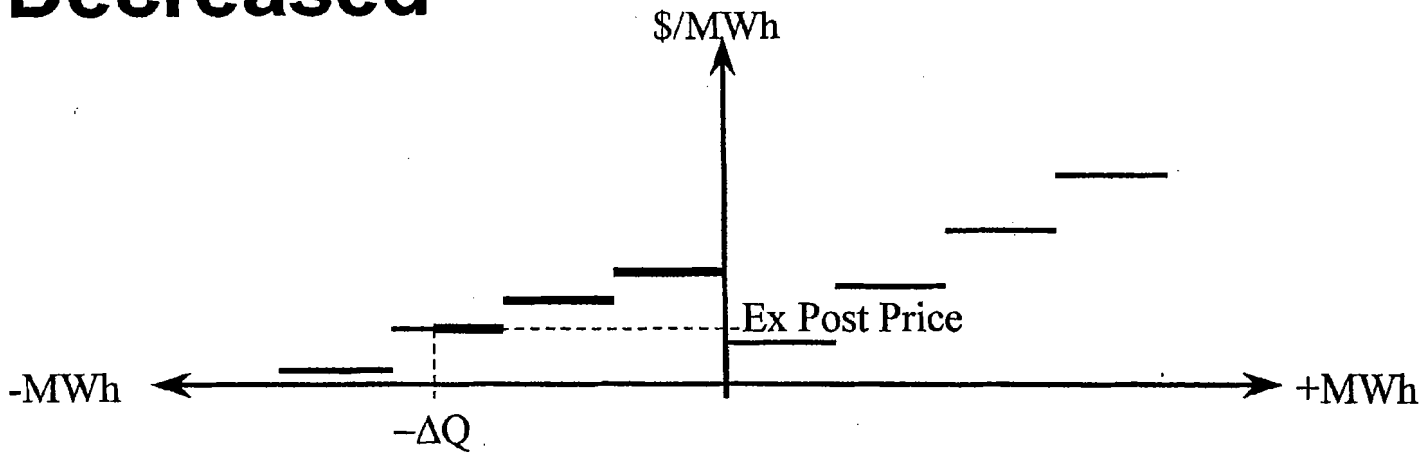
(5-6 Years: Start to Finish)



PAC UK Experience

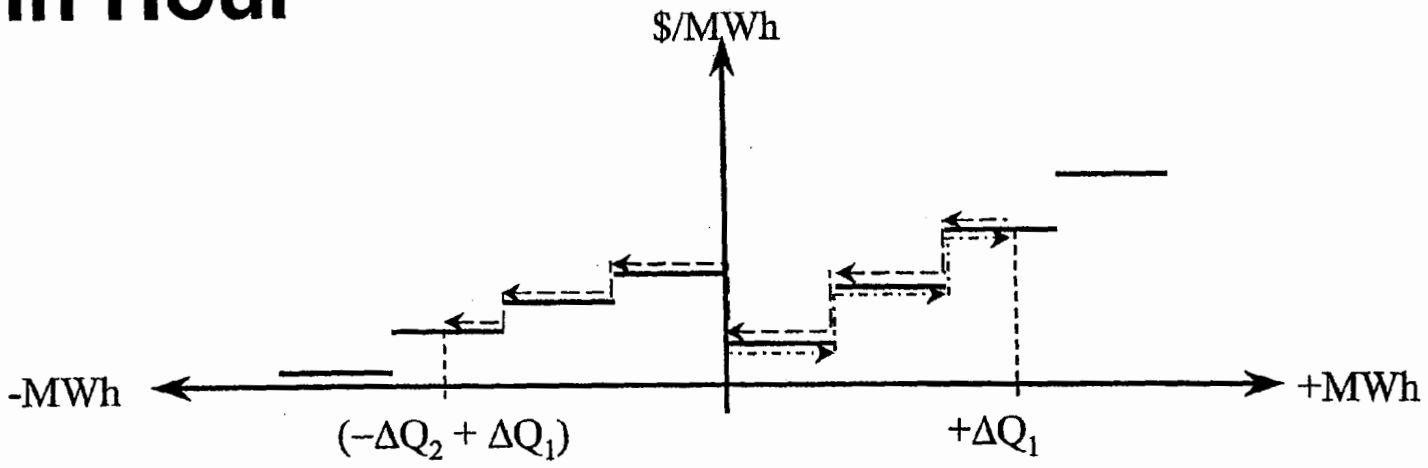
- All the RECs
- OFFER
- PowerGen, National Power
- Cambridge Econometrics, Ltd.
- Scottish Power Deregulation Training
- 500 -1000 Recorded "Game Moves" As of DOE Report Release
- Applied US System to UK Then UK to AU, SA and US
- HYPERSENS Portfolio Analysis
- Neural Network Forecasting and Data Mining (Also PSC)

Ex Post Price when Output is Decreased



- If reduction of energy (−ΔQ MWh) were needed
  - ISO would dispatch the decremental energy bids with available reduction in order of decreasing bid price
  - Ex post price would be the price of the least expensive resource dispatched downward

Output Increases then Decreases in Hour



- Increased output of $+\Delta Q_1$ followed by decrease of $-\Delta Q_2$ within the hour, with $\Delta Q_1 < \Delta Q_2$

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Controlling the Real-Time Market

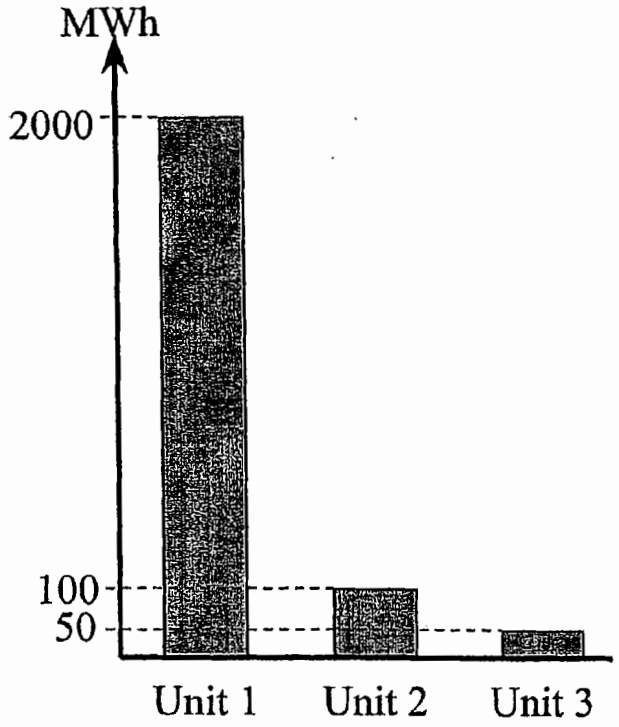
- The structure of the real-time imbalance energy market would have permitted strategies by which a participant could have:
  - controlled the ex post price
  - dumped power on the real time market at a very high ex post price
  - caused wild swings in the ex post price

Simplified Example

- Participant P1 has three generation units:
  - Unit 1 with operating limits of [100 MW, 2000 MW]
  - Unit 2 with operating limits of [100 MW, 2000 MW]
  - Unit 3 with operating limits of [50 MW, 100 MW]
- P1 bids to sell 2150 MWh in the forward market (for 1 hour)
  - P1 intentionally forgoes the chance to sell an additional 1950 MWh in the forward market
  - P1 will use this capacity to control the ex post price and sell high-priced imbalance energy

Schedule and Supplemental Bids

Schedules from Forward Market



- Supplemental Energy Bids:
  - Unit 1: Decremental only
    $10,000/MWh for $100 \leq x \leq 2000$
  - Unit 2: No Bid
  - Unit 3: Incremental Micro Bids
    \$ 0/MWh for $50 \leq x \leq 55$
    \$10/MWh for $55 \leq x \leq 60$
    •
    •
    •
- Suppose that Unit 1 submits highest priced decremental bid to ISO

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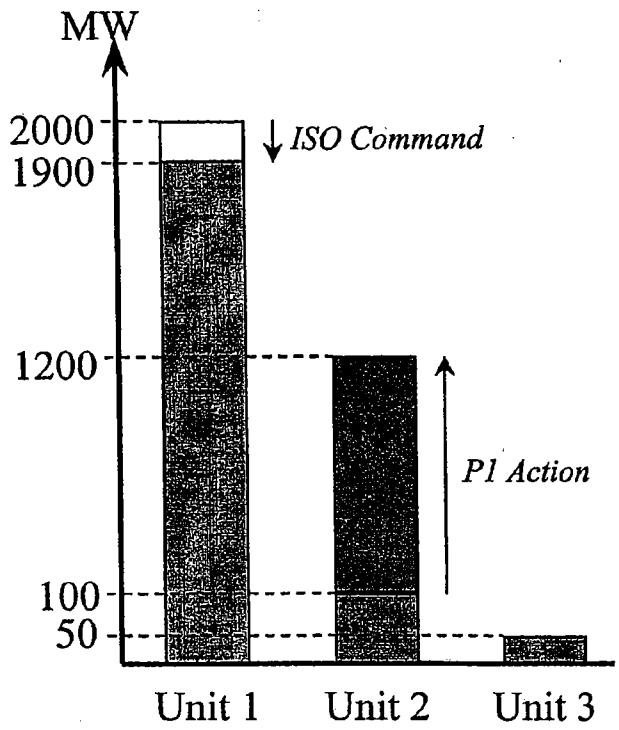
Case 1: ISO Needs Additional Energy



- Suppose ISO needs 1,000 MW more
- ISO will use incremental bids (including Unit 3 which gives P1 information)
- P1 starts to increment Unit 2 on its own
- ISO first backs down previously incremented units
- Unit 2 reaches a point at which ISO will have decremented all previously incremented units and starts reducing the highest priced decremental bid (Unit 1)
- P1 sells 1,000 MWh in imbalance energy market
- Ex post price set by last unit decremented ($10,000/MWh)
- P1 is paid $10,000,000

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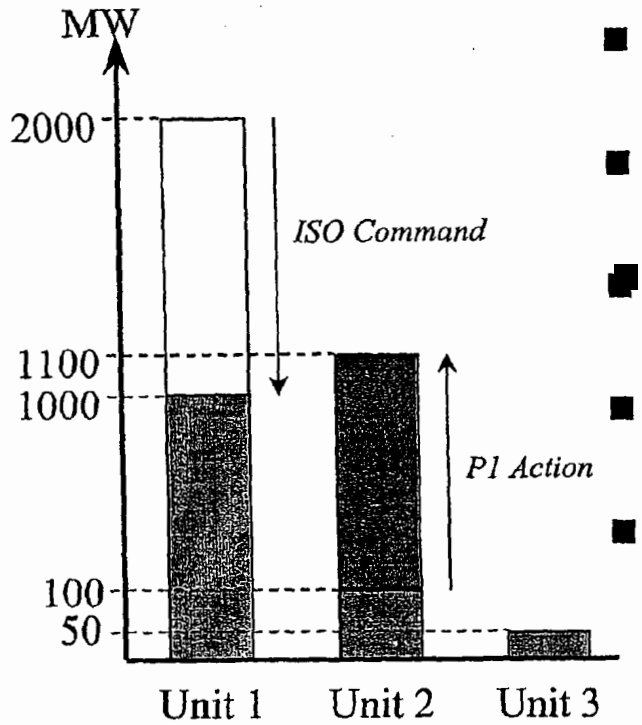
Case 2: ISO Must Reduce Output



- Suppose ISO must reduce by 1,000 MW
- ISO will use decremental bids and back Unit 1 down by 1000 MW
- P1 would have to pay the ISO $10,000,000 to replace Unit 1's output
- P1 eliminates this risk by simultaneously increasing Unit 2 by 1000 MW
- P1's total real-time output is at scheduled value, so P1's net payment to ISO is $0
- ISO has problems:
  - Imbalance persists
  - ISO leans more on regulation
  - Regulation capacity requirements increase so ISO must buy more
  - Ancillary service costs increase

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Effects on Other Participants

- Suppose that a participant usually experiences appreciable error in forecasting its real-time load
  - It would buy and sell energy on the imbalance energy market due to forecasting errors
  - It could experience extreme peaks in its payments for imbalance energy if ex-post price can rise very high
  - It could insure against these peaks:
    - Always schedule more energy in the forward market than it expects that it will need in real-time
      - Usually sells energy on imbalance energy market (or at least reduce the size of its purchases)
      - Additional costs if forward price > ex post price, but reduces its payment peaks for imbalance energy

Effects on PX

- PX participants would be exposed to swings in ex post price
  - PX participants could insure themselves against effects
  - Grouping participants reduces the amount of extra energy that must be scheduled and the expected cost
  - PX cannot take such a position to insure a group
- Power Marketer (PM) can take a position in a forward market to insure its participants
  - PM takes a position in forward market to sell insurance that PX cannot sell
  - PM attracts participants from the PX

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Effects on ISO

- Parties could have tried to dump considerable energy on the ISO's imbalance energy market
  - ISO would have needed to decrement energy production more than anticipated
  - Decremental supplemental energy bids are voluntary
    - No concept of the ISO buying "negative reserves" to ensure that it will have enough units that it can decrement
    - ISO may have to lean more on regulation
    - ISO may have to administratively reduce some generation
      - Real-time imbalance energy market may "fail" to set an ex post price based on decremental energy bids

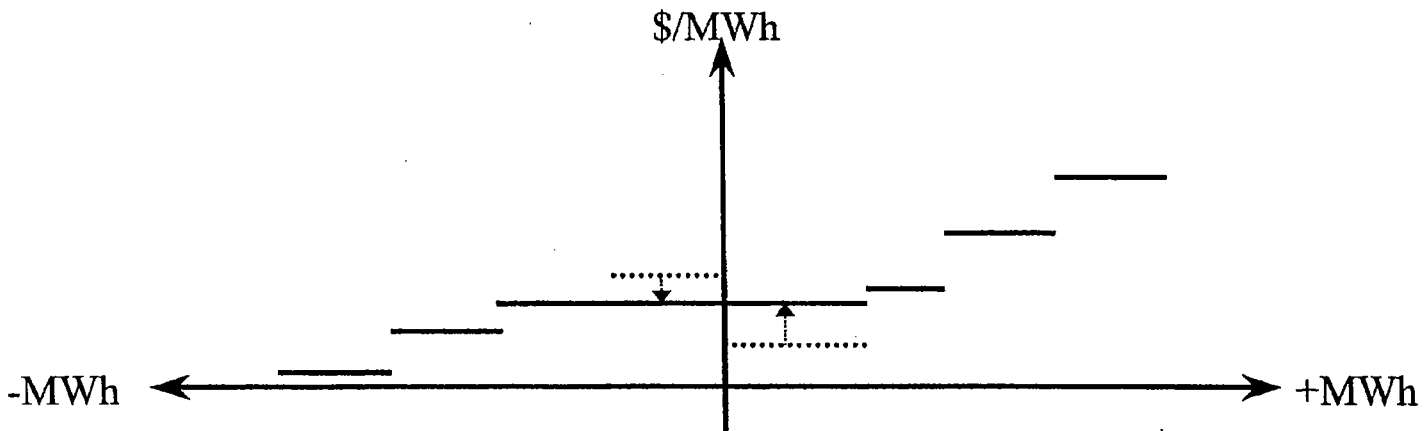
One Possible Basis for Correction

- Clear the real-time energy market
  - Dispatch all supplemental energy bids and reserves to minimize costs in real-time while respecting the operating constraints of the resources

ISO's Correction

- The ISO has revised the protocols to make a market that appears to clear:
  - Calculate the market clearing price (MCP) that would result if the ISO were to clear the real-time energy market
  - For incremental supplies with price less than MCP, raise the price of the supply to the MCP
  - For decremental bids with price more than MCP, lower the price to the MCP
- Effect on strategies unclear
  - Not aware of any strategic studies

"Re-Priced" Merit Order Stack



- Decremental Supplemental Energy Bids

If ISO must reduce energy output

- Incremental Supplemental Energy Bids and Energy from Reserves

If ISO must increase energy output

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Another Protocol Gap

- Perot Systems discovered a "hole" in the PX's protocols for setting zonal energy prices when there is congestion
  - Adverse interaction with a hole in the ISO's protocols for setting congestion usage charges
  - Allowed a strategy by which a small participant could control prices in CA and destabilize the market