GPU Energy Voluntary Load Reduction Pilot

Summer 2000 Results and Future Implications

GPU Energy System

- New Jersey Shore to Western Pennsylvania
- Customers (Sept00)
  
  Shopping  72,605
  Non-shop  2,003,614

- Peak Load MW (June 26, 6pm)
  
  Delivery  9,498
  Energy Supply  7,814
VLR Pilot Drivers

- Divested company-owned generation
- Retained default energy supply obligation (PA PLR & NJ BGS)
- Electric price volatility
- PA Competitive Default Supply bid failure January 2000
- Returning customers June 2000
Correlation of Electricity Price with Load (June/July 1999)

PJM Avg Daily On-Peak W Hub LMP vs PJM Max Daily On-Peak Load for Jun & Jul 1999

Changing Forward Curve
PJM On-Peak Forward Prices From Feb '98, '99, '00 For Following 12 months And June 1, 2000 For Following 12 months

Average
25.91
31.21
43.51
51.85
VLR Program Design

- Targeted PA/NJ non-shoppers or returning customers (>300 kW)
- Advanced interval metering
- Term: June 1 - September 30
- Based on economic energy vs. reliability (PJM Pilot)
- Day-ahead bidding/settlement

VLR Program Design

- Hourly price signal/ on-peak 12-8
- 50-50 split of forecasted LMP
- Implemented by contract not tariff
- Pledge compared to avg. peak load profile
- Checks for gaming, ramp up/down
- Penalties for < 90% of pledged reduction
- Apogee Interactive Web interface
Apogee Interactive

- Web-based Demand Exchange Interface
  - Each Day, Customer - Looks/Calculates/Bids - LR
  - Each Day, GPUE - Monitors/Accepts/Rejects - LR
- Apogee measures actual LR event
  - develops "most probable Baseline"
  - notifies GPUE with LR estimate < 48hrs of event
  - GPUE reviews, adjusts (<90%), summarizes, sends monthly check (billing cycle)

VLR in Action

- GPUE forecasts $200 MWh @HE 13-15, Aug 8.
- Day-ahead price signal sent @9am, Aug 7 of $0.10 kW for HE 13-15, Aug 8.
- Customer elects to bid 1.3 MW @HE 14 only and sends pledge by 11am, Aug 7
- GPUE accepts pledge and factors into day-ahead bidding into PJM
VLR in Action (cont.)

- PJM releases day-ahead costs @4pm, Aug 7 of $140/MW for HE 14, Aug 8
- GPUE receives $182 (1.3 MW*$140/MW) load reduction benefit in day-ahead market
- GPUE transmits 15min interval meter data for the entire LR event day to Apogee
- Actual reduction of 1.33 MW for customer

VLR in Action (cont.)

- +/- 10% tolerance (no payment or penalty for over 110%, penalty of 2*LMP for <90% of pledge).
- GPUE pays customer $133 ($0.10*1.33).
- GPUE realizes net benefit of $49 ($182 for day-ahead settlement with PJM minus $133 for actual LR payment to customer).
VLR Pilot Participants

- 7 participating companies
- Water, Stone quarries (2), Paper, Offices (3)
- 10 sites totaling 15 MW
- 7 NJ/3 PA
- Size: Smallest 300 kW, Largest 4 MW

VLR Pilot Event Days

- Cool Summer of 2000 limited event days.
- July 26, August 3, 8-9,
- Avg. Forecast Temp 90 F, 50,000 MW
  Load on PJM, Target LMP>$150/MWh
- 4 MW reduction pledged from 3 participants
- Web interface, bidding, settlement all functioned normally
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<th>GPU ENERGY</th>
<th>VLR Lessons Learned</th>
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<td>• Customer interest/activity high</td>
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<td>• Selling by demo more effective than mail</td>
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<td>• Penalties create confusion/hesitancy</td>
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<td>• Customer knowledge of LR potential varies</td>
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<td>• LR measurement method must be clear</td>
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<td>• 50/50 split negotiable</td>
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<td>• Advanced meters with telephone read capability preferred</td>
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<th>GPU ENERGY</th>
<th>VLR Future Implications</th>
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<td>• Reconcile overlap potential with competitive supplier and PJM programs.</td>
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<td>• Maximize program participation and effectiveness by integrating real-time customer energy analysis system with web-based LR program.</td>
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<td>• Offer LR capability within total energy solution environment using Silicon Energy platform</td>
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Silicon Energy

- Enterprise-wide integration linkage
  - Meter Data Warehouse
  - Real-time communication
- Two-way real-time information exchange
- Enhance flow of decision data to customer
- Optimize LR potential
- Build out market-driven load management & customer control system platform