



Load Participation for Ancillary Services for Department of Energy

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Outline

- Comverge Program Summary
- Comverge Megawatts under Management
- Residential Aggregation
- Best Load for Residential Aggregation
- Alternate Residential Approaches
- Alternate Curtailment Approaches
- Real time Monitoring

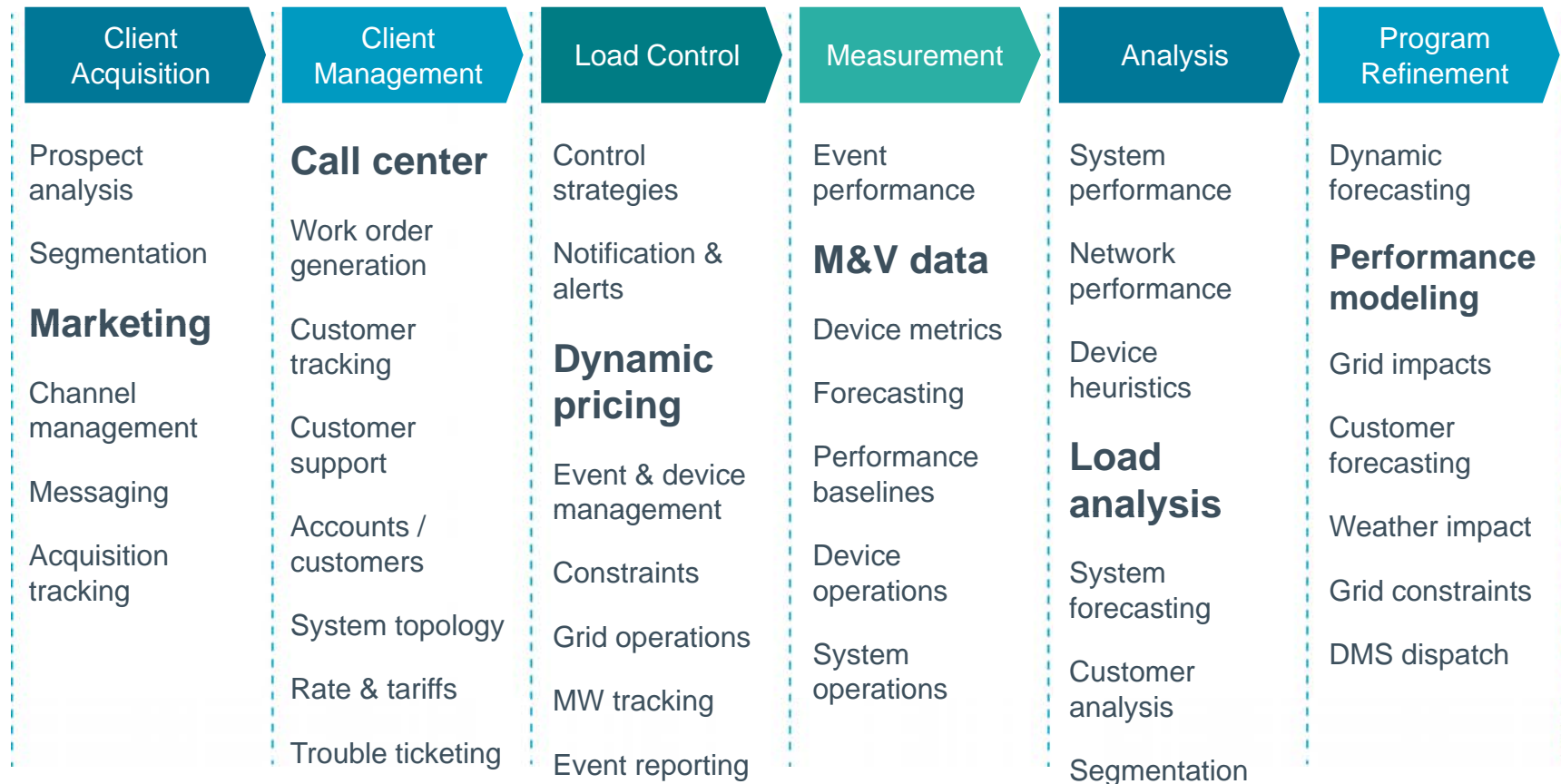
Comverge's Unmatched Incumbency for Demand Response



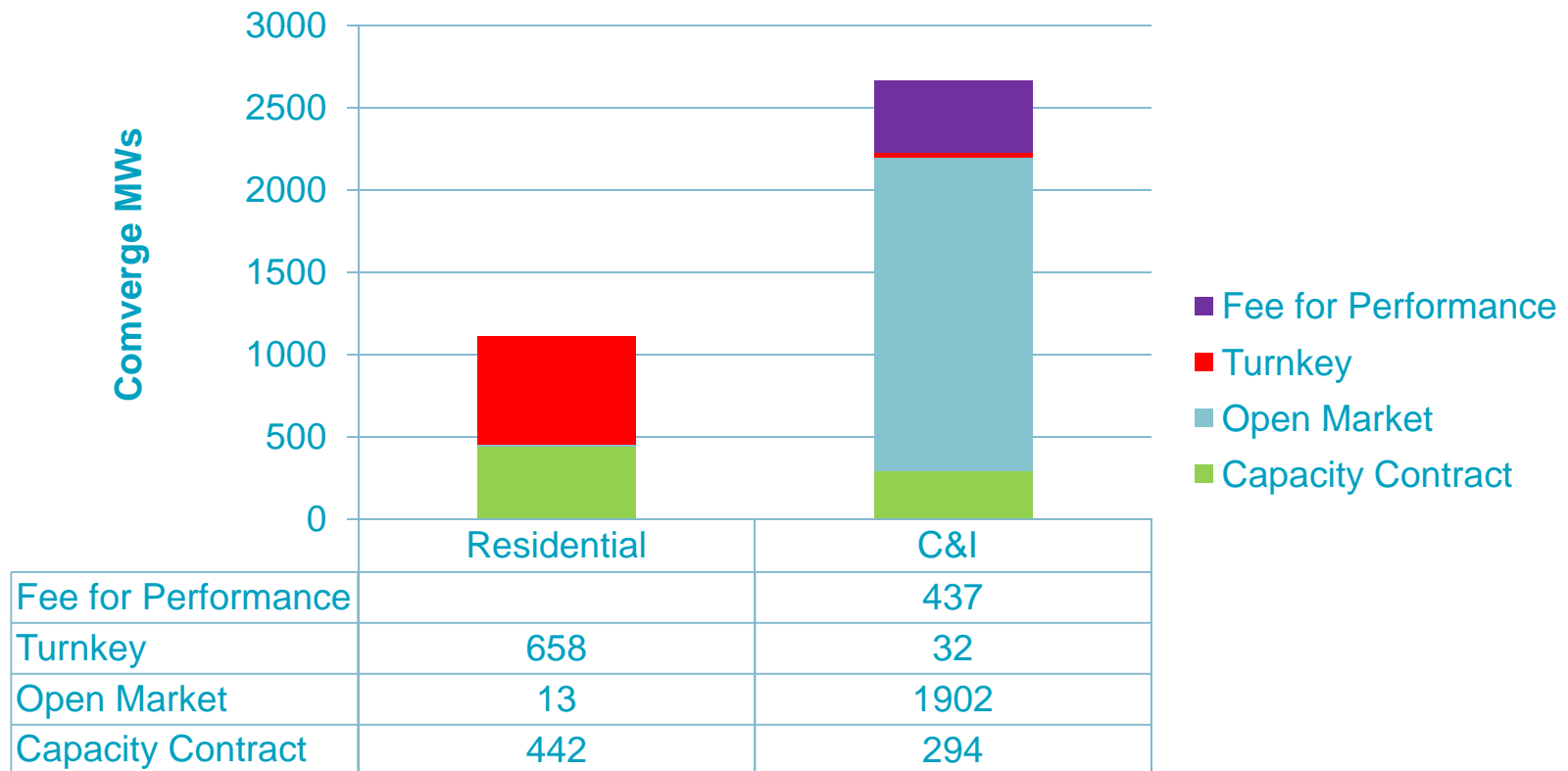
500+ Utility Customers



Wide Range of Services



Comverge's Megawatts under Management

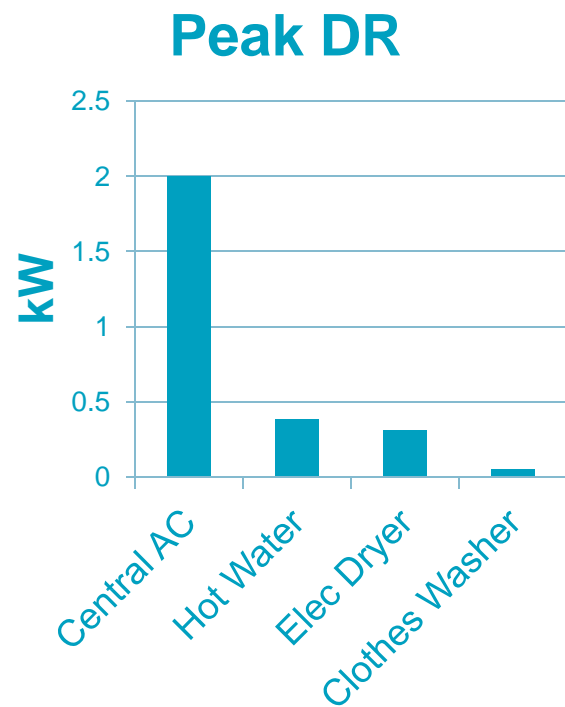


Comverge 10-Q – June 30, 2011

Advantages of Residential Aggregation

- Geographically distributed
 - Easy to target specific areas
- Able to tailored reduction MWs to need
 - Vary Cycling Percentage
- Ability to tailor response profile
- Time to response
- Highly reliable
 - Statistical advantages of using more participants

Air conditioning is the best residential load for DR



Central Air Conditioning
2.0 kW peak



Clothes Washer
.05 kW peak



Electric Dryer
.31 kW peak*



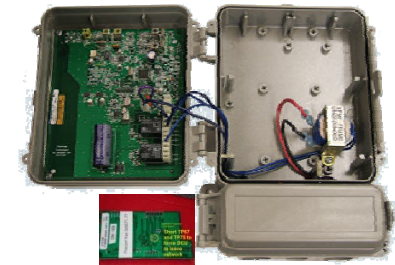
Electric Hot Water
.376 kW peak*

*Technical Reference Manual, Pennsylvania PUC, June 2011

Flexibility in Device Deployment

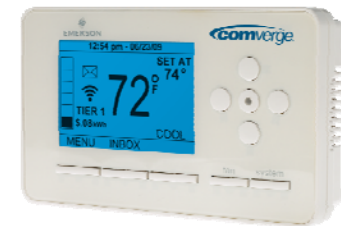
Digital Control Units (DCU)

- Features
 - Single device to control multiple loads and/or load types
 - Compatible with multi-stage HVAC systems
- Benefit to Utility
 - Cost-effective and easy to install



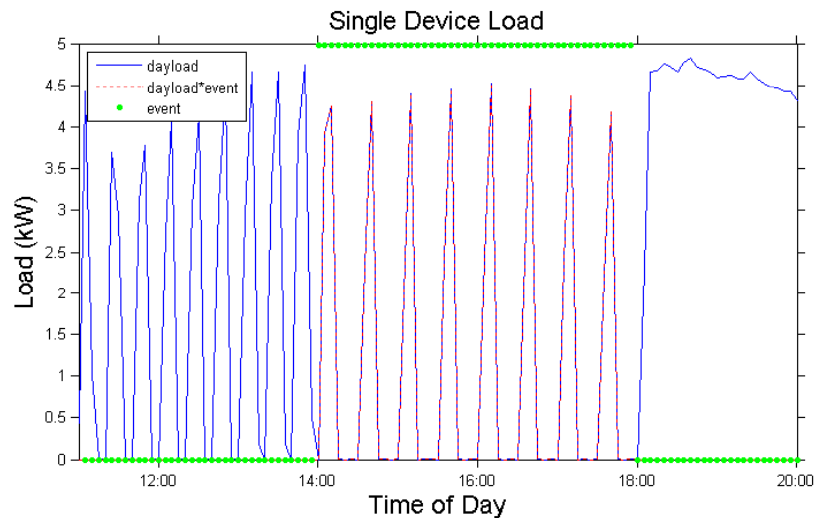
Thermostats

- Features
 - Advanced user display
 - Display energy usage, price, tiers, control information, etc.
 - ZigBee-based communications
- Benefit to Utility
 - Energy Efficiency device in client's name
 - Extend brand into home

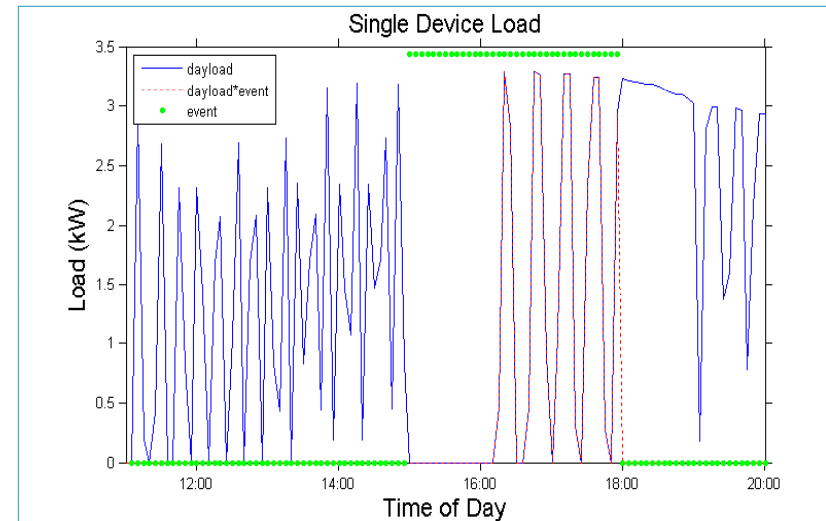


 **comverge**

Cycling vs. Temperature Offset



50% Adaptive Algorithm Cycling



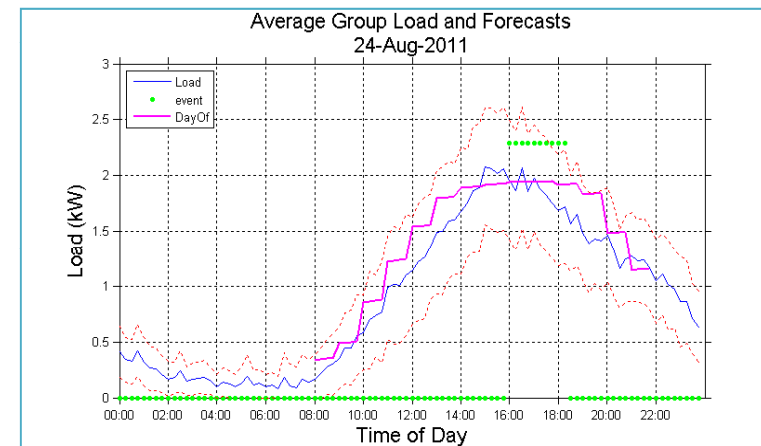
3F Temperature Offset

Cycling:

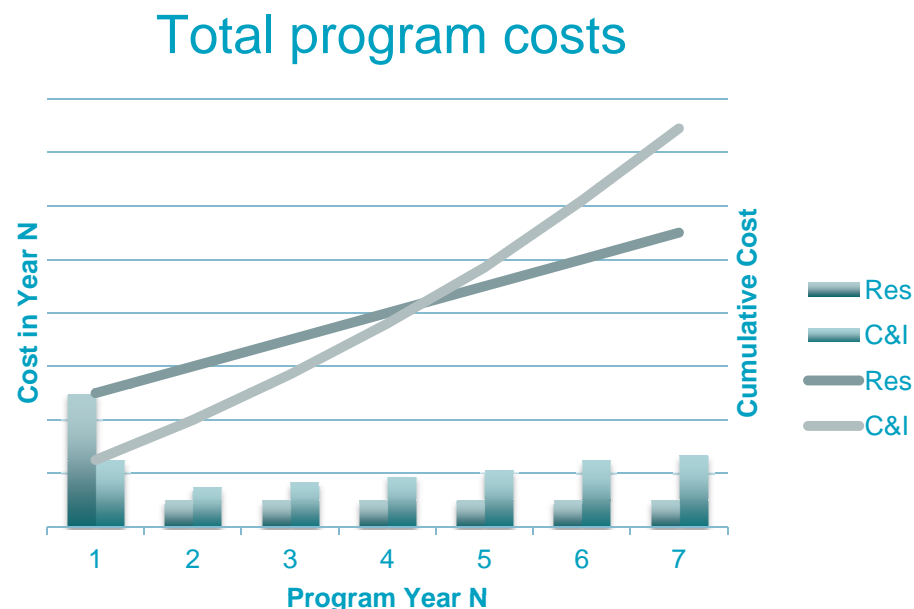
- Enables a better ramp in by varying curtailment initiation time
- Spreads kW reduction more evenly across response interval
- Provides DR from load use

Real Time Load Measurement

- Best Practice:
5 minute load profile data reported,
processed and displayed every 30 minutes
or better
- Near real time reporting enables
verification during DR events
- Near Real time load measurement
enables good estimates of DR Potential
 - Better than a “time - temperature
matrix”
- Actual measurements are the best
estimate of the next few hours
- Dispatch should have access to this data
- 5 minutes enables analysis of response
time



Residential & Commercial Cost Comparison



- Both Residential and Commercial programs incur significant up front marketing costs
- Residential programs have in additional install cost
- Residential DR costs per kW are constant after initial install
- Commercial DR cost tend to rise each year
- Residential programs tend to be more cost effective after about four years, and continue for ten years or more

Recommendations

- Encourage the broad deployment of interval meters all the way down to the residential levels
- Encourage time of use and critical peak pricing to enable price responsive demand response
- Support market rules in energy markets that encourage long term investments, five years or more, in equipment to enable effective demand response
- In non-market jurisdictions, facilitate rules to encourage long term investments in equipment to enable effective demand response