



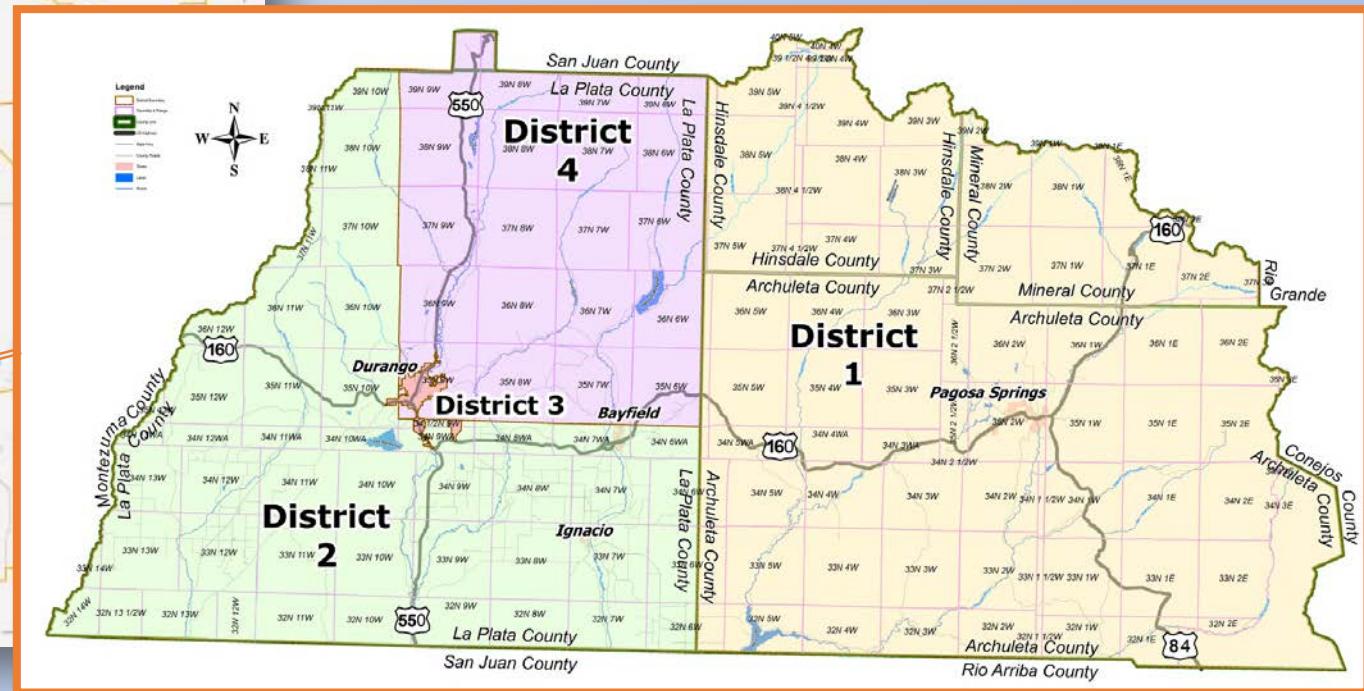
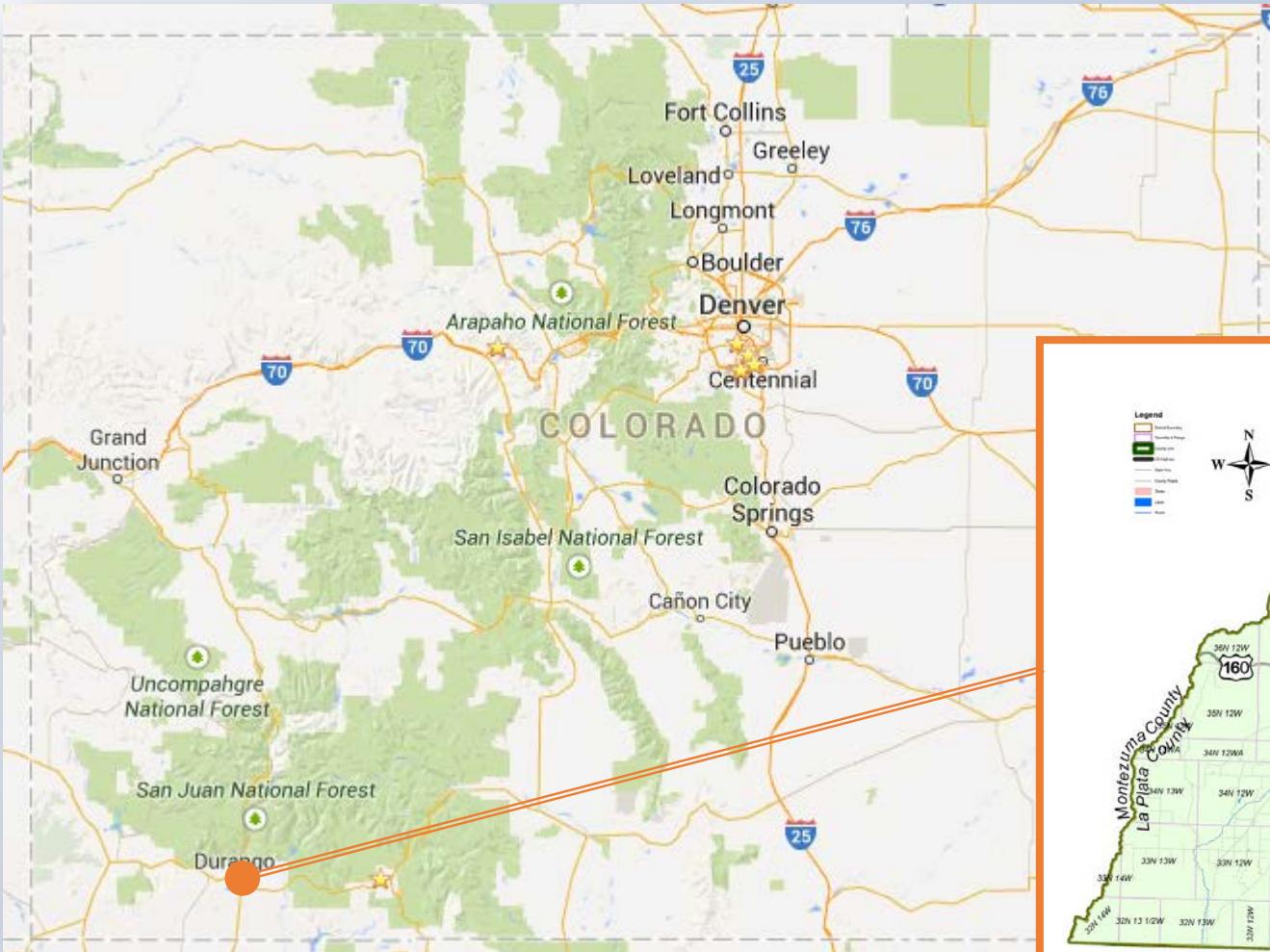
La Plata Electric Association, Inc.

A Touchstone Energy® Cooperative



Time of Use Rates

The Policy, Economics, Physics



Southwest Colorado – Archuleta and La Plata Counties

Bayfield, Durango, Ignacio, Pagosa Springs

40,000 meters located over 3,050 sq miles

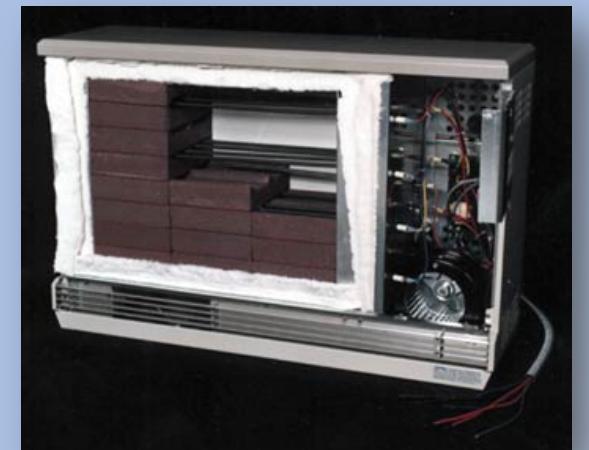
188 Miles Transmission -- 1,800 Miles OH – 1,500 Mile UG Distribution

Who is La Plata Electric Association, Inc.

- Winter Peaking System
 - January 2015 peaked at 152 MW's at 6:30 PM
 - August 2015 peaked at 134 MW's at 4:00 PM
- Typically Peak early morning or evening
- System Load Factor between 70-85%
- Industrial Load just over 40 MW's

Time of Use Rate/Program at LPEA

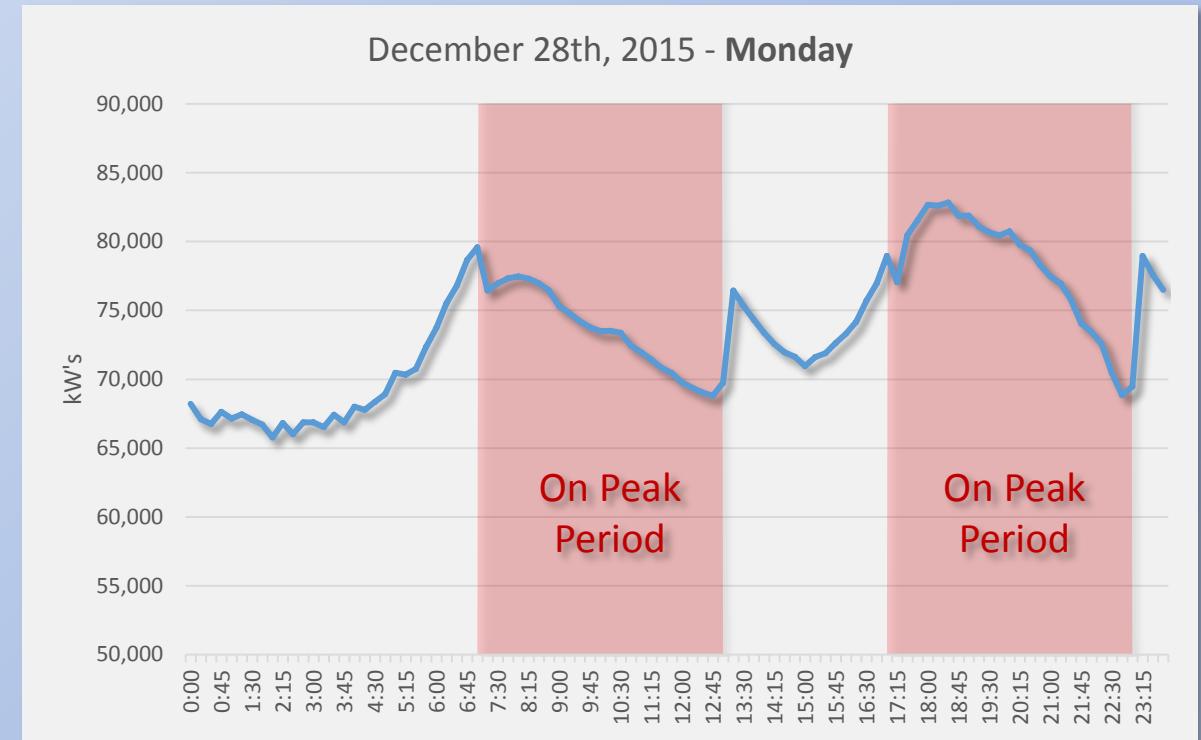
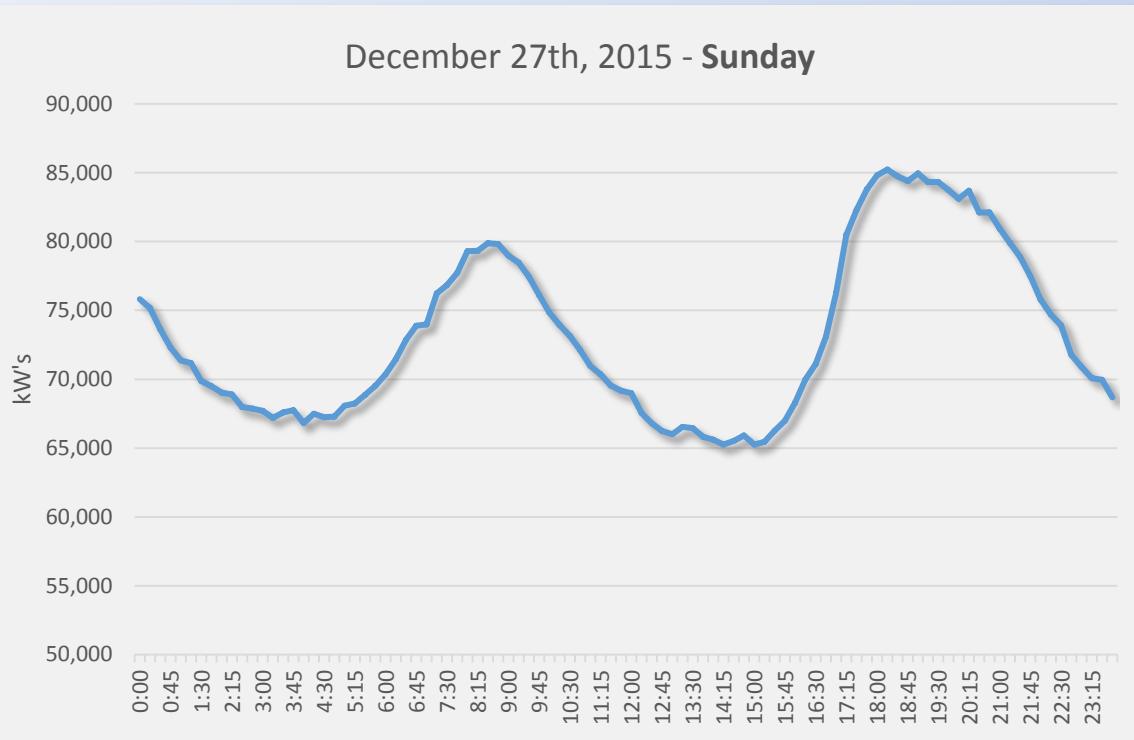
- LPEA has had a TOU rate since the early 1990's
- TOU rate development is based upon savings of peak reduction
- Electric Thermal Storage is technology supporting TOU program
 - Water Heaters
 - ETS Heaters – "Box of Bricks"
- Savings for Membership is over the winter months



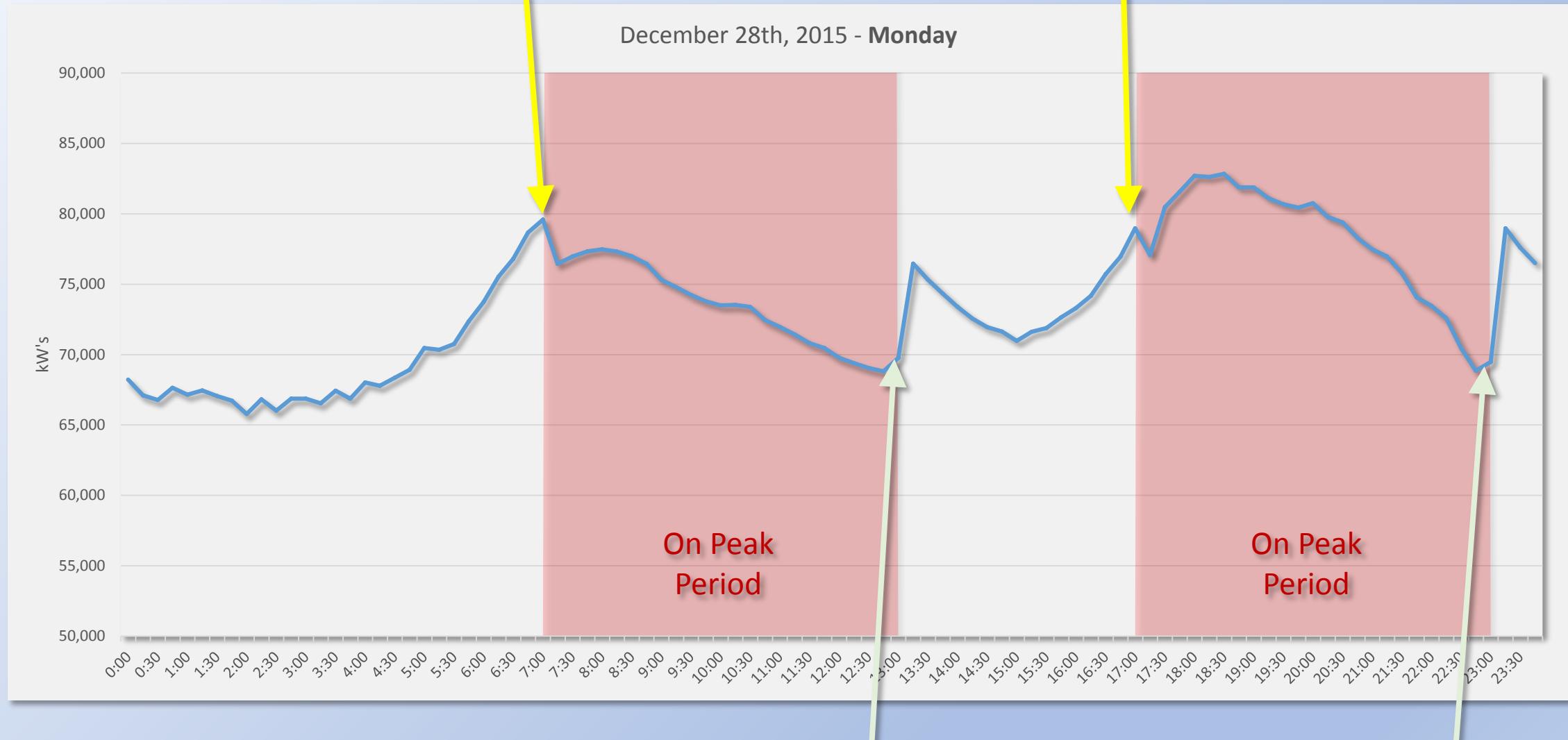
Policy to support TOU

- LPEA sells ETS Heating Systems and Ultra Efficient Water Heaters
 - Products were not available in local market
- LPEA offers rebate programs
 - \$75 for Ultra Efficient Water Heaters (\$55 for others)
 - \$30/kW for Electric Thermal Storage with timer or master control
 - \$30/kW for Thermal Slab with timer or master control
- Line Extension Policy allows for “free” service upgrade
- One year guarantee – pay the cheaper of TOU versus General Service Rate

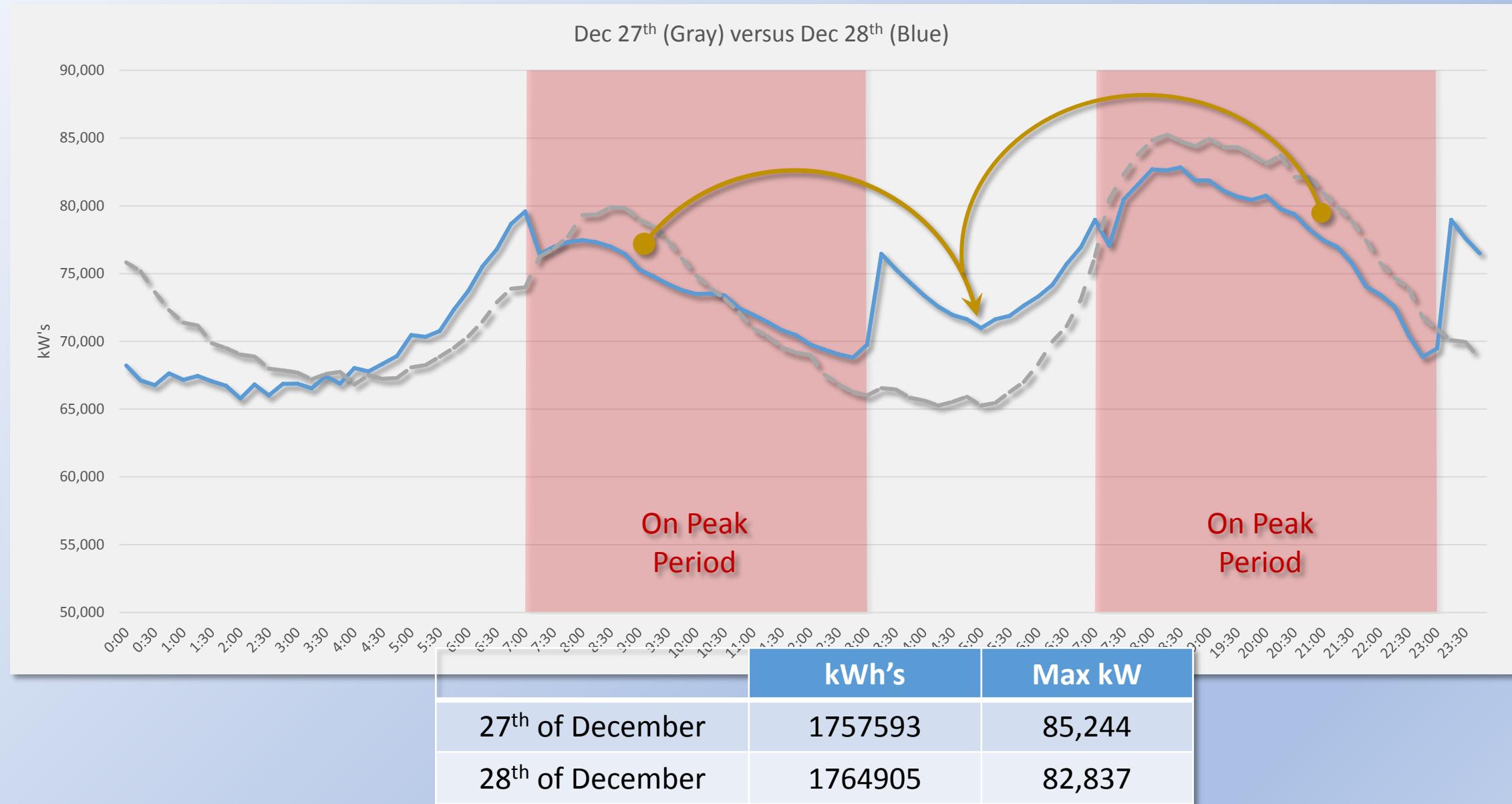
TOU in affect – Load Profiles



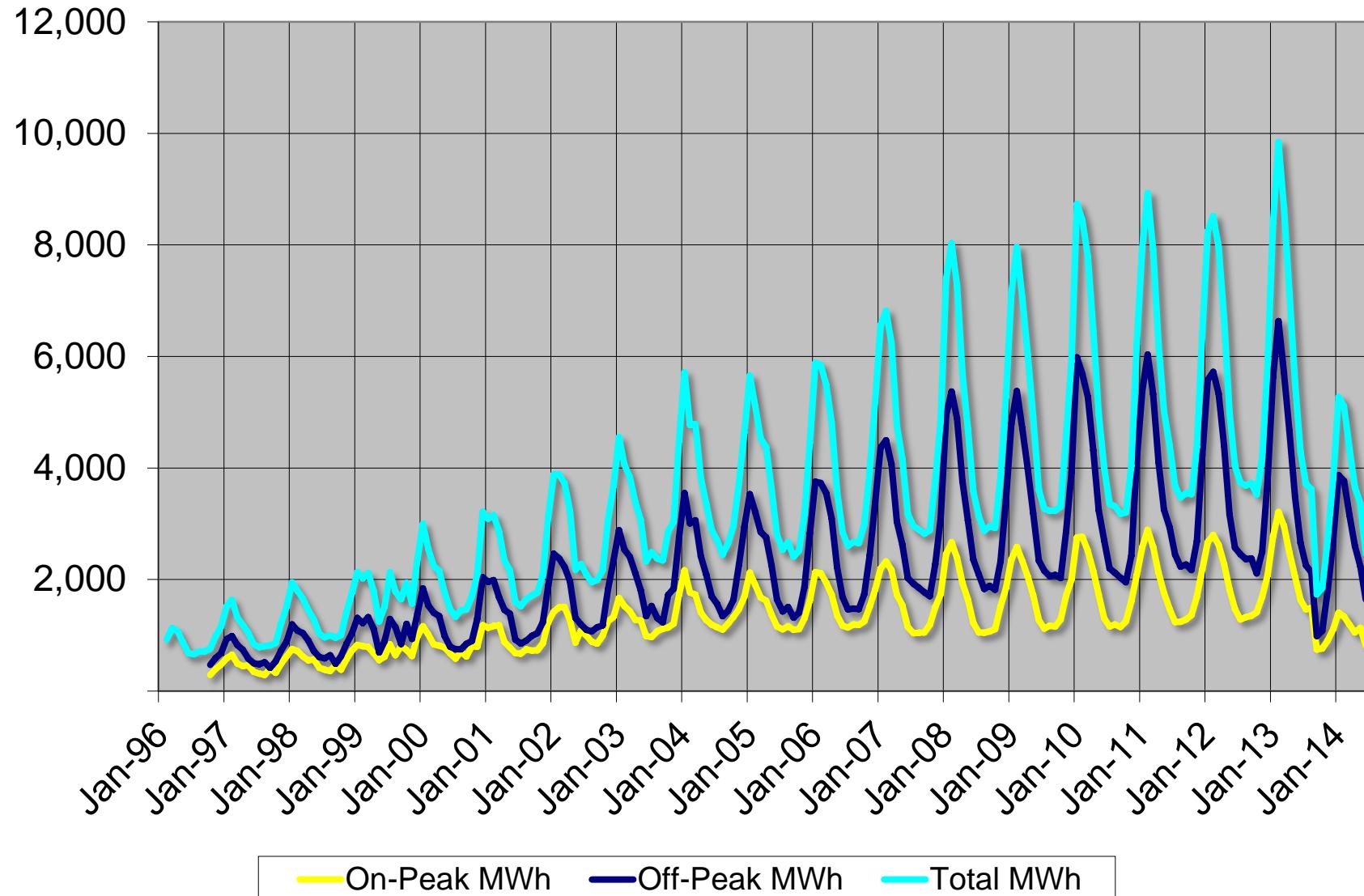
TOU in an On-Cycle Load Profile



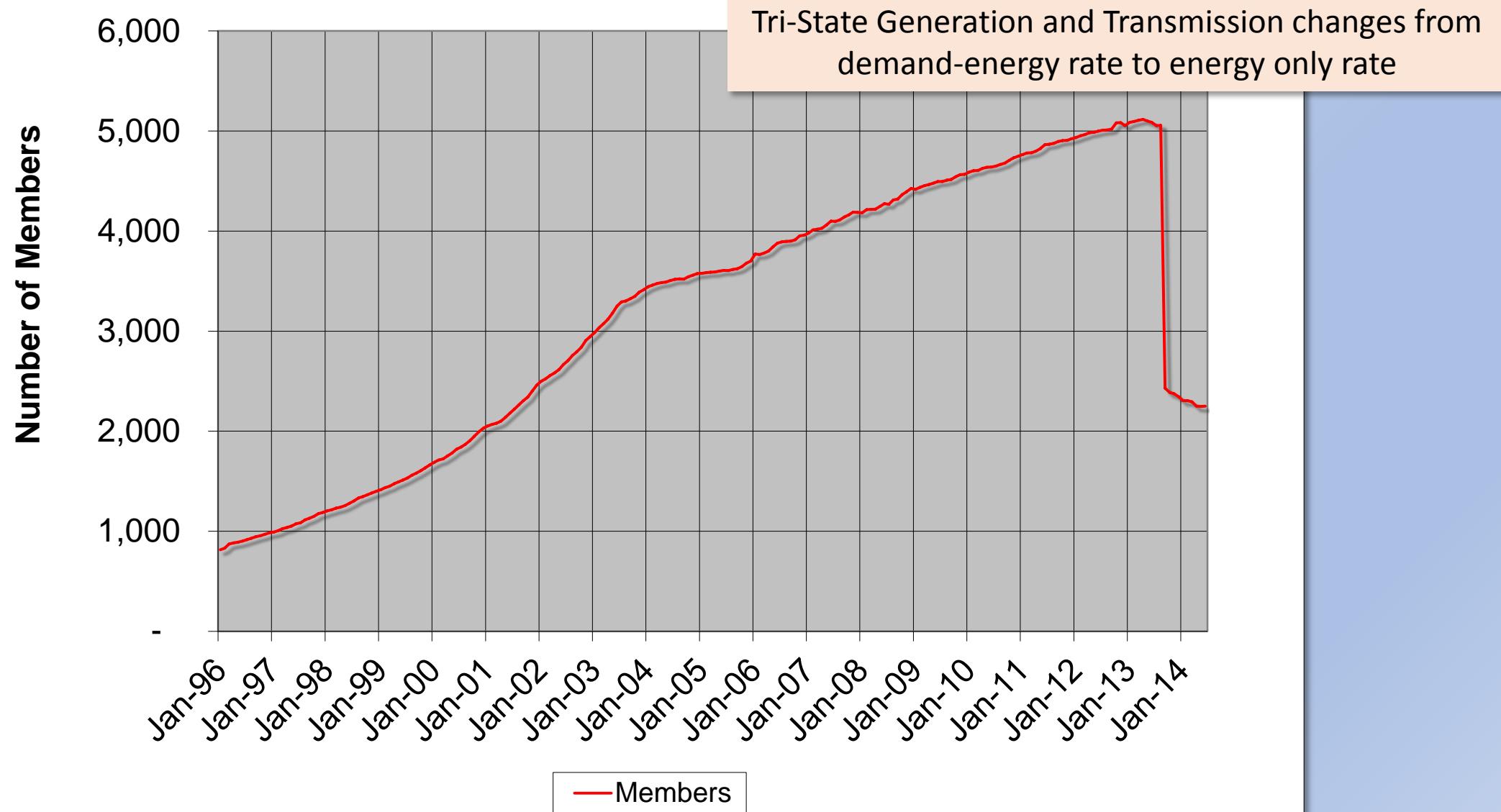
Filling in the Valleys



TOU Usage (MWh)



TOU Participation



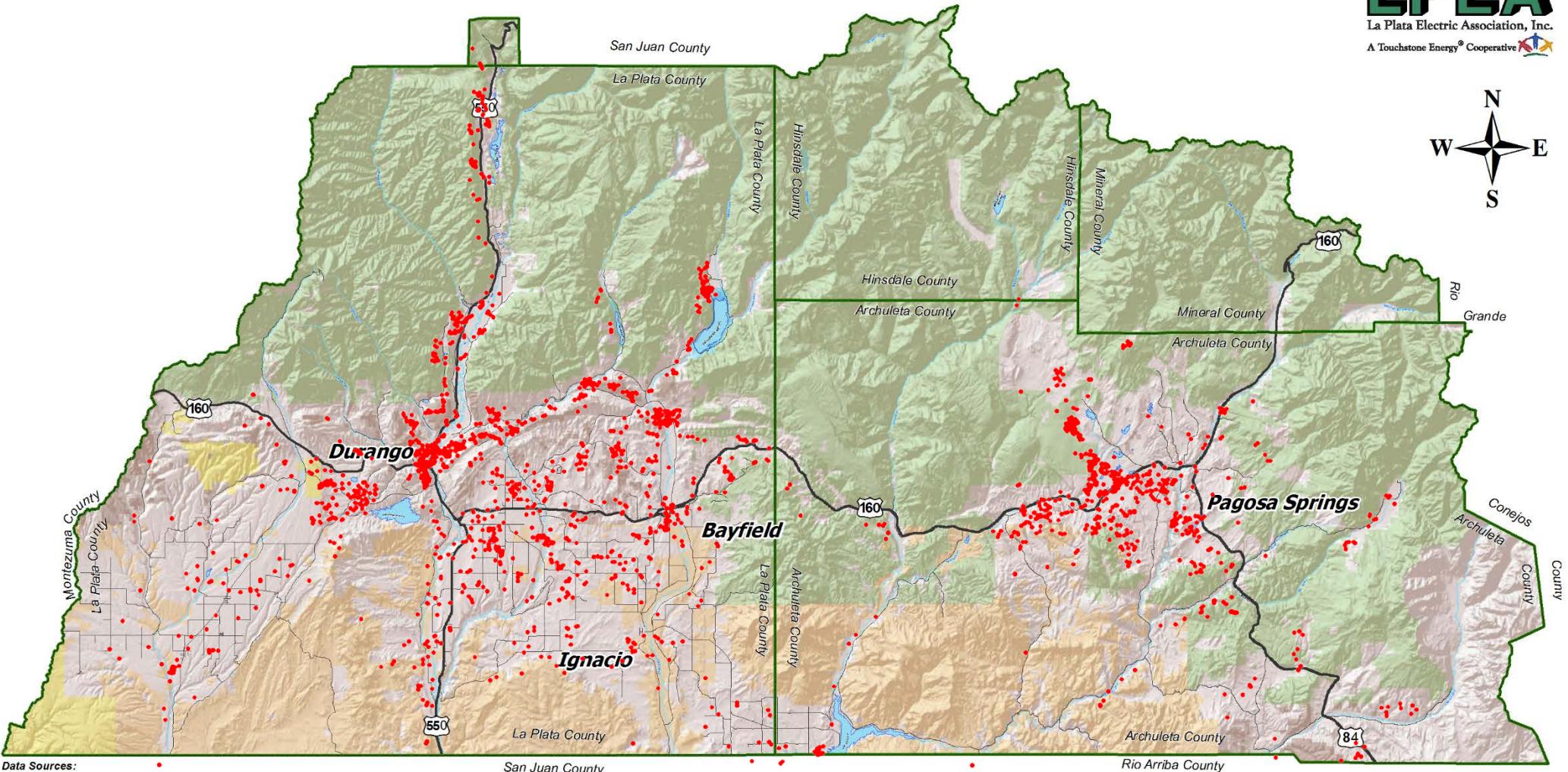
Tri-State Rate Structure Change Impact

Year	On Peak Rate (\$/kWh)	Off Peak Rate (\$/kWh)	On Peak Hours (Mon – Sat) (Sun/Holidays Off Peak)	TSGT Demand Rate (\$/kW)	TSGT Energy Rate (\$/kWh)
2012	.151	.046	6am – 1pm & 5pm – 10pm 10am – 10pm (Summer)	22.38	0.02895
2013 TOU TOU (ETS)	.144	.073	7am – 11pm	0	0.07176
	.144	.073 (Day) .050 (Night)	7am – 1pm & 5pm – 11pm		
2016	.168	.065	7am – 1pm & 5pm – 11pm	18.76	0.04034

Ratio between On and Off Peak rate is lessened in 2013 making program less attractive

LPEA goes from just over 5,000 to 2,200 accounts

Time of Use Accounts across the Area



A Physics Story

- Regional Feeder overloads at transition from On Peak Period to Off Peak causing low voltage and blowing feeder fuses
- ETS and Water Heaters all coming on at the same time
- LPEA had to limit installation of heaters until system improvements of the grid
- Implemented randomized charge start periods in ETS control systems
- Extended on peak hours in the evening from 10pm to 11pm

Other Challenges throughout program

- Prior to LPEA's recent “smart” meter installations
 - Changes in On and Off Peak times required physical reprogramming of meters
 - Daylight Saving Time change 2007 led to ~\$20,000 reprogramming effort
- ETS timing technology evolving from:
 - Manual Timers/Clocks
 - Wired Contact Signal from TOU meter into control center
 - Power Line Carrier Signal into meters directly – lowering of wiring costs

Take aways

- LPEA's TOU Program is specific to pricing signals from Power Supplier
- LPEA's “controllable/storable” energy limited mainly to winter
 - Some commercial activities
- LPEA's success in areas led to challenges to the grid

The future

- Impact of AMI (aka smart meters) & Meter Data Management
 - AMI meters provide interval data
 - Changes to schedules are done in meter data management/billing software
 - Rate comparison between General Service & TOU Rate made at the account level
 - One year guarantee program not needed

The future

- Net Metering and TOU?
 - Benefits for peak shaving from PV systems not realized due to load profile
 - PV production during off-peak period offsetting less expensive energy
 - TOU is a step closer to unbundled rates, helps with valuation of PV
- TOU and Energy Storage?
 - LPEA has a few “pioneer” members who use ZERO energy during on peak periods

The future

- LPEA looking at On Peak period only between the hours of 4:00 pm to 11:00 pm
 - Reflects TSGT demand period (12 pm – 10pm) and LPEA's native load profile
- ETS technology being controlled by other rate signals
 - Mapped to Renewable Generation availability

Recommendations for others

- Take into consideration the goal of the program when it comes load shifting and potential consequences
 - LPEA's was so successful that we started affecting reliability of grid in localized area
 - ETS heaters being “sized” taking into account number of off-peak hours creates a boundary for future consideration of on/off peak schedule

Recommendations for others

- If possible, avoid specialized meters that require programming to be within the meter
- Make sure to have billing infrastructure in place if using “Smart” meters
 - “Smart” meter interval data creates huge amounts of data
 - Meter Data Management Systems are necessary

Recommendations for others

- TOU rates can be developed to incentive/support technologies
 - Distributive Generation
 - Energy Storage beyond heat
- TOU rates represent truer costs/price signals to the member/customer
 - PV systems within LPEA's system do not bring value to peak shaving in the middle of the day. Our TOU rate reflects this in that the price for electricity is "off-peak" in the afternoons



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Time of Use at LPEA

<http://www.lpea.coop/services/tou.html>

ETS & Water Heaters at LPEA

<http://www.lpea.coop/products/ETS.html>
<http://www.lpea.coop/products/marathon.html>

Home Page of LPEA
www.lpea.coop