

*Knowledge to Shape Your Future*

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[www.itron.com](http://www.itron.com)

# The Smart Grid that the Customer Will Never See

Missouri Public Service Commission –  
Smart Grid Technical Conference



## Agenda

- A Little Bit About Itron
- How does Smart Grid and Advanced Metering Infrastructure (AMI) Work?
  - > Itron's OpenWay System
- What are the benefits?
  - > To Utility Customers
  - > To Utilities
- Lots of data.....now what to do with it?
  - > Meter Data Management (MDM)

## About Itron

- World headquarters in Liberty Lake, Washington (NASDAQ: ITRI)
- Utility-focused leader in:
  - > Metering Automation Systems
    - 60,000,000+ endpoints in the field
  - > Metering Hardware and Software Solutions for collection, analysis and integration of data
    - Managing the data for some of the largest Smart Grid projects
- All products for U.S. market are **Made in U.S.A.**



# The Shopping Cart Story





# Automation Changes Everything



## New ideas from the inventors

“Wand” speeds checkout. To move supermarket lines faster, this recent IBM patent would use a flexible tube and a vacuum pump to suck up magnetically printed stickers and feed them to a register. The register would read the magnetic code and total the purchases quickly. The tabs would also serve for the store’s stock and inventory control.

# Automation Changes Everything



## Automated Meter Reading

- More accurate
- Safer
- Cost reduction
- Mobile collector or network
- Monthly for billing
- Hourly or more frequently for operations and advanced rates





## IRP

Regional Interaction (ISO/RTO)  
Distributed Generation including Renewable Energy  
PHEV (V2G)

## ATO

Regional Interaction (ISO/RTO)  
Supervisory Command And Control (SCADA)  
Substation Automation

## ADO

Self Healing Delivery Systems (Peer-To-Peer)  
Workforce and Asset Management & Optimization  
Distribution Management Systems (DMS)

## AMI

Asset Monitoring & Management (Basic DA)  
Energy Management: Demand Response  
Metering: Dynamic Rates & Communications Home  
Complex Metering: CPP / PTR / RTP Smart  
Meter Data Management: Enterprise Data Mart  
Outage & Restoration Reporting

## AMR

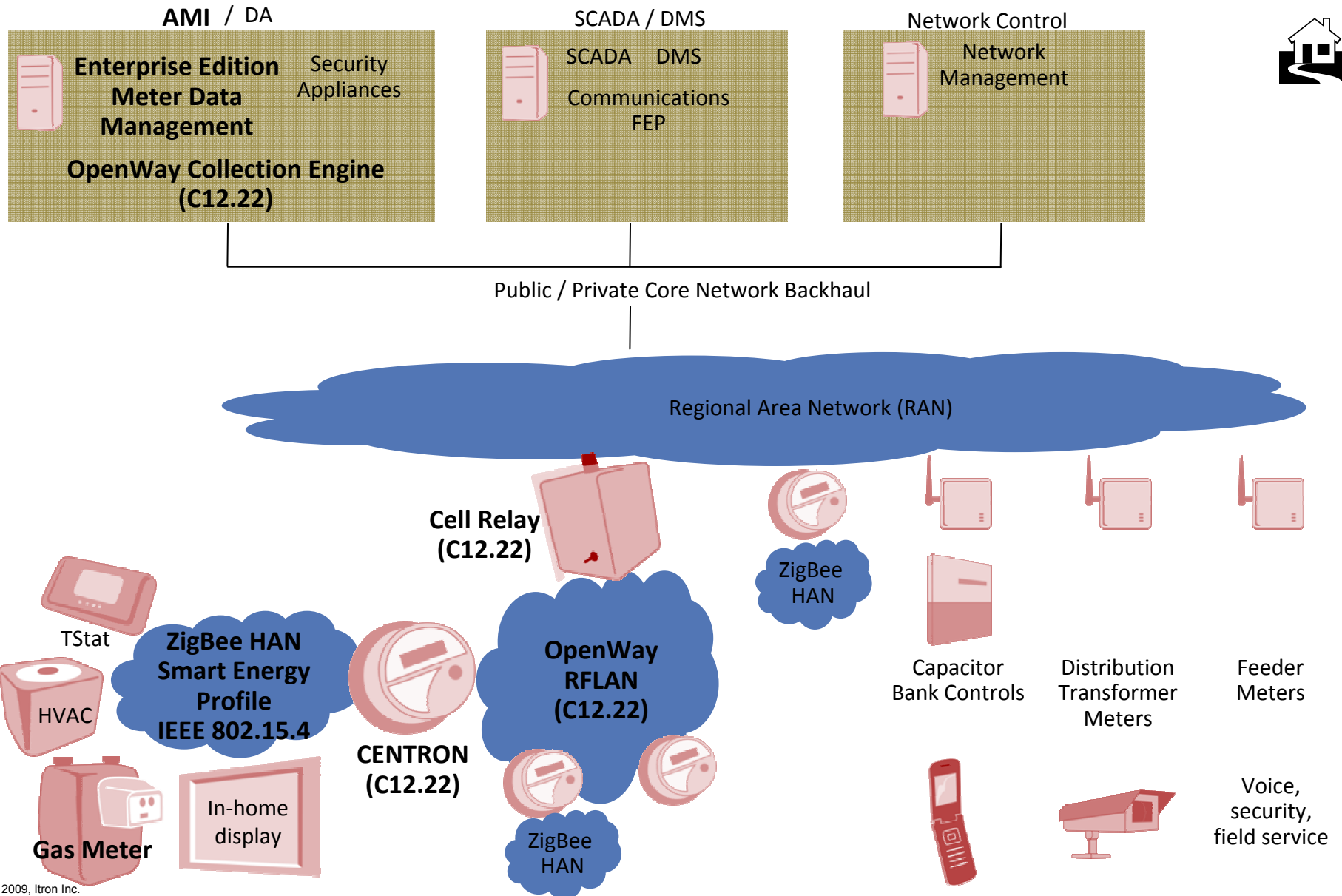
Advanced Metering & Rates: TOU / Demand  
Customer Operations: Field Operations  
Revenue Cycle Services: Meter-To-Cash

Availability & Reliability

Latency & Throughput

Cost & Longevity



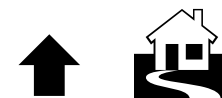


## Benefits to Utilities are also Benefits to Consumers

- Each meter is capable of:
  - > Outage and Restoration Notification
    - Reducing outage time
  - > Remote Disconnect / Reconnect
    - Faster, Safer account transition
  - > Interval Data, Time of Use, Critical Peak Pricing, Voltage Monitoring and Bi-Directional “Net” Metering
    - Flexible rate structures
  - > On Demand Readings
    - Fast, accurate settlement on move-in/out
  - > Wireless Communication of data to customer via Zigbee
    - Empowers customers with information on energy usage



# Distributed Generation Including Renewable Energy



- Support for “net” metering
- Measure kilowatt-hours delivered to customer
- Separately measure kilowatt-hours received from customer on-site generation



Source: EcoTech Energy Solutions Website



Source: Dixon Power Systems Website



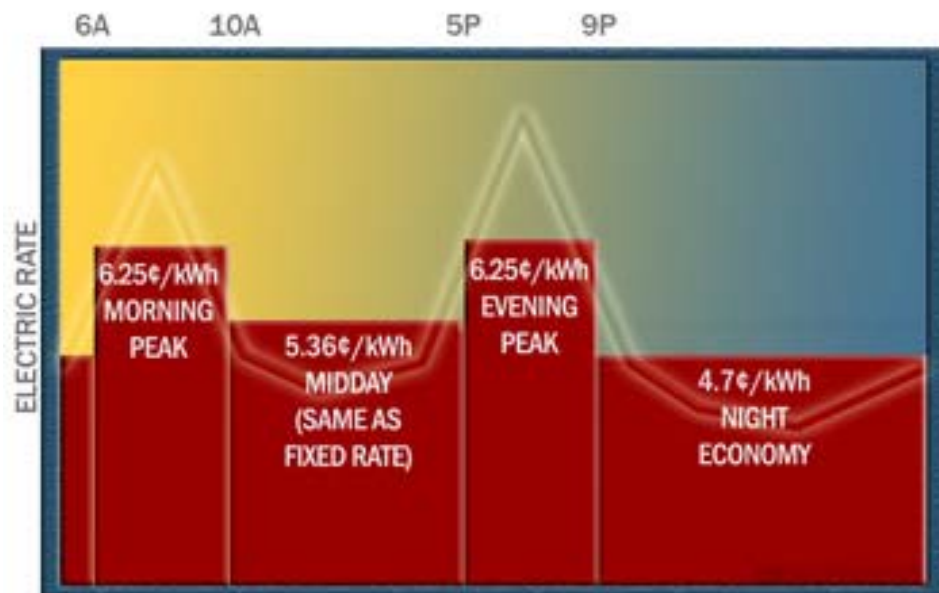
## Time of Use (TOU)

- Cellular phone companies successfully implemented Time of Use Rates
- “Nights and Weekends free”
- \$0.25 / minute during heavy network traffic times during rush hour
- \$0.04 / minute after 9pm and before 6am

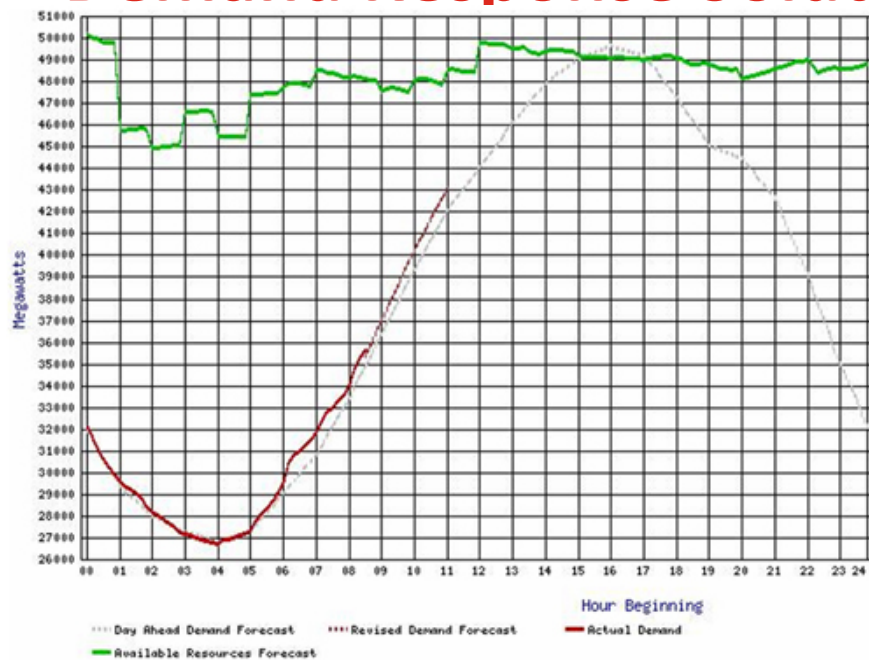


## Demand Response – Time of Use (TOU)

- Energy charged at different rates at different times
- Energy is charged at a lower rate when generation is less expensive (low demand)
- Energy is charged at a higher rate when generation is more expensive (high demand)
- Two-way communications allows TOU rates to be changed remotely
- Critical peak pricing / Peak Time Rebate

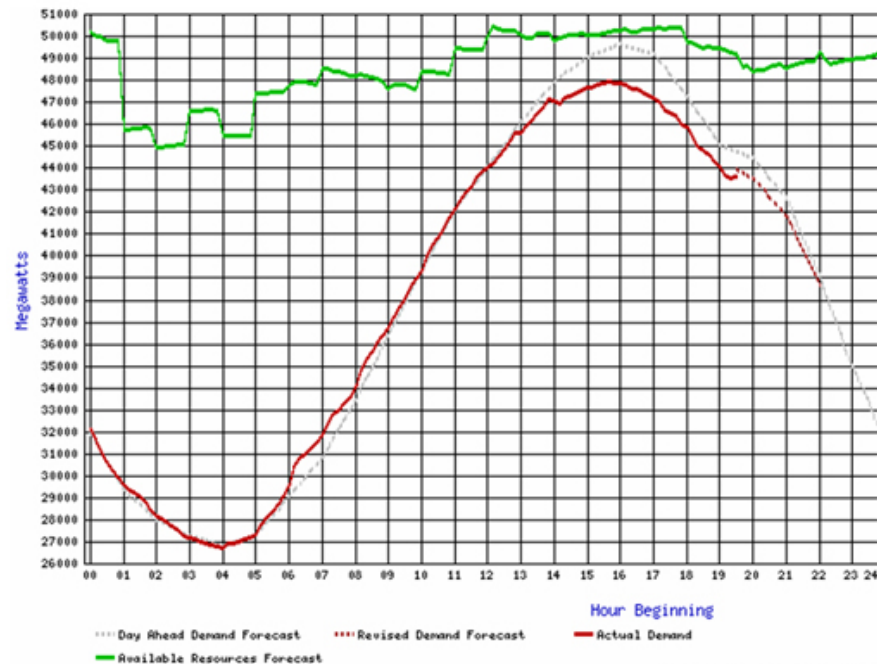


# Demand Response Solutions



Source: California ISO

**Before Demand Response**



Source: California ISO

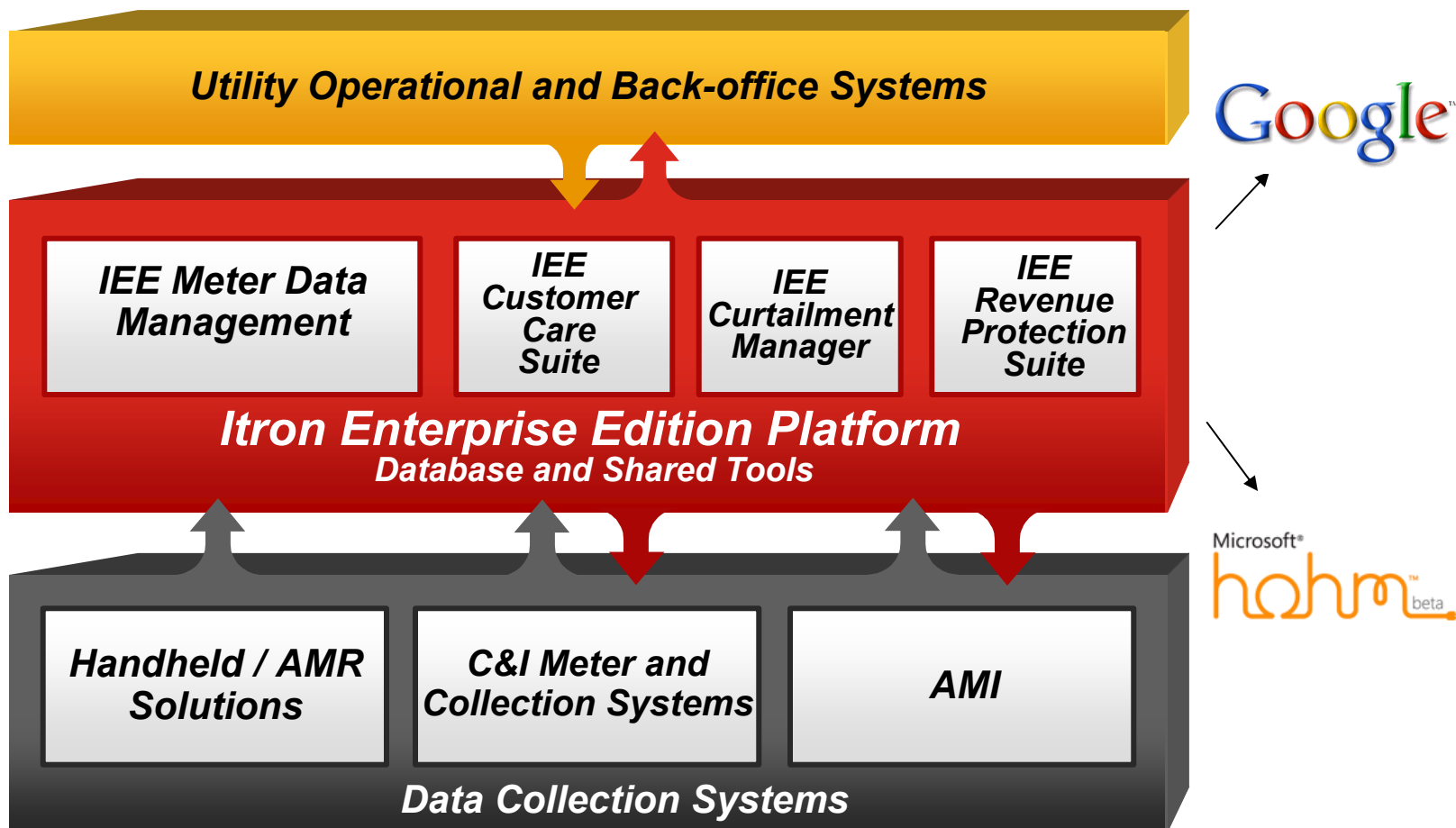
**After Demand Response**

## Lots of data.....what do we do with it?

- Reading all meters once per month creates approximately 100,000 data values per month (per 100,000 accounts)
  - > Current systems designed to manage this volume
- Interval data for all meters creates much more data
  - >  $(4 \text{ readings per hour})(24 \text{ hours/day})(30 \text{ days/month})(100,000) =$
  - > **288,000,000** data values per month!
  - > Most standard utility systems are NOT designed to manage this volume of data
- Meter Data Management System required to process and validate large volume of interval data
- Meter Data Management System needs to be integrated with various utility systems

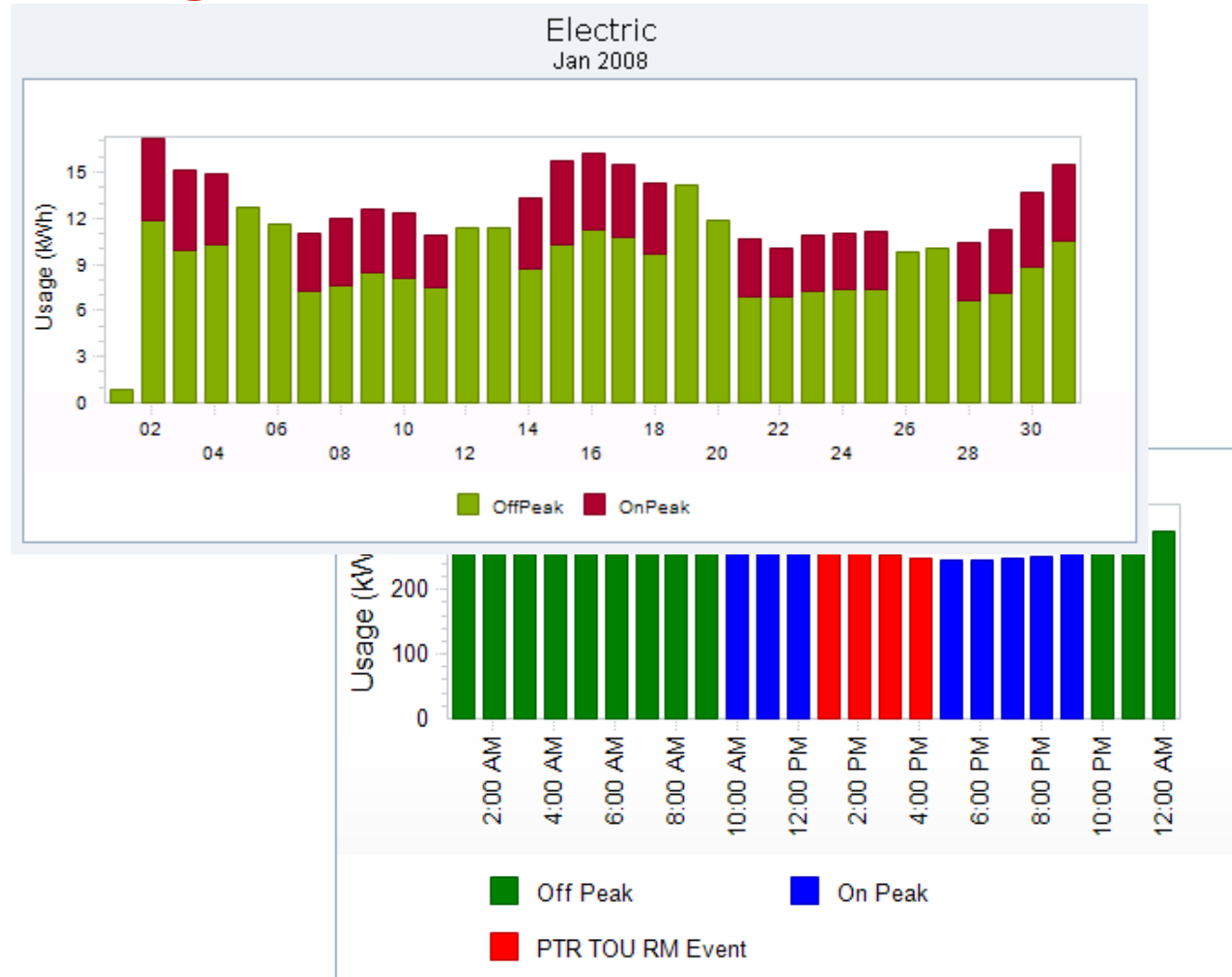


## Itron Enterprise Edition – Meter Data Management System



# Meter Data Management – Customer Care

- On-line display of usage patterns
- Compare to prior periods
- Ability to display TOU and CPP Periods
- Shows usage or \$
- Rate Education



## Conclusion

- Itron's OpenWay
  - > The Foundation of the SmartGrid
- Empowering customers with energy information