Smart Meter Functionality Implementation Update

ERCOT Board of Directors Meeting

August 16, 2011

Presented by:

Christine Wright, PUC | Michael Sullivan & Jeff Stonehocker, Champion Energy |

Donny Helm, Oncor Electric Delivery | Bob Frazier, CenterPoint Energy |

Betty Day & Paul Wattles, ERCOT

Agenda

1. PUC: Christine Wright
   - Smart Meter Overview
   - Customer Experience
2. REP perspective: Michael Sullivan & Jeff Stonehocker, Champion Energy
3. Joint TDSPs: Donny Helm, Oncor & Bob Frazier, CenterPoint Energy
   - SMT Overview and Statistics
   - Integration Challenge
4. ERCOT: Betty Day & Paul Wattles
   - Strategic Discussion – SMT data repository
   - Demand Response opportunities
   - Load forecasting

1. Public Utility Commission
Christine Wright

Smart Meter Deployment

- Over 6 million smart meters will be deployed by the end of 2013.
- As of August 5, 2011, over 3.6 Million meters are installed:
  - Oncor – 1.95 Million + installed, 60% complete
  - CenterPoint – 1.5 Million + installed, 69% complete
  - AEP – 335,000 + installed, 33% complete
  - TNMP – 13,306 installed, 5.83% complete
- Customers with a smart meter can access their usage data and join an In Home Device (IHD) through Smart Meter Texas
- Several REPs are offering products and services that utilize smart meter functionality, such as energy monitoring, time-of-use pricing, or pre-paid service.

Smart Meters & the Market

In Home Devices (IHDs)

- REPs, TDUs, Vendor Testing
- Third-Party Access
- Interoperability Events
- Trial and Error

Utility Infrastructure & Back Office

- Switching
- Processing Service Orders
- Meter Reading
- Alarms (tampering)
- 15-minute data VEE
- Outage Notification System

Market Web Portal

- Smart Meter Texas (SMT)
- Designed for turnover to ERCOT
- Rulemaking Requirements
- Stakeholder Requirements
- HAN, DR, Prepaid Tool
- Upgrades
- Retail Product Support
- Third-Party Access

Meters

- Progress Reports Filed Monthly
- Remote upgrade
- Can communicate inside the home

ERCOT Implementation

- ESI ID Look-Up
- 15-Minute Settlement
- TX SET 4.0
- Revisions to work with Nodal
- Demand Response
- Load participation in SCED

Customer Experience

- **Customer without an advanced meter:**
  - Discretionary service charge reductions
- **Customer with Smart Meter:**
  - Access to Smart Meter Texas showing detailed usage
  - Registering HAN devices
  - Sharing usage with “friends” and third-parties
- **Customer with a HAN device:**
  - Provide information and infrastructure for customer control of usage
  - Can be energy services combined with home automation
  - Can use utility network or customer broadband
- **How a customer can get a device:**
  - Through Energy Efficiency Utility program
  - Through REPs
  - Through Device Providers
  - Through the low income distribution (future)

Meter Deployment and Data Access

- **Deployment Information**
  - Available on the 15th of each month in TDSP progress reports (list of ESI IDs)
- **Data Access**
  - 15-minute data provided on a day-after basis through the Smart Meter Texas web portal
  - Real-time access for customers and the REP through the Home Area Network (HAN)
  - The ability to ping the meter and provide an on demand read (ODR)
    - Set for SMT Release #3
    - CenterPoint Energy Interim Portal supports pinging today

How to Access Data

Tool	Description	Data	Product Support
Smart Meter Texas (SMT)	• Online repository • Tool for joining devices, friends and family, pinging the meter • Only for smart meters	• VEE data • 15-minute data • Day -after basis	• All smart energy products • HAN services • API
Programmable Thermostat (PGT)	• Joined to the smart meter • Can control air conditioning, and/or other devices	• Can receive data from smart meter	• Based on product choice and customer preferences
In Home Display (IHD)	• Joined to the smart meter • Provides data, messaging, alerts • Communication path using the TDSP network and/or customer broadband connection	• Presents real time data from smart meter (updated 5-10 seconds)	• Bill Estimate based on cents/kWh • Messages
Smart Phone	• Allows provider to send messages to customer • Does not link with meter	• Data provided comes from the provider • Works for both standard /smart meters	• Bill Reminders; • Messages for Disconnect & Reconnect

REP Products Snapshot

- Green Mountain Time of Use Pilot
- Direct Energy:
  - Pay As You Go, Web Portal, Home Energy Monitor, Appliance Pilot (Whirlpool)
- TXU Energy:
  - Weekly Usage Email, Web Portal, Time of Use Rate Plan, In Home Display and Thermostats
- Reliant Energy:
  - Weekly Summary Email, Web Portal, iGoogle Gadget, Time of Use Rate Plan, SMS Alerts, In Home Monitors, Mobile App
- Prepaid Services – smart meter enabled
  - More than 11 REPs offering services using smart meters

Next on the Horizon

- PUC Leading market efforts
  - Projects & Strategies (PSWG) Work Group
  - Operations & Maintenance (OMWG) Work Group
  - Registration & Access (RAAWG) Working Group
  - Security (SWG) Working Group
  - Joint meetings with ERCOT DSWG and other(s)
- TX SET 4.0 implementation *(to leverage deployment of advanced meters)* –
  - Same Day Switch (including Sat.), Move-Out, Saturday AMS operations

2. Champion Energy

Michael Sullivan &

Jeff Stonehocker

Champion Energy

- Champion Energy ranks in the top five nonutility-affiliated retail electric providers in the United States and among the top 20 retail electricity companies in the nation.
  - Reflecting its explosive growth since entering the Texas electric utility market upon in 2002, Champion Energy serves 700,000 residential customer equivalents, with a peak load near 2,200 Megawatts.
  - The company currently serves residential, commercial and industrial customers in Texas, Illinois, Ohio, New Jersey and Pennsylvania deregulated electricity markets.

Champion Energy

The Smart Control Product

- Champion has an internal pilot of an (LMP) Market Price product with load control and will be expanding the pilot to include select customers in August, 2011
- Consumers' load is curtailed during energy prices spike above a set value by automatically adjusting thermostat set points via SMT API
- The Smart Control product affords customers the following benefits:
  - The opportunity to take advantage of RT LM prices while reducing risk of RT LM price spikes
    - Real time prices regularly prove to be less expensive than hedged power; however RT LMP exposes the customer to unwanted price spikes
    - The Smart Control product allows the customer to take advantage of the lower spot market prices while mitigating the risk of price spikes
  - Customers can learn from their own consumption habits and associated energy costs; may impact usage patterns from TOU learned behavior

Champion Energy

Inhibitors to broad adoption

- **Customer education:**
  - The savings proposition may be difficult for customers to grasp/quantify
  - Customers may be reluctant to use indexed products
  - Customers may be reluctant to allow their REP to control their comfort level
- **Current infrastructure limitations:**
  - REPs are limited on the number of messages allowed to be sent per day
    - Current network limit of 12 prices per day, six point-to-point load control events per day
    - In an ideal world, customers would set their own parameters and receive every LMP change
    - In the current environment, REPs will need to use remote load control to realize savings
  - Timeliness of messaging:
    - In the current environment, current Load Zone LMP 15 minute prices are already in effect before REPs are notified; ideally notification would be at least 90 seconds prior the interval starting
    - It takes ~ 90 seconds from the time a load control event is issued to when it actually takes effect at the meter
- **Cost: HAN enabled thermostats can be expensive; current costs outweigh the margin on any reasonably price 12 month product**

Champion Energy

- What does Champion get out of the investment and knowledge sharing?
  - We believe that the deregulated electricity world is moving towards smarter energy consumption management
  - We need many REPs to push the education for the market to realize the full benefit sooner rather than later

3. TDSPs and Projects & Strategies Working Group

Donny Helm & Bob Frazier

SMART METER TEXAS™

Functionality

- Monthly, daily, and 15-minute consumption up to 18 months
- HAN Registration
- English and Spanish
- ADA Compliant
- “Friends” Access

Next Release

- Consumer Mobile Experience
- Enhanced Data reporting and exporting
- Enhanced Security
- On Demand Reads
- Poll for Power Status
- Event Notifications

Participating Utilities

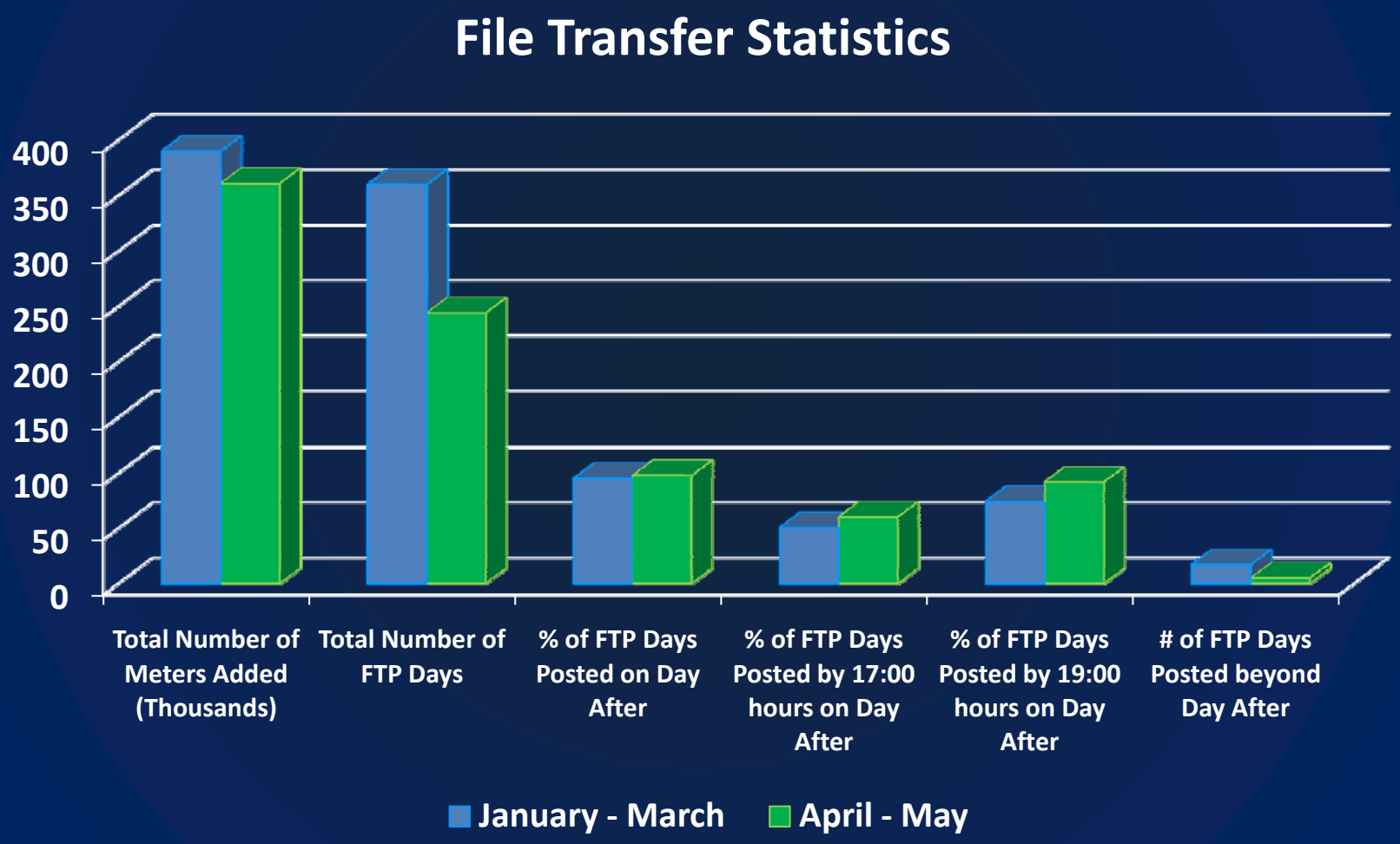
- American Electric Power
- CenterPoint Energy
- Oncor Electric Delivery
- Texas New Mexico Power

Participating REPs

- 58 Different REPs with 345 accounts are registered in SMT using one or more functions available only to REPs:
  - Usage for some or all their customers
  - HAN registration for their customers
  - Reporting
  - Help Desk

See Graphic provided in Appendix, Slide 35

SMART METER TEXAS™

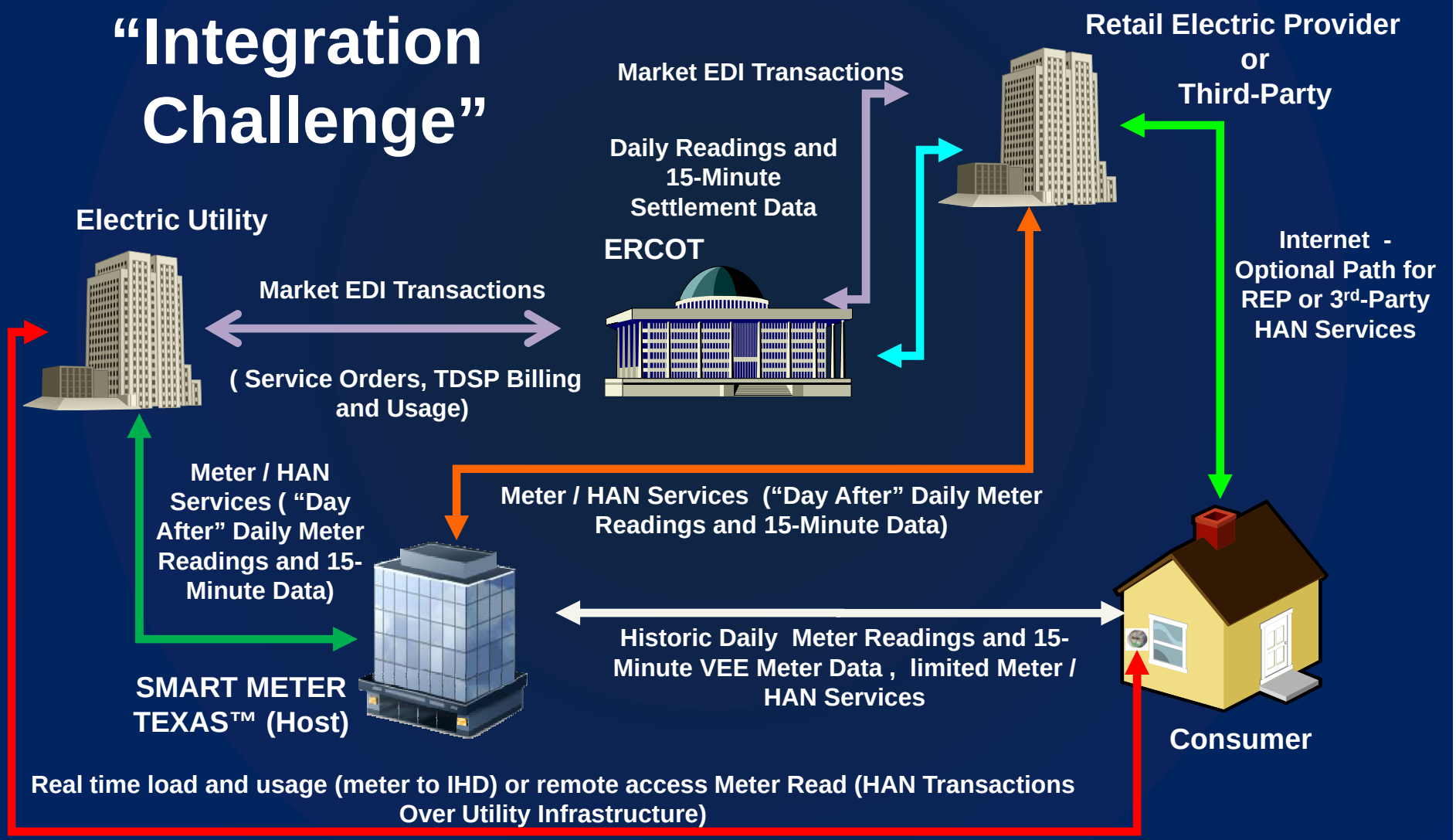


See additional information in Appendix, Slide 36

Smart Meter Texas Information Aug 5, 2011

1. 3,583,789 Smart Meters accessible via SMT
   - 39% CNP, 52% Oncor & 9% AEP
2. 2,831 Consumer HAN Devices Deployed
   - 1,716 CNP, 1099 Oncor & 16 AEP
3. 19,241 Residential Users on SMT
4. 58 Retail Electric Providers with 345 accounts using SMT (individually or API)
5. 544 total “friend” agreements

Texas AMI Solution – End-to-End



4. ERCOT
Betty Day & Paul Wattles

ERCOT Perspectives

Strategic discussions – Betty Day

- **Energy Data Management Assessment & Recommendations**
  - Duplication of data today between ERCOT and SMT
    - ERCOT needs for Settlement
    - SMT needs for REP/Customer data transparency
  - Evaluate consolidation of the TDSP LSE file processes to ERCOT and SMT solution.
  - Evaluate separating out the data repository of SMT and the customer portal.
    - Who should manage the data repository?
    - Who should manage the customer portal?

- **Home Area Network (HAN)**
  - Wireless device that allows consumers to monitor/control device-level energy use within the home (HVAC, pool pump, water heater, etc)
  - Does HAN registration remain with SMT?

DR Potential in ERCOT

- FERC estimates >18 GW of DR potential in Texas by 2019
  - Attributed to high peak demand
  - This would represent 20-25% of total ERCOT peak!

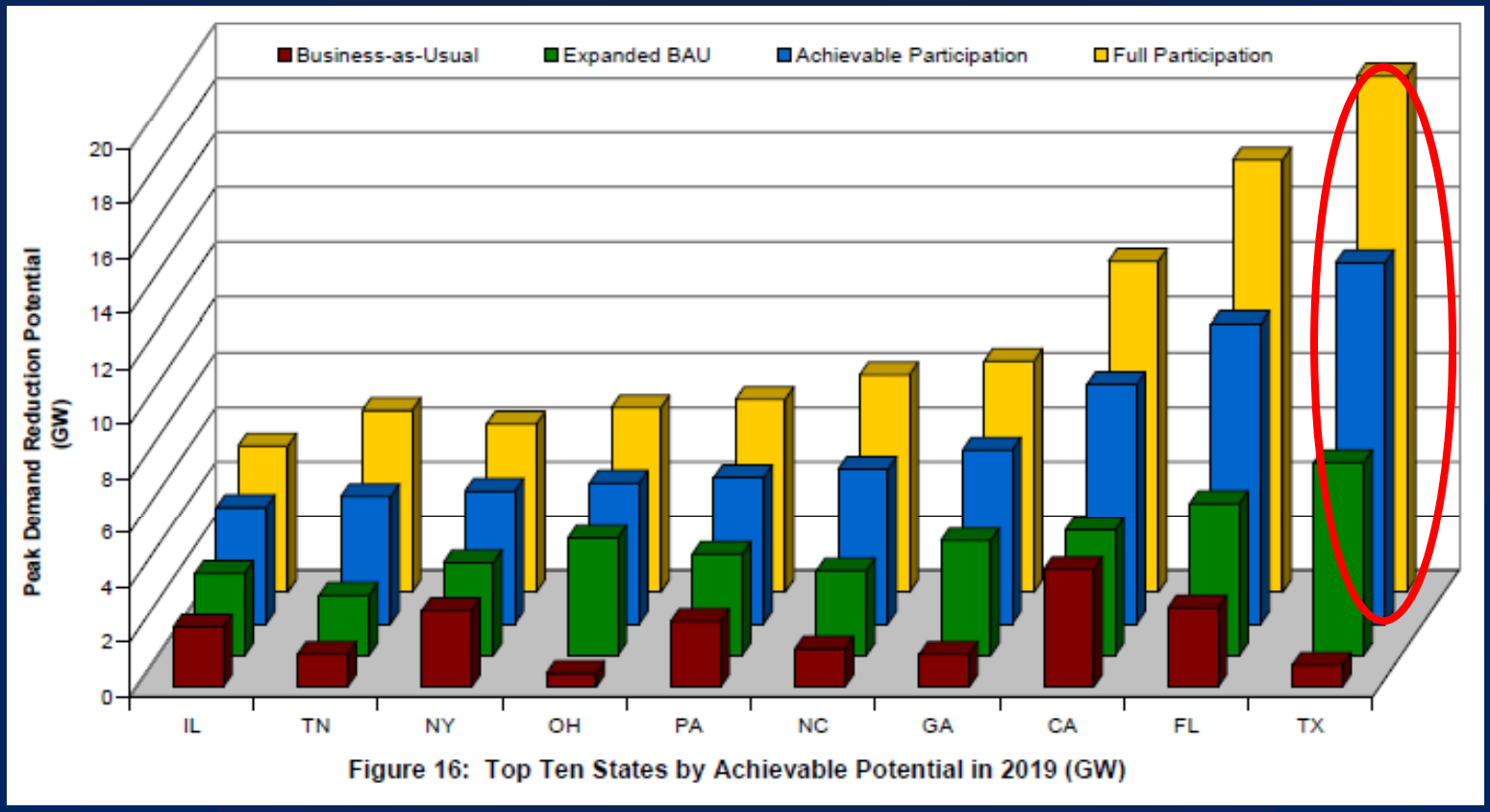


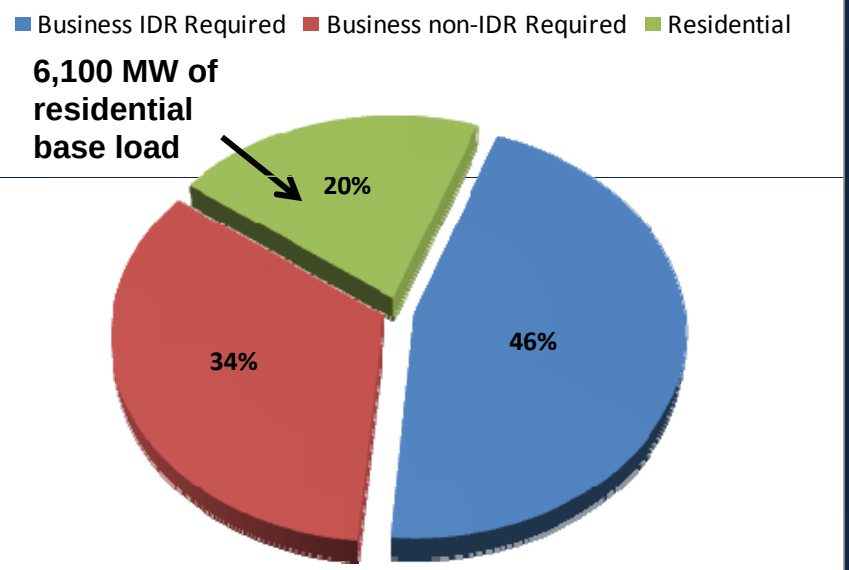
Figure 16: Top Ten States by Achievable Potential in 2019 (GW)

Source: FERC 2009 National Assessment of DR, page 42

Off-peak vs. on-peak: 2 different worlds

Moderate day, low A/C load

10-11 AM, March 31, 2010

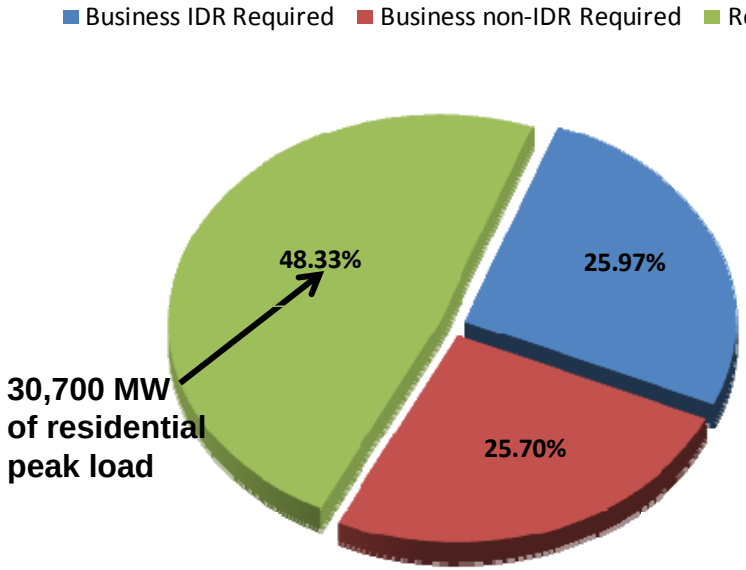


ERCOT load for this hour: 30,697 MW

- Customer class breakdown is for competitive choice areas only; system-wide numbers are estimated using those counts as proxy for entire region
- IDR meters are required at >700kW

Hot day, high A/C load

4-5 PM, Aug. 4, 2010



ERCOT load for this hour: 63,594 MW

24,000+ MW of residential air conditioning on a 65,000 MW grid

ERCOT Perspectives

Demand Response – Paul Wattles

- 15-minute data and settlement should be a catalyst for expansion of DR opportunities for residential & small commercial customer aggregations
- Direct load control enabled thru AMI/HAN or third-party products
- DR could be activated by customer, REP or third party, or automated
- Price Responsive Demand
  - Critical peak pricing or other signals tied to real-time LMPs
- ISO-administered DR products
  - Represented in ERCOT markets by DR-enabled QSE
  - EILS today, potentially Ancillary Services in the future

- AMI data will also assist ERCOT in Load forecasting
  - More granular meter data will assist ERCOT planning activities via improved mid-term and long-term Load forecasting

Thank You for the Opportunity to Present

Any Questions?

Appendices

PUCT Rule Requirements:

§25.130(g)(1)(E)-(F)

(1) An AMS shall provide or support the following minimum system features in order to obtain cost recovery through a surcharge pursuant to subsection (k) of this section:

(E) the capability to provide direct, real-time access to customer usage data to the customer and the customer's REP, provided that:

(i) hourly data shall be transmitted to the electric utility's web portal on a day-after basis.

(ii) the commission staff using a stakeholder process, as soon as practicable shall determine, subject to commission approval, when and how 15-minute IDR data shall be made available on the electric utility's web portal.

(F) means by which the REP can provide price signals to the customer;

PUCT Rule Requirements:

§25.130 (j)

(j)**Access to meter data.**

(1) An electric utility shall provide a customer, the customer's REP, and other entities authorized by the customer read-only access to the customer's advanced meter data, including meter data used to calculate charges for service, historical load data, and any other proprietary customer information. The access shall be convenient and secure, and the data shall be made available no later than the day after it was created.

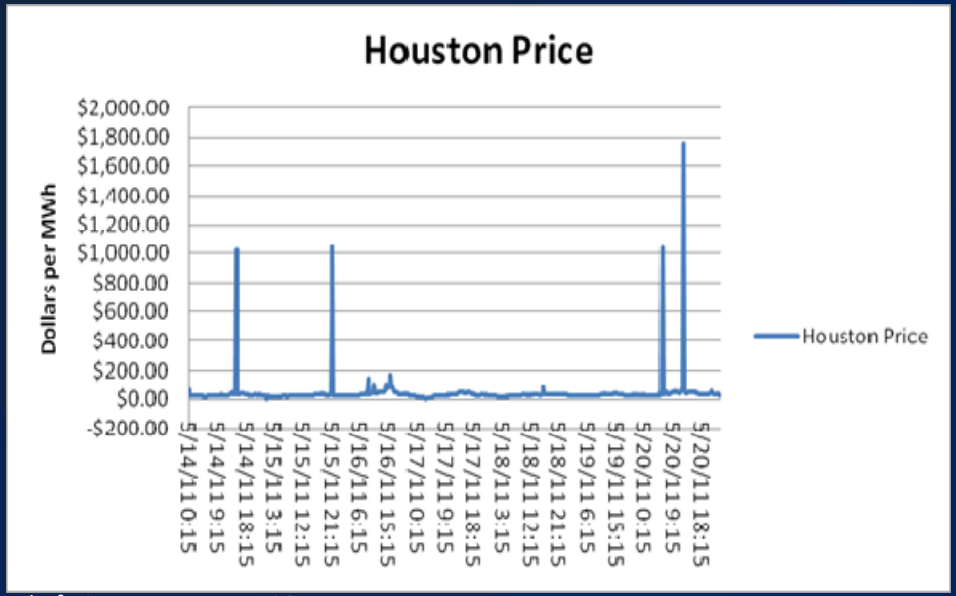
Champion Energy – Details of product

Illustration of how it is works…

- Thermostats will be adjusted remotely via the Smart Meter Texas API. Messages will be sent to SMT indicating which ESIDs to adjust, how to adjust and how long to adjust
- A typical air conditioning unit has a demand value of 5 kW which could be minimized or eliminated during price spikes
- The grid (right) assumes 75% reduction in energy consumption during times where prices exceed the trigger. The savings shown represent energy costs only and do not include TDSP pass thru charges.

From 5/14 to 5/20			
Trigger	Intervals	Total Hours	Savings*
$40	101	25.25	19.60%
$50	33	8.25	11.49%
$60	23	5.75	10.76%
$70	17	4.25	10.34%
$80	17	4.25	10.34%
$90	12	3	9.69%
$100	10	2.5	9.62%

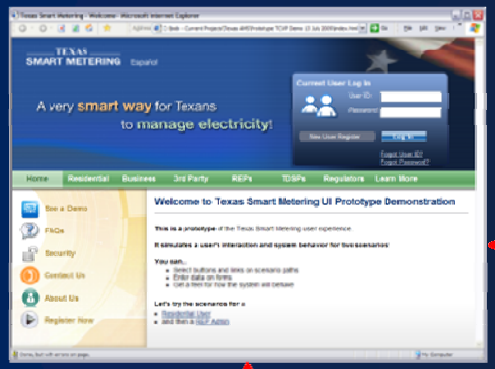
*Savings assume unlimited load control duration



AMS & the Home Area Network

Advanced Metering System

(Consumer Perspective)

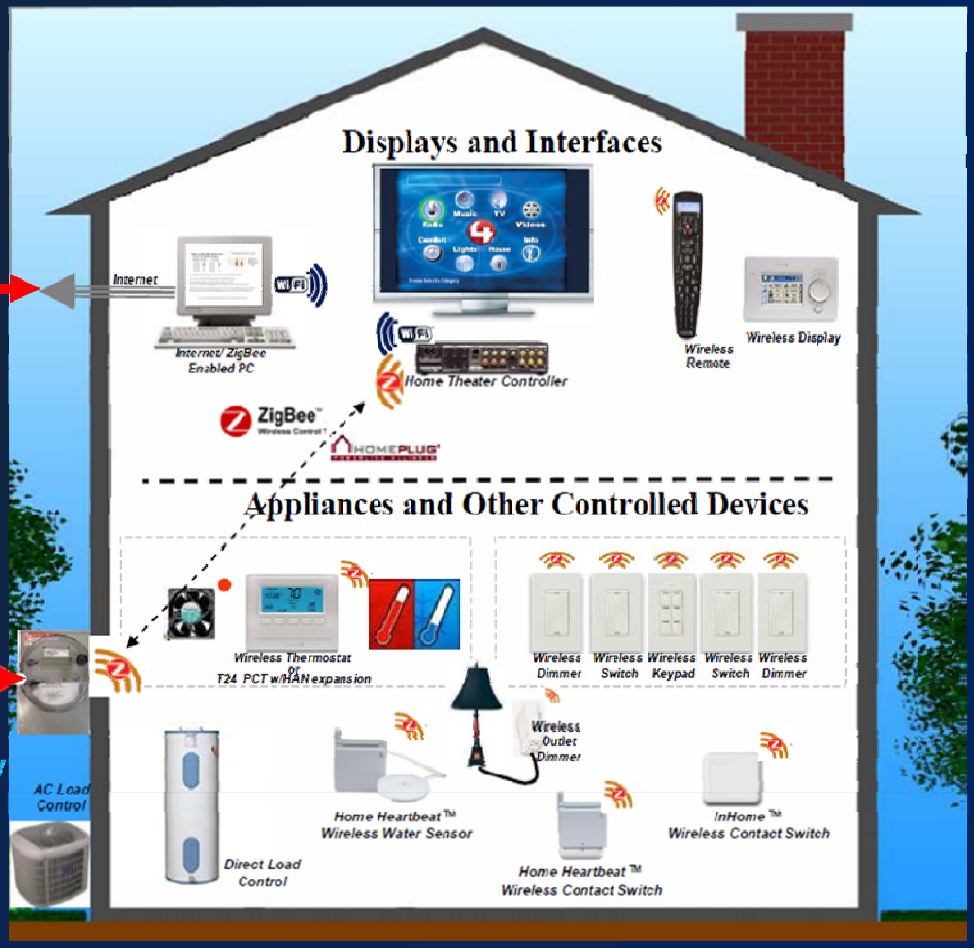


Meter / HAN Services

Meter / HAN Services

TDSP

Meter / HAN Transactions Over Utility Infrastructure



Smart Meter Texas

Smart Meter Texas

Meter Interval Usage

HAN Messages

Meter Attributes

Customer Premise

Meter Provisioning

Demand Response

Settlement

Pricing

Text Messaging

Presentment

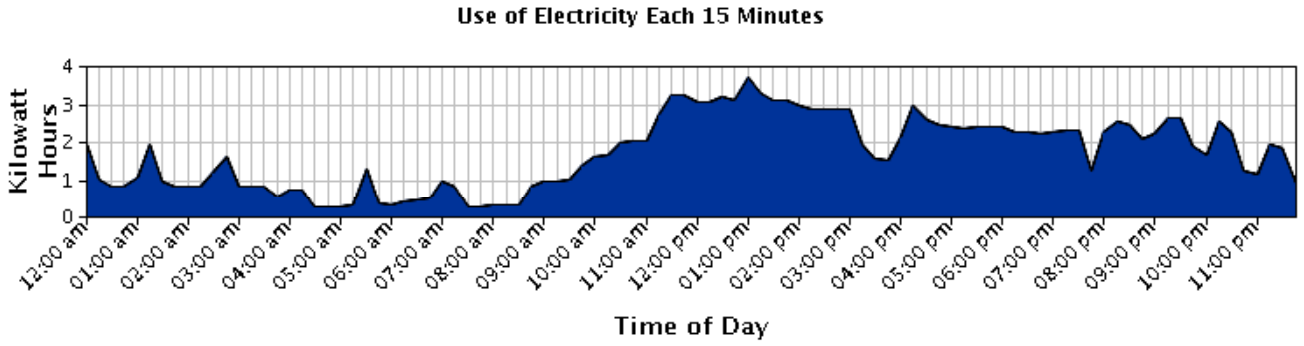
Customer View on Smart Meter Texas

Report Option

Report Type: Daily Usage (15 min intervals)

Start Date: 08/03/2011 End Date: 08/03/2011 Update Report

Daily Usage (each 15 minutes) - Kilowatt Hours for 08/03/2011

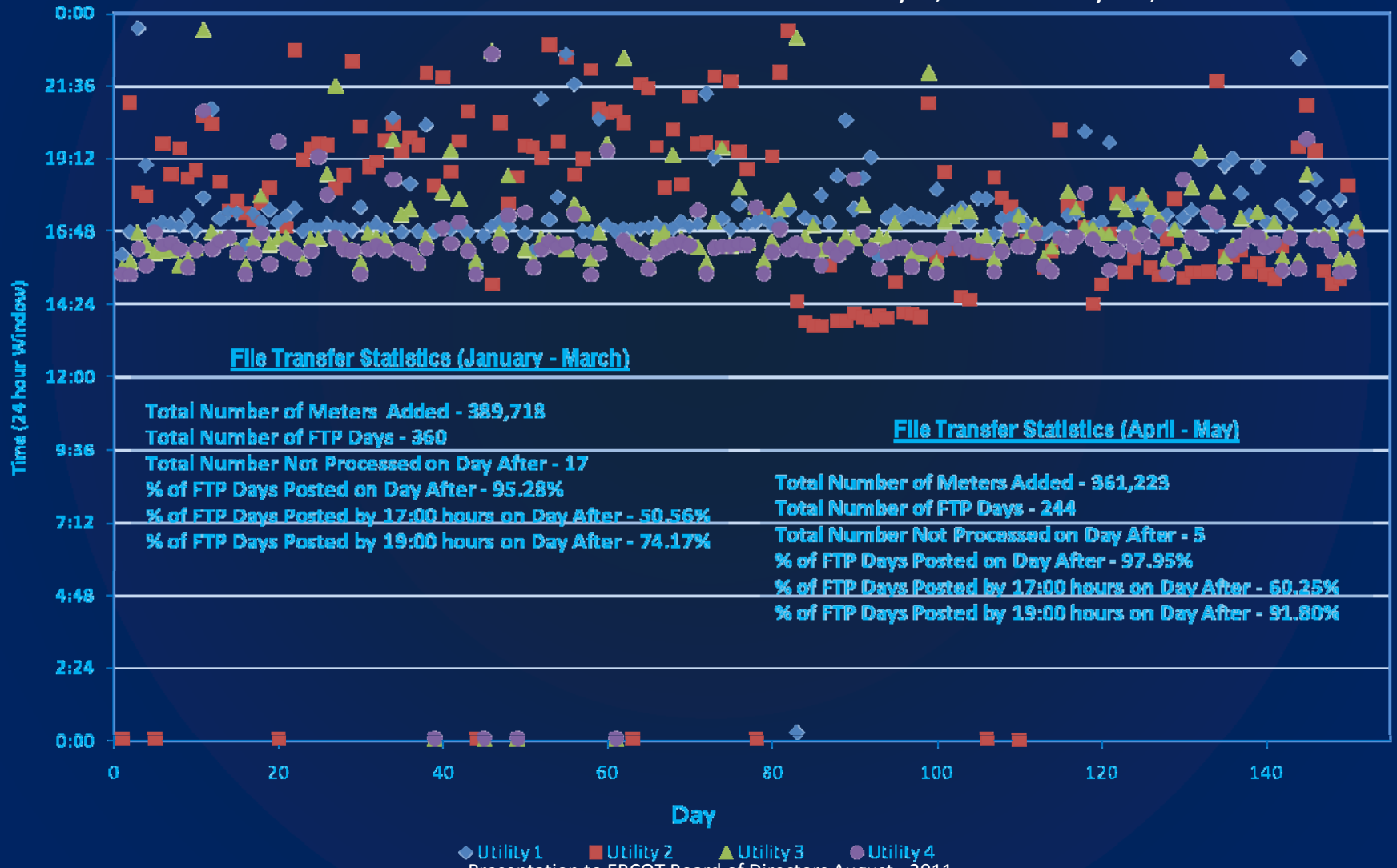


Print Export < Previous Day Next Day >

Start Time	End Time	Usage(kWh)	Act./Est.
12:00 am	12:15 am	1.979	A
12:15 am	12:30 am	1.046	A
12:30 am	12:45 am	0.874	A
12:45 am	01:00 am	0.846	A
01:00 am	01:15 am	1.09	A
01:15 am	01:30 am	1.987	A
01:30 am	01:45 am	0.998	A
01:45 am	02:00 am	0.846	A
02:00 am	02:15 am	0.878	A

Smart Meter Texas

File Transfer Process to SMT from TDSPs January 1, 2011 - May 31, 2011



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File Transfer Statistics (Jan - Mar)

- Total Number of Meters Added - 389,718
- Total Number of FTP Days – 360
- # of FTP Days Posted beyond Day After – 17
- % of FTP Days Posted on Day After - 95.28%
- % of FTP Days Posted by 17:00 hours on Day After - 50.56%
- % of FTP Days Posted by 19:00 hours on Day After - 74.17%

File Transfer Statistics (April - May)

- Total Number of Meters Added - 361,223
- Total Number of FTP Days - 244
- # of FTP Days Posted beyond Day After – 5
- % of FTP Days Posted on Day After - 97.95%
- % of FTP Days Posted by 17:00 hours on Day After - 60.25%
- % of FTP Days Posted by 19:00 hours on Day After - 91.80%