Wired Group Introduction

- **Clients:** advocates, regulators, associations, utility suppliers
- **Expertise:** electric distribution grids/utilities/businesses
  - DSM program development, marketing, evaluation
  - RPS compliance/PV Solar incentive program design
  - New rate development, offer design, and marketing
  - Distribution utility performance and compensation
  - Modern Grid: distribution, metering, communications
- **Distinctive Competence:** evaluations of smart grid deployments
  - Boulder Colorado for Xcel Energy
  - Duke Energy Cincinnati for Ohio PUC

Free to NARUC members; e-mail mailing address to palvarez@wiredgroup.net
Preview

1. How utilities can use data to increase customer value from grid modernization investments

   Q: To what degree do ratemaking mechanics discourage IOUs from maximizing smart grid value for customers?

2. How Regulators and Staff can use publicly-available data to encourage greater value through performance benchmarking
Data Analytics Are Critical to Improving the Customer Benefit-Cost Ratio . . .

Data Analytics

RELIABILITY

NEW RATE DESIGNS

REVENUE ASSURANCE

GRID CAPITAL & ENERGY EFFICIENCY

CUSTOMER EFFICIENCY

. . . But We Must Eliminate IOU $ Penalties for Doing So!
Observations on smart meter data and reliability

- “Last gasp”/OMS integration: not critical to CAIDI improvement
- Voltage data exception reporting: has some merit, but incidence typically low
- MASS METER PING to identify “nested outages”: best CAIDI improvement from meter data.

CAIDI Improvement by Capability
Typical vs. Ideal Deployment

- Typical: 26% Smart Meters, 3% Fault Location, 1% Fault Isolation
- Ideal: 34% Total Improvement, with 5% each for Smart Meters, Fault Location, and Fault Isolation
Enhancements to Validation, Editing, and Estimation (VEE) routines are needed to detect theft via bypass in meter data.
Grid Capital and Energy Efficiency: Advanced Distribution Management Systems

<table>
<thead>
<tr>
<th>Capability</th>
<th>Reliability</th>
<th>Energy Efficiency</th>
<th>Capital Efficiency</th>
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<tbody>
<tr>
<td>Fault Location/Isolation/Svc. Restoration (FLISR)</td>
<td>High Value</td>
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<td>Device Condition Monitoring (outage prevention)</td>
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<td>Conservation Voltage Reduction &amp; Volt-VAr Optimization</td>
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<td>Distributed Energy Resource Management System</td>
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<td>Distribution Optimization Modeling – Phase Balance</td>
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<tr>
<td>Distribution Optimization Modeling – Load Balance</td>
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</table>
Customer Efficiency: DSM Programs

Data Analytics

- Reduced DSM Participant Acquisition Costs
- Improved Measurement & Verification
- New Program Opportunities
- Target Marketing
- Southern California Edison’s “Budget Assistant”
- Energy Efficiency Demand Response
New Rate Designs (3-Part, TVR, etc.)

DESIGN
- More effectively reduce peak
- More accurately revenue neutral

INTRODUCE (Default/Opt-Out)
- Which customers will be big losers?
- Special outreach?
- Smoother transition

Data Analytics

ADMINISTER
The *Utility Evaluator™*

- Internet-based software application
- Aggregates public data into actionable information
  - Financial data from FERC Form 1
  - Operational data from EIA Form 861
  - Customer Satisfaction from JD Powers & Associates
  - Regulatory filings, SEC filings, ACEEE, others
- Benchmarks key performance indicators & trends (reliability, costs, satisfaction, ROE, DSM, etc.)
- Enables peer grouping by utility characteristics (load, customer, business, regulatory, demographic)
2014 Performance Dashboard for:

Quantile Performance vs. All Utilities

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<thead>
<tr>
<th>Metric</th>
<th>Quantile</th>
<th>All Utilities Average</th>
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<tbody>
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<td>O&amp;M Spending</td>
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<tr>
<td>Customer Service Spending</td>
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<td>G&amp;A Spending</td>
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<td>Customer Satisfaction</td>
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<table>
<thead>
<tr>
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<tbody>
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<tr>
<td>Years to Replace Grid</td>
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<td>Return On Equity %</td>
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www.wiredgroup.net
Key Performance Indicator: Billing & Customer Service Spend per Customer

Peer Group: All Utilities

Dollars Spent per Customer per Year

'10  '11  '12  '13  '14

745  83  121  273  197  159

Dollars Spent per Customer per Year

'10  '11  '12  '13  '14

273  197  159

www.wiredgroup.net

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Key Performance Indicator: Billing & Customer Service Spend per Customer

Peer Group: Customer Count > 1,400,000 AND AMI > 75%

Dollars Spent per Customer per Year

'10 '11 '12 '13 '14

60 79 97 116 190 153 134

www.wiredgroup.net
Thank You!

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Copies of Smart Grid Hype & Reality are being made available to NARUC members at no charge; simply e-mail Paul Alvarez with preferred mailing address and number of copies desired. A limited number of free trial subscriptions to the Utility Evaluator™ are also available for a limited time.
AMI & DA $ Benefit-Cost/Customer, Ideal Case

Utility “Throughput Incentive” Penalties

Utility “Rate Case Timing” avoids sharing w/customers
Smart Meter Benefit-Cost/Customer, 10 years

Cost or Benefit per Customer (today's $)

-400 -300 -200 -100 0 100 200

Costs | Meter Reading | Time-Varying Rates | Prepayment | Revenue Assurance

Typical Deployment | Ideal Deployment Increment

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Distribution Automation Benefit-Cost/Customer

![Graph showing cost or benefit per customer compared to typical and ideal deployments.](image-url)
Before the Committee:

1. Should affirmative policies be established?
2. What implementation steps exist today?
3. What are boundaries between basic, platform and competitive services?
Why consider consumer data access policies?

1. Digital technology and distributed energy advances prompt a review of the role of data.

2. Data access is ubiquitous in all other sectors of the consumer economy.

3. Economic, operational & environmental benefits easily reach into the billions of dollars.

4. Competitively neutral approaches will foster innovation
INTRODUCTION

- ~40 companies

- Active participant in proceedings nationwide (NY, TX, IL, CA, CO, MN...)

- Our Belief:

  Consumers should have convenient, useful access to best available information
1. Consumers have an affirmative right to access best available information about their own energy use, including:
   - Historical interval data
   - Direct, real-time information (as available)
   - Bill charges and tariffs

2. Consumers can share information with trusted service providers (i.e., market engagement)

3. Information access included as component of basic service (implementation costs included in rates)
POLICY CONSISTENCY

- **FEDERAL**: EISA, NBP, ARRA, Green Button
  
  “Provision to consumers of timely information and control options...”

- **NEW YORK**: 09-M-0074 (AMI Functional Requirements)
  
  “AMI systems must have the ability to provide customers direct, real-time access to electric meter data. The data access must be provided in an open, non-proprietary format.”

- **REV**: Commission Orders, Staff Findings, Party Comments
  
  “It is essential to have a means to facilitate transactions and delivery of data...” and “A key objective is to provide mass-market customers with convenient access to their energy usage information, and facilitate their ability to share that information with vendors they select.”
Data Policy & Advanced Metering

Policy Established: *Data & HAN Access*

- >50% AMI (or 1m meters)
- >25% AMI (or 250k meters)
<table>
<thead>
<tr>
<th>State</th>
<th>Policy Established</th>
<th>Revenue (SB)</th>
<th>Large IOU’s (&gt;$250m)</th>
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Periodic Table of State Policy
AMI Deployment

- Deep South: Fl, GA, SC, LA, MS
- Upper South: VA, KY, TN, AL, MS
- Lower Plains: OK, MO, KS, NE, ND
- Upper Plains: MT, WY, CO, ID, OR
- Intermountain West: NV, AZ, CA, WA, OR
- Pacific Rim: HI, AK, HI, AK, HI
- Midwest: OH, PA, IL, IN, MI, WI
- Mid-Atlantic: NJ, NY, CT, MA, DE, MD
- New England: VT, NH, ME, RI, VT

© Tol
# US Electricity Market

## Private Ownership

- **Integrated**: $145.8 B (37%)
- **Restructured**: $83.0 B (21%)
- **Retail**: $39.9 B (14%)

## Public Ownership

- **Municipal**: $39.9 B (10%)
- **Cooperative**: $44.6 B (11%)
- **Other**: $23.0 B (6%)

### US Electricity Sales:
- $391.6B annual retail sales
- ~$1.07B per day

*Investor-owned: (73%)*
- 37% integrated
- 21% restructured
- 14% retail

*Publicly-owned: (27%)*
- 10% municipal
- 11% cooperative
- 6% other public power

$ = $1B annual revenue

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© Tolerable Planet Enterprises
### US Electricity Market

<table>
<thead>
<tr>
<th>Category</th>
<th>Annual Sales</th>
<th>Market Share</th>
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<tbody>
<tr>
<td>Integrated</td>
<td>$145.8 B</td>
<td>37%</td>
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<tr>
<td>Restructured</td>
<td>$83.0 B</td>
<td>21%</td>
</tr>
<tr>
<td>Retail</td>
<td>$39.9 B</td>
<td>14%</td>
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<tr>
<td>Municipal</td>
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</tr>
<tr>
<td>Other</td>
<td>$23.0 B</td>
<td>6%</td>
</tr>
</tbody>
</table>

#### US Electricity Sales:
- $391.6B annual retail sales
- ~$1.07B per day

AMI:
- 40% by Revenue

**Investor-owned:**
- 33% integrated
- 48% restructured
- 64% retail

**Publicly-owned:** (27%)
- 19% municipal
- 48% cooperative
- 21% other public power

- $1B annual revenue

- Private Ownership
- Public Ownership
GREEN BUTTON CONNECT is available for immediate implementation by all utilities in the United States.

GREEN BUTTON CONNECT offers...

- Customer Convenience and Benefit
- Industry Infrastructure (standards, certification, functionality)
- Implementation Experience (CA, IL, DC)
- Market Development and “Animation”
1. “DOWNLOAD MY DATA”
   - File transfer “snapshot” of energy use

2. “CONNECT MY DATA”
   - Direct “subscription” to ongoing customer information
   - Eliminates “manual” touch from consumer
Cost:

- Costs and benefits must be addressed in open forum (all other state assessments have determined enormous benefits)
- 1% residential energy reduction represents $1.75B
- Cost estimates must distinguish between:
  - *Legacy system upgrades*: (OAuth, user authentication, etc. to enable secure and authorized web services)
  - *Information model*: Costs attributable to GB data configuration
Commissions and Staff have opportunity to demarcate basic service, platform service and competitive markets:

- **BASIC**: Features and services to modernize grid infrastructure and align with customer expectations (included in rates)

- **PLATFORM**: Enhanced features required to engage market participants in fulfilling platform functions (based on grid neutrality and implementation costs)

- **COMPETITIVE**: Investor-based market offerings and regulated earnings (with Commission oversight of utility participation)
THANK YOU

Cameron Brooks
Mission: data
www.missiondata.org
303.957.7667
cbrooks@tolerableplanet.com
OAuth 2.0 Is THE Standard to Authorize Data Access

- **GOOGLE**: “Google APIs use the OAuth 2.0 protocol for authentication and authorization. Google supports common OAuth 2.0 scenarios such as those for web server, installed, and client-side applications.” (https://developers.google.com/identity/protocols/OAuth2)

- **PAYPAL**: “The PayPal REST API uses the OAuth 2.0 protocol to authorize calls. OAuth is an industry-standard open standard for authorization used by many companies to provide secure access to protected resources.” (https://developer.paypal.com/docs/integration/direct/paypal-oauth2/)

- **YAHOO**: “OAuth 2.0 is an updated version of the OAuth protocol that supercedes OAuth 1.0 and 1.0a. OAuth is an open standard for authorization that Yahoo uses to grant access to user data.” (https://developer.yahoo.com/oauth2/guide/)

- **TWITTER**: “The 3-legged OAuth flow allows your application to obtain an access token by redirecting a user to Twitter and having them authorize your application.” (https://dev.twitter.com/oauth/3-legged)
Green Button is a superior standard, consistent with modern industry norms and support infrastructure. EDI is a legacy protocol with no established transition pathway.

- EDI does not segregate personally identifiable information (PII)
- Green Button Data is flexible with regard to PII
- Green Button supports integrated business-to-business (B2B) and direct-to-consumer applications
- Green Button Connect has robust security & authorization
- Costs of data standard (Green Button) are negligible. (Costs are dominated by secure web service with authentication and authorization, regardless of data standard.)
Legend

- **Pending Natural Gas Pipeline Project**
- **Existing Interstate Pipeline**
- **Tight Oil and Shale Gas Play**

Map Data Source: DOE EIA

Chart Data Source: http://www.ferc.gov/industries/gas/indus-act/pipelines
Natural Gas Pipeline Siting - Easy, Right?

Stakeholder Outreach

February 15, 2016
Stakeholder Outreach for Pipeline Projects

Outreach

- Coordination between public affairs and other areas of the project including right-of-way, environmental, safety, operations and legal.

- Identify and engage a wide variety of constituents along and near the project area.

- Utilize all communication platforms to help explain information, providing updates throughout the life of the project.
Stakeholder Outreach for Pipeline Projects

Typical compressor station

Don Barnette
Lifetime Lobelville Resident
27-Year Tennessee Gas Pipeline Employee

The environmental survey

The pre-construction survey

The civil survey

The archaeological survey
Typical Customer Class Load Curves

Average of Four Monthly Summer Peak Days

System Peak Hour