Using Data to Increase the Value Utilities Deliver to Customers

Wired Group

NARUC Energy Resources and Environment Committee

Winter Meeting February 15, 2016

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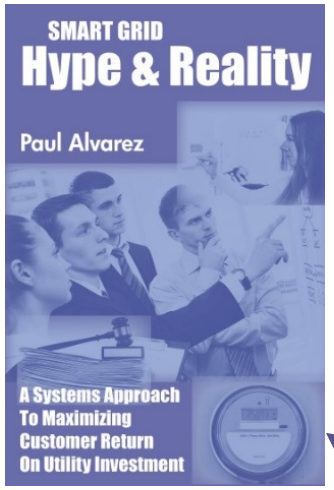
Wired Group Introduction

- **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

OUCC Indiana Office of Utility Consumer Counselor

Ohio Public Utilities Commission

EDF Environmental Defense Fund — Finding the ways that work

ACLARA

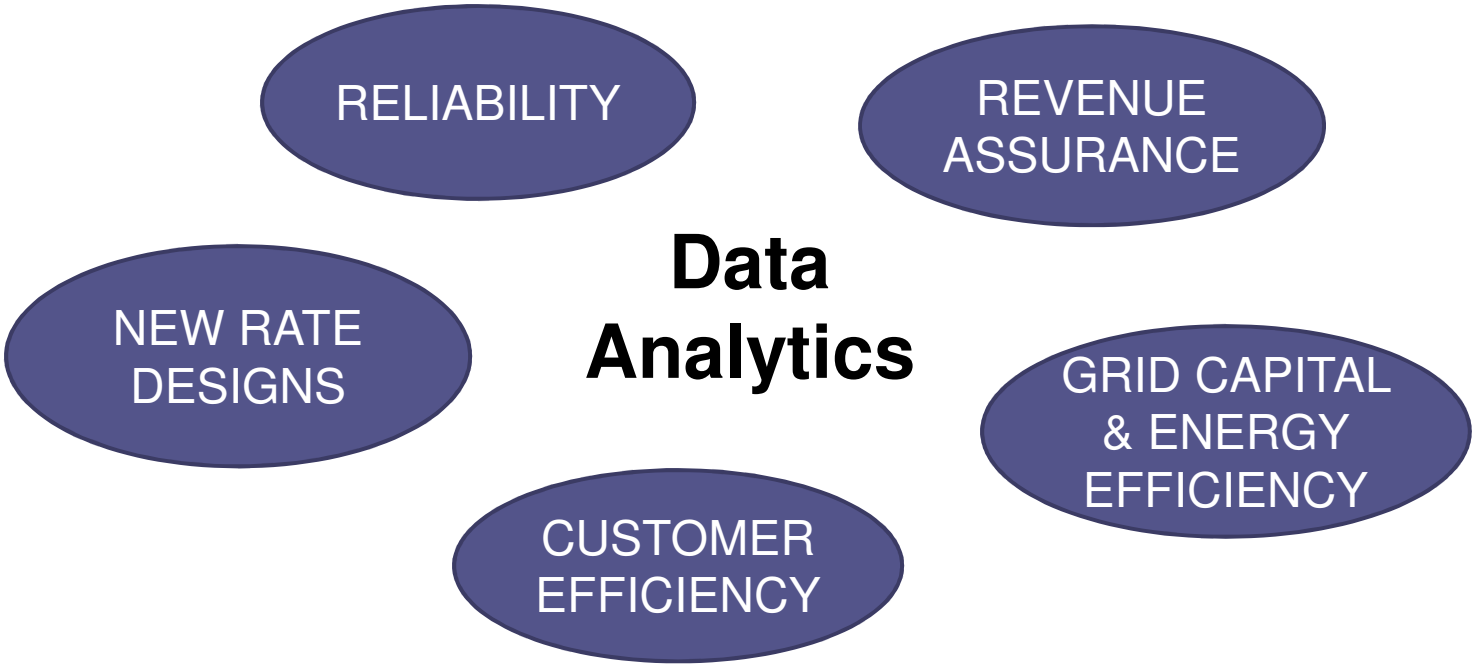
Preview

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 . . .

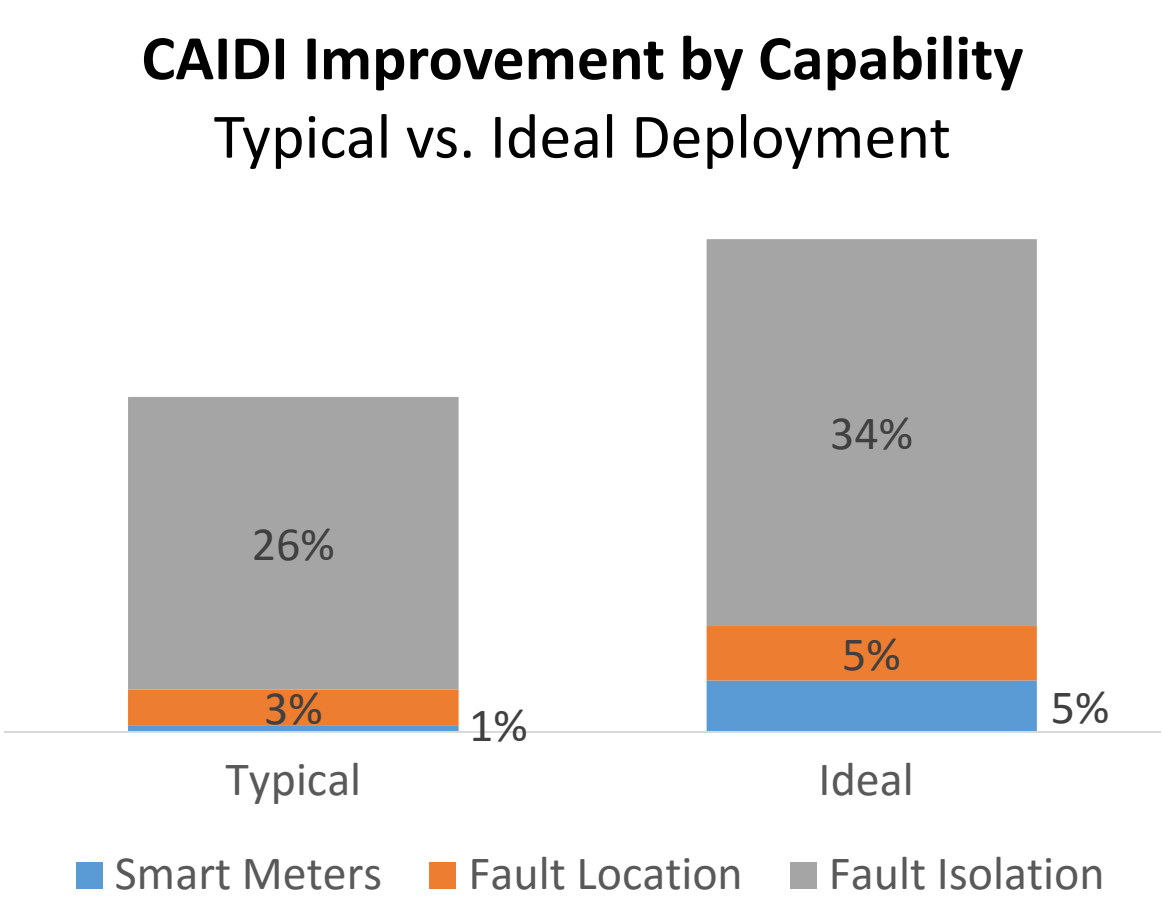


. . . But We Must Eliminate IOU $ Penalties for Doing So!

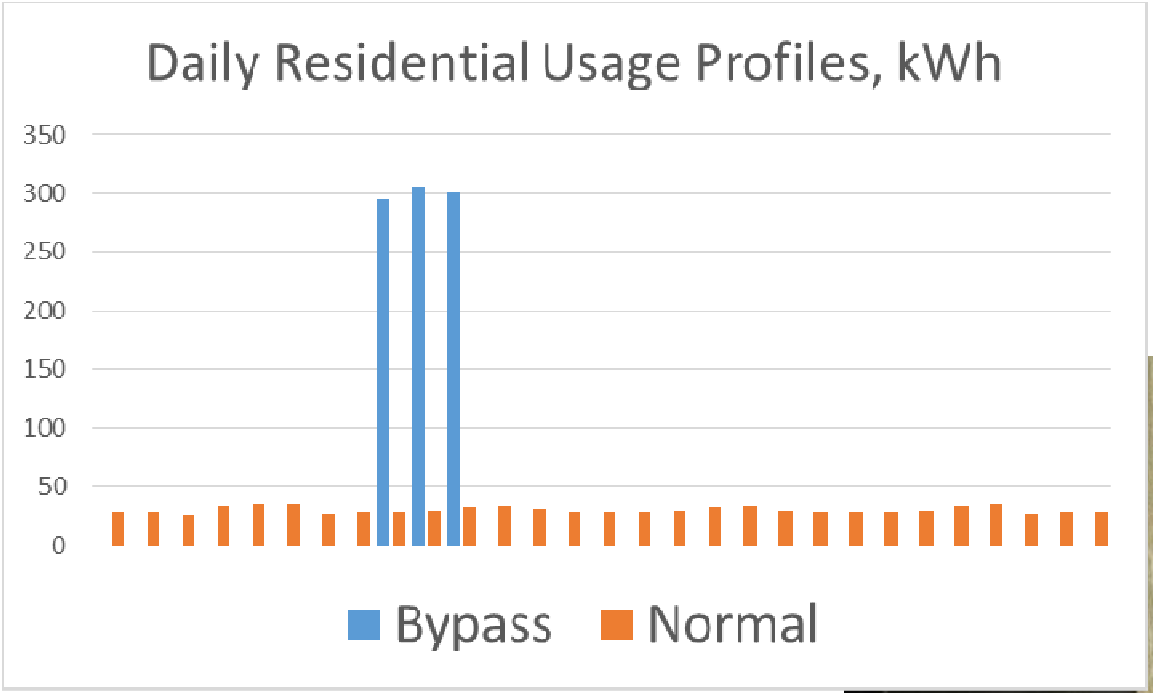
Reliability – Outage Restoration

Observations on smart meter data and reliability

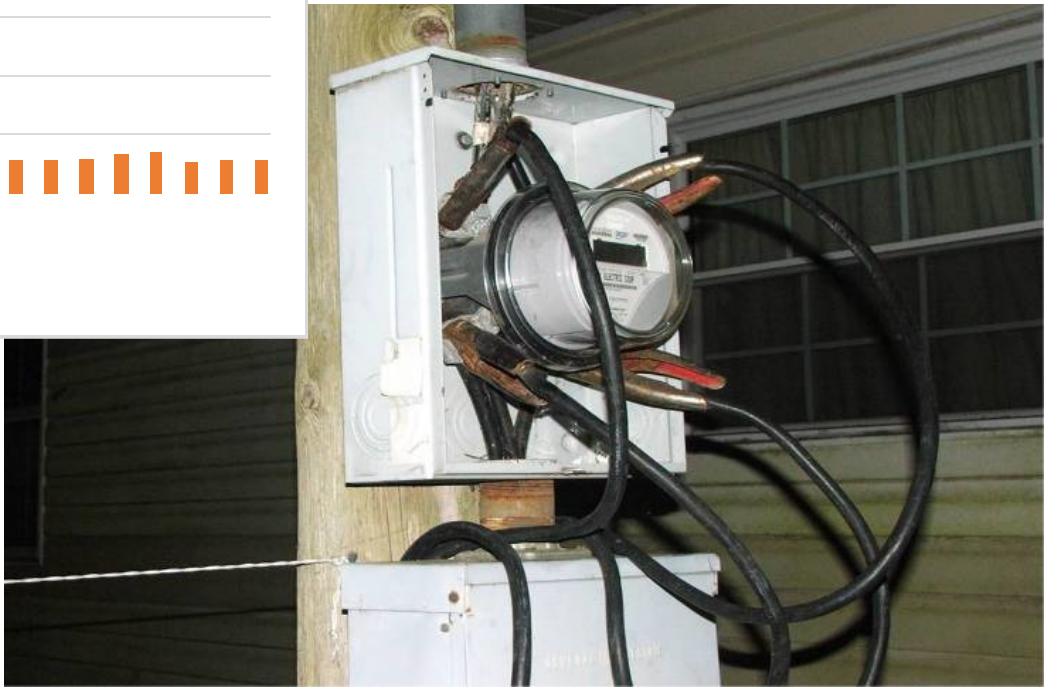
- "Last gasp"/OMS integration: not critical to CAIDI improvement
- Voltage data exception reporting: has some merit, but incidence typically low
- MASS METER PING to identify "nested outages": best CAIDI improvement from meter data.



Revenue Assurance – Meter Bypass Theft



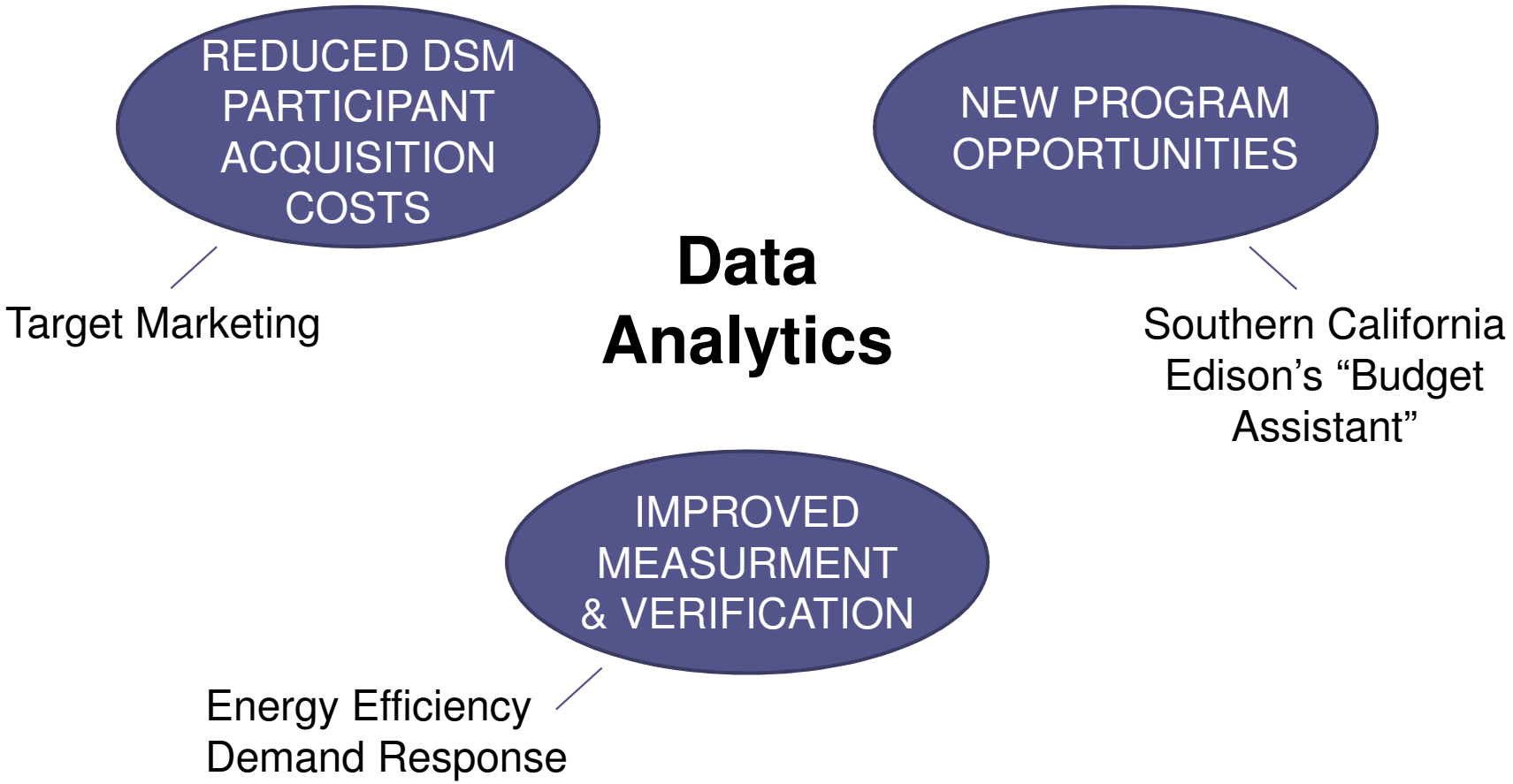
Enhancements to Validation, Editing, and Estimation (VEE) routines are needed to detect theft via bypass in meter data.



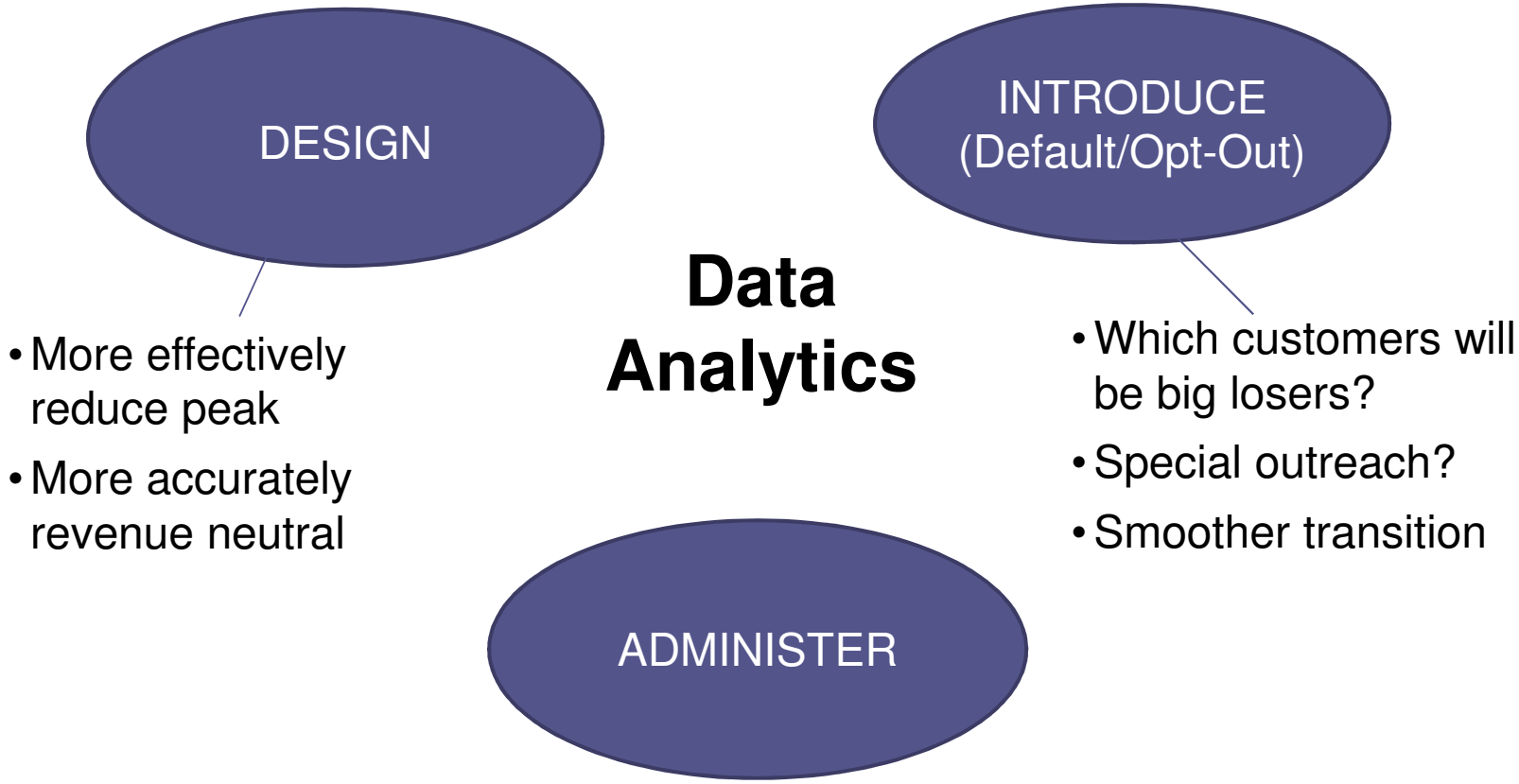
Grid Capital and Energy Efficiency: Advanced Distribution Management Systems

Capability	Reliability	Energy Efficiency	Capital Efficiency
Fault Location/Isolation/Svc. Restoration (FLISR)	●		
Device Condition Monitoring (outage prevention)	◔		
Conservation Voltage Reduction & Volt-VAr Optimization		●	◑
Distributed Energy Resource Management System	◔		
Distribution Optimization Modeling – Phase Balance		◑	
Distribution Optimization Modeling – Load Balance			◑

Customer Efficiency: DSM Programs



New Rate Designs (3-Part, TVR, etc.)

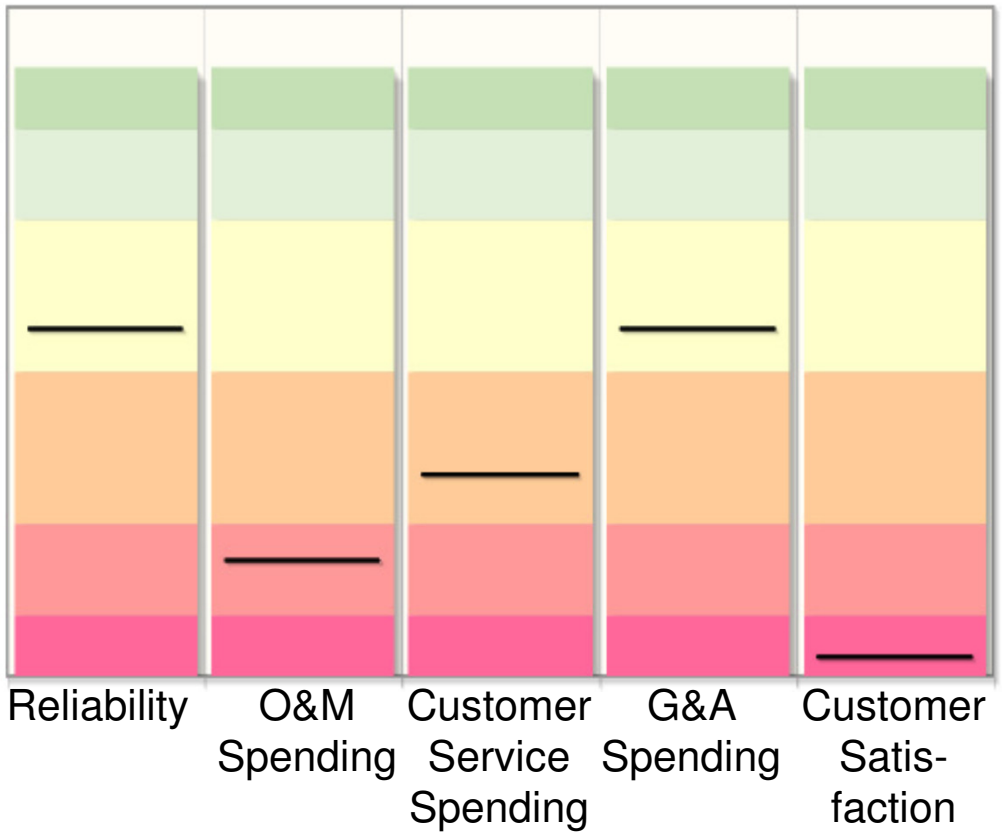


The *Utility Evaluator™*

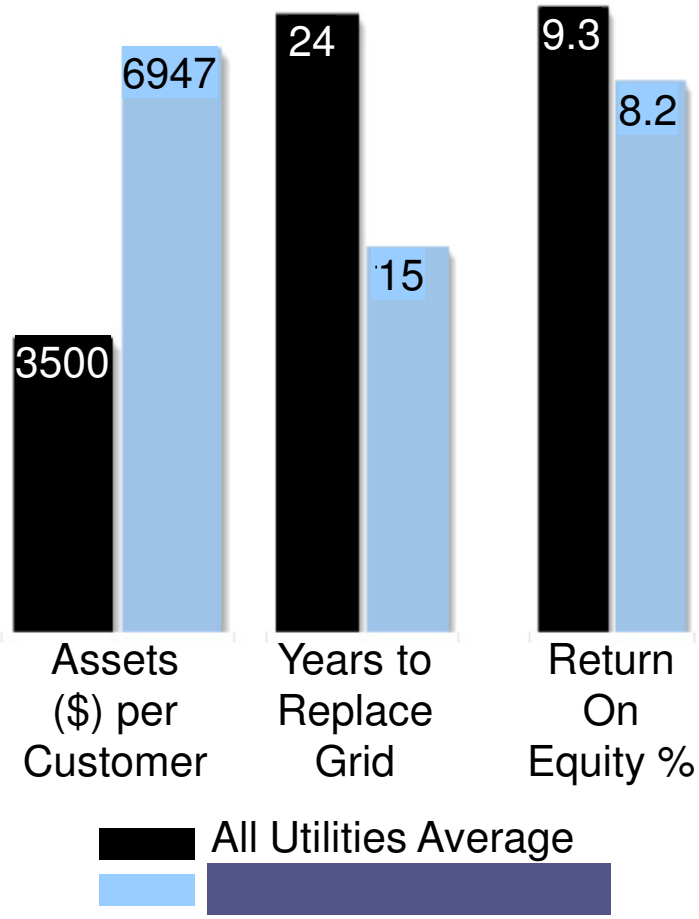
- Internet-based software application
- Aggregates public data into actionable information
  - Financial data from FERC Form 1
  - Operational data from EIA Form 861
  - Customer Satisfaction from JD Powers & Associates
  - Regulatory filings, SEC filings, ACEEE, others
- Benchmarks key performance indicators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

2014 Performance Dashboard for: [redacted]

Quantile Performance vs. All Utilities

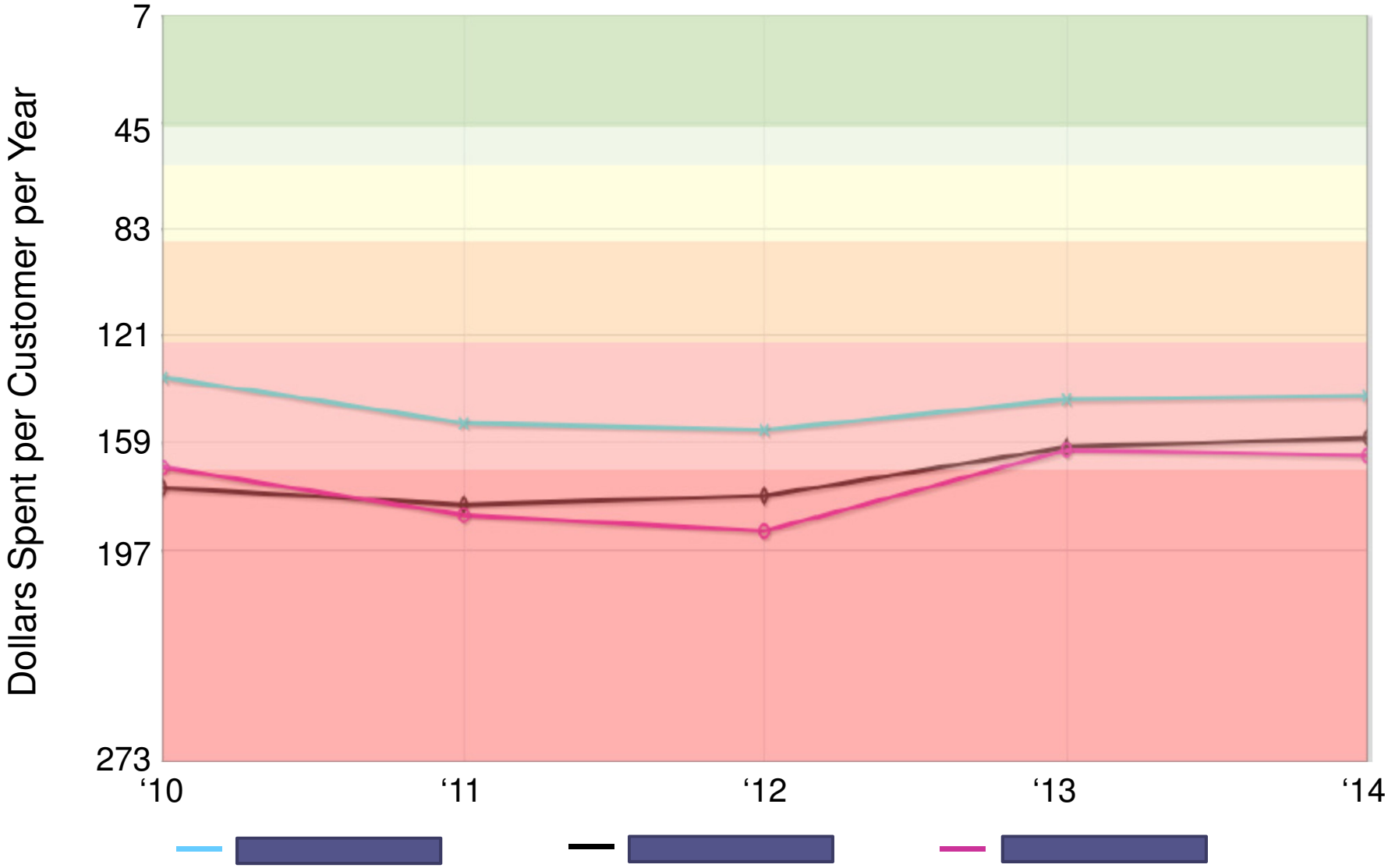


Performance vs. All Utilities Average



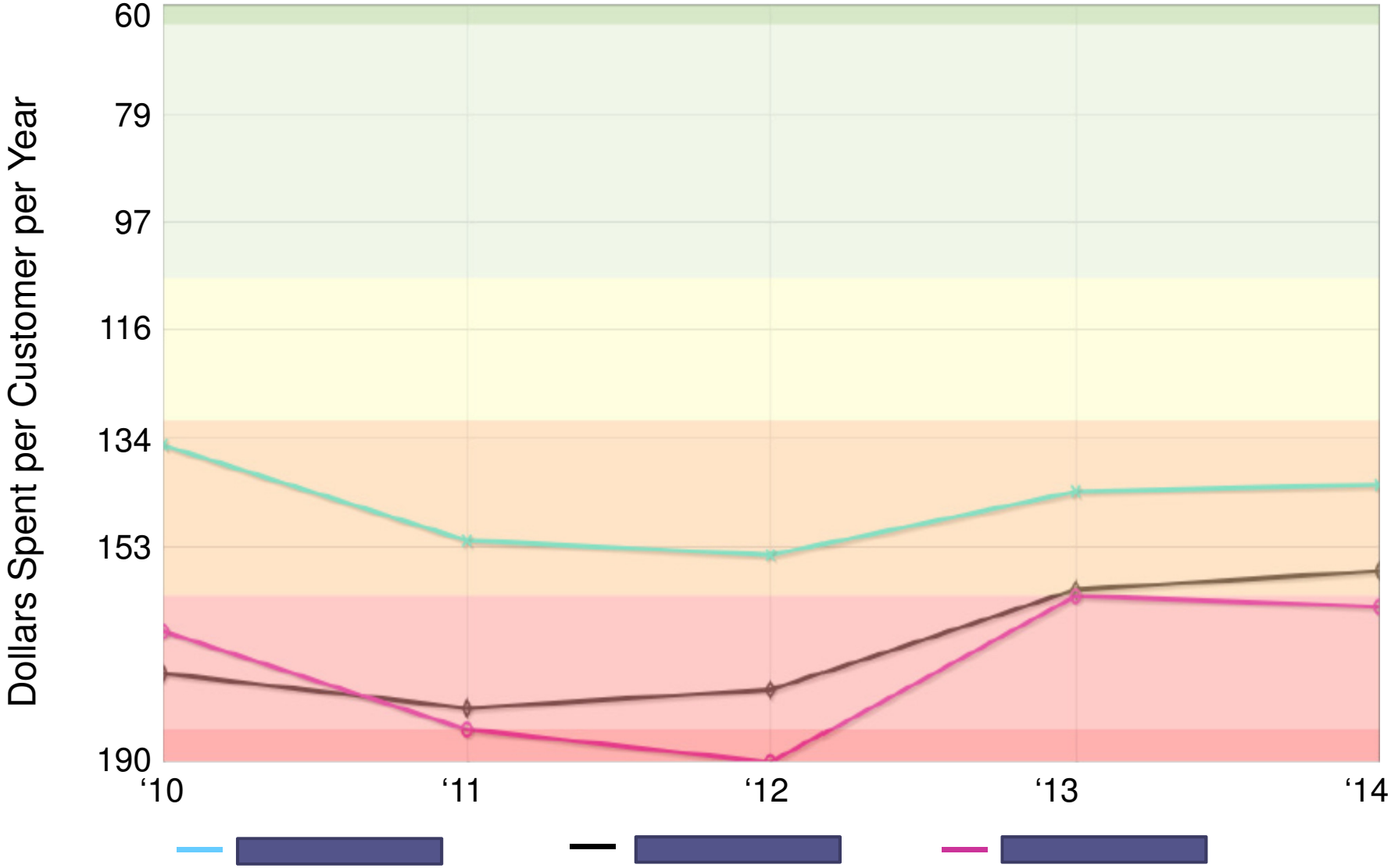
Key Performance Indicator: Billing & Customer Service Spend per Customer

Peer Group: All Utilities



Key Performance Indicator: Billing & Customer Service Spend per Customer

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



Thank You!

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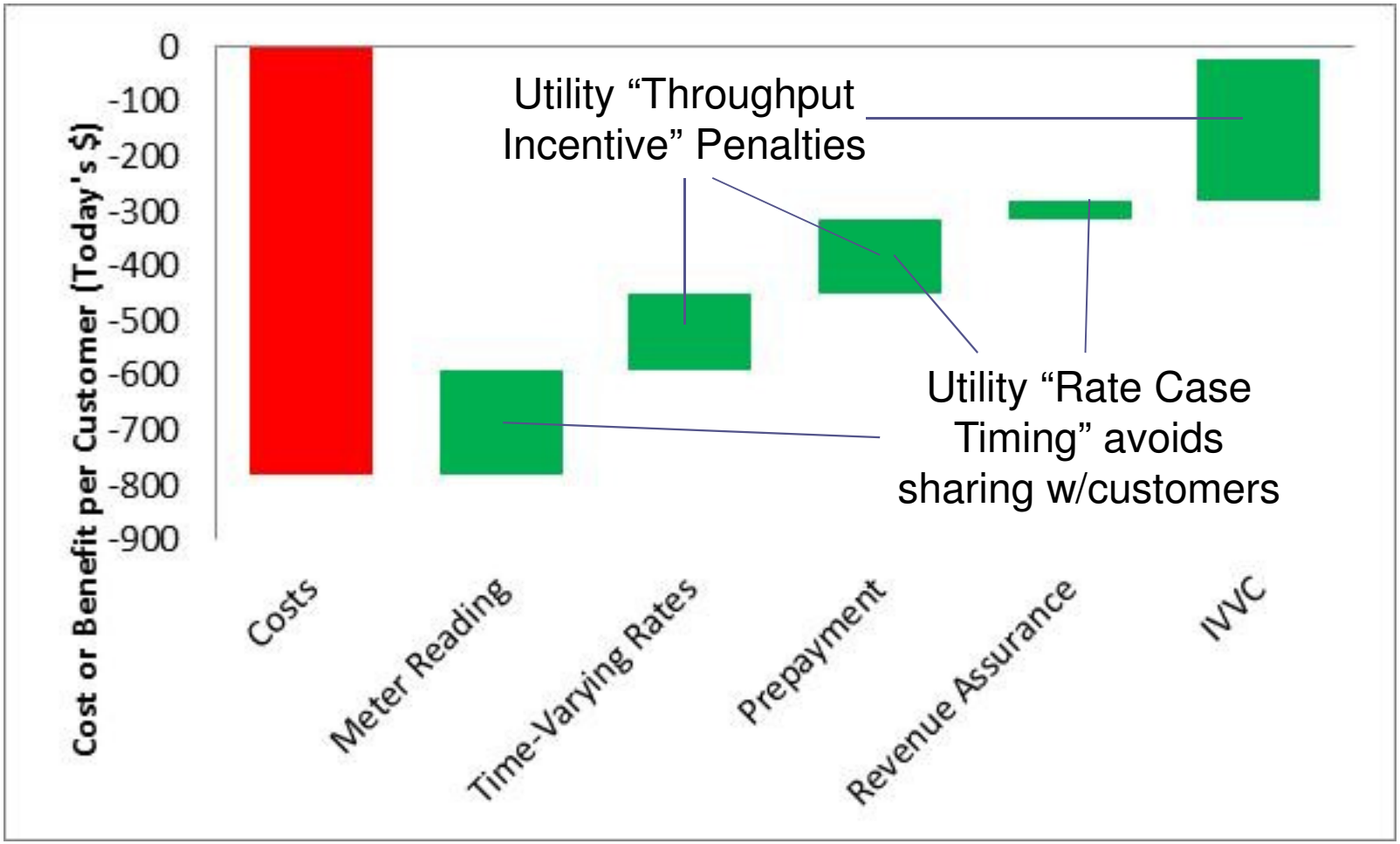
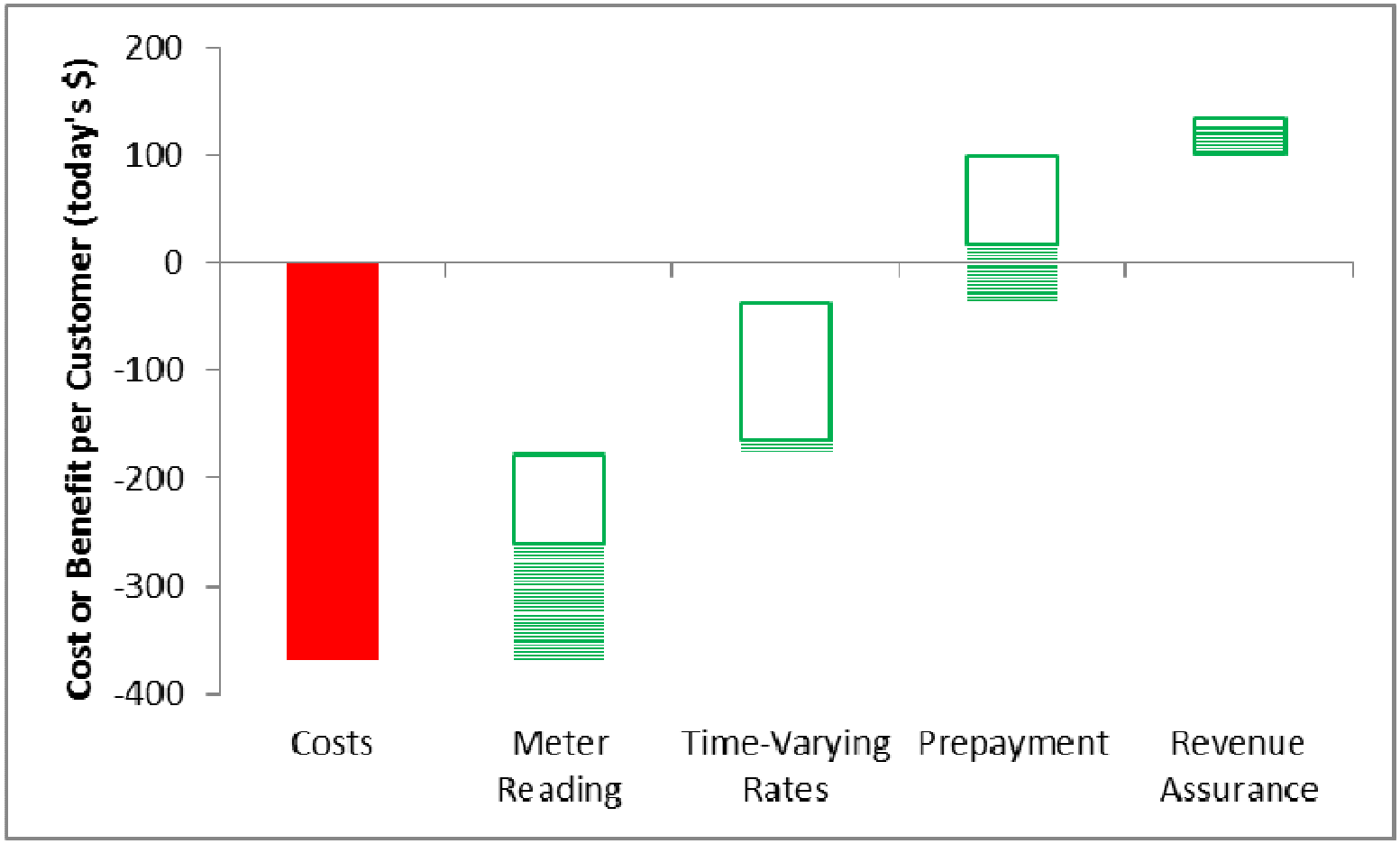
Copies of **Smart Grid Hype & Reality** *are being made available to NARUC members at no charge; simply e-mail Paul Alvarez with preferred mailing address and number of copies desired. A limited number of free trial subscriptions to the Utility Evaluator™ are also available for a limited time.*

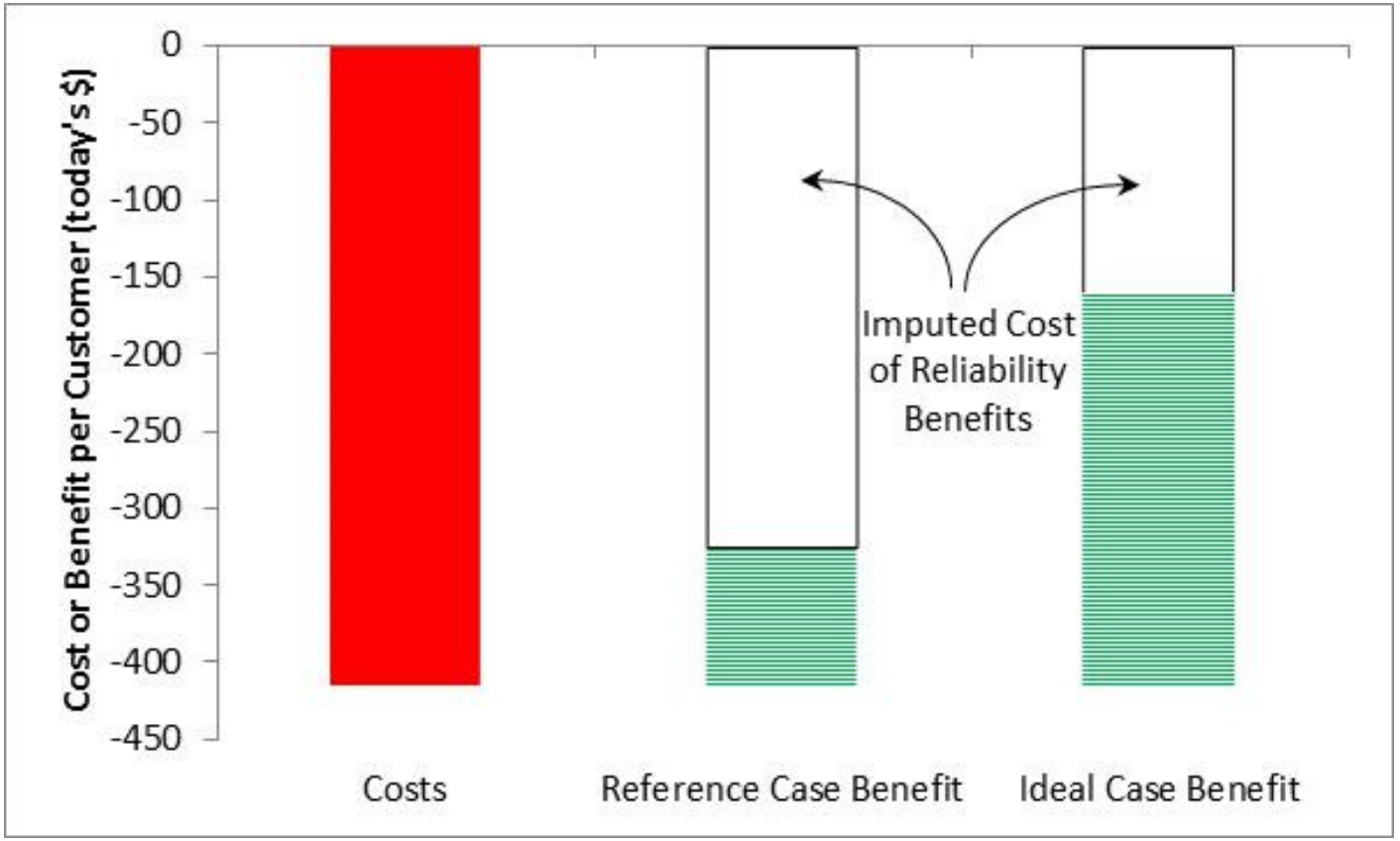
AMI & DA $ Benefit-Cost/Customer, Ideal Case



Smart Meter Benefit-Cost/Customer, 10 years



Distribution Automation Benefit-Cost/Customer



Typical Deployment

Ideal Deployment Increment

MISSION DATA

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NARUC Winter Committee Meetings

Energy Resources & The Environment

Better Decisions with Data

February 15, 2016

QUESTIONS

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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?

CONTEXT

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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

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- ~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

DATA POLICY

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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

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- **FEDERAL**: EISA, NBP, ARRA, Green Button

  "Provision to consumers of timely information and control options…"

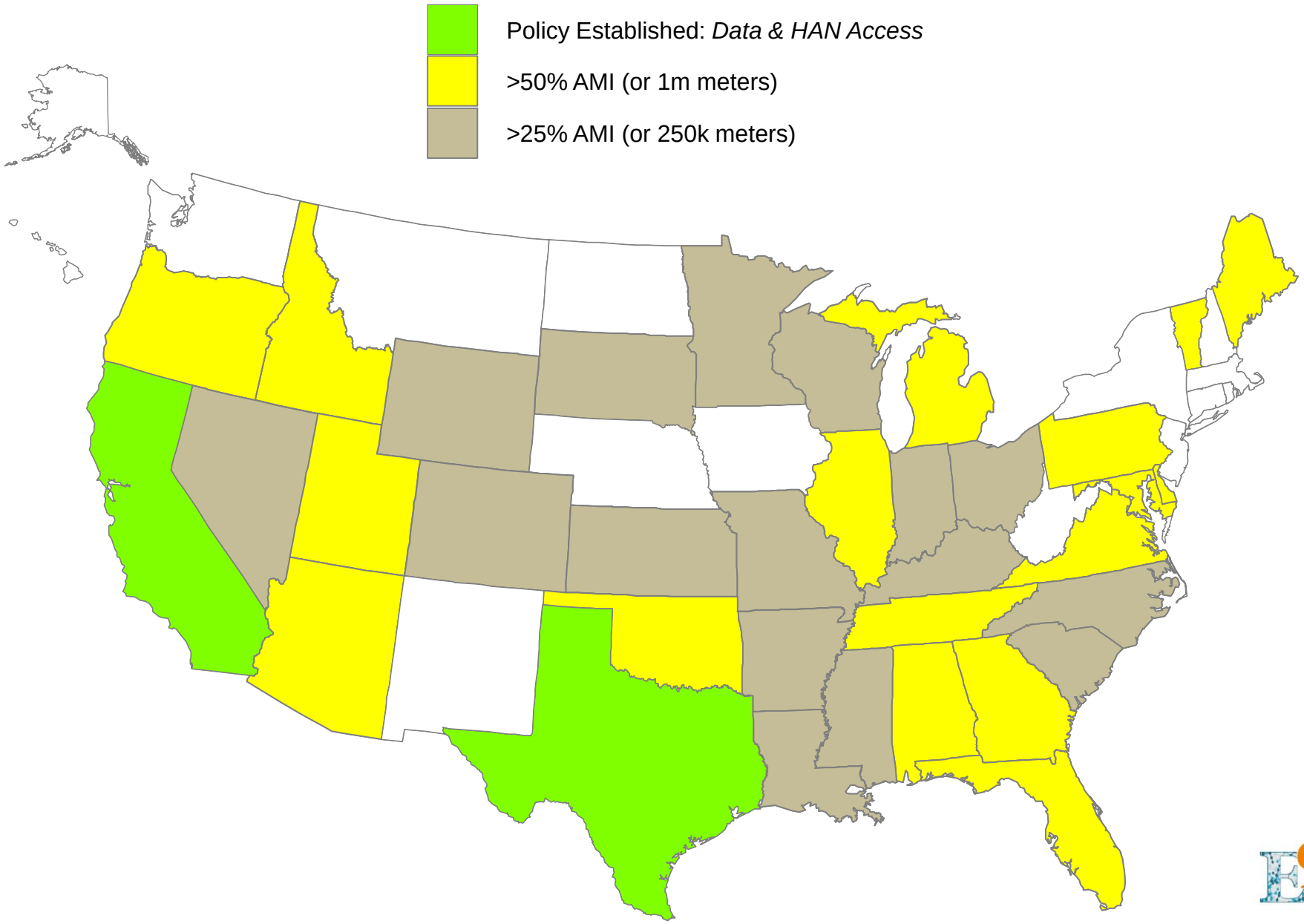
- **NEW YORK**: 09-M-0074 (AMI Functional Requirements)

  "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



Periodic Table of State Policy

AMI Deployment

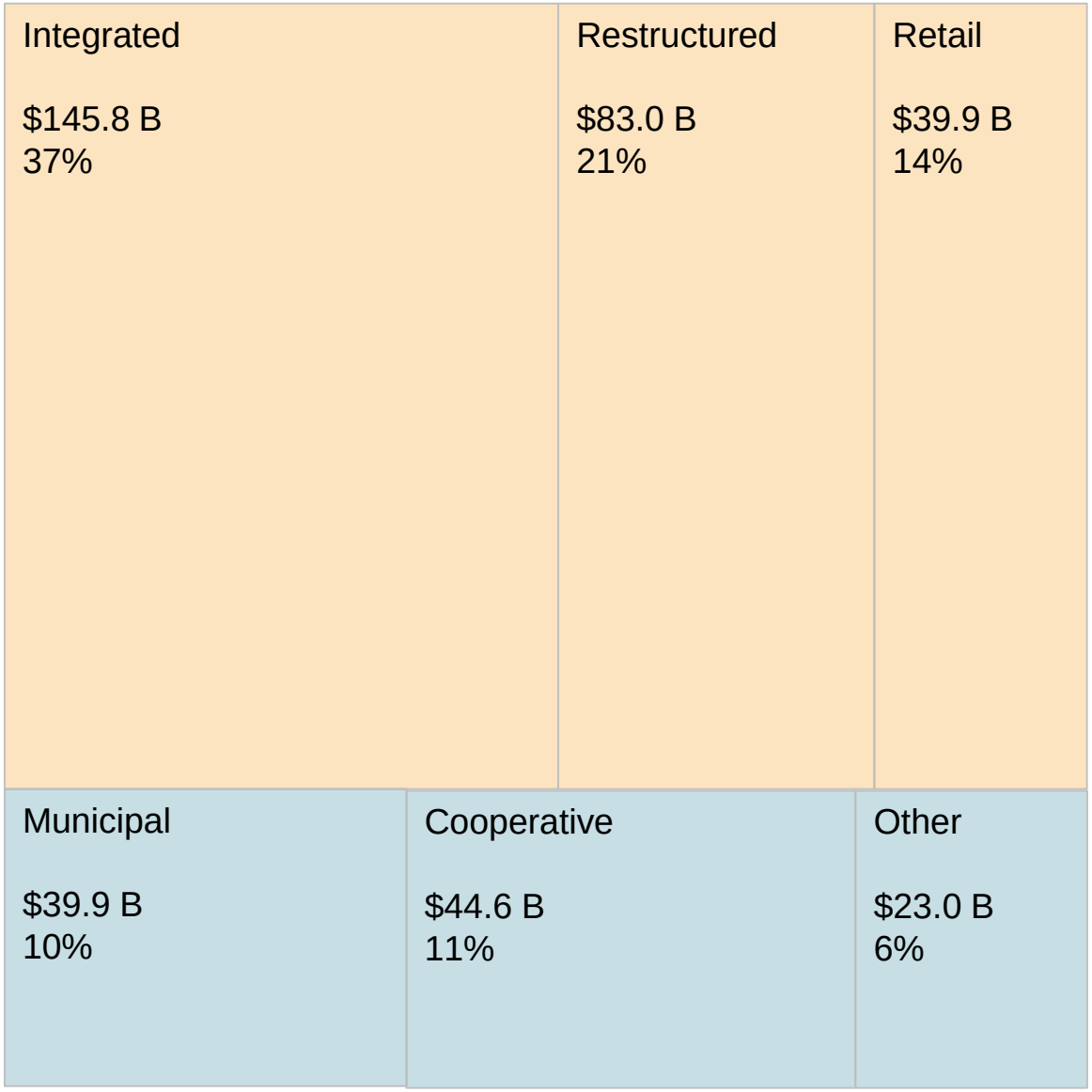
- Policy Established
- >50% AMI
- >25% AMI

Revenue ($B) ↘ 31.2 | 4 | Tx | 3 ↗ Large IOU's (>$250m)

Commissioners ↗ *Texas*

Deep South	*Upper South*	*Lower Plains*	*Upper Plains*	*Intermountain West*	*Pacific Rim*	*Midwest*	*Mid-Atlantic*	*New England*
23 | 4 | Fl | 5							21.7 | 6 | Ny | 5	7.6 | 3 | Ma | 3
12.3 | 1 | Ga | 5	11.7 | 3 | Nc | 7	7 | 4 | Mo | 5			35 | 3 | Ca | 5	13.9 | 6 | Oh | 5	14.3 | 6 | Pa | 5	4.6 | 2 | Ct | 3
8.9 | - | Tn | 4	9.8 | 2 | Va | 3	4.5 | 2 | Ok | 3	6 | 2 | Mn | 5	7.4 | 2 | Az | 5	3.1 | 2 | Nv | 3	6.4 | 3 | Wa | 3	12.1 | 3 | Il | 5	10.3 | 3 | Nj | 5	1.5 | 1 | Nh | 3
7.9 | 1 | Al | 3	7.1 | 3 | Sc | 7	3.8 | 3 | Ks | 3	3.5 | 2 | Ia | 3	5 | 1 | Co | 3	1.6 | 2 | Id | 3	3.8 | 2 | Or | 3	11.5 | 2 | Mi | 3	7 | 4 | Md | 5	1.4 | 1 | Me | 3
5.8 | 5 | La | 5	6.5 | 4 | Ky | 3	2.6 | - | Ne | 5	1.2 | - | Nd | 3	2.3 | 1 | Ut | 3	1.2 | 1 | Wy | 3	3.3 | 3 | Hi | 3	8.7 | 5 | In | 5	1.3 | 1 | Dc | 3	1 | 1 | Ri | 3
4.2 | 2 | Ms | 3	2.5 | 3 | Wv | 3	3.6 | 2 | Ar | 3	1 | - | Sd | 3	2 | 2 | Nm | 5	1.1 | 1 | Mt | 5	1 | - | Ak | 5	7.1 | 5 | Wi | 3	1.3 | 1 | De | 5	.8 | 1 | Vt | 3

US Electricity Market



US Electricity Sales:

- $391.6B annual retail sales
- ~$1.07B per day

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

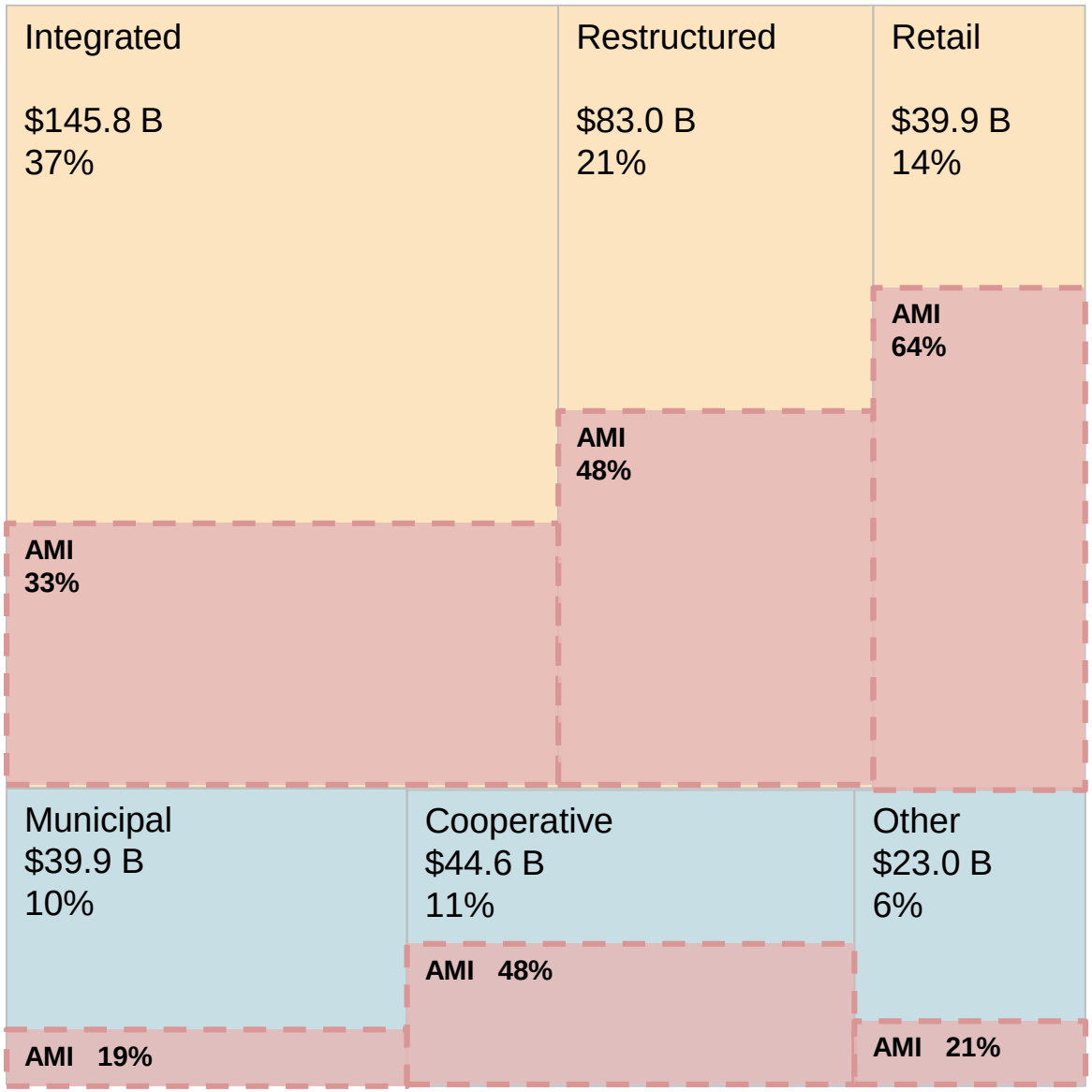
Publicly-owned: (27%)
- 10% municipal
- 11% cooperative
- 6% other public power

= $1B annual revenue

Private Ownership

Public Ownership

US Electricity Market



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

IMPLEMENTATION

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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”

GREEN BUTTON

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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

CONCERNS RAISED

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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

FINAL THOUGHT

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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

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AUTHENTICATION

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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 & EDI

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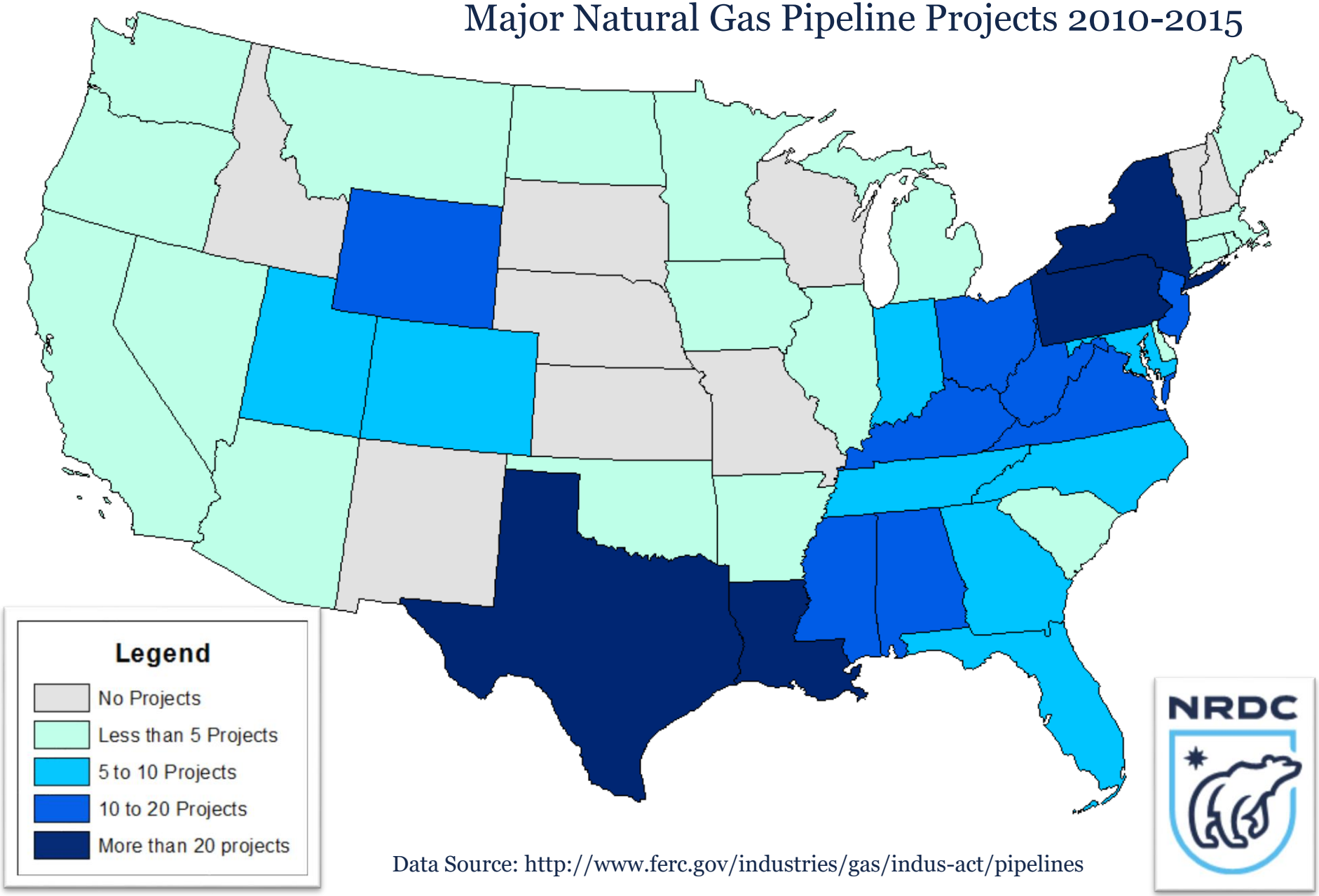
Green Button is a superior standard, consistent with modern industry norms and support infrastructure. EDI is a legacy protocol with no established transition pathway.

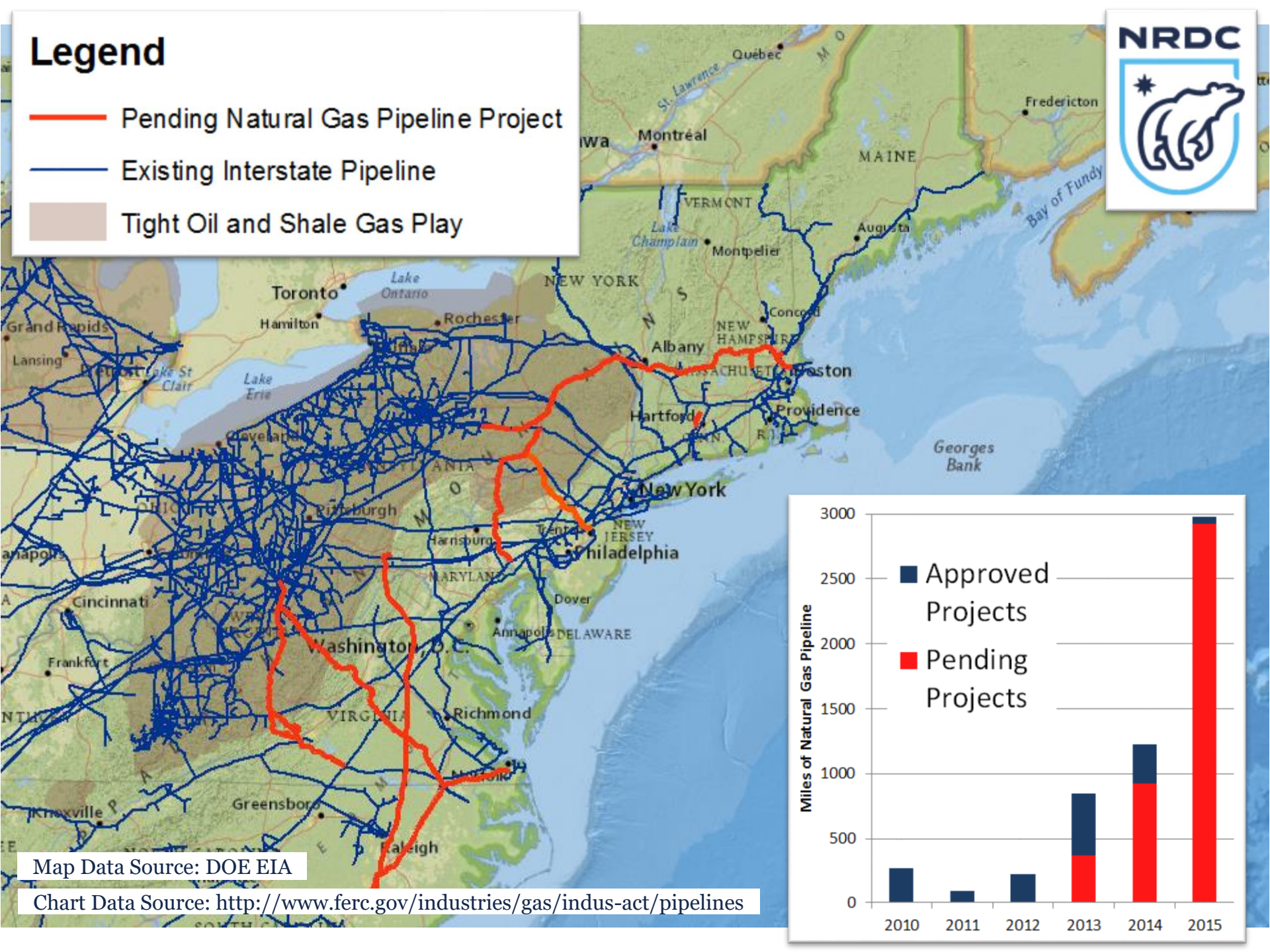
- EDI does not segregate personally identifiable information (PII)
- Green Button Data is flexible with regard to PII
- Green Button supports integrated business-to-business (B2B) and direct-to-consumer applications
- Green Button Connect has robust security & authorization
- Costs of data standard (Green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

Major Natural Gas Pipeline Projects 2010-2015



Data Source: http://www.ferc.gov/industries/gas/indus-act/pipelines

NRDC



Map Data Source: DOE EIA

Chart Data Source: http://www.ferc.gov/industries/gas/indus-act/pipelines

KINDER MORGAN

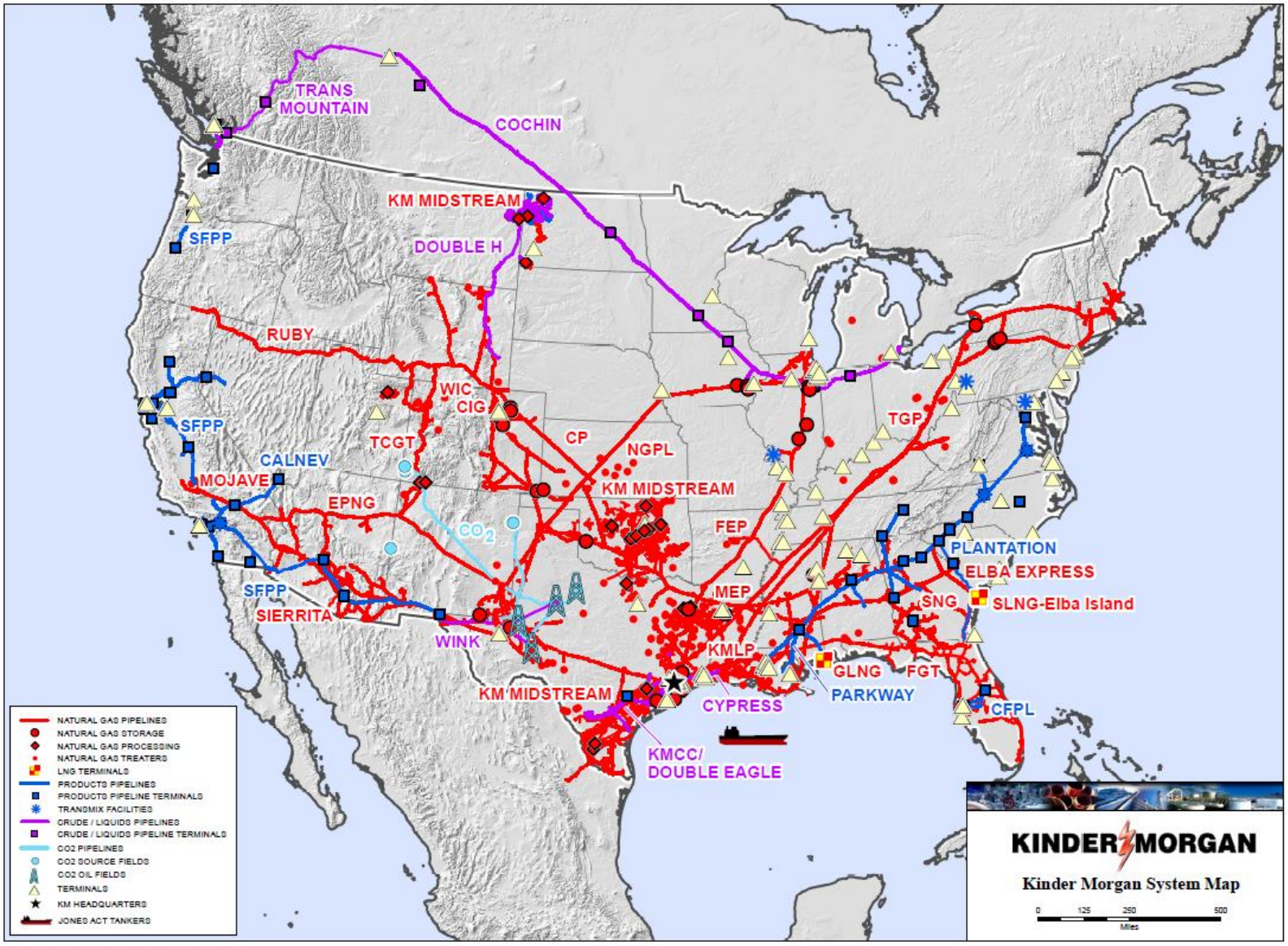
Natural Gas Pipeline Siting - Easy, Right?

Stakeholder Outreach

February 15, 2016



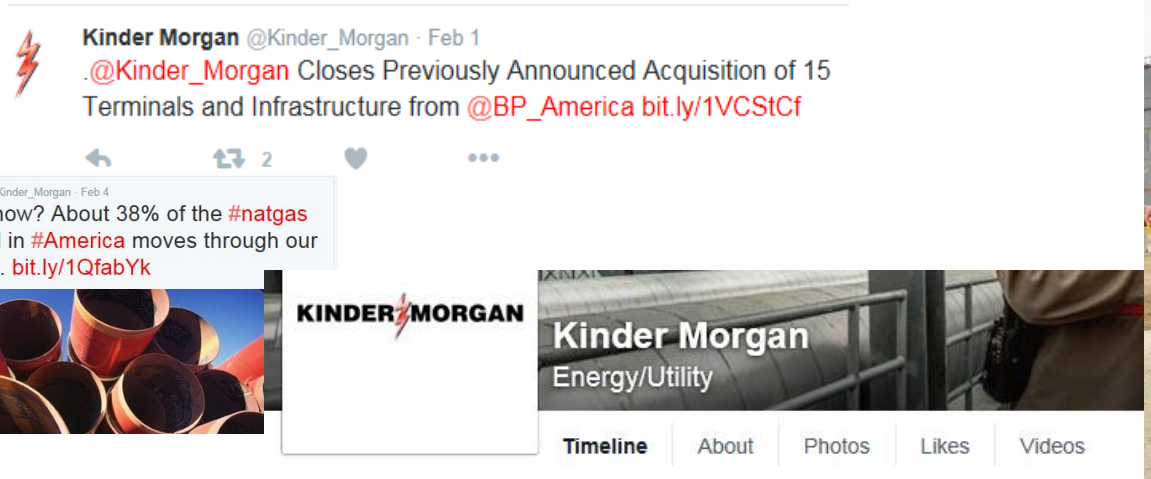
Kinder Morgan Asset Map



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 Customer Class Load Curves

Average of Four Monthly Summer Peak Days