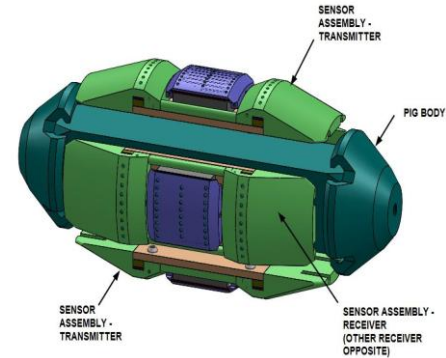


the Energy to Lead



Technology Update

NARUC Gas Staff Subcommittee

Ron Edelstein

Director, Regulatory & Government Relations

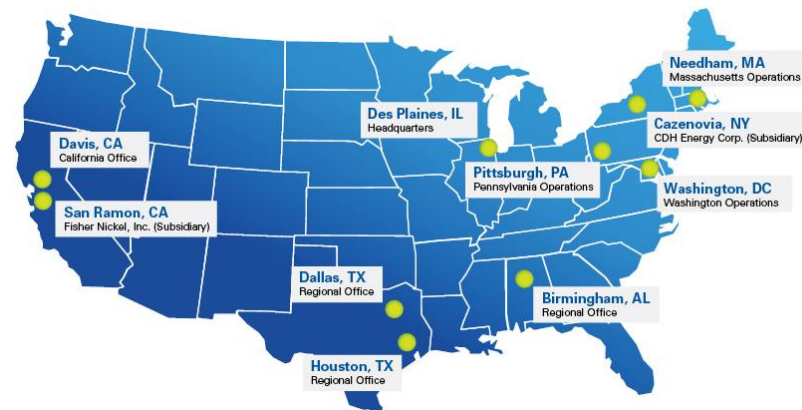
July 12, 2015

New York City

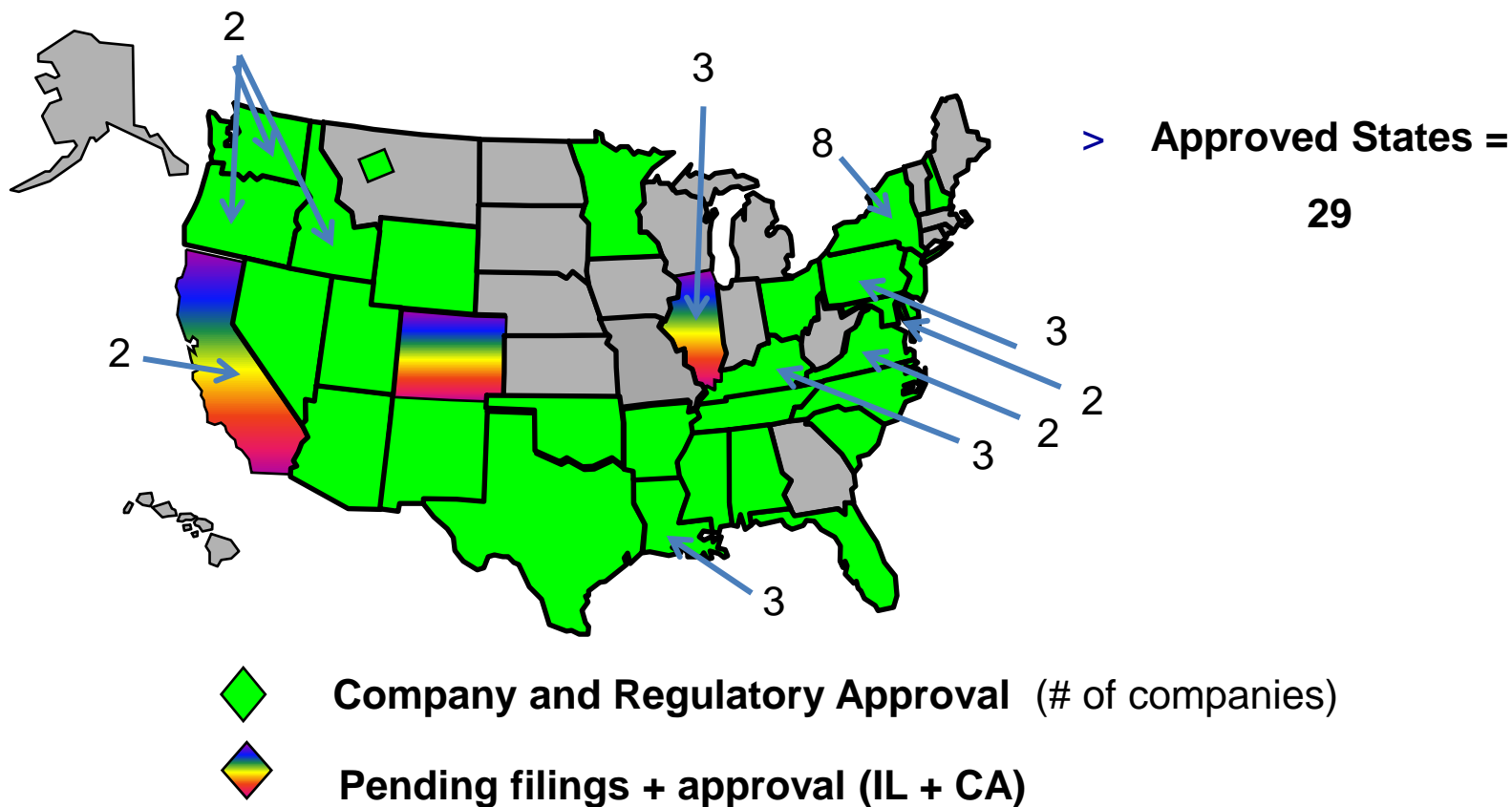
GTI Overview

ESTABLISHED 1941

- > Independent, non-profit company established by natural gas industry
- > Providing natural gas research, development, technology deployment, consulting, and training services to industry and government clients
- > Facilities/Locations
 - Primary: 18-acre Lab near Chicago, with 200,000 ft² with 28 labs
 - Core staff of 250 in RD&D
 - Plus subsidiary energy services businesses



Delta Map



29 States Have Approved Voluntary R&D Recovery

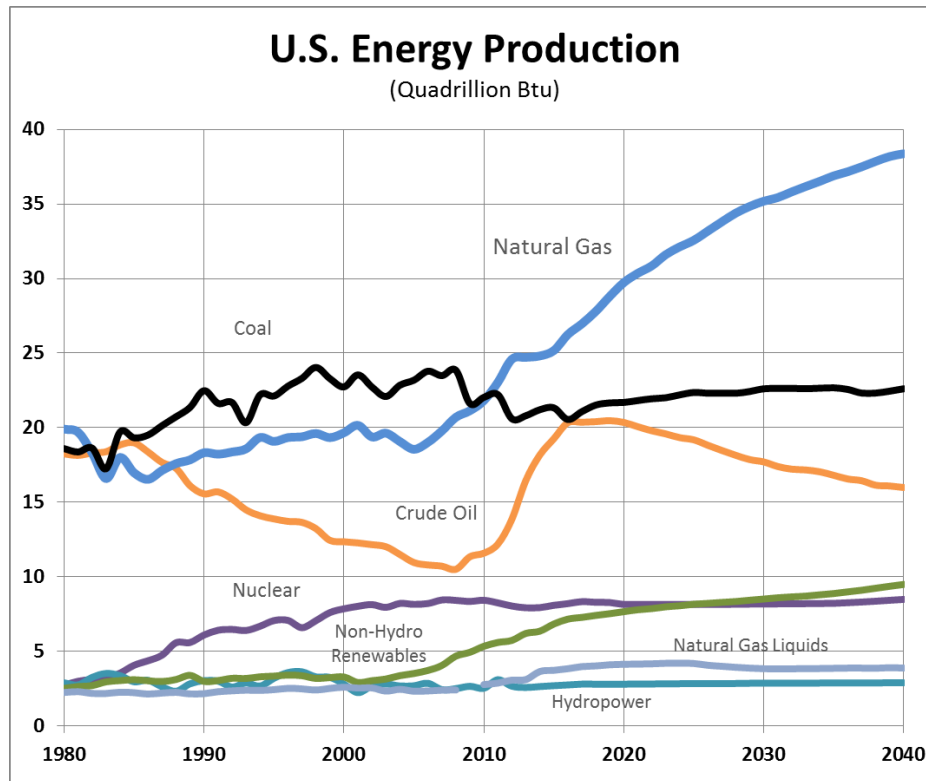
- > Ohio: Duke Energy (2014)
- > Maryland: Washington Gas (2011), Columbia Gas of MD (2014)
- > South Carolina: Piedmont Gas (2011)
- > Texas: (2011) Atmos Energy
- > Tennessee (2010) AGL*
- > Nevada (2010) Southwest Gas
- > Louisiana (2009) CenterPoint, Entergy, Atmos Energy
- > California Semptra, (3/07 and 3/13) PG&E
- > Arizona: Southwest Gas (2/23/06)
- > Oklahoma: ONG (OneGas) (11/05)
- > New Mexico: PNM (10/05)
- > Minnesota: CenterPoint Minnegasco (07/05)
- > Pennsylvania: National Fuel (04/05), NiSource, PECO (2011)
- > Virginia: Columbia Gas of VA (12/14), Atmos Energy (01/05)
- > Delaware: Conectiv* (12/03)
- > Oregon: NW Natural (3/03), Avista
- > Florida: TECO Peoples Gas (1/03)
- > New Hampshire: NiSource (11/02)
- > Kentucky: Delta Natural Gas (11/04), NiSource (11/02), Atmos Energy
- > Utah/Wyoming: Questar Gas Co.
- > Alabama: Alabama Gas Corp.
- > Idaho: Avista, Intermountain Gas
- > Washington: NW Natural, Avista
- > Illinois: Atmos Energy, Nicor (10/05), Peoples Gas (2010)
- > Mississippi: Atmos Energy
- > North Carolina: Piedmont (10/05)
- > New York: Con Ed, KeySpan Energy, NYSE&G, National Fuel, National Grid, Central Hudson E&G, Rochester G&E
- > New Jersey: PSE&G*

*Approved but not funded

“New Technology” Fundamentally Transformed U.S. Gas Market in 2008

Supply Driving Prices Driving Demand

Expanding natural gas supplies have ***saved consumers about \$100 billion/year*** compared to 2008 prices...

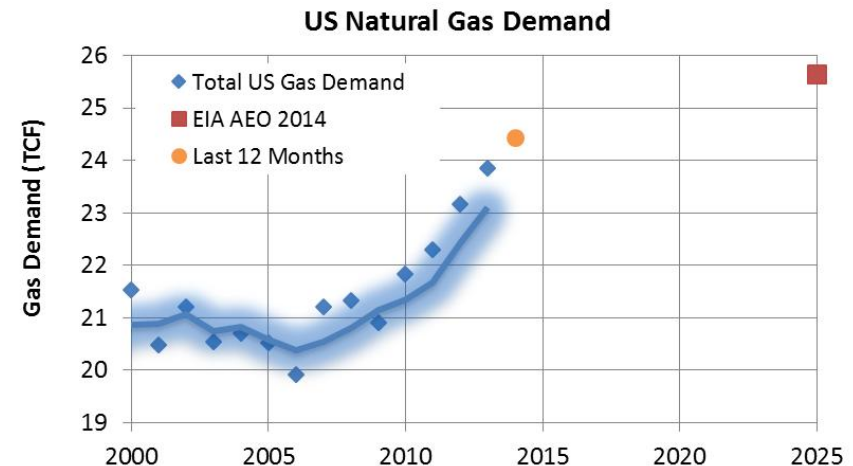


Prices (\$/MMBtu)	Residential	Commercial	Industrial	Power Generation
2008 Prices	13.89	12.23	9.65	9.26
2013 Prices	10.33	8.13	4.66	4.49
Percent Change	(26%)	(34%)	(52%)	(52%)
Sector Savings	\$16.7 billion	\$12.8 billion	\$35 billion	\$36.9 billion

Derived from DOE-EIA data

...and is stimulating demand.

More macro-economic benefits still to be realized.

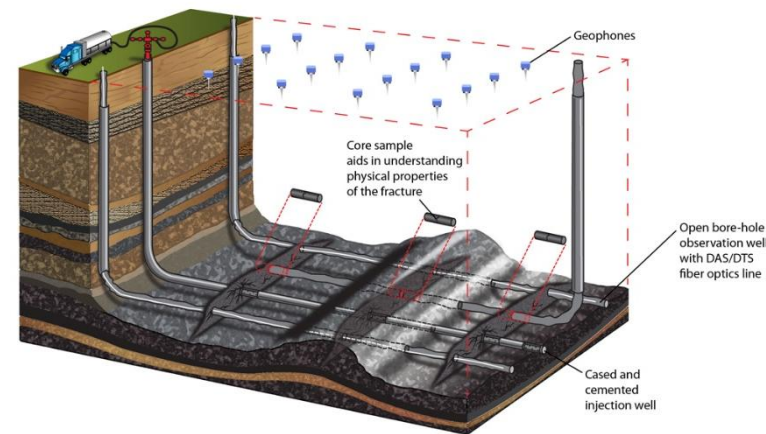
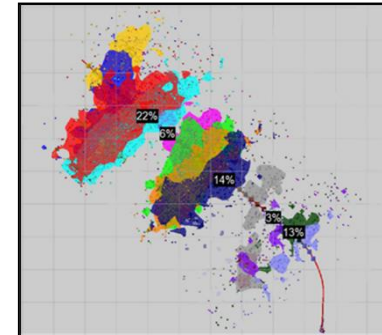
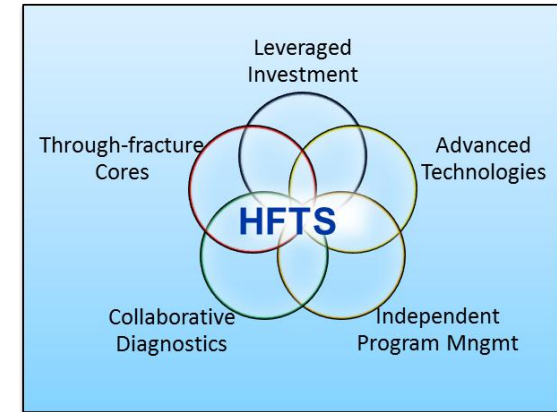


Source: DOE-EIA

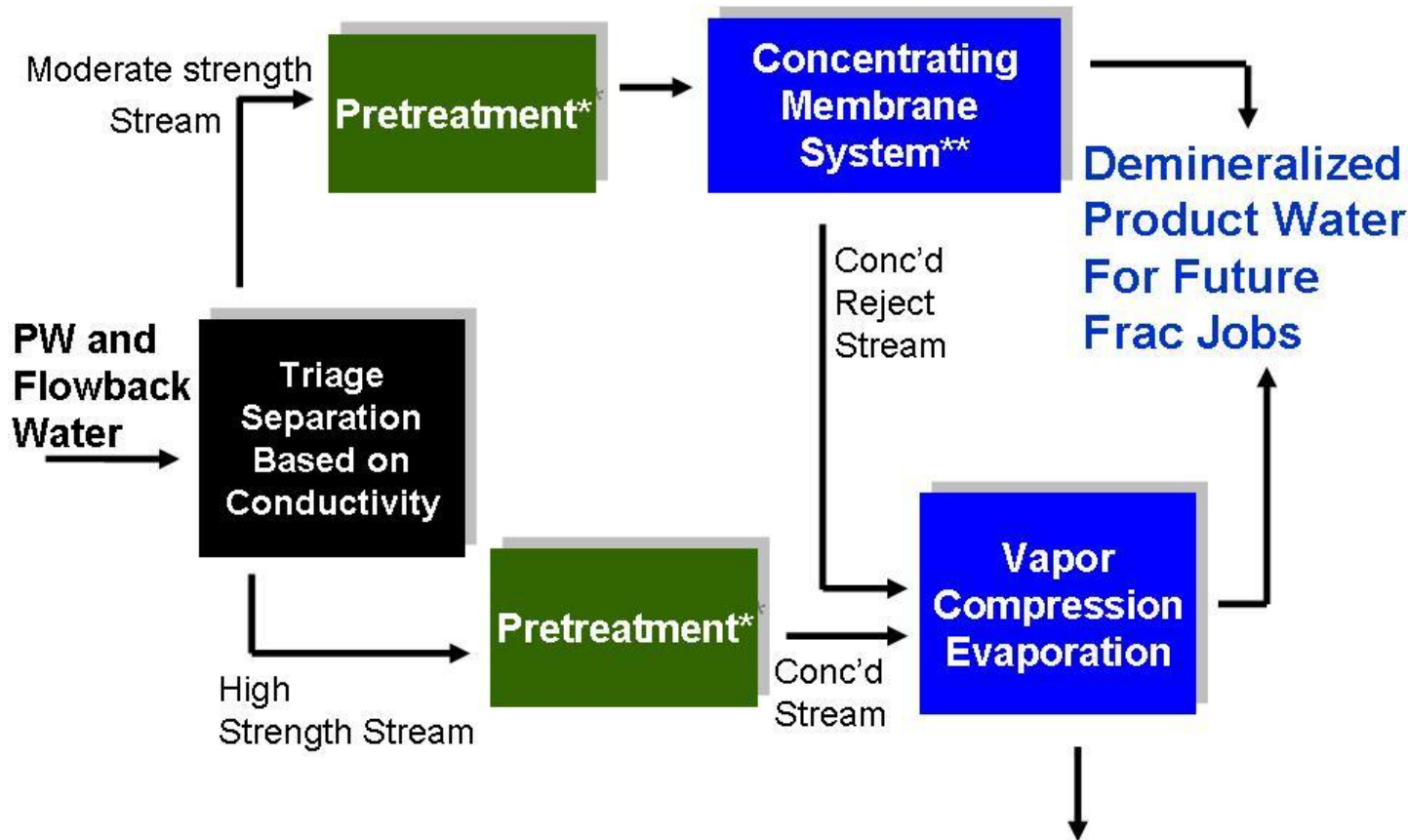
E&P Advancements

New Hydraulic Fracture Test Site (HFTS) Program

- > New collaborative \$15MM GTI-led gas industry/DOE hydraulic fracturing diagnostics and testing program
- > **Clearer understanding of fracturing dynamics** are key to enhance fracture stage production
- > Design and implement **conclusive tests using advanced technologies** to characterize, evaluate, and improve the effectiveness of individual hydraulic fracture stages and minimize environmental impacts



Strategies for Water Management and Reuse



- * Options may include conventional deoiling, rapid sand filtration and/or microfiltration.
- ** Options may include nanofiltration, reverse osmosis (RO) and/or electrodialysis.

**Highly Concentrated
Brine to Class II
Disposal or to By-
Product Recovery**

Advancements for LDC Operators

Reliability, Automation, Environmental Assurance



Acoustic Plastic Pipe Locator



Commercially available through SENSIT Technologies as the Ultra-Trac APL

DBS Directional Bag Stopper



Commercially available from Mueller Company as the DBS II Directional Bag Stopper

Keyhole Technology



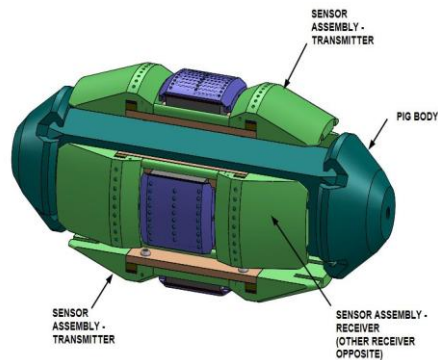
Expanding keyhole technology adoption allows utilities and their contractors to cost-effectively perform repair and maintenance work on underground pipe and other facilities

Advancements for LDC Operators

Reliability, Automation, Environmental Assurance



Small-Diameter Pipe Electromagnetic Acoustic Transducer



Low power, electromagnetic acoustic transducer (EMAT) sensor that fits addresses unpiggable pipe. Working with Quest Integrity Group (commercializer).

GPS Enabled Leak Surveying



Commercialized as *VeroTrack* through UbiSense (formerly InMaps). Integrated with two leak detection devices. Four pilot projects complete

Plastic Pipe Emission Factors



Revised Plastic Pipe EF	3.72 scf/leak-hr
GRI/EPA 1996 Plastic Pipe EF	12.45 scf/leak-hr

Asset Lifecycle Tracking & Traceability

Information	Mfg. Values
Lot Number	1234567
Production Date	1/4/2010
Material Type	PE2708
Component Type	Electrofusion tapping tee with a stab outlet
Component Size	2" IPS SDR 11 x 1" IPS SDR 11



Create GIS
Features
in the
Field

Post to Enterprise GIS

Integrate
Data into
GIS
System of
Record

LocusView: Turnkey Implementation of Mobile GIS Technologies

- > Turn-key implementation services including hardware, software, hosting, training, and IT support
 - Mobile GIS for mapping new installations with tracking and traceability data for pipes, fittings, and fusions
 - Leak survey route tracking with GPS
 - Survey and inspections reports
 - Remote contractor monitoring for enhanced quality control
 - Mobile map viewing



www.locusview.com

Microturbines

> Capstone

- > Systems from 30 kW to 1 MW
- > DOE program to achieve higher power rating and efficiency



C200

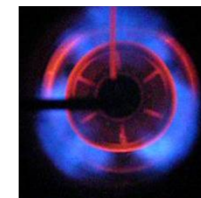
> FlexEnergy

- > 250 kW recuperated machine

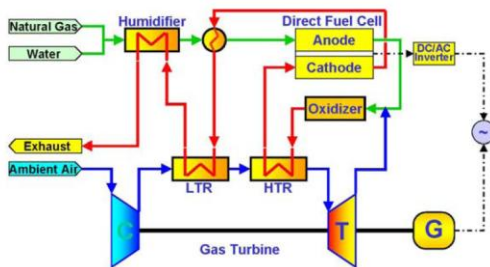


FlexCHP System

- > FlexCHP System – a fully integrated high-efficiency, ultra-clean power & steam package
- > NOx emissions less than 0.07 lb/MWh
 - Comply with strict CA standards
 - Use Capstone microturbine
- > 85% system efficiency
- > Cofunding from CEC, DOE
- > Working with SoCal Gas & Empire Foods (Riverside, CA)



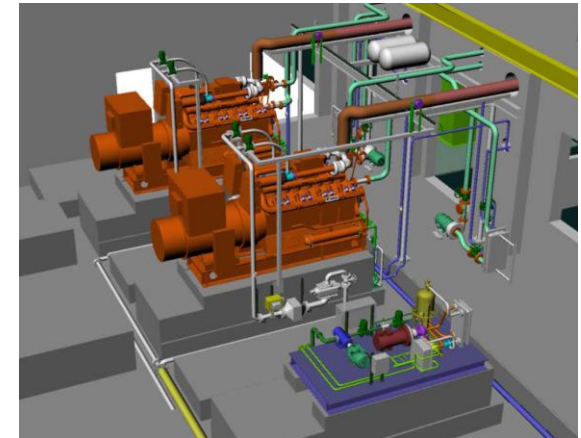
Future: Hybrid Natural Gas Power Plants To Boost System Electrical Efficiency and Value



FuelCell Energy/DOE Hybrid Fuel Cell/Gas Turbine System (Billings, MT). Alpha unit achieved OVER 56% electrical efficiency



GTI/Rocketdyne/DOE ARPA-E Partial Oxidation Gas Turbine for Power, Heat, and GTL Production



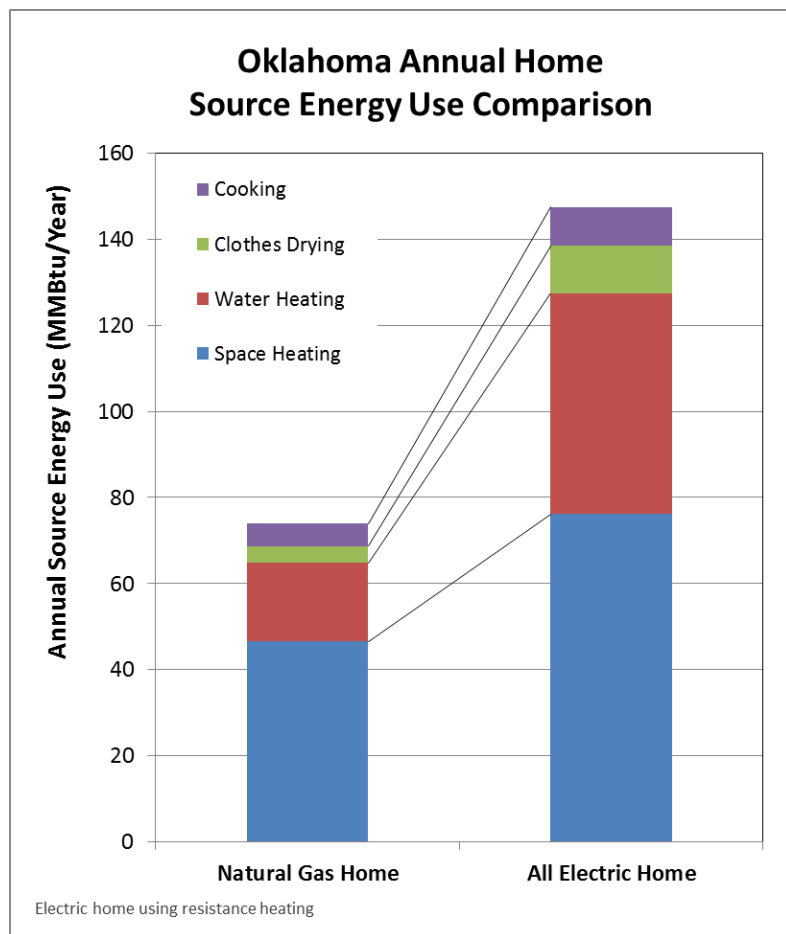
Gas Engine/Turbine Hybrid (GTI/CEC/SoCal Gas/San Bernardino WWTP)

Source Energy and Public Policy

Fuel Switching

- > Source energy is an important public policy issue
 - Provides compelling societal and customer benefits
- > Transformation seen in a growing number of states permitting smart “fuel switching”
 - Florida, Idaho, Massachusetts, New Hampshire, New York, Oklahoma, Pennsylvania, Rhode Island, Texas, Vermont, Washington
- > “Gas-only” incentives, especially high efficiency water heaters
- > ***Can contribute to state solutions for 111(d) to reduce kWhr usage***

Oklahoma Case Study for Electric to Gas Switching Using Energy Efficiency Rebates



Electric to gas conversions can **save 50% in total energy consumption** and **22% on energy costs**

Total carbon emissions also reduced by 52%

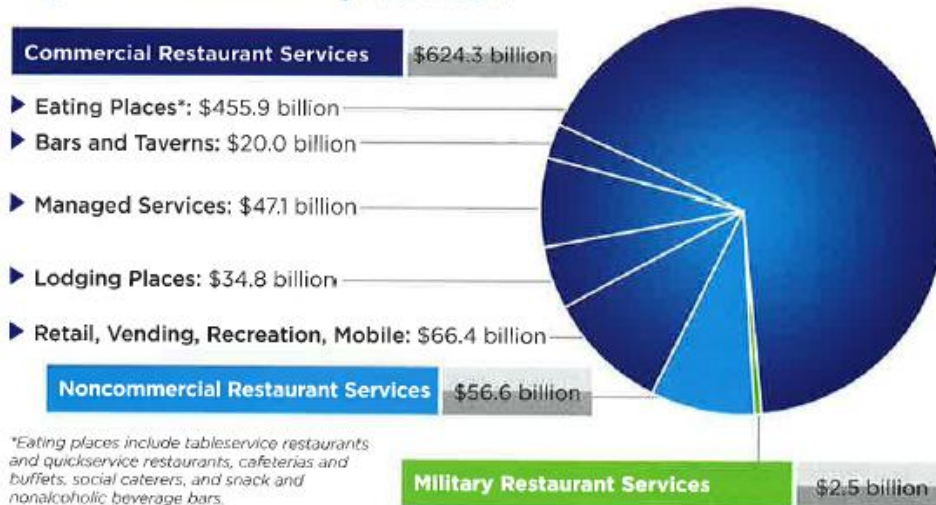
Appliance	Gas Source Usage in MMBtu	Electric Source Usage in MMBtu	Gas Cost using	Electric Cost using
Heating	46.56	76.15	495.80	521.87
Water Heating	18.23	51.26	194.15	351.32
Clothes Drying	3.87	11.02	41.26	75.52
Cooking	5.24	9.03	55.75	61.86
Total	73.90	147.46	\$ 786.95	\$ 1,010.57

Commercial Foodservice

Key Natural Gas Industry Market Segment

Adding It All Up: \$683.4 billion

Projected restaurant industry sales in 2014



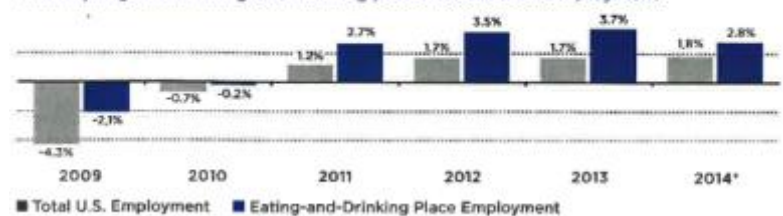
Source: National Restaurant Association

Restaurant Industry Sales (In Billions of Current Dollars)



Restaurant Job Growth Projected to Outpace Overall Economy for 15th Straight Year

Annual job growth: Eating-and-drinking places vs. total U.S. employment



*Projected

Energy Efficient Commercial Foodservice Solutions

- > Low Oil Volume Fryer
- > Hooded Charbroiler
- > Pizza Oven
- > Boilerless Steamer
- > Demand Control Ventilation
- > Wok



FISHER
NICKEL inc.

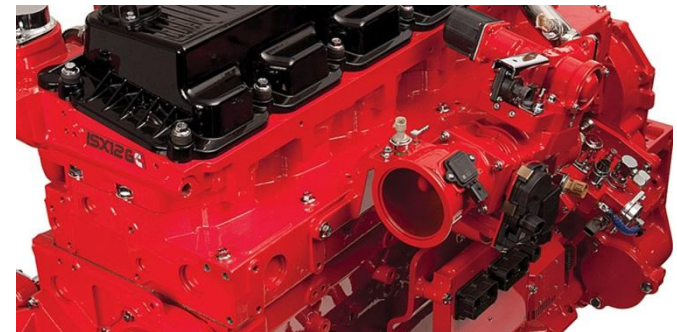
www.fishnick.com

Industry-Leading NGV Engines

Cummins Westport ISX12 G

> Critical next-generation high-horsepower NGV engine

- Major new product for NGVs
- \$3 million+ support from CEC, GTI, DOE
- 350-400 hp for larger vehicles
- Perfect fit for high gross vehicle weight regional haulers, refuse collection, concrete mixers, etc
- Advanced engine design and controls
 - > Out-performs strict California emission standards
 - > Improved engine efficiency



Cummins Westport 6.7L MD Natural Gas Engine

Development (CEC and GTI/UTD funding)

Striving to fill-in advanced NGV engine technology portfolio for the medium-duty market. Expected 2016 product launch.

Goals & Targets

- 260 hp / 660 ft-lb rating
- Spark ignited; stoichiometric with cooled EGR
- Below CARB (0.02 g/bhp-hr NOx performance
- GHG emissions at or below USEPA 2017 levels
- CNG / LNG / biomethane capable

Benefits/Value

- School bus, package delivery, class 5-7 trucks
- Fills out product line above highly successful, world-leading ISL-G (8.9L) sold worldwide and new 11.9 liter

Key Funding Partners

- CEC-DOE-SCAQMD-SoCal Gas
- GTI is prime for CEC contract with UTD support
- Secured over \$1 million in government & industry funding to date.



ISB6.7G

6.7 Litre

Spark Ignited
SEGR
Three Way Catalyst



CNG Home Refueling Appliance (HRA) Development

- > Cost-effective commercial products needed
- > Several companies doing R&D, e.g. novel piston arrangements, hydraulic drives, linear motors, etc.
- > GTI and Univ. of Texas-CEM has early-stage development underway (US DOE – ARPA-E \$4.3 million) on Free Piston Linear Motor Compressor
- > GTI is participating in new CSA – NGV5.1 Standard for Home Refueling Appliance (HRA) - certification is in progress



Image credit:
BRC
FuelMaker



Image credit:
GONatural Inc.

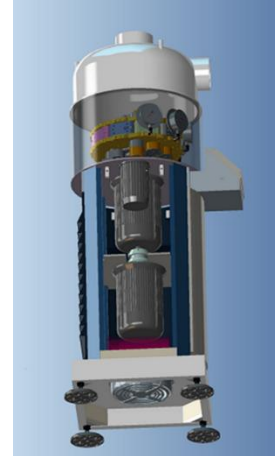


Image credit:
HE Systems

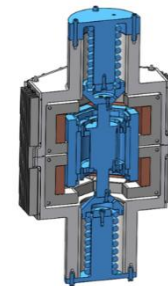


Image credit: GTI

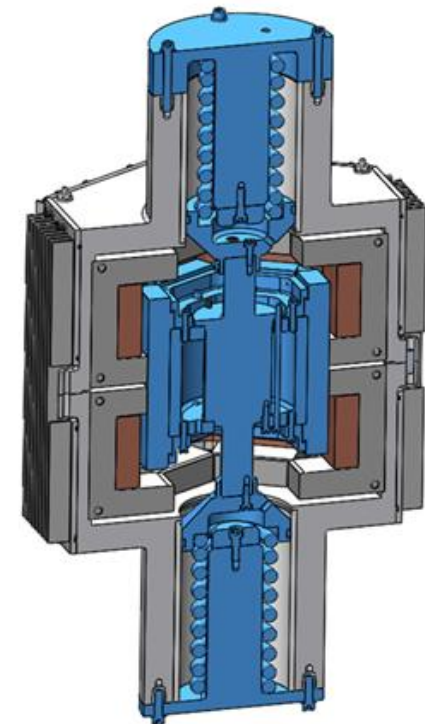
Free-Piston Linear Motor Compressor

> SPECIFICATIONS

- ~1 GGE/hour (2 scfm)
- ~1500 W of 220V single-phase power
- Multi-stage dual acting single free piston
- Indoor or outdoor installation
- Simple field serviceable design
- Low cost wearing parts with targeted life >5000 hours

> Status

- Prototype build is underway
- Shop test by Fall 2014
- Optimizing seal life
- Component durability testing is ongoing



Summary

- > Exciting time for natural gas industry – major benefit of long-term unconventional gas RD&D
 - The most impactful energy innovation in decades
- > Supply/Price/**Demand**, Challenges in Core Markets, and Safety & Environmental Regulations shaping RD&D
 - Importantly, see market pull scenario for customers in Power Gen, Industrial, Transportation sectors
 - > Market interest adds to manufacturer's motivation for new natural gas products
 - Need to keep a sharp focus on operational reliability and minimizing environmental impacts

Natural Gas Industry Emerging Technology Drivers

Distinct gas industry needs and opportunities, driven by key societal needs to reduce energy intensity, strive for sustainability, achieve renewable energy integration, lower carbon/methane emissions, ensure public safety, and boost economic welfare



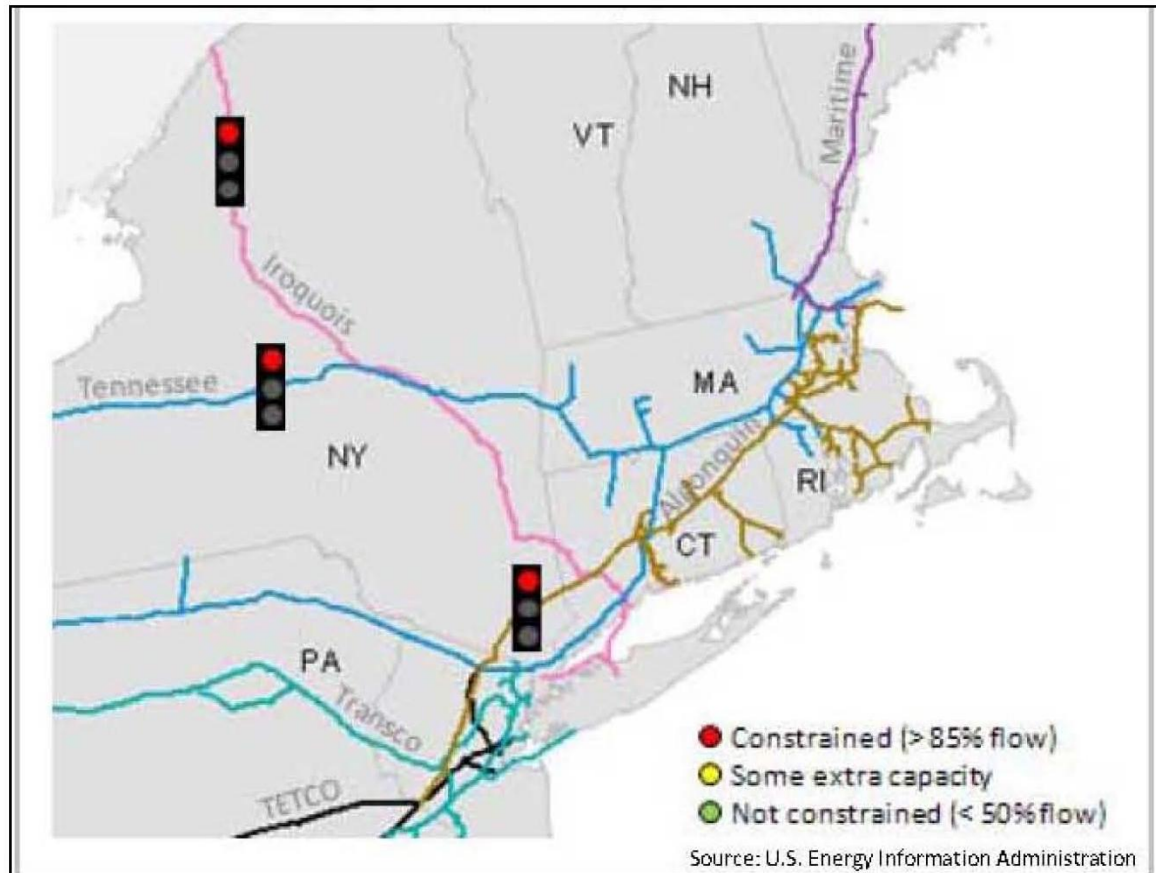
New England Lacks Storage of Natural Gas

- Highest cost of energy in the country
- Fully subscribed and at capacity pipelines
- Several years away from new capacity being created
- Limited dual fuel capabilities
- Further closing of coal and oil plants
- Increase demand of natural gas
- Pay for Performance will add constraint to the system

Add all of these points=think outside of the box

Capacity Constraints: Essentially, a Traffic Jam

 **Northeast**
GAS ASSOCIATION



LNG Solution

- Liquefied off of the existing pipeline system (or trucked to site)
- Transport up to 850 mcf in one truck, 2,500 MCF in one rail car, 130,000 MCF in one barge, or 3+ BCF in one ship
- Transported to serve areas that are disconnected ~~to~~ from the distribution system
- Backfill the pipeline in areas that are constrained
- Provide optionality for the LDCs for fuel supply at lower costs
- Cleaner Dual Fuel for Generators
- Provide peak shaving needs for the LDCs
- Strategically located and right size for specific needs

6 to 8 BCF of LNG Facility by 2018

- Power an Existing natural gas plant of 500 MW
- LNG storage on site of .5 BCF
- Another power plant will be powered on LNG approximately 100 hours/per year
- Start up in Winter 2018-2019



Methane Leaks from U.S. Distribution Systems

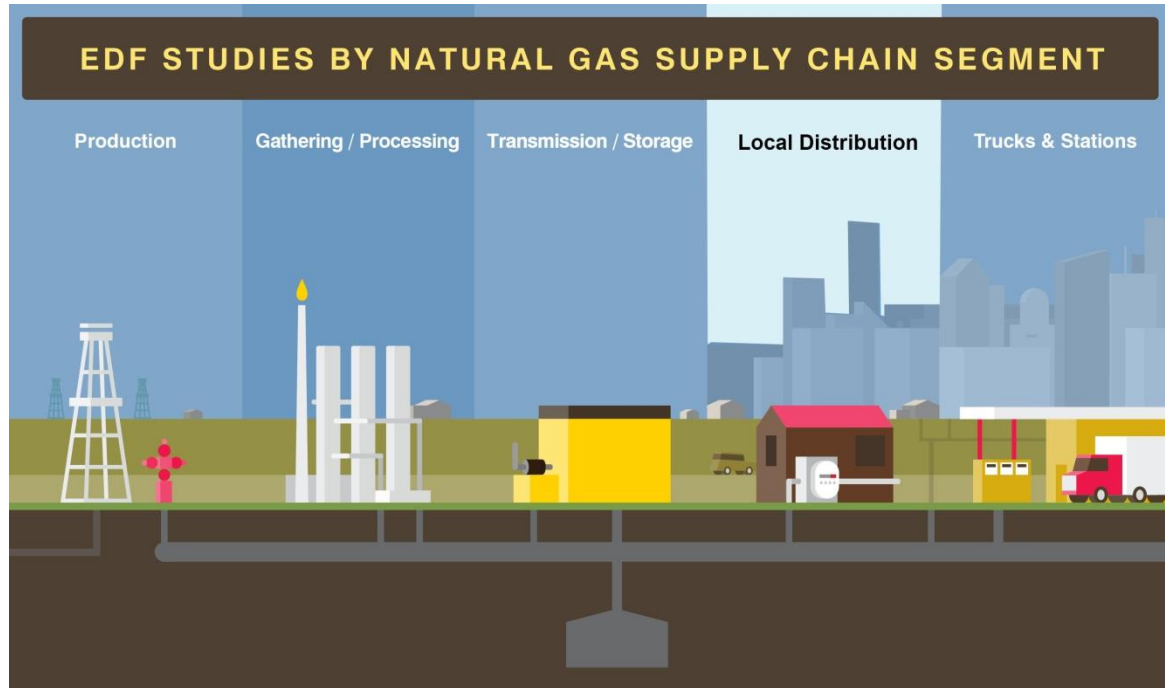
EDF's Scientific Research

N. Jonathan Peress – NARUC 2015 Summer Meeting



Research Overview

- EDF 16-part series of methane emission studies look at the **natural gas supply chain**
- Methane is a **waste** of resources and a powerful **pollutant**
- Local distribution studies find **older** infrastructure often leaks more methane
- Much of the older infrastructure is located in the **Northeast**
- New methods to find and measure leaks allow companies to **better prioritize and repair** highest-emitting sources



Multi-city Local Distribution Study

- Led by **Washington State University**, published in *Environmental Science and Technology*
- Researchers quantified methane emissions from facilities and pipes operated by **13 utilities** in various regions to come up with a **national leak estimate**
- Leaked gas valued at up to **\$195 million**
- **Findings:** Progress is being made in reducing emissions from these systems, mainly through **regulation and investment by utilities**, but more must be done



Current Estimates of Methane Emissions from Natural Gas Distribution Systems

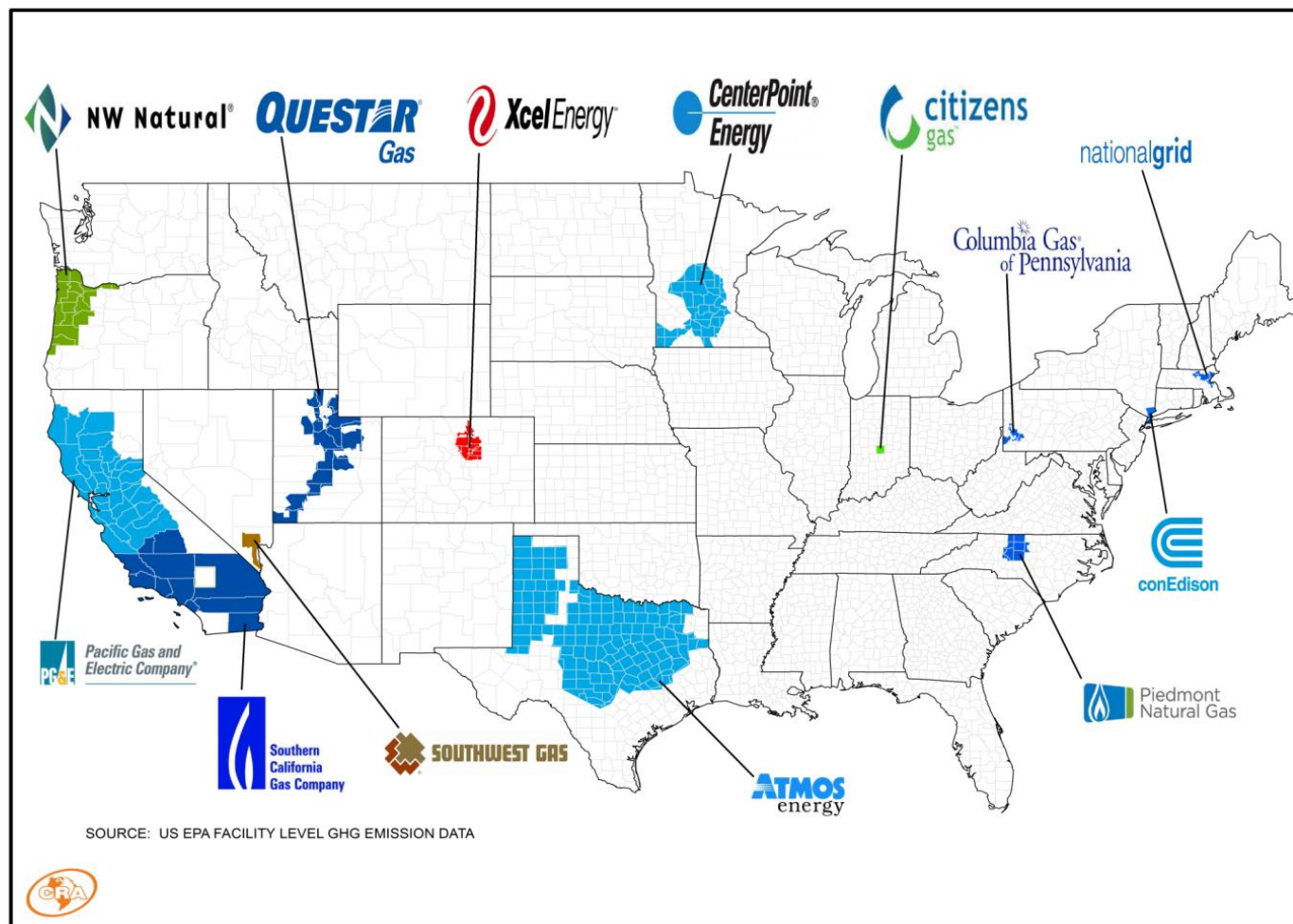
- Emissions from different categories
 - Underground pipelines and services
 - Metering and regulating (M&R) stations
 - Customer meters
 - Mishaps (dig-ins) and maintenance
- For each category
 - Emissions = Emission Factor x Activity Factor = EF x AF
 - The emissions from each category are summed for the total distribution system emissions
 - Current EPA Greenhouse Gas inventory uses EFs from a 1992 GRI/EPA national study of the natural gas system

Project Overview

- A nationwide field study to better understand methane emissions associated with the distribution of natural gas.
- Most comprehensive set of direct measurements yet of emissions from the distribution system.
- Over 400 new emission measurements for pipeline leaks and M&R stations
- Fieldwork conducted in the summer and fall of 2013
- Principle Investigator – Washington State University
 - Funded by:
 - Environmental Defense Fund
 - Consolidated Edison of New York
 - National Grid
 - Pacific Gas & Electric
 - Southern California Gas Company
 - American Gas Association and associated utility companies

Source: Washington State University, Brian Lamb

Participating Partners and Service Areas



Source: Washington State University, Brian Lamb

Methodology

- For each area, randomly select pipeline leaks and M & R facilities to measure; approximately 10-20 pipeline leak measurements and emissions data for 10-20 M&R stations.
- At M & R facilities, A **HIGH-FLOW SAMPLER** was used to measure emissions component by component
- For pipeline leaks, flexible surface enclosure to capture leaks

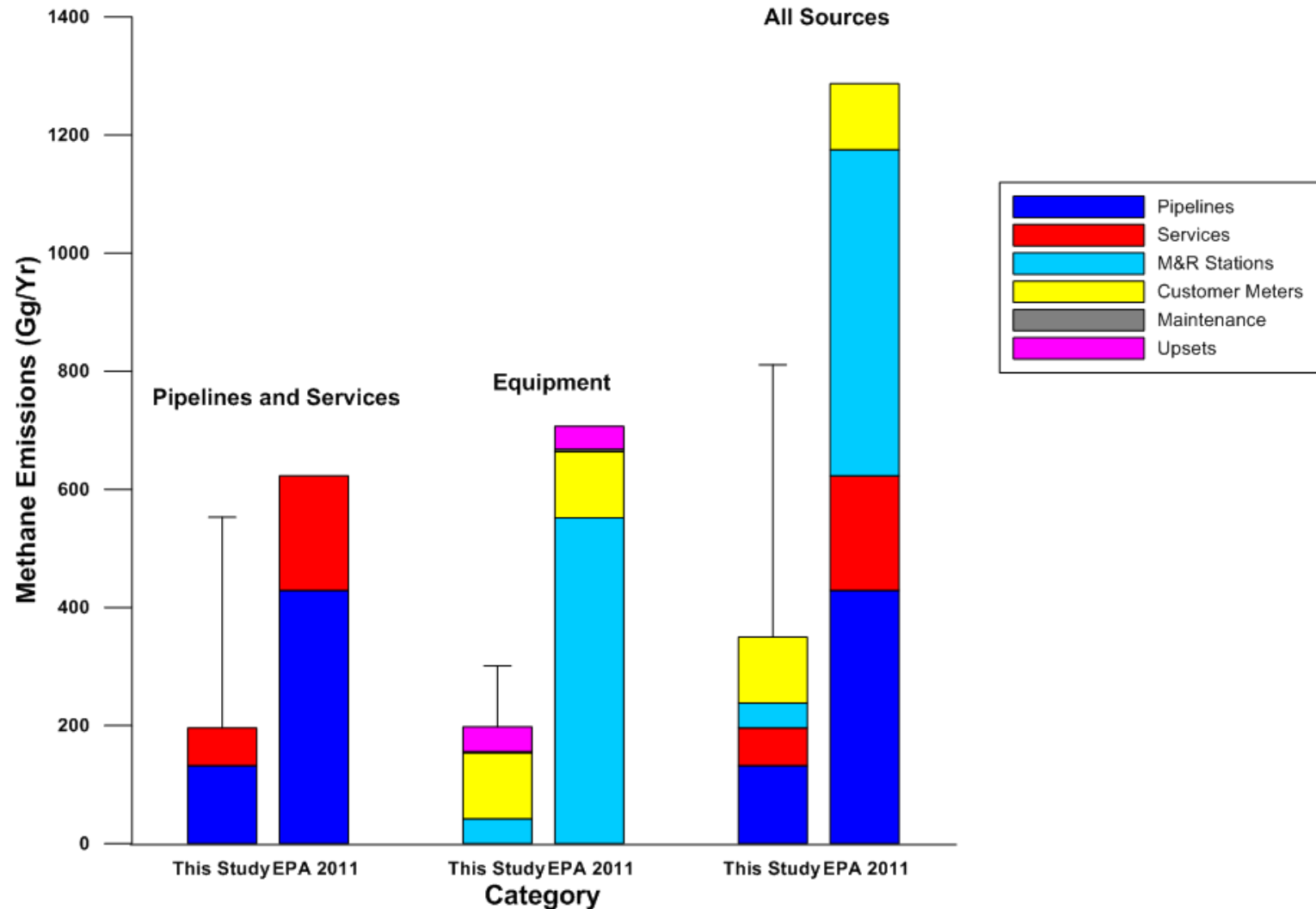


Source: Washington State University, Brian Lamb

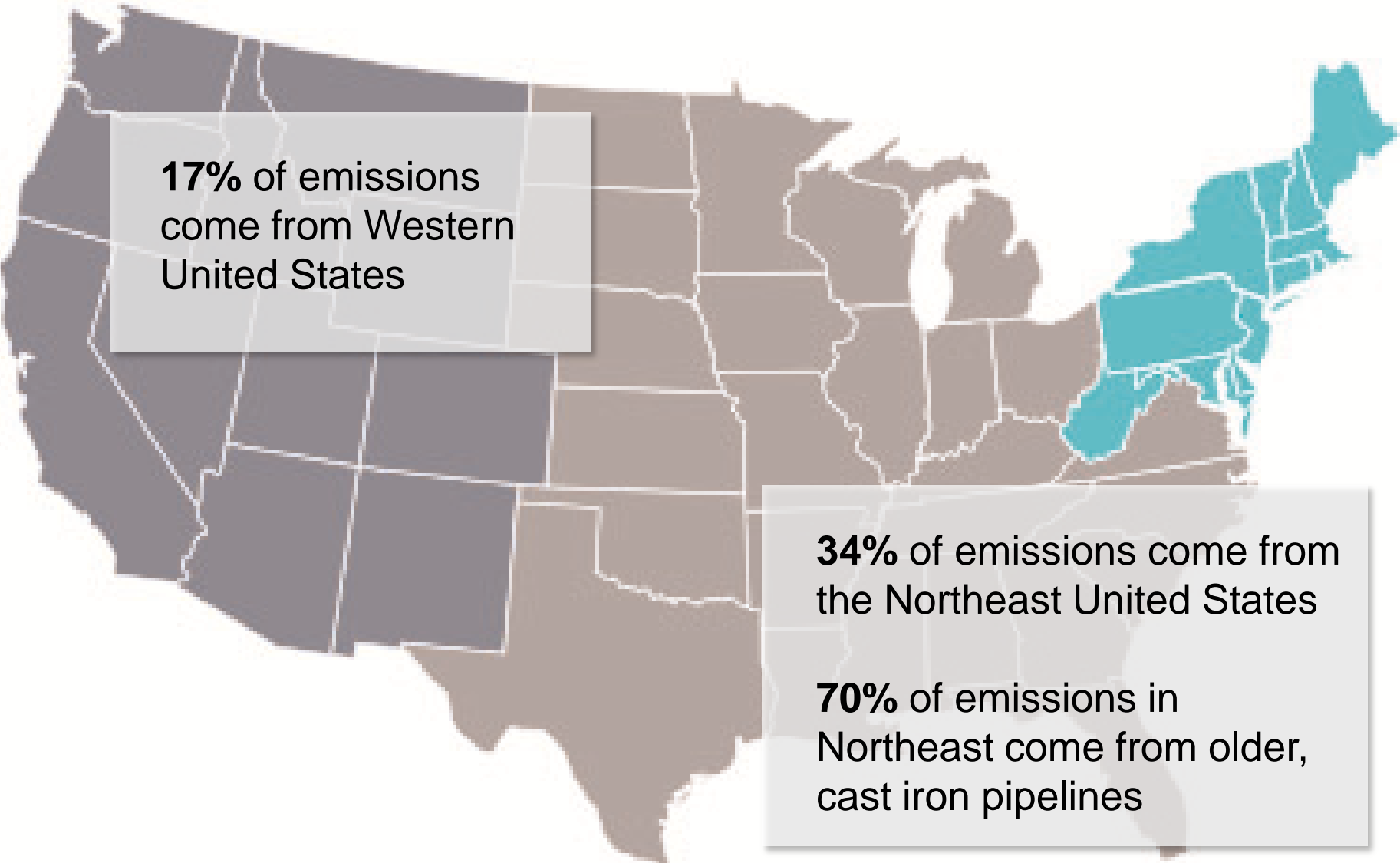
Key Findings

- Methane emissions from local natural gas distribution systems in cities and towns throughout the U.S. have decreased in the past 20 years with significant variation by region.
- For both M&R stations and pipeline leaks, the distribution of measured emission rates is highly skewed where a few sites contribute a large fraction of the total measured emissions
- For pipeline leaks, our emission factors were less than in the 1992 study, but it is less clear why these differences exist
 - Differences in the study methods
 - Changes in company survey, repair and maintenance methods
- Vented devices at M&R stations often are the largest emission source within a facility
- M&R stations have undergone significant upgrades and our Emission Factors were substantially less than those from the 1992 GRI/EPA study
 - These changes were confirmed by re-visiting 9 sites from the GRI/EPA study where we found more than a factor of 10 smaller emissions

Overall US Inventory for Local Distribution Systems



Multi-city Local Distribution Study



A map of the United States with states colored in three categories: dark grey for the West, medium brown for the Midwest and South, and teal for the Northeast. Two text boxes are overlaid on the map. The first box, in the West, states that 17% of emissions come from the Western United States. The second box, in the Northeast, states that 34% of emissions come from the Northeast United States and that 70% of emissions in the Northeast come from older, cast iron pipelines.

17% of emissions
come from Western
United States

34% of emissions come from
the Northeast United States


70% of emissions in
Northeast come from older,
cast iron pipelines

Boston Pipeline Study – Top-Down

- Harvard, Boston and Duke universities with Aerodyne Research, Atmospheric and Environmental Research University
- Published in **Proceedings of the National Academy of Sciences**
- **Tower-based quantitative technique** for use in the urban environment.
- **Findings:** Boston's methane emissions are more than two times higher than inventory data suggests, with a yearly **average loss rate between 2.1 and 3.3- percent.**



Top-down Studies Report Higher Emissions than Bottom-up

- Emission factors developed using very small or unrepresentative samples
 - Bias from sampling only at self-selected or cooperative facilities
 - Failure to account for emissions from uncommon but anomalously high emitters
 - Need better understanding of other sources, especially in urban areas
- 

EDF Methane Mapping Project

- EDF partnered with **Google** to map methane emissions from pipelines under city streets.
 - thousands of leaks found and sampled
- Led by researchers at **Colorado State University**
- Project **quantifies methane leak rates** from pipelines under the street
- Utilities could use data to identify and **prioritize repair or replacement** of leaky pipelines, not otherwise addressed as an immediate public safety risk.
- **Findings:** Older systems/materials tend to be leakier than newer systems/material



Boston

[About leaks in Boston](#)

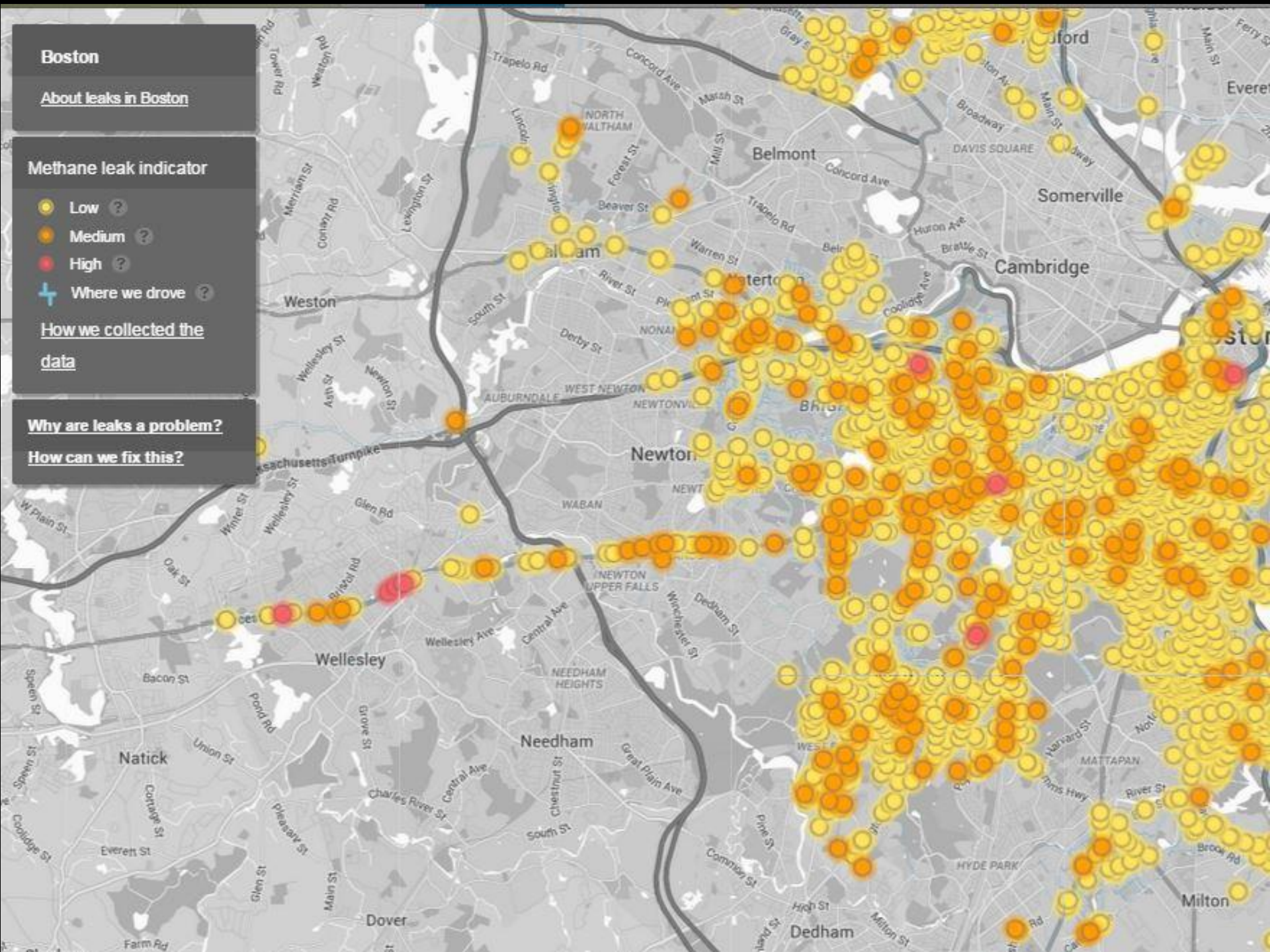
Methane leak indicator

- Low ?
- Medium ?
- High ?
- + Where we drove ?

[How we collected the data](#)

[Why are leaks a problem?](#)

[How can we fix this?](#)



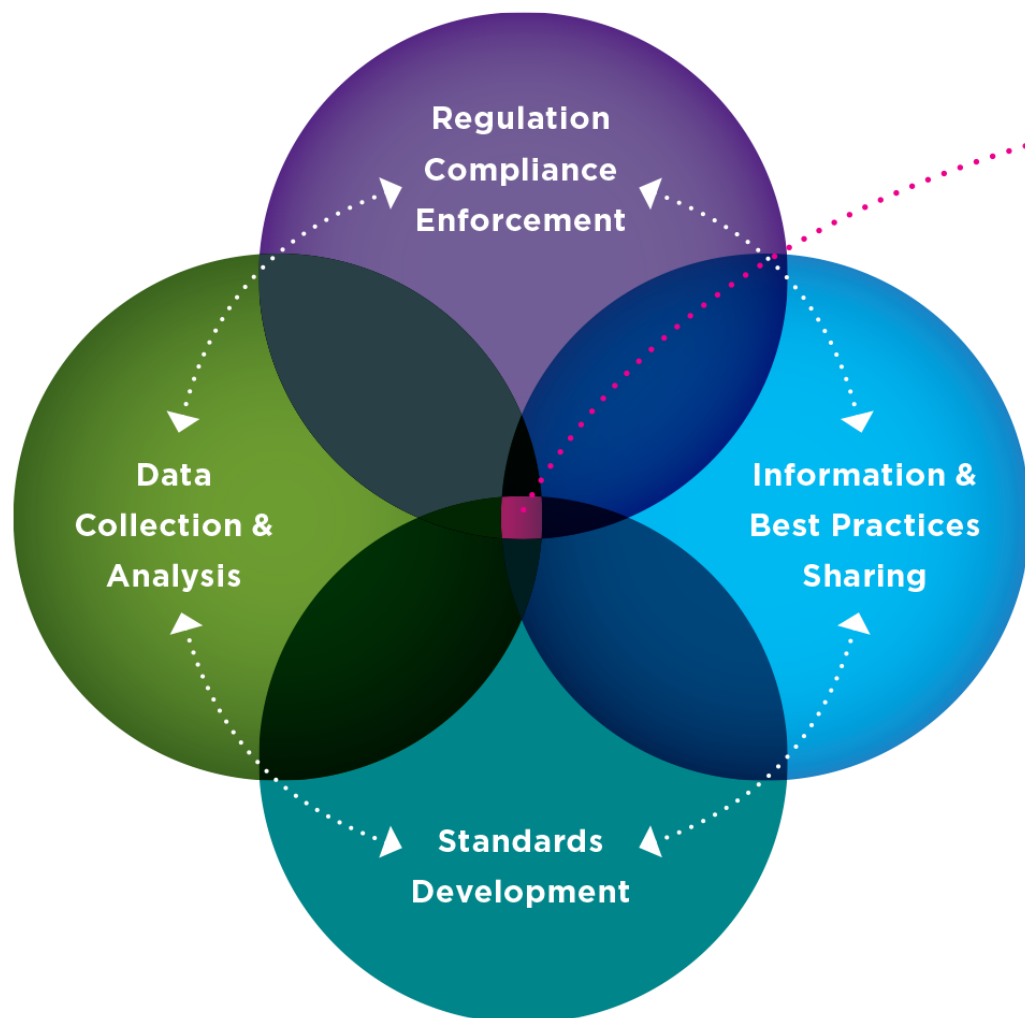
Thank You



Pipeline Safety & Infrastructure Replacement Update

July 12, 2015

Commitment to Safety



Safest

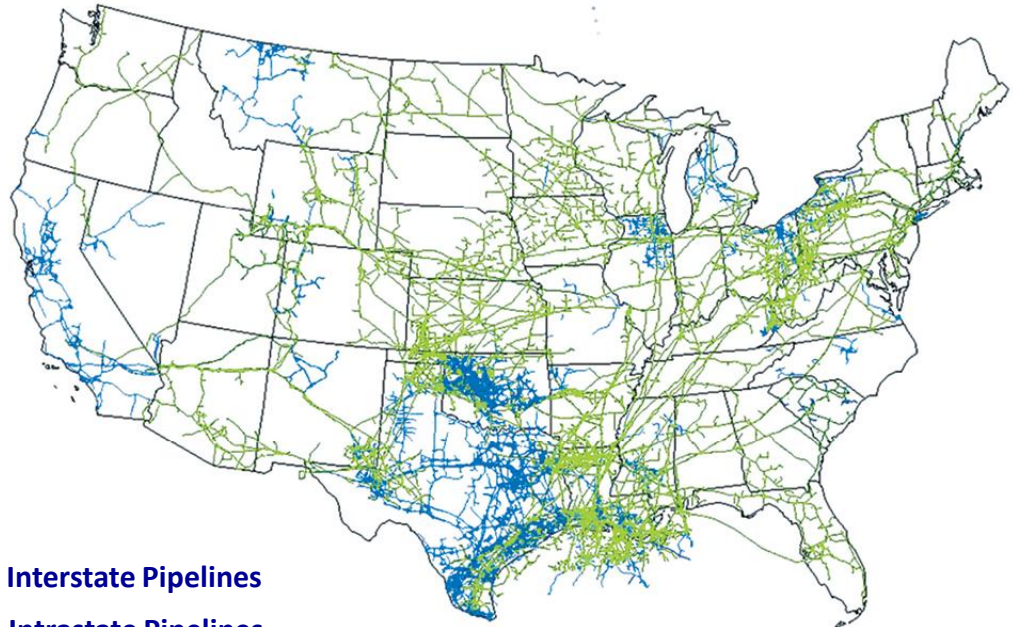
Energy Delivery
System in America

The natural gas industry has a long-standing record of providing natural gas service safely and effectively to more than 177 million Americans and is dedicated to the continued enhancement of pipeline safety.

Safely transported Across the Country

- Natural gas pipelines, are an essential part of the nation's infrastructure. Transportation by pipeline is the safest form of energy delivery in the country.
- Natural gas utilities spend \$19 billion annually to help enhance the safety of natural gas distribution and transmission systems.

2.4
MILLION
miles of pipeline



● Interstate Pipelines
● Intrastate Pipelines

Regulatory Oversight

There is significant oversight and regulation focused on the natural gas industry to help ensure public safety.

The U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA) establishes federal safety standards for pipelines, and PHMSA partners with state pipeline safety agencies on inspections and enforcement of intrastate pipelines. Individual states can regulate intrastate pipeline systems above and beyond federal requirements, and there are hundreds of state-specific pipeline safety regulations currently in place.



AGA supports continuous improvements to the safe delivery of natural gas through:

- Information sharing among emergency responders and the public that effectively informs and enhances pipeline safety
- Research and development of safety-enhancing technologies
- Collaboration with key stakeholders
- Advocating for the effective enforcement of "Call 811"
- Conducting forums for the industry that facilitate the sharing of leading practices

Pipeline Safety Regulations

- **DOT Pipeline Safety & Hazardous Materials Administration (PHMSA)**

Regulates gas utilities under 49 C.F.R. Part 192

- **Significant number of new requirements on the way**

More than 80 mandates from Congress and recommendations from NTSB, GAO, and the OIG

PHMSA's

Other Initiatives:

- *Transmission Integrity Management Program (TRIMP)*
- *Distribution Integrity Management Program (DIMP)*
- *Control Room Management*
- *Damage Prevention*
- *Land Use Planning*
- *Public Awareness*
- *Emergency Preparedness*



DOT Pipeline Safety Action Plan

- Raise the bar on pipeline safety
- Accelerate rehabilitation, repair and replacement programs for high risk pipelines
- *Focus on cast iron, bare steel, older plastic*

In Section 7 of the Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011, Congress directed the Secretary of Transportation to develop a report on the national cast iron inventory

- *AGA Supports the Action Plan and “Smart Modernization” of infrastructure that is no longer fit for service*

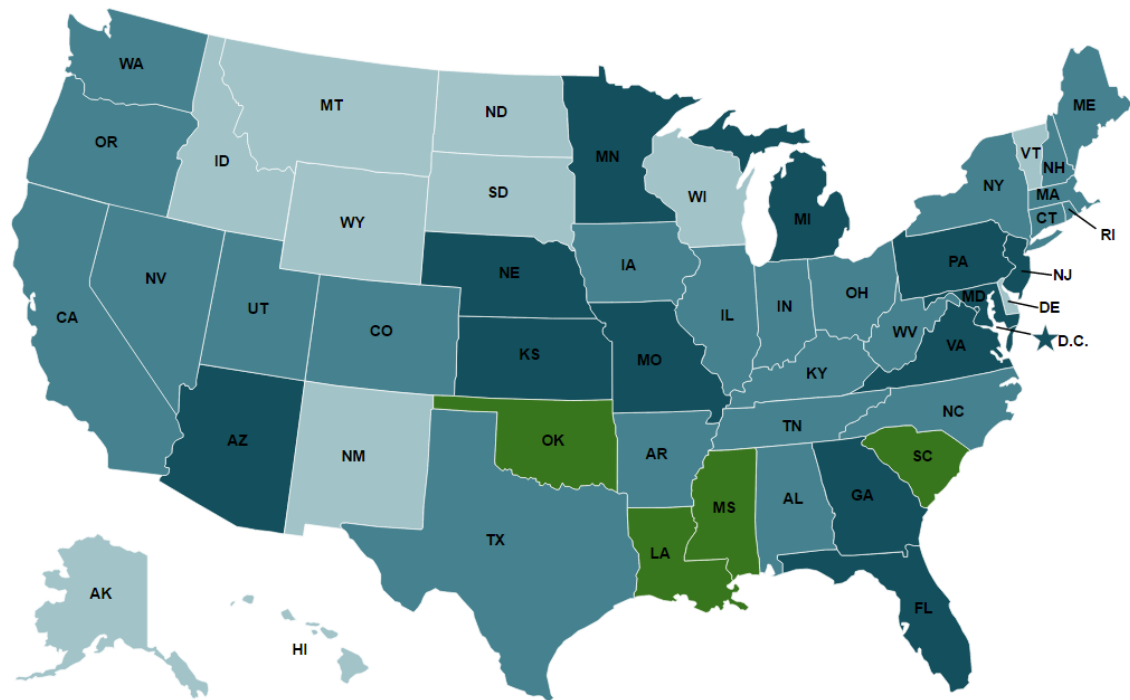
2013 NARUC Resolution

RESOLVED, That the Board of Directors of the National Association of Regulatory Utility Commissioners... *encourages regulators and industry to consider sensible programs aimed at replacing the most vulnerable pipelines as quickly as possible along with the adoption of rate recovery mechanisms that reflect the financial realities of the particular utility in question*; and be it further;

RESOLVED, That State commissions should explore, examine, and *consider adopting alternative rate recovery mechanisms as necessary to accelerate the modernization, replacement and expansion of the nation's natural gas pipeline systems.*

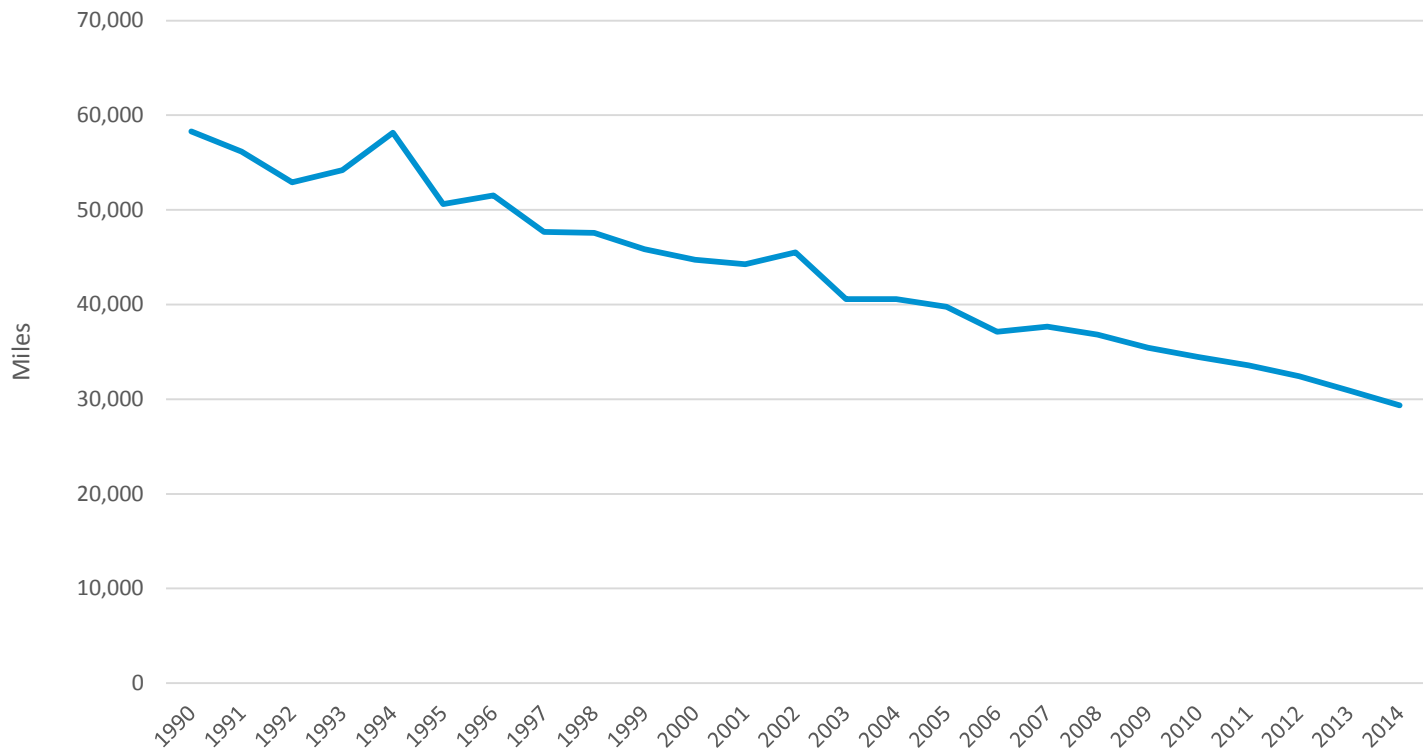


States with Accelerated Infrastructure Replacement Programs



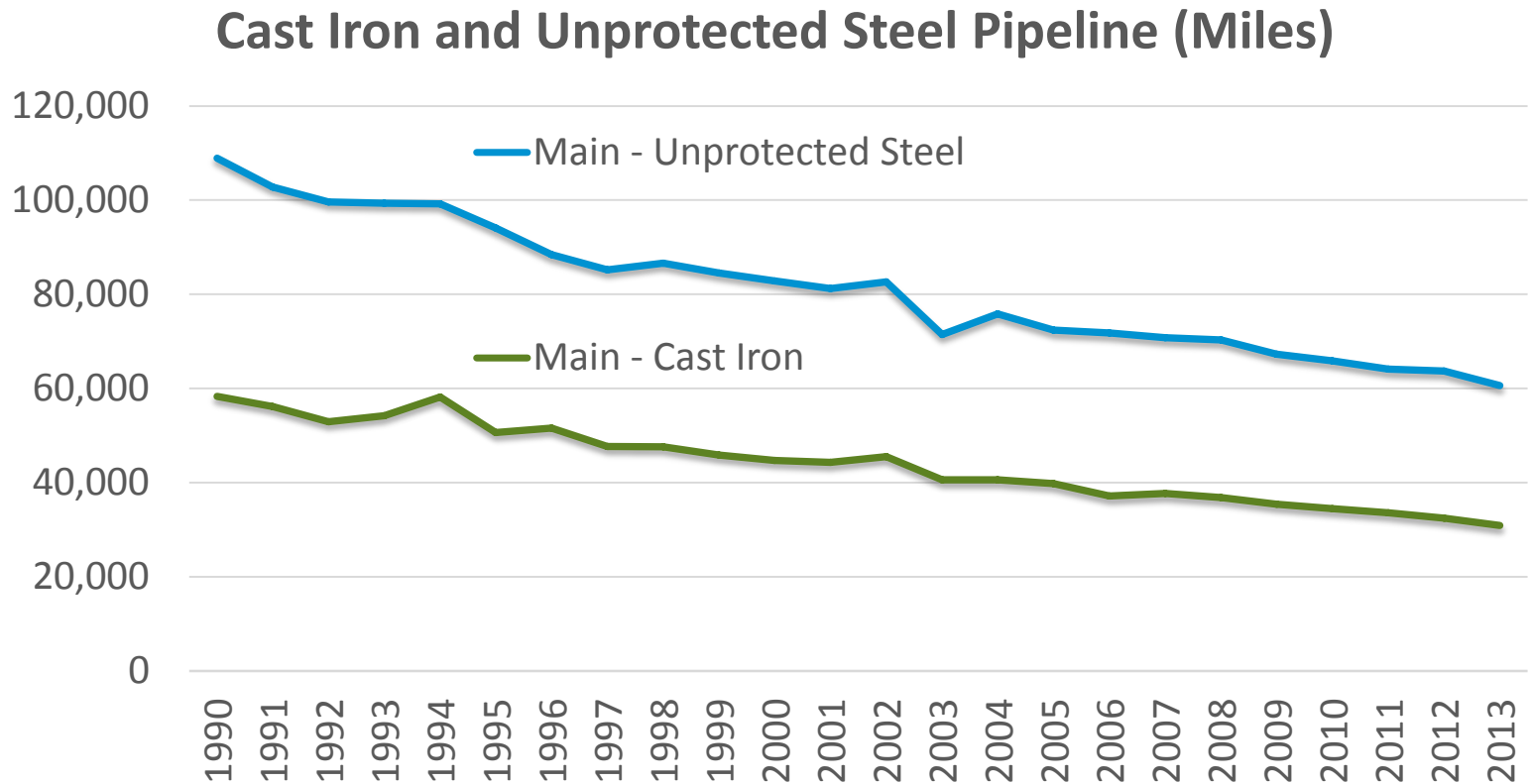
- *The overall trend is positive*
- *Nine states moved to adopt programs in 2013, alone*
- *NJ, MA, PA & DC adopted pipeline safety measures in 2014*
- *West Virginia recently passed legislation*
- *States address this issue differently*
- *The basis for these decisions is always just and reasonable rates for consumers*

Overall Cast Iron Main Makes Up Less than 3% of the Distribution Mileage, and is Decreasing Annually



SOURCE: U.S. Department of Transportation, PHMSA, Distribution Annual Data

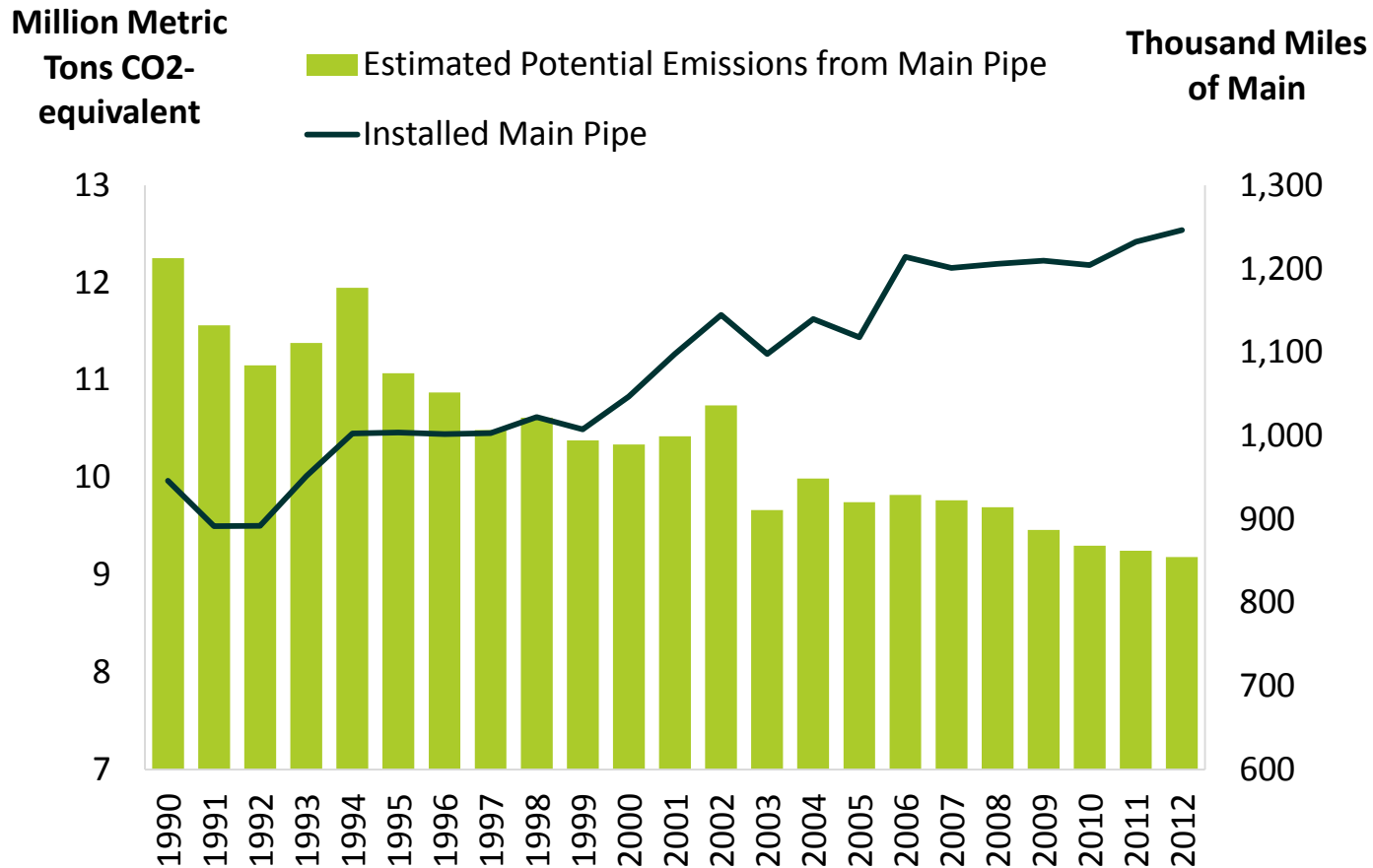
System Modernization Has Been a Decades Long Process and Will Continue



Source: Department of Transportation

As a Result, Emissions Have Declined Even as the System Grows

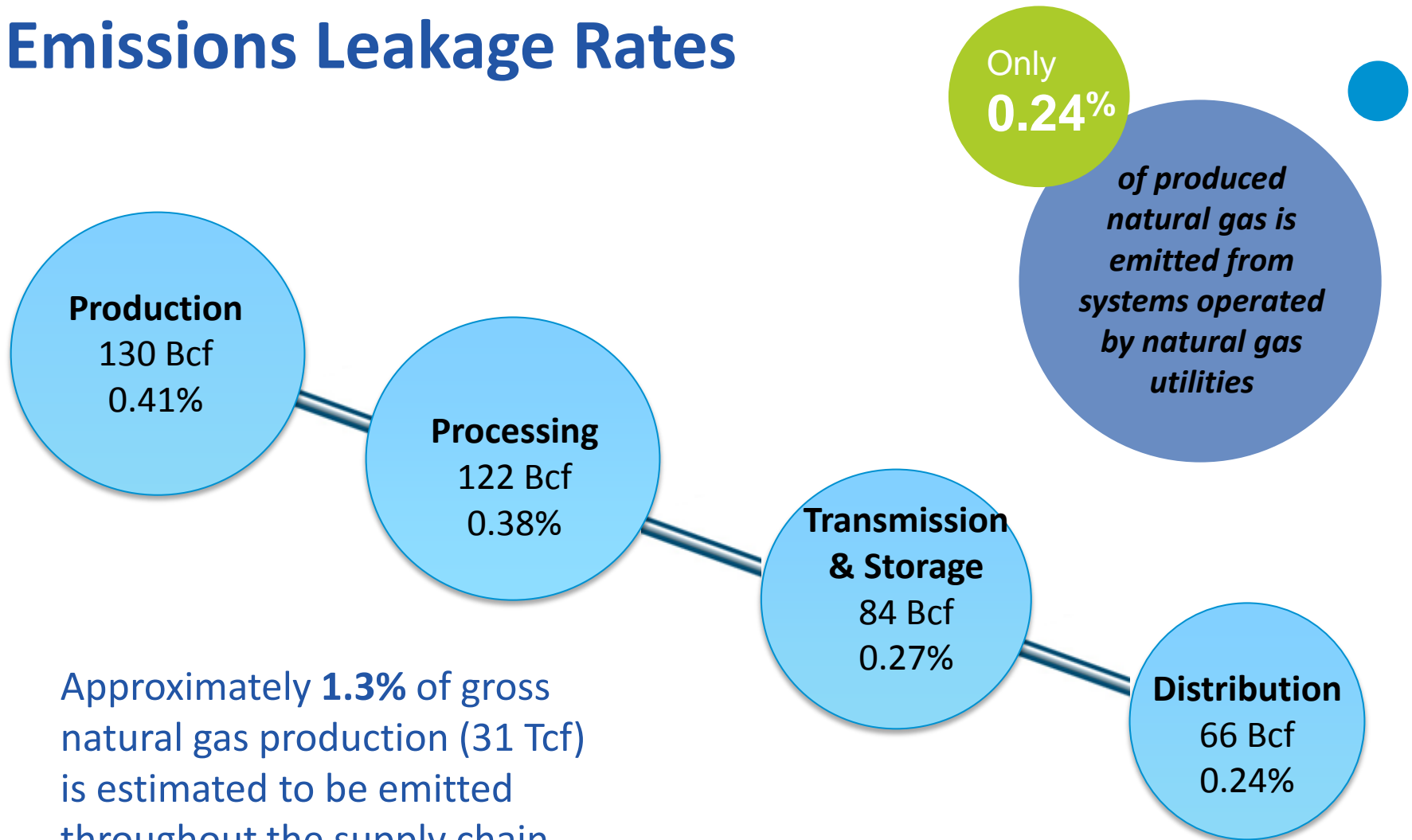
Pipeline Replacement Lowers Emissions



Source: AGA Analysis based on Department of Transportation data and EPA *Inventory of U.S. Greenhouse Gas Emissions and Sinks 1990-2012*

**Excludes Reductions from Voluntary Programs*

Emissions Leakage Rates



AGA Voluntary Guidelines for Reducing Natural Gas Emissions

1. Modernize Distribution Systems – Pipe Replacement
2. Replace High-Bleed Pneumatic Valves
3. Enhance “Before You Dig” Damage Prevention
4. Reduce Venting Before Repairs
5. Conduct Directed Inspection & Maintenance Programs

*Operators will need to evaluate actions in light of system variables, the operator’s system integrity assessment, risk analysis and mitigation strategy and what has been deemed reasonable and prudent by the state utility regulatory commission.



Natural Gas Distribution

Shrinking Emissions by the Numbers

- **65,100** – miles of cast iron & bare steel pipe replaced with PE plastic pipe
- **300,000** – added miles of distribution mains
- **18 million** – number of new customers served (**32% increase**)
- **16%** - emissions decline since 1990
- **0.24%** - EPA estimated distribution system emissions as a percentage of U.S. Gross Production

*Numbers reflect data collected from 1990-2012



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AGL Resources:

Special Infrastructure Programs under State Regulatory Oversight

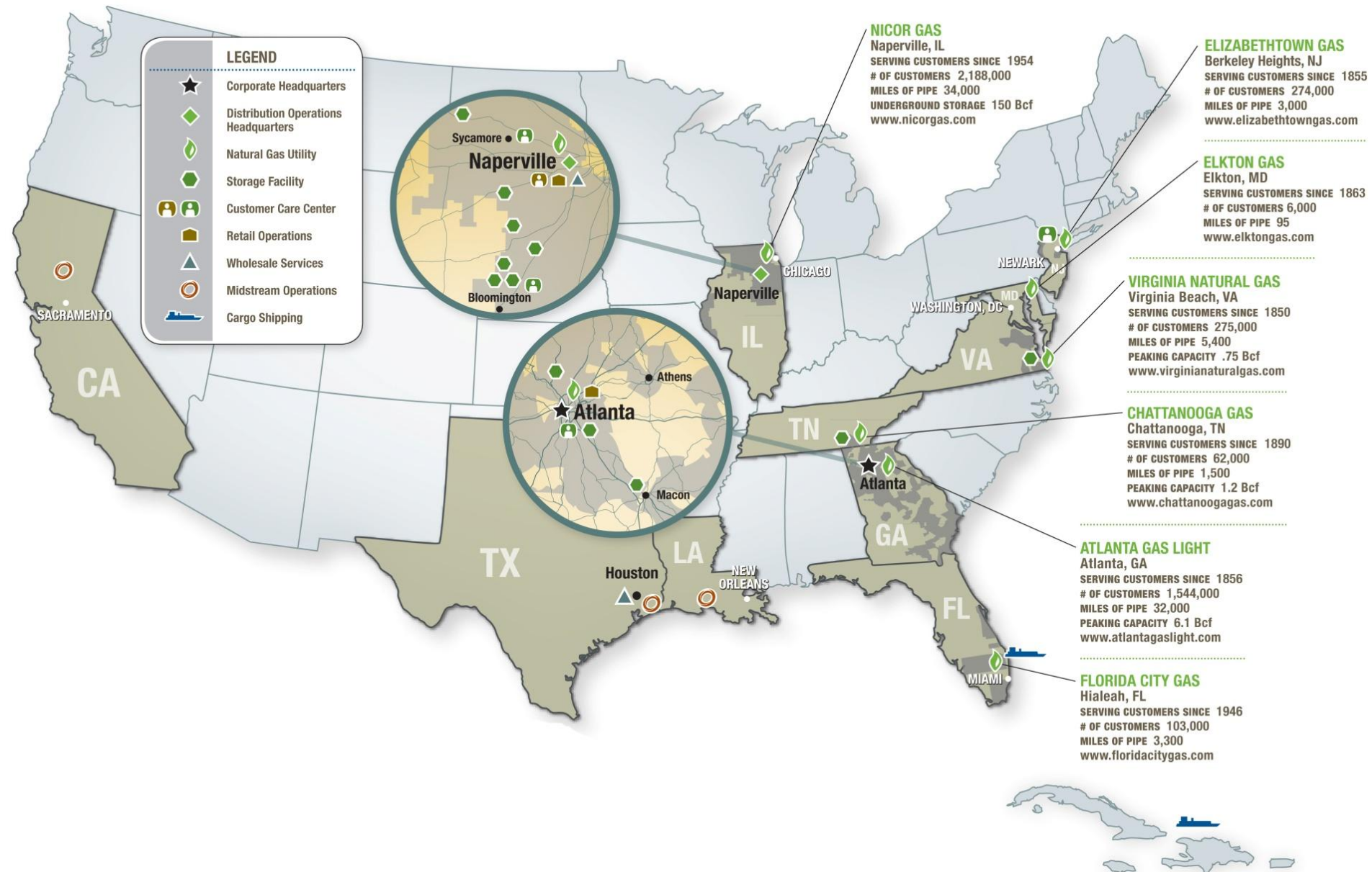
David C. Weaver
Vice President
Regulatory Affairs
July 2015

This Slide makes the lawyers happy!

Forward-Looking Statements

Certain expectations regarding in this presentation are forward-looking statements. Forward-looking statements involve matters that are not historical facts. Forward-looking statements contained in this press release include, without limitation, the expected use of proceeds of the senior note offerings. AGL Resources' and AGL Capital's expectations are not guarantees and are based on currently available information. While these expectations are believed to be reasonable in view of the currently available information, they are subject to future events, risks and uncertainties, and there are several factors - many beyond the control of AGL Resources and AGL Capital - that could cause results to differ significantly from these expectations. These events, risks and uncertainties include the possibility that the conditions to closing the senior note offerings or the proposed merger with Nicor will not be satisfied or waived, and unforeseen events that may necessitate the application of the net proceeds of the senior note offerings to other, more critical purposes. Events, risks and uncertainties which may cause actual events to differ materially from expectations also include, but are not limited to, changes in price, supply and demand for natural gas and related products; the impact of changes in state and federal legislation and regulation including changes related to climate change; actions taken by government agencies on rates and other matters; concentration of credit risk; utility and energy industry consolidation; the impact on cost and timeliness of construction projects by government and other approvals, development project delays, adequacy of supply of diversified vendors, unexpected change in project costs, including the cost of funds to finance these projects; the impact of acquisitions and divestitures; direct or indirect effects on AGL Resources' business, financial condition or liquidity resulting from a change in credit ratings or the credit ratings of counterparties or competitors; interest rate fluctuations; financial market conditions, including recent disruptions in the capital markets and lending environment and the current economic downturn; general economic conditions; uncertainties about environmental issues and the related impact of such issues; the impact of changes in weather, including climate change, on the temperature-sensitive portions of AGL Resources' business; the impact of natural disasters such as hurricanes on the supply and price of natural gas; acts of war or terrorism; and other factors which are provided in detail in AGL Resources' filings with the Securities and Exchange Commission, which we incorporate by reference in this press release. Forward-looking statements are only as of the date they are made, and neither AGL Resources nor AGL Capital undertakes to update these statements to reflect subsequent changes.

AGL Resources



Status Report

- AGL Resources has accelerated infrastructure programs in place/about to begin in 5 of our states.
- We have invested approximately **\$1.8 billion** to date under state created programs targeting safety, reliability and economic development
 - By focusing on safety and reliability, AGL Resources has nevertheless reduced cumulative emissions by **over 700,000 mt CO₂E**
- With continued support from our state regulators and state leaders, we have line of sight to invest an additional **\$3 - \$4 billion over the next 10 – 20 years**

Special Infrastructure Programs Work

- **Planning and Transparency**
 - Preselect projects supported by construction estimates and growth data.
 - Surcharge ‘pre-approved’ subject to Commission audits
 - Actual cost recovery guaranteed
- **Partnership approach:**
 - Improves traditional regulatory process and oversight
 - Eliminates the “gotcha” penalty of traditional rate case approval
- **If not now, when?**
 - Relatively low gas costs
 - Shale gas provides supply reliability and price stability
 - Risk losing control to D.C. priorities

AGL Resources Infrastructure Programs

- **Georgia**
 - **STRIDE**
 - Pipeline Replacement Program (1998)
 - 2700 miles of bare steel/cast iron mains and services replaced in 15 yrs.
 - i-SRP – System Reinforcement (2009)
 - Replace/upgrade core transmission lines
 - i-CGP – Customer Growth (2010)
 - Economic development extensions to open more areas to gas service
 - i-VPR – Vintage Plastic Replacement (2013)

AGL Resources Infrastructure Programs

- **Illinois**
 - Legislature Enacted “Qualified Infrastructure Programs”
 - 10 year safety and system reinforcement program covering 6 comprehensive areas
 - Annual investment limited to surcharge recovery approximating 4% of base rate revenues
 - Nicor Gas’ “Invest in Illinois” program proposes to invest approximately \$2 billion over next 9 years

AGL Resources Infrastructure Programs

- **Virginia**
 - SAVE (2012): \$125 million
 - Modeled on Georgia's STRIDE
 - Phase 2 later this year
- **New Jersey**
 - UIE (2010): \$175 million
 - AIR: (2013): \$115 million
 - ENDURE: (2014) \$15 million
 - SMART: (2015) Replace remaining vintage pipes
- **Florida**
 - SAFE program (pending)

Special Infrastructure Programs Work

- **Planning and Transparency**
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Thank you!

Natural Gas Value Chain Emissions

Segment	2012 Leakage Rate (1.3%)
Production	0.124 tcf (0.42%)
Processing	0.053 tcf (0.19%)
Transmission and Storage	0.116 tcf (0.44%)
Distribution	0.069 tcf (0.26%)

Natural Gas Utility Emissions

Source	Share
Pipeline Leaks	49.5%
Meters/Regulators/City Gates	39.4%
Customer Meters	8.0%
Routine Maintenance	0.3%
Upsets (third party dig-ins, etc.)	2.8%

Note: Includes non-hazardous Grade 3 leaks

The Carbon Challenge – Methane Blueprint

Obama Administration Released Methane Emissions Blueprint on January 14, 2015

- 40-45% reduction in oil and gas value chain methane emissions by 2025 (vs. 2012 levels)

Context:

- Methane was less than 10% of US greenhouse gas emissions in 2012
- ~30% of total US methane emissions were from **oil and gas** production, processing, transmission, and distribution (~3% of total US greenhouse gas emissions)
- **Natural gas** value chain – 1.3% leakage rate - about 2% of total US greenhouse gas emissions
 - Less than 0.5% of US greenhouse gas emissions are from **LDC systems**
 - The bulk of LDC emissions are in a handful of states

ONE Future Approach

- Practical, methane emission reductions based on an intensity target that achieves an eventual 1% leakage rate across the natural gas supply chain
 - Update EPA inventories and establish a credible baseline emissions using latest science and data
 - Each sector assigned a leakage rate goal
 - Establish transparent and verifiable annual emission accounting and emissions data reporting standards
 - Promote a flexible, performance-based, best practices approach that focuses on addressing the most cost-effective abatement opportunities across the value chain
- Incorporate existing and new technologies and work practice standards but do not “lock” the company into a specific technology or practices
- Partner achieves its goal by meeting the intensity target for the sector for the year



Pipeline Infrastructure: National Best Practices

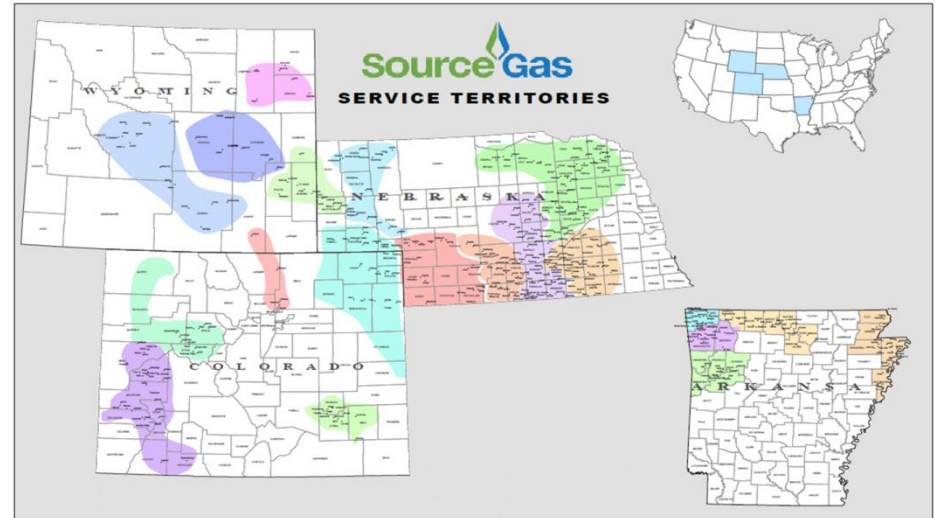
Presentation to Staff
Subcommittee on Gas

Summer NARUC Committee Meetings
July 12, 2015
New York City



My Company

💧 **SourceGas** is a natural gas local distribution utility headquartered in Golden, Colorado. The company and its affiliates serve **425,000** customers and operate **19,000** miles of distribution, gathering and transmission pipeline, as well as storage facilities, in **Arkansas, Colorado, Nebraska and Wyoming**. The company and its affiliates also provide gas transportation, in-home HVAC and appliance service and sales, as well as gas commodity sales services to its natural gas customers.



Pipeline Infrastructure – Areas of Focus

- Nebraska
 - 580 miles of top-of-ground pipeline (15 years)
- Arkansas
 - 42 miles of bare, unprotected steel transmission pipeline (5 years)
 - 514 miles of bare, unprotected steel distribution pipeline (20 years)

Recovery Mechanisms

Division	Nebraska	Arkansas
Rider	System Safety and Integrity Rider (SSIR)	Main Replacement Program (MRP)
Type of Mechanism	Surcharge With True-Up	Tracker
Scope	<ul style="list-style-type: none"> • Transmission integrity management program (TIMP) • Distribution integrity management program (DIMP) • New Pipeline and Hazardous Materials Safety Administration (PHMSA) rules and regulations • Facility relocation projects with a per-Project total cost of \$20,000 or more 	<ul style="list-style-type: none"> • Bare steel main • Coated steel distribution mains that are not cathodically protected • Mains that are the subject of an advisory issued by a federal or state agency and which the Company has determined to be in unsatisfactory condition • Associated services
Eligible Projects	Planned capital and other projects that meet specified criteria	Completed capital projects that meet specified criteria
What Can Be Recovered?	<ul style="list-style-type: none"> • Return on capital investment • Depreciation • Income taxes • Property taxes • Budgeted O&M expenses 	<ul style="list-style-type: none"> • Return on capital investment • Depreciation • Income taxes • O&M savings offset

Recovery Mechanisms

Division	Nebraska	Arkansas
Filing Interval	Annually	Monthly
Regulatory Lag	None	45 days
Timing of Filing	Oct 1 – Feb 1	First of Month
Filing Package	All pertinent information and supporting data related to eligible costs, e.g., project description and scope, project costs, in-service date, etc.	All pertinent information and supporting data related to eligible costs, e.g., project description and scope, project costs, in-service date, etc.
True-Up	Report filed by Apr 1 detailing the project costs incurred during the previous year, explaining how the project costs were managed and any deviations between budgeted and actual costs True-up in subsequent SSIR filing	None
Review	Commission must hold hearing to approve each year	Compliance audit up to 5 years after filing

Questions?



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