

**NEW ENGLAND CONFERENCE OF
PUBLIC UTILITIES COMMISSIONERS
68TH ANNUAL SYMPOSIUM**

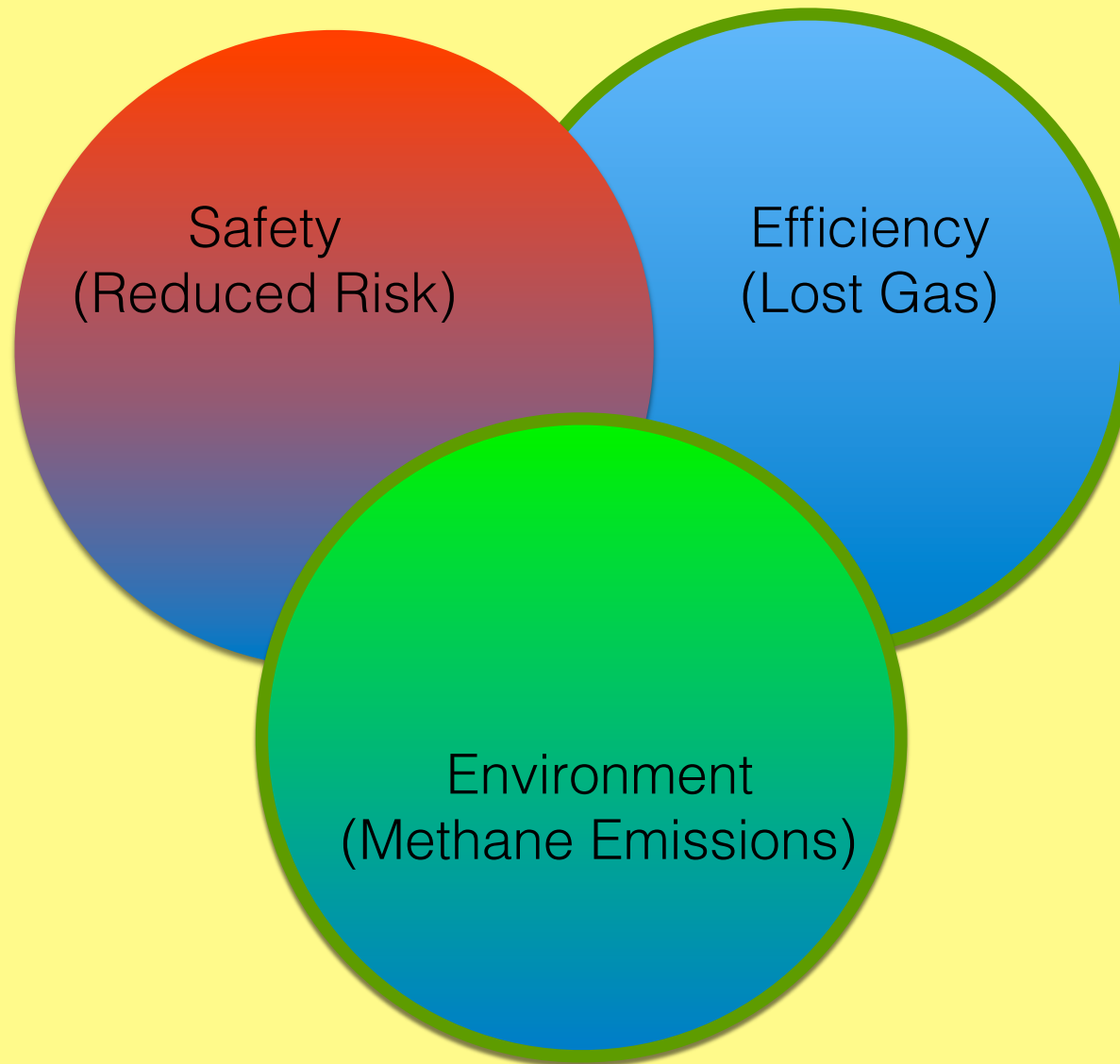


**METHANE EMISSIONS AND SOLUTIONS
IN THE NATURAL GAS INDUSTRY**

**NEWPORT, RI
JUNE 8, 2015**

**PAUL J. ROBERTI
COMMISSIONER, RHODE ISLAND PUBLIC UTILITIES COMMISSION**

The Synergistic Trilogy of Pipeline Modernization





San Bruno, CA 2010



Allentown, PA 2011

“In 2010, there were 34 serious pipeline incidents in which 19 people were killed, 104 were injured. In 2011, another 12 people were killed and 55 injured in 34 serious pipeline incidents. Overall, the number of serious incidents has declined since 1992, but the consequences when something does go wrong are far too large to fail to improve pipeline safety.”

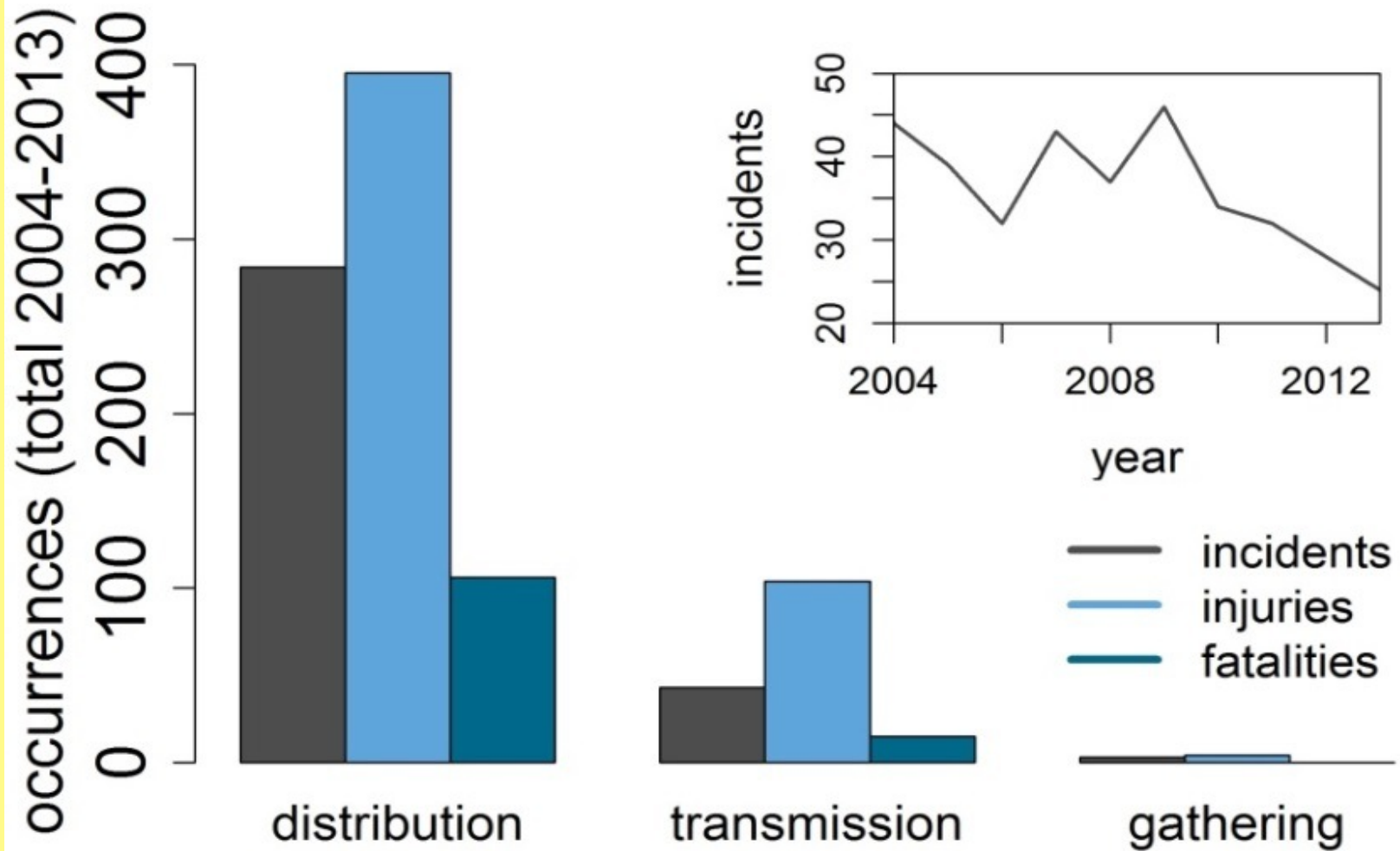
Assessment of National Transportation Safety Board

CAST IRON REMAINS ON PHMSA'S "WATCH LIST"

- **10.5 percent** of the incidents occurring on gas distribution mains involved cast iron mains. However, **only 2.5 percent** of distribution mains are cast iron.
- In proportion to overall cast iron main mileage, the frequency of incidents on mains made of cast iron is more than **four times that of** mains made of other materials.
- **38 percent** of the cast/wrought iron main incidents caused a fatality or injury, compared to only 20 percent of the incidents on other types of mains.
- **12 percent of all fatalities** and **8 percent of all injuries** on gas distribution facilities involved cast or wrought iron pipelines

Source: USDOT PHMSA

Total Incidents, Injuries, and Fatalities Associated with U.S. Natural Gas Pipelines (PHMSA, 2014)

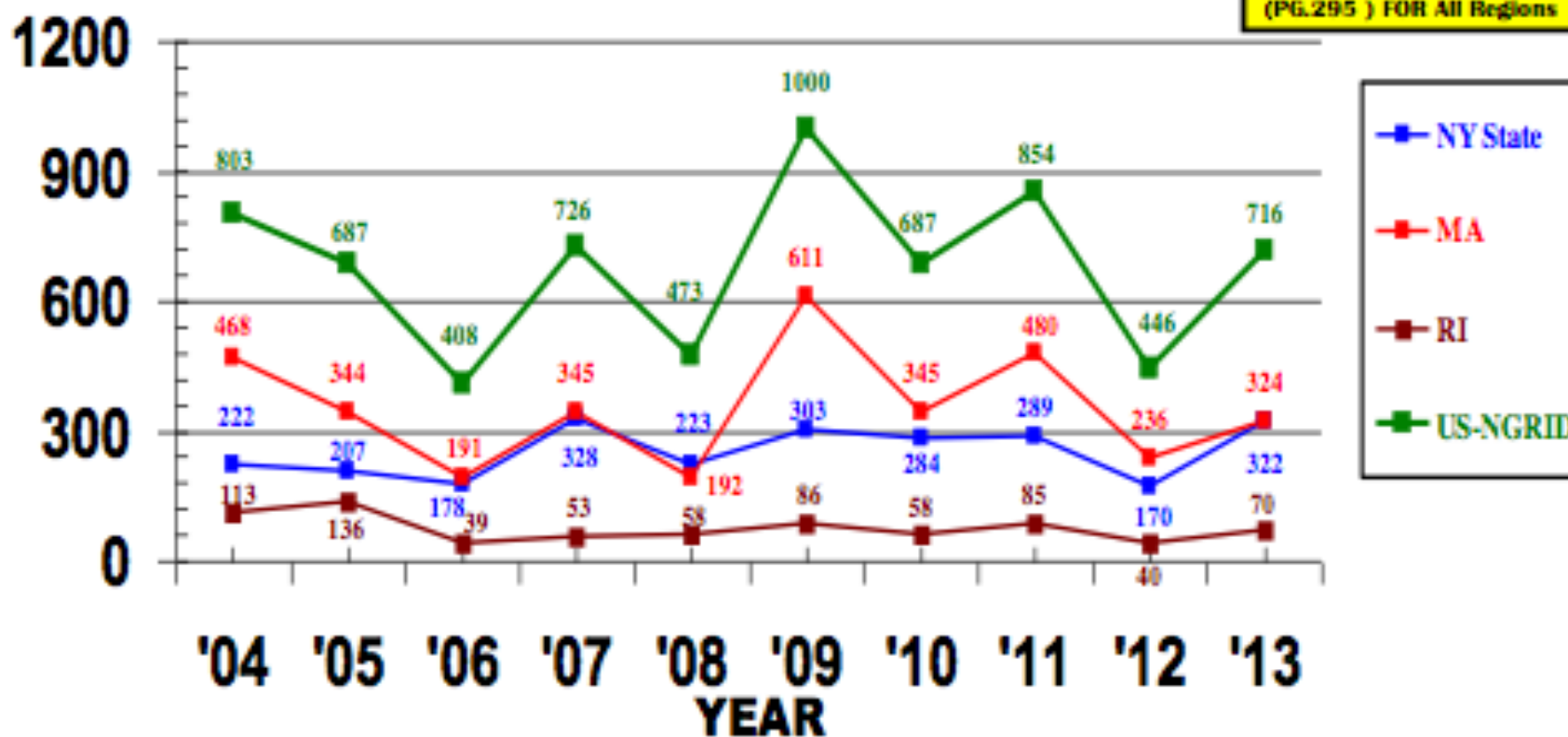


2013 SYSTEM INTEGRITY REPORT

TOTAL CAST IRON MAIN BREAKS

BREAKS

SEE FINDING #8
(PG.295) FOR All Regions



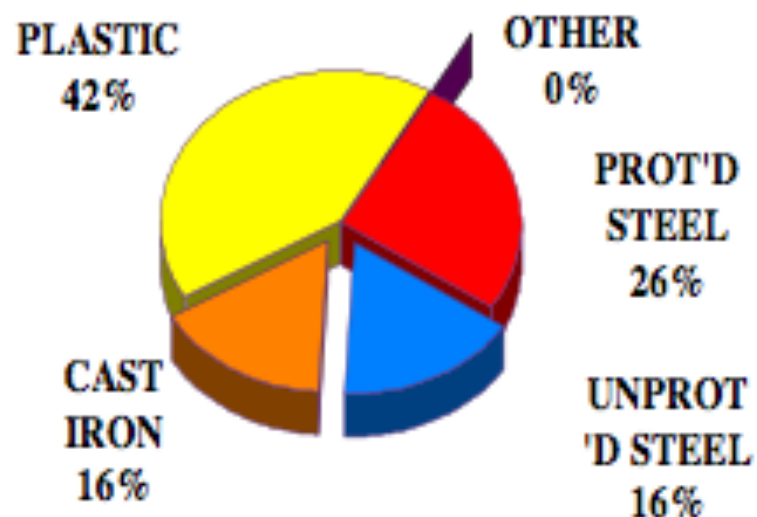
2013 SYSTEM INTEGRITY REPORT

US-NGrid

2013 TOTAL MAIN LEAKS REPAIRS

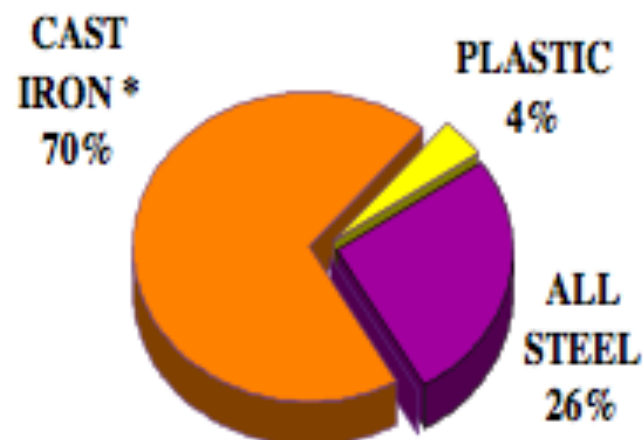
TOTAL MAIN INVENTORY BY MATERIAL

34,821 MILES



TOTAL MAIN LEAK REPAIRS BY MATERIAL

9,266 LEAKS (including damages)



NOTE: (*) CI Leaks include Other material Leaks.
Leak Count Totals Individual Repairs



- 2011: NARUC establishes Pipeline Safety Task Force after San Bruno, CA and Allentown, PA incidents (13 fatalities)
- April 2013: Task Force converted into permanent Subcommittee on Pipeline Safety
- Congress Enacts Pipeline Safety, Regulatory Certainty and Job Creation Act of 2011
- PHMSA issues “Report to America” and NOPRs
- Close coordination between NAPSr and NARUC
- Efforts include education, technology, surveys and close coordination with PHMSA

NARUC Resolution

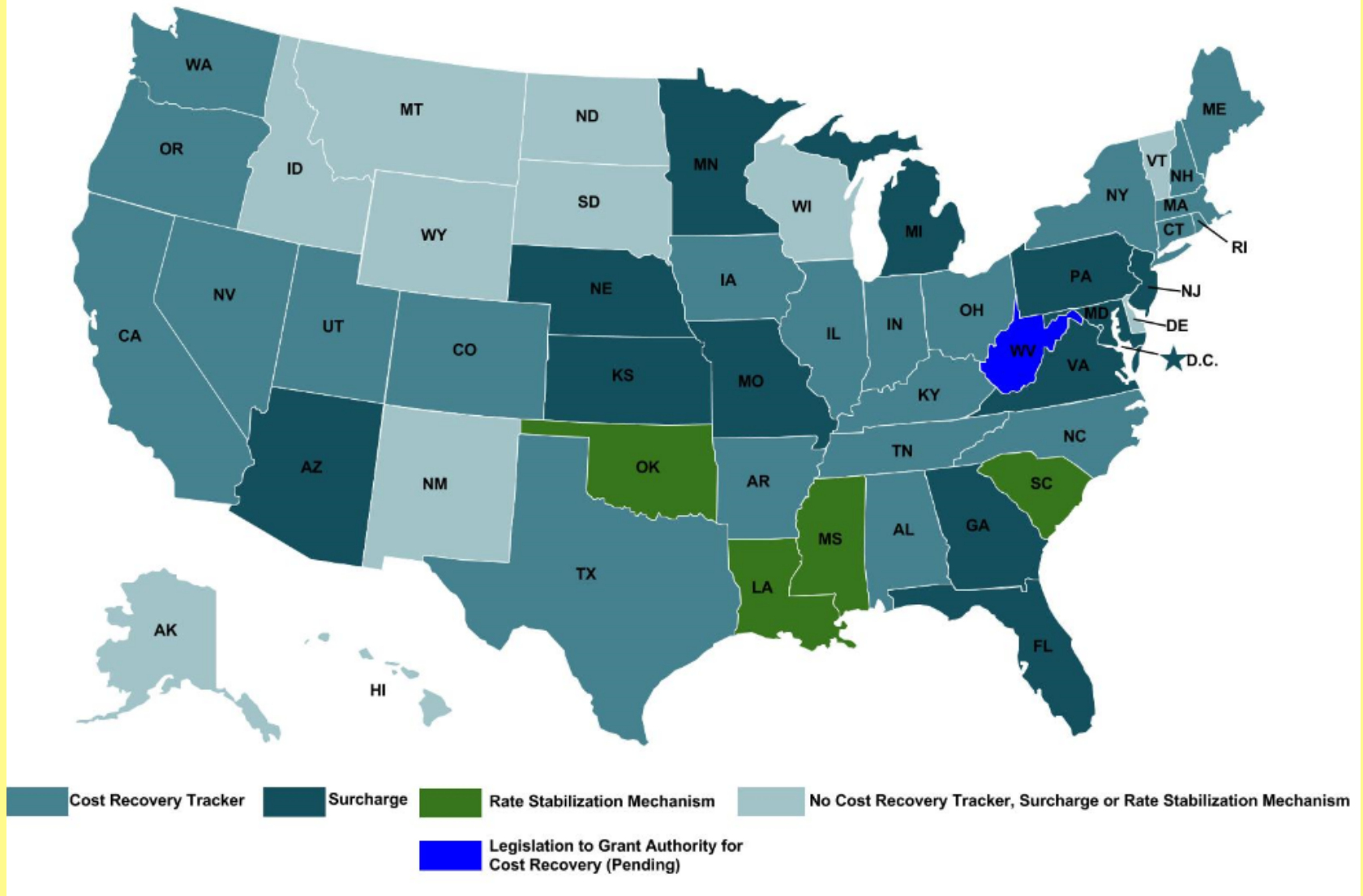


”RESOLVED, That the Board of Directors of the National Association of Regulatory Utility Commissioners... ***encourages regulators and industry to consider sensible programs aimed at replacing the most vulnerable pipelines as quickly as possible along with the adoption of rate recovery mechanisms that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

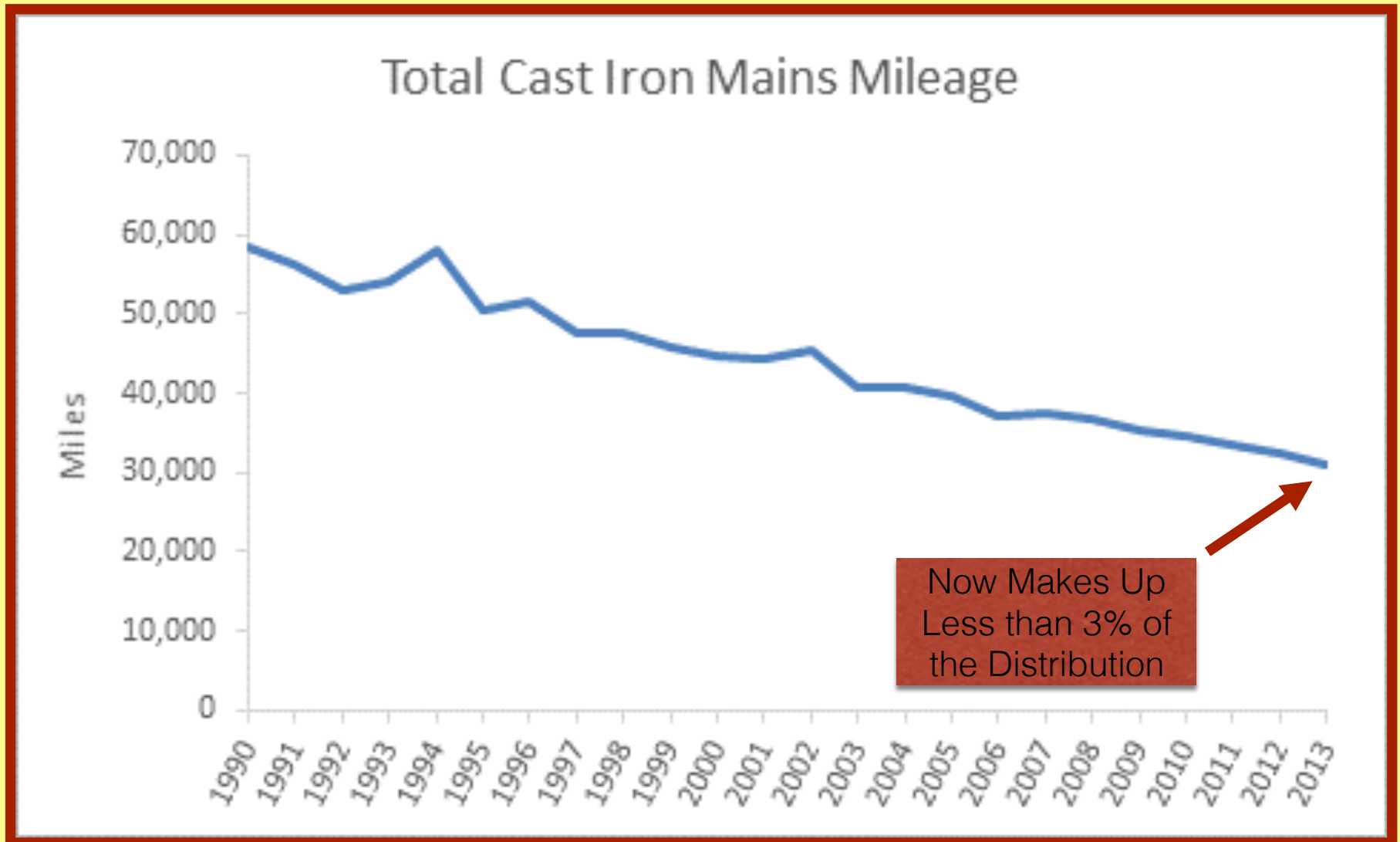
RESOLVED, That State commissions should explore, examine, and ***consider adopting alternative rate recovery mechanisms as necessary to accelerate the modernization, replacement and expansion of the nation’s natural gas pipeline systems.***”

States with Accelerated Infrastructure Replacement Programs

Source: American Gas Association



Cast Iron Pipeline Attrition 1990—2013



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

Preliminary 2014 Gas Distribution Annual Report Mileage for Eastern Region

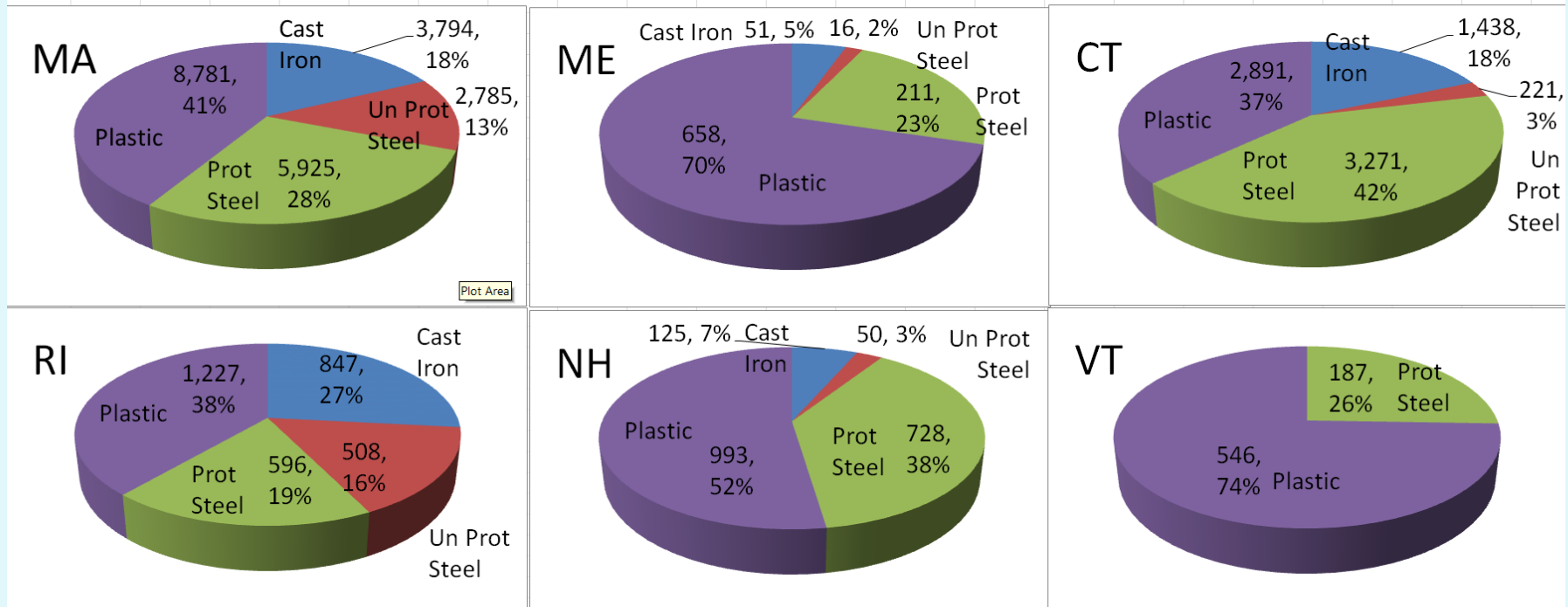
Data as of 03/23/2015

REPORT YEAR 2014	Miles of Main				
	Unprotected Steel	Cast/Wrought Iron	Total Miles leak prone pipe	% leak prone pipe	Total Main Mileage
WASHINGTON DC TOTALS	88	415	503	41.5%	1,212
RHODE ISLAND TOTALS	483	806	1,289	40.4%	3,188
MASSACHUSETTS TOTALS	2,604	3,433	6,037	28.0%	21,526
WEST VIRGINIA TOTALS	2,954	14	2,968	27.7%	10,717
PENNSYLVANIA TOTALS	8,405	3,007	11,412	24.0%	47,536
NEW YORK TOTALS	7,294	4,095	11,389	23.8%	47,782
CONNECTICUT TOTALS	218	1,381	1,599	20.3%	7,889
NEW JERSEY TOTALS	2,134	4,788	6,921	20.1%	34,436
MARYLAND TOTALS	367	1,350	1,717	11.7%	14,703
NEW HAMPSHIRE TOTALS	40	119	159	8.3%	1,904
MAINE TOTALS	15	48	64	5.7%	1,118
VIRGINIA TOTALS	708	293	1,001	4.7%	21,143
DELAWARE TOTALS	35	82	117	3.9%	3,034
VERMONT TOTALS	0	0	0	0.0%	757
EASTERN REGION TOTALS	25,345	19,831	45,176		216,945



New England Pipeline Safety Statistics

Amount of Leak Prone Pipe (Mains) in New England



MA has more than 6,300 miles of leak prone main (30%)

CT has more than 1,600 miles of leak prone main (21%)

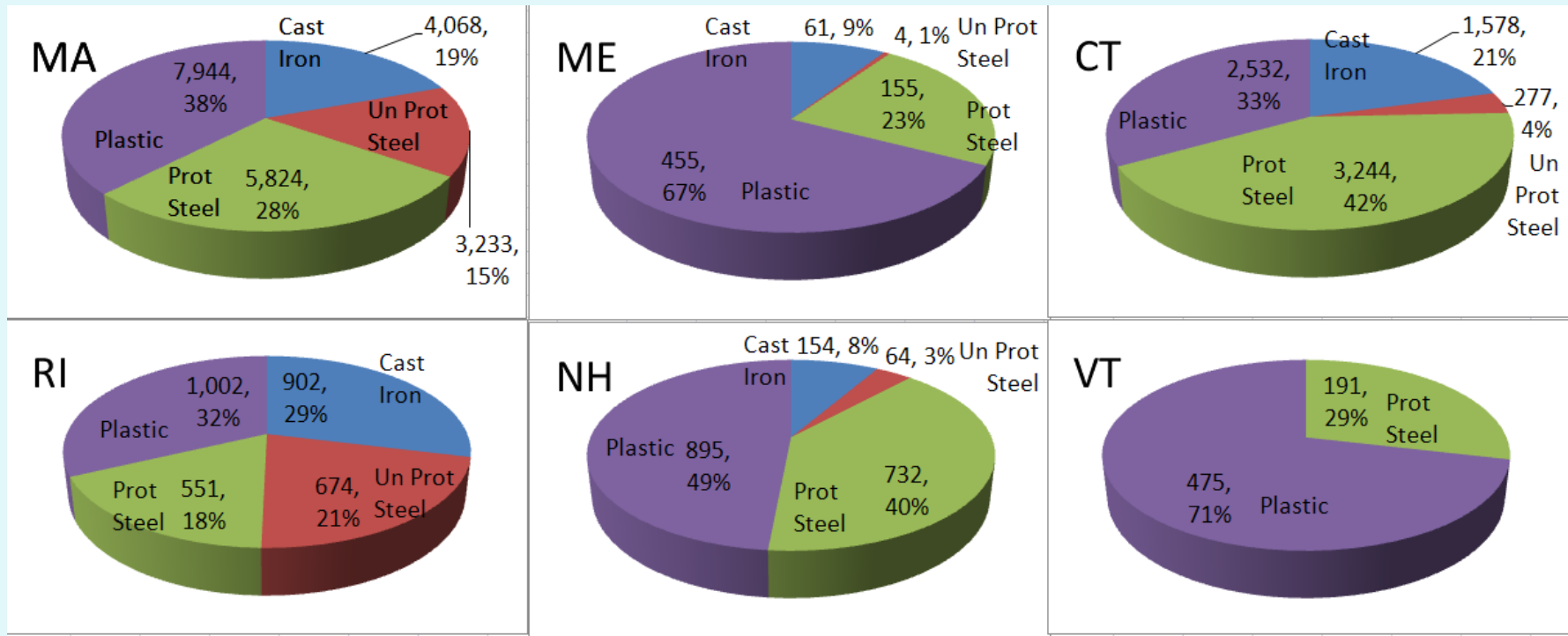
RI has more than 1,300 miles of leak prone main (42%)

NH has more than 170 miles of leak prone main (9%)

ME has more than 60 miles of leak prone main (7%)

**2014
DATA**

Amount of Leak Prone Pipe (Mains) in New England



MA has more than 7,300 miles of leak prone main (34%)

CT has more than 1,750 miles of leak prone main (25%)

RI has more than 1,500 miles of leak prone main (50%)

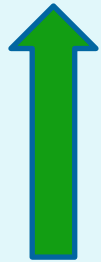
NH has more than 200 miles of leak prone main (11%)

ME has more than 60 miles of leak prone main (10%)

**2009
DATA**

Positive Trends in New England

	2009 (Base)	2012	2013	2012 Increase/ Decrease	2013 Increase/ Decrease
Overall Infrastructure is Increasing					
% Increase in Dist Pipelines New England (Miles)	58,972	60,281	61,514	2.2%	4.3%
% Increase in Gas Mains New England (Miles)	35,015	35,593	35,948	1.6%	2.7%
% Increase in Gas Services New England (Miles)	23,957	24,689	25,565	3.1%	6.7%
Aged Infrastructure is Decreasing					
% Decrease in Cast Iron Gas Mains New England (Miles)	6,763	6,338	6,153	-6.3%	-9.0%
% Decrease in Bare Steel & Unprotected Steel Mains (Miles)	4,252	3,626	3,484	-14.7%	-18.1%
% Decrease in Bare Steel & Unprotected Steel Services (Miles)	5,107	4,516	4,454	-11.6%	-12.8%



4 year period 2009 to 2013

Leak Prone Pipe Statistics in New England – as of Jan 2014

	2009 (Base)	2012	2013	2012 Increase/ Decrease	2013 Increase/ Decrease
Biggest Decreases in Aged Infrastructure Mains					
CT	1,855	1,716	1,659	-7.5%	-10.5%
MA	7,301	6,579	6,381	-9.9%	-12.6%
RI	1,576	1,409	1,355	-10.6%	-14.0%
NH	218	189	174	-13.3%	-20.0%
ME	65	72	67	10.9%	3.7%
VT	0	0	0	0%	0%
Biggest Decreases in Aged Infrastructure Services					
CT	1,008	872	891	-13.5%	-11.7%
MA	3,178	2,865	2,814	-9.8%	-11.5%
RI	808	673	648	-16.7%	-19.8%
NH	125	118	114	-5.9%	-9.0%
ME	9	7	6	-17.8%	-35.6%
VT	0	0	0	0.0%	0.0%

It's Not Just Aging Mains...

- NE Regulators realize Leak Prone Piping Programs must also address the smaller **Service** piping
- **Leak Prone Services** constitute an additional **32%** of Leak Prone Piping in NE
- **Leak Prone Services** are equally important as a result of closer proximity to people and property
- **Leak Prone Services** have thinner walls
- **Leak Prone Services** have less cover and more susceptible to 3rd party excavation Damage

Rhode Island Gas Statistics



- National Grid
- 259,060 Customers
- 192,931 Services
- 3,179 miles of main
- 483 miles of unprotected steel mains
- 806 miles of cast iron mains

Company started in 1847

537

This Bill, if not paid to the Collector on Presentation, must be paid at the Office of the Company within 5 days from January

Robt Knight

To PROVIDENCE GAS COMPANY, Dr.

For Gas consumed from Sept. 21 to Dec. 31 1866.

Index, 1179-1281	112	} at \$3.50 per M., Free of Government Tax,
" 48-63	15	
11700 Cubic Feet,		Rent of Meter 6 mos.


Received Payment for the Company, **4095**

Jan'y 14 1867. *Campbell* \$

Clerk.

Cheer Building.
M. III 6 P. M.

Of Copies of Rules and Terms of Supply furnished at the Office.



2013 SYSTEM INTEGRITY REPORT

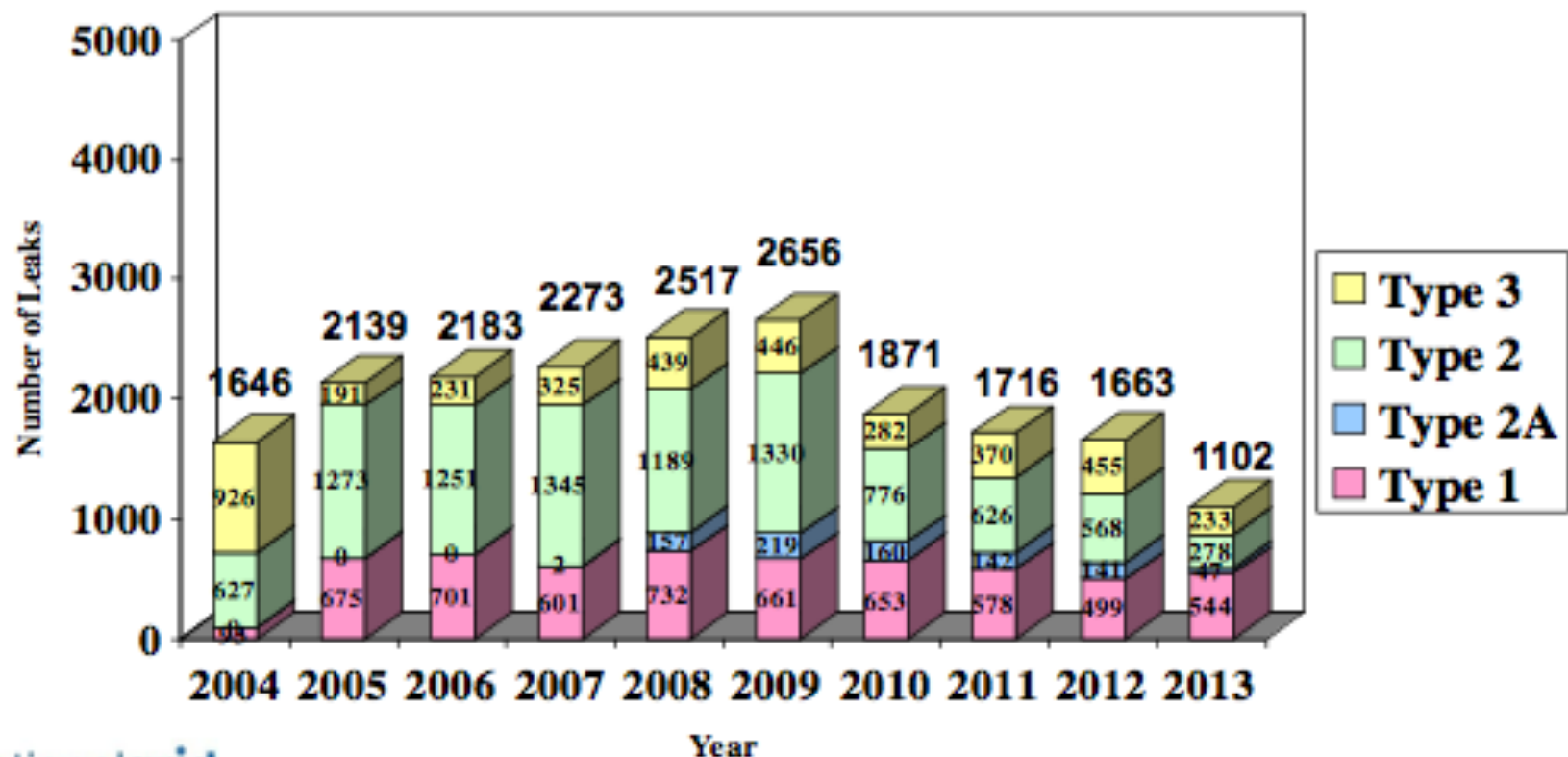
LEAKS REPAIRED

RI

By REPAIRED Type

MAIN

(Including damages)

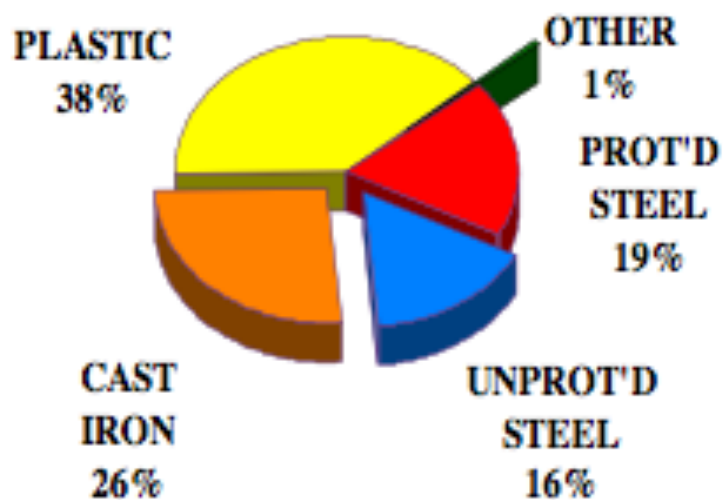


RI

2013 TOTAL MAIN LEAKS REPAIRS

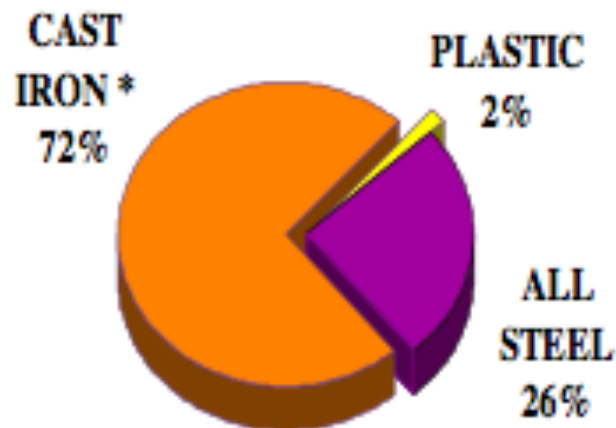
TOTAL MAIN INVENTORY BY MATERIAL

3,179 MILES



TOTAL MAIN LEAK REPAIRS BY MATERIAL

1,102 LEAKS (including damages)



NOTE: (*) CI Leaks include Other material Leaks.
Leak Count Totals Individual Repairs.



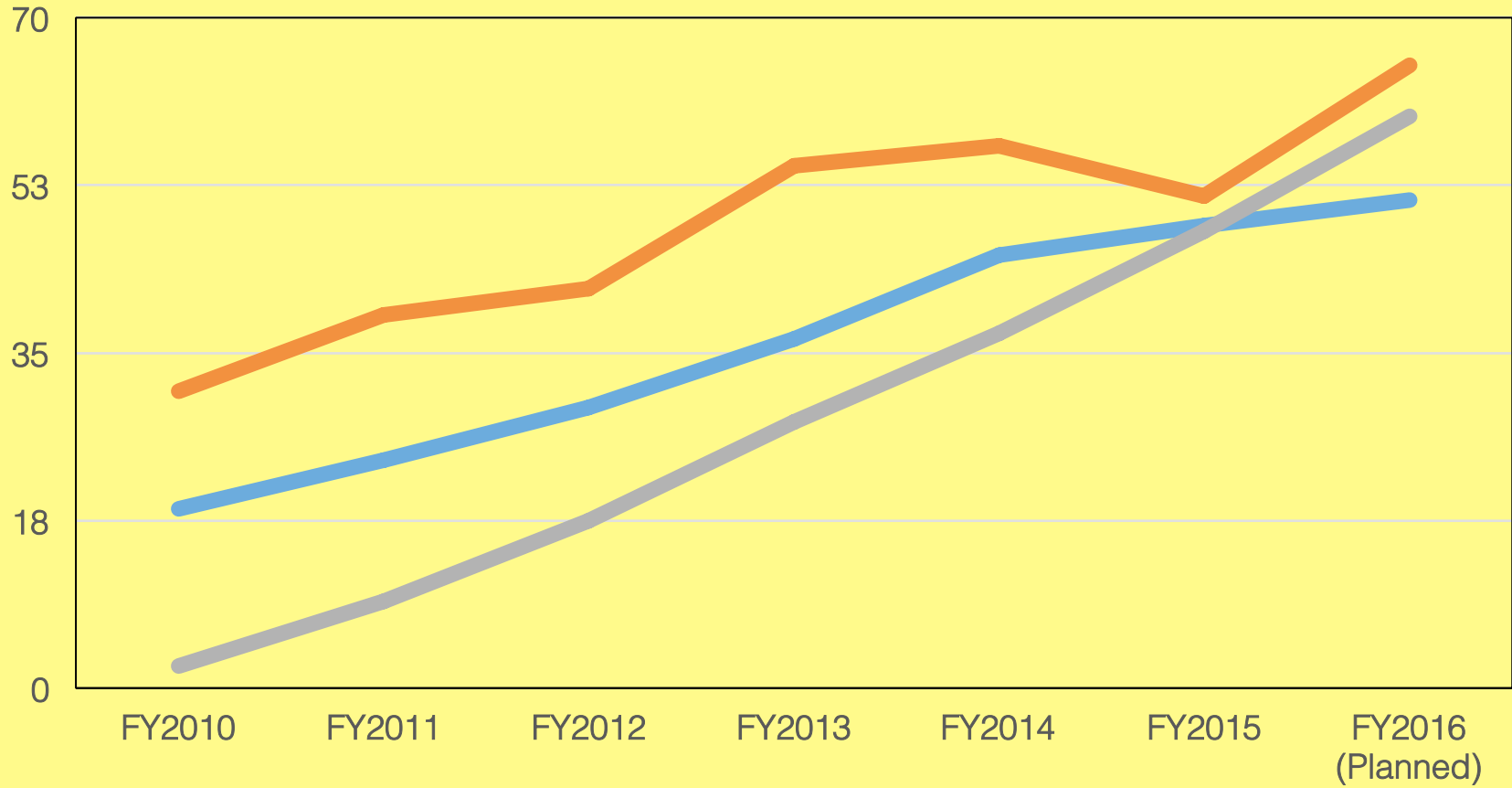
RHODE ISLAND PUBLIC UTILITIES COMMISSION

- **Accelerated Replacement Program (ARP)**
 - ARP began as part of a 2008 Rate Case Settlement over the 2 year period, funded replacement of 70 miles of Leak Prone Pipe and 4,391 Bare Steel, high pressure services.
- **Infrastructure Safety and Reliability Plan (ISR)**
 - Replaced existing ARP and legislatively mandated 5 year strategic plan.
 - The plan funds both replacement of leak prone mains and bare steel, high pressure services. The plan also includes funds for system reliability, mandated programs and special projects
 - The plan is expected to annually fund replacement of approximately 60 miles of Leak Prone Pipe and 2,125 Bare Steel, high-pressure inside services.
 - Implementation of a fully reconciling rate mechanism designed to recover actual and anticipated capital investments as reflected in the approved ISR spending plan.

Rhode Island Leak Prone Pipe Replacement Program

	FY2010	FY2011	FY2012	FY2013	FY2014	FY2015	FY2016 (Planned)	Total
Capital Spend (Millions of US \$)	\$18.7	\$23.8	\$29.3	\$36.5	\$45.2	\$48.3	\$50.9	\$252.7
Miles of Main Installed	31.0	39.0	41.7	54.5	56.6	51.4	65.0	339.2
Annual Impact on Typical Residential Customer (US\$)	\$2.28	\$9.05	\$17.51	\$27.83	\$37.04	\$47.70	\$59.71	
All financial data based on fiscal year (Apr 1 - Mar 31)								

National Grid Rhode Island Leak Prone Pipe Replacement Program

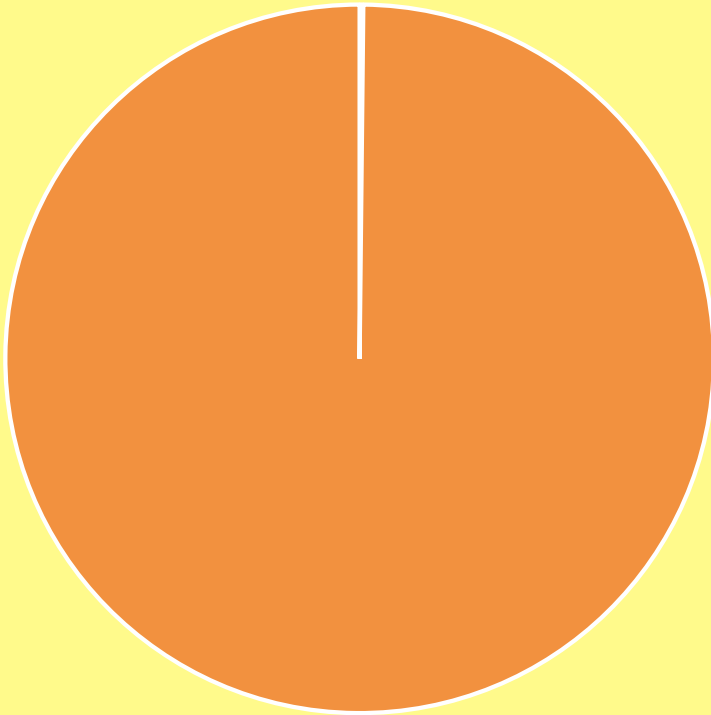


- Capital Spend (Millions of US \$)
- Annual Miles Main Installed
- Impact on Typical Residential Customer (US \$)

Cost of Pipe Replacement as a Percentage of Total Bill for Residential Customers

FY 2010

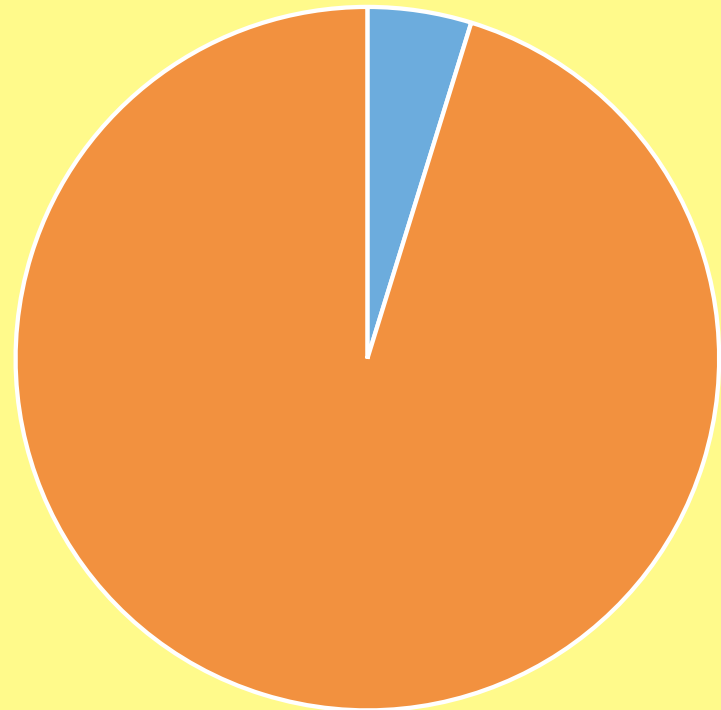
Pipe Replacement
0%



All Other Bill Components
100%

FY 2016

Pipe Replacement
5%

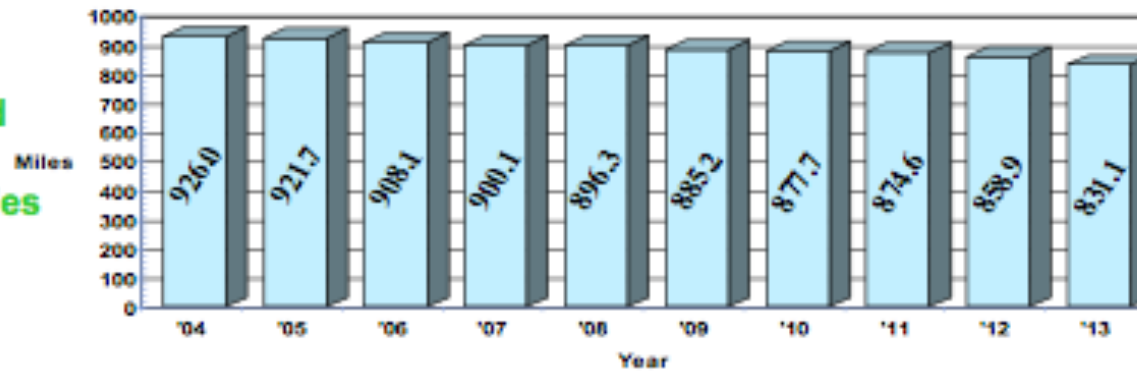


All Other Bill Components
95%

RI

DOT-
Reported
Pipe
Inventories

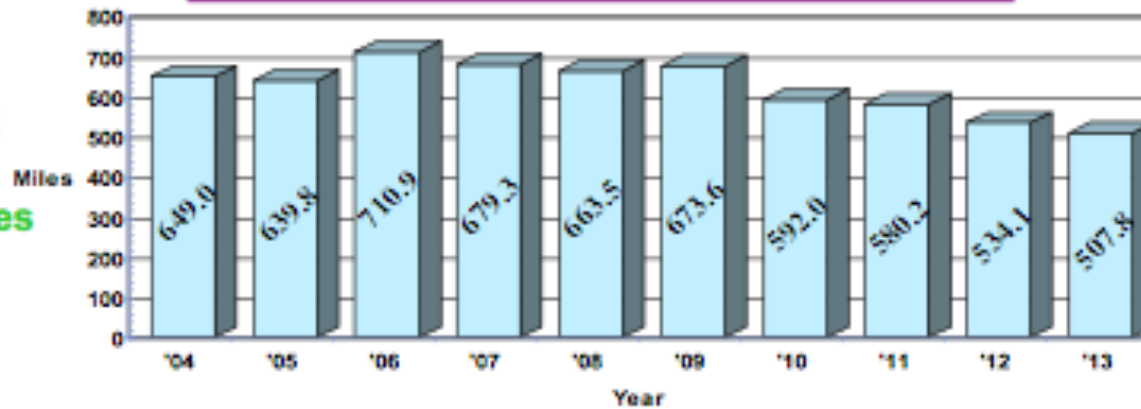
CAST IRON MAIN INVENTORY



RI

DOT-
Reported
Pipe
Inventories

UNPROTECTED STEEL MAIN INVENTORY

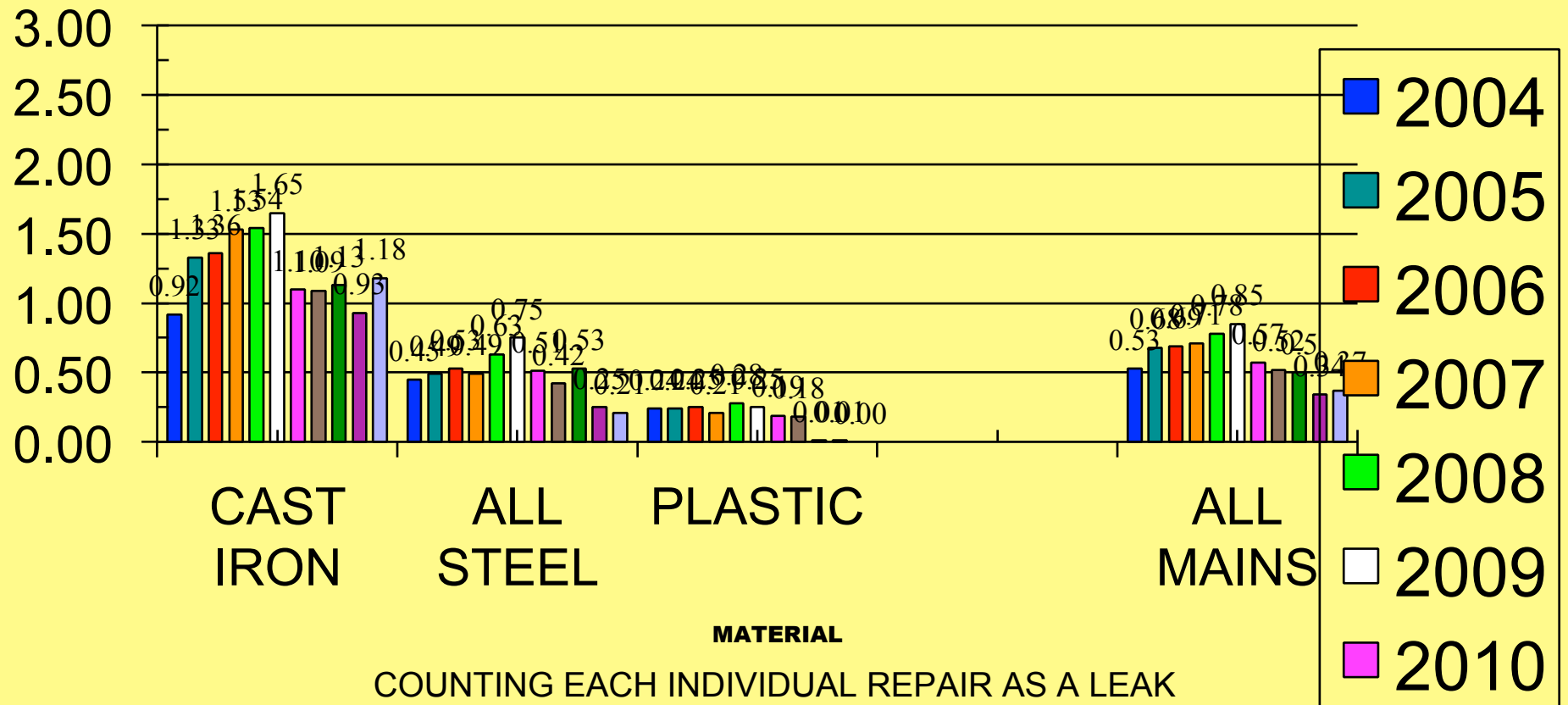


RI

MAIN LEAK "RATES" COMPARISON BY MATERIAL

LEAK REPAIRS
PER MILE OF MAIN

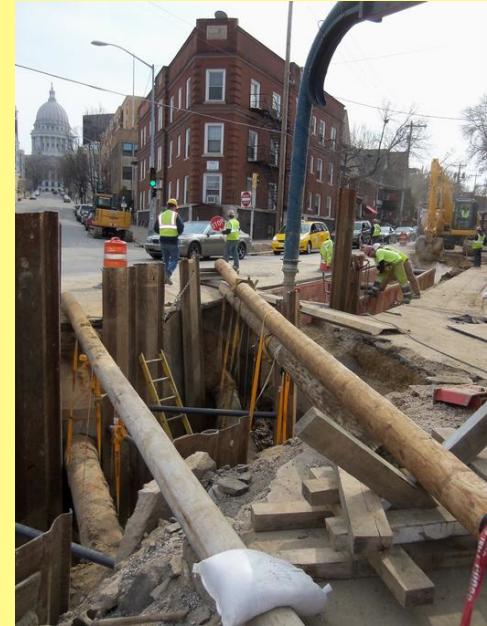
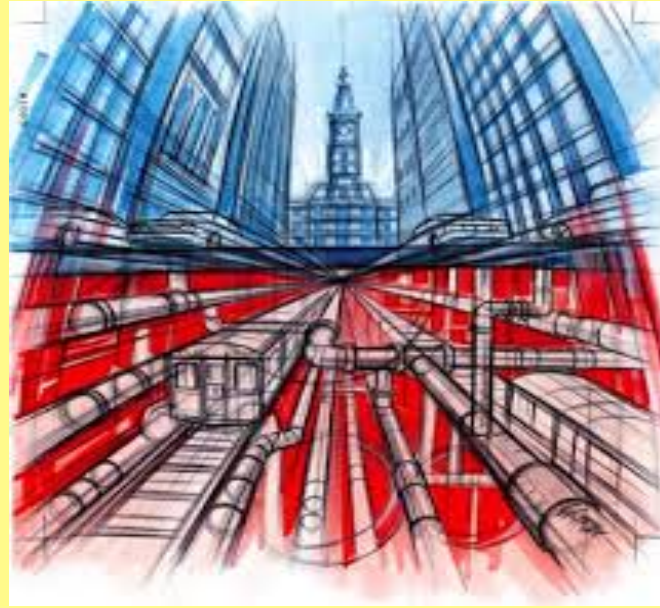
EXCLUDING Damages



**AT CURRENT PACE OF REPLACEMENT, IT WILL TAKE 20+ YEARS TO REMOVE
REMAINING LEAK-PRONE MAINS**



WHAT LIES BENEATH = TIME AND \$\$\$



Quantifying Fugitive Emissions and Economic Value of Lost Gas



Lost and Unaccounted for Gas

FINAL

December 23, 2014

Prepared for
Massachusetts Department of Public Utilities
One South Station
Boston, MA 02110

Prepared by
ICF International
100 Cambridge Park Drive
Suite No. 501
Cambridge, MA 02140

“This research makes apparent that the definitions of LAUF vary widely and that the methods for estimating the magnitude of various LAUF components are not well defined.”

“A review of LAUF reports from 2008 to 2011 indicated large variability and inconsistency in reported values.”

ICF International

Table 1-3: Unaccounted for Gas as Reported to Different Agencies from the Same Company in 2012

Company	MA DPU Annual Return	PHMSA Form 7100	EIA Form 176¹
A	1.54%	1.45%	1.25%
B	2.60%	1.62%	2.2%
C	0.53%	0%	0.1%
D	4.55%	3.52%	-30.9%
E	1.35%	1.30%	9.2%

¹ Percentage calculated by dividing Unaccounted for (Line 20) by Total Supply (Line 7)



Methane Emissions Reductions Strategies Capstone Roundtable July, 29, 2014

Announced the formation of a technical partnership between DOE and NARUC to enable investments in infrastructure modernization and repairs to natural gas distribution networks. Partnership will provide funding for research and technical workshops to bring together PHMSA and other federal agencies to help establish leak measurement protocols, to identify new technologies and cost-effective practices for enhancing pipeline safety, efficiency and deliverability.

USDOE's Quadrennial Energy Review Provides Funding to Support Replacement of Aging Infrastructure



QUADRENNIAL ENERGY REVIEW: ENERGY TRANSMISSION, STORAGE, AND DISTRIBUTION INFRASTRUCTURE

April 2015

- **\$2.5 to 3.5 Billion competitive funding program** to help LDC's achieve the *dual goals of enhanced safety and lower emissions* through pipeline replacement, DI&M and other innovative approaches to improving the performance of natural gas distribution systems.
 - Federal funding would provide rate-relief for low-income households to help leverage broader, accelerated investments in infrastructure modernization.
 - To expedite projects and reduce costs, State governments would be encouraged to coordinate permitting processes between agencies.
 - Goal is to support a "portfolio approach" to investments that are most cost-effective within each individual context. Quantifiable benefits could include a combination of gas conservation, avoided fatalities and injuries and reduced GHG emissions (accounting for Social Cost of Carbon).



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