

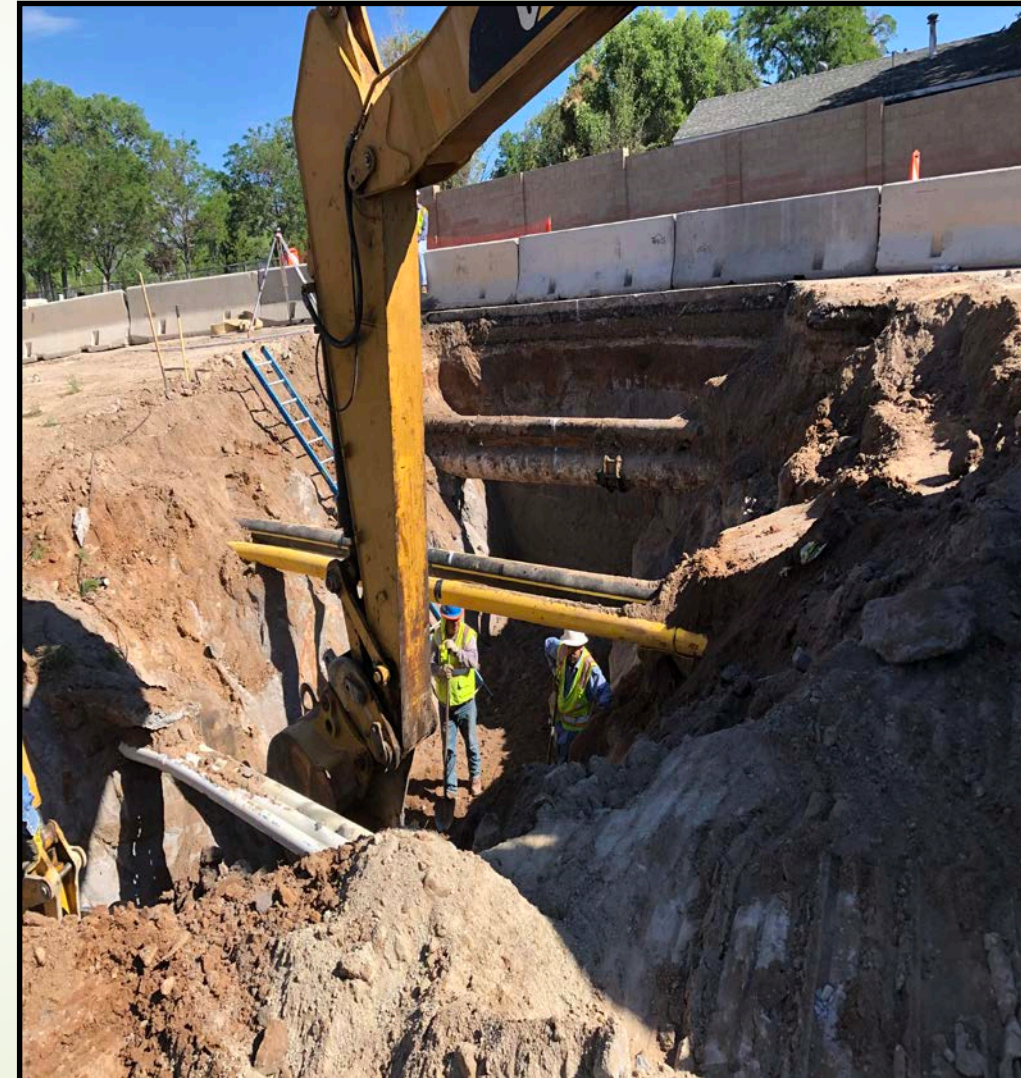
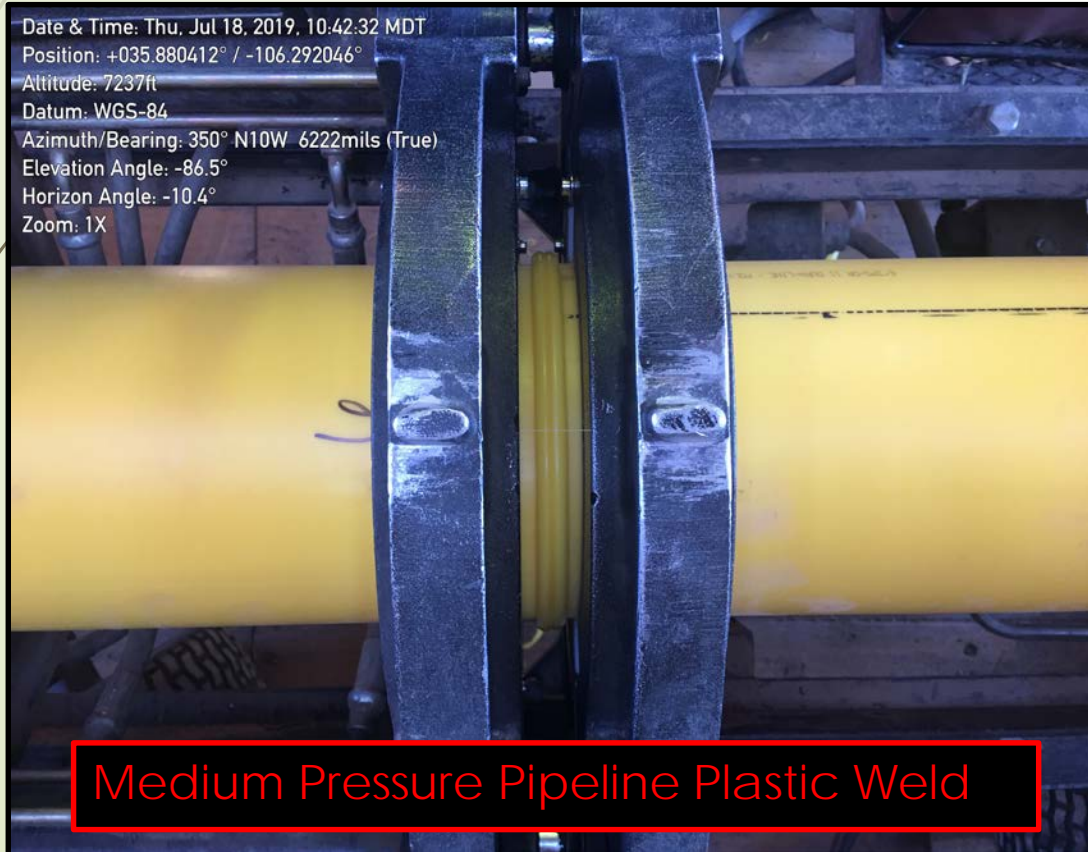
Quarterly Update to BPU Gas Distribution Utility System

By: Jack Richardson, PE

Deputy Utility Manager – Gas, Water, Sewer (GWS)

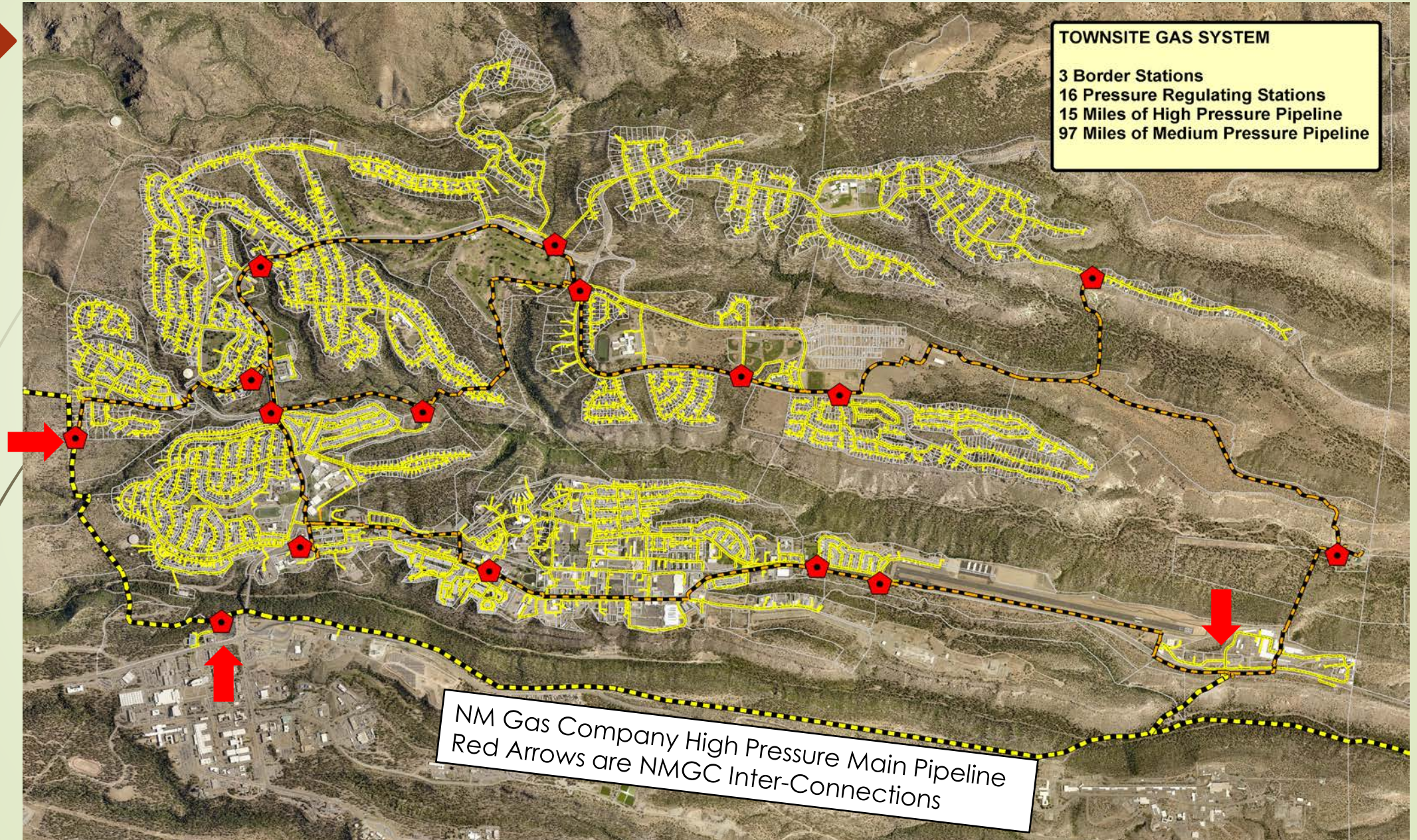
BPU Meeting – 20 November 2019

NM 502 Project
Storm Drain Excavation
Under New Gas Pipelines



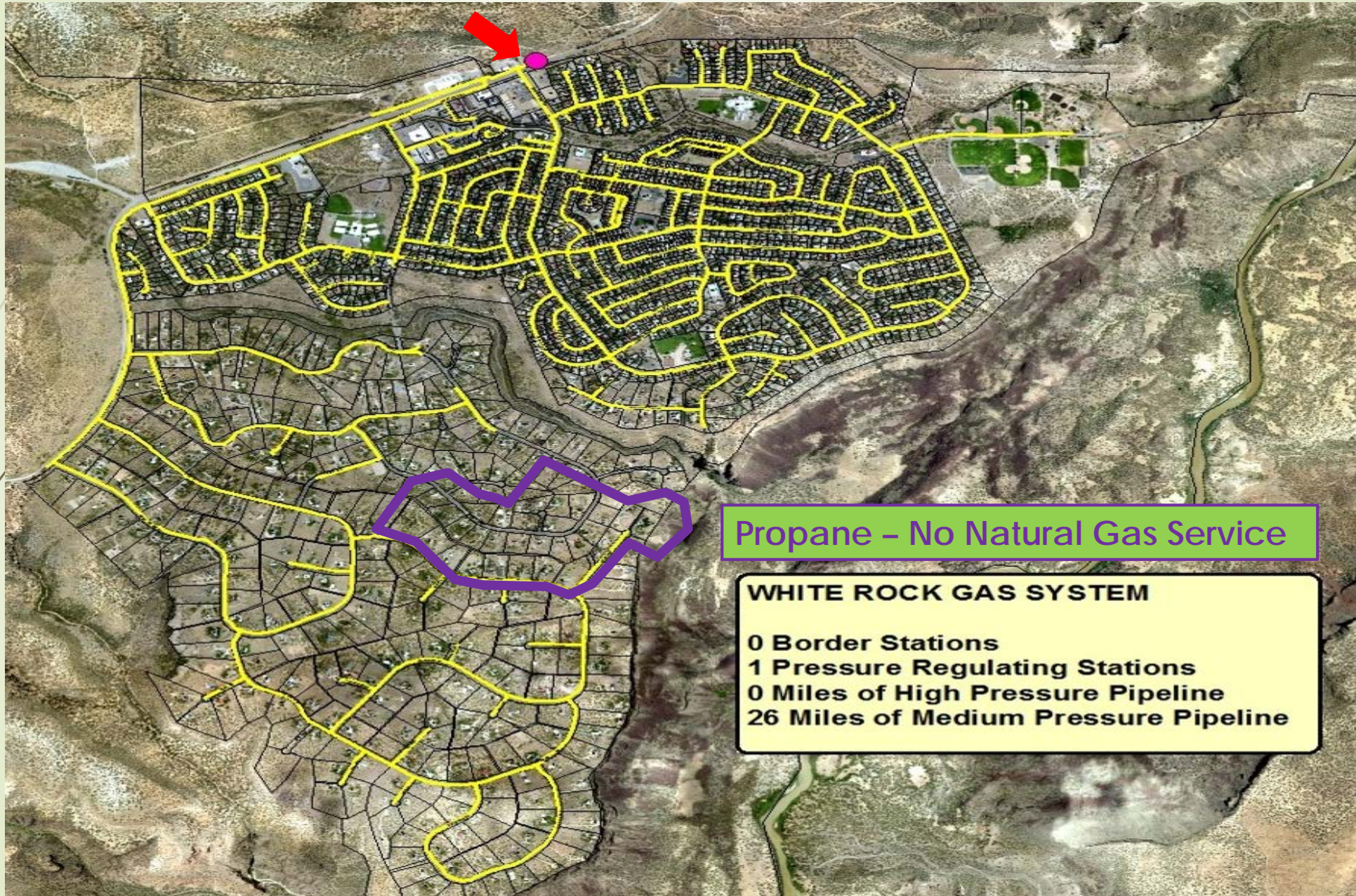
Los Alamos Townsite Gas Distribution System

2



White Rock Gas Distribution System

3



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- ❖ **Federal DOT/Pipeline and Hazardous Material Safety Administration (PHMSA) & New Mexico Public Regulatory Commission (PRC)/Office of Pipeline Safety (OPS) are the Main Regulatory Agencies**
- ❖ **Mandated Audits of Gas System Programs (every 3 to 5 years there is a 1 to 2 week audit on each of these programs)**
 - ▶ Operator Qualifications Program (OQ)
 - ▶ Drug & Alcohol Program (County DPU and Private Contractor Personnel) (D&A)
 - ▶ Operation & Maintenance Program (O&M)
 - ▶ Public Relations Program (PR)
 - ▶ Distribution Integrity Management Plan (DIMP) } **LAST AUDIT FY 2019**
- ❖ **Regulatory Mandated O&M Work (must be done and documented every year)**
 - ▶ Annual Leak Detection Surveys and Class 1, 2 & 3 Repairs; PRV Station Checks and Repairs; Key Valve Exercise, Inspection and Repairs; Cathodic Protection Surveys and Repairs; System Pressure Checks; Excess Flow Valve Checks
- ❖ **Virtually Every Activity Done on or for the Gas System Must be Documented and Available for a State Audit - Examples of Typical Documentation Required**
 - ▶ **Installation of a Pipe Segment**: Date & Mfr of new pipe; Type, Result, Date & Name of pressure test; Date & Name of pressure test equipment calibration; Type, Condition, Date & Name of existing pipe (condition inspection includes Material, Condition, Coating, Internal & External Corrosion); OQ records (Dates) of every Name (County DPU or Private Contractor); D&A records for every Name (County DPU or Private Contractor)
 - ▶ **Leak Survey Patrol**: Date & Type of survey (mobile, walking, combination); Reason for patrol (Annual, Leak Call, Known Damage, etc.); Type & Mfr of leak detection equipment; Date & Name of detection equipment calibration; Discovered Leak Assessment (Grade, Cause, Location); Leak Repair (Grade 1 = Immediate, Grade 2 = Scheduled, Grade 3 = Routine When Ready)(also see "Installation of a Pipe Segment" above); OQ and D&A records (see above)

LAST AUDIT FY 2017

❖ **Required Annual Reports**

▶ Annual O&M Report

- System Composition {Miles of Mains & Services, Pipe Material Type, Pipe Size, Number of Services}
- Number of Leaks {with root cause information}
- Number of Excess Flow Valves

▶ Greenhouse Gas Report

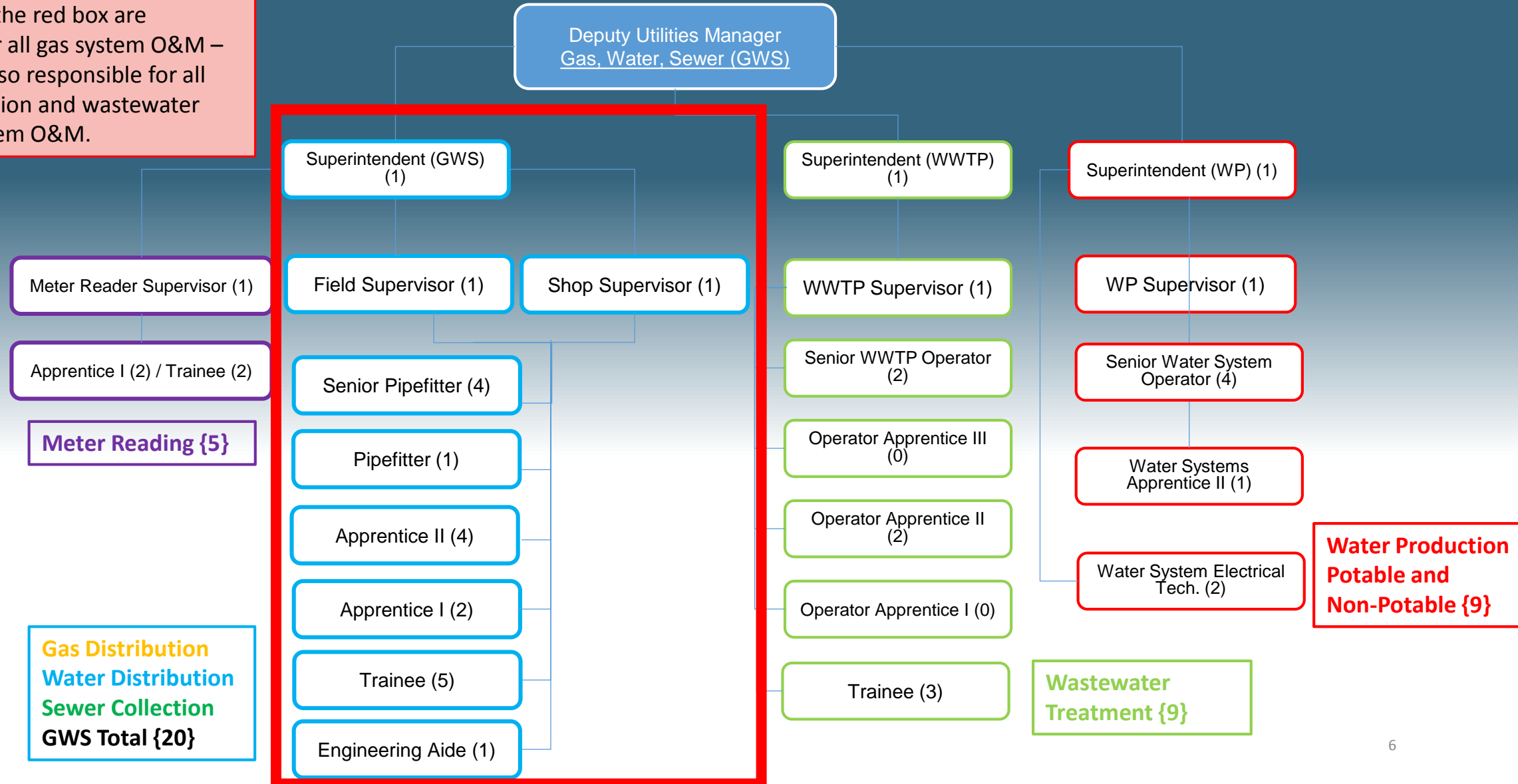
- Amount of Carbon Dioxide (CO₂) released into the atmosphere
- Derived from Unaccounted for Natural Gas Emissions (Losses) (metric tons/year)

❖ **Operator Qualification (OQ) Documentation**

- ### ▶ Typical Activities: Backfill a trench; Leak or Odor complaint investigation; Cathodic Protection inspection and/or maintenance; PRV Station checks and/or maintenance; Meter installation; etc.
- 90 = Number of "covered activities" for which primary personnel must be "OQ'd"
 - 180 = Number of computer based training & field performance evaluations that need to be passed and documented in order to be "OQ'd" on the 90 covered activities
 - Primary personnel, in addition to being "OQ'd", must be a Journeyman Gas Pipefitter licensed through the State of New Mexico
 - Primary personnel must also be certified in Plastic Welding / and for their other duties in water & wastewater must be certified in Cross Connection Control/Back Flow Prevention, Water Level II & Wastewater Level II Operations and have a CDL-A driver's license

GWS ORGANIZATIONAL STRUCTURE

These folks in the red box are responsible for all gas system O&M – but they are also responsible for all water distribution and wastewater collection system O&M.



Typical Gas Distribution Pipeline Inspection Project Photos (NM 502 Project)

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Excavation Damage to Existing High Pressure Pipeline. Did Not Cut Through and Leak.

Date & Time: Thu, Jul 18, 2019, 11:30:41 MDT
Position: +035.881506° / -106.287491°
Altitude: 7240ft
Datum: WGS-84
Azimuth/Bearing: 084° N84E 1493mils (True)
Elevation Angle: -83.4°
Horizon Angle: +81.0°
Zoom: 1X



Temporary Repair Clamp on Damaged HP Pipeline. Ultimate Repair was to Cut Out Damaged Section and Replace with a New Short Pipe Segment.

Date & Time: Thu, Jul 18, 2019, 12:26:17 MDT
Position: +035.881401° / -106.287415°
Altitude: 7238ft
Datum: WGS-84
Azimuth/Bearing: 005° N05E 0089mils (True)
Elevation Angle: -36.6°
Horizon Angle: -05.0°
Zoom: 1X

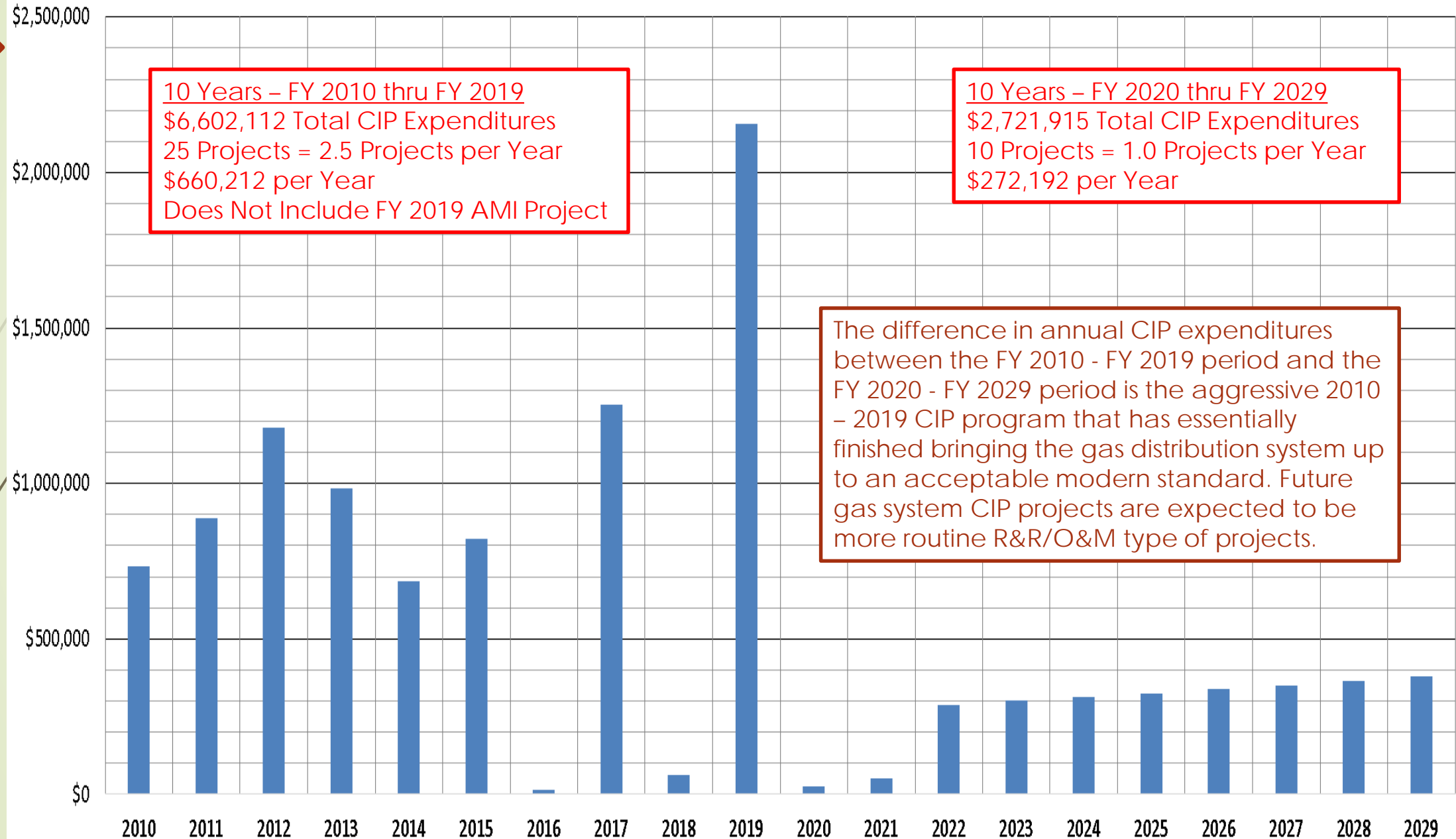


❖ HISTORIC CIP EXPENDITURES

- ▶ Pipe Replacement/Capacity Expansion Combination Projects - \$5,127,669
- ▶ Pipe Replacement Projects – Corroded or Other Deficient Pipe Material Replacement - \$1,574,528
- ▶ System Capacity Expansion Projects – New or Vastly Expanded Pipe Size Installation - \$1,350,505
- ▶ Steel Riser Replacement Project – Regulatory Requirement – 5-Year Phased Project – Apx. 600 Riser's Replaced - \$857,321
- ▶ Other Projects – Service Extensions/Upgrades, PRV Station Upgrades, Routine R&R - \$587,310

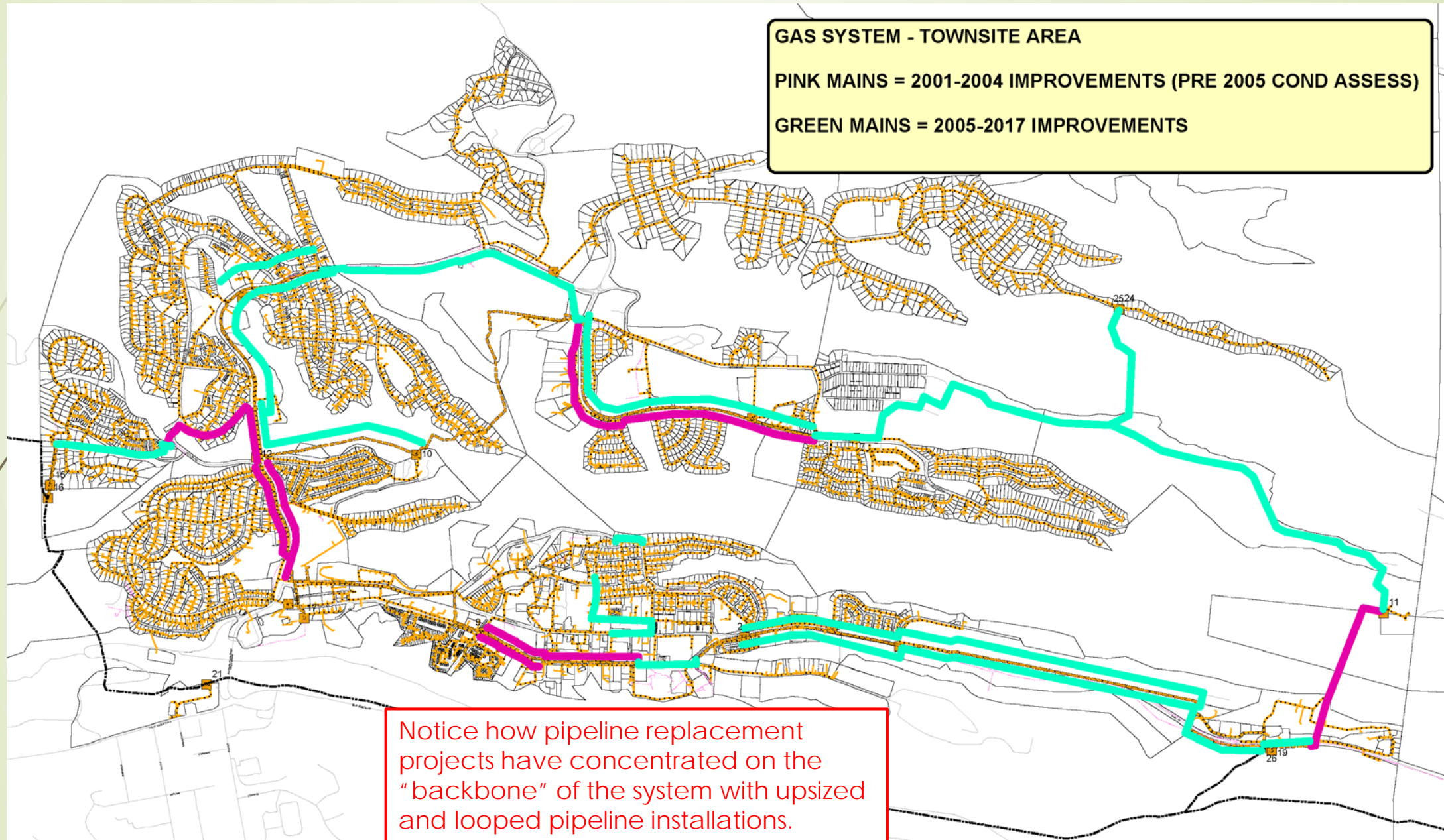
Gas Distribution - CIP Program – FY 2010 Through FY 2029

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Historic CIP Program – Gas Distribution System – Pipeline Replacements

10



Examples of CIP Program Efficiency – Gas Distribution System -1 of 2

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❖ **El Gancho PRV Station Elimination (FY 2016)**

- ▶ Original CIP project was to replace 850 feet of steel pipeline with polyethylene pipe to continue the program of removing steel pipe from the system and to feed the El Gancho PRV Station. After inspection of the steel pipeline condition, the final project was to eliminate the El Gancho PRV station and pipe through straight into the Barranca Mesa gas distribution system “district” without replacing the old steel pipeline. Provide upgraded cathodic protection measures to the steel pipeline.
 - Cost of project was reduced from an estimated \$200,000 to a final cost of \$30,000
 - Allowed for the Barranca Mesa “district” to be combined with the larger golf course area “district”
 - Resulted in an additional feed into the new larger combined “district” from both directions providing for improved reliability for customers of both of the original smaller “districts”

❖ **Quemazon “District” PRV Station Addition (FY 2018)**

- ▶ Original CIP project, recommended in the 2005 Condition Assessment document, was to add a second gas line feed from either the Urban Drive or Sandia Drive area of North Community. DPU Engineering staff submitted a proposal to the AMT suggesting replacing this pipeline project with a new PRV Station installation to feed the Quemazon “district” at a lower cost. To further reduce the cost of this project, the AMT team decided on re-using gas valves and appurtenances still in good condition from recently eliminated PRV Stations across the system. The AMT team approved these suggestions and the project was completed in FY 2018.
 - Cost of project was reduced from an estimated \$250,000 to an estimated final cost of \$75,000
 - Provides the second feed into the Quemazon “district” recommended in the 2005 Condition Assessment document

❖ **SCADA Initiation for the Gas Distribution System – System Pressure and Entry Station Flow Metering (FY 2021 thru FY 2023)**

- ▶ Original CIP project was to add HSQ type SCADA throughout the gas distribution system in order to record NMGC sales volumes into the DPU system and record system pressures, as required by regulation, and to provide immediate auto-alerts when an alarm situation occurs. DPU Engineering staff submitted a proposal to the AMT suggesting a new cell based SCADA system at a lower cost. The AMT team approved this suggestion and the project is scheduled to start in FY 2021.
 - Cost of project was reduced from an estimated \$500,000 to an estimated final cost of \$150,000

Examples of CIP Program Efficiency – Gas Distribution System - 2 of 2

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❖ **Barranca Mesa Steel Pipeline Replacement Program Elimination (FY 2018 – FY 2025)**

- ▶ Original CIP project, as recommended in the 2005 Condition Assessment document, was an 8 phase project to replace all 68,500 feet of steel main & service pipeline in the Barranca Mesa area with polyethylene pipe to continue the historic program of removing steel pipe from the system. DPU Engineering staff submitted a proposal to the AMT suggesting that the actual condition of the steel pipelines (based on up to date inspections) are acceptable provided that a renewed emphasis on the cathodic protection program was implemented. The cathodic protection program has been enhanced and the AMT team approved this suggestion.
 - Cost of project was reduced from an estimated \$5,300,000 CIP to a final cost of an estimated \$30,000 +/- in additional annual O&M expenditures in both the GWS and Engineering divisions
 - Resulted in the continued existing level of service to the Barranca Mesa customers using steel pipelines with a cathodic protection program consistent with national standards

❖ **White Rock Steel Pipeline Replacement Program Elimination (FY 2026 – future FY's)**

- ▶ Original CIP project, as recommended in the 2005 Condition Assessment document, was a multiple year phased project to replace all 169,000 feet of main line and 95,000 feet of service line steel pipeline with polyethylene pipe to continue the historic program of removing steel pipe from the system. The actual condition of the steel pipelines (based on up to date inspections) was found to be acceptable provided that a renewed emphasis on the cathodic protection program was implemented. The cathodic protection program has been enhanced and the AMT team approved this suggestion.
 - Cost of project was reduced from an estimated \$20,000,000 to a final cost of an estimated \$30,000 +/- in additional annual O&M expenditures in both the GWS and Engineering divisions
 - Resulted in the continued existing level of service to the White Rock area customers using steel pipelines with a cathodic protection program consistent with national standards

❖ **Installation of Replacement Natural Gas Engine for Pajarito Well # 4 (FY 2019 – FY 2020)**

- ▶ Not a GA CIP Project (but a WP CIP Project) however significant to the gas system due to re-start of PW4 using natural gas engine as the driver for water supply pumping. This is a significant natural gas using piece of equipment to boost gas sales in future years that was missed during the past two years.

❖ PROPOSED FUTURE CIP EXPENDITURES

- ▶ SCADA Initiation for Pressure and Point of Entry Pressure Regulation & Flow Metering – Original Budget = 3-Year Phased Project - \$50,000 per Year (FY 2021 – FY 2023) / **Proposed FY 2021 Budget = 1-Year Non-Phased \$150,000**
 - ▶ New regulations related to extreme cold weather gas curtailment means DPU needs to better monitor and control gas volume sales from NMGC. Plus this DPU gas metering will provide backup monitoring of NMGC meter sales ensuring accuracy in NMGC feed sales volumes.
 - ▶ Existing regulations related to gas pressure safety means DPU would be better protected with the addition of pressure regulating valves at NMGC feed connections controlled by DPU.
 - ▶ SCADA addition for monitoring both high pressure feed and medium pressure system pressures would significantly increase the level of protection for the DPU system and DPU customers.
- ▶ PRV Station Enclosure Upgrades – Regulatory Requirement for Protection from Damage – 3-Year Phased Project - \$150,000 per Year (FY 2022 – FY 2024)
- ▶ White Rock Sectionalizing/Key Valve Installation – O&M Efficiency Improvement/Regulatory Requirement Combination - Multi-Year Phased Project - \$50,000 per Year
- ▶ Future Typical Routine Repair & Replacement (R&R) Projects - \$250,000 +/- per Year (FY 2019 dollars)

Typical Gas Distribution Pipeline Inspection Project Photos (NM 502 Project)

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Tap Required for Pressure Testing
New Medium Pressure Pipeline
Segment. Tap Pipeline to be
Abandoned in Place.



Temporary Pressure Testing Pipeline Run to Pressure
Testing Equipment.



❖ CURTAILMENT PLAN MODIFICATIONS

- ▶ Continuous improvement process to review and modify, as necessary, major gas system policies and procedures as new regulations are promulgated.
- ▶ New gas curtailment regulations require better control and monitoring of gas usage during extreme cold weather periods in Northern New Mexico. Penalties for use of "too much gas" during designated gas curtailment periods are now in place.
- ▶ Modifications included: clearly defined members of gas curtailment committee; better defined roles & responsibilities for each committee member; pre-defined public notifications for CCC, emergency management, code red, etc.

❖ INTEGRITY MANAGEMENT PROGRAM AUDIT

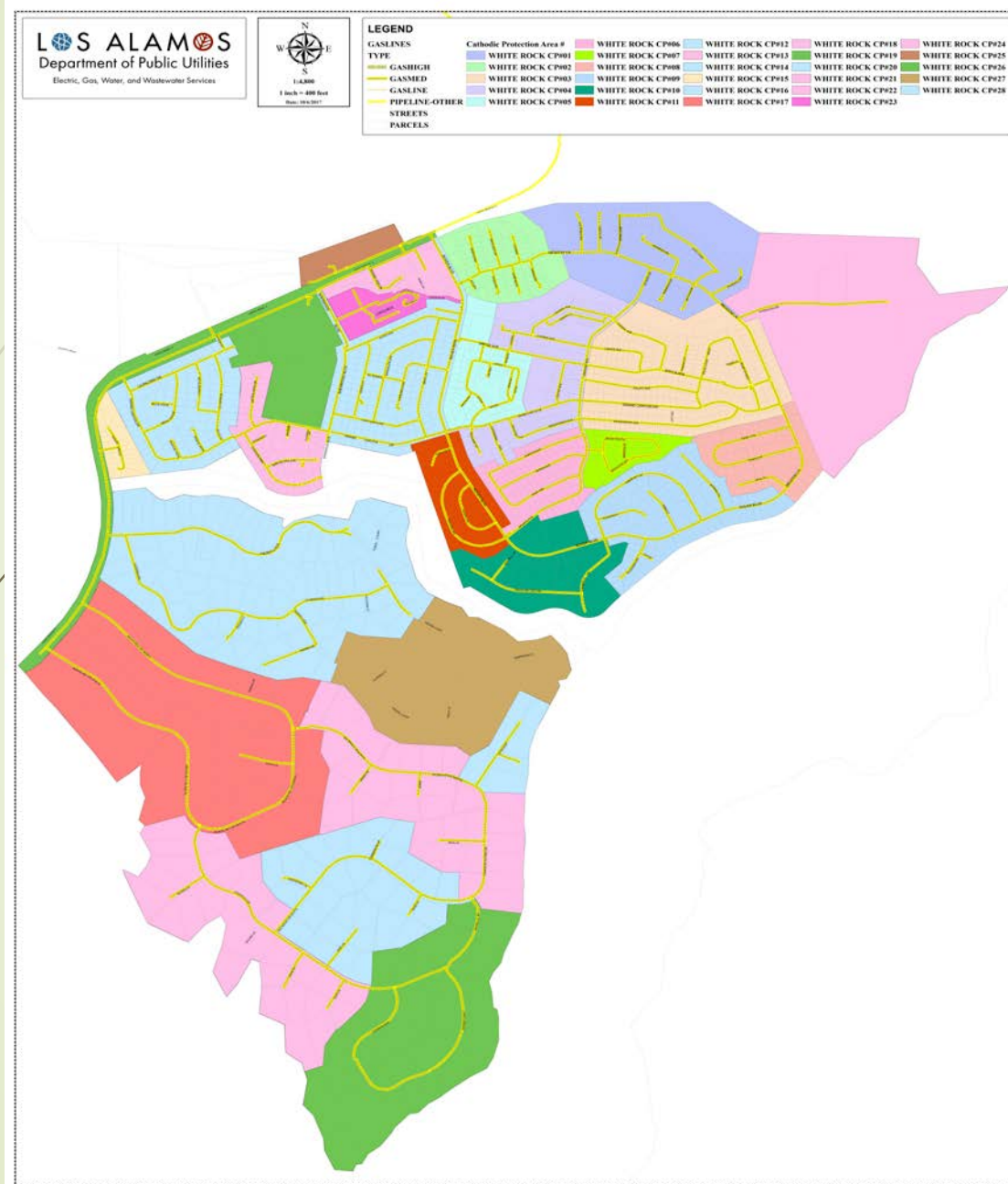
- ▶ Completed in 2 days instead of the scheduled full week projected by NMPRC auditors.

❖ FY 2019 LEAK SURVEY

- ▶ No underground leaks.
- ▶ Some minor non-reportable leaks at meter fittings and regulators.

❖ WHITE ROCK CATHODIC PROTECTION R&R PROJECT

- ▶ 5 of 11 non-compliant sections brought back into compliance.
- ▶ Loss of momentum last summer due to loss of Primary staff. Project to pick up again Spring 2020.



Both White Rock and LA Townsite are broken out into separate sections. White Rock has 28 sections. LA Townsite has 18 – all in the Barranca Mesa area.

Each section has its own Cathodic Protection (CP) Section Data Field Form.

CP Section Data Field Forms must be completed every year per federal regulation. Any out-of-spec Pipe-to-Soil Potential reading during the field inspection must be remediated.

Auditable documentation on all readings, and any necessary remediation activity, must be kept in preparation for the O&M Program Audit by the State of New Mexico.

❖ NM 502 PROJECT 80% COMPLETE

- ▶ Arroyo Lane PRV Station eliminated.
- ▶ Last segment of old & corroded (and often leaking) high carbon steel high pressure backbone Townsite main feeder pipeline removed from service and replaced with new HDPE pipeline.
- ▶ Elimination of double parallel medium pressure pipelines both sides of NM 502. Replaced with new single larger diameter pipeline.

❖ FY19 PRV STATION ANNUAL INSPECTION

- ▶ Older Quemazon PRV Station had one set of pressure regulating valves replaced with new standard valves.
- ▶ Systematic R&R of oldest PRV Station valves ongoing.

❖ LARGE METER INSPECTION AND R&R PROGRAM

- ▶ High School complex received a new high pressure service line to go along with a new higher pressure meter to provide adequate service volumes and to more accurately measure gas volume sales into the upgraded higher gas use school complex. All recently renovated school facilities have received this same R&R.
- ▶ Scattered large volume multi-family complex meter R&R with new pressure regulators and meters as multi-family complexes upgrade internal gas using appliances.
- ▶ Implemented new GIS standards for meter bank installations. White Rock gas meters are now 100% GPS located.

❖ CONSTRUCTION STANDARDS REVISIONS

- ▶ Completed for gas system standard details and specifications (as well as other utilities).

❖ PRIMARY KEY ORGANIZATIONAL PERFORMANCE MEASURES (all)

- ▶ O&M Expenditures per 100 Miles of Main Pipeline (excluding the cost of gas and profit transfer) (\$/100 miles)
- ▶ PHMSA Reportable Main Pipeline Leaks per 100 Miles of Pipeline (#/100 miles)
- ▶ Therms per Capita per Heating Degree Day (therms/capita/hdd)
- ▶ Therms Delivered (related to heating degree days) (therms)

❖ SECONDARY KEY ORGANIZATIONAL PERFORMANCE MEASURES (all)

- ▶ Number of Gas Meter Change Outs per Year (#/year) and Average Gas Meter Age (years)
- ▶ Unaccounted for Gas Loss (metered gas purchased/metered gas delivered) (%)
- ▶ PHMSA Reportable Service Pipeline Leaks per 1,000 Service Connections (#/1,000 serv. conn.)
- ▶ Total Revenue per Account (also compared to O&M-COG-PT) expenditures) (\$/account)
- ▶ Planned Maintenance as a Percent of Total Maintenance (planned maint. hours/planned + corrective maint. hours) (%)
- ▶ System Renewal and Replacement (CIP Expenditures for R&R/Total Present Worth of Gas System) (%)

❖ PERFORMANCE MEASURES WITH TARGETS OR BENCHMARKS

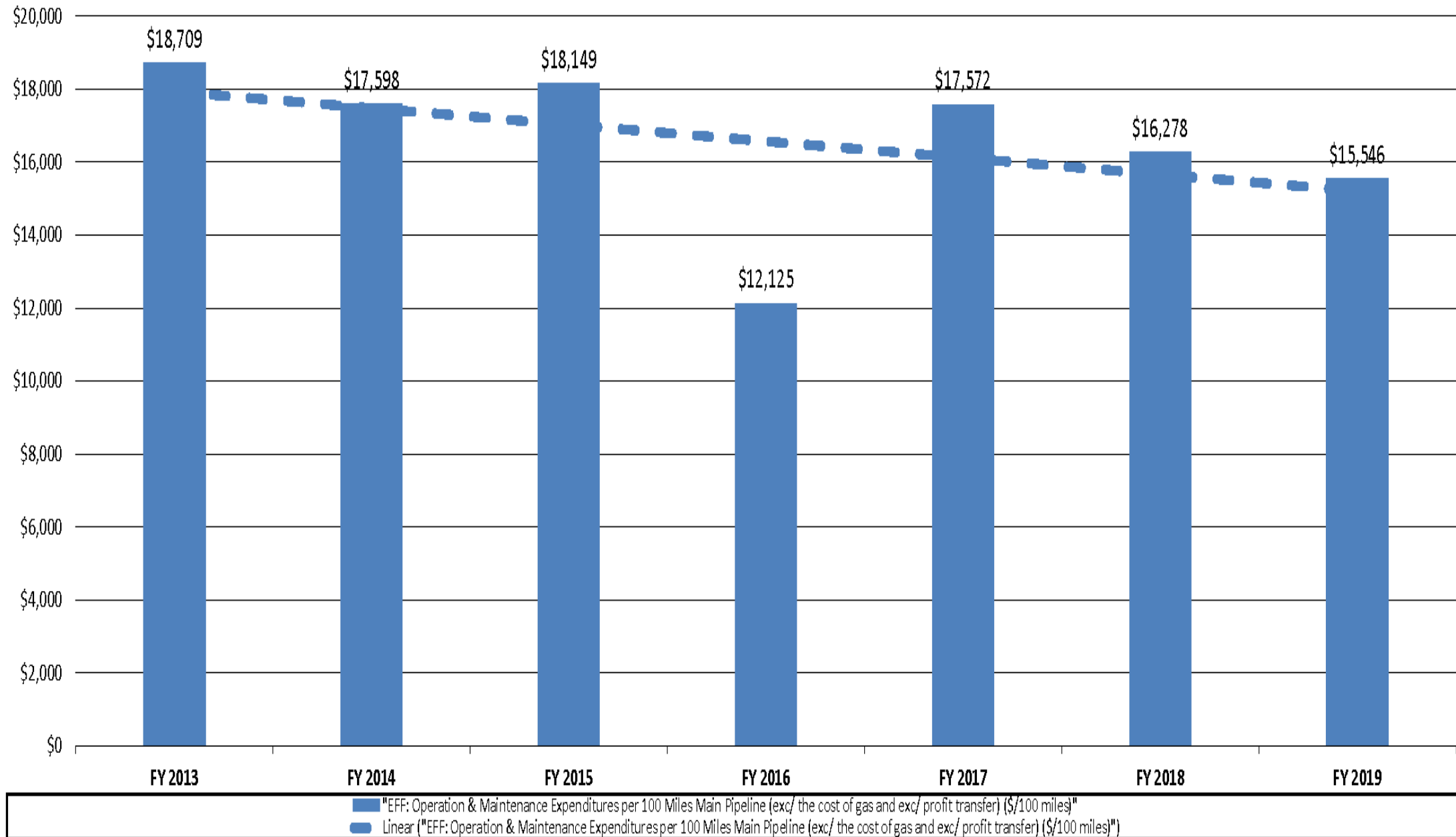
- ▶ Performance Measures with known national standards for system comparison are in GREEN (Typically APGA standards)
- ▶ Performance Measures with a DPU Strategic Plan or Conservation Plan Goal are in Magenta
- ▶ Measures are collected and reviewed monthly. Annual FY performance measures data is transferred from the annual data sets to a multi-year data set for year over year / multi-year comparison.

➤ Abbreviated summary of dashboard data for Gas Distribution.

- **GA-1: \$O&M/100 Miles** - Excellent 7-year trend downward. No national standard for comparison. Reaching the goal of being an acceptable modern standard system has helped result in this positive trend.
- **GA-2: PHMSA Leaks/100 Miles** - Excellent 7-year trend downward. Excellent comparison to national standard. Reaching the goal of being an acceptable modern standard system has helped result in this positive trend.
- **GA-3: Therms /Capita/HDD** - 7-year trend is flat. Good comparison to DPU Conservation Goal. Difficult to assess for a single year due to the very small annual incremental change in this value's goal. Difficult to find consistent heating degree day data – which has a major affect on this value's calculation.
- **GA-4: Therms Delivered (with HDD)** – 7-year trend is downward toward less gas sold each year – even though FY19 was a very high gas sales year. Obvious relation between gas sales and HDD. Need to continue to monitor this trend over an extended period before modifying gas rates or considering transfer of cash balance funds.

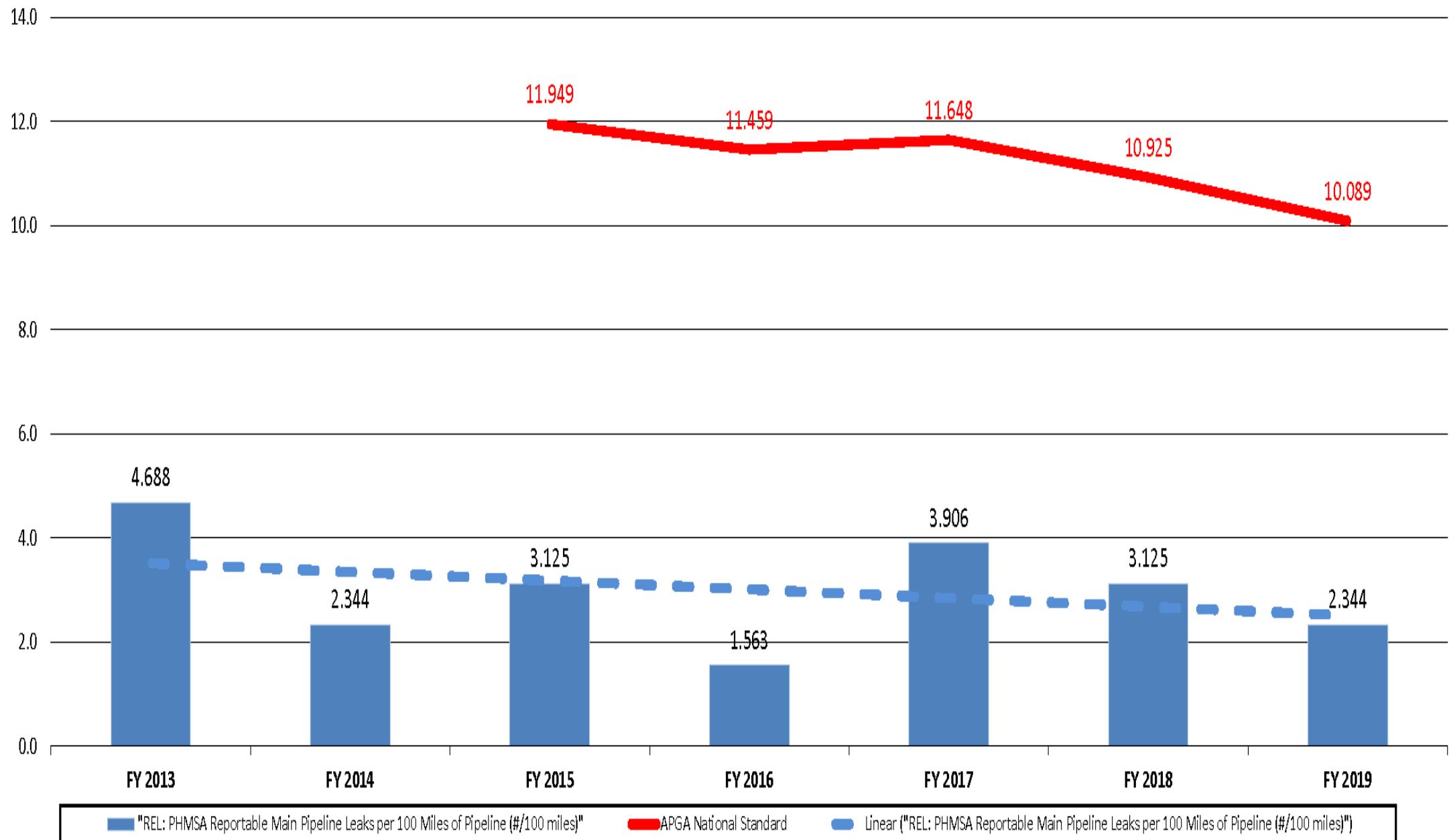
Gas Distribution – Primary KOPM – GA-1 / O&M Expenditures per 100 Miles Main Pipeline

20



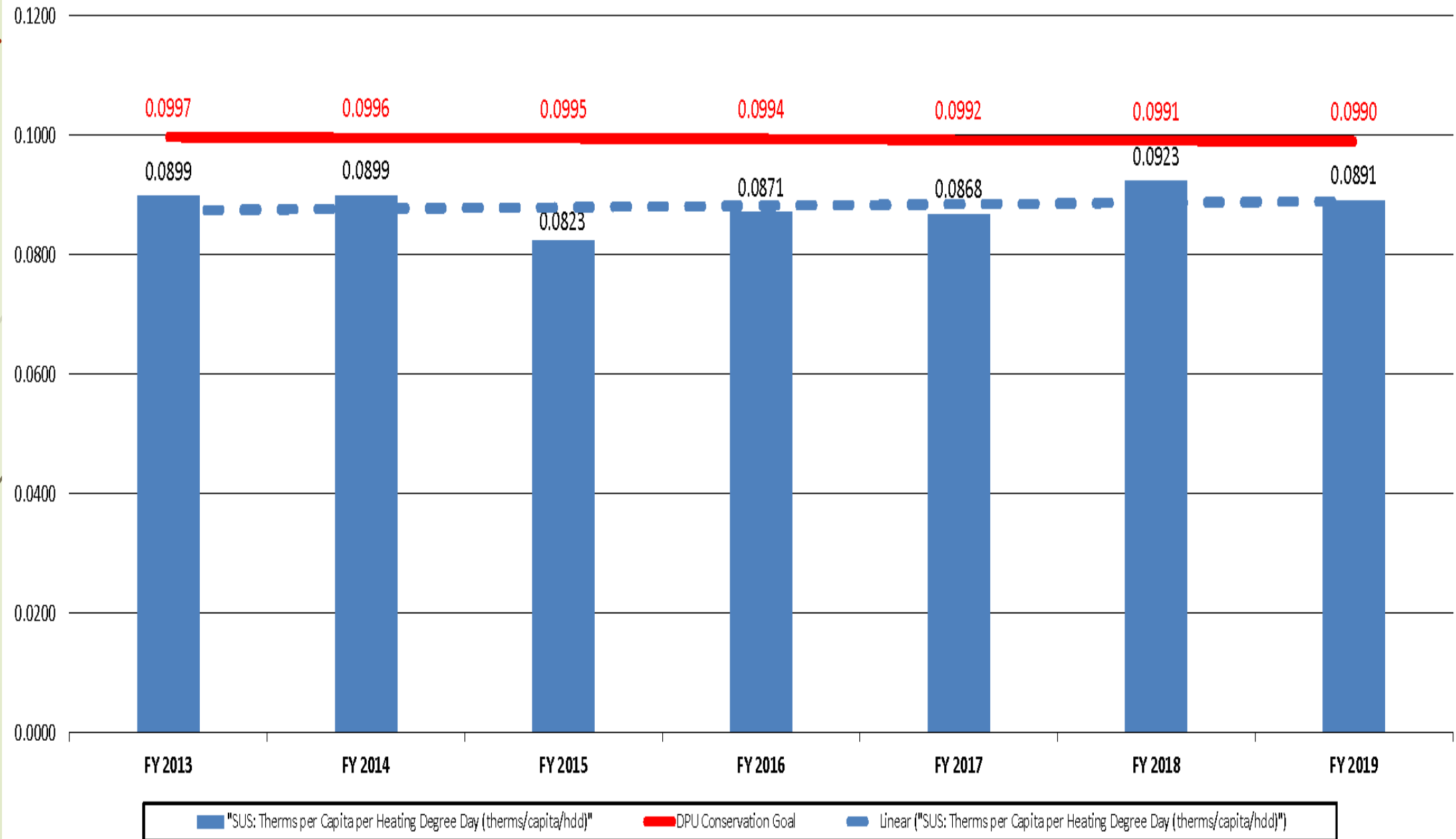
Gas Distribution – Primary KOPM – GA-2 / PHMSA Leaks per 100 Miles Main Pipeline

21



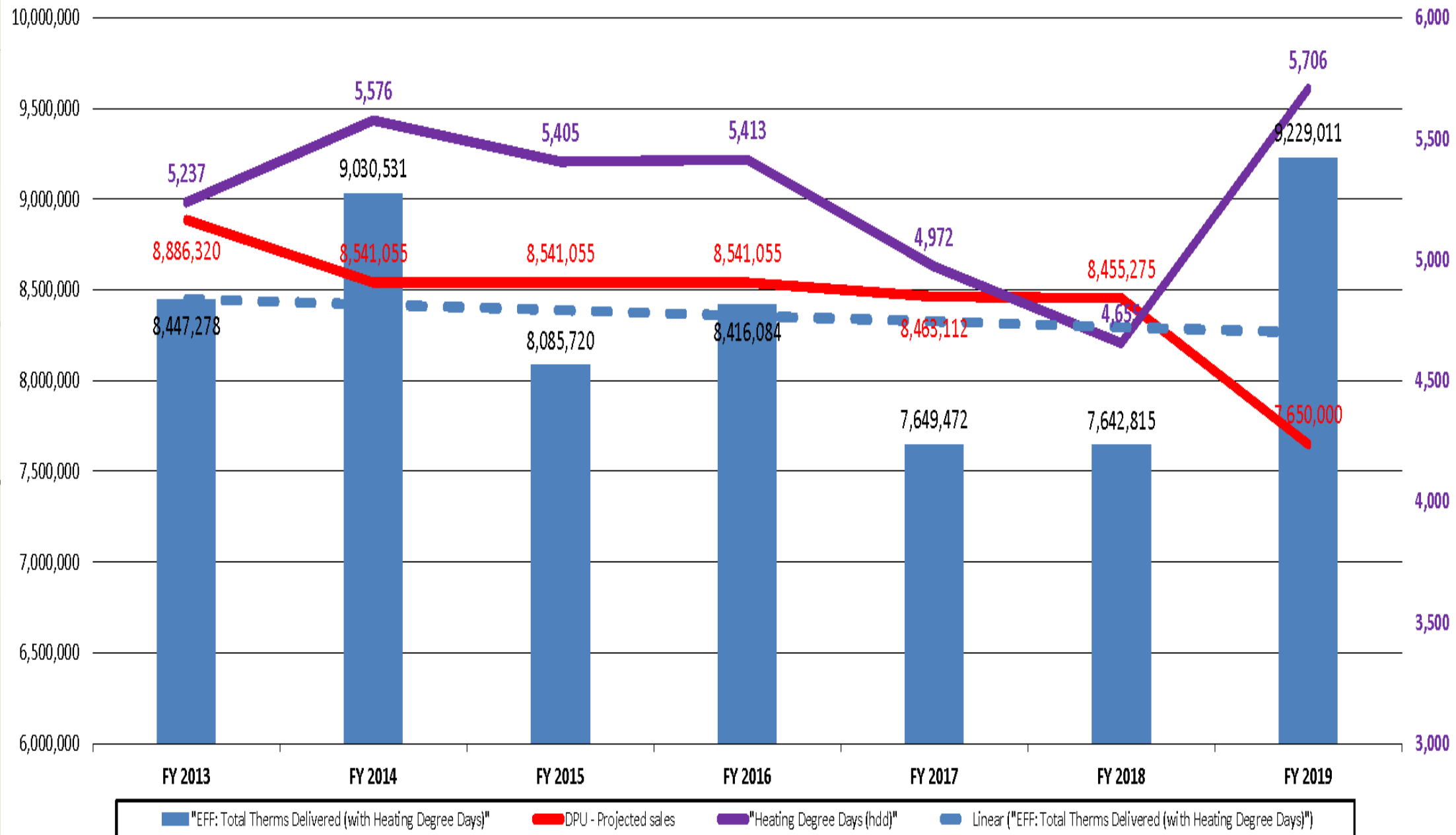
Gas Distribution – Primary KOPM – GA-3 / Therms per Capita per Heating Degree Day

22



Gas Distribution – Primary KOPM – GA-4 / Therms Delivered with Heating Degree Days

23

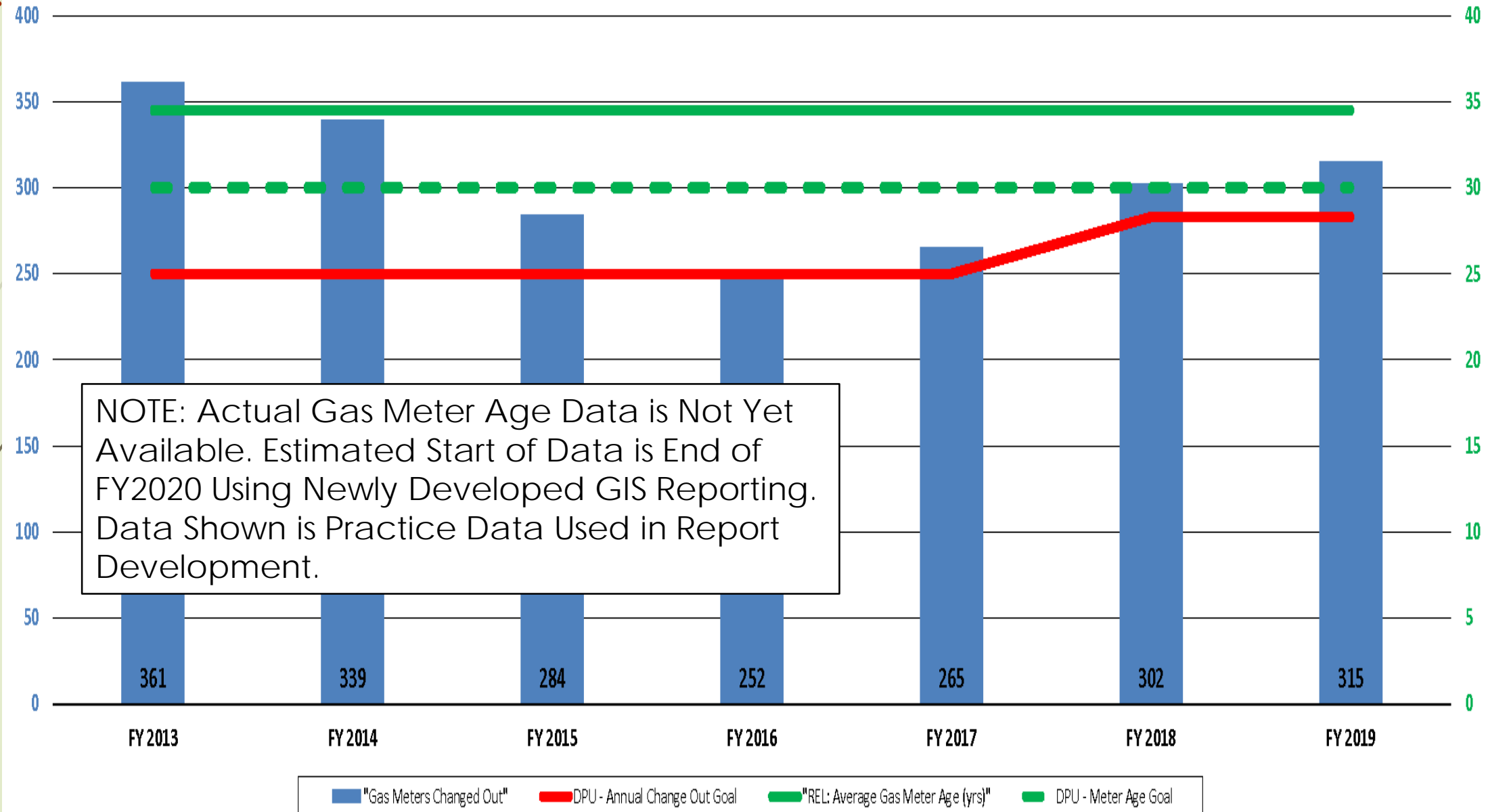


- Abbreviated summary of dashboard data for Gas Distribution.

- **GA-5: Gas Meter Age & Change Outs** – Meter Age not available until GIS reporting development is complete the end of FY20. Meter age data is not real but included to enable report development. Meter change outs have consistently met or surpassed DPU goal. Change out goal set to ensure meter age does not exceed 30 years.
- **GA-6: Unaccounted for Gas Loss** - Good 7-year trend downward. Not yet a good comparison to national standard. FY21-FY23 CIP project to add calibrated metering at NM Gas Company connections is anticipated to help verify these numbers. FY17 value is an anomaly that should not occur after AMI is functioning.
- **GA-7: Service Breaks/1,000 Service Connections** - Excellent 7-year trend. Excellent comparison to national standard.
- **GA-8: Revenue/Account** – DPU revenue per account consistently lower than national standard. Difficult to compare individual years due to seasonal variations across the country. Good long term comparison however.

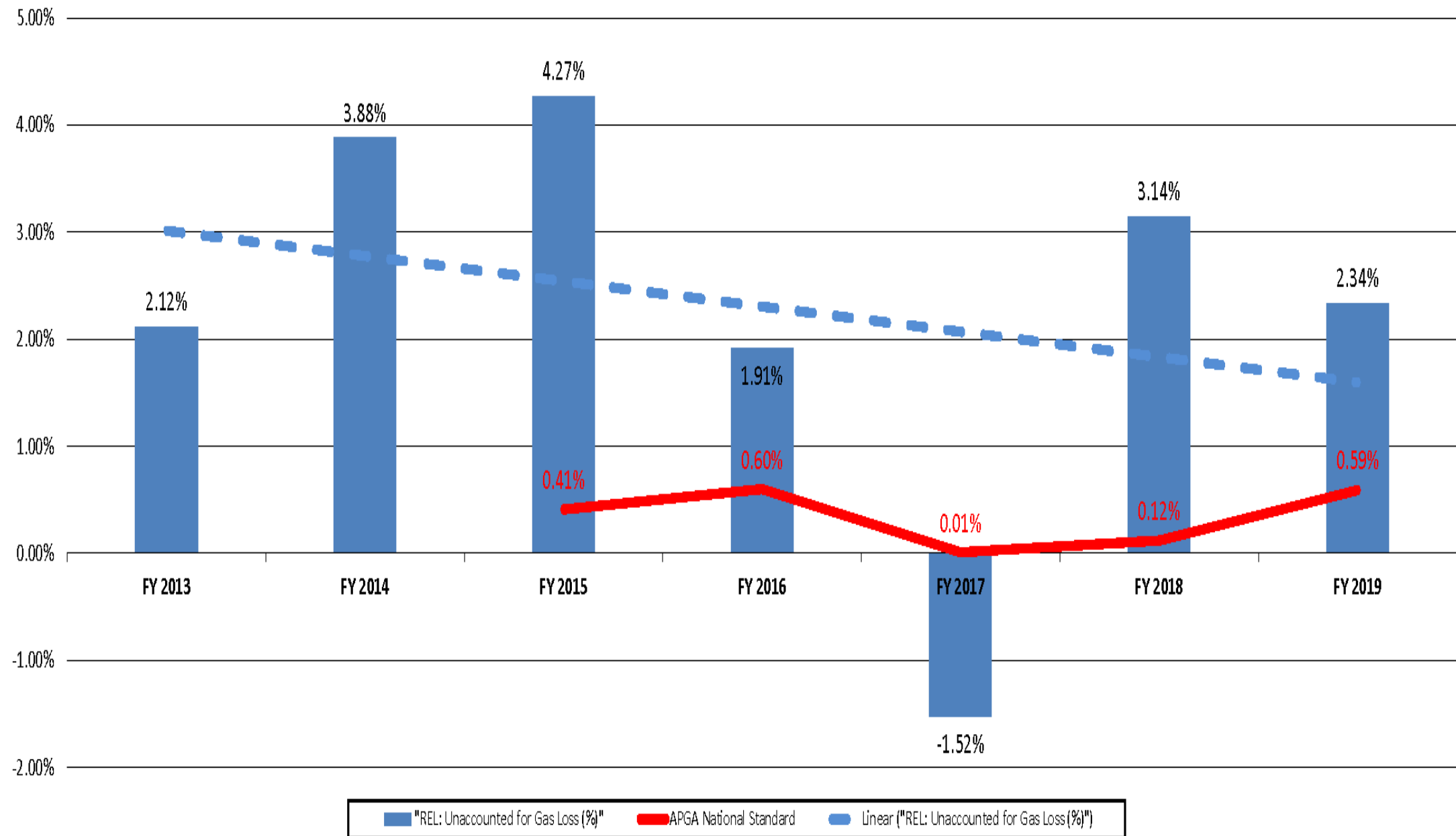
Gas Distribution – Secondary KOPM – GA-5 / Gas Meter Age and Gas Meter Change Outs

25



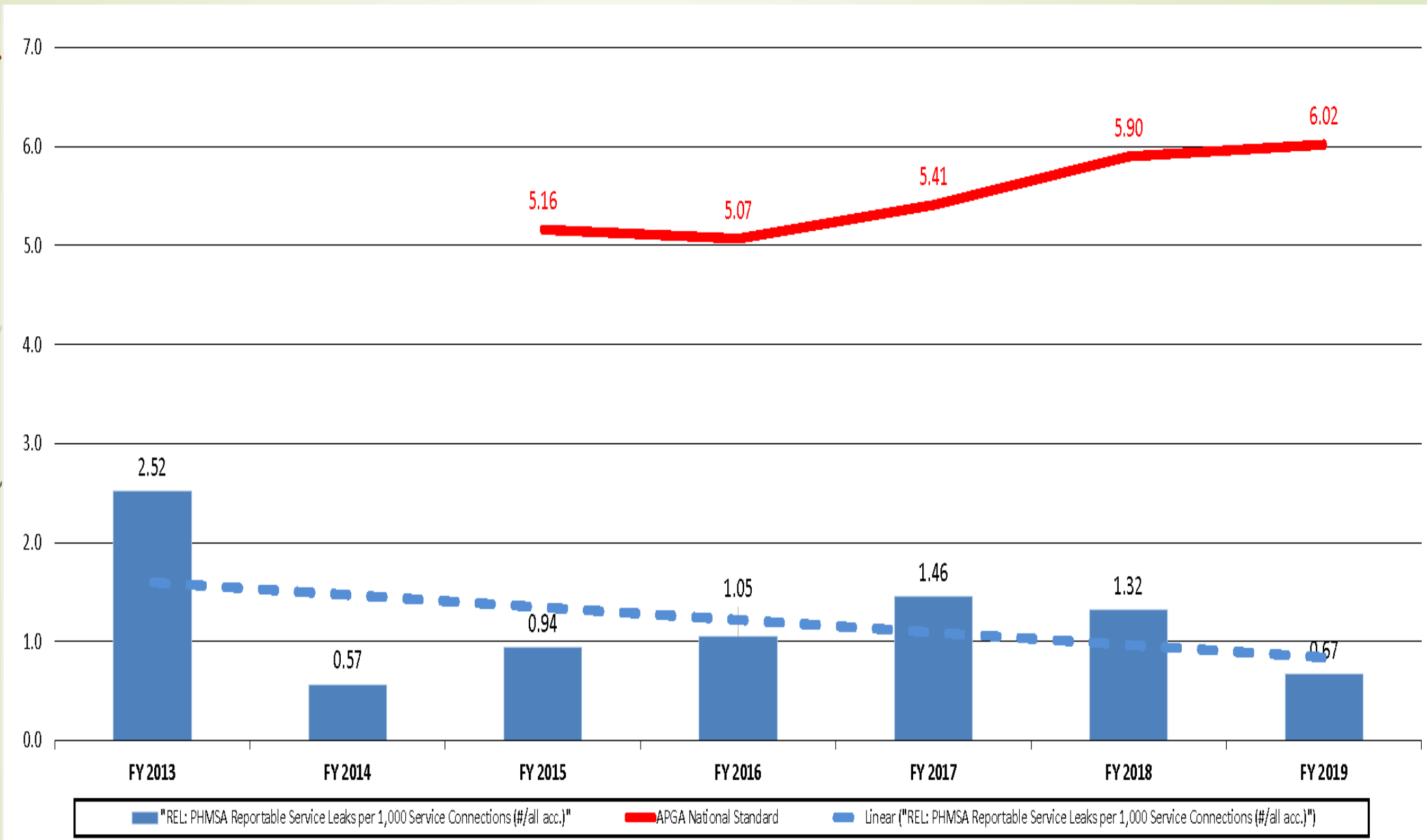
Gas Distribution – Secondary KOPM – GA-6 / Unaccounted for Gas Loss

26



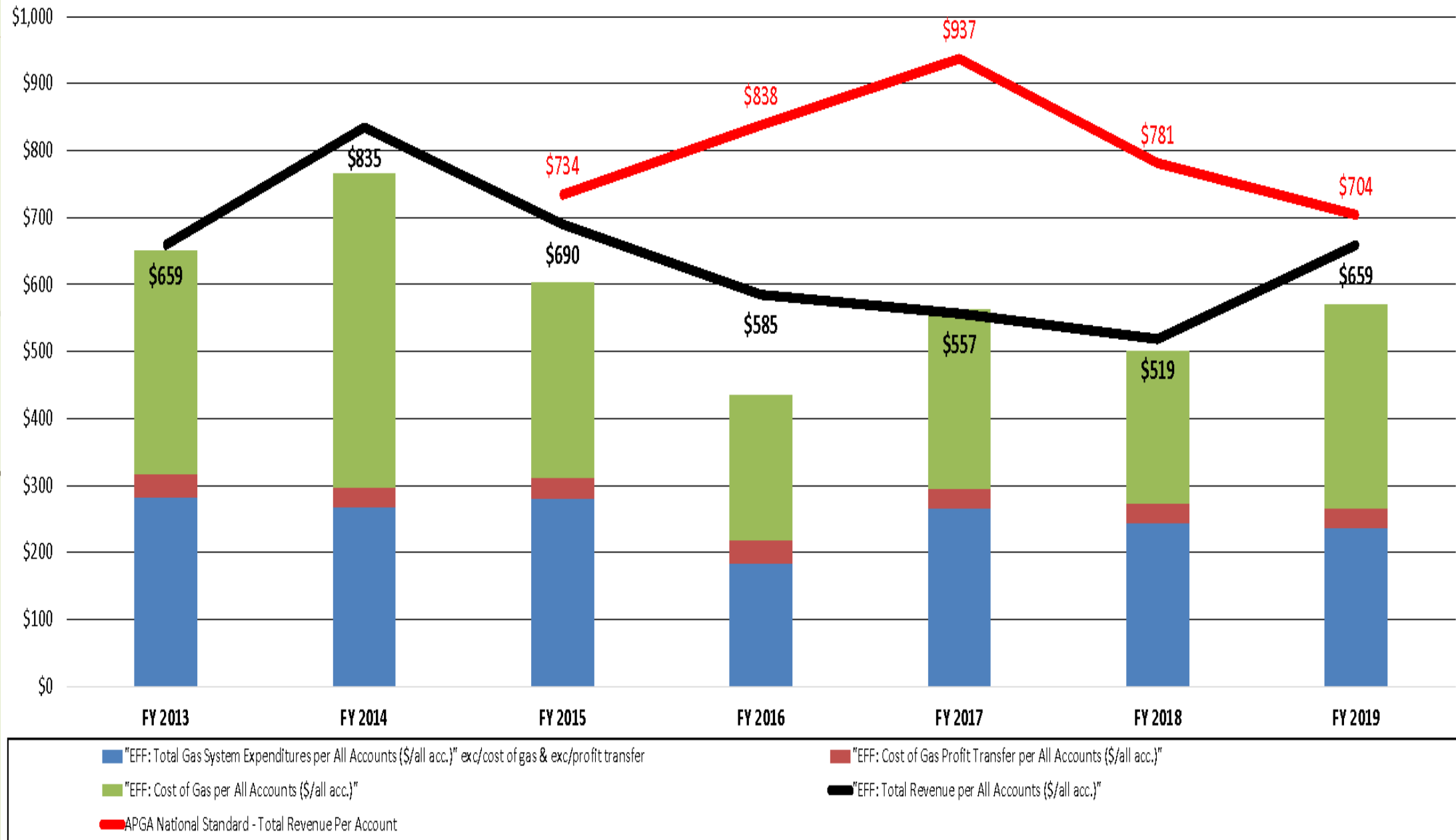
Gas Distribution – Secondary KOPM – GA-7 / Service Breaks per 1,000 Service Connections

27



Gas Distribution – Secondary KOPM – GA-8 / Revenue per Account (w/ O&M-COG-PT Costs)

28

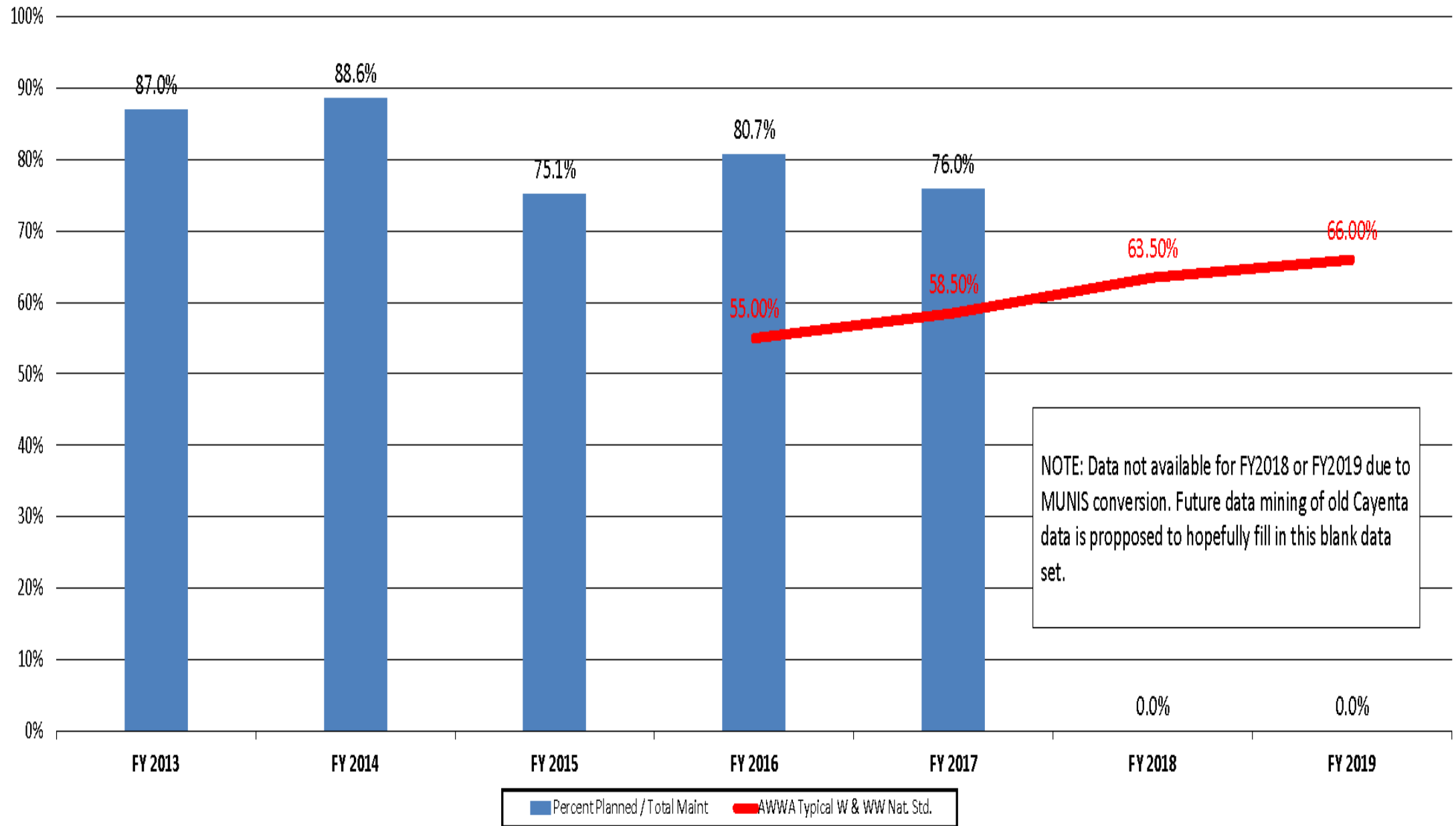


➤ Abbreviated summary of dashboard data for Gas Distribution.

- **GA-9: Planned Maintenance as a % of Total Maintenance Hours** – Transition to MUNIS created a problem with capturing this data for FY18 & FY19. National standard was derived from average values for Water & Wastewater because no gas system national standard for this performance measure is available. Long term trend was good.
- **GA-10: System Renewal & Replacement vs PWV** - National standard was derived from average values for Water & Wastewater because no gas system national standard for this performance measure is available. Past performance has been excellent due to aggressive CIP program. Future performance trend expected to be more consistent but still good in comparison to national standard.
- **GA-11: Revenue vs Expenditures (O&M-COG-PT)** – No national standard to compare to. Simple comparison of Expenditures for O&M, Cost of Gas & Profit Transfer and Revenue. Excellent consistency in having revenues higher than expenditures. In this data set IDC & Admin expenses are included within the O&M expenditure value.

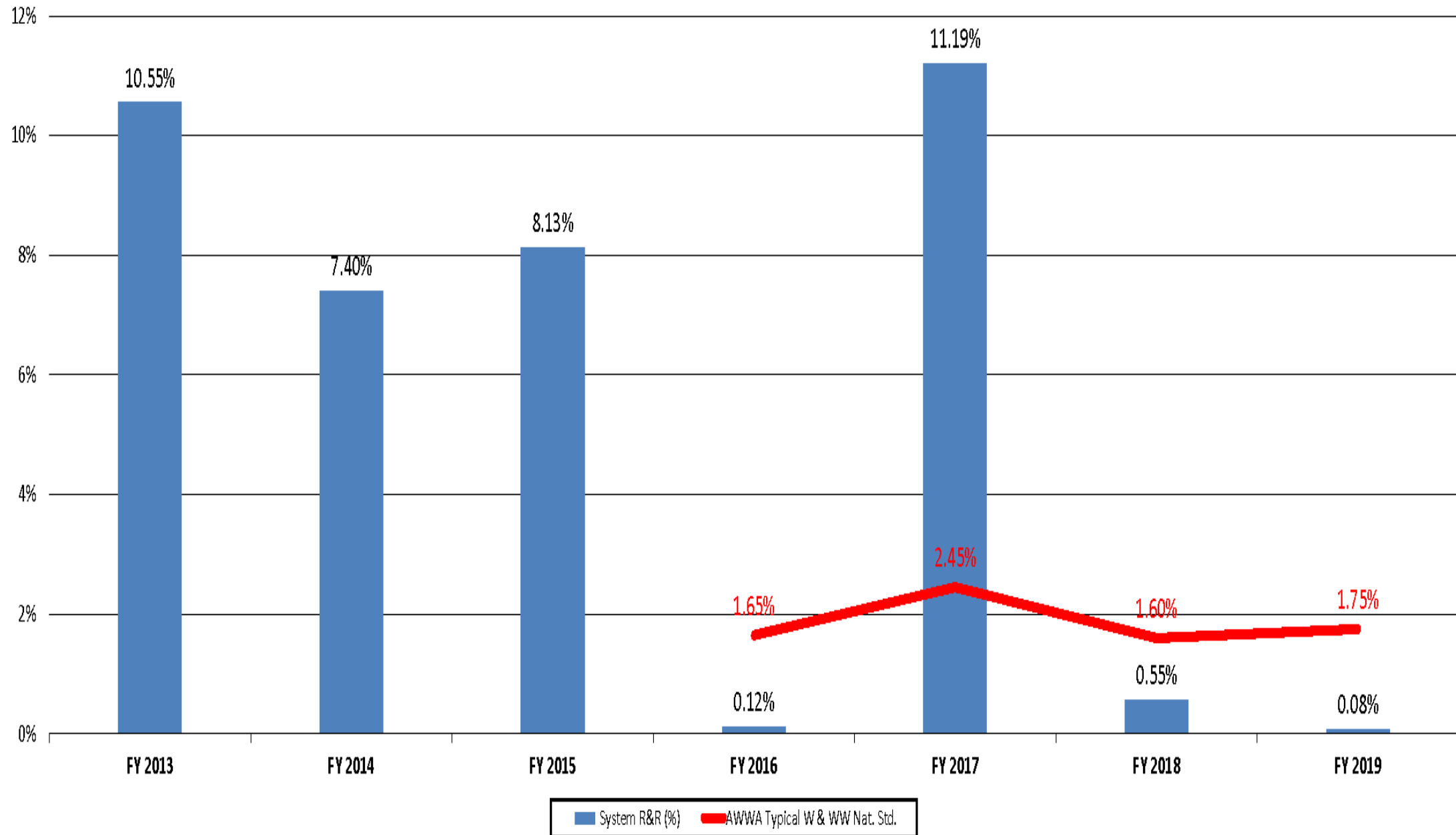
Gas Distribution – Secondary KOPM – GA-9 / Planned Maint. Hrs. as a % of Total Maint. Hrs.

30



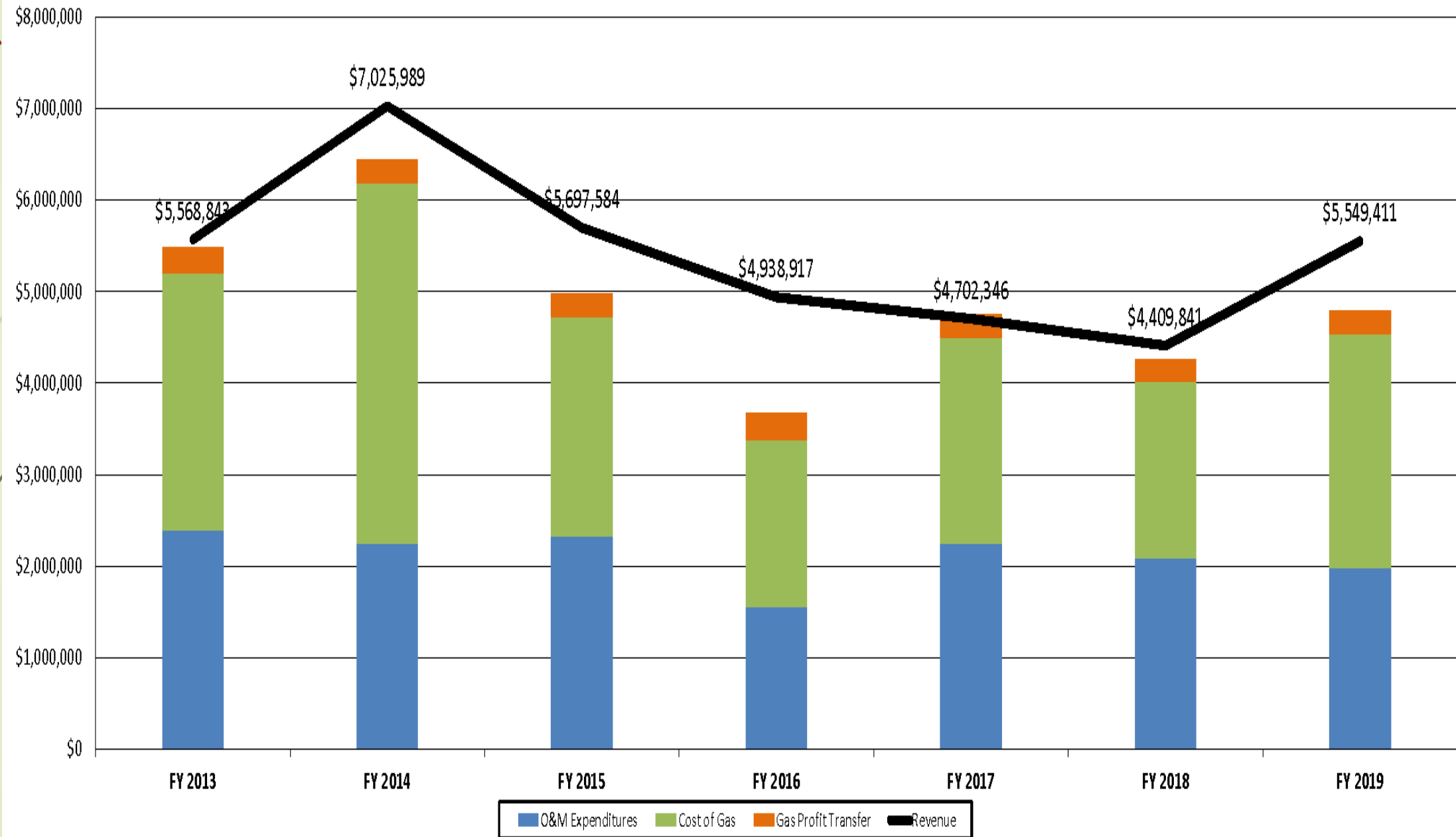
Gas Distribution – Secondary KOPM – GA-10 / System Renewal & Replacement vs PWV

31



Gas Distribution – Secondary KOPM – GA-11 / Revenue vs Expenditures (O&M-COG-PT)

32

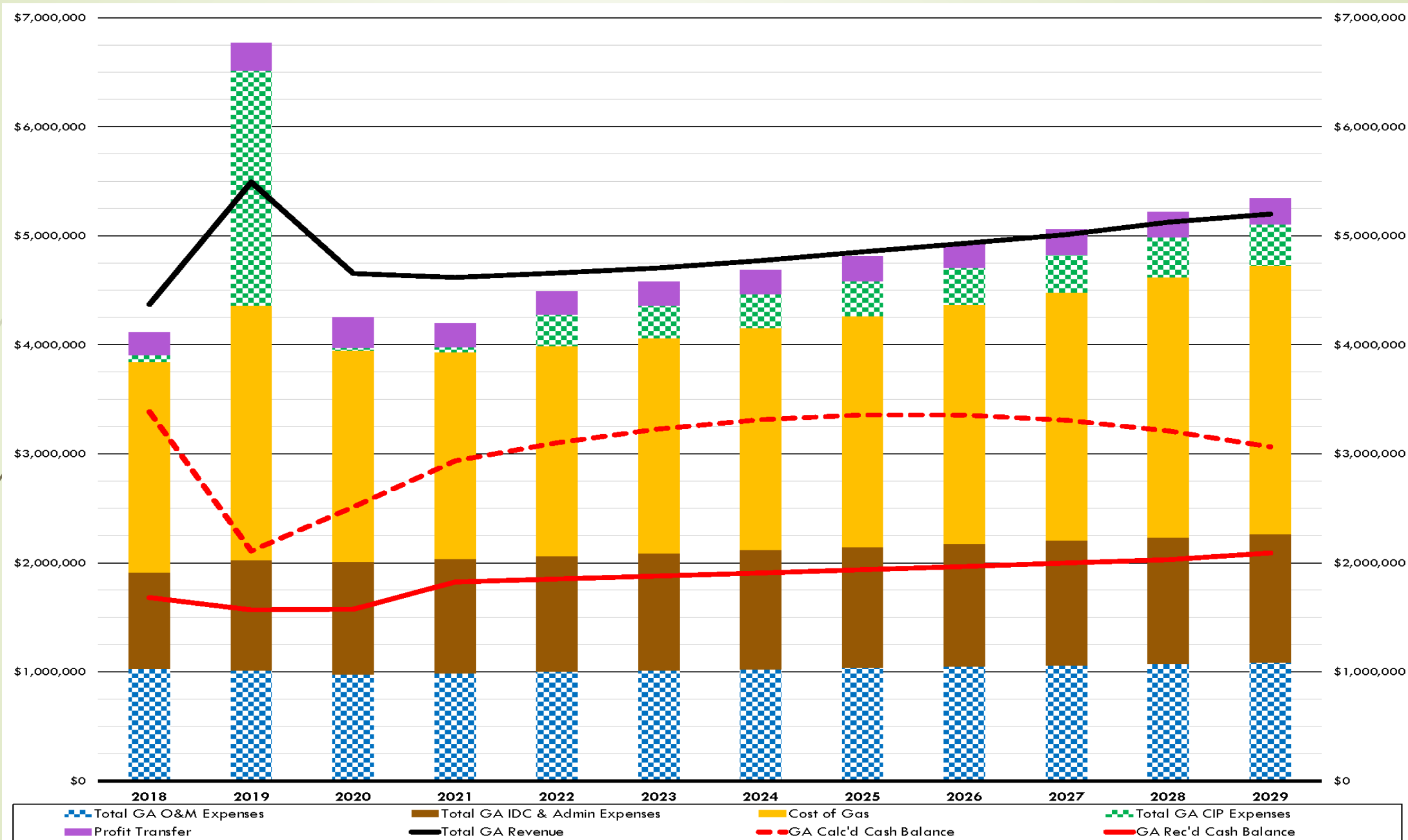


- Abbreviated summary of the Gas Distribution FY 2020 Budget Forecast Revenue / Expense / Cash Balance Graph.

- **FY19 Revenue Spike:** Revenue spike attributed to significantly higher gas volume sales in FY19 (9,229,011 therms) compared to FY18 (7,642,815 therms) and future FY sales projections (7,650,000 therms).
- **FY19 CIP Spike:** Attributed to the expense in FY19 of the AMI (Automated Meter Infrastructure) project implementation.
- **FY18 Cash Balance Value:** Cash balance at the end of FY18 takes into account the \$2.5 million transfer from the gas fund into the wastewater fund for the White Rock wwtp project; this transfer taking place in FY18.
- **FY18 thru FY20 Calculated Cash Balance:** In reality, the AMI project will not be expensed 100% in FY19 as shown on the graph. AMI expenses split into multiple fiscal years FY19 & FY20 will likely smooth the Calculated Cash Balance curve and avoid the large dip in FY19. Actual anticipated gas fund cash balance is not expected to drop significantly below \$3 million during the 10-year planning period.

Gas Distribution / FY20 Budget / Revenue – Expenditure - Cash Balance Graph

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- The current physical condition of the gas distribution system is very good.
- The high pressure “backbone” and much of the medium pressure distribution system have undergone significant upgrades over the last 19 years and all known deficient corroded steel pipe material and undersized mains will have been eliminated at the completion of the NM 502 CIP project scheduled for the spring of 2020.
- All individual “districts” are now fed from multiple sources (no single feed “districts”). Oldest individual pressure regulating valves are systematically being replaced with new valves in all PRV stations – standardizing on a single type, make & model of pressure regulating valve.
- After the spring of 2020, the gas distribution system will be considered to meet acceptable modern standards for material safety and capacity conditions such that future CIP projects should be considered as typical R&R or O&M program efficiency enhancement projects.
- The increased emphasis on enhanced O&M activities – as opposed to major CIP project completion – was implemented starting in FY18 and progress is evident. When the first phase of the GIS upgrade project is completed at the end of FY20, the enhanced O&M programs of the gas distribution system will take another significant step forward.

- The current financial condition of the gas distribution system is excellent.
- The existing cash balance reserves of the gas distribution system exceed the requirements of the financial policy adopted by the Board of Public Utilities. This is due in large part to the previous restructuring of the gas rate from a steady state monthly level billing system that required a large cash reserve to provide for gas price fluctuations to a cost-of-gas pass through billing system that does not require as large a cash reserve.
- \$2.5 million was transferred from the gas fund cash balance into the wastewater fund in FY18 for the White Rock WWTP project. The financial health of the gas fund remains strong after this transfer.
- The remaining gas distribution system cash balance funds, while exceeding the financial policy goals, should remain as is. If climate change causes significantly lower natural gas sales this cash balance would help stabilize the gas fund without significant increased rates. Further, if the gas fund is deemed stable in the future, then some of this cash balance might possibly be available to the wastewater or water funds to assist those funds toward financial policy goal compliance.
- All of the aforementioned programs and program expenditures are related to maintaining and operating a reliable gas distribution system in a safe and efficient manner.