

Replacing Compressor Rod Packing at SoCalGas

EPA Technology Transfer Workshop

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Overview

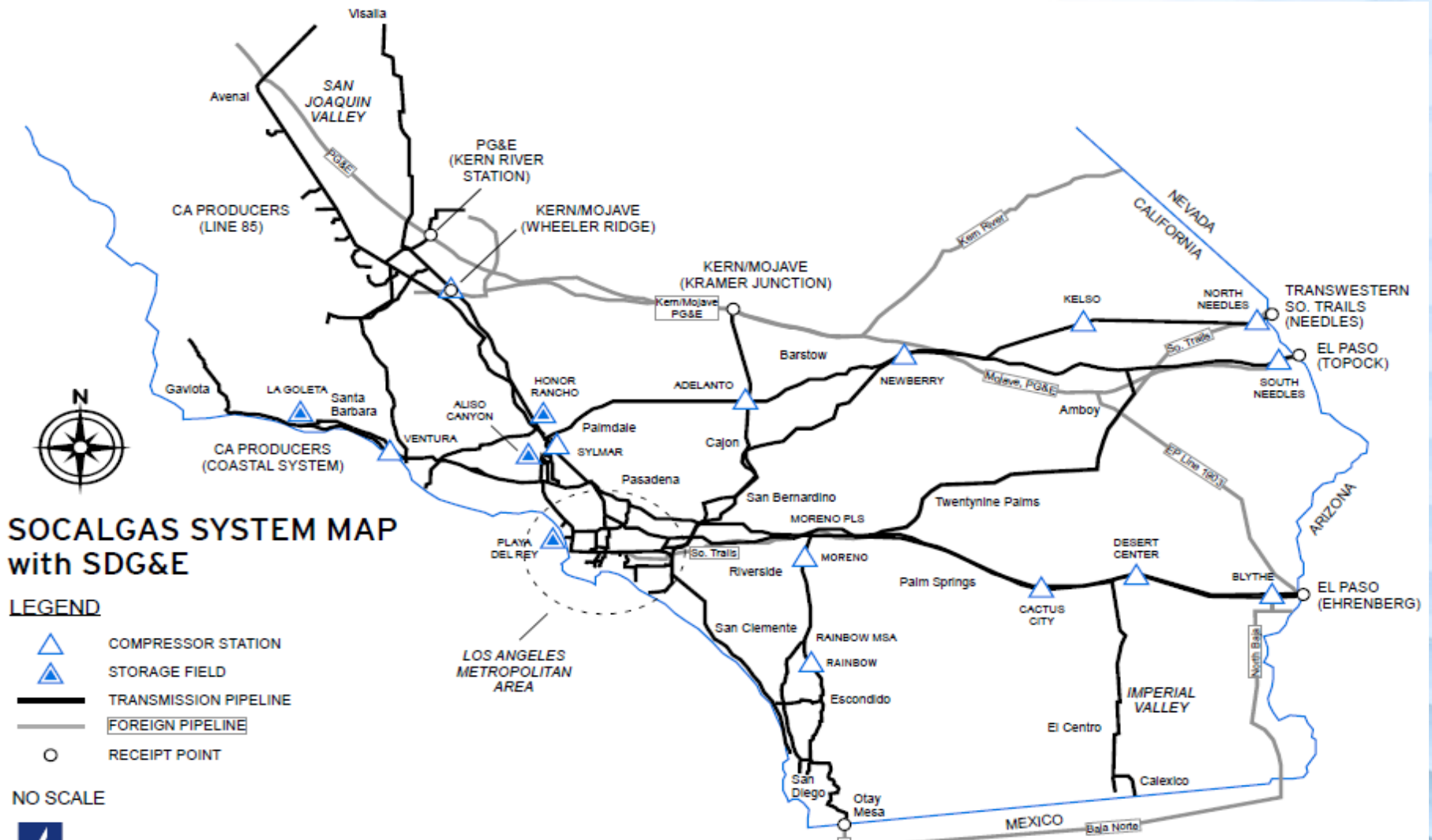
- » Southern California Gas Company Overview
- » EPA Gas STAR Program History
- » Operational and Technology Challenges
- » Regulatory Climate
- » Compressor Rod Packing Replacement Drivers
 - EPA Gas STAR
 - Methane Challenge
 - CARB Oil and Gas Rule
- » Conclusion

Company Overview

- 140 Years in Service
- 5.8 Million Meters
- 21 Million Customers
- 135 Bcf Storage Capacity
- 100,000 Miles Distribution Mains & Services
- 3,500 Miles Transmission Lines
- **9 Compressor Stations**
- **4 Gas Storage Fields**



SoCalGas Territory



Storage Fields and Compressor Stations



Facility	Engines	Cylinders	Packing
Aliso Canyon	5	4	20
Blythe	8	4	16
Blythe	2	6	12
Goleta	7	2	14
Honor Ranch	5	6	30
Honor Ranch	2	4	8
North Needles	2	6	12
North Needles	1	5	5
North Needles	2	4	8
South Needles	7	3	21
Ventura	3	2	6
Total			152

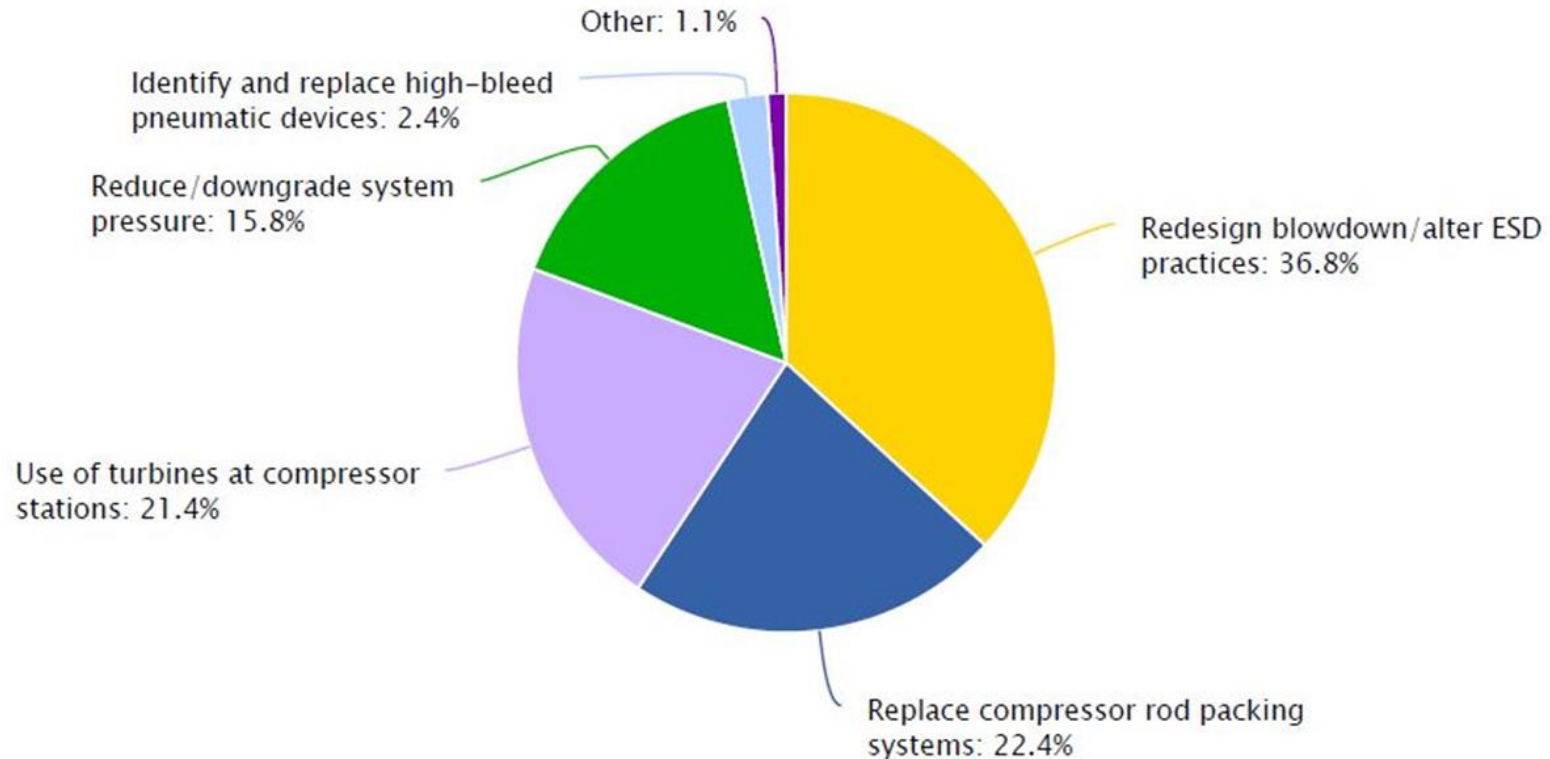
EPA Gas STAR Program History



- » Joined **EPA Gas STAR** Transmission Sector in 1993
- » Cumulative methane emissions reductions of **2,489,804 Mcf** (as of 2016)
- » Equates to Total Reduction **1,028,300 MTCO₂e**
- » Achieved Reductions from:
 - Replacement of High-Bleed Pneumatics
 - Use of Turbines at Compressor Stations
 - Redesign Blowdown/ESD Practices
 - Reduce System Pressure
 - **Replace Compressor Rod Packing**

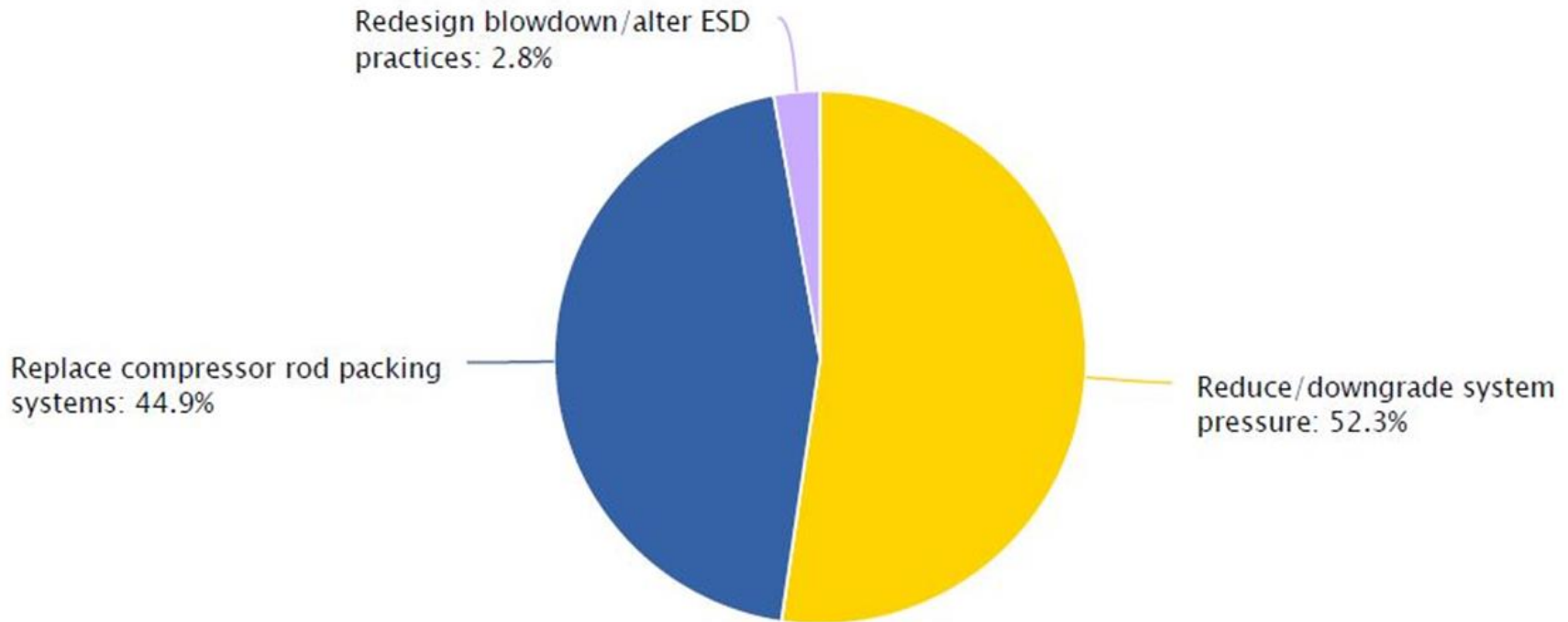
EPA Gas STAR Program Reductions

Cumulative Reductions for Southern California Gas Company: 2,489,804 Mcf



EPA Gas STAR Program Reductions

2016 Reductions for Southern California Gas Company: 75,203 Mcf



Recent Rod Packing Replacements

YEAR	# ROD PACKINGS	Mcf CH4
2008	41	35,465
2009	31	26,815
2010	29	25,085
2011	13	11,245
2012	60	51,900
2013	63	54,495
2014	58	50,170
2015	29	25,065
2016	39	33,735



Operational Reasons for Replacement

- » Audio Inspection
- » Periodic Compressor Performance Checks
- » Compressor cylinder is repaired/overhauled
- » Over 26,000 hours run time (per Methane Challenge)



Regulatory Drivers for Replacement

- » Programs requiring methane/natural gas measurements or reductions
 - **EPA Natural Gas STAR (Voluntary)**
 - **EPA Methane Challenge (Voluntary)**
 - EPA GHGRP (Annual Leak Survey)
 - CARB MRR (Annual Leak Survey)
 - CARB Oil and Gas Rule
 - Quarterly Leak Survey
 - Annual Compressor Vent Measurement
 - SB1371 Best Practices
 - BP #23 - Prevent/Minimize/Stop Fugitive & Vented Methane Emissions



Observations and Challenges

- » All Rod Packings are Not Created Equal
 - Diverse Vintage Engine Types
 - Effectiveness and Life Span may Vary
 - Investigating various materials and ring designs that form a better seal against rod
 - Run Hours Provides Good Metric for Replacement
 - Replacing due to Run Hours Could be Premature (if packing in good condition)
- » Regulatory Changes In California Reduces Impact of Voluntary Programs for SoCalGas
 - CARB Oil and Gas Rule (2 scfm leak threshold)
 - SB1371 Best Practices – reducing leakage

Thank You for Your Attention!

QUESTIONS?