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**California Public
Utilities Commission**



**California Energy
Commission**



**Los Angeles Department
of Water and Power**



California ISO

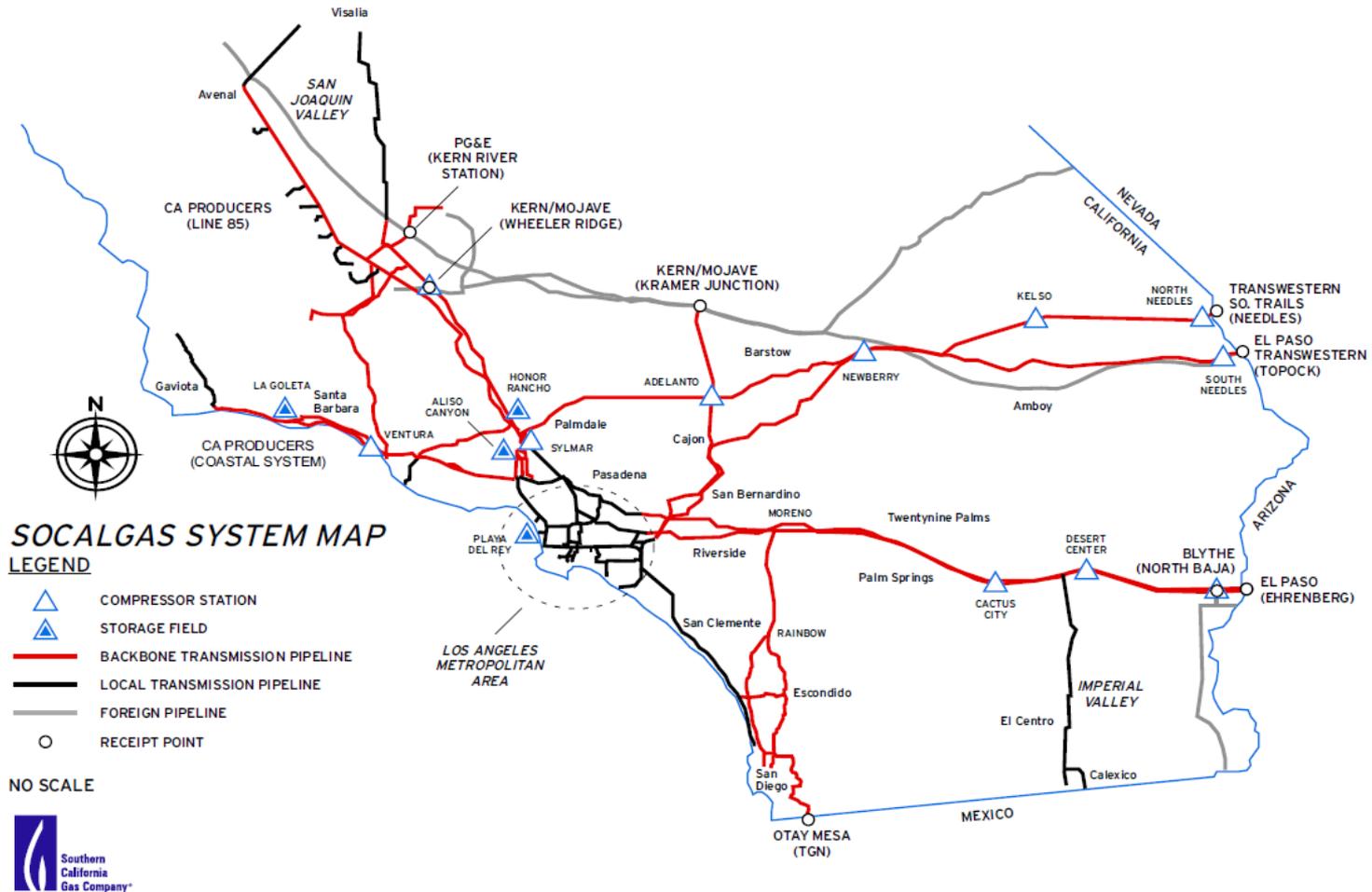
Aliso Canyon Status of Action Plans

Joint Agency Workshop
May 22, 2017

Coordination of Alison Canyon's Impact on Electric Reliability

- California Public Utilities Commission (CPUC)
- California Energy Commission (CEC)
- California Independent System Operator (CAISO)
- Los Angeles Department of Water and Power (LADWP)

Directly Affects 17 Gas-fired Plants Generating ~9800MW; Indirectly Affects 48 Plants Generating 20,120MW



Status of Aliso Canyon Natural Gas Facility

- Moratorium on injections at Aliso Canyon continues
- As of May 1, 2017, Aliso Canyon held approximately 14.8 Bcf of natural gas
- Aliso inventory remains available for withdrawal at critical times
- New storage safety enhancement plan is being implemented across facilities
- Inventory at other SoCalGas natural gas facilities are below levels needed to achieve target inventory needed to support summer needs

2017 Update to 2016 Summer Assessment: Methodology

- Calculated the ability of the SoCalGas/SDG&E gas transmission system to support peak hour(s) demand
- Determined the minimum amount of gas needed to maintain electric system reliability in the SoCalGas/SDGE service territory during peak hours on a 1-in-10 year peak load summer day
- Power flow analysis reflects:
 - Sufficient external supply and full import capability is available into southern California following system contingency
 - A minimum generation level lower than historical economic dispatch levels normally observed during peak load days
- Hydraulic analysis scenario of 3.638 Bcfd send out reflects
 - 100% utilization of pipeline capacity: 3.185 Bcfd
 - Maximum storage (excluding Aliso) withdrawal rate: 1.47 Bcfd (at peak)

2017 Update to 2016 Summer Assessment: Summary

- Expected demand can be met if pipeline supply is at 100% and storage inventory at non-Aliso facilities is adequate to support withdrawal of 1.47 Bcfd during peak
 - If pipeline supply is reduced or storage inventory at the non-Aliso facilities is inadequate, the system could face challenges
 - Other risk factors include prolonged hot weather affecting supply availability and electric import capability into Southern California
- If the electric system is not fully available or electric supplies outside of Southern California are limited, the electric system could still be at risk even with the higher storage supply rates

2017 Hydraulic Analysis Findings

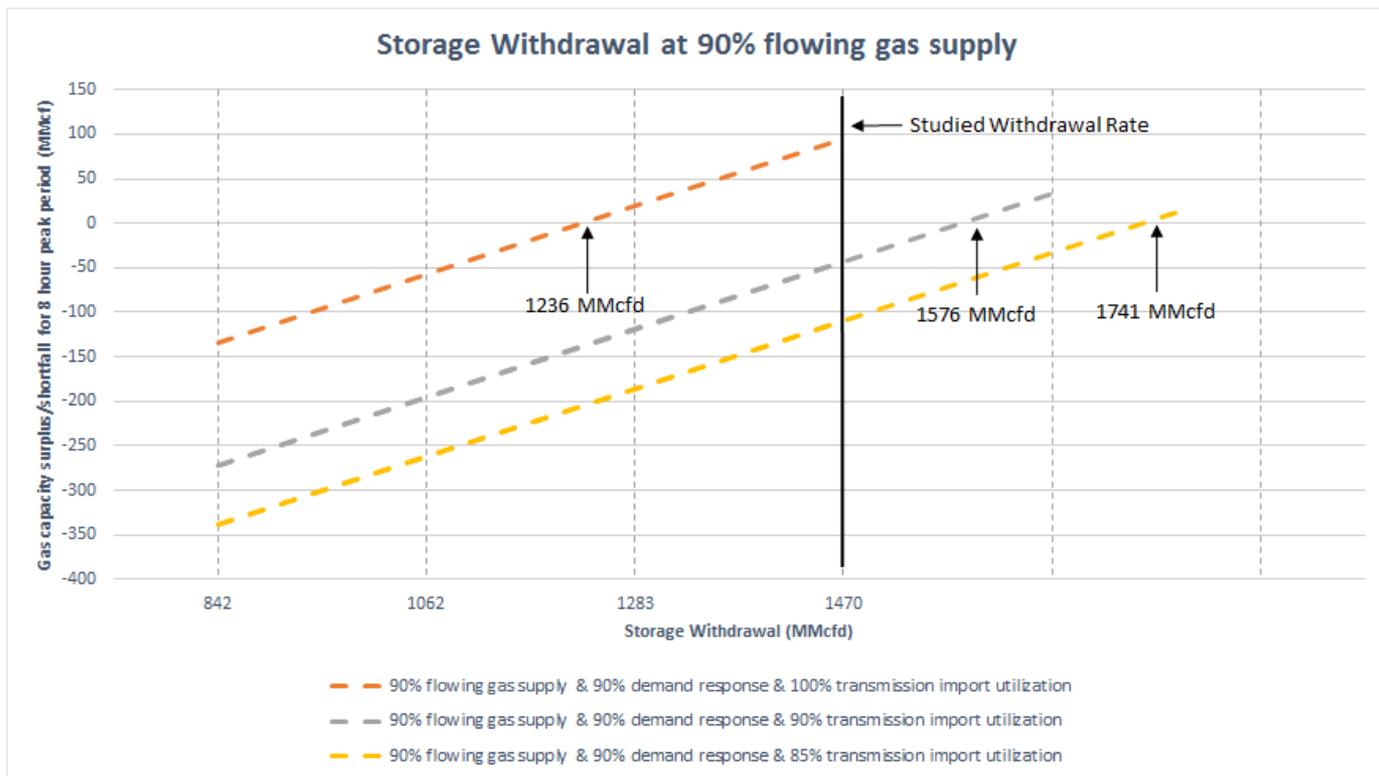
- The maximum sendout that can be supported based on storage withdrawal requirements provided by the CPUC to SoCalGas without Aliso Canyon is 3.638 Bcfd
- Achieving this maximum sendout requires: that no other transmission or storage facility outage occurs beyond the current Line 3000 outage, 100 percent utilization of receipt point capacity, and sufficient storage inventory at the three non-Aliso storage fields
- If flowing supply drops below 100 percent receipt point utilization, it is expected to reduce sendout capacity on a one-to-one basis

2017 Electric Analysis Findings

- The LADWP/California ISO joint 2017 power-flow study found that electric reliability can be satisfied with 1.87 Bcfd (976 MMcf for 8 peak hours)
- Assuming 100 percent electric transmission import utilization:
 - Electric generation curtailments will be greater if gas supplies are lower
 - Based on studied targeted level of storage inventory available sufficient withdrawal capability during peak hour(s), the electric system is expected to be able to maintain electric reliability for the summer 2017 without interruption in all scenarios
- Based on peak summer load and transmission conditions dispatch of gas-fired generation higher than minimum level studies may occur
- If gas supply is insufficient to meet peak demand and access to replacement electric supply is limited: emergency assistance from neighboring balancing authorities, electric load shed in Southern California or withdrawal from Aliso Canyon may be necessary

2017 Electric Analysis Findings

Relationship between storage withdrawal capability versus gas capacity surpluses / shortfall for electric generation demand across 8 peak hours



Status of 2016 Action Plan

- 31 mitigation measures remain in place
 - 22 identified for Summer
 - 9 identified for Winter
- 2016 Action Plan implementation and a mild summer weather pattern helped to prevent significant electric generation curtailments during summer 2016
- Measures greatly reduced the large intra-day rate of change risk of concern last summer

2017 Update to Action Plan

- 1 new measure was added to increase storage injections into the Honor Ranch and La Goleta storage fields in order to reach adequate inventory levels to maintain reliable delivery during peak summer days
- 19 measures require no further agency actions, or continued agency actions are rolled into standing processes and procedures - impacts continue to accrue over time
- 10 measures are being revisited to determine if extensions or further actions are needed for 2017
- 2 active measures still being implemented

Active and New Mitigation Measures for 2017

- **Efficiently complete the required safety review at Aliso Canyon**
– Underway with required safety review in progress. 45 wells have passed the six-test series and 69 have been taken out of service. As of May 1, 2017, withdrawal capability is about 440 MMcfd from tested wells.
- **Modify Core Balancing Rules** – A proceeding on whether to further modify core balancing rules is expected to begin 9/30/17.
- **(New) Increase gas inventory at the other SoCalGas storage facilities** – In progress.

2016 Mitigation Measures completed, in use, and under evaluation to extend and continue for 2017

Prudent Aliso Canyon Use

- Stored 15 Bcf At Aliso Canyon Available to Prevent Summer Electricity Interruptions
- Updated Aliso Canyon Withdrawal Protocol and Gas Allocation Process

Tariff Changes

- Tightened Balancing Rules – some provisions expire 11/30/17
- CAISO market changes that increase gas-electric coordination – Expires 11/30/17
- Advance Gas Burn Operating Ceiling for Electric Generation – Expires 11/30/17

Operational Coordination

- Determine if Gas Maintenance Task Deferrals Outweigh the Safety Risks

Reduce Natural Gas and Electricity Use

- Continued use of Flex Alerts
- Accelerate Electricity Storage Energy Procurement
- Develop and Deploy Gas Cold Weather Conservation Messaging

Reduce Gas Maintenance Downtime

- Progress Reports on Restoring Pipeline Service

CPUC Completed Mitigation Measures

- Implement Tighter Gas Balancing Rules
- Modify Operational Flow Order (OFO) Rule
- Establish More Specific Gas Allocation among Electric Generators In Advance of Curtailment
- Expand Gas and Electric Efficiency (EE) Programs Targeted at Low Income Customers
- Expand Demand Response (DR) Programs
- Reprioritize Existing EE Towards Projects to Impact Usage
- Reprioritize Solar Thermal Program Spending for Summer Projects and Add/Accelerate Solar PV programs by end 2017
- Develop and Deploy Gas Demand Response (DR) Program

CPUC Completed Mitigation Measure Estimated Impacts

Aliso Canyon Mitigation Measures by Summer Peak Day Demand (Bcf)

Gas Balancing	0.469
Energy Efficiency	0.003
ESAP	0.0003
CSI	0.00011
ME&O	0.01248
Energy Storage	0.004
Demand Response	0.00168
Total	0.491
Reliability Need from Aliso	0.906
Remaining Need from Aliso	0.415
% of Need Met by Mitigation Measures	54.2%

Aliso Canyon Driven Energy Storage Projects

Name	MW	IOU
1. Millikan Energy Storage	2	Southern California Edison
2. Center Peaker (Battery Enhanced)	10	
3. Grapeland Peaker (Battery Enhanced)	10	
4. Mira Loma Energy Storage	20	
5. Pomona Energy Storage	20	San Diego Gas & Electric
6. El Cajon	7.5	
7. Escondido Energy Storage	30	
Total	99.5 MW	



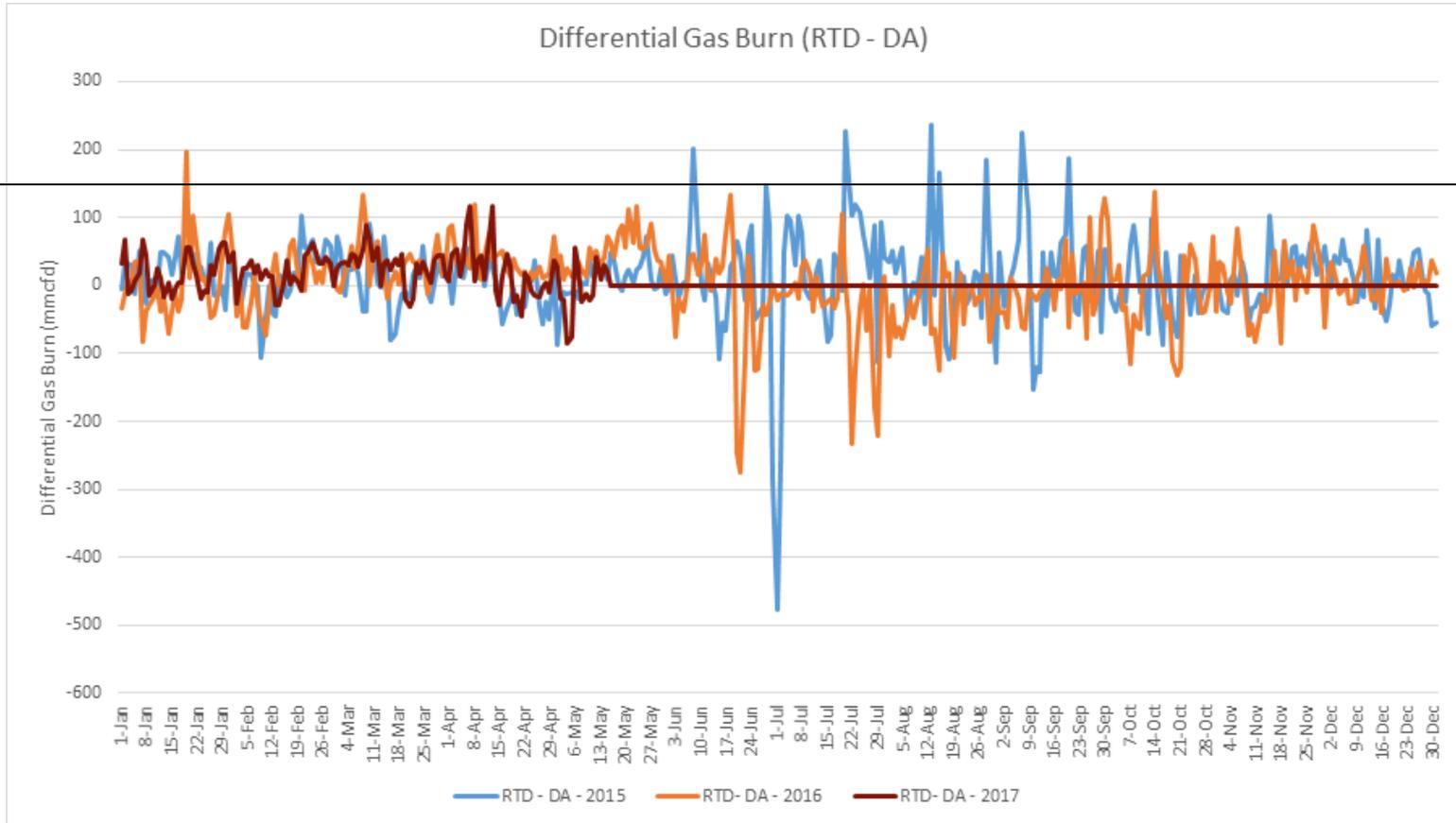
CPUC Activities Beyond the Action Plan

- Updated its Aliso Canyon Demand-Side Resource Impact Report <http://www.cpuc.ca.gov/aliso/>
- In addition to the estimated Aliso Canyon mitigation measure impacts, the CPUC estimated impacts of existing and authorized demand-side resources that also reduce the demand for natural gas in the region
- A long-term study of statewide viability of natural gas storage by the California Council for Science and Technology is underway
- An investigation into the feasibility of reducing or eliminating use of Aliso Canyon is being conducted through an Order Instituting Investigation (I.17-02-002)

CAISO Completed Mitigation Measure Estimated Impacts

- **Provide Market Information to Generators Before Cycle 1 Gas Scheduling**
 - Estimated dispatch levels based on D+2 market results
 - Used for participation in timely gas nomination cycle
- **Increase Electric and Gas Operational Coordination**
 - Enhanced capability for SoCalGas to consume gas burn volumes related to electric generation supplied within the CAISO BA
 - Improves proactive operation of gas system
 - New coordination meetings further enable proactive operation of both the SoCalGas and CAISO systems
- **Protect California Ratepayers**
 - Department of Market Monitoring (DMM) analysis continues to show limited overall impact on electric markets
 - Reported in quarterly reports and the DMM 2016 Annual Report
 - DMM continues to monitor and will report on any significant impacts

CAISO Impact of Mitigation Measures



Row Labels	Max Underscheduled 2015	Max Underscheduled 2016
June	194	136
July	234	108
August	231	54
September	228	119
Grand Total	234	136

New Transmission Facilities in 2017 Summer Case

- SCE area
 - New Whirlwind XFMR
 - Vincent-Mira Loma 500kV line
- SDGE area
 - Imperial Valley Phase Shifters
 - Miguel Synchronous Condensers
- PG&E area
 - Sobrante XFMR capacity increase project
 - Three series reactors have been installed on the 230kV side of Midway 500/230 Bank 11, 12 and 13.
- Arizona
 - Palo Verde-Hassayampa 500 kV # 1, 2, and 3 series line reactors

CAISO Activities Beyond the Action Plan

- Previously planned improvements of transmission projects will also strengthen Southern California energy reliability and permit the electrical system to adjust more readily to changing conditions:
 - Santiago Substation Synchronous Condenser (225 MVar) scheduled to be in-service by summer of 2018
 - San Onofre Synchronous Condenser (225 MVar) scheduled to be in-service by the end of 2017
 - San Luis Rey Synchronous Condensers (450 MVar) scheduled to be in service by the end of 2017

LADWP Completed Mitigation Measure Estimated Impacts

- **Increase Electric and Gas Operational Coordination**
 - Improved coordination between utilities has increased LADWP's situational awareness, particularly during critical high heat days
- **Update Physical Gas Hedging Practice**
 - Provides additional operational flexibility for LADWP in the event of gas curtailments or curtailment watch periods
- **Update Economic Dispatch Practice**
 - Provides additional operational flexibility and non-economic energy purchases reduce reliance on local gas by 1.7 Bcf total gas burn
- **Update Block Energy and Capacity Sales Practice**
 - Provides additional operational flexibility for LADWP in the event of gas curtailments or curtailment watch periods

LADWP Completed Mitigation Measure Estimated Impacts (cont.)

- **Explore Dual Fuel Capability**
 - 1,500 MW alternative fuel capability only as a last resort to maintain electric reliability in emergency situations.
- **Reprioritize Existing Energy Efficiency Towards Projects with Potential to Impact Usage**
 - Lighting assessments completed for 28 LAUSD schools, retrofits pending.
 - Commercial Direct Install accounts for 46,934,149 kWh savings.
 - AC Tune Up accounts for 1,734,491 kWh savings.
 - Upstream Commercial HVAC accounts for 7,394,024 kWh savings.
 - Residential Lighting accounts for 56,856,207 kWh savings.
 - SummerShift program resulted in 100 MW of load shift from large commercial & industrial customers.

LADWP Activities Beyond the Action Plan

- **Continued Solar Adoption**

- Recently energized 144 MW utility-scale solar at Beacon for a total of 945 MW. Another 106 MW upcoming summer 2017
- Continued Net Energy Metering incentives into 2017, beyond mandate
- Made available additional Feed-in Tariff program capacity to secure 65 MW in new proposals

- **Accelerated Energy Storage**

- Accelerated Beacon 20 MW battery storage project to 2018
- Launched Fire Station Resiliency Solar+Battery project

- **Increased Demand Response Enrollment to 50 MW**

- **Completed Distributed Energy Resource Integration Study**

CEC Completed Mitigation Measure Estimated Impacts

- **Identify and solicit additional gas supply sources including more CA Natural Gas Production**
 - No increase in CA production forthcoming or feasible that would effectively increase gas supply into SoCalGas
- **Prepare to Buy LNG**
 - Barriers research completed
 - Take actions to implement and procure LNG
- **Monitor Natural Gas Use at Refineries and Gasoline Prices**
 - California refiners appear to have adjusted to Aliso Canyon constraints
 - CEC staff continues to monitor situation

Next Steps

- Monitor plan for increasing storage inventories
- Continue implementing mitigation measures
- Complete the CPUC OII on the feasibility of reducing or eliminating use of Aliso Canyon
- Complete long-term study of the statewide viability of natural gas storage