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**California Public
Utilities Commission**



**California Energy
Commission**



**Los Angeles Department
of Water and Power**



California ISO

Aliso Canyon and Winter Reliability

Joint Agency Workshop
August 26, 2016

Coordination of Alison Canyon's Impact on Electric Reliability

- Department of Gas and Geothermal Resources (DOGGR) – Oversees the drilling, operation, maintenance, and plugging and abandonment of oil, natural gas, and geothermal wells
- California Public Utilities Authority (CPUC) – Regulates privately owned electric, natural gas, telecommunications, water, railroad, rail transit, and passenger transportation companies
- California Energy Commission (CEC) – The state's primary energy policy and planning agency
- California Independent System Operator (CAISO) – The largest balancing authority (one of roughly 38 in the Western US, one of 8 in California) charged with operating generation and transmission resources to insure the electric system stays reliable
- Los Angeles Department of Water and Power (LADWP) – Also a balancing authority in California, charged with operating generation and transmission resources to insure a reliable electric system for Los Angeles and several municipal utilities

Reports on Winter Reliability Released Aug. 22: Gas System Risk Remains; Electric Generation may be able to Mitigate

- Assessment shows risk for this winter is lower than was estimated for summer
- Gas from Aliso Canyon is a key tool to handle that risk
- Even if gas can be injected in October and/or November we will have more-than-normal risk of gas curtailments
- CAISO and LADWP appear able to rely on generation sources outside the SoCalGas service area to replace lost output, so long as no other transmission or generation outages occur
- Uncertainty remains about weather and equipment
- 10 mitigation measures will help, including gas conservation and using some of the 15 Bcf still at Aliso

Current Status

- Summer is not over. Significant risk remains.
- 15 Bcf remains in the Aliso field
- Safety review is continuing
- Unknown when SoCalGas will apply to begin injections; cleared wells may produce less due to influx of liquids
- SoCalGas must retain enough wells to withdraw 420 mmcf/d through summer
- 21 mitigation measures were implemented for summer
- Made it through heat events in June and in July, thanks to combination of good planning (with mitigation measures) and luck (with weather better than forecast)

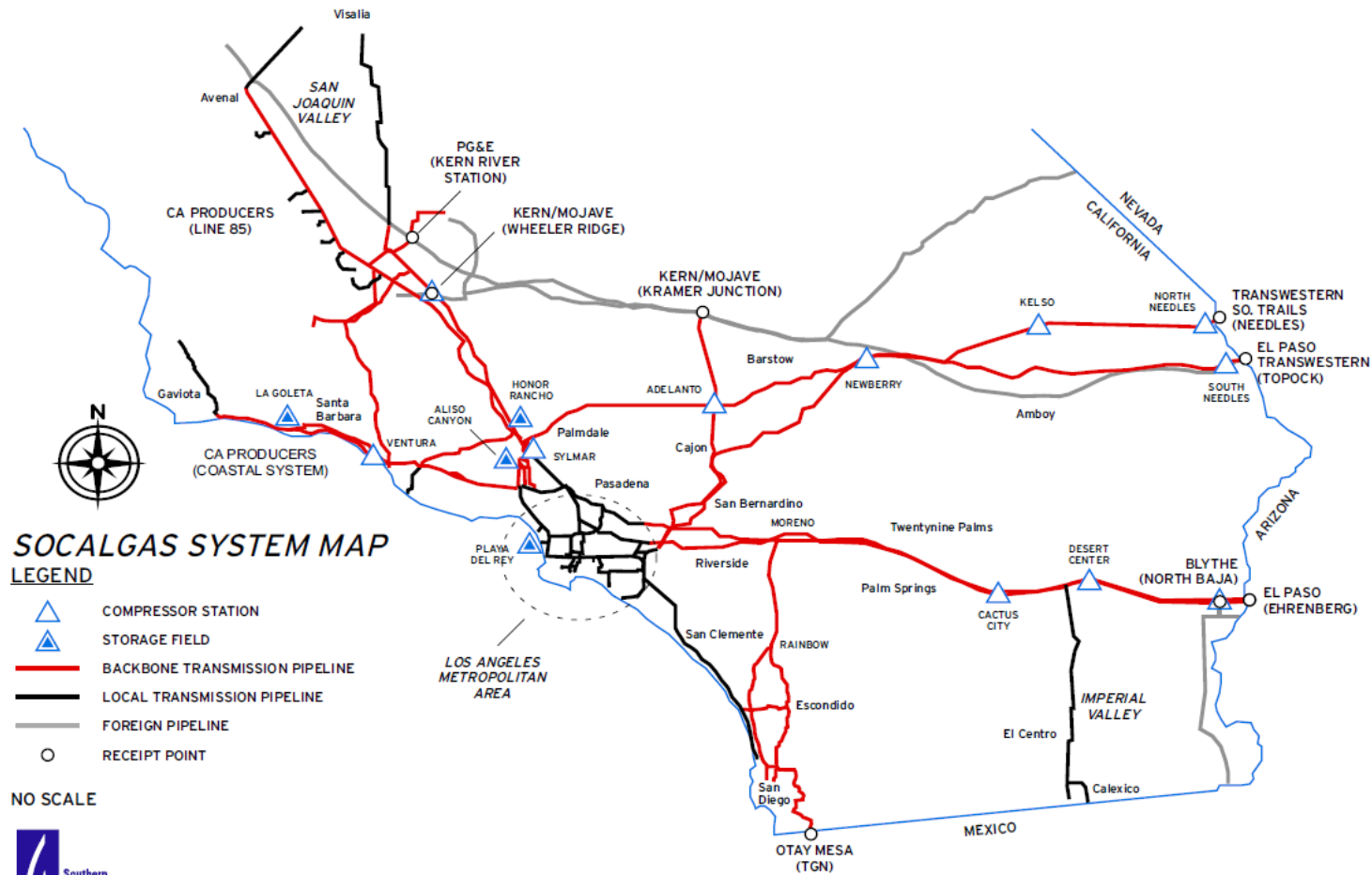
DOGGR is Overseeing Comprehensive Safety Review

- Goal: Ensure that no other wells at Aliso Canyon could cause another major leak
 - Safety program developed in cooperation with independent technical experts from national labs
- Gas may be injected into Aliso Canyon only after all 114 wells have passed comprehensive tests or have been isolated
- Unknowns: when safety review will be completed; if or how many wells will be cleared to operate; the ultimate production capability of the wells

Working Since December to Understand Reliability Impacts and to Develop Action Plan

- In compliance with Governor's Proclamation, reliability studies performed by CPUC, CEC, CAISO and LADWP
- Analysis focused on Winter 2016-2017
- Three new reports released on August 19
 - Technical Assessment
 - Hydraulic Analysis
 - Electricity Ability to Absorb Gas Curtailment
 - Independent Review of Hydraulic Analysis
 - Action Plan
 - Gas Balance Analysis
 - Winter Mitigation Measures
 - June 20 heat event review

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



A Sempra Energy utility

May 2010

Winter Key Finding: Gas Reliability Still Threatened but Electricity Challenges are Fewer than in Summer

- Demand flips, so core customers use 60% of gas supply
- Electric generators are noncore customers and are first to lose gas during a curtailment
- Winter peak day in gas balance (1-in-10 for noncore):

Customer	2016 Forecasted Peak Demand	Percent of Peak Demand
Core	3.050 Bcf	60
Electric Generation	1.031 Bcf ¹⁷	20
Noncore, not electric generation ¹⁸	0.996 Bcf	20
Winter Total	5.077 Bcf	100

Source: CPUC Energy Division *Preliminary Staff Analysis*, February 16, 2016; initially taken from 2014 *California Gas Report*, p. 90

- Electricity demand lower in winter; more flexibility to shift generation to resources outside the SoCalGas service area

Gas Balance Shows Range of Gas Curtailment Size Depending on How Much Gas at Aliso

- Gas Balance is a “first cut” comparison of supply to demand to see how much excess may or may not exist
- Prepared by Energy Commission, independent of SoCalGas
- Reviews entire season to determine impact on inventory: at Aliso Canyon versus other three fields
- Recognizes that system is not planned to operate everyday at peak capability
- Assumed 3.225 Bcf from receipt points + maximum of 1.64 from non-Aliso storage
- 4 Aliso inventory (and withdrawal) scenarios versus three weather conditions; withdrawals very preliminary

If Injections Resume in October, Winter Peak Day Appears to be Barely OK for Serving All Gas Demand

- 12 Cases varying Aliso Inventory and Weather
- Shows that ~ 300 mmcf/d of Winter Peak Day demand cannot be met without using gas from Aliso (before taking into account HR/Line 225 issue)
- Even if some gas is injected at Aliso so inventory increases (48, 36 and 25 Bcf scenarios):
 - have to change operations at other fields from “normal” in certain months
 - won’t have enough at Aliso in any scenario to withdraw at “normal” levels
 - Reserve margins very tight
- Expect hydraulic analysis would show bigger gas curtailments than estimated in these cases

Hydraulic Analysis Shows Winter Peak Day Gas Demands Cannot be met without Aliso

- Gas Balance cannot assess operating pressures or look within a day
- Assumes no Aliso Canyon
- Exposes problem that if Line 225 is full with gas from Wheeler Ridge, cannot take full 1 Bcf from Honor Rancho
- Cannot meet winter peak day design criterion of 5.2 Bcf

Condition: Flowing Supply at Receipt Points (Pipeline Utilization by Shippers) or Pipeline Outage	Maximum Servable Demand
100%	4.7 Bcf
Loss of 0.2 Bcf flowing to Line 3000 work	4.5 Bcf
85% pipeline utilization/less gas at receipt points	4.2 Bcf

CAISO and LADWP can Re-dispatch to Avoid Electricity Interruptions...Most of the Time

- Assumes no transmission outages
- Assumes generation needed outside SoCalGas service area has gas and can operate
- Minimum of 96 mmcf/d to cover non-simultaneous N-1 contingency event and 22 mmcf/d with no contingency
- Gas curtailment of electric generation may be necessary when the SoCalGas/SDG&E total core and non-core gas demand exceeds 4.5 Bcf/d which assumes 100% gas receipt point utilization or 4.2 Bcf/d assuming 85% gas point utilization
- If the gas delivery utilization/supply falls below 4.1 Bcf/d, Aliso gas withdrawal are needed to avoid electric load interruption during peak winter load conditions

Independent Review of Hydraulic Modeling Affirms Results

- Los Alamos National Laboratory (recommended by DOE) and Walker & Associates (experience with gas system modeling and management)
- Found the modeling consistent with industry practices
- In the statistical analysis for summer may be some over-estimation relative to unplanned outage days, but understatement of impact relative to high impact low probability events
- Otherwise concur with findings for summer and winter
- Recommendations consistent with Action Plan
- Their report was released on Monday with the Action Plan and Technical Report; are here to present findings

10 New Mitigation Measures for Winter

Category	Mitigation Measure
Gas-targeted Programs to Further Reduce Usage	Develop and Deploy Gas Demand Response Program
	Develop and Deploy Gas Cold Weather Messaging
Winter Operations Changes	Extend Tighter Noncore Balancing Rules into Winter
	Add Core Balancing Rules
	Create Gas Burn Operating Ceiling for Electric Generation
Reduce Gas Maintenance Downtime	Submit Reports Describing Rapid Progress on Restoring Pipeline Service
Increase Supply	Ask for more California Natural Gas Production
	Prepare to Buy LNG
Use of Gas from Aliso Canyon	Update the Aliso Canyon gas Withdrawal Protocol and Gas Allocation Process
Refineries	Monitor Natural Gas Use at Refineries and Gasoline Prices

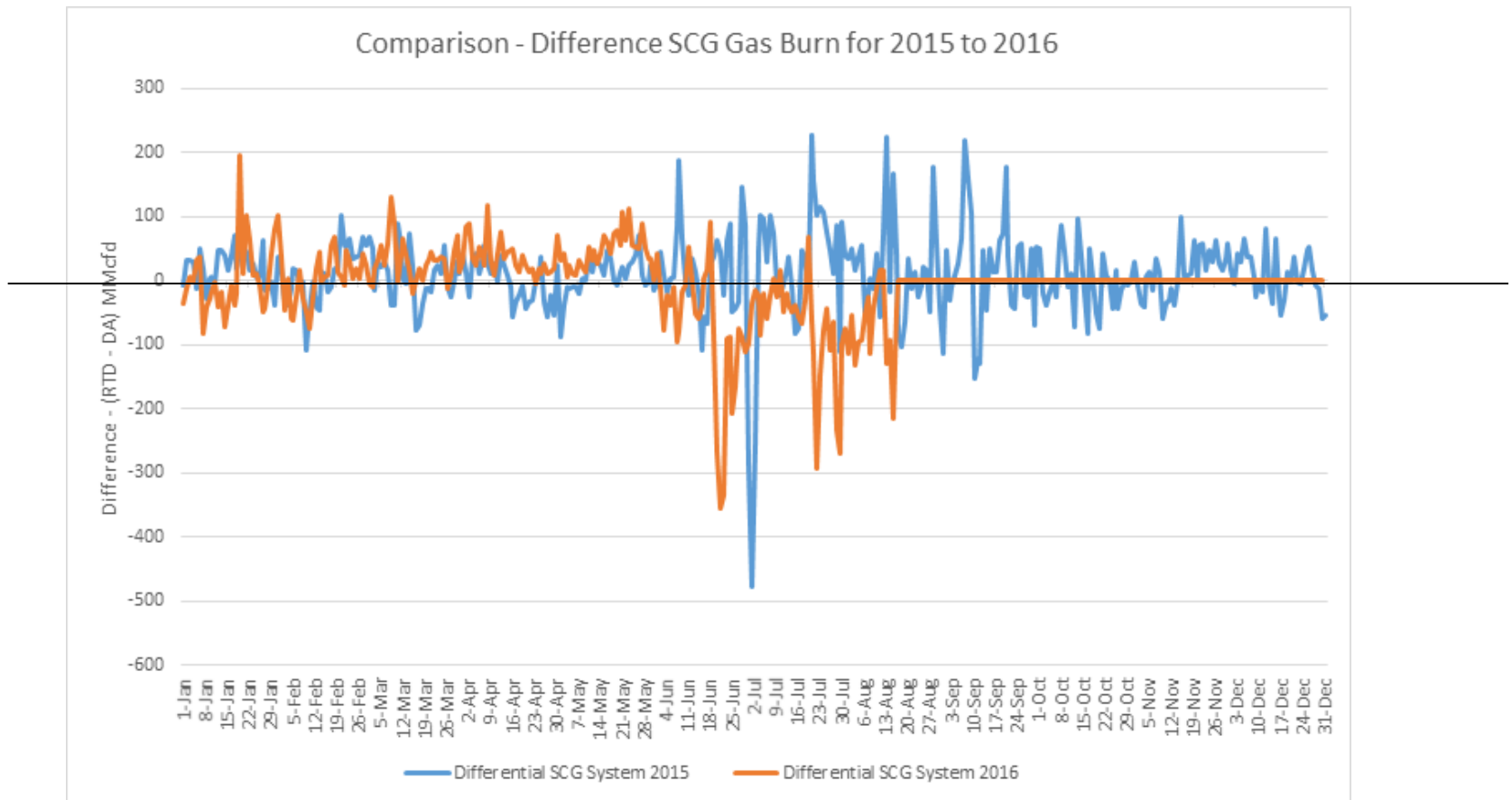
All Measures from Summer Remain Underway; Those Listed Below Continue

- Safety review
- CAISO market changes that increase gas-electric coordination
- LADWP's changes to economic dispatch, halt to block energy/capacity sales and halt to physical gas hedging
- LADWP expects to seek approval to extend its use of dual fuel capability
- All new summer EE and DR programs continue
- Efforts to accelerate electricity storage remain relevant
- Monitoring of gas and electricity prices
- As of today, 15 Bcf at Aliso remains to offset risk

How Summer Mitigation Measures Helped

- Summer not over, Southern CA often peaks in September
- 2016 milder than expected; no long duration heat wave yet
- Tighter balancing rules seem to be effective at eliminating supply and demand mismatches
- For June 20, first high load conditions of Summer:
 - the weather moderated versus forecast
 - had the Monday heat been as predicted or lasted longer, curtailments would have been likely
 - SoCalGas had Aliso prepared to withdraw
 - DR programs and calls for conservation reduced demand by several hundred MWs
 - No significant transmission outages

Good Coordination and Advanced Planning of Electric Helped Mitigate Risk of Gas Supply and Demand Differences



Row Labels	Max Under scheduled 2015	Max Under scheduled 2016
June	188	93
July	226	69
August	225	18



Mitigation Measures and Estimated Savings Impacts

MITIGATION MEASURE	Description	Total Estimated Savings Achieved to Date	Estimated total savings by the end of 2016 - MMBtu per day, MW saved, or MW of capacity online.
CSI-Thermal Program	<p>Measure #1: Increased Low Income Budget</p> <p>Measure #2: Project cost cap for Solar Pool Heating incentives</p> <p>Measure #3: Increased General Market incentive rate*</p>	<p>Total additional projects - 124</p> <ul style="list-style-type: none"> Measure #1 – 503.3 MMBtu Measure #2 - 6334.4 MMBtu Measure #3 - 0 <p>Total estimated savings 6837.7 MMBtu</p>	86.6 MMBtu per day
Demand Response	Increased certain Demand Response programs and activities to mitigate reliability during periods of high electric use.	Enrolled an incremental load of approximately 30MW	40MW
Low Income Program Expansion	Intensified deployment of Energy Savings Assistance (ESA) Program measures.	<p>Homes treated: SCG 8,309; SCE 1,856</p> <p>Total estimated savings - 235kW and 11,095.2 MMBtu</p>	500kW and 160.8 MMBtu per day
Reprioritize Existing Energy Efficiency	Accelerated custom projects and expanded activities and partnerships to achieve energy savings.	<p>Total estimated savings - 1,400,000 MMBtu</p> <p>Estimated savings expanded activity - 60,000 MMBtu</p>	19,400 MMBtu per day
Accelerate Deployment of Electricity Storage	<p>Solicitation for accelerated storage resources to address electrical reliability risks.</p> <p>(Note: Accelerated means bringing storage resources online faster than business as usual, but is not incremental to existing mandates and incentives.)</p>	<p>SCE is pursuing up to aprox 65 MW of accelerated storage procurement to be online by 2016:</p> <p>SDG&E contracts CPUC-approved for 37 MW of SDG&E-owned storage to be online by 1/31/17.</p>	<p>.</p> <p>Additional efforts to accelerate interconnection of storage could bring total to at least 119 MW of storage online near the end of the year.</p>
Flex Alerts	Mass marketed Flex Alerts under the direction of CAISO on high use days.	CAISO reported a reduction of 490 MW and 540 MW on July 27 and 28.	n/a

*Increase in applications occurred in Single Family Residential sector, which has significantly smaller average system size than Commercial/Multifamily.

High Use Days: July 27 and 28

- Demand Response programs and Flex Alerts reduced peak load significantly on two high-use days

Program	July 27	July 28
Demand Response*	-610 MW	-402 MW
Flex Alerts**	-490 MW	-540 MW
Total	-1,100 MW	-942 MW

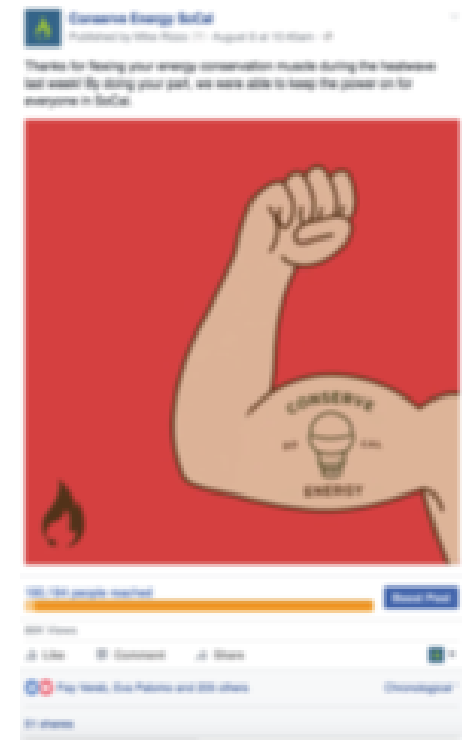
*CPUC Estimate

** CAISO Estimate (not verified by CPUC)



Aliso Canyon Marketing, Education, and Outreach Response – *Conserve Energy So Cal*

- SCG leading an advisory committee of 10 local governments and utilities on coordinated campaign
- Strategies include social media, earned media, event outreach, and others.
- Website: ConserveEnergySoCal.com



Next Steps

- Safety review and testing continue and must be completed before public hearing to decide if injections can resume
- Implement Mitigation Measures
 - Certain measures require action by CPUC or FERC
 - Some require further development or investigation
- Decide in late winter if Action Plan for next summer is needed and, if so, begin to develop
- Continue longer-term reliability assessments

Take-Away Messages

- Assessment shows risk for this winter is lower than was estimated for summer
- Gas from Aliso Canyon continues to be tool to mitigate risk
- Even if we can reinject some gas in October and/or November we have more risk that gas curtailments will occur than normal
- CAISO and LADWP appear able to rely on generation sources outside the SoCalGas service area to replace lost output as long as no other transmission or generation outages occur
- Uncertainty about weather and equipment remains
- 10 mitigation measures, including gas conservation and using some of the 15 Bcf still at Aliso, will help