DOCKETED

Docket Number:	18-IEPR-03
Project Title:	Southern California Energy Reliability
TN #:	223362
Document Title:	Aliso Canyon Impact on Reliability Summer 2018
Description:	Joint agency presentation by the CPUC, Energy Commission, LADWP, and the California ISO for the May 8, 2018 IEPR Joint Agency Workshop on Energy Reliability in Southern California
Filer:	Stephanie Bailey
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	5/7/2018 3:01:21 PM
Docketed Date:	5/7/2018

California Public Utilities Commission

California Energy Commission

Los Angeles Department of Water and Power

California ISO

Aliso Canyon Impact on Reliability: Summer 2018

May 8, 2018

Purpose of the Summer 2018 Technical Assessment

- 5th in series of assessments jointly prepared by staff at the CEC, CPUC, CAISO and LADWP (hydraulic modeling by SoCalGas)
- Assess risk to electric generation given restricted operations at Aliso Canyon and identify measures to mitigate that risk
- Calculate minimum gas required for electricity generation ("min gen"), not as plan to curtail
- Summer 2018 Assessment is posted in IEPR docket at: http://www.energy.ca.gov/2018_energypolicy/documents/index.html#05082018
  - Comments due May 22

Assessment Covers Following Key Topics

- Update on SoCalGas system status
- Preliminary look at how the system largely avoided gas curtailments and electricity outages to date – including February 19 to March 6 curtailment event
- Ability to meet 1-in-10 year electricity demand peak day and resulting surplus or shortage
- Storage inventory preview for winter
- New mitigation measures to reduce electricity outage risk
- Update on mitigation measure results to date

Overall: Base Case Sufficient But With More Outages Generation faces Curtailment Risk

(MMcfd)	Summer 2018 Base	Summer 2018 Sensitivity (More Outages)
1-in-10 Electric Peak Day Gas Demand	3,511	3,511
1-in-10 Gas Demand at MinGen with N-1	3,114	3,114
Pipeline Capacity Available	2,655	2,525
Required Storage Withdrawal (from Hydraulic Model)	900	900
Supported Demand (from Hydraulic Model)	3,555	3,425
Surplus or Shortfall on 1-in-10 Electric Peak Day	44	-85
Surplus or Shortfall at MinGen with N-1	441	311*
December 31 Storage Inventory from Gas Balance (Bcf)	54[1]	43[2]

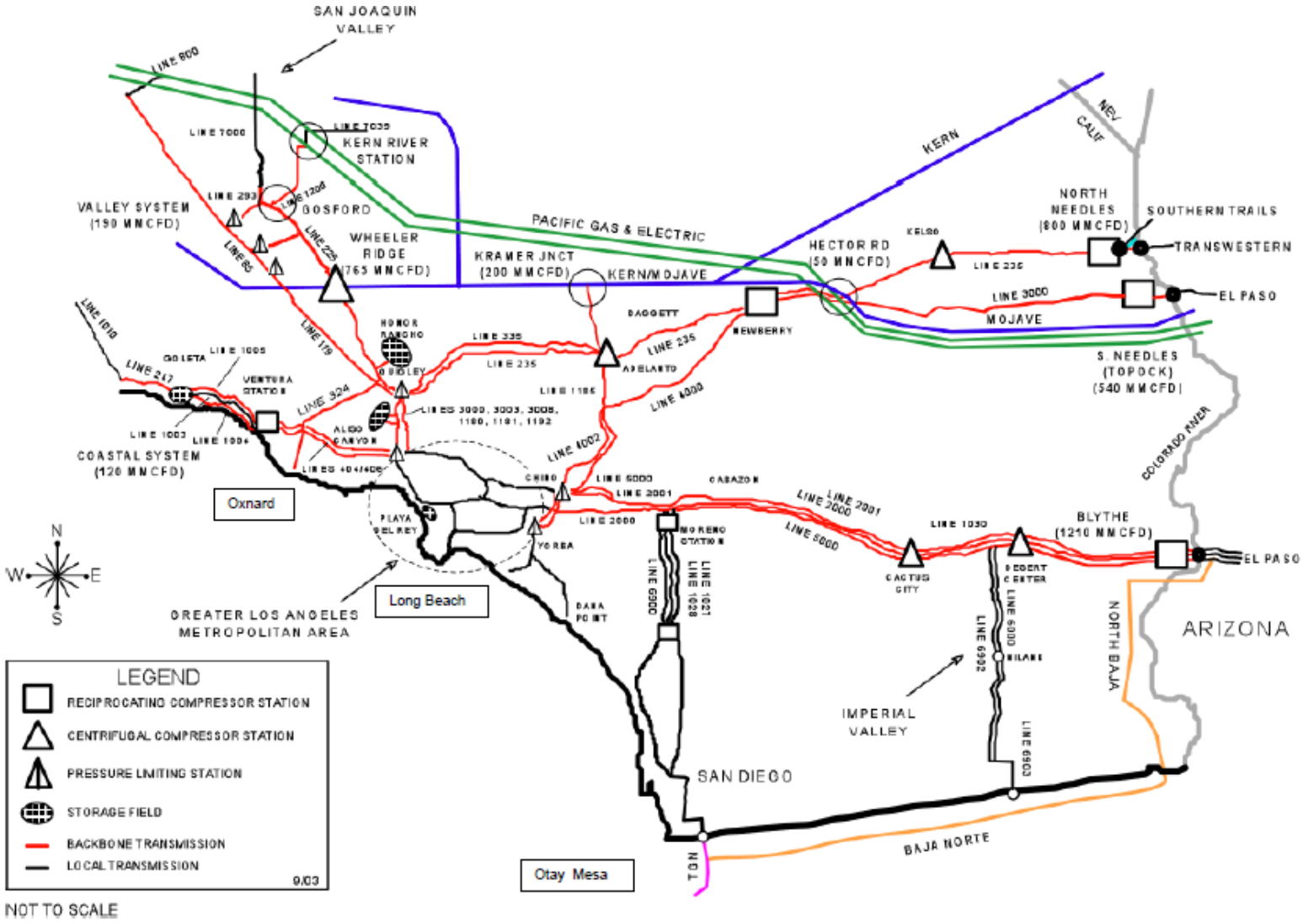
[1] *From Case A Gas Balance with pipeline capacity of 2,655 MMcfd*
[2] *From Case D Gas Balance with pipeline capacity of 2,480 MMcfd*

** This surplus assumes 100% of electric transmission is available and utilized. It shrinks if reduced to 90% and by 85% becomes a shortfall.*

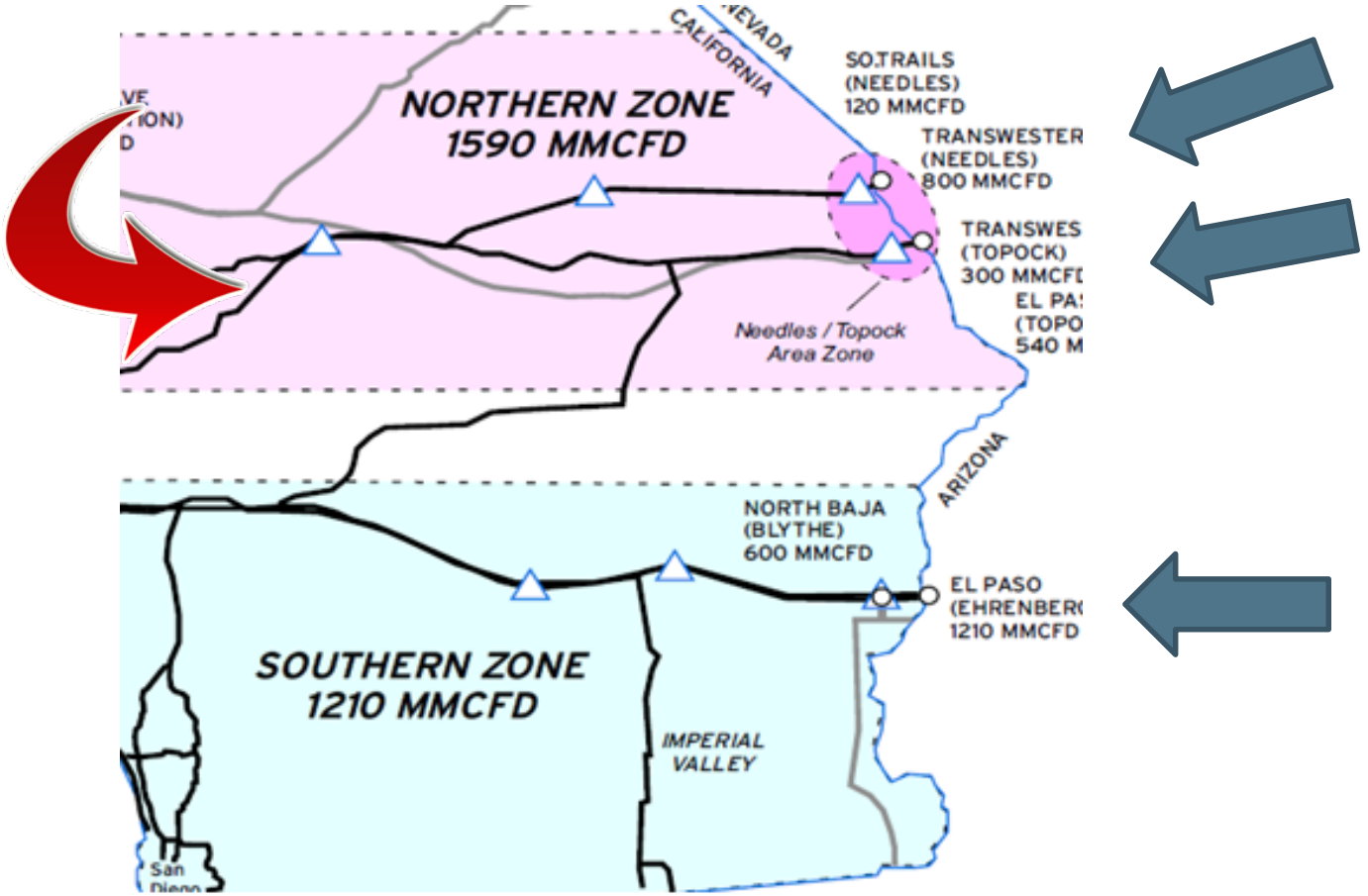
SoCalGas' System Remains Impaired by Multiple Pipeline Outages

- On October 1, Line 235-2 ruptured, burning the outside of an excavated section of Line 4000
- The rupture led to increased concerns about Line 4000, which went down for expedited maintenance
- Line 4000 partially returned to service on December 22
- There is no estimate for when Line 235-2 will return to service
- Line 3000 remains out
- Line 2000 is reduced to 980 MMcfd
- May be more outages

Reduced Capacity on Line 2000, Outages or Potential Outages on Lines 235, 3000, 4000 and 5000



Receipt Capacity into Both Zones Affected



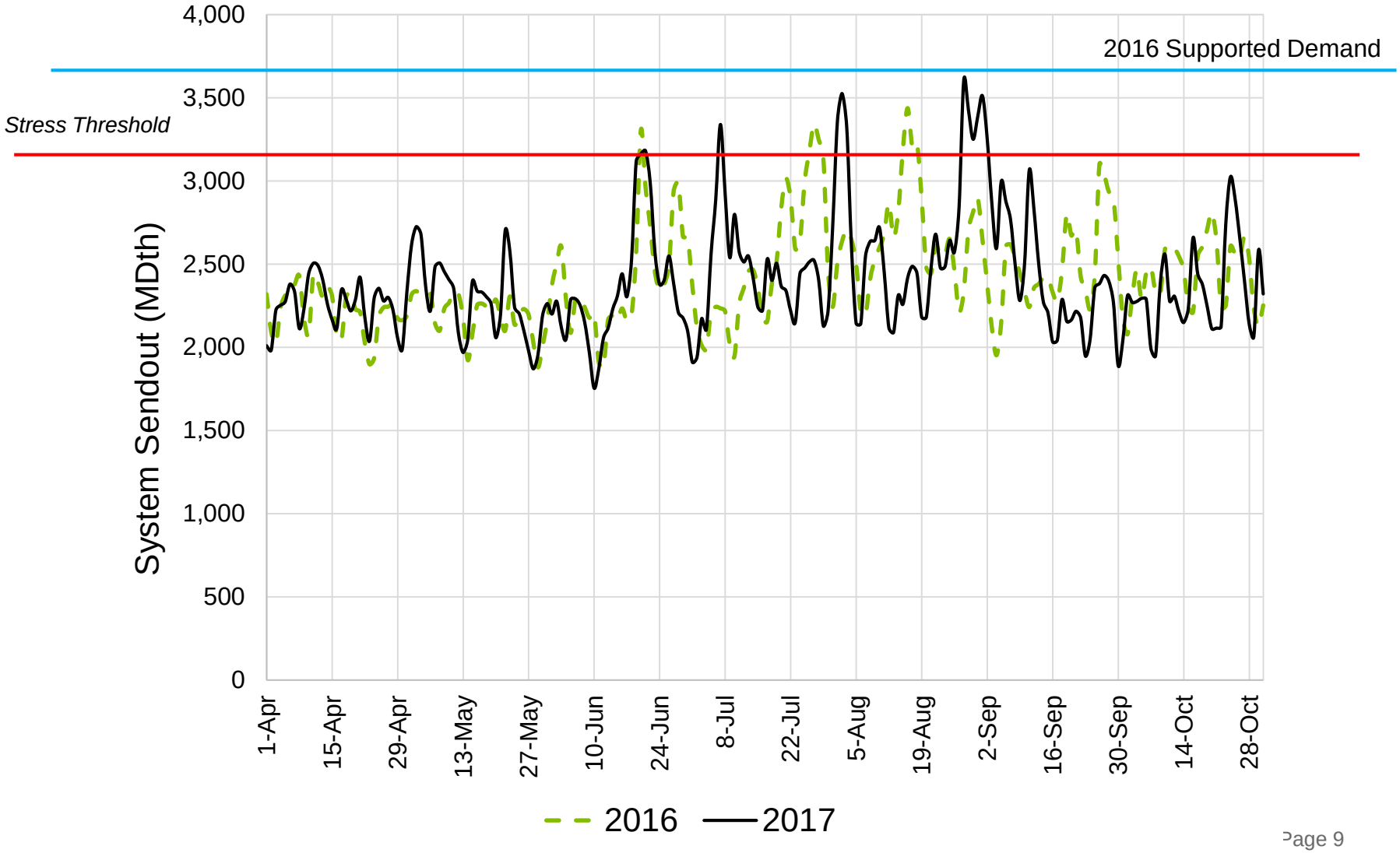
Interagency Cooperation, Lower Demand and OFOs Helped Limit Curtailments throughout 2016 and 2017

- Manageable demands, supported largely by cooperative weather helped offset limited supply
- Low OFOs used frequently to maintain balance
- Notices, watches and other alerts when necessary
- Only 2 days with EG curtailment, until February 2018
- Constant monitoring and work between SoCalGas, CAISO and LADWP to shift generation, use imports key

	Weather Notice	Curtailment Watch	Flex Alert	SCG Request to All Customers	EG Load Curtailment	Low OFO	Delayed Work	Days > 3.2 Bcf
Summer 2016		3	3			42		6
Winter 2016-17	28	6		7	2	64		45
Summer 2017	11	10	4			26		10
Winter 2017 -18	8	15			14	77	LADWP, CAISO and SoCalGas	14

OFO

Daily Natural Gas Sendout (Demand) for Past Two Summers

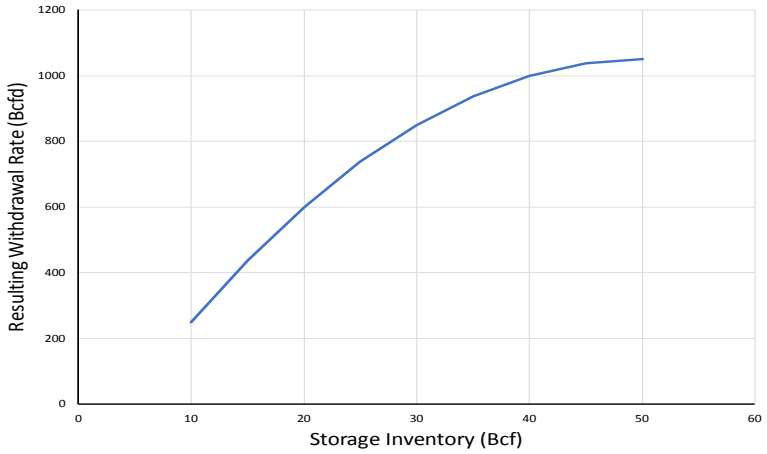


Late Winter Cold with the Outages Caused Curtailment

- Avoided expected curtailments in December and January due to warm weather
- Cold spell February 18 through March 6
- CAISO and LADWP reduced gas burn (i.e., curtailed)
- Withdrew from Aliso in few hours over six days (total of 1.1 Bcf)
- Using Aliso as asset of last resort reduced operating flexibility
- Lower inventory reduces withdrawal capacity as field pressure declines as illustrated

	3.2+ Bcf	4+ Bcf
Winter 2015	41	4
Winter 2016	45	3
Winter 2017	14	0

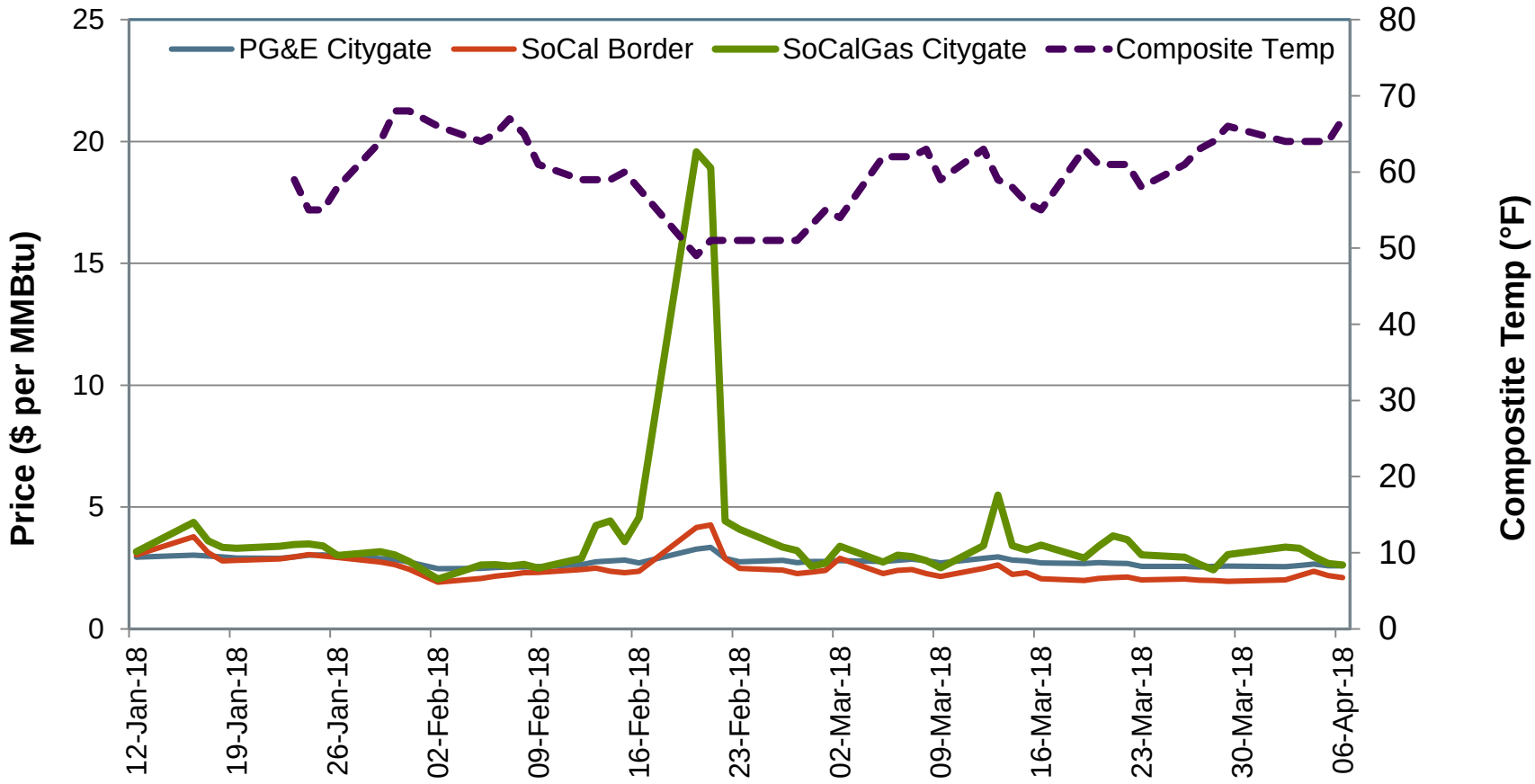
Storage Inventory	
January 1	63.8
February 18	57.4
March 6	48.8



Full Analysis of Cold Spell Impacts Remains Underway

- Preliminary review shows system receipts consistently less than system demand
  - Both daily AND hourly
  - zero hours in which receipt point capacity on SoCalGas system was fully utilized
  - ~6 MDth was available in every hour = 144 MDth or ~140 MMcfd
- Expect more detailed findings from CPUC later
- LADWP and CAISO assessing cost impact to electricity users
- Other CPUC Report Updates Will Take Account of Winter 2018 experience
  - 715 report
  - Withdrawal Protocol

SoCalGas Citygate Prices Higher on Colder Days



Overall Finding for Summer 2018: Risk Remains Despite 24.6 Bcf at Aliso

Good News:

- Gas required for minimum generation on 1-in-10 peak day lower

Bad News:

- Continuing pipeline outages
- Uncertain physical system mitigation
- “Supported Demand” is lower

End Result:

- Have to use storage more heavily this summer
- Cannot meet 1-in-10 electricity peak day with N-1 without gas from storage
- Cannot meet it at all in sensitivity case with more outages
- Minimum generation appears achievable but is NOT recommended to drop EG to “mingen” levels due to challenge of available supply and transmission
- More OFOs likely
- Outlook for winter storage inventory uncertain

SoCalGas System Capacity is Impaired Due to Continuing and New Pipeline Outages

- Gas system has lower capacity this summer because key pipelines out of service
  - Pipeline capacity reduced by 255 – 860 MMcfd versus last summer
  - Supported Demand reduced by 83 – 213 MMcfd versus last summer
- MinGen requirement reduced by 296 MMcfd versus last summer
- Pipeline Capacity is ~500 MMcfd lower than last summer
  - Could improve with system mitigation
  - Could be worse with more outages and limited or no system mitigation

System Capacity UNCERTAIN Depending on Outages and Mitigation Scenario

	Summer 2017	May 1	Summer 2018 Pessimistic	Summer 2018 Optimistic	Summer 2018 Combined	2016 CA Gas Report
	MMcfd					
Receipt Point						
North Needles	800	270[a]	0	270[a]	0	1,590
Topock*	0	0[b]	0	0[b]	0	
Kramer Junction	550	550	550	625[c]	625	
Ehrenberg	1,010	980	800	980	800	1,210[d]
Otay Mesa	0	30	150	230	230	
Wheeler Ridge	765	765	765	765	765	765
CA production	60	60	60	60	60	310[e]
TOTAL Supply	**3,185**	***2,655***	***2,325***	***2,930***	***2,480***	**3,875**

Pipeline capacity reduced by 255 – 860 MMcfd compared to last summer.

Maximum Supported Demand Varies Depending on Outages and System Mitigations

	SUMMER 2017		SUMMER 2018			
	Base Case		Base Case		Sensitivity	
	DAY	PEAK HOUR	DAY	PEAK HOUR	DAY	PEAK HOUR
	MMcfd	MMcfh	MMcfd	MMcfh	MMcfd	MMcfh
Pipeline	3185	132.7	2655	110.6	2525	105.2
North Needles	800	33.3	270	11.3	0	0
Topock*	0	0.0	0	0	0	0
Kramer Junction	550	22.9	550	22.9	700	29.2
Ehrenberg	1010	42.1	1010	42.1	800	33.3
Otay Mesa	0	0.0	0	0	200	8.3
Wheeler Ridge	765	31.9	765	31.9	765	31.9
CA production	60	2.5	60	2.5	60	2.6
Storage	468	61.3	900	55	900	55
Aliso Canyon	0	0.0	0	0	0	0
Honor Rancho	198	35.0	380	33.3	380	33.3
La Goleta	170	13.8	220	9.2	220	9.2
Playa del Rey	100	12.5	300	12.5	300	12.5
Supported Demand	***3638***	***221.5***	***3555***	***214.7***	***3425***	***205.3***
Core	808	33.7	770	32.1	770	32.1
Electric Generation	2201	153.5	2015	151.6	1885	141.9
Noncore non-EG	629	34.3	770	31.0	770	31.3
Pack(+)/Draft(-)	15	-27.5	0	-49.1	0	-45.1

Supported Demand is 83 – 213 MMcfd lower than last summer.

Serving Supported Demand Uses More Storage This Summer Due to Pipeline Outages

- Anytime demand > pipeline capacity, must use storage
- Achieving supported demand makes greater use of storage than in previous summer: *468 vs. 900*

	SUMMER 2017	SUMMER 2018
	MMcfd	MMcfd
Storage	468	900
Aliso Canyon	0	0
Honor Rancho	198	380
La Goleta	170	220
Playa del Rey	100	300

- Substantial summer storage use reduces field inventories
- Expect more OFOs, both high and low

Summer 2018 Minimum Generation Requirement = 1,574 MMcfd

- Minimum Generation is the gas needed to prevent electricity service outages and no more
- CAISO shifts generation to other units outside the SoCalGas service area; LADWP needs imports from external entities to achieve “MinGen”
- Departs from economic dispatch; increases cost of electricity
- Achievable only if
  - all electric transmission lines operating at full capacity
  - the replacement units have access to gas
- Calculations by CAISO and LADWP
- Last summer’s near 1-in-10 year peak day required 2,028 MMcfd
- “MinGen” gas requirement = 1,574 MMcfd

1-in-10 Demand Met When Electric Generation Reduced to Minimum Generation

- Supported Demand is Lower but so Is EG Minimum Generation
- Results in increased cost to serve electric load
- Only feasible when sufficient external energy supplies are available
- Assumes 100% Electric Transmission is Available and Used

Shortfall or Surplus on a 1-in-10 Peak Day with Minimum Electric Generation and an N-1 Contingency		
(MMcfd)	Assessment Group Base Case	Assessment Group Sensitivity
1-in-10 Electric Peak Day Gas Demand	3,511	3,511
1-in-10 Year Customer Demand with Generation Curtailed to Minimum Levels	3,114	3,114
Supported Demand without Aliso Canyon	3,555	3,425
Gas System "Surplus" After Moving Electric Generation to Minimum	441	311

- Turns into a shortfall somewhere between 85 and 90 percent electric transmission utilization at which point withdrawal from Aliso Canyon may be necessary to avoid interruption to electric service

Gas Balance Simulation Shows Range of Potential Storage Inventory for Winter

- 7 cases testing different pipeline outages and system mitigation
- Fields reach maximum by July/August without violating parameters
- Reserve margins very low throughout
- December 31 storage inventory similar to last winter in most cases
- Higher inventory better to guard against cold-driven higher demand

SoCalGas Monthly Gas Balance NORMAL WEATHER Summary					
Case	Description	September Capacity	Reserve Margin	Year-End Storage	Max Storage, Month
		MMcf	%	Bcf	Bcf
A	Current Conditions	2655	0-10	54	70, July
A.30	Aliso increased to 30 Bcf	2655	0-10	59	75, July
B	Additional Outages + 30 Bcf	2325	0-2	30	75, August
C	Current Conditions + Mitigation and Aliso increased to 30 Bcf	2930	0-22	67	75, July
D	Additional Outages + Mitigation	2480	0-11	43	70, July
D.30	D, with Aliso increased to 30 Bcf	2480	0-11	48	75, July
D. Max	D, with all pipeline capacity used to inject	2480	0%	69	96, August

Update to Action Plan

- 39 mitigation measures accumulated in prior Action Plans
- Many continue with no additional action
- Suggest 5 new measures for summer 2018:
  - Get 230 MMcfd for certain at Otay Mesa using LNG
  - Fully utilize pipeline capacity by allowing SoCalGas to buy gas (i.e., expand Southern System Minimum procurement authority)
  - Use existing rules to call high and low OFOs more frequently and together when necessary
  - Identify and expedite pending transmission upgrades with potential to reduce MinGen requirement
  - Monitor status of US Department of Energy NG demand response pilot program to ensure California is a region for any pilots
- Work on plan for next winter unless outages remedied soon

Prior Measures Implemented by CPUC

Measure	Note
Require SoCalGas to Use Aliso for Reliability	Done
Tighter Gas Balancing and OFO Rules	Done; may have to extend
Efficiently Complete the Required Safety Review at Aliso Canyon to Allow Safe Use of the Field	Done
Establish More Specific Gas Allocation among Generators in Advance of Curtailment	Done
Determine if any Maintenance Can be Deferred and Still be Safe	Done
Expand Gas and Electric Energy Efficiency (EE) Targeted at Low Income Customers	Done
Expand Demand Response (DR) Programs	Done
Reprioritize Existing EE Towards Programs with More Immediate Impact	Extended through 2020
Reprioritize Solar Thermal Program Spending	Done
Develop and Deploy Gas DR Program	Done

CPUC-Estimated IOU Peak-Day Gas Demand Reductions Resulting from Mitigation Measures & Others since 2010

Mitigation Measures	Summer	Winter
	MMcfd	
Gas Balancing Rules	536.5	72.3
Energy Efficiency	263.3	77.3
Energy Savings Assistance Program	6.8	2.5
California Solar Initiative: Thermal Program	0.9	0.9
Customer-Side Solar PV Electricity Generation	72.4	0
Marketing Education and Outreach	NA	NA
Electricity Storage	8	0
Electric Demand Response	63	0
Gas Demand Response	NA	NA
Total	950.8	153

These program reduced peak summer and winter gas demand by about 27% and 3%, respectively, for SDG&E, SoCalGas and Southern California Edison.

CPUC Activities Beyond the Action Plan

- Updated the Aliso Canyon Demand-Side Resource Impact Report http://www.cpuc.ca.gov/aliso/ and retitled “Aliso Canyon Mitigation Measure Impacts Report.”

- 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

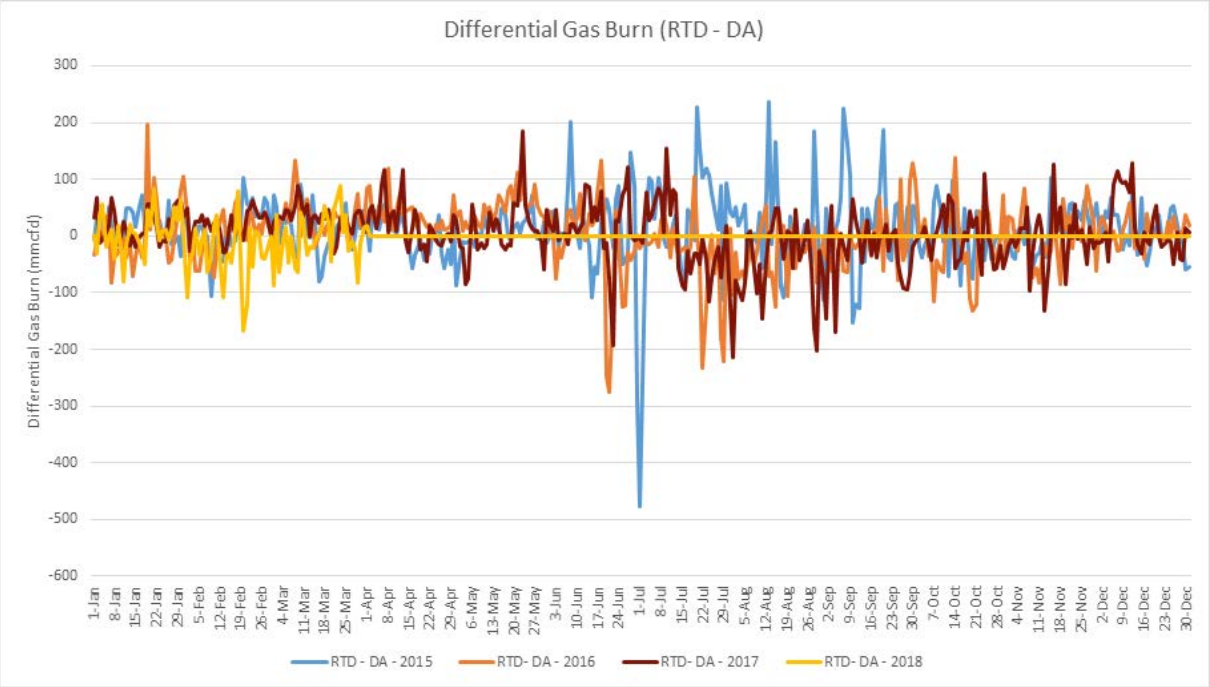
- California Council for Science and Technology’s long-term study of statewide viability of natural gas storage was released January 2018

- Order Instituting Investigation (I.17-02-002) into the feasibility of reducing or eliminating use of Aliso Canyon is underway

- Updates to Section 715 report

CAISO Impact of Mitigation Measures

- Proactive coordination between CAISO, SoCalGas and generators demonstrates success in reducing gas imbalances.
- Enabling tariff provisions expire December 16, 2018 and may need extension.



Row Labels	Max Underscheduled 2015	Max Underscheduled 2016	Max Underscheduled 2017
June	201	132	121
July	227	105	154
August	236	53	48
September	224	129	66

New Transmission Facilities in 2018 Summer Power Flow

- Santiago Substation Synchronous Condenser (243 MVar) in service 12/8/2017 (SCE area)
- San Luis Rey Synchronous Condensers (450 MVAR) in service 12/29/2017 (SDG&E area)
- Sycamore – Penasquitos 230 kV line expected in service July 2018 (SDG&E area)
- These facilities help reduce the gas required at minimum generation versus last summer.

Facilities Planned After Summer 2018 Will Also Help

- Three additional projects (previously planned) to improve transmission facilities will strengthen Southern California energy reliability and permit the electrical system to adjust more readily to changing conditions:
  - San Onofre Synchronous Condenser (240 MVAR) expected in service by October 2018
  - Suncrest Static VAR Compensator (300 MVAR) in service date being revisited by project sponsor
  - Mesa 230/500 kVLoop-In 500 kV line expected in service March 2022

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
- Maintain Dual Fuel Capability
  - 1,500 MW alternative fuel capability only as a last resort to maintain electric reliability in emergency situations.
- Other actions highlighted in morning presentation

Comes Down to Outages, Balancing, and Weather -- Even With Mitigation Measures

- Risk to electric generation is larger this summer than last
  - The outages reduce pipeline capacity and Supported Demand
  - By more than the decrease in 1-in-10 year demand
- Need system fully utilized before curtail generators
- Need demand < "*Supported Demand*"
- Need the pipeline system restored to full capacity

Next Steps

- Continue monitoring closely:
  - pipeline outages
  - pipeline utilization
  - storage inventory
  - gas system mitigation success at Otay Mesa
  - natural gas prices in Southern California
- Review and implement the additional mitigation measures
- Comments Due May 22 to Energy Commission docket:

  18 -IEPR-03–Southern California Energy Reliability