DOCKETED

Docket Number:	17-IEPR-04
Project Title:	Natural Gas Outlook
TN #:	221391
Document Title:	Presentation - North American Natural Gas Macro
Description:	Presentation by George Wayne of Kinder Morgan
Filer:	Raquel Kravitz
Organization:	Kinder Morgan
Submitter Role:	Public
Submission Date:	10/5/2017 1:34:09 PM
Docketed Date:	10/5/2017

KINDER MORGAN

North American Natural Gas Macro

Cautionary Language
Regarding Forward-Looking Statements

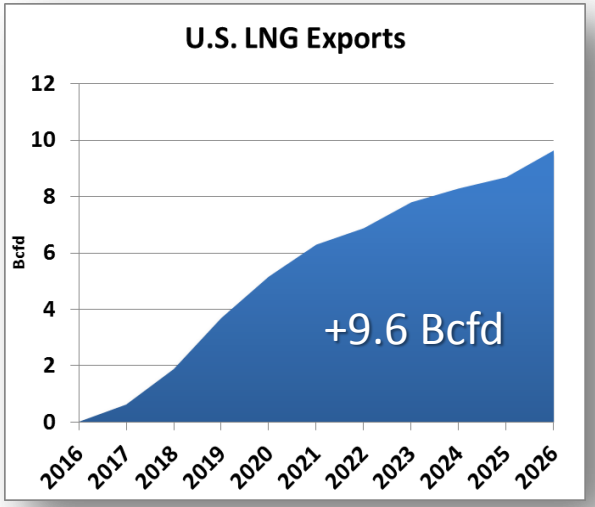
This presentation contains forward-looking statements. These forward-looking statements are identified as any statement that does not relate strictly to historical or current facts. In particular, statements, express or implied, concerning future actions, conditions or events, future operating results or the ability to generate revenues, income or cash flow or to make distributions or pay dividends are forward-looking statements. Forward-looking statements are not guarantees of performance. They involve risks, uncertainties and assumptions. Future actions, conditions or events and future results of operations of Kinder Morgan Energy Partners, L.P., Kinder Morgan Management, LLC, El Paso Pipeline Partners, L.P., and Kinder Morgan, Inc. may differ materially from those expressed in these forward-looking statements. Many of the factors that will determine these results are beyond Kinder Morgan's ability to control or predict. These statements are necessarily based upon various assumptions involving judgments with respect to the future, including, among others, the ability to achieve synergies and revenue growth; national, international, regional and local economic, competitive and regulatory conditions and developments; technological developments; capital and credit markets conditions; inflation rates; interest rates; the political and economic stability of oil producing nations; energy markets; weather conditions; environmental conditions; business and regulatory or legal decisions; the pace of deregulation of retail natural gas and electricity and certain agricultural products; the timing and success of business development efforts; terrorism; and other uncertainties. There is no assurance that any of the actions, events or results of the forward-looking statements will occur, or if any of them do, what impact they will have on our results of operations or financial condition. Because of these uncertainties, you are cautioned not to put undue reliance on any forward-looking statement.

KINDER MORGAN

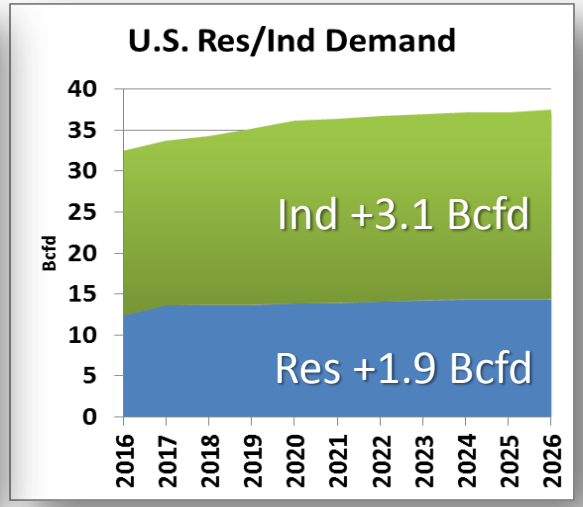
Agenda

- North American Overview
- Regional Supply and Demand
- Power Generation
- Mexico

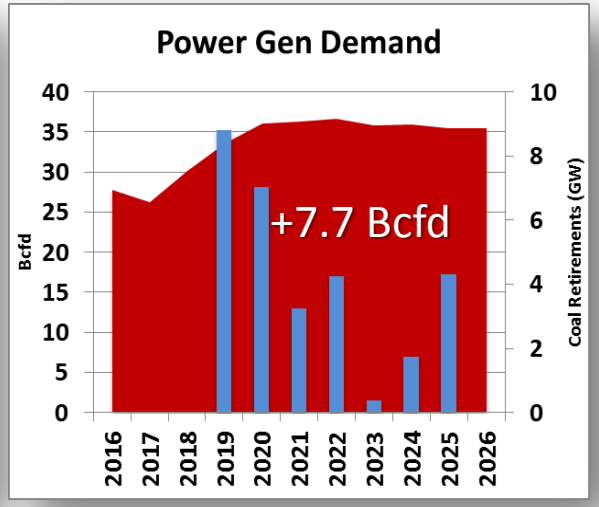
Current Key Trends



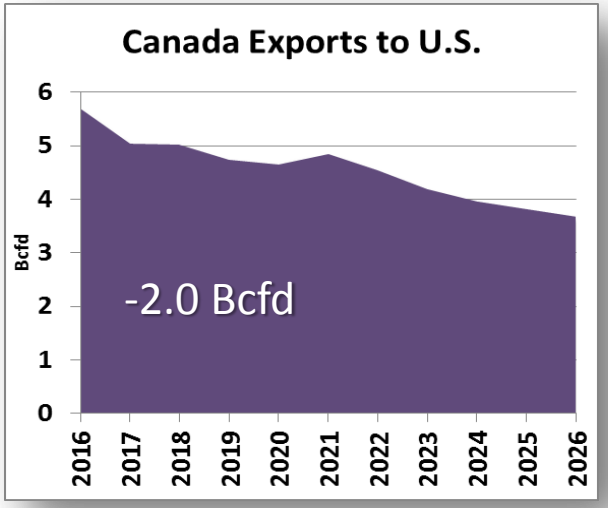
U.S. becomes net exporter



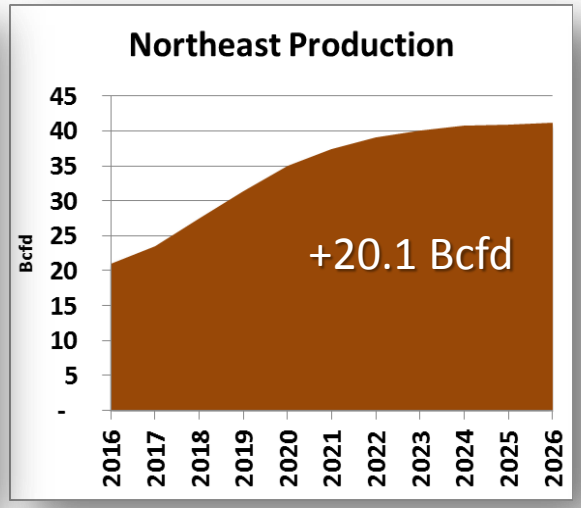
Industrial demand growth



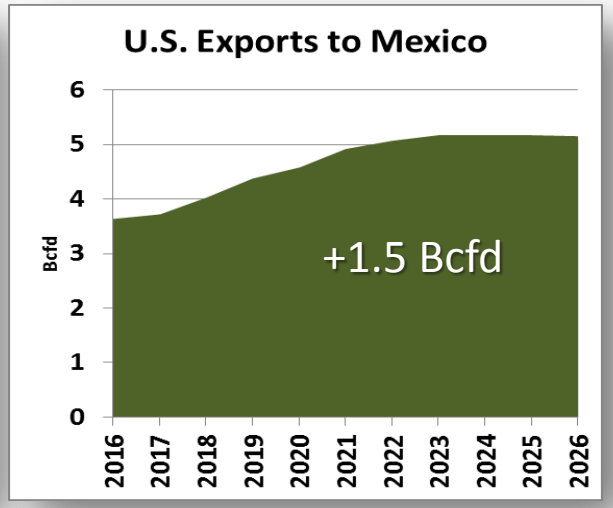
Gas-fired generation increases



Less Canadian Exports to U.S.



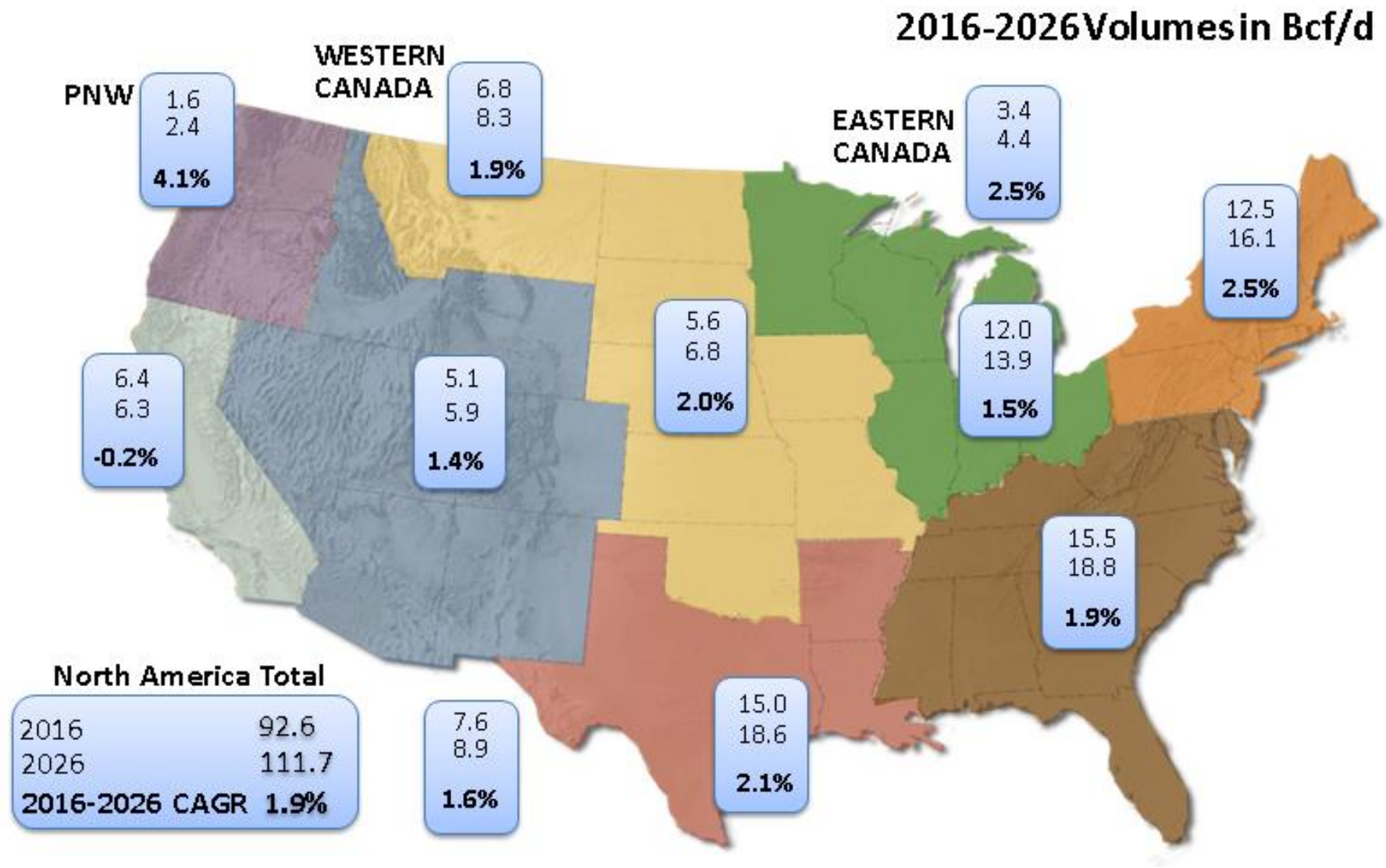
Continued supply increases



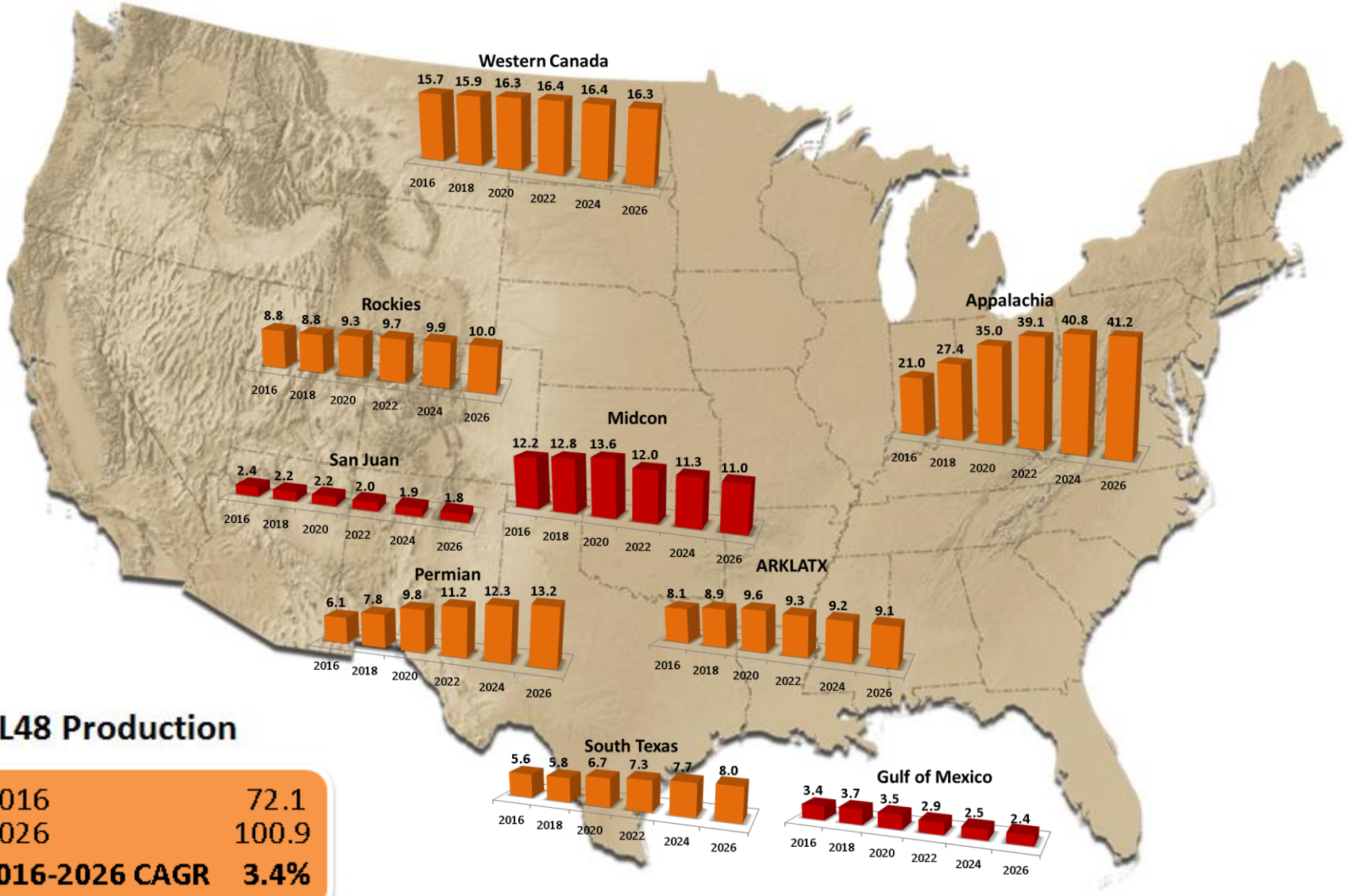
More U.S. Exports to Mexico

Source: ICF International and Kinder Morgan Analysis

Demand
(Not Including Exports)



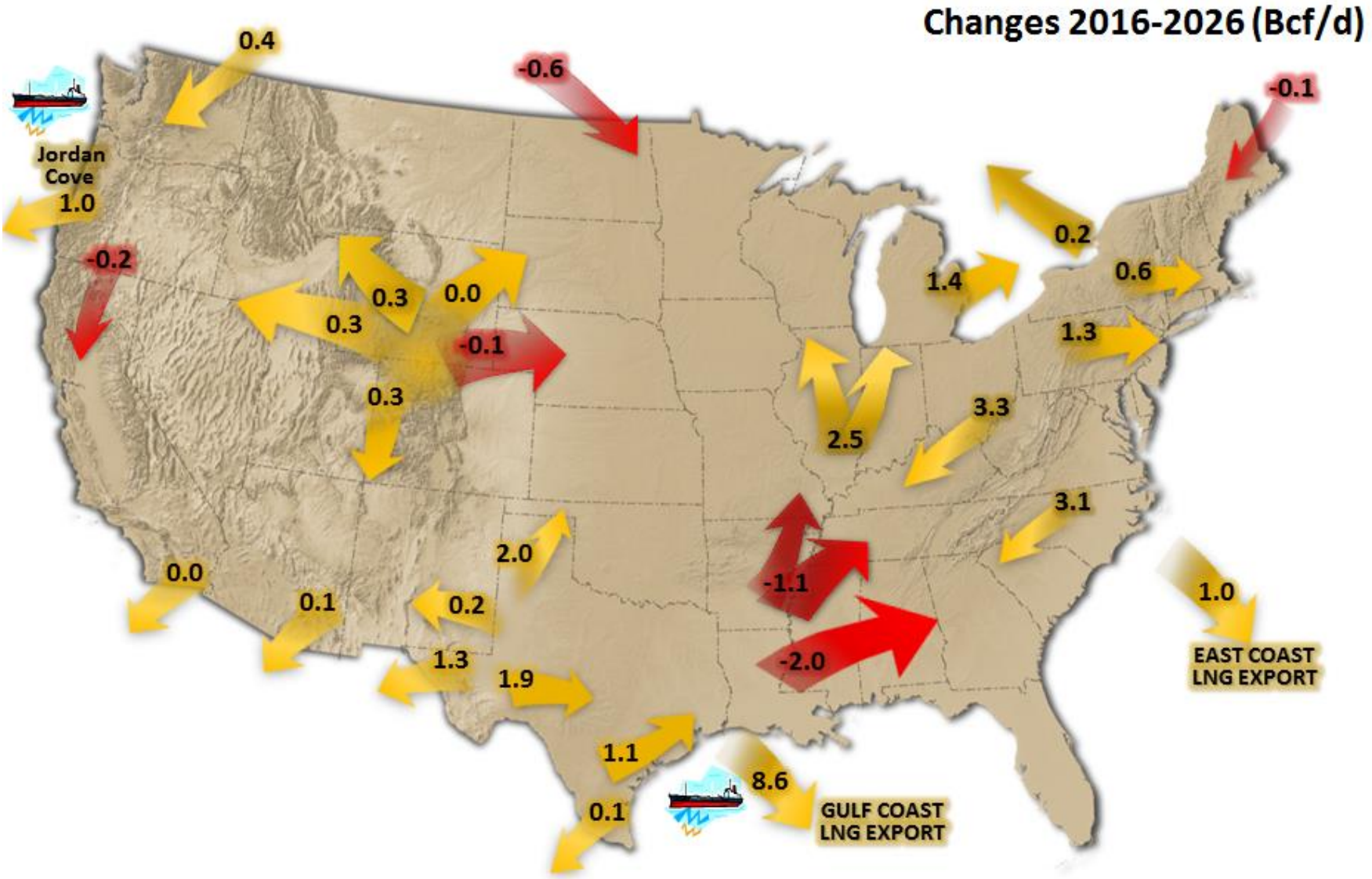
Supply
(Dry Gas)



L48 Production

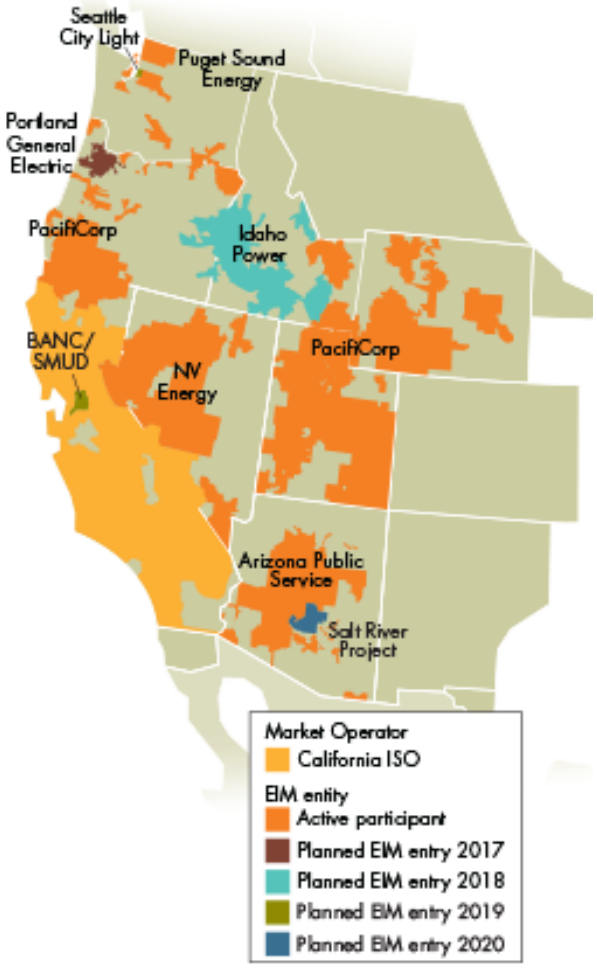
2016	72.1
2026	100.9
2016-2026 CAGR	**3.4%**

Flow Changes



Power Generation

Energy Imbalance Market (EIM)



The EIM seeks to optimize generation resources across a broad power market region to reduce costs and emissions:

- ✓ Minimizes sub-hourly dispatch
- ✓ Reduces reserve capacity requirements
- ✓ Reduces renewable generation curtailments

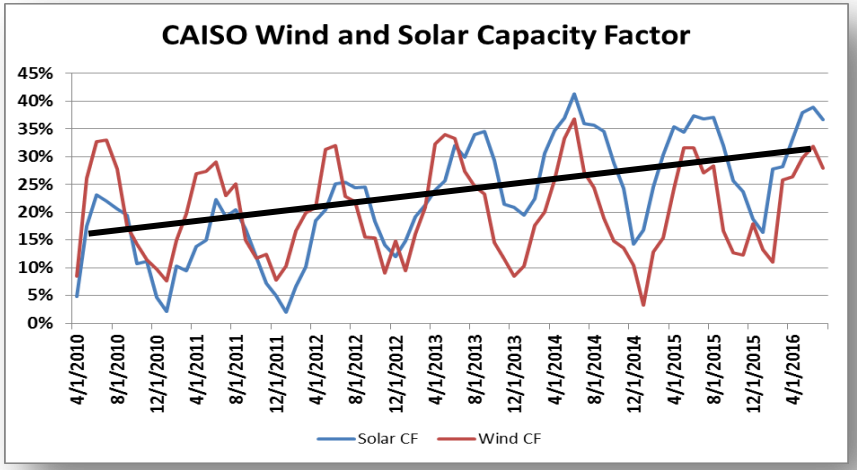
Seattle City Light, Portland General Electric, Idaho Power, and Salt River Project will also join the EIM

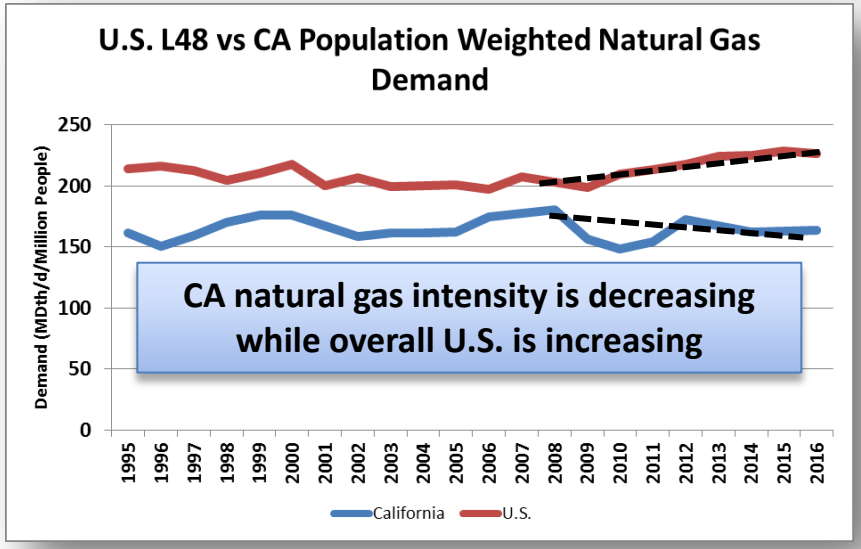
100-200 MMcfd net impact to WECC region gas demand

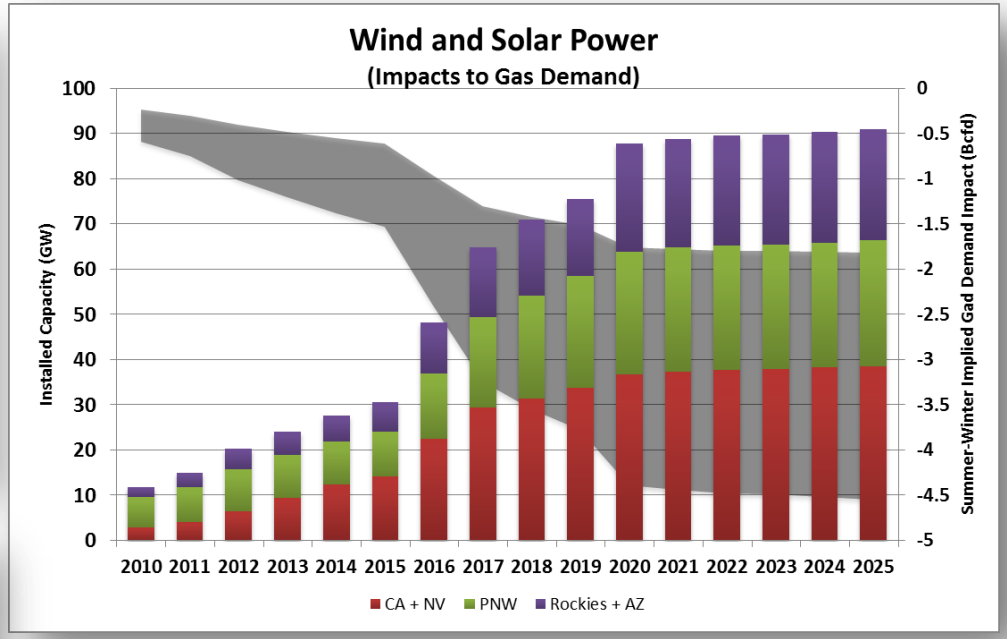
Since its inception, EIM has saved $146 MM and averaged 5 MMcfd of reduced gas-fired generation demand in 2016

Source: CAISO

Renewable Growth



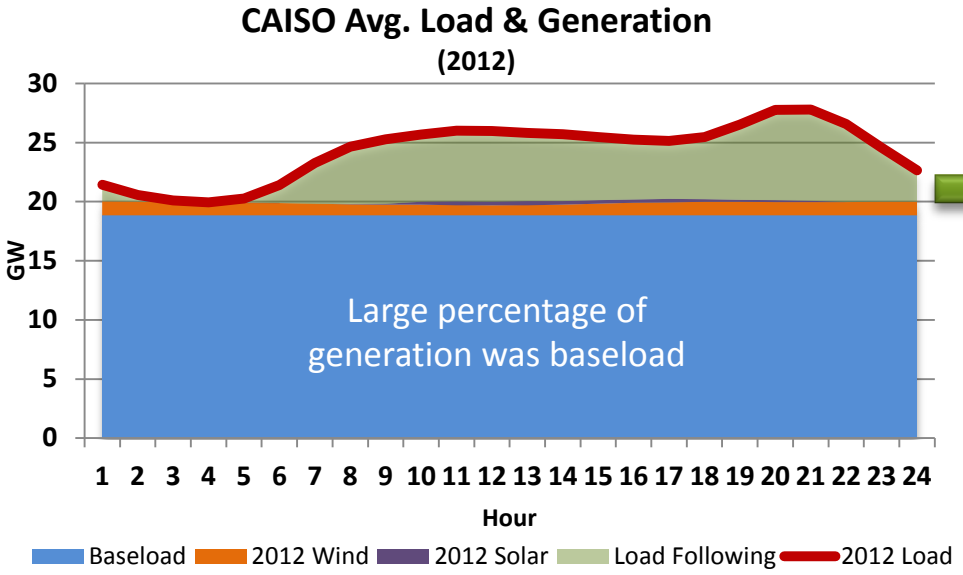


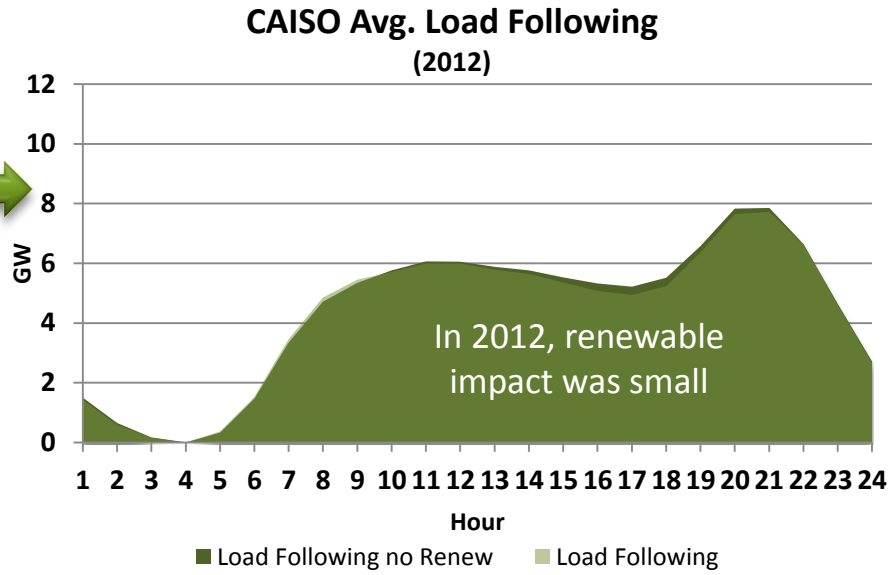


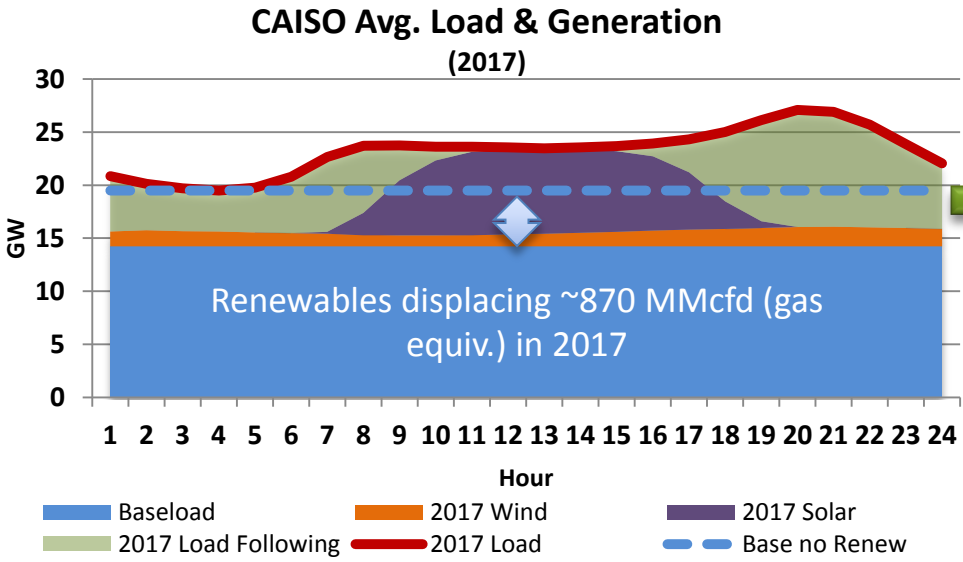
Source: Existing to planned capacity from Velocity Suite; Gas demand impacts derived from ICF International generation forecast data

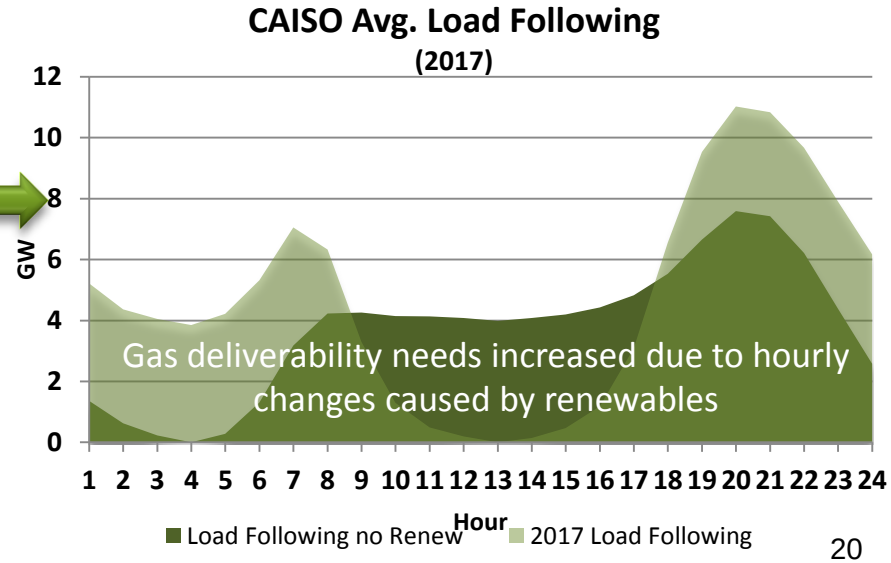
Given the projections for existing and new renewable power, the West Region may see a maximum demand destruction in power gen of 3.2 Bcfd (1.8 winter to 4.5 summer) by 2025.

CAISO Renewables 2012 to 2017

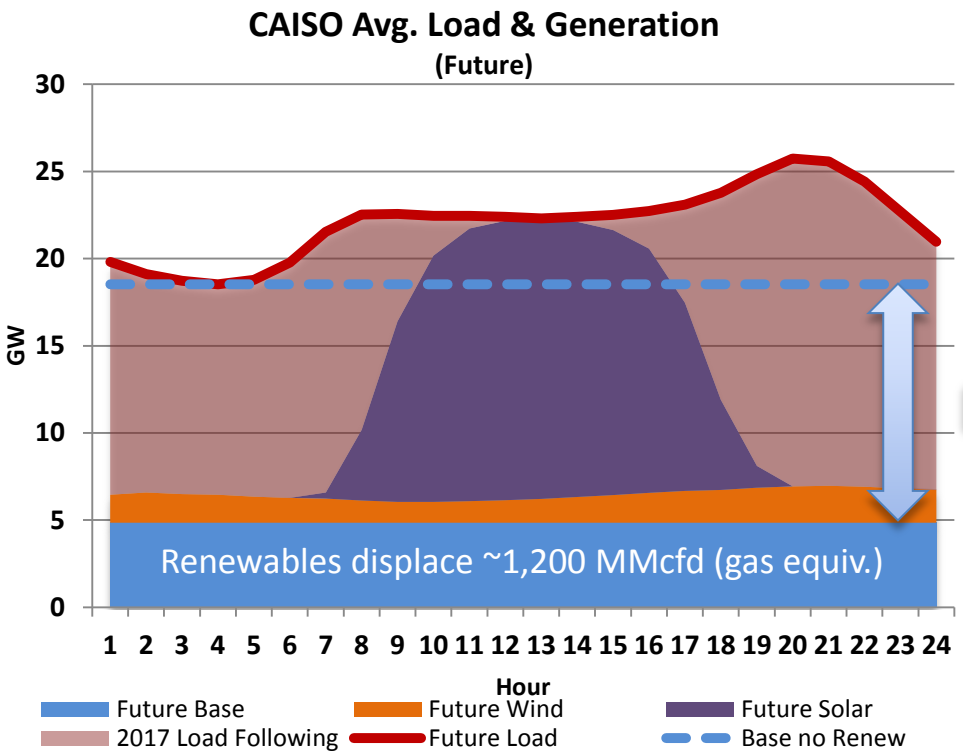


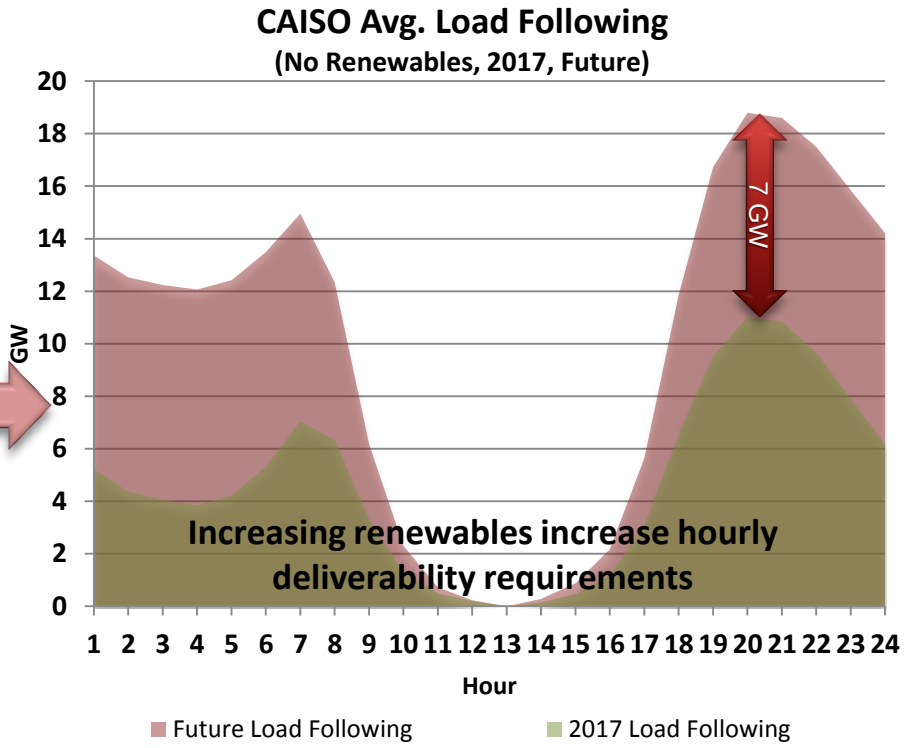






CAISO Future Generation





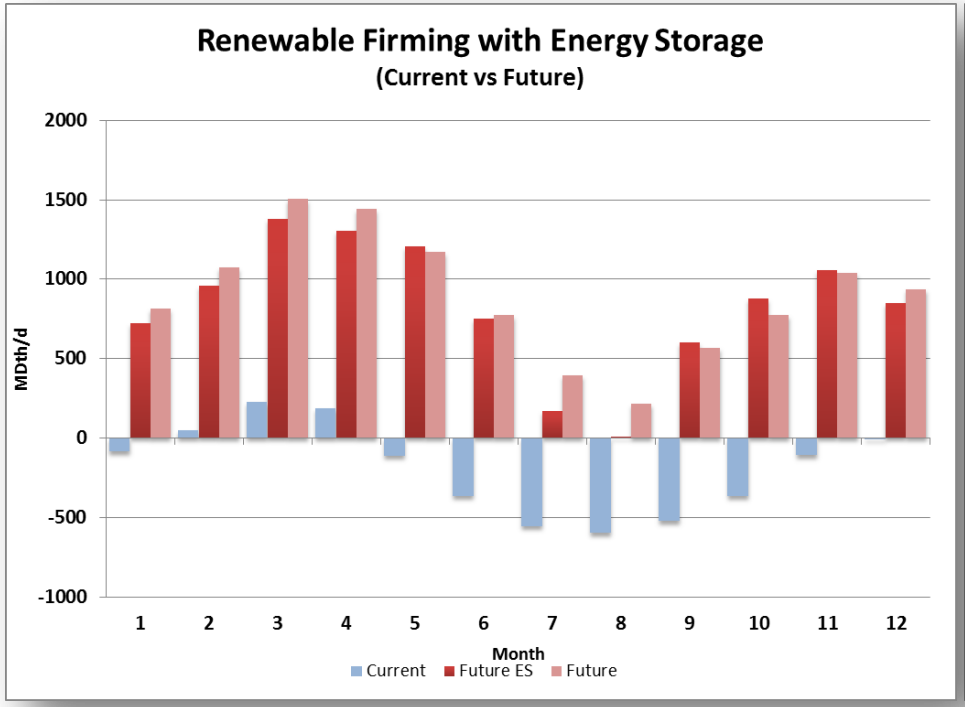
Higher solar generation pushes out more baseload generation leading to a reduction of ~300 MMcfd in gas equivalent generation compared to 2017 (1.2 Bcfd reduction compared to no renewables case)

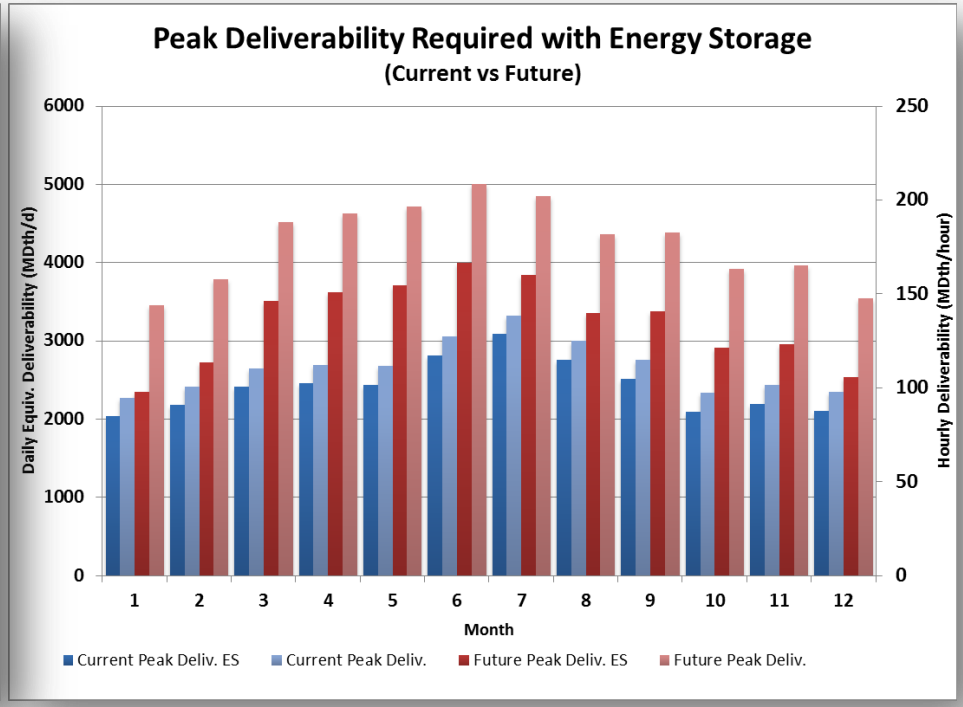
Gas-fired hourly peaking grows by 7 GW[1] (2 Bcfd increase[1], 5 Bcfd total)[2]

Assumes 200% of 2017 solar, 115% of 2017 wind, and 95% of 2017 load; charts based on an average March day

[1]Peak day compared to 2017, [2]Daily equivalent hourly flow rate

Renewable Implications to Natural Gas





On average, without energy storage gas-fired renewable firming is higher by 70 MMcfd

In a higher solar generation scenario, renewable firming increases by 1.1 Bcfd compared to 2017

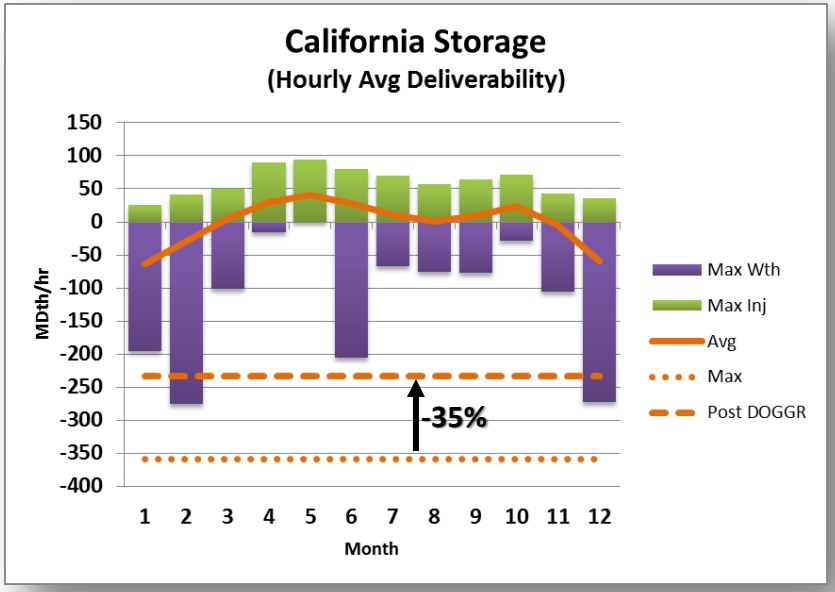
Rapid hourly changes in solar generation result in need for substantial hourly gas capacity to support gas-fired renewable firming generation

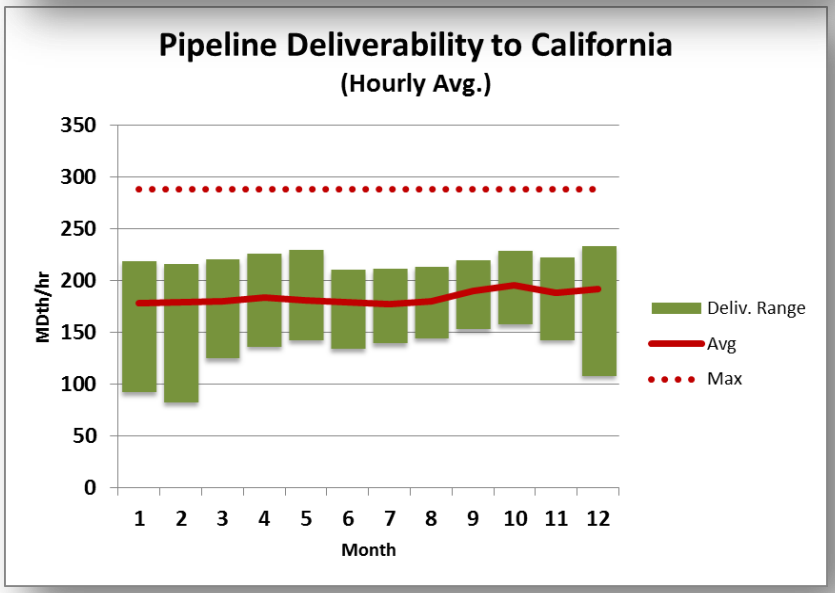
Without energy storage, peaking need is higher by 1 GW (1 Bcfd)[1]

"Future," assumes 200% of 2017 solar, 115% of 2017 wind, and 95% of 2017 load, 13 GW x 5 hour energy storage discharge

[1]Daily equivalent hourly flow rate

California Gas Deliverability
(2012 to 2017 YTD)





Historical average and peak storage withdrawal demand has been within California's storage withdrawal capability. Future storage limitations may impact peak day deliverability.

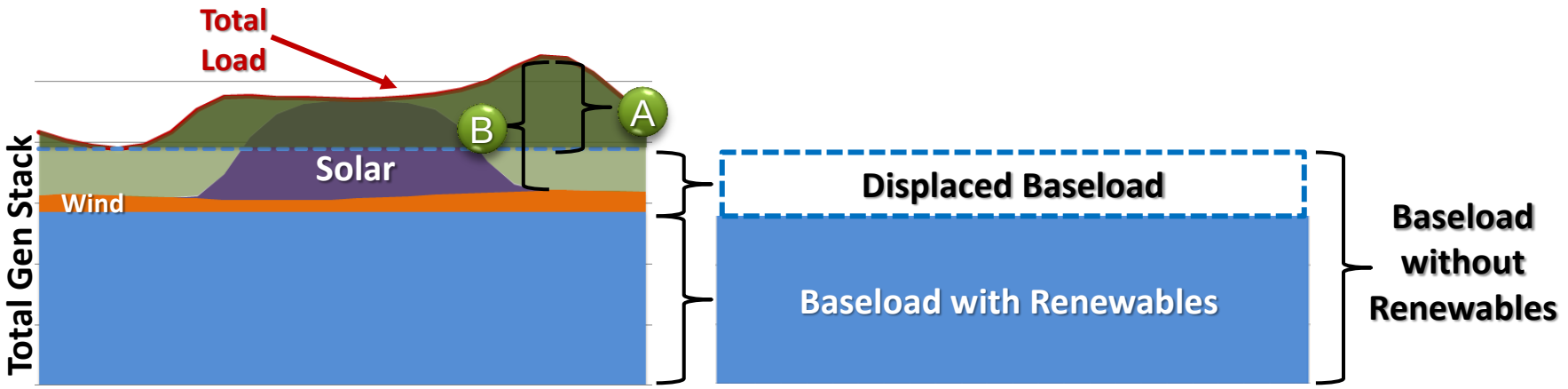
Hourly deliverability needs based on renewable firming may put pressure on overall California deliverability, requiring greater pipeline delivery flexibility.

Increasing renewables and DOGGR storage rules reduce the deliverability margin in California.

More detailed in-state deliverability analysis is needed as power generation peaking needs could disrupt the current allocation of storage and pipeline capacity.

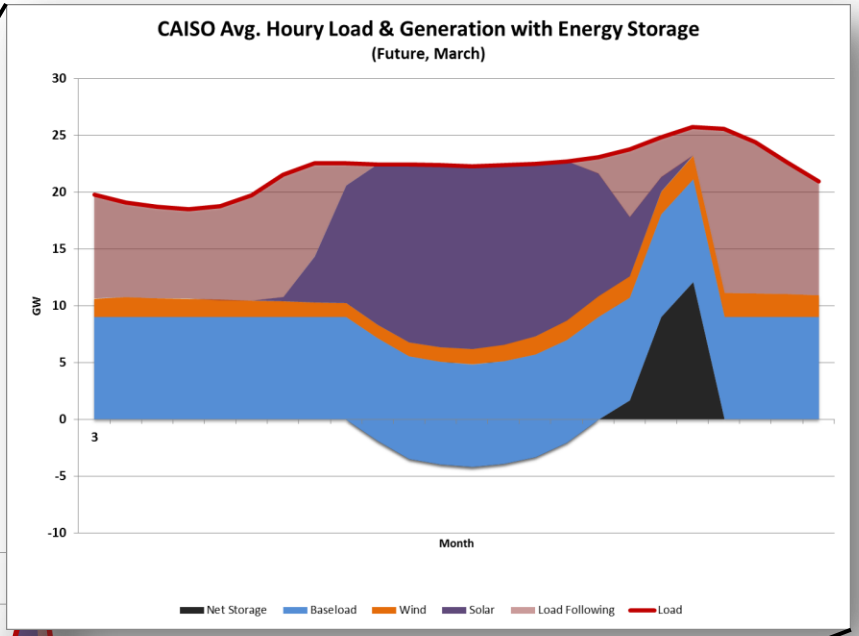
Appendix

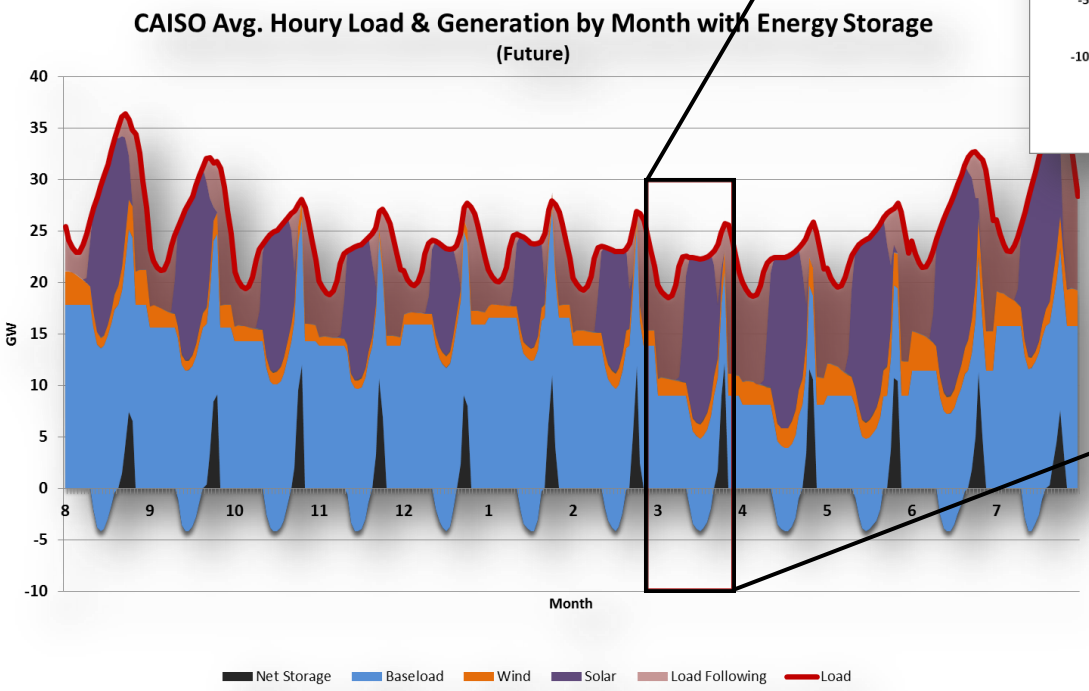
Definitions



Future CAISO with 13 GW Energy Storage

Energy storage increases total gas-fired generation by 200 MMcfd[1] but reduces renewable firming by 70 MMcfd. Hourly peaking growth is limited to 2 GW[2] (1 Bcfd increase[2], 4 Bcfd total)[3]





Assumes 200% of 2017 solar, 115% of 2017 wind, 95% of 2017 load, 13 GW x 5 hour energy storage discharge

[1]Compared to future case with no energy storage; gas-fired generation increases because over-generation of baseload is needed to enable charging of energy storage [2]Compared to 2017, [3]Daily equivalent hourly flow rate