



California ISO

Historical RA export from NWPP to CAISO

An analysis of CAISO-contracted Resource Adequacy import

California ISO

May 29, 2020

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CAISO analysis on contracted Resource Adequacy imports from the Northwest Power Pool

- In response to a request made by the Northwest Power Pool (NWPP), the CAISO prepared this analysis of Resource Adequacy (RA) imports. The analysis is based on historical data of CAISO RA import contracts and energy flows between the NWPP and CAISO footprints
- The NWPP request was made as part of an effort being undertaken by the NWPP to assess the resource adequacy of the NWPP region and the potential benefits of forming an RA program for the NWPP footprint
- This analysis is based on historic data that are aggregated to a regional level, such that it does not disclose any entity-specific confidential information of contractual or operational data
- The analysis is a historic lookback only and does not draw any conclusions with respect to future RA contracting or energy flows between the regions

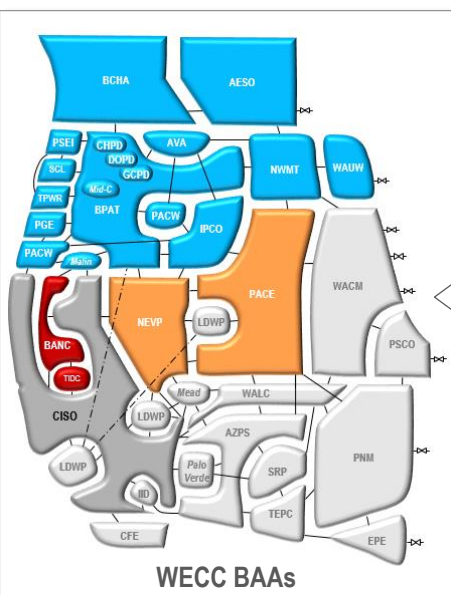
Footprint of Northwest Power Pool (NWPP)

NWPP

Northwest

NEVP + PACE

BANC + TIDC



WECC BAs

Source: CAISO

NERC/WECC BAs by Sub-regions



Northwest Power Pool (NWPP RSG)

Alberta Electric System Operator
Avista Corporation
Bonneville Power Administration
British Columbia Hydro Association
Chelan County PUD
Douglas County PUD
Grant County PUD
Idaho Power Company
NaturEner Power Watch – Wind Energy
Northwestern Energy
PacifiCorp-East
PacifiCorp-West
Portland General Electric Company
Puget Sound Energy
Sacramento Municipal Utility Board
Seattle City Light
Sierra Pacific Power Company
Tacoma Power
Turlock Irrigation District
Western Area Power Administration – UGP

Rocky Mountain Power Pool (RMPP)

Public Service Company of Colorado
Western Area Power Administration – CM

Arizona-New Mexico (SRSG)

Arizona Public Service Company
CECD – Arlington Valley
CECD – Griffith
CECD – Harquahala
CECD – Panda Gila River
El Paso Electric Company
Imperial Irrigation District
Nevada Power Company
Public Service Company of New Mexico
Salt River Project
Tucson Electric Power Company
Western Area Power Administration – LCR

California-Mexico

California Independent System Operator
Comision Federal de Electricidad
Los Angeles Dept. of Water and Power

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Source: "Northwest Power Pool Reliability through Cooperation", presentation by NWPP, 2013

Terminology

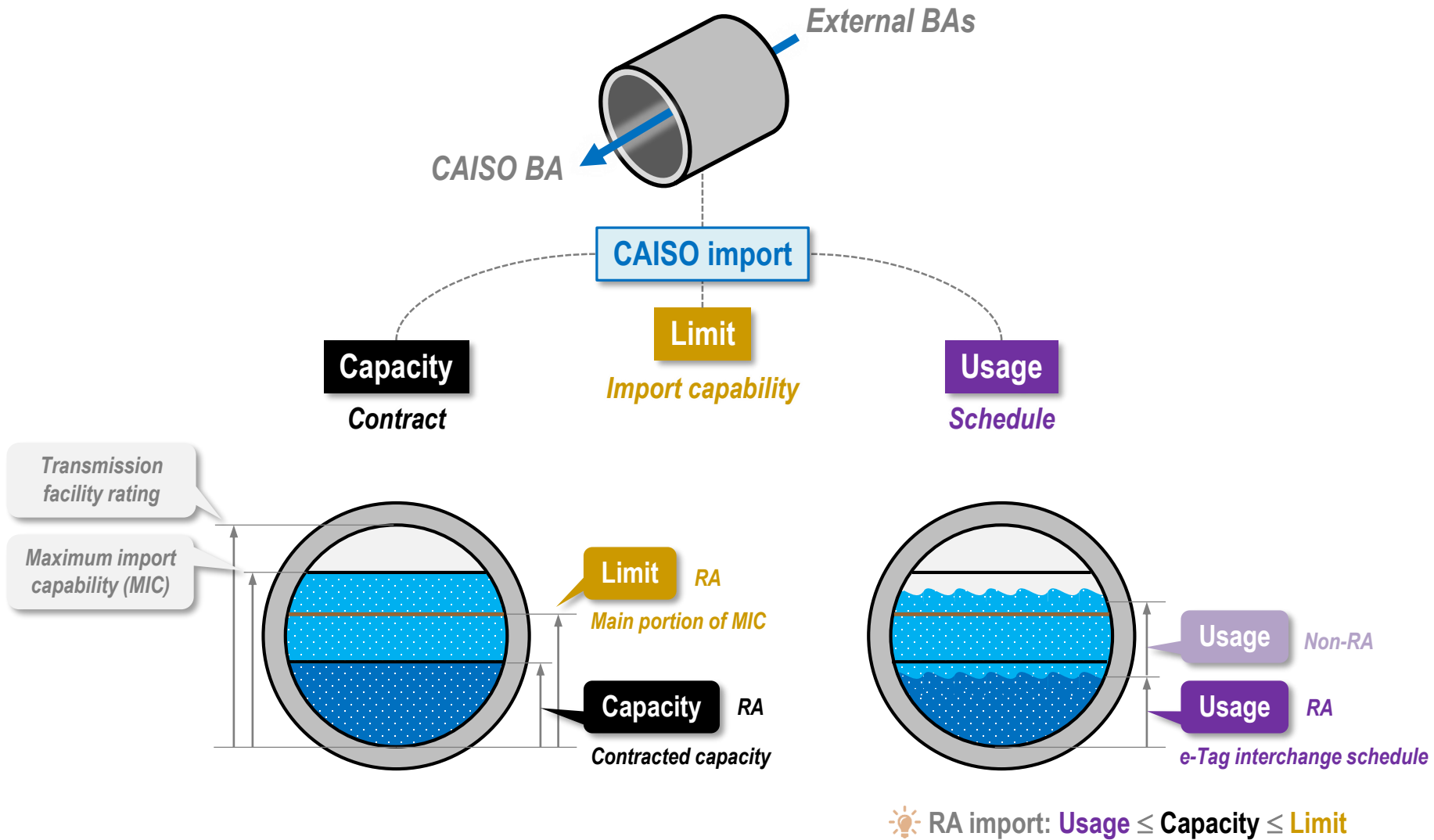



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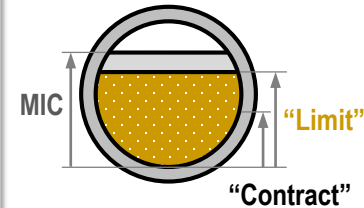
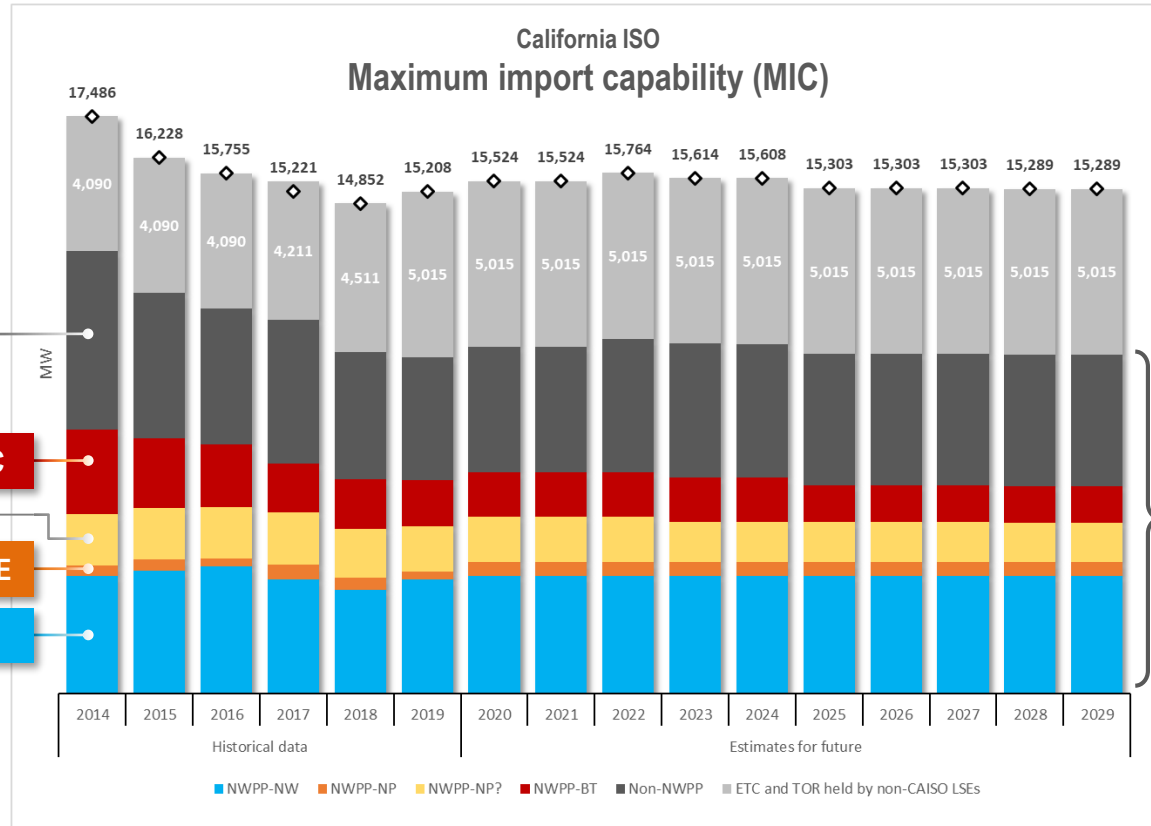
CAISO maximum import capability (MIC)

A major portion of MIC is RA import capability, i.e. the “limit”



Not from NWPP

3. From NWPP BANC+TIDC
- Maybe from NWPP*
2. From NWPP NEVP+PACE
1. From NWPP Northwest



Maximum possible
CAISO RA import

Note: The breakdown of RA import capability is estimated from tie-points' possible association with source BAs

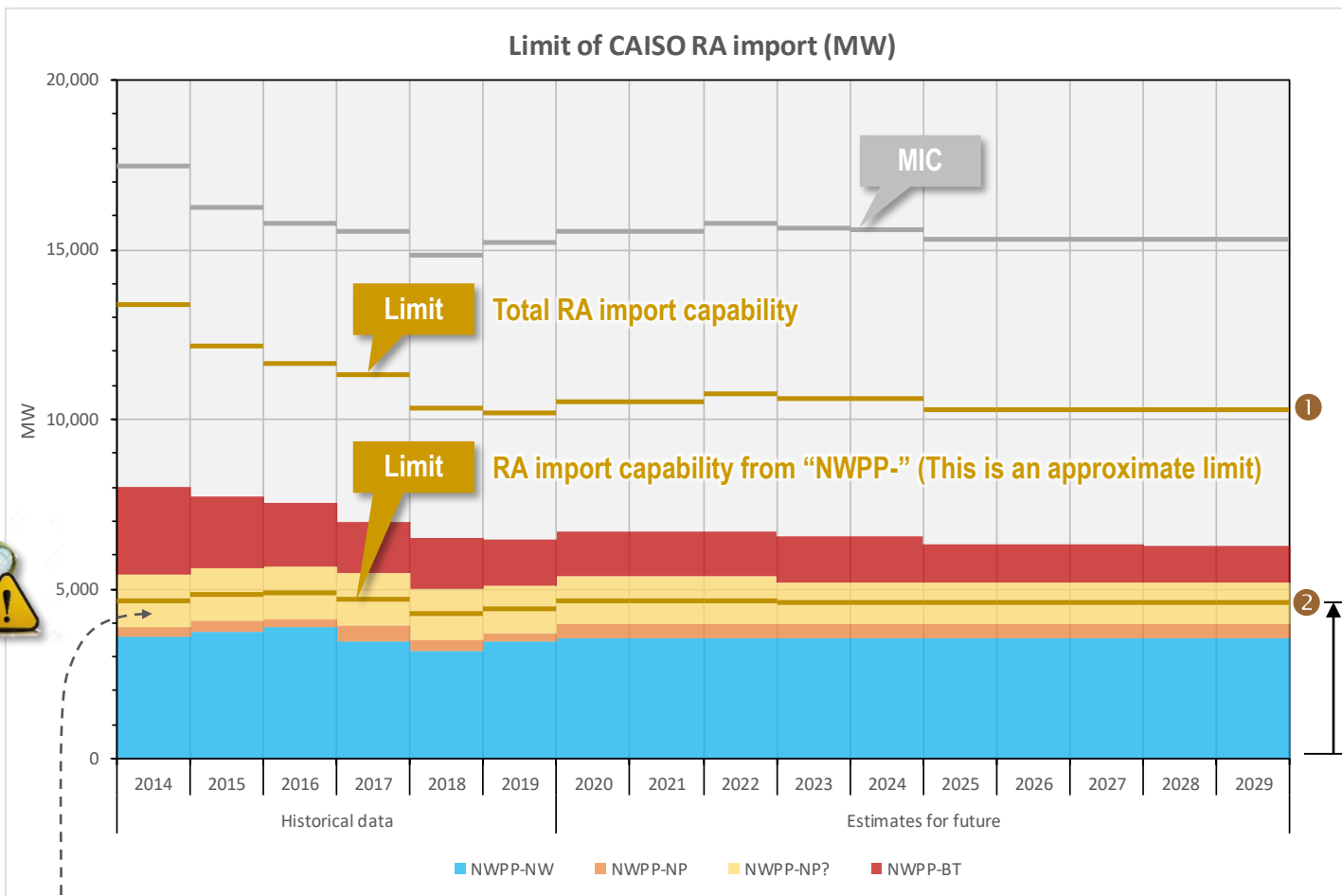


* “Maybe from NWPP”: These are imports through tie-points around the CA-NV-AZ border. Through these tie-points, import can come either from NWPP or elsewhere like Southwest

Source of MIC data: <http://www.caiso.com/planning/Pages/ReliabilityRequirements/Default.aspx>

“Limit” of CAISO RA import

Estimated portion of RA import capability from “NWPP-”



Scope of “NWPP-”
NWPP excluding CA BAAs



Maybe from NWPP




① CAISO RA import capability is about 10,000 MW

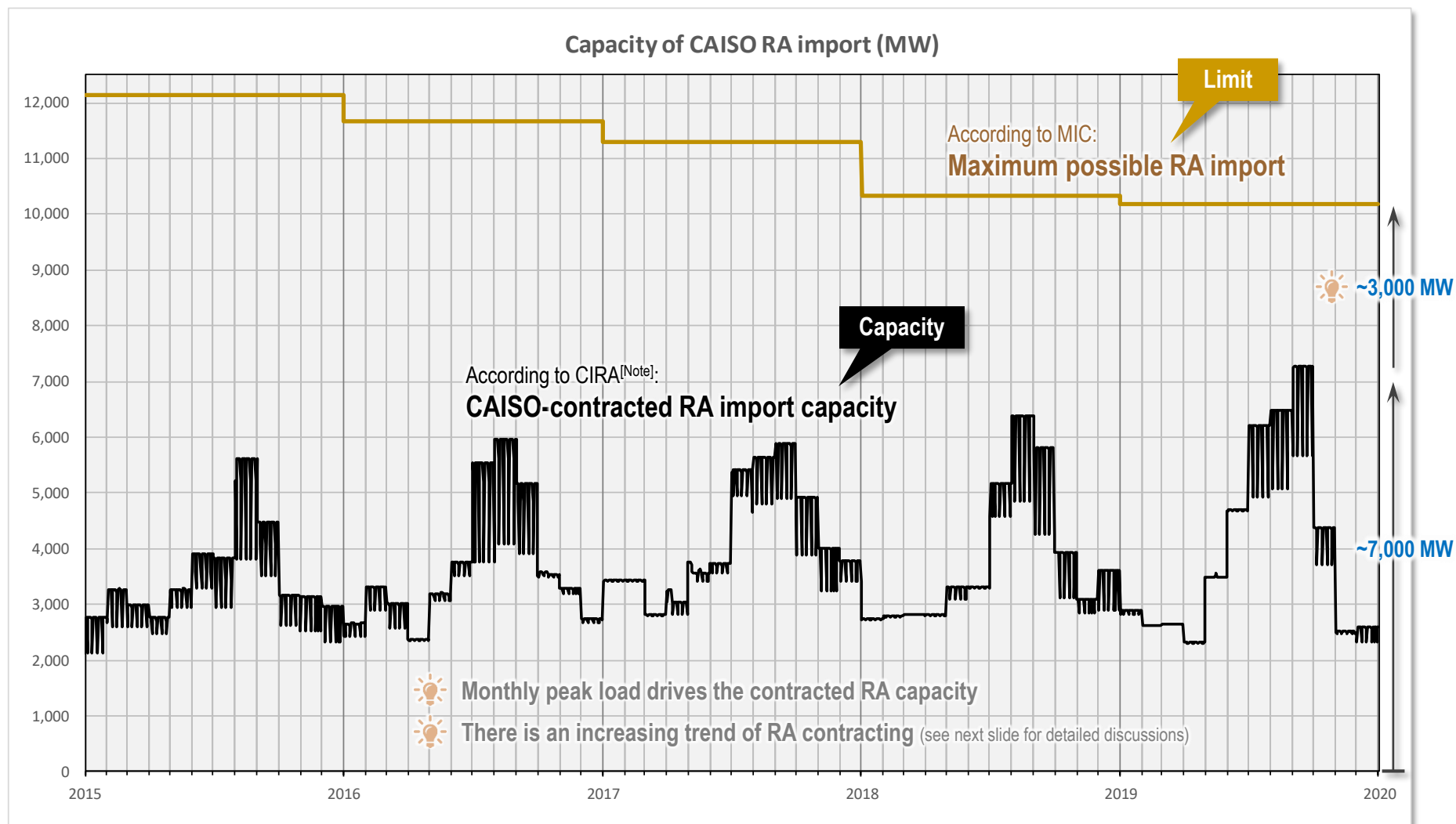
② CAISO RA import capability from “NWPP-” is about 5,000 MW



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“Capacity” of CAISO RA import



[Note] CIRA (Customer Interface for Resource Adequacy) data are commercially sensitive and *not* publicly available. To protect confidentiality, this analysis describes aggregated data

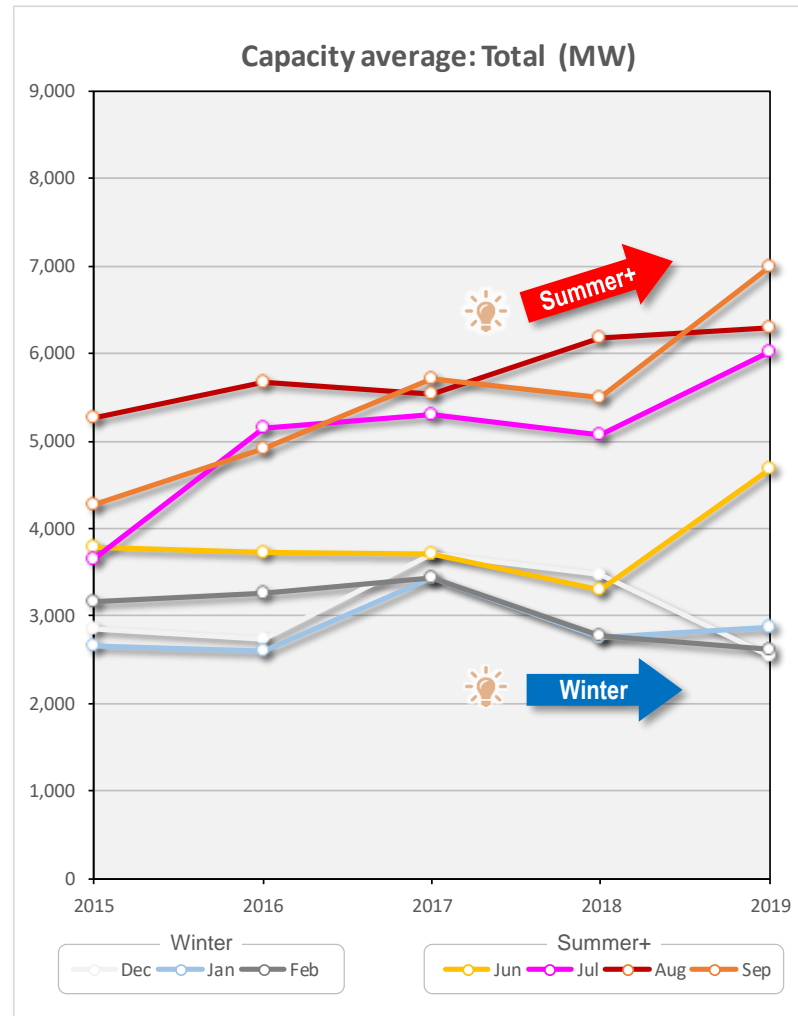


Trends of CAISO-contracted RA import capacity

Summer and winter months

💡 RA contracting increased over the past few years

However, the increase was only for **summer** months, not for **winter** months



Sep } Late summer (early autumn)

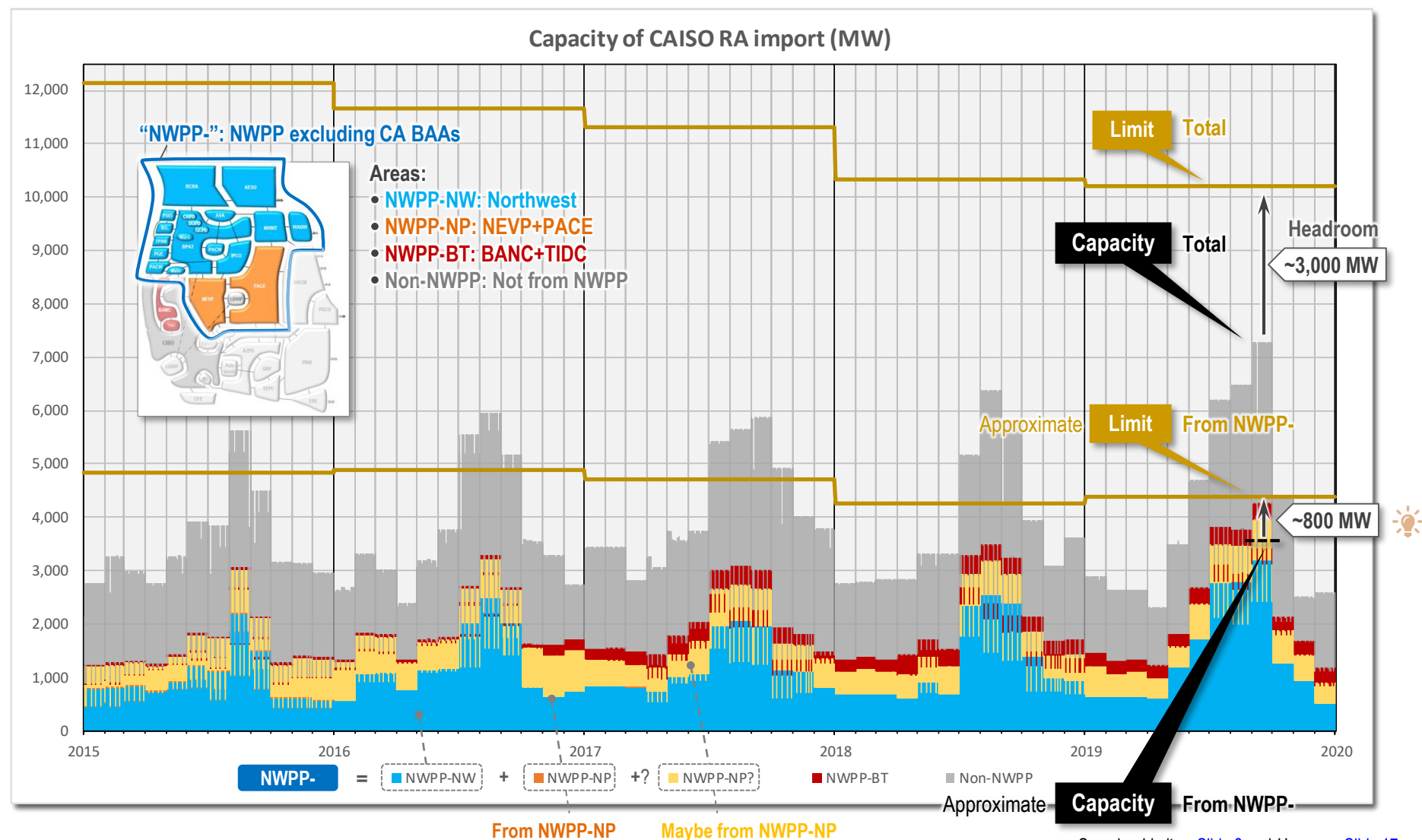
Aug } Mid summer
Jul }

Jun } Early summer

Jan } Winter
Feb }
Dec }

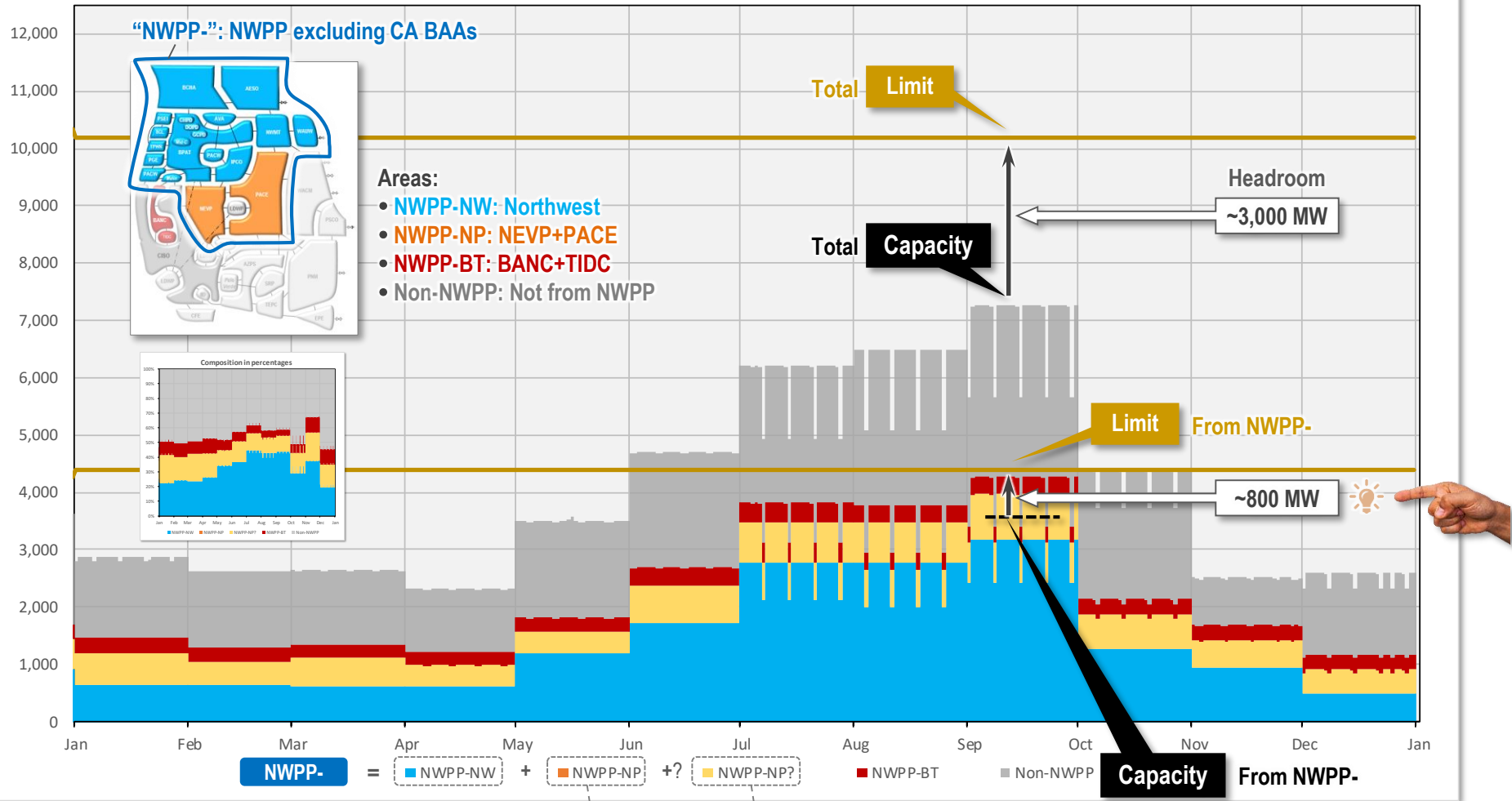


How much does CAISO-contracted RA capacity come from NWPP-?



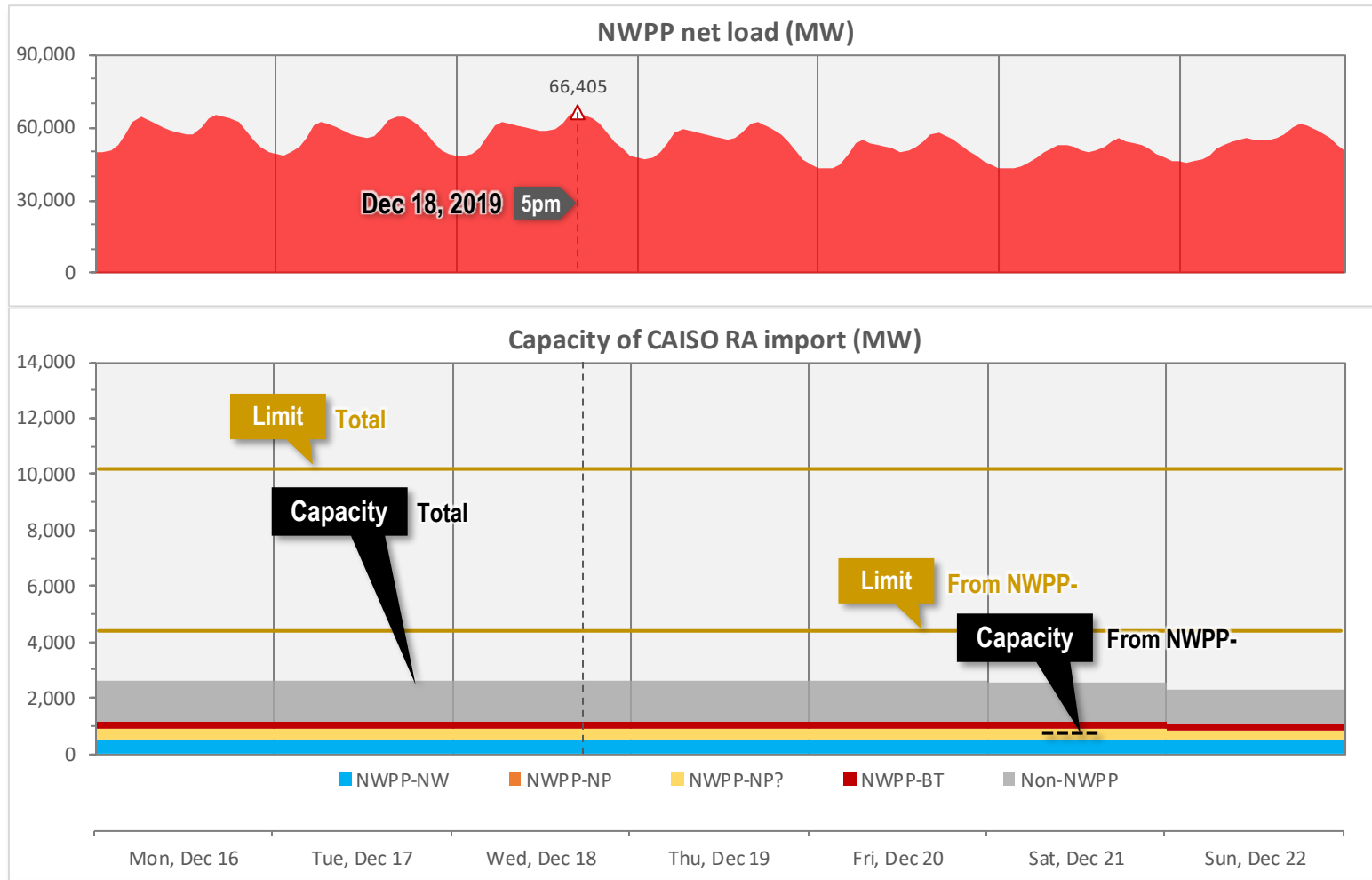
Capacity of CAISO RA import in year 2019

Capacity of CAISO RA import (MW) in 2019



Capacity of CAISO RA import in winter time

During NWPP's winter peak in 2019



Capacity of CAISO RA import in summer time

During NWPP's summer peak in 2019

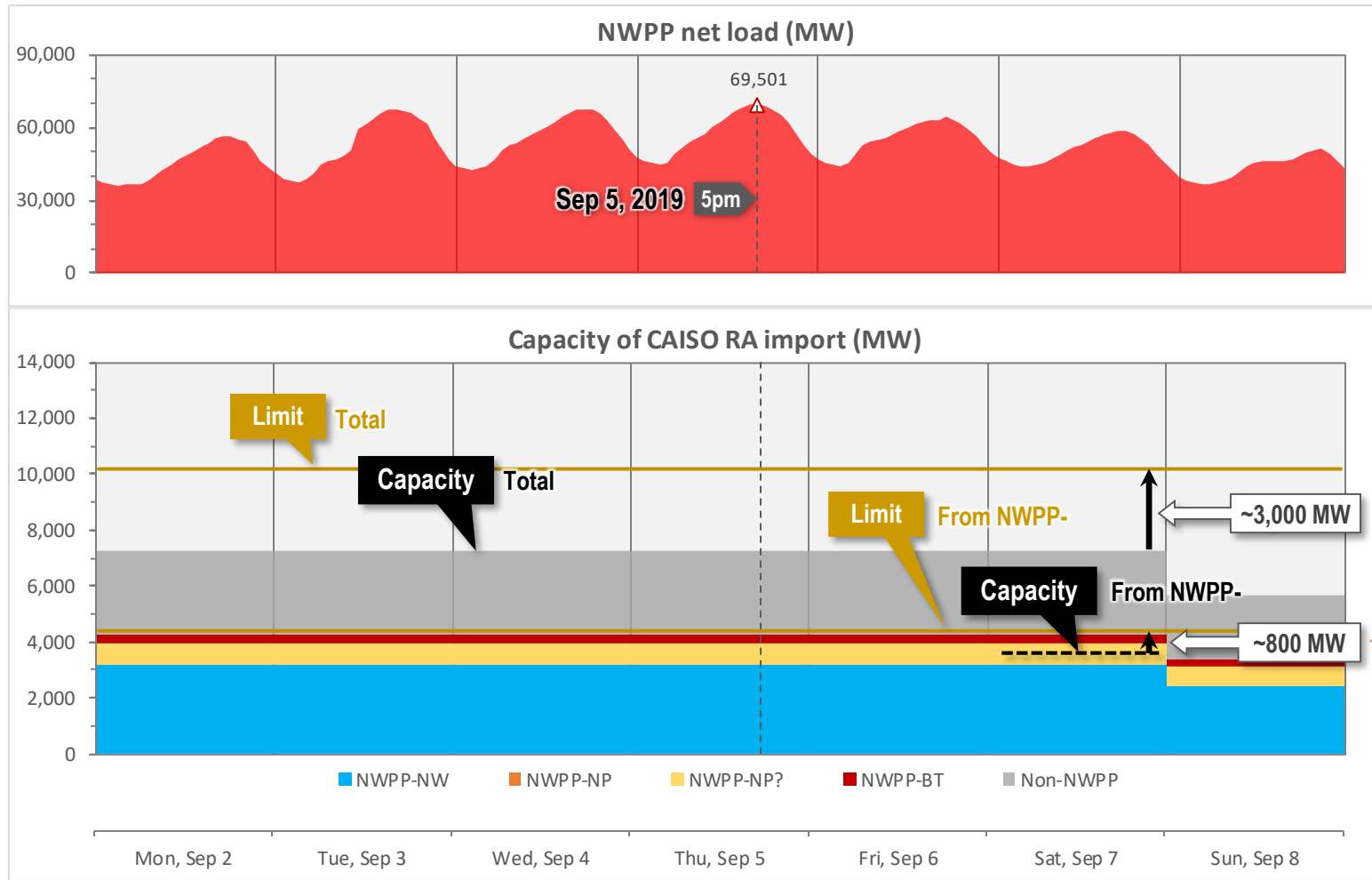

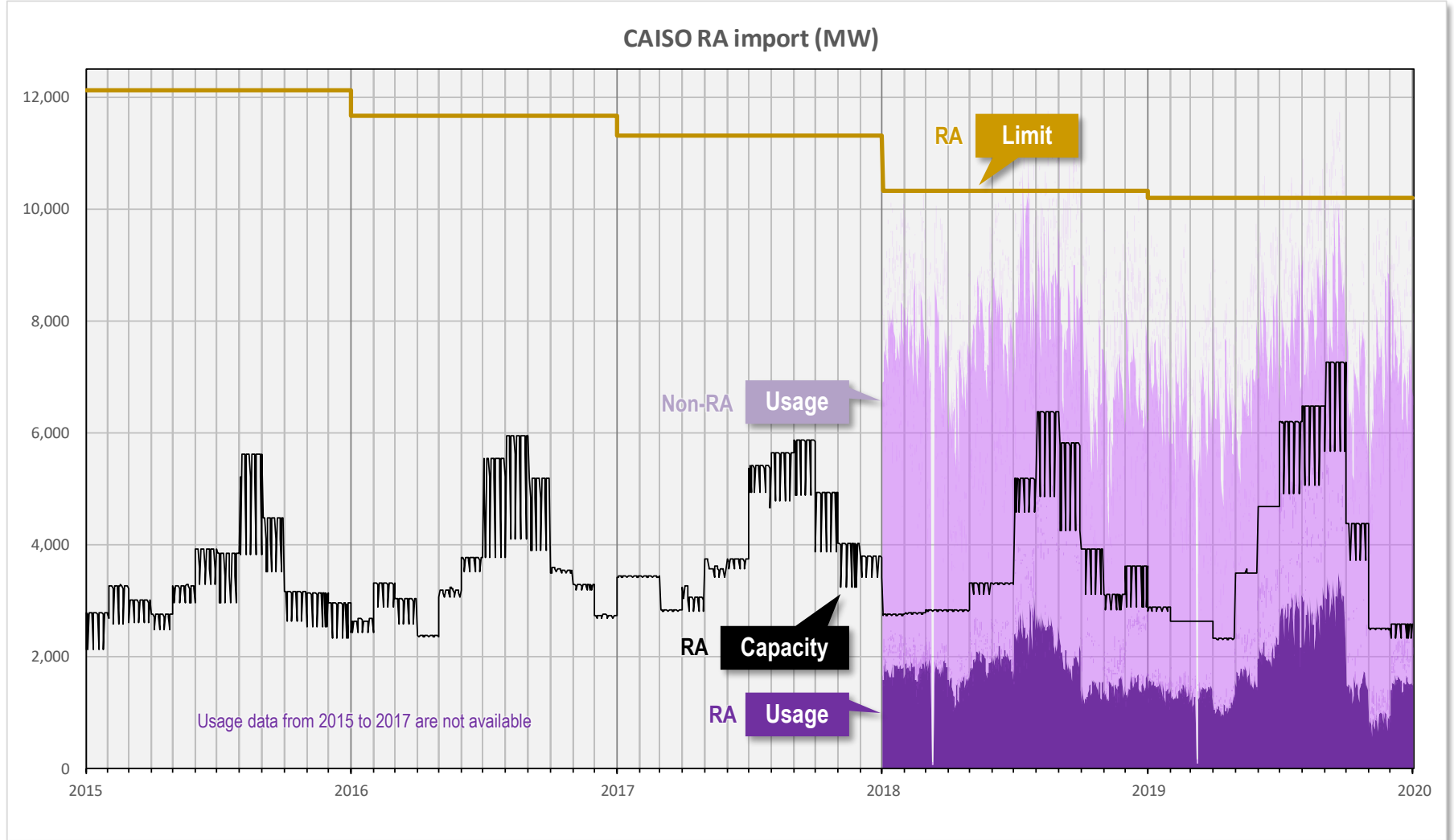


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“Usage” of CAISO RA import

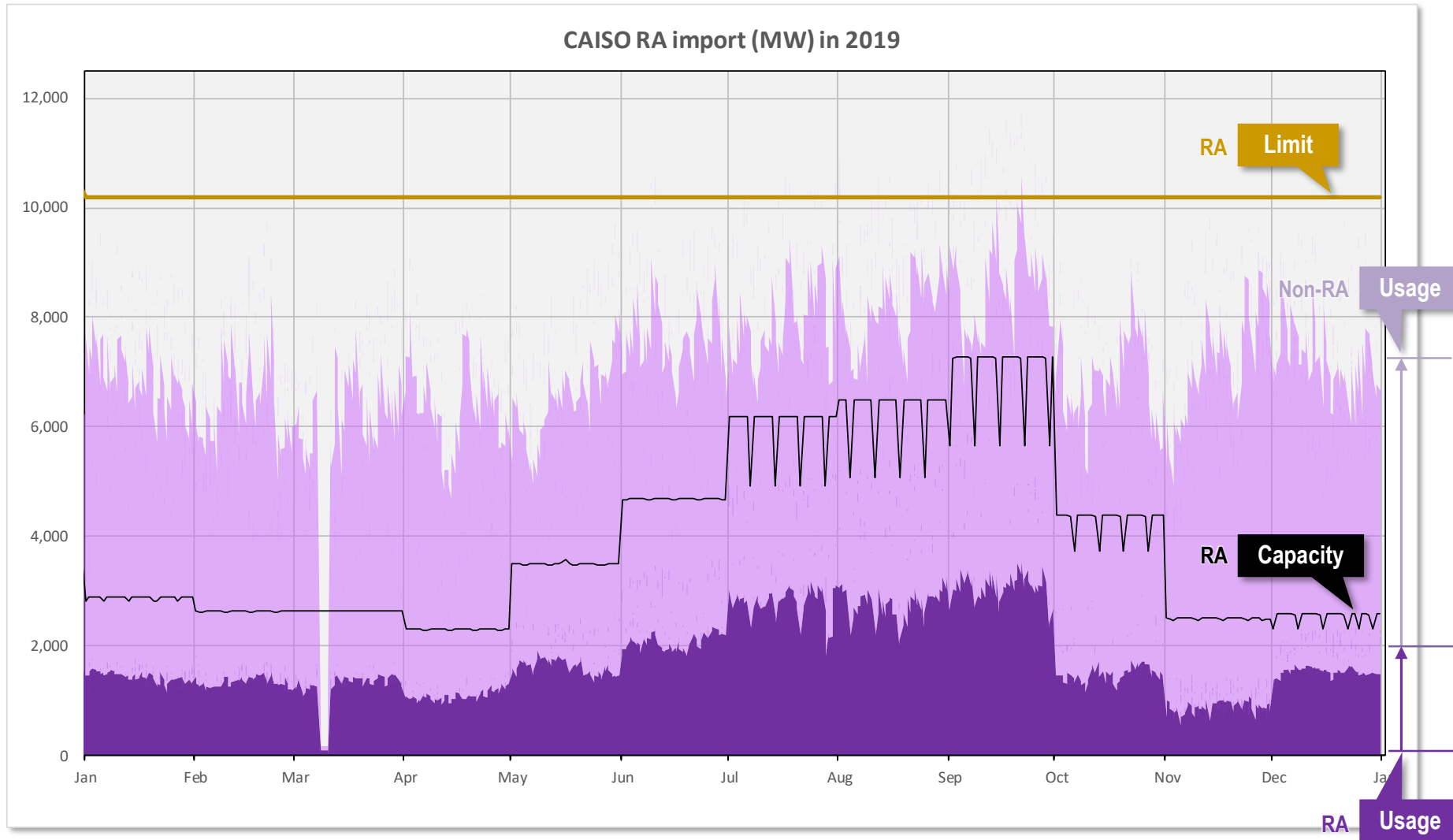


[Note] Details of interchange schedules are commercially sensitive information. To protect confidentiality, this analysis describes aggregated data

See also [Capacity](#) on [Slide 10](#) and [Slide 12](#)

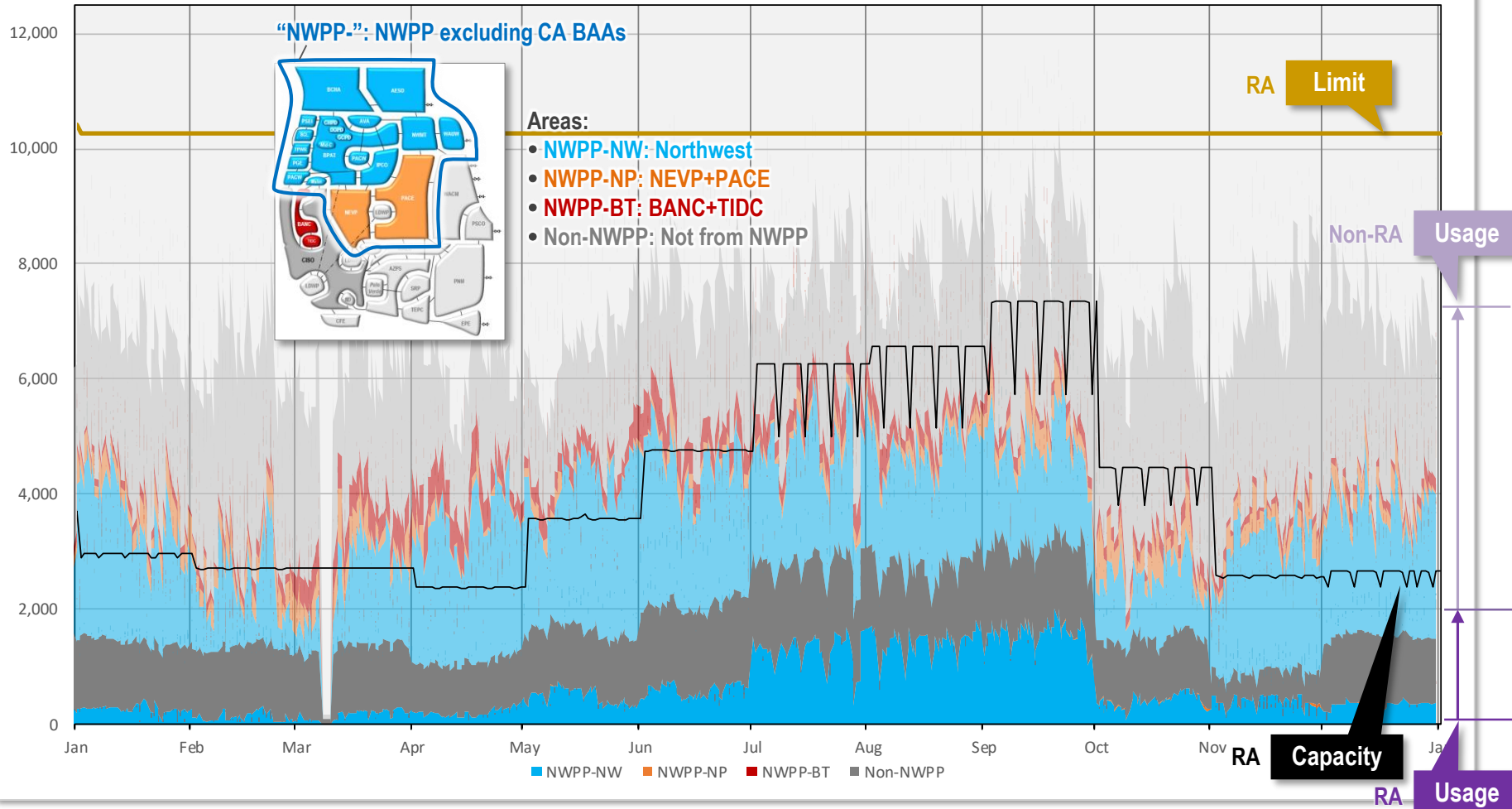


Usage of CAISO RA import in 2019



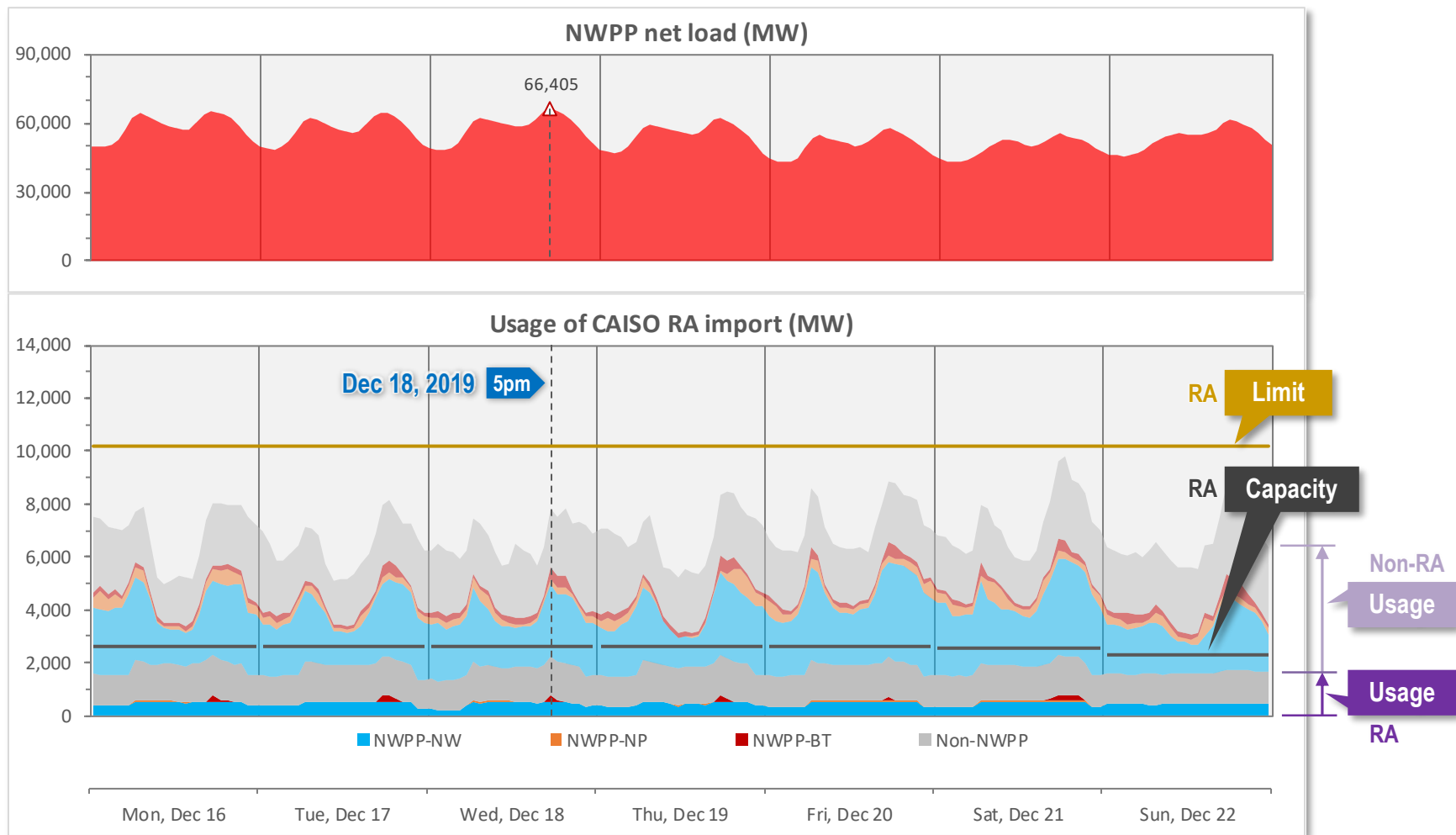
Usage of CAISO RA import in 2019 – Detailed breakdown

CAISO RA import (MW) in 2019



Usage of CAISO RA import in winter time

During NWPP's winter peak in 2019



Usage of CAISO RA import in summer time

During NWPP's summer peak in 2019

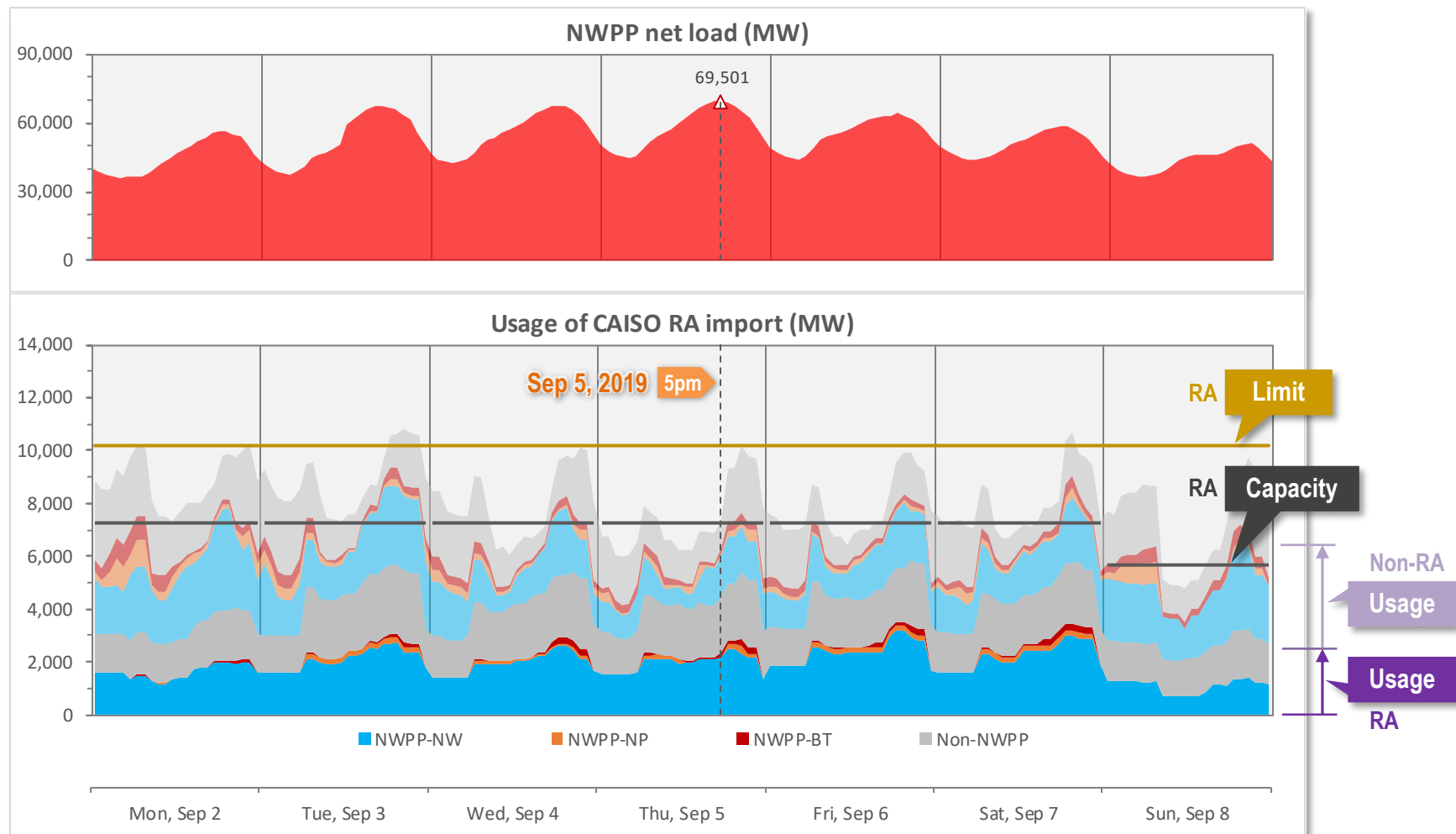

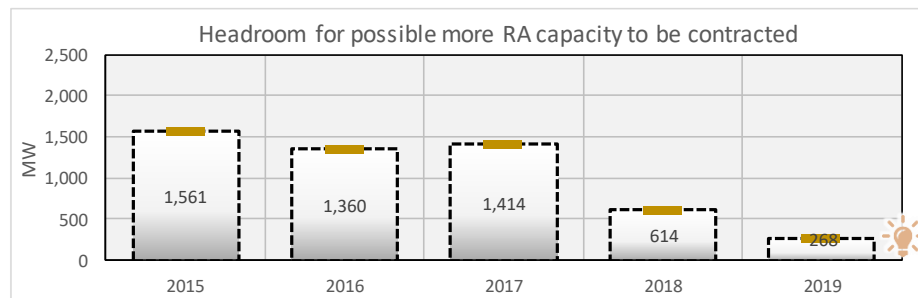
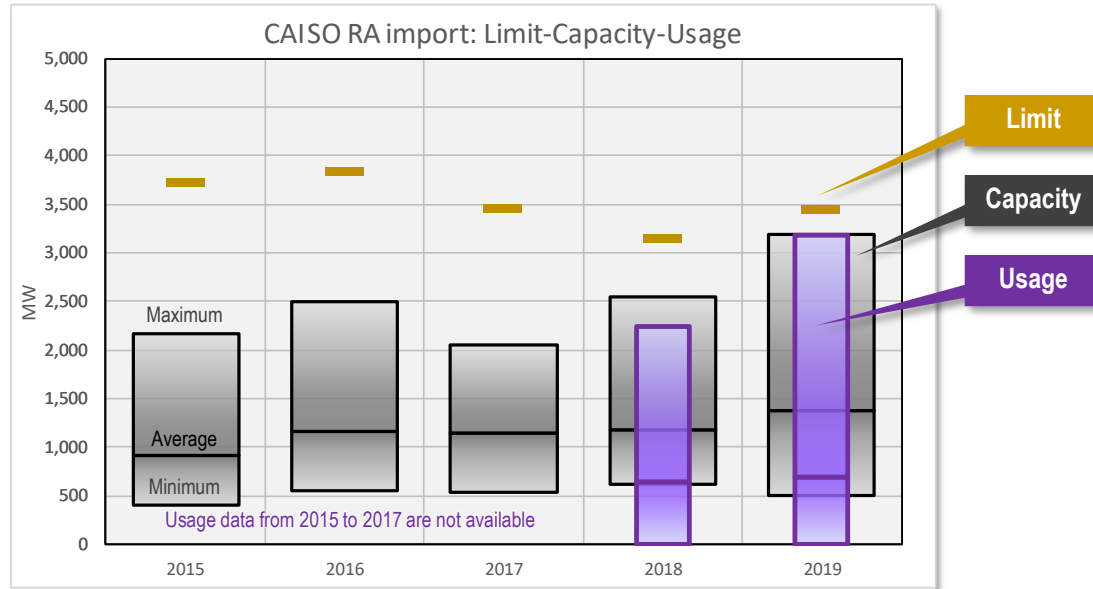
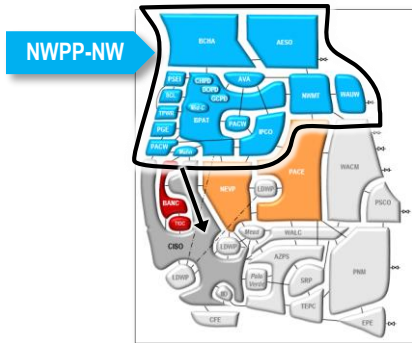


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Putting it all together

RA import 1 of 4: From NWPP-NW (Northwest)

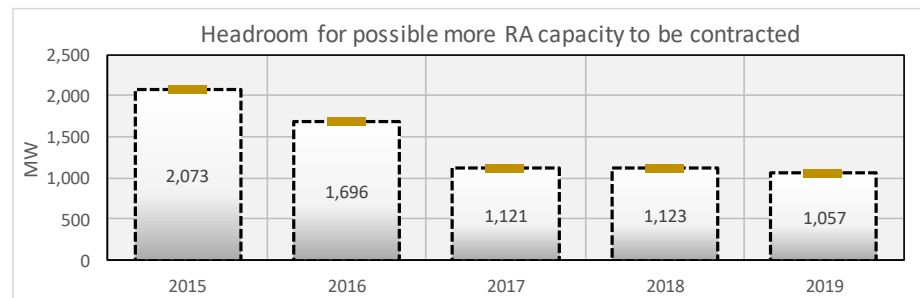
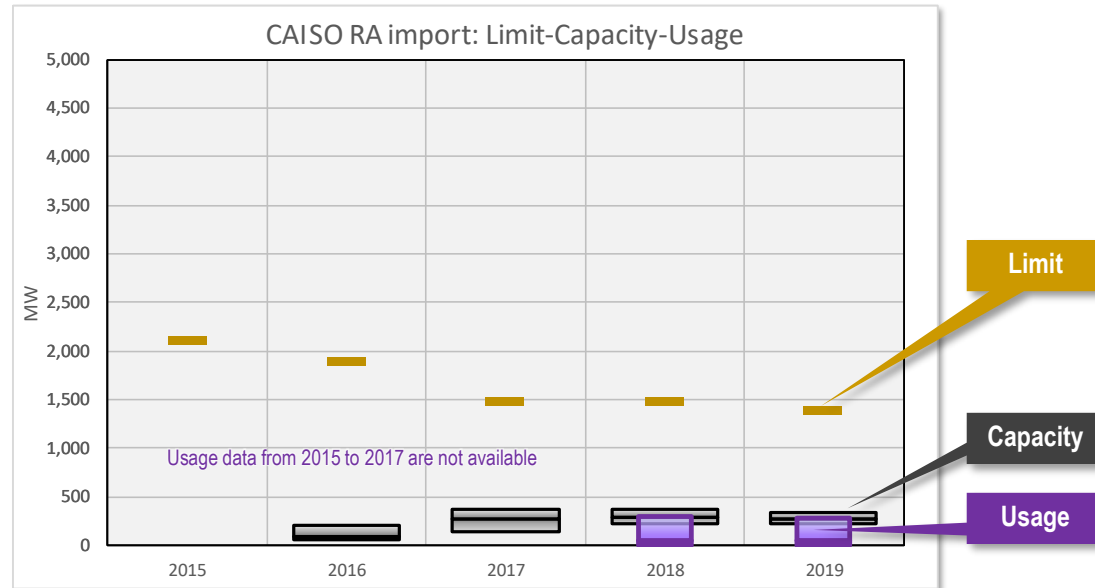
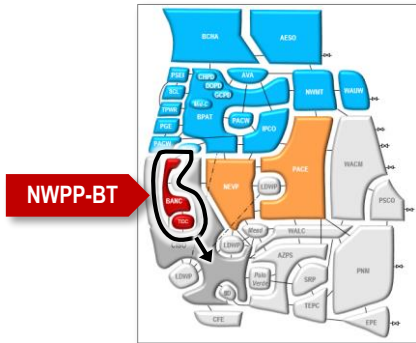


💡 Amount of contracted RA import is significant
Limited headroom is left



Putting it all together ^{Cont'd}

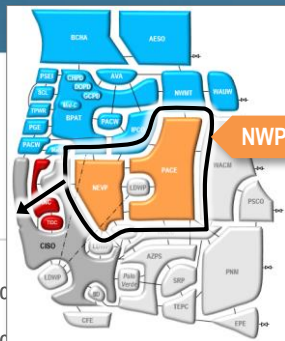
RA import 2 of 4: From NWPP-BT (BANC+TIDC)



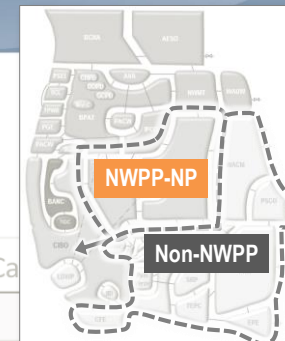
💡 Amount of contracted RA import is insignificant
A lot of headroom is still available

Putting it all together ^{Cont'd}

RA import 3 of 4: From NWPP-NP (NEVP+PACE)



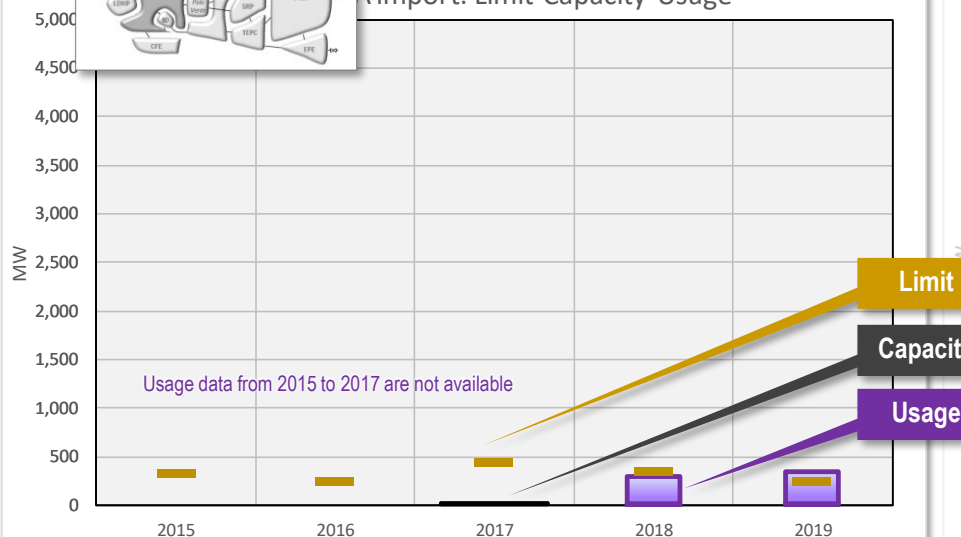
NWPP-NP



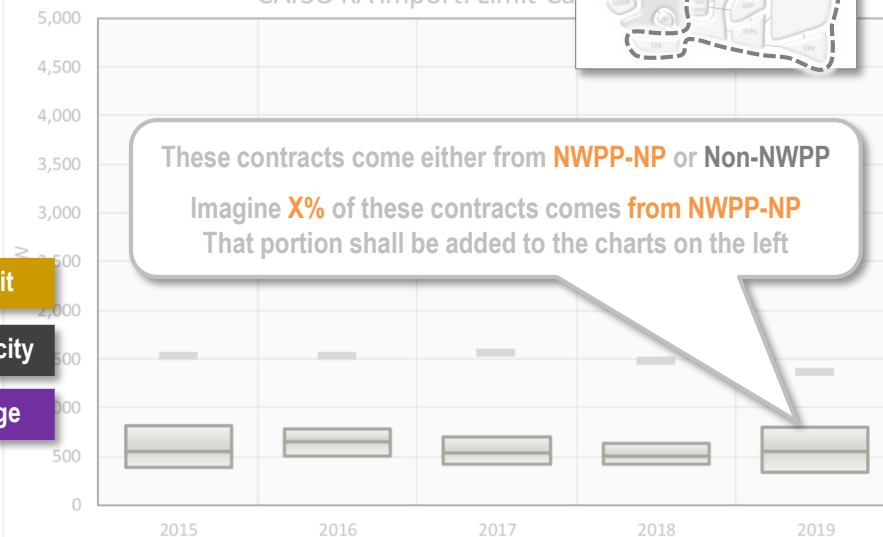
NWPP-NP

Non-NWPP

RA import: Limit-Capacity-Usage



CAISO RA import: Limit-Capacity-Usage

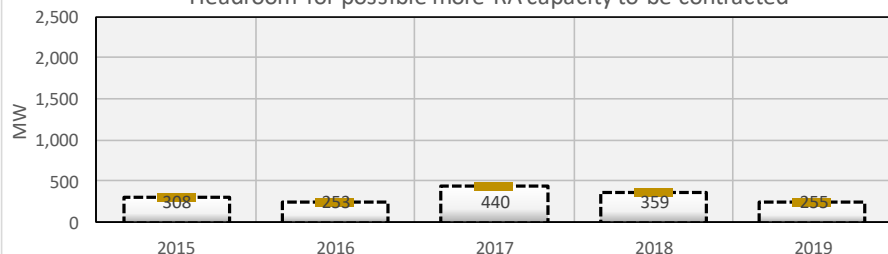


These contracts come either from NWPP-NP or Non-NWPP

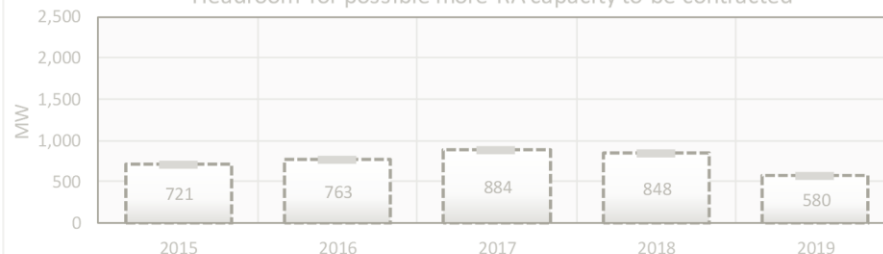
Imagine X% of these contracts comes from NWPP-NP

That portion shall be added to the charts on the left

Headroom for possible more RA capacity to be contracted



Headroom for possible more RA capacity to be contracted



Amount of contracted RA import is insignificant

Headroom is still available

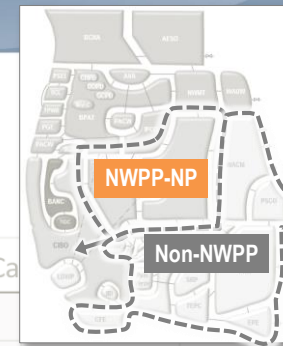




Non-NWPP

Putting it all together ^{Cont'd}

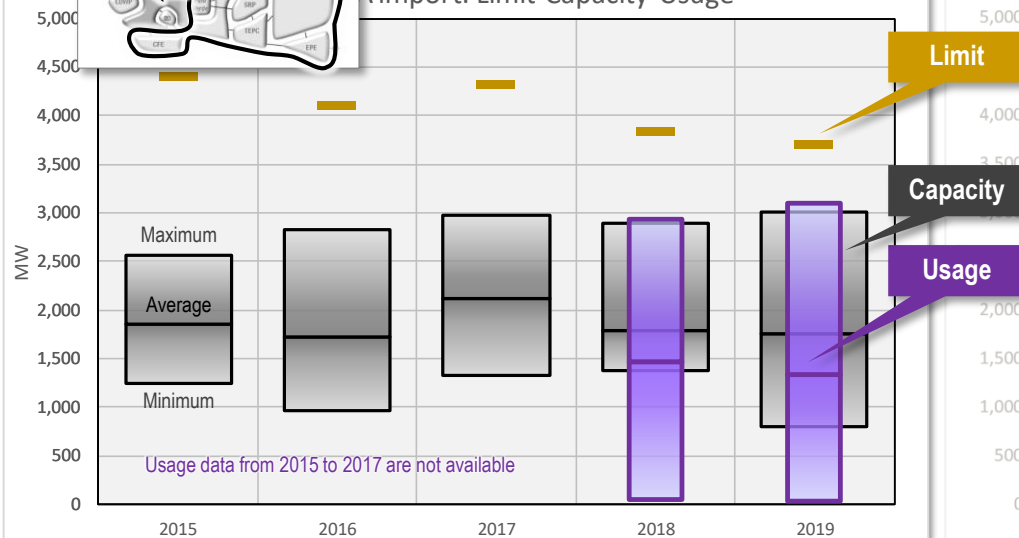
RA import 4 of 4: From Non-NWPP (Other area)



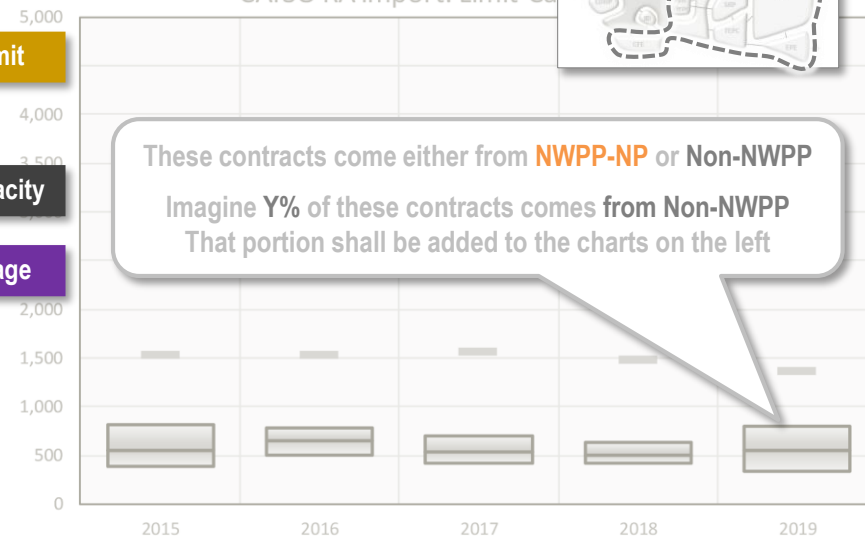
NWPP-NP

Non-NWPP

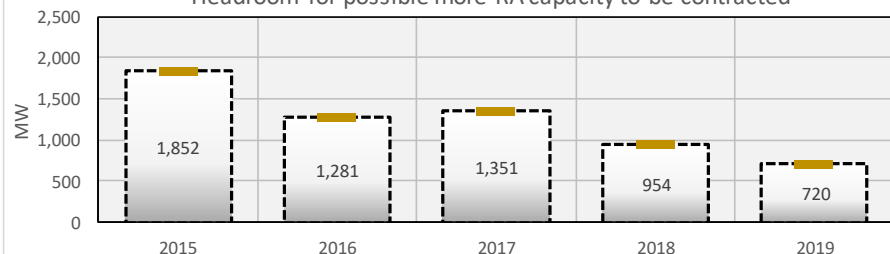
RA import: Limit-Capacity-Usage



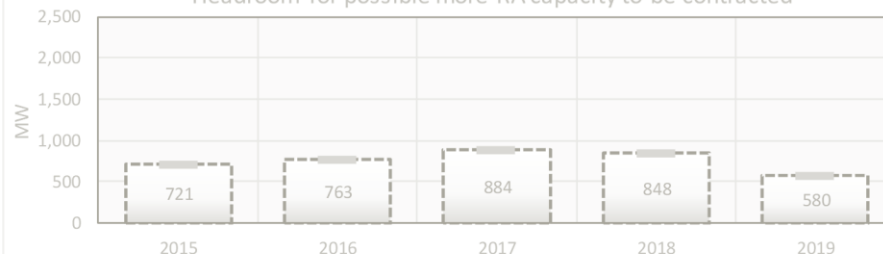
CAISO RA import: Limit-Capacity-Usage



Headroom for possible more RA capacity to be contracted







Headroom for possible more RA capacity to be contracted



💡 Amount of contracted RA import is significant
Headroom is still available

Summary

-  This work reviewed multi-year historical data of CAISO RA import
-  “Limit”, “Capacity” and “Usage” are investigated
-  Historical patterns and trends are analyzed
-  Breakdown is shown for portions of RA export from NWPP to CAISO



**Past-years' historical data do not necessarily reflect future trends
Caution shall be exercised when extrapolating data into future years**



THANK YOU



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