



Assembly Concurrent Resolution 188

Public Stakeholder Call

Public Stakeholder Final Presentation

03/08/2023

Reminders

- This call is being recorded for informational and convenience purposes only. Any related transcriptions should not be reprinted without ISO permission.
- If you need technical assistance during the meeting, please send a chat to the event producer.

Participating during today's call

- Please raise your hand using the “raise hand” feature in WebEx, or submit your question through the chat.
- Please state your name and organization when asking your question.

Agenda

Topic	Presenter
Meeting logistics and introductions	Isabella Nicosia
Welcome <ul style="list-style-type: none">Recap of ACR 188 Requirements	Stacey Crowley
Review Individual Sections of the ACR 188 Report	CAISO & NREL
Questions	CAISO & NREL
Contact & Webpage Information	

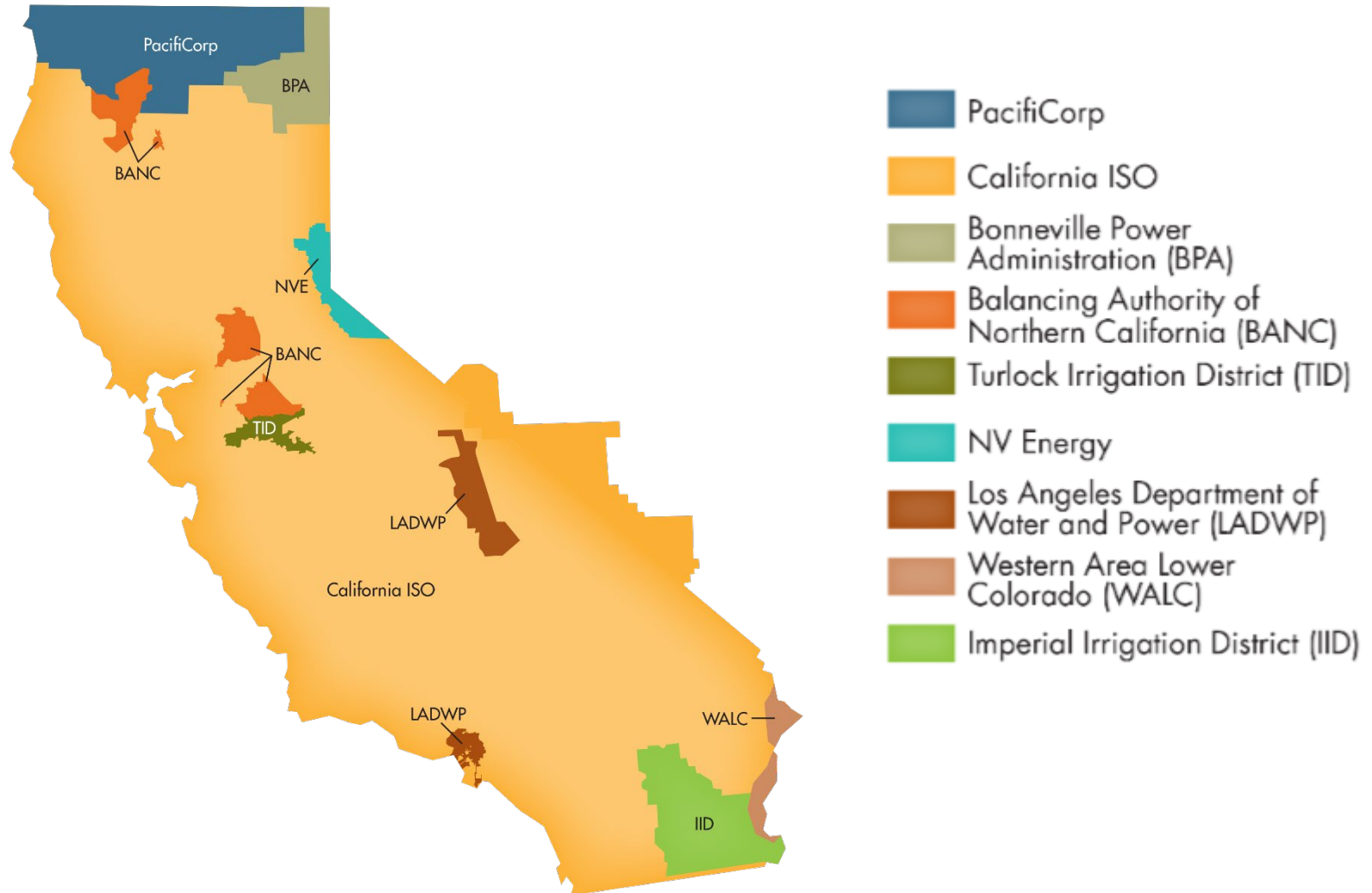
CA Balancing Authorities (BAs) Who Have Been Partnering With Us On The Report



BANC



California balancing authorities



Initial Clarifications and Caveats

- *The terms “regional cooperation” and “western RTO” are not identical; an RTO is one of several possible modes of regional cooperation*
- *There is no endorsement by NREL, expressed or implied, of expanding CAISO to be a western regional transmission organization (RTO), nor do we endorse any other specific mode of regional cooperation addressed in the review*
- *While regional cooperation generally is beneficial, the form it takes is best determined by negotiation and consensus among affected parties based on their assessments of benefits and risks, with the understanding that consensus may evolve over time*

Initial Clarifications and Caveats

- *There is no endorsement by NREL of any position that the State of California might take in discussions with other western states*
- *NREL's review includes impacts on western states besides California*
 - *Our understanding of the Legislature's intent in ACR 188 is to gather knowledge that will inform strategies for regional cooperation that might advance California's energy and environmental goals*
 - *Ignoring benefits and risks for non-California entities would result in an incomplete analysis of literature on regional cooperation*

EXECUTIVE SUMMARY

Executive Summary

- The studies reviewed form a consistent narrative:
 - Measurable benefits of regional cooperation are production cost savings, capacity savings, and emissions reductions.
 - Qualitative benefits include greater transparency, increased stakeholder participation, and more efficient use of transmission.
 - Regional cooperation can enhance reliability and resilience.
 - Geographically larger operational footprint yields greater resource and load diversity.
 - RTOs tend to yield larger cost savings and grid flexibility than more limited forms of cooperation. They also expand the types of issues that must be addressed, such as transmission cost allocation and governance.
 - More limited forms of cooperation also yield benefits (e.g., cost savings), even though these benefits are not as large as they would be with more comprehensive frameworks.

Executive Summary

- Regional cooperation is not a single decision. Experience in other parts of the country suggest it is an evolutionary progression.
 - For example, in the West, experience with the Western Energy Imbalance Market (WEIM) provided a foundation for CAISO's Extended Day-Ahead Market (EDAM). Therefore, it is reasonable to expect that the EDAM and the newly approved Western Resource Adequacy Program (WRAP) might inform the next phase of regional cooperation.

Executive Summary

- Modes of regional cooperation addressed in the literature
 - Regional RTO expansion
 - Utilities in the West that are currently outside CAISO either join CAISO or the Southwest Power Pool (SPP), or form a new RTO
 - RTO doesn't require participation by all BAs
 - Centrally dispatched day-ahead, real-time energy markets operated by an RTO (for utilities not opting to join an RTO)
 - A regional resource adequacy and planning reserve sharing program

Executive Summary

- Benefits related to cooperation on transmission expansion
 - More efficient renewable energy integration, less curtailment due to transmission congestion
 - Access to more low-cost renewable energy development areas
 - The ability to move excess wind and solar power elsewhere in the region when local production is high and demand is low
 - More operational flexibility to balance the variations in solar and wind output
 - Improved grid resilience

Executive Summary – Main Takeaways

- California can achieve its renewable energy and greenhouse gas reduction goals more quickly and with less cost through any form of expanded regional cooperation.
- The literature suggests regional cooperation will help California and other states realize cost savings and common energy policy goals.
- Cooperation depends on mutual benefits for California *and* the rest of the West. Benefits might not be spread evenly across participating states and their utilities.
- The magnitude of benefits to California varies based on the mode of cooperation and which states and utilities participate.

Executive Summary – Main Takeaways

- A full RTO provides the highest margin of benefit but entails the most complexity.
- Industry trends suggest that California will require
 - commercial procurements from the rest of the West
 - more export capability
 - reserve sharing, and
 - improved reliability during times of stress on the grid

Executive Summary – Stakeholder Comments

- Stakeholder draft for comment was submitted January 13, 2023
- NREL's charge was to prepare an objective review of existing literature for the California legislature, and not to elevate or reject any mode of cooperation
- Some topics raised in the comments pertained to new areas where research on expanded cooperation is currently limited
 - Extreme weather events, energy justice, cybersecurity risks, new metrics for resource adequacy
 - New research was outside the scope of ACR 188
 - In any case, deadline made new research impossible

Section 1

BACKGROUND

Section 1— Background

Topics identified in ACR 188

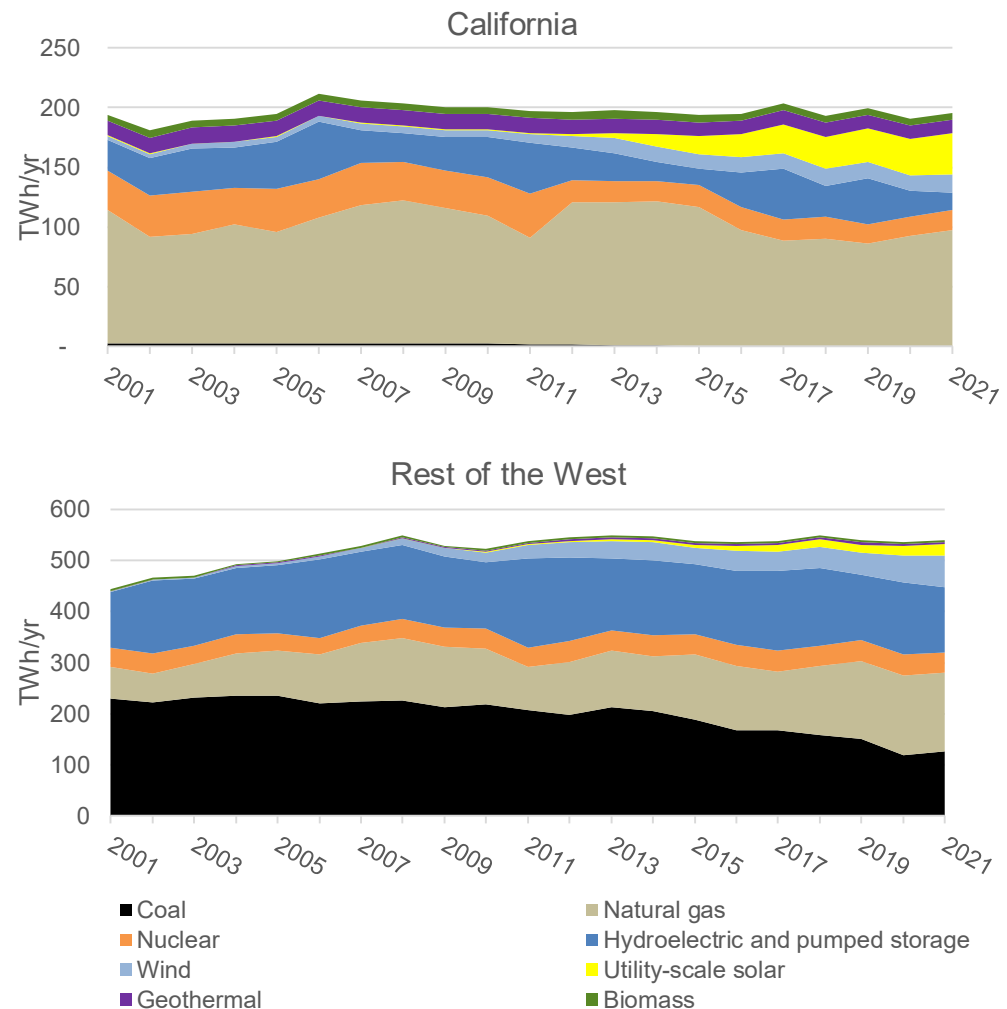
ACR 188 Text	Topic
<p><i>“...the Legislature requests that by February 28, 2023, the Independent System Operator, in consultation with the California balancing authorities, produce a report that summarizes recent relevant studies on the impacts of expanded regional cooperation on California and identifies key issues that will most effectively advance the state’s energy and environmental goals, including any available studies that reflect the impact of regionalization on transmission costs and reliability for California ratepayers...”</i></p>	<p>Impacts of expanded regional cooperation on California</p> <hr/> <p>Issues that will most effectively advance the state’s energy and environmental goals</p> <hr/> <p>Impact of regionalization on transmission costs and reliability for California ratepayers</p>
<p><i>“...the report should include relevant updates to the transmission development and resource diversity estimates in the 2021 SB 100 Joint Agency Report ...”</i></p>	<p>Updates to the 2021 SB 100 Joint Agency Report (CEC 2021)</p>
<p><i>“...the report should also discuss the regional transmission organizations in Colorado, Nevada, and other regional states, collaboration between states on energy policies to maximize consumer savings while respecting state policy autonomy, and engagement between neighboring states on the future of regional transmission organizations in the West...”</i></p>	<p>RTOs in Colorado, Nevada, and other regional states</p> <hr/> <p>Collaboration between states on energy policies to maximize consumer savings while respecting state policy autonomy</p> <hr/> <p>Engagement of neighboring states on the future of RTOs in the West</p>

Section 1 – Background

- What drives the value of regional cooperation
 - Climate change and grid stress related to extreme weather events
 - State policies for electrification in transportation, buildings, other sectors
 - Transformation of the resource mix in California and the rest of the West
 - Dwindling planning reserve margins, especially in California and the Northwest

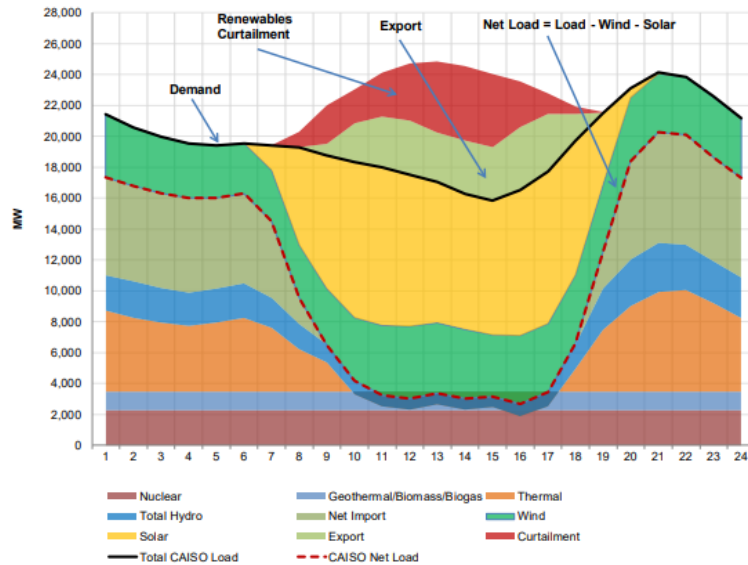
Section 1 – Background

- Changing resource mix in California and the rest of the West
- New mix favors new practices
 - Short interval energy markets maximize the value of flexible resources
 - Economies of scale through geographic diversity rather than central station plants
 - Operational practices have an increasing reliance on dispatchable resources

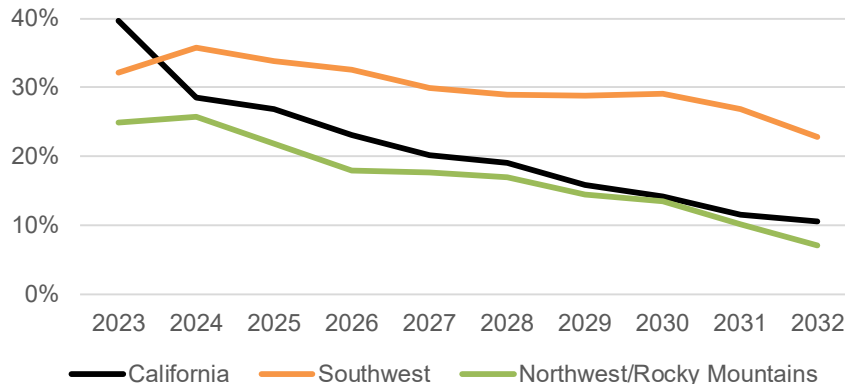


Section 1 – Background

Using Exports to Reduce Curtailment



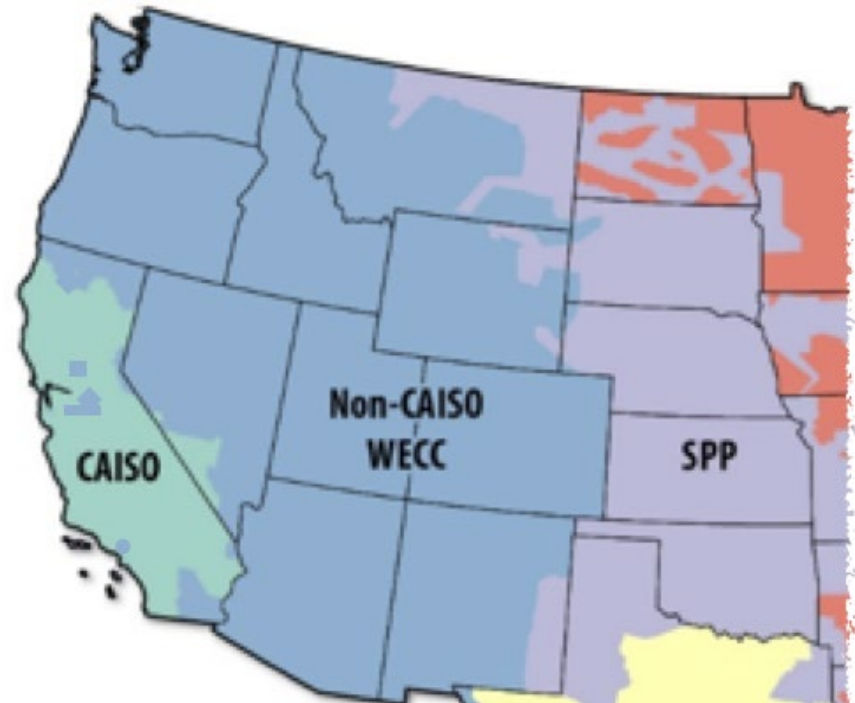
Prospective Planning Reserve Margins in the West



- Implications for how California and the West exchange electricity:
 - California will continue to need bulk procurements from the rest of the West
 - California will need to export more surplus solar in the middle of the day to minimize curtailment
 - Reserve sharing will help California and the rest of the West deal with shrinking reserve margins
 - Emphasis on reliability resulting from transformation of generation resources, electricity demand, and operational challenges (e.g., drought and extreme weather)

Section 1 – Background

- Options for regional cooperation are emerging from CAISO, Southwest Power Pool (SPP), and discussions outside RTOs



Section 1 – Background

- Multistate RTOs work against a backdrop of different state policies
- No study included herein addressed how an RTO might address resource shuffling, but many touched on the need to reconcile policy differences
- It is important to have a governance structure where states all have meaningful input, such as a state advisory committee
- In a multistate RTO, states retain authority over retail service issues, and these policies can differ from state to state on matters related to renewable energy and demand response

Section 2

REGIONAL COOPERATION EFFORTS IN THE WEST

Section 2 – Regional Cooperation Efforts in the West

Several states across the West have engaged in efforts to explore the benefits of regional cooperation.

- Multi-state effort – *State-Led Market Study* analysis of options for more coordinated approaches to grid management
- Individual state efforts – legislation, regulatory proceedings, studies, etc. (e.g., AZ, CO, NV, NM, OR)

Section 2 – Regional Cooperation Efforts in the West

Several frameworks for regional cooperation are currently in operation or under development in the West.

- Through CAISO:
 - Western Energy Imbalance Market (WEIM)
 - Extended Day-Ahead Market (EDAM)
- Through SPP:
 - Western Energy Imbalance Service (WEIS)
 - Markets+
- WPP’s Western Resource Adequacy Program (WRAP)
- Western Markets Exploratory Group (WMEG)

Section 3

LITERATURE INCLUDED IN THE REVIEW

Review of Section 3 – Literature Included in the Review

- Technical analyses of various modes of coordination [*19 studies*]
- Policy statements and analyses by government agencies [*5 studies*]
- Analyses of legal issues [*2 studies*]
- Other relevant documents [*12 studies*]

Section 4

ANNOTATED SUMMARY OF THE LITERATURE

Section 4 – Annotated Summary of Literature

Types of benefits

- Reduced production costs (including the cost of operating reserve for reliability)
- Reduced resource adequacy costs
- Efficient transmission planning
- Reliability benefits

The magnitude of the benefits depending on market paradigm, geography, and other detailed assumptions (e.g., capital costs, fuel costs, and other basic inputs).

Section 4 – Annotated Summary of Literature

Options for cooperation

- A more comprehensive structure for cooperation that optimizes a wider array of grid functions (i.e., an RTO) tends to yield greater cost and decarbonization benefits than more limited forms of cooperation.
- Larger and more comprehensive structures increase the breadth of issues that must be addressed, such as new transmission cost allocation and state roles in governance.

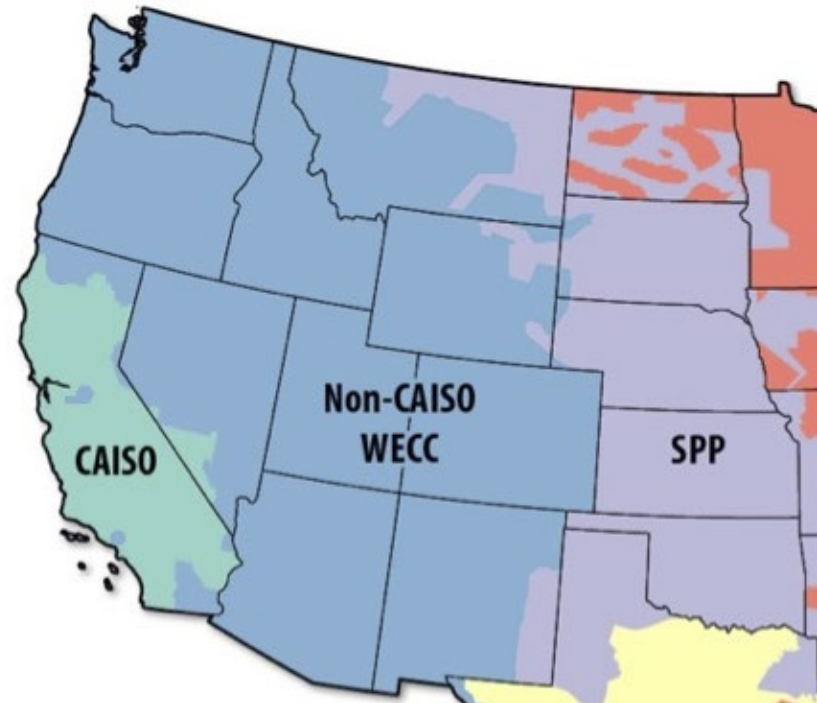
Section 4 – Annotated Summary of Literature

Options for cooperation

- More limited forms of cooperation also yield benefits, even though the benefits might not be as large as they would be with more comprehensive frameworks for cooperation.
- Resource adequacy costs may decrease overall with coordination on resource adequacy through programs such as the Western Resource Adequacy Program (WRAP).

Section 4 – Annotated Summary of Literature

- The distribution of production cost savings and savings in resource adequacy costs can vary among individual states.
- Transmission limits affect flows between different parts of WECC, therefore a state's geography can affect its benefits under different scenarios



Section 4 – Annotated Summary of Literature

Impacts on California's energy, environmental policies

- Reduced operating costs, capacity costs, and resource adequacy costs
- Improved resource adequacy planning
- Increased use of clean energy resources
- Lower WECC-wide emissions
- No study directly addressed the California-specific impacts of regional transmission planning and cost allocation

Section 5

SB 100 JOINT AGENCY REPORT UPDATES

Section 5 – SB 100 Joint Agency Report

- SB 100 tasked the Energy Commission, the Public Utilities Commission, and the Air Resources Board to publish a report on all the progress made toward SB 100's goals, every four years.
- 2021 Report looked at 3 Case Scenarios (60% RPS, SB 100 Core, High Electrification Study)
- Findings:
 - In all three scenarios, capacity needs to increase significantly. Example: 110 GW in 60% Scenario
 - New transmission fixed costs will be in the billions
 - Greater reliance on imports is necessary
- No updates as of the publication of the ACR 188 report
 - Next SB 100 Report will be in 2024, including demand forecasts substantially surpassing the 2021 findings.

Questions



California ISO

- ❖ ACR 188 Project Webpage:
<http://www.caiso.com/informed/Pages/RegionalSolutions.aspx>