Interregional Operational Opportunities in the West

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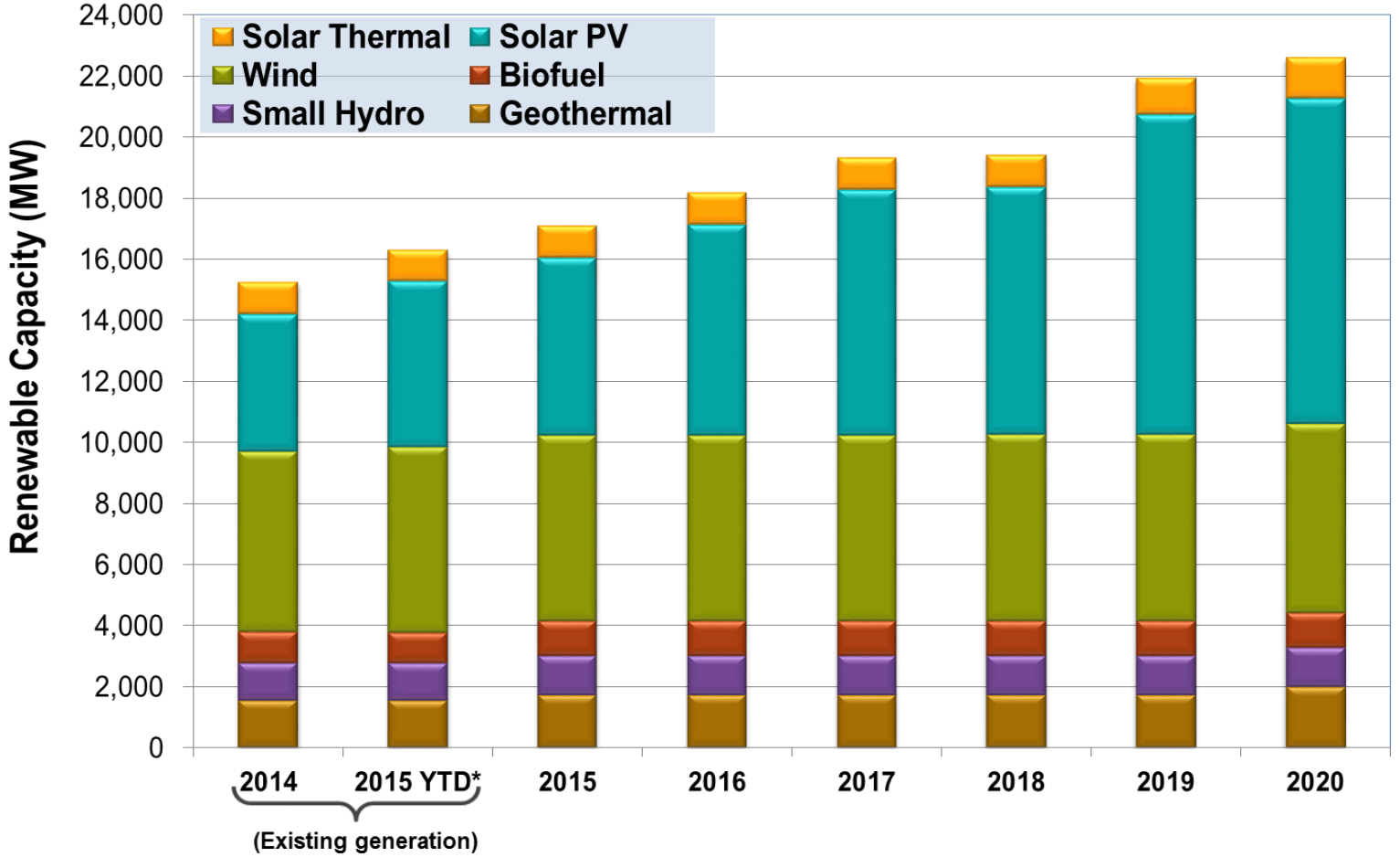
California energy and environmental policies drive renewable integration and transmission needs

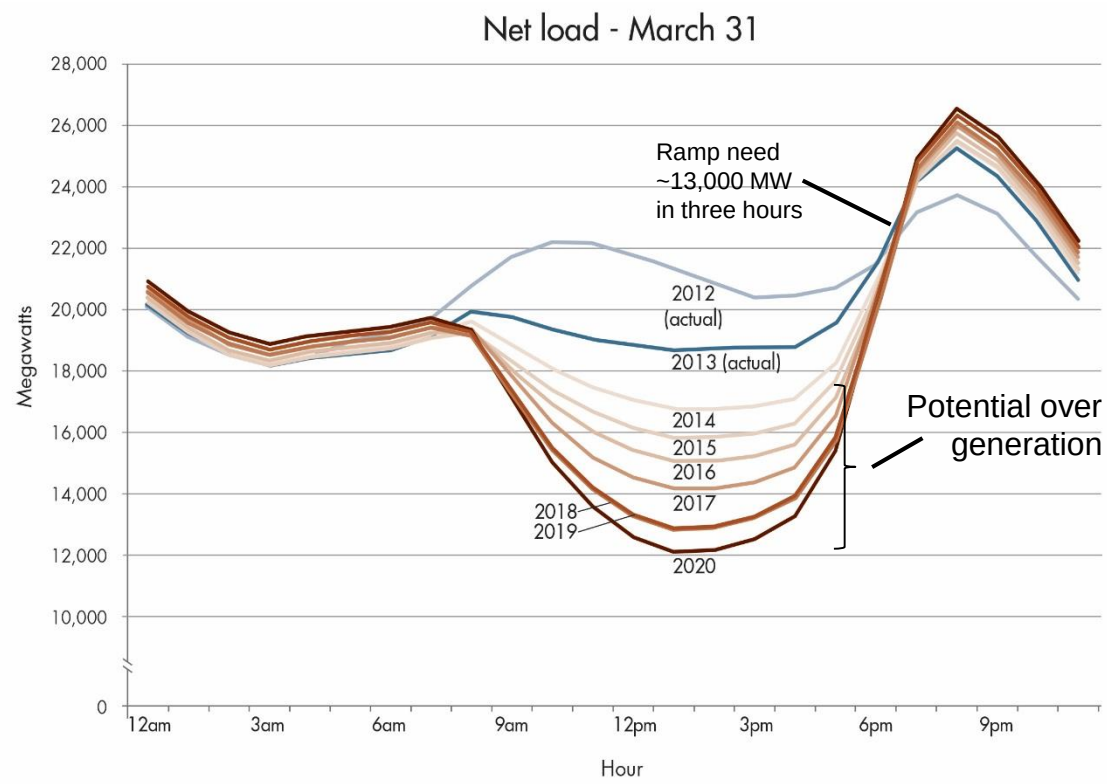
- 2020 Policies
  - Greenhouse gas reductions to 1990 levels
  - 33% of load served by renewable generation
  - 12,000 MW of distributed generation
  - Ban on use of once-through cooling in coastal power plants
- 2030 Policy Goals
  - 50% of load served by renewable generation
  - Double energy efficiency existing buildings
  - Greenhouse gas reductions to 40% below 1990 levels

Renewable Development Projections (transmission-connected)



*All online resources are included in the 2015 YTD amounts, including those yet to achieve full commercial operation.

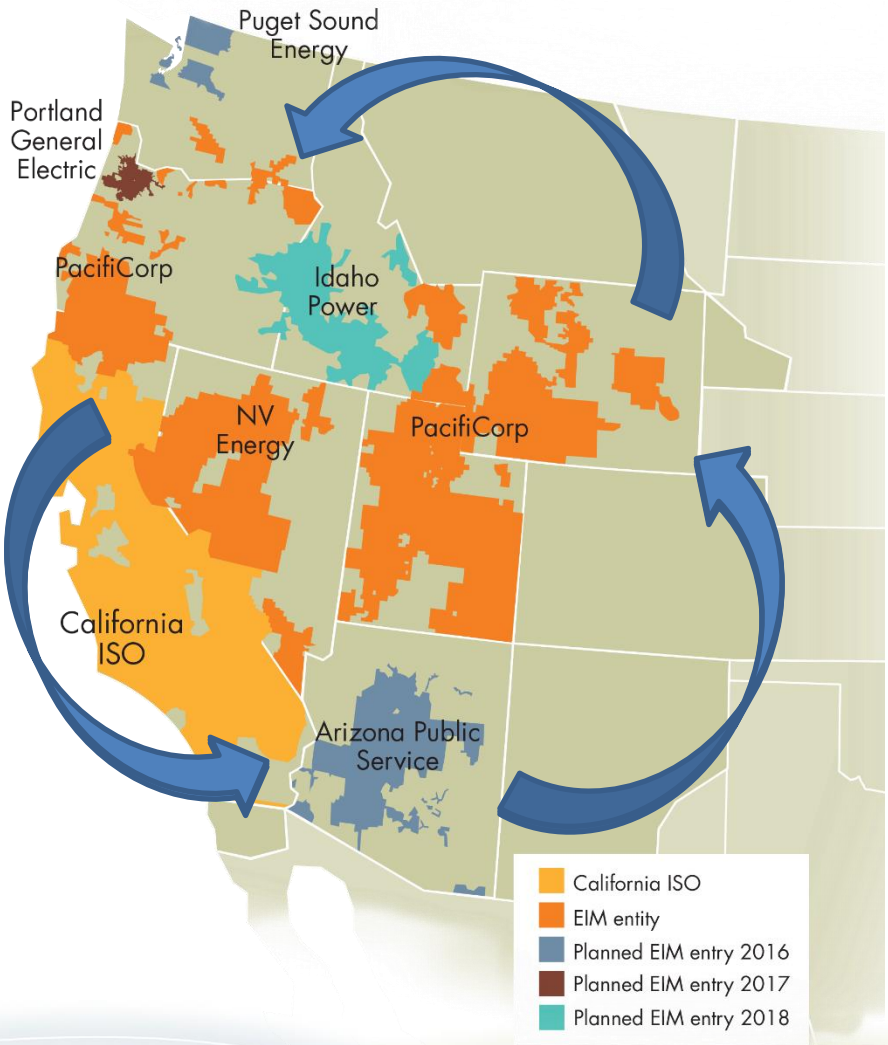
New resource mix can lead to significant over-supply conditions and potential for renewable generation curtailments.



Solutions
Increase storage and demand response
Enable economic dispatch of renewables
Decarbonize transportation fuels
Retrofit existing power plants
Align time-of-use rates with system conditions
Target energy efficiency
Deepen regional coordination

Energy imbalance market (EIM) is an easily-scalable extension of the real-time market to a broader region

- Total savings of $45.69 million through year ending 2015
- 17,776 MWh curtailment avoided, displacing 7,521 metric tons of CO2.
- Integration of renewables across a larger geographical area
- Enhances reliability with improved situational awareness
- Reduces costs through automatic economic dispatch
- Balancing authorities maintain control and reliability responsibilities



Scope of the SB 350 Study

Legislative Requirement:

- 359.5. (a) It is the intent of the Legislature to provide for the transformation of the Independent System Operator into a regional organization…, and that the transformation should only occur where it is in the best interests of California and its ratepayers.

- The ISO will conduct studies of the impacts of a regional market, including:
  1. Overall benefits to **California ratepayers**
  2. Emissions of **greenhouse gases** and **other air pollutants**
  3. Creation or retention of **jobs** and other **benefits to the California economy**
  4. **Environmental** impacts in California and elsewhere
  5. Impacts in **disadvantaged communities**
  6. **Reliability** and **integration of renewable energy** resources

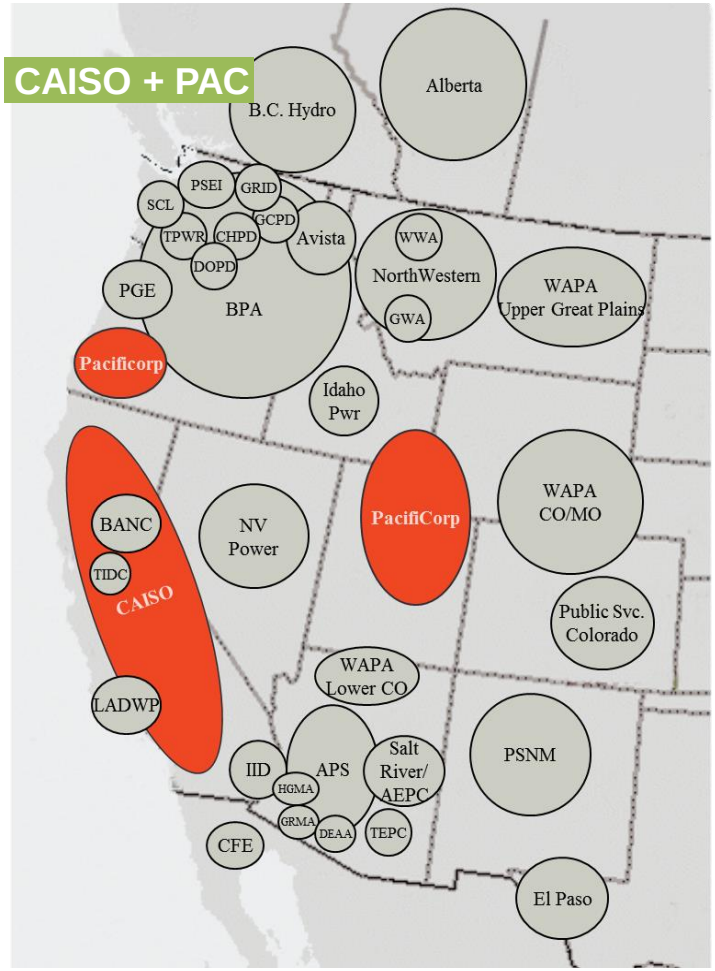
- The modeling, including all assumptions underlying the modeling, shall be made available for public review.

Transformation of the ISO to a regional organization entails a number of changes

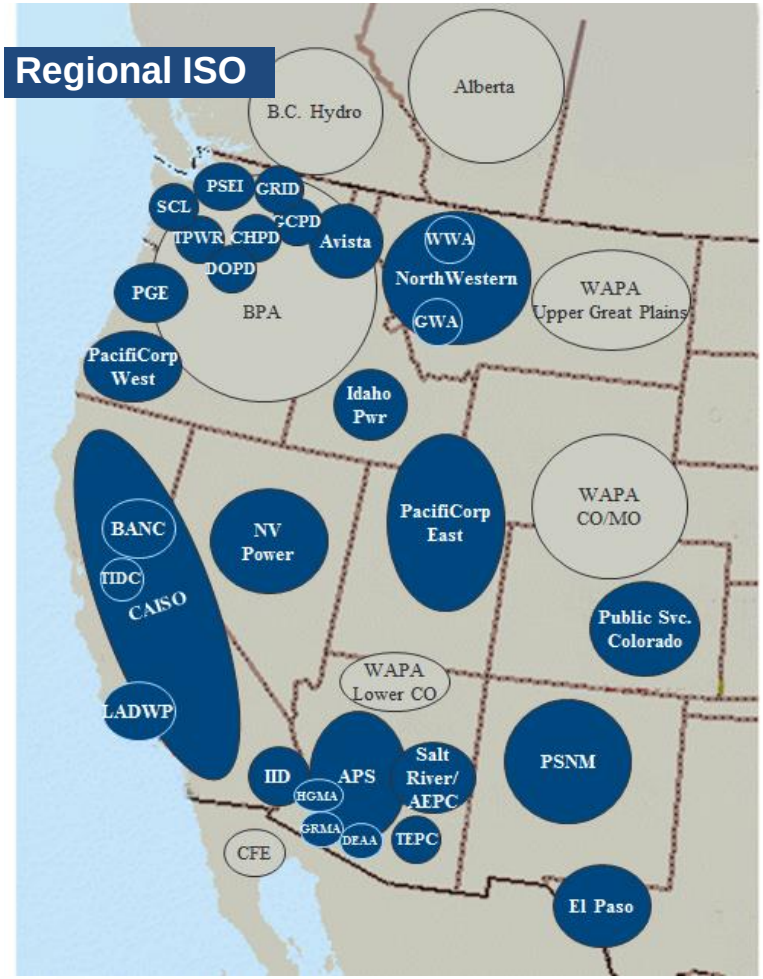
- Combines the Balancing Areas currently operated by California and utilities in other states
- Expands the footprint of the ISO market operation
- Provides access to the larger footprint under a single, regional transmission tariff
- Transforms the current governance structure into a regional entity

Two regional market footprint cases considered

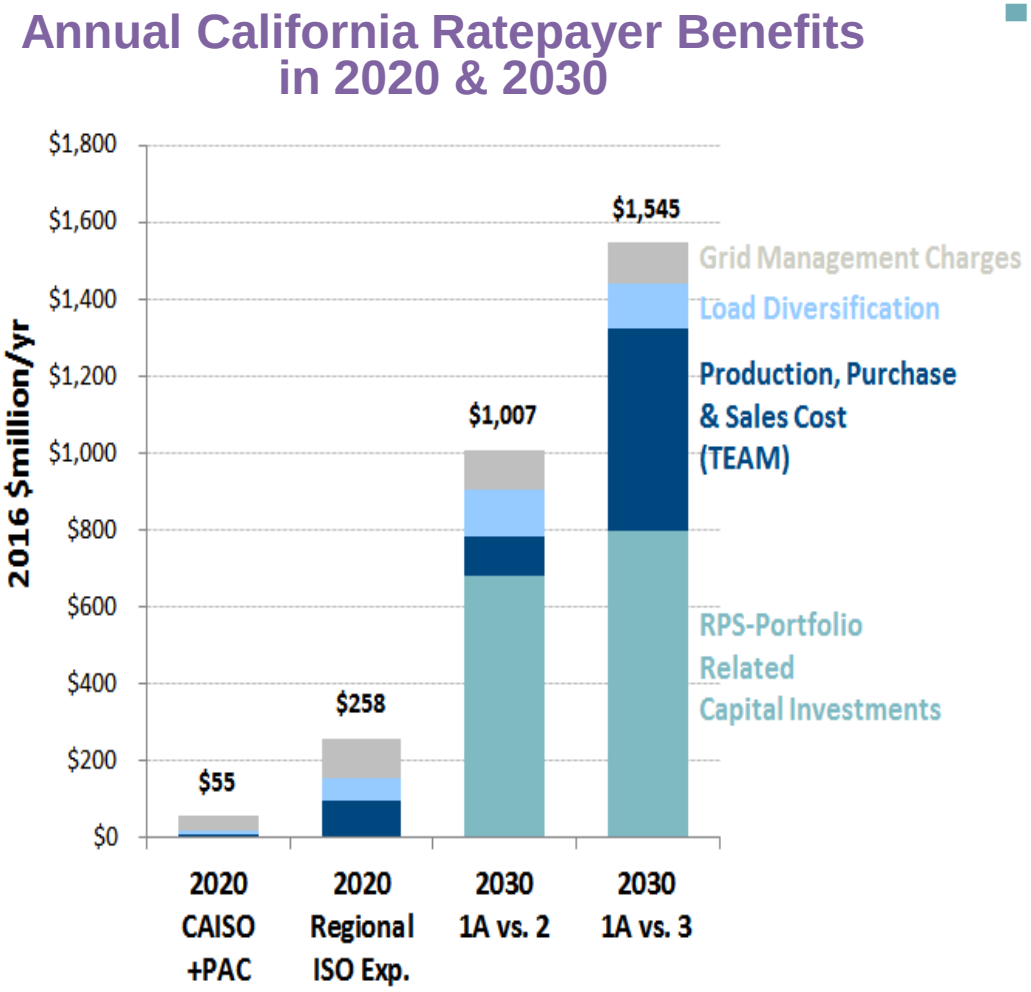
2020 Case



2030 Case & 2020 Sensitivity Case



Regional market provides significant savings to California Ratepayers

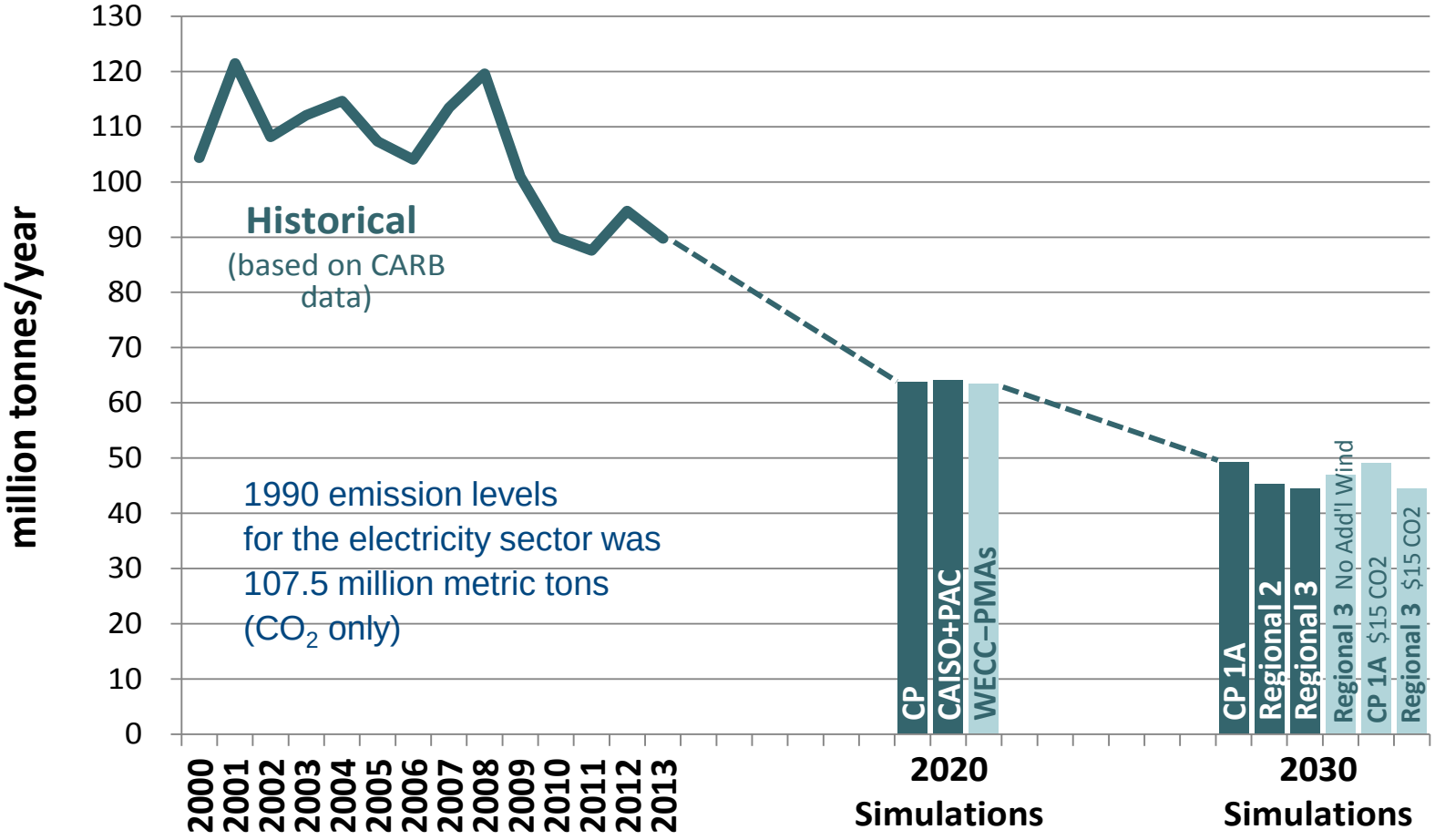


- California ratepayer impact analysis of an expanded regional market results in estimated annual savings of:
  - **$55 million/year in 2020** (0.1% of retail rates) based on limited scope of CAISO-PAC region.
    - Would be $258 million/year for expanded regional footprint (U.S. WECC without PMAs)
  - **$1 billion to $1.5 billion/year in 2030** (2–3% of retail rates) depending on approach to procure renewable resources to meet 50% RPS
  - 2030 sensitivities show range from **$767 million to $1.75 billion/year**

Potential additional benefits not quantified

- **Increased system reliability** due to expanding ISO operations to a larger regional footprint that improves pricing, congestion management, generation commitment, real-time operations, and system visibility/monitoring
- **Improved use of the physical capabilities of the existing grid** both on constrained WECC transmission paths and within the existing WECC balancing areas
- **Improved regional and inter-regional system planning** to increase efficiency in transmission buildout across the West
- **Improved risk mitigation** from a more diverse resource mix and larger integrated market that can better manage the economic impacts of transmission and major generation outages and better diversify weather, hydro, and renewable generation uncertainties
- **Long-term benefits** from stronger generation efficiency incentives and better long-term investment signals across a larger regional footprint

Simulated vs. Historical California CO2 Emissions



* Simulation results assume CO_2 emissions associated with imports are charged and exports are credited based on a generic CO_2 emission rate for natural gas CCs.

Next Steps

Milestone	Date
Comments due on presentation materials and meeting discussion – Please use comments template available at http://www.caiso.com/Documents/CommentsTemplate-SB350CleanEnergy-PollutionReductionAct-Presentation-Discussion.doc	June 8
Post final report	Target – Mid-June
Joint agency workshop	Target – July

Additional questions or comments can be directed to: regionalintegration@caiso.com

SB350 Study Reference Material

The May 24 – 25, 2016 stakeholder meetings will be recorded in their entirety. The recording will be available to stakeholders on the regional energy markets webpage at: http://www.caiso.com/informed/Pages/RegionalEnergyMarket/BenefitsofaRegionalEnergyMarket.aspx.

This is a service to stakeholders who couldn't join us, or would like to review the proceedings. Materials related to the SB350 study and other regional integration efforts are also available at the link provided above.

Additional reference materials:
Senate Bill No. 350 - Clean Energy and Pollution Reduction Act of 2015
https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB350
Fast Facts – Benefits of a regional energy market
http://www.caiso.com/Documents/2015RegionalBenefitsFactSheet.pdf
Early release material
http://www.caiso.com/informed/Pages/RegionalEnergyMarket/BenefitsofaRegionalEnergyMarket.aspx