Effective Generating Capacity and Resource Adequacy in the West

Maury Galbraith

Western Interstate Energy Board

Powering the Northwest: Balancing Our Energy Needs with Resources Now and in the Future

Salem City Club

January 7, 2020

Western Interstate Energy Board

The Western Interstate Energy Board (WIEB) mission is to promote energy policy that is developed through the cooperative efforts of WIEB member states and provinces, and in collaboration with the federal government.

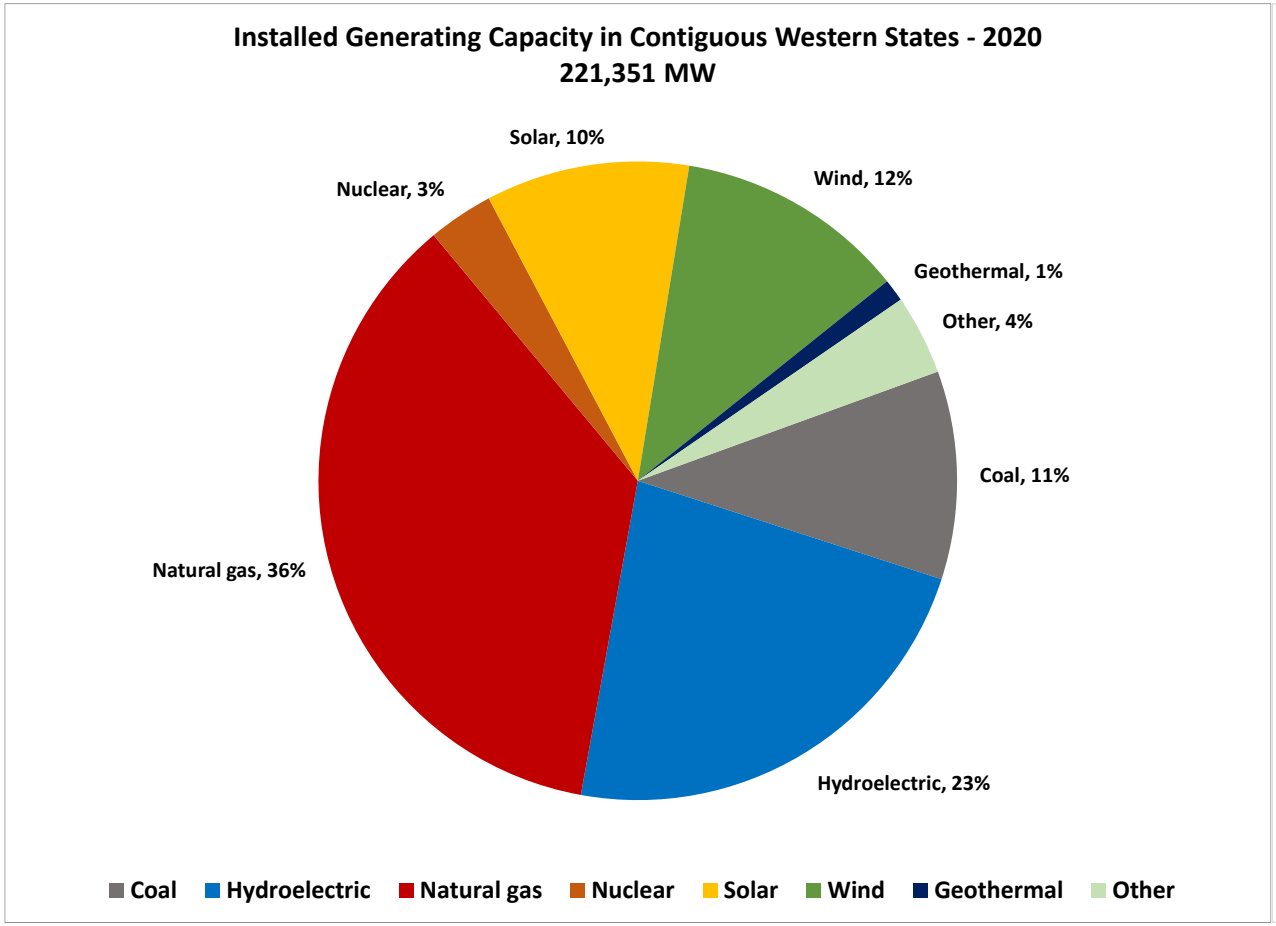
WIEB accomplishes this mission by providing the tools and framework necessary to support cooperative efforts among the states and provinces in the West.

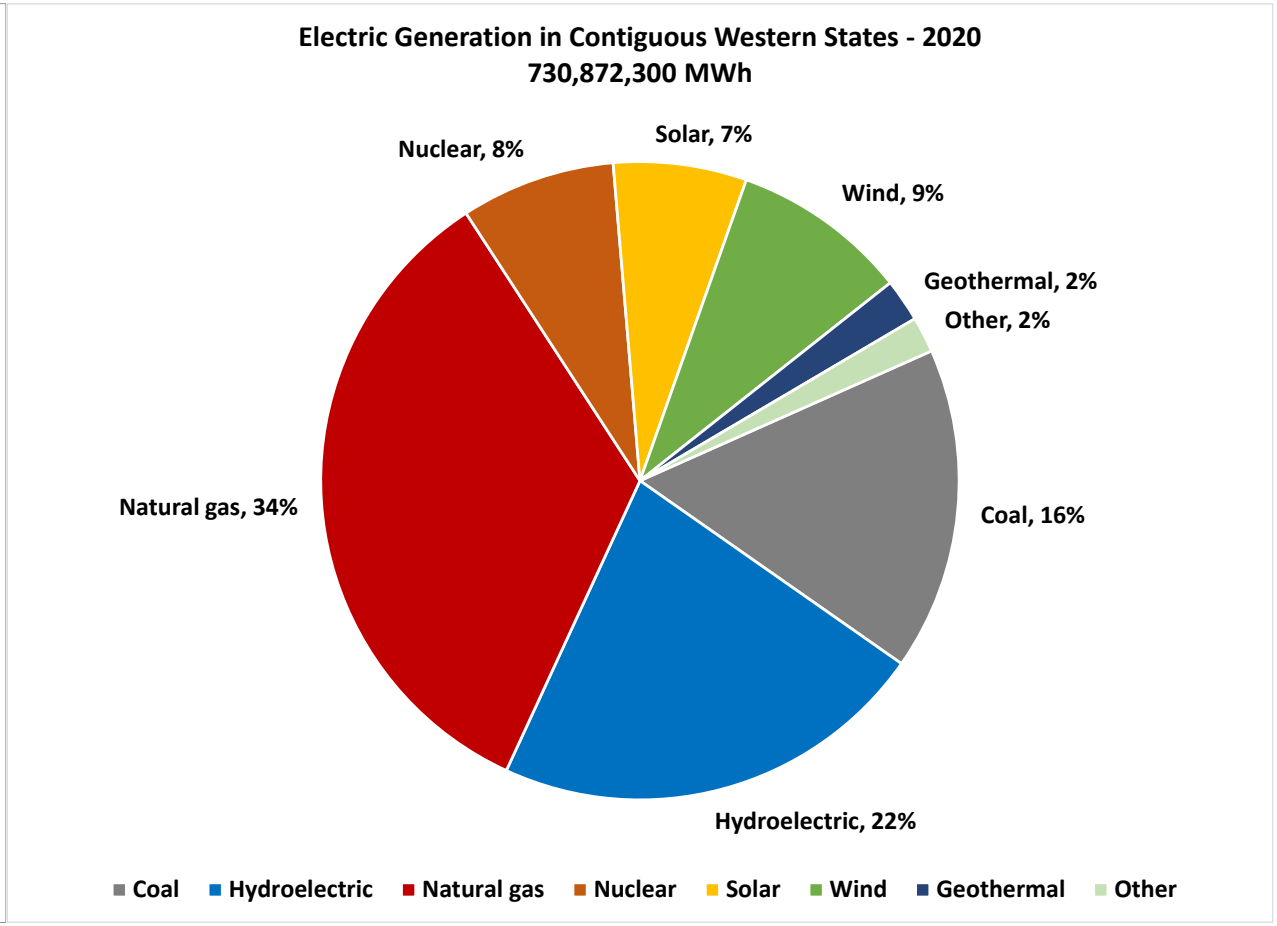
Framework for Cooperative Efforts

WIEB provides technical expertise and staff support to the following regional committees:

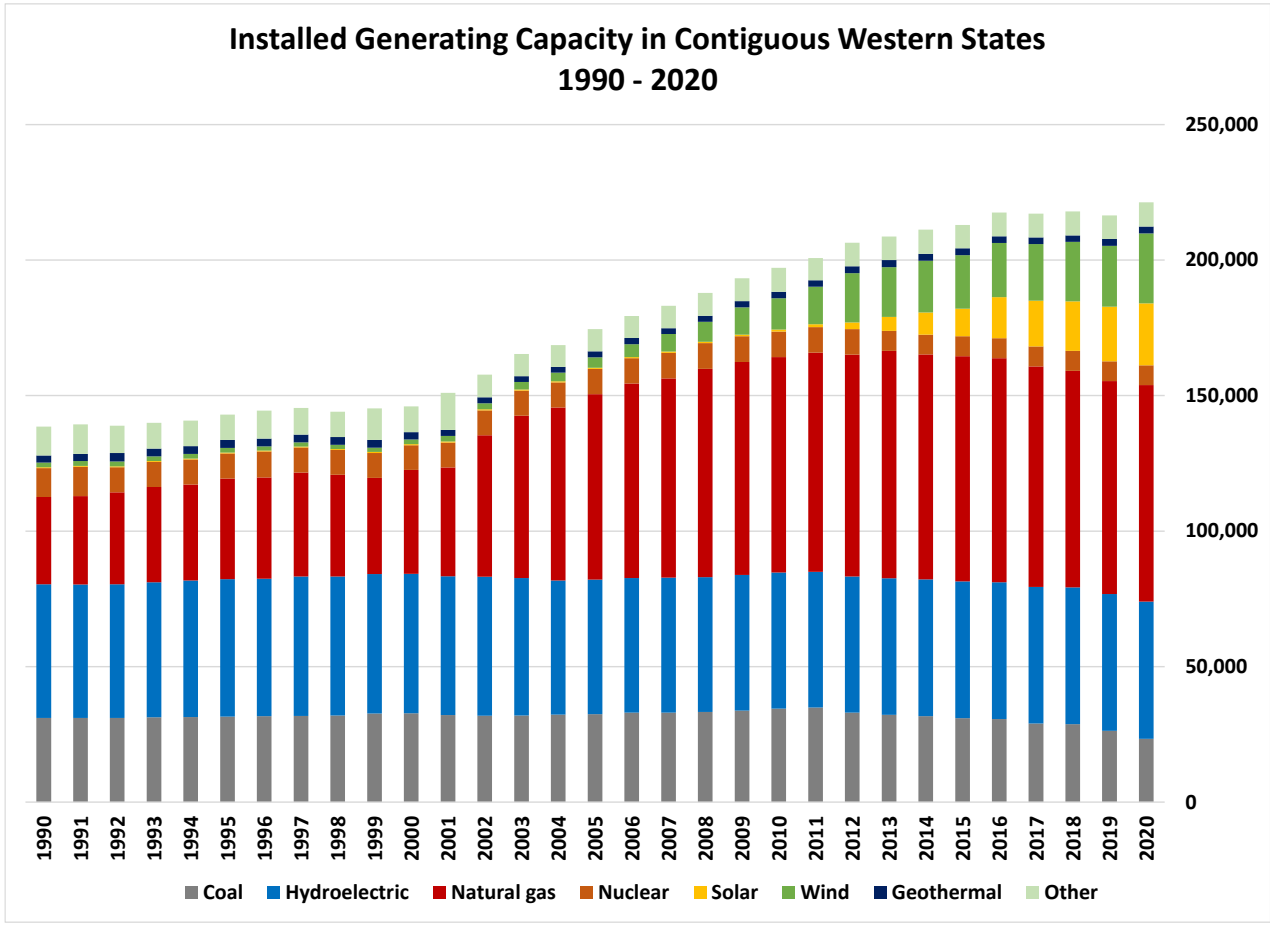
- High-Level Radioactive Waste Committee (HLRWC)
- Committee on Regional Electric Power Cooperation (CREPC)
- Western Interconnection Regional Advisory Body (WIRAB)
- Western EIM Body of State Regulators (EIM-BOSR)

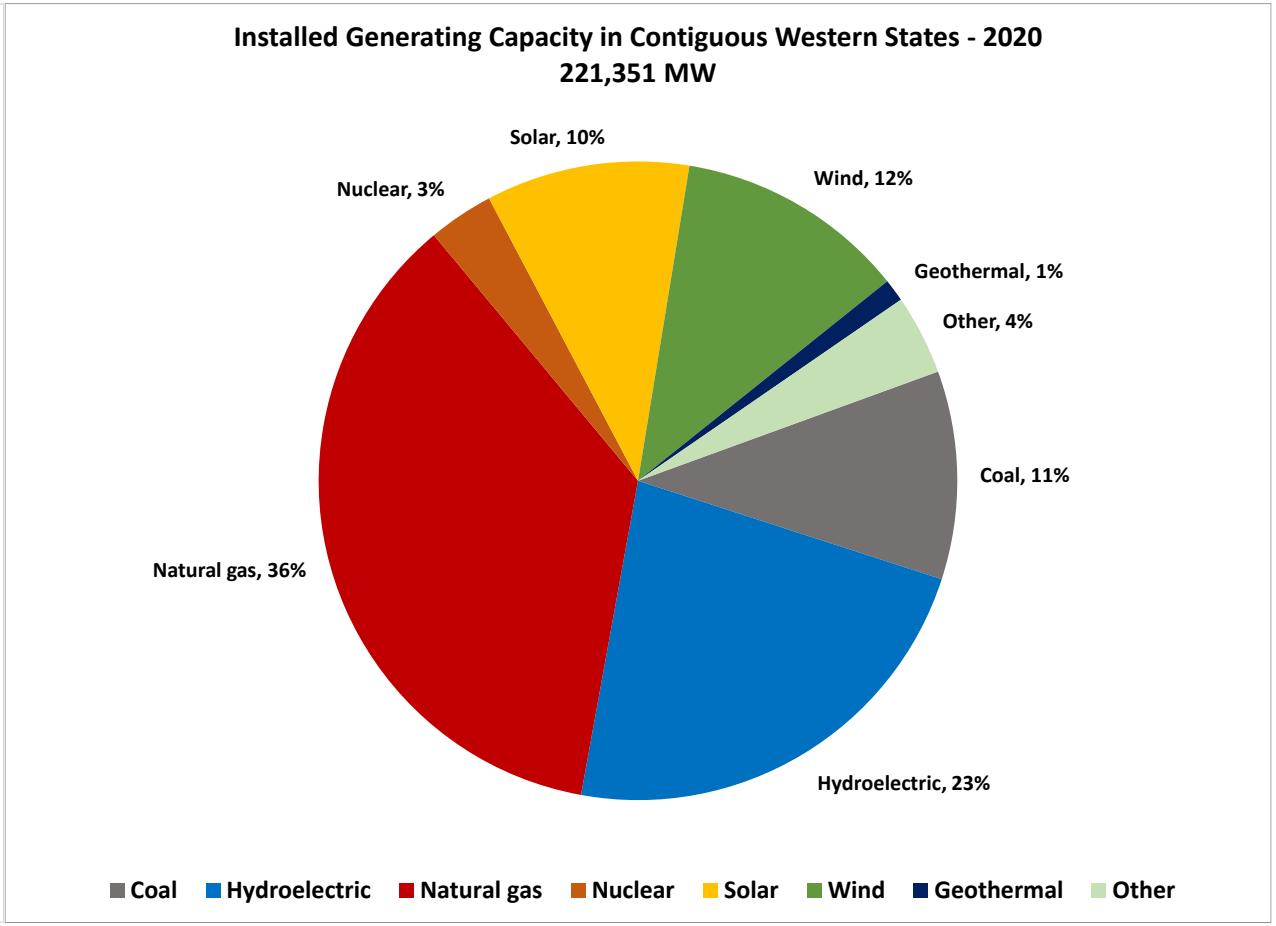
Resource Mix in the West - 2020
Installed Capacity vs. Energy





Installed Capacity Mix in the West 1990 - 2020

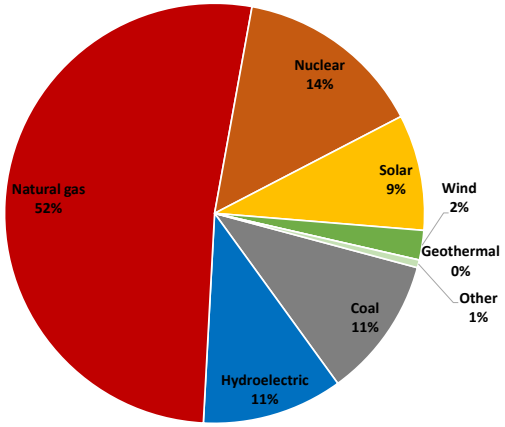




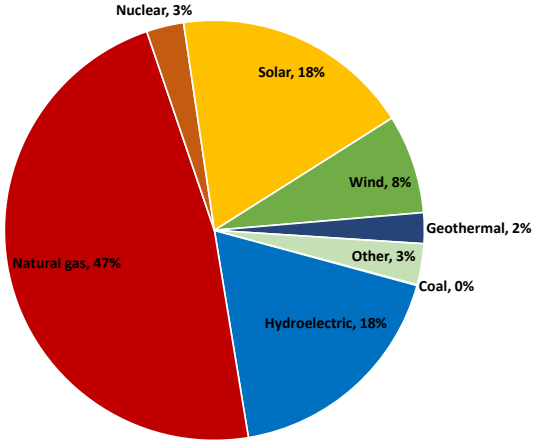
Installed Capacity Mix by State

Coal | Hydroelectric | Natural gas | Nuclear | Solar | Wind | Geothermal | Other

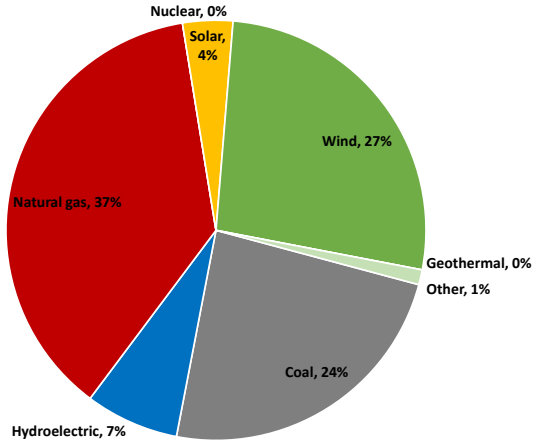
Arizona - 2020



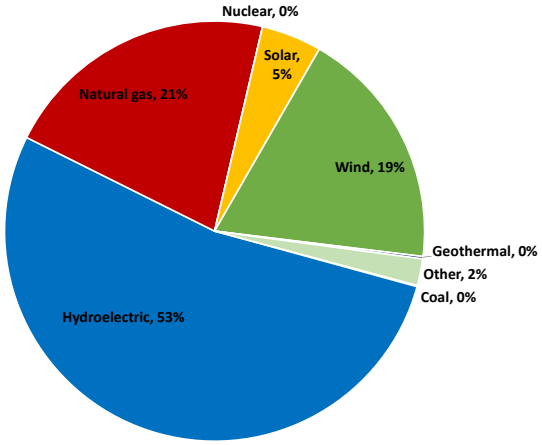
California - 2020



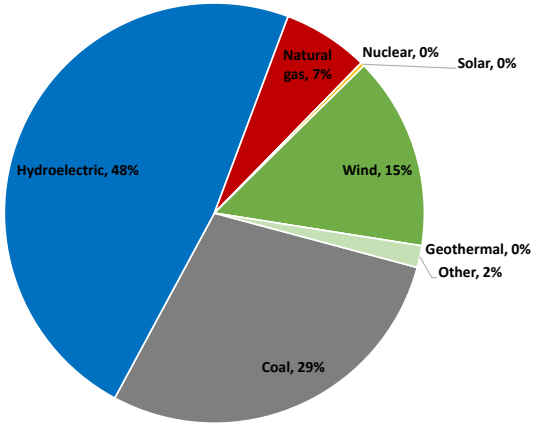
Colorado - 2020



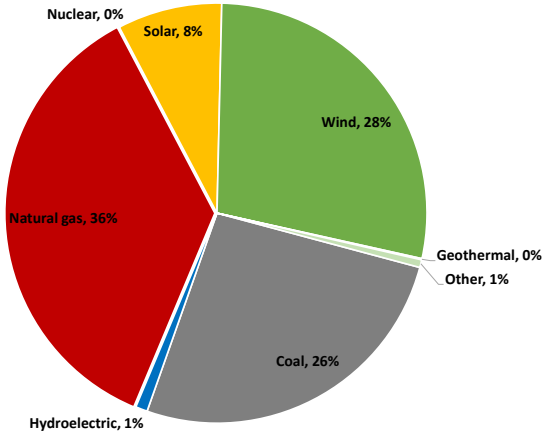
Idaho - 2020



Montana - 2020



New Mexico - 2020



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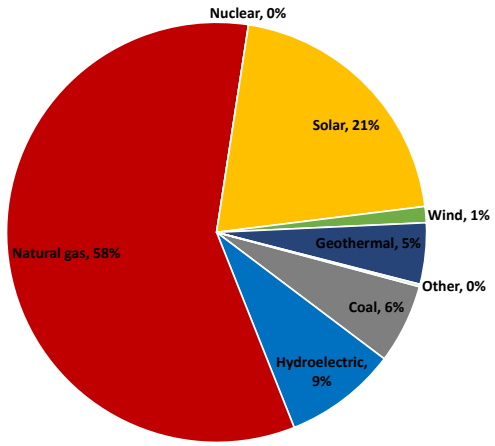
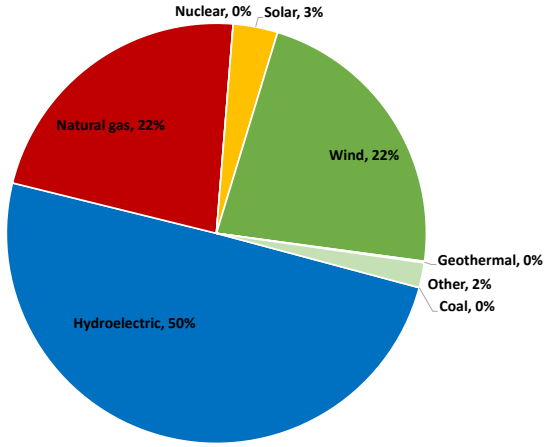
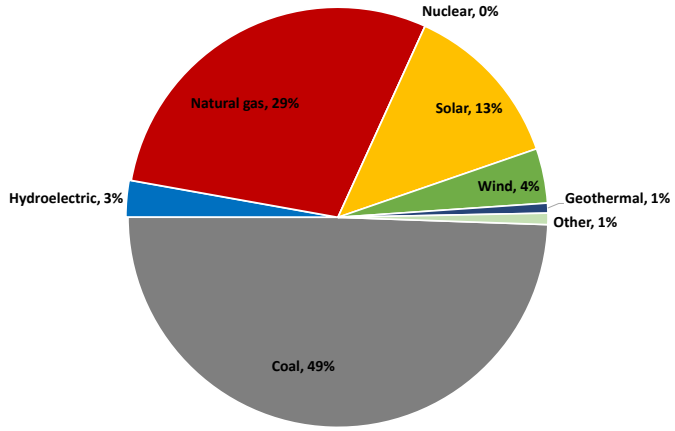
Nevada - 2020



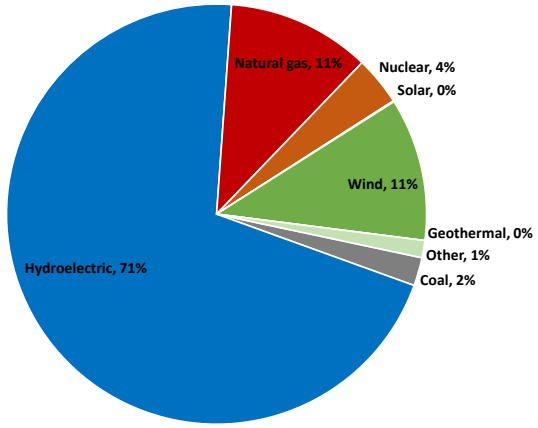
Oregon - 2020



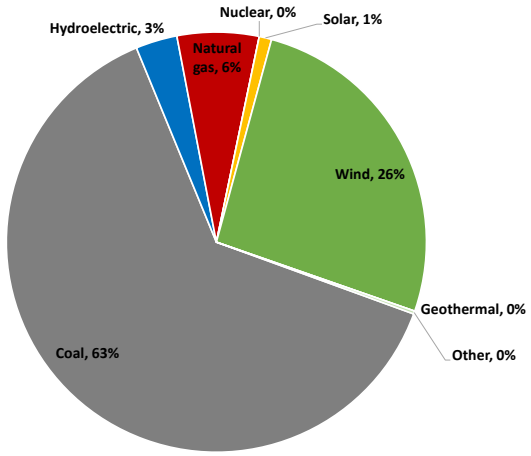
Utah - 2020



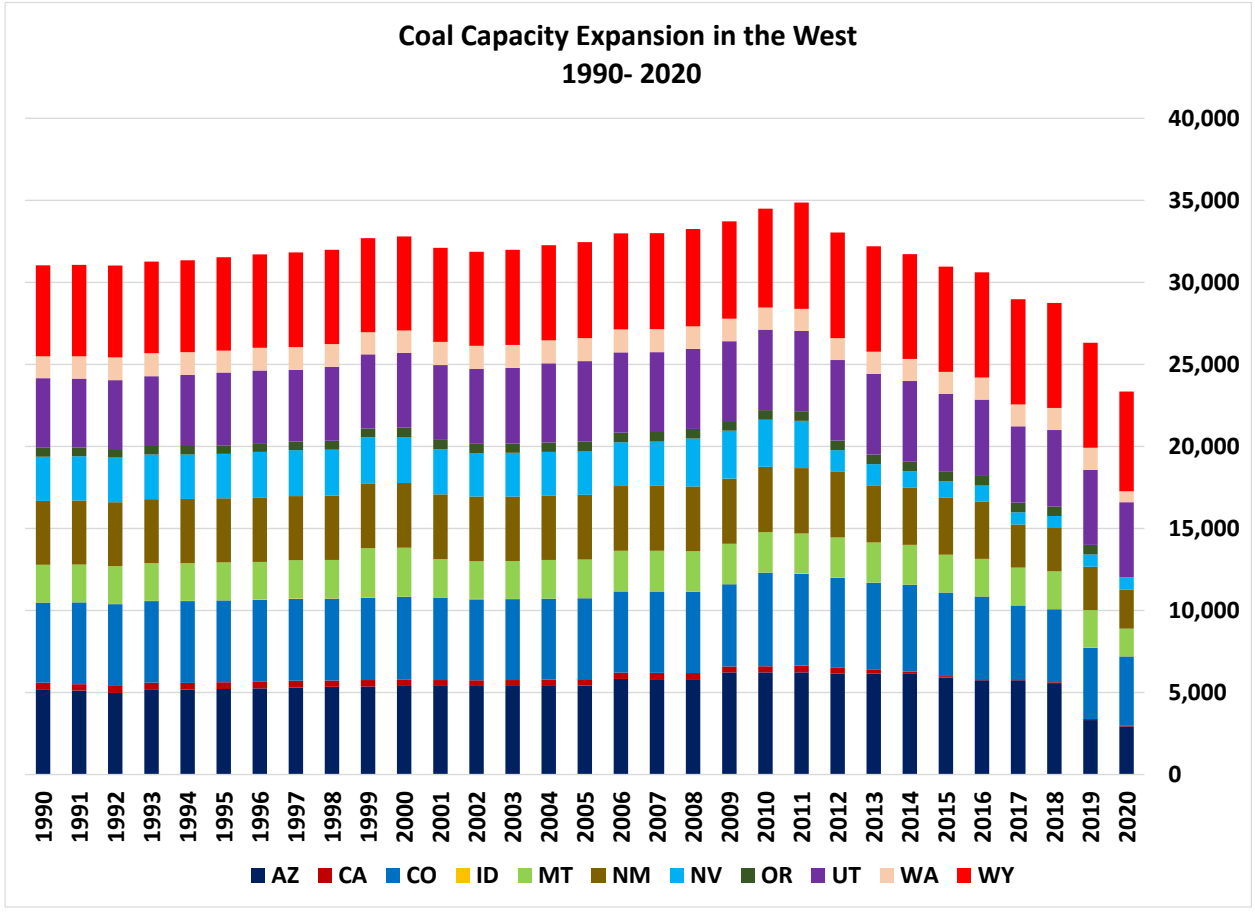
Washington - 2020

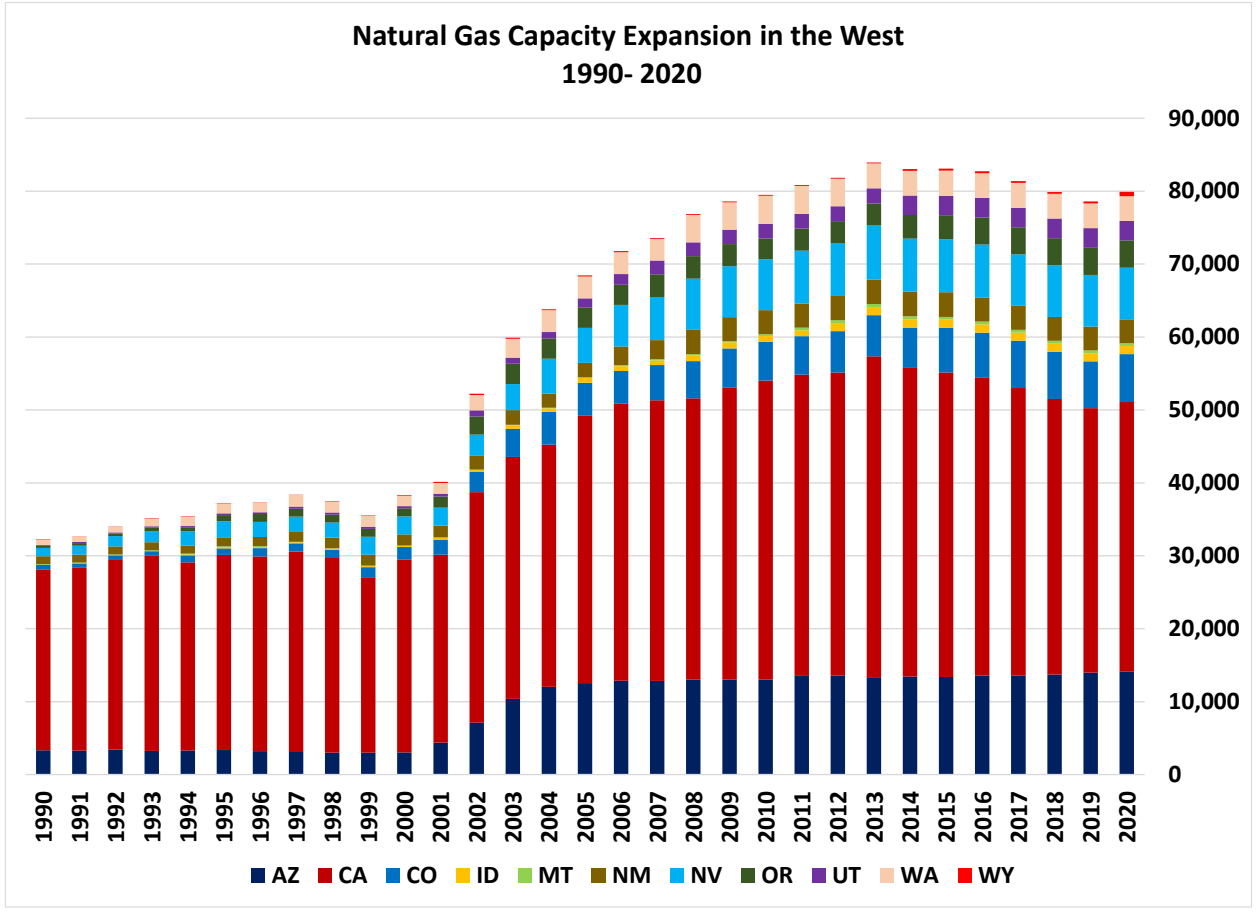


Wyoming - 2020

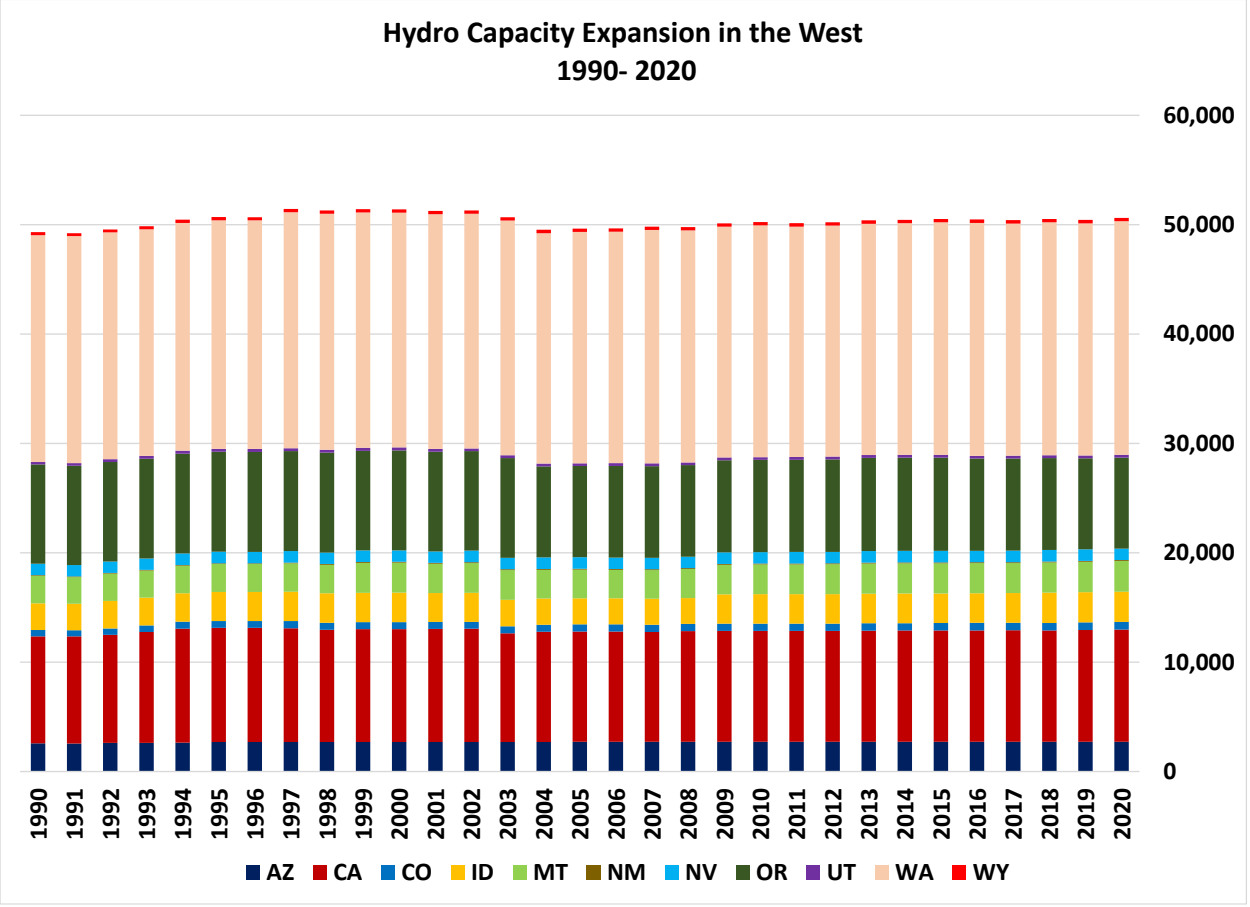


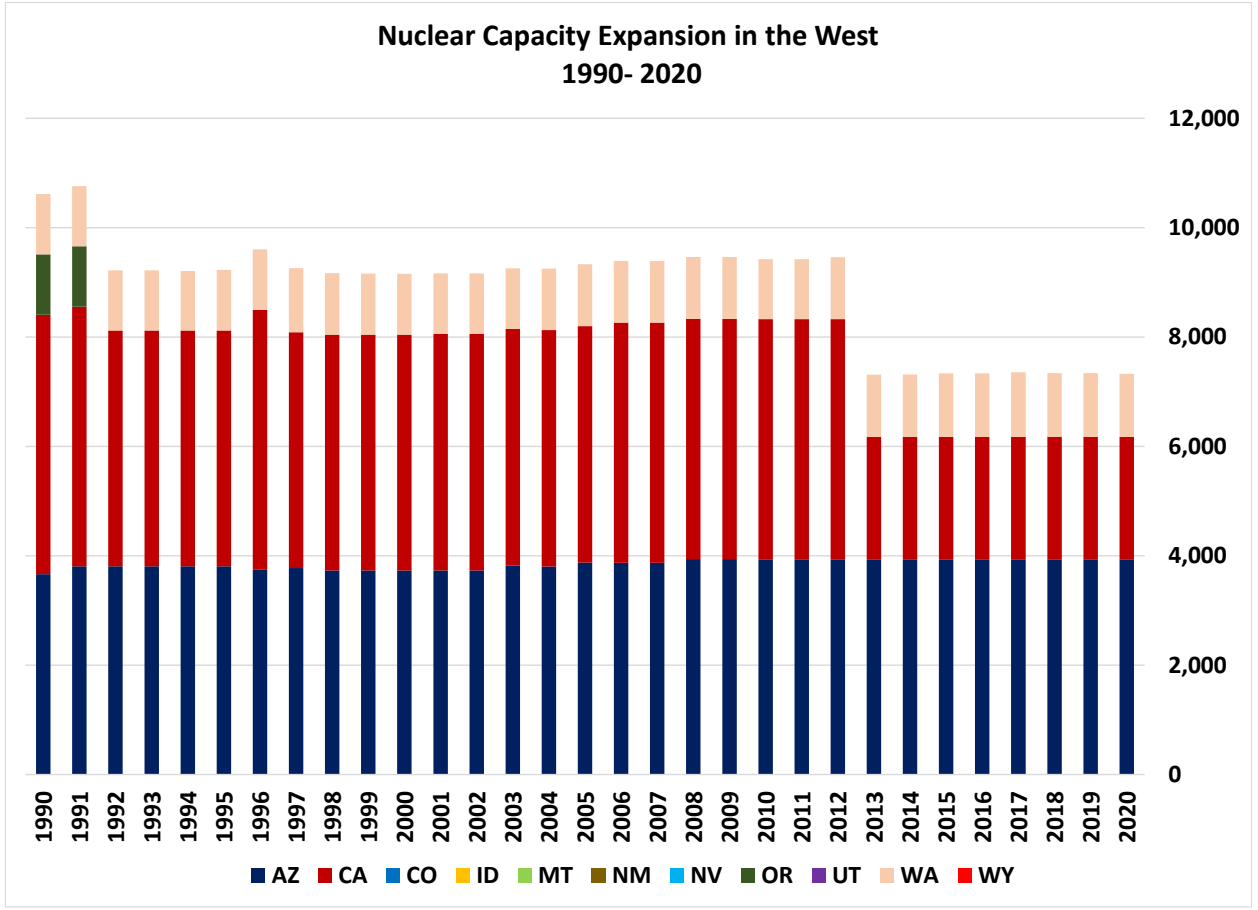
Capacity Trends in the West
Coal & Natural Gas



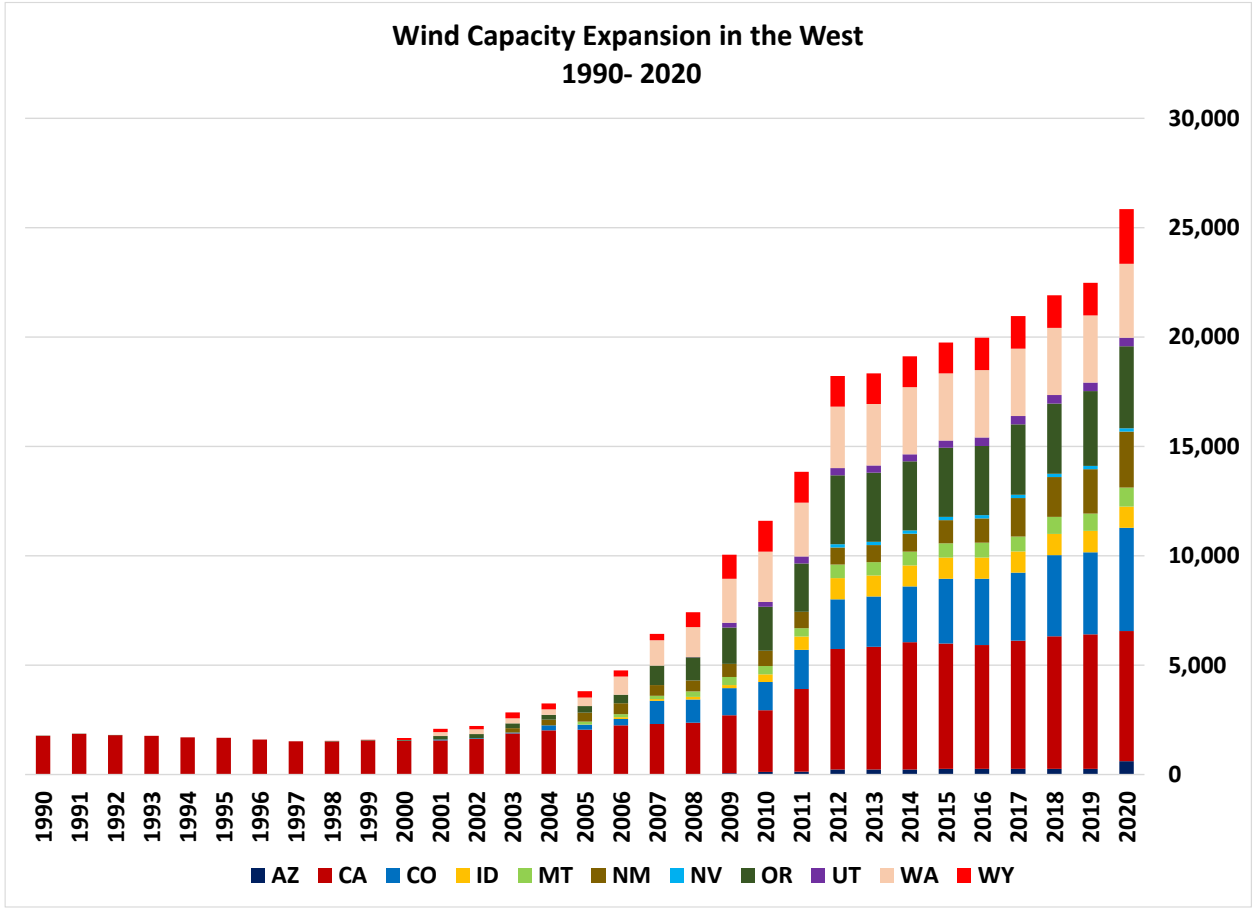


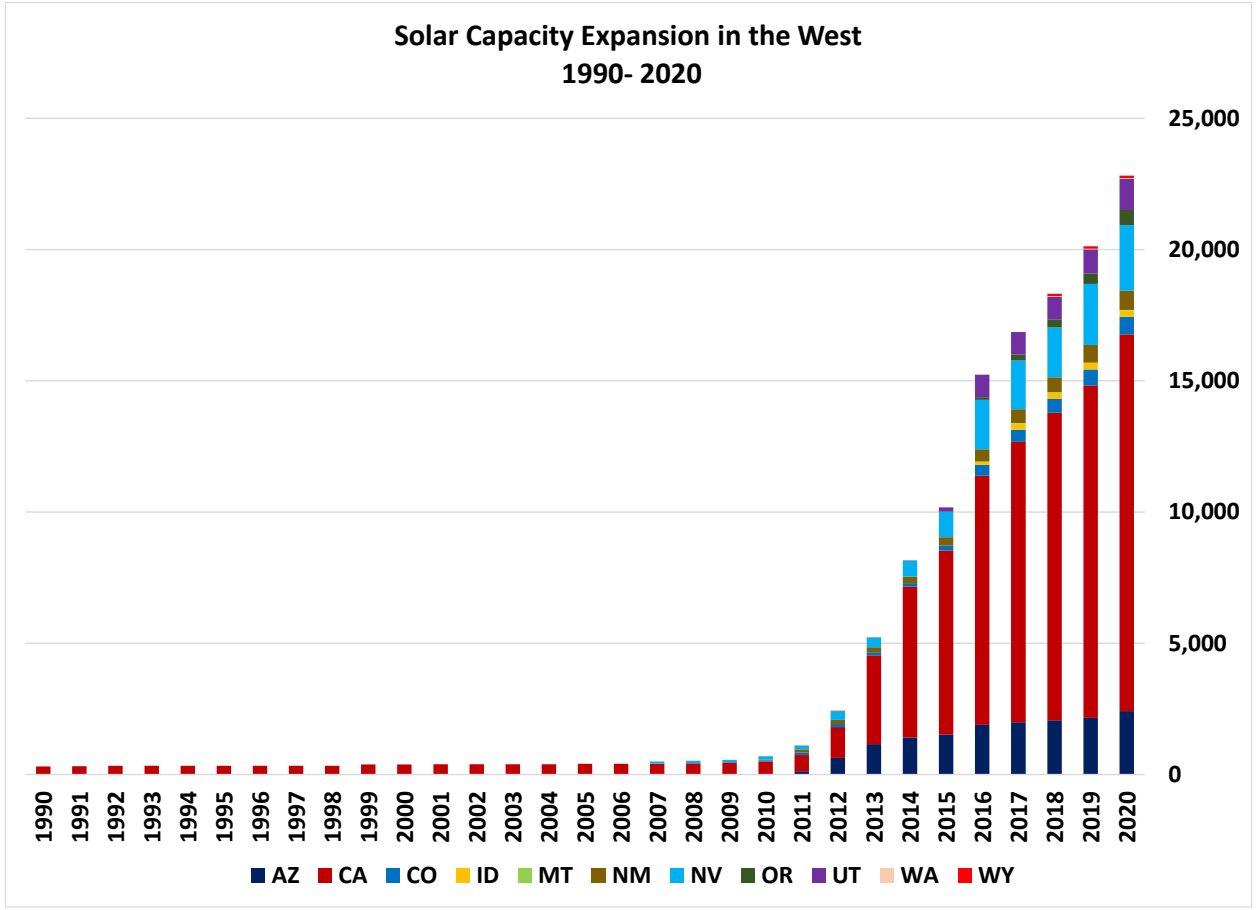
Capacity Trends in the West
Hydro & Nuclear



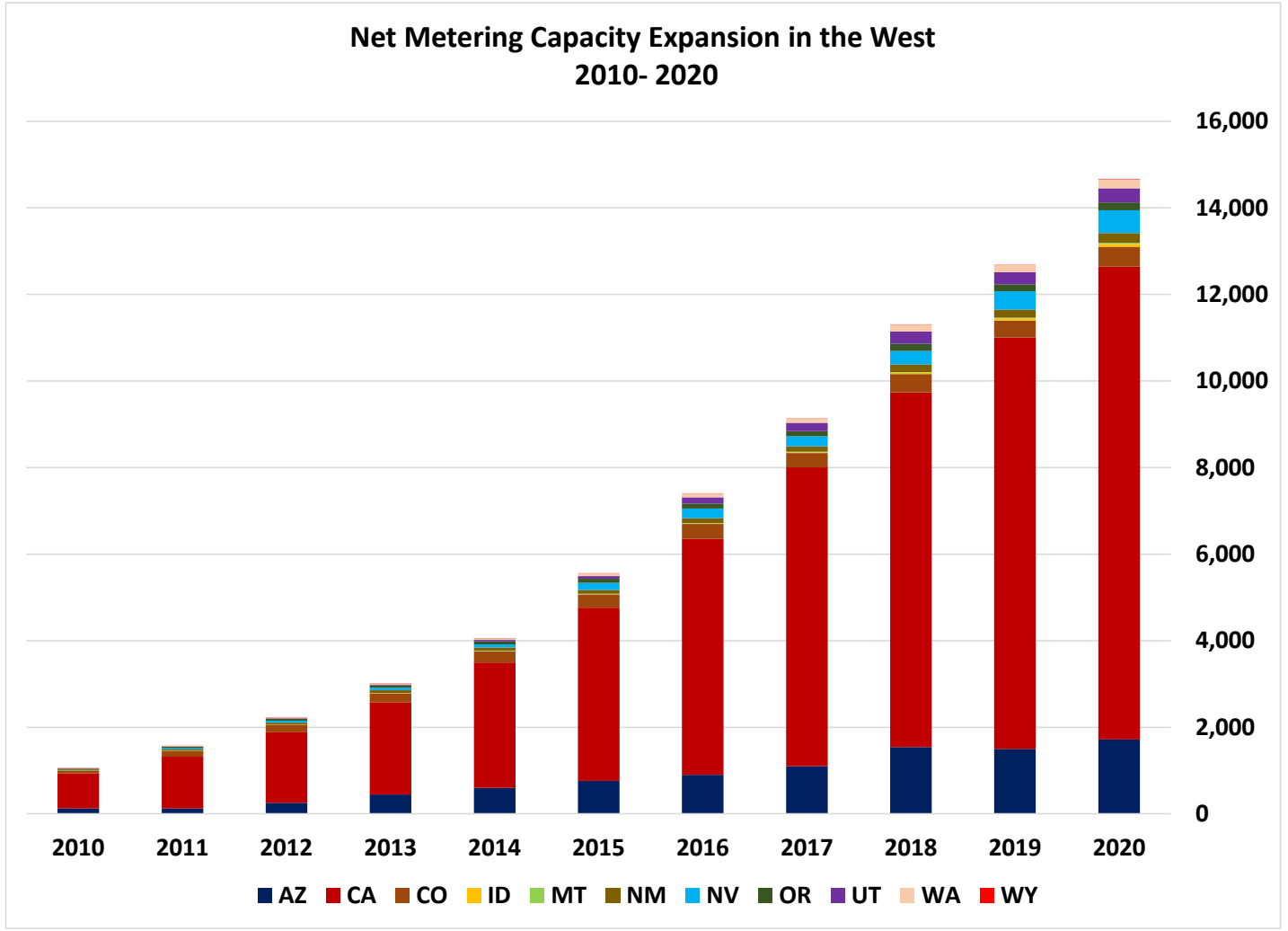


Capacity Trends in the West
Wind & Solar





Capacity Trends in the West Distributed Energy Resources



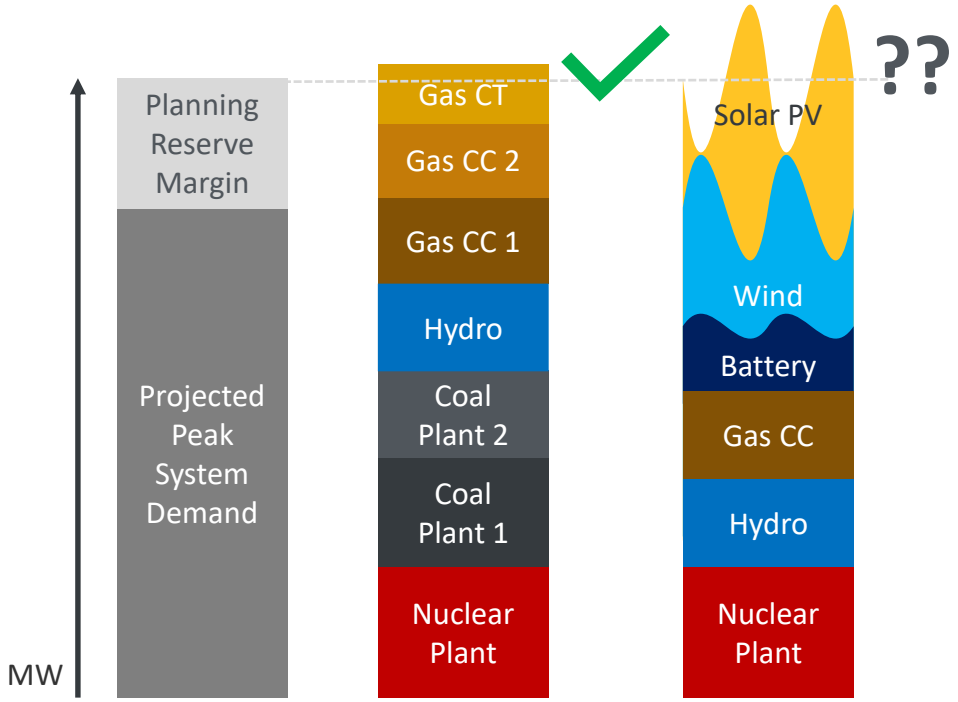
Underlying Drivers of Change

- State Mandates (RPS & Storage)
- Federal Incentives (ITC & PTC)
- Dramatic Decline in Cost of Solar PV
- Decline in Cost of Storage Technology
- Customer Preference and Choice
- Low Load Growth

Implications for the Electric System

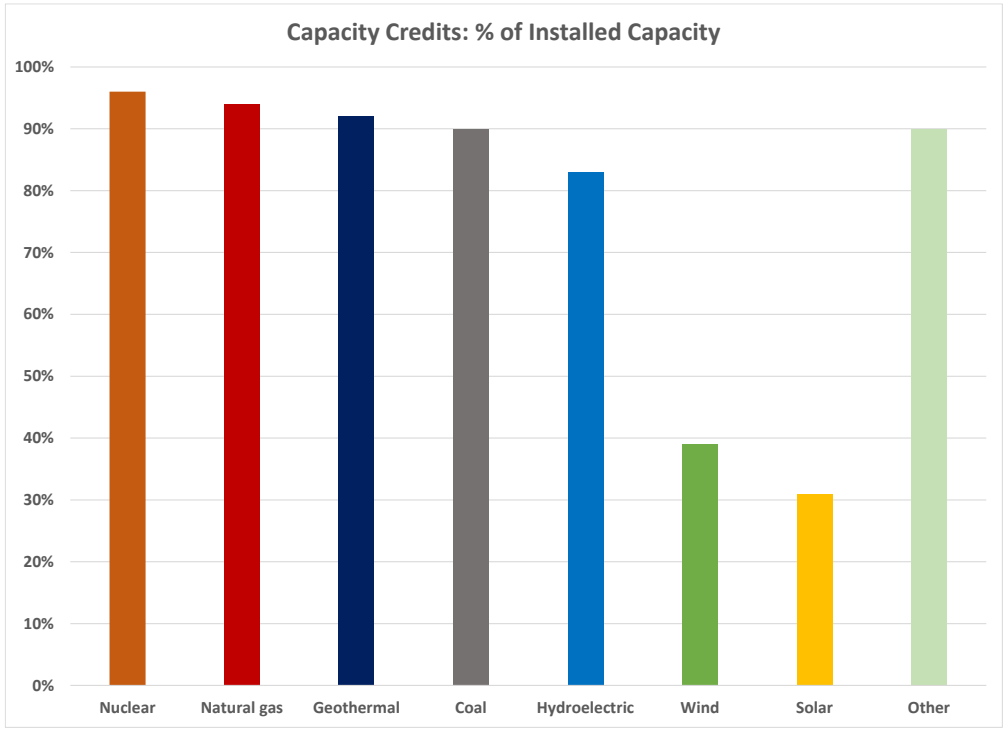
- Increased Balancing of Variability in Net Load
- Changing Flows on the Transmission System
- Decline in Synchronous Generation
- Need for Visibility into Distribution Systems
- Increased Complexity and Need for Innovation and Automation
- Increased Reliance on Natural Gas Infrastructure
- Even Greater Need for Regional Coordination

Resource Adequacy



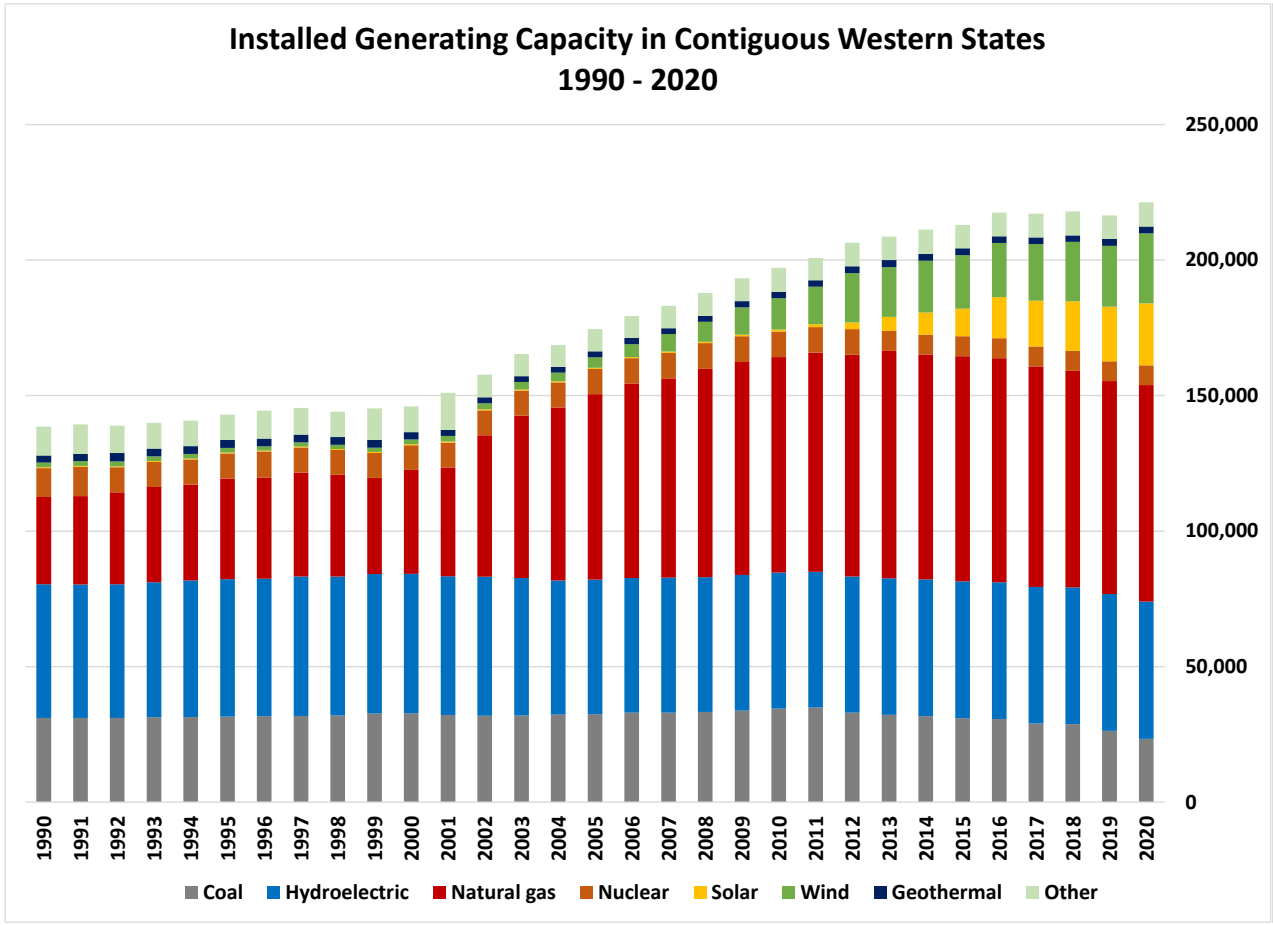
- The ability of an electric power system to meet demands for electricity using its supply-side and demand-side resources.
- Becoming increasingly complex due to plant retirements and higher penetration of variable renewable energy resources and increased uncertainty regarding the amount of generation that will be available during critical periods.

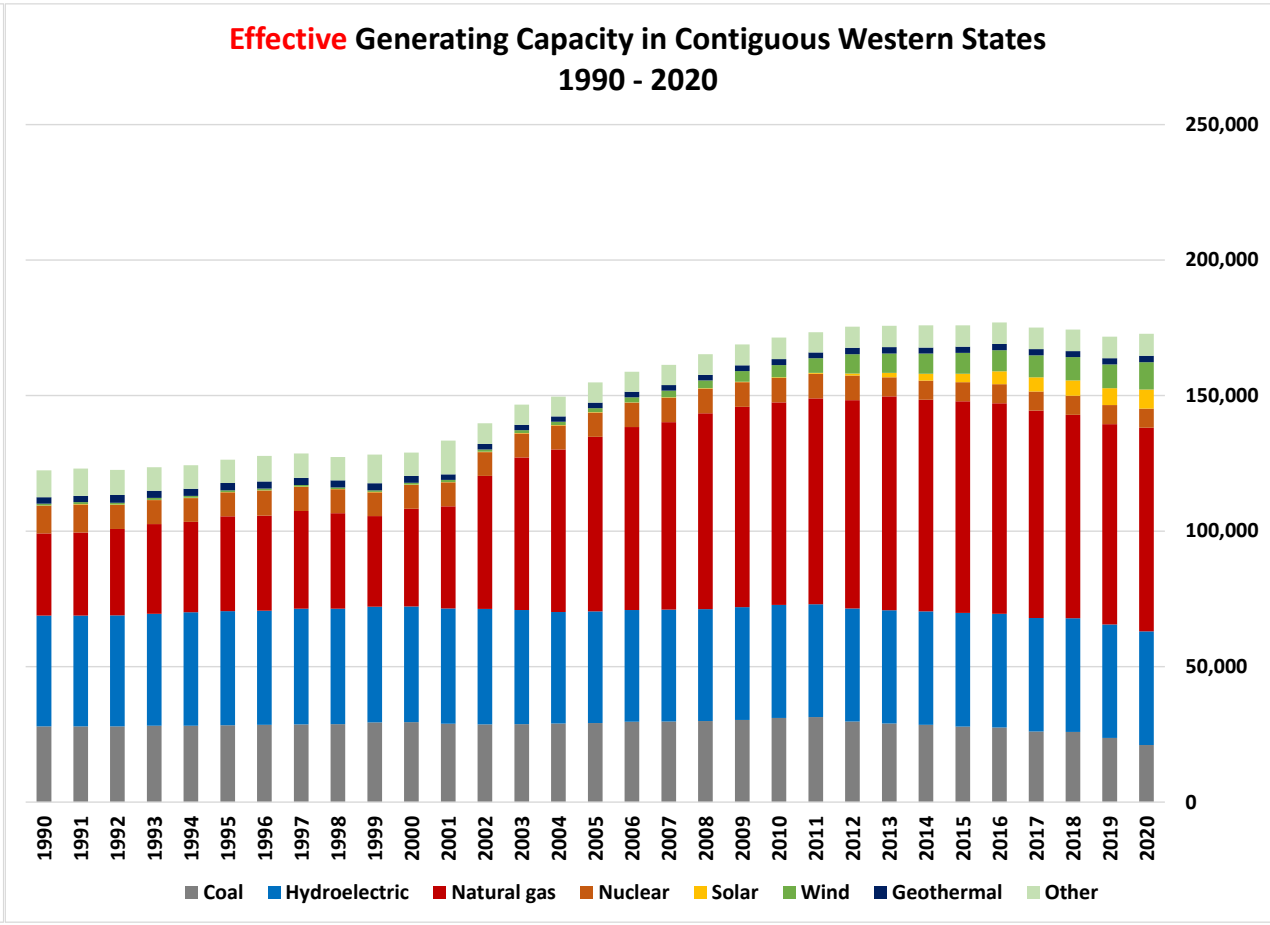
Effective Capacity



- The portion of installed capacity that is "firm" in the sense that it increases the amount of load that can be served.
- Effective capacity provides a means of translating a resource's contribution to resource adequacy in terms of equivalent "perfect" capacity.
- A "perfect" capacity resource is one that can generate at maximum capacity in all hours of the year.

Capacity Mix in the West
Installed vs. Effective Capacity





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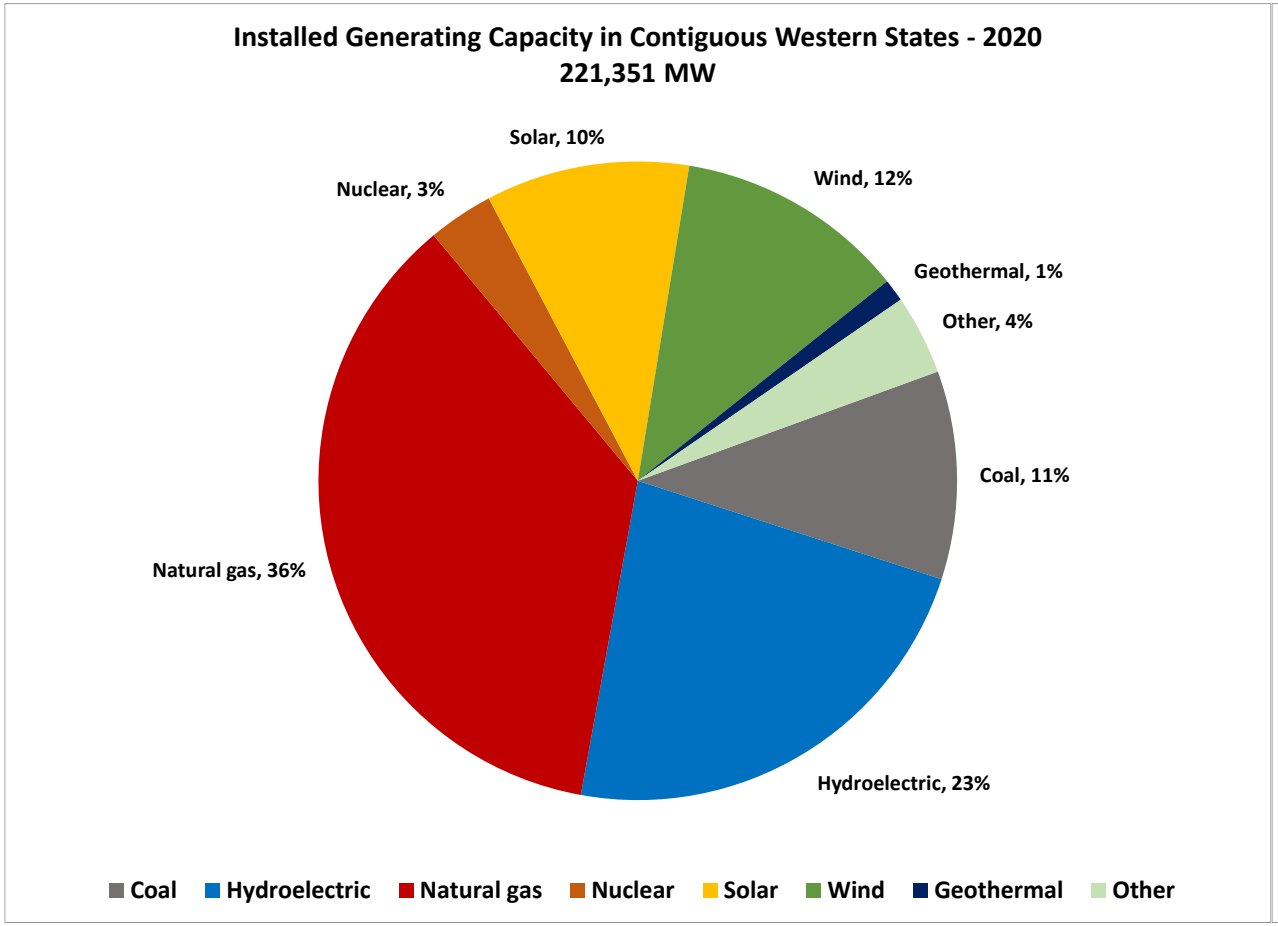
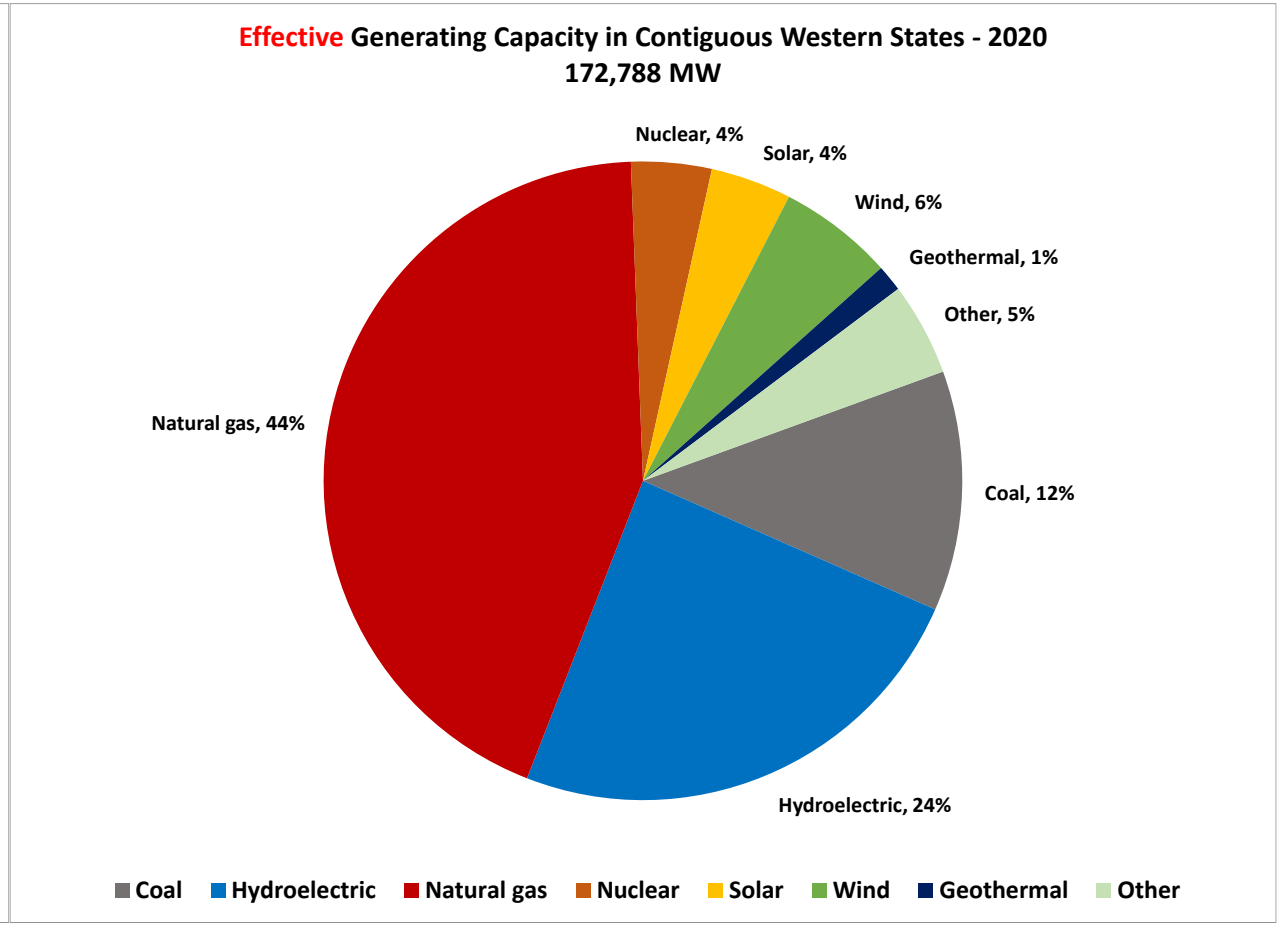
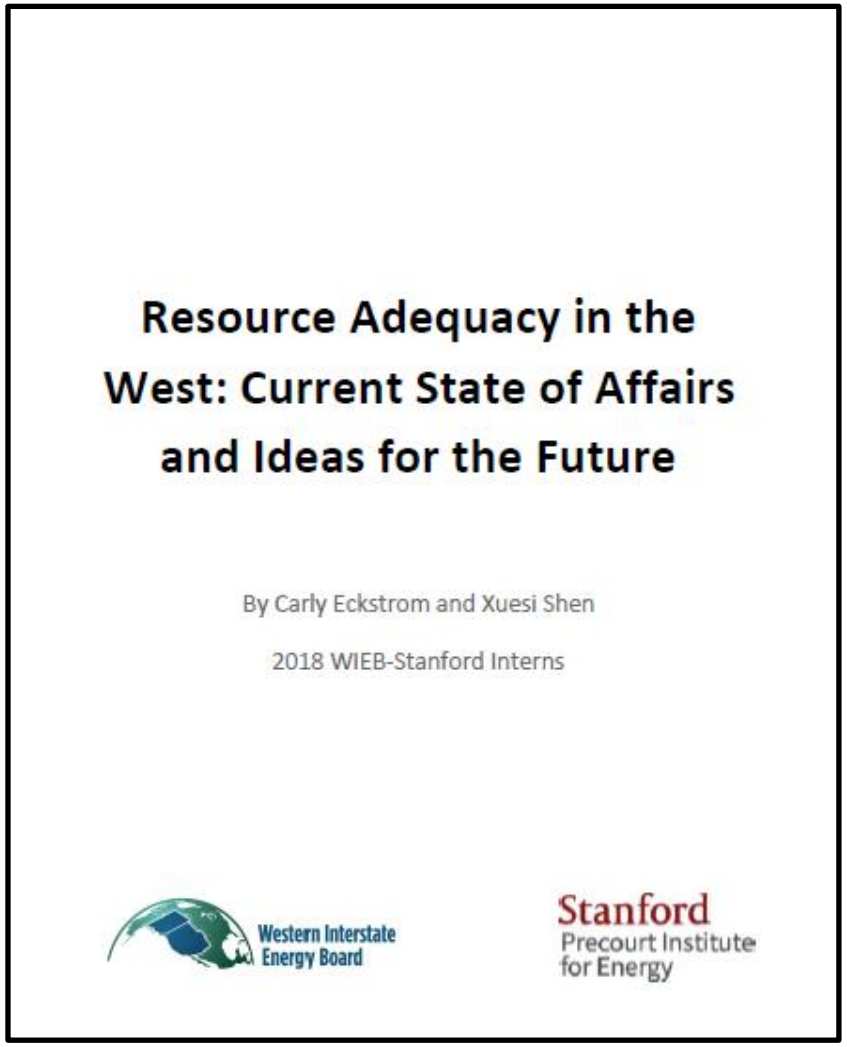


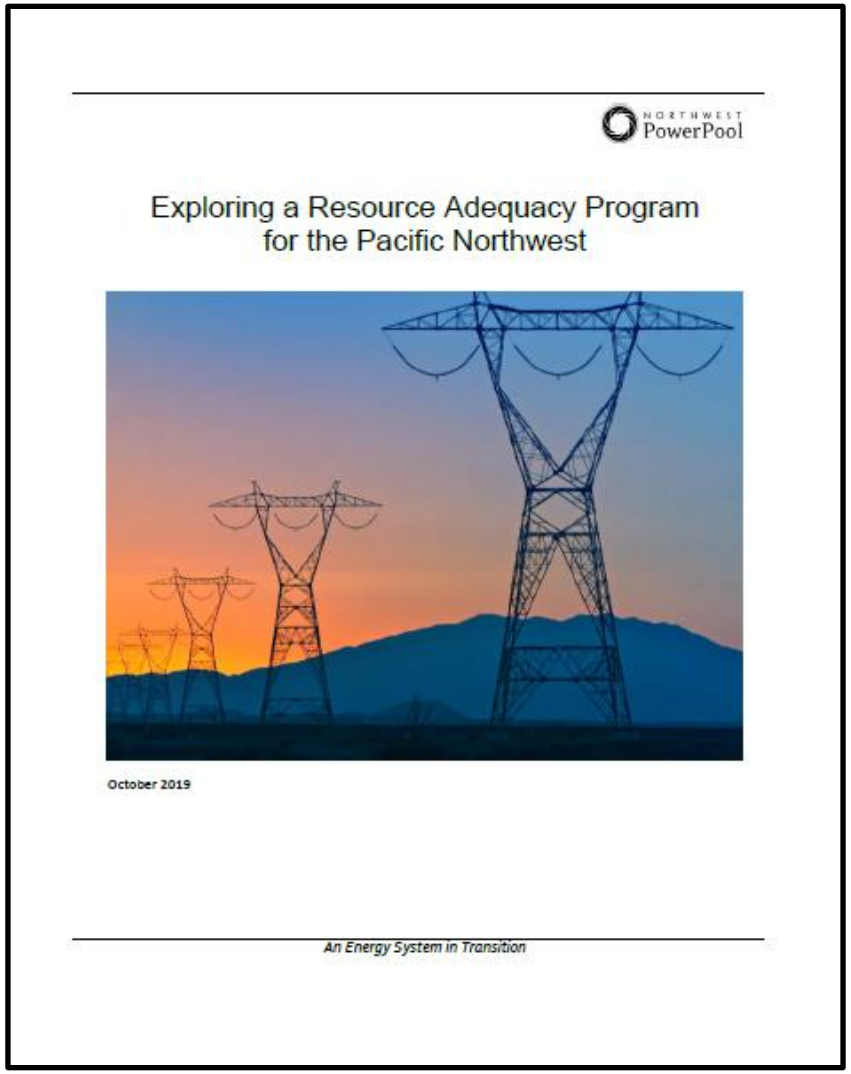


Lack of Data on Capacity Commitments



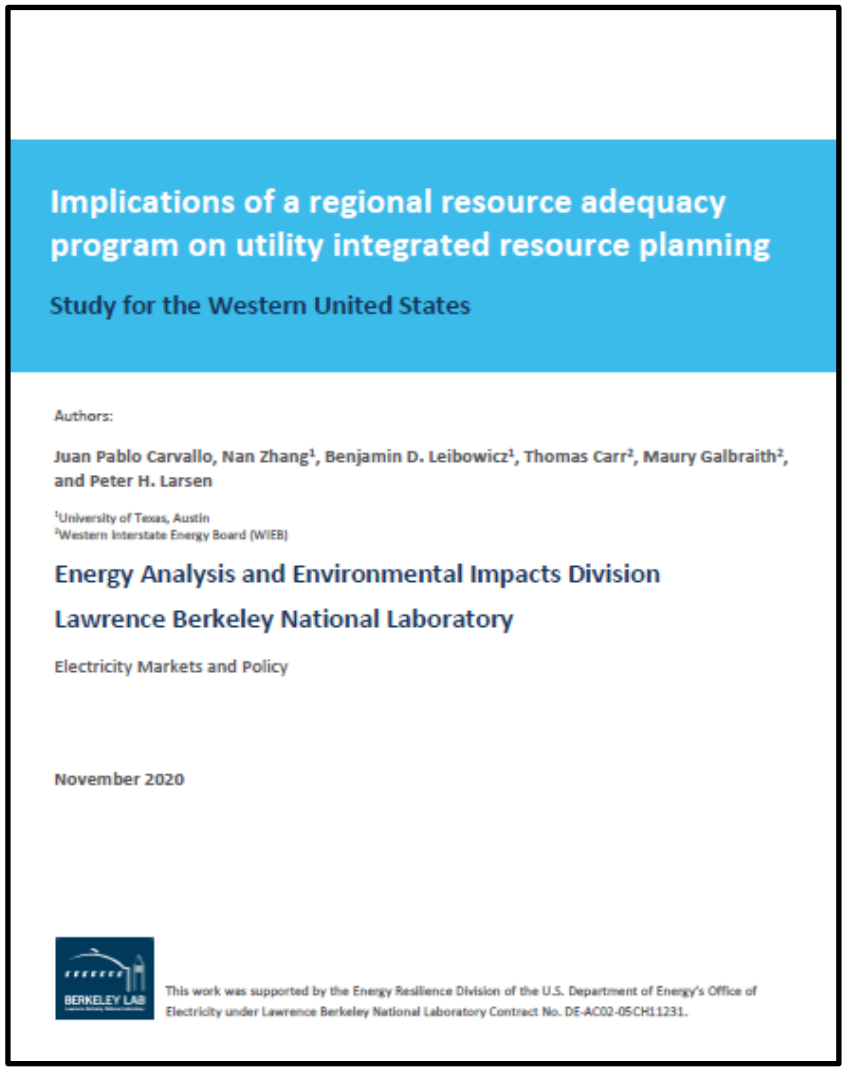
"Our proposal seeks to fill the need for an information collection framework that will allow regulators to easily track physical capacity and ensure that there is sufficient, dispatchable built generation to meet FOT obligations during coincident peaking events. This information collection framework will allow regulators to track built capacity, especially capacity that is dispatchable."

Industry Response to the Problem



"A regional RA program could offer ratepayers two key benefits. First and foremost, an RA program would ensure that sufficient generation is available to reliably serve demand during periods of grid stress. Second, a regional RA program could also produce cost savings by allowing utilities to rely on other entities' resources rather than building their own at higher cost."

Impact on State Processes



Implications of a regional resource adequacy program on utility integrated resource planning

Study for the Western United States

Authors:

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[2]Western Interstate Energy Board (WIEB)

Energy Analysis and Environmental Impacts Division

Lawrence Berkeley National Laboratory

Electricity Markets and Policy

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"IRP processes will not fundamentally change when an LSE joins a regional RA program. However, some key IRP assumptions or resource adequacy components will be impacted. This report identifies two resource adequacy components of IRP that will be highly impacted: (1) RA targets and (2) resource capacity accreditation."

RA Components of Utility IRP

High Impact
Medium Impact
Low Impact

IRP RA Component Impacted	Impact of Regional RA Program	Control Allocation
RA Reliability Targets		Regional
Load Forecast		Shared
Demand-side Resources		Local
Modelling Approach		Local
Resource Capacity Credit		Regional
Market Transactions		Local
Transmission Expansion		Shared
Emerging Technologies		Local
Load Uncertainty		Local
Power Supply Uncertainty		Local
Preferred Portfolio / Utility Resource Mix		Local

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Conclusions

- The NWPP Western Resource Adequacy Program can produce reliability benefits and cost savings by allowing utilities to rely on other entities' resources when appropriate.
- IRP processes will not fundamentally change if a utility joins the Western Resource Adequacy Program.
- Two components of IRP could be highly impacted: (1) RA targets and (2) resource capacity accreditation.
- *Effective* capacity needs to become the 'coin of the realm' if we are going to keep the lights as we decarbonize the Western grid.

Thank You

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