

# Energy Imbalance Market Options for Colorado

Prepared By:

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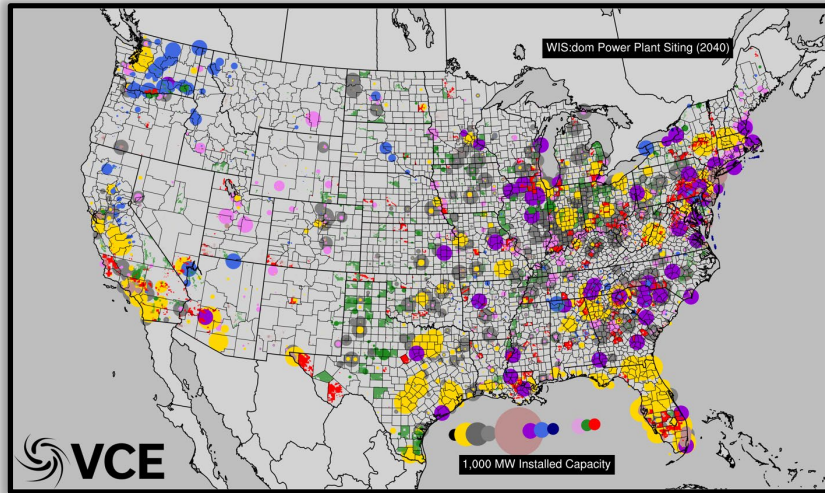
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# Who Are We: Vibrant Clean Energy



## Purpose of Vibrant Clean Energy, LLC:

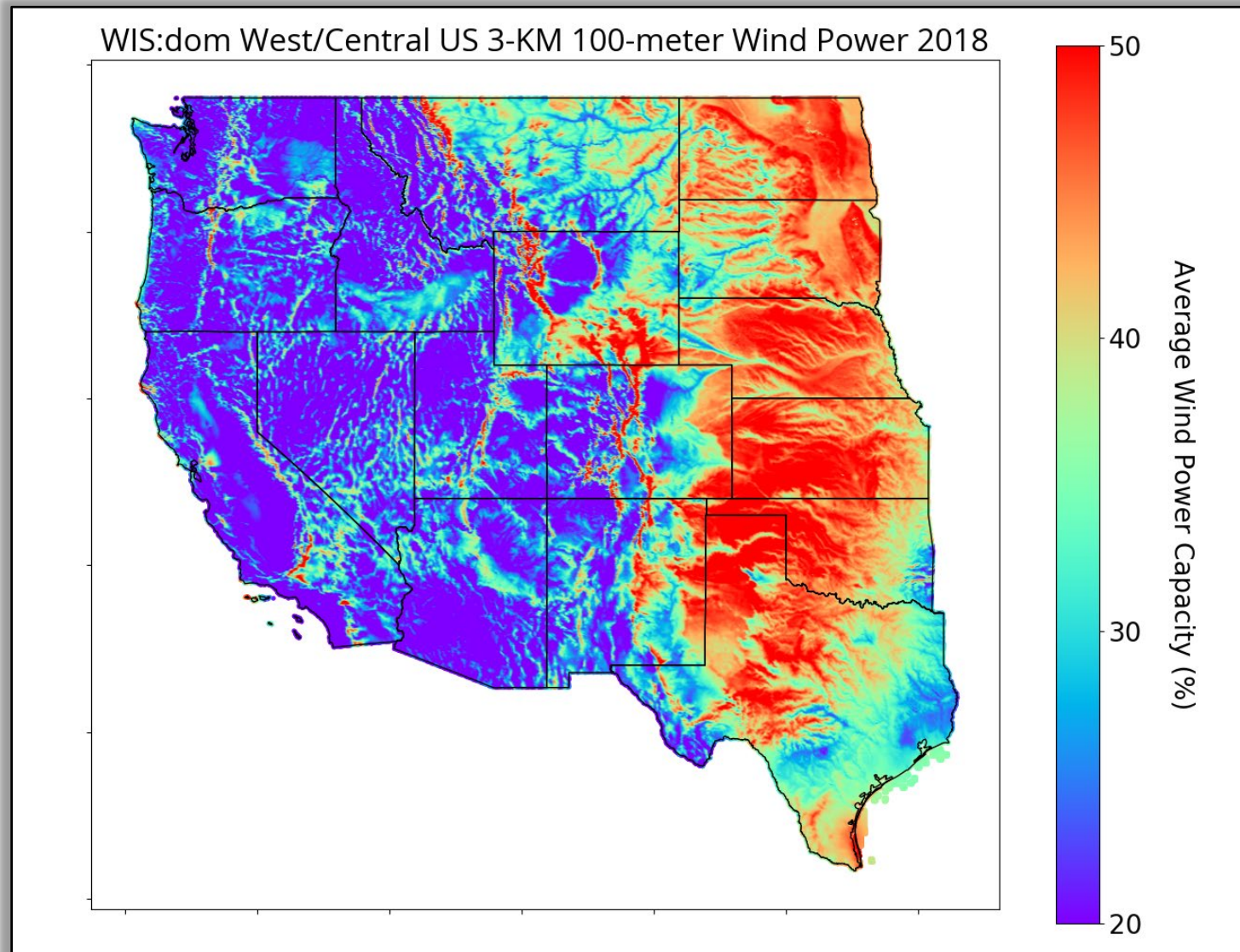
- Reduce the cost of electricity and help evolve economies to near zero emissions;
- Co-optimize transmission, generation, storage, and distributed resources;
- Increase the understanding of how Variable Generation impacts and alters the electricity grid and model it more accurately;
- Agnostically determine the least-cost portfolio of generation that will remove emissions from the economy;
- Determine the optimal mix of VG and other resources for efficient energy sectors;
- Help direct the transition of heating and transportation to electrification;
- License WIS:dom optimization model and/or perform studies using the model;
- Ensure profits for energy companies with a modernized grid;
- Assist clients unlock and understand the potential of high VRE scenarios, as well as zero emission pathways.



# Overall Summary

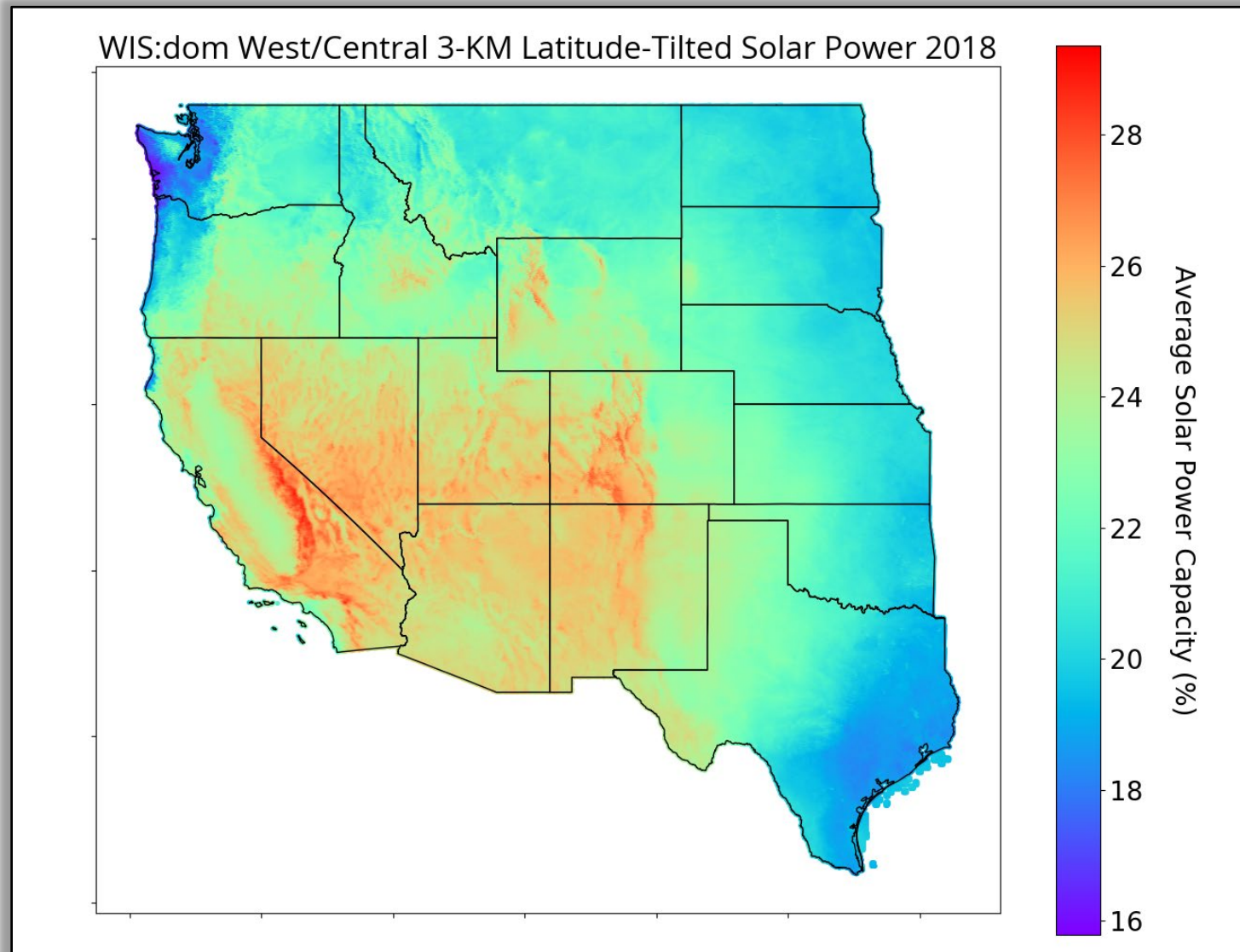
1. Colorado has the ability to reduce emissions and lower customer retail rates independently of joining an EIM or RTO if it acts in a ***unified direction***;
2. Colorado fares the worst economically and environmentally under the ***BAU scenario***. However, the WECC+SPP footprint fares the worst in the CO-JDA scenario;
3. The best scenario for Colorado and SPP+WECC combined is when ***Colorado joins the WEIM***. This reduces rates the most, lowers emissions the most and allows CO to export its generation to western states;
4. ***A CO-wide JDA brings economic benefits for all of Coloradans***, but regionalization adds benefits – the other regions benefit more from joining them.
5. All entities in Colorado deploy more capacity and DERs become more commonplace over time.

# Overview of WIS:dom<sup>®</sup>-P Modeling Domain

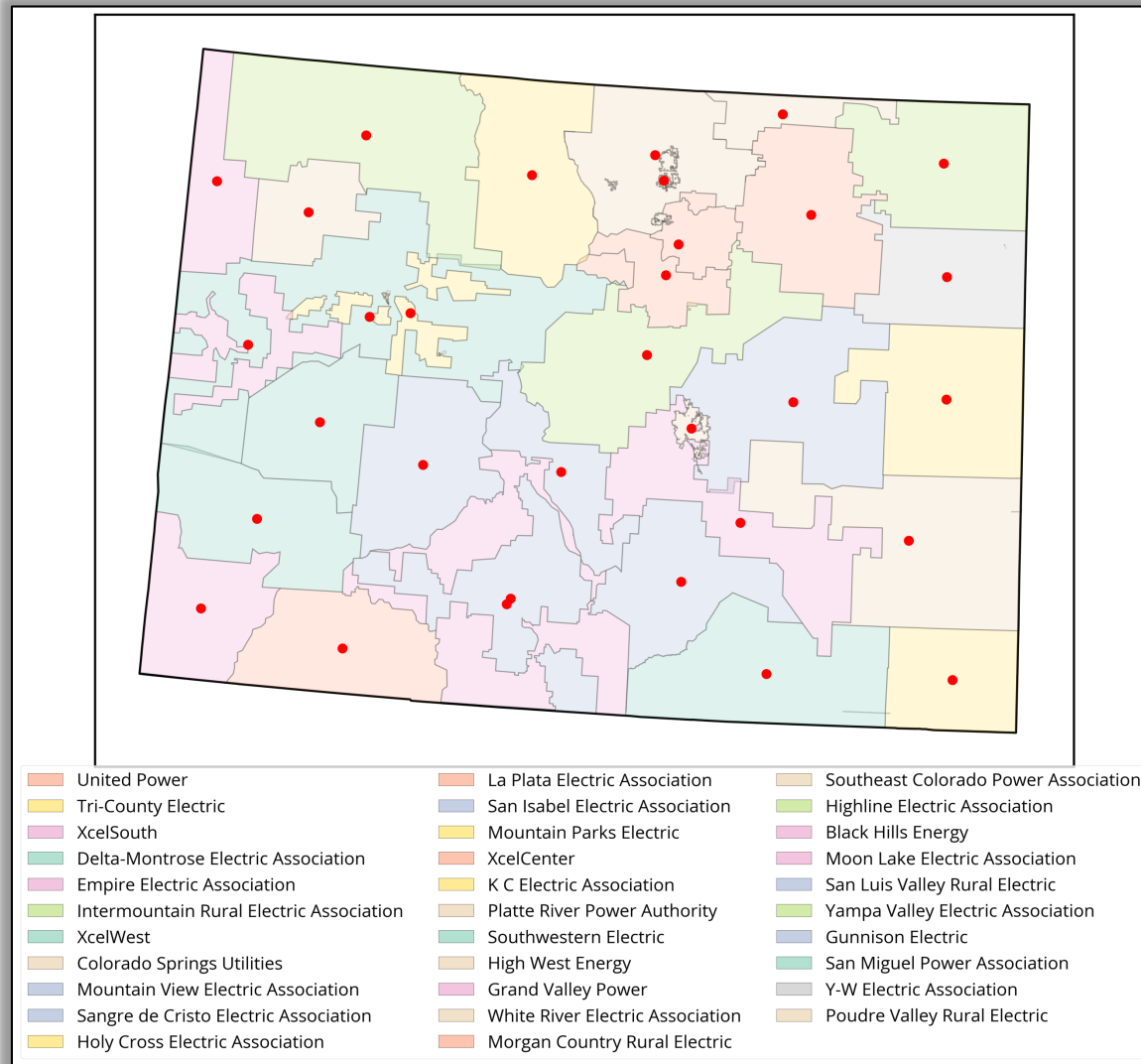




# Overview of WIS:dom<sup>®</sup>-P Modeling Domain



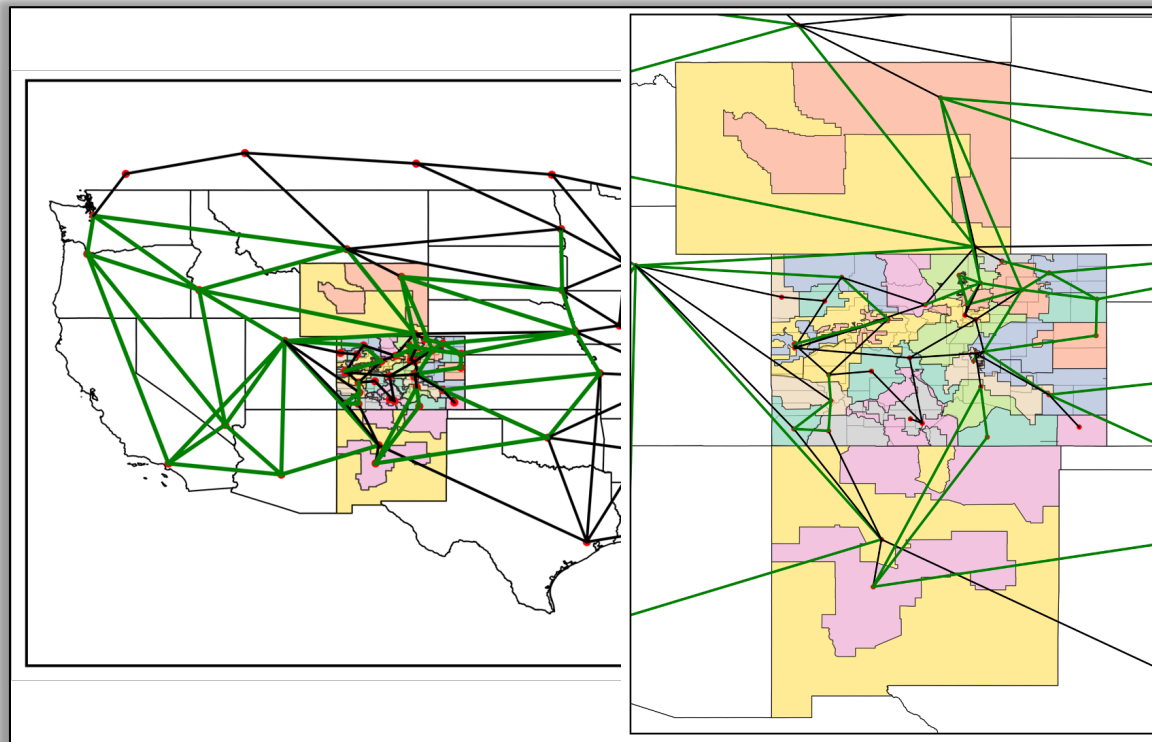
# Overview of Colorado in WIS:dom®-P



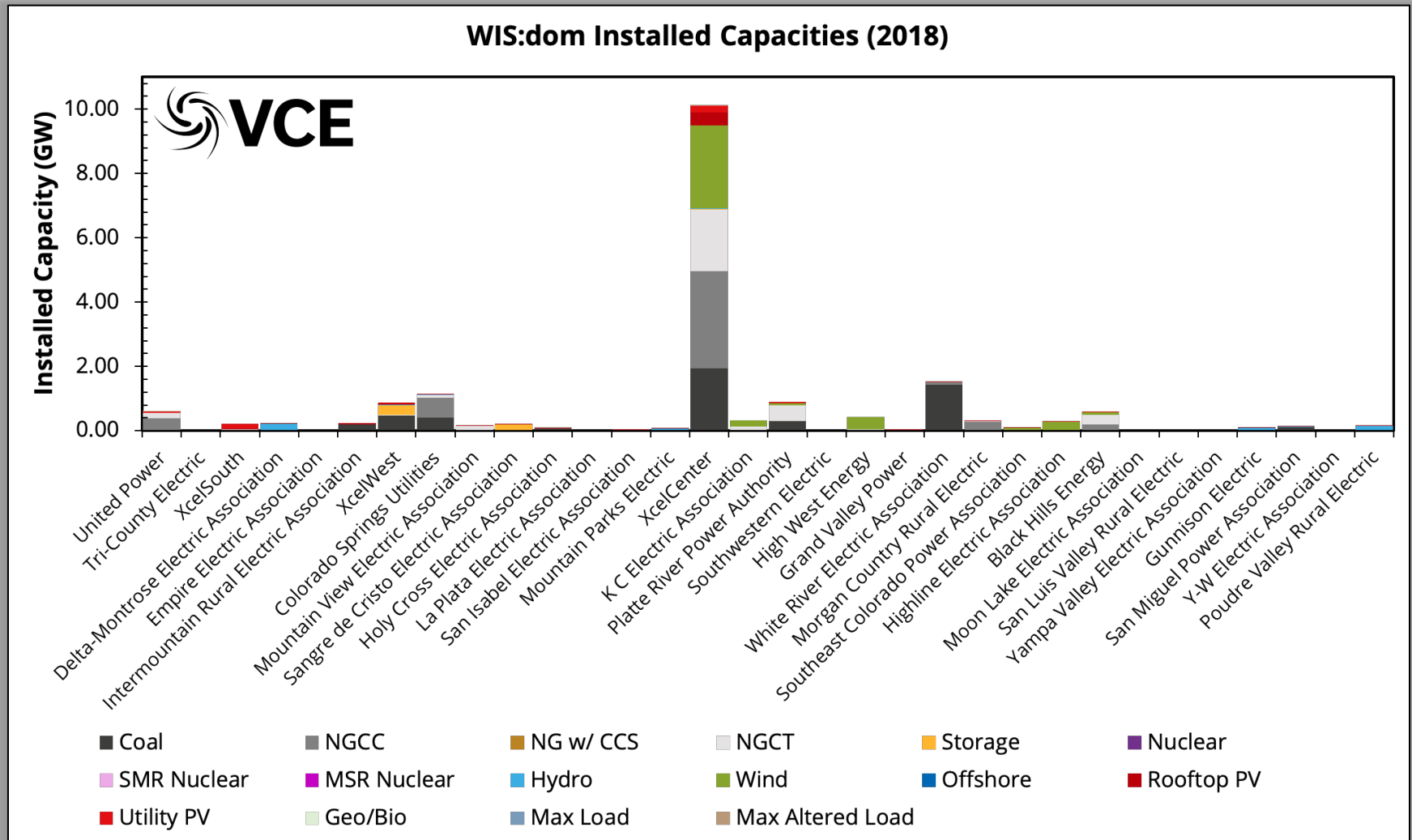


# Scenarios

1. Business as usual (BAU);
2. Colorado joins WEIM (West);
3. Colorado joins WEIS (East);
4. Colorado creates a state-wide JDA (CO-JDA).

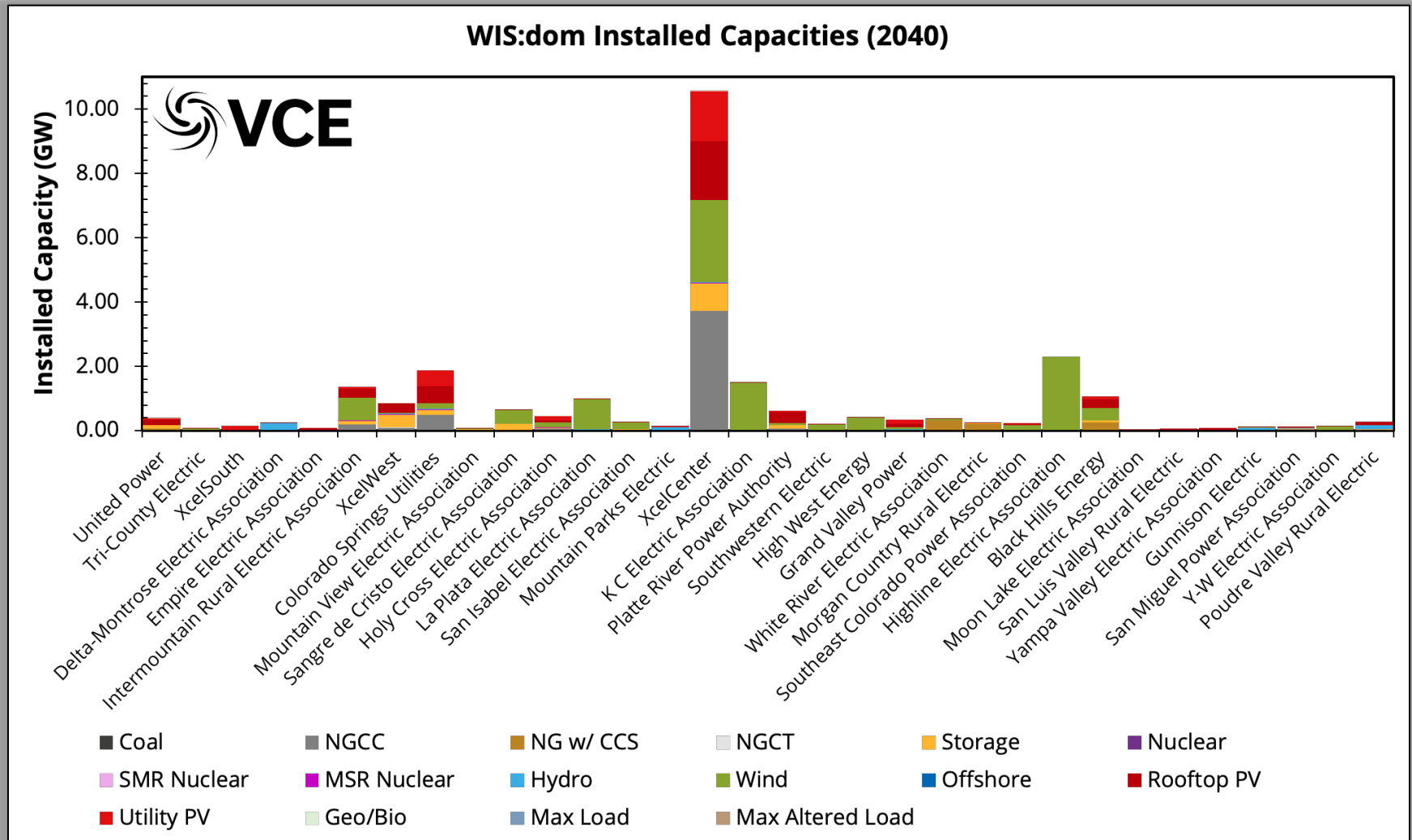


# Results (BAU)

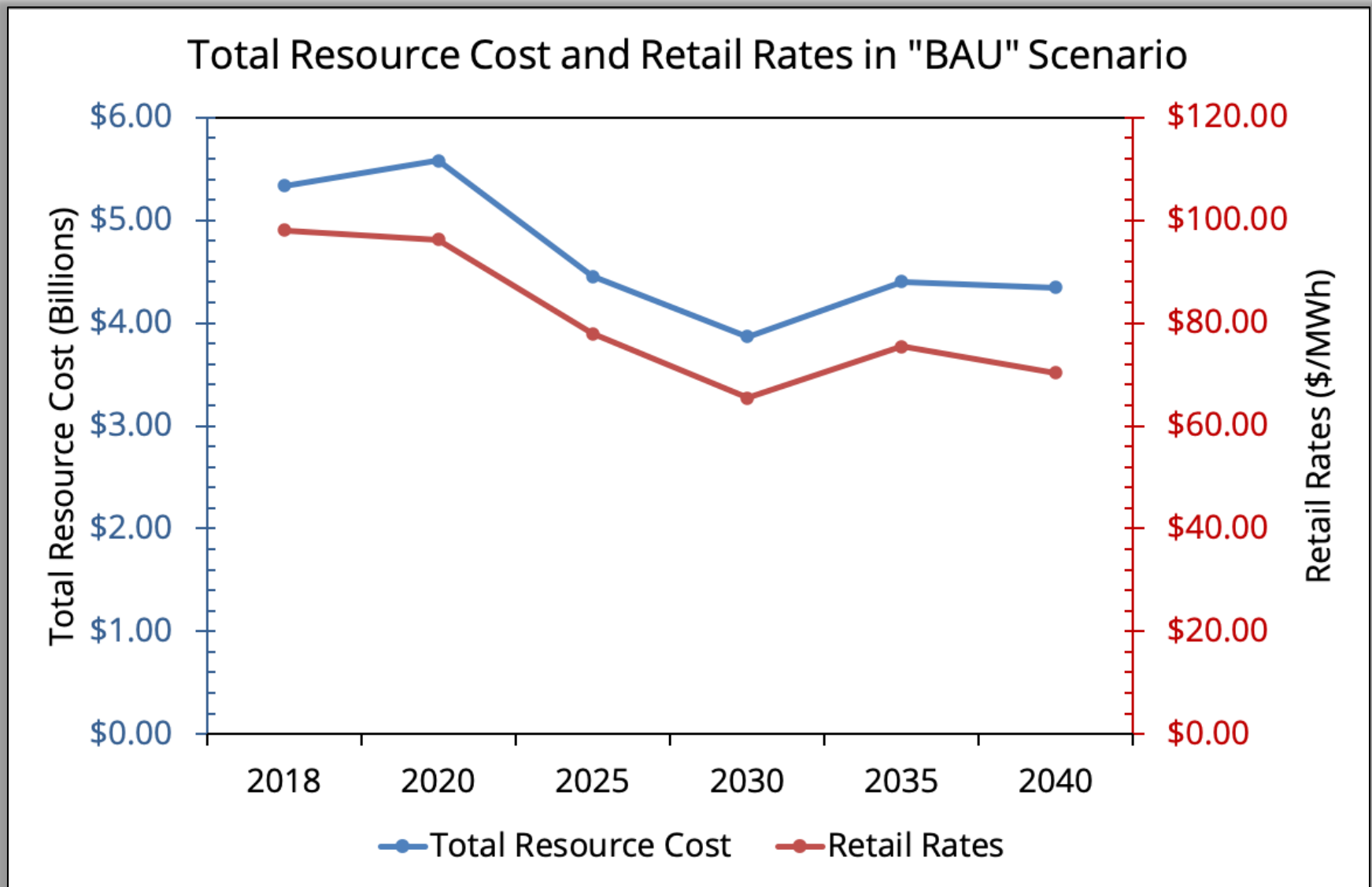




# Results (BAU)

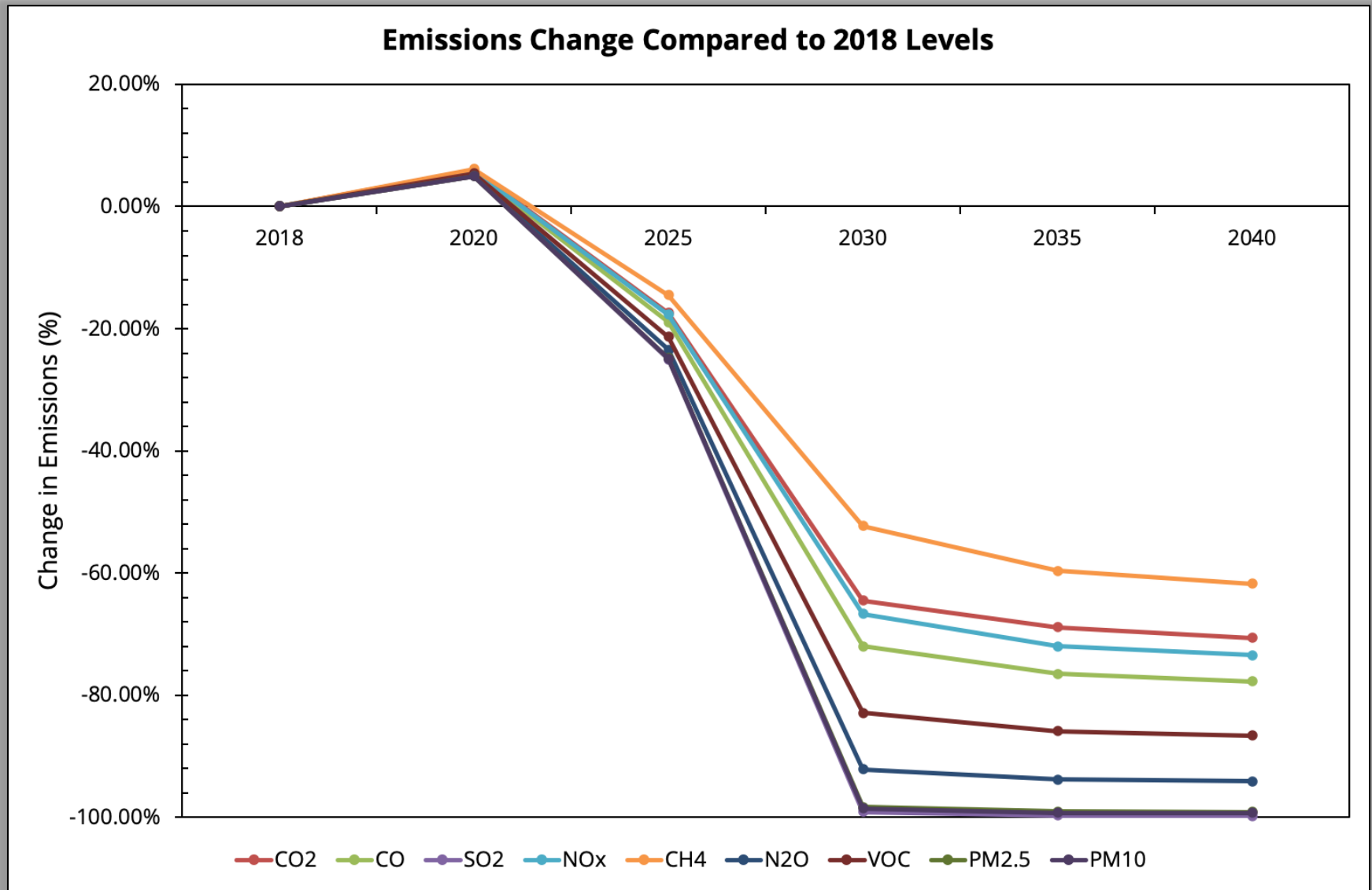


# Results (BAU)

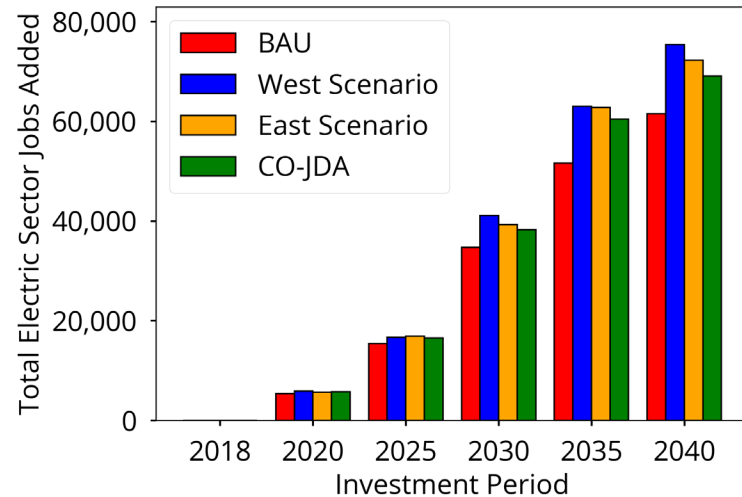
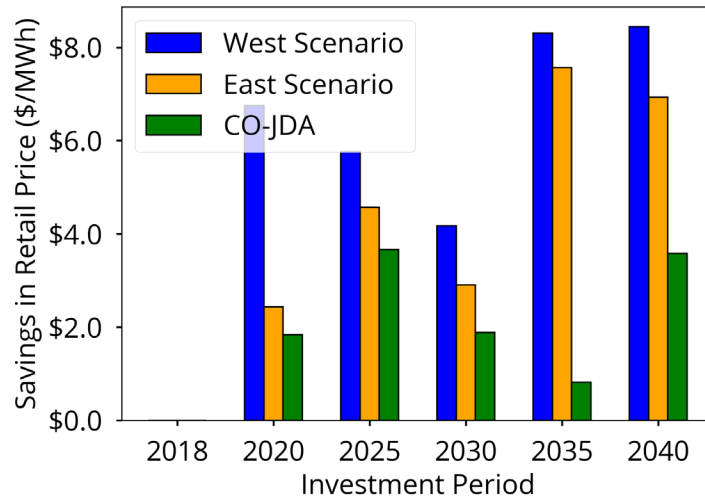
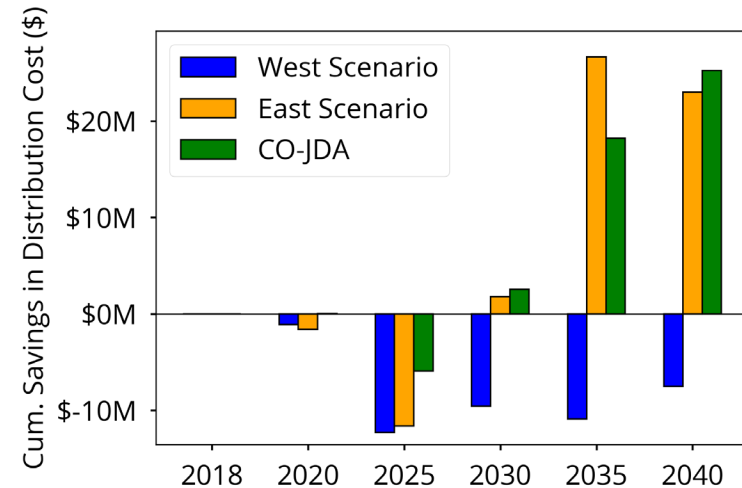
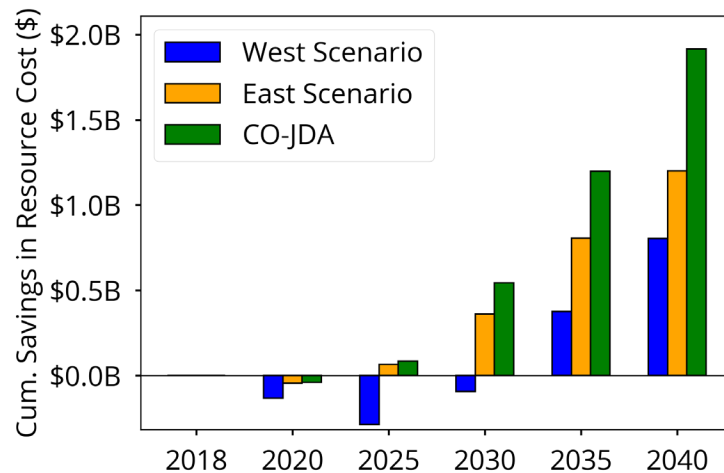




# Results (BAU)

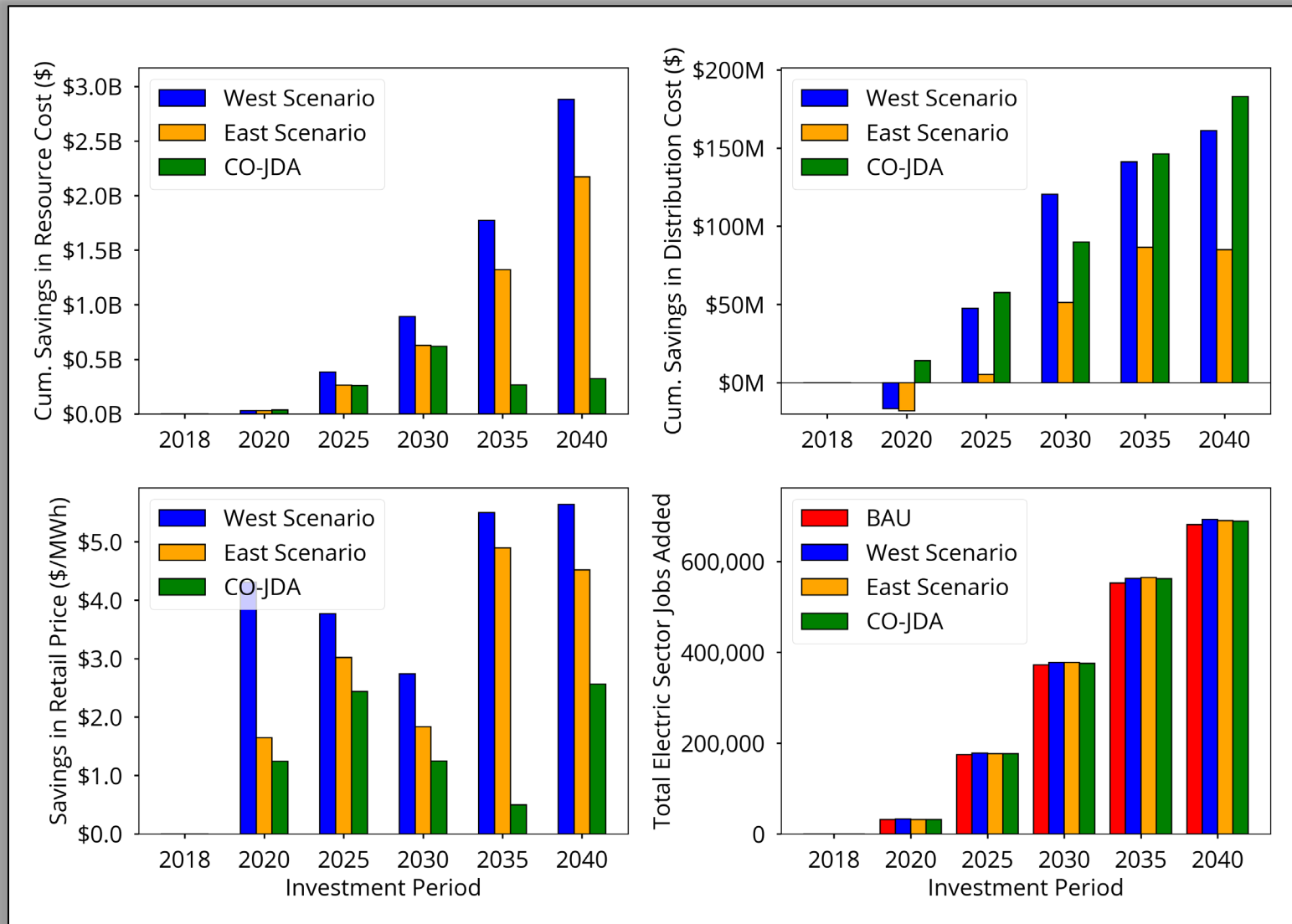


# Economic Results (CO)

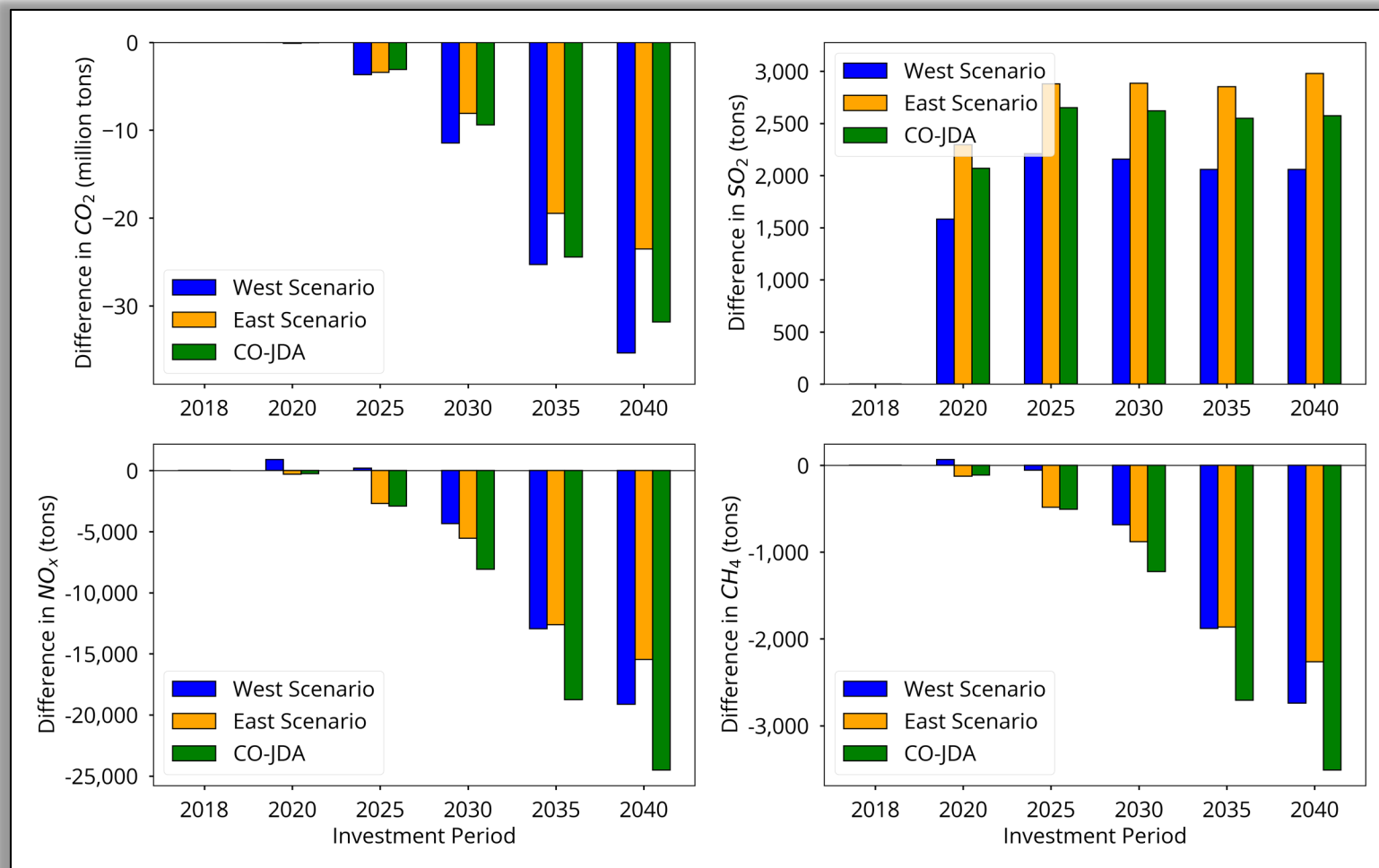




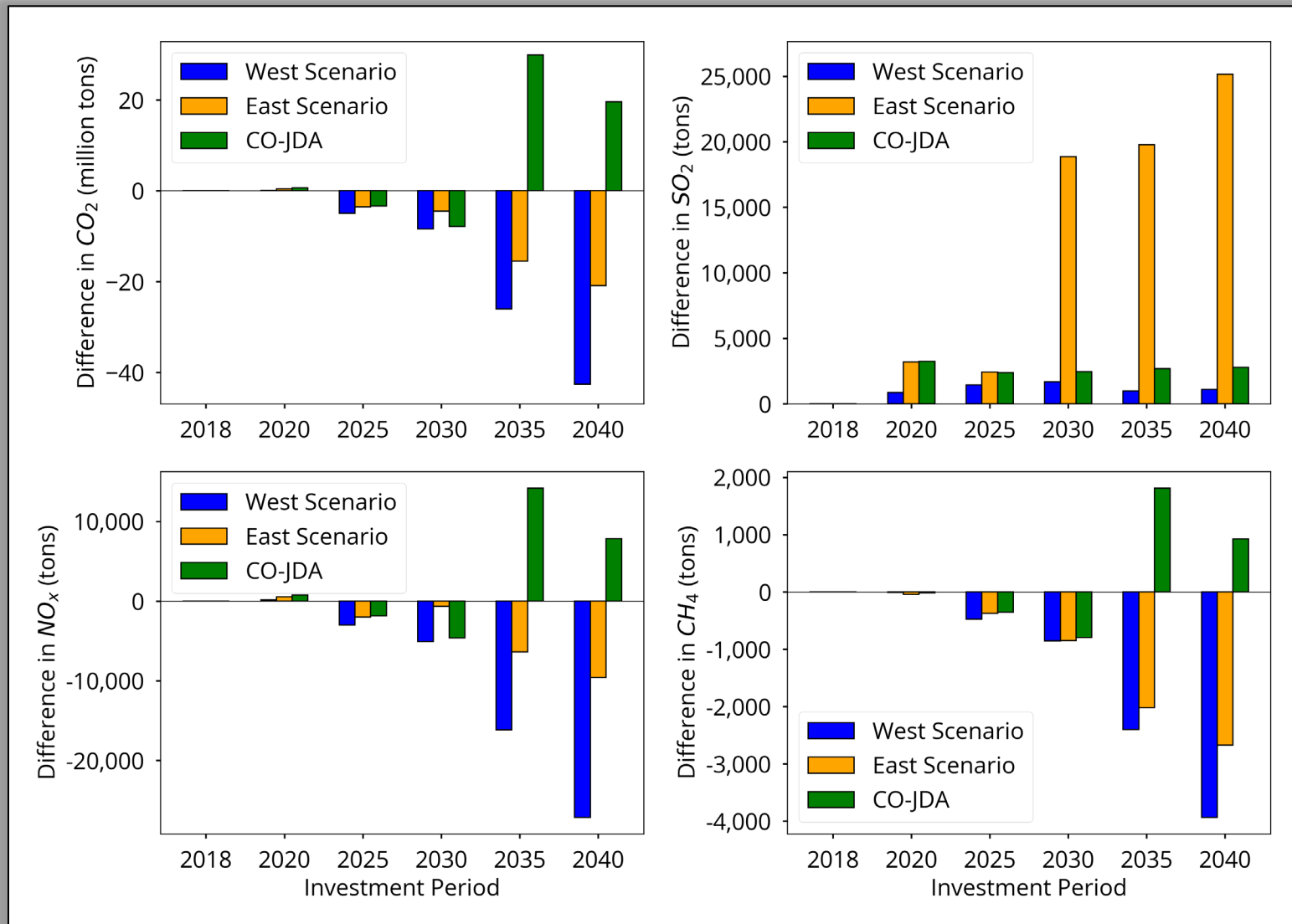
# Economic Results (WECC+SPP)



# Emission Results (CO)



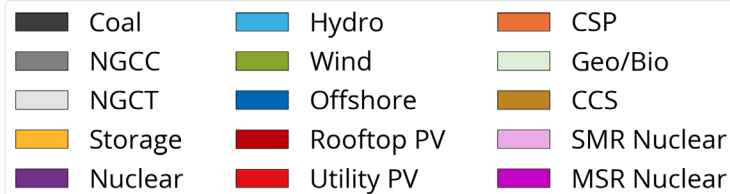
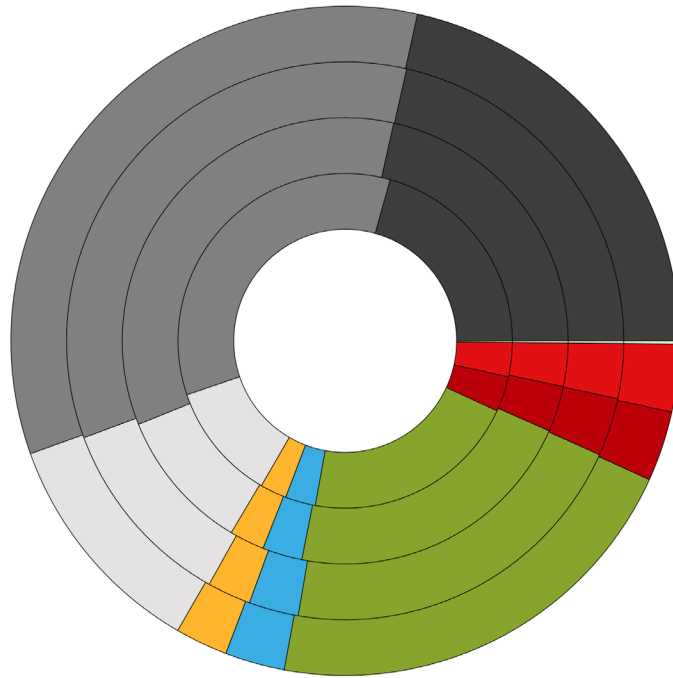
# Emission Results (WECC+SPP)



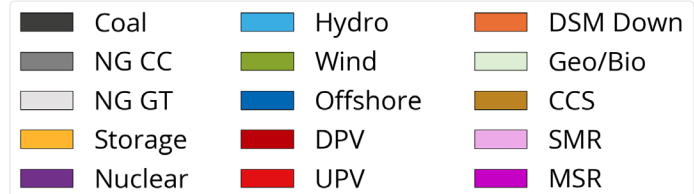
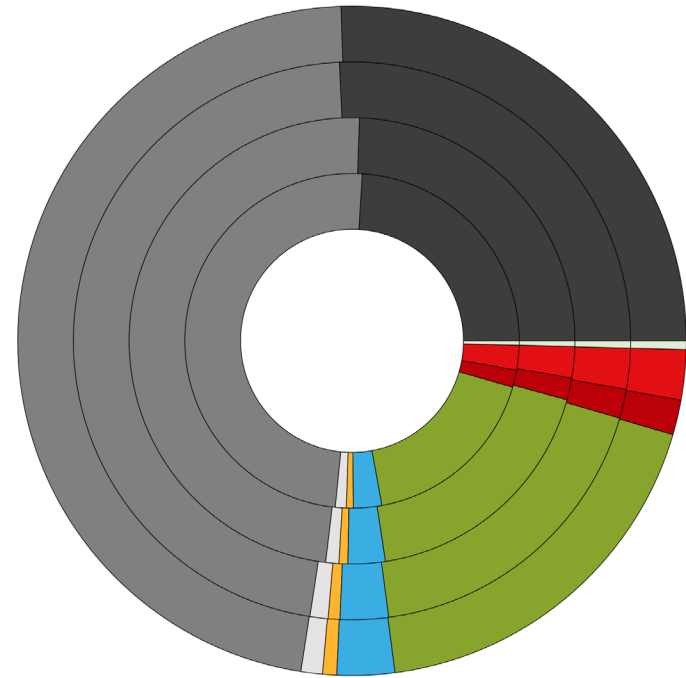


# Capacity & Gen. Results (CO)

Installed Capacities: 2020  
BAU (inner), West (second), East (third), CO-JDA (outer)

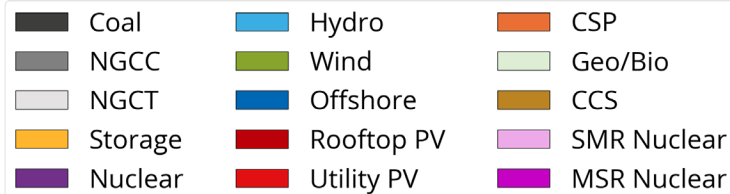
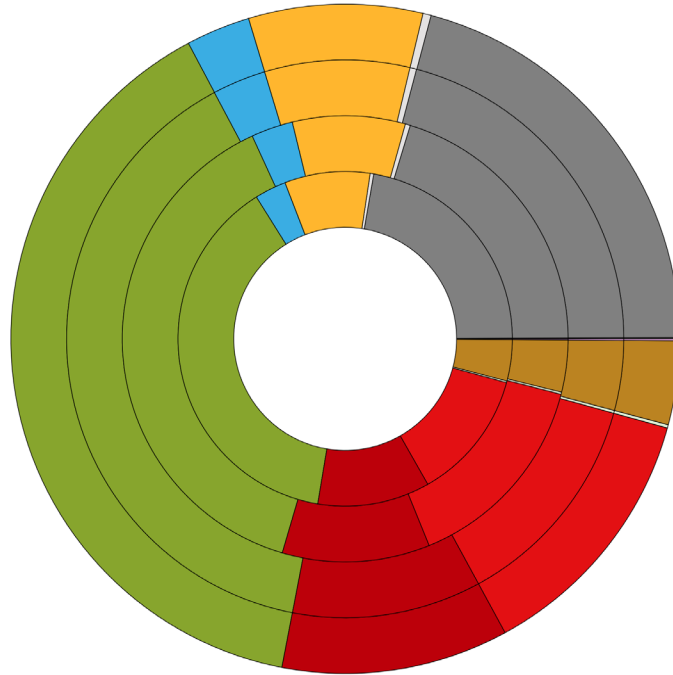


Generation: 2020  
BAU (inner), West (second), East (third), CO-JDA (outer)

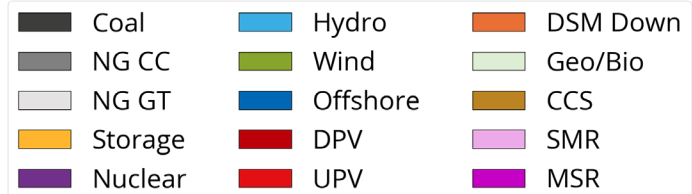
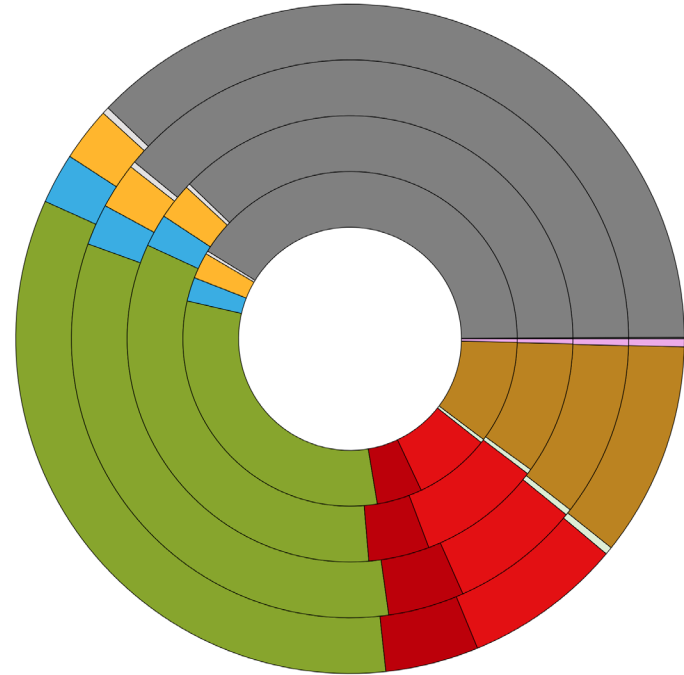


# Capacity & Gen. Results (CO)

Installed Capacities: 2030  
BAU (inner), West (second), East (third), CO-JDA (outer)

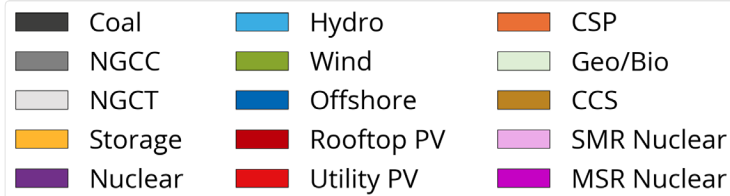
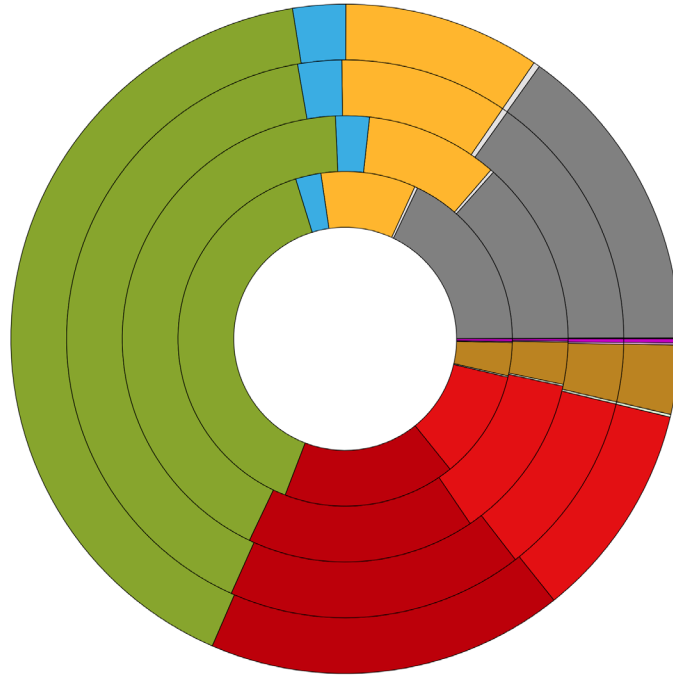


Generation: 2030  
BAU (inner), West (second), East (third), CO-JDA (outer)

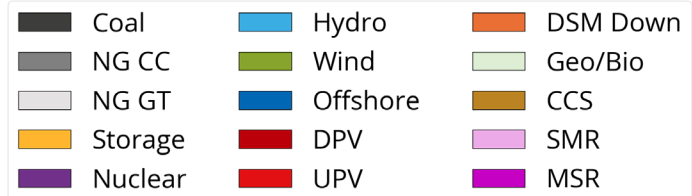
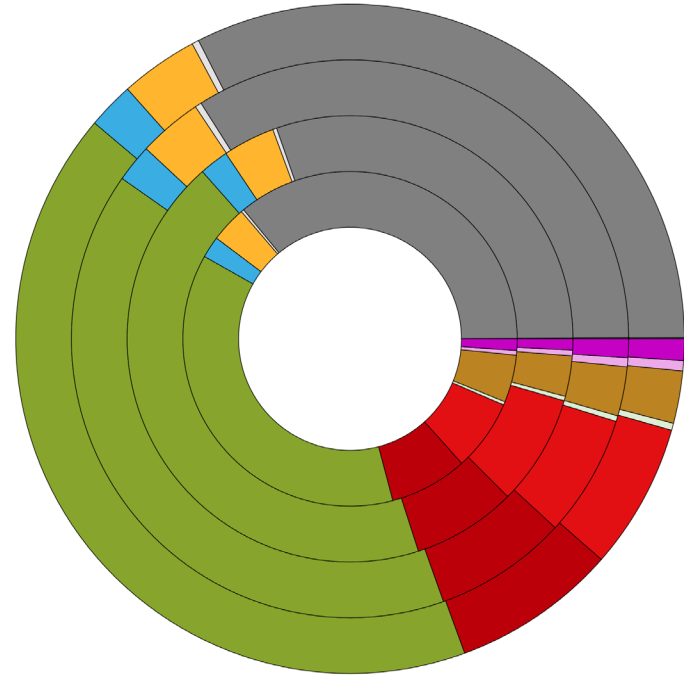


# Capacity & Gen. Results (CO)

Installed Capacities: 2040  
BAU (inner), West (second), East (third), CO-JDA (outer)

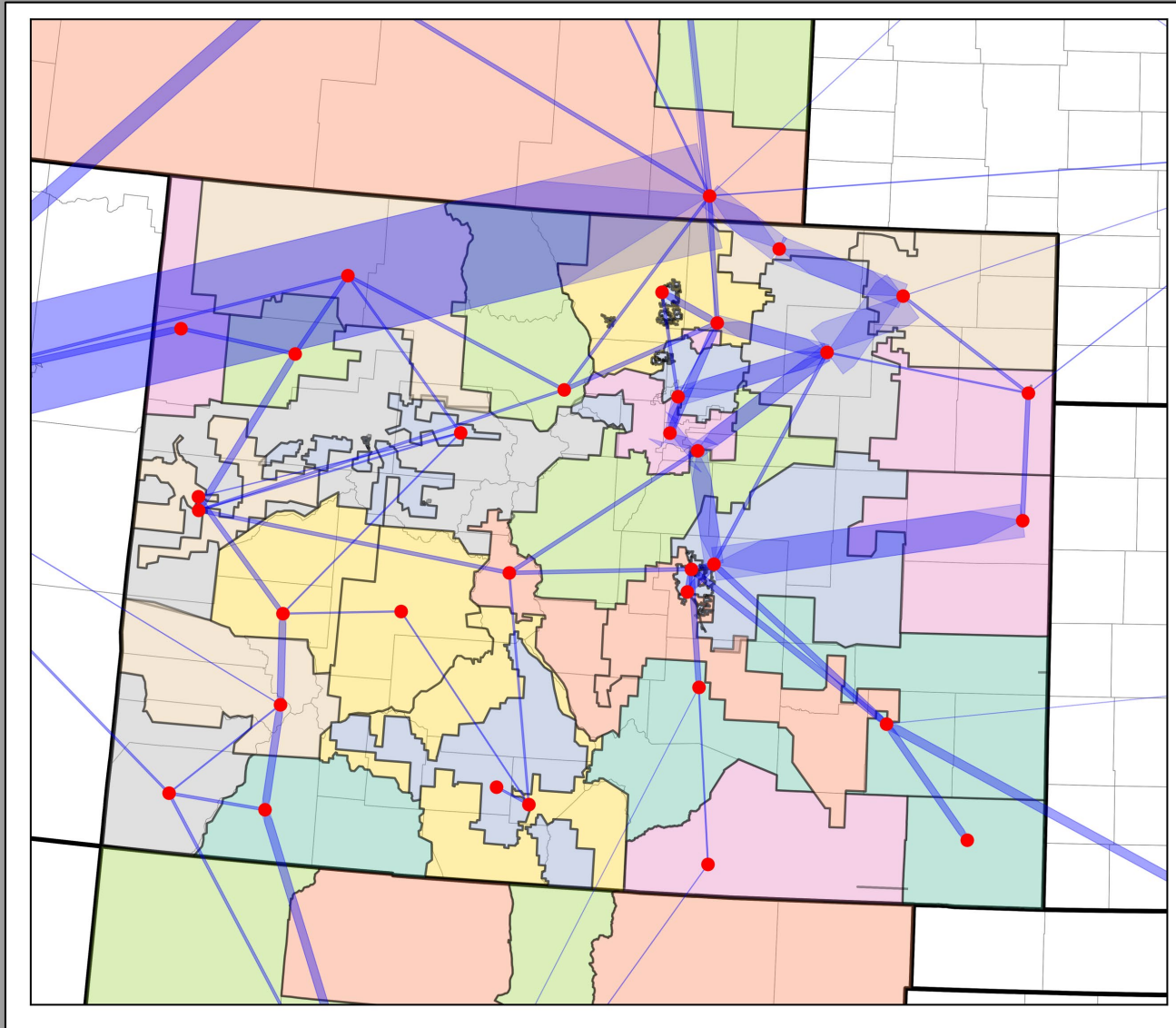


Generation: 2040  
BAU (inner), West (second), East (third), CO-JDA (outer)

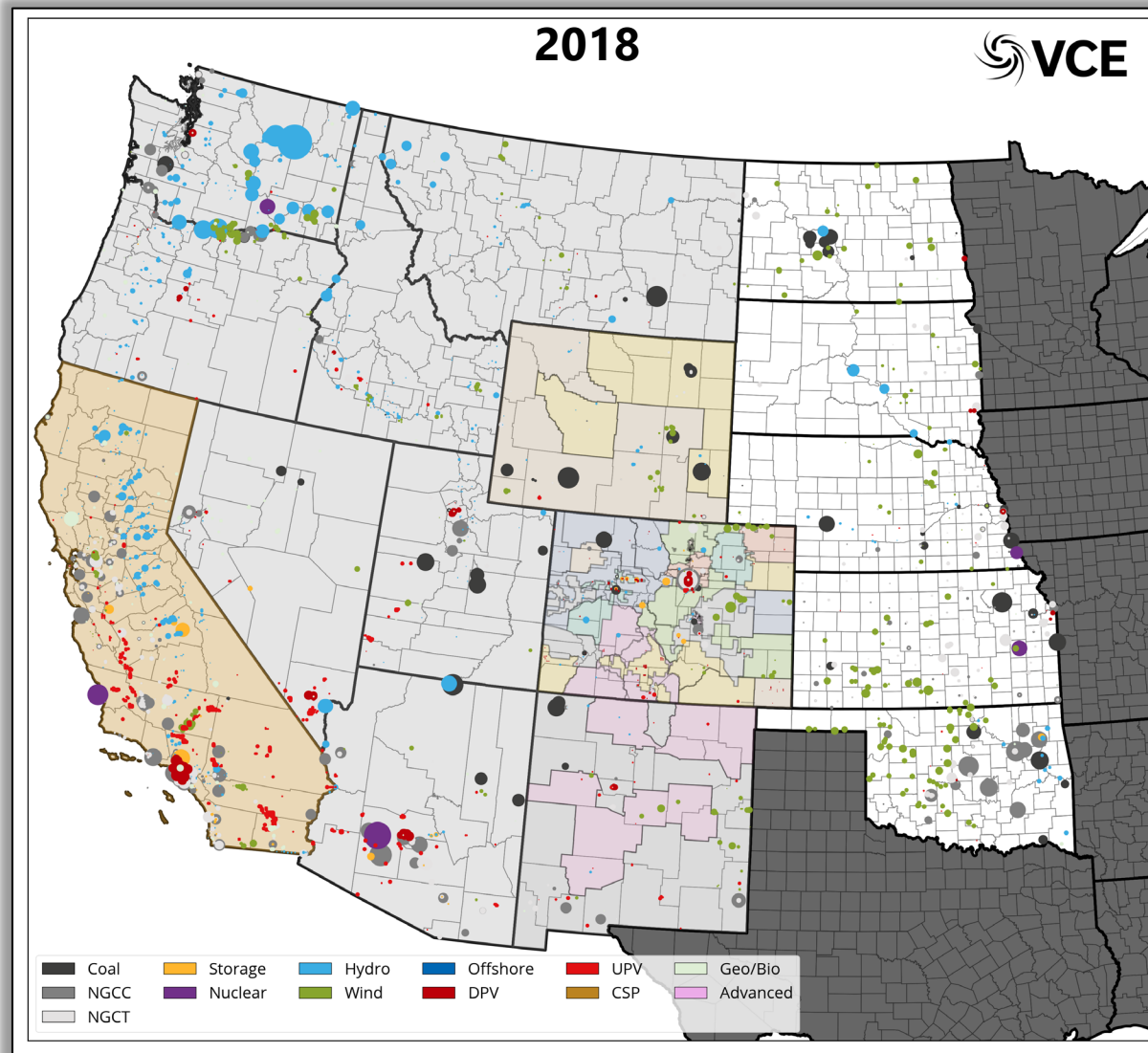




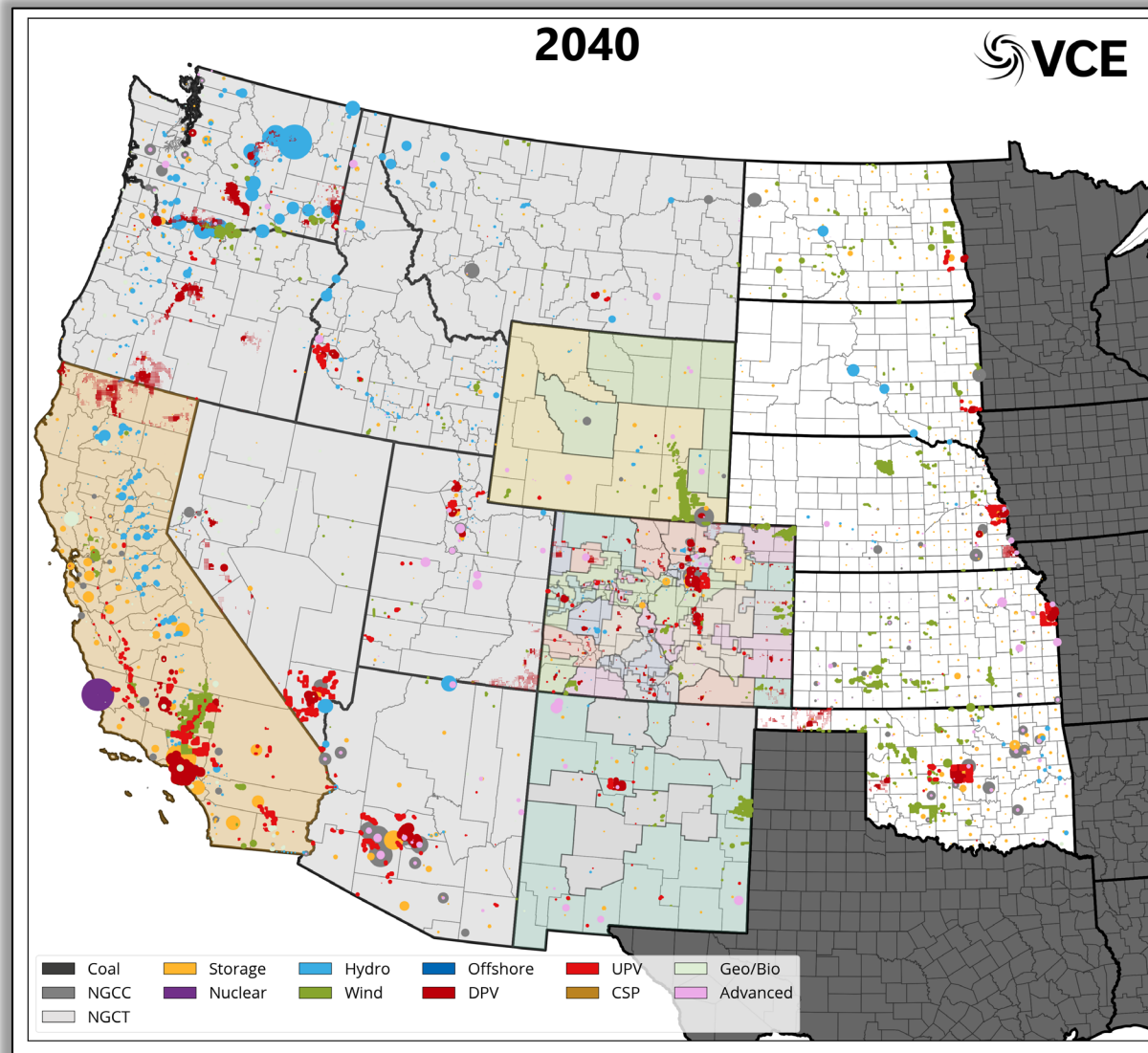
# Transmission Buildout (West)



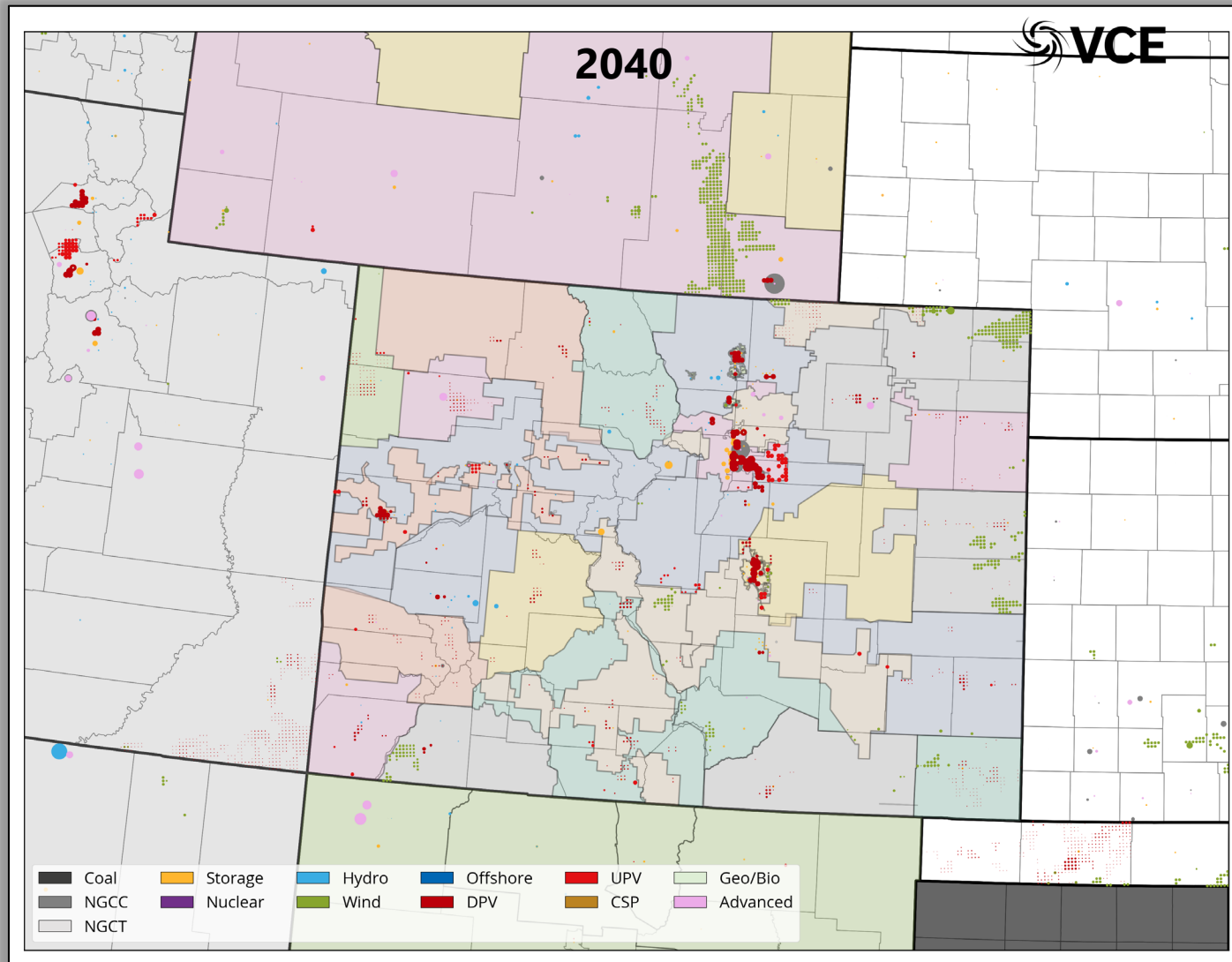
# Detailed Siting Results (West)



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# Detailed Siting Results (West)





# Overall Summary

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# Want to learn more?

Press Release:

<https://www.vibrantcleanenergy.com/wp-content/uploads/2020/10/CO-EIM-Options-PressRelease.pdf>

Full technical report:

<https://www.vibrantcleanenergy.com/wp-content/uploads/2020/10/CO-EIM-Options-Report.pdf>

This Presentation:

<https://www.vibrantcleanenergy.com/wp-content/uploads/2020/10/CO-EIM-Options-Presentation.pdf>

*The WIS:dom<sup>®</sup>-P model output spreadsheets:*

<https://www.vibrantcleanenergy.com/wp-content/uploads/2020/10/CO-EIM-Options-Spreadsheets.zip>



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