#### Visions, Solutions, and Technologies for a Zero Carbon Future: Reliable, robust, and resilient modeling

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## **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<sup>®</sup> 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.



#### **Co-optimization for Reliable, Robust, and Resilient Grid**





#### **DERs Can Combine to Reduce Supply Pressure**



"Conventional" approach: Almost inelastic demand



#### **DERs Can Combine to Reduce Supply Pressure**



"Enhanced" approach: Demand starts to follow supply



#### **DERs Can Combine to Reduce Supply Pressure**





### **Electrification Enhances DERs Ability to Reduce Supply Pressure**



Hydrogen storage and combustion or fuel cells can add additional flexibility for the system, with minimal additional cost



#### Storage (distribution & utility-scale) Can Handle Most Variability



VIBRANT CLEAN ENERGY

#### The Cost Change With Clean Electricity Beats "BAU"





#### **Clean Electricity Locally & Nationally**



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'he "Highest Strain" Periods Are Met with Combined Resources

# **Thank You**

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