

## Energy Communities: Repurposing Coal with Nuclear (Energy Justice, Infrastructure Preservation, and Early Adopter Market)

**Christine King** ([christine.king@inl.gov](mailto:christine.king@inl.gov)) and Jason Hansen  
(Idaho National Lab, Idaho Falls, ID, USA)  
Olufemi Omitaomu (Oak Ridge National Lab, Oak Ridge, TN, USA)

**Background/Objectives.** To analyze repurposing coal stations with nuclear technology, the evaluation criteria range from a national level through state/regional to community and project specific considerations. Benefits and challenges are complex and can be evaluated on many dimensions. The Gateway Accelerated Innovation in Nuclear (GAIN) and the Systems Analysis and Integration (SA&I) programs have been working over the past 18 months to evaluate (a) regional economic and environmental impacts to communities where the C2N transition takes place, (b) the potential for U.S. coal power plant (CPP) sites to be repurposed to sites with a nuclear power plant (NPP) measured at a national scale, and (c) the opportunity these potential transitions for advanced nuclear to create an early adopter market and move beyond first of kind demonstration projects.

**Approach/Activities.** Using the methodology of regional economic Input-Output analysis and the software IMPLAN, one can investigate the impact of replacing coal technology with nuclear technology in terms of jobs, taxes, economic growth and because of the relationship between the economy and the environment, one can also measure the impact on emissions. Included in the economic analysis is a review of the transition of workforce from one technology to another. Using nuclear specific siting criteria in OR-SAGE tool along with data from the DOE-Energy Information Administration (EIA), one can identify which coal power plant (CPP) sites could be repurposed to sites with a nuclear power plant (NPP) measured at a national scale. In addition to reviewing siting criteria, the equipment and buildings on site was reviewed to determine how much could be repurposed and how that impacts the overnight cost of capital for a project. Finally, to understand if repurposing is a viable, it also important to evaluate specific projects, various ownership models and the associated business objectives to determine if these potential transitions to create an early adopter market for advanced nuclear technologies.

**Results/Lessons Learned.** Jobs in the region could increase by more than 650 permanent jobs, distributed across the NPP, the supply chain, and the community. Long-term job impacts translate to additional economic activity on the order of \$275 million, implying a 92% tax revenue increase from the NPP for the local county. The environmental analysis shows that greenhouse gas emissions (GHG) in the region could fall by as much as 86%. For both retired and operating sites, 80% are conducive for siting advanced reactors. For large light water reactors, 22% of the retired sites and 40% of the operating sites are amenable. Nationally, this means there are 125 recently retired sites (with 64.8 GWe coal capacity) and 190 operating sites (with 198.5 GWe coal capacity) if they were backfitted with AR technology. By the time of the conference, we will have results from a specific case study at Coronado Generating Station owned by Salt River Project in St Johns, Arizona. In addition to a siting and economic study for CGS, we are analyzing specific technologies to determine which ones are the best fit for the utility's business objectives. Finally, we will be able to share early lessons learned from the Natrium project in Kemmerer, Wyoming with the permission of TerraPower and PacifiCorp.