EPRI ENERGY SYSTEMS AND CLIMATE ANALYSIS GROUP

NEWSLETTER AND RESEARCH HIGHLIGHTS

We are pleased to share fresh insights from the Energy Systems and Climate Analysis (ESCA) team. Researchers in our programs on Resource Planning for Electric Power Systems (178) and Energy, Environmental, and Climate Policy Analysis (201) have published work addressing critical mineral supply, climate change's impact on hurricane-induced outages, modeling energy storage, fuel decarbonization, and wildfire mitigation tools.

For more of our research head to ESCA's website.

Research Highlights

Critical Minerals for the Clean Energy Transition: Supply, Demand, and Impacts

The clean energy transition relies on critical minerals, such as copper, lithium, nickel, cobalt and rare earth elements (REEs). The potential for a shortage or an oversupply of critical minerals has received considerable media buzz, but how should these concerns be interpreted? ESCA researchers Robin Bedilion and Todd Gorgian produced this report exploring key insights on current and future states of critical minerals. Read to learn why a long-term shortage of these mineral resources is unlikely.

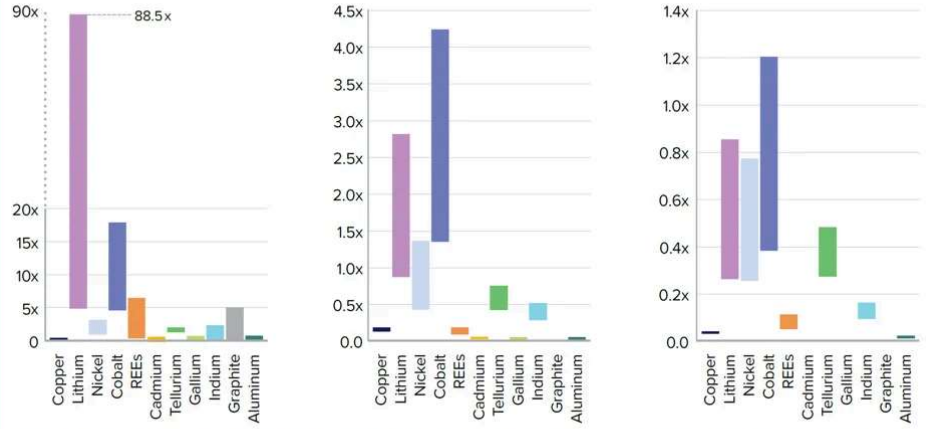


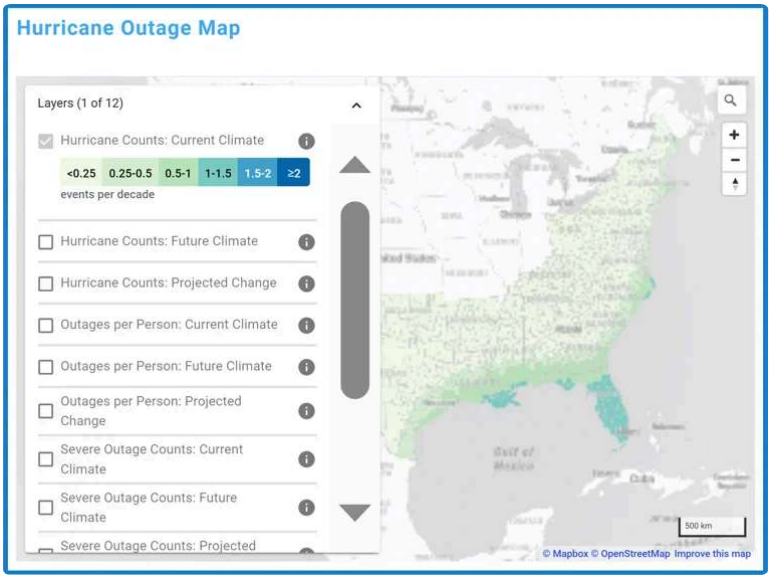
Figure 1: Ranges of projected annual and cumulative demand of key minerals versus current production, reserves, and known resources [7]

READ REPORT

For more information reach out to Todd Gorgian.

How might climate change affect the risk of hurricane-induced power outages?

ESCA Principal Technical Leader Andrea Staid worked with researchers at Pacific Northwest National Laboratory (PNNL) to produce an interactive report to answer this question. Funded in part by EPRI's Climate READi Initiative, this work uses synthetic storm tracks and predictive outage analysis to characterize broad trends at the county scale across U.S. Gulf and Atlantic coast states. Explore the interactive map and read the story map to learn more about how future storm characteristics may impact power systems.



INTERACTIVE MAP

For more details contact ClimateREADi@epri.com.

On representation of energy storage in electricity planning models

Ongoing deployment of variable renewable technologies increases the value of electricity storage technologies, which makes it critical to include storage in electricity sector capacity planning models. Traditional methods to incorporate storage technologies in these models greatly increase computational time. In their recent article in Energy Economics, ESCA Principal Technical Executive Geoff Blanford, ESCA Program Manager John Bistline, and co-author James Merrick review existing approaches to this problem and present a new method to maintain key economic characteristics of these technologies at a low computational cost.

READ ARTICLE

For more information contact John Bistline.

Drivers and implications of alternative routes to fuels decarbonization in net-zero energy systems


nature communications

Article

Drivers and implications of alternative routes to fuels decarbonization in net-zero energy systems

READ ARTICLE

ESCA Senior Technical Executive Steven Rose and Senior Technical Leader Aranya Venkatesh contributed to an article in Nature Communications exploring the complexities of achieving net-zero emissions as it relates to decarbonizing remaining hydrocarbon fuels and gas. The study analyzes potential alternative energy system low-carbon transitions, finding that differences in assumptions about the opportunities for biomass and CO_2 sequestration drive significant differences in how the system might decarbonize and use fuels and gas. This finds that, to reach net-zero emissions, society will have to decarbonize liquid fuels and natural gas and consider a diverse set of possible transitions. Ultimately, limiting one strategy can increase reliance on another, thereby creating tradeoffs that need to be evaluated and managed.

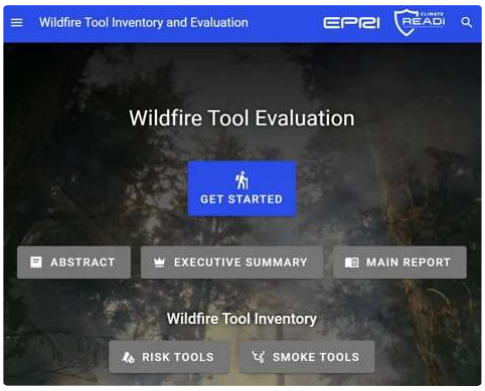
For more information reach out to Steven Rose or Aranya Venkatesh.

Wildfire Tool Inventory and Evaluation

The current landscape of wildfire data, models, tools, and services is complex and challenging to navigate for decision-makers. ESCA researchers Jacob Mardian, Laura Fischer, and Delavane Diaz produced the Wildfire Tool Inventory and Evaluation as part of EPRI's Climate READi Initiative. This research reviews 36 different wildfire risk products

and 13 wildfire smoke products and identifies wildfire data gaps and limitations. View their work in the report or use the interactive web tool to explore wildfire risk assessment tool options.

READ REPORT



VIEW WEB TOOL

For more details contact Jacob Mardian.

Back Pocket Insights

Accessible, two-page summaries of our longer reports make for quick takeaways and easy referencing. Find all our Back Pocket Insights on the Thought Leadership tab of our website.

Regional Decarbonization Opportunities and Risks

READ BRIEF

KEY INSIGHTS

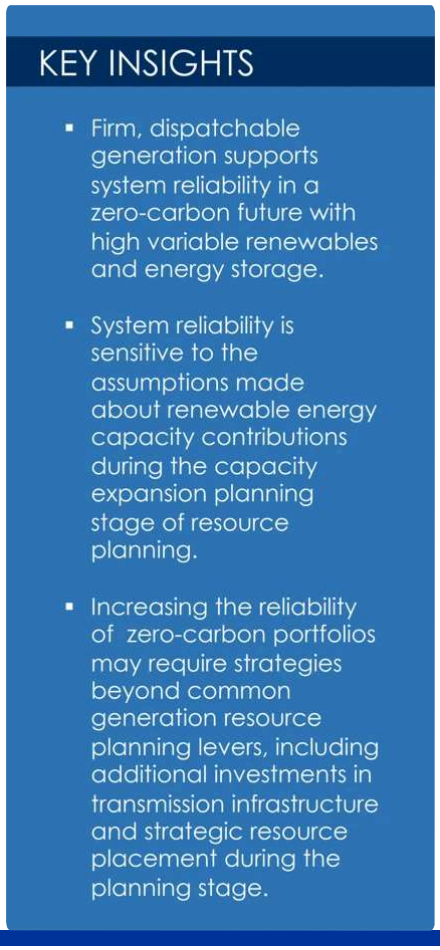
- **Decarbonization opportunities and costs vary significantly between global regions and within the U.S.** due to relative differences in endowments (e.g., wind and solar resource quality) and future low-carbon alternatives.

- **Climate policy design can shape regional decarbonization outcomes**, including power sector capacity and generation mixes, transition costs, energy system growth, and emissions pathways.

- **Understanding regional decarbonization opportunities is important for informed policy design, company strategy, and stakeholder engagement**, including greenhouse gas target setting, transition risk assessment, and cost-effective decarbonization.

Zero CO_2 Electric Sector Policy and System Reliability

READ BRIEF



Member Center

Resource Planning for Electric Power Systems

Impact of Uncertain Hydrogen Technology Futures on Long-Term Electric Company Investment Portfolios (3002030655)

Cost Projection Factors for Resource Planning: 2024 Update (3002030089)

Energy, Environmental, and Climate Policy Analysis

Energy Storage Deployment and Dispatch in Decarbonization Scenarios: An Economic Analysis of Energy Storage (3002026140)

System Effects of 24/7 Carbon-Free Electricity Procurement: Regional Modeling and Emissions Impacts of Voluntary Markets (3002030056)

For more information about Resource Planning for Electric Power Systems please contact Nidhi Santen.

For more information about Energy, Environmental, and Climate Policy Analysis please contact John Bistline.

Thank you for your continued interest in our work. If you have any questions please email eea@epri.com.

Best,

EPRI Energy Systems and Climate Analysis Group

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