Greetings,

We are excited to share recent research highlights from EPRI's Energy Systems and Climate Analysis (ESCA) group:

- A new multi-model study published in Science assessing the emissions and energy impacts of the Inflation Reduction Act (two-page summary) (press release);
- A recent report on climate-informed planning and adaptation for power sector resilience;
- An article on the growing trend of 24/7 carbon free corporate energy procurement;
- A quick insight on climatological and power system operating extremes.

All of ESCA's publicly available research can be found on the ESCA website.

ESCA Research Highlights

Emissions and energy impacts of the Inflation Reduction Act

POLICY FORUM

ENERGY AND CLIMATE POLICY

Emissions and energy impacts of the Inflation Reduction Act

Economy-wide emissions drop 43 to 48% below 2005 levels by 2035 with accelerated clean energy deployment

By **John Bistline[1], Geoffrey Blanford[1], Maxwell Brown[2], Dallas Burtraw[3], Maya Domeshek[3], Jamil Farbes[4], Allen Fawcett[5], Anne Hamilton[2], Jesse Jenkins[6], Ryan Jones[4], Ben King[7], Hannah Kolus[7], John Larsen[7], Amanda Levin[8], Megan Mahajan[9], Cara Marcy[5], Erin Mayfield[10], James McFarland[5], Haewon McJeon[11], Robbie Orvis[9], Neha Patankar[12], Kevin Rennert[3], Christopher Roney[1], Nicholas Roy[3], Greg Schivley[13], Daniel Steinberg[2], Nadejda Victor[14], Shelley Wenzel[9], John Weyant[15], Ryan Wiser[16], Mei Yuan[17], Alicia Zhao[11]**

READ REPORT

READ TWO PAGER

New in Science: A multi-model comparison of the Inflation Reduction Act looks at its emissions and energy system impacts. This study, led by EPRI's John Bistline, shows that **economy-wide emissions may drop 43-48% below 2005 levels by 2035** with accelerated clean energy deployment. Earlier today, EPRI published a press release on this work.

This nine-model comparison also finds that:

- **IRA could accelerate clean energy deployment**: Wind and solar capacity additions could be up to four times higher than without IRA.
- **Electric vehicles are 30-82% of new vehicle sales in 2035** (27-59% without IRA)
- Models agree that IRA could accelerate power sector decarbonization. **Electric sector CO2 could decline by 66-87% by 2035** from 2005 (39-68% without IRA).
- **Energy costs could be $10-52 billion per year lower by 2035** with IRA ($73-370 per household)
- **IRA's abatement costs are likely lower than updated social cost of carbon estimates**, even before accounting for improved air quality and other co-benefits. Climate benefits of IRA could range from $44-220 billion annually by 2030 using central social cost of carbon estimates.

https://www.science.org/stoken/author-tokens/ST-1277/full
https://esca.epri.com/pdf/Back-Pocket-Insights/IRA-MIP-Summary.pdf

For more information, please contact John Bistline jbistline@epri.com.

Climate-Informed Planning and Adaptation for Power Sector Resilience

READ REPORT

EPRI's Climate READi initiative has released a new report which brings together a vast array of literature from researchers and industry stakeholders to **address climate risk, power system impacts, and current practices to address power system resilience** against climate hazards.
https://www.epri.com/research/sectors/readi/research-results/3002026317

- This work also focuses on what new research or guidance is needed to consistently **integrate physical climate risk across multiple facets of decision-making** within a company, and offers guidance for decisions that span planning and operations across generation, transmission, distribution, and markets, and customer-side considerations such as technology adoption, health impacts, and equity.
- Recognizing the need to account for costs of inaction and societal benefits associated with greater resilience, we include **an overview of approaches for valuing and prioritizing resilience investments in a cost-benefit framework**.
- This research also identifies the importance of metrics across all of these spaces, as they will be needed to **compare and evaluate options to justify adaptation and resilience-focused investments**.

This report provides an understanding of the current landscape of best practices as well as the missing pieces. We hope it will be a key **reference material to build a shared understanding that will help energy companies and other interested parties communicate needs** and contextualize results for climate resilience. Climate READi seeks to provide a framework that enables holistic approaches for climate resilience and adaptation to guide decision-makers in this space.

For more information, please contact Andrea Staid AStaid@epri.com.

Can Carbon-Free Energy Meet Corporate Clean Energy Demand 24 Hours a Day?

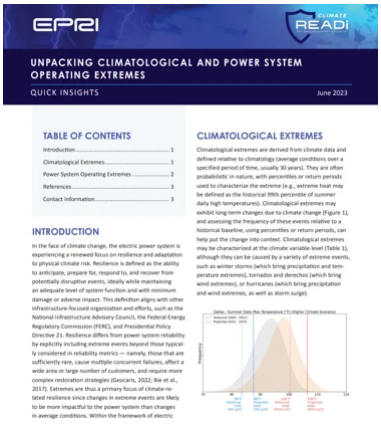
READ HERE

In a recent article for Energy Central, Adam Diamant discusses the emerging trend of 24/7 clean energy procurement, and the significant challenges and questions it poses for the electric power industry.

> "Corporate clean energy commitments have proliferated in recent years, driven by growing sustainability and decarbonization goals. For example, nearly 400 global corporations– including well-known brands like Starbucks, eBay, and General Mills – have pledged to achieve 100 percent renewable targets to offset their annual greenhouse gas (GHG) emissions from electricity consumption through their membership in the group RE100.
>
> More recently, several large corporate electricity customers, such as Google, Microsoft, Iron Mountain, and others have started procuring “carbon-free energy” that more closely matches their corporate hourly electricity load profile on a 24/7 hourly basis. It’s a concept that has come to be known as 24/7 carbon-free energy (24/7 CFE)."

For more information, please contact Adam Diamant ADiamant@epri.com.

Unpacking Climatological and Power System Operating Extremes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CLIMATE READI

UNPACKING CLIMATOLOGICAL AND POWER SYSTEM OPERATING EXTREMES

QUICK INSIGHTS

June 2023

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INTRODUCTION

In the face of climate change, the electric power system is experiencing a renewed focus on resilience and adaptation to physical climate risk. Resilience is defined as the ability to anticipate, prepare for, respond to, and recover from potentially disruptive events, ideally while maintaining an adequate level of system function and with minimum damage or adverse impact. This definition aligns with other infrastructure-focused organization and efforts, such as the National Infrastructure Advisory Council, the Federal Energy Regulatory Commission (FERC), and Presidential Policy Directive 21. Resilience differs from power system reliability by explicitly including extreme events beyond those typically considered in reliability metrics — namely, those that are sufficiently rare, cause multiple concurrent failures, affect a wide area or large number of customers, and require more complex restoration strategies (Gescario, 2022; Bie et al., 2017). Extremes are thus a primary focus of climate-related resilience since changes in extreme events are likely to be more impactful to the power system than changes in average conditions. Within the framework of electric

CLIMATOLOGICAL EXTREMES

Climatological extremes are derived from climate data and defined relative to climatology (average conditions over a specified period of time, usually 30 years). They are often probabilistic in nature, with percentiles or return periods used to characterize the extreme (e.g., extreme heat may be defined as the historical 99th percentile of summer daily high temperatures). Climatological extremes may exhibit long-term changes due to climate change (Figure 1), and assessing the frequency of these events relative to a historical baseline, using percentiles or return periods, can help put the change into context. Climatological extremes may be characterized at the climate variable level (Table 1), although they can be caused by a variety of extreme events, such as winter storms (which bring precipitation and temperature extremes), tornados and derechos (which bring wind extremes), or hurricanes (which bring precipitation and wind extremes, as well as storm surge).

READ HERE

Resilience—defined as the ability to anticipate, respond to, and recover from potentially disruptive events—differs from power system reliability by explicitly including extreme events that are sufficiently rare, cause multiple concurrent failures, affect a wide area or large number of customers, and require more complex restoration strategies. This Quick Insight, as part of EPRI's larger Climate 101 training series, discusses two definitions of extreme events that may arise from the use of climate data, namely climatological extremes and power system operating extremes. https://www.epri.com/research/sectors/readi/research-results/3002026298

For more information, please contact Jonathan Lala JLala@epri.com or Delavane Diaz DDiaz@epri.com

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26th Annual Energy and Climate Research Seminar

Thank you to everyone who joined us for EPRI's 26th **Energy and Climate Research Seminar** last month. This year's seminar took place over a full day on Wednesday, May 10 with a reception, and a half day on Thursday, May 11, 2023.

This long-running event covers key energy and environmental topics of significant interest to the U.S. energy sector related to **climate science understanding, policy perspectives, decarbonization technologies and research priorities**. For an overview of the 2023 Seminar, please visit our website.

Event Website

Member Center

The ESCA Group conducts its research as part of EPRI Programs 178 (*Resource Planning for Electric Power Systems*) and 201 (*Energy, Environmental, and Climate Policy Analysis*). Examples of recent program-specific research includes:

- Cost Projection Factors for Resource Planning (3002025394) - Program 178
- Harmonized Carbon Capture Costs for Integrated Modeling (3002026706) - Program 178
- Understanding Distributional Impacts of Decarbonization: Modeling Effects of Household Income on Transport Electrification (3002024043) - Program 201
- Power System Reliability under Deep Decarbonization (3002025593) - Program 201

For more information about these programs, please contact Nidhi Santen (P178) or David Young (P201).

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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