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TWINNING NUCLEAR REACTORS WITH MACHINE LEARNING

A multidisciplinary team from the Idaho and Argonne National Laboratories, Kairos Power, and Curtiss-Wright, along with support from academics, have developed digital twin nuclear reactors. By using a US\$5.2 million grant from the Department of Energy's Advanced Research Projects Agency-Energy, the scientists and engineers have engaged a physics-based machine learning process to construct and later maintain the digital twin reactors. By grounding the machine learning algorithm in actual physics, the artificial intelligence model generates predictions that are more robust and reliable when compared to more abstract models.

The complex nature of this approach provides two layers of problem-solving simultaneously. First, a machine learning-driven predictive maintenance system actively avoids unexpected outages while optimizing maintenance, and predicts mechanical failure before prototypical mechanical stress indicates as much. Second, by developing this system as a digital twin, engineers have real-time data of the complex interconnections and components within a nuclear power plant. Engineers envision the digital twin model to serve as a complete software package available to other vendors to which they may apply specific models and information.

FERC INVITES POST-TECHNICAL CONFERENCE COMMENTS ON RTO/ISO CREDIT PRACTICES

On 21 April, the Federal Energy Regulatory Commission (FERC) issued a [notice](#) inviting post-technical conference comments discussing principles and best practices for credit risk management in organized wholesale markets. Comments must be submitted within 45 days, or on or before 7 June.

The staff-led [technical conference](#) explored the fundamental principles underlying credit risk management and how those principles are applied in regional transmission organization (RTO) and independent system operator (ISO) markets. Panelists also discussed strengthening internal processes and staffing.

K&L Gates partner [Ruta K. Skucas](#) was chosen by FERC to participate on the panel titled "Impact of Market Design on Credit Risk," which explored how market design impacts the credit risk in RTO/ISO markets, particularly the Financial Transmission Right (FTR) markets. In her filed remarks and panel presentation, Ms. Skucas outlined how high minimum capitalization requirements result in decreased liquidity as smaller market participants are pushed out of the market, and discussed the importance of scaling credit requirements to the degree of risk a company takes on. Panelists additionally discussed how differences in market design across the various markets shapes credit risk and policies among similar products, as well as the potential benefits and drawbacks of third party clearing of FTRs.

UNIVERSITY OF ILLINOIS WILL SOON COMPLETE FINAL PHASE OF SOLAR FARM 2.0 PROJECT

On 13 May, the University of Illinois Urbana-Champaign (University) **announced** that it will complete the final stage of its “Solar Farm 2.0” project by planting native vegetation that will support a pollinator-friendly habitat. The custom seed mix will include 21 different native plant species for a total of 6.5 million flowering plants and grasses, and is expected to increase land resiliency and create a natural habitat for local and migratory birds and beneficial insects. The native vegetation will also provide opportunities for future research to measure any improvements in panel efficiency due to reduced ground temperature.

The 12.3 MW facility was developed by Sol Systems LLC, constructed by Inovateus Solar LLC, and is owned by Capital Dynamics Inc. The photovoltaic system uses bifacial solar panels equipped with single-axis trackers and has operated for three months, generating over 4,000 MWh. The University purchases this energy via a 20-year power purchase agreement.

The project advances the University's climate action plan, which calls for net-zero carbon emissions by 2050. With the addition of the Solar Farm 2.0 Project, the University will meet approximately 12 percent of its total electricity usage from clean energy resources.

SPAIN PASSES CARBON NEUTRALITY LEGISLATION THAT BANS FOSSIL FUEL VEHICLES FROM CIRCULATION WITHIN NATION'S BORDERS BY 2050

On 13 May, Spain's parliament **approved** a clean energy bill designed to meet the EU's goal of carbon neutrality by 2050. The bill establishes a national target to reduce emissions by at least 23 percent compared to 1990 levels, requiring that renewables constitute 42 percent of the nation's energy consumption and a minimum of 74 percent of the nation's electricity production. The bill also requires that energy efficiency be improved by at least 39.5 percent.

The bill will also prohibit the sale of fossil fuel vehicles by 2040, and the use of such vehicles within the country by 2050. The mandate's phased approach will start with a requirement that all cities with populations exceeding 50,000 people have low-emission zones like in Madrid and Barcelona. While Spain is being criticized for the bill not taking big enough steps to meet the Paris Agreement commitments, others believe this bill is a step in the right direction.

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