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119TH CONGRESS
1ST SESSION

H. R. 4338

To develop weather tools for electricity system planning and operational modeling, expand research on extreme weather event scenarios for energy utility companies and regulators, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JULY 10, 2025

Ms. LEGER FERNANDEZ (for herself, Mr. CASTEN, Ms. CASTOR of Florida, and Ms. ROSS) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

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A BILL

To develop weather tools for electricity system planning and operational modeling, expand research on extreme weather event scenarios for energy utility companies and regulators, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Weather-Safe Energy Act of 2025".

SEC. 2. ESTABLISHMENT OF WEATHER-SAFE ENERGY PLATFORM AND SUPPORT FOR ELECTRICITY SYSTEM PLANNING AND OPERATIONAL MODELING.

(a) INITIAL REPORT ON METEOROLOGICAL AND EXTREME WEATHER EVENT DATA.—Not later than 6 months after the date of the enactment of this section, the Secretary shall submit to the appropriate congressional committees a report containing the following:

(1) A summary of current efforts in federally funded research and development centers to develop the use of meteorological, hydrological, and extreme weather event data for energy system modeling.

(2) A description of the specific actions that the Secretary shall take to carry out subsection (b).

(b) WEATHER-SAFE ENERGY PLATFORM DIGITAL TOOL.—

(1) IN GENERAL.—The Secretary shall develop and maintain an open-access digital tool, to be known as the ''Weather-Safe Energy Platform'' (in this section, referred to as the ''Platform''), to provide high-resolution data of meteorological and hydrological variables suitable for electricity system planning and operational models.

(2) AVAILABILITY OF PLATFORM.—The Secretary shall make available the Platform not later

than 2 years after the date of the enactment of this section.

(3) CONTENTS OF PLATFORM.—The Platform shall include the following, with respect to the United States:

(A) Meteorological and hydrological variables derived from state-of-the-science atmospheric models used in international model intercomparison projects, regional forecasting datasets, and reanalysis data, as determined appropriate by the Secretary, at spatiotemporal resolutions suitable for electricity system planning and operational modeling.

(B) Information that maintains spatiotemporal correlation of the meteorological and hydrological variables to ensure a realistic and reliable representation of conditions that may contribute to cascading failures of electricity systems.

(C) Historical data and projections of meteorological and hydrological variables across short-, medium-, and long-term timelines, developed using methods that ensure consistency with standard practices for evaluating elec-

tricity system planning and operational decisions.

(D) Sufficient information to provide for ensemble model scenarios that support narrative- or storytelling-based approaches to modeling current and future conditions and effects on electricity systems.

(E) Up-to-date information provided by ongoing relevant research projects.

(4) STAKEHOLDER INPUT.—The Secretary shall include input from stakeholders determined appropriate by the Secretary, including utility companies, municipalities, independent system operators, regional transmission operators, Federal and State regulators, and academic experts, to ensure the Platform meets the data needs of such stakeholders in the energy modeling activities of the stakeholders.

(5) FIT-FOR-PURPOSE DATA STRATEGY.—The Secretary shall develop and implement a strategy to carry out the following:

(A) Evaluate whether the data in the Platform are appropriate for specific electricity system planning and operation applications.

(B) Ensure that each dataset in the Platform includes, or is accompanied by, clear and

standardized metadata that includes information on best-practice use cases such as trend detection, uncertainty analysis, and the study of extreme event intensification.

(C) Establish and implement procedures to regularly review and update datasets and the metadata of the datasets to account for and reflect advances in science and the evolving needs of stakeholders.

(c) RESEARCH AND MODELING INTO EXTREME WEATHER EVENT SCENARIOS.—

(1) IN GENERAL.—The Secretary shall take such actions, as determined appropriate by the Secretary, to support research projects to enhance the understanding and modeling of the changes to extreme weather events that affect the planning and operations of electricity systems.

(2) GRANTS FOR INCREASED RESEARCH.—The Secretary shall make funds available, through grants made on a competitive basis, contracts, and cooperative agreements, to federally funded research and development centers, institutions of higher education, and other eligible independent research institutions (as determined by the Secretary) to carry out the re-

search projects and modeling referred to in paragraph (1).

(3) INTEGRATION OF RESEARCH FINDINGS INTO THE PLATFORM.—The Secretary shall integrate into the Platform such findings from the research projects and modeling referred to in paragraph (1) to assist energy utility companies and regulators with respect to planning for, and responding to, changes in extreme weather events.

(d) TECHNICAL ASSISTANCE.—

(1) IN GENERAL.—The Secretary shall provide training resources and technical assistance to utility companies, grid operators, municipalities, State regulators, and other interested stakeholders.

(2) GOALS.—In carrying out paragraph (1), the Secretary shall carry out the following:

(A) Offer workshops, training sessions, and distribute educational materials to stakeholders to improve understanding of how meteorological and hydrological variables and extreme weather events affect electricity system planning and operations.

(B) Provide technical assistance with respect to the following:

(i) Utilizing the tools and resources available through the Platform.

(ii) Integrating scenario data into electricity system planning and operational models.

(C) Facilitate collaboration and the exchange of knowledge among stakeholders to identify best practices for electricity system planning and operations with respect to changes in meteorological and hydrological variables and changes in extreme weather events.

(e) REPORTS TO CONGRESS.—Not later than 5 years after the date of the enactment of this section, and on a periodic basis thereafter not less frequently than every 3 years, the Secretary shall submit to the appropriate congressional committees a report containing descriptions of the following:

(1) The funds used to carry out this section, including grants made pursuant to subsection (c).

(2) The outcomes achieved through such grants.

(3) The development and deployment of the Platform.

(4) The advancements in the research carried out pursuant to subsection (b).

(5) The extent to which utility companies, grid operators, and Federal and State regulators have utilized the Platform.

(6) The activities and effects of the training resources and technical assistance provided under subsection (d).

(f) IMPLEMENTATION.—The Secretary shall carry out—

(1) subsections (a) and (c) through the Office of Electricity of the Department of Energy, in consultation with such agency heads as determined appropriate by the Secretary; and

(2) subsections (b) and (d) through research and development centers funded by the Secretary.

(g) DEFINITIONS.—In this section:

(1) APPROPRIATE CONGRESSIONAL COMMITTEES.—The term ''appropriate congressional committees'' means the following:

(A) The Committee on Energy and Commerce of the House of Representatives.

(B) The Committee on Energy and Natural Resources of the Senate.

(2) ENSEMBLE MODEL.—The term ''ensemble model'' means a collection of multiple simulations used to estimate uncertainty in projections of mete-

orological phenomena, including extreme weather events, that provides a range of possible outcomes with respect to such phenomena.

(3) EXTREME WEATHER EVENT.—The term ''extreme weather event'' means severe and abnormal earth system phenomena that can significantly affect the operations of electricity systems, including hurricanes, coastal or inland flooding, wildfires, snowpack or permafrost thaw, and extreme droughts.

(4) INSTITUTION OF HIGHER EDUCATION.—The term ''institution of higher education'' has the meaning given that term in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001).

(5) METEOROLOGICAL AND HYDROLOGICAL VARIABLES.—The term ''meteorological and hydrological variables'' includes temperature, humidity, wind speed, solar radiation, precipitation, streamflow, and other atmospheric and water-related measurements.

(6) OPEN-ACCESS DIGITAL TOOL.—The term ''open-access digital tool'' means a computational resource, including software, datasets, and modeling frameworks, that is designed to support energy system resilience planning and operational decision-

making that is publicly available without restrictions to access, use, or distribution.

(7) SECRETARY.—The term ''Secretary'' means the Secretary of Energy.

(8) SPATIOTEMPORAL CORRELATION.—The term ''spatiotemporal correlation'' means the statistical relationship between variables across both space and time that ensures consistency in modeling the effect of extreme weather events on energy systems.

(9) SPATIOTEMPORAL RESOLUTION.—The term ''spatiotemporal resolution'' means the level of detail in which data elements are represented across space and time that is appropriate for energy system modeling and analysis.

(10) STATE-OF-THE-SCIENCE.—The term ''state-of-the-science'' means the most advanced and validated knowledge, methods, or technologies available in scientific research and applications related to meteorology, hydrology, extreme weather events, and energy system modeling.

(11) UNITED STATES.—The term ''United States'' means each of the several States of the United States, the District of Columbia, and the territories and possessions of the United States.

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