COMMITTEE ON
SCIENCE, SPACE AND TECHNOLOGY
CHAIRMAN FRANK LUCAS

NOTICE OF UPCOMING COMMITTEE ACTIVITY

FULL COMMITTEE HEARING

TIME	**DATE**	**PLACE**
10:00 a.m.	Wednesday, March 8, 2023	2318 Rayburn House Office Building

Subject:
Innovation Through Collaboration: The Department of Energy's Role in the U.S. Research Ecosystem

Witnesses:

- Dr. Harriet Kung, Deputy Director for Science Programs in the Office of Science, the U.S. Department of Energy
- Mr. James L. Reuter, Associate Administrator for the Space Technology Mission Directorate, the National Aeronautics and Space Administration
- Dr. Michael C. Morgan, Assistant Secretary of Commerce for Environmental Observation and Prediction, the National Oceanic and Atmospheric Administration
- Dr. Sean L. Jones, Assistant Director for the Directorate of Mathematical and Physical Sciences, the National Science Foundation

This hearing will serve as a legislative hearing for a series of bills that would strengthen several of the Department of Energy's longstanding interagency research partnerships and codify them in law as appropriate. Attached are discussion drafts of three Science Committee Majority bills under consideration.

Committee on Science, Space, and Technology
2321 Rayburn House Office Building
Washington, DC 20515

[DISCUSSION DRAFT]

118TH CONGRESS
1ST SESSION

H. R. _____

To provide for Department of Energy and National Aeronautics and Space Administration research and development coordination, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

M__. _____ introduced the following bill; which was referred to the Committee on _____

A BILL

To provide for Department of Energy and National Aeronautics and Space Administration research and development coordination, 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 "[To Be Supplied] Act".

SEC. 2. DEPARTMENT OF ENERGY AND NATIONAL AERONAUTICS AND SPACE ADMINISTRATION RESEARCH AND DEVELOPMENT COORDINATION.

(a) IN GENERAL.—The Secretary of Energy (in this section referred to as the ''Secretary'') and the Administrator of the National Aeronautics and Space Administration (in this section referred to as the ''Administrator'') shall carry out cross-cutting and collaborative research and development activities focused on the joint advancement of Department of Energy and National Aeronautics and Space Administration mission requirements and priorities.

(b) MEMORANDUM OF UNDERSTANDING.—The Secretary and the Administrator shall coordinate the activities under subsection (a) through the establishment of a memorandum of understanding, or other appropriate interagency agreement. Such memorandum or agreement, as the case may be, shall require the use of a competitive, merit-reviewed process, which considers applications from Federal agencies, National Laboratories, institutions of higher education, non-profit institutions, and other appropriate entities.

(c) COORDINATION.—In carrying out the activities under subsection (a), the Secretary and the Administrator may—

(1) conduct collaborative research in a variety of focus areas, such as—

(A) propulsion systems and components, including nuclear thermal and nuclear electric, for the Moon and Mars, including radioisotope power systems, thermoelectric generators, advanced nuclear fuels, and heater units;

(B) modeling and simulation, machine learning, data assimilation, large scale data analytics, and predictive analysis in order to optimize algorithms for mission-related purposes;

(C) fundamental high energy physics, including regarding dark energy and dark matter, in collaboration with the program authorized under section 305 of the Department of Energy Research and Innovation Act (42 U.S.C. 18643);

(D) fundamental earth and environmental sciences, including in collaboration with the program authorized under section 306 of the Department of Energy Research and Innovation Act (42 U.S.C. 18644);

(E) radiation health effects, including in collaboration with the program authorized under section 306 of the Department of Energy

Research and Innovation Act (42 U.S.C. 18644);

(F) quantum information sciences, including quantum computing and quantum network infrastructure, including in collaboration with the programs authorized under sections 403 and 404 of the National Quantum Initiative Act (15 U.S.C. 8853 and 8854);

(G) nanotechnology;

(H) scientific observations of the early universe from the Moon;

(I) planetary defense from potentially hazardous asteroids and near-Earth objects;

(J) sensor and satellite development;

(K) space situational awareness; and

(L) fundamental heliophysics;

(2) develop methods to accommodate large voluntary data sets on space and aeronautical information on high-performance computing systems with variable quality and scale;

(3) promote collaboration, open community-based development, and data and information sharing between Federal agencies, National Laboratories, institutions of higher education, nonprofit institutions, and other appropriate entities by pro-

viding the necessary access and secure data and information transfer capabilities; and

(4) support research infrastructure as the Secretary and Administrator determine necessary.

(d) AGREEMENTS.—In carrying out the activities under subsection (a), the Secretary and the Administrator are authorized to—

(1) carry out reimbursable agreements between the Department of Energy, the National Aeronautics and Space Administration, and other entities in order to maximize the effectiveness of research and development; and

(2) collaborate with other Federal agencies as appropriate.

(e) REPORT.—Not later than two years after the date of the enactment of this section, the Secretary and the Administrator shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Energy and Natural Resources and the Committee on Commerce, Science, and Transportation of the Senate, a report detailing the following:

(1) Interagency coordination between each Federal agency involved in the research and development activities carried out under this section.

(2) Potential opportunities to expand the technical capabilities of the Department of Energy and the National Aeronautics and Space Administration.

(3) Collaborative research achievements.

(4) Areas of future mutually beneficial successes.

(5) Continuation of coordination activities between the Department of Energy and the National Aeronautics and Space Administration.

(f) RESEARCH SECURITY.—The activities authorized under this section shall be applied in a manner consistent with subtitle D of title VI of the Research and Development, Competition, and Innovation Act (enacted as division B of the CHIPS Act of 2022 (Public Law 117–167; 42 U.S.C. 19231 et seq.)).

[DISCUSSION DRAFT]

118TH CONGRESS
1ST SESSION

H. R. _____

To direct the Department of Energy and the National Oceanic and Atmospheric Administration to conduct collaborative research in order to advance numerical weather and climate prediction in the United States, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

M__. _____ introduced the following bill; which was referred to the Committee on _____

A BILL

To direct the Department of Energy and the National Oceanic and Atmospheric Administration to conduct collaborative research in order to advance numerical weather and climate prediction in the United States, 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 ''Advanced Weather Model Computing Development Act''.

SEC. 2. DEFINITIONS.

In this Act:

(1) DEPARTMENT.—The term ''Department'' means the Department of Energy.

(2) NATIONAL LABORATORY.—The term ''National Laboratory'' has the meaning given such term in section 2 of the Energy Policy Act of 2005 (42 U.S.C. 15801).

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

(4) ADMINISTRATOR.—The term ''Administrator'' means the Administrator of the National Oceanic and Atmospheric Administration.

SEC. 3. DEPARTMENT OF ENERGY AND NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION RESEARCH AND DEVELOPMENT COORDINATION.

(a) IN GENERAL.—The Secretary and Administrator shall carry out collaborative research and development activities in artificial intelligence and high performance computing, focused on the advancement of climate models and operational numerical weather prediction skill to support National Oceanic and Atmospheric Administration mission requirements and the advancement of Department computational and networking capabilities to analyze, model, simulate, and predict complex phenomena.

(b) MEMORANDUM OF UNDERSTANDING.—The Secretary and Administrator shall carry out the activities under subsection (a) through the establishment of a memorandum of understanding, or other appropriate interagency agreement. Such memorandum or agreement, as the case may be, shall require the use of a competitive, merit-reviewed process, which considers applications from Federal agencies, National Laboratories, institutions of higher education, nonprofit institutions, and other appropriate entities.

(c) ACTIVITIES.—In carrying out the activities under subsection (a), the Secretary and Administrator may—

(1) conduct collaborative research in modeling and simulation, machine learning, data assimilation, large scale data analytics, and predictive analysis in order to optimize algorithms for climate modeling and numerical weather prediction;

(2) explore options for performance portability of the optimized weather model codes between the operational computing systems of the National Oceanic and Atmospheric Administration and the Department's high performance computers;

(3) develop methods to accommodate large data sets on weather and climate information with variable quality and scale;

(4) collaborate on new approaches and maximize the use of algorithms developed through artificial intelligence, machine learning, data analytics, natural language processing, modeling and simulation, with a focus on new algorithms suitable for high performance computing systems and numerical weather prediction or climate models;

(5) to the maximum extent practicable, and in compliance with national security policies, promote collaboration, open community-based development, and data sharing between Federal agencies, National Laboratories, institutions of higher education, nonprofit institutions, and other appropriate entities by providing the necessary access and secure data transfer capabilities; and

(6) support scientific computing infrastructure as the Secretary and Administrator determine appropriate.

(d) COORDINATION.—In carrying out the activities under subsection (a), the Secretary and Administrator are authorized to—

(1) carry out reimbursable agreements between the Department, the National Oceanic and Atmospheric Administration, and other entities in order to

maximize the effectiveness of research and development to improve numerical weather prediction; and

(2) collaborate with other Federal agencies as appropriate.

(e) REPORT.—Not later than two years after the date of the enactment of this Act, the Secretary and Administrator shall submit to the Committee on Science, Space, and Technology of the House of Representatives, and the Committee on Commerce, Science, and Transportation and the Committee on Energy and Natural Resources of the Senate, a report detailing the following:

(1) Interagency coordination between each Federal agency involved in the research and development activities carried out under this section.

(2) Potential opportunities to expand the technical capabilities of the Department and the National Oceanic and Atmospheric Administration.

(3) Collaborative research achievements.

(4) Areas of future mutually beneficial gains by such activities.

(5) Continuation of coordination between the Department and the National Oceanic and Atmospheric Administration.

SEC. 4. CLIMATE AND WEATHER PREDICTION ON HIGH PERFORMANCE COMPUTERS INITIATIVE.

(a) IN GENERAL.—The Secretary and Administrator shall carry out an initiative to run advanced model code, including climate and operational weather models, on the Department high performance computers in order to conduct proof of concept scenarios and comparison to current issued forecasts and models. The Secretary and Administrator shall carry out such initiative through a competitive, merit-reviewed process, and consider applications from Federal agencies, National Laboratories, institutions of higher education, nonprofit institutions, and other appropriate entities.

(b) COMPONENTS.—In carrying out the initiative under subsection (a), the Secretary and Administrator shall prevent duplication and coordinate research efforts in artificial intelligence, high performance computing, modeling and simulation, machine learning, and data assimilation across the Department, and may—

(1) run real-time weather forecast scenarios to conduct comparative research on National Weather Service issued forecasts to forecasts issued through the use of operational models run on high performance computers;

(2) share relevant modeling system and applications innovations developed through such initiative,

including Unified Forecast System-based applications, through community-based activities; and

(3) leverage related weather and climate efforts and data from the National Science and Technology Council and the Interagency Council for Advancing Meteorological Services.

(c) REPORT.—Not later than two years after the date of the enactment of this Act, the Secretary and Administrator shall submit to the Committee on Science, Space, and Technology of the House of Representatives and the Committee on Commerce, Science, and Transportation and the Committee on Energy and Natural Resources of the Senate a report evaluating the following:

(1) The effectiveness of the initiative under subsection (a), including applied research discoveries and operational weather prediction improvements achieved.

(2) Potential opportunities to expand the technical capabilities of the Department and the National Oceanic and Atmospheric Administration through the development of artificial intelligence and data analytics technologies.

(d) SUNSET.—The authority under this section shall terminate five years after the date of the enactment of this section.

SEC. 5. RESEARCH SECURITY.

The activities authorized under this Act shall be applied in a manner consistent with subtitle D of title VI of the Research and Development, Competition, and Innovation Act (enacted as division B of the CHIPS Act of 2022 (Public Law 117–167; 42 U.S.C. 19231 et seq.)).

[DISCUSSION DRAFT]

118TH CONGRESS
1ST SESSION

H. R. _____

To provide for Department of Energy and Department of Agriculture joint research and development activities, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

M__. _____ introduced the following bill; which was referred to the Committee on _____

A BILL

To provide for Department of Energy and Department of Agriculture joint research and development activities, 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 "[To Be Supplied] Act".

SEC. 2. DEPARTMENT OF ENERGY AND DEPARTMENT OF AGRICULTURE JOINT RESEARCH AND DEVELOPMENT ACTIVITIES.

(a) IN GENERAL.—The Secretary of Energy and the Secretary of Agriculture (in this section referred to as the ''Secretaries'') shall carry out cross-cutting and collaborative research and development activities focused on the joint advancement of Department of Energy and Department of Agriculture mission requirements and priorities.

(b) MEMORANDUM OF UNDERSTANDING.—The Secretaries shall carry out and coordinate the activities under subsection (a) through the establishment of a memorandum of understanding, or other appropriate interagency agreement. Such memorandum or agreement shall require the use of a competitive, merit-reviewed process, which considers applications from Federal agencies, National Laboratories, institutions of higher education, nonprofit institutions, and other appropriate entities.

(c) COORDINATION.—In carrying out the activities under subsection (a), the Secretaries may—

(1) conduct collaborative research over a variety of focus areas, such as—

(A) modeling and simulation, machine learning, artificial intelligence, data assimilation, large scale data analytics, and predictive analysis in order to optimize algorithms for

purposes related to agriculture and energy, such as life cycle analysis of agricultural or energy systems;

(B) fundamental agricultural, biological, computational, and environmental science and engineering, including advanced crop science, crop protection, and breeding, including in collaboration with the program authorized under section 306 of the Department of Energy Research and Innovation Act (42 U.S.C. 18644);

(C) integrated natural resources and the energy-water nexus, including in collaboration with the program authorized under section 1010 of the Energy Act of 2020 (enacted as division Z of the Consolidated Appropriations Act, 2021 (42 U.S.C. 16183));

(D) advanced biomass, biobased products, and biofuels, including in collaboration with the activities authorized under section 9008(b) of the Farm Security and Rural Investment Act of 2002 (7 U.S.C. 8108(b));

(E) diverse feedstocks for economically and environmentally sustainable fuels, including aviation and naval fuels;

(F) colocation of agricultural resources and activities and ecosystem services with diverse energy technologies and resources, such as geothermal energy, nuclear energy, solar energy, wind energy, natural gas, hydropower, and energy storage;

(G) colocation of agricultural resources and activities with carbon storage and utilization technologies;

(H) invasive species management to further the work done by the Federal Interagency Committee for the Management of Noxious and Exotic Weeds;

(I) long-term and high-risk technological barriers in the development of transformative science and technology solutions in the agriculture and energy sectors, including in collaboration with the program authorized under section 5012 of the America COMPETES Act (42 U.S.C. 16538);

(J) grid modernization and grid security; and

(K) rural technology development, including manufacturing, precision agriculture tech-

nologies, and mechanization and automation technologies;

(2) develop methods to accommodate large voluntary standardized and integrated data sets on agricultural, environmental, supply chain, and economic information with variable accuracy and scale;

(3) promote collaboration, open community-based development, and data and information sharing between Federal agencies, National Laboratories, institutions of higher education, nonprofit institutions, industry partners, and other appropriate entities by providing reliable access to secure data and information that are in compliance with Federal rules and regulations; and

(4) support research infrastructure and workforce development as the Secretary and Administrator determine necessary

(d) AGREEMENTS.—In carrying out the activities under subsection (a), the Secretaries are authorized to—

(1) carry out reimbursable agreements between the Department of Energy, the Department of Agriculture, and other entities in order to maximize the effectiveness of research and development; and

(2) collaborate with other Federal agencies as appropriate.

(e) REPORT.—Not later than two years after the date of the enactment of this Act, the Secretaries shall submit to the Committee on Science, Space, and Technology and the Committee on Agriculture of the House of Representatives, and the Committee on Energy and Natural Resources and the Committee on Agriculture, Nutrition, and Forestry of the Senate, a report detailing the following:

(1) Interagency coordination between each Federal agency involved in the research and development activities carried out under this section.

(2) Potential opportunities to expand the technical capabilities of the Department of Energy and the Department of Agriculture.

(3) Collaborative research achievements.

(4) Areas of future mutually beneficial successes.

(5) Continuation of coordination activities between the Department of Energy and the Department of Agriculture.

(f) RESEARCH SECURITY.—The activities authorized under this section shall be applied in a manner consistent with subtitle D of title VI of the Research and Development, Competition, and Innovation Act (enacted as division B of the CHIPS Act of 2022 (Public Law 117–167; 42 U.S.C. 19231 et seq.)).