118TH CONGRESS
2D SESSION

S. 3732

To require the Administrator of the Environmental Protection Agency to carry out a study on the environmental impacts of artificial intelligence, to require the Director of the National Institute of Standards and Technology to convene a consortium on such environmental impacts, and to require the Director to develop a voluntary reporting system for the reporting of the environmental impacts of artificial intelligence, and for other purposes.

IN THE SENATE OF THE UNITED STATES

FEBRUARY 1, 2024

Mr. MARKEY (for himself, Mr. HEINRICH, Mr. WYDEN, Mr. WELCH, Mr. PADILLA, and Mr. BOOKER) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

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A BILL

To require the Administrator of the Environmental Protection Agency to carry out a study on the environmental impacts of artificial intelligence, to require the Director of the National Institute of Standards and Technology to convene a consortium on such environmental impacts, and to require the Director to develop a voluntary reporting system for the reporting of the environmental impacts of artificial intelligence, and for other purposes.

1   *Be it enacted by the Senate and House of Representa-*

2 *tives of the United States of America in Congress assembled,*

SECTION 1. SHORT TITLE.

This Act may be cited as the "Artificial Intelligence Environmental Impacts Act of 2024".

SEC. 2. FINDINGS.

Congress finds the following:

(1) Multiple estimates indicate that the amount of computational power being used for artificial intelligence applications has increased rapidly over the last decade. A 2022 estimate suggested that the number of computational operations being used to create each of the largest artificial intelligence models is currently doubling every 10 months.

(2) Accelerating use of artificial intelligence has the potential to greatly increase energy consumption due to the power utilization of computer hardware required for training and operating artificial intelligence models, despite ongoing efficiency gains in both artificial intelligence models and hardware.

(3) Rapid growth in data center infrastructure, including cooling systems and backup power equipment, supporting artificial intelligence and other computing-intensive technologies contributes to pollution, water consumption, and land-use changes.

(4) Resource and energy-intensive manufacturing processes are required for the hardware that runs artificial intelligence and other computing-in-

1 tensive technologies, leading to significant environ-
2 mental impacts.

3 (5) Yearly increases in electronic waste (known
4 as "e-waste") pose increasing environmental and
5 health risks, and will likely be exacerbated by out-
6 dated and discarded hardware used for artificial in-
7 telligence and other computing-intensive tech-
8 nologies.

9 (6) Many applications of artificial intelligence
10 can have direct and indirect positive environmental
11 impacts. Positive environmental impacts may include
12 optimizing systems for energy efficiency, developing
13 renewable energy, advancing planetary systems re-
14 search, enabling discovery of new materials, and
15 automatically monitoring environmental changes.
16 However, artificial intelligence applications may also
17 have direct and indirect negative environmental im-
18 pacts, including rebound effects, behavioral impacts,
19 and accelerating high-pollution activities.

20 (7) Estimates of the current and future envi-
21 ronmental impacts of artificial intelligence are cur-
22 rently uncertain.

23 (8) Negative environmental effects may have a
24 disparate impact across different regions and com-
25 munities.

1   (9) Various options exist to reduce the negative

2 environmental impacts of artificial intelligence, in-

3 cluding using more efficient models, hardware, and

4 data centers, using renewable energy, and examining

5 the impacts of artificial intelligence applications.

6   (10) Promoting transparency and environ-

7 mental protection measures may help mitigate nega-

8 tive environmental impacts of the rapid growth in

9 artificial intelligence use, while promoting artificial

10 intelligence uses with net positive environmental im-

11 pacts.

12 **SEC. 3. DEFINITIONS.**

13   In this Act:

14   (1) ARTIFICIAL INTELLIGENCE.—The term "ar-

15 tificial intelligence" has the meaning given such

16 term in section 5002 of the National Artificial Intel-

17 ligence Initiative Act of 2020 (15 U.S.C. 9401).

18   (2) ARTIFICIAL INTELLIGENCE MODEL.—The

19 term "artificial intelligence model" means a compo-

20 nent of an information system that implements arti-

21 ficial intelligence technology and uses computational,

22 statistical, or machine-learning techniques to

23 produce outputs from a given set of inputs.

24   (3) ARTIFICIAL INTELLIGENCE SYSTEM.—The

25 term "artificial intelligence system" means any data

1 system, software, hardware, application, tool, or util-

2 ity that operates in whole or in part using artificial

3 intelligence.

4 (4) VOLUNTARY REPORTING ENTITY.—The

5 term "voluntary reporting entity" means any com-

6 pany, organization, or other entity that—

7 (A) develops or operates an artificial intel-

8 ligence system; and

9 (B) chooses to participate in the reporting

10 system developed under section 6.

SEC. 4. STUDY ON ENVIRONMENTAL IMPACTS OF ARTIFI-

CIAL INTELLIGENCE.

13 (a) IN GENERAL.—Not later than 2 years after the

14 date of enactment of this Act, the Administrator of the

15 Environmental Protection Agency, in collaboration with

16 the Secretary of Energy, the Director of the National In-

17 stitute of Standards and Technology, and the Director of

18 the Office of Science and Technology Policy, shall carry

19 out, and submit to Congress and make publicly available

20 a report describing the results of, a comprehensive study

21 on the environmental impacts of artificial intelligence.

22 (b) REQUIREMENTS.—The study required under sub-

23 section (a) shall include an examination of—

24 (1) the energy consumption and pollution asso-

25 ciated with the full lifecycle of artificial intelligence

1 models, including the design, development, deploy-

2 ment, and use of those artificial intelligence models;

3 (2) the energy consumption and pollution asso-

4 ciated with the full lifecycle of artificial intelligence

5 hardware, including the extraction of raw materials,

6 manufacturing, and electronic waste associated with

7 that hardware;

8 (3) the energy and water consumption for the

9 cooling of the data centers used in the design, devel-

10 opment, deployment, and use of artificial intelligence

11 models;

12 (4) how choices made during the design, devel-

13 opment, deployment, and use of artificial intelligence

14 models, including the efficiency of the artificial intel-

15 ligence models used, the location, power source, and

16 design of data centers used, and the type of hard-

17 ware used, impact the resulting environmental im-

18 pacts;

19 (5) potential environmental impacts that could

20 be acute at local scales, which may include added

21 power loads that create grid stress, water with-

22 drawals that create water stress, or local noise im-

23 pacts;

24 (6) the positive environmental impacts associ-

25 ated with applications of artificial intelligence, which

1   may include optimizing systems for energy effi-

2   ciency, developing renewable energy, advancing plan-

3   etary systems research, enabling discovery of new

4   materials, and automatically monitoring environ-

5   mental changes;

6   (7) the negative environmental impacts associ-

7   ated with applications of artificial intelligence, which

8   may include rebound effects, behavioral impacts, and

9   accelerating high-pollution activities;

10   (8) disparate impacts in the negative environ-

11   mental impacts of artificial intelligence;

12   (9) other environmental impacts, as determined

13   by the Administrator of the Environmental Protec-

14   tion Agency; and

15   (10) the results of the updated data center

16   study carried out under section 453(e)(2) of the En-

17   ergy Independence and Security Act of 2007 (42

18   U.S.C. 17112(e)(2)).

19   (c) PUBLIC COMMENT REQUIRED.—In conducting

20 the study required under subsection (a), the Administrator

21 of the Environmental Protection Agency shall solicit and

22 consider public comments.

SEC. 5. ARTIFICIAL INTELLIGENCE ENVIRONMENTAL IM-PACTS CONSORTIUM.

(a) IN GENERAL.—The Director of the National Institute of Standards and Technology shall, in consultation with the Administrator of the Environmental Protection Agency, the Secretary of Energy, and such others as the Director considers appropriate, convene a consortium of stakeholders, including members from academia, civil society, and industry, to identify the future measurements, methodologies, standards, and other appropriate needs, in order to measure and report the full range of environmental impacts of artificial intelligence.

(b) LOCATION.—The Director may determine the location of the consortium within the National Institute of Standards and Technology.

(c) GOALS.—The goals of the consortium shall include the following:

(1) Facilitating consistent, comparable reporting on the environmental impacts of the full lifecycle of artificial intelligence models, systems, and hardware.

(2) According to technical feasibility, the development or cataloging of open source software and hardware tools and other resources designed to facilitate the measurement of environmental impacts

1 of artificial intelligence models, systems, and hard-

2 ware.

3   (3) Providing recommendations on how to miti-

4 gate the negative, and promote the positive, environ-

5 mental impacts of artificial intelligence.

SEC. 6. REPORTING SYSTEM FOR VOLUNTARY REPORTING

OF ENVIRONMENTAL IMPACTS OF ARTIFI-

CIAL INTELLIGENCE.

9   (a) VOLUNTARY REPORTING SYSTEM.—The Director

10 of the National Institute of Standards and Technology

11 shall, in consultation with the Administrator of the Envi-

12 ronmental Protection Agency, the Secretary of Energy,

13 the consortium convened under section 5, and such others

14 as the Director considers appropriate, develop a system

15 for voluntary reporting by voluntary reporting entities of

16 the full range of environmental impacts of artificial intel-

17 ligence.

18   (b) GUIDELINES.—

19   (1) IN GENERAL.—The Director shall develop

20   guidelines for voluntary reporting entities on how to

21   participate in the voluntary reporting system devel-

22   oped under subsection (a). Such guidelines may in-

23   clude guidelines on how to calculate and report en-

24   ergy consumption, water consumption, pollution, and

25   electronic-waste associated with the full lifecycle of

1 artificial intelligence models and hardware, as well

2 as other positive and negative impacts of artificial

3 intelligence use, as determined by the Director.

4 (2) PUBLIC COMMENTS.—Before finalizing the

5 guidelines under paragraph (1), the Director shall

6 solicit comments from the public on a draft version

7 of the guidelines.

8 (c) AVAILABILITY.—The Director shall, to the max-

9 imum extent practicable and with consideration to privi-

10 leged business information, make submissions to the vol-

11 untary reporting system under subsection (a) available on

12 a public website.

SEC. 7. REPORT TO CONGRESS.

14 Not later than 4 years after the date of the enact-

15 ment of this Act, the Administrator of the Environmental

16 Protection Agency, the Secretary of Energy, and the Di-

17 rector of the National Institute of Standards and Tech-

18 nology shall jointly submit to Congress a report detailing

19 the following:

20 (1) The main findings of the consortium con-

21 vened under section 5.

22 (2) A description of the reporting system cre-

23 ated under section 6.

24 (3) Recommendations for legislative or adminis-

25 trative action to mitigate the negative and promote

1   the positive environmental impacts of artificial intel-

2   ligence.

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