

Calendar No. 102

112TH CONGRESS
1ST SESSION

S. 1343

[Report No. 112-35]

To provide for the conduct of an analysis of the impact of energy development and production on the water resources of the United States, and for other purposes.

IN THE SENATE OF THE UNITED STATES

JULY 11, 2011

Mr. BINGAMAN, from the Committee on Energy and Natural Resources, reported the following original bill; which was read twice and placed on the calendar

A BILL

To provide for the conduct of an analysis of the impact of energy development and production on the water resources of the United States, 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,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Energy and Water In-
5 tegration Act of 2011”.

1 **SEC. 2. DEFINITION OF SECRETARY.**

2 In this Act, the term “Secretary” means the Sec-
3 retary of Energy.

4 **SEC. 3. ENERGY WATER NEXUS STUDY.**

5 (a) IN GENERAL.—Not later than 90 days after the
6 date of enactment of this Act, the Secretary, in consulta-
7 tion with the Secretary of the Interior and the Adminis-
8 trator of the Environmental Protection Agency, shall enter
9 into an arrangement with the National Academy of
10 Sciences under which the Academy shall conduct an in-
11 depth analysis of the impact of energy development and
12 production on the water resources of the United States.

13 (b) SCOPE OF STUDY.—

14 (1) IN GENERAL.—The study described in sub-
15 section (a) shall be comprised of each assessment de-
16 scribed in paragraphs (2) through (4).

17 (2) TRANSPORTATION SECTOR ASSESSMENT.—

18 (A) IN GENERAL.—The study shall include
19 a lifecycle assessment of the quantity of water
20 withdrawn and consumed in the production of
21 transportation fuels, or electricity used as a fuel
22 source, to evaluate the ratio that—

23 (i) the quantity of water withdrawn
24 and consumed in the production of trans-
25 portation fuels (measured in gallons), or

1 electricity (measured in kilowatt-hours);
2 bears to

3 (ii) the total distance (measured in
4 miles) that may be traveled as a result of
5 the consumption of transportation fuels, or
6 electricity.

7 (B) SCOPE OF ASSESSMENT.—

8 (i) IN GENERAL.—The assessment
9 shall include, as applicable—

10 (I) the exploration for, and ex-
11 traction or growing of, energy feed-
12 stock;

13 (II) the processing of energy
14 feedstock into transportation fuel;

15 (III) the generation, transpor-
16 tation, and storage of electricity for
17 transportation; and

18 (IV) the conduct of an analysis of
19 the efficiency with which the transpor-
20 tation fuel is consumed.

21 (ii) FUELS.—The assessment shall
22 contain an analysis of transportation fuel
23 sources, including—

- 1 (I) domestically produced crude
2 oil (including products derived from
3 domestically produced crude oil);
- 4 (II) imported crude oil (including
5 products derived from imported crude
6 oil);
- 7 (III) domestically produced nat-
8 ural gas (including liquid fuels derived
9 from natural gas);
- 10 (IV) imported natural gas (in-
11 cluding liquid fuels derived from nat-
12 ural gas);
- 13 (V) oil shale;
- 14 (VI) tar sands;
- 15 (VII) domestically produced corn-
16 based ethanol;
- 17 (VIII) imported corn-based eth-
18 anol;
- 19 (IX) advanced biofuels (including
20 cellulosic- and algae-based biofuels);
- 21 (X) coal to liquids (including
22 aviation fuel, diesel, and gasoline
23 products);
- 24 (XI) electricity consumed in—

- 1 (aa) fully electric drive vehi-
2 cles;
3 (bb) plug-in hybrid vehicles;
4 and
5 (cc) hydrogen; and
6 (XII) any reasonably foreseeable
7 combination of any transportation fuel
8 source described in subclauses (I)
9 through (XI).

10 (3) ELECTRICITY SECTOR ASSESSMENT.—

11 (A) IN GENERAL.—The study shall include
12 a lifecycle assessment of the quantity of water
13 withdrawn and consumed in the production of
14 electricity to evaluate the ratio that—

15 (i) the quantity of water used and
16 consumed in the production of electricity
17 (measured in gallons); bears to

18 (ii) the quantity of electricity that is
19 produced (measured in kilowatt-hours).

20 (B) SCOPE OF ASSESSMENT.—The assess-
21 ment shall include, as applicable—

22 (i) the exploration for, or extraction
23 or growing of, energy feedstock;

24 (ii) the processing of energy feedstock
25 for electricity production; and

1 (iii) the production of electricity.

2 (C) GENERATION TYPES.—The assessment
3 shall contain an evaluation and analysis of elec-
4 tricity generation facilities that are constructed
5 in accordance with different plant designs (in-
6 cluding different cooling technologies such as
7 water, air, and hybrid systems, and technologies
8 designed to minimize carbon dioxide releases)
9 based on the fuel used by the facility, includ-
10 ing—

- 11 (i) coal;
- 12 (ii) natural gas;
- 13 (iii) oil;
- 14 (iv) nuclear energy;
- 15 (v) solar energy;
- 16 (vi) wind energy;
- 17 (vii) geothermal energy;
- 18 (viii) biomass;
- 19 (ix) the beneficial use of waste heat;
- 20 and
- 21 (x) any reasonably foreseeable com-
22 bination of any fuel described in clauses (i)
23 through (ix).

24 (4) ASSESSMENT OF ADDITIONAL IMPACTS.—In
25 addition to the impacts associated with the direct

1 use and consumption of water resources in the
2 transportation and electricity sectors described in
3 paragraphs (2) and (3), the study shall contain an
4 identification and analysis of any unique water im-
5 pact associated with a specific fuel source, including
6 an impact resulting from—

7 (A) any extraction or mining practice;

8 (B) the transportation of feedstocks from
9 the point of extraction to the point of proc-
10 essing;

11 (C) the transportation of fuel and power
12 from the point of processing to the point of con-
13 sumption; and

14 (D) the location of a specific fuel source
15 from specific geographical regions, including
16 coastal regions.

17 (c) REPORT TO SECRETARY.—Not later than 18
18 months after the date of enactment of this Act, the Na-
19 tional Academy of Sciences shall submit to the Secretary
20 a report that contains a summary of the results of the
21 study conducted under this section.

22 (d) AVAILABILITY OF RESULTS OF STUDY.—On the
23 date on which the National Academy of Sciences completes
24 the study under this section, the National Academy of

1 Sciences shall make available to the public the results of
2 the study.

3 **SEC. 4. POWER PLANT WATER AND ENERGY EFFICIENCY.**

4 (a) IN GENERAL.—To protect water supplies and
5 promote the efficient use of water in the electricity produc-
6 tion sector, the Secretary, in consultation with the Sec-
7 retary of the Interior and the Administrator of the Envi-
8 ronmental Protection Agency, shall conduct a study to
9 identify alternative technologies and related strategies to
10 optimize water and energy efficiency in the production of
11 electricity by each type of generation.

12 (b) GENERATION TYPES.—The study shall include an
13 evaluation of different types of generation facilities, in-
14 cluding—

15 (1) coal facilities, under which the evaluation
16 shall account for—

17 (A) different types of coal and associated
18 generating technologies; and

19 (B) the use of technologies designed to
20 minimize and sequester carbon dioxide releases;

21 (2) oil and natural gas facilities, under which
22 the evaluation shall account for the use of tech-
23 nologies designed to minimize and sequester carbon
24 dioxide releases;

1 (3) hydropower, including turbine upgrades, in-
2 cremental hydropower, in-stream hydropower, and
3 pump-storage projects;

4 (4) thermal solar facilities; and

5 (5) nuclear facilities.

6 (c) REPORT TO CONGRESS.—Not later than 18
7 months after the date of enactment of this Act, the Sec-
8 retary shall submit to the appropriate committees of Con-
9 gress a report that contains a description of the results
10 of the study conducted under this section (including an
11 assessment of any region-specific factor, such as water
12 availability and energy reliability, that should be consid-
13 ered in evaluating the results).

14 **SEC. 5. RECLAMATION WATER CONSERVATION AND EN-**
15 **ERGY SAVINGS STUDY.**

16 (a) DEFINITIONS.—In this section:

17 (1) RECLAMATION PROJECT.—The term “Rec-
18 lamation project” means a project authorized by the
19 Federal Government and carried out by the Bureau
20 of Reclamation.

21 (2) SECRETARY.—The term “Secretary” means
22 the Secretary of the Interior, acting through the
23 Commissioner of Reclamation.

24 (b) STUDY.—

1 (1) IN GENERAL.—In accordance with para-
2 graph (2), to promote the efficient use of energy in
3 water distribution systems, the Secretary shall con-
4 duct a study to evaluate the quantities of energy
5 used in water storage and delivery operations in
6 Reclamation projects.

7 (2) ELEMENTS.—In conducting the study, the
8 Secretary shall—

9 (A) assess and estimate the annual energy
10 consumption associated with the Reclamation
11 projects; and

12 (B) identify—

13 (i) the Reclamation projects that con-
14 sume the greatest quantity of energy; and

15 (ii) the aspect of the operation of each
16 Reclamation project described in clause (i)
17 that is the most energy intensive (including
18 water storage and releases, water delivery,
19 and administrative operations); and

20 (C) identify opportunities to significantly
21 reduce current energy consumption and costs
22 with respect to each Reclamation project de-
23 scribed in subparagraph (B), including, as ap-
24 plicable, through—

25 (i) reduced groundwater pumping;

- 1 (ii) improved reservoir operations;
- 2 (iii) infrastructure rehabilitation;
- 3 (iv) water reuse; and
- 4 (v) the integration of renewable en-
- 5 ergy generation with project operations.

6 (c) REPORT TO CONGRESS.—Not later than 18
7 months after the date of enactment of this Act, the Sec-
8 retary shall submit to the appropriate committees of Con-
9 gress a report that contains a description of the results
10 of the study conducted under this section, including an
11 estimate of the quantity of renewable energy potentially
12 available for generation from reclamation projects.

13 **SEC. 6. DESALINATION RESEARCH.**

14 (a) IN GENERAL.—The Secretary of the Interior (re-
15 ferred to in this section as the “Secretary”) shall operate,
16 manage and maintain facilities to carry out research, de-
17 velopment, and demonstration activities to develop tech-
18 nologies and methods that promote brackish groundwater
19 desalination as a viable method to increase water supply
20 in a cost-effective manner.

21 (b) OBJECTIVES; ACTIVITIES.—

22 (1) OBJECTIVES.—The Secretary shall conduct
23 demonstration projects—

24 (A) to develop new water and energy tech-
25 nologies with widespread applicability; and

1 (B) to create new supplies of usable water
2 for municipal, agricultural, industrial, or envi-
3 ronmental purposes.

4 (2) ACTIVITIES.—In operating, managing, and
5 maintaining the facilities under subsection (a), the
6 Secretary shall carry out—

7 (A) as a priority, the development of re-
8 newable energy technologies for integration with
9 desalination technologies—

10 (i) to reduce the capital and oper-
11 ational costs of desalination;

12 (ii) to minimize the environmental im-
13 pacts of desalination; and

14 (iii) to increase public acceptance of
15 desalination as a viable water supply proc-
16 ess;

17 (B) research regarding various desalination
18 processes, including improvements in reverse
19 and forward osmosis technologies;

20 (C) the development of innovative methods
21 and technologies to reduce the volume and cost
22 of desalination concentrated wastes (including
23 the disposal of desalination concentrated
24 wastes) in an environmentally sound manner;

1 (D) an outreach program to create part-
2 nerships with States, academic institutions, pri-
3 vate entities, local public agencies, and other
4 appropriate organizations to conduct research,
5 development, and demonstration activities, in-
6 cluding the establishment of rental and other
7 charges to provide revenue to help offset the
8 costs of operating and maintaining the facility;
9 and

10 (E) an outreach program to educate the
11 public on—

12 (i) desalination and renewable energy
13 technologies; and

14 (ii) the benefits of using water in an
15 efficient manner.

16 (c) AUTHORITY OF SECRETARY.—The Secretary may
17 enter into contracts or other agreements with, or make
18 grants to, appropriate entities to manage, operate, or oth-
19 erwise carry out this section, including an agreement with
20 a local or regional academic institution or a consortium
21 of institutions to manage research activities.

22 (d) REAUTHORIZATION.—Section 8 of the Water De-
23 salination Act of 1996 (42 U.S.C. 10301 note; Public Law
24 104–298) is amended—

1 (1) in subsection (a), in the first sentence, by
2 striking “2011” and inserting “2016”; and

3 (2) in subsection (b), by striking “\$25,000,000
4 for fiscal years 1997 through 2011” and inserting
5 “\$2,000,000 for each of fiscal years 2012 through
6 2016”.

7 **SEC. 7. ENHANCED INFORMATION ON WATER-RELATED EN-**
8 **ERGY CONSUMPTION.**

9 Section 205 of the Department of Energy Organiza-
10 tion Act (42 U.S.C. 7135) is amended by adding at the
11 end the following:

12 “(n) WATER-RELATED ENERGY CONSUMPTION.—

13 “(1) IN GENERAL.—Not less than once during
14 each 3-year period, to aid in the understanding and
15 reduction of the quantity of energy used in associa-
16 tion with the use of water, the Administrator shall
17 conduct an assessment under which the Adminis-
18 trator shall collect information on energy use in var-
19 ious sectors of the economy that are associated with
20 the procurement, treatment, or delivery of water.

21 “(2) REQUIRED SECTORS.—An assessment de-
22 scribed in paragraph (1) shall contain an analysis of
23 water-related energy use for all relevant sectors of
24 the economy, including water used for—

25 “(A) agricultural purposes;

1 “(B) municipal purposes;

2 “(C) industrial purposes; and

3 “(D) domestic purposes.

4 “(3) EFFECT.—Nothing in this subsection af-
5 fects the authority of the Administrator to collect
6 data under section 52 of the Federal Energy Admin-
7 istration Act of 1974 (15 U.S.C. 790a).”.

8 **SEC. 8. ENERGY-WATER RESEARCH AND DEVELOPMENT**
9 **ROADMAP.**

10 (a) IN GENERAL.—Not later than 90 days after the
11 date of enactment of this Act, the Secretary shall develop
12 a document to be known as the “Energy-Water Research
13 and Development Roadmap” to define the future research,
14 development, demonstration, and commercialization ef-
15 forts that are required to address emerging water-related
16 challenges to future, cost-effective, reliable, and sustain-
17 able energy generation and production.

18 (b) REPORT.—

19 (1) IN GENERAL.—Not later than 120 days
20 after the date of enactment of this Act, the Sec-
21 retary shall submit to the appropriate committees of
22 Congress a report describing the document described
23 in subsection (a), including recommendations for any
24 future action with respect to the document.

1 (2) INCLUSIONS.—The report described in
2 paragraph (1) shall include a review of existing re-
3 search, development, and demonstration programs
4 within the Department of Energy to determine
5 which programs should include water use consider-
6 ations.

7 **SEC. 9. ENERGY-WATER CLEAN TECHNOLOGY GRANT PRO-**
8 **GRAM.**

9 (a) DEFINITIONS.—In this section:

10 (1) ELIGIBLE ENTITY.—The term “eligible enti-
11 ty” means—

12 (A) an eligible unit of local government;

13 (B) an Indian tribe; and

14 (C) a water or wastewater agency of a
15 State or local government or other public agen-
16 cy.

17 (2) ELIGIBLE UNIT OF LOCAL GOVERNMENT.—

18 The term “eligible unit of local government” has the
19 meaning given the term in section 541 of the Energy
20 Independence and Security Act of 2007 (42 U.S.C.
21 17151).

22 (3) INDIAN TRIBE.—The term “Indian tribe”
23 has the meaning given the term in section 4 of the
24 Indian Self-Determination and Education Assistance
25 Act (25 U.S.C. 450b).

1 (b) GRANT PROGRAM.—In accordance with sub-
2 section (c), the Secretary may carry out a competitive
3 grant program under which the Secretary may provide
4 grants to eligible entities to demonstrate the deployment
5 of technologies that reduce the consumption of, or con-
6 serve, energy supplies through energy savings and water
7 conservation activities in commercial, residential, and
8 mixed-use development projects.

9 (c) REQUIREMENTS.—

10 (1) PROVISION OF ASSISTANCE.—In carrying
11 out the program under subsection (b), the Secretary
12 shall provide assistance to eligible entities that carry
13 out projects that—

14 (A) have the potential to be replicated in
15 other locations;

16 (B) are of sufficient size to demonstrate
17 deployment of the project at scale; and

18 (C) are likely to accelerate and expand in-
19 vestment in cost-effective technologies that
20 demonstrate sustained reductions in energy con-
21 sumption or conservation of energy supplies, in-
22 cluding the deployment of renewable energy and
23 water reuse technologies.

24 (2) PRIORITIZATION.—In selecting eligible enti-
25 ties under paragraph (1), the Secretary shall give

1 priority to each eligible entity that carries out a
2 project that has the potential to create sustained en-
3 ergy reductions that are greater than 50 percent for
4 the project development, as compared to similar
5 project developments that do not include the tech-
6 nology used by the project that is the subject of the
7 demonstration.

8 (3) COST-SHARING.—Each demonstration activ-
9 ity carried out under a project under this program
10 shall be subject to each cost-sharing requirement de-
11 scribed in section 988 of the Energy Policy Act of
12 2005 (42 U.S.C. 16352).

13 (4) PUBLIC-PRIVATE PARTNERSHIPS.—The Sec-
14 retary shall provide a grant under this section only
15 to an eligible entity that uses a public-private part-
16 nership to design and carry-out the project of the el-
17 igible entity.

18 (5) LIMITATION ON FUNDS.—Funds provided
19 through a grant made by the Secretary under this
20 section shall not be used by the recipient eligible en-
21 tity for any operation or maintenance cost of the eli-
22 gible entity.

23 (6) REPORT.—The Secretary shall require each
24 eligible entity that receives a grant from the Sec-
25 retary under this section to submit to the Secretary

1 on a date not later than 1 year after the date on
2 which the eligible entity completes the project of the
3 eligible entity a report that contains a description
4 of—

5 (A) the estimated reductions in water use
6 achieved by the project of the entity;

7 (B) the reductions in energy consumption
8 achieved by the project of the entity;

9 (C) the comprehensive environmental bene-
10 fits achieved by the project of the entity; and

11 (D) the manner by which each reduction or
12 benefit described in subparagraphs (A) through
13 (C) compare to the original estimates of the eli-
14 gible entity.

15 **SEC. 10. RURAL WATER UTILITIES ENERGY AND WATER EF-**
16 **FICIENCY PROGRAM.**

17 As soon as practicable after the date of enactment
18 of this Act, the Secretary shall establish and carry out
19 a program similar to, and consistent with, the national
20 rural water and wastewater circuit rider program estab-
21 lished under section 306(a)(22) of the Consolidated Farm
22 and Rural Development Act (7 U.S.C. 1926(a)(22)) (in-
23 cluding the authority to make grants)—

24 (1) to provide on-site technical assistance to
25 rural drinking water and wastewater utilities (in-

1 including utilities serving an Indian tribe (as defined
2 in section 4 of the Indian Self-Determination and
3 Education Assistance Act (25 U.S.C. 450b)); and

4 (2) to improve energy efficiency, identify and
5 develop alternative and renewable energy supplies,
6 and conserve water in the operation of rural drink-
7 ing water and wastewater utilities.

8 **SEC. 11. COMPREHENSIVE WATER USE AND ENERGY SAV-**
9 **INGS STUDY.**

10 (a) IN GENERAL.—As soon as practicable after the
11 date of enactment of this Act, in consultation with other
12 Federal agencies and appropriate entities, and incor-
13 porating available governmental and nongovernmental
14 data as appropriate, the Secretary shall conduct a com-
15 prehensive study to determine the interrelated nature of
16 water and energy use (including energy consumption in
17 water-related processes and the manner by which to re-
18 duce water-related energy consumption) to promote the ef-
19 ficient use of water and energy.

20 (b) REQUIRED COMPONENTS.—

21 (1) IN GENERAL.—In conducting the study
22 under subsection (a), the Secretary shall include
23 each component described in paragraphs (2) through
24 (5).

1 (2) INDUSTRIAL WATER.—In accordance with
2 paragraph (1), the Secretary shall—

3 (A) assess the annual industrial water use
4 of the United States through a comparison, as
5 the Secretary determines to be appropriate, of
6 the differences in usage among—

7 (i) various regions of the United
8 States;

9 (ii) industry types and processes; and

10 (iii) the use of in-plant waste treat-
11 ment facilities; and

12 (B) identify opportunities to reduce signifi-
13 cantly industrial energy consumption and asso-
14 ciated costs through the use of—

15 (i) water management strategies;

16 (ii) water conservation using tech-
17 nologies in existence as of the date of en-
18 actment of this Act; and

19 (iii) reused water, particularly with re-
20 spect to industrial energy applications.

21 (3) PEAK DEMAND.—In accordance with para-
22 graph (1), the Secretary shall identify options to re-
23 duce energy use by water treatment and delivery
24 systems during peak electric demand periods, includ-
25 ing through—

1 (A) the use of increased water storage fa-
2 cilities;

3 (B) the aggregation of water system utility
4 accounts;

5 (C) the installation of supervisory control
6 and data acquisition systems; and

7 (D) improvements made to primary and
8 secondary water and wastewater treatment.

9 (4) NONPOTABLE WATER SOURCES.—In accord-
10 ance with paragraph (1), the Secretary shall identify
11 and assess—

12 (A) the applications and uses for nonfresh-
13 water sources of water supply in industrial,
14 commercial, and residential applications; and

15 (B) the potential energy conservation that
16 may result from the use of nonfreshwater sup-
17 plies, including—

18 (i) recycled and reclaimed water;

19 (ii) produced water; and

20 (iii) other nontraditional water
21 sources.

22 (5) EMBEDDED ENERGY.—In accordance with
23 paragraph (1), to facilitate an understanding of the
24 potential energy savings associated with water con-
25 servation and efficiency, the Secretary shall assess

1 and estimate the quantity and type of energy con-
2 sumed in the procurement, transport, and treatment
3 of water supplies and wastewater that serve indus-
4 trial, commercial, and residential uses, including
5 variations relating to differences in geography and
6 types of supply and wastewater processes.

7 (c) REPORT.—Not later than 18 months after the
8 date of enactment of this Act, the Secretary shall submit
9 to the appropriate committees of Congress a report that
10 contains a description of—

11 (1) the results of the study conducted by the
12 Secretary under this section; and

13 (2) the means by which to incorporate, and the
14 benefits of incorporating, the results of the study
15 into related reports prepared by the Secretary.

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