

111TH CONGRESS  
1ST SESSION

# S. 531

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

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## IN THE SENATE OF THE UNITED STATES

MARCH 5, 2009

Mr. BINGAMAN (for himself and Ms. MURKOWSKI) introduced the following bill; which was read twice and referred to the Committee on Energy and Natural Resources

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## A BILL

To provide for the conduct of an in-depth 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 2009”.

6       **SEC. 2. ENERGY WATER NEXUS STUDY.**

7       (a) IN GENERAL.—Not later than 90 days after the  
8       date of enactment of this Act, the Secretary of Energy

1 (referred to in this Act as the “Secretary”), in consulta-  
2 tion with the Secretary of the Interior and the Adminis-  
3 trator of the Environmental Protection Agency, shall enter  
4 into an arrangement with the National Academy of  
5 Sciences under which the Academy shall conduct an in-  
6 depth analysis of the impact of energy development and  
7 production on the water resources of the United States.

8 (b) SCOPE OF STUDY.—

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

12 (2) TRANSPORTATION SECTOR ASSESSMENT.—

13 (A) IN GENERAL.—The study shall include  
14 a lifecycle assessment of the quantity of water  
15 withdrawn and consumed in the production of  
16 transportation fuels, or electricity, to evaluate  
17 the ratio that—

18 (i) the quantity of water withdrawn  
19 and consumed in the production of trans-  
20 portation fuels (measured in gallons), or  
21 electricity (measured in kilowatts); bears to

22 (ii) the total distance (measured in  
23 miles) that may be traveled as a result of  
24 the consumption of transportation fuels, or  
25 electricity.

1 (B) SCOPE OF ASSESSMENT.—

2 (i) IN GENERAL.—The assessment  
3 shall include, as applicable—

4 (I) the exploration for, and ex-  
5 traction or growing of, energy feed-  
6 stock;

7 (II) the processing of energy  
8 feedstock into transportation fuel;

9 (III) the generation, transpor-  
10 tation, and storage of electricity for  
11 transportation; and

12 (IV) the conduct of an analysis of  
13 the efficiency with which the transpor-  
14 tation fuel is consumed.

15 (ii) FUELS.—The assessment shall  
16 contain an analysis of transportation fuel  
17 sources, including—

18 (I) domestically produced crude  
19 oil (including products derived from  
20 domestically produced crude oil);

21 (II) imported crude oil (including  
22 products derived from imported crude  
23 oil);

- 1 (III) domestically produced nat-  
2 ural gas (including liquid fuels derived  
3 from natural gas);
- 4 (IV) imported natural gas (in-  
5 cluding liquid fuels derived from nat-  
6 ural gas);
- 7 (V) oil shale;
- 8 (VI) tar sands;
- 9 (VII) domestically produced corn-  
10 based ethanol;
- 11 (VIII) imported corn-based eth-  
12 anol;
- 13 (IX) advanced biofuels (including  
14 cellulosic- and algae-based biofuels);
- 15 (X) coal to liquids (including  
16 aviation fuel, diesel, and gasoline  
17 products);
- 18 (XI) electricity consumed in—  
19 (aa) fully electric drive vehi-  
20 cles; and  
21 (bb) plug-in hybrid vehicles;
- 22 (XII) hydrogen; and
- 23 (XIII) any reasonably foreseeable  
24 combination of any transportation fuel

1 source described in subclauses (I)  
2 through (XII).

3 (3) ELECTRICITY SECTOR ASSESSMENT.—

4 (A) IN GENERAL.—The study shall include  
5 a lifecycle assessment of the quantity of water  
6 withdrawn and consumed in the production of  
7 electricity to evaluate the ratio that—

8 (i) the quantity of water used and  
9 consumed in the production of electricity  
10 (measured in gallons); bears to

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

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

15 (i) the exploration for, or extraction  
16 or growing of, energy feedstock;

17 (ii) the processing of energy feedstock  
18 for electricity production; and

19 (iii) the production of electricity.

20 (C) GENERATION TYPES.—The assessment  
21 shall contain an evaluation and analysis of elec-  
22 tricity generation facilities that are constructed  
23 in accordance with different plant designs (in-  
24 cluding different cooling technologies such as  
25 water, air, and hybrid systems, and technologies

1 designed to minimize carbon dioxide releases)  
2 based on the fuel used by the facility, includ-  
3 ing—

- 4 (i) coal;
- 5 (ii) natural gas;
- 6 (iii) oil;
- 7 (iv) nuclear energy;
- 8 (v) solar energy;
- 9 (vi) wind energy;
- 10 (vii) geothermal energy;
- 11 (viii) biomass;
- 12 (ix) the beneficial use of waste heat;
- 13 and
- 14 (x) any reasonably foreseeable com-  
15 bination of any fuel described in clauses (i)  
16 through (ix).

17 (4) ASSESSMENT OF ADDITIONAL IMPACTS.—In  
18 addition to the impacts associated with the direct  
19 use and consumption of water resources in the  
20 transportation and electricity sectors described in  
21 paragraphs (2) and (3), the study shall contain an  
22 identification and analysis of any unique water im-  
23 pact associated with a specific fuel source, including  
24 an impact resulting from—

- 25 (A) any extraction or mining practice;

1           (B) the transportation of feedstocks from  
2           the point of extraction to the point of pro-  
3           cessing;

4           (C) the transportation of fuel and power  
5           from the point of processing to the point of con-  
6           sumption; and

7           (D) the location of a specific fuel source  
8           that is limited to 1 or more specific geo-  
9           graphical regions.

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

15       (d) AVAILABILITY OF RESULTS OF STUDY.—On the  
16 date on which the National Academy of Sciences completes  
17 the study under this section, the National Academy of  
18 Sciences shall make available to the public the results of  
19 the study.

20       (e) AUTHORIZATION OF APPROPRIATIONS.—There  
21 are authorized to be appropriated to the Secretary such  
22 sums as are necessary to carry out this section.

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

24       (a) IN GENERAL.—To protect water supplies and  
25 promote the efficient use of water in the electricity produc-

1 tion sector, the Secretary, in consultation with the Sec-  
2 retary of the Interior and the Administrator of the Envi-  
3 ronmental Protection Agency, shall conduct a study to  
4 identify the best available technologies and related strate-  
5 gies to maximize water and energy efficiency in the pro-  
6 duction of electricity by each type of generation.

7 (b) GENERATION TYPES.—The study shall include an  
8 evaluation of different types of generation facilities, in-  
9 cluding—

10 (1) coal facilities, under which the evaluation  
11 shall account for—

12 (A) different types of coal and associated  
13 generating technologies; and

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

16 (2) oil and natural gas facilities, under which  
17 the evaluation shall account for the use of tech-  
18 nologies designed to minimize and sequester carbon  
19 dioxide releases;

20 (3) hydropower, including turbine upgrades, in-  
21 cremental hydropower, in-stream hydropower, and  
22 pump-storage projects;

23 (4) thermal solar facilities; and

24 (5) nuclear facilities.



1 (c) REPORT TO CONGRESS.—Not later than 18  
2 months after the date of enactment of this Act, the Sec-  
3 retary shall submit to the appropriate committees of Con-  
4 gress a report that contains a description of the results  
5 of the study conducted under this section.

6 (d) AUTHORIZATION OF APPROPRIATIONS.—There  
7 are authorized to be appropriated to the Secretary such  
8 sums as are necessary to carry out this section, to remain  
9 available until expended.

10 **SEC. 4. WATER CONSERVATION AND ENERGY SAVINGS**  
11 **STUDY.**

12 (a) DEFINITIONS.—In this section:

13 (1) MAJOR RECLAMATION PROJECT.—The term  
14 “major Reclamation project” means a multipurpose  
15 project authorized by the Federal Government and  
16 carried out by the Bureau of Reclamation.

17 (2) SECRETARY.—The term “Secretary” means  
18 the Secretary of the Interior, acting through the  
19 Commissioner of Reclamation.

20 (b) STUDY.—

21 (1) IN GENERAL.—In accordance with para-  
22 graph (2), to promote the efficient use of energy in  
23 water distribution systems, the Secretary shall con-  
24 duct a study to evaluate the quantities of energy

1 used in water storage and delivery operations in  
2 major Reclamation projects.

3 (2) ELEMENTS.—In conducting the study, the  
4 Secretary shall—

5 (A) with respect to each major Reclama-  
6 tion project—

7 (i) assess and estimate the annual en-  
8 ergy consumption associated with the  
9 major Reclamation project; and

10 (ii) identify—

11 (I) each major Reclamation  
12 project that consumes the greatest  
13 quantity of energy; and

14 (II) the aspect of the operation of  
15 each major Reclamation project de-  
16 scribed in subclause (I) that is the  
17 most energy intensive (including water  
18 storage and releases, water delivery,  
19 and administrative operations); and

20 (B) identify opportunities to significantly  
21 reduce current energy consumption and costs  
22 with respect to each major Reclamation project  
23 described in subparagraph (A), including, as  
24 applicable, 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.

11 (d) AUTHORIZATION OF APPROPRIATIONS.—There  
 12 are authorized to be appropriated to the Secretary such  
 13 sums as are necessary to carry out this section, to remain  
 14 available until expended.

15 **SEC. 5. BRACKISH GROUNDWATER NATIONAL DESALINA-**  
 16 **TION RESEARCH FACILITY.**

17 (a) DEFINITIONS.—In this section:

18 (1) FACILITY.—The term “facility” means the  
 19 Brackish Groundwater National Desalination Re-  
 20 search Facility, located in Otero County, New Mex-  
 21 ico.

22 (2) SECRETARY.—The term “Secretary” means  
 23 the Secretary of the Interior.

24 (b) DUTY OF SECRETARY.—The Secretary shall oper-  
 25 ate, manage, and maintain the facility to carry out re-

1 search, development, and demonstration activities to de-  
2 velop technologies and methods that promote brackish  
3 groundwater desalination as a viable method to increase  
4 water supply in a cost-effective manner.

5 (c) OBJECTIVES; ACTIVITIES.—

6 (1) OBJECTIVES.—The Secretary shall operate  
7 and manage the facility as a state-of-the-art desali-  
8 nation research center—

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

11 (B) to create new supplies of usable water  
12 for municipal, agricultural, industrial, or envi-  
13 ronmental purposes.

14 (2) ACTIVITIES.—In operating, managing, and  
15 maintaining the facility under subsection (b), the  
16 Secretary shall carry out—

17 (A) as a priority, the development of re-  
18 newable energy technologies for integration with  
19 desalination technologies—

20 (i) to reduce the capital and oper-  
21 ational costs of desalination;

22 (ii) to minimize the environmental im-  
23 pacts of desalination; and

1 (iii) to increase public acceptance of  
2 desalination as a viable water supply proc-  
3 ess;

4 (B) research regarding various desalination  
5 processes, including improvements in reverse  
6 and forward osmosis technologies;

7 (C) the development of innovative methods  
8 and technologies to reduce the volume and cost  
9 of desalination concentrated wastes in an envi-  
10 ronmentally sound manner;

11 (D) an outreach program to create part-  
12 nerships with States, academic institutions, pri-  
13 vate entities, and other appropriate organiza-  
14 tions to conduct research, development, and  
15 demonstration activities, including the establish-  
16 ment of rental and other charges to provide rev-  
17 enue to help offset the costs of operating and  
18 maintaining the facility; and

19 (E) an outreach program to educate the  
20 public on—

21 (i) desalination and renewable energy  
22 technologies; and

23 (ii) the benefits of using water in an  
24 efficient manner.

1 (d) AUTHORITY OF SECRETARY.—The Secretary may  
2 enter into contracts or other agreements with, or make  
3 grants to, appropriate entities to carry out this section,  
4 including an agreement with an academic institution to  
5 manage research activities at the facility.

6 (e) AUTHORIZATION OF APPROPRIATIONS.—There  
7 are authorized to be appropriated such sums as are nec-  
8 essary to carry out this section, to remain available until  
9 expended.

10 **SEC. 6. ENHANCED INFORMATION ON WATER-RELATED EN-**  
11 **ERGY CONSUMPTION.**

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

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

16 “(1) IN GENERAL.—Not less than once during  
17 each 3-year period, to aid in the understanding and  
18 reduction of the quantity of energy consumed in as-  
19 sociation with the use of water, the Administrator  
20 shall conduct an assessment under which the Admin-  
21 istrator shall collect information on energy consump-  
22 tion in various sectors of the economy that are asso-  
23 ciated with the acquisition, treatment, or delivery of  
24 water.

1           “(2) **REQUIRED SECTORS.**—An assessment de-  
2           scribed in paragraph (1) shall contain an analysis of  
3           water-related energy consumption for all relevant  
4           sectors of the economy, including water used for—

5                   “(A) agricultural purposes;

6                   “(B) municipal purposes;

7                   “(C) industrial purposes; and

8                   “(D) domestic purposes.

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

13 **SEC. 7. ENERGY-WATER RESEARCH AND DEVELOPMENT**  
14                   **ROADMAP.**

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

23          (b) **REPORT.**—Not later than 120 days after the date  
24          of enactment of this Act, the Secretary shall submit to  
25          the appropriate committees of Congress a report describ-

- 1 ing the document described in subsection (a), including
- 2 recommendations for any future action with respect to the
- 3 document.

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