# H. R. 1482

To provide for the research and development of advanced nuclear reactor, solar energy, and wind energy technologies for the production of hydrogen, and for other purposes.

## IN THE HOUSE OF REPRESENTATIVES

April 5, 2005

Mr. Wynn (for himself and Mr. Shimkus) introduced the following bill; which was referred to the Committee on Science, and in addition to the Committee on Energy and Commerce, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

## A BILL

To provide for the research and development of advanced nuclear reactor, solar energy, and wind energy technologies for the production of hydrogen, 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 referred to as the "Hydrogen Lib-
- 5 erty Act".

## 1 SEC. 2. HYDROGEN PRODUCTION PROGRAMS.

2	(a) Advanced Reactor Hydrogen Cogenera-
3	TION PROJECT.—
4	(1) Project establishment.— The Sec-
5	retary is directed to establish an Advanced Reactor
6	Hydrogen Cogeneration Project.
7	(2) Project definition.— The project shall
8	consist of the research, development, design, con-
9	struction, and operation of a hydrogen production
10	cogeneration research facility that, relative to the
11	current commercial reactors, enhances safety fea-
12	tures, reduces waste production, enhances thermal
13	efficiencies, increases proliferation resistance, and
14	has the potential for improved economics and phys-
15	ical security in reactor siting. This facility shall be
16	constructed so as to enable research and develop-
17	ment on advanced reactors of the type selected and
18	on alternative approaches for reactor-based produc-
19	tion of hydrogen.
20	(3) Project management.—
21	(A) Management.—The project shall be
22	managed within the Department by the Office
23	of Nuclear Energy, Science, and Technology.
24	(B) LEAD LABORATORY.—The lead labora-
25	tory for the project, providing the site for the
26	reactor construction, shall be the Idaho Na-

tional Laboratory (in this subsection referred to as "INL").

- (C) STEERING COMMITTEE.—The Secretary shall establish a national steering committee with membership from the national laboratories, universities, and industry to provide advice to the Secretary and the Director of the Office of Nuclear Energy, Science, and Technology on technical and program management aspects of the project.
- (D) Collaboration.—Project activities shall be conducted at INL, other national laboratories, universities, domestic industry, and international partners.

### (4) Project requirements.—

#### (A) Research and Development.—

(i) IN GENERAL.—The project shall include planning, research and development, design, and construction of an advanced, next-generation, nuclear energy system suitable for enabling further research and development on advanced reactor technologies and alternative approaches for reactor-based generation of hydrogen.

1	(ii) Reactor test capabilities at
2	INL.—The project shall utilize, where ap-
3	propriate, extensive reactor test capabilities
4	resident at INL.
5	(iii) Alternatives.—The project
6	shall be designed to explore technical, envi-
7	ronmental, and economic feasibility of al-
8	ternative approaches for reactor-based hy-
9	drogen production.
10	(iv) Industrial Lead.—The indus-
11	trial lead for the project shall be a com-
12	pany incorporated in the United States.
13	(B) International collaboration.—
14	(i) IN GENERAL.—The Secretary shall
15	seek international cooperation, participa-
16	tion, and financial contribution in this
17	project.
18	(ii) Assistance from inter-
19	NATIONAL PARTNERS.—The Secretary may
20	contract for assistance from specialists or
21	facilities from member countries of the
22	Generation IV International Forum, the
23	Russian Federation, or other international
24	partners where such specialists or facilities

1	provide access to cost-effective and relevant
2	skills or test capabilities.
3	(iii) Generation iv international
4	FORUM.—International activities shall be
5	coordinated with the Generation IV Inter-
6	national Forum.
7	(iv) Generation iv nuclear en-
8	ERGY SYSTEMS PROGRAM.—The Secretary
9	may combine this project with the Genera-
10	tion IV Nuclear Energy Systems Program.
11	(C) Demonstration.—The overall
12	project, which may involve demonstration of se-
13	lected project objectives in a partner nation,
14	must demonstrate both electricity and hydrogen
15	production and may provide flexibility, where
16	technically and economically feasible in the de-
17	sign and construction, to enable tests of alter-
18	native reactor core and cooling configurations.
19	(D) Partnerships.—The Secretary shall
20	establish cost-shared partnerships with domestic
21	industry or international participants for the re-
22	search, development, design, construction, and
23	operation of the research facility, and pref-
24	erence in determining the final project structure

shall be given to an overall project which re-

- tains United States leadership while maximizing cost sharing opportunities and minimizing Federal funding responsibilities.
  - (E) Target date.—The Secretary shall select technologies and develop the project to provide initial testing of either hydrogen production or electricity generation by 2011, or provide a report to Congress explaining why this date is not feasible.
  - (F) WAIVER OF CONSTRUCTION TIMELINES.—The Secretary is authorized to conduct the Advanced Reactor Hydrogen Cogeneration Project without the constraints of DOE Order 413.3, relating to program and project management for the acquisition of capital assets, as necessary to meet the specified operational date.
  - (G) Competition.—The Secretary may fund up to 2 teams for up to 1 year to develop detailed proposals for competitive evaluation and selection of a single proposal and concept for further progress. The Secretary shall define the format of the competitive evaluation of proposals.

1	(H) Use of facilities.—Research facili-
2	ties in industry, national laboratories, or univer-
3	sities either within the United States or with
4	cooperating international partners may be used
5	to develop the enabling technologies for the re-
6	search facility. Utilization of domestic univer-
7	sity-based facilities shall be encouraged to pro-
8	vide educational opportunities for student devel-
9	opment.
10	(I) Role of Nuclear regulatory com-
11	MISSION.—
12	(i) In General.—The Nuclear Regu-
13	latory Commission shall have licensing and
14	regulatory authority for any reactor au-
15	thorized under this subsection, pursuant to
16	section 202 of the Energy Reorganization
17	Act of 1974 (42 U.S.C. 5842).
18	(ii) RISK-BASED CRITERIA.—The Sec-
19	retary shall seek active participation of the
20	Nuclear Regulatory Commission through-
21	out the project to develop risk-based cri-
22	teria for any future commercial develop-
23	ment of a similar reactor architecture.
24	(J) Report.—The Secretary shall develop
25	and transmit to Congress a comprehensive

- 1 project plan not later than 3 months after the
- 2 date of enactment of this Act. The project plan
- 3 shall be updated annually with each annual
- 4 budget submission.
- 5 (b) ADVANCED NUCLEAR REACTOR TECH-
- 6 NOLOGIES.—The Secretary shall—
- 7 (1) prepare a detailed roadmap for carrying out
- 8 the provisions in this Act related to advanced nu-
- 9 clear reactor technologies and for implementing the
- 10 recommendations related to advanced nuclear reac-
- tor technologies that are included in the report
- transmitted under subsection (f); and
- 13 (2) provide for the establishment of 5 projects
- in geographic areas that are regionally and climati-
- cally diverse to demonstrate the commercial produc-
- tion of hydrogen at existing nuclear power plants,
- including one demonstration project at a national
- laboratory or institution of higher education using
- an advanced gas-cooled reactor.
- 20 (c) Collocation With Hydrogen Production
- 21 Facility.—Section 103 of the Atomic Energy Act of
- 22 1954 (42 U.S.C. 2011) is amended by adding at the end
- 23 the following new subsection:
- 24 "g. The Commission shall give priority to the licens-
- 25 ing of a utilization facility that is collocated with a hydro-

- 1 gen production facility. The Commission shall issue a final
- 2 decision approving or disapproving the issuance of a li-
- 3 cense to construct and operate a utilization facility not
- 4 later than the expiration of 2 years after the date of the
- 5 submission of such application, if the application ref-
- 6 erences a Commission-certified design and an early site
- 7 permit, unless the Commission determines that the appli-
- 8 cant has proposed material and substantial changes to the
- 9 design or the site design parameters.".
- 10 (d) Solar Energy Technologies.—The Secretary
- 11 shall—
- 12 (1) prepare a detailed roadmap for carrying out
- the provisions in this Act related to solar energy
- technologies and for implementing the recommenda-
- tions related to solar energy technologies that are in-
- 16 cluded in the report transmitted under subsection
- 17 (f);
- 18 (2) provide for the establishment of 5 projects
- in geographic areas that are regionally and climati-
- 20 cally diverse to demonstrate the production of hydro-
- 21 gen at solar energy facilities, including one dem-
- 22 onstration project at a national laboratory or institu-
- 23 tion of higher education;
- 24 (3) establish a research and development pro-
- 25 gram—

1	(A) to develop optimized concentrating
2	solar power devices that may be used for the
3	production of both electricity and hydrogen; and
4	(B) to evaluate the use of thermochemical
5	cycles for hydrogen production at the tempera-
6	tures attainable with concentrating solar power
7	devices;
8	(4) coordinate with activities sponsored by the
9	Department of Energy's Office of Nuclear Energy,
10	Science, and Technology on high-temperature mate-
11	rials, thermochemical cycles, and economic issues re-
12	lated to solar energy;
13	(5) provide for the construction and operation
14	of new concentrating solar power devices or solar
15	power cogeneration facilities that produce hydrogen
16	either concurrently with, or independently of, the
17	production of electricity;
18	(6) support existing facilities and research pro-
19	grams dedicated to the development and advance-
20	ment of concentrating solar power devices; and
21	(7) establish a program—
22	(A) to research and develop methods that
23	use electricity from photovoltaic devices for the
24	onsite production of hydrogen, such that no in-
25	termediate transmission or distribution infra-

1	structure is required or used and future de-
2	mand growth may be accommodated;
3	(B) to evaluate the economics of small-
4	scale electrolysis for hydrogen production; and
5	(C) to research the potential of modular
6	photovoltaic devices for the development of a
7	hydrogen infrastructure, the security implica-
8	tions of a hydrogen infrastructure, and the ben-
9	efits potentially derived from a hydrogen infra-
10	structure.
11	(e) WIND ENERGY TECHNOLOGIES.—The Secretary
12	shall—
13	(1) prepare a detailed roadmap for carrying out
14	the provisions in this Act related to wind energy
15	technologies and for implementing the recommenda-
16	tions related to wind energy technologies that are in-
17	cluded in the report transmitted under subsection
18	(f); and
19	(2) provide for the establishment of 5 projects
20	in geographic areas that are regionally and climati-
21	cally diverse to demonstrate the production of hydro-
22	gen at existing wind energy facilities, including one
23	demonstration project at a national laboratory or in-
24	stitution of higher education.

1	(f) Report.—The Secretary shall transmit to the
2	Congress not later than 120 days after the date of enact-
3	ment of this Act a report containing detailed summaries
4	of the roadmaps prepared under subsections (b)(1),
5	(d)(1), and (e)(1), descriptions of the Secretary's progress
6	in establishing the projects and other programs required
7	under this section, and recommendations for promoting
8	the availability of advanced nuclear reactor energy tech-
9	nologies, solar energy technologies, and wind energy tech-
10	nologies for the production of hydrogen.
11	SEC. 3. HYDROGEN PRODUCTION RESEARCH.
12	(a) Program Support.—The Secretary shall sup-
13	port research programs at institutions of higher education
14	for the development of advanced nuclear reactor energy
15	technologies, solar energy technologies, and wind energy
16	technologies for the production of hydrogen. The research
17	programs supported under this section shall—
18	(1) enhance fellowship and faculty assistance
19	programs;
20	(2) provide support for fundamental research;
21	(3) encourage collaborative research among in-
22	dustry, national laboratories, and institutions of
23	higher education;
24	(4) support communication and outreach; and
25	(5) to the greatest extent possible—

1	(A) be located in geographic areas that are
2	regionally and climatically diverse; and
3	(B) be located at part B institutions, mi-
4	nority institutions, and institutions of higher
5	education located in States participating in the
6	Experimental Program to Stimulate Competi-
7	tive Research of the Department of Energy.
8	(b) Nuclear Reactor Research Programs.—Re-
9	search programs supported under this section that are re-
10	lated to advanced nuclear reactor technologies—
11	(1) shall be programs that research designs for
12	nuclear reactors capable of producing hydrogen from
13	a variety of feedstocks;
14	(2) may provide technical assistance, in collabo-
15	ration with the United States civilian nuclear indus-
16	try, to relicense and upgrade research nuclear reac-
17	tors at institutions of higher education involved in
18	such programs;
19	(3) may use funding authorized under sub-
20	section (d)(1) for improvements of research nuclear
21	reactors at institutions of higher education involved
22	in such programs as part of a focused effort that
23	emphasizes research, training, and education; and
24	(4) may use funding authorized under sub-
25	section $(d)(1)$ to offset a portion of the operating

1 and maintenance costs of a research nuclear reactor 2 at an institution of higher education involved in one 3 of such programs. 4 (c) Institutions of Higher Education and Na-TIONAL LABORATORY INTERACTIONS.—In conjunction with the programs supported under this section, the Sec-6 retary shall develop sabbatical, fellowship, and visiting sci-8 entist programs to encourage national laboratories and institutions of higher education to share and exchange per-10 sonnel. 11 (d) AUTHORIZATION OF APPROPRIATIONS.— 12 (1)ADVANCED NUCLEAR REACTOR TECH-13 NOLOGIES RESEARCH PROGRAMS.—For the purpose 14 of supporting research programs related to the de-15 velopment of advanced nuclear reactor technologies 16 under this section, there are authorized to be appro-17 priated to the Secretary— 18 (A) \$65,000,000 for fiscal year 2006; 19 (B) \$74,750,000 for fiscal year 2007; 20 (C) \$85,962,500 for fiscal year 2008; 21 (D) \$98,856,875 for fiscal year 2009; 22 (E) \$113,685,406 for fiscal year 2010; 23 (F) \$130,738,217 for fiscal year 2011; 24 (G) \$150,348,950 for fiscal year 2012; 25 (H) \$172,901,292 for fiscal year 2013;

1	(I) \$198,836,486 for fiscal year 2014; and
2	(J) $$228,661,959$ for fiscal year 2015.
3	(2) Solar energy technologies research
4	PROGRAMS.—For the purpose of supporting research
5	programs related to the development of solar energy
6	technologies under this section, there are authorized
7	to be appropriated to the Secretary—
8	(A) \$65,000,000 for fiscal year 2006;
9	(B) \$74,750,000 for fiscal year 2007;
10	(C) \$85,962,500 for fiscal year 2008;
11	(D) \$98,856,875 for fiscal year 2009;
12	(E) \$113,685,406 for fiscal year 2010;
13	(F) \$130,738,217 for fiscal year 2011;
14	(G) \$150,348,950 for fiscal year 2012;
15	(H) \$172,901,292 for fiscal year 2013;
16	(I) \$198,836,486 for fiscal year 2014; and
17	(J) $$228,661,959$ for fiscal year 2015.
18	(3) Wind energy technologies research
19	PROGRAMS.—For the purpose of supporting research
20	programs related to the development of wind energy
21	technologies under this section, there are authorized
22	to be appropriated to the Secretary—
23	(A) \$65,000,000 for fiscal year 2006;
24	(B) \$74,750,000 for fiscal year 2007;
25	(C) \$85,962,500 for fiscal year 2008;

1	(D) \$98,856,875 for fiscal year 2009;
2	(E) \$113,685,406 for fiscal year 2010;
3	(F) \$130,738,217 for fiscal year 2011;
4	(G) \$150,348,950 for fiscal year 2012;
5	(H) \$172,901,292 for fiscal year 2013;
6	(I) $$198,836,486$ for fiscal year 2014; and
7	(J) $$228,661,959$ for fiscal year 2015.
8	SEC. 4. DEFINITIONS.
9	For purposes of this Act—
10	(1) the term "advanced nuclear reactor tech-
11	nologies" means—
12	(A) technologies related to advanced light
13	water reactors that may be commercially avail-
14	able in the near-term, including mid-sized reac-
15	tors with passive safety features, for the gen-
16	eration of electric power from nuclear fission
17	and the production of hydrogen; and
18	(B) technologies related to other nuclear
19	reactors that may require prototype demonstra-
20	tion prior to availability in the mid-term or
21	long-term, including high-temperature, gas-
22	cooled reactors and liquid metal reactors, for
23	the generation of electric power from nuclear
24	fission and the production of hydrogen;

1	(2) the term "concentrating solar power de-
2	vices" means devices that concentrate the power of
3	the sun by reflection or refraction to improve the ef-
4	ficiency of a photovoltaic or thermal generation proc-
5	ess;
6	(3) the term "institution of higher education"

- (3) the term "institution of higher education" has the meaning given to that term in section 101(a) of the Higher Education Act of 1965 (20 U.S.C. 1001(a));
- (4) the term "minority institution" has the meaning given to that term in section 365 of the Higher Education Act of 1965 (20 U.S.C. 1067k);
- (5) the term "part B institution" has the meaning given to that term in section 322 of the Higher Education Act of 1965 (20 U.S.C. 1061);
- (6) the term "photovoltaic devices" means devices that convert light directly into electricity through a solid-state, semiconductor process; and
- (7) the term "Secretary" means the Secretary of Energy.

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