

RE-ENERGYSE (Regaining our Energy Science and Engineering Edge)
Funding Profile by Subprogram

(dollars in thousands)

	FY 2009 Current Appropriation	FY 2009 Current Recovery Act Appropriation	FY 2010 Current Appropriation	FY 2011 Request
RE-ENERGYSE				
Higher Education	0	0	0	35,000
Technical Training, Education and Outreach	0	0	0	15,000
Total, RE-ENERGYSE	0	0	0	50,000

Public Law Authorizations:

- Public Law 95–91, “Department of Energy Organization Act” (1977)
- Public Law 101–510, “DOE Science Education Enhancement Act” (1991)
- Public Law 109–58, “Energy Policy Act of 2005”
- Public Law 110–69, “America COMPETES Act of 2007”
- Public Law 110-140, “Energy Independence and Security Act of 2007”

Mission

The mission of RE-ENERGYSE (Regaining our Energy Science and Engineering Edge) is to provide the education and training necessary to build a highly skilled U.S. clean energy workforce dedicated to solving the world’s greatest energy challenges.^a

Benefits

The U.S. is on the cusp of transformational changes in how energy is produced and used. Major investments are being made by the Federal government and private industry in clean energy technologies that will help create entirely new growth industries, expand markets for solar, wind, and other clean energy sources, and support the productivity gains inherent in energy efficiency. These efforts, if coupled with a well-educated and skilled clean energy workforce, will ensure that the U.S. remains highly competitive in global markets, while meeting the President’s goal of reducing greenhouse gas (GHG) emissions by 83 percent by 2050.

However, challenges exist. Statistics show that the U.S. currently lags behind other nations in the race to produce and bring to market new clean energy systems. European countries, for example, currently control 80 percent of the wind technology market, and China is projected to become the world’s largest

^a RE-ENERGYSE activities funded within the Office of Energy Efficiency and Renewable Energy (EERE) will be coordinated with the Office of Nuclear Energy (NE) (\$5 million requested). Funds are requested in separate accounts to be consistent with appropriated intent; RE-ENERGYSE funds requested within NE will only support nuclear technology education, and funds requested in EERE will support other clean energy technologies. RE-ENERGYSE activities will also be coordinated closely with the National Science Foundation (NSF).

supporter of solar energy by 2011.^a A recent study by the World Wildlife Fund showed that the U.S. is ranked 19th in relative global clean energy technology product sales, weighted by GDP; behind France, Germany, Japan, and others outside of the G8.^b

The U.S. ranks behind other major nations in making the transitions required to educate students for emerging energy trades, research efforts, and other professions to support the future energy technology mix. Having a high competency level in science, technology development, engineering, and mathematics (STEM) subjects is critical to knowledge creation, technology, and innovation. However, the U.S. ranks 20th out of the 30 Organisation of Economic Cooperation and Development (OECD) nations in the percentage of students which performed at the top level of science.^c According to a study of the National Assessment of Educational Progress, only 18 percent of U.S. 12th grade students performed at or above the proficient level in math and science, while only two percent excelled. These numbers are not sufficient to create the leaders and innovators of a new clean energy workforce or even resupply the current energy workforce, which could see a 40 to 60 percent retirement rate within the next five years.

In order to make the leap in global energy technology leadership, the U.S. must also make the leap in energy education. However, the current energy education infrastructure is severely under developed. According to the Association of American Universities, there are no post-doctorate fellowships at U.S. universities related to renewable energy, and not one of the 149 U.S. professional science masters degree programs offered currently at 84 American universities focuses on interdisciplinary energy studies.^d At the community college level, the American Association of Community Colleges estimates that less than 10 percent of the Nation's 1,700 community colleges have begun to develop curricula for renewable energy and energy efficiency career tracks, and these programs generally lack national standards and accreditation processes.^e According to the Interstate Renewable Energy Council's training catalog, only 106 institutions are currently offering courses in energy efficiency and renewable energy technologies, of which only 24 are universities.^f This is significant, as there are 6,519 post-secondary institutions in the U.S.^g

Meeting the challenge of creating the new clean energy economy will require research and development of new energy technologies and the application of science to understand the impact of these technologies on a sustainable environment. As such, DOE will partner with the National Science Foundation (NSF) to collaborate closely on the administration, management and impact measurement of RE-ENERGYSE

^a United Nations Environment Programme. "Green Jobs: Towards Decent Work in a Sustainable, Low-Carbon World" Published by Worldwatch Institute. September 2008: http://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/documents/publication/wcms_098503.pdf

^b "Clean Economy, Living Planet: Building Strong Clean Energy Technology Industries." World Wildlife Fund. Amsterdam, The Netherlands. November 2009. p. 13: http://assets.panda.org/downloads/rapport_wwf_cleaneconomy_international_def.pdf

^c "Education at a Glance 2009: OECD Indicators." Organization for Economic Co-operation and Development. September 2009. p. 78: <http://www.oecd.org/dataoecd/41/25/43636332.pdf>

^d Professional Science Master's (PSM), PSM Locations Map, <http://www.sciencemasters.com/Default.aspx?tabid=58> (January 11, 2010).

^e American Association of Community Colleges, 2009: <http://www.aacc.nche.edu/Pages/default.aspx>

^f "2009 Updates and Trends." Interstate Renewable Energy Council. October 2009. Anaheim, CA. p. 4: <http://irecusa.org/wp-content/uploads/2009/10/IREC-2009-Annual-ReportFinal.pdf>

^g As specified by Title IV of the Higher Education Act

education programs. This partnership will build on the scientific and engineering expertise of both agencies in the energy field, and benefit from NSF's successful track record of integrating research with education in programs it has developed and administered over the past two decades.

Contribution to the Secretary's Goals

RE-ENERGYSE contributes to the following Secretarial goals.

Innovation: Lead the world in science, technology, and engineering

RE-ENERGYSE addresses basic and applied science through the support of research fellowships and internships at DOE National Laboratories, universities, other research institutions, and the private sector. These fellowships will complement existing Federal efforts, and provide the U.S. research community with a major influx of highly specialized technical expertise that can bring new technologies to the marketplace.

Energy: Build a competitive, low-carbon economy and secure America's energy future

Given the need to reduce the environmental impact of the U.S. energy sector, there is a need for a well-trained workforce for a transformed energy sector. RE-ENERGYSE will help create leading scientists, engineers and technicians who can accelerate the adoption and improve the reliability and performance of clean energy technologies. This will lead to transformational changes in U.S. energy demand and supply that enables the U.S. to achieve a low carbon future.

RE-ENERGYSE will educate and train Americans to adapt green technology to their existing industry/trade, to enter thousands of green jobs and increase U.S. competitiveness. This effort will help universities and community colleges develop cutting edge programs, with redesigned and new curricula to produce tens of thousands of other highly skilled U.S. workers who can sustain American excellence in clean energy in industry, trades, academia, the Federal government, and National Laboratories.

RE-ENERGYSE will develop leading edge undergraduate and graduate programs; help between 3,000 and 6,000 highly educated scientists, engineers, and other professionals enter the clean energy field by 2016; and approximately 7,000 to 13,000 professionals by 2021. By 2016, efforts will result in the development of approximately 75 community college and other training programs to equip thousands of technically skilled workers for clean energy jobs. By 2016, thousands of U.S. residents and students will be educated about clean energy technologies leading reduced energy consumption and cost saving benefits.

Annual Performance Results and Targets

The RE-ENERGYSE Program activities support the Secretary's Strategic Priority goal of Innovation by coordinating education efforts within DOE, working collaboratively with NSF, and other federal agencies to build a pipeline to create a resource of highly educated scientists and engineers. This pipeline will further accelerate the burgeoning clean technology industry in the U.S., positioning the country to lead in science, technology, engineering and energy by educating students through universities, community colleges, and K-12 programs. These programs, which will not only prepare students to pursue careers in developing and deploying the clean energy solutions of the future, will also increase awareness of the issues surrounding energy efficiency and sustainability.

RE-ENERGYSE will help make the U.S. significantly more technologically competitive globally, while contributing to creating a grassroots foundation of a low-carbon economy here at home. In response to

international climate agreements, CO₂ reduction goals,^a and investments in clean energy technologies,^b the clean energy market is poised as the next great industry. Through the 2009 Recovery Act, the U.S. government made considerable investments in the advancement of clean energy technologies and energy infrastructure which could accelerate development of clean technologies. Pending legislation may have additional incentives for the development and deployment of these technologies into the marketplace. Despite the current financial climate, the clean energy market is expected to grow between 5 and 15 percent per year for the foreseeable future,^c resulting in a concurrent growth in workforce demand. RE-ENERGYSE will offer fellowships, multi-disciplinary masters programs, technical training, and K-12 education and outreach programs. The programs supported by RE-ENERGYSE respond to the very real challenge that the U.S. suffers a shortage of skilled workers available to enter energy professions.^d

^a 2009 G-8 Summit, Declaration of the Leaders on Energy and Climate committed to limit average global temperatures from exceeding 2 degrees Celsius above pre-industrial levels. This figure corresponds with the 450 ppm scenario and CO₂ reduction targets. http://www.g8italia2009.it/G8/Home/Summit/G8-G8_Layout_locale-1199882116809_Atti.htm

^b The Recovery Act provided DOE with substantial funding to support clean energy and environmental clean up projects, creating hundreds of thousands of jobs and providing a meaningful down payment on the nation's energy and environmental future.

^c "Clean Economy, Living Planet: Building Strong Clean Energy Technology Industries." World Wildlife Fund. Amsterdam, The Netherlands. November 2009. http://assets.panda.org/downloads/rapport_wwf_cleaneconomy_international_def.pdf

^d 40 to 60 percent of energy utilities' skilled workers and engineers could retire by 2012. Center for Energy Workforce Demand 2007 Report: Gaps in the Energy Workforce Pipeline: http://www.cewd.org/documents/CEWD_08Results.pdf

Annual Performance Targets and Results									
Secretarial Goal: Goal 1: Innovation: Lead the world in science, technology, and engineering, Goal 2: Energy: Build a competitive, low-carbon economy and secure America's energy future GPRA Unit Program Goal: RE-ENERGYSE Subprogram Name: Higher Education									
FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Performance Measure: Number of post-secondary students awarded competitive STEM education research fellowships and internships. ^a									
T: NA A: NA	T: NA A: NA	T: NA A: NA	T: NA A: NA	T: NA A: NA	T: 1130 A:	T: 1130 A:	T: 1130 A:	T: 1130 A:	T: 1130 A:

^a The FY 2011 performance measures are based on similar education and training programs in other Federal agencies, for example the National Science Foundation. Previous years of educational activities conducted by EERE further informed the creation of this new performance measure for RE-ENERGYSE. Performance monitoring for the Higher Education subprogram activities are intended to support future impact evaluations to assess potential effects on public awareness, attitude and behavior.

Annual Performance Targets and Results									
Secretarial Goal: Goal 1: Innovation: Lead the world in science, technology, and engineering, Goal 2: Energy: Build a competitive, low-carbon economy and secure America's energy future									
GPRA Unit Program Goal: RE-ENERGYSE									
Subprogram Name: Technical Training, Education and Outreach									
FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
Performance Measure: Number of students participating (directly or indirectly) in a technical training, K-12 education and/or outreach program sponsored by RE-ENERGYSE. ^a									
T: NA A: NA	T: NA A: NA	T: NA A: NA	T: NA A: NA	T: NA A: NA	T: 250,000 A:	T: 350,000 A:	T: 450,000 A:	T: 550,000 A:	T: 600,000 A:

^a The FY 2011 performance measures are based on similar education and training programs in other Federal agencies, for example the National Science Foundation. Previous years of educational activities conducted by EERE further informed the creation of this new performance measure for RE-ENERGYSE. Performance monitoring for the Technical Training, Education and Outreach subprogram activities are intended to support future impact evaluations to assess potential effects on public awareness, attitude and behavior

Means and Strategies

RE-ENERGYSE will use the following means and strategies:

- Strategically plan and implement activities by coordinating with experts in education, DOE's Office of Science, the Department of Labor (DOL), the Department of Education, the NSF, and the American Academy of Community Colleges, to ensure that this program fills educational gaps and does not duplicate efforts;
- Leverage the capacity of universities, the DOE National Laboratories, educational foundations, NSF, and industry to offer educational and research opportunities that will make a critical difference in informing and inspiring students to pursue careers in clean energy;
- Reach out broadly to universities, community colleges, and other relevant institutions to encourage widespread involvement of diverse communities, as well as constructive competition to stimulate the development of outstanding programs;
- Develop the outreach infrastructure necessary to communicate and disseminate curricula and other programs materials, and importantly enable collaboration and feedback;
- Issue competitive solicitations to ensure that high quality institutions have the means and interest to create and sustain education and training efforts;
- Dedicate up to 10 percent of each subprogram for metric driven program evaluation activities and peer reviews;
- Create energy-specific materials at the K-12 level, to engage, excite, and educate;
- Provide direct channels feeding energy-accredited and up-to-date materials into K-12 schools and communities; and
- Attract qualified candidates to competitive higher education programs.

RE-ENERGYSE provides a much needed collaborative model of innovation in the Federal government, by performing the following activities:

- Works with NSF, DOL, Department of Education, the American Association of Community Colleges, and other leading scientific and academic organizations to create teacher professional development opportunities nationwide, and ensure strategic and non-duplicative investment in science education at all levels;
- Works with leading researchers in the public, private, and academic sectors to provide cutting-edge research opportunities that can attract highly qualified undergraduate, graduate, and post-doctoral students into the clean energy field;
- Works with the NSF to compile and evaluate existing K-12 resources for teaching, as well as creating innovative ways to communicate the challenges and promises of clean energy at all grade levels; develop and assess the effectiveness of different educational communication strategies and innovate ways to scale-up the most effective ones into general practice; and
- Rewarding student success and fostering innovation and collaboration is an important element of engaging youth. Incentive competitions will complement the academic effort through public, private and academic organizations.

Validation and Verification

To validate and verify the impact of each program, RE-ENERGYSE will:

- Assemble an expert panel from the science, education and government sectors to review and accredit educational materials, competition guidelines, and other outreach materials;
- Conduct rigorous reviews of individual performance, program effectiveness, and overall programmatic accomplishment of goals, and impact on student achievement;
- Undertake comprehensive impact and process evaluations for training and outreach elements, as supported by the OMB Voluntary Evaluation Initiative (OMB October 7, 2009). These evaluations will expand on initial program design and be conducted by third-party independent evaluators;
- Use randomized controlled trials when possible;
- Use effective evaluation processes including pre- and post-program testing of participants, longitudinal workforce studies to determine program effectiveness, and external reviews conducted by experts in education and training; and
- Conduct technical workshops with key stakeholder groups to inform priorities and implementation. Representatives from academia, industry, the Federal Government, professional societies and other stakeholder groups will provide input needed to help effectively carry out and monitor programs.

- Data Sources:
- A wide range of education and science organizations (e.g., National Science Foundation, National Center for Education Statistics, National Science Board, Department of Education, and National Science Teachers Association) will be consulted to provide data for the development of program priorities.
 - Existing studies that can guide efforts include:
 - *Rising Above the Gathering Storm (2007)*
http://sciencedems.house.gov/Media/File/Reports/natacad_compete_exsum_6feb06.pdf;
 - *Graduate Education: The Backbone of American Competitiveness and Innovation (2007)*
http://www.cgsnet.org/portals/0/pdf/GR_GradEdAmComp_0407_EMB.pdf;
 - and
 - *Losing the Competitive Advantage: The Challenge for Science and Technology in the United States (2005)*
http://www.aeanet.org/publications/IDJJ_AeA_Competitiveness.asp.
 - Data collected from grant recipients and other sources as needed, such as pre- and post-program surveys, to verify the accomplishment of specified goals and milestones.

- Baselines:
- Number of post-secondary students awarded competitive STEM education research fellowships and internships: 0 in 2010; and
 - Number of students participating (directly or indirectly) in a technical training, K-12 education and/or outreach program sponsored by RE-ENERGYSE: 0 in 2010.

Frequency: Annual

- Evaluation: In carrying out the program’s mission, RE-ENERGYSE will use several forms of evaluation to assess progress and to promote program improvement:
- Critical peer review of both the program and subprogram portfolios and activities by independent third-party evaluators;
 - Specialized program field metrics and impact and process evaluation studies, including metrics, preparing a multi-year comprehensive Evaluation Plan, and implementing the Plan to gather baseline data;
 - Quarterly and annual assessment of program and management results based performance; and
 - Annual review of methods.
- Data Storage: EERE Benefits website, the EERE Corporate Planning System, and other computer-based data systems.
- Verification: Peer reviews and program evaluations.

Higher Education Funding Schedule by Activity

(dollars in thousands)

	FY 2009	FY 2010	FY 2011
Higher Education	0	0	35,000
Total, Higher Education	0	0	35,000

Description

The Higher Education subprogram will support fellowships, internships, post-doctoral opportunities, and the development of interdisciplinary masters programs in the area of clean energy. In particular, this subprogram will support:

- Up to 60, three-year fellowships for graduate students in engineering and other relevant fields;
- Up to 70 post-doctoral opportunities that will allow exceptional students to apply their skills in a laboratory setting devoted to clean energy topics;
- Up to 1,000 assistantships for undergraduate students to support a summer research project, as well as continued study in the clean energy field with participating faculty members;
- The development of two interdisciplinary masters programs in clean energy;
- Up to 3,000 students involved in the high-profile Solar Decathlon competition, which is proposed to be included within RE-ENERGYSE in FY 2011; and
- Implementation, from the ground up, of rigorous evaluation methods to assess the impact and process for RE-ENERGYSE activities on the clean energy workforce using various metrics including number of students, cost-effectiveness, career choices upon completion on activities, etc.^a

Benefits

Higher Education efforts will result in hundreds of highly qualified candidates each year entering the clean energy field through various disciplines. These activities will make competitive awards to ensure support for the superior proposals, programs, and individuals. The development of an effective education pipeline will serve the needs of a growing clean energy field to ensure U.S. leadership in energy and climate change mitigation.

These opportunities for undergraduates, graduate, and post-doctoral students will support at least 500 U.S. citizens per year who will contribute to the invention and commercialization of advanced clean energy technologies, such as net zero energy buildings, nanotechnology-based solar cells, energy storage for advanced electric cars, smart grid technologies, and other areas. Higher education programs focused on clean energy, along with funded research opportunities, will encourage students to pursue careers in clean energy research and practice in industry, academia, and government.

^a Best-practices for evaluating the impact of higher education programs were elucidated, for example, in the Report of the Academic Competitiveness Council in 2007 – <http://www.ed.gov/about/inits/ed/competitiveness/acc-mathscience/report.pdf>

Undergraduate internships for U.S. students are vital to ensuring U.S. leadership in STEM fields. Enrollment by U.S. students in STEM graduate programs from 1996 to 2006 has been relatively flat (less than one percent increase in 10 years), while foreign student enrollment in U.S. graduate programs increased by 31 percent during the same time period.^a These efforts in increasing the supply of U.S. STEM undergraduates interested in energy and environmental research is critical to developing a sustained pipeline of skilled energy workers for U.S. industry, academia, and U.S. research institutions.

Detailed Justification

(dollars in thousands)

FY 2009	FY 2010	FY 2011
0	0	35,000

Higher Education

The Higher Education subprogram is dedicated to the development of scientists, engineers, and other professionals with the skills needed to enter the clean energy field. Widespread outreach will be conducted at U.S. universities, scientific professional societies, and other organizations with relevant student populations within each subprogram activity. Priority will be placed on recruiting applicants from under-represented populations and applicants attending Minority Serving Institutions (MSIs). Activities within this subprogram include post-doctoral fellowships, graduate fellowships, interdisciplinary masters programs, undergraduate research internships, and a high profile university competition.

The Post-Doctoral Fellowships (approximate funding \$8 million) will support approximately 70 post-doctoral one-year fellowships in various energy science and technology fields, with particular emphasis on energy efficiency, renewable energy, and other clean energy topics at DOE National Laboratories, research institutions, and industry. Eligible applicants will include recent graduates, as well as other professionals with a relevant Ph.D. who are interested in moving into the clean energy field. Therefore, this opportunity will attract not only new doctoral students but also highly educated scientists in related fields.

These post-doctoral fellowships will fill a compelling need within clean energy and DOE workforce development pipeline. A 2008 NSF survey^b found that of the 1,718 postdoctoral students working at DOE National Laboratories; only 39 percent (664) were U.S. citizens. This supports recent reports by the National Academies of Science^c that U.S. citizens are not pursuing STEM careers in numbers equal to other nations.

The Graduate Research Fellowships will support approximately 60 three-year fellowships leading to a Ph.D. in science, engineering and other fields such as chemistry, materials science, or computational sciences, with a particular emphasis on clean energy topics. Fellowships will provide up to three years of support over a maximum of five years, and will pay for tuition and fees at a U.S. university, travel associated with the students' research, and an annual stipend. Research fellowships will be encouraged at DOE National Laboratories, other research institutions, and at industries that conduct research in clean energy technologies. Applicants will be competitively selected by external reviewers based on an

^a "Survey of Graduate Students in Post-Doctorate in Science and Engineering." National Science Foundation, Division of Science, Resources and Statistics. 2007. Table 1.

^b "Survey of Postdoctorates at Federally Funded Research and Development Centers." National Science Foundation. November 2008.

^c "Rising Above the Gathering Storm: Energizing and Employing America for a Brighter Future." National Academies of Science. 2007.

(dollars in thousands)

FY 2009	FY 2010	FY 2011
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evaluation of each application against established criteria, such as the student’s academic performance and demonstrated interest and experience in clean energy research. (Approximate funding \$10 million)

The Masters Program in Interdisciplinary Energy Studies will solicit applicants through a competitive process offered only to U.S. universities. This activity will also support the development of at least two Clean Energy University Collaborations (CEUCs) per year across the U.S. These CEUCs will develop and offer two-year programs of study in various fields including science, engineering, public policy, economics, architecture, and business. CEUCs will support curriculum development, equip laboratories, train students, develop faculty lecture series, and dedicate specific resources to encourage innovation in the clean energy field. In addition, each CEUC will participate in an annual national student business plan competition project.

Each CEUC will offer a master’s degree in “Interdisciplinary Energy Studies” related to the solution of energy problems and the advancement of energy efficiency and clean energy. The interdisciplinary master’s program will require coursework in the selected discipline, as well as courses focusing on public policy, business, and economics, specialized study in energy engineering or a related energy field, and a part-time or summer student internship at a DOE National Laboratory, a private sector research firm, or other laboratory. Given the high and growing industry demand for professionals with cross-cutting energy training, these graduates will be particularly valuable. (Approximate funding \$6 million)

The Undergraduate Internships will support up to 1,000 research appointments for undergraduate students through competitive awards to students to participate in individually mentored research in the clean energy field. Internships can be carried out at universities, in industry, and at DOE National Laboratories. Through these internships, students will become a part of the research community and a source of energy innovation for DOE and the U.S.

Students will apply on a competitive basis, and will then be matched with mentors working in each student’s field of interest. Participants will spend an intensive 10 to 16 weeks working under the individual mentorship of resident scientists, and will produce an abstract and research paper, with a goal of publishing results in a peer-reviewed journal. Participants will attend seminars that broaden their view of energy science careers and help them understand how to become members of the energy research community. This activity will provide hands-on experience and academic mentoring for a large group of students to improve their expertise and ability to make early contributions as they move toward careers in the clean energy field. (Approximate funding \$6 million)

Beginning in FY 2011, the Solar Decathlon is proposed to be transferred from the Buildings Technology Program and included within the RE-ENERGYSE Program. Solar Decathlon is a high-profile university competition held in Washington, D.C., that promotes public awareness of highly efficient building technologies and Zero Energy Homes (ZEH) using solar energy. The competition also fosters innovation and encourages incorporation of new building technologies and design practices into engineering and architecture university curricula. This event is held in September/October every other year. New teams for the 2011 Solar Decathlon will be recruited through a request for proposals issued in October 2009 to all universities throughout the country. The proposals will be reviewed and ranked, and the top 20 universities will be selected and each awarded grants to support their projects. New participants will be announced in January 2010. Activities will also include monitoring the 2009 competition houses to gain long-term performance data after the homes are relocated to a permanent site. In addition, these funds may be used to support efforts such as peer reviews; data collection and

(dollars in thousands)

FY 2009	FY 2010	FY 2011
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dissemination; and technical, market, economic, and other analyses. (Approximate funding \$5 million)
In addition, up to 10 percent of funds will be used for administration and evaluation.

Total, Higher Education	0	0	35,000
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Explanation of Funding Changes

FY 2011 vs. FY 2010 (\$000)

Higher Education

The increase reflects the start of a new activity and the transfer of the Solar Decathlon from the Buildings Technology Program.

+35,000

Total Funding Change, Higher Education

+35,000

**Technical Training, Education and Outreach
Funding Schedule by Activity**

(dollars in thousands)

	FY 2009	FY 2010	FY 2011
Technical Training, Education and Outreach	0	0	15,000
Total, Technical Training, Education and Outreach	0	0	15,000

Description

The Technical Training, Education and Outreach subprogram will support the development of effective training programs at community colleges and other training centers. Competitively-selected community colleges and other training institutions will develop up-to-date, technically accurate curricula, as well as faculty training that will focus on solving the Nation’s energy challenges. Training and educational programs will be designed to meet current and near-term local market needs for a green workforce. This subprogram will also include activities designed to engage and empower K-12 students, parents, and educators to help meet the Nation’s energy and environment challenges. This subprogram will include a national communication campaign to create an energy-literate population and develop high-value, targeted public service advertisements and strategic media relations to create broad public awareness. The subprogram will also support K-12 energy literacy by working closely with schools and educational programs to enhance STEM education and support the future workforce needs. These efforts will include ongoing evaluations and semi-annual reporting to inform program implementation, execution and content as well as measure effectiveness.

Benefits

According to the Interstate Renewable Energy Council’s training catalog, only 106 institutions are offering courses in energy efficiency and renewable energy technologies, of which only 24 are universities.^a There are 6,519 post-secondary institutions in the U.S.^b Community colleges account for over 40 percent of U.S. undergraduate enrollment and enroll a majority of under-represented students in STEM. However, less than 10 percent of the Nation’s 1,700 community colleges offer courses in “green technology.”^c Colleges that do offer such courses, with the exception of the solar industry, lack national certification processes.

Expanding the ability of community colleges and other institutions to provide technical training and certification is a critical factor in ensuring that the U.S. workforce is scaled up and adequately trained to implement new and advanced energy technologies. Furthermore, community colleges and training centers remain a largely untapped but highly viable avenue to increase participation of under-represented, as well as lower-income populations, in STEM clean energy careers. DOE will conduct a comprehensive study in FY 2010 that defines the current and projected needs at the community college level for energy-related fields, and work to establish what DOE can do to fill the gaps required to meet these workforce and educational needs.

^a “2009 Updates and Trends.” Interstate Renewable Energy Council. October 2009. Anaheim, CA. p. 4: <http://irecusa.org/wp-content/uploads/2009/10/IREC-2009-Annual-ReportFinal.pdf>

^b As specified by Title IV of the Higher Education Act

^c American Association of Community College’s CC STATS home page: <http://www2.aacc.nche.edu/research/index.htm>

This subprogram will ensure excellence in technical training for workers interested in entering clean energy trades. Approximately seven technical training programs will be established each year with the capacity to train up to 400 highly skilled technicians each year to enter the clean energy field.

This subprogram will also reach thousands of K-12 students and educators with campaigns, curricula, competitions, and other efforts aimed at educating, engaging, and inspiring students to pursue clean energy careers and adopt sustainable energy practices that are necessary to mitigate climate change.

Efforts will also help tap into the potential for increased energy efficiency in the U.S., conveying simple messages that can remind Americans that energy savings are important. Just as recycling has become a standard operating practice recognized widely by all Americans as an integral part of their lives, smarter, more efficient use of energy can become much more widely integrated. A national, strategic communication campaign can help launch such a transformation.

Detailed Justification

(dollars in thousands)

FY 2009	FY 2010	FY 2011
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Technical Training, Education and Outreach **0** **0** **15,000**

Technical training grants will be awarded through competitive and peer reviewed processes. This subprogram will offer competitive grants to community colleges and other training institutions to develop certificate programs to train approximately 400 U.S. technicians and faculty per year in STEM subjects focusing on clean energy technologies, processes, and applications. Selected institutions will develop appropriate curriculum, equip laboratories, and train students and faculty in clean energy fields. In addition, students and faculty at these institutions will be eligible for research internships at DOE National Laboratories, industry, and academic institutions. In addition to the technical grants, this effort will include the development of an online, state-of-the-art, educational system to train teachers and workers on a variety of skills needed in clean energy fields. The training system will be modeled in part on the effective online learning systems used by the Department of Defense that includes training through simulation. In addition, the system will be designed to allow for continuous improvement as new methods, technologies, and information becomes available. This effort will complement the direct grants to community colleges and create an avenue for information sharing among grant recipients and others involved in clean energy training and education. (Approximate funding \$6 million)

The K-12 Education activity will work with U.S. K-12 students and educators who are eager to contribute their ideas to the solution of long-term environment and energy challenges, but often do not have adequate knowledge about the issues or potential career opportunities. These activities will be aimed at inspiring the next generation of Americans to pursue careers in science and energy, as well as teach young students the importance of sustainable energy use and energy savings in their daily lives and choices. (Approximate funding \$9 million)

DOE will seek input from a wide range of stakeholders and experts to formulate a strategy specifically targeted at enhancing K-12 interest in and understanding of science, technology, and clean energy. K-12 targeted activities will be coordinated with educational efforts across DOE and other Federal agencies. In addition to the Federal sector, DOE will reach out to private and non-profit organizations involved in science education to avoid duplication and build on other effective programs.

In FY 2011, DOE will implement activities that are viewed as most effective in getting K-12 students

(dollars in thousands)

FY 2009	FY 2010	FY 2011
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excited about how they can become a part of developing solutions to important problems associated with energy use such as climate change. This effort will include developing innovative approaches to engage the Nation's K-12 students and teachers, such as new online training offering interactive games and lessons that use the latest graphics, simulation, and technologies designed to appeal to youth.

In addition, DOE will collaborate with NSF on a national outreach effort to communicate the benefits of energy efficiency, as well as the actions that U.S. citizens can take to realize those benefits. The campaign will stress practical, cost-effective measures consumers can use to reduce consumption. The campaign will tailor messages to most effectively appeal to specific audiences. Depending on the targeted audience, messages may stress the cost benefits of energy efficiency; the link between affordable domestic energy and job growth; or, the connection between energy conservation, climate change and other environmental issues; as well as a variety of other themes. The campaign will take advantage of multimedia and modern communication technologies that have become widely used particularly among younger audiences (e.g., text messaging, Twitter, You-tube, video games, etc.). As with messaging, the method for communication will be tailored to the appropriate audience. This effort will include ongoing evaluations and semi-annual reporting to inform program implementation, execution and content as well as measure effectiveness.

In addition, up to 10 percent of funds will be used for administration and evaluation.

Total, Technical Training and K-12 Education	0	0	15,000
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Explanation of Funding Changes

FY 2011 vs. FY 2010 (\$000)

Technical Training, Education and Outreach

The increase reflects the start of a new activity.

+15,000

Total Funding Change, Technical Training, Education and Outreach

+15,000