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## COMMUNITY ESSAY

# EPA's P3 - People, Prosperity, and Planet - Award

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### Author's Personal Statement:

Challenges regarding population growth, global warming, resource scarcity, globalization, and environmental degradation have led to an increasing awareness that engineering design and policy strategies can more effectively advance sustainability. From a design perspective, this requires a fundamental conceptual shift from current "cradle to grave" industrial system designs toward more sustainable systems based on efficient use of benign materials and energy. One of the most powerful approaches to advancing sustainability is ensuring that the next generation of scientists, engineers, and policymakers has the intellectual tools necessary to design effective products, processes, and systems. I hope that EPA's P3 Award program remains central to this important and urgent effort.

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The United States Environmental Protection Agency (USEPA) has launched a unique grant program called P3 (People, Prosperity and the Planet), to foster future generations of scientists, engineers, and technology workers who can advance the principles of sustainability through technology innovation. Unique in the federal government, this program awards grants to teams of undergraduate and graduate students, along with their faculty advisors, to design and develop sustainability projects and support the integration of sustainability into higher education curricula. The teams also compete for additional funding to move their ideas to the marketplace. In its first year, the P3 program involved over 65 teams and 400 students from colleges and universities across the country and has already resulted in three small businesses. The program was launched and implemented in less than eighteen months and has been such a great success that the USEPA hopes to fund it annually.

Planning for the future is a critical aspect of sustainability. For the body of creative technology solutions to advance, we need to train future generations. However, most of the academic curricula in science and engineering is structured along traditional lines and offers only a small number of disjointed courses that discuss sustainability. The P3 program addresses the need to rigorously train students in the fundamentals of science and engineering, while they gain an awareness of their work's impact on the economy, society, and the environment.

To launch the P3 program, the USEPA brought together over forty partners from the federal government, industry, and scientific and professional societies to provide support. Through their communication efforts, the USEPA received nearly 150 applications. Each applicant was required to articulate the challenge and detail its relationship to sustainability, to define the innovation and technical merit associated with the project, to demonstrate their ability to measure outcomes through an effective evaluation method and implementation strategy, and to discuss the use of the P3 competition as an educational tool.

Ultimately, the EPA awarded 65 grants of \$10,000 to teams composed of students and faculty from diverse disciplines, such as engineering, chemistry, architecture, industrial design, business, economics, policy, social science, and others. The teams conducted their research and development over the course of the 2004-2005 academic year. In May 2005, the teams demonstrated their projects and competed for additional funding. The competition was held on the National Mall in Washington, DC and judged by a panel convened by the National Academies, advisors to the nation on science, engineering, and medicine.

Through the competition, seven teams won Phase II awards to further develop their innovations, in some cases commercializing them, and to continue learning about sustainability science and engineering. The seven teams and their projects follow:

- **Oberlin College** designed a system that monitors total energy and water use for individual dormitory floors or an entire college campus. This project was converted to a small business with clients including Duke University and Sidwell Friends School in Washington, DC.  
<http://www.oberlin.edu/dormenergy/main.html>
- **Rochester Institute of Technology** looked at how solar ovens could be mass-produced at low cost in Latin America using local resources. These ovens reduce wood consumption and deforestation, while providing local jobs. This project has been successfully implemented and evaluated in Venezuela, with plans to expand to other communities in South America.  
<http://www.rit.edu/~633www/EPAsolarovens/index.html>
- **University of North Carolina at Chapel Hill** measured the effectiveness of three drinking-water treatment technologies for the developing world. Their project is now quantifying the public health benefits of these technologies.
- **University of Colorado at Denver** looked at environmentally-friendly energy technologies, such as small wind turbines, composting methods (for solid waste management), and solar cookers to see if they could be adopted in a tribal village in India. This team has returned to the village to implement its design and continues discussing ideas for innovations that would improve the inhabitants' quality of life.  
[http://carbon.cudenver.edu/engineering/places/current\\_project/current\\_project.html](http://carbon.cudenver.edu/engineering/places/current_project/current_project.html)
- **University of California at Berkeley** tested two designs to disinfect drinking water, and even conducted user-preference and willingness-to-pay surveys. This project has won several additional awards, including the Massachusetts Institute of Technology IDEAS International Technology Prize, for its innovative design that is serving communities in Mexico and Haiti.  
<http://ist-socrates.berkeley.edu/~rael/uvtube/uvtubeproject.htm>
- **Massachusetts Institute of Technology** designed a management model for research labs to use less-toxic and less-polluting green chemical alternatives. MIT has now partnered with Los Alamos National Laboratory to perform a feasibility study of incorporating this software into their purchasing system.  
[http://web.mit.edu/environment/academic/green\\_chemicals.html](http://web.mit.edu/environment/academic/green_chemicals.html)
- **University of Michigan** developed a computer-based tool for homeowners to monitor their resource consumption. Real-time costs and environmental

impacts show how conservation actions are reflected in dollars saved and emissions reduced.  
<http://www.engin.umich.edu/labs/EAST/@home/home.htm>

Because one of the five key criteria used in evaluating proposals for funding was implementation as an educational tool, the P3 program already has exerted exponential influence on the next generation of students majoring in the winning schools' science and engineering departments.

The over 500 faculty and students from 52 colleges and universities that participated in P3 (see <http://www.epa.gov/P3> for more information) used this opportunity to alter core required courses, evolve senior capstone design courses around sustainability and their particular P3 project, and initiate certificates and minors in sustainability science and engineering. They also established extracurricular organizations that use science and engineering to address sustainability challenges on their campuses, within their communities, across the nation, and throughout the developing world.

Several universities that did not secure competitive funding from the EPA nevertheless proceeded with plans from their proposals, using the award process as an educational tool that reached students beyond the P3 boundaries.

The P3 program has the goal and potential to reach out to the thousands of colleges and universities across the country to transform the way we prepare tomorrow's workforce to meet tomorrow's challenges.