

Project Outcomes Report

Substantial global changes in energy production and use are occurring at present and will continue to occur for decades to come, with widespread ramifications for the distribution of wealth and power and humanity's social and environmental future. This raises important ethical considerations that should be addressed in the education of engineers and scientists, whose research and practice will assuredly involve energy to some degree.

In the three years of the project, the collaborative partners—the Center for Engineering, Ethics, and Society at the National Academy of Engineering (NAE) and the Consortium for Science, Policy and Outcomes at Arizona State University (ASU) sponsored a research workshop at NAE to delineate the project focus, developed an ASU seminar involving numerous faculty members that mentored graduate student research and participated in the development of the Arizona energy plan, held two rounds of workshops in energy ethics education for ASU graduate students, sponsored an energy ethics video contest, and held the National Institute in Energy, Ethics, and Society (NIEES) at ASU in April 2013 and the capstone project workshop “Energy Ethics in Graduate Education and Public Policy: Enhancing the Conversation” at the National Academies in September 2013. Evaluation results indicate the project has been successful in engaging students in various formats; additionally the project has illuminated a number of fundamental ideas about the interrelationships among energy, ethics, and society.

Overall, the project provided substantive educational opportunities for 150+ graduate and undergraduate students from a range of science and engineering disciplines at a dozen universities. The project also provided training in energy ethics research for 12 graduate students at ASU and six others at five different US institutions and one foreign institution, significantly enhancing a number of master’s and PhD theses projects. Work under this grant also contributed to 20 journal articles, book chapters, and thesis publications that contain specific results from the project.

The general project findings indicate that choices to develop or reorient energy technologies entail ethical and societal commitments that go beyond those that can be captured in cost-benefit analyses. They involve issues of justice as well as community life, so the choices should attend to questions of public participation and engagement, particularly how to include those persons and groups who are less influential. Design decisions that scientists and engineers make, and alternative energy pathways that can be selected, will influence the answers to these social and ethical questions so they need to be accounted for in these decisions. These findings influenced the educational framework and materials developed in the project. The project introduces energy systems as complex socio-technological systems and introduces ethical approaches to the analysis of these systems and system transitions. It uses case studies to illuminate ethical challenges.

Project information and materials are available at

<http://www.nae.edu/Projects/CEES/57196/EnergyEthics.aspx>.

This report is also available on the NSF Research.gov site at

www.research.gov/fedAwardId/1032966