Global Sustainability: An Authentic Context for Energy Education

Introduction
As a member of the NARA Education team, Facing the Future (FTF) was tasked with creating K–12 curricula and teacher workshops that promote the bioenergy literacy of students and teachers. While others may approach this task from the lens of one discipline such as science or social studies, our approach was to use a learning context that inspires educators and students to delve deeply and methodically into the social, economic, and environmental interconnections of energy issues—in other words, to learn about energy within the context of global sustainability.

For twenty years, FTF has developed global sustainability resources for educators around the world through a process that includes developing critical thinking skills, build global awareness, and engage in positive solutions for a sustainable future. Global sustainability education (GSE) describes the concurrent and intentional use of both global issues—issues that are transboundary, interconnected, and persist over time—and sustainability to frame and design curriculum.

FTF’s curriculum is used in all 50 US states and over 140 countries by teachers and students in grades K-12, in undergraduate and graduate classes, and across multiple subject areas. Our approach of working with educators around the nation and across the globe suggests that the context for education matters. Recent research and publications on energy literacy also suggest that the context for energy education matters.

Background
The desired outcome of many energy education programs is not necessarily to produce energy experts, but to foster energy literate citizens who are able to understand and explore the law of conservation of energy.

“Literacy implies not only the understanding of a particular, relevant body of knowledge and set of relationships, but moreover, the ability and willingness to use that knowledge in a functional manner—to read and write, to communicate, to participate in society.”

If our desired outcome for energy education is energy literacy, then content knowledge is not enough. Affect and behavior also must be addressed in order to promote energy literacy-essential-principles-and-fundamental-concepts-energy-education

Methods
Global sustainability was used as a guiding framework to select content, context for lessons, and to choose appropriate pedagogical methods for the elementary, middle, and high school versions of Fueling Our Future: Exploring Sustainable Energy Use. This curricula is interdisciplinary; the lessons seamlessly integrate core math, science, and social studies skills and create an authentically interdisciplinary opportunity for students to study energy. The lessons also help students broaden and deepen their global perspective through the inclusion of diverse cultural perspectives, world data, and case studies from around the globe.

Once outlines and lessons were drafted, many content experts, NARA members, and educators reviewed and piloted them, including the team at University of Idaho College of Natural Resources McColl Outdoor Science School (MOSS). Once lessons were finalized, Fueling Our Future was published in print, PDF, and SMART Board formats to meet the diverse needs of teachers. Content from this unit was then integrated into online and in-person professional development resources and presented to teachers at workshops in the Pacific Northwest and Wisconsin. Fueling Our Future is now available on Facing the Future’s website: www.facingthefuture.org

Outcomes
Since publication:
• 388 copies of Fueling Our Future have been purchased and distributed
• 271 free individual lessons have been downloaded from FTF’s website

“FTF conservatively estimates that 50% of teachers who order the resource use the resource, and each teacher serves 60 students.”

Since 2013,
• 487 educators have participated in FTF energy-related workshops or viewed FTF energy-related webinars.

Pre and post surveys were used with 32 teachers that participated in 3 different energy workshops facilitated by FTF in 2015. After these workshops:
• 100% of teachers agreed that they are more likely to integrate energy into their curriculum.
• 97% of teachers agreed that they are more likely to integrate sustainability into their curriculum.

Conclusion
As human energy use is complex and interdisciplinary in nature, so too should be our efforts in energy education. As shown in Facing the Future’s current, Fueling Our Future: Exploring Sustainable Energy Use, global sustainability is an authentic, interdisciplinary context for teaching students about the complexities of energy, addressing the social, economic, and environmental components of human energy use, and preparing students to be energy literate citizens. By presenting students with multiple perspectives on important energy issues and allowing them to grapple with real-world issues such as the development of sustainable aviation biofuels, students are able to formulate their own perspectives on energy issues and to develop the skills needed to positively respond.

Acknowledgements
This work, as part of the Northwest Advanced Renewables Alliance (NARA), was funded by the Agriculture and Food Research Initiative Competitive Grant no. 2011-68055-30416 from the USDA National Institute of Food and Agriculture.

References

Danica Hendrickson, ME; Kimberly Corrigan, MA, MCPL; Alicia Keeffe, ME; Danielle Shaw, JD; Sheeba Jacob, MEd; Laura Skelton, MS; Jennifer Schon, PhD; Karla Bradley Eitel, PhD; and R. Justin Hougham, PhD
NARA is led by Washington State University and supported by the Agriculture and Food Research Initiative Competitive Grant no. 2011-68005-30416 from the USDA National Institute of Food and Agriculture.