

Energy Education Forum #2: Energy Education
 Questions, Answers, and Comments

From	Question/Comment	Answer/Response
Mohamed Badissy	<p>Question re International Collaboration: Hannah made a great point about how a number of our international students are interested in Energy science/policy/economics (we've had the same experience at Dickinson Law). How are we connecting the Energy University initiative, and the associated curriculum reform, with our outreach to universities around the world? For example, a number of potential partner universities in Sub-Saharan Africa, South Asia and Central America sit in markets that are undergoing energy transitions that are strikingly similar to what we are experiencing here in Pennsylvania (fossil -> renewable, ag/energy nexus, focus on sustainable mining, etc). Some of our curriculum updates may want to borrow from their experience or could even be co-taught.</p>	<p><i>Tom Richard:</i> Penn State has formal MOU's with literally dozens, maybe hundreds of colleges and universities around the world. Many of the strongest connections are at the level of individual faculty, some with departments or colleges. IEE has focused on the Global Engagement Network partners selected by the Office of Global Programs: https://global.psu.edu/category/strategic-partners . Those collaborations with energy components include 2IE in Burkina Faso; University of Freiburg in Germany, Monash University in Australia, and Dalian University of Technology in China. We are also members of the International Universities Climate Alliance and the Global Council for Science and the Environment.</p>
Lara Fowler	<p>Question for Mary Beth and Joe. You both mentioned the need to integrate energy literacy throughout our courses, and help support the Commonwealth faculty focused on these issues. Given both of your experiences, how might you recommend doing this? The GenEd courses are mentioned as one way; are there others?</p>	<p><i>Joe Ranalli:</i> I think that one important element is paying attention to accessibility of the events to people throughout the state. Can we make sure that our communication reaches everyone at the university and provide opportunities for faculty and students at the campuses to engage in events remotely? And conversely, how can we make sure that activities taking place at the campuses are seen and engaged in by faculty and students at University Park?</p>
Seth Blumsack	<p>I am hearing a lot of wonderful things going on in energy education throughout the Penn State campus network - is there any discussion about using all of our new-found skills in online and multi-campus education to bring students from multiple campuses together in these educational activities?</p>	<p><i>Bruce Logan:</i> That is part of what this forum is about, seeing how we might do that. Ideas welcome! I know Joe Ranalli (Hazelton campus) is interested in this.</p> <p><i>Mark Sentesy:</i> This seems connected to the initiative Tom Richard mentioned the other day - the University-wide One Penn State 2025 initiative that aims to integrate campuses by 2025.</p>

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Justin Schwartz	How proactively do we couple our energy educational efforts with undergraduate research opportunities?	<p><i>Seth Blumsack:</i> That is a great question - in its short existence the Center for Energy Law and Policy has been successful at engaging undergraduates to work jointly with interdisciplinary teams of faculty, doctoral and professional students. These experiences leverage their core knowledge but give them exposure to broader parts of the energy world.</p>
Amber Cesare	How can we coordinate K-12 energy education outreach initiatives at the University? Most K-12 teachers are not trained on energy unless they seek out professional development in the area. As a result, K-12 students may not even know of the opportunities available in energy or have energy literacy.	<p><i>Mark Sentesy:</i> I spoke with Dean Lawless at The College of Education about the sustainability side of this issue, and I think they are very well connected to, and invested in building these relationships – we should bring them into the conversation.</p> <p><i>Tom Richard:</i> One program to leverage that has already developed some great K-12 energy programs is the Center for Science in the Schools. Contact Amber (see also her response below)!</p>
Stephen Lynch	Regarding energy literacy: one thing we are pursuing in Mechanical Engineering is to work with PSU OPP to display campus power/steam generation in realtime in student work spaces. This is especially interesting when they can link the various energy production sources with local conditions and time-of-day fluctuations.	<p><i>Tom Richard:</i> Great suggestion! That could be complemented by showing electricity consumption (which building occupants have more control over). Some colleges have set up competitions and even financial incentives to save energy.</p>

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Eric Reinhard	Other than time, etc. are there particular resource constraints/needs that are hampering our ability to advance our energy education aspirations?	<p><i>Justin Schwartz:</i> One issue our students face sometimes is needing to decide between a job that helps pay bills versus time spent on extracurricular activities like research. So if we had "Energy Scholars" to provide \$\$ support to UGs to participate in energy scholarship outside of their curricular requirements it would be impactful.</p> <p><i>Mark Sentesy:</i> new faculty need a) institutional recognition for interdisciplinary work, b) active support for developing connections across disciplines, since getting a research program running takes time, and such connections delay it.</p> <p><i>Tom Richard:</i> To transform the curriculum also takes time. Buying out a week or two of faculty time for a workshop that includes curriculum renovation with new modules as deliverables might help. A boot camp on Energy Education for Educators?</p>
Lara Fowler	Hannah mentioned the DSIRE website: database of state incentives for renewable & efficiency (https://www.dsireusa.org/)	<i>Seth Blumsack:</i> DSIRE is now a major resource for state energy policy information that was started as a project at NC State. So there is a huge role for universities to play in creating focal points for otherwise hard-to-find energy information.
Paul Shrivastava	Great discussion. Need more integration science with arts social science and humanities. Since 11 Colleges have established a Sustainability Council, perhaps these Councils be brought into conversation about energy transition, or even charged with proposing cross department and cross college courses on energy transformations	<i>Mark Sentesy:</i> great idea. Will need to set up a series of inter-collegial meetings between SCs.

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Hari Osofsky	We are very excited to be launching new Masters programs in Penn State Law and with College of Engineering and with Smeal. This program will help people for whom some legal knowledge will increase their impact. Our new Master's in Legal Studies and Certificate in Legal Studies launching this fall at Penn State Law will have an option to take a specialized degree in Energy Law and Regulation.	<i>Mark Sentesy:</i> Wonderful initiative. An opportunity to increase engagement with Liberal Arts units, especially ethics and justice, AFAM, Global Studies, School of Public Policy.
George Lesieutre	Could we steer more BS honors thesis research towards energy-related topics by offering resources and perhaps prizes?	<i>Bruce Logan:</i> Incentives are good for both students and faculty. <i>Mark Sentesy:</i> perhaps also connect with the Governor's Capstone program.
Paul Shrivastava	Marybeth and Mark mentioned the need for project based real world engaged learning. Sustainability Communities Collaborative is a good vehicle for such projects. Its projects in energy/climate have included developing GHG inventories for client organizations, and auditing solar potential for organizations. Each year we do about 40 projects each involving a Faculty mentor and group of 4 to 6 students.	<i>Tom Murphy:</i> There are a number of outreach efforts underway now to bring legislators in PA to a better understanding of the impacts associated with utility scale solar. This has expanded to an intense outreach effort within county commissioners and municipal officials on the front line of decision making on related topics. The work Mohamed Badissy is highly valuable in supporting this initiative. The demand is there and increasing. It is a question on willingness to engage, particularly as the topics become contentious. And PSU should remain neutral to keep its voice viable going forward with all sides of an issue.
Heidi Shadeck	I wholeheartedly support the focus on interdisciplinary energy education and research, but I would like to know if there is a similar, related focus on bringing together regulators, policy makers, researchers, educators, students and current energy industry professionals (in traditional oil and gas and alternative energy) so that all stakeholders have a deeper understanding of the true issues facing each role and leverage opportunities to align priorities.	<i>Seth Blumsack:</i> This is a major part of the mission of the Center for Energy Law and Policy. this engagement is built into the projects that the Center runs, and as the Center grows we anticipate being able to do this on a more consistent and broader basis. <i>Mark Sentesy:</i> Converges with opportunities from the Governor's Capstone project, and the upcoming federal Climate Corps.

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Thomas Richard	Susan Stewart is modest, Penn State has won the national Collegiate Wind Competition 4 of its seven years. We also have 1 second place and 1 third place. Other student energy related competitions include Ecocar and NetZero buildings.	
Tom Murphy	Does anyone want to offer any novel ideas on how to share their energy related research expertise with the many off campus public stakeholders beyond students?	<p><i>Amber Cesare:</i> The Center for Science and the Schools works with University Researchers to design and implement teacher professional development based on their research that is appropriate for K-12 students. We currently work Susan on KidWind.</p> <p><i>Susan Stewart:</i> Adding to Amber's comment... I work with CSATS to offer Teacher Professional Development in wind energy topics each year and also host a wind turbine design competition (virtual this year, but typically at the HUB) for middle and high school students in PA). I have also done an OLLI course, a lecture at Foxdale, talks at trade association meetings.</p> <p><i>Hannah Wiseman:</i> Tom Murphy raises a great point about sharing research beyond the university with stakeholders. Beyond Tom's major outreach work and efforts such as those led by the Center for Energy Law & Policy (directly working with regulators, industry, etc.), there's a lot more thinking to be done about how to bridge the academic-non academic divide. I think that hearing from communities about the research that would benefit them, and engaging them directly, is an important start. I'm new here, but it sounds like the Sustainable Communities Collaborative provides opportunities in that area.</p> <p><i>Hannah Wiseman:</i> One more point on outreach to other stakeholders: the legal clinics directly represent clients in Pennsylvania on energy/ag issues.</p>

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Paul Shrivastava	Tom Murphy/Heidi/Seth and others point to bridging academic with non academic audiences. This is vital and time bound. The longer our policy makers are uninformed the more damage they can cause. Especially true as the country transitions to a new low carbon economy. Can we focus some resources on getting our state legislators the science based understanding of energy, economy.	<i>Seth Blumsack:</i> Good point, Paul. One area we haven't talked about at all is continuing education or education for professionals, versus those seeking a traditional academic credential.
Hari Osofsky	On the environment and energy justice front, we might connect this civic education effort to the new collaboration emerging across the university on Rule of Law and Racial Equity	<i>Tom Richard:</i> Agreed Hari. Energy literacy is not just about technology. It includes understanding the role that power (economic, political, social, cultural... or the lack thereof) plays in power (production of energy, its distribution and use).
Brook Duer	I concur with all the comments made about the "outward facing" education, and I will get specific and say legislators, as what is the #1 single highest priority of an academic institution of PSU's magnitude at this extraordinary time. They are not amenable to education and that barrier needs to be broken down somehow.	<i>Tom Richard:</i> Penn State has enjoyed widespread support from the Pennsylvania legislature, and our government affairs staff have good connections that can open doors. While some conversations are hard, there is common ground to be found for those willing to engage.

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Lara Fowler	Joe mentioned equity- not only for students who may need support, but this is also a critical question for addressing inequities in energy & environmental justice (as Mark mentioned). I'd be curious to hear more on this from the panel.	<p><i>Mark Sentesy:</i> One approach would be for interdisciplinary groups (Energy Roundtables?) to coordinate classes to work on multiple aspects of a single big case per year (e.g. urban pollution in Pittsburgh, abandoned wells and mines).</p> <p>This should be supported by a citizen science initiative that actively engages local groups in the formulation, execution, and communication of such studies. This would empower citizens to shape research projects to be maximally useful, and give them the skills to analyze the issues, and the authority to speak on the issues affecting their communities.</p> <p>The justice issue is also deeply related to the discussion about inviting and building relationships with all our politicians on these questions.</p> <p>A domestic initiative, which would also foster connections across disciplines, would be to develop a review process for energy -related (and sustainability) grant proposals, in which projects would receive feedback from faculty (or alumni) who work on ethics issues.</p>

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Bruce Logan	Do we look at energy education individually in our college, or do we need a university wide committee to review this?	<p><i>Seth Blumsack:</i> One potential value of a university-wide committee would be to identify parts of the large university system that are doing similar things and could work collaboratively or learn from one another; and to identify potential gaps university-wide - things that no one is doing but we might think about starting.</p> <p><i>Michele Halsell:</i> university-wide is essential</p> <p><i>Mark Sentesy:</i> Agreed</p> <p><i>Susan Stewart:</i> Agreed as well. Although changes may also be necessary at the college level.</p> <p><i>Tracey Huston:</i> Perhaps you can model this after the University Health Sciences Council structure, agendas, strategy development, and execution.</p> <p><i>Hari Osofsky:</i> I agree with Tracey. The UHSC model has been very effective.</p> <p><i>Tom Richard:</i> the UHSC model is at the level of deans, directors and VPs. Top down support is essential and strategic coordination is needed, but I think there is also need for bottom up efforts. Rachel Brennan recently led the College of Engineering in a major-by-major assessment of the curricula with respect to Sustainable Development Goals. Something similar on Energy could be valuable. And for energy literacy, the Faculty Senate will likely need to be in the lead.</p>

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Mohamed Badissy	<p>One (potentially) simple action that could make a significant difference just within our faculty is some sort of central repository for energy/enviro related case studies that all faculty can access. For example, being able to draw on engineering, IP/licensing, land management challenges that come from other departments and use them as a basis for teaching law and regulation would raise the quality of our curriculum and would create a feedback loop where we are building more and more advance interdisciplinary materials.</p> <p>Also, cohorts for new professors (like myself) who are unfamiliar with interdisciplinary research, which is usually a post-tenure luxury, but are focused on energy issues could start building a community of like-minded scholars that can increase their impact as their careers develop</p>	<p><i>Sarah Klinetob Lowe:</i> In addition to faculty, and in response about continuing education & education for professionals, there is work by technical staff that can be part of this efforts, e.g., at Sustainability Institute, PennTAP, and Pennsylvania Housing Research Center.</p> <p><i>Mark Sentesy:</i> I second Mohamed's point: new faculty need a special amount of support here, not least because getting interdisciplinary research going takes longer - an obstacle for faculty on the tenure track.</p> <p><i>Hannah Wiseman:</i> I like Mohamed's comment about building interdisciplinary case studies. It would allow a law professor, for example, to teach a course in which students explored the impacts of rare minerals mining (land use, pollution-based, social impacts, etc.), potential engineering and other solutions for sustainable mining, and tools that could be woven into potential policies. Teaching courses with an end product of a model cord or a white paper report with specific solutions for communities (instead of or in addition to a final exam) is also a possibility. The courses could potentially focus on these interdisciplinary case studies.</p>
Susan Stewart	<p>There had been a question about whether we need new programs or whether we need to better advertise what we have now. I think we need to be doing both. We need to be better at advertising educational programs that we offer and make it clear to our students what they can expect from our programs.</p>	<p><i>Bruce Logan:</i> I think there was a lot of agreement that we need to be doing both.</p> <p><i>Tom Richard:</i> I would also argue that many of our existing programs will be more effective, and more attractive to students, if we refresh them with a look forward to the next 30 years.</p>

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Tom Murphy	On the professional development aspects of education, we have offered credits to attorneys for instance on energy related topics. There is a new initiative forming now on solar technology that some on this call will be involved with shortly. There is even greater need for this but there has to be support in both personnel and resources to make it happen. Most importantly, passion for doing this work is often the main driver for starting the efforts and continuing them over time as more people glean value from those programs	<i>Tom Richard:</i> This is a great example Tom, and illustrates the need for support.
Amber Cesare	(On the topic of energy literacy and education K-12) @Tom Richard I work for Kathy at the Center for Science and the Schools	<p><i>Lara Fowler:</i> Center for Science & the Schools: https://www.csats.psu.edu/ (Amber- thanks for joining us and sharing your thoughts on education, and CSATS).</p> <p><i>Michele Halsell:</i> Energy literacy of secondary students in New York State, DeWaters & Powers, 2010. energy literacy curriculum for high school students.</p> <p><i>Susan Stewart:</i> I have worked with CSATS for over a decade on offering wind professional development to teachers in PA as well as an annual Kidwind competition for middle and high school students.</p> <p><i>Bruce Logan:</i> I'm writing a book on energy use and climate change that might be helpful for instructors at many different levels.</p>

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Stephen Lynch	<p>@Mark Sentesy: what about helping students set up their own student organization around energy, that could be linked to institutes or college efforts?</p>	<p><i>Mark Sentesy:</i> Great idea, @Stephen. I think that integrating student clubs into existing energy unit programs is a great idea. The UPUA created sustainability committees that can be more deeply connected to the energy discussion too.</p> <p>I envision a dialogue connecting student orgs, Student affairs, UPUA, IEE, and OPP. Further ideas around this are welcome.</p> <p><i>Tom Richard:</i> There are many energy-related student clubs, especially in the energy-intensive majors. Some of the energy related interdisciplinary competitions include: Collegiate Wind Competition; Ecocar</p>