International Faculty Professional Development: Utilizing Hybrid Environments to Deepen Learning and Grow Community

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1.0 Introduction

In 2018, the Center for Renewable Energy Advanced Technological Education (CREATE) received funding from the National Science Foundation to administer an Energy Storage Project with the overarching goal of advancing the renewable energy sector by facilitating integration of energy storage technology into existing two-year college programs. The goals for this project included gathering expertise, conducting job task and curriculum gap analyses, producing instructional materials, implementing pilot energy storage courses, and providing professional development for college instructors.

The project's initial task was to work with educators to gather knowledge and expertise around energy storage technologies and energy education. Widespread adoption of energy storage is only beginning in the U.S. and, subsequently, energy storage-related educational programs are few; conversely, energy storage education efforts have already been pioneered and established in Europe, most notably in Germany. As a result, CREATE leveraged its history of improving energy education through international cooperation and organized a study tour to Germany for nine renewable energy educators to examine innovations in renewable energy and energy storage and to research how these technologies are incorporated into German workforce preparation.

In the planning and conducting international professional development opportunities for educators, two distinct challenges arise: that of ensuring academic rigor and of anchoring and capturing learning, especially given the additional cognitive load presented by being abroad. CREATE employs an evidence-based, international collaboration model - developed and improved over the course of two previous study tours - to meet these challenges. The learning plan consists of pre-travel online activities, knowledge capture and collaborative sharing during travel, and post-travel reflection. These activities combine to support educators in gathering and preserving knowledge gains and to facilitate collaborative knowledge-building that leverages the expertise and skills of the participant cohort.

While this paper presents the results of the CREATE professional development model, however the findings are not limited to energy storage or to the energy sector. Indeed, this analysis and the resulting set of recommended practices should be of interest to anyone interested in creating a meaningful educator professional development opportunity, especially if international travel is incorporated.

2.0 Context

2.1 Participants

Nine participants were selected using an application process developed during two previous CREATE international projects. An initial pool of potential partcipants were nominated by CREATE's industry and educational partners as having demonstrated discipline-centric expertise and educational excellence. This group was invited to complete a comprehensive application that captured their history, credentials and motivation for participation. From these nominees' application materials, the CREATE leadership team assembled an accomplished group representing a range of disciplines, regions and educational institutions.

Demographically, the final cohort provided national representation with participants hailing from Florida, Illinois, Indiana, New York, North Carolina, Oregon, Washington State and Wisconsin. The group consisted of four females and five males with expertise in a range of areas including building efficiency and automation, energy management technology, sustainable building practices, photovoltaic and solar thermal systems, industrial engineering, bio-fuels, and hydropower.

In terms of institutional representation, the group consisted of six community college or technical college faculty members, one high school instructor, and one university assistant professor; the remaining participant has community college teaching experience but currently directs a national non-profit renewable energy training organization. The educator-participants represented institutions ranging in size from from 5,000 to 40,000+ student full-time equivalents (FTEs) and administer programs that collectively offer a range of academic credentials including technical diplomas and certificates, associate, bachelor, and master degrees, and various types of industry certifications. For more information on participants, see Appendix A.

2.2 Itinerary

The Energy Storage Project study tour itinerary consisted of on-site visits with experts and practitioners in the areas of energy storage technology research and development, renewable energy education, and energy policy. The group initially convened at the Washington D.C. offices of the Heinrich Boell Foundation, a German non-profit public policy think tank affiliated with the German Green Party, for presentations on the German school system, the German political structure and the Energiewende - or "energy transition" - that Germany is in the midst of as it shifts from coal and nuclear energy to renewables and energy storage.

Once in Germany, the group visited energy storage technology and utility providers and met with city officials of two municipalities: the Green City of Freiburg and the energy independent city of Wildpoldsried which produces 7.5 times the amount of energy that it consumes. In addition, the participants visited cultural sites, educational institutions and co-operative Green communities. The trip concluded with two days at the SmarterE Conference, one of the largest solar conferences in the world. See Appendix B for itinerary and site details.

2.3 Professional Development Learning Activities

A proven curriculum, developed over the course of CREATE's prior international study tours, was employed to ensure academic rigor and to deepen participant learning. The learning plan consisted of 1) pre-travel online activities and webinars, 2) daily knowledge capture, individuated research and collaborative sharing during travel, and 3) post-travel reflection and summation. These mandatory activities supported the capture and preservation of acquired knowledge and facilitated participant sharing, which deepened and extended learning for the group and leveraged the expertise of cohort. Please see Appendix C for participant instructions for select activities.

Activities prior to travel were designed to capture existing knowledge, provide context and baseline knowledge in support of in-country learning, foster community and group colloboration, and to establish academic rigor. See Table 1 for a full description of pre-travel learning activities.

Table 1. Pre-Travel Learning Activities and Intended Purpose

Pre-Travel Learning Activity	Purpose
Pre-Survey	Inform selection of pre-travel learning materials; provide baseline data
Weekly readings & guided online discussions	Provide information on German education system, culture, energy policy, and storage technologies; foster community of learners; establish rigor
Monthly webinars	Increase connections via peer presentations and synchronous discussions
Pre-visit Site Reports *(peer presentations via webinar)*	Increase group awareness of sites, peers; reinforce rigor.
Individual Inquiry selected	Select research area tied to specific professional interest; reinforce rigor

Activities during travel ensured that participants captured acquired knowledge and reflected on their experiences daily, and actively participated with providing context and technical knowledge to the group. Please see Table 2 for details regarding learning activities conducted during travel.

Table 2. Learning Activities During Travel and Intended Purpose

During Travel Learning Activity	Purpose
Pre-Visit Site Reports *(peer presentation en route to sites)*	Reinforce site knowlege just before visit; deepen peer connection
Site Reports *(one report per site, due daily)*	Record of acquired knowledge, experiences, reflection; sustain rigor.
Individual Inquiry research	Anchor experience; capture individually relevant information

Post-travel activities supported participant reporting out of summative knowledge gains, measurement of pre/post project knowledge, and dissemination of key findings. Please see Table 3 for more details on post-travel activities.

Table 3. Post-Travel Learning Activities and Intended Purpose

Post-Travel Learning Activity	Purpose
Individual Inquiry Reports	Anchored learning experience; individualized outcome
Post-Survey *(conducted upon return)*	Collect data to compare against pre-travel survey results; solicit feedback on trip logistics and planning
Follow-up Survey *(conducted 8 months post-travel)*	Deepen awareness of project impact; solicit reflective feedback on learning experience; gain insights into practical applications
Conference presentations, journal publications	Dissemination of techical knowledge, project results; synthesize acquired knowledge

2.4 Theoretical Basis

The theoretical constructs that shaped the curricular model derive from a range of literature and methodologies, including those of learning science, distance education, and curricular design. Principles, theories and approaches from these disciplines and others were incorporated into the learning plan to increase its effectiveness. Below are three illustrative examples.

The first is the incorporation of social learning theory. Social learning theory posits that learning is fundamentally social, a "situated" activity rather than an isolated individuated process. Social learning theory is at the basis for many pedagogical practices today and was advanced in the foundational work of Jerome Bruner (1996) who proposed that to really "stick", learning needs to involve both acquiring knowledge about a topic or discipline but also understanding how this knowledge fits into the greater structure of the discipline's practice and culture. Jean Lave and Etienne Wenger, proponents of learning communities and the first to use the term "communities of practice," also embraced socially situated learning and found in their research that social learning is beneficial for growing group knowledge, noting that "where the circulation of knowledge among peers and near-peers is possible, it spreads exceedingly rapidly and effectively" (Wenger, 1998). Learning activities that utilized social learning theory and its promise of enriching and extending participant learning included online discussions and peer presentations of pre-travel site reports.

A second key element of the learning plan is reflected in the written Site Reports, submitted daily, that documented participant observations for each site visited. The act of writing has long been accepted as a means to solidify thought and observation; in this case, daily writing was employed to reinforce participant knowledge acquisition in the short term and to improve recall of the learning experience. This learning activity relates to the qualitative research methodology of autoethnography during which the researcher examines their own experience (auto) within the larger context or situation (ethnography). Examples of application would be the inclusion of reflective question prompts on the Site Reports template which cued participants to consider their knowledge gains and experiences against the backdrop of German technology, practice and culture.

The incorporation of anchored instruction also shaped the learning plan for this project. Anchored learning was first described by John Bransford and his team at the Cognition & Technology Group at Vanderbilt University (CTGV) in 1990. Closely related to the theory of situated learning mentioned above, anchored instruction is based on the theory that learning is improved when knowledge is embedded and contextualized and applied in an environment rather than in the absence of context. The Individual Inquiry activity is a variation on anchored instruction; proposed participant questions were vetted closely to ensure that inquiries aligned with trip resources. Allowing the participants to single out something they wanted to investigate stimulated curiosity, increased involvement, and made the results more personally meaningful.

3.0 Methodology

3.1 Approach

The primary source of data used to analyze the effectiveness of the various learning activities on participant knowledge acquistion and collaborative knowledge-building was a web-based survey conducted eight months after travel. This survey captured participant perceived value of the various learning activities and persistent changes in technical knowledge, teaching practice and curricular activity. Two surveys had been administered previously, one when the project began and one immediately following travel. These captured participant responses to similar survey items but as this data is not included in this analysis, these will not be mentioned further.

3.2 Subjects

The participants in the CREATE Germany Energy International Faculty Consortium are described in section 2.1 above. For more information on participants, please see Appendix A.

3.3 Survey Administration

The survey was administered via SurveyMonkey from January 2 to January 12, 2020. An initial email invitation was sent to all participants with reminders to non-responders on days 5 and 7. The final response rate was 100% with all surveys completed in full.

3.4 Instrument Design

An interactive initial page ensured informed consent. Four items on the first page collected data regarding impact on teaching and curriculum. The second page of five items focused on the impact on professional development, perceived knowledge gains, and community involvement. The following three pages recorded perceived value of each learning activity grouped as pre-travel (4 items), during travel (4 items) and post-travel which included dissemination (5 items). The final page used two open text items to request the most valuable aspect of the project and for any additional feedback. An exit page provided choices to opt in or out of being quoted in publication and to be consulted before being quoted. Throughout the survey, Likert-like scales were utilized to collect interval and ratio-scaled data along with open-ended text items. Please see Appendix D for the full survey instrument.

Responses were automatically aggregated prior to analysis to identify trends and frequency of response. For questions employing Likert scales, both the percentage of respondents selecting a given response and weighted averages were calculated to rank importance and facilitate interpretation of the results. Open text responses were analyzed independently by two reviewers, with conclusions then compared to discern emergent patterns and themes.

4.0 Results

4.1 Perceived Value of Pre-Travel Learning Activities

Learning activities that occurred prior to travel included reviewing provided learning materials, posting to moderated discussion boards, attending monthly webinars, preparing and presenting pre-visit site reports to peers, and selecting and finalizing an Individual Inquiry question. The majority of participants ranked each of the pre-travel activities as either "very useful" or "somewhat useful" with no activities perceived as "not useful at all". (see Table 4).

Table 4. Perceived Usefulness of Pre-Travel Learning Activities.

How useful were the PRE-TRAVEL learning activities?					
	Very Useful	**Somewhat Useful**	**Not very useful**	**Not useful**	**Weighted Average**
Preparing Pre-Visit Site Reports for others	8	1	0	0	3.89
Required readings	6	3	0	0	3.67
Crafting a question for my Individual Inquiry	5	4	0	0	3.56
Presenting Pre-Visit Site Reports on webinar	4	4	1	0	3.33
Moderated online discussions of readings	3	5	1	0	3.22
Listening to Pre-Visit Site Reports on webinar	3	4	2	0	3.11
Reviewing posted Pre-Visit Site Reports	3	3	3	0	3.00

A key takeaway is that activities that garnered relatively lower marks were mostly passive; reviewing/reading and listening to the reports of others were not reported to be as impactful as the active tasks of writing, presenting and even reading source materials.

Participants were also queried about the amount of information, facts and knowledge provided prior to travel to determine if the resources were perceived as too little, too much, or appropriate for their needs. Fifteen topical categories were utilized to collect and organize this feedback. The majority of respondents indicated that for twelve of the fifteen topic areas they had received the right amount of information (see Table 5).

Table 5. Participant feedback on the amount of information provided prior to travel.

Was the provided amount of PRE-TRAVEL information too little, too much, or an appropriate amount?				
	Appropriate amount	**Too little**	**Too much**	**Weighted Average**
Info about sites to be visited	9	0	0	3.00
Info on German energy policy	8	0	1	2.89
Info on societal factors influencing German energy usage	8	1	0	2.78
Info about participant expectations/ deliverables	7	2	0	2.56
Info on the German education system	7	2	0	2.56
Info on German energy storage technologies	7	2	0	2.56
Info on German culture in general	7	2	0	2.56
Pre-travel presentations by international peers	6	1	2	2.56
Pre-travel relationship-building with international peers	6	1	2	2.56
Info about peers with whom I'd be traveling	6	2	1	2.44
Info on German energy industry	6	3	0	2.33
Info on environmental influences on German energy use	6	3	0	2.33
Info on U.S. energy storage/renewable energy industry	4	5	0	1.89
Info on U.S. energy storage/renewable energy policy	4	5	0	1.89
Info on U.S. energy storage technologies	3	6	0	1.67

Interestingly, the three areas in which more than half the respondents would have preferred more information were all tied to the United States green energy and energy storage industry, technologies and policies. While this may be due to an oversight or to information overcrowding given the short time span to prepare the participants for travel, it may also speak to the emergent nature of this sector and the difficulty for experts and educators alike to keep current. Regardless it is an important reminder that providing relevant domestic information prior to travel increases

the ability of the participants to actively compare and contrast that which they are exposed to when abroad.

Comments from participants regarding pre-travel activities – for example, *"I think the pre-travel information was well done, thoughtful, and comprehensive. I feel it did a good job preparing me for the visit to Germany"* - reinforced the survey findings of perceived effectiveness of the activities. One comment that may be of interest to future professional development designers spoke to the inherent friction between thorough preparation and the desire to approach learning experiences without any pre-knowledge by noting *"Sometimes (often) I am at my best when I learn something that I've hardly been introduced to. Other times its the opposite."* While the two approaches are essentially mutually exclusive, it would be worthwhile to keep both positions in mind while creating professional development programs and activities.

4.3 Perceived Value of Learning Activities During Travel

During travel, learning activities consisted of written Site Report submissions for each site visited to capture participant knowledge gains, and the continuance of collaborative knowledge-building through peer presentations of Pre-Visit Site Reports while traveling to a given site. As with the pre-travel learning activities, none were rated as "not at all useful" and participants again showed a preference for actively constructing knowledge rather than passively absorbing information however this preference was less pronounced than with pre-travel activities (see Table 6).

Table 6. Perceived Usefulness of Learning Activities Occurring During Travel

How useful were the learning activities that occurred DURING TRAVEL?					
	Very Useful	**Some-what Useful**	**Not very useful**	**Not at all useful**	**Weighted Average**
Pre-seminar at Heinrich Boell Foundation	8	1	0	0	3.89
Listening to en route Pre-Visit Site Reports	7	1	1	0	3.67
Presenting en route Pre-Visit Site Reports	6	2	1	0	3.56
Gathering info for Individual Inquiry report	5	3	1	0	3.44
Writing Site Reports	4	5	0	0	3.44
Reviewing peers' Pre-Visit Site Reports online	4	4	1	0	3.33

The slight increase in perceived value of passive activities during travel is likely due in part to the top ranking of the all-day in-person orientation session at the Boell Foundation that preceded the group's international departure. While this particular activity was essentially passive, the presenters were extremely knowledgeable and generous with their time, and also provided the participants with their first opportunity to interact face-to-face with German colleagues. The peer presentations of the Pre-Visit Site Reports, which were among the lowest ranked pre-travel activities, moved into the second ranking during travel; this was likely due to proximity to the site and the immediacy of the need to know where one was going.

Participants were also asked to identify additional activities they felt would have deepened their learning during travel. Two of the six respondents indicated that meeting German educators would have been beneficial, noting that "it would be great to hold a collaboration session between German and American college instructors...to exchange curriculum and teaching ideas." These types of session were incorporated into previous international projects (see Alfano & Slowinski, 2014; Alfano, Slowinski & Walz, 2016) and were found to be quite helpful to participants. For this project, however, the focus was on gathering information on energy storage that will inform curricular development upon return, so visits were more heavily skewed to emergent technological sites. One other comment noted that "facilitated group discussions / de-brief sessions following each site visit (or group of site visits - or even every few days) to help process and share information, insights, and ideas among peers" might enhance learning. This suggestion may well inform future professional development activities however caution should be exercised, given the number of sites visited and the many hours spent together each day, to ensure that such additions do not preclude periods of unstructured time that allow for reflection, completion of required reports, and rest.

4.4 Perceived Value of Post-Travel Learning Activities

As with the learning activities that took place prior and during travel, both post-travel activities were reported to be “Very Useful” or ‘Somewhat Useful” by all participants (see Table 7).

Table 7. Perceived Usefulness of Post-Travel Learning Activities.

How useful were the learning activities that occurred AFTER TRAVEL?						
	Very Useful	**Somewhat Useful**	**Not very useful**	**Not useful**	**NA**	**Weighted Average**
Participating as a presenter or panelist	7	0	0	0	2	4.00
Completing Individual Inquiry Report	5	4	0	0	0	3.56

Although not all participants had yet been able to participate as a presenter or panelist, those that had done so clearly found this to be very useful to their learning and retention. Overall, the work on the Individual Inquiry Report was reported to be useful as well, with one respondent adding in the provided comment section that "I'll probably rate my report higher in a few years" presumably as the memories of the trip begin to recede. This is an interesting insight as it may speak to the importance of capturing the experience while it is fresh and documenting it in writing.

4.5 Impact on Professional Development

Nearly all of the participants reported impacts on their teaching practices and on curriculum development activity following this professional development opportunity. Key changes noted by participants as either implemented or in progress at the time of the follow-up survey included increasing or incorporating an international perspective to existing courses (76%), creating new lecture content (78%) and learning materials (56%), integrating new teaching methods learned from peers over the course of travel (33%) and even the creation of entire new courses (33%). While a more detailed analysis of these results is outside the scope of this paper, a full report on the impact of this study trip on content knowledge, teaching and curricular development is

provided by our peers in Bosman, Brinker & Walz (2020) and we encourage the interested reader to seek out this publication.

Survey items also sought to measure how this experience was perceived to have impacted the participants' professional development. The first of these questions explicitly asked respondents to rate how impactful the experience was on their development as professionals (see Table 8).

Table 8. Perceived Impact of Participation on Professional Development.

How has the international project impacted your PROFESSIONAL DEVELOPMENT?						
	Very Much	**Some what**	**A little**	**Did Not Occur**	**N/A**	**Weighted Average**
Gained knowledge about new or unique technologies	8	1	0	0	0	3.89
Developed professional relationships with other participants	8	1	0	0	0	3.89
Developed an understanding of renewable energy policy outside of U.S.	6	3	0	0	0	3.67
Fulfilled professional development institution requirement	5	0	1	1	1	2.88
Developed professional relationships w/ international peers	2	2	3	1	0	2.63
Influenced me to join related professional organizations	1	2	2	4	0	2.00

Two items tied for the top rating, those being "*gained knowledge about new or unique technologies*," and "*developed professional relationships with fellow participants*." These were followed closely by "*developed an understanding of renewable energy policy outside the United States*." In evaluating this feedback, it is worth noting that the learning activities developed for this professional development project were intended to support, encourage and facilitate educator knowledge-building and collaborative learning in an international setting. The impacts reported by the participants aligns well with the project objectives.

The next survey item that prompted participant response around professional development gains was an open text item; the resulting comments repeated very similar impacts. Of the seven comments, four noted professional knowledge advancement in the area of energy storage; two spoke to the connections formed with colleagues including the comment: "*Many of the instructors on this trip shared teaching strategies, and I have adopted some of their ideas and continue to stay in touch with them as we strengthen our classes and programs based on our collective experience."* This reinforces the findings from the previous survey item indicating that project objectives were met.

Finally, when respondents were asked about perceived persistence of the professional gains they had experienced as a result of this professional development opportunity, they again responded that the significant lasting impacts obtained from the experience centered around technological knowledge advancement, the benefits of an expanded professional peer network, and the first-hand observation of their area of pedagogical expertise in a foreign setting (see Table 9).

Table 9. Perceived Lasting Impact of Learning Activities.

How much LASTING IMPACT did the following experiences have on your professional practice?					
	Significant	**Some**	**Little**	**None**	**Weighted Average**
Exposure to new technologies	8	0	1	0	3.78
Working, traveling, learning with educator/peers	7	2	0	0	3.78
Visiting industry sites	7	2	0	0	3.78
Exposure to non-U.S. energy storage deployment	7	2	0	0	3.78
Visiting cultural sites	4	3	1	1	3.11
Visiting German energy policy makers	3	4	2	0	3.11
Interacting with educator/peers from outside the U.S	4	2	1	2	2.89

This data, along with the results from the two survey items discussed above, appears to substantiate the finding that the project goals - in terms of participant learning and collaborative knowledge-building - were realized.

5.0 Discussion

Designing and implementing professional development opportunities for educators, as with all curricular development, is made easier when goals are explicit and distinct. For this segment of CREATE's Energy Storage Project, the goals were to ensure academic rigor, to anchor and capture participant learning by supporting participants in recording and preserving knowledge acquisition and to facilitate collaborative knowledge-building. The data analysis of reported impacts of these learning activities and the overall professional development experience, while limited by the small number of subjects, does indicate that the goals of the project were met.

This analysis also allowed the authors to identify the learning plan elements most effective in deepening learning, aiding professional development, and building community, along with those elements that were less successful or that could be improved. These findings have been summarized as suggestions for developing impactful international professional development projects and are presented below.

5.1 Effective Learning Plan Elements

Academc Rigor: The expectation for academic rigor began with the first round of participant submissions and continued throughout the project; all submissions were reviewed with feedback promptly provided by the Learning Coordinator to guide participants in engaging with the learning activities at an appropriate level of critical thinking and review.

Knowledge Acquistion: In terms of deepening learning and ensuring knowledge acquisition, the inclusion of both pre- and post-travel activities stands out as key. Clearly the study results point to the effectiveness of the orientation provided by the Boell Foundation immediately prior to travel; such an orientation is strongly recommended as a result. Providing study materials and requiring their review and discussion grounded participants in the educational, economic,

cultural and political landscape of the country to be visited as well as the technologies to be encountered prior to travel; this too appears crucial as it provides context before the inevitable cognitive load presented by international travel. Setting a distinct personal learning goal prior to travel, as facilitated by the Individual Inquiry activity, anchored and guided learning for participants so that a meaningful personal outcome was obtained. Daily report writing provided for structured reflection, self-observation and critical thinking about knowledge acquisition as it occurred and deepened the professional development of the participants. Additionally, post-travel summaries and dissemination efforts served to cement the learning that had occurred, and expedited the discussion and sharing of individual findings.

Collaborative Knowledge-Building: The facilitation of collaborative knowledge-building was somewhat accomplished through required pre-travel online discussions and, more effectively, during travel when pre-visit site report presentations occurred on the way to a given site. Outside of the learning activities themselves, participants informally shared expertise, insights and acquired knowledge spontaneously during long hours of travel and rare moments of unstructured time. This type of exchange is a natural outgrowth of professional development-based travel and is enhanced when the cohort is mindfully selected with intentional balances struck in terms of areas of expertise, years of experience, teaching environment and general demographics. Although participant selection is not a formal learning activity and falls outside the scope of this paper, it is an important element when constructing a collaborative learning environment.

5.2 Learning Plan Elements To Be Improved

The learning activities were reported as effective by most project participants and supported the project goals. However, several elements were identified that could be improved.

One potential improvement would be to provide more information about U.S. technologies, policies and practices that mirror those studied abroad. The study results clearly indicate that this type of information was missed by participants and, given the speed at which such technologies and policies evolve, would provide a valuable service to all involved. Other improvements would be to increase the effectiveness of pre-travel webinar presentations of Pre-Visit Site Reports, and to improve instructions for the Individual Inquiries to support selection of meaningful topics to investigate. Adding summative group discussions periodically while traveling, without overfilling the schedule, may also be useful.

Lastly, it may be worthwhile to reincorporate a post-travel activity - such as a collaborative essay comparing and contrasting U.S. and German technologies and educational practices – that was part of previous CREATE study tours. This activity helped participants to summarize their learning and synthesize their findings into documents that can be shared with a wider audience.

5.3 Recommended Practices for International Professional Development Programs

When reviewing the analysis presented here, and considering the evaluation and analysis of CREATE's two prior international study tours, certain best practices emerge. Below is a summary that distills the learning activities and related components that the study authors have found to be effective. Please note that these recommendations are not limited to professional

development efforts with energy educators alone but should prove useful for anyone charged with creating a professional development experience abroad. Here are the recommendations:

- Create and use a competitive nomination, application and participant selection process to assemble a strong community of practice that embodies professional diversity and excellence and ensures a personal commitment by those selected to participate.
- Utilize pre-travel activities to present learning materials, webinars, and required assignments that establish baseline knowledge, foster peer relationships, and build the context for the international experience. This front-end work also helps ensure the best use of valuable time abroad.
- Ensure knowledge capture and retention by requiring daily writing exercises while traveling.
- Utilize post-travel assignments to support integration of acquired knowledge into participants' professional and instructional practices. Setting personal learning goals prior to travel and then reporting out post-travel can be helpful in accomplishing this.
- Plan and budget for dissemination opportunities for participants. Conference presentations, panel discussions and article submissions cement lessons learned and provide opportunities for participants to share experiences with others, thereby magnifying the impact of the project.
- Plan to measure both immediate outcomes and longer-term impacts to assess the success of the project. The impacts of such professional development experiences often take 1-2 years to manifest and it is important that project organizers plan and budget accordingly to capture such impacts.
- Do not underestimate the amount of work such a study trip involves! At a minimum, create a leadership team that includes the project lead, a program coordinator to handle logistics, and a learning specialist to develop, implement and manage the learning activities. Each performs distinct and necessary duties to ensure the study tour meets its goals. Ideally, this team would be expanded to make the workload manageable for all.
- If traveling to a region that speaks a language other than English, retain the services of translators with both foreign language and technical expertise.

6.0 Conclusion

When international professional development opportunities are deliberately and thoughtfully designed, are informed by learning theory, and are implemented with structured participant activites and feedback, project goals can be met and participants can experience meaningful gains. The results of this study demonstrate that international study tours can be extremely effective in deepening the technical knowledge of educators, in facilitating the incorporation of international trends and technological advances into curricula and instruction, and in fostering on-going community between education professionals to further advance teaching practice and improve the quality of related programs of study. Those interested in developing international programs in any discipline are encouraged to adopt and adapt the recommendations provided here to create successful projects of their own.

7.0 Acknowledgements

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List of Tables with Captions

Appendix A: Participants

PARTICIPANT	INSTITUTION	POSITION	SECTOR
Lisa Bosman	Purdue University West Layfette, IN	Assistant Professor	Industrial Engineering
Jennifer Brinker	Northeast Wisconsin Technical College Green Bay, WI	Faculty	Energy Management
Roger Ebbage	Lane Community College Eugene, OR	Faculty, Director - Energy & Water Education Programs, Director - NW Energy Education Institute	Building Efficiency
Deb Hall	Valencia College Valencia, FL	Faculty, Program Chair - Electronics Engineering Technology	Engineering Technology
Richard Lawrence	The Solar Foundation Washington, D.C.	Program Director	Solar, Renewable Energy
Scott Liddicoat	Green Bay Southwest High School Green Bay, WI	Faculty	Renewable Energy
Andrew McMahan	Central Carolina Community College Pittsboro, NC	Faculty, Department Chair – Sustainability	Bio-fuels, Hydropower, Sustainability
Chris Miller	Heartland Community College Normal, IL	Faculty, Program Coordinator	Renewable Energy
Louise Petruzzella	Shoreline Community College Shoreline, WA	Faculty, Director - Clean Energy & Technology Program	Renewable Energy

Appendix B: Sites Visited (by Type)

INDUSTRY and UTILITY SITES	
ADS Tec	The ADS-TEC group stands for advanced system solutions in the industrial computing and battery technologies sectors. The company offers energy management systems and the StoraXe and Big-LinX lithium-ion battery systems. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_9.html
Bandenova	Badenova is an ecologically-oriented, municipal energy service provider and distribution grid operator in the South Baden region with almost 1 million inhabitants. Its shareholders are 96 municipalities and Thüga AG, Munich. The company operates around 190,000 electricity meters and 170,000 natural gas meters. Badenova supports its municipal shareholders in the "Energiewende" with innovative, sustainable solutions. In addition to smart home components, Badenova offers end-customers battery storage, heating and PV systems as well as wall boxes for electro mobility. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_11.html
Bosch	Bosch is a German engineering and technology company. The Bosch Stuttgart location is the site of their prototype 2.7 megawatt lithium-ion battery designed for participation in the frequency regulation market. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_7.html
enBW Utility	Based in Baden-Wurtemburg, enBW is one of the largest energy suppliers in Germany and Europe. Projects include Project Grid-Control that is focused on maintaining a high quality, reliable supply of electricity while managing increasingly decentralized energy systems and an E-Mobility Alley that explores the effects on the grid of charging increasing numbers of electric vehicles. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_31.html
Reterra	Biodigester company responsible for collecting organic waste from the City of Freiburg's residences that processes approximately 32,000 tons of organic waste. Also recycles small volumes of organic waste from commercial businesses. The plant uses state-of-the-art technology and produces 4.7m cubic meters of high quality biogas every year. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_11.html

Solar Center	A platinum certified building providing 40 tenants and visitors an energy-efficient building with an energy concept at conventional costs. Among other things, the building features geothermal energy, photovoltaics, solar thermal energy and a natural cooling system. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_99.html
Strasse 50	The world's first high rise construction with Passiv Haus construction certification which requires less than 15 kWh per year for its heating facilities. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_99.html
Sonnen Battery	A global leader in battery storage in the ten years since its founding in 2010. Sonnen produces home energy storage systems for private residences and small businesses. Its batteries are based on lithium-ion technology and can last up to 40 years. Sonnen has already installed over 40,000 storage batteries worldwide and is expanding throughout Europe, in the U.S. and in Australia. The company was among the first in the world to introduce the concept of a virtual utility based on dispatchable energy storage capacity. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_14.html
The Solar Settlement	The Solar Settlement in Freiburg consists of 59 residential buildings, including nine penthouses on the rooftop of the office and commercial "Sun Ship" building. All homes are built of wood construction, using only healthy building materials, and all have a large roof of photovoltaic modules. The individual residences remain car-free, thanks to an underground parking structure beneath the "Sun Ship" and a well-organized car-sharing system. With a total photovoltaic capacity of 445 kW, the generates around 420,000 kWh of clean solar electricity per year. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_12.html
VAG	Verkhers AG is the public transportation agency in Freiburg Germany. It operates a fleet of 62 trams and 104 buses which combined provide for more 9.2 million kilometers of travel per year. Verkhers AG installed a flywheel energy storage system to recover energy from the tram cars during braking events. This energy is then released back to the tram to boost acceleration when leaving the tram stop. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_10.html

COMMUNITY SITES	
Creilsheim, Steinbeis Research Institute for Solar and Sustainable Thermal Energy Systems	The City of Creilshiem located in the state of Baden-Württemberg is the location of a large scale solar thermal seasonal energy storage project. The project integrates solar collectors into the architectural design of both multi-unit and single family homes. The massive undergound energy storage field is located within a communal green space, constructed under a hill near a children's play area. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_8.html
Heliotrope	Designed by the architect Rolf Disch, the Heliotrope was the first home in the world to produce more energy than it consumes. The home is emission-free, carbon neutral and 100% regenerative. The building is cylindrical in design and rotates on a central axis to capture optimal sunlight for the solar panels that are placed around the building. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_12.html
Vauban	The District of Vauban in Freiburg, has been called the "world's most successful model for sustainable urban development." Vauban was created on the site of a former French Army housing area, that was redeveloped as a sustainable living community. The District was planned around green transportation with no cars allowed in the area. The commitment to developing green spaces within Vauban began at the earliest design stage of its development with a commitment by residents to keep as many of the native trees in place. Remarkably, this motivated the alteration of the development site plans so as not disturb the existing trees, and ultimately resulted in an interconnected network of central parks and green spaces that tie the neighborhood together. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_12.html
ACADEMIC SITES	
Fraunhofer Institute	The Fraunhofer Institute for Silicate Research ISC is an R&D center for material-based research and development in the fields of energy, environment and health. The lab conducts rigorous testing of many types of solar devices, inverters and battery systems to evaluate their efficiency, quality and durability. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_50.html

University of Stuttgart	The University of Stuttgart Institute for Thermodynamics and Thermal Engineering targets scientific research in fundamental thermodynamics and thermal energy that enables solving challenging engineering problems of high practical and social relevance. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_8.html
POLICY SITES	
Boell Foundation	The Heinrich Boell Foundation is the educational foundation associated with the German Green Party. Headquartered in Berlin, the Heinrich Boell Foundation maintains 30 offices across the globe, including the one in Washington D.C. Through the analysis of policy initiatives, standards, and pricing mechanisms, the Foundation seeks to provide the German government and other groups with information necessary for informed policy discussions. The Foundation publishes analyses of German energy policies and perspectives, and pieces on European and global issues related to sustainability, climate change, and related topics. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium.html
City of Freiburg	Freiburg is known for being one of the greenest cities in the world and leads Germany in initiatives for energy efficiency, renewable energy, electric vehicles, city planning, sustainable housing and building standards. The city aims to reduce their carbon dioxide emissions by 60% by the end of the year 2020. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_9.html
City of Wildpoldsried	Wildpoldsried has a population of approximately 2,600 and is considered a European champion for energy as it produces 750% more energy than the village consumes. This village is supported entirely by renewable energy sources including biomass, biogas, hydro, wind, solar, combined heat and power, and district heating technology . The village manages the distribution of energy using a smart grid and battery system to strategically store and dispatch energy to the local utility. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_14.html

CONFERENCES	
Smarter E Europe	Smarter E began as the Intersolar Conference in the 1990s and was held in Freiburg, Germany for many years until 2007, when it became so large that it moved to Munich. It is now the world's largest renewable energy trade fair with international exhibitions in Europe, North America, South America and Asia. With the growth of the industry, Intersolar's influence and reach has grown to incorporate several related technologies. Under the new Smarter E brand, the event now combines four parallel conferences and exhibits including Intersolar, Electrical Energy Storage, Power2Drive, and EM Power. https://createenergyorg.blogspot.com/2019/05/energy-storage-faculty-consortium_15.html
CULTURAL SITES	
Heidelberg Castle	Located in the university town of Heidelburg, the castle is a ruin and historic German landmark. The ruins are among the most important Renaissance structures north of the Alps.
Hohenzollern Castle	Hohenzollern Castle is the ancestral seat of the imperial House of Hohenzollern. The third of three hilltop castles built on the site, it is located atop Mount Hohenzollern, above and south of Hechingen, on the edge of the Swabian Jura of central Baden-Württemberg, Germany.
Rothenburg ob der Tauber	Rothenburg ob der Tauber is a historic walled city in northern Bavaria known for its medieval architecture. Half-timbered houses line the cobblestone lanes of theits old town. The perimeter walls include many preserved gate houses and towers, plus a covered walkway on top. St. Jakob's Church houses an intricate, late Gothic altarpiece by woodcarver Tilman Riemenschneider.

Appendix C: Sample Assignment Instructions

Pre-Visit Site Reports - Overview

For this assignment, each of you will become the "lead learner" for the various sites we will visit, and provide an overview about the location for the team both before and during travel.

Each participant will be assigned 1-2 site(s) in Freiburg and 1-2 sites in Stuttgart. This module contains the instructions and support materials you need to complete this "pre-visit" assignment but here's an overview of what you will do:

- **Complete a written report about your sites.** Research your site(s) and complete a standardized form to report what you have learned. The completed reports will be collected, posted, and used to provide everyone with "snapshot" reviews of the places we will be visiting.
- **Share your findings** during our March 22nd and April 26th webinars by providing your responses to three quick questions about your site.
- **Repeat your summary en route to your sites** to get us all reacquainted with what we will be seeing

Pre-Visit Site Reports - Instructions

Completed reports will be posted on this site to provide everyone with "snapshot" reviews of the places we will visit. Here's what to do:

- **Determine the site to which you have been assigned.** Site assignments are listed on the next page of this module.
- **Download the form.** Use the standardized form (provided) to help everyone easily review the sites we will be visiting.
- **Research your site(s).**
- **Upload your completed form using this Assignment tool. Click** on the "submit assignment" button to the right and attach the completed form.

Appendix C: Sample Assignment Instructions (continued)

Site Visit Report – Report Template

CREATE Energy Storage Project
Site Visit Report

Site:

Date of Visit:

Report Author:

Optional: Submit two images of site *(.jpg, .png or .gif only)*

Image File #1 (*site_yourlastname01*):
Short description/caption of scene, people:

Image File #2 (*site_yourlastname01*):
Short description/caption of scene, people:

What was unique about this site or the work being done there?

What was your biggest take-away from this visit?

Who did you learn the most from during this visit? Host or peer? What knowledge did they help you attain?

Did this site provide insights or information you will integrate into your teaching? If so, please describe.

Did this site contribute in any way to the research you are doing on your individual inquiry question(s)? If so, how?

Other comments or notes:

Appendix C: Sample Assignment Instructions (continued)

Individual Inquiry Report - Instructions

The post-travel Individual Inquiry report will consist of findings from an individualized investigation undertaken during travel. Each participant will select an overarching or framing question (or set of questions) that are relevant to your work as an educator for green jobs; this will then serve as a framework for inquiry while visiting sites and meeting our hosts.

Step One: Propose your Framing Question(s)

Due Thursday April 11

- Select one or two overarching questions regarding energy storage, German technician education and/or technician training system that relate to your work as an educator.

  For example, questions might be related to:
  - educational pathways
  - program administration
  - curricular models
  - educator professional development
  - industry involvement
  - teaching methods
  - lesson plans
  - or any other topic that could inform your own technician training activities

- Submit your draft questions by **Thursday April 11** using the assignment drop box for Individual Inquiry Draft Questions

- You will receive feedback on your proposed inquiry questions by Friday April 19th

Step Two: Finalize your Framing Question(s)

Due Thursday April 25

- After receiving feedback regarding your draft question(s), further refine your framing question(s) if necessary.
- Submit your final framing question(s) by April 25th using the Final Report Part II: Final Framing Question assignment page.
- Questions will also be announced during the April 26th webinar.

Next Steps: Research your question during travel & write up your findings

Instructions for writing up your individualized investigation will be published prior to travel with an emphasis on outcomes that will be useful and usable in your practice as an educator.

Appendix D: Full Survey Instrument

CREATE International Energy Storage Project Participant Survey

Introduction

Thank you for assisting in our efforts to better understand and measure the impact of CREATE's international **Energy Storage Project** on your teaching practice, professional development and community work.

The following survey is intended to capture your thoughts and actions as related to this project. Results will form the basis for papers submitted to the American Society for Engineering Education (ASEE) and future presentations.

Please note:

- This survey should take approximately 20 minutes to complete. It may take a bit more time if you provide longer, more detailed answers.
- You can revisit the survey and complete it over multiple visits and/or revise your responses up until the day the survey closes on **Sunday January 12 at 11:59pm**.
- Your responses will be reported in the aggregate, for the most part. Comments may be quoted in the paper to highlight findings, but you can opt out of being quoted at the end of the survey and we will honor your wishes.
- Your participation is completely voluntary and you may withdraw at any time but we hope you will contribute your thoughts so that we can create an accurate picture of the outcomes of this project.

Again, we sincerely appreciate your time and generosity in sharing your thoughts and suggestions.

If you have any concerns, suggestions or questions, please contact Mary Slowinski (mslow.create@gmail.com) or Gabie Temple (gabrielle.temple@canyons.edu).

Response Required: By clicking "I agree" below, I indicate that I have read and understood the information provided above, and agree to participate in this survey willingly.

- ○ I agree
- ○ Exit survey

CREATE International Energy Storage Project Participant Survey

Impact on Teaching and Curriculum

What subjects do you teach? *(select all that apply)*

- [ ] Energy Efficiency
- [ ] Solar
- [ ] Wind
- [ ] BioEnergy
- [ ] Geothermal
- [ ] Other (please specify)

How has your participation with the international Energy Storage Project impacted your TEACHING practice? I have...

	Implemented	In process	Not at this time	N/A
Developed new course lectures	○	○	○	○
Developed new written course materials	○	○	○	○
Developed new course units or modules	○	○	○	○
Developed entire new courses	○	○	○	○
Adopted new instructional techniques	○	○	○	○
Incorporated or increased the international perspective in my courses	○	○	○	○
Connected my classroom to international speakers	○	○	○	○
Referred students to pursue international opportunities	○	○	○	○
Sponsored student international activities (trips, conferences, partnerships, etc)	○	○	○	○

Are there any additional ways in which your TEACHING practice has been impacted by your international experience?

If YES, please describe.

In the next FIVE years, how likely is it that:

	5 - Very Likey					0 - Not Likely
New lecture content will be added on energy storage technology	○	○	○	○	○	○
New lab activities will be added on energy storage technology	○	○	○	○	○	○
New equipment or tools will be acquired for teaching energy storage technology	○	○	○	○	○	○
The school/institution will install an energy storage system on site	○	○	○	○	○	○
A new course will be developed on energy storage	○	○	○	○	○	○
One or more faculty will seek additional professional development in energy storage technology	○	○	○	○	○	○

CREATE International Energy Storage Project Participant Survey

Impact on Professional Development & Community Leadership

How has the international Energy Storage Project impacted your PROFESSIONAL DEVELOPMENT?

	Very Much	Somewhat	A Little	Did not occur	Not applicable
Gained knowledge about new or unique technologies	○	○	○	○	○
Developed professional relationships with fellow participants	○	○	○	○	○
Developed professional relationships with international peers	○	○	○	○	○
Fulfilled professional development expectations by my institution	○	○	○	○	○
Developed an understanding of renewable energy policy outside the United States	○	○	○	○	○
Influenced me to join related professional organizations	○	○	○	○	○

Do the following statements reflect changes you've experienced because of the international experience?

	Very much so	Somewhat	No change	Not applicable
I am more attentive to international events and developments in energy storage and renewable energy	○	○	○	○
I am more likely to engage in discussions related to international advances in energy storage and renewable energy	○	○	○	○
I am more likely to engage in conversations about international energy policy	○	○	○	○
I am more likely to be active as an energy policy advocate in political arenas.	○	○	○	○

To what degree did the ESP project increase your knowledge or understanding of the following topics?

	5 - Significant Gain	4	3	2	1	0 - No Gain
Thermal Energy Storage	○	○	○	○	○	○
Seasonal Energy Storage	○	○	○	○	○	○
Utility Scale Battery Energy Storage	○	○	○	○	○	○
Residential Scale Battery Energy Storage	○	○	○	○	○	○
Energy Storage for Transportation	○	○	○	○	○	○
Integration of Energy Storage and Solar Photovoltaic Technology	○	○	○	○	○	○
Integration of Energy Storage and Smart Grid Technology	○	○	○	○	○	○

In summary, how much did you know about energy storage...

	5 - A lot					0 - Nothing
BEFORE the Energy Storage Project?	○	○	○	○	○	○
AFTER the Energy Storage Project?	○	○	○	○	○	○

Please describe one example of how your involvement with this project has impacted you as a professional.

CREATE International Energy Storage Project Participant Survey

Project Activities: Pre-Travel

How useful were the PRE-TRAVEL learning activities in terms of expanding or solidifying knowledge?

	Very useful	Somewhat useful	Not very useful	Not useful at all
Required readings (on web site)	○	○	○	○
Group discussions of readings (on web site)	○	○	○	○
Researching and writing my Pre-Visit Site Report(s) for others	○	○	○	○
Reviewing Pre-Visit Site Reports posted by others	○	○	○	○
Listening to Pre-Visit Site Reports on a webinar	○	○	○	○
Presenting my Pre-Visit Site Report(s) on a webinar	○	○	○	○
Crafting a question for my Individual Inquiry	○	○	○	○
Monthly logistics webinars	○	○	○	○

In regards to information provided PRE-TRAVEL, would you have liked…

	More information	Less information	Appropriate amount of info provided
Info about sites to be visited	○	○	○
Info about peers with whom I'd be traveling	○	○	○
Info about participant expectations/deliverables	○	○	○
Info on the German education system	○	○	○
Info on the German energy storage and renewable energy industry	○	○	○
Info on German energy storage technologies	○	○	○
Info about environmental factors that influence German energy storage and renewable energy usage	○	○	○
Info on German energy storage and renewable energy policy	○	○	○
Info about cultural and societal factors that influence German energy storage and renewable energy usage	○	○	○
Info on German culture in general	○	○	○
Info on the U.S. energy storage and renewable energy industry	○	○	○
Info on U.S. energy storage and renewable energy policy	○	○	○
Info on US energy storage technologies	○	○	○
Pre-travel presentations by international peers	○	○	○
Pre-travel relationship-building activities with international peers	○	○	○

Other (please specify)

CREATE International Energy Storage Project Participant Survey

Project Activities: During Travel

How useful were the learning activities that occurred DURING TRAVEL in terms of expanding your knowledge, solidifying discoveries and/or impacting your teaching practice?

	Very useful	Somewhat useful	Not very useful	Not useful at all	N/A
Writing Site Reports	○	○	○	○	○
Reviewing Pre-Visit Site Reports posted by others	○	○	○	○	○
Listening to the Pre-Visit Site Reports en route to a site	○	○	○	○	○
Presenting my Pre-Visit Site Report(s) en route to a site	○	○	○	○	○
Collecting information for my Individual Inquiry report	○	○	○	○	○
One-day seminar at Heinrich Boell Foundation	○	○	○	○	○

Are there any other activities that would have assisted you in building knowledge or improving your practice DURING TRAVEL? If so, please describe.

Please describe the one (or more) experience you had DURING TRAVEL that has most influenced your thinking about energy storage or energy storage education.

CREATE International Energy Storage Project Participant Survey

Project Activities: Post-Travel

How useful were the learning activities that occurred AFTER TRAVEL in terms of expanding or solidifying your knowledge and impacting your practice?

	Very useful	Somewhat useful	Not very useful	Not useful at all	N/A
Researching and writing my Individual Inquiry Report	○	○	○	○	○
Participating as a presenter or panelist on behalf of CREATE	○	○	○	○	○

Other (please specify)

How have you disseminated the knowledge you gained through this experience?

	5 or more times	3-4 times	twice	once	have not yet shared in this way	N/A
Discussed this with peers at my institution	○	○	○	○	○	○
Discussed what I learned with my school administration	○	○	○	○	○	○
Delivered presentations/lectures to faculty at my institution	○	○	○	○	○	○
Delivered presentations/lectures to my school administration	○	○	○	○	○	○
Delivered presentations/lectures to other energy professionals	○	○	○	○	○	○
Delivered presentations/lectures as part of a conference or symposium	○	○	○	○	○	○
Delivered presentations/lectures to the general public	○	○	○	○	○	○
Written articles	○	○	○	○	○	○
Presented before government or regulatory agencies	○	○	○	○	○	○

Other dissemination efforts (please specify):

Which of the following experiences during travel have had lasting impact on your professional practice?

	Significant lasting impact	Some lasting impact	Little lasting impact	No lasting impact
Interacting with educator/peers from outside the U.S.	○	○	○	○
Working, traveling and learning with a cohort of renewable energy educator/peers	○	○	○	○
Visiting industry sites	○	○	○	○
Exposure to new technologies	○	○	○	○
Visiting with German renewable energy policy makers	○	○	○	○
Exposure to energy storage deployment outside the U.S.	○	○	○	○
Visiting cultural sites	○	○	○	○

Other useful opportunities during travel? Please describe.

Please estimate the approximate NUMBER of people from the following groups with whom you shared information, insights, or details from your international experience with CREATE.

Students

Educators

School Administrators

Energy Professionals

Business and Industry Contacts

Government Agency Workers/Regulatory Officials

Elected Officials

General Community Members

CREATE International Energy Storage Project Participant Survey

Last Page!

Please describe the most useful thing you took away from the international experience.

Please share any additional comments, observations or outcomes/impacts you may have regarding the CREATE international learning project(s).

CREATE International Energy Storage Project Participant Survey

Thank You!

Thanks very much for taking time from your busy schedule to help us to measure the impact CREATE's international Energy Storage Project has had on your practice, professional development and community work.

As the results from this survey are compiled, we may want to contact you with some follow-up questions. Please indicate your willingness to participate below.

- ○ Yes, it is okay to contact me with follow up questions.
- ○ No, please do not contact me with follow up questions.

We also may want to include your comments as illustrative examples in papers and presentations. Please indicate your preference regarding this below.

- ○ Yes, I consent to my individual responses being used in the ASEE paper.
- ○ No, please report my responses in the aggregate ONLY.
- ○ Please contact me prior to using my statements

This concludes the survey.

If you wish to revisit or revise your responses, you can do so until the survey is closes on SUNDAY JANUARY 12th at 11:59PM.

Please exit by clicking "Done" below. This browser window will close at that time.