

U.S.-Pakistan Centers for Advanced Studies in Energy

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Energizer



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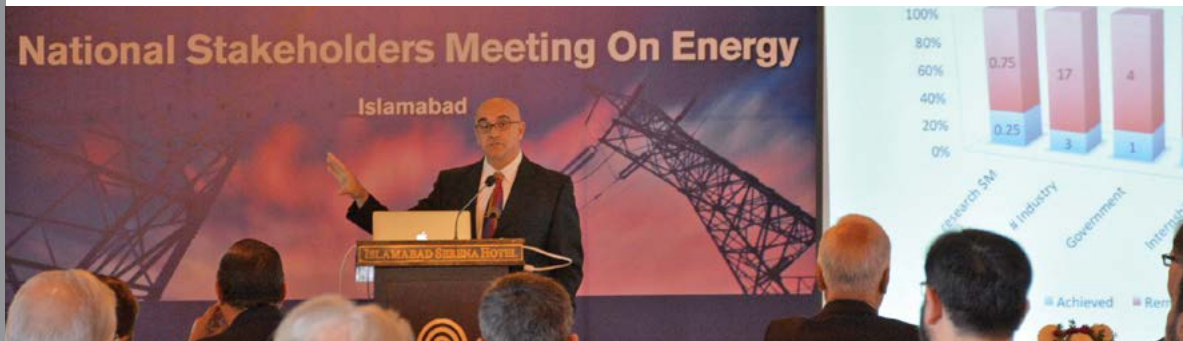
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Second Stakeholders Meeting Takes Place in Islamabad

The U.S.-Pakistan Centers for Advanced Studies in Energy (USPCAS-E) organized its second National Stakeholders Meeting on Energy in Islamabad, Pakistan this December. Led by Arizona State University, the meeting included senior officials from the government of Pakistan, the United States Agency for International Development (USAID), energy firms based in Pakistan and representatives from academia.

The meeting served as a platform to discuss and prioritize strategies that can help create a collaborative and sustainable environment under which key stakeholders and the USPCAS-E universities will continue to work. The end goal of this meeting is to create enhanced cooperation and help mitigate Pakistan's energy challenges.

During the meeting, stakeholders provided candid feedback on how USPCAS-E's activities, like applied research projects and curriculum, need to be aligned with the aim of meeting the demands of Pakistan's energy sector. The stakeholders also assessed and helped prioritize the role of NUST and UET Peshawar with regard to influencing Pakistan's energy policy.



Message from the Project Director

USPCAS-E has made great strides in governance, curriculum reform, applied research, sustainability as well as the scholar exchange program as we conclude 2016. Two cohorts of exchange scholars have now returned to Pakistan and USPCAS-E is gearing up for the next group of enterprising scholars who will arrive in the new year. 2017 brings great promise for further developing the relationship with our partners as well as bringing the U.S. and Pakistan people closer together.

-Dr. Sayfe Kiaei, Project Director, USPCAS-E



ASU Conducts 4th Technical Workshop in Pakistan Green Buildings: U.S. and Pakistani Practices

Arizona State University in collaboration with the Green Building Council of Pakistan facilitated a two day training workshop on Green Buildings in Pakistan in December. This was the fourth in a series of workshops on energy that ASU will deliver in Pakistan throughout the duration of the USPCAS-E project. Led by Professor Harvey Bryan, the workshop reviewed several of the

green building practices that are currently in use in the U.S. which could be adapted to Pakistan. Attended by over 100 participants from partnering Pakistani universities and representatives from Pakistani industry, the participants learned the basic principles associated with green building projects and the impact that construction projects have on the environment.

Dr. Harvey noted that, “Students from NUST and UET were very engaged during our two day workshop. They asked great questions and were very interested in moving green buildings into the mainstream of Pakistani building practices.”



“The building sector is one of the fastest growing sectors in the Pakistani economy. Initiating aggressive green building practices will create a strong sustainable foundation as Pakistan moves forward.”

Dr. Harvey Bryan, USPCAS-E Curriculum Lead,
Director of Solar Energy Engineering and Commercialization/ASU

ASU/USPCAS-E Energizes Entrepreneurial Aspirations for Pakistani Scholars

The second cohort of Pakistani engineering scholars has completed their entrepreneurship course of study at Arizona State University. In addition to entrepreneurship, the students also studied engineering as well as policy in an effort to enact change and improve their country’s energy prospects.

ASU entrepreneurship profes-

sor Kenneth Mulligan says, “The intention of the program is to improve availability of clean reliable power in Pakistan. Strategic innovation and entrepreneurship provides a pathway for widespread implementation of their innovative technical solutions.”

“Pakistan is subject to rolling blackouts that impede stability, progress and business. The

problems faced in Pakistan are not easy problems, which is why coming up with solutions that reside ‘outside the box’ are so critical,” says Mulligan, who has taught and mentored both cohorts so far. “They get to use causative thinking, systems analysis and technical feasibility to solve complex technical problems in energy generation and distribution. However, this problem

solving approach and skillset is insufficient in the development of innovative and disruptive products and technologies.”

Mulligan believes that all of the scholar’s final projects have market potential. All 27 of the visiting scholars, six of whom are women, took Mulligan’s class. One project of particular interest was presented by Nafeesa Irshad. Irshad’s project involved developing a solar-powered drinking water purifi-

and cleans the water. “It would be [a] more energy-efficient system as compared to existing reverse osmosis technologies.”

Noaman Khan, another enterprising student in the class has the idea to pursue low-cost catalysts for proton exchange membrane (PEM) fuel cells. He wants to find new materials that can possibly replace platinum as a catalyst because the material is so cost-prohibitive. A more affordable, durable and reliable catalyst would

entrepreneurship to go side-by-side. I didn’t realize it before this course. We should make discoveries that can create value.”

According to Mulligan, “Entrepreneurship gets them to think about implementation and commercial feasibility. It’s a way to connect their engineering skill set with an entrepreneurial mindset. Who has the problem? What is their true pain point? What solution solves both the technical feasibility and commercial feasibility? The benefits are enormous. It equips them to think in terms of real impact on their communities back in Pakistan.”



Kenneth Mulligan, professor for the U.S.-Pakistan Centers for Advanced Studies in Energy, presents Pakistani exchange scholars their certificates of completion for the entrepreneurship portion of the program. Photographer: Erika Gronek/ASU/USPCASE

“Strategic innovation and entrepreneurship provides a pathway for widespread implementation of their innovative technical solutions.”

cation system which addresses both Pakistan’s need for renewable energy and clean water. “In Pakistan, the unsafe drinking water is the main cause of children’s deaths and other health issues,” said Irshad.

“This system would be reliable to provide safe water to the people through its high temperature and UV C action,” said Irshad. UV C, a type of ultraviolet light, kills microbes

reduce the cost of fuel cells, therefore opening up a market opportunity, according to Khan. Future applications could include the large scale commercialization of the technology for automotive and other fuel cell applications.

Khan says of the program that it, “is not about publishing research papers but [about] solving Pakistan’s energy problem. It requires science and

“My task is to instruct them in Lean Methodology — the core of tech entrepreneurship — and to inspire and mentor their abilities to solve problems through tech entrepreneurship and commercialization,” adds Mulligan.

The scholars who now see themselves as problem solvers and value creators hope to take their plans back home and turn those ideas into entrepreneurial ventures in Pakistan’s energy sector.

USPCAS-E Scholars Become Energy Policy Trainees

ASU's School for the Future of Innovation in Society (SFIS) Associate Director Dr. Clark Miller is USPCAS-E's energy policy lead, having developed and organized a training workshop in energy policy and leadership for all of the students in the project.

Two of the participating master's students, Bilal Malik and Nafeesa Irshad along with their professor, Dr. Rabia Liaquat, were hosted by SFIS as energy policy trainees with PhD student Carlo Altamirano as their program liaison. All three said they are excited to be at ASU, praising in particular the culturally diverse student community as being supportive and welcoming. They attended weekly seminars with different presenters each week, such as SFIS faculty Britt Crow-Miller and affiliate Chris Jones.

Dr. Liaquat sees the virtue in interdisciplinary cooperation among faculty, between universities, and especially between academia and policymakers. The students have gravitated towards a communal learning environment that

they have found at the University. "It's so interactive!" said Irshad, while Malik appreciated faculty who are "always ready to talk with us." They all hope to be leaders in the transition to a renewable energy future in Pakistan. Liaquat and Irshad, with Malik's support, intend to encourage and empower other women to enter the energy field.



Left to right: Carlo Altamirano, Nafeesa Irshad, Dr. Clark Miller, Dr. Rabia Liaquat and Hafiz Muhammad Bilal Ahmed Maki. Photo credit: SFIS

USPCAS-E Scholars Prep for Workforce, Leverage ASU Experience

In October, 27 exchange scholars were trained at ASU in job seeking skills like resume writing and interview preparation.

One of the more unique points during the presentation discussed was whether to use a resume versus a curriculum vitae. Context, job type and

country all factored into how students might apply for employment in the future. With the global job market ever-changing students needed to weigh the variables of this equation.

Best practices for updating resumes, keeping a clean digital footprint, breaking stereotypes about engineers and

how to prepare for an interview, were all covered.

No doubt, these scholars will be incorporating what they have learned into their resumes and cover letters as they prepare for the future.



ASU Holds Virtual Seminar on Energy for Pakistani Universities

Arizona State University organized the first of a series of virtual seminars for approximately 150 NUST and UET Peshawar energy engineering students and faculty. Delivered by ASU Professor George Karady, the seminar focused on the 'multi-disciplinary research work example FREEDM (Engineering Research Center for Future Renewable Electric Energy Delivery and Management) project', a joint research project between ASU, North

Carolina State University, Florida Agriculture and Mechanical University, and the Missouri University of Science and Technology.

During the seminar, Dr. Karady spoke about how the FREEDM system aims to modernize the power grid system by using a solid-state transformer, which is being coined as a 'magical device' that will revolutionize the conventional transformer.

The seminar concluded with an interactive question and answer session where students and faculty asked Dr. Karady questions about power grids and sought advice on the research they are currently working on. The scholars expressed their appreciation about the seminar and looked forward to attending more virtual seminars in the future.

Bottom Up Bioenergy Strategy to Generate Social Impact and Mitigate Poverty

Dr. Rabia Liaquat of NUST spent six weeks at ASU working with the School for the Future of Innovation in Society (SFIS) to identify a strategic approach to improving the policy framework involved in using biomass resources as a means for bioenergy production.

Dr. Liaquat credits the Swette Center for Environmental Biotechnology within the Biodesign Institute at ASU for providing state-of-the-art equipment and expertise to carry waste-to-energy research forward. She is excited to bring her new knowledge back to her home country in order to play a significant role in addressing Pakistan's energy needs.

She would like to encourage more women to follow in her footsteps and come forward to play a constructive role in Pakistan's energy transition. Dr. Liaquat also credits USPCAS-E's entrepreneurship course for helping women aspire to be entrepreneurs and move

Pakistan toward economic sustainability.

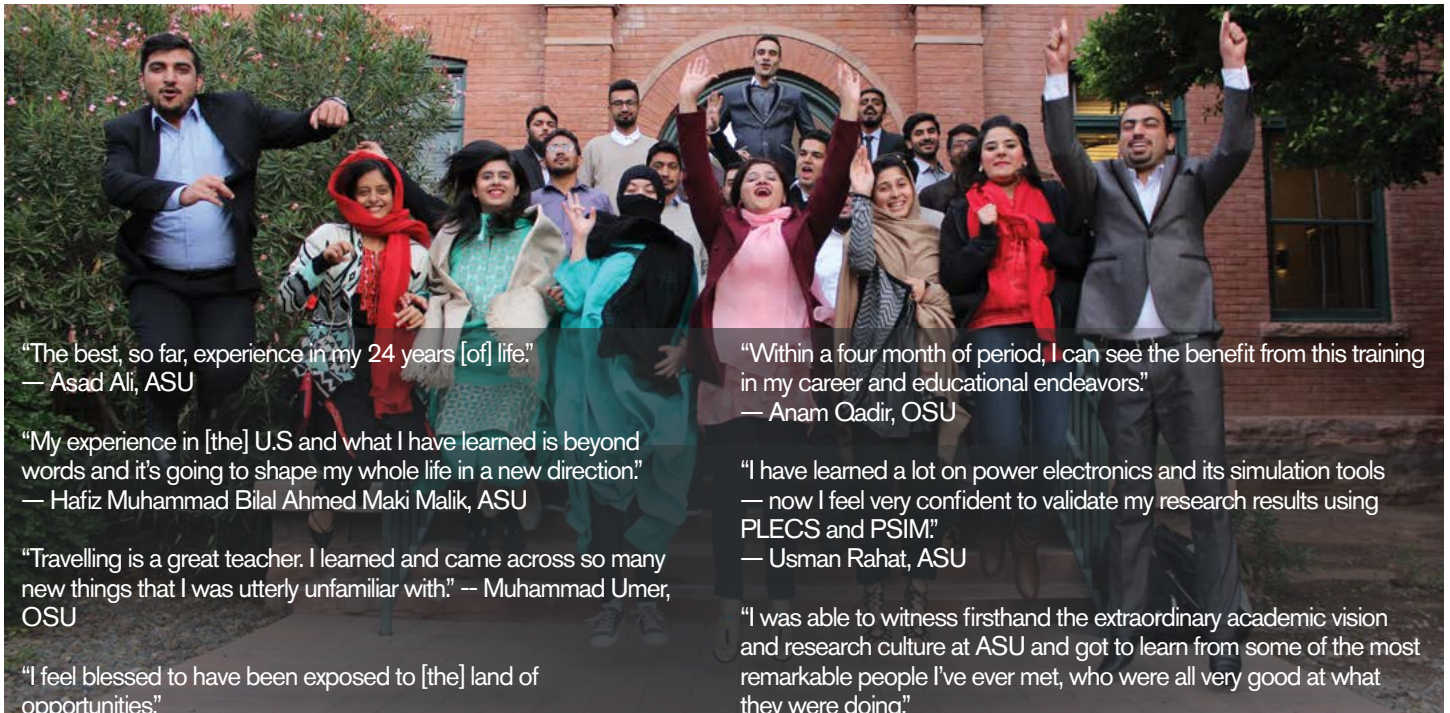
Dr. Liaquat says that, "Pakistan still needs capacity building, technology transfer, industry linkages and national-international training for successful operation and [to] move towards sustainable bioenergy resources." She believes that the launch of waste-to-bioenergy projects with the help of USPCAS-E helps to fulfill a national need.



Dr. Rabia Liaquat
Photographer:
Erika Gronck/ASU/USPCASE

Fall 2016 Cohort Reflects

ASU and OSU Students Reflect on the Impact of USPCAS-E



"The best, so far, experience in my 24 years [of] life."
— Asad Ali, ASU

"My experience in [the] U.S and what I have learned is beyond words and it's going to shape my whole life in a new direction."
— Hafiz Muhammad Bilal Ahmed Maki Malik, ASU

"Travelling is a great teacher. I learned and came across so many new things that I was utterly unfamiliar with." — Muhammad Umer, OSU

"I feel blessed to have been exposed to [the] land of opportunities."
— Dr. Rabia Liaquat, ASU

"Within a four month of period, I can see the benefit from this training in my career and educational endeavors."
— Anam Qadir, OSU

"I have learned a lot on power electronics and its simulation tools — now I feel very confident to validate my research results using PLECS and PSIM!"
— Usman Rahat, ASU

"I was able to witness firsthand the extraordinary academic vision and research culture at ASU and got to learn from some of the most remarkable people I've ever met, who were all very good at what they were doing."
— Syeda Qudsia, ASU



Visit the Video Vault

Check out the latest educational talks and see the scholars' experiences.

Educational Talks:

- Energy and Society - Dr. Rabia Liaquat
- Hydrogen, Water, Electrons: Providing the Means for a Sustainable World. - Dr. Ivan Ermanoski
- Metal Oxide - Based Thermochemical Redox Processes for Producing Solar Fuels and Storing Thermal Energy - Dr. Jim Miller
- Energy Policy and Leadership Workshop: The Importance of Energy Leadership - Dr. Clark Miller
- ASU Entrepreneurship Final Presentations - Ken Mulligan
- ASU Final Presentations

View them all here:

<https://vimeopro.com/user58603860/fall2016>

The Scholars' Experiences:

- The First Cohort of Exchange Scholars Returns to Pakistan
<https://vimeo.com/album/4258095/video/192481079>
- The Fall 2016 Cohort Arrives in the U.S.
<https://vimeo.com/album/4233314/video/192470303>
- OSU Scholar Reports from the Hinsdale Wave Research Lab and the Oregon Coast
<https://vimeo.com/album/4233314/video/190585469>