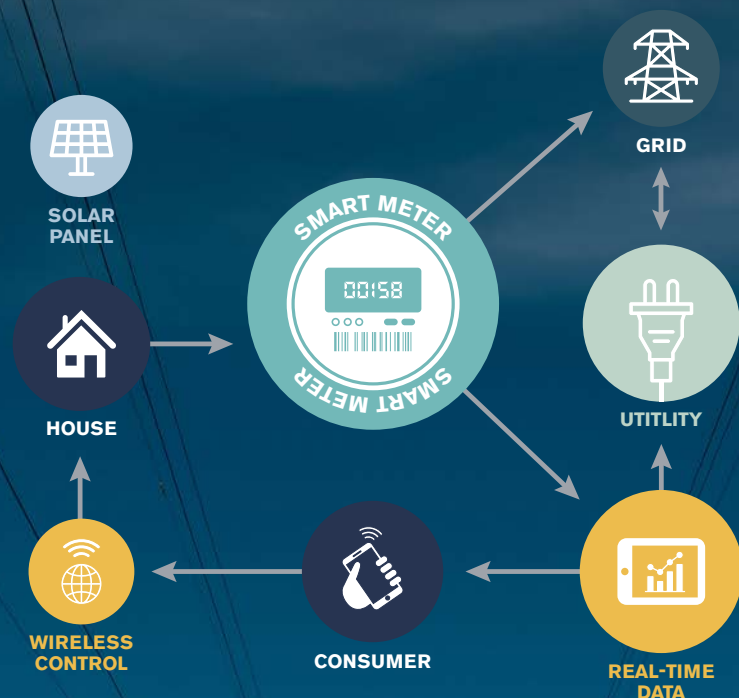


U.S.-PAKISTAN CENTERS FOR ADVANCED STUDIES IN ENERGY

ENERGIZER

PAGE 2

MAXIMIZING ENERGY AVAILABILITY WITH THE HELP OF SMART METERS



Sajjad Zaidi, a professor of engineering at NUST, and USPCASE students, are working on the design and development of a home-grown advanced metering infrastructure solution — also known as AMI.

IN THIS ISSUE

PAGE 5

PUTTING THE FOCUS ON TEACHING

ASU is working with USPCASE faculty at NUST and UET Peshawar to deepen their understanding and use of active learning approaches.



PAGE 6

SCHOLARS MAKING THE MOST OF THEIR EXCHANGE EXPERIENCE

Meet two of the scholars who are leveraging their exchange experiences to benefit Pakistan.

- 8 STAKEHOLDERS MEETING AND THINK TANK DIALOGUE
- 9 ENTREPRENEURSHIP SEMINAR
- 10 DIRECTOR'S MESSAGE
- 11 NEWS AND EVENTS
- 16 IN THE NEXT ISSUE



USAID
FROM THE AMERICAN PEOPLE

ASU Arizona State University



SMART SOLUTIONS TO ADDRESSING ENERGY SHORTAGES

USPCASE TEAM DEVELOPS FOUNDATIONAL TECHNOLOGY FOR THE SMART GRID

Country by country, across the globe, utilities and governments are scrambling to install advanced metering infrastructure (AMI). Also known as smart metering, AMI provides the backbone for the power grid of the future, a grid where distributed energy resources like rooftop solar arrays, customer-owned battery storage devices and electric vehicles that feed their electrons back onto the power system are as much as part of the electricity resource mix as utility-owned power plants.

In Pakistan, AMI could help electricity suppliers better manage the grid, end electricity shortfalls and integrate customer-owned generation resources like rooftop solar arrays. These are some of the reasons Sajjad Zaidi, a professor of engineering at the National University of Sciences and Technology (NUST), worked with student scholars in the U.S.-Pakistan Centers for Advanced Research in Energy (USPCASE) to develop a home-grown AMI solution.

MORE THAN A METER READING

Traditional analog meters were designed for one thing: finding out how much electricity customers used so that utilities could bill them appropriately. AMI meters are digital, and they come equipped with two things that make them smart: computing power and the ability to connect with the utility over a communications network.

That network allows utilities to read the meters remotely, and the computing power within the devices supports using them for more than meter reading.

In Pakistan, AMI will help stem power theft, and that's a huge driver, according to Zaidi.

"Pilferage and theft is a serious problem in the power sector. Power shortages will be reduced if this issue is addressed," he says.

Government researchers estimate that during 2017 and 2018, theft of service cost distribution companies some 53 billion Pakistani rupees or nearly \$379 million U.S. dollars. Zaidi's AMI system works via power-line carrier communications (PLCC), which means the signal travels over the power lines themselves.

In areas where theft occurs through illegal line taps – a common approach in Pakistan – PLCC will minimize or even eliminate the problem, he says.

The meters Zaidi and his team are developing also have some important added features. Among them is bi-directional or net metering.

"Net metering is a billing arrangement that allows businesses and individuals generating their own electricity to deliver unused energy back to their local power grid and get credited back for its retail price," he explains. "It is available to customers who install renewable fuel generators such as solar, wind, hydro or biomass sources and operate the generator in parallel with their electric company's electrical system."





BETTER POWER QUALITY, MORE CONTROL

In addition, Zaidi's meters serve as power quality sensors so that data can be used to operate the grid more efficiently and with greater reliability.

"Power quality analysis enables continuous monitoring," Zaidi says. It allows power suppliers to detect voltage and frequency excursions quickly, analyze causes and, he adds, take "timely corrective actions improving overall grid reliability."

Higher power quality also helps large industrial electricity consumers avoid expensive equipment failures that can result when voltage and frequency stray from standards.

Another key benefit of the meters is that they facilitate Home Area Networks (HANs).

Zaidi explains that the AMI system "provides a platform to establish two-way communication with the consumer's home, which enables smart meter connectivity with household devices like displays, load control devices and smart appliances."

Because the HAN lets consumers monitor and control household appliances, it can help people lower their energy bills. "The HAN is one of the major drivers of smart grid technologies," Zaidi says.

Why do utilities need these capabilities in their meters? Because these capabilities help power providers run the grid more efficiently while also allowing customers to be more active participants in the electricity arena.

STRONGER GRID, STRONGER PAKISTAN

Pakistan has been experiencing electricity shortages for years, says Ammar Yasser, corporate engagement specialist for USPCASE.

"Each and every member of the society needs to play an active role in controlling this drastically rising energy shortfall," he adds.

Smart metering supports that goal.

"The meters will help us control the excessive waste of electricity in our homes and small commercial units," Yasser says. "The Government of Pakistan is planning to undertake widespread adoption of this technology in the future. Indigenization of technology will support capacity building and transfer of technology to the country."



That is achieved through multiple mechanisms that are facilitated via bi-directional communications. Along with supporting the HAN, the meters allow utilities to take power consumption readings multiple times a day. That, in turn, supports special rates, such as time-based rates designed to lower peak loads by charging people more when there's too much load on the grid.

Smart meters feed the utility companies consumption readings throughout the day, so power suppliers will have more data for load forecasting, which could help them prevent widespread black-outs, Zaidi notes.

"This technology can be used for system planning, as it gives a better understanding of the power trends in our country."

In addition, utilities will be better able to manage the assets on their grids. For instance, having consumption data on a frequent-interval basis – say every 15 minutes – allows the utility to see exactly how local transformers are loaded

because they can see time-based consumption on the premises hooked into a particular transformer. This means utility managers will be able to swap out transformers that are over- or under-loaded with ones that are the right size, thereby eliminating waste and helping equipment last longer.

Finally, the AMI system will help Pakistan economically. There will be an investment in technology and a more efficient, reliable grid to support industry and commerce.

This, he says, is why he and his team decided to work on advanced metering infrastructure. "AMI is the primary building block of a modern grid," he says. He adds, "Cutting down theft and peak loads – and allowing more individuals/parties to contribute to the grid – will result in a better, more stable grid, increasing investor trust in more development and a better economy."

This economic boost will be even greater if the meters are designed and manufactured in Pakistan.

"The market size of smart grid technologies, and specifically smart meters, is huge," Zaidi notes. "There is a lot of room for new products and new shareholders, which made this project a lucrative venture."

Already, Zaidi and his team have interest from two major Pakistani electric supply companies. That's not surprising given the competitive price and features – such as HAN support and theft prevention – that these meters offer.

Current smart meters cost around 70,000 rupees – about \$500 USD – and they are also prone to theft, Zaidi says. The estimated cost for this version is 25,000-28,000 rupees (\$178-200 USD) – less if the smart meters can be mass produced.

"Users have no way of verifying the meter readings since there is no proper checking system in place. Our advanced meter and HAN interface will allow cross-checking and easy verification of meter readings while sitting at home. Moreover, our communication module uses a variety of communication methods, which will help in detecting any tampering done in the cables. Hence, within reasonable cost, we are offering more features as well as a user-friendly interface that current smart meters lack."

Right now, the meters still await approval from Pakistani authorities before they can go into production.

Still, Zaidi says "prospects for commercialization are very bright. This project can contribute toward industrial and technological growth of the country."

BY BETSY LOEFF



PUTTING THE FOCUS ON TEACHING

USPCASE SUPPORTS CENTER FACULTY IN BUILDING THEIR PEDAGOGY TOOLKITS

A key focus area for USPCASE is pedagogy: improving course delivery methods and assessing the outcomes in the teaching and learning environment.

Engineering curricula needs constant adjustment to maximize alignment to the needs of society and industry. In addition to their content focus, engineering programs, especially at the master's and doctoral levels, should provide learning contexts for engineers to become excellent designers, problem-solvers, critical thinkers, team members and leaders. Active learning methodologies, including project-based learning (PjBL) and problem-based learning (PBL), can help to ensure the desired outcomes. These methods also align with the needs and expectations of today's students.

ASU is working with USPCASE faculty at NUST and UET Peshawar to deepen their understanding of active learning approaches and benefits, to increase the use of active learning approaches in their instruction, and to better improve their use of these approaches to achieve desired outcomes. Part of this focus is to embrace the Scholarship of Teaching and Learning (SoTL), not only to improve instruction but also as an additional outlet for scholarship, creating a sustainable drive towards constant innovation. Faculty attendance at a SoTL conference in fall 2018 helped achieve this goal.

With support from ASU, faculty from the current exchange cohort from NUST and UET-P attended the Conference of the International Society for Exploring Teaching and Learning, in Tempe, Arizona on October 10-13, 2018. There, they learned methods for improving their instruction, ways to conduct research on teaching approaches, and how this research can lead to scholarly endeavors in the form of presentations and publications.

“ ”

“The key lesson learned during the conference was that it is very important to highlight the novel teaching practices among stakeholders (faculty, admin, students) in order to improve the student's learning.

The faculty while supervising interdisciplinary projects should also focus on the thinking process of the students rather than ensuring the success of the overall project.

Multi-sensory (sight, touch, sound, smell, taste) experience combined with digital stories is necessary to enhance the learning experience of the students.”

—Dr. Affaq Qamar, UET-P

“ ”

“The conference provided a comprehensive insight to state-of-the-art teaching methodologies. It has enabled me to learn from experiences of faculty from diverse backgrounds.

The sessions were highly interactive and most of the presentations were complemented by involvement from the audience. They drew our attention to issues faced by faculty, students and administration in an intuitive manner and provided a vision of a highly functioning knowledge enterprise.

I am positive and will try to incorporate these lessons while working at USPCASE-NUST.”

—Dr. Arsalan Habib Khawaja, NUST

Exchange Scholars



LIGHTS GOING OFF TURN ON SCHOLAR'S INTEREST IN ENERGY

Mehak Asad, a master's candidate at the University of Engineering and Technology–Peshawar (UET-P), remembers exactly when her scholastic interest began to shift to the world of energy.

"I was in my bachelor's program," she recalls. "We had semester exams going on and, in the evenings, we had electricity outages. I realized how crucial it is to solve our energy crisis. If we didn't, millions of people would be unable to do their work."

Mehak comes to her master's studies and participation in the USPCASE program with a strong background in electrical engineering and a focus on communications. While earning her bachelor's degree, Mehak learned computer programming, as well as the ins and outs of

microcontrollers, circuit analysis, data signal processing and more. This provided a solid foundation for the turn her studies took once she came to the U.S. as part of the USPCASE scholar exchange program and began studying at Arizona State University.

"HERE, I AM WORKING ON MACHINE LEARNING AND HOW IT CAN BE USED IN POWER SYSTEMS," SHE SAYS. "I HOPE THAT BY THE END OF THIS PROGRAM, I WILL BE ABLE TO USE THE TECHNIQUES I'VE LEARNED TO SOLVE POWER SYSTEM PROBLEMS."

Mehak also hopes to continue her research after earning her master's, and she's already thinking about pursuing a doctorate degree.

"It's a harsh reality that for females in Pakistan, pursuing education is difficult in one way or another," she says. "USPCASE provides a great platform, especially for females."

Mehak says USPCASE support goes beyond financial aid and scholarships.

"Females are always encouraged to participate in different events. Also, many female students have been to the U.S. under the exchange program to get international exposure," she explains.

Mehak, who says she always wanted to be an engineer, will be the first female engineer in her family, something her parents and siblings applaud.

"My family was always a source of encouragement and motivation for me," she says.

Loyalty to country is also a driver for Mehak.

"Pakistan has been facing an energy crisis for years," she says. "We have been hearing about this issue since childhood, and we know the problems face by people due to unscheduled outages. USPCASE is particularly aimed to solve the energy crisis in Pakistan. I felt that this is the correct place from which I can contribute to solve the problem."

BY BETSY LOEFF

ON HER DRAWING BOARD: FUEL CELL SOLUTIONS

“Most people don’t know this, but I am a good sketch artist,” says

Afaf Ali, a master’s candidate at the University of Engineering and Technology – Peshawar (UET-P). “I also do painting when I have enough free time,” she says.

Today, those kinds of creative outlets get little of Ali’s attention. As a USPCASE scholar and exchange student at Arizona State University, she’s been hard at work conducting research related to her master’s thesis, which focuses on the development of a non-platinum catalyst for the fuel reduction reaction in proton exchange membrane fuel cells (PEMFC).

Used primarily for transportation, PEMFC generate electricity through chemical reactions promoted through a catalyst, which usually is platinum, a very pricey element. A recent Reuters article noted that platinum is some 56,000 times more expensive than steel. Because of this, even the least expensive fuel-cell vehicles are twice the cost of similar electric vehicles.

Still, fuel cells hold great promise.

“This technology, if implemented at an economical cost, can be a breakthrough in the electric car industry,” Ali says.

Backed by this belief, she plans to pursue a doctorate while also engaging with industry to make her research practical and impactful.

SCIENCE AS SERVICE

As a USPCASE scholar, Ali has also worked on wind energy and its potential in Pakistan, in which coastal areas have much to offer, she notes. Like most students in the program,



she’s committed to helping Pakistan overcome its energy shortages.

“Five years from now, I would like to see the commercial implementation of my current research work,” she says.

“Facing 10 to 12 hours of power cuts in the major cities of Pakistan surely makes you aware that something is really wrong with current energy policies and systems,” Ali says. “In rural areas, the situation is far worse. No electricity at all. We need to generate, conserve and secure energy.”

Ali adds that when she looked at the Pakistani energy crisis after getting her bachelor’s degree in chemical engineering at UET-P, she “felt a responsibility” to be part of the energy sector.

Service to country comes naturally to Ali, perhaps because her father is a retired air force officer. The eldest of four daughters, she says her dad urged all his girls to pursue scholastic excellence.

“His efforts led me to my path and my other sisters, as well,” she says.

With her father’s encouragement, Ali has gone beyond academics to pursue self-development in other areas. She’s attended a boot camp for social entrepreneurship and attended conferences on sustainability and green energy technologies.

So, despite her artistic talent, Ali doesn’t spend her days sketching landscapes and still life scenes. But, she is a dedicated USPCASE scholar eager to return to her native land.

“I am looking forward to completing my research and being a part of positive change in Pakistan,” she says. “We are the future that can save our country from the immense energy crisis. That is what motivates me.”

BY BETSY LOEFF

STAKEHOLDERS MEETING



THE ONGOING ENGAGEMENT OF STAKEHOLDERS IS KEY TO THE SUCCESS OF THE USPCASE PROJECT

In November 2018, the U.S.-Pakistan Centers for Advanced Studies in Energy (USPCASE) organized their 5th National Stakeholders Meeting on Energy and 2nd Think Tank Dialogue in Islamabad, Pakistan. The consultative session was attended by 100 participants including senior officials from the United States Agency for International Development (USAID), industry, academic partners, and various government agencies in Pakistan, including the Higher Education Commission (HEC).

Led by Arizona State University, the event provided the USPCASE centers with a forum to share updates on academic programs and ongoing applied energy research.

FORGING A PATH TO A SUSTAINABLE FUTURE

The Think Tank Dialogue session provided a platform to discuss strategies to enhance cooperation and address Pakistan's energy needs. Think Tank panelists included Dr. Tariq Banuri, Chairman HEC; Mr. Himayat Ullah Khan, Advisor Energy KP Government; Dr. Waqar Masood, Ex. Secretary Finance; and Mr. Hammad Hashmi, Advisor Ministry of Energy.

Moderated by Dr. Sayfe Kiaei, USPCASE Project Director (ASU), the Think Tank Dialogue focused on the role of academia in energy policy development.

Speaking at the forum, Dr. Tariq Banuri, Chairman HEC, said that USPCASE centers can become sustainable through sponsored research, consultancy services, corporate investment, and philanthropic and public funds. Stakeholder engagement and feedback from all sectors—the energy industry, government agencies, NGOs and other funding agencies—is key to long-term viability and success.

The second panel discussion, moderated by Mr. Ammar Yasser, USPCASE Corporate Engagement Specialist (ASU), focused on the impact and sustainability of the centers. The panelists included Mr. Amjad Ali Awan, CEO Alternative Energy Development Board; Dr. Baqar Raza, Director General Pakistan Council of Renewable Energy Technologies; Mr. Ashfaq Mahmood, Ex. Secretary Ministry of Water and Power; Dr. Parvaiz Naim, Advisor KfW; and Mr. N. A. Zuberi, CEO Three Georges South Asia Investment Limited. They deliberated on issues such as the role of energy centers in international projects, the impact of international funding, the centers' role in advancing renewable energy in Pakistan, and building the capacity of the energy sector at the national level.

SHOWCASING GRADUATE STUDENT RESEARCH

The one-day meeting also featured over 30 student research posters that showcased cutting-edge energy research being conducted by USPCASE faculty and their students at both National University of Sciences and Technology and University of Engineering and Technology Peshawar.



The visiting stakeholders provided technical feedback on the research projects that have the potential to be commercialized.

In her closing remarks, Ms. Asima Rehman, Senior Education Advisor USAID/Pakistan noted the accomplishments of the USPCASE program and particularly the linkages that have been developed among universities, industry partners and government agencies.

A PARTNERSHIP TO ENERGIZE PAKISTAN

The USPCASE program is a partnership between NUST and UET Peshawar and ASU that focuses on building relevant energy expertise and bandwidth to address Pakistan's energy needs. Under the umbrella of the HEC and with guidance from ASU, the centers have initiated applied research projects, developed curricula based on international best practices, established new state-of-the-art laboratories, and participated in exchange programs.

These centers are working to become Pakistan's premier sustainable energy research centers and think tanks. The centers are already delivering on that promise and are on track to produce hundreds of skilled graduates equipped with hands-on experience in the latest renewable energy technologies. These graduates will help to jumpstart Pakistan's energy sector. In addition, USPCASE is providing more than 200 scholars with the opportunity to enhance their research skills and expand their professional networks through international exchange programs at ASU. USPCASE faculty are conducting nearly 50 research projects that are focused on finding immediately actionable solutions to improve energy access for people throughout Pakistan and enhancing the quality of life for all.

ENTREPRENEURSHIP VIRTUAL SEMINAR

IMPROVING TECHNICAL INNOVATION THROUGH THE PATTERNS OF THINKING THAT UNLOCK THE ABILITY TO INNOVATE

The USPCASE program organized a virtual seminar on entrepreneurship for young engineers. Mr. Ken Mulligan, an ASU instructor who teaches entrepreneurship, provided an overview of entrepreneurial thinking patterns that consistently produce novel insights, breakthrough ideas and create value through high-value products and services.

This was an opportunity for Pakistani students to learn from an entrepreneurial leader about various ways to launch their own startups. Seminar attendee Abu Bakr commented that the talk was very inspirational. Ehsan Malik, an engineering student, remarked that the seminar was an eye opener for him because this was the first time he learned about the difference between a business setup and having an entrepreneurial mindset.

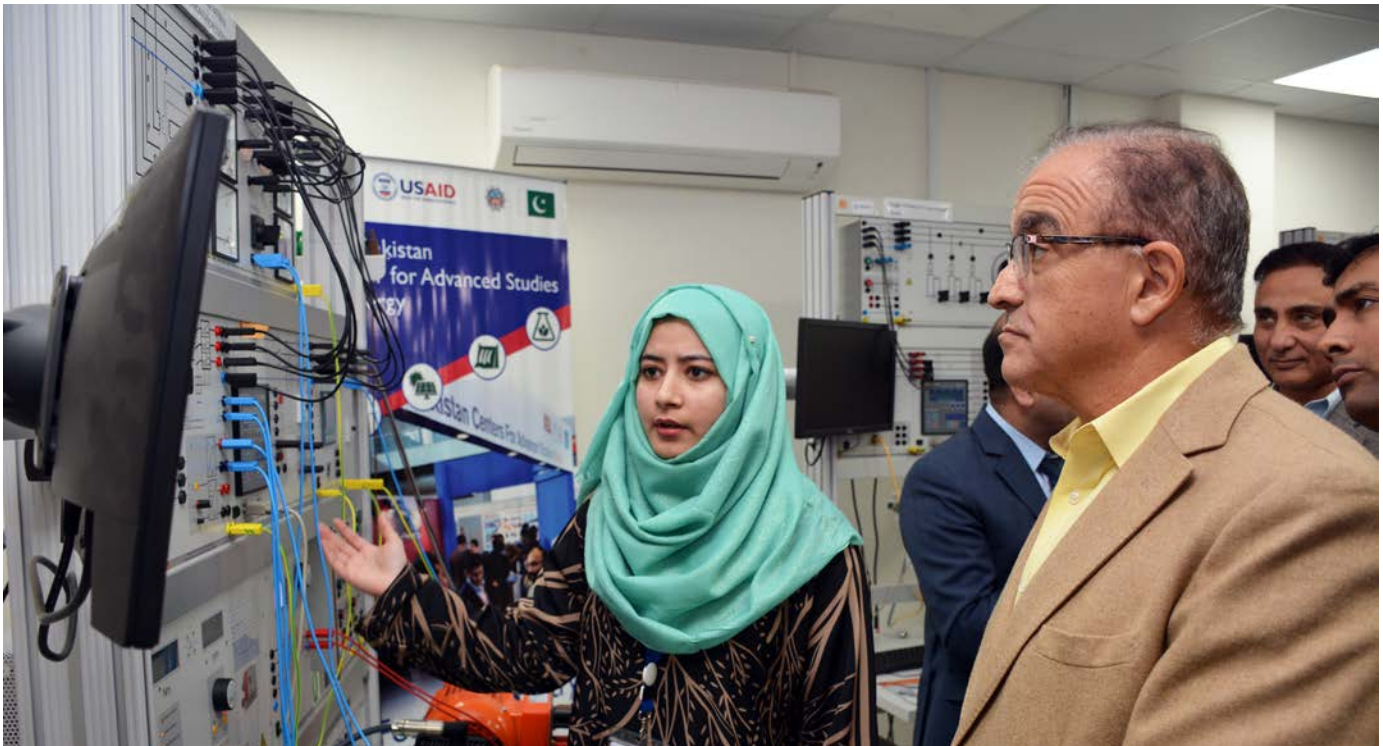
"Everyone of us should employ entrepreneurial thinking first, even if we aren't starting our own business," he says.



Another participant, Asad Tariq, said that he learned about the qualities of entrepreneurs and that the session also led him to think of ways to create opportunities for others.

"I want to shift from job seeking to job creation," he remarked.

The USAID-funded USPCASE program is building the capacity of its graduates and encouraging them to convert their research and innovation into startups that can provide solutions to Pakistan's energy needs and foster job creation.



FROM THE DIRECTOR

We are welcoming the last official USPCASE exchange cohort in January 2019. NUST and UET Peshawar will send 47 exchange scholars to spend the semester in top labs at ASU and OSU. This brings the total number of exchange scholars to 217, a significant accomplishment that exceeds our project goal of 200. The exchange program is critical to jump-starting new ways of thinking about energy problems in Pakistan and it's nothing short of transformational.

In the last quarter, a second Think Tank Dialogue was held in conjunction with our fifth stakeholders meeting. These dialogues are critical to the sustainability of the centers if they are to assume the roles of connectors and thought leaders in Pakistan's energy landscape. Beginning in January 2019, the centers will begin organizing these meetings on their own, a critical handoff in the project and one of many that will happen this year.

Preparations are underway to host a joint international conference next quarter with UET-P and NUST taking the lead. Conferences help create vital connections within the partner universities, and they solidify a global network of partners. They also bring important research findings to the center faculty and students so that they can stay abreast of the state-of-the-art in energy research.

Next quarter we will kick off formal leadership training for the centers. Everything that we have done up this point is to build the new leaders that can take Pakistan into a bright future and this training is designed to solidify all that the center leaders have learned during the past four years as they create their independent road maps for the future.

Above: On November 15, 2018, Dr. Sayfe Kiaei visited UET Peshawar to meet with the vice chancellor, deans and directors. After a detailed presentation by the vice chancellor, Dr. Kiaei briefed the faculty about ASU and the ongoing research work in the Ira A. Fulton Schools of Engineering.

Dr. Kiaei also toured the UET-P USPCASE center and learned about the new research labs from the faculty and lab engineers. He chaired a joint meeting of USPCASE faculty to discuss project progress, implementation issues, and plans for the sustainability of the centers.

DR. SAYFE KIAEI

Project Director, USPCASE ASU

News & Events



NUST HOSTS NATIONAL CONFERENCE ON ENERGY TRENDS

PAKISTAN NEEDS TO TAP LOCAL RESOURCES FOR LONG-TERM SOLUTIONS TO ENERGY CRISIS

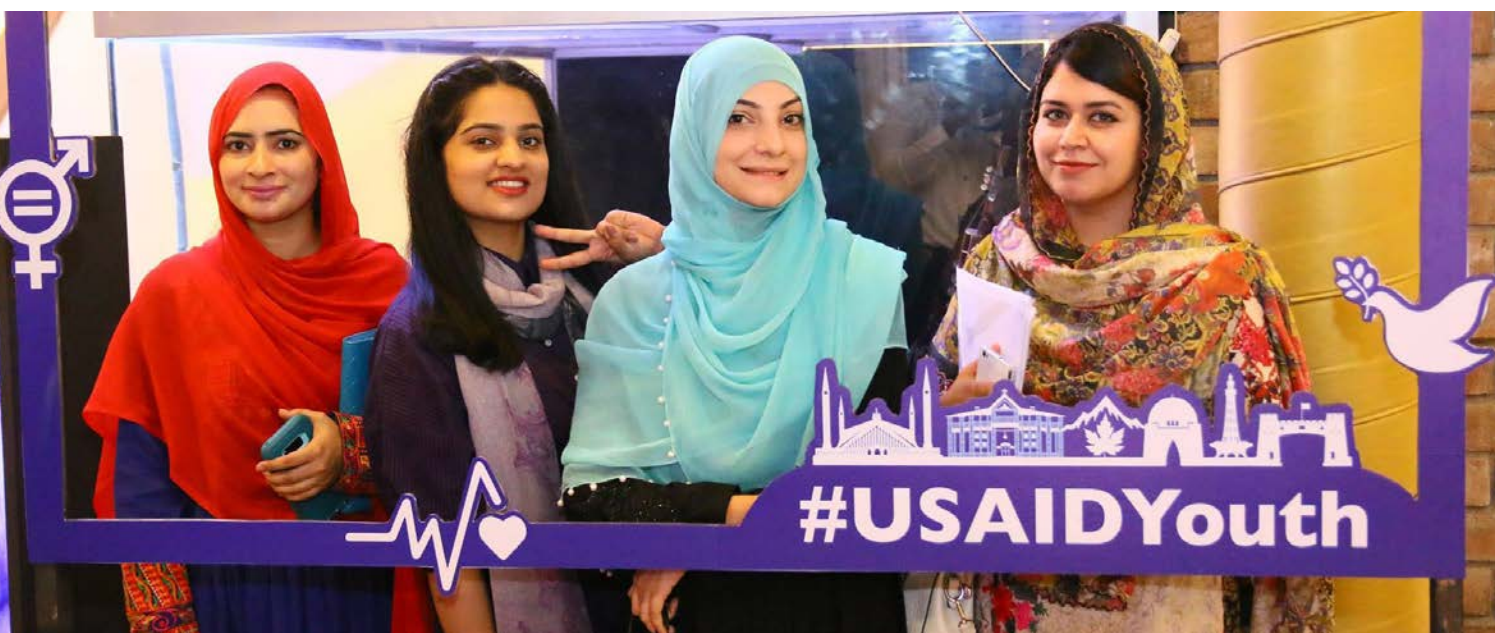
On October 1, 2018, the USAID-funded U.S.-Pakistan Center for Advanced Studies in Energy at NUST hosted a National Conference on Energy Trends. Experts from academia, industry, the corporate sector and think tanks participated in this one-day national conference to exchange information and ideas on select renewables, thermal power generation, electrical power system engineering and planning, and energy policy.

The conference provided a platform to over 200 engineers and experts in the field of energy to review the latest national and China-Pakistan Economic Corridor (CPEC)-related developments, opportunities and

challenges in the renewable and non-renewable energy sectors and discuss future trends.

In his message announced by the Joint Secretary Power Division Usman Akhtar Bajwa, the Federal Minister for Energy Omar Ayub Khan said NUST is recognized as a symbol of quality education and excellence in the fields of science and technology. The increasing energy demand across the globe makes energy availability and sustainability major issues and preparations must be made now to lessen the detrimental impacts on the region.

Speaking at the conference, Major General (Ret.) Muhammad Shahid restated his commitment to making NUST one of the top universities in the world with a research platform to boost the knowledge-based economy in Pakistan. He expressed appreciation for U.S. support to build the Center for Advanced Studies in Energy as the centers not only contribute to formulating sound energy policies for Pakistan, they also provide highly educated scientists and energy experts in renewable and power systems engineering and planning.



USAID YOUTH FESTIVAL CELEBRATES YOUNG PAKISTANIS

The United States Agency for International Development (USAID) organized a Youth Festival on October 4, 2018, providing a platform for Pakistani youth to discuss and explore topics including education, jobs, entrepreneurship, power, healthcare, peacebuilding, infrastructure, clean water, the environment and gender equality. The event celebrated the accomplishments of inspiring young Pakistanis who are actively making a difference in their communities.

Two USPCASE scholars, Asfandiyar Ali and Noor Ul Ain Binte Wasif Ali, received the USAID Youth Champions 2018 award from Paul Jones, the U.S. Ambassador to Pakistan.



Noor Ul Ain Binte Wasif Ali recently completed her M.S. in Energy Systems Engineering from USPCASE and was nominated for the presidential gold medal for her undergraduate class. She is working on the sustainability of environmental and energy systems. She has completed 20 impact assessment studies of incinerator installation projects in 17 districts of Pakistan. She recently won a student grant of 0.5 million rupees for a USPCASE applied research project in the field of solar thermal engineering and is working on the development of a novel water desalination unit.

As a child, **Asfandiyar Ali's** world was changed forever by a deadly earthquake in Pakistan on October 8, 2005. He lost his friends and his school — even his home was completely destroyed.

Later, he also lost his father after a prolonged illness. After 13 years of hard work, Asfandiyar is an engineer determined to bring electricity to the villages of Muzaffarabad in Azad Jammu and Kashmir.

He says that his semester at ASU as an exchange student equipped him with entrepreneurial and applied research skills.

"Let passion fuel your journey through any ups and downs that come along the way," says Asfandiyar.





USPCASE UET PESHAWAR SCHOLARS VISIT NEELUM-JHELUM HYDROPOWER PROJECT

On October 25, the U.S.-Pakistan Centers for Advanced Studies in Energy arranged an industrial visit for master's students in the Energy Management and Sustainability program at UET-P to the Neelum-Jhelum Hydropower project in Kashmir. The purpose of this visit was to provide first-hand exposure to real-world power energy project implementation and management techniques. The project has an installed capacity of 969MW electricity and achieved maximum generation in summer 2018.

"There is a misconception that this project is a failure due to the prolonged completion time and increasing costs, but our visit here was an eye-opener. I came to know about the actual facts and figures. The project is no doubt costly but still can be profitable due to useful life and number of sufficient electricity units produced annually," said Danish Shahzad.

On site, the students were briefed by the project engineer about different phases of implementation.

This plant is a run-of-the-river project with no storage and minimum waste in both the Neelum and Jhelum rivers. Water from the river is diverted to a tunnel that is under the mountains, over 60 km in total length. Initially, only a single tunnel was planned but later, modifications were made to the plan to include two bifurcated tunnels because of the weight of the mountains. Also, two spillways and a buffer zone with rock fills over fault lines were built as a protection shield against earthquakes. The powerhouse is located downstream, underground where the water from both rivers is combined to run the underground MW Francis turbines.

"The industrial visits are a good initiative by USPCASE. Not many programs offer this support to students. This visit helped me integrate theoretical knowledge with a practical scenario. I also got some ideas of research topics that I plan to work on," says another student Syed Faisal Shah.



GOOD FOR YOUTH, GOOD FOR PAKISTAN

The United States Agency for International Development (USAID) launched a mass media campaign, “Good for Youth, Good for Pakistan,” to celebrate the accomplishments of inspiring young Pakistanis who have achieved personal successes as a result of partnership and support from USAID projects across the country.

This campaign is providing a platform for young people to discuss the challenges they are facing and how they personally can play active roles in proposing solutions.

As part of this national initiative for Pakistani youth, a TV program on Khyber News featured USPCASE scholars who took the stage as panelists and shared how they are making a difference in their communities. The program, mainly in the Pushto and Urdu languages, focused on issues related to education, healthcare, jobs, energy, clean water, and gender equality.

The program was aired on November 17. One of the USPCASE exchange scholars from UET Peshawar, Aemal Ahmed, received the best speaker award from USAID at the event.



USPCASE GOES ON AIR

The Pakistan Television (PTV) news show 45 Minutes featured the USPCASE project on December 15 and 16, 2018. Panelists for the first program included Ammar Yasser (ASU), Zuhr Khan (NUST), Dr. Gulfriz Ahmed (Former Federal Secretary Petroleum) and Shahzad Qasim (PM Special Assistant on Power). Panelists for the second program were Ahmed Sohail (ASU), Dr. Adeel Javed (NUST), Amjad Awan (CEO AEDB), and Waqar Ahmed (CEO Star Hydro).

The overarching theme was the national energy situation in Pakistan with an emphasis on renewable energy, thermal power, electrical power and energy policy.

The anchor of the show, Naheed, talked about the issues, challenges and solutions with the panelists. To keep the program interactive, experts responded to questions and comments from the audience which included USPCASE faculty and students. The audience and panelists had a chance to contribute, highlighting the importance of industry-academia linkages and sharing the efforts of research centers at both NUST and UET Peshawar in becoming an effective workforce and policy think tank resource on energy in Pakistan.



ASU's technical support in curriculum, research and exchange for both partner universities was also highlighted during the discussions.

ASU also participated in two FM-101 radio shows with its partner universities UET-P and NUST, on December 20 and 27, 2018. These programs provided opportunities for USPCASE to share accomplishments with a larger audience, discuss its energy research agenda and also encourage engineering students to apply for graduate programs in energy engineering.



MOU WITH PCRET SIGNED

On December 18, the U.S.-Pakistan Centers for Advanced Studies in Energy at UET Peshawar signed an MoU with Pakistan Council of Renewable Energy Technologies (PCRET) to further strengthen its mission of producing materials, devices and applications in the field of renewable energy.

Three MoUs were signed this quarter.

MINISTER OF EDUCATION VISITS UET CENTER

On December 18, the Minister of Education Khyber Pakhtunkhwa, Mr. Zia Ullah Khan Bangash (right, in blue jacket), visited the USPCASE center at UET Peshawar. He toured the facilities and was particularly impressed with the state-of-the-art research labs at the center.



INTERNATIONAL CONFERENCE PLANNED



INTERNATIONAL CONFERENCE ON SUSTAINABLE ENERGY IN PAKISTAN (ICSEP)

Pakistan's energy sector is hindered by a lack of visionary policy, outdated power plants and transmission grid, economic

factors, dependency on imported fossil fuels, and a weak indigenous technology base. While there has been considerable improvement over the last couple of years, the generation, transmission and distribution challenges remain and these challenges are affecting the economic growth and prosperity of the country.

NUST, UET-P and ASU are organizing a two-day International Conference on Sustainable Energy to discuss and address these issues.

The conference, scheduled for March 12-13, 2019, will promote research and development in energy by bringing together researchers, industrial experts, senior policy makers and civil society stakeholders explore challenges and solutions in a common forum.

WHO SHOULD ATTEND

- Engineering experts and scholars from international universities and research centers
- Manufacturers and technology providers
- Investors and members of chambers of commerce and other impacted industries
- Donors, banks and other financial institutions
- NGOs interested in financing entrepreneurs as well as small and medium enterprises in Pakistan

ABOUT USPCASE

The U.S.-Pakistan Centers for Advanced Studies in Energy (USPCASE) is a five-year program implemented by partners National University of Sciences and Technology (NUST), University of Engineering and Technology Peshawar (UET-P) and Arizona State University (ASU).

The project focuses on applied research relevant to Pakistan's energy needs. The program has multiple goals including curriculum development, applied research, the establishment of new laboratories, and international visitor programs.

Partnering Universities:



ARIZONA STATE UNIVERSITY
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Pedagogy Training

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Leadership Development Training

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