

RESEARCH FOR SUSTAINABLE DEVELOPMENT AT **PRINCE SULTAN UNIVERSITY**



PRIORITISING SUSTAINABILITY IN LOCAL AND GLOBAL INITIATIVES

In Saudi Arabia, Prince Sultan University demonstrates its strong commitment to the UN's Sustainable Development Goals through its partnerships, international collaborations and outreach work

The importance of sustainability is recognised across the globe. The fragility of our planet is laid bare by reports of drought, deluge and displacement. The importance of sustainability has been embraced by governments, corporations and higher education institutions alike. One such body that has proudly taken up the mantle of sustainability is Prince Sultan University (PSU) in Riyadh, Saudi Arabia.

Committed to the United Nations' Sustainable Development Goals (SDGs), PSU makes every effort to align its teaching, research, partnerships and outreach with the 17 goals. It's a commitment that reveals itself in the



university's committees, awareness campaigns, research centres and many sustainability-related initiatives.

"Sustainability and SDGs are of the utmost importance to PSU," says Jolly Sahni, Director of the Jubilation Office and associate director for the MBA programme at the university. "Higher education institutions play a pivotal role in shaping future generations. We not only share knowledge with our students but help create a mindset with sustainability at its centre."

Universities like PSU play a major role in developing a framework for the SDGs to be achieved, focusing on three dimensions: the economy, society and the environment. "PSU is one of the most active universities in the region in terms of its initiatives and work on the SDGs," Sahni says. "As part of both the local and global communities, we have been contributing to sustainability for a long time, even predating the announcement of the SDGs."

An example of PSU's longstanding commitment to sustainability is its Environment Club, where students are encouraged to take part in responsible activities such as recycling while collaborating with local entities on related issues. It is one of a number of groups furthering the university's efforts around the SDGs.

"We have established several permanent committees to address the SDGs," says Heba Khoshaim, vice-president of PSU's Campus for Women. "In addition to the Environment Club, we have launched our

own SDG Club which is the first Saudi SDG Club to educate students about sustainability, environmental and climate issues, bring students together to discuss pressing issues and collaborate across various SDG initiatives. We also encourage our faculty members to include the SDGs as part of their research."

"PSU was the first university in the Middle East to introduce a sustainability certification for education," says Mohammad Nurunnabi, aide to the president, director of the Centre for Sustainability and Climate, and chair of the Accounting Department. "This has been hugely successful for the academic community and policymakers in the kingdom."

Given that the challenges facing the world today are so broad, it is essential that higher education institutions work together to craft and promote viable solutions. This is something that PSU takes extremely seriously, contributing to various international events and conferences. "We sent several faculty

"Sustainability is of the utmost importance to PSU"

members to participate in the THE Global Sustainable Development Congress last year," Khoshaim says. "We took part in various workshops where we were able to not only share the work PSU is conducting with regard to the SDGs with other universities but also hear about their own contributions. We are eagerly looking forward to next year's THE Global Sustainable Development Congress, hosted at King Abdullah University of Science and Technology in May."

International conferences such as the THE Global Sustainable Development Congress provide an ideal opportunity for institutions like PSU to collaborate on their SDG programmes. This collaboration extends beyond the academic sphere, with PSU creating partnerships with government and industry in an effort to make progress towards the fulfilment of the SDGs.

"We are here for a cause and that cause is central to everything we do at PSU,"



Nurunnabi says. "Many universities discuss sustainability, but we prioritise impact. As such, we collaborate with the United Nations Global Compact network. We are also one of only two universities in Saudi Arabia that are part of the Higher Education Sustainability Initiative. We work with the private sector too, including global corporations like PepsiCo, which the university recently partnered with to inform students about the importance of a zero-waste future."

A COLLECTIVE MISSION

Meeting the SDGs requires holistic solutions that stretch across national borders and industries. Recognising this, PSU brought together entities from the private and public sectors in March 2022 to host high-level policy discussions on the creation of a higher education sector that is committed to achieving net-zero emissions.

To ensure PSU's sustainability initiatives have a prolonged impact, the university has many long-term plans in progress. These include proposals that specifically target each of the 17 SDGs individually. Regarding SDG 1, which calls for an end to poverty, PSU provides financial support to its students as part of community anti-poverty programmes and collaborates with the Charity Committee for Orphans Care to provide quality education to orphans.

In terms of SDG 5, improving gender equality, PSU is increasing the proportion of female graduates and faculty members at the university. In fact, wherever the SDGs have their focus, whether it concerns responsible consumption or encouraging innovation, PSU has proposals in place to support them.

"We are striving for the whole PSU community to be a part of our sustainability initiatives," Khoshaim says. "Recently,

some of our faculty have been carrying out research to collect information regarding the extent to which the PSU community is aware of the importance and details of the UN's SDGs. This research is both informative and educational, with our researchers teaching all stakeholders about the importance of the SDGs."

Nurunnabi shares a similar view. "Our sustainability programmes are not presented for the sake of it or to improve the university's image," he says. "There is a huge demand for sustainability-related skills, and we are aiming to present a global model for how best to nurture these for other higher education institutions."

"Sustainability is part of our culture," Sahni says. "Every semester, we have several guest lecturers, many of whom have talked about the benefits of meeting the SDGs. Recently, we held one on how sustainability could be a source of competitive advantage. To achieve economic growth with sustainability, the SDGs present a win-win for students, faculty, industry and universities."

"Sustainability is a collective mission, with collective benefits," Nurunnabi says. "At PSU, we believe in working together for our sustainable future."

To find out more about Prince Sultan University, visit www.psu.edu.sa/en



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EMPOWERING WOMEN TO PARTICIPATE IN ARCHITECTURE AND DESIGN

At PSU, the female-only College of Architecture and Design creates a supportive environment for women during their studies and as they enter the job market

Saudi Arabia has made great progress regarding the level of female participation in higher education. This has led to an increasing number of women joining the workforce, with women comprising 33.6 per cent of all Saudi employees as of March 2022 – up from just 17.4 per cent in 2017.

Universities play a fundamental role in equipping women to enter the workforce, and this is a part of Prince Sultan University's (PSU) remit that the institution takes extremely seriously. This commitment can be broken down further, whether focusing on data science, financial literacy or any other sector of the economy. One area where PSU has displayed real success is around architecture and design.

"The College of Architecture and Design [CAD] emerged following the establishment of the interior design programme back in 2006," says Samaher Fallatah, vice-dean of the college. "Then, due to shifting market needs, we launched the architecture programme in 2011. At the time, both programmes were overseen by the College of Engineering. However, based on the university's aim of offering students a greater variety of courses, we decided to create a new, separate entity. And that's how the College of Architecture and Design was established."

The CAD is proud to be a women-only college, encompassing both students and faculty members. Despite having been established only a few years ago,

the college already boasts an impressive employment rate of more than 80 per cent. "Within six months of graduating, many of our CAD students either gain full-time employment, find work as a freelancer or establish their own business," Fallatah says.

Additional validation for the CAD's programmes came when the college received accreditation from Saudi Arabia's National Commission for Academic Accreditation and Assessment. These programmes include a range of

extracurricular activities that encourage students to engage with the local community.

"Today, women in Saudi Arabia have a great opportunity to shape the world in a positive, pioneering way as part of the kingdom's Vision 2030 initiative," says Rouaa Atyah, chair of the interior design department. "At the college, we empower students to get them ready for the job market. I think women, and a new generation of women in particular, are truly redefining the look and architecture of Saudi Arabia."

Many of the CAD's graduates are very active in the wider community of architects, with some running their own international companies and having gained recognition across the globe. "To ensure our graduates continue to make an impact on the world stage, we aim to keep up with emerging trends in architecture and design while motivating our students to continue innovating," Atyah says.

FUTUREPROOFING DESIGN

As with many economic sectors, the field of architecture and design is constantly evolving. "At any one time, there are several exciting developments taking place in the architecture and design space, especially with regard to the climate and environment," Fallatah says. "We take great care to incorporate sustainability trends within our courses. For example, students are required to consider building

certifications during both theoretical and practical lessons."

Faculty members also encourage students to practise the implementation of the UN's Sustainable Development Goals (SDGs) where possible. "We are looking to promote the SDGs internationally across a variety of projects," Fallatah says. "At the same time, we also encourage students to be aware of Vision 2030 to ensure all our projects are aligned with this initiative."

"We urge our students to take part in competitions that are relevant to their projects, both international and local," says Eman Sabry, chair of the department of architecture at PSU. "Many of the local competitions are especially focused on the goals of Vision 2030."

It's important to mention PSU's Cooperate Education Programme and how this relates to CAD students. The Coop Programme requires students to spend seven months in a professional field working for a company that is relevant

"We empower students to get them ready for the job market"

to their course. This helps students gain valuable experience in the job market, enhances their skills and exposes them to new architecture and design ideas.

Many of the projects being pursued by students are connected to heritage, sustainability and sustainable growth. PSU is working hard to focus its students more in this area, with the support of the Ministry of Culture. "Partnership is hugely important to the work we carry out at the CAD," Sabry explains. "There is an annual exhibition for the CAD to showcase student work and partner with the local community. We prepare a series of workshops about women in architecture, where we invite successful female architects to inspire and support students as they start their own careers."

In addition to the annual exhibition, the college supports women in architecture and design through its career day, for which it invites organisations from the public and private spheres to share their expertise and network with students.



"Our career day has proven itself to be a hugely successful event," Sabry says. "This provides our students with knowledge and support about their chosen career, how they can participate in the job market and which roles are best suited to their skills."

The facilities that are made available to students at the CAD play a significant role in their preparedness to enter the job market. PSU offers recently updated studios, cutting-edge design software and a well-stocked resource room for students to use. The college also boasts its own



Fabrication Laboratory, which contains a range of digital design tools, including 3D printers, laser cutting and other advanced technologies.

"We think the sky's the limit for PSU," Fallatah says. "It's our dream to expand the college to include not just two programmes, but additional courses like graphic design, project design and fashion design. Following our national accreditation, we are now preparing to acquire international validity."

"We are also actively encouraging our faculty members to conduct more research projects, offering generous incentives," Atyah says. "PSU currently spends SAR 17 million [£3.7 million] annually on research, but we are attempting to increase this figure, specifically supporting research that is mapped to the SDGs and aligned with Vision 2030."

To find out more about the College of Architecture and Design at PSU, visit www.psu.edu.sa/en/CAD

CURRICULA DESIGN CREATES EMPLOYABLE GRADUATES

At PSU, a wide range of stakeholders, both internal and external, help craft market-driven curricula to meet the needs of students and the economy

Given the relentless pace of digital transformation and the widening skills gap that it is fostering in many economies, higher education institutions are increasingly being asked to amend their curricula to support the creation of job-ready graduates.

According to the World Economic Forum, a billion workers will need to be reskilled by 2030, putting huge pressure on universities to ensure students are ready to enter a constantly evolving workplace. The institutions that will handle this pressure best are those that commit to producing market-driven curricula suited to the world of work – both now and for the future. This is the challenge being grasped by Prince Sultan University (PSU).

“The university has continuously looked

to expand its degree offerings to ensure graduates are ready for the job market,” says Saad A. Almosa, dean of the College of Business Administration. “This was clear from the establishment of our Cooperate Education Programme, which was set up within just a few years of the university’s founding.”

The Coop Programme, which continues to this day, is designed to prepare university graduates for the labour market and serves as an active part of PSU’s degree requirements. Members of the Riyadh Chamber of Commerce collaborate with faculty members at PSU to ensure study is open, meets international standards and is aligned with the needs of the job market.

“Working with university staff, government personnel and business leaders, PSU has established degree programmes that serve the needs of the

wider community,” Almosa says. “This is supported by faculty from all over the world. We now have over 30 nationalities represented within our faculty. Of course, we also have graduates from all over the world.”

A GUIDING VISION

In ensuring that all of PSU’s graduates boast a high level of employability, the Saudi Vision 2030 serves as a helpful guide, meeting the needs of the country’s diversifying economy. “The Crown Prince, government ministers and private companies are ready to support the education sector with the necessary investment,” says Mohammad Nurunnabi, aide to the president, director of the Centre for Sustainability and Climate, and chair of the Accounting Department. “We are already witnessing the benefits of this investment. For example, we recently launched a project in partnership with the Saudi Organisation for Chartered and Professional Accountants, specifically designed around integrated market-driven skills. This project was officially recognised as having a market-driven curriculum by the International Federation of Accountants in the US. This is a major achievement for us, validating our decision to integrate various market-driven skills, including digital auditing, working with artificial intelligence and cybersecurity.”

The market-driven curricula being pursued at PSU have attracted the attention of many experts and respected individuals from the business world. “PSU hosts many international industry speakers to enrich the student experience,” Nurunnabi says. “This provides students with valuable insight into the world of work, which only serves to increase their employability. At our College of Business Administration, for instance, all our programmes have an employability rate of over 90 per cent.”

Education can play a fundamental role in reducing the level of unemployment. But this means universities must continually update their curricula to meet new market needs. This is something PSU is wholeheartedly committed to, and a major curricula review is conducted every five years. “We conduct our curricula reviews based on the input of both internal and external stakeholders, such as alumni, directors and employers,” explains Priyanka Aggarwal, associate chair of the Finance Department at PSU. “This helps integrate market needs within our curricula with the



Vision 2030 initiative, setting a road map for all economic sectors in the kingdom.”

Another indicator of the employability of PSU’s business graduates comes in the form of university benchmarking. “We map curricula against local, regional and international needs,” Aggarwal says. “We align our curricula with professional certification, such as mapping our finance curriculum against Chartered Financial Analyst benchmarks.”

With sustainability representing such an important trend within many industries, it should come as no surprise that this factors heavily in PSU’s market-driven curricula design. The university works hard to align its programmes with the United Nations’ Sustainable Development Goals (SDGs). “We believe our courses should contribute significantly to the SDGs,” Nurunnabi says. “With regard to SDG 5, for example, which aims to achieve gender equality and empower all women and girls, universities like PSU has helped to raise the level of female employment above 35 per cent from just 17 per cent in 2017, the fastest rate of improvement in the world.”

At PSU, faculty are keen to create a

model for other universities to follow. To do this, engagement with all stakeholders is crucial, including employers, government ministries and professional bodies. The university believes in adopting a 360-degree approach to change. Human capital development is also fundamental to the work carried out by PSU. “We empower graduates to create their own businesses,” Almosa says. “The work of a university goes beyond just employability. It’s also about creating entrepreneurs – individuals that will become employers.”

Key to PSU’s market-driven curricula is the unique nature of its degree programmes. They are structured to admit graduates for five-year study programmes that consist of two

“We map curricula against local, regional and international needs”

phases. The first is the Preparatory Year Programme, where students are enrolled in English, maths and computational skills of a digital nature. They will also acquire skills for personal development and study physical education. After two semesters at the preparatory level, students can select a programme to study for a further four years.

“Of course, our curriculum is important but there is not much point in having the best curricula in the world if you don’t have the right teaching staff to deliver it,” Nurunnabi says. “That is why we prioritise faculty recruitment. We employ strict quality measures for recruiting the best faculty members from around the globe. Their expertise and research experience ultimately benefit our students. Together with our advisory board, comprising academics and industry leaders, our faculty members are fundamental to ensuring our graduates are ready for whatever the world of work throws at them – now and in the future.”

To find out more about employability at PSU, visit www.psu.edu.sa/en



MEETING SAUDI ARABIA'S ECONOMIC AND SUSTAINABILITY GOALS

At Prince Sultan University, projects related to renewable energy are helping to meet Saudi Arabia's economic and sustainability goals

The move away from fossil fuels towards renewable energy sources is well under way. Despite this trajectory, fossil fuels continue to account for about 80 per cent of the global energy mix. Evidently, although there is a desire to embrace renewables, something is holding back the energy transition.

Higher education institutions have an important role to play in facilitating the use of renewable energy sources and ensuring that the technology and infrastructure are reliable and affordable enough for the rejection of fossil fuels to be feasible. Some, such as Prince Sultan University (PSU), have long been committed to the renewable energy market, furthering both national and global goals.

"At PSU, we focus our research into renewables to align with national needs," says Abdulhakim Almajid, dean of the College of Engineering at PSU. "As per the Saudi Arabia Vision 2030 initiative, the kingdom has set a target of implementing 9.5 gigawatts of renewable energy by 2030. As a university, we are working hard to support this."

One way that PSU delivers this support is through its Renewable Energy Lab (REL), part of the College of Engineering. "The lab is dedicated to the research, development, commercialisation and deployment of technologies related to renewable energy," Almajid says. "The

lab is designed to increase the impact of PSU's research, help lab members with their professional development and foster high-quality projects around renewable energy."

As well as the Renewable Energy Lab, PSU also works with the Saudi Energy Efficiency Centre (SEEC), which was established in 2010 to rationalise the production and consumption of energy in the kingdom. Alongside the SEEC, the REL is tasked with monitoring and auditing energy efficiency to ensure consumption remains appropriate at all times.

"Last year, PSU became the first Saudi university to commit to net zero carbon emissions by 2060," says Dhafer Almakhlles, chair of the Electrical Engineering Department at PSU. "As part of this ambition, we are pioneering research on the operation and speed control of a direct current [DC] motor powered by solar energy. The motor can be used in electric cars, household appliances, pumps and refrigeration appliances. This represents just one of many projects we are working on that focus on green energy and sustainability."

These projects include three focus areas under the umbrella of the REL: electronics, microgrid energy management and electric breakers. "Electronics will play an important role in the rise of renewable energy," says Umashankar Subramaniam, associate professor at the REL. "Our microgrid energy management system, meanwhile, has been designed to test

the feasibility of DC power within various projects. Our work with electric breakers aligns with the growth in electric vehicle charging infrastructure."

PSU has established a student club around renewable energy use and is in discussion with the Ministry of Industry about opportunities to expand it. Consultation with various funding agencies is also underway.

"Many of our projects are deliberately aligned with Vision 2030," Almakhlles says. "We have submitted several proposals to the national government, including a project for the first DC microgrid in Saudi Arabia. We have submitted a proposal for King Abdullah Economic City and we are planning to install a 1 megawatt solar photovoltaic plant here on campus. We are also planning to install solar streetlights."

Many of the projects being pursued by PSU receive industry support, with collaboration between public and private organisations proving crucial to new renewable developments. This feeds into the benefits that each project produces, where local communities are always considered.

"Renewable energy has many advantages for local communities," Almajid says. "Many of these advantages are elucidated by PSU's student clubs, including the Consultation Club and Sustainability Club. Through these, our students can spread the word about the REL. This improves awareness of sustainability."

PSU seeks to drive greater awareness around renewable energy through the expert speakers it invites to campus. These speakers are experts in the many different areas that sustainability touches upon. "At PSU, we organise awareness workshops to ensure that both local and global communities appreciate the importance of renewable energies," Almakhlles says. "Some of these workshops take place online so they can be enjoyed by an international audience; others are in-person. We also work with other universities to ensure our students and researchers can share their work and learn from the projects being undertaken outside PSU."

"Our collaboration involved the national government here in Saudi Arabia," Subramaniam says. "In supporting the needs of the national economy, we offer entrepreneurship workshops around energy auditing so our students can help



create the next successful renewable energy business. We also take part in national and international competitions, such as those connected with solar car technology. This represents a great opportunity for our students."

As evidence of the importance that PSU places on competition as a driver of innovation, its students are set to take part in the Shell Eco-marathon programme, one of the world's leading student engineering competitions. The event will task students with designing, building and operating a car that can drive the furthest with minimum energy consumption.

The Shell Eco-marathon competition is far from the only thing that PSU students have to look forward to in the field of renewable energy. "The future is bright, and we have great ambition at PSU," Almajid says. "We aim to enhance the capabilities of the REL, for example, so that it encompasses different energy sources, such as wind power."

"We are also exploring how the Internet of Things can be applied to our DC microgrid project," Almakhlles adds. "Government guidance will help with steering our work and we are keen to support plans for 30 per cent of all passenger cars in Riyadh to be electric

"Renewable energy has many advantages for local communities"

vehicles by 2030. As such, we want to support the extension of electric charging infrastructure across campus and beyond."

PSU is working on many projects in the field of renewable energy. As technologies develop, new projects will continue coming to light, whether they involve green hydrogen, smart cities or some as-yet-undiscovered innovation.

To find out more about the College of Engineering at PSU, visit www.psu.edu.sa/en/CE





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