Shatt Al-Arab University

جامعة شط العرب

BASRAH · IRAQ · EST. 1993

Times Higher Education
Impact Rankings

SUSTAINABLE DEVELOPMENT GOALS · UNIVERSITY COMMITMENT

SDG 13: Climate Action

13

CLIMATE ACTION

SUSTAINABLE DEVELOPMENT GOAL

13

Climate Action

Take urgent action to combat climate change and its impacts — through clean energy and sustainability across our campus and the Basra community.

TIMES HIGHER EDUCATION IMPACT RANKINGS

Sustainable Development Goals · Evidence Submission

2026

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13.1 Introduction: the university and climate action

> ***How can a university act on climate change in a way that is practical, visible, and lasting — setting an example for its students and its city?***

Climate change is the defining environmental challenge of our time, driven in large part by the burning of fossil fuels for energy. The thirteenth Sustainable Development Goal calls for urgent action to combat climate change and its impacts, and one of the most direct contributions any institution can make is to change the way it produces and consumes energy. By shifting from conventional, carbon-intensive power toward clean and renewable sources, a university can cut its own emissions while demonstrating, in concrete terms, that a low-carbon future is achievable.

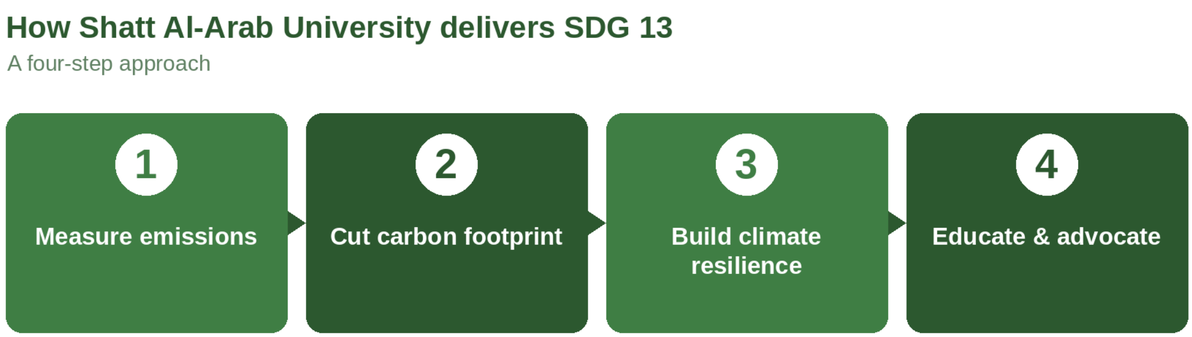


Figure 1. A four-step delivery approach.

SDG 13 framework at Shatt Al-Arab University

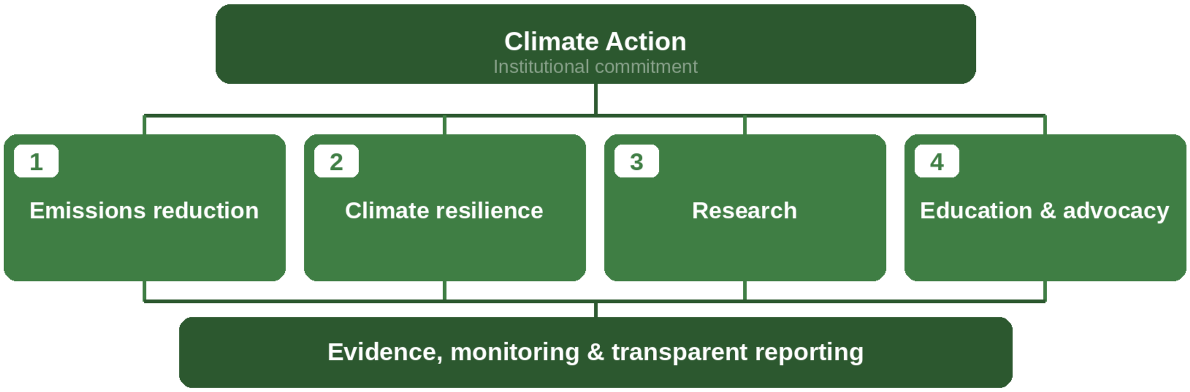


Figure 2. Institutional framework and reporting.

Shatt Al-Arab University has taken exactly this step. As the centrepiece of its response to Goal 13, the university has designed and installed a solar-energy system on its campus, harnessing the abundant sunlight of southern Iraq to generate clean electricity. The project does more than reduce the institution's reliance on the national grid: it lowers its carbon footprint, reduces long-term operating costs, and serves as a living teaching tool that raises environmental awareness among students and staff alike. This report sets out the design and performance of that system, its environmental and economic benefits, the wider landscape of solar technology it draws upon, and the university's plans to build on what it has achieved.

13.2 The university's commitment and objectives

The university approaches climate action as a practical, institution-wide responsibility rather than a slogan. Its solar project reflects a deliberate commitment to renewable energy and environmental stewardship, and is guided by a clear set of objectives:

1. To reduce the university's greenhouse-gas emissions by generating clean electricity on site.
2. To lessen dependence on the national grid and on conventional, carbon-intensive power.
3. To lower long-term energy costs and improve the institution's energy independence.
4. To use the solar installation as a teaching and research resource that raises climate awareness.
5. To set a replicable example of sustainable development for other academic campuses in Iraq.
6. To engage students, staff, and the wider Basra community in the transition to clean energy.

Taken together, these aims translate the global ambition of Goal 13 into measurable action on a single campus — the kind of concrete, repeatable model that the surrounding community can see, understand, and adopt.

13.3 The campus solar-energy project

13.3.1 System design and capacity

At the heart of the university's climate response is a photovoltaic system designed to make the most of the region's strong, reliable sunlight. The installation comprises twenty high-efficiency solar panels, each rated at 8.8 kilowatts, giving a total installed capacity of 176 kilowatts. Configured for the local solar conditions, the system delivers a steady output of around 35 amps, enough to support a range of day-to-day university operations.

The choice of high-efficiency panels was deliberate. In an institutional setting, where the roof and ground area available for installation is limited, the priority is to generate as much power as possible from each square metre. High-performance modules make that possible, allowing the university to achieve a meaningful capacity without requiring a large physical footprint. The result is a clean, on-site source of electricity that offsets power drawn from the national grid and reduces the emissions associated with conventional generation.

System at a glance: 20 high-efficiency panels · 8.8 kW each · 176 kW total installed capacity · steady output of ≈35 A.

13.3.2 Panel efficiency and performance

The efficiency of a solar panel describes how well it converts incoming sunlight into usable electricity. For modules of the class used at Shatt Al-Arab University, efficiency typically falls in the range of about 20 to 22.8 percent, depending on the specific model and manufacturer. High-performance panels — comparable to leading commercial models such as the REC N-Peak or Maxeon 440 W — can reach the upper end of that band, converting close to a quarter of the sunlight striking their surface into electrical energy.

That level of efficiency matters most precisely where space is constrained, as it is on a university campus. The more electricity each panel produces, the more the system can deliver from a fixed installation area — which is why the project prioritised efficiency over sheer panel count. In practical terms, the solar installation at Shatt Al-Arab University stands as a working model for applying the principles of sustainable development inside an educational institution, and reflects the wider modern shift toward clean energy sources, energy independence, and reduced environmental impact.

13.4 Environmental and economic impact

The benefits of the project are both environmental and economic, and they reinforce one another. On the environmental side, generating power on site from sunlight reduces the quantity of electricity the university must draw from the national grid, and with it the carbon emissions associated with conventional generation — directly lowering the institution's carbon footprint. On the economic side, the system reduces long-term operating costs, since sunlight is free and the marginal cost of solar electricity, once the panels are installed, is very low.

Beyond these measurable gains, the project carries an educational dividend that is harder to quantify but no less important. A visible, functioning solar array on campus raises environmental awareness among students and academic staff, making the abstract idea of climate action tangible and immediate. In this way the installation pays back not only in kilowatt-hours and reduced bills, but in a stronger culture of sustainability across the university community.

13.5 Solar technology: types and innovations

The university's project sits within a fast-moving field. Understanding the main types of solar panel, and the innovations now reshaping the technology, helps explain the choices behind the campus system and points to the directions in which it can grow.

13.5.1 The main types of solar panel

Solar panels come in several types, each with its own strengths depending on budget, available space, and installation environment. The principal options are summarised below.

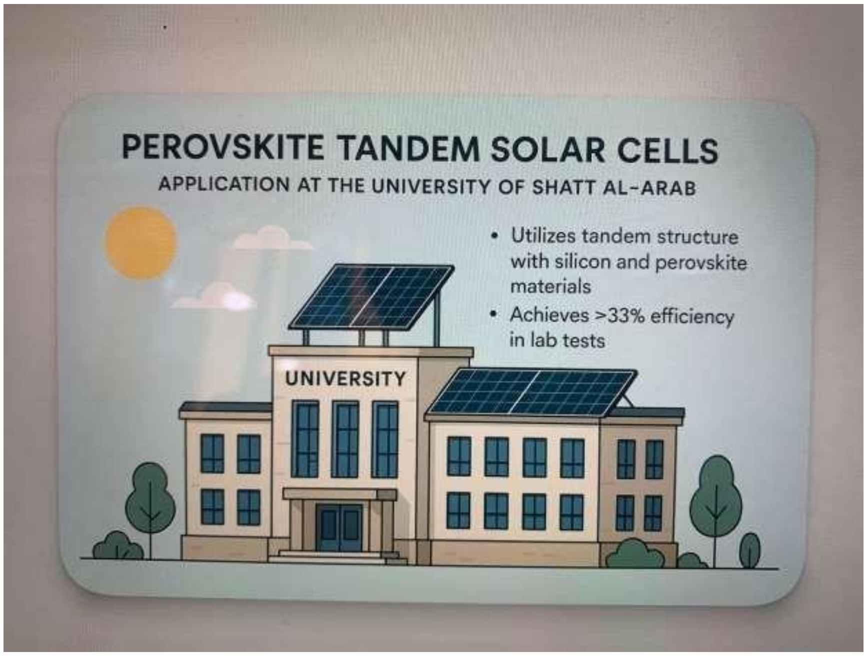
Panel type	Efficiency	Lifespan	Best suited for
Monocrystalline	20–25%	30–40 yrs	Limited roof space or high energy demand
Polycrystalline	18–21%	25–30 yrs	Budget installations with ample space
Thin-film	17–19%	10–20 yrs	Lightweight, curved, or temporary setups
PERC	Above standard mono	—	Hot climates; east/west-facing roofs
Solar tiles (BIPV)	10–20%	25–30 yrs	New builds and design-sensitive projects
Perovskite (emerging)	~29–31%	—	Future use; not yet commercially available

Monocrystalline panels, with their high efficiency and sleek black appearance, are the natural choice where space is limited and energy demand is high — the situation that applies on the university campus. Polycrystalline panels cost less but are becoming less common; thin-film panels trade efficiency for flexibility and light weight; PERC (Passivated Emitter and Rear Contact) cells perform better in low light and high temperatures; and building-integrated solar tiles offer an attractive, architectural option for new construction. Perovskite panels, still at the research stage, promise very high efficiency at low production cost and represent one of the most exciting prospects for the years ahead.

13.5.2 Recent innovations in solar technology

Solar technology has advanced rapidly, pushing the boundaries of efficiency, flexibility, and smart integration. Several innovations stand out:

- Perovskite tandem cells, which combine silicon with perovskite materials to capture more of the solar spectrum and have reached over 33 percent efficiency in laboratory tests; the remaining challenge is making them stable enough for everyday use.
- Bifacial panels, which absorb sunlight from both faces — including light reflected from the ground or rooftop — and can raise output by up to 30 percent in favourable conditions.
- Smart panels with embedded Internet-of-Things sensors, enabling real-time monitoring, predictive maintenance, and integration with smart grids.
- Flexible and lightweight panels, including organic photovoltaics, suited to curved surfaces, vehicles, and portable applications.
- Integrated energy storage, with batteries built into the system to simplify installation and improve energy independence, especially for backup or off-grid use.
- Transparent and aesthetic panels, used in windows and facades to turn buildings into power generators without compromising their design.
- Next-generation silicon designs such as TOPCon (Tunnel Oxide Passivated Contact) and HJT (Heterojunction Technology), which offer higher efficiency and lower degradation, making them strong candidates for commercial adoption.



13.6 Awareness, education, and community engagement

A central aim of the project is to turn the campus into a place where climate action is taught as well as practised. The university uses its solar installation, together with lectures and seminars, to explain the science and economics of clean energy to students and the wider community, and to make the case for sustainable development in concrete, local terms.

As part of this programme, the university has hosted presentations and seminars on solar energy and the transition to clean power, in which academic staff set out how photovoltaic systems work, why energy efficiency matters, and how renewable energy supports both environmental and economic goals. These events connect the visible hardware on the roof to the ideas behind it, helping students see the solar project not as an isolated installation but as one expression of a broader commitment to climate action.

13.7 Proposed developments and the way forward

The university regards its solar installation as a foundation to build on rather than a finished achievement. A number of practical additions have been proposed to extend the system's value, improve its reliability, and deepen its educational role:

1. Installing a smart monitoring system to measure energy production and consumption in real time.

2. Adding battery storage to ensure a continuous electricity supply during grid outages.
3. Implementing a periodic maintenance programme to clean the panels and inspect cables and inverters.
4. Establishing an educational platform on campus that displays live system data for students.
5. Extending the use of solar energy to power outdoor lighting and partial air-conditioning.

Each of these steps strengthens a different dimension of the project — visibility and data, resilience, longevity, teaching value, and reach — and together they chart a clear path for the system's growth. Pursued steadily, they would turn an already successful installation into a comprehensive, self-improving model of campus climate action.

13.8 Conclusion

The solar-energy project at Shatt Al-Arab University is a practical and important model for applying the principles of sustainable development within an educational institution. By generating clean electricity on site, the university reduces its emissions and its reliance on the national grid, lowers its long-term costs, and gives its students and staff a visible, working example of climate action in their own surroundings. It reflects the modern trend toward adopting clean-energy sources, achieving energy independence, and reducing environmental impact — the very aims at the heart of Goal 13.

The work, by its nature, is ongoing. With the proposed additions — smart monitoring, storage, structured maintenance, an educational data platform, and wider use of solar power across the campus — the university is well placed to deepen and extend its contribution in the years ahead. In doing so it not only acts on climate change within its own walls, but sends graduates into the community equipped to carry the same commitment forward, helping to build, day by day, the low-carbon future that Goal 13 envisions.

Research contributions (Scopus-indexed publications)

Shatt Al-Arab University's research is indexed in Scopus and mapped to the UN Sustainable Development Goals by Elsevier - the same data source the THE Impact Rankings use for their research metric. The university currently records 179 documents from 59 authors (Scopus ID 60109790; last updated May 2026). The chart below shows how this output is distributed across the goals.

Figure. Scopus-indexed publications by SDG (data source: Scopus).

The following publication is mapped to SDG 13 in the Elsevier/Scopus SDG dataset (1 document):

#	Publication title	Source & year
1	**Optimising soybean seed classification through ensemble deep learning: a novel computational approach** *Nemer, Z.N., Jiyad, M.A., Abdulsamad, A.M., Harfash, E.J.*	African Journal of Applied Research, 2026