7 AFFORDABLE AND CLEAN ENERGY

SDG 7 PROGRESS REPORT

Affordable and Clean Energy

What Universitas Negeri Surabaya did for clean energy in 2025 and 2026, from energy audits and solar systems to lessons for villages and schools.



Visitors look at a vehicle prototype at UNESA's third Innovation Product Exhibition, Lidah Wetan Campus, Surabaya, 24 to 26 November 2025.

SDG 7 AT A GLANCE

A campus that saves energy and teaches clean power

SDG 7 asks universities to cut their own energy use, move to clean sources and help their communities do the same. This report covers UNESA's targets and rules, its savings on campus, the carbon it measures, the solar and wind systems built with partners, and its teaching and research. It ends with the work done with villages, schools and energy companies.

HOW UNESA WORKS ON SDG 7

The Rector sets UNESA's energy rules through circulars that apply to every work unit. The Directorate of Smart Eco Campus runs the sustainability programmes, including energy, and the Directorate of Innovation, Ranking and Scientific Publication (IPPI) coordinates the sustainability data and the UI GreenMetric evidence. The Mechanical Engineering, Electrical Engineering and Physics Education study programmes carry out audits, research and outreach, and the SDGs Center publishes the evidence.

This report is one of seventeen: UNESA reports its progress on each SDG separately, and each report links to the full evidence pages, with every source, at sdgscenter.unesa.ac.id.

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SDG 7 online: every evidence page, with its sources, under SDG metrics at sdgscenter.unesa.ac.id

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more solar panel energy used every year, set in the same circular
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POLICY AND GOVERNANCE

Yearly targets for less electricity and more solar power

The Rector's circulars turn energy goals into rules for the whole academic community: targets for electricity and solar power, rules for daily work, and a rule on investment.

10%
less electricity used every year, set by the Rector on 31 July 2023

20%
more solar panel energy used every year, set in the same circular

70%
cut in official travel abroad, and 50% at home, asked of every work unit from 6 April 2026

2050
the year UNESA aims for net zero emissions, after a 50% cut by 2030

THE CLIMATE ACTION PLAN

On 31 July 2023 the Rector signed Circular B/60690/UN38/HK.01.01/2023 on the Climate Action Plan. It tells the whole academic community that UNESA will reduce energy use on campus by limiting how long electricity is used, increase the use of solar panel energy by 20% every year, reduce electricity use by 10% every year and promote energy saving in the community. The same circular sets out how to cut carbon emissions: limit motor vehicles entering the campus, run a shuttle bus between campuses, provide electric bicycles and pedestrian areas, and use biogas to reduce the use of LPG.

THE 2026 CIRCULAR ON WORK PATTERNS

Circular Letter B/44908/UN38.II/HK.01.01/2026 of 6 April 2026 asks the head of every work unit to take energy and mobility measures. Air conditioning is set no lower than 25 degrees Celsius, other electrical devices are used efficiently, study rooms, meeting rooms and offices are used well, and meetings are held online. Official travel is cut by up to 50% at home and up to 70% abroad, and the arrangements are monitored and evaluated.

A RULE ON INVESTMENT

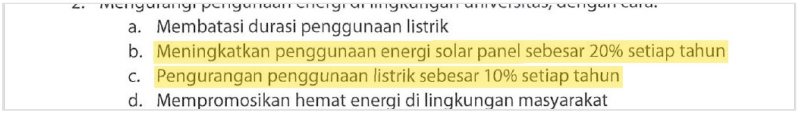
A second circular of 31 July 2023, B/60685/UN38/HK.01.01/2023 on sustainable investment, tells the university community not to support investment in companies that use carbon-intensive energy in any form, and to support and increase investment in environmentally friendly companies and activities. UNESA publishes both circulars in its sustainability policy collection at sdgscenter.unesa.ac.id.

THE NET ZERO COMMITMENT

UNESA's net zero commitment states an ambition of net zero emissions by 2050 and an emission cut of 50% by 2030. The route is energy-saving equipment (inverter air conditioners, laptops with an energy-saving label and LED-only lamps), lower vehicle emissions through bicycles, electric bicycles and public transport, and fewer leaks from air conditioners and refrigerators.

WHO LEADS THE WORK

The Directorate of Smart Eco Campus runs UNESA's sustainability programmes, including energy. The Directorate of Innovation, Ranking and Scientific Publication (IPPI) coordinates the sustainability data and the energy and climate change indicator across work units. The head of each work unit carries out the measures in the 2026 circular, and the arrangements are monitored and evaluated.


a. Membatasi durasi penggunaan listrik
b. Meningkatkan penggunaan energi solar panel sebesar 20% setiap tahun
c. Pengurangan penggunaan listrik sebesar 10% setiap tahun
d. Mempromosikan hemat energi di lingkungan masyarakat

IN THE POLICY

Rector's Circular B/60690/UN38/HK.01.01/2023 on the Climate Action Plan, set on 31 July 2023. Point 2(b) and 2(c): increase the use of solar panel energy by 20% every year and reduce electricity use by 10% every year. Highlight added.

SAVING ENERGY ON CAMPUS

Less power for air conditioning, travel and lighting

Since April 2026 every work unit follows rules to save energy, and UNESA buys energy-saving equipment. Students audit buildings to show where the savings are.

25°C
lowest air conditioning setting asked of every work unit

4 + 1
office days and one home day each week, with at least 80% of a unit's staff in the office on office days

50% / 70%
cut in official travel at home and abroad

WORKING AND TEACHING WITH LESS ENERGY

From April 2026 UNESA works from the office on Monday to Thursday and from home on Friday. Lecturers' timetables are concentrated so that each can work from home one day a week. Students from semester 5 and postgraduate students learn remotely in proportion, and attendance is recorded online through the MyUnesa app, while practicals, laboratories, studios, clinics, workshops and field practice stay face to face. A study programme reported on 14 April 2026 that these measures were being applied across the university.

BUYING ENERGY-SAVING EQUIPMENT

UNESA's greenhouse gas emission reduction programme says the university buys air conditioners, laptops with an energy-saving label, solar panels and automatic switches through the government e-catalogue, and that its logistics section supplies LED lamps only. In September 2026 the Directorate IPPI reported that sensor-based automatic lighting now works in a number of rooms, so that electrical equipment runs only when it is needed.

SMART BUILDINGS

At its sustainability data meeting of 4 March 2026 IPPI made the planning and monitoring of smart building and climate change programmes part of the energy and climate change indicator, with data due on 13 March. UNESA began organising monthly energy monitoring after the meeting of 20 May 2026.

WHERE ENERGY IS USED MOST

On 5 June 2026 the Mechanical Engineering Study Programme reported an energy audit of Building A6, carried out by students with experts from PT Enerco Nusantara Engineering as a project-based learning activity. They listed the equipment that uses energy, measured lighting, air conditioning and electrical equipment, calculated the building's Energy Consumption Intensity and analysed how its electricity is used. The audit showed savings in lighting, in how air conditioning is run and in users' habits, and its recommendations are meant as the basis of an energy conservation strategy for the Faculty of Engineering.

2) Pengaturan penggunaan pendingan ruangan paling rendah pada suhu 25°C dan perangkat Listrik lainnya secara efisien;

IN THE POLICY

Circular Letter B/44908/UN38.II/HK.01.01/2026 on adjusting employee work patterns, set on 6 April 2026. Point 5(b)(2): air conditioning is set no lower than 25 degrees Celsius and other electrical devices are used efficiently. Highlight added.

CARBON AND MONITORING

Measuring the carbon footprint and watching the meters

UNESA calculates the carbon its campus produces, works to a 50% cut by 2030 and tracks its energy through monthly data and a smart campus platform.

28th
of more than 2,100 universities in UI GreenMetric Indonesia 2026, announced 15 September 2026

4th
among teacher-training universities, and 15th among state legal-entity universities

Monthly
energy and carbon monitoring organised from May 2026 for the UI GreenMetric evidence

MEASURING THE CARBON FOOTPRINT

UNESA's greenhouse gas emission reduction programme sets out how the campus carbon footprint is calculated. Carbon dioxide from electricity is the yearly electricity use in kWh multiplied by an emission factor of 0.84 and divided by 1,000, which turns 4,156,455 kWh into 3,491.422 tons. Carbon dioxide from campus buses, cars and motorcycles is calculated from the number of vehicles, the trips made and the distance driven on campus each day. The programme totals 4,906.272 metric tons for electricity and vehicles together.

CUTTING EMISSIONS

The programme covers three kinds of source. For stationary combustion UNESA buys energy-saving equipment and LED lamps. For mobile combustion it provides bicycles and electric bicycles for the campus community and encourages Bus Surabaya and other public transport. For fugitive emissions it provides air conditioners and refrigerators with an energy-saving label.

BENCHMARKING AND DATA MEETINGS

On 8 August 2025 a UNESA delegation visited Institut Pertanian Bogor (IPB) for benchmarking. The Director of Smart Eco Campus named carbon emission reduction as one of three focus areas, and IPB showed a dashboard that tracks electricity and water use, transport, waste and carbon footprint. In March and May 2026 IPPI held data meetings in which the energy and climate change indicator called for carbon-based data, monthly energy monitoring in kWh and carbon emission monitoring.

RECOGNITION AND LIVE METERS

On 15 September 2026 UI GreenMetric ranked UNESA 28th among more than 2,100 universities in Indonesia, and IPPI named energy efficiency through sensor-based lighting among the strategies behind the result. UNESA's Smart Sustainability Campus platform shows electricity use as it happens: its Smart Office page for 23 October 2026 shows power, daily energy and the hourly use of air conditioning and lighting, with daily to yearly views.

ENERGY AND CARBON MILESTONES, 2025 AND 2026

DATE	WHAT HAPPENED	LED BY
8 Aug 2025	Benchmarking visit to IPB on carbon emission reduction and sustainability dashboards	Directorate of Smart Eco Campus
6 Apr 2026	Circular on energy and mobility savings: air conditioning at 25 degrees Celsius or higher, travel cut by 50% and 70%	Rector's office
20 May 2026	Evidence templates adjusted; monthly energy monitoring, kWh conversion and carbon monitoring	IPPI
5 Jun 2026	Energy audit of Building A6, with the Energy Consumption Intensity calculated	Mechanical Engineering with PT Enerco Nusantara Engineering
18 Sep 2026	Sensor-based automatic lighting reported in a number of rooms	IPPI

CLEAN ENERGY INFRASTRUCTURE

Solar and wind systems built with partners across East Java

In 2025 UNESA built 18 environmentally friendly installations with villages, schools, companies and other partners. Most of them run on solar power.

18
environmentally friendly installations built with partners in 2025

10
solar power systems (PLTS)

3
small wind systems

1
public electric vehicle charging station

WHAT THE SYSTEMS DO

UNESA's 2025 impact report counts 18 installations built with external partners and in use at sites across East Java. Most use solar power for lighting, farm irrigation, remote control of equipment and stand-alone electricity supply. The report says they give an alternative to fossil energy, make energy use more efficient and help cut emissions, and it ties the work to SDG 7, 11, 12 and 13.

WIND AND ELECTRIC TRANSPORT

The three small wind systems are a switch between the grid and a wind turbine in Ponorogo, a portable turbine that charges smartphones in Kenjeran, Surabaya, and an Archimedes turbine that lights a pond in Wadak Kidul, Gresik. PT Migo Anugerah Sinergi supplies an electric transport service for the campus, and Utomo Charge+ built the public charging station, which the campus community and residents around the campus can use.

THE SOLAR, WIND AND ELECTRIC TRANSPORT INSTALLATIONS

TYPE	SYSTEM	PLACE
Solar	Off-grid system with Node-RED monitoring	Vocational canteen, UNESA
Solar	Two remote-control applications for off-grid solar lighting	Began Village cemetery, Lamongan
Solar	Automatic irrigation pump	Denanyar, Jombang
Solar	Microcontroller-based motor control	Maguan, Malang
Solar	Automatic switch between the grid and solar power	Ambeng-Ambeng, Sidoarjo
Solar	Two small systems: a portable hybrid emergency energy box (solar panel and hand-crank generator) and a 100 Wp system with smart-home load control	East Java
Solar	Portable wireless charging system	Tulungagung
Solar	Dual-axis solar tracker with light sensors	Nganjuk
Wind	Automatic switch between the grid and a wind turbine	Ponorogo
Wind	Portable turbine for smartphone charging	Kenjeran, Surabaya
Wind	Archimedes turbine for pond lighting	Wadak Kidul, Gresik
Transport	Electric transport service (PT Migo Anugerah Sinergi) and public electric vehicle charging station (Utomo Charge+)	Campus and surroundings

TEACHING AND RESEARCH

Renewable energy in the classroom, the laboratory and the workshop

UNESA teaches renewable energy in 23 courses, and its researchers present and build clean-energy technology in Indonesia and abroad.

23

courses on renewable energy in the 2025 academic year, among 215 on sustainability and biodiversity

79

products at the Innovation Product Exhibition, 24 to 26 November 2025

26.2%

faster response in charge mode for a UNESA and ITERA microgrid controller than for conventional controllers, in tests reported in September 2026

COURSES AND SKILLS

In the 2025 academic year UNESA taught 215 courses on sustainability and biodiversity, 23 of them on renewable energy. Lecturers of the D4 Electrical Engineering programme completed a professional recertification, reported on 5 May 2026, that tests the planning, installation, operation and evaluation of rooftop solar power systems, so that their teaching follows current technology and industry standards.

RESEARCH SHOWN ABROAD

At the 12th International Conference on Environment and Renewable Energy (ICERE 2026) in Nha Trang, Vietnam, from 28 February to 2 March 2026, a UNESA doctoral student presented a review of ocean-wave energy systems and a study of solar panel STEAM projects. The Physics Education Master's programme sent papers on a vertical-axis wind turbine, on hybrid solar, wind and biomass systems, and on green buildings.

SMARTER SOLAR AND BATTERY SYSTEMS

In September 2026 UNESA's Electrical Engineering researchers, with the Sumatra Institute of Technology (ITERA), reported a controller that learns to share power in a DC microgrid of solar panels and batteries. In tests it responded 26.2% faster in charge mode than conventional controllers and held voltage steadier in discharge mode.

SOLAR TECHNOLOGY THAT REACHES USERS

UNESA's 2025 impact report describes a transparent drying house for farm produce that runs on solar cell power with temperature and humidity control, and a portable solar-cell learning kit that teaches letters and numbers with visuals, sound and touch. At the Innovation Product Exhibition of 24 to 26 November 2025 a student's EyeON street light adjusts its brightness to the traffic it detects, and trials showed it can save up to 50% of energy.



A pupil tries a portable solar-cell learning kit developed at UNESA, which teaches letters and numbers with visuals, sound and touch, shown in UNESA's 2025 impact report.

COMMUNITY AND PARTNERS

Taking clean energy to villages and schools, and working with energy partners

UNESA teams trained villagers to run solar lighting, showed pupils how clean energy becomes electricity, and agreed new work with energy companies and universities abroad.

4

kinds of energy (solar, wind, water and vibration) shown working in the Smart Energy City model

3

partner events in 2026: PLN UIP3B Sulawesi, the Seoul clean energy forum and PT Petrogas Jatim Utama Cendana

SMART ENERGY CITY AT A SIDOARJO SCHOOL

On 9 June 2026 four Physics Education students were reported to have brought Smart Energy City (SECi) to SMA Negeri 4 Sidoarjo. The model is a miniature smart city that makes electricity from solar, wind, water and vibration energy. Grade X pupils watched a solar panel, a wind turbine, a water turbine and a vibration energy harvester at work in demonstrations and project-based lessons, and responded positively.

PARTNERS IN ENERGY

On 20 February 2026 UNESA signed a memorandum with PT PLN's transmission and load-control unit for Sulawesi (UIP3B Sulawesi) for internships and applied research in artificial intelligence, digital electricity operations and energy transition. On 18 April 2026 a UNESA delegation led by Vice-Rector III presented research at the Forum on Clean Energy Engineering in Seoul and co-supported the conference with universities including Soochow University and the University of Ljubljana. On 8 May 2026 the Faculty of Food Security signed a cooperation agreement with PT Petrogas Jatim Utama Cendana on energy and food security.

COMMUNITY AND PARTNER ACTIVITIES, 2025 AND 2026

DATE	ACTIVITY	WITH
20 Feb 2026	Memorandum on internships and applied research in electricity digitalisation and energy transition	PT PLN UIP3B Sulawesi
18 Apr 2026	Forum on Clean Energy Engineering: research presented, conference co-supported	Soochow University, University of Ljubljana and others
8 May 2026	Cooperation agreement on energy and food security	PT Petrogas Jatim Utama Cendana

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About this report

UNESA's progress report on SDG 7, Affordable and Clean Energy, covering activities in 2025 and 2026. It is one of seventeen reports, one for each SDG. The full evidence pages, with every source, are at sdgscenter.unesa.ac.id.