# Upgrade buildings to higher energy efficiency
# November 2023

Menoufia National University, established as a fourth-generation smart university in 2022, has developed a comprehensive Sustainable Building Upgrade and Modernization Plan to enhance energy efficiency, automation, water management, indoor environmental quality, and safety features across all campus facilities.
This plan is based on a detailed assessment of the current status of sustainability components within each building, as shown in the audit table.

The assessment indicates that all university buildings, including the Administration Building, Central Laboratories, Medical Sciences Buildings (A & B), and Engineering Sciences Buildings (C & D), already incorporate a strong baseline of sustainability features such as:

- **Energy Management Systems (E1, E2)**
- **Water-saving fixtures (W components)**
- **Indoor environmental quality measures (I1–I4)**
- **LED lighting systems (L1–L4)**
- **Safety systems (S1–S4)**
- **Partial automation infrastructure (B1–B2)**

These existing features reflect the smart, modern, and energy-aware design of the university's relatively new infrastructure.
However, the sustainability audit also identified several components that are not yet implemented. These components have therefore been integrated into the University's Enhancement and Development Plan (2025–2028), which includes:

**1. Full Automation Integration**
Expanding current automation to include advanced smart controls, central monitoring, and intelligent building management (BMS) across all buildings.
**2. Advanced Safety Upgrades**
Improving fire detection, emergency communication, and evacuation systems to align with international safety standards.
**3. Enhanced Energy Efficiency Measures**
Retrofitting HVAC systems to high-efficiency models
Increasing insulation and building envelope performance
Installing advanced energy meters for real-time monitoring
**4. Water Efficiency Improvements**
Expanding greywater reuse applications
Installing leak-detection technologies
Adding smart irrigation systems for landscape areas
**5. Indoor Environment Quality Optimization**
Ensuring optimal air quality, noise control, thermal comfort, and natural lighting through modern sensors and monitoring technologies.
**6. Lighting System Upgrades**
Although LED lighting is already used, the plan includes:
Installing motion sensors
Upgrading lighting controls
Reducing unnecessary light pollution

**Purpose of the Plan**

This plan ensures that all buildings move from an already strong baseline to a fully optimized, internationally aligned sustainability performance level consistent with SDG 7, SDG 9, SDG 11, and SDG 13, while directly supporting SDG 17 (Partnerships for Sustainable Development) through collaboration with national and international partners.

| No. | Name | Place | automation | | safety | | | | energy | | water | | Indoor environment | | | | lighting | | | | Building Area ($m^2$) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | B1 | B2 | S1 | S2 | S3 | S4 | E1 | E2 | A1 | A2 | I1 | I2 | I3 | I4 | L1 | L2 | L3 | L4 | |
| | Menoufia National; Building A Administration building | Kilometer 70 on the Cairo-Alexandria Agricultural Road, Egypt | | | x | x | x | x | x | | x | | x | | | x | x | | | x | 3192 |
| | Menoufia National; Central Laboratories Building | Kilometer 70 on the Cairo-Alexandria Agricultural Road, Egypt | | | x | x | x | x | x | | x | | x | | | | x | | | x | 2326 |
| | Menoufia National; Medical Sciences Building (A) | Kilometer 70 on the Cairo-Alexandria Agricultural Road, Egypt | | | x | x | x | x | x | | x | | x | | | | x | | | x | 2322 |
| | Menoufia National; Medical Sciences Building (B) | Kilometer 70 on the Cairo-Alexandria Agricultural Road, Egypt | | | x | x | x | x | x | | x | | x | | | | x | | | x | 2322 |
| | Menoufia National; Engineering Sciences Building (C) | Kilometer 70 on the Cairo-Alexandria Agricultural Road, Egypt | | | x | x | x | x | x | | x | | x | | | | x | | | x | 2322 |
| | Menoufia National; Engineering Sciences Building (D) | Kilometer 70 on the Cairo-Alexandria Agricultural Road, Egypt | | | x | x | x | x | x | | x | | x | | | | x | | | x | 2322 |
| | **Total** | | | | | | | | | | | | | | | | | | | | 14806 |

| Administration building | Central Laboratories Building |
|---|---|
|  |  |
| Area **3193**m2 | Area: **2326** m2 |
| Medical Sciences Building (A) | Medical Sciences Building (B) |

| | |
|---|---|
|  |  |
| Area: **2322** m2 | Area: **2322** m2 |
| Engineering Sciences Building (C) | Engineering Sciences Building (D) |
|  |  |
| Area: **2322** m2 | Area: **2322** m2 |