



The future-ready campus playbook

A building performance playbook for higher education

CUNDALL

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Teesside University Net Zero Innovation Centre © Andrew Heptinstall

Introduction

Across the UAE, colleges and universities are expected to do far more than deliver academic programmes. They must support national priorities, attract and retain talent, enable research, reduce operational costs, demonstrate sustainability leadership, and deliver learning environments that are healthy, flexible, resilient and future-ready.



Mick Reilly
Director of Building Services

This is no longer just an academic issue, it is an estates, facilities management, operational performance, and governance challenge.

National priorities are reshaping expectations, placing growing pressure on institutions to deliver high-performing, future-ready campuses that support sustainability, digital transformation, and the knowledge economy.

Yet many existing buildings were not designed for these demands. They are often energy-intensive, inflexible, and misaligned with evolving teaching models and performance expectations. Some remain operational but no longer support the academic, environmental, or digital ambitions of the institution.

This playbook helps universities move from reactive operations to high-performing, future-ready campuses - unlocking the full value of their estates, improving performance, aligning with UAE priorities, and optimising assets for 2030 and beyond.

A campus now sits at the intersection of:

Compliance is just the starting point. Today's facilities teams must demonstrate that their buildings are efficient, adaptable, and ready for what's next.

Education policy



Energy and carbon reduction



Sustainability reporting



Green building regulation



Student wellbeing



Digital transformation



AI readiness



Operational resilience



Asset lifecycle planning



Institutional brand and competitiveness



What's driving change?

National Strategy for Higher Education 2030

The National Strategy for Higher Education 2030 prioritises quality education, employability, future skills, research and innovation, placing new demands on campus environments.

To support evolving learning models, university buildings must move beyond traditional formats. They need to enable research, collaboration, hybrid teaching, digital learning and student wellbeing through spaces that are flexible, comfortable and technologically equipped.

UAE Net Zero 2050

The UAE Net Zero 2050 strategy sets a clear direction for decarbonisation, making energy and carbon performance increasingly critical to reputation, cost, funding and ESG reporting.

As highly visible institutions, universities are expected to lead by example. A disconnect between sustainability commitments and inefficient campus operations risks undermining credibility.

Campus performance must align with the values universities promote.

UAE Energy Strategy 2050

UAE Energy Strategy 2050 positions energy efficiency, demand management and sustainable resource use as national priorities, elevating energy performance to a strategic issue for campuses.

With complex, energy-intensive building types and high cooling demand, universities must actively manage how energy is used.

This requires accurate metering, effective controls and intelligent operation, ensuring energy is used where and when it adds real value.

UAE National Strategy for Artificial Intelligence 2031

The UAE National AI Strategy 2031 highlights AI, data and digital infrastructure as national priorities, creating a dual role for universities: advancing AI in education and embedding it within their campuses.

However, AI-enabled campuses depend on strong data foundations. Reliable systems, clear data ownership and robust infrastructure are essential.

A campus becomes truly smart not through dashboards, but when data drives better decisions and performance.

What's driving change?

The United Nations 17 Sustainable Development Goals

The UN Sustainable Development Goals (SDGs) provide a globally recognised framework that underpins many universities' teaching, research, reporting, and strategy.

The performance of campus buildings plays a direct role in advancing several of these goals, including:



© United Nations SDG

For universities, SDG alignment should not sit only in academic publications or sustainability reports. It should be visible in how buildings are designed, operated, measured, adapted and improved.

LEED, Estidama, Al Sa'fat and Green Building Requirements

Across the UAE, green building regulations and rating systems have shaped the design of new developments and major refurbishments. These include Estidama and the Pearl Rating System in Abu Dhabi, Dubai's Green Building Regulations and Al Sa'fat, alongside voluntary frameworks such as LEED.



For existing university buildings, the challenge is often more complex than new-build certification. Many assets predate current standards, while others no longer perform as intended. Refurbishments, extensions, or changes of use can trigger requirements related to permitting, energy, water, indoor air quality, accessibility and sustainability.

This creates a critical campus risk: compliance on paper, but underperformance in operation.

Bridging the gap requires assessing real-world performance and aligning targeted interventions with regulatory, sustainability, and institutional priorities.



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Operational challenges



Buildings designed for yesterday's timetable

Traditional campus buildings were designed for fixed lecture formats, cellular offices, and predictable occupancy. Today's education model is far more dynamic, with hybrid learning, collaboration, and specialist spaces placing new demands on the campus.

The result is a mismatch between academic need and building capability.

Some spaces are overcooled, underused, and costly to operate; others are fully occupied yet uncomfortable, poorly ventilated, or inflexible. Facilities teams are left managing symptoms rather than shaping performance.

Space utilisation is now a building performance issue, not just a timetabling one.



Energy demand that is difficult to control

University buildings are inherently energy-intensive, with diverse spaces - from labs and auditoria to libraries, sports facilities and IT rooms - each with distinct load profiles.

When these environments are managed through ageing BMS platforms, fixed schedules or limited metering, inefficiencies become embedded in day-to-day operations.

Common issues include:

- HVAC systems running beyond actual occupancy
- Overcooling in underutilised spaces
- Poor zoning between high and low-use areas
- Outdated lighting with limited daylight or occupancy response
- Simultaneous heating and cooling
- Plant systems operating without performance feedback
- Utility data arriving too late to inform decisions
- Misalignment between academic timetables and building operation
- Limited sub-metering across different space types

For many campuses, the opportunity isn't a single large-scale retrofit, but a structured programme of targeted, data-led interventions - prioritised by value, disruption, payback, carbon impact and academic benefit.



Reactive maintenance instead of predictive performance

Facilities teams are highly effective at keeping buildings running, but "running" is not the same as performing.

A building can be operational yet inefficient, compliant yet uncomfortable, or equipped with systems but lacking real insight. It may support current use, but fall short of future teaching needs, continuing to waste energy in the process.

The shift is from reactive maintenance to predictive performance.

This means using metering, sensors and BMS analytics, alongside indoor environmental data and fault detection, to identify and address issues before they become complaints, failures or cost pressures.



Ageing assets and constrained capital budgets

Campuses rarely have the luxury of full replacement. Universities must remain operational - teaching continues, students stay on site, and research cannot be easily interrupted. Shutdown windows are limited, budgets are annualised, and procurement can be slow.

This makes prioritisation essential.

By turning long defect lists into clear investment roadmaps, operators can identify what is urgent, what can wait, and what delivers the greatest value in terms of energy, resilience, compliance and long-term performance.

It's not about spending more, but spending in the right sequence for impact.

Operational challenges



Comfort, wellbeing and indoor environmental quality

Campus quality is experienced through the fundamentals: temperature, air quality, lighting, acoustics, noise, Wi-Fi, and ease of movement.

When these fall short, the impact goes beyond complaints, affecting concentration, attendance, perceived quality, and how effectively spaces support learning.

Looking beyond energy, operators must consider how buildings feel, support learning, and use performance data to evidence improvements in student and staff experience.



Sustainability commitments without a delivery pathway

Many universities already embed sustainability across teaching, research, partnerships, reporting, and ESG commitments.

The challenge is translating ambition into a practical, estate-level delivery plan.

A credible pathway must answer:

- What is the current energy and carbon baseline?
- Which buildings are the poorest performers?
- What is driving peak demand?
- Which assets are nearing end of life?
- What can be achieved through optimisation, and what requires capital investment?
- Which interventions support LEED, Estidama, Al Sa'fat, ESG, or SDG reporting?
- What is the role of renewables, electrification, and demand management?
- How will progress be measured and reported?

Translate sustainability intent into a costed, sequenced and measurable building performance programme.



Case study

A net zero carbon innovation centre

Cundall delivered MEP, BREEAM, Net Zero Carbon and sustainability services for Teesside University's Net Zero Carbon Innovation Centre – a purpose-built facility supporting the UK's 2050 net zero ambitions and the university's target to become net zero by 2030.



The 2,000–2,500 m² centre brings together advanced laboratories focused on hydrogen, circular economy, intelligent energy systems and digital modelling, enabling collaboration between academia and industry.

To meet ambitious operational energy targets, we addressed the performance gap between design and operation through a fabric-first, systems-led approach:

- **High-performance envelope** with low U-values, reduced air leakage and optimised glazing
- **Façade design optimisation** to minimise heat loss and maximise daylight
- **Efficient building services**, including heat pumps, LED lighting with smart controls and on-site photovoltaics
- **Advanced BMS** to monitor, track and continuously optimise energy performance

Circular economy principles were embedded throughout, reducing embodied carbon, minimising waste and enabling future adaptability. By taking a whole-life carbon approach, Cundall ensured the most efficient, flexible and future-ready solutions for the facility.



**Winner of
multiple industry
awards**

**Beautiful Buildings, 2024
Green Apple Environment Awards**

**Climate Action Award, 2024
CENE Awards**

Is your campus ready for 2030 and beyond?

The next generation of education buildings will not be passive containers, they will be intelligent, responsive, data-enabled environments.

They will:

- Sense occupancy and adapt in real time
- Flex to different teaching modes
- Support hybrid and immersive learning
- Optimise energy use automatically
- Provide live feedback on comfort and air quality
- Enable predictive maintenance
- Generate data for ESG, SDG, and sustainability reporting
- Inform better capital investment decisions
- Align with national priorities for education, energy, AI, and net zero
- Support research, innovation, and wellbeing

The question for every university is no longer: are our buildings operational?

It is: are they delivering the performance your institution now demands?

Steps to a high-performing campus

Start by assessing, optimising, and future-proofing campus performance through a structured methodology.

Discover: understand how your campus performs

We begin by building a clear view of current performance, through utility analysis, BMS reviews, asset condition surveys, space utilisation studies and stakeholder insight.

The goal is to move beyond anecdote.

We identify where energy is wasted, where spaces underperform, where systems are nearing end of life, where controls are misaligned, and where compliance or operational risks are impacting the academic experience.

Diagnose: identify root causes, not symptoms

Symptoms rarely tell the full story.

A hot classroom may not be an HVAC issue.

High energy use may not be old equipment.

Poor space utilisation may not be planning.

We take a whole-system view - integrating architecture, MEP, controls, façade, occupancy, operations, and user behaviour - to identify root causes, not just visible issues.

Align: connect performance with strategy and compliance

We align building performance with the wider regulatory and strategic context, including:

- Local and regional frameworks
- LEED and international certification pathways
- Green building regulations
- Authority requirements triggered by refurbishment or change of use
- ESG, carbon, and sustainability reporting
- Internal policies and capital planning

This provides a clear foundation for decision-making, prioritisation, and stakeholder alignment.

Steps to a high-performing campus

Prioritise: define a practical investment roadmap

We translate insights into a clear, prioritised roadmap to support approvals, budgeting, and phased delivery.

Interventions may include:

- Operational optimisation
- Controls and BMS improvements
- Energy efficiency measures
- Indoor environmental quality upgrades
- Asset replacement and life cycle planning
- Space reconfiguration and activation
- Smart campus and IoT integration
- Decarbonisation actions
- Resilience and business continuity measures
- Compliance and certification upgrades

Each intervention is assessed against cost, impact, risk, payback, user experience and future flexibility.

Optimise: improve performance before replacing assets

One of the most overlooked opportunities in campuses is optimisation before replacement.

Many buildings can deliver significant gains through improved controls, zoning, scheduling, sensor calibration, and ventilation and lighting strategies.

We help clients identify what can be improved quickly, what requires design intervention, and what should align with planned lifecycle replacement - avoiding unnecessary capital spend and building confidence for larger investments.

Future-proof: design for flexibility, data, and change

Education is evolving faster than buildings. We help universities create adaptable, long-life environments that respond to changing academic models.

This includes:

- Flexible teaching and collaboration spaces
- Modular MEP systems for future reconfiguration
- Enhanced digital infrastructure
- Demand-responsive HVAC and lighting
- Advanced metering strategies
- Sensor-driven utilisation and environmental monitoring
- AI-ready data architecture
- Resilience planning for critical spaces
- Decarbonisation aligned with asset lifecycles
- Certification and sustainability reporting support

The goal is simple: avoid locking today's assumptions into tomorrow's campus.

The performance gap

These principles highlight the shift from compliance-led building management to performance-driven campus strategy.



Compliance is no longer the finish line

Meeting minimum requirements does not guarantee performance. Buildings can comply with design standards yet still be energy-intensive, uncomfortable, data-poor, or misaligned with future teaching models.

The opportunity is to move beyond compliance to measurable performance.



The hidden campus tax

Inefficient buildings create a hidden cost, through energy use, maintenance burden, comfort issues, poor utilisation, and avoidable carbon and capital spend.



Stop cooling empty rooms

In the UAE, cooling often dominates energy use - yet many campuses still operate on fixed schedules rather than actual demand.

A high-performing campus doesn't just use less energy, it uses it where it matters.



The best new campus may already exist

Future-ready campuses don't always require new build. Often, the most sustainable and cost-effective solution is to re-purpose and upgrade existing assets.

Unlock the potential of existing spaces for new academic uses.



A BMS is not a smart campus

A BMS only adds value if it is configured, monitored, and used to inform decisions. Many campuses have data but lack insight.

Turns visibility into performance intelligence.



Student experience is an engineering outcome

Comfort, air quality, lighting, acoustics, and digital reliability directly shape student experience.

These are measurable, manageable, and improvable building performance outcomes.



AI-ready campuses need strong foundations

AI-enabled estates rely on quality data, robust controls, integrated systems, and clear governance. Before a campus becomes AI-enabled, it must be data-ready.

Build the technical foundations for intelligent operation.



SDG alignment starts in the plantroom

SDG impact is not just strategic, it is operational.

Energy efficiency, water use, indoor environmental quality, and asset management translate sustainability goals into measurable outcomes across campus systems.

Where to start: turning challenges into action



Campus performance and compliance opportunity scan

A focused review to identify high-value opportunities across selected buildings.

Typical outputs:

- Energy and utility analysis
- Operational pain point mapping
- BMS and controls review
- High-level asset and system assessment
- Space utilisation and comfort insights
- Compliance and certification opportunities
- Prioritised opportunity schedule
- Recommended next steps



Building reactivation and space flexibility study

A targeted study to unlock underused or underperforming buildings.

Typical outputs:

- Space and servicing constraints
- MEP capacity and adaptability
- Comfort and ventilation insights
- Future use scenarios
- Authority considerations
- Budget-level roadmap

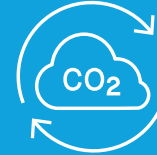


Smart campus and IoT readiness review

An assessment of digital infrastructure and readiness for data-led operation.

Typical outputs:

- Metering and sensor strategy
- BMS integration assessment
- Data architecture recommendations
- Fault detection and diagnostics opportunities
- Indoor environmental quality monitoring strategy
- AI readiness roadmap
- Governance and operating model recommendations
- Cybersecurity and data ownership considerations



Net zero and energy demand reduction roadmap

A strategic pathway to reduce energy, carbon, and operational cost.

Typical outputs:

- Baseline energy and carbon profile
- Building performance benchmarking
- Energy conservation measure registerControls optimisation plan
- Lifecycle replacement alignment
- Renewables and electrification opportunities
- Phased investment roadmap
- Measurement and verification strategy

Where to start: turning challenges into action



LEED, Estidama, Al Sa'fat and green building alignment review

A focused review for universities planning refurbishments, upgrades, or sustainability-led reporting.

Typical outputs:

- Applicable standards and rating framework review
- Gap analysis against certification or compliance targets
- Energy, water, materials, and indoor environmental quality assessment
- Design and operational improvement recommendations
- Certification pathway guidance
- Practical implementation roadmap



A conversation worth having

Cundall brings together building services engineering, sustainability, digital engineering, asset performance, smart buildings, decarbonisation and technical due diligence expertise.

For university estates teams, this means one partner who can connect strategic aspiration with practical delivery.

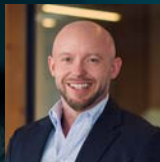
We understand that campus buildings cannot be treated as isolated technical assets. They are live operational environments that must support students, faculty, researchers, visitors, leadership teams and facilities managers every day.

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Black Country & Marches Institute of Technology © Speller Metcalfe

About Cundall

As multi-disciplinary engineers and sustainability consultants we see how the relationship between people and place can be strengthened through integrated innovation.

Smart building approaches are part of our core business: we enhance how buildings function and optimise the experience of those who learn, teach, work, and live within them. Our global teams collaborate to help new and existing buildings, precincts, and portfolios perform better, use less energy, and reduce the environmental impact of the built environment.

We would welcome the opportunity to explore how your campus buildings are performing today, and how they can be enabled to support the education models of 2030 and beyond.

Cundall Manchester office



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