



SIEMENS

Reimagining campuses for a changing world

Innovative pathways to sustainable, connected,
thriving higher education environments
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Foreword

Challenges

Introduction

Outcomes

Campus
insights

References

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In today’s rapidly changing world, higher education institutions are more important than ever. They are at the forefront of addressing global challenges and equipping the next generation to thrive in a dynamic future. We are committed to supporting higher education by helping create smart, sustainable, and resilient campuses that inspire learning, innovation, and inclusive growth. Together, we can bridge the gap between aspiration and action, tackle shared complexities, and drive the transformative change the world so urgently needs.

Faye Bowser
Vice-president Higher Education Vertical
Siemens Smart Infrastructure



Key challenges in higher education



Globalization of opportunities



Internationalization is reshaping higher education as students seek global diversity, quality education, and career advantages abroad. This trend fuels the rise of international education hubs, intensifying competition for students, faculty, and research prestige.

Pressure to innovate



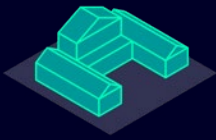
Modern campuses must provide spaces for learning, leisure, and collaboration that meet rising student expectations. Inspiring facilities and sustainable infrastructure enhance the institutional value proposition in an increasingly competitive market.

Growing demand



The global demand for higher education is growing, driven by the expanding middle class, the knowledge economy's need for specialized skills, and education's role as a pathway to socio-economic mobility. Institutions must adapt to serve diverse demographics and emerging markets.

Technological transformation



Digital platforms, MOOCs (Massive Open Online Courses), and hybrid learning models are revolutionizing education. As digitalization advances, institutions must integrate AI, data analytics, and digital tools to enhance learning, campus management, and collaboration across borders.

Future-proof mobility



The demand for sustainable, low-carbon mobility solutions grows as campuses connect with external urban spaces. HEIs must reimagine transport infrastructure to accommodate diverse student demographics and meet environmental goals.

Evolving learning models



Skill-based education and flexible study options are transforming academic delivery. (HEIs must adapt to industry demands, bridging theoretical knowledge with practical applications through part-time programs, remote learning, and living labs.

Safety and resilience



Post-pandemic realities have heightened awareness of safety and resilience. Institutions must protect students and staff, maintain operations during disruptions, and adapt to critical challenges through robust infrastructure and preparedness.

Competition and differentiation



Rising competition is driving institutions to prioritize enhancing research impact, student experiences, and graduate employability. Strong branding and differentiation strategies are essential to securing a distinct position in a crowded global landscape.

Financial situation



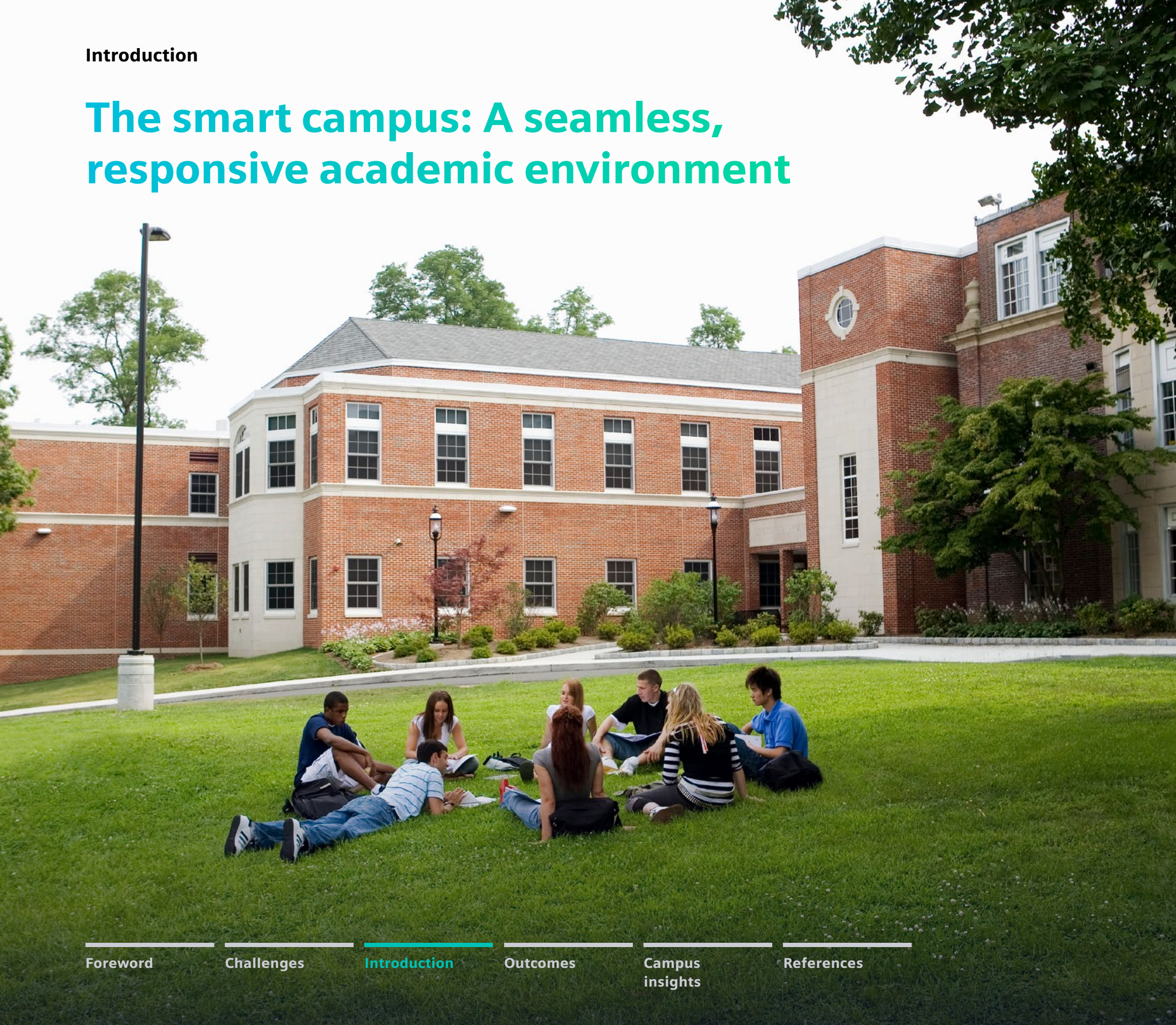
As public funding stagnates, institutions face financial pressures to sustain infrastructure and attract talent. HEIs must explore innovative financing solutions and diversify income sources to support academic excellence and expand their academic offerings.

Sustainability requirements



Sustainability dominates higher education strategies, and HEIs need to meet environmental goals and align with student expectations. Institutions are addressing energy inefficiency, reducing carbon footprints, and promoting eco-conscious campus designs.

The smart campus: A seamless, responsive academic environment



Connecting data-driven solutions with everyday campus life, using AI, IoT, and intelligent infrastructure, a smart campus adapts to the needs of students and faculty in real time. It leverages the advantages of digitalization and advanced technology to become a thriving ecosystem that enhances the educational experience, attracts talent, and adapts to evolving demands.

In an era of rapid technological and financial change, higher education institutions (HEIs) face complex challenges and opportunities. To remain competitive and sustainable, they must adapt to a highly competitive student market and new forms of learning and scientific work alongside unprecedented financial and operational challenges. With increasing investments in sustainability, cybersecurity, and AI, HEIs are forging a path toward improved efficiency and enhanced campus experiences.

Embracing the smart campus vision

As digital ecosystems continue to evolve, HEIs are increasingly focused on leveraging smart campus concepts, which integrate systems for facility and energy management, data-driven decision-making, and adaptive spaces. Recent advancements in AI-driven analytics enable campuses to process data in real time, helping predict and respond to student needs, optimize resources, and implement proactive security measures.

While many implementations remain at an exploratory stage, with few institutions having fully adopted integrated systems, it is becoming increasingly clear that the convergence of physical and digital environments is transforming HEIs into highly adaptive ecosystems. This transformation enhances the educational journey, creates an environment that improves outcomes, and attracts top students and researchers.

Strategic investment in data and AI

To realize their potential, modern HEI campuses require smart, integrated infrastructure solutions that connect energy management, digital services, and mobility options with core educational goals. Today, HEIs are allocating significant portions of their technology budgets toward solutions that address resilience, efficiency, and sustainability across campus facilities. Investment in platforms and SaaS solutions is growing, spurred by a need for proven outcomes in areas such as big data analytics, AI, and cybersecurity.

With innovations in IoT and data integration, campuses today can autonomously monitor and optimize building performance, reduce carbon footprints through adaptive energy systems, and enhance mobility with smart, on-demand transportation solutions. These solutions increasingly depend on partnerships with technology providers that bring expertise in AI, edge computing, data analytics, renewable energy, and IoT systems.

Siemens, for example, has expanded its offering for the higher education sector to include next-generation AI-driven building management systems and energy management, adaptive learning spaces, and more extensive e-mobility infrastructure.

Responding to the sustainability mandate

The evolving focus on sustainable practices is also shaping HEI strategies, with rising awareness of environmental accountability. Institutions are prioritizing energy efficiency and low-impact infrastructure upgrades, aligning with broader goals to reduce carbon footprints and meet regulatory expectations. Campus sustainability initiatives now cover a range of goals, from optimizing energy use and waste management to fostering eco-friendly commuting and sustainable food practices.

Siemens has expanded its work with higher education institutions to deploy future-ready technologies that include low-carbon distributed energy systems, advanced automation for energy management, and data-driven solutions for real-time campus analytics. These innovations contribute to sustainability goals while ensuring economic savings, improved operational resilience, and an excellent educational experience.

Cybersecurity as a priority

Cybersecurity remains a top priority for HEIs, as the proliferation of connected devices and digital resources increases exposure to data privacy risks and cyber threats. Institutions are investing in advanced cybersecurity frameworks to safeguard sensitive student, faculty, and research data while ensuring that technology integrations remain secure. However, achieving effective cybersecurity is an ongoing challenge; what is secure today may not be tomorrow as cyber threats constantly evolve.

To protect critical assets, ensure the smooth operation of infrastructure, and safeguard sensitive data, HEIs must rely on skilled experts and customized solutions. Companies like Siemens provide comprehensive cybersecurity services tailored to the unique needs of higher education, helping institutions proactively reduce vulnerabilities, comply with regulatory standards, and minimize potential threats.

Charting a path forward

In short, as higher education transforms, the smart integration of digital solutions across core processes offers a clear path to greater operational resilience, enriched campus experiences, and improved educational outcomes. By adopting a balanced smart campus approach that embraces innovation while addressing practical considerations, and partnering with trusted experts like Siemens, HEIs can effectively achieve these goals and create optimal environments for students, faculty, and staff to learn, live, and work.



Shaping the future of higher education

As higher education evolves, HEIs face new challenges in supporting diverse learning needs, nurturing long-term growth, and remaining resilient amid financial pressures. Driven by technological advancements and evolving student demographics, universities, colleges, and polytechnics are rethinking how they structure both academic environments and physical spaces. In doing so, they must also account for the broader global trends, such as digital transformation and shifts in the workforce, which are profoundly reshaping education.

Changing learning and teaching models

The traditional model of in-person, lecture-based instruction has shifted as institutions increasingly rely on online, hybrid, and flexible learning formats. This shift requires HEIs to accommodate diverse learning preferences, allowing students to engage remotely, on campus, or in blended learning settings. As institutions look to integrate remote learning, they must invest in robust communication infrastructure to ensure accessibility, particularly in regions where bandwidth limitations pose challenges. Adapting to these new models of teaching and learning remains a priority as higher education institutions strive to support an increasingly global and diverse student body.

Diverse student demographics

HEIs today must meet the needs of a more diverse population, including international students, working professionals, and non-traditional learners who seek flexible learning options. This trend reduces demand for traditional lecture halls and residential housing but increases the need for flexible, adaptable meeting areas, shared spaces, and satellite locations. Institutions are tasked with allocating space efficiently, monitoring occupancy, and enhancing digital connectivity to create inclusive, accessible environments that enable collaboration and community among varied student demographics.

Sustainability and environmental responsibility

The need to respond to increased expectations for carbon reduction, energy efficiency, and environmental stewardship, alongside tangible long-term economic benefits, has made sustainability a major focus for most HEIs. Sustainability goals have become central to campus planning, with HEIs actively pursuing renewable energy, green building designs, and sustainable waste practices to minimize their ecological footprint. Institutions face the challenge of integrating these initiatives with existing campus infrastructure and finding ways to monitor and adjust the consumption and other resources. Many universities, polytechnics, and colleges must navigate complex funding mechanisms, such as green bonds and public-private partnerships, to finance sustainable initiatives, balancing immediate costs with the long-term environmental, social, and economic impacts of their decisions.

Data and digital infrastructure

The expansion of data-driven decision-making offers valuable insights into areas such as student engagement, resource allocation, and facility management. However, as institutions adopt digital tools to enhance campus operations, they face challenges in establishing reliable data collection systems and ensuring that data analytics tools are effective and secure. Integrating IoT devices, managing cybersecurity risks, and safeguarding the integrity of data-driven campus environments require meticulous planning and ongoing assessment to ensure both operational efficiency and data privacy.

Introduction

Financial situation

Amid these shifts, financial pressures, including rising tuition fees and reduced public funding, are further intensifying the need for HEIs to explore innovative and sustainable funding solutions for campus development. In response, many institutions are exploring alternative financing models like power purchase agreements and green financing options to support infrastructure improvements, energy management systems, and sustainable projects. Balancing financial constraints with the need for innovation and sustainability remains a key challenge as HEIs seek to maintain competitiveness and enhance student experiences.

Global competition and strategic positioning

As higher education becomes more internationalized and at the same time more focused on post-graduation employability and practical skills that meet the needs of evolving industries, particularly in emerging markets, institutions are under pressure to enhance their appeal to international students with hands-on learning opportunities, establish global partnerships, and build strong networks both within the research community and with industry partners. This competitive landscape challenges institutions to differentiate themselves through quality teaching,

research, and campus amenities that enhance both academic and social experiences, including innovative spaces like living labs that facilitate experiential learning. Building a distinctive brand and demonstrating value in an increasingly crowded market are essential for institutions aiming to attract top students, faculty, and collaborators worldwide.

Building the campus of tomorrow

In light of these challenges, it is essential that HEIs adapt strategically, cultivate partnerships, prioritize data-driven insights, and create dynamic learning environments to ensure their continued relevance and success in an ever-changing global landscape.

They must balance innovation with practicality, creating adaptable, healthy, resilient, and sustainable environments that respond to both current and future needs. We aim to assist HEIs in addressing these challenges thoughtfully and to design, implement, deliver, maintain, and operate smart campus environments – leveraging digital infrastructure, data-driven decision-making, and sustainable technologies – that support meaningful academic experiences and position institutions as leaders in innovation, responsibility, and student-centered learning, creating enjoyable environments that promote academic success and holistic development.



Connecting buildings, spaces, people, and energy



Outcomes



Campus safety
and security



Efficient and
predictable
campus operations



Smart energy
management



Smart space
optimization



Campus
sustainability



Students'
experience and
satisfaction



Research and
teaching
excellence

Seamless connectivity enables
smarter campuses

A truly smart campus relies on the seamless network-
ing of energy systems, buildings, spaces, and people.
Achieving optimal results for all stakeholders requires
numerous technologies from diverse domains to inter-
act seamlessly. This integrated approach ensures a
balance between cost efficiency, a superior user
experience, and environmental, health, and socio-
economic objectives.

Driving efficiency, sustainability,
and innovation

Modern campuses can leverage a vast and growing
array of digital technologies. The open digital business
platform Siemens Xcelerator offers a curated portfolio
of software and IoT-enabled hardware built on stan-
dardized application programming interfaces (APIs).
It includes solutions developed by Siemens and
certified partners. This platform supports flexible
and scalable solutions tailored to the specific needs
of HEIs.

Siemens Xcelerator helps enhance cost efficiency,
streamline management and planning of space utiliza-
tion and people flows, optimize space utilization, and
implement more sustainable, people-centric transpor-
tation solutions. Furthermore, the platform's connec-
tivity and data resources open up new opportunities
for teaching, learning, and research.

Partnering for campus transformation

Siemens is dedicated to transforming higher educa-
tion by creating vibrant, sustainable campuses where
people love to research, learn, work, and live. The
company provides expert support throughout the
entire life cycle of a smart campus project, from initial
planning and financing to the implementation of
advanced technologies and all the way to operation
and maintenance.

Discover on the following pages how Siemens helps
institutions achieve their goals and adapt to changing
demands, ensuring academic spaces remain innova-
tive, sustainable, and impactful through integrated
solutions and continuous campus optimization.

Campus safety and security



The evolving demands of higher education require campuses to become more accessible and adaptable than ever before. As new forms of learning and community engagement reshape the use of campus facilities, the challenges of safety and security grow in complexity, encompassing both physical and digital domains. Siemens offers advanced safety and security solutions that integrate robust physical measures with cutting-edge cyber-security protocols, ensuring campuses remain safe, resilient environments for learning and innovation.



Ensuring physical safety

The physical safety of students, faculty, and staff is paramount as campuses address emerging threats, including gun violence and other critical safety incidents. Advanced surveillance systems, access controls, and emergency response frameworks enable real-time threat detection and rapid intervention. Technologies such as mobile-enabled access enhance daily operations by replacing traditional keys with digital alternatives, streamlining security processes while minimizing vulnerabilities. Automated emergency systems further improve situational awareness, guiding operators in responding to incidents with precision and ensuring compliance with regulatory standards.

Addressing diverse cybersecurity infrastructures

HEIs operate within diverse and evolving digital ecosystems, often integrating legacy systems with modern technology. This variability poses challenges for implementing robust cybersecurity protocols. Customizable solutions play a crucial role in safeguarding sensitive information, such as student records, research data, and intellectual property, while meeting regulatory requirements like the General Data Protection Regulation (GDPR). Automated monitoring and maintenance systems from Siemens reduce risks, streamline building and operational technologies, and minimize downtime, allowing HEIs to maintain continuity in their digital infrastructure.

The need for integrated approaches

A unified safety management platform enhances operational efficiency by centralizing oversight and enabling coordinated emergency responses. Such systems incorporate live video monitoring, automated notifications, and mobile-based access management to optimize workflows and user convenience. For instance, digital credentials can replace physical access cards, reducing administrative overhead and improving security. Fire safety measures, supported by automated eLogbooks, further bolster compliance and risk mitigation through precise documentation and reporting capabilities.

Creating value through smart solutions

Integrated safety and security solutions based on Siemens Desigo CC, Siveillance Suite, and Building X provide significant benefits, extending beyond immediate threat mitigation. These systems enable crime prevention, rapid emergency response, and evidence-based decision-making, contributing to a safer campus environment. Technologies such as surveillance cameras and access controls reduce incidents of theft and vandalism, while data-driven insights help refine safety strategies. Streamlined operations and compliance efficiencies lower operational costs, enhancing the institution’s reputation and appeal to prospective students and faculty.

Quantifying success

The measurable impact of Siemens’ integrated safety and security solutions for HEI campuses highlights their transformative potential. HEIs achieve up to 100% compliance with security audits, drastically improve data recovery times to up to 95% within a 24-hours RTO, and experience fewer security breaches. Combined with rapid incident response and seamless integration of physical and digital safety measures, these outcomes reinforce the role of advanced safety systems in creating secure, adaptable campuses. By adopting these measures, HEIs position themselves as leaders in innovation and resilience, ensuring an environment where learning and research thrive.

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Smart energy management



On HEI campuses, smart energy management is increasingly central to achieving sustainability goals, reducing operational costs, and enhancing resilience in energy supply. This concept relies on the structured integration of data-driven systems, on-site renewable energy, and advanced monitoring platforms. These measures are essential for transforming campus energy infrastructures into efficient, adaptable, and sustainable entities.



Addressing vendor integration challenges

HEIs often face the complexity of managing disparate energy systems from various vendors. This fragmentation can lead to inefficiencies and hinder the development of cohesive energy strategies. Holistic management systems that unify all components are vital for creating streamlined, efficient operations. Advanced platforms enable real-time control and optimization, ensuring systems work together to reduce waste and improve overall performance. Such integration facilitates a seamless transition toward a more resilient and efficient campus energy infrastructure.

Goethe University in Frankfurt am Main, Germany, commissioned Siemens with the energy modernization of the Biocenter at the Riedberg campus. This project illustrates how existing campus buildings can be efficiently aligned with sustainability objectives, ultimately paying for themselves in just a few years through energy cost savings and state subsidies.

Meeting student demands

Students increasingly demand robust sustainability initiatives, including the adoption of renewable energy. Incorporating technologies like solar panels, wind turbines, energy storage systems, and microgrids into campus infrastructure aligns with these expectations while significantly reducing greenhouse gas emissions. These efforts demonstrate a HEI’s commitment to environmental stewardship, enhancing its appeal to prospective students and faculty.

In collaboration with Siemens, the University of East London in the UK has developed an ambitious net-zero roadmap to achieve net-zero emissions by 2030. This

initiative combines campus and community activities, offering enhanced green learning opportunities, partnerships with local energy enterprises, and the integration of IoT-enabled technology to drive sustainable outcomes.

Bridging technological and resource gaps

Budgetary and technical constraints often make the adoption of modern energy solutions challenging. HEIs may struggle to implement IoT-enabled sensors, automation, and predictive analytics – critical tools for maximizing energy efficiency and shifting from reactive to proactive energy management. Addressing these barriers requires strategic, tailored solutions that align with financial and operational realities while delivering measurable outcomes.

For example, Morgan State University in Baltimore, in collaboration with Siemens and the Maryland Clean Energy Center, has developed a 10-year strategic plan to transform its campus. Phase one alone is projected to yield US\$10 million in guaranteed savings, and the comprehensive measures will reduce greenhouse gas emissions by up to 65% by the end of phase four.

In Dallas, Texas, Southern Methodist University began transforming its campus into a smarter, more efficient one in 2017. Partnering with Siemens, the institution implemented data-driven energy management and maintenance programs. This resulted in energy savings of 29 million kWh over the first five years. On average, Southern Methodist University has saved \$2.5 million annually through the energy management program, while also increasing maintenance staff productivity by 26% and enhancing campus comfort and reliability.

Comprehensive scope

Effective smart energy management begins with a thorough assessment of existing infrastructure. This evaluation identifies inefficiencies and explores optimization potential. Automated platforms can then be implemented to enable dynamic adjustments to energy usage, reducing utility costs. Continuous monitoring through unified dashboards ensures efficient system performance, while regular evaluations provide insights for further refinements.

Once this foundation is established, renewable power generation systems can be installed alongside micro-grids to optimize the mix of renewable and other energy sources. These solutions enhance energy independence, reduce reliance on traditional utilities, and allow participation in energy markets.

Tangible value

By embracing integrated and innovative approaches, HEIs can position themselves as leaders in sustainability while ensuring operational excellence. Smart energy management curbs energy waste, optimizes operations, and maximizes the value of on-site energy

resources. This includes coordination with local utilities or wholesale market rates, yielding substantial benefits. In many cases institutions can capitalize on considerable savings in investment costs through government funding while benefiting from improved rankings in sustainability assessments, further amplifying their reputation as leaders in responsible environmental practices.

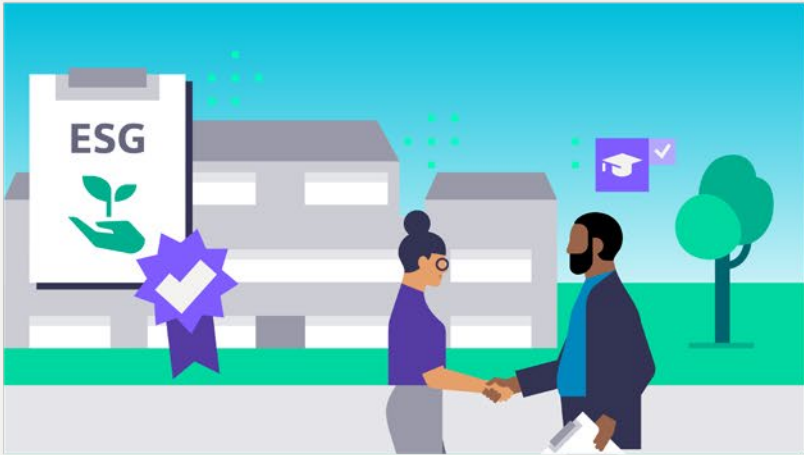
Experience suggests that smart energy solutions can lead to a 25% reduction in energy consumption, translating to annual cost savings of approximately US\$100,000 per project. Environmentally, these measures contribute to 30-40% reductions in carbon emissions, reinforcing institutional sustainability goals.

Additionally, smart energy management initiatives create new educational opportunities, offering students hands-on experience with cutting-edge energy technologies in living labs. Enhanced system reliability also minimizes disruptions, improves campus resilience, and ensures consistent energy availability while preparing institutions for an evolving energy landscape.

➤ Discover our solutions



Campus sustainability



HEIs worldwide face mounting pressures to implement effective sustainability initiatives amidst aging infrastructure, ambitious carbon reduction targets, and heightened student expectations for environmentally responsible campuses. Siemens supports institutions in addressing these complexities through a comprehensive and results-driven approach, transforming campuses into hubs of sustainability while achieving measurable environmental and economic outcomes.



Navigating sustainability masterplans

HEIs often outline ambitious goals in their sustainability masterplans, including achieving net-zero emissions. However, the execution of these plans is aggravated by outdated infrastructure, budget constraints, and the scale of necessary upgrades. Siemens employs advanced energy management systems, renewable energy integration, and building automation technologies to streamline these efforts.

Thorough campus assessments and prioritizing high-impact areas help institutions identify and implement solutions that align with their strategic goals. A recent project in the U.S. saw energy consumption reduced by 29 GWh, yielding US\$ 9.5 millions of savings in the first five years.

Meeting carbon reduction targets

Governments and regulatory bodies are increasingly mandating aggressive carbon reduction targets, compelling HEIs to take a leadership role in environmental stewardship. To decarbonize operations effectively, however, tailored solutions, such as smart grid technology and renewable energy systems, are required.

At Humber College in Toronto, Canada, for instance, the integration of solar PV installations and a micro-grid equipped with advanced monitoring systems enabled a 30% annual reduction in emissions while generating clean energy onsite. The college also established a living lab, providing students and professionals with hands-on experience in sustainable power systems.

Responding to student expectations

Students today demand environmentally responsible campuses as part of their educational experience, influencing HEI reputation and enrollment decisions. Siemens supports the development of energy-efficient buildings, smart campuses, and innovative transportation solutions, all aimed at creating an ecologically sustainable yet vibrant campus environment.

In partnership with Siemens, the University of Birmingham aims to transform its Edgbaston and Dubai campuses into some of the world’s smartest campuses while achieving net zero carbon emissions by 2035. The project involves multiple phases, with Siemens providing long-term advisory support. Leveraging digitalization, initial measures have already reduced annual emissions by nearly 3,000 tons of CO₂, lowered maintenance costs, and enhanced building comfort levels. At the same time, the transformation is creating a dynamic living laboratory environment for power generation, energy systems management, social behavior analysis, and big data utilization. Over the next decade, the University of Birmingham will equip up to 1,000 graduates and over 200 doctoral candidates with expertise in energy sector disciplines critical for the transition to net zero.

A structured approach

To address the complexity of sustainability transformation, Siemens adopts a phased, data-driven approach. Initial campus estate assessments generate detailed data on metrics such as carbon emissions, energy usage, and water conservation opportunities. These insights inform roadmaps that prioritize high-impact areas and align initiatives with recognized certification standards. Collaboration with stakeholders ensures that energy audits lead to actionable recommenda-

tions, such as HVAC upgrades and the adoption of renewable energy. For legacy campus infrastructure, Siemens develops specialized migration programs to seam-lessly integrate sustainability measures in brownfield settings.

Tangible value

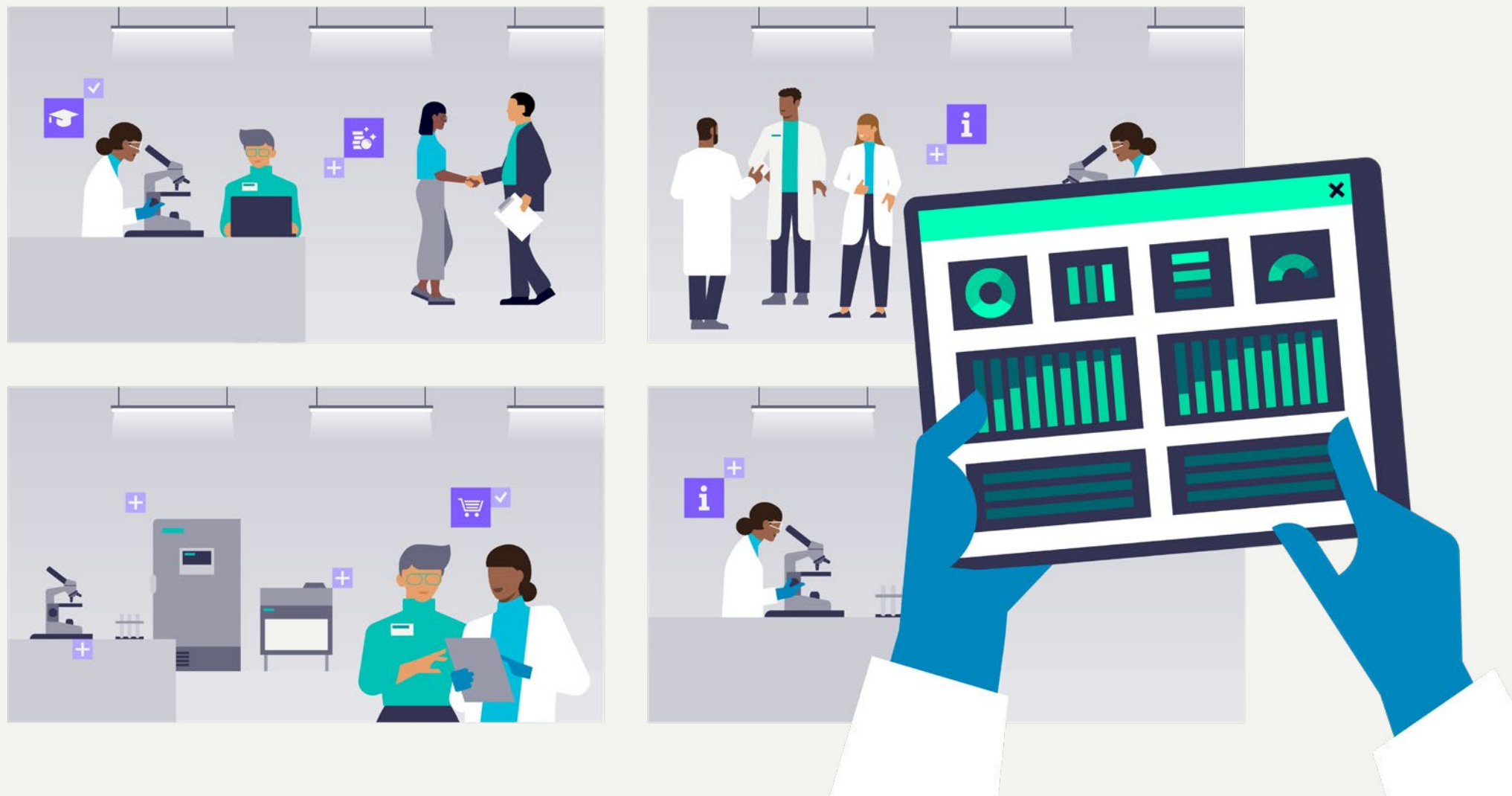
The impact of Siemens’ approach extends far beyond ecological benefits, offering institutions significant long-term advantages across multiple dimensions. By reducing utility costs, universities, polytechnics, and colleges can redirect financial resources toward academic and research initiatives, strengthening their core mission. Furthermore, sustainability efforts enhance institutional reputation, attracting environmentally conscious students and fostering collaborations with organizations sharing similar values.

The tangible benefits of these measures are evident in data from previous implementations in the smart building space. HEIs focusing on sustainability have achieved approximately 25% reductions in energy consumption and a 30–40% decrease in carbon footprints, with short-term carbon reductions reaching up to 10%. These changes also correlate with a 25% increase in student and faculty satisfaction, reflecting the broader appeal of eco-friendly campuses.

Ultimately, the adoption of innovative technologies and sustainable practices enables the transformation of HEI campuses into living labs, driving research and inspiring broader societal change. Drawing on real-life campus infrastructure data, such a living lab provides hands-on learning and research opportunities for students, faculty, and industry partners while facilitating academic inquiry into sustainability practices.

➤ Discover our solutions

Research and teaching excellence



HEIs face a dual mandate: conducting advanced research that pushes the boundaries of knowledge and preparing students with the practical skills necessary for success in a dynamic workforce. Strategic partnerships with industry leaders are integral to fulfilling these goals. By aligning academic excellence with industry relevance, HEIs can create educational and research outcomes that directly address societal and economic needs. Recognizing the importance of campus environments that stimulate collaboration, innovation, and academic rigor, Siemens is dedicated to equipping educators and researchers with the tools they need to drive new discoveries and advancements.



Bridging academia and industry

To enhance student employability and align academic programs with today’s real-world challenges, HEIs must cultivate meaningful connections with external partners. These collaborations provide invaluable opportunities such as internships, industry-sponsored research, and project funding. Siemens plays a key role in facilitating these connections, offering platforms that enable universities, polytechnics, and colleges to collaborate with not only industry leaders, but also government agencies and non-profit organizations. Through these strategic partnerships, HEIs can address critical challenges such as campus sustainability, while simultaneously equipping students with the practical skills that are in high demand in the workforce. For instance, Humber College in Toronto, Canada, has partnered with Siemens to establish the Sustainable Microgrid and Renewable Technology Lab (SMART Lab), a living lab focused on microgrid technology and control.

Cutting-edge research infrastructure

A persistent challenge for many HEIs is the lack of robust digital infrastructure, which limits their ability to conduct advanced, often commercially relevant research. This is particularly acute in fields like clean energy, where cutting-edge technologies are crucial. Siemens addresses this gap by offering tailored solutions that integrate advanced technologies such as IoT sensors, data analytics, and energy management systems. These tools empower researchers to tackle complex problems while providing institutions with the means to contribute meaningfully to global sustainability efforts.

For example, at Algonquin College in Ontario, Canada, Siemens is enhancing the college’s educational mission by creating new research opportunities through a living lab focused on distributed energy systems. Additionally, Siemens experts are contributing to sustainability education by teaching students through a new graduate certificate program that allows specialization in this critical area.

Ideal spaces for innovation and learning

Modern campuses require dynamic environments that support both teaching and research activities. From flexible, interactive classrooms to cutting-edge research laboratories, Siemens’s Smart Lab Ecosystem offers a modular, adaptable infrastructure that meets the diverse needs of both educators and researchers. These spaces are designed with sustainability in mind, incorporating energy-efficient solutions and offering compatibility with a range of technologies. The Smart Lab Ecosystem sets benchmarks in terms of safety, flexibility, user experience, and energy efficiency, addressing the high energy consumption of laboratory facilities by optimizing ventilation requirements and reducing heating and cooling loads, while driving innovation in academic and research environments.

Customized educational experiences

As educational models evolve, there is a growing emphasis on experiential learning in settings such as living labs that leverage real-world data for research and teaching. Siemens collaborates with HEIs to design initiatives like Empower+, which provide students with hands-on learning opportunities through internships, projects, and real-world research. These programs allow students to apply academic knowledge in practical settings, preparing them to tackle complex global challenges and innovate within their chosen fields.

In London, UK, for example, Siemens is assisting the University of East London in establishing a living lab that captures real-time data across campus for teaching and research purposes. This data, stored on Siemens’ platform, will also be accessible to partners of the university, enabling collaboration and analysis from any location.





Knowledge exchange and research commercialization

Collaboration between academia and industry extends beyond teaching to include joint research projects that drive innovation. By combining academic insight with industry expertise, these partnerships yield breakthrough discoveries and facilitate the commercialization of research. Whether through patenting technologies, licensing innovations, or establishing spin-off companies, such collaborations create tangible societal and economic impacts. Furthermore, these industry connections offer faculty members opportunities for professional growth, through internships, sabbaticals, or consulting projects, which enrich their teaching and research expertise.

Measurable outcomes

The value added by industry collaborations is reflected in both qualitative and quantitative outcomes underscoring the transformative potential of strategic partnerships in advancing academic excellence and workforce preparedness. On average, HEIs that engage in these collaborations typically experience higher student enrollment rates, a notable increase in industry-sponsored research projects (20-30%), and improved satisfaction among students and faculty, with increases of up to 25%.

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Driving Innovation together: Siemens-Academia partnership

Industry-university collaborations and co-innovation initiatives play a vital role in bridging the gap between theoretical knowledge and real-world applications. By engaging with cutting-edge technologies, innovative engineering expertise, and diverse career pathways, students gain invaluable practical experience, specialized knowledge, and enhanced employability. Researchers benefit from increased access to resources, opportunities for collaboration, and better prospects for commercializing their work.

We invite academics, researchers, and students to actively participate in our range of initiatives designed to foster innovation, build connections, and drive impactful change.

Siemens Research and Innovation Ecosystem

The Siemens Research and Innovation Ecosystem (RIE) demonstrates how Siemens supports the core processes of HEIs. It addresses current challenges through future technologies in a collaborative, impactful manner. Siemens grows this globally connected, locally anchored ecosystem by engaging with internal and external stakeholders, researchers, employees, customers, founders, students, and creative innovative minds.

Alongside traditional contract research and aligned with Siemens' technology portfolio, RIE participates in global innovation projects, publicly funded research consortia, and various collaborative formats. The mission is to develop solutions that empower customers, enhance success, and drive sustainable innovation.

Higher Education Partnership and Workforce Development Programs

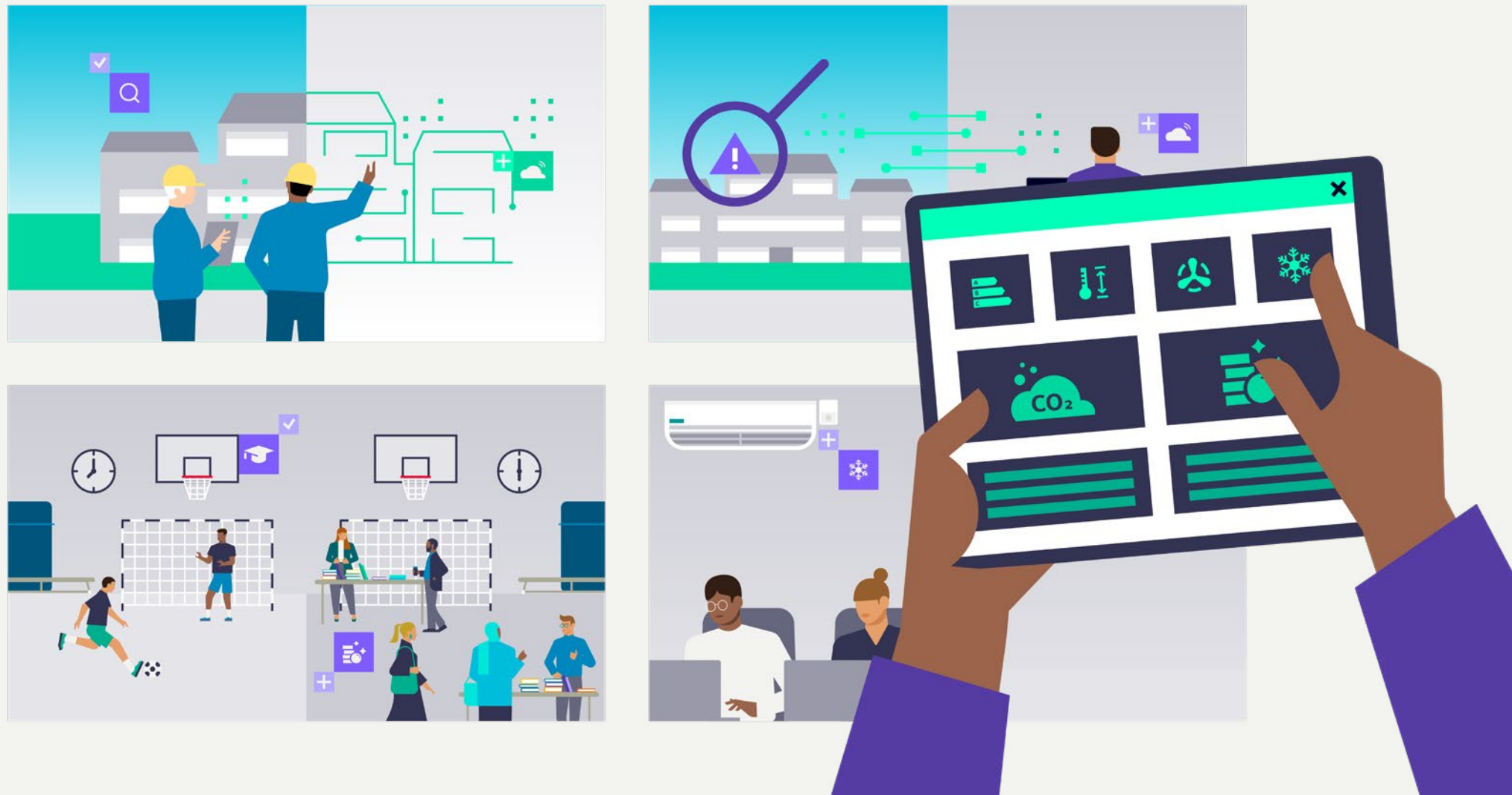
Siemens partners with HEIs to design and implement educational and workforce development programs that align with student needs, industry trends, and emerging technologies. These partnerships offer avenues for academic growth, workforce development, internships, and living labs.

Initiatives like EMPOWER+ and "connected curriculum," give HEIs the opportunity to leverage Siemens' expertise and technology to enhance teaching and learning. Students and instructors gain access to industry-relevant hardware and software, including heatmaps of regional companies using Siemens technology in manufacturing environments. As partnerships are long-term commitments, Siemens strives to become more than a supplier – focusing on listening, advising, and strengthening both HEIs' educational missions and local economies, while supporting workforce readiness.

Siemens Innovation Ecosystem

The Siemens Innovation Ecosystem bridges the gap between academia and real-world technological challenges. This open platform invites researchers, students, startups, and suppliers to participate in open innovation challenges and programs, hackathons, and other research-focused initiatives, fostering collaboration and addressing key technological issues.

Efficient and predictable campus operations



As HEIs evolve into increasingly complex ecosystems, the demand for advanced technologies, strategic investments, and sustainable practices continues to grow. By adopting innovative approaches to streamline operations, institutions can establish a robust foundation for reliable, adaptable, and efficient learning environments. Initiatives such as digitalizing facility management, optimizing lifecycle processes, and workforce development are underpinned by data-driven insights, enabling strategic investments in advanced technologies. Collaborating with Siemens equips HEIs to enhance performance, reduce costs, and provide supportive environments for students, faculty, and staff.



Transitioning to predictive maintenance

Many HEIs still depend on reactive maintenance strategies, which may address immediate concerns but often lead to inefficiencies, elevated costs, and unexpected downtimes. Transitioning to predictive maintenance, supported by cloud-based platforms and IoT sensors, provides a proactive alternative. These systems enable remote monitoring and advanced analytics to identify and address potential issues before they escalate.

This approach reduces maintenance costs, minimizes downtime, and improves energy efficiency and occupant comfort by continuously optimizing building performance. Predictive systems also extend the lifespan of assets and integrate seamlessly with building management platforms. For example, Tampere University in Finland achieved a 50% reduction in user complaints and replaced 70% of visual inspections with data analytics through a data-driven maintenance model.

Bridging workforce gaps

Aging facilities staff and limited expertise in emerging technologies present challenges for modern campus operations. Modernization necessitates targeted workforce development, including tailored training and recruitment of skilled personnel. Collaborations with technology partners and ongoing staff education ensure teams are equipped to manage advanced systems effectively, supporting continuity as campuses evolve technologically.

Legacy infrastructure challenges

Deferred maintenance and aging infrastructure affect energy efficiency, occupant comfort, and sustainability objectives. To address these issues, digitalization tools such as digital twins offer transformative capabilities. These virtual models provide real-time visualization, monitoring, and optimization of campus infrastructure, supporting data-informed decisions for modernization efforts. Lifecycle assessments further help HEIs prioritize and allocate resources effectively, ensuring cost-efficient and sustainable upgrades. For example, the University of Birmingham, in partnership with Siemens, employs a digital twin of its energy systems to enhance transparency and guide decisions on achieving net-zero emissions by 2035.

Investments and revenue

Budget constraints and competing demands often challenge HEIs in prioritizing investments in building technologies. However, strategic assessment tools can help institutions identify upgrades that balance short-term feasibility with long-term benefits. Advanced asset management systems, data analytics, and lifecycle twins based on the Building X platform provide actionable insights into energy consumption, asset conditions, and optimization potential, enabling HEIs to maximize return on investment and maintain operational sustainability over time while enhancing financial resilience.

Data-driven approaches also enable HEIs to optimize the use of their real estate. For example, sensor-driven analytics can reveal inefficiencies in space utilization, allowing institutions to repurpose or rent underutilized facilities. Such efforts generate additional revenue streams and ensure that real estate serves both community engagement and revenue generation goals.

Systematic approach

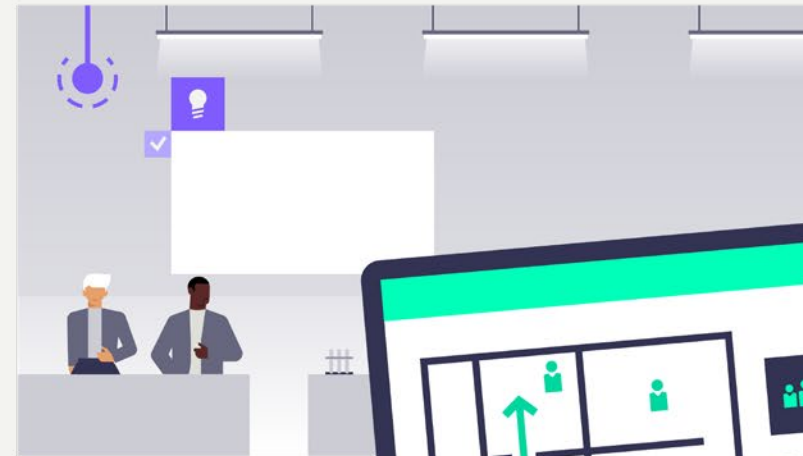
Optimizing campus operations involves a strategic integration of technology and targeted interventions. Maintenance needs are systematically assessed to identify gaps and set priorities, leveraging IoT sensors and analytics platforms for real-time monitoring of equipment and energy usage. This data informs predictive maintenance planning, reducing downtime and extending asset lifespans. Digital twins offer detailed visualizations for infrastructure optimization, aiding long-term planning and resource allocation. Outsourcing select facility management tasks and continuously refining strategies through training and reviews further enhance efficiency. These measures align operational goals with long-term sustainability and resource optimization.

Proven impact

The adoption of predictive and data-driven operational strategies has proven successful in higher education settings worldwide. Institutions using digital twins and cloud platforms report fault resolution times improving by up to 30% and unexpected equipment failures decreasing by 50%. These outcomes highlight the value of proactive campus management. Through tailored solutions from Siemens, HEIs can achieve operational efficiencies, from reducing energy costs to optimizing facility utilization, positioning themselves to meet future challenges while advancing academic excellence.

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Smart space optimization



The rise of remote learning and the increasing costs of campus operations pose significant challenges for HEIs. Inefficient use of physical spaces results in unnecessary expenses and limits the ability to adapt to evolving academic and operational needs. Through smart space optimization strategies based on advanced data analytics and real-time monitoring, HEIs can address these challenges effectively, ensuring both resource efficiency and an improved campus experience.

Addressing underutilization and rising costs

Remote learning trends have intensified the issue of underutilized campus spaces. This inefficiency can be mitigated through advanced data analytics and real-time monitoring. By evaluating room occupancy and usage patterns, HEIs can enhance space allocation, achieving a potential 30% improvement in utilization. Spaces such as classrooms, laboratories, and communal areas can be dynamically adapted to current needs, ensuring optimal use without overcrowding.

Additionally, smart sensors and automated building systems enable energy-efficient management by adjusting HVAC and other systems according to real-time occupancy levels. This reduces operational costs and aligns campus management with sustainability objectives while maintaining comfort for students and staff.

Data-driven insights for campus efficiency

A detailed understanding of campus usage patterns allows institutions to reimagine their facilities effectively. Siemens's integration of real-time occupancy data with advanced analytics and visualization tools empowers decision-makers with actionable insights. These tools identify areas that are overused, underutilized, or poorly allocated, guiding strategic improvements in space planning. For instance, repurposing underused rooms into collaborative or innovation spaces can address the evolving needs of the academic community. Meanwhile, renting excess capacity to third parties can generate additional revenue. Real-time visibility into occupancy also enhances emergency preparedness, enabling rapid and effective evacuations during critical situations.

At the same time, the available space utilization data can be used for research on topics such as building usage and people flow patterns or floorplan and traffic optimization.





Creating adaptable, sustainable spaces

HEIs face the dual challenge of modernizing outdated infrastructure and adapting to hybrid learning models, often within tight budget constraints. Siemens provides tailored solutions, integrating IoT-enabled systems and energy management tools to optimize campus functionality. These measures enhance the adaptability of campus spaces, making it easier to accommodate shifts in pedagogy, enrollment, or operational demands.

Optimized space usage benefits the campus community by improving access to well-designed and purpose-driven facilities, such as laboratories and study areas. This contributes to a more engaging and productive environment for students, while reducing the overall environmental impact of campus operations.

Optimizing space utilization together

Siemens’s approach begins with a comprehensive assessment of campus spaces, analyzing historical and real-time data to identify inefficiencies. Advanced monitoring systems like the Building X occupancy app process data generated by Enlighted IoT sensors to provide ongoing insights into space utilization, informing decisions about room allocation, resource deployment, and infrastructure upgrades. These insights also support operational improvements, such as refining cleaning schedules to prioritize high-traffic areas or enhancing security measures through occupancy monitoring.

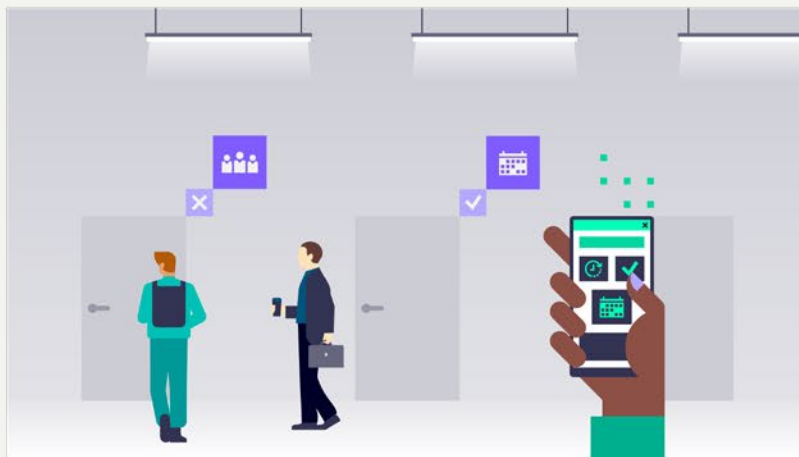
By examining movement patterns across the campus, Siemens helps institutions refine infrastructure and service offerings. Adjustments can include improving walkways, expanding study spaces, or reconfiguring rooms to align with usage trends. Such targeted interventions ensure that campus operations remain aligned with the needs of the academic community.

Maximizing resource efficiency

The implementation of space optimization strategies yields measurable results, addressing the evolving demands of academia and society. By improving space utilization, institutions reduce the need for new construction, curb operational expenses, and improve energy efficiency, with institutions achieving, on average, a 30% reduction in energy management and maintenance costs through data-driven, adaptive approaches. Students benefit from enhanced access to modernized facilities, supporting academic achievement and engagement. Furthermore, sustainability efforts are strengthened through more efficient use of resources, contributing to a greener and more responsible campus environment.

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Students' experience and satisfaction



HEIs are increasingly committed to creating environments that enhance academic achievement while supporting students' well-being. Addressing the evolving expectations of students involves integrating advanced technology, upgrading infrastructure, and using data-driven insights to improve campus life. Siemens collaborates with university partners to create innovative solutions, from improving air quality and lighting to designing sustainable and accessible spaces. Through smart building features that enhance safety and convenience, these efforts help students and staff thrive both academically and personally.

Better digital experiences

Many HEIs face challenges in modernizing campus systems to create seamless, interactive digital experiences. Outdated infrastructure often hampers operational efficiency and limits students’ ability to access essential services. Siemens addresses this by implementing advanced IoT-enabled systems, digital signage, and mobile applications, establishing a connected campus ecosystem. These platforms improve access to services, simplify wayfinding, and enhance engagement through interactive platforms that adapt to students' evolving needs.

More healthiness and comfort

The quality of physical spaces significantly impacts student satisfaction and productivity. Healthier indoor environments reduce risks of respiratory conditions, boosting productivity and well-being. Advanced indoor air quality (IAQ) sensors, integrated with HVAC systems through solutions like Building X and Desigo, continuously measure parameters such as CO₂ levels, humidity, and volatile organic compounds (VOCs). This ensures the maintenance of indoor AQI levels above 50 across 95% of campus facilities, creating healthier and more comfortable learning spaces.

Enlighted and Desigo Room Automation further enhance campus environments by optimizing lighting and automated blinds based on occupancy and daylight levels, ensuring energy efficiency and comfort. Additionally, digital wayfinding solutions ensure ease of navigation, particularly for students and visitors with disabilities, improving convenience, access, and inclusivity across campus facilities.

Data-Driven continuous improvement

Siemens designs and implements systems that emphasize long-term performance optimization, promoting healthier environments, efficient resource management, and data-driven decision-making. By harnessing analytics from IAQ sensors, integrated HVAC systems, and digital platforms, Siemens enables continuous refinement of campus operations. This iterative process reveals opportunities to scale innovations, from improving energy efficiency to optimizing navigation systems, ensuring a campus environment that evolves with institutional needs.

Tangible impact

By adopting integrated systems that prioritize user comfort and health while offering seamless navigation tools, HEIs can achieve up to a 25% increase in student and faculty satisfaction. These efforts also strengthen the institution’s reputation, attract prospective students, and differentiate the university in a competitive educational landscape, contributing to increased student enrollment. Furthermore, improvements in students’ experiences and satisfaction align with growing demands for sustainable campus management practices.

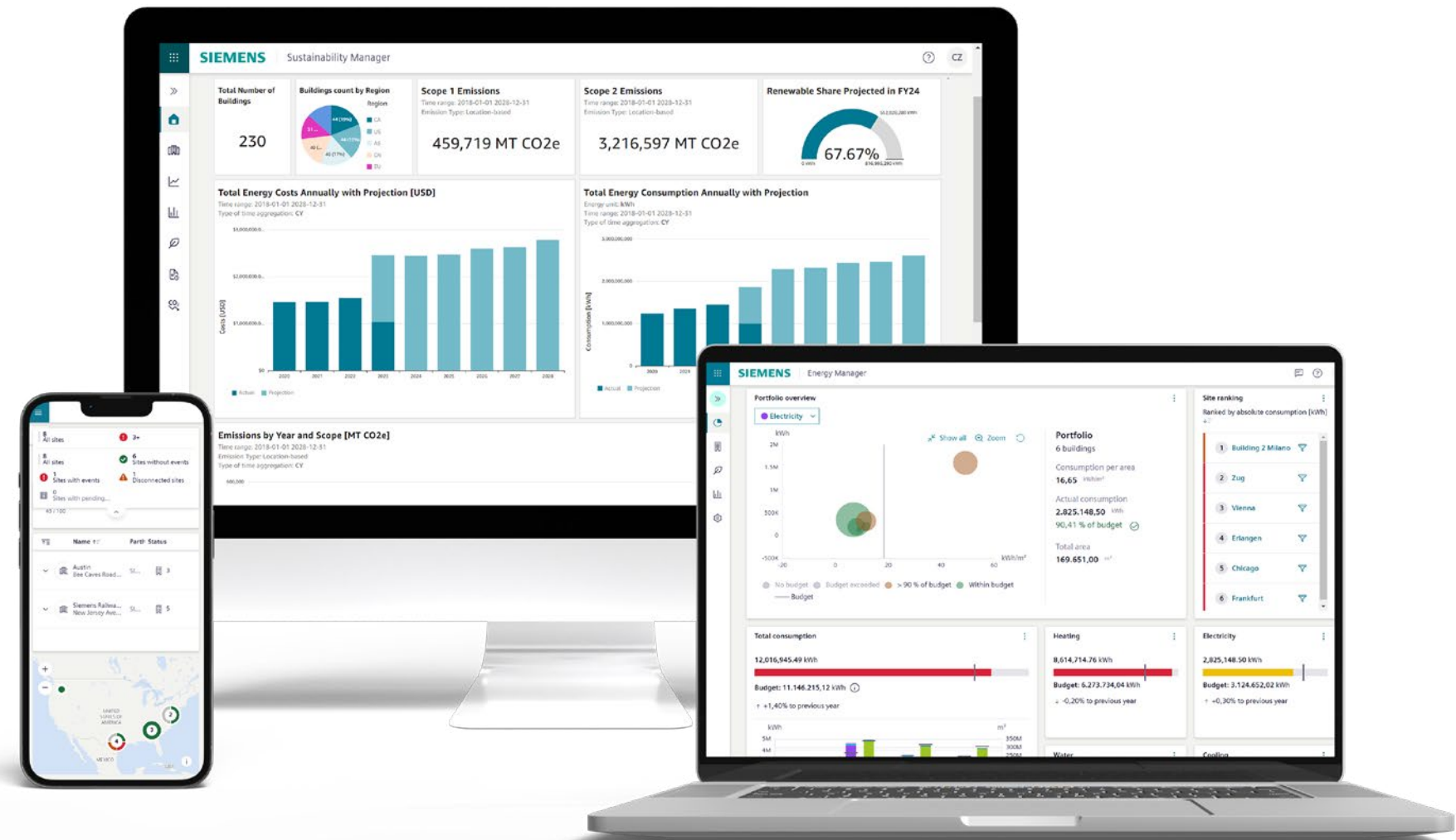
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A holistic platform for campus transformation

Campus Insights is a scalable, software-driven solution that redefines the higher education landscape by bridging the gap between academia and campus operations. Based on Siemens Building X and tailored for modern HEIs, it provides a holistic, open ecosystem to merge infrastructure data with academic needs, transforming disparate data streams into actionable insights.

Through the collection of data from multiple sources, deployment of AI algorithms, management of digital twins, and real-time monitoring, institutions can benchmark performance metrics, integrate partners and third-party solutions, and streamline both academic and operational workflows.



Leveraging hidden potential

By centralizing the management and operation of campus infrastructure, Campus Insights supports the development of tailored, campus-specific solutions that help HEIs create optimized environments to learn, work, and live.

For example, class schedules can be synchronized with energy consumption patterns, while safety protocols can be assessed against real-time behavioral data. Such insights help improve efficiency, comfort, health, and safety while addressing critical challenges in energy and sustainability management. For example, advanced monitoring and AI-powered optimization help HEIs:

- Reduce their carbon footprint.
- Lower operational costs by optimizing energy usage.
- Improve student and staff well-being through better comfort and safety measures.
- Maximize space utilization by aligning timetables, building usage, and workflows.

New opportunities for learning and research

Campus Insights provides HEIs with innovative ways to elevate academic excellence and encourage experimentation and discovery by integrating campus operations into the academic experience. Through living labs, students and faculty can access and exchange real-time campus infrastructure data for teaching, learning, and research. This collaborative framework enables institutions to align operational strategies with academic goals, creating a dynamic environment for innovation.

A collaborative journey

Campus Insights evolves alongside higher education institutions, guiding them through a transformative process to establish and enhance their digital ecosystems. This journey begins by identifying and digitizing relevant data, followed by deploying and scaling initial digital applications. Institutions can then leverage data-driven insights to optimize operations, implement analytics and automation, and enhance ROI. Finally, the platform matures into a comprehensive ecosystem by integrating third-party tools, aligning academic and infrastructure workflows, and engaging broader stakeholders to enrich research, education, and campus experiences.



A truly smart campus with a top-tier energy management program

In 2017, Southern Methodist University (SMU) launched a comprehensive effort to develop a smarter and more efficient campus. The initiative aimed to enhance the overall campus experience for students, faculty, and staff while significantly improving energy management, system reliability, and operational efficiency. A key objective was addressing deferred maintenance while reducing operating and maintenance costs.





Infrastructure upgrades and modernization

SMU partnered with Siemens to create a detailed roadmap for achieving these goals. This included upgrading critical infrastructure and investing in campus-wide data collection, enhanced controls, and modern building management systems. A new central utility plant was constructed, and existing systems were updated with extensive submetering and sensors to enable real-time data capture.

Data-driven analytics and maintenance

SMU leveraged data-driven analytics, remote monitoring, and troubleshooting tools based on Building X to achieve greater operational efficiencies. These technologies provide the university's facilities team with transparency into the performance of more than 25,000 mechanical equipment components. The proactive maintenance strategy allows the team to detect and address issues before they escalate, reducing downtime and improving system reliability.

Financial and operational benefits

The energy management program has delivered substantial financial benefits, with SMU realizing annual savings of approximately \$2.5 million. In addition, a natural gas and electricity hedging program has protected the university against price volatility and weather-related disruptions, ensuring budget stability. These measures have also improved campus comfort and reliability.

Integrated campus management

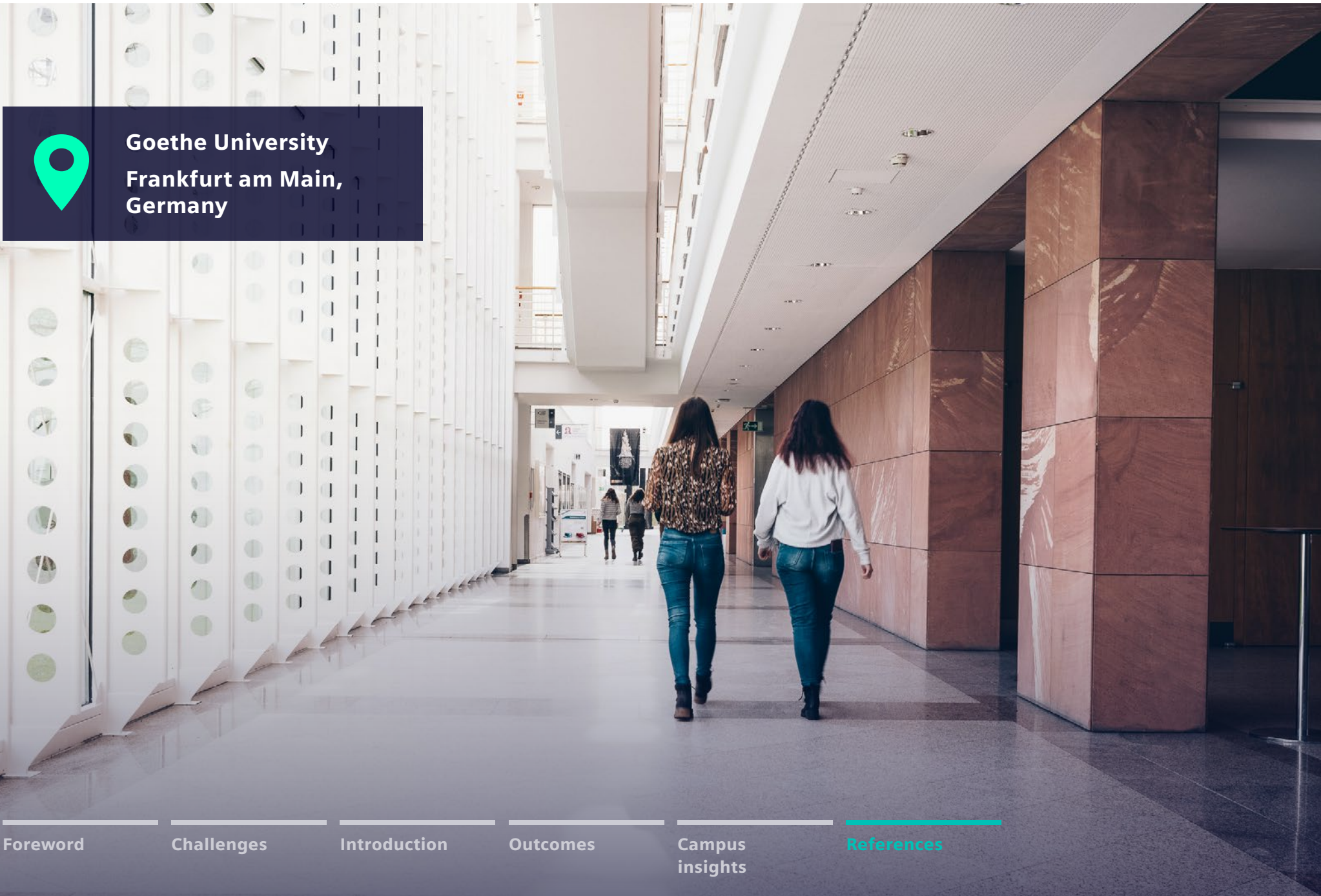
SMU's transformation journey reflects the broader shift in higher education towards leveraging IoT, data analytics, and sustainable practices to optimize campus operations and experiences. An integrated management system now connects building automation, the central utility plant, fire and life safety systems, and security and access controls. Campus-wide submetering and sensors support efficient resource allocation and enable data-driven decision-making.

Long-term sustainability and growth

By implementing these technologies and processes, SMU has established a sustainable financial model that supports its long-term priorities and growth. The smart campus framework allows the university to better allocate resources, enhance campus safety and comfort, and remain adaptable to future challenges.

[➤ Learn more](#)

Existing buildings on course for sustainability



Goethe University Frankfurt, with 48,000 students across five urban locations, undertook a transformative energy modernization project at its Biocenter on the Riedberg campus. The initiative aimed to address the high energy consumption and outdated infrastructure in this key research facility, advancing the university’s sustainability objectives and aligning with the climate goals of the federal state of Hesse.

Energy hungry legacy infrastructure

The Biocenter, built in the 1990s, spans seven interconnected buildings covering approximately 71,000 square meters. Housing laboratories, offices, and testing facilities, it is a hub for research and education in natural sciences. However, its ventilation systems accounted for over 80% of heat consumption and more than half of electricity use, resulting in annual energy costs in the seven-digit range. The university sought to reduce energy consumption, lower costs, and significantly cut carbon emissions to support both institutional sustainability goals and the state’s broader climate strategy.

Comprehensive energy modernization

Goethe University partnered with Siemens and other specialists to develop a detailed plan for upgrading the Biocenter’s air handling systems and control technology. Automation stations and input-output modules were upgraded to enhance operational control, while exhaust fan drives were replaced with energy-efficient motors equipped with frequency converters for demand-based operation. To optimize energy use, occupancy sensors were installed to adjust air exchange rates based on real-time room usage. Nighttime settings further reduced ventilation rates when buildings were unoccupied. Additionally, a heat recovery system was integrated with the building management system, ensuring seamless functionality and improved energy efficiency.

Significant savings, enhanced sustainability

The energy modernization has achieved substantial improvements. Thermal energy consumption for ventilation systems was reduced by nearly two-thirds, while electricity use dropped by more than half. These efficiencies resulted in annual savings of approximately €236,000 for just one upgraded building. Beyond financial benefits, the project significantly contributes to the university’s sustainability objectives and aligns with Hesse’s climate protection plan. The initiative also leveraged government funding, with half the costs covered by the Carbon Reduction and Energy Efficiency (COME) program.

Model for sustainable campus development

Serving as a replicable model for other institutions, Goethe University’s energy modernization project highlights the role of targeted investments in achieving measurable environmental and financial benefits. Gabi Lilienthal, Team Lead for Technical Building Services at Goethe University, remarked that the outcomes exceeded expectations in efficiency and cost savings, underlining the potential of such projects for large, established academic institutions.

[➤ Learn more](#)



A truly sustainable partnership

Humber College, in collaboration with Siemens, has integrated advanced sustainability technologies into its campus infrastructure, working toward the goal of net-zero carbon emissions for Scope 1 and 2 by 2050. Comprising advancements in building automation, HVAC system optimization, and the establishment of a sustainable microgrid, the project has positioned the college as a leader in both sustainability and academic innovation.





Strategic campus innovation

Having been partners for decades, Humber College and Siemens signed a memorandum of understanding in 2021 to enhance the college’s educational offerings while supporting its ambitious carbon reduction and energy efficiency targets. Measures include the installation of state-of-the-art building automation systems and HVAC optimization, improving campus energy efficiency. Furthermore, a campus microgrid was created to incorporate distributed energy resources and battery storage on campus for improved energy resilience and sustainability.

Smart building management

Humber College’s smart campus initiatives are technically based on the implementation of Siemens Desigo building automation systems across the North and Lakeshore campuses. These building management system upgrades enhance operational performance and user comfort while contributing to the college’s carbon reduction efforts. Additionally, advanced HVAC control systems ensure both efficiency and compliance with high standards for indoor air quality and comfort.

Smart energy management

The campus microgrid system, integrating photovoltaic panels, the college’s iconic Smartflower photovoltaic array, and battery storage, enables the campus to better manage energy consumption, reduce greenhouse gas emissions, and increase energy resilience. Advanced energy management equipment such as a SICAM A8000 microgrid controller and a distribution control panel enable intelligent, data-driven energy management, further boosting campus operations.

Educational impact and broader significance

A particularly notable aspect of the partnership is the creation of the Sustainable Microgrid and Renewable Technology Lab (SMART Lab), launched in 2023. With its educational programs centered around this living lab, Humber College is setting a benchmark for universities in Canada. The SMART Lab provides students and industry professionals with hands-on experience in microgrid technology, equipping learners with the skills needed to meet the growing demand for clean energy professionals.

“Our students get to use the latest technology, they get to be creative, they get to invent, they get to work with industry on the problems of today and solving the problems of today, so that we have the workforce and the opportunities for tomorrow,” says Dr. Ann Marie Vaughan, President and CEO of the Humber College Institute of Technology & Advanced Learning. The SMART Lab also offers industry partners the opportunity to test new technologies and solutions in a real-world environment, advancing sustainable energy practices through research and practical experimentation.

[➤ Learn more](#)

University of
Tampere
Tampere, Finland



Redesigning building maintenance with data-driven services

University Properties of Finland (Suomen Yliopistokiinteistöt Oy, SYK), a nationwide campus developer that owns and develops properties on university campuses outside the Greater Helsinki metropolitan area, has transformed its maintenance operations at Tampere University. The initiative aimed to move from traditional, static maintenance models to a dynamic, data-driven approach to improve operational efficiency, user comfort, and sustainability while reducing energy consumption and costs.

Data-driven, demand-based maintenance

SYK recognized the need for a new approach to maintenance at Tampere University, driven by the limitations of traditional methods. Complaints about uncomfortable indoor climates, inefficient heating, and lighting issues were common, highlighting the inefficiencies of the existing maintenance approach based on periodic inspections and visual checklists.

In response, SYK partnered with Siemens to implement a data-driven, demand-based maintenance model. This new model uses sensors to collect real-time data on campus conditions, enabling proactive maintenance and smarter energy management. With the integration of these systems, maintenance activities are now guided by actual usage patterns, allowing for more targeted interventions that are both timely and efficient.

Leveraging the power of analytics

The transformation involved installing sensors across campus, which monitor a wide range of variables such as temperature, humidity, and occupancy. These data points feed into a central platform, where analytics algorithms process the information to identify issues, optimize energy consumption, and predict maintenance needs. For instance, weather data is now integrated into the building management system, allowing the system to preemptively adjust heating and snow-melting systems, improving campus safety and energy efficiency.

Additionally, the system uses predictive analytics to detect emerging problems before they become significant, reducing the need for manual inspections. This shift from visual inspections to data-driven analytics has led to a 70% reduction in visual checks, enabling maintenance teams to focus on high-priority tasks.

Improved efficiency and sustainability

The new maintenance model has resulted in significant improvements in both operational efficiency and user satisfaction. Key outcomes include a 50% reduction in user complaints, with 57% of identified issues leading to improved energy efficiency. By adopting a more agile maintenance approach, SYK has enhanced energy efficiency, user comfort, and overall maintenance performance. Furthermore, the success of this project extends beyond the university. The shift towards smart campus management addresses the university’s immediate needs while strengthening its role in Finland’s climate action goals. At the same time, this initiative provides a scalable model for other universities, polytechnics, and colleges aiming to modernize their infrastructure.

[➤ Learn more](#)



Going beyond Net Zero with the University of East London

The University of East London (UEL), in partnership with Siemens, is implementing a comprehensive net-zero roadmap to achieve ambitious sustainability goals. This collaboration has already resulted in significant reductions in carbon emissions, with further phases targeting sustainable power generation, infrastructure modernization, and educational initiatives to support future green talent. The strategic partnership emphasizes both decarbonization and the development of skills required to address global sustainability challenges. With plans to achieve net-zero emissions for scope 1 and 2 by 2030, UEL is setting a benchmark for urban sustainability and advancing the global energy transition.



Advancing renewable energy

Energy efficiency and renewable energy are central to UEL’s net-zero road-map. UEL began its net-zero journey in 2021 by assessing energy use and identifying inefficiencies across its Stratford and Docklands campuses. Key early actions included the installation of 11,000 LED lighting and upgrades to 35 building management system controllers. These measures reduced operational costs and achieved a 10% reduction in carbon emissions in the first year, amounting to 470 metric tons of CO₂ saved.

Meanwhile, the installation of solar photovoltaics, heat pumps, and EV charging stations supports renewable energy generation and sustainable mobility. Siemens is deploying approximately 2 MW of PV capacity across the campuses, projected to produce 1.2 GWh of renewable electricity annually. Of this, 90% will be consumed on-site, with the remaining 10% exported to the National Grid. The installation of 27 electric vehicle charging stations at the Docklands Campus further supports the university’s transition to a sustainable and energy-efficient environment.

Hands-on learning and innovation

As a careers-first institution, UEL places a strong emphasis on experiential education and innovation. This is why the partnership between UEL and Siemens includes the development of a living lab, designed to provide real-time campus data for research, teaching, and external collaboration. To strengthen the pipeline of green talent and prepare the next generation of sustainability leaders, the collaboration integrates sustainability into the curriculum and offers mentorship programs, internships, and industry placements.

Community engagement and global impact

The partnership between UEL and Siemens extends beyond campus boundaries. By engaging the local community in sustainability initiatives and showcasing net-zero achievements, the collaboration aims to inspire widespread adoption of green practices. The establishment of an innovation hub connects UEL with local green energy start-ups, offering co-working spaces and creating job opportunities for students.

Recognition and leadership

In 2023, UEL and Siemens received the prestigious Net Zero Leader Award from the UK Association for Decentralized Energy. This accolade acknowledges their innovative approach to sustainability and the creation of a replicable model for other HEIs striving for decarbonization in densely populated areas.

[➤ Learn more](#)



Smart solutions for smart campuses



Creating a smart campus requires the intelligent integration of energy systems, buildings, safety and security, mobility, and other elements into a cohesive ecosystem. This holistic approach enables universities, colleges, and polytechnics to optimize resource usage, provide a highly attractive environment for learning, teaching, and living, and pave the way for future innovation.

To fully realize the potential of a smart campus, technologies and systems from both the physical and digital domains must interact seamlessly, delivering benefits that extend across all areas of campus life.

Our integrated approach

As a long-standing technology partner for higher education institutions, we offer a comprehensive portfolio combining expertise in energy management, building technology, digitalization, and mobility. By combining strengths and resources across Siemens, we create an overarching vertical portfolio that provides HEIs with a comprehensive range of solutions that meet their needs. This integrated, value-based approach ensures a holistic perspective of the campus throughout its lifecycle for both greenfield developments and upgrades to existing infrastructure.

From initial planning and implementation to commissioning, maintenance, and optimization, each phase is designed to maximize the contributions of individual components to the broader campus ecosystem. By leveraging cloud-based digital services enabled by the Siemens Xcelerator portfolio along with advanced products and systems, we enable institutions to advance sustainably and cost-effectively.

A partnership for progress

Whether your goal is to improve building performance, achieve ambitious sustainability and energy targets, develop and operate trendsetting mobility solutions, or create the degree of flexibility needed to support innovation and change, we'll be at your side.

Together, we can create efficient, safe, and inspiring environments for learning and teaching, positioning your campus as a leader in academia that attracts top-tier faculty, researchers, and students.

[➤ Get in touch](#)

Smart Infrastructure combines the real and digital worlds across energy systems, buildings and industries, enhancing the way people live and work and significantly improving efficiency and sustainability.

We work together with customers and partners to create an ecosystem that both intuitively responds to the needs of people and helps customers achieve their business goals.

It helps our customers to thrive and communities to progress, and it supports sustainable development to protect our planet for the next generation.

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Published by
Siemens Switzerland Ltd
Smart Infrastructure
Global Headquarters
Theilerstrasse 1a
6300 Zug
Switzerland
Tel +41 58 724 24 24

For the U.S. published by
Siemens Industry Inc.
3617 Parkway Lane
Peachtree Corners, GA 30092
United States

Article no. SI_0203_EN (Status 1/2025)

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