



KelTech IoE
THE NET ZERO NETWORK

NUIG GALWAY DDN **LIGHTING & CCTV PROJECT**



OLLSCOIL NA GAILLIMHE
UNIVERSITY OF GALWAY

EXECUTIVE SUMMARY

The National University of Ireland, Galway (NUIG) embarked on a ambitious project to enhance campus safety, connectivity, and sustainability through the deployment of advanced lighting and CCTV systems. Central to this initiative is KelTech IoE's Dual Distribution Network (DDN) technology, which integrates power and data distribution into a single, efficient system. This innovative approach not only meets NUIG's immediate infrastructure needs but also aligns with the university's long-term sustainability goals by providing a scalable and future-proof solution.

Key to the project's success were two critical partners: Electric Skyline and Urbis Schreder. Electric Skyline's expertise ensured the smooth and timely installation of the DDN system, managing the logistical challenges with minimal disruption. Urbis Schreder provided the energy-efficient DC-powered LED luminaires that significantly enhanced campus lighting quality while reducing energy consumption, supporting NUIG's commitment to sustainability.

The DDN system delivered impressive results, including a 15-20% reduction in capital expenditures and a 15% decrease in operational costs, highlighting the financial viability of this approach. Additionally, the innovative use of DDN technology led to a 60% reduction in the amount of copper required compared to traditional SWA cables. This substantial reduction not only lowered material costs but also contributed to a decrease in the CO2 emissions associated with the project, further supporting NUIG's environmental objectives.

As NUIG continues to evolve, the infrastructure laid down in this project provides a robust foundation for future technological advancements, reinforcing the university's role as a leader in sustainable innovation.



THE CUSTOMER

The National University of Ireland, Galway (NUIG) is one of Ireland's most prestigious and historic educational institutions, known for its strong commitment to research, innovation, and academic excellence.

Established in 1845, NUIG has grown to become a leader in higher education, offering a wide range of programs across multiple disciplines, including science, engineering, arts, and business.

At the heart of NUIG's mission is a dedication to creating a learning environment that fosters creativity, critical thinking, and practical skills, ensuring that students are well-prepared to meet the challenges of a rapidly changing global landscape. The university's College of Science and Engineering, in particular, has earned a reputation for its cutting-edge research and innovative approaches to solving complex global issues.

The university's sprawling campus, situated along the picturesque Corrib River in Galway City, serves as a hub for both academic and extracurricular activities. With a student population of over 19,000, NUIG is not just a place of learning but also a vibrant community that values sustainability, inclusivity, and the well-being of its students, faculty, and staff.

Given its commitment to sustainability and innovation, NUIG has been proactive in implementing initiatives that reduce its environmental footprint while enhancing campus infrastructure. The Lighting & CCTV Pilot Project is a prime example of this forward-thinking approach, as it integrates modern technology to improve safety and connectivity in a manner that is both efficient and environmentally responsible.

The project aligns perfectly with NUIG's overarching goals of reducing energy consumption, lowering carbon emissions, and creating a safer, more connected campus environment. This commitment to sustainability is further reflected in the university's strategic plan, which emphasizes the importance of innovative solutions in achieving long-term environmental and social impact.



THE CHALLENGE

The NUIG Lighting & CCTV Pilot Project faced several key challenges, foremost among them being the need to complete the project within a tight time frame dictated by the academic calendar. The infrastructure had to be fully operational before the return of students and staff, leaving little room for delays.

Traditional deployment methods for such projects would have involved separate contractors for electrical services and data services, leading to coordination difficulties and increased risks of delays. Typically, this approach would require extensive trenching and the installation of both AC power lines and fiber optic cables to each light pole and CCTV camera. This not only complicates the project logistics but also significantly extends the timeline.

Moreover, NUIG's commitment to sustainability meant that any solution had to minimize material usage and energy consumption while aligning with the university's environmental goals. Traditional methods, with their higher material and energy demands, would have struggled to meet these requirements.

Given these challenges, NUIG needed an innovative solution that could streamline the deployment process, reduce the number of contractors involved, and ensure timely completion without compromising on quality or sustainability.



SOLUTION BENEFITS

To overcome the challenges of the NUIG Lighting & CCTV Pilot Project, KelTech IoE's Dual Distribution Network (DDN) technology was chosen as the optimal solution.

The DDN system integrates both power and data delivery into a single, streamlined cable, drastically simplifying the deployment process and addressing the project's tight timeline.



KEY ELEMENTS OF THE SOLUTION



Rapid Deployment

One of the primary challenges was the need to complete the project within a short time frame. The DDN technology allowed for a much faster deployment compared to traditional methods. By combining power and data into a single cable and reducing the need for separate contractors, the installation process was significantly streamlined. This efficiency enabled the project to meet its tight deadline, ensuring that the infrastructure was fully operational before the students and staff returned to campus.



Integrated Power and Data Delivery

The DDN technology enabled the delivery of both electrical power and data through a single hybrid cable, eliminating the need for separate AC power lines and fibre optic cables. This integration reduced the complexity of the installation, allowing the project to be completed more quickly and with fewer contractors.



Efficient Infrastructure Deploy

By laying 800 meters of DDN hybrid cable across the campus, NUIG was able to connect 21 energy-efficient DC-powered LED luminaires and multiple CCTV cameras. The system was designed to minimize the physical infrastructure needed, with the DDN headend centrally located to optimize cable routing and reduce installation time.



Sustainability and Cost Savings

The DDN system led to a 60% reduction in the amount of copper required compared to traditional SWA cables, significantly lowering material costs and reducing the project's environmental impact. This reduction in materials also contributed to a decrease in CO2 emissions, aligning with NUIG's sustainability goals. Additionally, the DDN approach resulted in a 15-20% savings in capital expenditures and a 15% reduction in operational costs, demonstrating both financial and environmental benefits.



Scalability and Future-Proofing

The DDN system is designed with future expansion in mind. The DDN Headend has additional capacity available, meaning that as new projects arise, the university can expand its infrastructure without necessarily provisioning new AC power. Furthermore, the system's flexibility allows it to power a wide range of devices beyond lighting and CCTV, such as communication infrastructure, digital signage, or other campus technologies. Additionally, the project has established a robust fiber optic backbone, providing high-speed data connectivity across the campus. This backbone not only supports the current deployment but also enables future digital initiatives, ensuring the infrastructure remains adaptable to evolving needs.



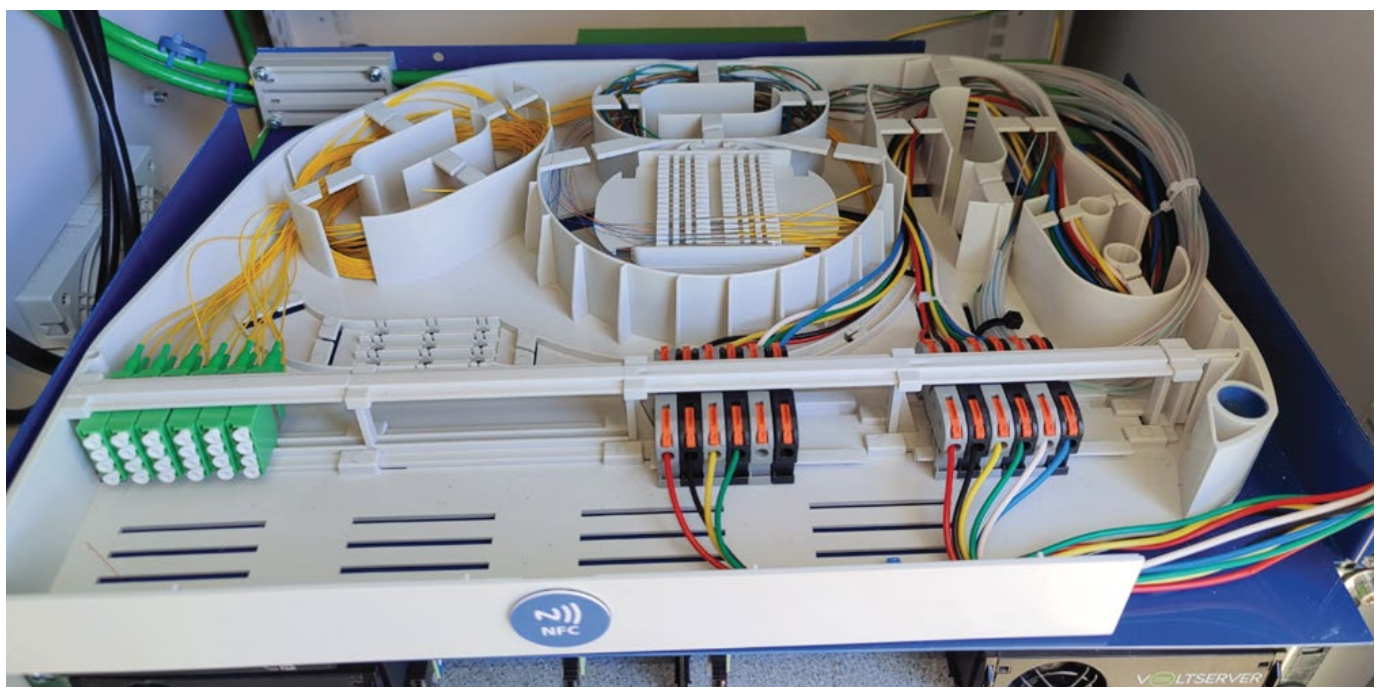
Enhanced Safety Standards

Safety was a paramount consideration in the design and implementation of the DDN system. The DDN complies with IEC 62368-1 standards as a limited power source, making it "touch safe." This compliance ensures the highest safety standards are maintained for both contractors and the general public. The "touch safe" nature of the DDN system reduces the risk of electrical hazards during installation and operation, providing peace of mind for everyone involved.



Renewable and Battery Backup Options

The DDN headend offers flexible power options, capable of being powered by renewable energy sources, such as solar panels, or connected to an Uninterruptible Power Supply (UPS) for battery backup. This allows the system to operate independently of the grid, ensuring continuous operation during power outages and enhancing the overall resilience and sustainability of the campus infrastructure.



PARTNERSHIP CONTRIBUTIONS

01 University of Gawlay

Special thanks to Michael Curran, Head of Building Services, Energy and Utilities , Sean Farrell Building Services Engineer and Kenny O'Toole Electrical Supervisor.

02 Electric Skyline's Expertise

The installation was executed with precision by Electric Skyline, whose expertise ensured that the DDN system was deployed efficiently and within the tight project deadlines. Their long-standing relationship with NUIG was a key enabler of the project's success, providing a foundation of trust and collaboration that facilitated smooth communication and coordination. Electric Skyline's ability to manage the project's logistics minimized disruption to campus activities and ensured a seamless transition to the new infrastructure.

03 Urbis Schreder's Energy-Efficient Luminaires

The use of Urbis Schreder's DC-powered LED luminaires was crucial to achieving the project's energy efficiency targets. These luminaires not only provided high-quality lighting but also reduced energy consumption, supporting NUIG's commitment to sustainability.

04 Voltserver Digital Electricity (DE)

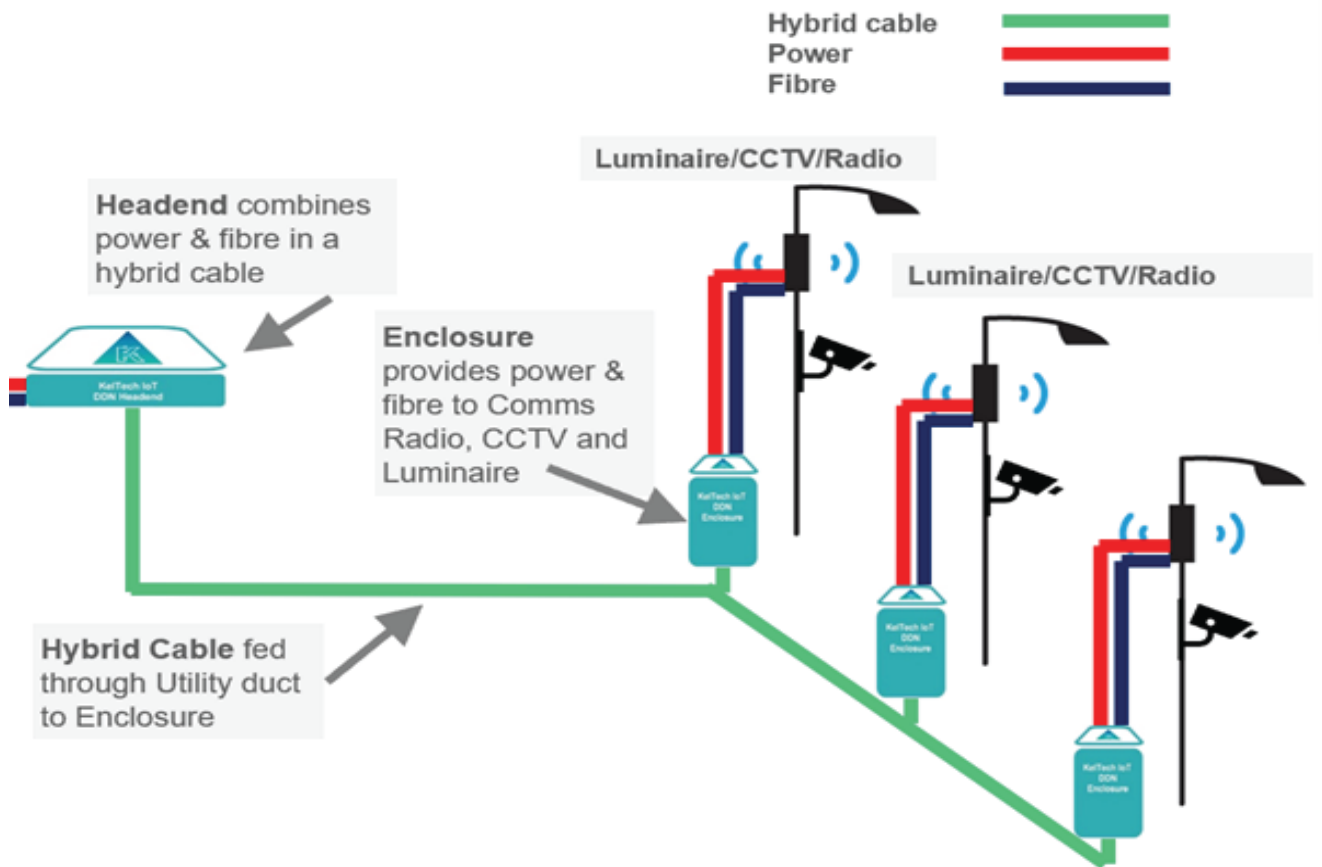
VoltServer is a pioneering company that specializes in the transmission of Digital Electricity (DE), an innovative technology that allows high-voltage DC power to be safely delivered over standard low-voltage infrastructure.

05 WESTIre Photocels

Lighting Control was accomplished through new innovative energy-efficient Direct Current Photocells supplied by WestIre.

SOLUTION

The NUIG Lighting & CCTV Pilot Project leveraged several key components to achieve its goals of enhancing campus safety, connectivity, and sustainability. Central to this solution was the integration of KelTech IoE's Dual Distribution Network (DDN) technology, supported by strategically selected components that ensured efficient deployment and long-term operational success. A key enabler of this technology is Digital Electricity (DE) by VoltServer, which safely transmits high-voltage DC power alongside data over the same cable infrastructure. Below is a breakdown of the primary components that were essential to the project's implementation.



DDN Headend:

Located within the park and ride drivers' rest cabin, the DDN headend is the central hub that manages the distribution of both power and data. It connects to the hybrid cables that run throughout the campus.

Hybrid Optical Distribution Frame (ODF-H):

This component combines power and data streams for distribution across the campus. Installed at the DDN headend, the ODF-H ensures that both energy and connectivity needs are met efficiently.

Feeder Pillars:

Two feeder pillars were strategically positioned to distribute power and data from the DDN headend to the luminaires and cameras. Each pillar serves as a local hub, reducing the need for extensive cabling and minimizing energy loss.

Urbis Schreder Luminaires:

The 21 luminaires are connected to the DDN system through a single cable loop, which passes through each lamppost. This design minimizes the physical infrastructure required while ensuring reliable power delivery to each light.

CONCLUSION



The NUIG Lighting & CCTV Pilot Project exemplifies how innovative technology can address complex infrastructure challenges while aligning with sustainability goals. By adopting KelTech IoE's Dual Distribution Network (DDN) technology, NUIG successfully enhanced campus safety, connectivity, and energy efficiency in a streamlined and cost-effective manner.

The DDN system provided a comprehensive solution, integrating power and data delivery into a single cable, which enabled rapid deployment and reduced the need for multiple contractors. This approach not only met the tight project deadlines but also minimized the environmental impact through a significant reduction in material usage, particularly copper, and associated CO2 emissions.

The project also future-proofed NUIG's infrastructure, with the DDN Headend offering additional capacity for future expansions. The system's flexibility to power a wide range of devices—such as communication infrastructure and digital signage—combined with a newly established fiber optic backbone, ensures that the university can continue to evolve its technological landscape without the need for extensive new infrastructure.

Safety was a key consideration, with the DDN system adhering to the highest safety standards under IEC 62368-1 as a limited power source. The "touch safe" design provides protection for both contractors and the public, reducing the risk of electrical hazards during installation and operation.

Moreover, the DDN headends capability to be powered by renewable energy sources or connected to an Uninterruptible Power Supply (UPS) for battery backup adds resilience and supports NUIG's commitment to sustainability. This flexibility ensures that the system can operate independently of the grid, providing continuous service even during power outages.

The success of this project was further ensured by the strong partnership with Electric Skyline, whose long-standing relationship with NUIG facilitated smooth project execution, and Urbis Schreder, whose energy-efficient luminaires played a crucial role in meeting the university's environmental objectives.

As NUIG continues to grow and innovate, the infrastructure established by this project will serve as a robust and adaptable foundation, enabling the university to remain at the forefront of sustainable campus development. This project not only addresses immediate needs but also positions NUIG as a leader in integrating advanced, sustainable technologies into the educational environment.

Thank you!

