

Smarter Lighting for
EU Public Sector Infrastructure:

A Decision-Maker's Guide to DALI



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Executive Summary

Lighting is a critical lever. Ageing analogue systems waste energy and fail to provide the oversight cities now need.

DALI — the globally standardised, interoperable, and open protocol for digital lighting control — is already embedded across thousands of European projects, from airports to rail to city streets.

Why DALI matters for decision-makers

Energy & Climate

Enables up to 40% lighting energy savings¹ through daylight-responsive dimming, occupancy-based control, and intelligent lighting management — supporting the EU Green Deal, national net-zero targets, and compliance with the EU Energy Performance of Buildings Directive (EPBD).

Operational Savings

Real-time monitoring, automated fault detection, and extended fixture lifetimes reduce site visits, failures, and maintenance-related emissions.

Interoperability & Flexibility

DALI-2 certification guarantees cross-vendor compatibility, avoiding lock-in and aligning with EU public tendering rules.

Future-Proofing

Zhaga-D4i luminaires and DALI+ wireless/IP extensions enable modular upgrades, and smart-city integration, supporting circular economy principles.

Accountability & Reporting

Device-level data on energy use, diagnostics, and performance underpins sustainability reporting and compliance with Environmental, Social, and Governance (ESG) frameworks, the EPBD, compliance with the Building Research Establishment Environmental Assessment Method (BREEAM), Leadership in Energy and Environmental Design (LEED), the WELL Building Standard (WELL), and the International Dark-Sky Association (IDA) — providing verifiable return on investment (ROI) for funding bids and audits.

Public Safety & Quality

Consistent, adaptive lighting improves visibility, reduces light pollution, and creates safer conditions for pedestrians, cyclists, and drivers.

Proven in Europe



[Manchester Airport](#) (UK)

~7 GWh saved annually, with
85–89% cuts at Terminals 1–3.



[Crossrail](#) (London)

35,500+ assets digitally
controlled for energy, safety,
and passenger comfort.



[Algeciras](#) (Spain)

5,600 Zhaga-D4i street lights,
>50% energy reduction,
~€0.5m annual savings.

The takeaway - DALI is not just a lighting-control system. It is the globally standardised open protocol that enables municipalities to deliver measurable savings today — while building the flexible, compliant, and connected infrastructure Europe needs for tomorrow.

Public Lighting in Europe — Policy and Market Drivers



Public lighting in Europe has become a strategic enabler of the Green Deal, net-zero commitments, and the EPBD.

Modern lighting systems must go beyond illumination to deliver:

- measurable energy and carbon reductions,
- support for circular economy principles, and
- seamless integration with smart-city platforms.

Yet many municipalities still rely on outdated analogue systems that cannot deliver these outcomes. Without digital control, cities struggle to optimise energy use, monitor performance, or comply with tightening EU sustainability standards.

DALI Market momentum in Europe

Independent market analyses confirm that Europe leads the global shift to digital lighting control:

€1.4 billion

Europe's share of the global DALI market in 2024 (~37% of global total)

Source

[Growth Market Reports \(2024\)](#)

~16% CAGR

(Compound Annual Growth Rate, 2024–2030)

Forecast growth of the European lighting control systems market.

Source

[Grand View Research \(2024\)](#)

€690 million

Estimated value of Europe's DALI controller segment in 2024, with strong growth expected through 2033.

Source

[Growth Market Reports \(2024\)](#)

What this means for decision-makers

For public bodies, these findings underline two things:

1. DALI is already Europe's dominant protocol for lighting control — a globally standardised approach that ensures interoperability, reliability, and long-term compliance.
2. Policy and market forces are accelerating adoption, making DALI an essential foundation for sustainable, compliant, and future-ready infrastructure.

Quick Wins with DALI — Immediate Benefits for Public Infrastructure

- Up to 40% energy savings through daylight response, dimming, and occupancy-based control.
- 30% lower maintenance costs with automated fault detection and real-time diagnostics.
- No vendor lock-in: DALI-2 certification guarantees cross-vendor interoperability.
- Future-proofing with Zhaga-D4i upgradeable luminaires and DALI+ wireless/IP integration.
- Supports EU compliance and ESG reporting (EPBD, BREEAM, LEED, WELL).
- Safer, adaptive lighting for streets, campuses, and transport hubs.

What Is DALI — and Why It Matters to Public Sector Leaders?

When public lighting doesn't evolve, it wastes energy, drives up costs, and leaves cities behind.

That's where DALI comes in.



DALI at a glance

DALI® (Digital Addressable Lighting Interface) is an IEC 62386 global standard, certified by the DALI Alliance. Unlike analogue systems, it provides a digital foundation for smart, sustainable infrastructure by enabling:

- two-way communication between luminaires, sensors, and software,
- dynamic response to occupancy, daylight, and schedules,
- real-time data reporting on energy, performance, and faults,
- reliable operation across certified products from multiple manufacturers.

Certifications that power interoperability and insight



DALI-2

Ensures components from different vendors work together reliably, avoiding lock-in.



D4i

Brings energy-use and diagnostics reporting into the luminaire itself, enabling device-level data for predictive maintenance and integration with smart systems.



Zhaga-D4i

Combines D4i with a Zhaga connector, enabling **plug-and-play communication modules and sensors for municipal networks** (motion, traffic, air quality) and supporting economy goals.

What DALI Systems Deliver: Real-World Advantages Over Basic Controls

When it comes to lighting, the control system you choose defines how much energy you save, how much flexibility you gain, and how future-ready your infrastructure becomes.

The Control System You Choose Changes Everything



No Controls

- ✗ Always-on lighting
- ✗ Excessive energy use
- ✗ No automation
- ✗ High operational costs



Simple Controls

- ✗ Basic dimming or switching
- ✗ Minor energy savings
- ✗ No visibility into faults
- ✗ Inflexible
- ✗ Often proprietary



DALI (Fully Featured)






- ✓ Granular control of zones or fixtures
- ✓ Smart automation based on occupancy, daylight, and schedules
- ✓ Advanced energy-saving features such as daylight harvesting
- ✓ Software-based reconfiguration without rewiring
- ✓ Cross-vendor compatibility through DALI-2 certification
- ✓ Wireless expansion with DALI+
- ✓ Device-level diagnostics with D4i
- ✓ Plug-and-play sensor upgrades with Zhaga-D4i

Outcome

Lower costs, greater visibility, faster response to issues, and infrastructure that evolves with your needs.

In short, DALI provides the technical backbone for smarter, safer, and more sustainable infrastructure.

5 Reasons DALI Pays Off – Operational and Strategic Benefits

- **1 Performance & Efficiency**
Up to 40% energy savings; faster ROI; lower total cost of ownership.
- **2 Flexibility & Scalability**
Reprogram digitally; add wireless with DALI+; expand across thousands of devices.
- **3 Compliance & ESG Value**
Supports compliance with EPBD, BREEAM, LEED, WELL, and IDA — ensuring alignment with EU sustainability policy and international building standards.
- **4 Integration & Control**
Links with Building Management Systems (BMS), Heating, Ventilation, and Air Conditioning (HVAC), security; centralised oversight; predictive maintenance.
- **5 Long-Term Value**
Open standard; vendor choice; future-ready; protects investment.

Why DALI Outperforms Analogue Systems

Unlike legacy analogue lighting controls such as 0–10V, DALI ensures accurate, repeatable dimming, real-time feedback, and consistent performance across certified products. Public-sector organisations also gain open interoperability, future-ready integration with smart systems, and reliable data for maintenance and reporting. The result is lower energy waste, fewer failures, and infrastructure that can evolve over time — benefits that analogue systems cannot deliver.

Case Studies: DALI in Action

Across Europe, DALI is already delivering measurable results in major public-sector projects — from airports to city streets. These examples show how municipalities and infrastructure operators are using the globally standardised protocol to cut energy use, reduce costs, and improve safety. Beyond Europe, further large-scale deployments highlight DALI's scalability and proven reliability worldwide.



Manchester Airport - UK (2023)

As part of a major redevelopment, Manchester Airport extended DALI control across Terminals 1–3.

- Energy savings: >7 GWh annually; 85% cuts at T1/T2, 89% at T3
- Cost impact: Rapid ROI from lower bills and maintenance
- Strategic value: Open, vendor-independent system protects long-term investment

Reference: [DALI Alliance Project Library – Manchester Airport project](#)



Crossrail (Elizabeth Line) - London, UK (2022)

The UK's largest public infrastructure project adopted DALI to control lighting across seven central London stations, tunnels, and depots.

- Scale: 35,500+ assets, incl. 30,000 luminaires
- Impact: Lower energy and maintenance costs through automation and predictive relamping
- Recognition: Highly Commended at 2020 DALI Lighting Awards; BREEAM "Very Good" ratings across all stations

Reference: [DALI Alliance Project Library – Crossrail \(Elizabeth Line\) project](#)



City of Algeciras – Spain (2022)

City-wide DALI/Zhaga-D4i renewal covering 5,600 light points.

- Energy & Carbon Dioxide (CO₂): >50% reduction; ~1,261 t CO₂ avoided annually
- Cost impact: ≈€0.5 million electricity savings each year
- Flexibility: Cross-vendor Zhaga-D4i nodes managed under a single Central Management System (CMS)

Reference: [DALI Lighting Award Winners 2022](#)

Beyond Europe: Scalability at Global Scale

DALI is also proven in some of the world's largest and most complex infrastructure projects:

- [Zayed International Airport](#) – UAE (2022)
180,000 luminaires integrated with BMS; 40–60% estimated energy savings.
- [Xi'an Overpass Lighting](#) – China (2021)
10,000+ roadway lights with dynamic brightness control and remote monitoring.
- [Auckland Zoo](#) – New Zealand (2024)
Climate-controlled exhibit using DALI for natural daylight simulation and energy efficiency.

Scalable by Design: Basic to Best

DALI systems are inherently scalable — from small retrofits to city-wide infrastructure. They support a “Basic, Better, Best” approach, enabling public-sector organisations to:

- start with essential functionality,
- build in smarter features over time, or
- deploy fully integrated, future-ready systems from day one.

Zhaga-D4i allows outdoor fixtures to be upgraded in the field — adding motion detection, environmental monitoring, or smart-city connectivity without hardware replacement. This provides long-term flexibility and maximises return on investment.

How to Explore DALI Further

Explore how DALI can work for your organisation:

- Visit www.dali-alliance.org
- Access product directories and case studies — including certified Zhaga-D4i products for smart, upgradeable outdoor lighting
- Consult [Specifying with DALI – A Lighting Designer's Guide](#) for practical procurement guidance

With correctly configured DALI systems, better lighting isn't a vision — it's an achievable reality.



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DiiA(SE)001a Smarter Lighting for EU Public Sector Infrastructure

The DALI Alliance is also known as the Digital Illumination Interface Alliance (DiiA).

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