

This presentation was live at:



Smart Buildings

SHOW

18-19 October 2023 • ExCel London



DALI

Its Role in Connected
Networks



“HELLO”

I am Stewart Langdown FSLL, Your Presenter!

I've worked in Emergency & Lighting Controls for 28 years and been involved with Lighting for over 30. I sit on several Technical and Commercial committees and am a Fellow of the Society of Light and Lighting.

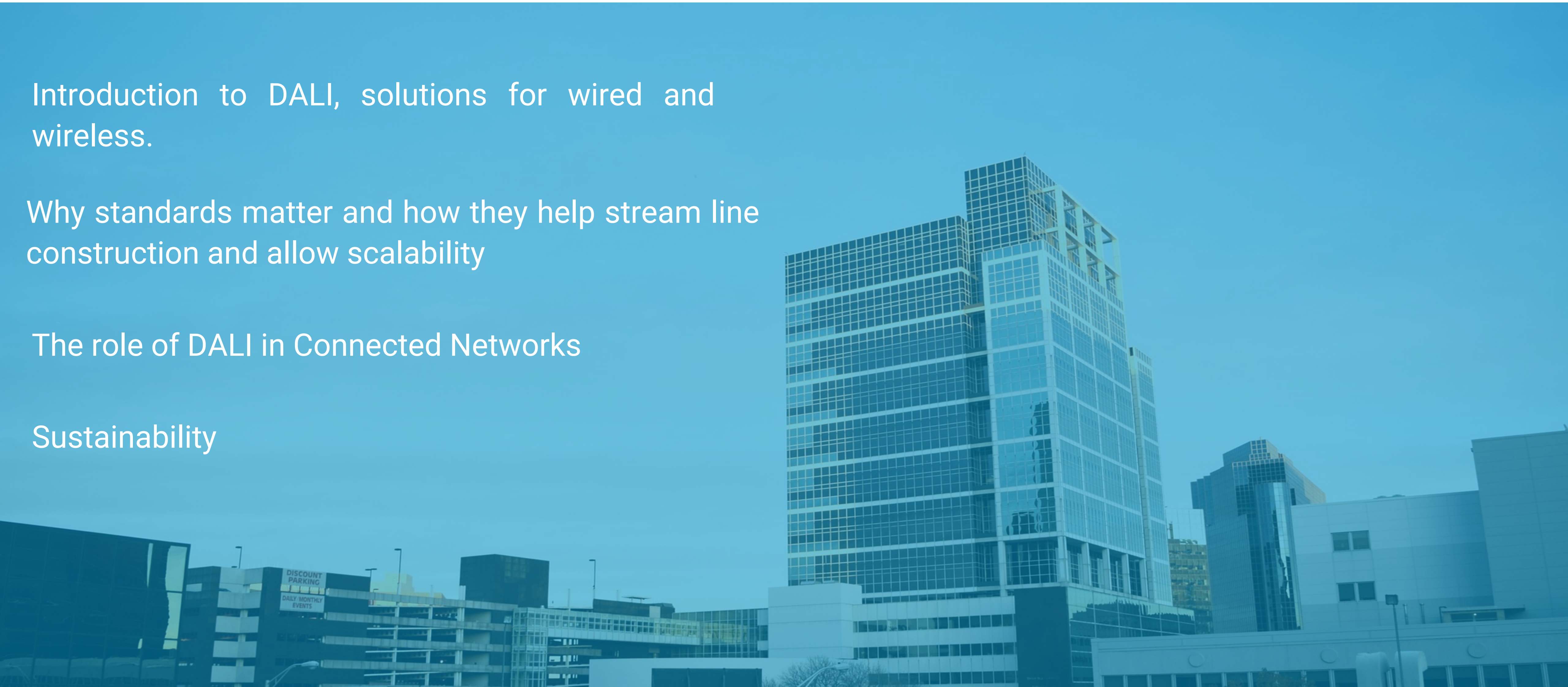
INTRODUCTION

Introduction to DALI, solutions for wired and wireless.

Why standards matter and how they help stream line construction and allow scalability

The role of DALI in Connected Networks

Sustainability



Global Controls Market -Size

The global luminaire and lighting control market size is expected to reach \$130.56 billion by 2030 from \$72.72 billion in 2020, growing at a CAGR+ of 6.44% from 2021 to 2030.



*Compound Annual Growth Rate

The background of the image shows several modern high-rise buildings with glass facades. The buildings are arranged in a way that creates a sense of depth and scale. The entire image has a monochromatic blue tint, giving it a professional and technological feel. The text is centered and stands out prominently against the grid-like pattern of the windows.

IEC 62386 DALI

DALI Alliance Brands



Lighting control
in a wired network



Luminaire level
lighting control



Lighting control in
wireless & IP
networks

DALI Alliance

IEC 62386 is the default standard for lighting control

Parts 101 Covers the wired aspects of DALI and the basic protocol

Part 102 Covers the drivers and emergency inverters

Part 103 Covers the input devices, sensors and switches

All DALI -2 certified products are third party approved and listed on the DALI Alliance website

DALI Alliance-Wireless

IEC 62386 is the default standard for wired and wireless lighting control

Parts 104 is the standard defining how DALI-2 can be used on different physical mediums.

IEC 62386 Part 104 uses the Thread protocol and will be known as DALI+

DALI also supports gateways to Bluetooth and Zigbee

System components

1. Wireless Application controller
2. Wireless Driver

3. Wireless Emergency
4. Wireless Bridge

5. Wireless Sensors
6. Wireless Switches



Wireless DALI+

Standardised Lighting control built on the international standard IEC 62386 Part 104.

Full bandwidth wireless Mesh network

Allows for standard DALI Protocols over a wireless infrastructure

Allows for interoperability with devices from other manufacturers

Reduces risk and increases competition

Works with wired DALI-2 Application controllers



What is Thread

Thread provides the foundation for a wireless mesh network built on IEEE 802.15.4 and delivers the following

Simplicity: Simple installation, start up and operation.

Security: All devices in a Thread network are authenticated and all communications are encrypted

Reliability: Self healing mesh network, with no single point of failure, and spread spectrum techniques to provide immunity to interference.

Efficiency: Low power Thread devices can sleep and operate on battery power for years.

Scalability: thread networks can scale up to hundreds of devices. Connect multiple networks together to scale across a building

DALI Alliance-Wireless Gateways

- ✓ Part 341 is the Bluetooth to DALI-2 gateway and is the only certified DALI to BLE gateway.
- ✓ Part 342 is the Zigbee to DALI-2 gateway



DiiA specification

Part 341: Particular requirements – Control devices – Bluetooth mesh gateway



DiiA specification

Part 342: Particular requirements – Control devices – Zigbee gateway

zencontrol- supports

DALI+ (Wireless DALI)	See https://www.dali-alliance.org/dalipius/ for more details.
Bluetooth	See https:// www.bluetooth.com/ for more details.
DALI/DALI-2.	See https://www.dali-alliance.org/dali/ for more details.
Thread.	See https://www.threadgroup.org/ for more detail
Matter	See https://csa-iot.org/all-solutions/matter/ for more details.
IBeacon	See http://www.ibeacon.com/what-is-ibeacon-a-guide-to-beacons
Eddystone	See https://github.com/google/eddystone for more details.



Why Standards Matter

Standards

Here are some of the benefits of standardising your lighting control:

- Interoperability: Source hardware from multiple sources
- Cost-effective: Competition keeps pricing regulated
- Protection: Standards are based on an agreed level of attainment



DALI Benefits



Standardised



Scalable



Interoperable



Data rich



Connectivity

DALI Features



Well being



Trustworthy



Track record



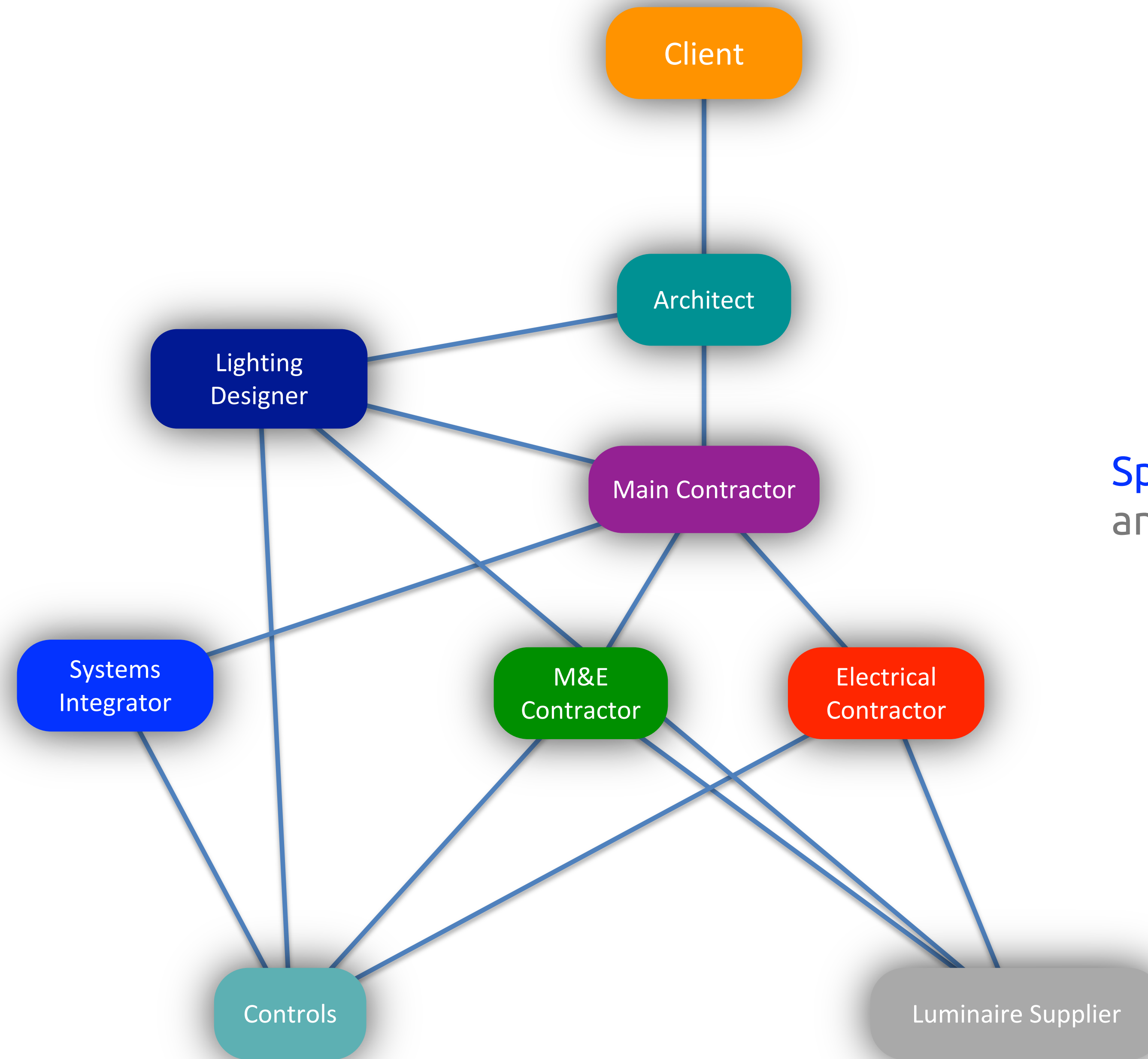
IoT Ready



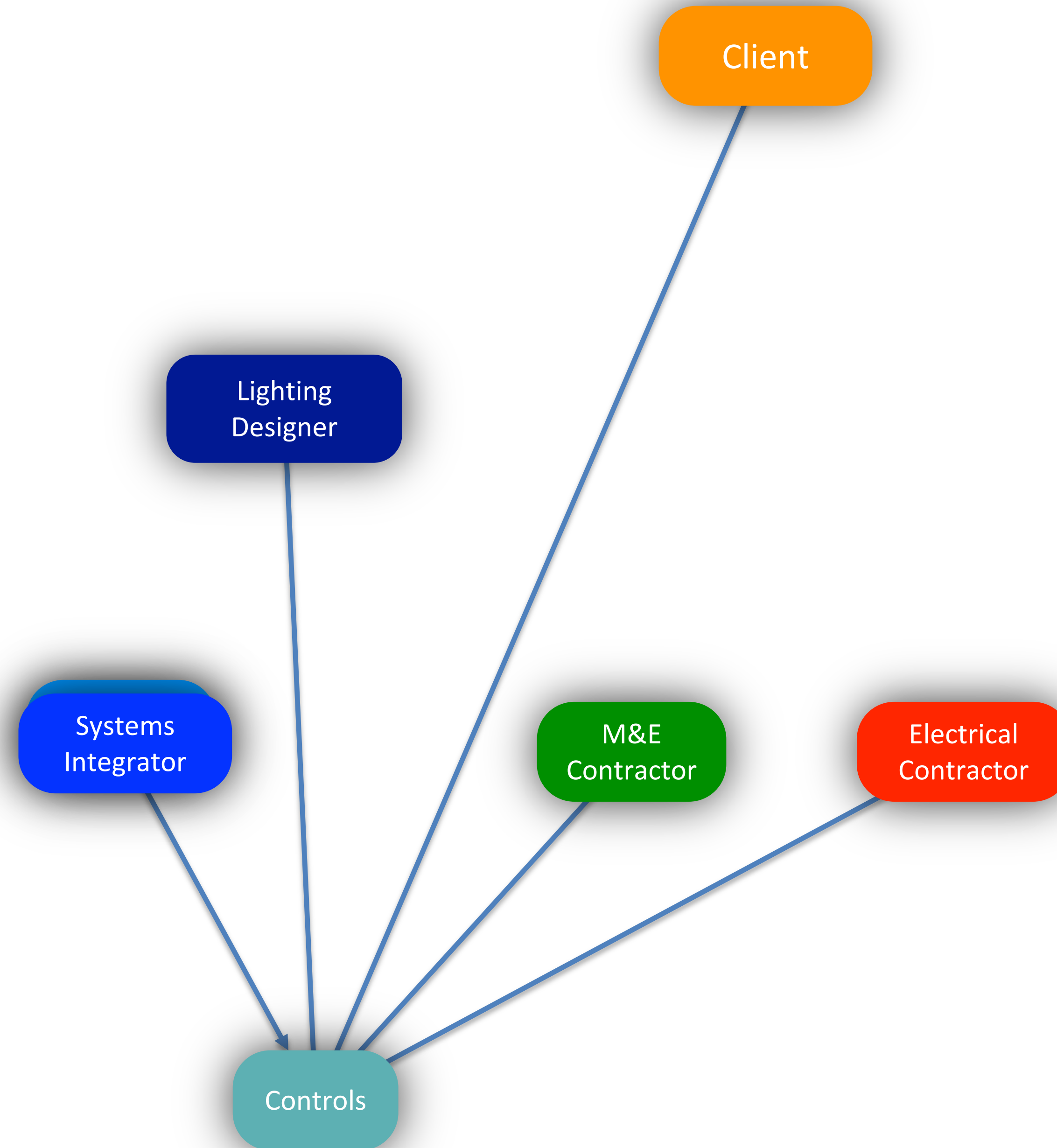
Energy saving

An aerial photograph of a dense urban landscape, likely New York City. The image is filled with numerous skyscrapers and buildings of varying heights and architectural styles. A prominent building with a large, golden, conical dome stands out in the center-right. To its right is a very tall, dark, rectangular building with a grid-like window pattern. The word "Specification" is overlaid in large, white, sans-serif font across the middle of the image.

Specification



Specification who are the influencers and owners of the specification.



Specification who are the influencers and owners of the specification.

A modern office interior with a glass-walled conference room on the left, a long white reception desk in the foreground, and a blue-lit ceiling. The text "Streamline & Scalable" is overlaid in the center.

Streamline & Scalable

Simplify installation



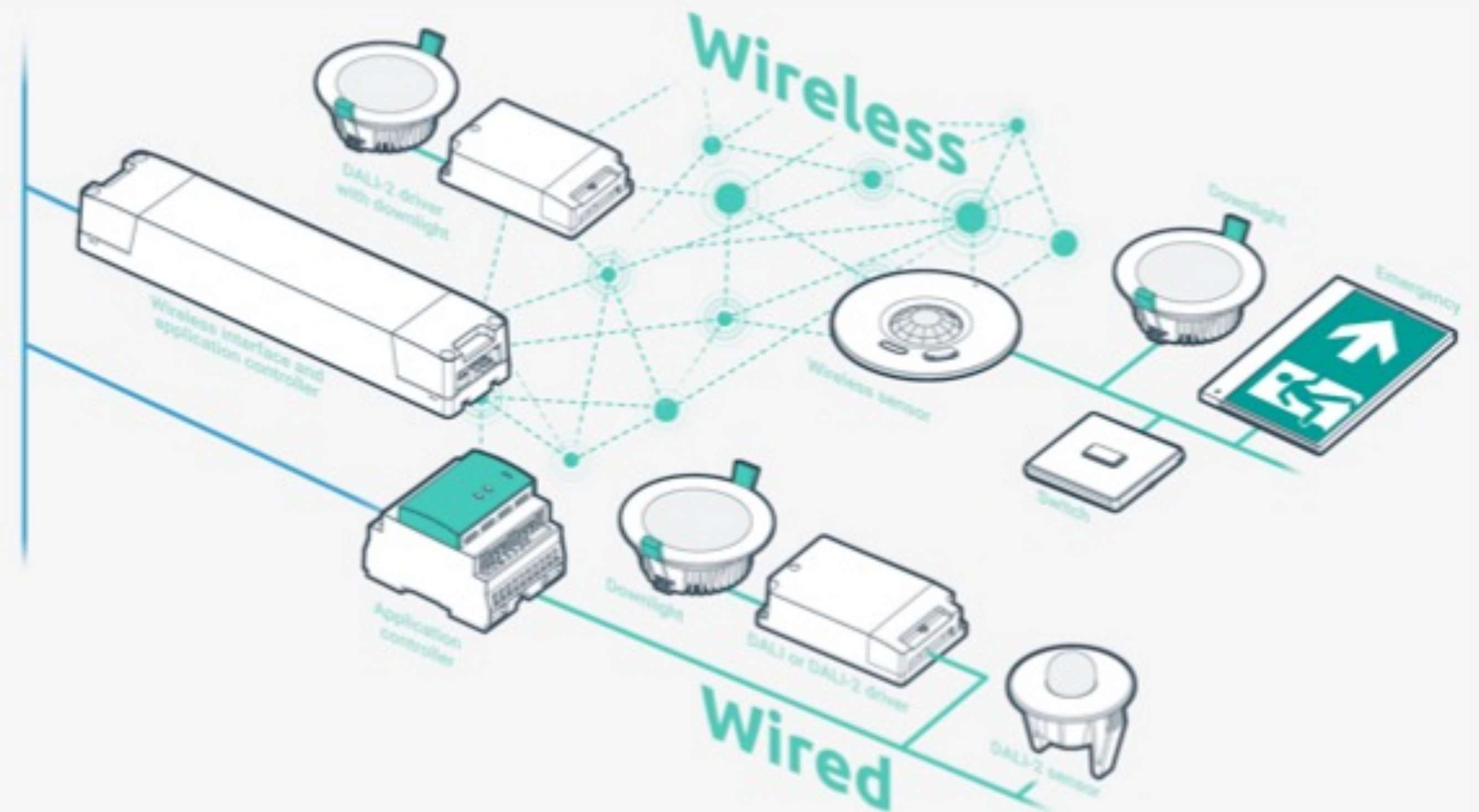
Here are some of the benefits of standardising your lighting control:

- Connectivity: connection standardised
- Choice: Source hardware from multiple vendors
- Hybrid: Reflects trends in controls evolving

Scalable- hybrid

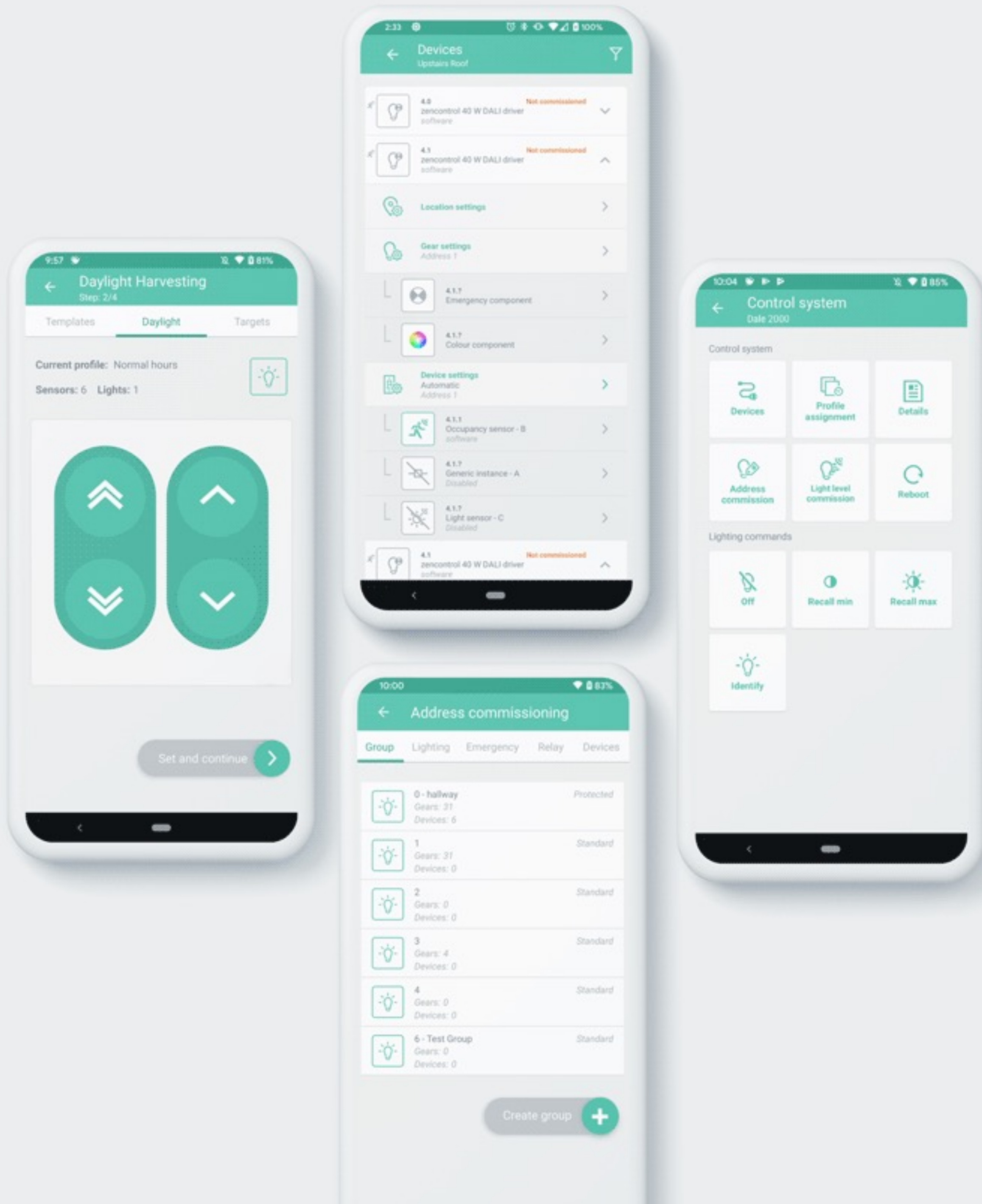
Not all buildings are the same and customer's requirements can differ

- With a zencontrol system, wired and wireless systems work together seamlessly.
- Creates a fully functioning building with no compromises



Commissioning

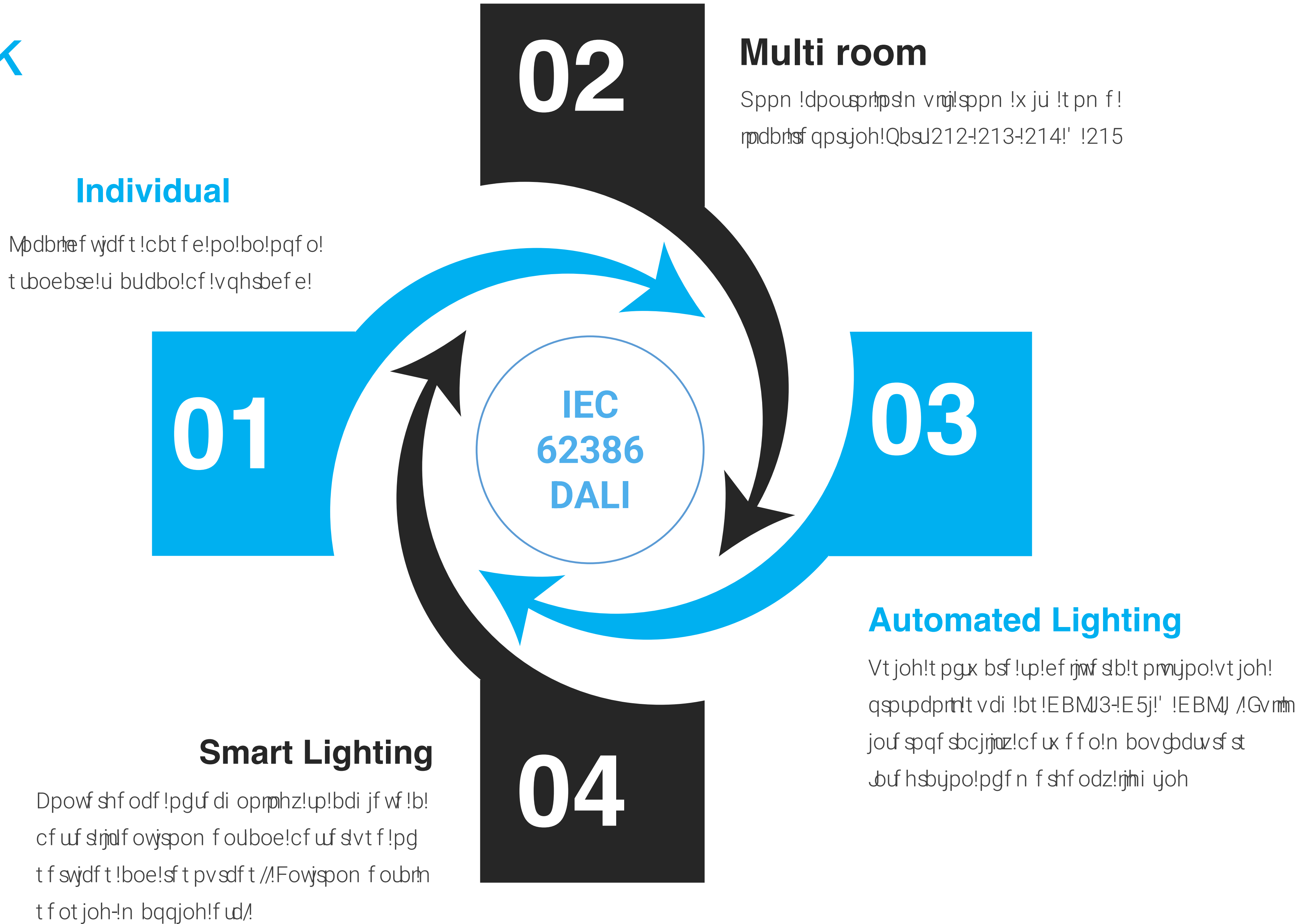
A top-down view of a person wearing a white lab coat with grey cuffs, typing on a silver laptop. The laptop screen displays a data dashboard with various charts and tables. To the left of the laptop is a white smartphone showing a similar dashboard. To the right is a clipboard with a document featuring line graphs and data. On the far left, a portion of a technical drawing or blueprint is visible. The entire scene is set on a light-colored wooden desk.





Risk

De-Risk



Building Safety Act



Building Safety Act 2022

Changes in legislation Building Safety Act 2022

- High Risk: 18m high or at least 7 storey. Includes Hospitals/ Prisons/ MOD
- The Golden Thread is a digital record of all project and asset data, detailing how a building was designed, built, managed and operated
- Golden Thread: The golden thread is both the information that allows you to understand a building and the steps needed to keep both the building and people safe.
- Accountable person: Buildings must be registered before first occupation

Building Safety Act Enforcement

Offence	Scope of power	Penalty	Reference
Providing false or misleading information to BSR	Criminal offence Triable as an either way offence	Unlimited fine 1 year imprisonment (magistrates) 2 years imprisonment (crown)	Section 24 BSA22
Contravention of building regulations	Criminal offence Triable as an either way offence No time limit	Unlimited fine Fine for each day the contravention continues (£200)	Section 35 BA84
	Compliance notice Must be served within 12 months	Unlimited fine 1 year imprisonment (upon summary conviction - magistrates) 2 years imprisonment (upon indictment - crown)	Section 35B BA84
	Stop notice		Section 35C BA84
Failure to comply with compliance and stop notice	Criminal offence		Section 35B & C BA84
Removal of offending work	Time limit extended to 10 years	Notice to remove contravening work Chargeable work	Section 36 BA84

The image features a vibrant night cityscape, likely Singapore, with numerous illuminated skyscrapers. A semi-transparent blue overlay with a complex circuit board pattern and glowing network lines is applied across the entire scene. The text 'Connected Networks' is centered in a large, white, sans-serif font.

Connected Networks

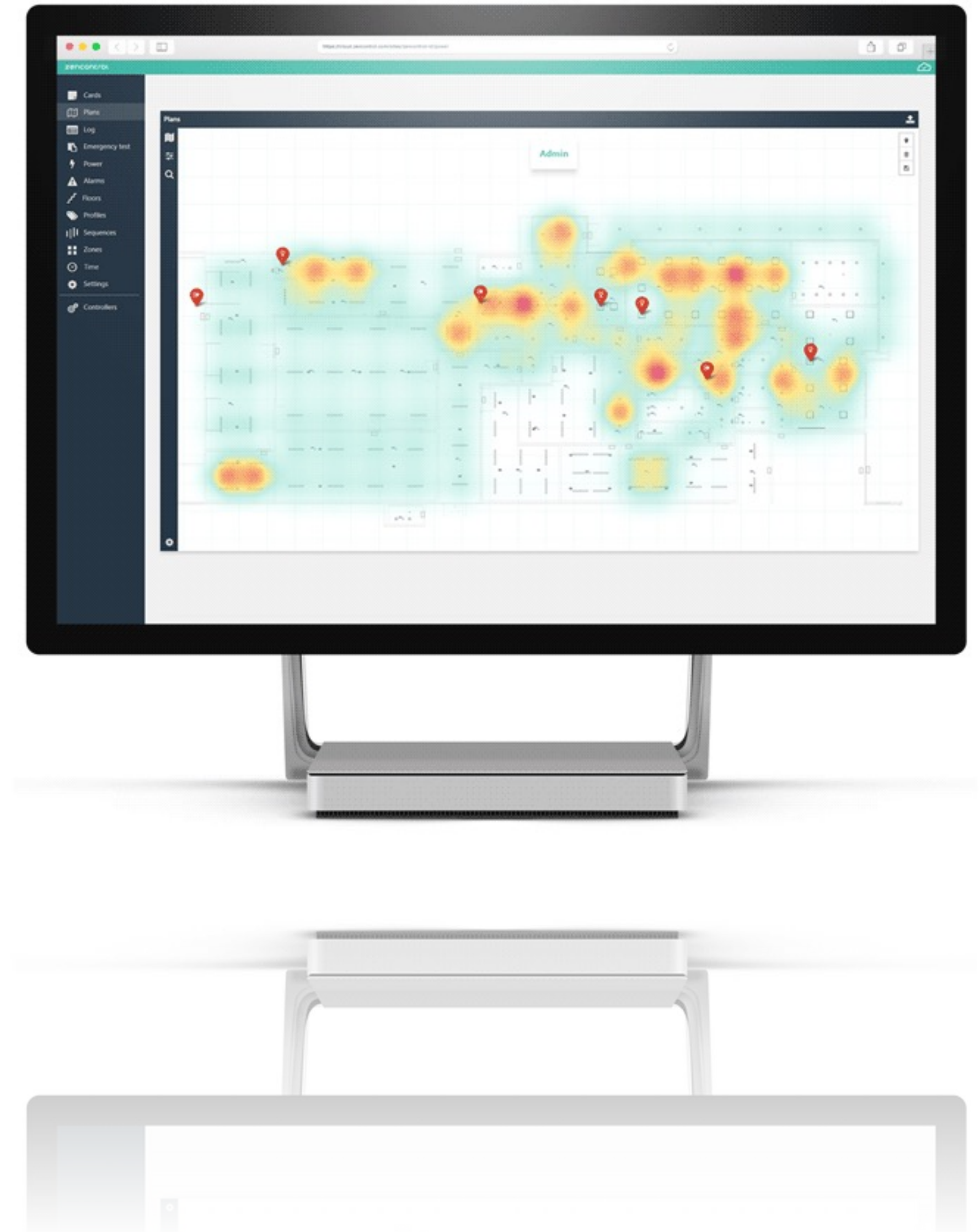
Manageable networks

Wired or Wireless DALI

64 ECGS (lights / relays)

64 ECDs (switches / sensors) per network.

Each network wired or wireless is connected to an IP gateway which provides an ethernet backbone



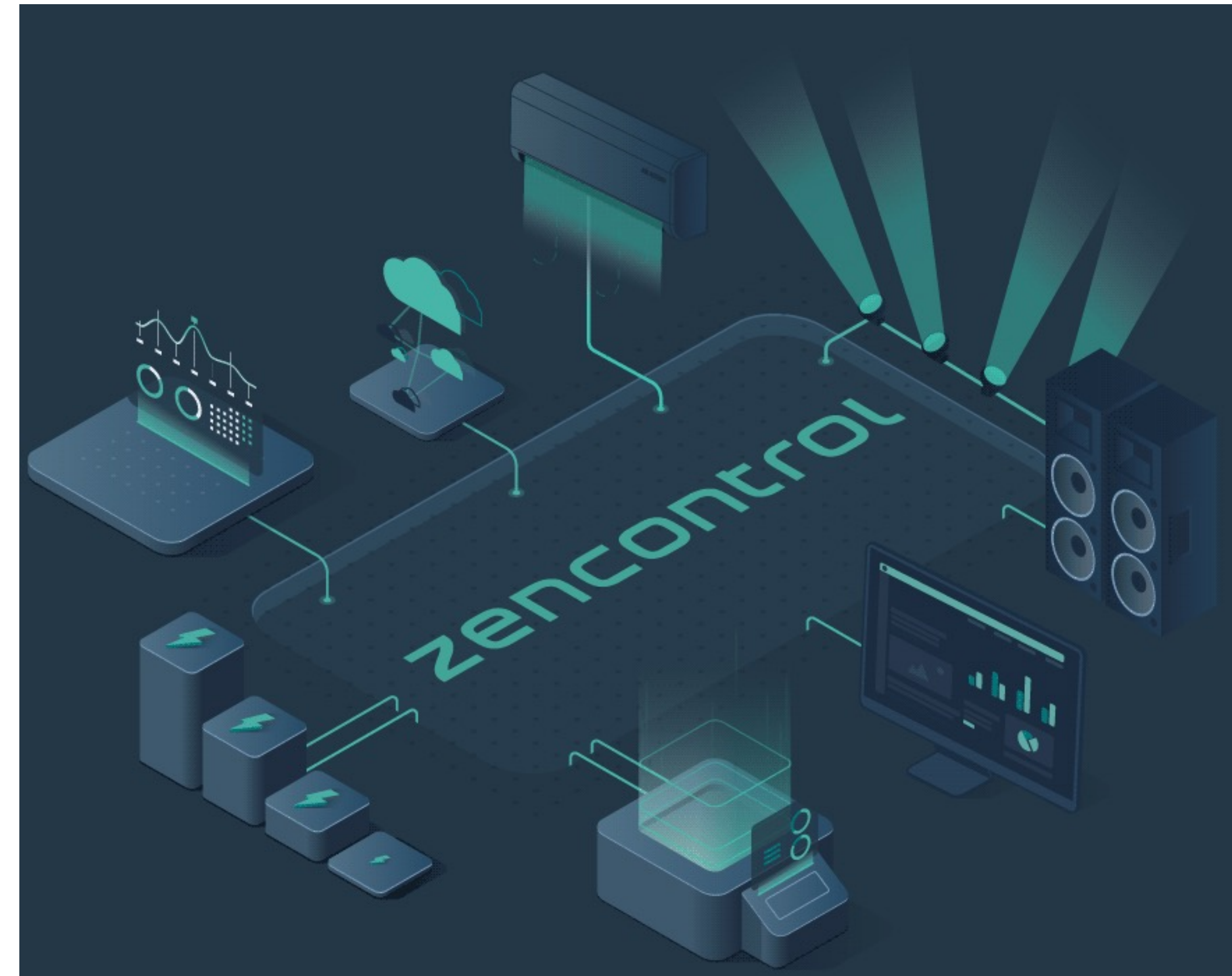
This approach allows for

Standardised deployment and design, as the systems have the same building blocks

Straightforward fault management,

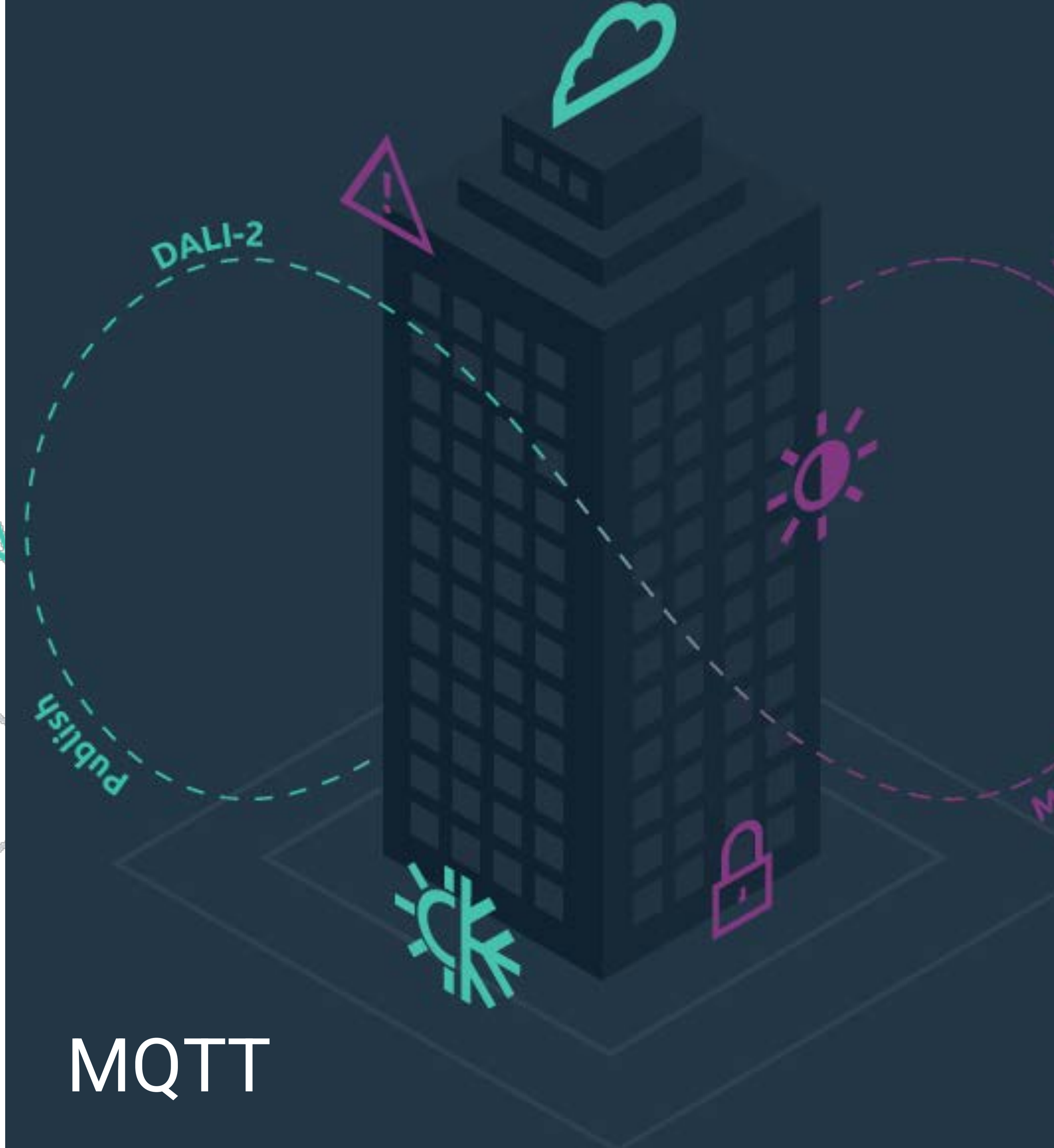
Easy quoting and specification, design follows that of DALI

Better security, each network is protected





BACnet

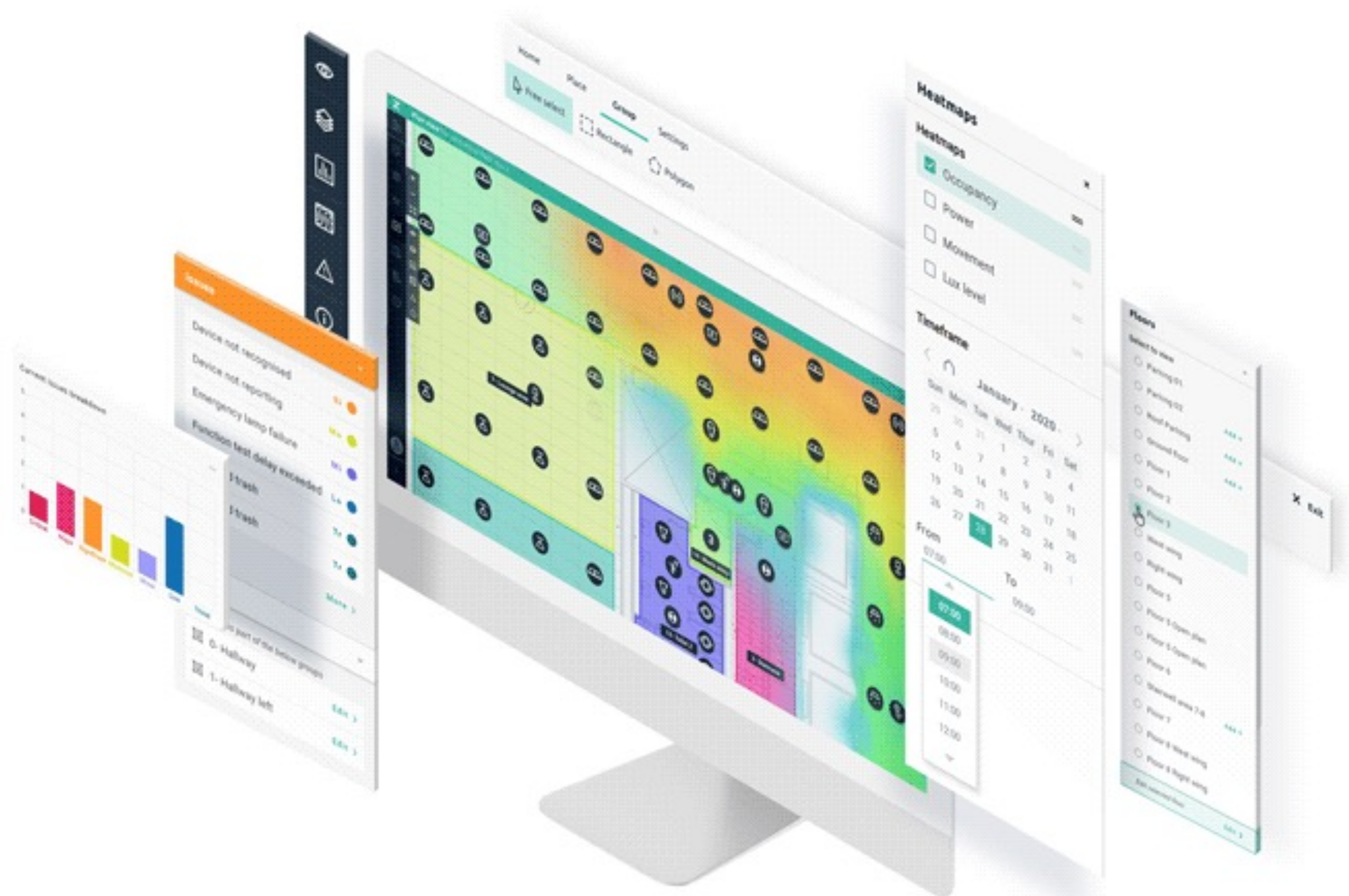


MQTT

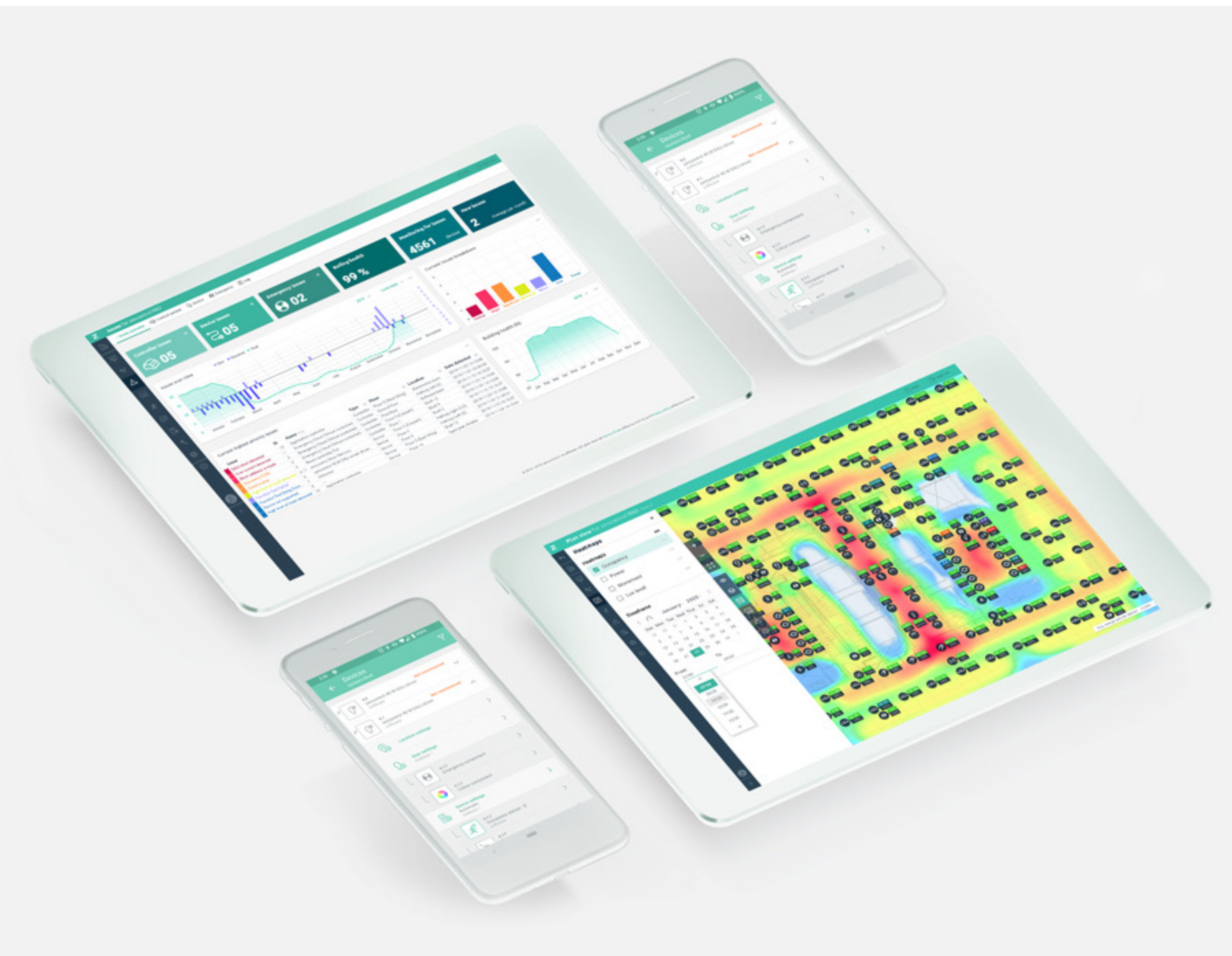
Software

```
if (n) {  
  if (a) {  
    for (; o > i; i++)  
      if (r = t.apply(e[i], n), r === !1) break  
  } else  
    for (i in e)  
      if (r = t.apply(e[i], n), r === !1) break  
} else if (a) {  
  for (; o > i; i++)  
    if (r = t.call(e[i], i, e[i]), r === !1) break  
} else  
  for (i in e)  
    if (r = t.call(e[i], [i]), r === !1) break;  
return e  
},  
trim: b && !b.call("\uffeff\u00a0") ? function(e) {  
  return null == e ? "" : b.call(e)  
} : function(e) {  
  return null == e ? "" : (e + "").replace(C, "")  
},  
makeArray: function(e, t) {  
  var n = t || [];  
  return null != e && (M(Object(e)) ? x.merge(n, "string" == typeof e ? [e] : e) : h.call(  
),  
isArray: function(e, t, n) {  
  var r;  
  if (t) {  

```





The image features two large, clear glass lanterns with thick, braided rope handles. Each lantern contains a single, light-colored flower and is filled with a layer of small, white, crystalline material at the bottom. They are placed on a white, lace-like fabric. The background is a dark, blue-toned night scene with bare tree branches and a string of warm, glowing lights in the distance. The text "Sustainability & Wellbeing" is centered over the lanterns in a white, sans-serif font.

Sustainability & Wellbeing

Wellbeing



WELL standard

The [WELL Building Standard](#) (WELL), is a roadmap for creating and certifying spaces that advance human health and well-being.

WELL sets pathways for accomplishing health-first factors that help every one of us to do our best work and be our best selves by supporting our physical and mental health across 10 core concepts.

WELL works at any scale, from a single interior space to an entire organization.

Change-other factors

THE WELL BUILDING STANDARD™

SEVEN CONCEPTS FOR HEALTHIER BUILDINGS



AIR



WATER



NOURISHMENT



LIGHT



FITNESS



COMFORT



MIND

Rating systems



Office buildings

Productive employees are essential for creating competitive businesses.

Healthy people are essential for creating vibrant societies.

A NABERS Indoor Environment rating is a robust and measurable complement any health and wellbeing initiative.

- Base building Indoor Environment rating
- Tenancy Indoor Environment rating

Rating systems

The logo for BREEAM Outstanding. The word "BREEAM" is in a large, bold, green sans-serif font, followed by a registered trademark symbol (®). Below it, the word "OUTSTANDING" is in a smaller, bold, black sans-serif font. The entire logo is centered within a white rectangular box that has a subtle drop shadow.

BREEAM®
OUTSTANDING

BREEAM is a sustainability assessment method that is used to measure the environmental performance of buildings.

It assesses buildings across a range of categories, including energy, water, health and wellbeing, pollution, transport, materials, waste, ecology and management processes.

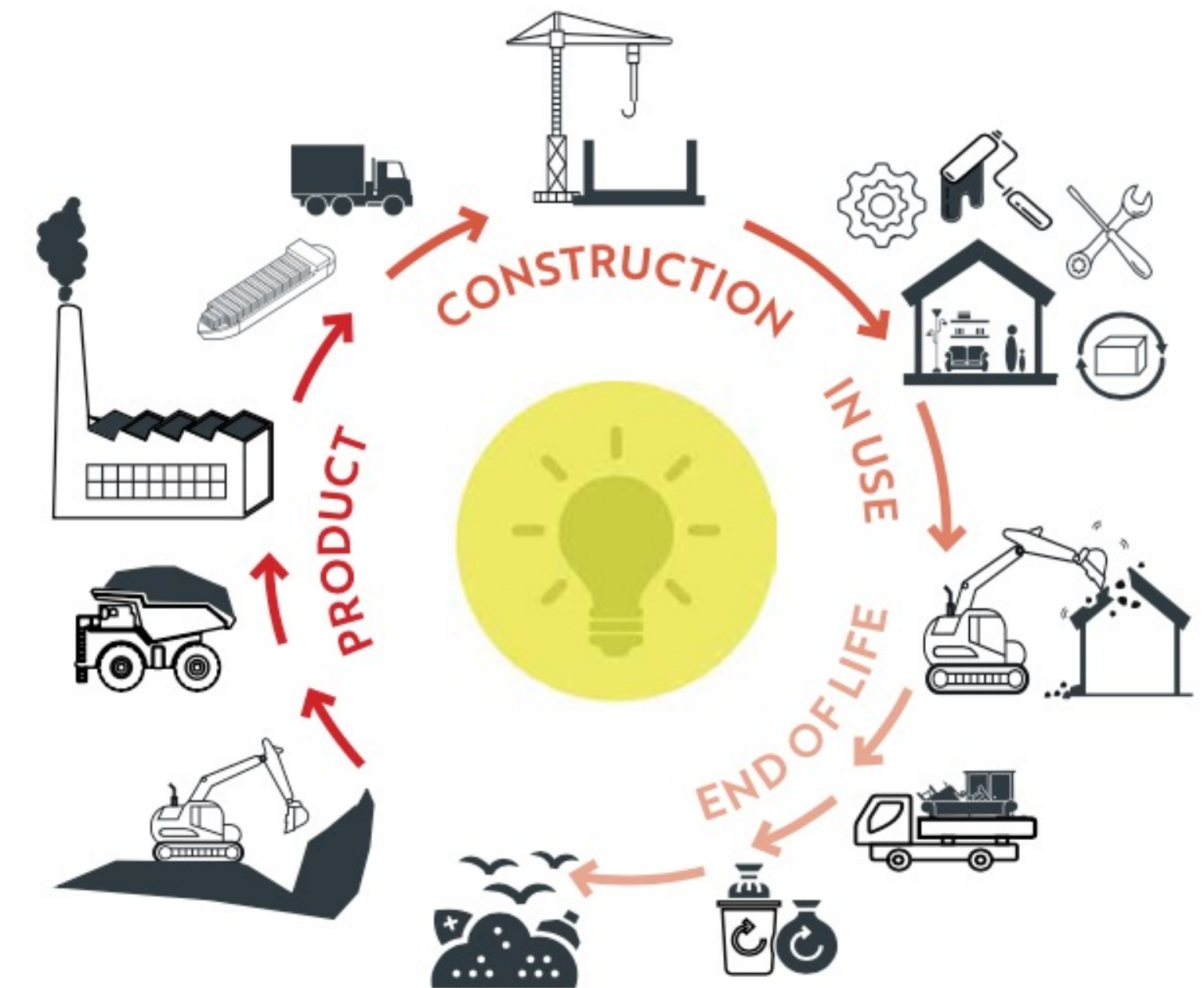
Buildings are rated and certified on a scale of 'Pass', 'Good', 'Very Good', 'Excellent' and 'Outstanding'.

Embodied carbon

The purpose of this guide is to help the industry take a first step together to evaluate embodied carbon emissions in MEP design, alongside operational carbon emissions.

As a first step, this document provides guidance on how to estimate embodied carbon at product level, rather than at system or building level. Guidance on system-level whole life carbon assessment may be included in a subsequent version of this guide.

Embodied carbon in building services:
lighting



TM65.2:2023



Circular economy

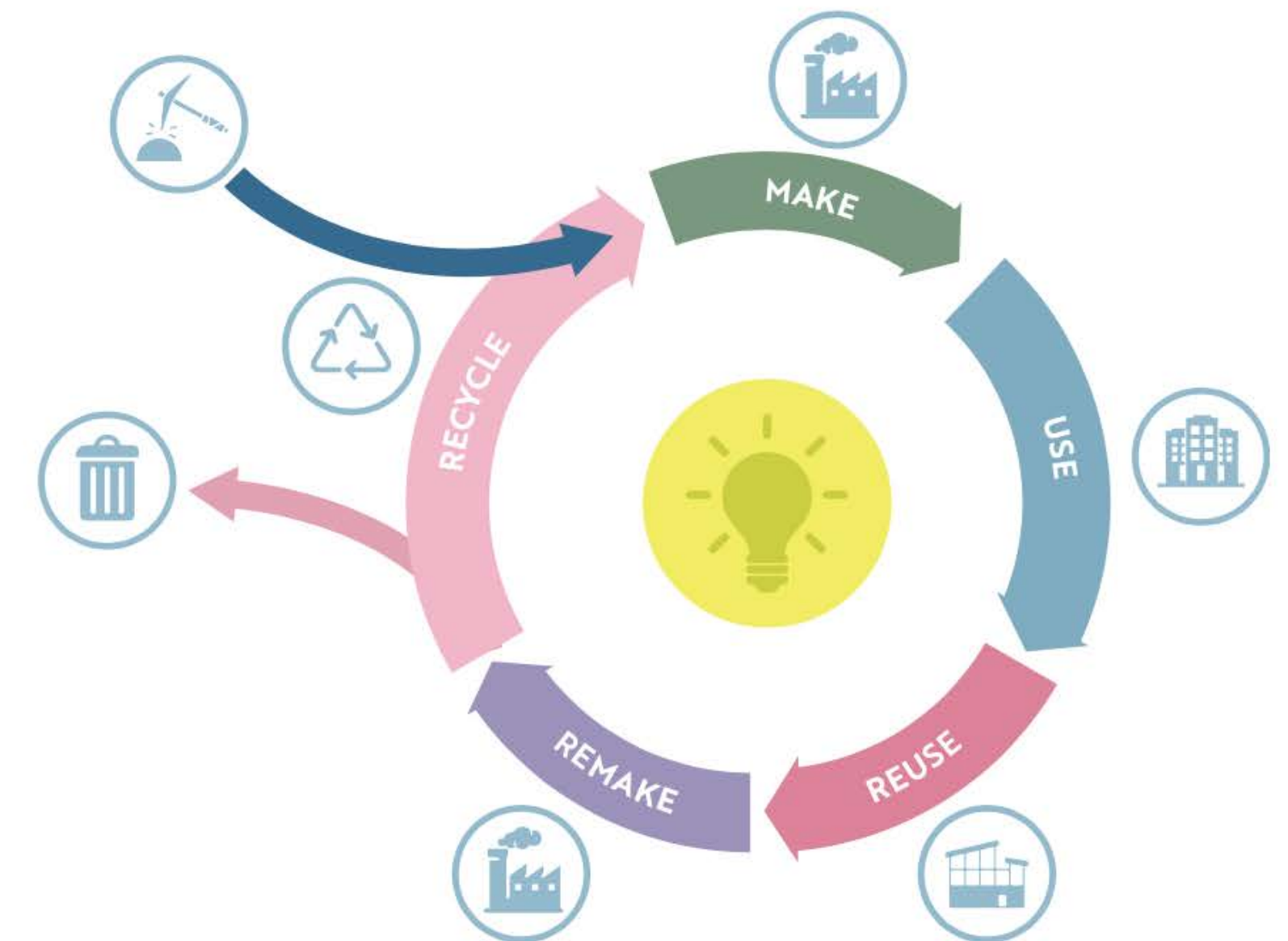
Consistent approach to local devices

DALI has rules that are defined by a standard and not a manufacturer

Long life and availability of spares or new components is essential to avoid waste.

Security of supply

Creating a circular economy in the lighting industry



TM66: 2021

A man in a dark suit and tie is walking from left to right across a paved area. He is carrying a black briefcase in his right hand and talking on a mobile phone held to his left ear. In the background, there is a modern building with a light-colored stone or concrete facade. Large, dark, angular, metallic structures, possibly part of a sculpture or architectural feature, frame the scene on both sides. The ground is paved with light-colored rectangular tiles. A semi-transparent blue rectangular overlay covers the lower half of the image, containing the text.

Thank you

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Smart Buildings **SHOW**

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We look forward to seeing you in 2024