



Power Efficiency for Sustainable Applications

DC2DC Architecture



The Power of DC for Your Lighting

The Acuity Brands DC2DC architecture provides distributed DC power to a LED lighting system, enhancing its efficiency by eliminating the need and cost to convert AC to DC power at the luminaire, and facilitating the installation and commissioning of lighting controls.

Intrinsically more efficient by design, our DC-powered lighting architecture also delivers savings at design and installation, facilitates maintenance, and empowers lighting design focused on sustainable and well-being applications.



To help foster the adoption of the use of DC power in building design, the US Green Building Council has introduced a LEED® credit for Direct Current Power Systems¹ as well as consideration for DC-powered systems under its LEED Zero certification.



Converting AC to DC power results in efficiency losses of up to 10%², and every power conversion represents not only additional material costs, but a potential failure point for the connected devices and systems.

DC2DC Architecture in Action

The Acuity Brands DC2DC architecture provides distributed normal or emergency low-voltage DC power for a range of LED luminaires as well as options for digital controls by nLight.

The DC2DC architecture is particularly suited for spaces, such as classrooms, offices, hospitals and more, that consider both energy efficiency, increased occupant comfort and well-being, and that are typically designed with multiple lighting zones.

Components include:

DCHUB to distribute DC power to up to 1080 VA of DC-powered LED luminaires, with support for either all normal or all emergency lighting.



57VDC powered LED luminaires, with Static CCT or Tunable White options.



Networked lighting controls by nLight®, with field-installable control devices and/or luminaires with networked embedded controls.

- Wired nLight controls, for both Static White and Tunable White applications
- Wireless nLight AIR controls, for Static White applications



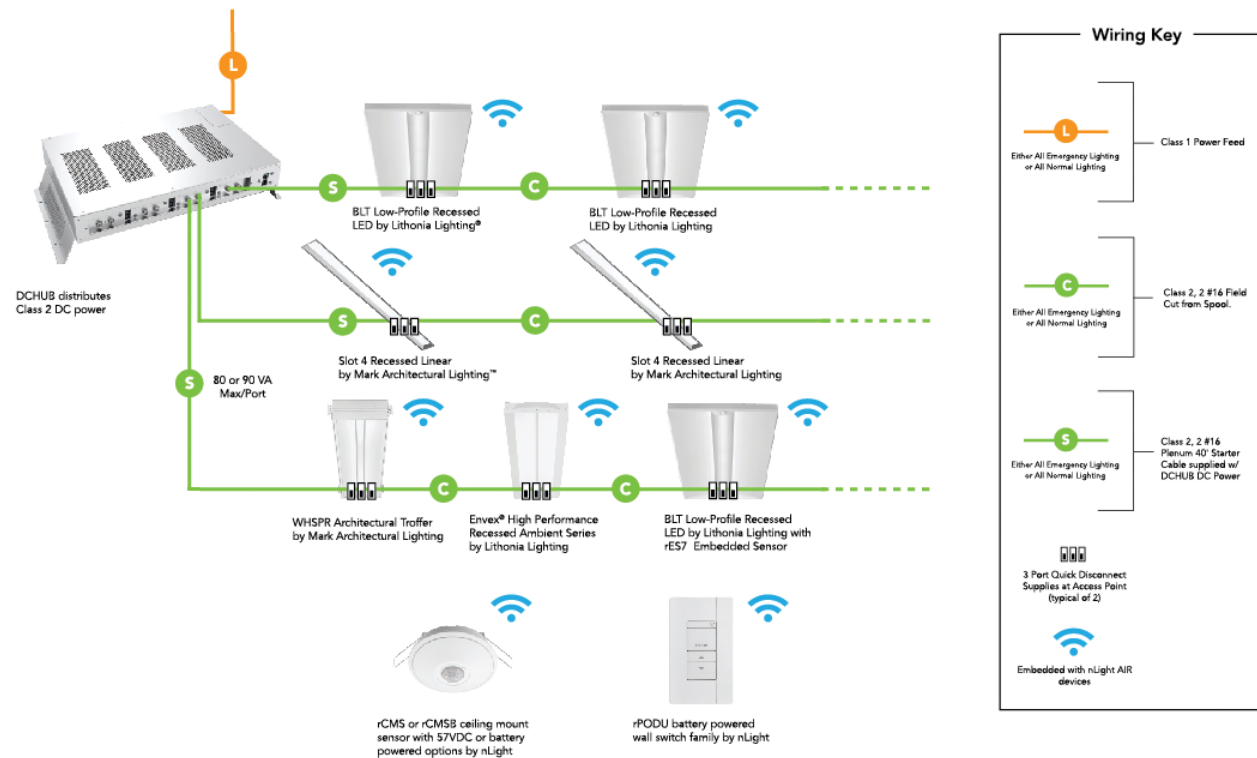
nPS 80 DALI controller to provide nLight® devices with the ability to control DALI drivers, bringing all the benefits of an nLight system where DALI protocol is required.



Standard Class 2 power and control cables

DC2DC Architecture with wireless nLight® controls

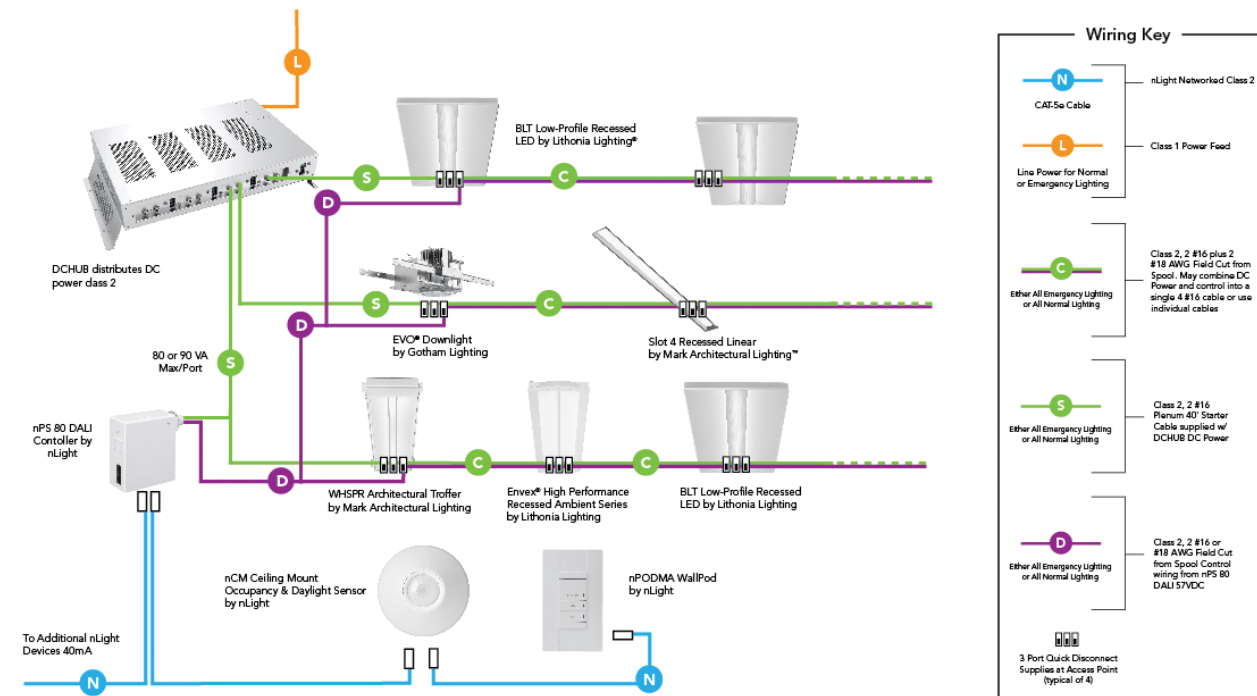
Leverage DC-powered luminaires with wireless embedded nLight AIR devices for Static White applications.



Note: All luminaires require 57VDC NLTAIR2 or NLTAIR2EM options

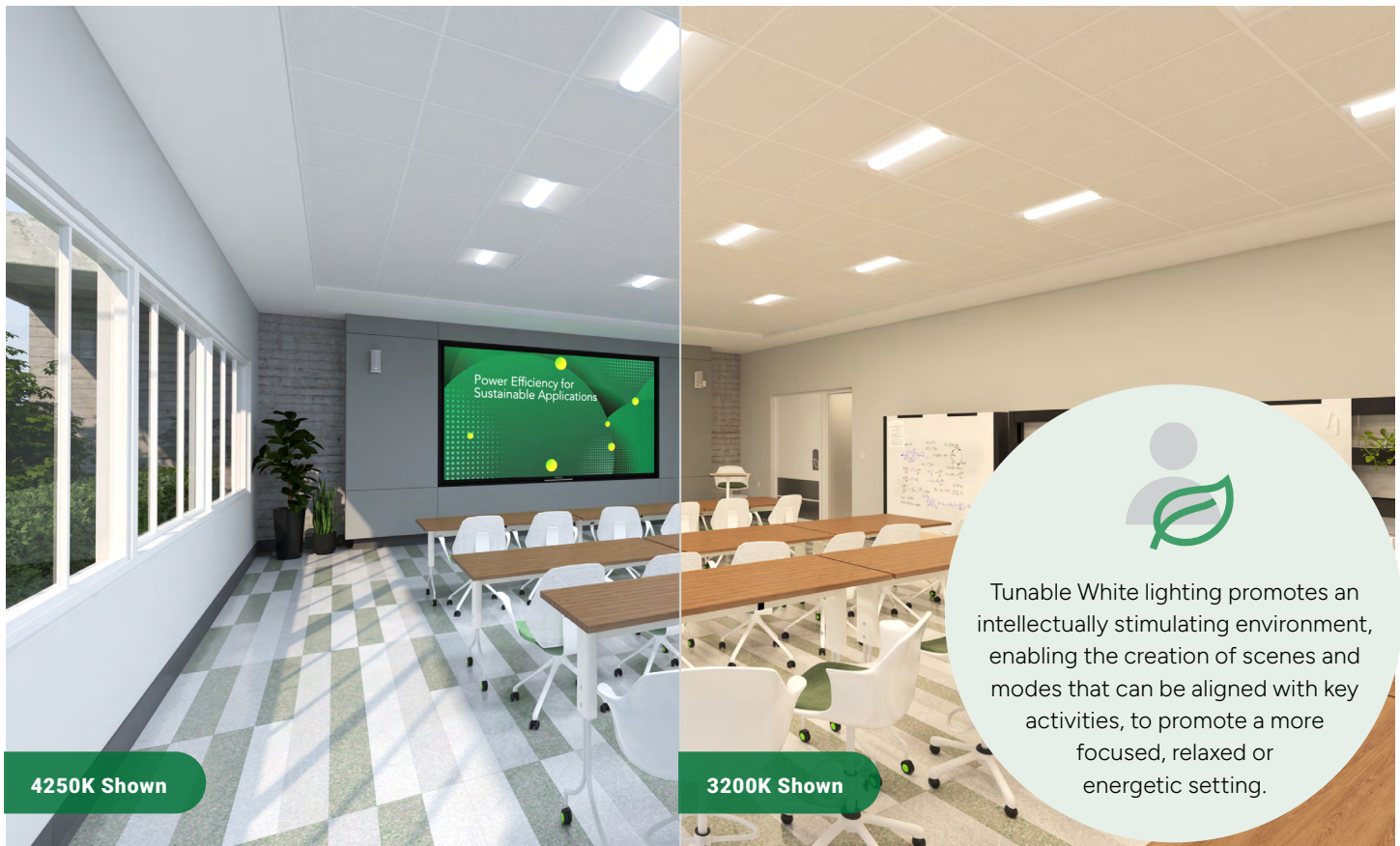
DC2DC Architecture with wired nLight® controls

Interface with DALI and choose the nPS 80 DALI 57 VDC model for Static White or Tunable White applications.



Note: All luminaires require 57VDC plus DALI (Static White) or DALI8 (Tunable White) options

Deliver Unique Value for Your Space



- **Energizes lighting design for occupant well-being.** The DC2DC architecture's control cabling and DC powered LED drivers provide native support for Tunable White applications, enabling the creation of scenes and modes that can be aligned with key activities during the day.
- **Empowers flexible lighting control design.** Luminaires can be individually controlled or grouped in zones, with up to 16 independent control channels for luminaires with Static CCT or up to 8 channels for luminaires with Tunable White. In addition, installation time can be further reduced by leveraging embedded occupancy and daylight sensors within luminaires.
- **Enables "flex space" configuration.** Spaces can be reconfigured and lighting control zones customized, without the need and cost of rewiring.
- **Reduces materials and installation hours.** The DC2DC architecture utilizes Class 2 low voltage DC wiring, eliminating the need for power packs, junction boxes and conduit to luminaires, providing reductions of both materials and related installation hours, and contributing to a reduction in construction carbon footprint.
- **Integrates for a unified building approach.** The DC2DC architecture can be used within a hybrid implementation of DC and AC powered lighting systems within one building. It is part of a unified platform through nLight networked controls, enabling building-wide control and lighting strategies.
- **Facilitates maintenance.** The DCHUB is a single point of AC to DC power conversion and luminaire control interface, reducing points of maintenance.

Build Your DC2DC Solution

This design guide is a teaching guide, using a classroom application as a practical example. The DC2DC architecture is also applicable for other applications such as open office, healthcare spaces, and more.

1. Select Luminaires (DC Powered, 57 VDC), Lumen Output and Static CCT or Tunable White Options



BLT

- 40L 3/port
- 60L 2/port
- TUWH 48L 2/port



ENVEX

- 30L 3/port
- 48L 2/port
- TUWH 40L 2/port

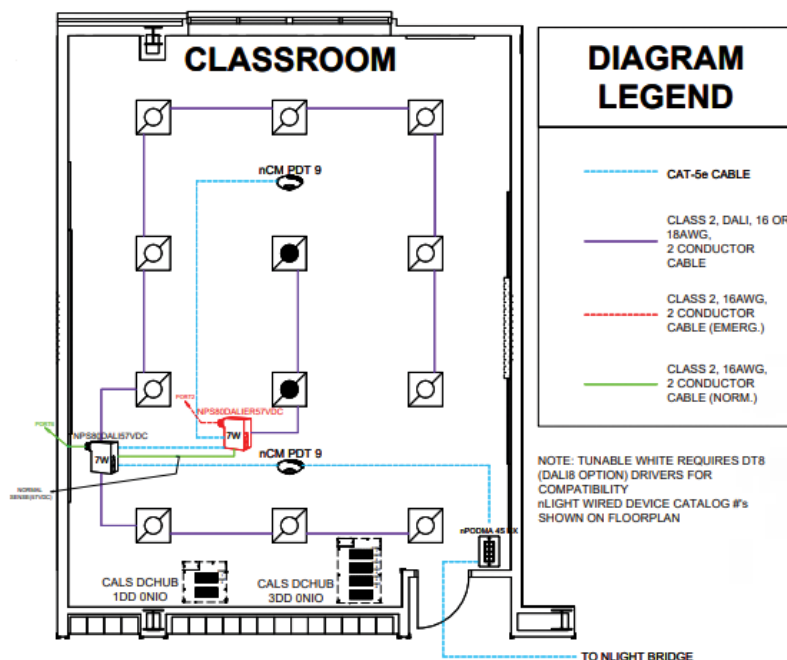


WHSPR

- 33L 3/port
- 48L 2/port
- TUWH 40L 2/port

2. Select Sensors and Controls

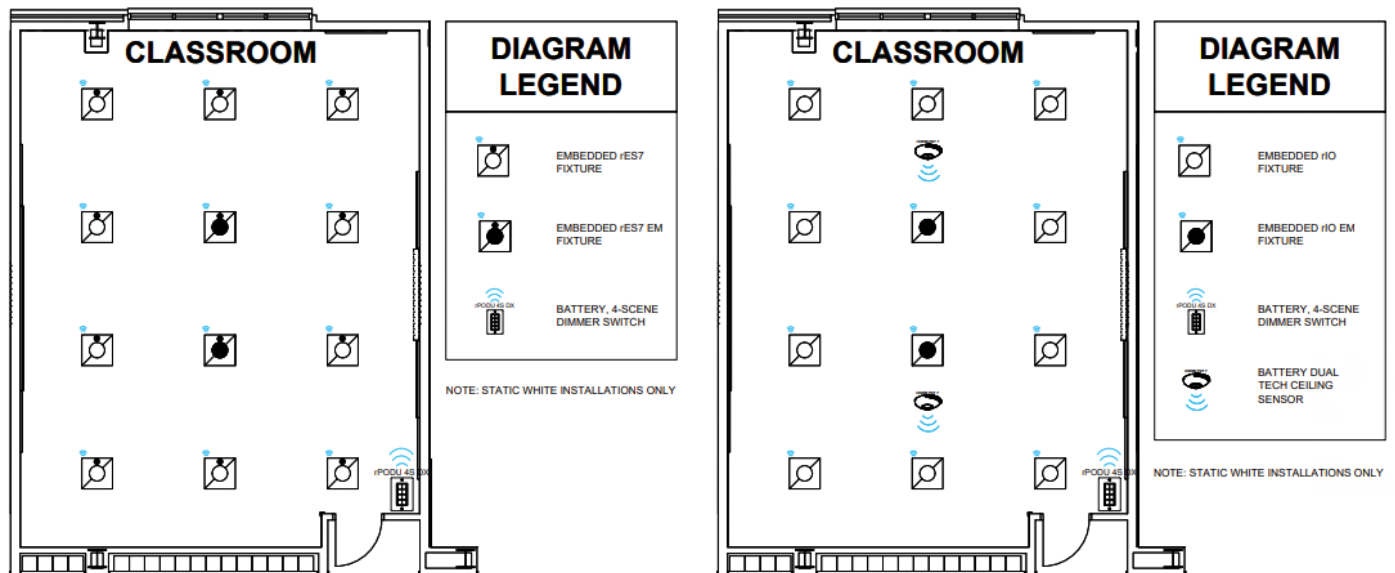
1. Wired with nPS 80 DALI - recommended for achieving Tunable White



Note: Refer to luminaire spec sheets for exact wattages based on options
- up to 45W, 2 per DCHUB port/ up to 90W, 1 per DCHUB port

[See all 57 VDC Luminaire Options](#)

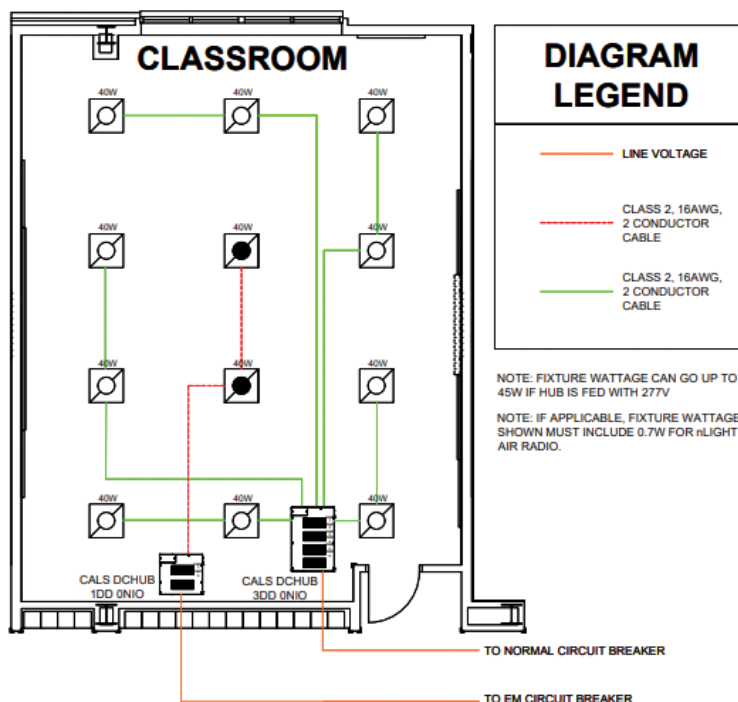
2. Wireless nLight AIR with embedded sensors or with battery option – recommended for achieving the lowest total install cost



3. Detail Your DCHUB to Luminaire Wiring

Determine number of DCHUB ports - use 90W maximum per port for 240 or 277 VAC input. In example below, 31W - 45W luminaires are shown with two allowed per port.

For 30W or less fixtures, three per port are allowed. For 120 VAC input DCHUB limit is 80W maximum per port - higher voltage input recommended.



Example - Classroom Bill of Materials

<p>Application – Wired; Tunable White Whisper 2X2, 240 or 277 power feed, with emergency lighting from a generator or central inverter</p> <ul style="list-style-type: none">• (12) WHSPR LCTR 90CRI TUWH RHYR 48L DARK DALI8 57VDC• (1) DCHUB 3DD 0NIO 277 GRD PLN• (1) DCHUB 1DD 0NIO 277 GRD PLN• (1) nPS80 DALI 8Z CCT 57VDC• (1) nPS80 DALI ER 8Z CCT 57VDC• (1) NCM PDT 10 RJB ADCX• (1) NPODMA 4S DX CCT EDUTW	<p>Application – Wireless; Static White 2BLT2, 240 or 277 power feed, with emergency lighting from a generator or central inverter</p> <ul style="list-style-type: none">• (10) 2BLT2 48L ADP 57VDC LP940 NLTAIR2• (2) 2BLT2 48L ADP 57VDC LP940 NLTAIREM2• (1) DCHUB 3DD 0NIO 277 GRD PLN• (1) DCHUB 1DD 0NIO 277 GRD PLN• (1) RCMSB PDT 7 G2• (1) RPODU 4S DX G2
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DESIGN YOUR SPACE WITH DC2DC IN VISUAL CONTROLS

www.AcuityBrands.com/DC2DC

¹ [New LEED pilot credit encourages energy savings with DC power systems | U.S. Green Building Council \(usgbc.org\)](https://www.usgbc.org/news/new-leed-pilot-credit-encourages-energy-savings-with-dc-power-systems)

² Pacific Northwest National Laboratory. Arnold, Gabe & Pennell, Grace. 2020. DC Lighting and Building Microgrids, Opportunities and Recommendations. DC_Lighting_and_Microgrids_White_Paper_09-09-2020.pdf (pnnl.gov)

³ Requirements may vary according to local code