IN THE KNOW
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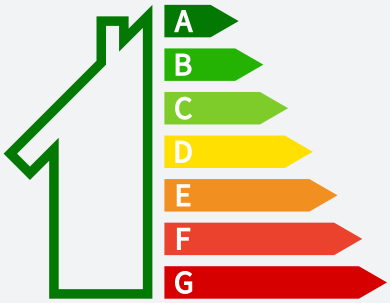
THE KNOWLEDGE YOU NEED DIRECT FROM THE MINDS OF MEP ENGINEERS

Sub-Metering, Part II: Getting it Right

In our last issue of ***In the Know*** we discussed the latest updates to the energy code and the introduction of new requirements for sub-metering; requirements that emphasize more detailed monitoring of building energy use. In this article we'll dig in deeper.



A quick review: sub-metering is an essential tool for achieving energy efficiency. By providing granular data on energy use across different building systems—such as lighting, HVAC, and plug loads—sub-metering helps identify opportunities for energy savings, optimize system performance, and comply with regulations. The updated energy code takes this a step further by mandating sub-metering for specific systems and spaces, especially in larger commercial buildings.

As engineers, this presents both an opportunity to improve building efficiency and a set of complex challenges to overcome. Some of the challenges include:

Integration with Building Automation Systems (BAS)

A common objective and one of the most significant challenges associated with sub-metering is effectively integrating sub-meters with the BAS. The BAS acts as the brain of the building, monitoring and controlling everything from HVAC to lighting systems. However, integrating sub-meters into this system is far from straightforward.

- **Communication Protocol Compatibility:** Sub-meters often use communication protocols that are different than the BAS. Most meters are equipped with common protocols like BACnet, Modbus, or LonWorks, but seamless communication between the meters and the BAS often requires additional hardware like protocol converters, which add cost, added programming time, and complexity.
- **Data Integration Complexity:** Integrating the data into a BAS involves more than just connecting devices. The design team must ensure that the sub-metering data is accurately tagged, processed, and aligned with other system data so it can be used meaningfully within the BAS. This often requires a custom approach, including reconfiguring BAS settings and designing data processing algorithms that can handle the variability of different meter types and configurations.

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Producing Meaningful Dashboard Data

Beyond integrating sub-meters with the BAS, another challenge is to produce dashboard data that is not only compliant but also meaningful for building operators. The ultimate goal of sub-metering is to provide actionable insights that can be used to improve efficiency, but turning raw data into something useful requires significant effort.

Coordination Between Multiple Stakeholders

Meeting the new sub-metering requirements involves collaboration between multiple parties, including MEP engineers, controls specialists, BAS vendors, and commissioning agents. Poor communication or misalignment between these stakeholders can lead to delays, added costs, and suboptimal integration.

- **Vendor Coordination:** Different vendors may supply the sub-meters, BAS, and other building systems. Coordinating these components to ensure compatibility and smooth integration is often a logistical challenge. MEP engineers must carefully specify components that will work together and may need to facilitate communication between vendors during commissioning.
- **Commissioning and Testing:** Proper commissioning is essential to ensure that sub-meters are installed correctly, integrated with the BAS, and generating reliable data. This process requires testing each component and validating the flow of data from the sub-meter through the BAS to the dashboard.

Conclusion: Best Practices

- **Early Collaboration with BAS Vendors:** Engaging BAS vendors early in the design process helps ensure that sub-meters are compatible, and that the system can handle the added data volume.
- **Use of Open Protocols:** Specifying sub-meters that use open communication protocols, such as BACnet, ensures compatibility and reduces integration costs.
- **Modular Dashboard Design:** Creating modular, user-specific dashboards allows different stakeholders to access the data they need in an easy-to-understand format, making it more likely that the information will be used to drive efficiency improvements.
- **Thorough Commissioning:** Ensuring a comprehensive commissioning process, including calibration and verification of data accuracy, will help catch issues early and ensure long-term reliability of sub-meter data.

The sub-metering requirement is multifaceted and adds both opportunity and complexity to projects. Want to make sure you get it right from the start? Let's talk.

On the mind of ***Kelly Artz***
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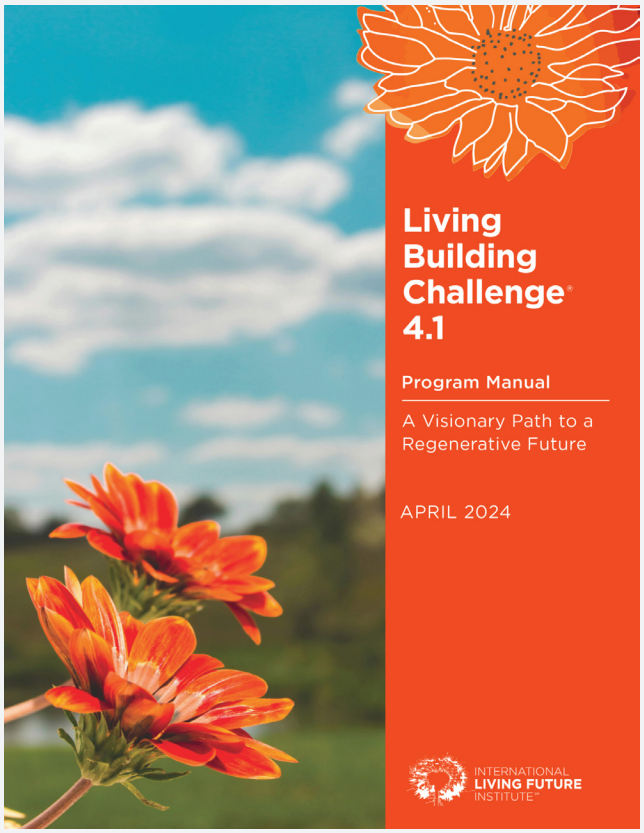
International Living Future Institute Introduces LBC 4.1

The International Living Future Institute (ILFI) certification programs, including the Living Building Challenge (LBC), Zero Energy Certification (ZE), and Zero Carbon Certification (ZC), provide rigorous frameworks for creating regenerative buildings. These certifications aim to foster socially just, culturally rich, and ecologically restorative environments.

Earlier this year, the ILFI introduced LBC version 4.1 which brings significant updates, refining certification levels, and enhancing standards around water, energy, and carbon reduction.



Changes in Certification Levels

A major update in LBC 4.1 is the consolidation of the Core program. ILFI will no longer run a separate Core program, integrating it instead as the baseline across all projects. This update simplifies the pathway to certification, while retaining multiple levels of recognition:

- **Core Certification:** Achieved by meeting the baseline Core Imperatives across the seven Petals.
- **Petal Certification:** Projects must meet the Core Imperatives and fully achieve one of the Water, Energy, or Materials Petals.
- **Living Certification:** Projects must meet all seven Petals and fulfill all 20 Imperatives.

This integration streamlines the certification process, allowing projects to scale their efforts toward full Living Certification while still earning recognition at intermediary levels.

Major Program Changes in LBC 4.1

I05 WATER EFFICIENCY

- **LBC 4.0:** Required projects to reduce water use by 50% for new buildings and 30% for existing buildings, compared to regional baselines.
- **LBC 4.1:** Builds on this by mandating a 25% reduction in fixture flow rates compared to EPAct 2005. Projects must now use best-in-class water-consuming equipment and implement a comprehensive leak detection system. Additionally, a **Water Budget and Conservation Plan** is required, ensuring that water consumption is within 3% of the projected budget. HVAC systems must also prioritize water conservation, with single-pass cooling systems prohibited.

I07 ENERGY PETAL: EFFICIENCY

- **LBC 4.0:** Required a 70% reduction in energy use for new buildings, a 50% reduction for existing buildings, and a 35% reduction for interior projects, compared to equivalent baselines.
- **LBC 4.1:** Aligns with updated energy codes like **ASHRAE 90.1-2019** or **IECC 2021**. New buildings must achieve a 20% improvement beyond ASHRAE 90.1-2019, or IECC 2021. Renovation and interior projects must either meet these updated standards or achieve a 50% reduction in **Energy Use Intensity (EUI)** relative to typical baselines using ILFI-approved tools.

I07 ENERGY + CARBON REDUCTION

- **LBC 4.0:** Required projects (both new and existing) to demonstrate a **20% reduction in embodied carbon** of primary materials compared to a baseline. Existing

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buildings could count in-situ primary materials toward this reduction, though site materials were excluded.

- **LBC 4.1:** Maintains the same 20% embodied carbon reduction requirement but expands it to include **both primary and exterior materials**. ILFI-approved tools must be used to establish material baselines, and projects can now claim carbon-sequestering benefits from specific materials (e.g., wood vs. steel), if properly documented in line with **ISO 14025 and ISO 21930**. The embodied carbon impact of site materials remains excluded from this calculation.

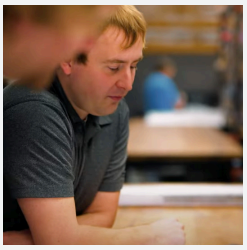
WHAT DOES **GOOD** LOOK LIKE?

Living Buildings are:

- Regenerative buildings that connect occupants to light, air, food, nature, and community.
- Self-sufficient and remain within the resource limits of their site.
- Buildings that create a positive impact on the human and natural systems that interact with them.

Summary of Program Evolution

The transition from LBC 4.0 to LBC 4.1 enhances the ILFI's focus on water, energy, and carbon reduction, making the certification process clearer and more robust. The consolidation of Core into the main framework simplifies pathways to certification, while the introduction of more stringent requirements for embodied carbon and HVAC water conservation demonstrates ILFI's commitment to tackling both operational and material impacts in building projects. By aligning energy goals with updated standards like ASHRAE 90.1-2019 and expanding carbon reduction strategies, LBC 4.1 strengthens the framework for truly regenerative buildings.



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