Challenge Theme	Energy Efficient Buildings
Statement Number	05
Launch Date	9 January 2026

Title	**Transforming existing building operations for a low-carbon future**
Background	Existing buildings represent one of the largest and most immediate opportunities for carbon reduction. While new construction standards continue to improve, operational emissions from existing buildings—driven by inefficient energy use, outdated systems, and human behaviour—remain a significant barrier to achieving climate and energy targets.
Challenge	Operational energy consumption in buildings is often characterized by fragmented systems (e.g. ACMV, lighting, and etc), limited real-time visibility, and reactive rather than adaptive management. Even where energy-efficient technologies are installed, their potential is frequently undermined by poor integration, lack of data-driven decision-making, and misaligned incentives among building owners, operators, and tenants. As a result, buildings routinely consume more energy than necessary, leading to avoidable costs and emissions. At the same time, behavioural factors play a critical role in building energy performance. Occupant and operator decisions—such as temperature setpoints, equipment usage, and scheduling—can significantly influence energy outcomes. However, most occupants and operators lack clear, actionable feedback on how their behaviours affect energy consumption and carbon emissions. There is a clear need for tools and systems that not only optimize building operations technically, but also actively engage users, align incentives, and encourage sustained energy-saving behaviours. Finally, while many solutions claim energy or carbon benefits, the sector continues to face challenges (cost effective approach) related to **measurement, verification, and accountability**. Inconsistent data, limited standardization, and insufficient analytics make it difficult to validate performance, compare solutions, or scale successful approaches. Robust monitoring and verification frameworks are essential to ensure transparency, enable continuous improvement, and build confidence among building owners, tenants, investors, and policymakers.
Desired Outcomes	The envisioned solution shall demonstrate the ability to **transform existing building operations to achieve measurable, low-carbon performance** by delivering the following outcomes • Buildings operate with significantly reduced energy consumption (i.e. 15 to 20% from existing baseline) through intelligent energy management, automation, and data-driven optimization that can adapt dynamically to changing usage patterns and energy demand. • Tenants and building operators are actively engaged and empowered to reduce energy use through intuitive tools, feedback mechanisms, and incentives that encourage long-term behavioural change and collective action. • Energy and carbon reductions are transparently measured, verified, and communicated using robust data and analytics, enabling continuous improvement, accountability, and informed decision-making • Contribute to future efforts for GreenMark certification/recertification
Requirements	• Technologies and/or solutions must be innovative and have not been deployed in large scale projects. • Technology readiness level of >=7 • Be scalable and cost effective

<table>
<tr><td></td><td>

Ensure ease of use and continuity of operations
The solution should help to improve user behaviour rather than be dependent on user behaviour for success.
Proposals should demonstrate applicability to existing buildings and involve deployable solutions that can be piloted within real operational environments.

</td></tr>
<tr><td>Possible Solutions</td><td>Potential approaches could combine intelligent building energy management systems, real-time performance monitoring, and occupant engagement tools to reduce energy use, influence everyday behaviours, and verify carbon savings in existing buildings</td></tr>
<tr><td>Development Timeframe</td><td>
<table>
<tr><th>Step</th><th>Task</th><th>Start</th><th>End</th></tr>
<tr><td>1</td><td>Proof of concept and baseline energy profiling</td><td>T_o</td><td>T_o + 3 months</td></tr>
<tr><td>2</td><td>Performance verification</td><td>T_o + 3 months</td><td>T_o + 12 months</td></tr>
</table>
</td></tr>
<tr><td>Testbed/ Trial site (envisioned deployment site)</td><td>The solution will be tested at selected JTC industrial developments (to be confirmed).</td></tr>
<tr><td>Additional Info</td><td></td></tr>
</table>