SUMMARY NOTES

EEAP WEBINAR 31

Fast Tracking Energy Efficiency Projects through IoT: An HVAC Case Study

14 October 2026 | Online webinar

On 14 October 2026, Energy Evaluation Asia Pacific (EEAP) convened its 31st webinar to examine how Internet of Things (IoT) sensors, continuous energy monitoring, and automated controls can accelerate energy-efficiency projects. Drawing on commercial-building experience in Australia and the Philippines, the speakers explained how measured operating data can support earlier action, improve heating, ventilation and air-conditioning (HVAC) performance, and strengthen the evidence used to scope, finance, and evaluate investments.

Speakers: Colin Steley, Founder and Managing Director, Stratcon Power Services Philippines; and Robert de Burgh-Day, Founder and CEO, Brightspace

Moderator: Dr. Edward Vine, Lawrence Berkeley National Laboratory affiliate and EEAP Steering Committee Member

The session combined an introduction to building intelligence with two Australian HVAC examples, Stratcon's measurement-first approach, and audience questions on industrial applications, weather adjustment, existing buildings, and energy service company (ESCO) partnerships. The discussion emphasized energy savings alongside occupant comfort, power quality, practical operation, and credible measurement and verification.

Central message

Continuous monitoring can bring energy-efficiency action forward by making actual demand and operating performance visible. When reliable baselines, responsive controls, and measurement and verification are built into a project from the beginning, building owners can identify opportunities sooner, assess results more credibly, and make better investment decisions while maintaining comfort.

Webinar Agenda

Time (PHT/SGT)	Session / Speaker
9:00–9:05 AM	Welcome remarks and context setting – Dr. Edward Vine
9:05–9:40 AM	Joint presentation – Colin Steley and Robert de Burgh-Day, "Fast Tracking Energy Efficiency Projects through IoT: An HVAC Case Study"
9:40–9:55 AM	Moderated audience Q&A – Dr. Edward Vine
9:55–10:00 AM	Concluding comments and vote of thanks

Introduction and Context Setting

Dr. Edward Vine, *Lawrence Berkeley National Laboratory affiliate and EEAP Steering Committee Member*

Dr. Vine introduced EEAP as a community of practice established in 2018 to strengthen objective evaluation of energy-efficiency and renewable-energy programmes and policies across Asia-Pacific. He highlighted collaborative learning, robust data analysis, capacity building, and post-implementation monitoring as ways to understand what works, improve programmes, and identify approaches that can be scaled.

He also emphasized that energy evaluation should consider behaviour and wider benefits, including operating costs, employment, air quality, and climate outcomes. The webinar connected these evaluation priorities to a practical question: how can better data help move efficiency projects from estimated opportunities to implemented and measurable improvements?

Why HVAC and real-time data matter

Robert described growing cooling demand in Asia-Pacific, particularly in commercial facilities such as airports, shopping centres, and convention venues. Reducing unnecessary demand can relieve pressure on electricity generation, storage, and networks while lowering building operating costs. However, savings need to be demonstrated through measurement rather than assumed from design calculations or modelled performance alone.

Many HVAC systems operate on fixed schedules and design assumptions about occupancy. This can mean conditioning and ventilating spaces when few people are present, while failing to respond adequately when demand changes. The speakers presented continuous occupancy, environmental, and energy data as a way to connect operation more closely to actual conditions.

1. Using Building Intelligence to Match HVAC to Demand

Robert de Burgh-Day, *Founder and CEO, Brightspace*

Robert explained how Brightspace combines sensors, edge computing, and controls software to create a live representation of occupied spaces. This operational “digital twin” focuses on how rooms are being used and the conditions experienced by occupants. It is not necessarily a detailed engineering model of every pump, duct, or item of plant.

From sensing to closed-loop control

- Sensors collect occupancy and environmental information, including carbon dioxide, temperature, humidity, and other indicators of room conditions.
- Software interprets changing demand and adjusts HVAC operation through the existing building management system (BMS), including ventilation, airflow, and heating or cooling where the installed equipment allows.
- Continuous feedback helps the system respond to actual conditions rather than relying only on bookings, fixed operating hours, or assumed occupancy.
- The control strategy can include preparing a space before it is occupied and reducing operation when demand falls, while tracking comfort and indoor-air-quality requirements.

The approach depends on the capabilities of the existing building. Some sites need additional sensors, airflow measurement, variable-speed drives, dampers, or zoning changes before responsive control is practical. Robert stressed the value of integrating with existing engineering and optimization providers rather than treating every building as a complete replacement project.

Digital models and cybersecurity

An audience question clarified that a three-dimensional building model is not automatically created by the sensors. Models draw on available plans, site information, inspections, and sometimes scanning. Their detail depends on the quality of those inputs. Robert noted that facility teams may prefer a

straightforward two-dimensional floor view for daily operation, even when a three-dimensional model is available.

Cybersecurity was identified as an adoption concern. Robert described a proprietary sensor mesh separate from the building's Wi-Fi and other networks, with connections to building systems or cloud services where required. The discussion underlined the need to consider security and data access as part of integration, alongside the potential benefits of connected systems.

2. HVAC Case Studies and Reported Results

Shellharbour Airport

Robert presented a small airport terminal south of Sydney, approximately 2,000 square metres, with variable flight activity and café operating hours. Its HVAC had been running for long periods on fixed schedules, with limited demand control. The project worked with three direct-expansion units and three zones, adding minor monitoring equipment to support more responsive operation.

- Robert reported approximately 30.7% less energy taken from the grid compared with consumption in the corresponding period of the previous year.
- He reported approximately 40% lower energy costs, with the timing of consumption and time-of-use prices contributing to the difference between energy and cost savings.
- HVAC operating hours fell from about 17 to 9 hours per day, and the reported payback on hardware and installation was under 12 months.
- The reported average peak indoor carbon-dioxide concentration was about 570 parts per million, with no exceedance of 1,000 parts per million and no reported comfort complaints.

These figures describe different measures and should be read within their stated scope. Grid-energy reduction, energy-cost savings, operating hours, and indoor conditions provide complementary information; they are not interchangeable measures of HVAC energy savings.

International Convention Centre Sydney

The second example concerned a large convention facility where HVAC operation had been linked to bookings, event setup, and pack-down schedules. Brightspace worked alongside existing optimization specialists and other service providers to add information about actual occupancy and conditions. This illustrates a collaborative delivery model rather than attributing every improvement to a single technology or organization.

Robert reported approximately 45% HVAC energy reduction and 62% fan-energy reduction over the comparison period discussed, through August. These are separate measures, with fan energy representing a specific end use. He also reported temperatures within the intended band about 96% of the time, carbon dioxide below the maximum about 99.9% of the time, and around 41% fewer comfort complaints or air-conditioning requests.

Maintaining conditions was commercially important because event clients could receive discounts when contractual comfort requirements were not met. Robert also showed how manual overrides could sharply increase demand and move a room outside its intended conditions. The example highlighted the need to support operating staff and address behaviour alongside automation.

Practical insight

Assess energy performance together with comfort and service quality. A responsive system may need to work harder when a space is crowded, while reducing unnecessary operation at other times. The relevant result is sustained performance under actual operating conditions.

3. Starting with Measurement Before Committing Capital

Colin Steley, *Founder and Managing Director, Stratcon Power Services Philippines*

Colin described Stratcon's development from an ESCO ambition toward a broader energy-transition services model for commercial and industrial facilities. Drawing on experience in the Philippines, he

argued that long gaps between audits, investment decisions, and implementation can leave projects dependent on snapshots that no longer reflect current facility conditions.

The Step Zero approach

Stratcon's "Step Zero" approach brings continuous power monitoring forward, before major capital is committed. Rather than waiting until an investment-grade audit to begin collecting useful data, a facility can establish a baseline early, identify operating problems, and develop a stronger basis for project design. Longer monitoring periods can also reveal seasonal variation and changes that short surveys miss.

Historical and real-time data presented on an easy-to-use dashboard allow facility managers to identify operational anomalies and performance issues.

Developments in AI make the data easier to understand. Tools are already available to proactively identify issues and notify facility managers, helping them respond before problems persist or escalate.

- Find immediate operational issues, such as phase imbalance or unusual consumption, while longer-term investment options are being developed.
- Build a record of actual energy use and operating conditions so that proposed projects can be sized and assessed using measured data.
- Reduce delays associated with starting data collection late in the project-development process.
- Support measurement and verification and reduce disagreements over the baseline or savings used in performance-based arrangements.

Colin described modular, multi-channel monitoring as a way to collect information across several loads without requiring a separate stand-alone meter for every application. Relevant data can include energy consumption, demand, power factor, harmonics, and other utility or fuel information where suitable devices are installed. The choice of measurements should follow the facility's actual needs.

Making data useful to operators

The speakers emphasized that more data is valuable only when it is reliable and usable. Colin noted that complex BMS installations can be underused when facility staff find them difficult to operate. Simple dashboards, practical alerts, and accessible records can help translate monitoring into action. Poor-quality inputs also limit the value of AI-assisted analysis.

Integration and access were recurring themes. The discussion covered interfaces and communication methods that allow monitoring information to work with building systems and other applications. Robert supported collaboration and the use of relevant data from different providers, subject to client permission and appropriate security. Occupancy information may also inform room use, staffing, and cleaning decisions beyond HVAC.

4. Delivery Models and Investment Decisions

Even when an efficiency opportunity appears attractive, capital budgets can delay implementation. Robert described operating-expenditure and shared-savings arrangements under which the provider can fund equipment and minor modifications and recover costs through an ongoing commercial agreement. He presented this as one way to bring projects forward where owners cannot immediately allocate capital.

Such arrangements depend on a credible estimate of savings and a clear way to demonstrate performance. The discussion linked early monitoring to project scoping, financing, and payment, while recognizing that the suitability of any arrangement depends on the site, contract, and economics. Results from one building do not establish the payback for another.

Working with ESCOs and existing service providers

Dr. Vine encouraged a complementary view of monitoring and ESCO delivery. Robert explained that early operating data can help an ESCO begin with an informed picture of a facility, identify opportunities, and strengthen the financing case. Colin also discussed the need to adapt delivery models to local institutional and financing conditions, including those facing smaller commercial and industrial customers.

The discussion considered aggregation across groups of facilities, such as municipal buildings, universities, schools, and hospitals, as a possible route to scale. Colin suggested that operating and payment information might also help financiers understand customers, but this was presented as a potential application rather than a validated credit-assessment method.

5. Audience Discussion and Q&A

Can the approach work in industrial facilities?

Questions included pharmaceutical operations in Nepal and a security-printing facility with both grid electricity and diesel generation. Colin explained that monitoring is not limited to a single industry. The starting point is to understand the facility's loads, supply sources, and operational risks. Insights into power quality, harmonics, power factor, downtime, and equipment protection also lead to reductions in kilowatt-hours.

Monitoring both grid and generator inputs can also inform decisions about solar and battery systems. The speakers did not present one standard solution for every facility: the appropriate equipment and business case depend on engineering assessment, operating requirements, and local conditions.

How should weather be reflected in savings?

Dr. Vine asked how changes in weather and heating or cooling demand were accounted for. Robert described baseline development and weather regression within an approach based on the International Performance Measurement and Verification Protocol (IPMVP). Appropriate historical data and adjustment are important because a simple year-on-year reduction can reflect weather or other changes as well as an efficiency intervention.

The exchange reinforced that credible measurement and verification is especially important when payments or financing depend on achieved savings. A hot or humid climate does not remove the need for a suitable baseline and transparent comparison. The case-study figures in these notes are the speakers' reported results; the webinar discussion did not provide a full independent review of the underlying calculations.

What about older or specialized buildings?

An audience question concerned a secure government facility with specialized production requirements. Robert emphasized assessing the site first and tailoring the control strategy to its equipment and operating needs. Some buildings require additional dampers, better zoning, or other upgrades; others may not offer an attractive return without more substantial work.

The speakers encouraged coordination with existing engineers, optimization teams, and ESCOs. Combining expertise and data can improve delivery, while a clear understanding of site constraints helps avoid assuming that the same package will work everywhere. The closing discussion returned to sharing practical experience and evidence across the EEAP community.

Key Takeaways

- Begin measurement early. Continuous monitoring before major investment can reveal immediate operating problems and improve the evidence used for audits, project design, and financing.
- Match HVAC operation to actual demand. Occupancy and environmental data can support more responsive controls, provided the building's equipment and integration allow it.
- Measure comfort as well as energy. Indoor conditions, service quality, operator behaviour, and customer requirements are central to successful implementation.
- Use credible baselines and adjustments. Weather and other operating changes need to be considered when assessing savings, particularly in performance-based contracts.
- Design for practical use. Reliable data, accessible dashboards, interoperability, cybersecurity, and staff engagement help turn monitoring into sustained action.
- Tailor delivery to the site. Building condition, industrial requirements, financing, and existing service-provider relationships determine which technical and commercial approach is appropriate.