Hastie Australia

The Contractors Take On Energy Management

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Design & Implementation

- **Design Intent / Requirements**

Key items to note:

- The design needs to be locked down, and match the target energy rating in its philosophy. It is no use trying to target a rating which the philosophy is unlikely to achieve.
- Assess the impacts of post design introduced Green Star initiatives in relation to the energy targets.
- Request the energy model up front and ensure the model clearly defines individual target categories, prior to implementation of the design.
- Ensure the design and associated energy model clearly details the performance requirements of the plant and includes a controls philosophy.

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Design & Implementation

- **Understanding**

Key items to note:

– We need to clearly understand the design intent and modelled system, along with the manner which the system was intended to operate. Without this knowledge we will be unable to refine the design and select appropriate plant suited to the targets.

– We need to ensure that the intended controls strategies are implemented and the overall system control marries up to the modelled philosophy. Diversion from the modelled control logic usually affects the outcome.

– We need to be careful and understand the implications of changes to the design, as changes can run the risk of impacting the outcome in a negative manner.

– We need the controls contractor to understand the design requirements in full and actively adopt the design intent and modelled logic. The adopted logic should be reviewed in detail by the contractor & consultant to ensure compliance and suitability.

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Design & Implementation

- **Construction**

  Key items to note:

  – Adhere to the intent design and the associated energy model, have deviations either checked for suitability or remodel as required.

  – Ensure the intent philosophies and modelled logic are adopted within the installation along with all system components and verification measures to prove the system operation and compliance with the model.

  – Plant selections need to suitable for the application whilst staying within the bounds of the intent and energy model criteria, have alternatives either checked for suitability or remodel as required.

  – The final control logic needs to match the application documentation and retain the logic utilised with the energy model.

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Design & Implementation

- **Tunning & Commissioning**

  Key items to note:

  – **The introduction of quarterly building tunning, via means of Green Star Man-3 is a step in a positive direction when it comes to energy management, not only does it allow us to tune the building to suit the way the building is being operated, but also permits monitoring & tunning to reduce energy consumption.**

  – **Proper building commissioning pays dividends when it comes to overall building operation and energy consumption. Results need to be recorded in a manner which confirms performance.** (This requires time)

  – **It is important to limit the number of logic and or operational changes undertaken at any one time during the tuning process, this allows appropriate assessment of the impact.**

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Plant Selection

- **General**

  Key items to note:

  – There is a fine balance between energy consumption and cost, it is easy to offer a client a cost reduction but often this impacts energy consumption.

  – Be mindful of modelled performance versus selected and their implications.

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Control & Operation

- **General**

Key items to note:

- Check the application documentation against the energy model logic for compliance, and ensure that the logic is adopted into the final installation. (The model logic is the line in the sand)
- Ensure that the controls engineer clearly understands the system design along with the required operating philosophy. The controls engineer needs to interpret the logic correctly when programming the system.
- Try and keep setpoints which may need tuning and or seasonal changes easily accessible and not embedded in the programme logic.
- Design appropriate trending into the system for easy validation of base operational logic. (Engineering of the required trends is not a building operators job, it should be engineered into the system by the project team),

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Control & Operation

- **Metering & Monitoring**

Key items to note:

– Metering and monitoring is one of the most important aspects of energy management, as without an appropriate metering design and a monitoring philosophy, we have no means of justifying the result.

– Ensure that the metering system not only monitors overall energy but monitors energy against the energy model & its target criteria. As often we are involved with the metering of all services, we need to ensure that the metering design is sufficient across all fields. (This process should include the consultant, contractor and controls agent)

– Monitoring does not just mean record the data provided by the energy meters, but needs to include the required calculations to reference directly against the energy model along with separate in-hours and after-hours usage.

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Typical Issues

- **Facility Management & Training**

  Key items to note:

  – The imparting of system knowledge onto facility management is invaluable, but the knowledge must include, design parameters, general system operation & impacts on operation and energy consumption when operated outside the design intent and modelled logic.

  – The key to avoiding operational issues arising from operator influences is training and the provision of appropriate documentation of the systems operation. Often one training session is not enough.

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- **Design / Green Star Influences**

  Key items to note:

  – **Be mindful of Green Star initiatives such outside air improvement and mould prevention, as such initiatives such can have an impact on plant operation, energy and gas consumption.**

  – **It is important to target the correct Green Star points in relation to system type and operational intent.**

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Typical Issues

- **Metering**

  Key items to note:

  – **The most common issue faced, this includes the following:**

  - **A lack of meters, or inadequate switch board circuiting resulting in poor meter grouping.**
  - **No grouping calculations.**
  - **A lack of in-hours / after-hours measurement.**
  - **Calibration and or scale entries within the BMCS.**

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- **Control Logic**

  Key items to note:

  – The most common issue found is the logic programmed into the system does not match the modelled logic, often this is due to interpretation of the required systems operation.

  – Conflicting operation with the requirements of the design.

  – Excessive variables within the logic, and scheduling inconsistencies.

  – Parameters within the BMCS conflicting with those embedded in third party controllers.

  – Calibration and range entry issues within the BMCS associated with interfaced devices.

  – Incorrect setpoints and or dead band entries compared with the design and modelled parameters.

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- **Building Usage & Operator Impacts**

  Key items to note:

  – Alteration to setpoints and dead bands.

  – Extending of operational hours and or over-riding of BMCS points and operations.

  – Over-loading and or under-loading of the occupied space.

  – Lack of maintenance .

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