UNDERSTANDING AND IMPROVING THE PERFORMANCE OF NEW ZEALAND HOMES: A CASE STUDY FROM THE ZERO ENERGY HOUSE

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Conference theme: Sustainability

Sub-themes:

- Measuring sustainability.
- Indicators, metrics, benchmarks and tools to support sustainable decision making by policy makers, designers and owners.
- Demonstrating the cost benefits of sustainable design and behaviour.

Paper aims & objectives:

- To explain the role of performance measurement in the marketing, design, build, and operation of homes.
- To justify investment in performance measurement against the benefits obtained.
- To demonstrate an approach to performance measurement, using the Zero Energy House as a real-world case study.

Most New Zealand homes are built without understanding how they will perform. Many other aspects of our lives, however, are informed by such information. Cars can be selected by fuel efficiency, washing machines by water consumption, televisions by electricity usage, food by calories delivered. For each of these products consumers can make informed choices, but when it comes to our homes – which can be the biggest expense in our lives – we select, design, build, and occupy them with little idea of how they perform.

A small group of homes are incorporating performance as a fundamental requirement. In these homes the objectives communicated to designers and architects are broader than aesthetic or spatial requirements – they include energy and water efficiency, materials selection and thermal performance. Such objectives then underpin the design, specification and build. Following construction, performance can be measured to assess whether the objectives were met, identify areas of the home that may need further attention, and inform the design of future homes.

One of those homes is the Zero Energy House in Auckland. At the outset objectives were established for target temperature ranges, energy generation and consumption levels, and expected volumes of water capture, use, and disposal. During construction forty sensors were embedded in the house to allow reporting against those targets and understanding of the performance of integrated systems.

While the most visible outcome may be the data demonstrating performance once the house is occupied, the key to building such a house is the establishment of performance objectives before design even begins. These are what ultimately achieve the outcomes the house is seeing today, deliver the type of home environment envisaged and desired by the homeowner, and develop a knowledge base to inform industry practice and housing policy.

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