

# Improving the performance of New Zealand homes

A case study from the Zero Energy House

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# Background

- Zero Energy means the house generates as much energy as we use
- First NZ project to achieve Living Building Challenge net-zero certification
- Three year communications program documenting design, construction and operation at [zeroenergyhouse.co.nz](http://zeroenergyhouse.co.nz)



# Current performance of NZ homes



## Build to code

Minimum standard of construction  
with inferred performance

People do not understand how their  
house will perform



## Build to a rating

Higher standards of construction with  
inferred performance

People expect their homes  
will perform 'better'

People seek good housing outcomes but performance standards are not clear

# An emerging customer

- Early adopters, innovators
- It is not enough for their home to be 'affordable', 'sustainable' or rated
- They seek the same housing outcomes but achieve them through setting objectives for:
  - Affordability
  - Comfort & health
  - Environmental impact
  - In addition to spatial and aesthetic preferences

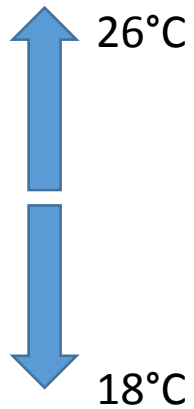
# How the process changes

Examples from the Zero Energy House...

# Thermal performance

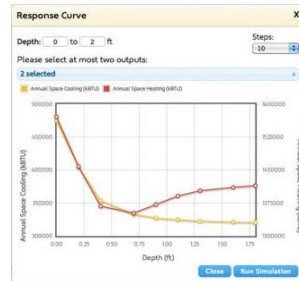
## Objectives

- Minimum & maximum temperature range



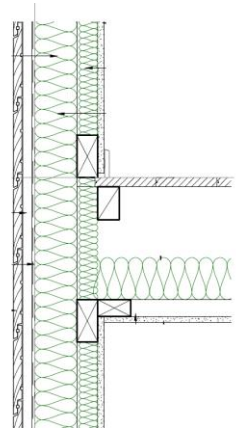
## Design

- Thermal modelling of building envelope



## Specification

- Framing delivers thermal performance



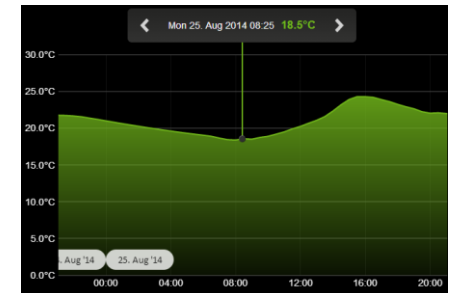
## Build

- Insulation installation checked to ensure performance



## Occupation

- Performance data captured against project objectives



# Energy generation

## Objectives

- Energy generation matches or exceeds consumption

## Design

- Building shape and placement on site influenced by solar needs



## Specification

- Solar array size and configuration

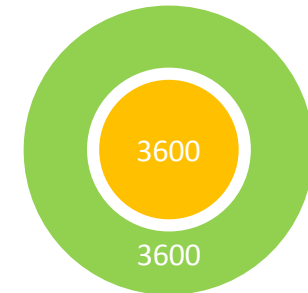
## Build

- Performance monitoring system embedded into energy systems



## Occupation

- Performance data captured against project objectives



# Water

## Objectives

- Reduce water usage and cost

## Design

- Collection and reuse systems

## Specification

- Selection of fittings for efficiency and function

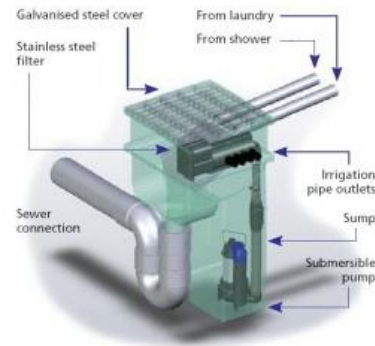
## Build

- Performance monitoring system embedded into water systems

## Occupation

- Performance data captured against project objectives

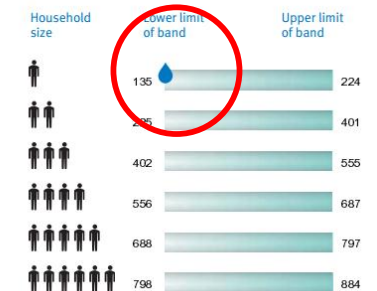
50%  
Rain



## Usage comparison

Average daily consumption in litres per day\*

• The droplet shows you where your household falls





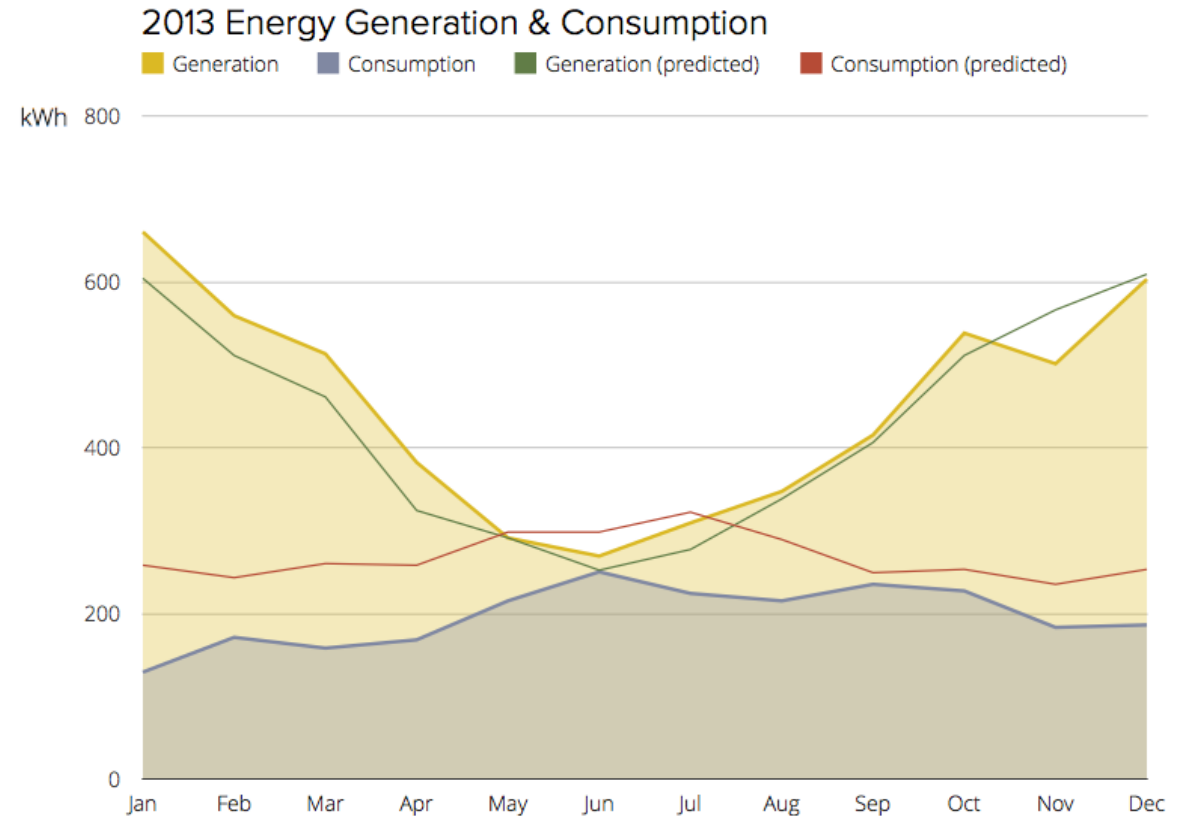
# What are the outcomes?

## For us:

- **Performance.** Results assured by accountability throughout the process
- **Satisfaction.** Performance matches individual priorities
- **Marketing.** The house can be sold based on expected future costs based on historic performance data

## For others:

- **Learning.** Data collected informs future design and proves product performance
- **Education & inspiration.** Real-time online data allows the public to see how the house performs over the year



# Industry opportunities

## Meeting growing demand:

- **Performance.** Higher performing housing *areas*
- **Satisfaction.** Healthier, financially resilient communities
- **Marketing.** Customers select houses that suit their long-term requirements

## Raising the bar:

- **Learning.** Real-time data on thousands of homes
- **Education & inspiration.** A role to play in high-performing homes leading by example and sharing design for others to use

