Design Journey to Passive House Premium

A CLIENT PERSPECTIVE – JOURNEY OF LEARNING FOR THE CLIENT AND DESIGN JOURNEY FOR NEW ZEALAND AND AUSTRALASIA'S FIRST PASSIVHAUS PREMIUM DESIGN

INTRODUCTION AND WELCOME

Formalities

- From Yorkshire, England
- Not sure if that's in Europe
- Live in Hawea Flat, New Zealand
- Client not the Designer, Builder or Supplier
- Accountant and ICT Professional
- First Home Build
- Talk about the parallel journeys of learning and construction of our new home

TIP: KEEP THI'SEN CALM THA'S FROM YORKSHIRE

Build in Energy Efficiency rather than just bolt on solar

The Beginning – Solar Energy

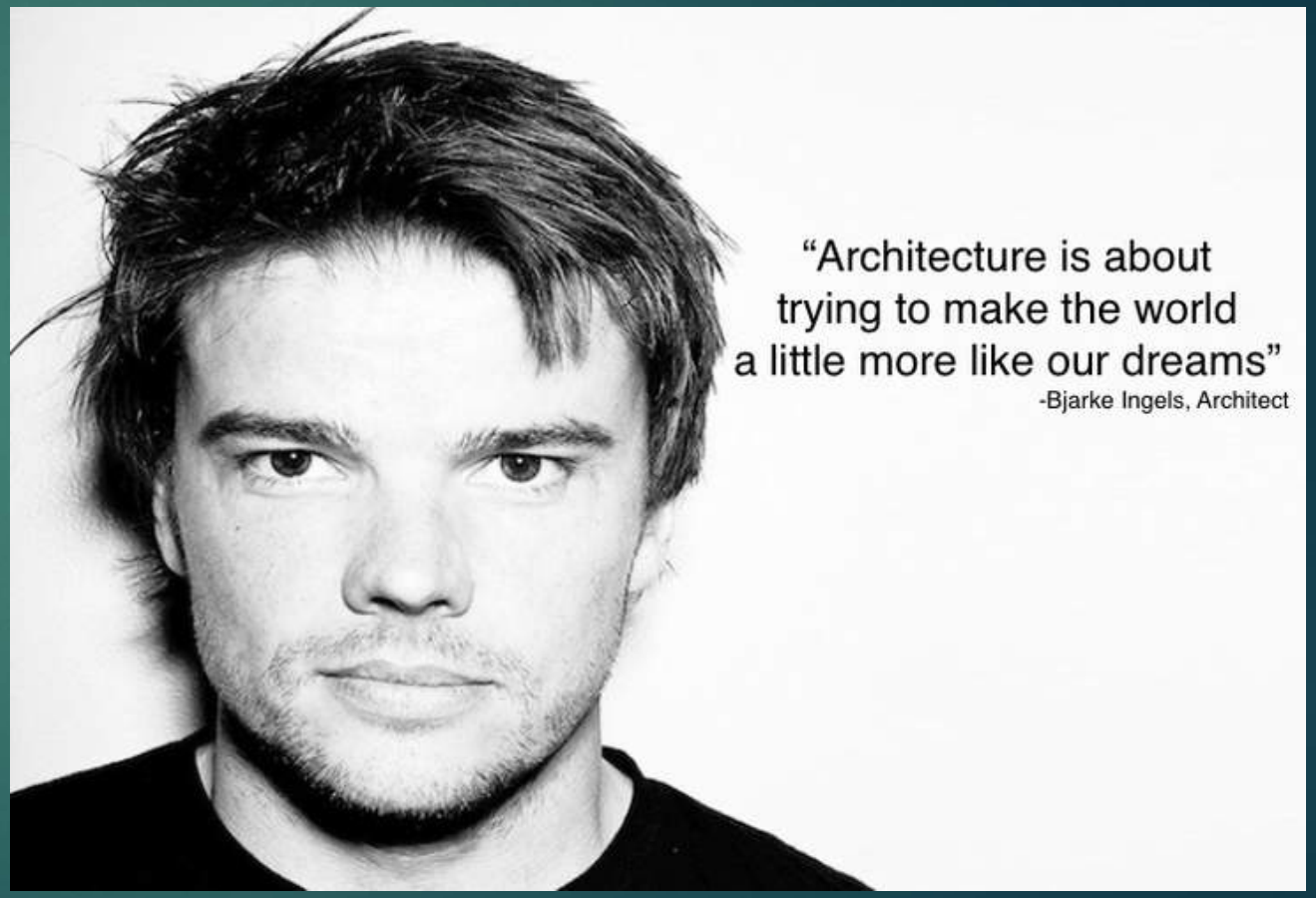
- Background in Electricity Sector and Solar Energy
- Opportunity to Sub-Divide and Build New
- "Knowing what I know now, I would build the next house differently"…common experience
- Do It Right First Time

TIP: REDUCE ENERGY DEMAND

What do architects do?

Architects and PassivHaus Designers

- Background research
- Attend 2016 South Pacific PassivHaus Conference in Christchurch
- Commence MSc in Architectural Technology and Design, Leeds Beckett University
- PassivHaus Classic, Plus and Premium



Tip: ENGAGE IN THE DESIGN PROCESS

Who would you trust? Why PassivHaus?

A Question of Confidence

- Output not input based
- Proven not guess work
- Optimised not maximised investment
- Predictive not reactive
- Data not politically driven
- Credible (GERMAN)

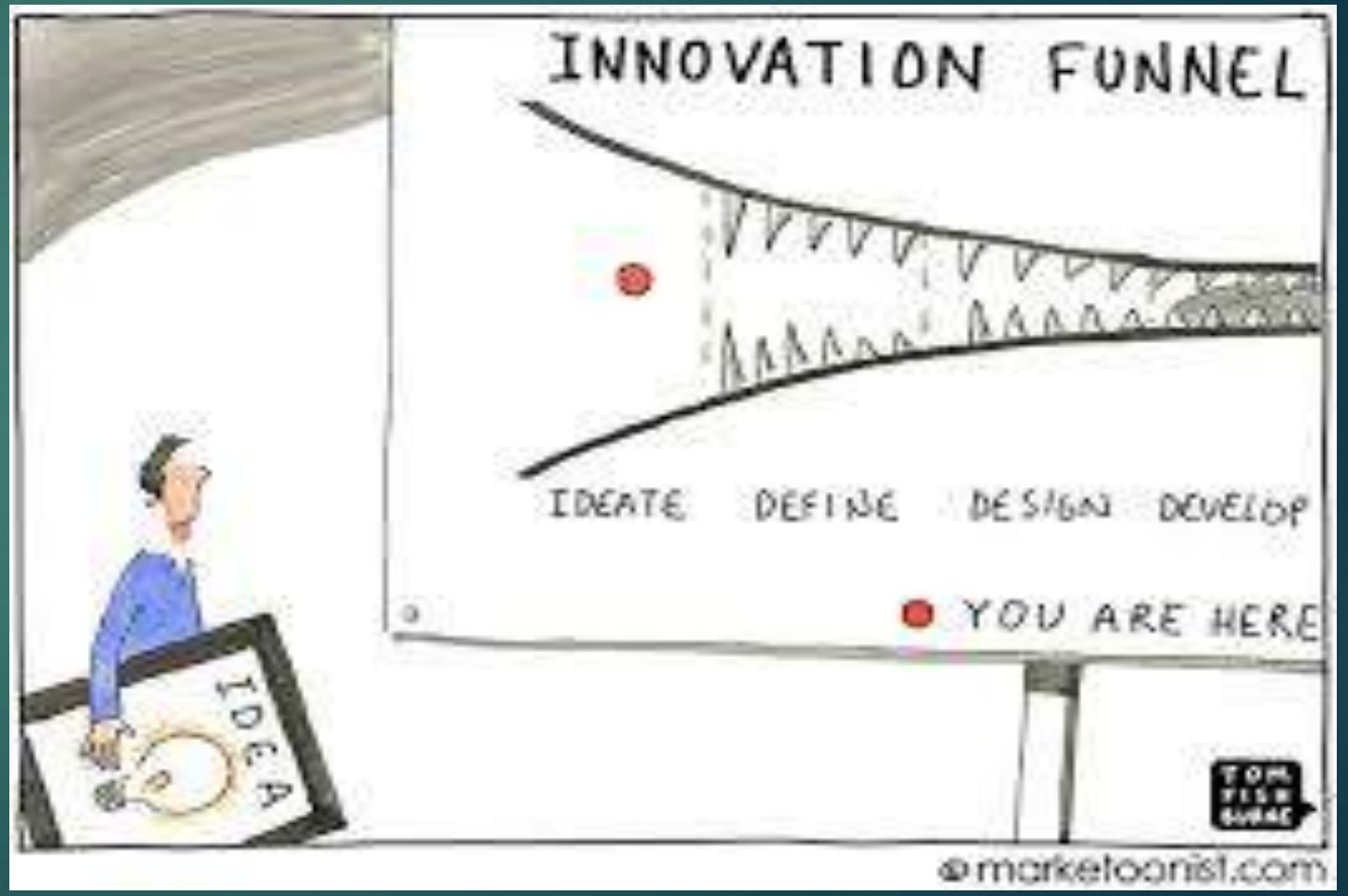
TIP: COMMIT TO PASSIVHAUS CERTIFICATION NOT PRINCIPLES

How to be Creative?

For an Accountant it's good to have a process and use Pinterest

- Background: marketing is all about idea generation
- Brainstorming: no idea is a bad idea
- **K**eep **I**t **S**imple **S**tupid (KISS)
- **D**efer **A**ll **D**etail (DAD)
- Explore a number of different design concepts rather than iterate one

Tip: USE A CREATIVE PROCESS THAT WORKS FOR YOU



Use the Simple Stick

Insanely Simple: The Obsession That Drives Apple's Success (Book by Ken Segall)

- "Ken Segall has literally captured lightning in a bottle. *Insanely Simple* reveals the secret of Steve Job's success with such clarity, even worse we non-geniuses can make use of it. Ken shows us how to cut through the cobwebs of fuzzy thinking, bureaucracy and mediocrity, and clearly see what's essential – and therefore most important" by Steve Hayden

TIP: KEEP BOTH DETAIL AND CONCEPT SIMPLE

Inspiration – Renovated Barn

Cat Hill Barn (UK) by Snook Architects

Cat Hill Barn
Sheffield [2008-2012]

Cat Hill Barn is a beautiful grade II listed barn built in the late 16th century, sitting in the rolling hills of Yorkshire. Despite a difficult process with the local planning officer Snook won planning permission on appeal. Key in winning the support of the appeal officer was the restrained aesthetic of the scheme which deliberately avoided being too domestic in appearance.

It delivered a flowing open plan internal space that avoided compartmentalisation and opened up to reveal the splendour and scale of the original barn and its trusses. Snook completed the scheme in 2012 and subsequently received two nominations in the 2013 RIBA awards in the regional category and small projects. Snook won in both categories.

2013 Regional Award Winner
Best Small Project
Cat Hill Barn

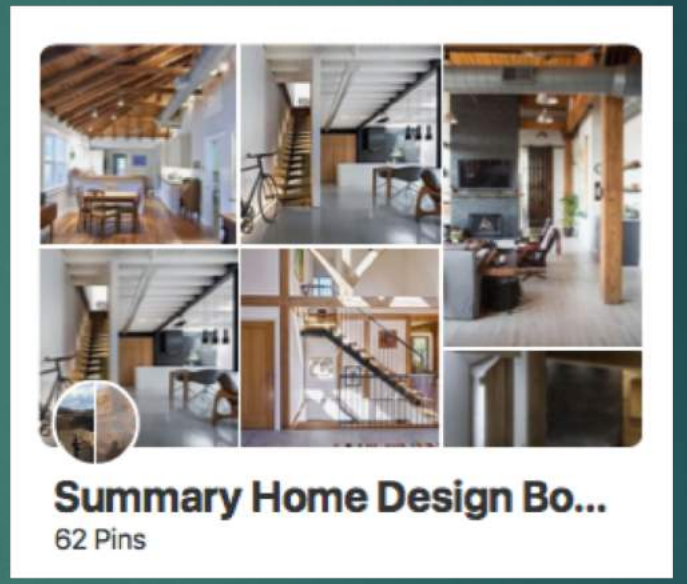
RIBA

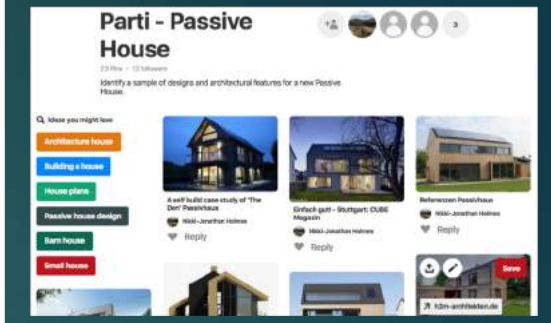
Tip: Use natural materials, relate to the typology and link to UK

How to be Creative?

Architecture Short Course: How to Develop a Design Concept – 30x40 Workshop by American Architect

- Use of Pinterest
- Add notes to images
- Add, add, add then rationalise
- Share summary with the Designer





Tip: EXPLORE FUNDAMENTALLY DIFFERENT CONCEPTS

GOING PREMIUM?

The energy demand is limited to just 30 kWh/(m²a), with at least 120 kWh/(m²a) of energy being generated by the building

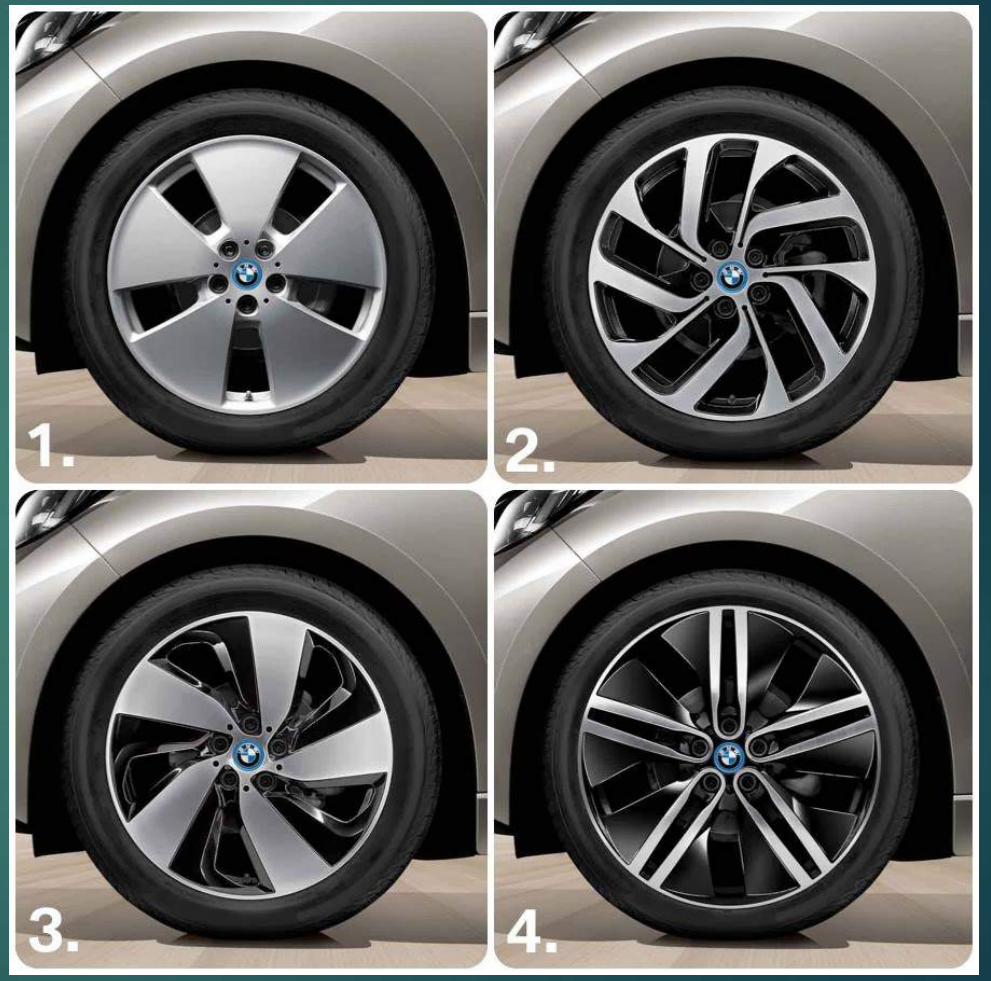
- Motivate the project team
- Do your Best
- Supposed to be Hard
- Be the First in New Zealand
- Energy Efficiency and Renewable Energy Generation

Tip: IT'S MORE SATISFYING DOING THE FULL RATHER THAN THE HALF

TEAM WORK – INTEGRATED DESIGN

The result is better with team work

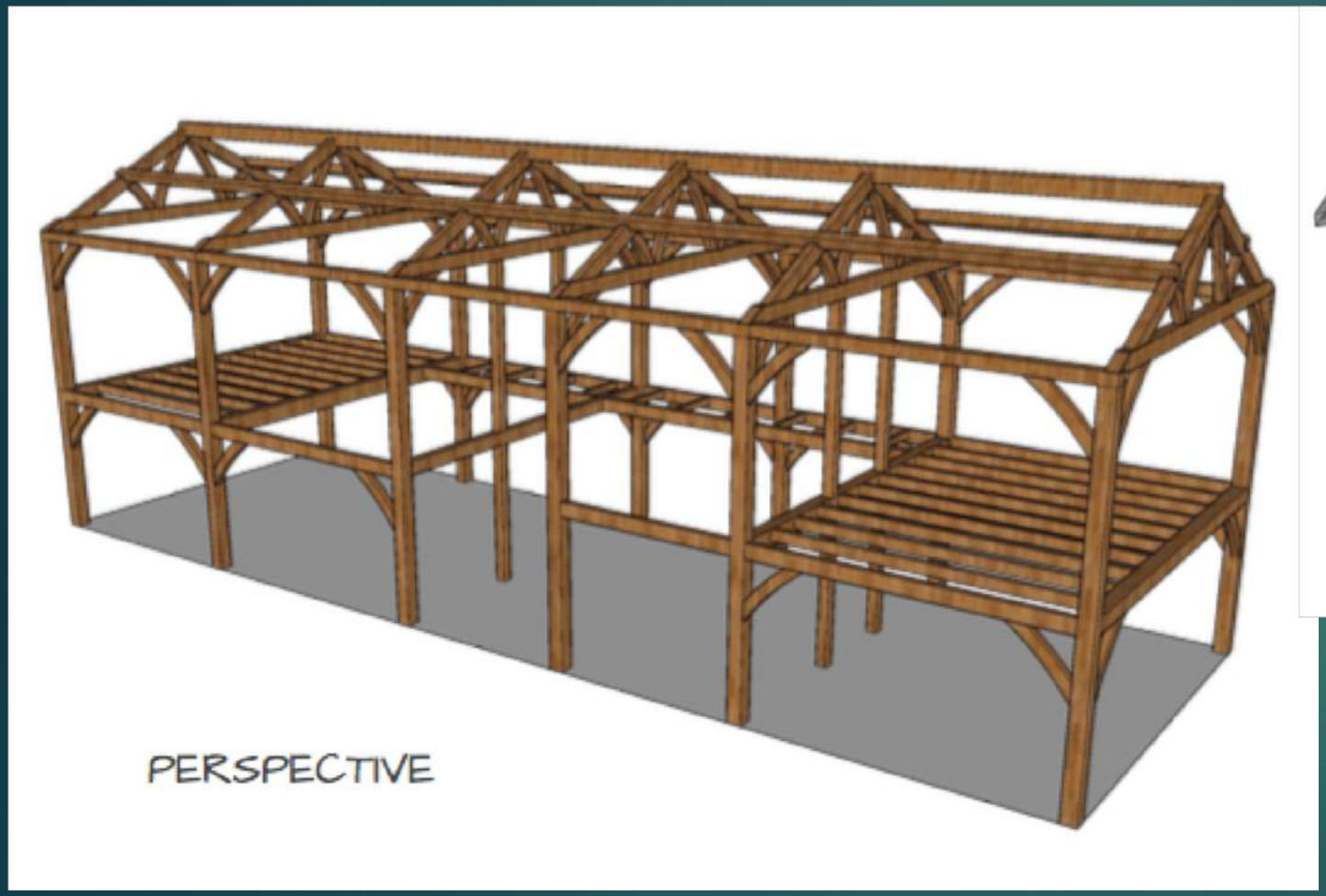
- Team approach rather than hierarchical
- You're not on your own
- Everyone is happy to help
- Talk to suppliers and build relationships
- Fun and Involving
- You learn stuff

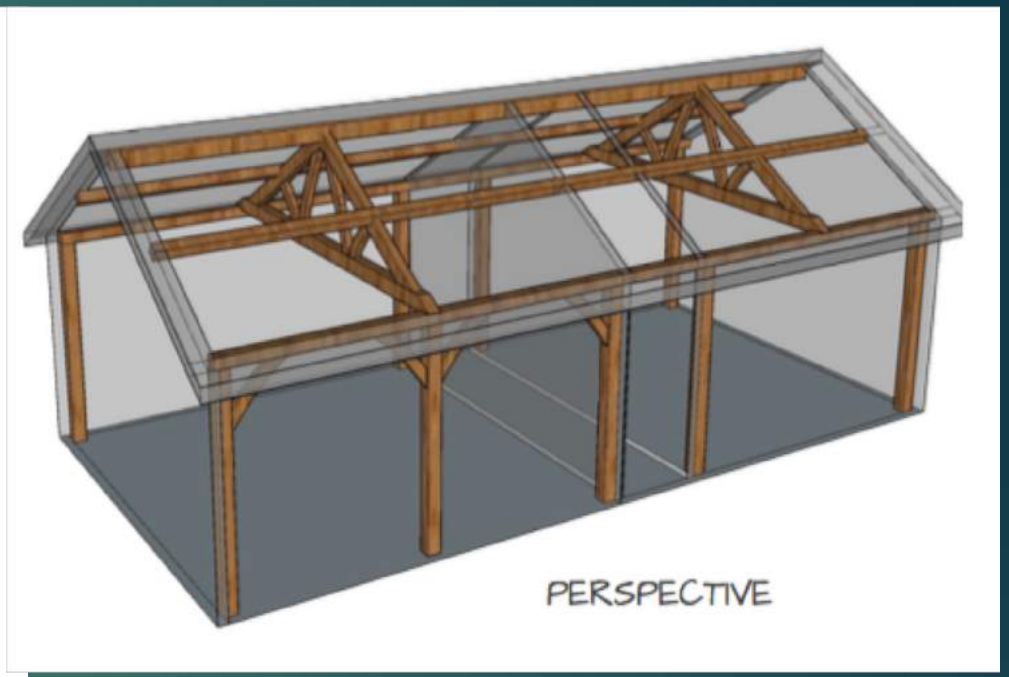


Tip: Project centric with everyone vested in the outcome

Working with Suppliers – More Oak?

Exposed Interior Oak Framing by Timberworks NZ





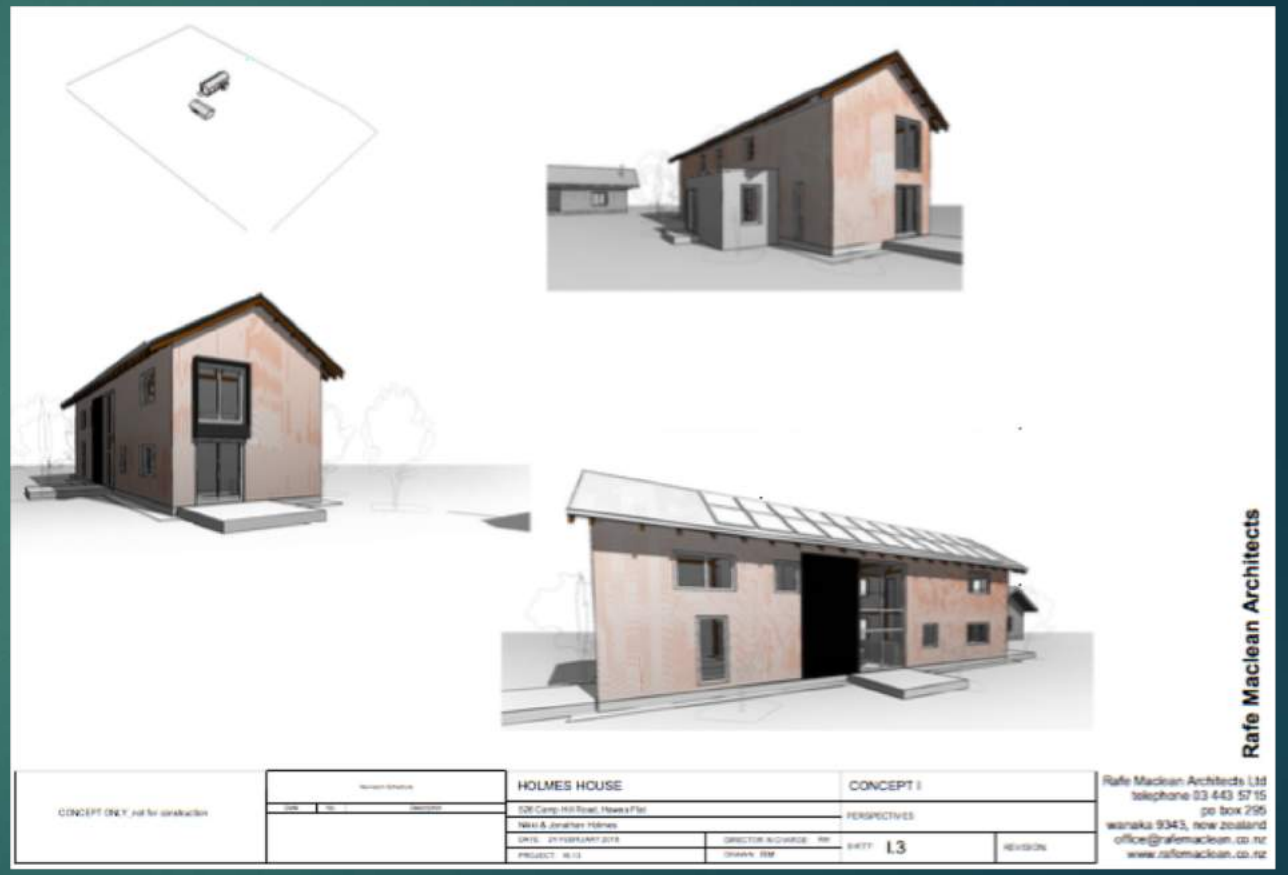
TIMBER WORKS
Handcrafted Timber Spaces

Tip: GIVE THE SUPPLIERS THE OPPORTUNITY TO SHOW WHAT THEY CAN DO

SO WHAT'S THE HOUSE LIKE

On the Outside

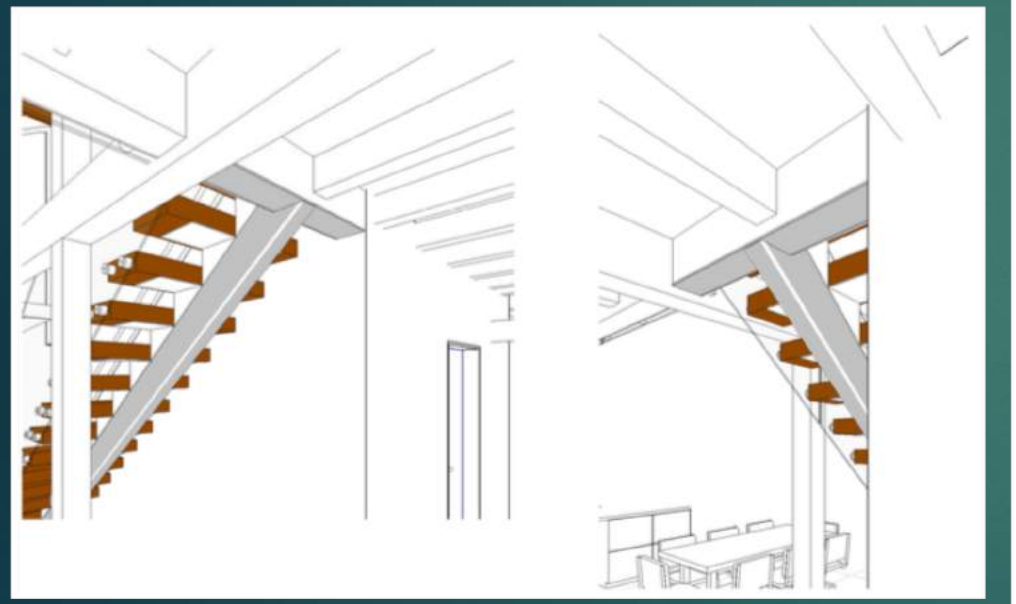
- Simple Rectangle
- Additions not PassivHaus, i.e. Porch and Carport
- Common suppliers and building components between buildings
- Simple Layout
- Converted Barn Residence Style
- Reduce variability, e.g. windows and doors



Tip: GET SAMPLES FOR ALL MATERIALS

SO WHAT'S THE HOUSE LIKE

and on the inside



PHPP MODELLING

The Performance Numbers from Jason Quinn

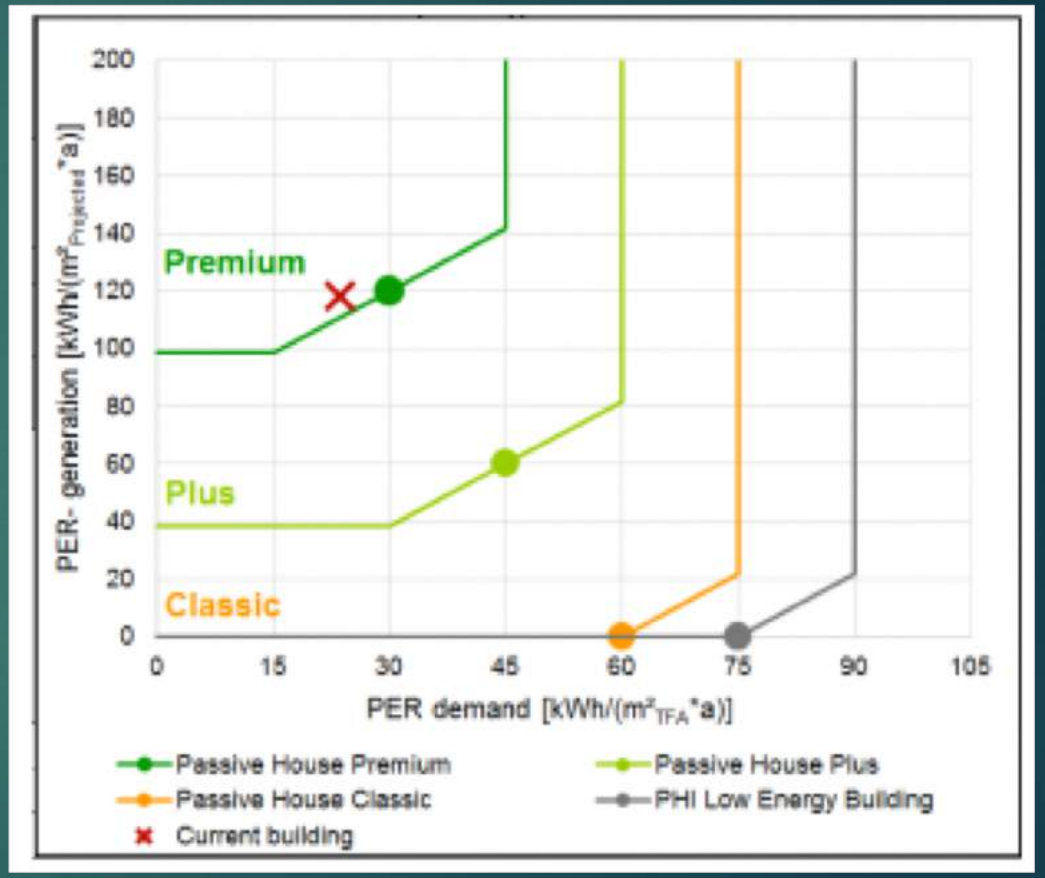
Passive House Metrics

Heating Demand	**Heating Load**
12.7 kWh/m²/year	12.5 W/m²
Cooling Demand	**Cooling Load**
9 kWh/m²/year	9 W/m²
TFA	**Form Factor**
163.6 m²	3.2
Air leakage @ 50Pa	**PER demand**
0.6 ACH	24 kWh/m²/year
Renewable Energy Generation	
118 kWh/m²/year	

Under construction - these numbers are not yet certified

Construction Details Average Values

U-value External Walls 0.15 W/(m²K)	140mm NZSIP / 45mm TerraLana Service Cavity
U-value Floor 0.21 W/(m²K)	Timber flooring / 60mm XPS / 100mm Slab / 60mm XPS
U-value Roof 0.12 W/(m²K)	190mm NZSIP / 45mm TerraLana Service Cavity
U-value Glass 0.52 W/(m²K)	Silverstar EN2plus (4:/20/4/20/:4 90% Ar)
U-Windows 0.79 W/(m²K)	ThermaDura Designline 90 Passive
Ventilation Efficiency 77.3%	Zehnder Comfoair Q450



After initial starting point insulation was removed from foundations and glazing added on South Elevation for cooling effect.

Tip: ADD MORE RENEWABLES AND EXTERNAL SHADING

ACHIEVING PREMIUM AND COST

- Mitsubishi HyperCore Heat Pump rather than panel heater
- LonGi, ArtSign and SMA 10kw solar system
- Wagner Solar EcoShower Waste Water Heat Recovery systems
- Client designed Kitchen, Bathroom, Laundry, Data Network and Solar System
- Direct Import from Germany: Oak and Siberian Larch
- Direct Import from UK, China and Netherlands: IKEA furniture, MyEnergi EV Charger, Lights, Solar and Internal Doors
- Great NZ Suppliers give you Great Prices

Tip: IF IT'S EXPENSIVE IMPORT IT FOR THIRD TO HALF THE PRICE

LEARNING JOURNEY CONTINUES

Living Building Challenge and Sustainable Construction

- We're at ONE MINUTE TO MIDNIGHT on Climate Change
- HOMESTAR, etc prevents deep retrofits and is just not sufficient anymore
- Some building materials are insanely hazardous and will kill you

"Ethically unacceptable to ignore the challenge of global warming."

Royal Institute of British Architects (RIBA)

Tip: Elrond Standard = PassivHaus + Low Embodied Energy + Non-toxic https://www.treehugger.com/green-architecture/energy-efficiency-isnt-enough-anymore.html

DESIGN JOURNEY CONTINUES

Reduce risk of overheating and Selection of Building Materials

- Roma External Venetian Blinds to be added to Glass Curtain Wall and West Glazing Elements
  - Reduces percentage overheating to 5% from 17% (without using the heat pump)
- Adding additional Solar Panel
  - ArtSign Racking – total 30 not 29
- Selecting DECLARE (non-RED LIST) building materials

Tip: IT'S NOT OVER UNTIL IT'S OVER

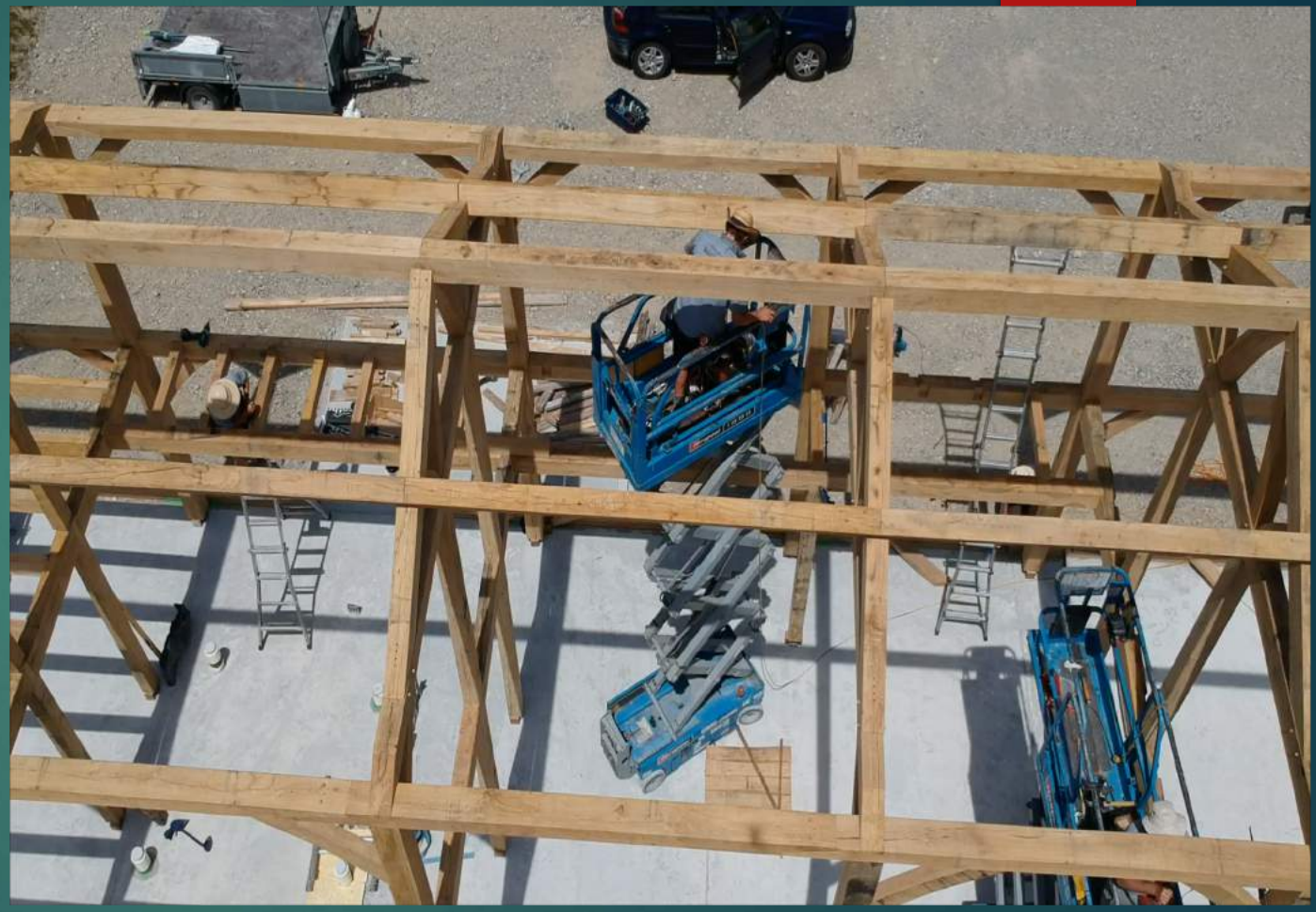

LAROS
TECHNOLOGIES
HALSWELL TIMBER
Your Timber Yard
STIEBEL ELTRON
Technik zum Wohlfühlen
CARPENTER
SØKTAS
ALBA
SMA
ARTSIGN
CENTRAL LAKES
ENGINEERING
plumbingworld
Quality check and
certification by:
Passive House
rothoblaas
LONGi
dmlights
Jacobsen
Expertise from the floor up
IKEA
backhouse
LIVING. WOOD. IDEAS.

Question Time

"The beautiful thought is the fact that this building will not only stand up and be comfortable for the next 200 years, but it will also stay totally healthy throughout its life as no dew-point is being shifted into the interstitial part of the building fabric when constructed to building physics knowledge embedded in the Passivhaus standard. A truly long-term achievement, looking after many, many generations of inhabitants to come."

Dr Andreas Luzzi LAROS TECHNOLOGIES

Thank You



Follow the Build on:

HaweaFlatPassivHaus