SOUTH PACIFIC PASSIVE HOUSE 15

CONFERENCE & TRADE SHOW

Auckland, 14-15 February

Conference Programme

Nau mai, haere mai!

Welcome to the first ever Passive House conference in the Southern Hemisphere!
By now Passive Houses are proven to work in all of New Zealand's climate zones – as was to be expected based on the experience with them from Antarctica to Qatar. Over in Australia, there is likewise a steady increase of Certified Passive House numbers – in climates far more challenging than ours.
Furthermore, Passive Houses are not confined to residential buildings: all buildings where people can dwell have been built to the Passive House standard, and are performing as you expect of a Passive House: exceptionally well. While I hail from Germany, it pains me to read about the “German” Passive House standard. We are not referring to the German motorbike, the German helicopter or the German Christmas tree – although all of these originate from Germany. Germany has never claimed Passive House. It is a universally applicable standard – lets make it ours!

I wish you all an inspiring conference with many a good conversation!

Noho ora mai
Dr Kara Rosemeier - Passive House Institute New Zealand

FOOD

will be available during the breaks in the courtyard area (see plans on the back); should the weather be inclement, an alternative indoor location will be provided.

INTERNET

free Wifi is available during the conference.
Please connect to *Unitec-Hotspot* and once connected, start your browser. A login screen will come up.
Username: *temp5851*
Password: *temp5851*

Saturday 14 Feb

9:00	Welcome	*Dr Kara Rosemeier*
9:15	Keynote: Alta California, Aotearoa and an Amazonian dream of Passive House	*Bronwyn Barry*
10:00	Passive beyond the House	*Elrond Burrell*
10:45	Morning tea	
11:15	Affordable certified climate files - process used in New Zealand	*Jason Quinn*
12:00	Homes for living in: feedback from residents	*Mark Siddall*
12:45	Lunch	
14:15	Isn't pretty good, good enough? Why go the extra mile for Passive House?	*Nick Grant*
15:00	The benefits of panelised prefabrication in Passive Houses	*Glenn Murdoch*
15:45	Afternoon tea	
16:15	A Passive House in Antarctica - report from Princess Elisabeth station	*Johnny Gaelens*
17:00	Gala dinner cruise Please go to main entrance and board the taxis	

Sunday 15 Feb

9:00	Welcome	*Glenn Murdoch*
9:15	Passive House: Design it to be expensive and it will be!	*Nick Grant*
10:00	The New Zealand Passive House experience - observations of three homes	*Jon Iliffe*
10:45	Morning tea	
11:15	Optimizing windows for Passive House	*Bronwyn Barry*
12:00	Airtightness: the future of housing	*Elrond Burrell*
12:45	Lunch	
14:15	Panel presentation	*Visiting experts*
15:00	Designing for Resilience: iDEAL House Auckland	*Paula Hugens*
15:45	Afternoon tea	
16:15	Panelised Prefabrication: key to high quality and affordable Passive Housing	*Johann Betz*
17:00	Awards ceremony and closing	*Dr Kara Rosemeier*

Download conference papers at www.phinz.org.nz/spphc-papers

Motion-sickness warning: We will take a roller-coaster ride across the Pacific to deliver a Valentine to Auckland from San Francisco. I will include some practical advice, based on my humble experience in California, on 'how to' build more Passive House projects. This keynote will not include one single image of a polar bear stranded on an ice floe, nor any images of the melting polar ice caps. The 'Amazonian' bit will come at the end. It will be a surprise for everyone, including myself.

Bronwyn Barry, is a Certfied Passve House Desiger, Passive House California Board Member, and Co-President of the North American Passive House Network.

The Passive House standard is often thought of being a standard for primarily for single-family residences. And this is where most architects first start implementing it. Architype is different to this – among the collection of Architype's completed Passive House projects, there is not one single-family residence yet.
As a medium sized architectural practice in the UK (~50 technical staff currently), Architype undertakes projects across a wide range of sectors. The practice does not specialise in a single sector, although it does have particular strengths in education and housing. Instead, Architype specialises in integrated sustainable design and brings this to the design process of every project.
After more than 20 years in practice at the forefront of sustainable design, Architype invested in several years of post-occupation evaluation (POE) and building performance evaluation (BPE) research in partnership with Oxford Brookes University. This resulted in direct feedback of what was and wasn't successful about the sustainable design strategies that had been implemented across ten projects – some current and some from several years earlier. One of the both powerful and painful lessons learnt was that there was still a significant gap between predicted and measured energy performance and occupant comfort.

This led Architype to reflect on the question of how to solve this issue. The answer arrived at was Passive House.
From this point in 2009 onwards, Architype have been working towards every Architype project being a Passive House project. Currently Passive House projects make up around 40 – 50% of the practice's work.
This presentation will share the process of getting to the decision to adopt Passive House on all projects and illustrate seven key Passive House projects by Architype: a public library, a primary school, a multi-family housing project, a church, an archive and records centre, a university facility and a 150 house village addition.

Not having existing certified Passive House Planning Package (PHPP) climate data is a significant obstacle to the growth of Passive House (PH) design. Certified local PH climate data is needed to confidently design a cost effective PH; otherwise there is a risk of significant over-design.

To remove this barrier to the uptake of PH design, Passive House Institute New Zealand is sponsoring the development of regional certified climate files for the whole of New Zealand. This paper explains the process used to develop and check these files and discusses the lessons learnt.

The process made use of NIWA hourly typical meteorological year (TMY) weather data files for New Zealand. All weather stations in New Zealand with 30 or more years of temperature data were checked to ensure they were adequately bounded by the proposed regional weather file[??] for a tolerance agreed with Passive House Institute (PHI). The checked zones and NIWA TMY files were provided to PHI for a final quality check and calculation of the heating and cooling loads using their DYNBIL hourly simulation code.

This collaborative approach meant that New Zealand climate files are available much faster and at significantly less cost compared to having PHI undertaking the entire project. This process, could be used to produce local certified climate files in other countries.

Why go the extra mile for Passive House?
Whilst some detractors suggest that Passive House does not go far enough and should give way to active house or net zero, others point to diminishing returns and the low cost of photovoltaic to offset emissions. Nick will use his own pretty good house as an example to illustrate why he wishes he had known about Passive House when he built it and why he thinks that the Passive House energy targets are about right for most climates.

"In buildings people are the best measuring instruments, they are just harder to calibrate."
- Gary Raw, UK Director of the Centre for Safety, Health and Environment

Within the UK there has been scepticism about whether Passive House buildings can offer high standards of comfort and occupant satisfaction. In 2013 a survey was undertaken in order to develop a better understanding as to whether or not this scepticism is warranted. Later in 2014 a second survey was undertaken with a smaller group of residents from the same development.

The project examined suggests that homes built to the Passive House standard can address many of the concerns that have been raised, however, issues such as overheating risk may require even closer examination during the design process.

Hot Dishes

Root vegetable tagine
Curried potato, chickpea & lentil burgers
Cauliflower, macaroni & mushroom croquettes
Mushroom, spinach & tofu lasagne
Tofu korma on coconut rice
Paella

Salads

Rocket salad with pear, “blue cheese”, toasted walnuts & raspberry vincotto
Baby spinach, avocado, red pepper & sweet potato salad with sweet chilli dressing
Raw salad – shredded beetroot, carrot, cabbage, capsicum, sprouts & peas
Baby gems, mushroom, apple & celery
Garlic beans & almond flakes
Roast pumpkin, Puy lentil, beetroot, tempeh & watercress salad
Spiced brown lentil & rice salad with chilli, peanuts & coriander
Balsamic red onion couscous with preserved lemon, carrots, almonds & currants

Sweets

Tofu cheesecake with summer berries
Cinnamon sugar donuts, chilli chocolate sauce
Peanut butter chocolate fudge
Nutty crunch slice (gf)
Orange almond slice (gf)

hsc hamish stewart catering™

Talk 6 **The benefits of panelised prefabrication in Passive Houses**

Glenn Murdoch

Can the benefits of prefabricated panelisation, like increased quality, speed and accuracy, be experienced when building Passive Houses in New Zealand?
Our experience from the first projects indicates that with quality materials, proper planning and clear communication, these expectations are being met; as a further critical bonus, the increased protection of the structure from the elements during construction emerged.

The experience also shows that consenting authorities are very supportive of the prefabricated approach but require careful processes, controls and documentation.

My presentation will highlight the benefits from the first projects, touch on New Zealand specifics, and also discuss learning points in the journey.

Talk 7 **A Passive House in Antarctica**

Johnny Gaelan

We are going live to the Belgian Princess Elisabeth Station in Antarctica to learn about building and living in a Passive House in an exceptionally challenging environment.

Talk 8 **Passive House: design it to be expensive and it will be**

Nick Grant

Passive House buildings are by necessity built to a high standard with high performance windows and mechanical ventilation. All these things can be expected to add cost. And yet many designers claim to have delivered Passive House buildings for the same or less than the non-passive-house buildings that were proposed as alternatives. How can that be possible?

Nick will explore this apparent paradox with some examples that he has worked on. His suggestion is that we should consider energy efficiency as a set of design constraints to inspire creative solutions rather than as a set of expensive add ons. However this raises the question, how low does the budget have to be for Passive House to be impossible?

Nick teaches Passive House building science for the CEPH examination and is a regular contributor at the International Passive House conference. But at heart he is a practical engineer and self builder. He is also inherently lazy and so is very motivated to find ways to achieve as much as possible for least effort and that is why he is attracted to the Passive House approach.

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Talk 9 **Optimizing windows for Passive House**

Bronwyn Barry

Window selection and installation detailing are arguably some of the most complex and time-consuming items in the Passive House design and construction process. This presentation will give a comparative overview of options, starting with your choice of window design. We will then look at the installation process and outline which details matter most, and how they affect your building performance. Bronwyn will review the comfort and performance specific guidelines recommended for South Pacific climates by the Passive House Institute. She will close with a few observations on recent window installations and details she is excited about or intrigued by.

Image source: Hella.info, Balance Project (www.needsbased.com) and author's own photo of project

In 2010 there were no Passive House buildings in New Zealand, our newly formed company was keen to change this but we did not want to tell others about the amazing performance and comfort that a Passive House building might offer until this could be substantiated with local evidence based data. We also wanted to determine how feasible it was to build a home designed using a European energy standard in our local situation. In view of this we designed and built the first home with the aim of conducting a controlled experiment. We would install temperature, humidity and electricity monitoring to gather data and then compare this to the predicted performance. A secondary part of the experiment was to understand and “feel” the Passive House difference for ourselves.

The results of the first home confirmed that the Passive House standard when applied to our local climate and conditions produced predictable results in line with the PHPP spreadsheet. The living experience also confirmed that both comfort and energy savings in line with the European claims with winter internal temperatures of 20+ maintained with minimal heating requirements.

Following on from this first experience our family has had the opportunity of living in two other newly constructed Passive Houses. The three house designs were quite different so it was interesting to understand the physical impact that the different designs had on the living experiences and the predicted performance in the PHPP.

In the second home we have found the PHPP to be an accurate tool that is able to predict the future performance and comfort of our buildings. We have also recognised from the experience that the flexibility in the design process, that the use of the PHPP offers, can produce results that meet the standard but are not as desirable for our own comfort.

The third house is now our family home. Through the design process we have applied Passive House principles the most stringently of the three projects. We have started monitoring the house this year and although it is very early days the results again are looking in line with the expectations set by the PHPP.

What role does airtightness play in the future of housing?

Elrond Burrell will introduce the 34-minute documentary 'The Future of Housing – And How Airtightness Can Help' and then the conference will host the New Zealand première screening. Following the screening, Elrond Burrell will take questions and answers and lead a short discussion.

The documentary was produced in 2014 by Ben Adam-Smith, who runs the House Planning Help website and podcast. Ben is the presenter in the documentary and wants to build a decent new home for his family. We follow him as he learns about the importance of airtightness while doing his research. Featured in the film are:

- UK air testing expert Paul Jennings
- "The Gunge Brothers"
- 'Cropthorne Autonomous House' owner Mike Coe (this is probably the UK's most energy efficient Passive House to date)
- A nine year old typical developer house
- A typical 1950s suburban house
- Academics and professionals
- A site of a proposed co-housing development
- Ashley Vale, a group self build scheme in Bristol

Wider issues such as climate change, global population, corporate domination of the housing market and access to land are also explored along the way. The success and benefits of the Passive House standard get highlighted, contrasting with what typically gets built in the UK.

The visiting experts are available to discuss any question about Passive House you may have.

Ask

Bronwyn Barry

Elrond Burrell

Nick Grant

and

Mark Siddall

anything, as long as it relates to Passive Houses.

Notes

Paula Hugens
Denise Henkenhaf

The iDEAL house is a private family home, located in suburban Auckland and due for completion in October 2014. The design brief by the client, asked for a highly energy efficient and net zero energy home within a modest budget, whilst maintaining a high level of indoor environmental quality.

Outstanding thermal performance of the building envelope was essential to achieving the aspirations of this brief. In order to safeguard the performance targets, the project underwent Passive House Certification (pending). A far more detailed analysis was undertaken than would normally occur for a family home. Interstitial condensation, mould and structural decay issues were particular concerns that were evaluated and addressed. This paper will discuss the results of this analysis, and the hygrothermal performance of the building envelope that can subsequently be expected.

Results were obtained using the following analytic tools:

• Passive House Planning Package (PHPP) , for Passive House Certification, to ensure compliance with the Passive House performance targets;

• Wärme und Feuchte Instationär (WUFI®) for calculation of the transient coupled heat and moisture transport in multi-layer building components exposed to natural indoor and outdoor environment.

• Psi-Therm for the calculation of thermal bridging coefficients to limit the additional heat loss, as well as assessing resulting interior surface temperatures, to prevent discomfort and surface condensation throughout the building.

• On site Blower Door testing for airtightness of the building envelope.

Measures and construction details that were identified to meet the performance targets are presented, also with regard to their fit with the requirements of the New Zealand Building Code Clauses and the budget constraints of the project. This paper will demonstrate that an aspirational brief can be answered with limited additional cost when proper design strategies are employed.

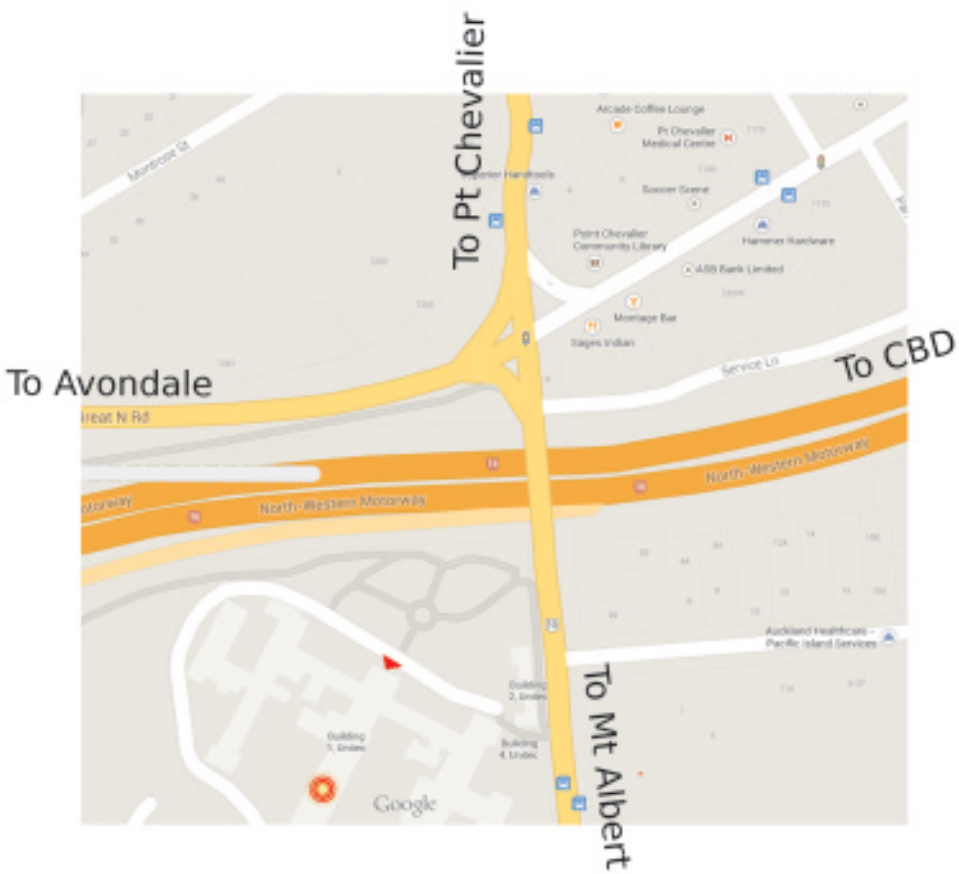
Passive Houses typically incur higher cost on building materials and energy efficiency features. Additionally the more complex building envelope (compared to traditional New Zealand/Australian homes) adds labour cost to a project, which means passive houses currently come at a premium. This higher capital cost is to be (hopefully) recouped through lower lifecycle costs over the useful life of the building.
Panelised prefabrication in the context of this paper is the pre-manufacture of closed wall, floor, and roof elements, essentially shifting construction work from the building site into a prefab factory with the goal to raise building quality, construction productivity, and ultimately reduce overall project cost. By definition the cost structure of this mode of construction is quite different to a traditional site-build including new types of costs that have to be catered for, e.g. cost of factory and plant.

This paper briefly introduces the different options on how to build a Passive House: component-based on site, as well as three different off-site methods (panelised, 3D modules and completed buildings). Panelised prefabrication will be investigated in more detail regarding manufacturing processes, manufacturing technology, and factory layout.
The paper investigates the quality of local site-built projects as well as overseas panelised prefabricated housing. Quality and cost of panelised prefabrication and their applicability towards the passive house standard will be explored in the local context towards the end of this paper.

Getting around

STOP 8029		STOP 8028		STOP 8131		STOP 8130	
Opposite 50 Carrington Rd		50 Carrington Rd		1181 Great North Rd		1174 Great North Rd	
ROUTE	DESTINATION	ROUTE	DESTINATION	ROUTE	DESTINATION	ROUTE	DESTINATION
OUT	LNK WESTMRE	OUT	LNK STLUKES	135	BRITOMART	154	GLEN EDEN
007	PT CHEV	007	ST HELIERS	030	BRITOMART	115	GLENDENE
OUT	LNK WESTMRE	OUT	LNK STLUKES	090	BRITOMART	030	PT CHEV
OUT	LNK WESTMRE	010	ONEHUNGA	154	BRITOMART	080	WESTGATE

Go to www.maxx.co.nz for real-time travel information and timetables.



The Passive House Institute is a Charitable Trust with the following aims:

1. To advance education through:
• Educating the building industry and members of the public about improved energy efficiency in New Zealand buildings;
• Promoting the Passive House Standard as defined by the Passivhaus Institut, Darmstadt-Germany, and mandated by the European Parliament resolution of 31 January 2008 (2007/2106(INI)) in New Zealand;
• Researching the performance of built Certified Passive Houses in New Zealand and making such research publicly available;
• Researching the New Zealand housing industry in general and the New Zealand climate and making such research publicly available in order to promote energy efficient building options;
• Providing a platform for the building sector to gain knowledge of highly energy efficient buildings;
• Educating building professionals and lay persons about Certified Passive Houses.

2. To benefit the community by:
• Improving public health and well-being and relieving fuel poverty of the people of New Zealand through the promotion of healthy and highly energy efficient homes and public buildings;
• Working with the public sector of New Zealand to improve the energy efficiency of New Zealand homes and public buildings.

If you are interested in furthering these aims, please get in touch!

The Passive House Academy New Zealand is the educational arm of the Passive House Institute New Zealand.

We are passionate about disseminating the knowledge needed to design and build highly energy efficient buildings. It is the only institution in the Southern hemisphere to offer preparation courses for the examination as Certified Passive House Designer/Consultant. This internationally recognised qualification signals to your customers a profound knowledge of Passive Houses.
Why should you enroll in a course at Passive House Academy? Read what former students have to say:

"Passive" is a word 'loosely' used in building design/construction today. Having completed the Passive House courses, I can now quantify how a building will perform, as the Passive House standard is based on science, which allows us to accurately predict performance and deliver real results.

Baden Brown, Registered Master Builder, Wanganui

Kara's passion for efficiency & detail creates exactly the right framework for understanding the impressively rigorous approach of Passive House to achieving energy efficiency & airtightness through quality building design techniques. Her course has demonstrated that solar passive design is only a small part of the solution; given me the knowledge to overcome its deficiencies and create buildings that can run on renewables alone. Kara's passion for efficiency & detail creates exactly the right framework for understanding the impressively rigorous approach of Passive House to achieving energy efficient buildings, and shows a way to prove it!

Roger Joyner, Building Designer, Lower Chittering, WA

to learn more and to enrol go to

www.phanz.ac.nz

Projects short-listed in the architectural merits category:

eHaus Roxborough

Architecture:
Black Pine Architects - Duncan Sinclair

Building services: eHaus - Cyril Vibert

Building physics: eHaus - Cyril Vibert

Statics :
eHaus - Jon Iliffe - Baden Brown - Cyril Vibert

Builder: eHaus - Baden Brown Builders

eHaus Middlemarch in Greytown:

Architecture:
eHaus - S J Naus Architecturer

Building services: Jon Iliffe- Baden Brown

Building physics: Jon Iliffe

Statics : Jon Iliffe - Baden Brown

Builder: eHaus - D R Borman

First Passive House in Glendowie:

Architecture: Jessop Architects

Research/owner: Philip Ivanier

Builder: Chris Foley

Projects short-listed in the cost-effectiveness category:

eHaus Winton:

Architecture:
eHaus - S J Naus Architecturer

Building services: Jon Iliffe- Baden Brown

Building physics: Jon Iliffe

Statics : Jon Iliffe - Baden Brown

Builder: eHaus - Kelvin & Martin Pearce

eHaus Middlemarch in Greytown

Architecture:
eHaus - S J Naus Architecturer

Building services: Jon Iliffe- Baden Brown

Building physics: Jon Iliffe

Statics : Jon Iliffe - Baden Brown

Builder: eHaus - D R Borman

Ideal House in Beachlands

Architecture: S3 Architects

Building physics: eZED

Builder: Palladium Homes

Find your way around Building 1:

1st floor

ground floor