SUSTAINABLE ENGINEERING LTD

South Pacific Passive House Conference 2015

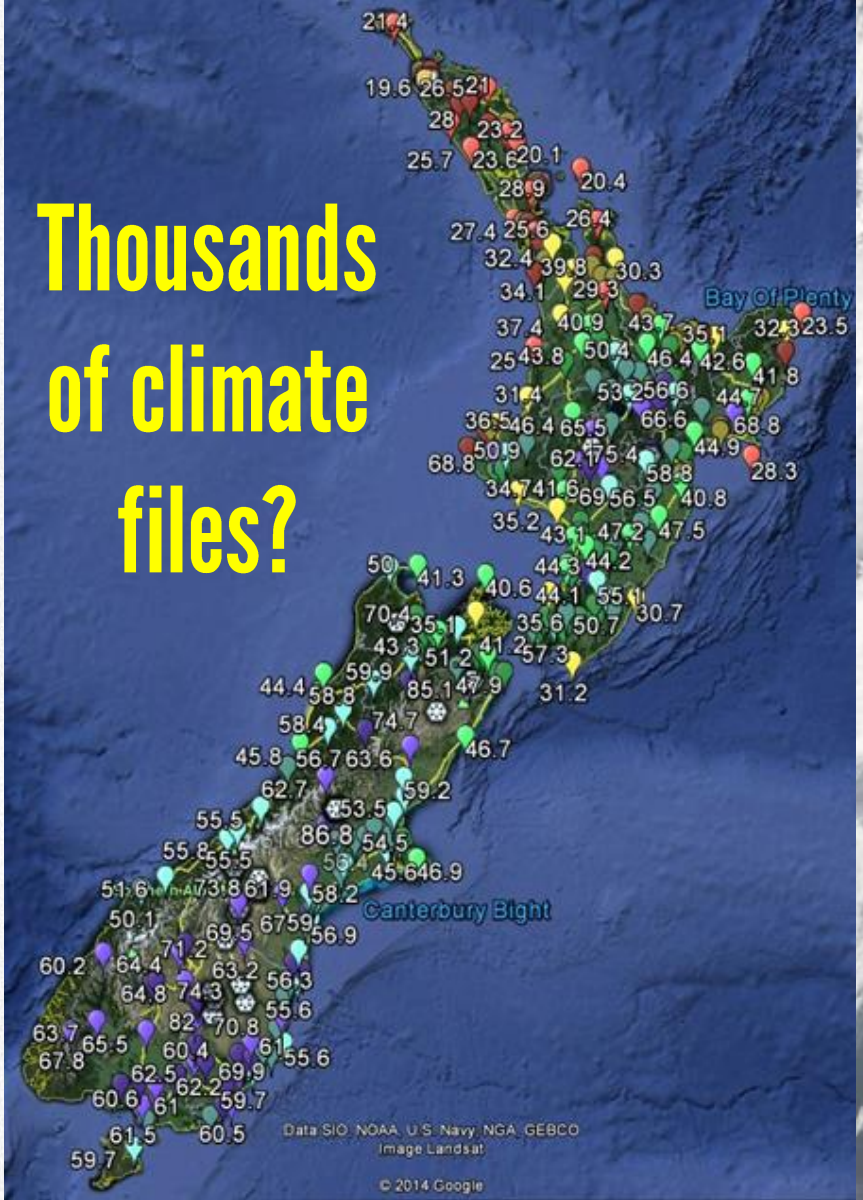
AFFORDABLE CERTIFIED CLIMATE FILES – PROCESS USED IN NEW ZEALAND

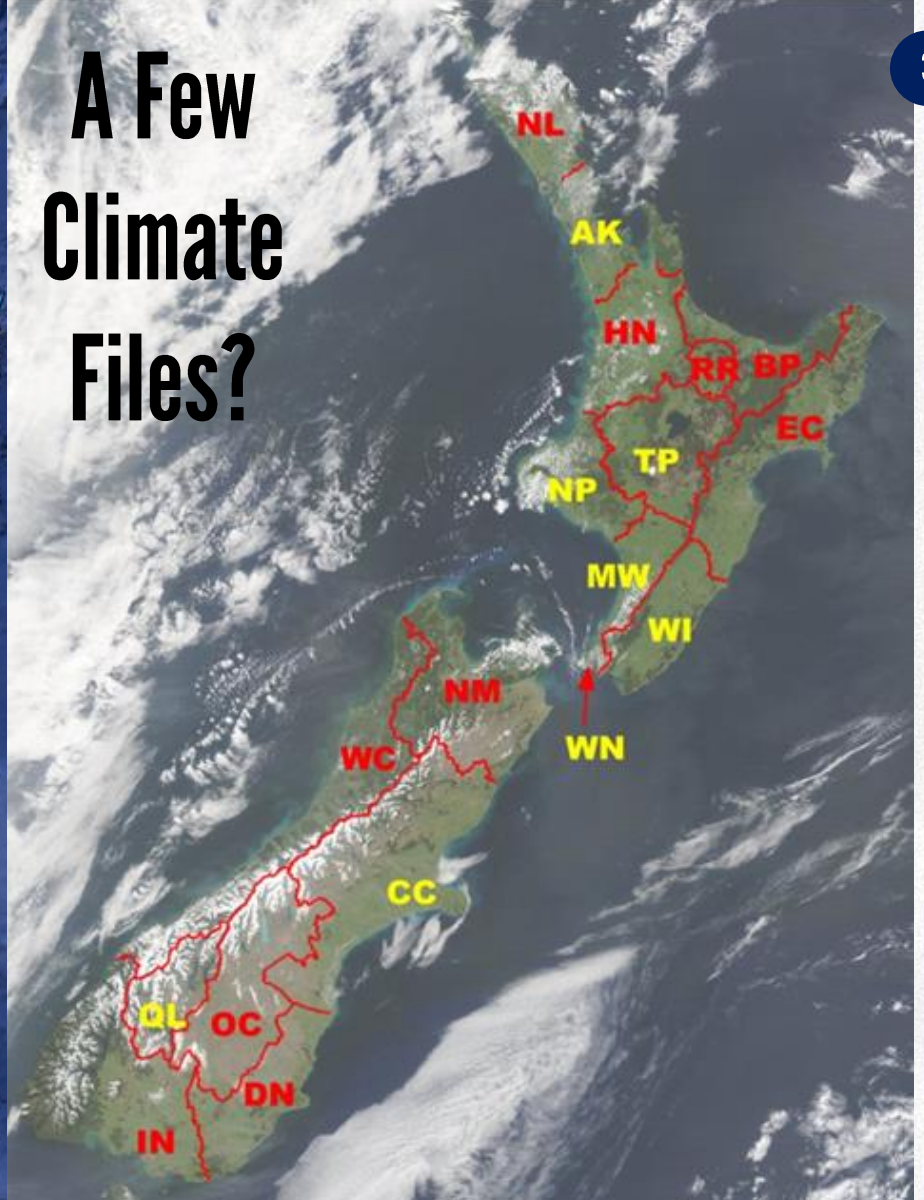
www.SustainableEngineering.co.nz/PHClimateNZ

One climate file to rule them all?

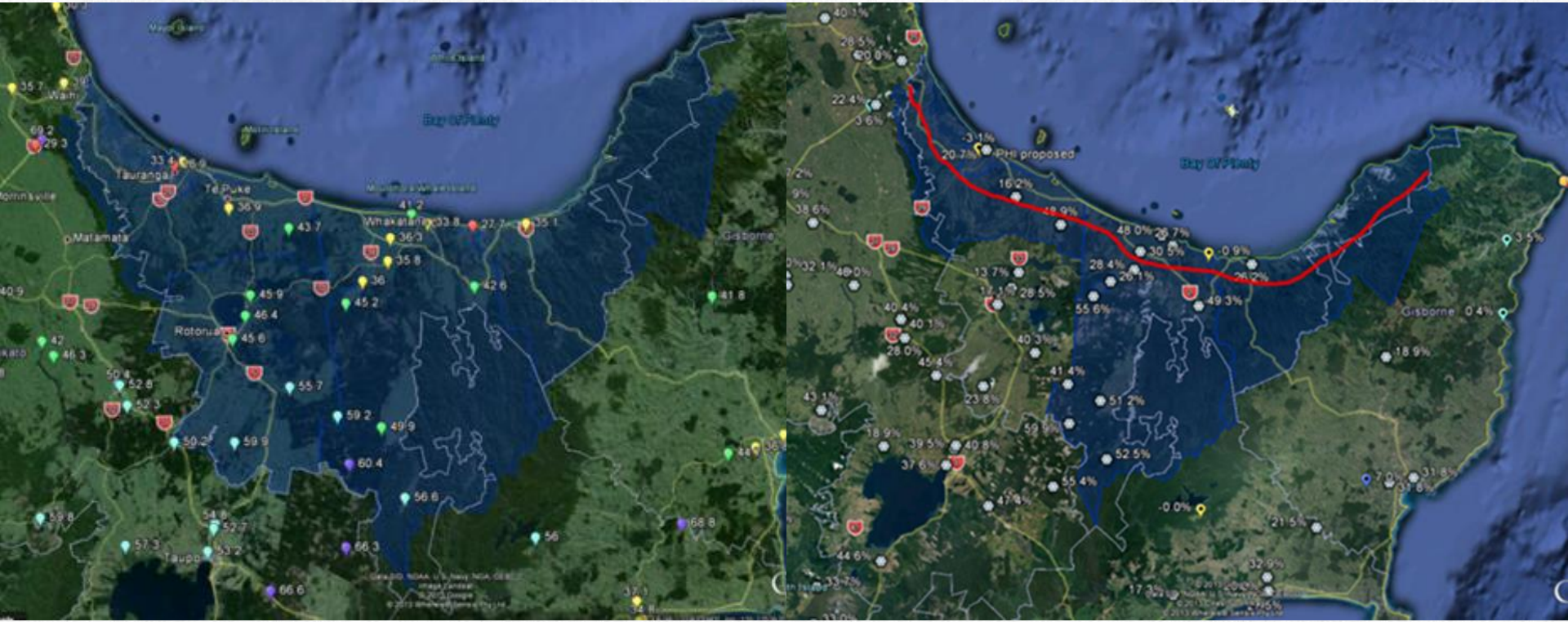
Thousands of climate files?

A Few Climate Files?

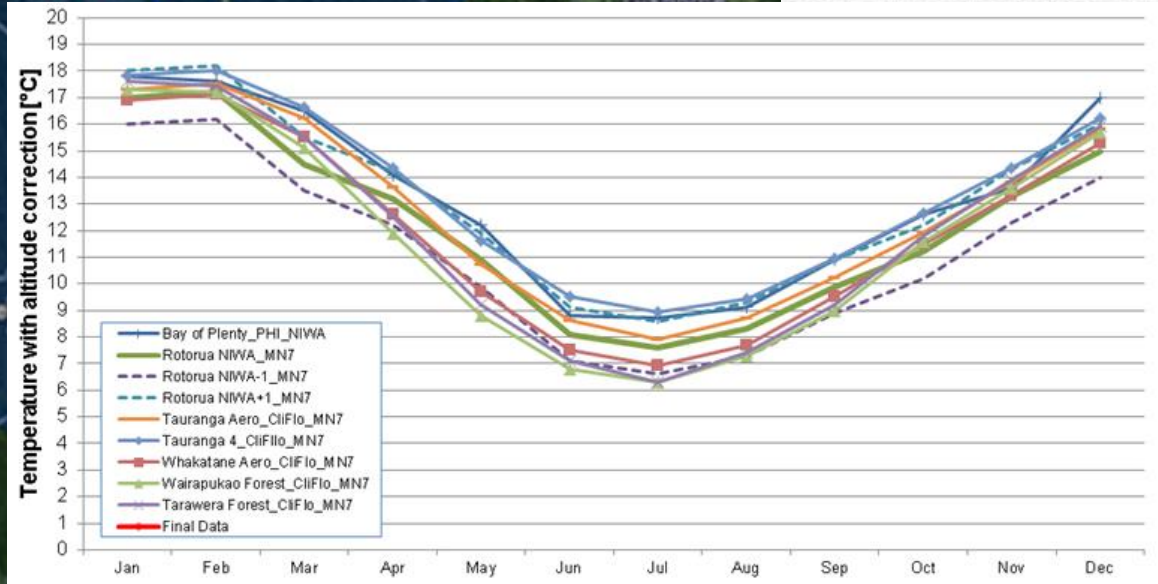




Make the world FLAT



Boundary set



Passive House Planning

CLIMATE DATA

Building: End-of-Terrace Passive House Kranichstein

Standard/Regional Climate: Select here.

Regional Climate Data

Select Region Here

User Data

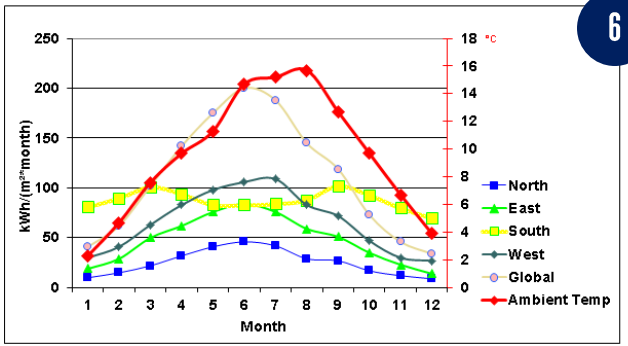
Select regional climate here:

Queenstown-Lakes (certified)

Use Regional Data?	Yes
Climate Building	Queenstown-Lakes (certified)
Chosen Method for Annual Heat D	Annual Method
Monthly Data:	Queenstown-Lakes (certified)
Annual Data:	
Use Annual Climate Data Set	No
Results:	
Annual Heat Demand	4.5 kWh/(m²a)
Heat Load	5.8 W/m²

Transfer to Annual Method

H_T	205	d/a
G_t	68	kKh/a
North	107	kWh/(m²a)
East	212	kWh/(m²a)
South	579	kWh/(m²a)
West	294	kWh/(m²a)
Horizontal	454	kWh/(m²a)



Parameters for PHPP Calculated Ground Temperatures:	Month	1	2	3	4	5	6	7	8	9	10	11	12	Heating Load Weather 1	Heating Load Weather 2	Cooling Load Radiation
	Days	31	28	31	30	31	30	31	31	30	31	30	31			
	Queenstown-Lakes (certified)	Latitude:	45.0	Longitude ° East	168.7	Altitude m	354		Daily Temperature Swing Summer (K)		9.0	Radiation Data:	kWh/(m²*month)	Radiation: W/m²		W/m²
Phase Shift Months	Ambient Temp	2.3	4.7	7.6	9.7	11.3	14.7	15.2	15.7	12.7	9.7	6.7	3.9	-2.1	-0.9	20.0
2.00	North	10	15	22	32	41	46	42	29	27	17	12	9	10	10	80
Damping	East	19	29	50	62	76	84	76	59	51	35	23	14	20	25	160
-1.05	South	81	90	101	94	83	83	84	88	102	93	80	70	95	90	210
Depth m	West	30	41	63	83	98	106	109	83	72	57	30	27	35	35	220
3.32	Global	41	62	102	142	175	200	188	145	119	73	46	34	40	45	350
Shift of Average Temperature K	Dew Point	-1.4	0.4	1.5	3.3	4.1	6.0	7.2	8.6	6.1	4.2	2.9	0.5			
1.60	Sky Temp	-11.3	-8.6	-6.9	-4.3	-3.2	-0.5	1.2	3.2	-0.3	-3.0	-4.9	-8.4			8.4
	Ground Temp	10.8	10.5	10.6	11.2	12.0	12.8	14.4	14.7	13.7	13.2	12.3	11.5	10.5	10.5	14.7

SSHD = Heat Demand / Treated Floor Area

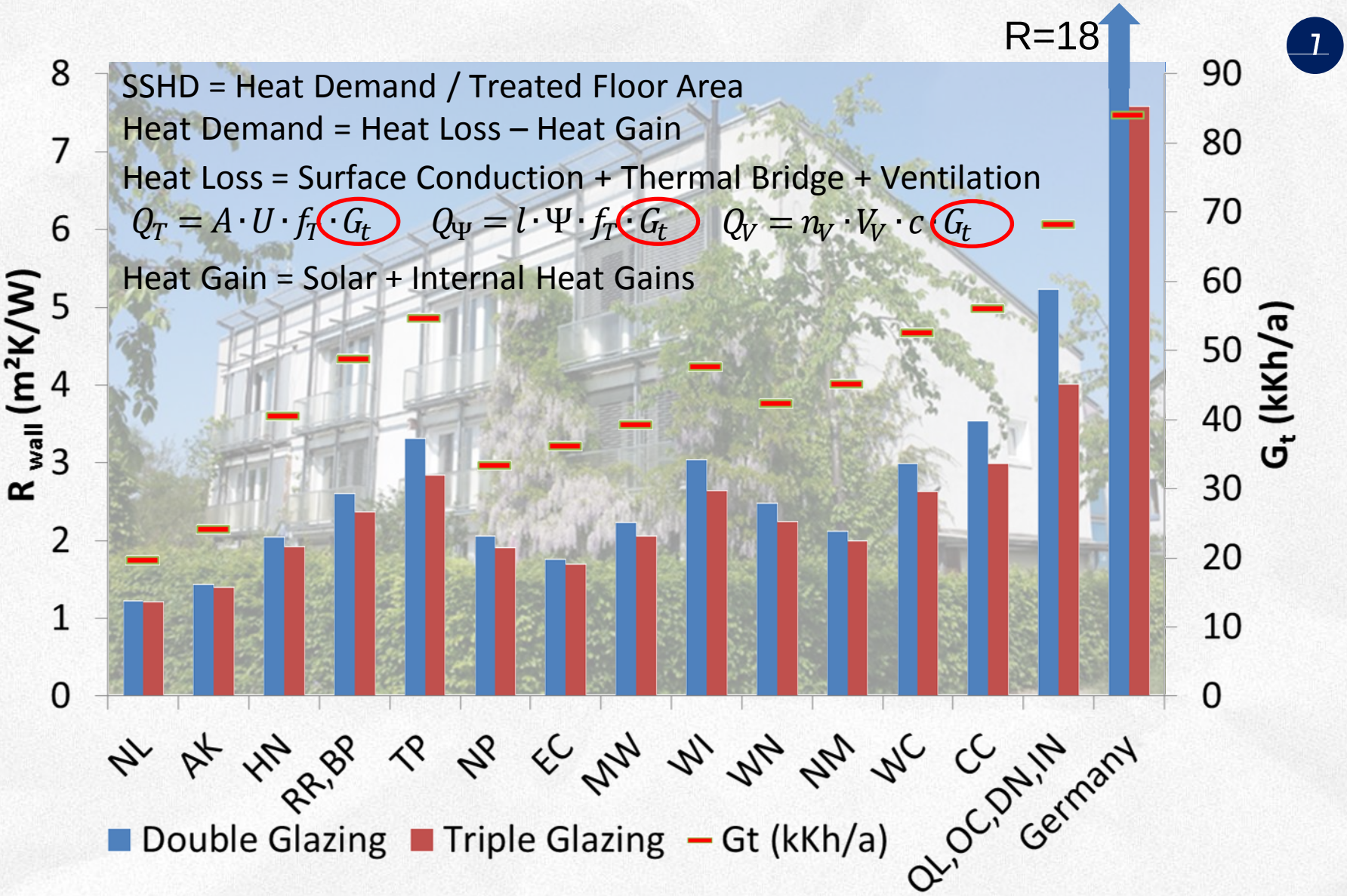
Heat Demand = Heat Loss – Heat Gain

Heat Loss = Surface Conduction + Thermal Bridge + Ventilation

$$Q_T = A \cdot U \cdot f_T \cdot G_t \qquad Q_\Psi = l \cdot \Psi \cdot f_T \cdot G_t \qquad Q_V = n_V \cdot V_V \cdot c \cdot G_t$$

Heat Gain = Solar + Internal Heat Gains

Site altitude is critical


R=18
SSHD = Heat Demand / Treated Floor Area
Heat Demand = Heat Loss – Heat Gain
Heat Loss = Surface Conduction + Thermal Bridge + Ventilation
$Q_T = A \cdot U \cdot f_T \cdot G_t$
$Q_\Psi = l \cdot \Psi \cdot f_T \cdot G_t$
$Q_V = n_V \cdot V_V \cdot c \cdot G_t$
Heat Gain = Solar + Internal Heat Gains
R wall (m²K/W)
G_t (kKh/a)
0
1
2
3
4
5
6
7
8
10
20
30
40
50
60
70
80
90
NL
AK
HN
RR,BP
TP
NP
EC
MW
WI
WN
NM
WC
CC
QL,OC,DN,IN
Germany
Double Glazing
Triple Glazing
Gt (kKh/a)

SUSTAINABLE ENGINEERING LTD

Paper and climate data in PHPP formatted spreadsheet at:

www.SustainableEngineering.co.nz/PHClimateNZ

Jason@SustainableEngineering.co.nz

AFFORDABLE CERTIFIED CLIMATE FILES – PROCESS USED IN NEW ZEALAND

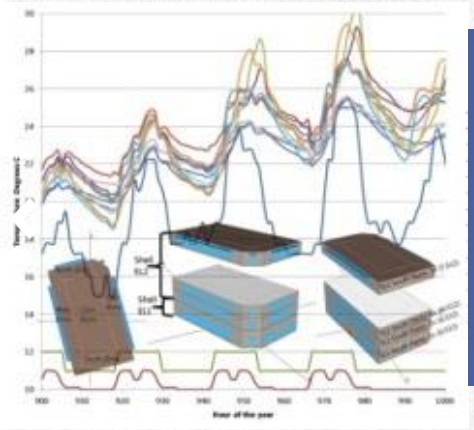
Jason Quinn is a mechanical and aerospace engineer, who was a rocket scientist at NASA for over 12 years. He has outspoken views on the quality (or lack thereof) of much New Zealand housing and is deeply concerned about fuel poverty and the effect of cold, damp housing on families' health.

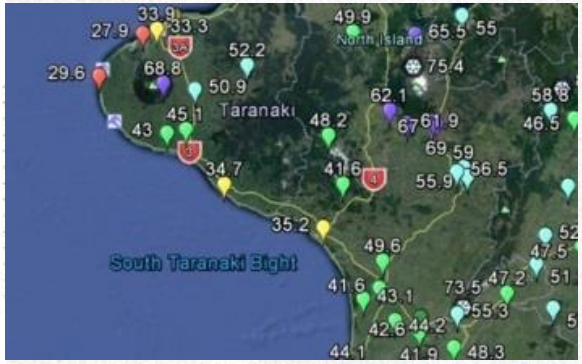
Jason and his family moved to New Zealand in 2009 for a better quality, more sustainable life. He has trained in the passive house standard and works as a building scientist & sustainability consultant. Most recently he's been consulting on several ambitious, environmentally sustainable office buildings undergoing redevelopment in Wellington. He has also provided advice on new homes identifying problems and opportunities at the planning stage that have made for better buildings. He can be reached via his website.

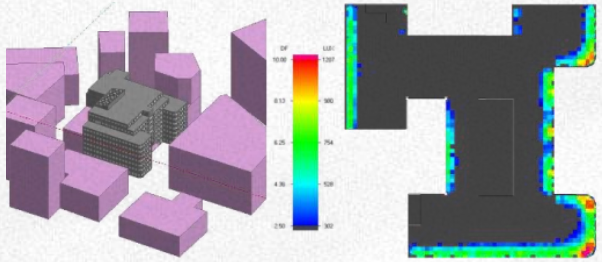
Passive house is a building standard that produces incredibly efficient, healthy buildings, that use very little energy for heating or cooling yet stay a comfortable temperature year round in any climate. Pioneered in Germany, passive house construction is happening across Europe and now in North America to build single family homes, apartment buildings, schools, offices and factories. North American construction companies can now build to passive house specs for the same cost per square foot as conventional builds, yet passive house structures are up to 90 per cent cheaper to heat. Nine homes have been built in New Zealand to passive house standards, with more coming.

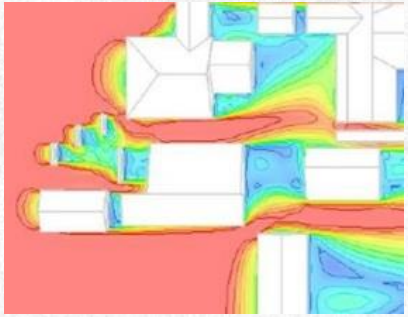
What we do

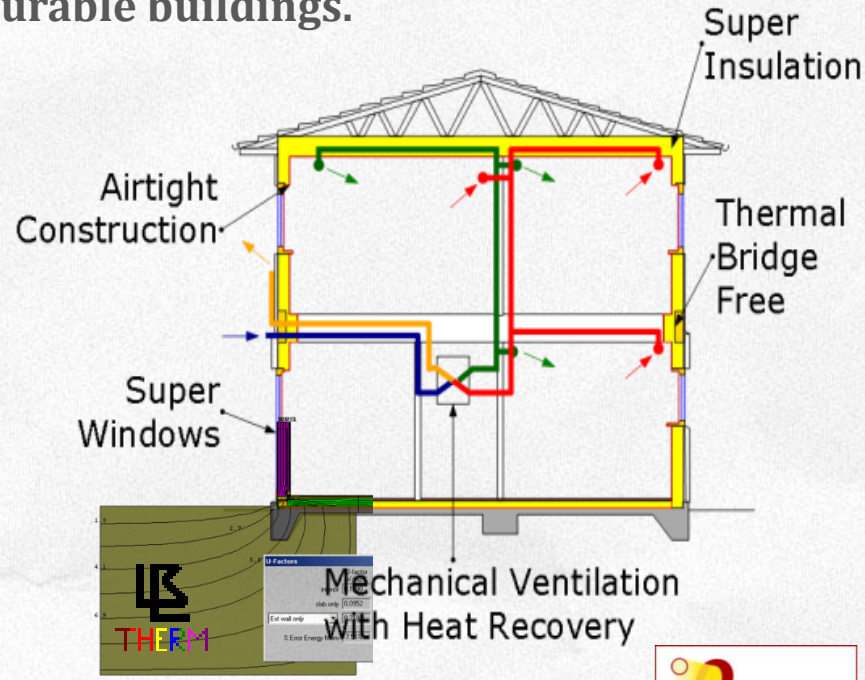
Best-practice building science / building envelope consulting to produce comfortable, healthy, & durable buildings.











WUFI® PRO

DESIGNER
CERTIFIED PASSIVE HOUSE DESIGNER

WHY DIDN'T WE HAVE THESE PROBLEMS BEFORE?