Construction Clients' Group CONSTRUCTING EXCELLENCE

Queenstown Event

1st March 2023

enue: Sherv 54 Frankton Ros	vood Queenstown ad Queenstown 9300	1 March 2023
tps://sherwood	dqueenstown.nz	_
07:00	Networking	
07:15	Welcome and Introduction	Patrick Stone Senior Mechanical & Sustainability Enginee
07:20	The Big Picture	
	Myth Busting	Cr Alexa Forbes* Otago Regional Councillor
07-45	*Member of Queenstown Lakes Distr	ict Council Climate Reference Group (QLDC CR
07.45	Carbon Accounting 101 Introduction to greenhouse gas accounting. What is it and how does it impact you?	Katherine Durman Climate Action Programme Manager
08:00	Break and light breakfast	
08:10	Action! Part 1	
	What is the industry doing in practice? e.g., TM Consultants, the wider industry, NZGBC etc.	Patrick Stone Senior Mechanical & Sustainability Engin
08:25	Action! Part 2	
	QLD Climate and Biodiversity Plan	Katherine Durman Climate Action Programme Manager
	Case study: Luggate Memorial Centre	Paul Carter Property Strategy Advisor
08:55	Wrap up & CCG 2023 Programme	Tim Warren CCG Company Secretariat



Patrick Stone

Senior Mechanical and Sustainability Engineer | TM Consultants

Welcome and Introductions

Sharing ■ Learning ■ Innovating ■ Together



Alexa Forbes

Regional Councillor | Otago Regional Council

The Big Picture Myth Busting

Sharing Learning Innovating Together

How did I get here?

- Whanau mai au ki Te Awamutu
- Queenstown since 1986
- Journalism, pr 1992 2015
- Partner and child in there too.
- 2012 2017 three quals
- 2012 facilitator transformational learning – Otago Polytechnic
- 2013 2019 Shaping our Future to QLDC
- 2019 elected member ORC
- DT≈70/r



How did we get here?

• DT≈70/r



The problem is here and now

You are the people to adapt and to drive mitigation

Offsetting can do the heavy lifting to get us to net zero carbon



The problem is here and now

You are the people to adapt and to drive mitigation

Everything we do now, makes for a better future

So thinking needs to move from cost/benefit ratios to true cost and long term benefits

DT ≈ 70/r

Ó



Carbon neutrality will solve the climate issue

We can replace one energy source with another.

The solution is a switch to renewable sources.



We are making progress against the goals we have committed to



Being more efficient is key... A circular economy is a fix...



It's not worth doing anything, we're too small/China needs to do this/we've missed the timeframe... Party on dude!



"We live in a physical world governed by physical law. Unlike the case for civil or criminal law, we are not even afforded the opportunity to break the laws of physics, except in fiction or entertainment. We do not need to create a physics police force or build physics jails or plead cases in front of some physics court. Nature provides perfect, automatic enforcement for free." – T. W. Murphy, Jr



References and reading

- <u>Alan Bartlett: Exponential function https://www.youtube.com/watch?v=kZA9Hnp3aV4</u>
- <u>https://theconversation.com/cyclone-gabrielle-how-microgrids-could-help-keep-the-power-on-during-extreme-weather-events-199665</u>
- <u>https://theconversation.com/landslides-and-law-cyclone-gabrielle-raises-serious-questions-about-where-weve-been-allowed-to-build-200250</u>
- <u>https://theconversation.com/nz-cities-urgently-need-to-become-spongier-but-system-change-will-be-expensive-200061</u>
- <u>https://www.newsroom.co.nz/jan-heijs-stormwaters-inclusion-in-three-waters-reforms-will-worsen-flood-risks</u>
- <u>https://escholarship.org/uc/energy_ambitions</u>
- <u>https://www.lulu.com/shop/thomas-murphy/energy-and-human-ambitions-on-a-finite-planet/paperback/product-dejvvd.html?page=1&pageSize=4</u>
- <u>https://www.resilience.org/stories/2020-06-17/jevons-paradox/</u>
- https://www2.deloitte.com/nz/en/pages/strategy-operations/articles/the-business-cost-of-climate-change.html
- <u>https://deepsouthchallenge.co.nz/resource/climate-change-the-cascade-effect/</u>

"Even though the transformation of energy, in all of its various forms, is the very basis of all economic activity, only a tiny fraction of economists have even studied thermodynamics. And only a handful of individuals inside the profession have attempted to redefine economic theory and practice based on the energy laws."

— <u>Jeremy Rifkin</u>

"... We need to start intercepting carbon before it gets back to the atmosphere and instead incorporate it into everything we build, buy, or clothe ourselves with. We need wooden ships, char-crete buildings, bamboo bicycles, moringa furniture, and hemp clothing. We need to elegantly craft those things to last for centuries."

- www.resilience.org

Emissions Reduction Roadmap





Katherine Durman

Climate Action Programme Manager Queenstown Lakes District Council

Carbon Accounting 101



Patrick Stone

Senior Mechanical and Sustainability Engineer | TM Consultants

Action! Part 1

Sharing Learning Innovating Together





What is the industry doing?

Sustainability tools

- Greenstar
- Homestar
- Nabers
- H1 updates
- Other thoughts

Sustainable Rating Tools and Certifications in NZ



Types of Rating for Construction Phase



Design and As Built

 Helps guide the sustainable design and construction of any new commercial build or major refurbishment.

Interiors

 Interiors for any type of commercial fitout

Communities

 Helps guide building and urban design at a neighbourhood, precinct or community scale.

Performance

Assesses operational performance
 of existing buildings



Design Rating

A assessment of the dwelling based on documentation required to fully describe the build. (Checkpoint to Build Rating and expires after 2 years)

Built Rating

• A physical inspection of the completed dwelling by the Homestar assessor.

Volume Assessment

 Where a developer has standard house designs, aspects of these designs relating to various Homestar credits may be preassessed.



Base Built Rating

 Measures the energy performance of a building's core services. (Lifts, stairwell lighting, common toilets, air conditioning and ventilation)

Tenancy Rating

 Measures just the floors/areas occupied exclusively by the tenant, including energy use such as computers, lighting, data centres and staff kitchens.

Whole Building Rating

• Combines the base building and tenancy.



Certified Passive House

• For new constructions.

EnerPHit Certified Retrofit

For buildings refurbished to the passive house institute retrofit standard.

The Low Energy Building Standard

For buildings that do not fully comply with the Passive House criteria but still achieve high levels of energy efficiency with a slightly lower criteria.

Categories Comparison

	Energy	Indoor Air Quality	Transport	Water	Materials	Ecology	Thermal Bridging	Airtightness	Emissions
Green Star	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark			\checkmark
Homestar	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark	\checkmark
Passive House	\checkmark	\checkmark			\checkmark		\checkmark	\checkmark	
NABERSNZ	\checkmark			\checkmark					\checkmark









Green Star Rating Levels



Green Star Categories

Design and As Built v1.1		Interiors v1.1		Performance v1.2		Communities v1.1		
Category	Available Points	Category	Available Points	Category	Available Points	Category	Available Points	
Management	15	Management	13	Management	17	Governance	28	
Indoor Environment Quality	17	Indoor Environment Quality	23	Indoor Environment Quality	18	Liveability	22	
Energy	20	Energy	20	Energy	24	Economic Prosperity	21	
Transport	10	Transport	7	Transport	7	Environment	29	
Water	10	Water	5	Water	12	Total	100	
Materials	18	Materials	24	Materials	10	Points are awarded for successful		
Land Use & Ecology	5	Land Use & Ecology	5	Land Use & Ecology	6	 meeting the criteria, the total nu of points awarded decides the fin Green Star Rating There are additional 'Innovation' 		tal numt the final
Emissions	5	Emissions	3	Emissions	6			ation'
Total	100	Total	100	Total	100	credits, up to 10 of which can b targeted also by the project.		

Green Star Categories and Credits



Main changes under V1.1 (current version)

- Credit 15 Greenhouse Gas Emissions → Fossil Fuel limits and banned for 6 Star → Increased GHG reduction thresholds
- Credit 19 Life Cycle Impacts ➤ 10% minimum upfront carbon emissions ➤ Requires Life Cycle Analysis



Next Phase - Green Star Buildings







Positive

Resilient

Encourages solutions that address the capacity of the building to bounce back from short-term shocks and long-term stresses.

Encourages a positive contribution to key environmental issues of carbon, water and the impact of materials.





Leadership

Nature

Encourages active connections between people and nature and rewards creating biodiverse green spaces in cities.

Recognises projects that set a strategic direction, build a vision for industry or enhance the industry's capacity to innovate.





Healthy

Recognises activities that ensure the building is designed, procured, built and handed over in a responsible manner.

Promotes actions and solutions that improve the physical and mental health of occupants.



Places

People

Supports the creation of safe, enjoyable, integrated and comfortable places.

Encourages solutions that address the social health of the community



Homestar Categories

	Points Available				
Category	Apartments and Terraces	Standalone Homes			
Efficient	37	37			
Healthy and Comfortable	43	41.5			
Livable	11	11			
Environmentally Responsible	29	29			
Total	120	118.5			
Innovation	10	10			

Efficient	Health and Comfort	Livable Health & Comfort
Resource Efficiency Urban Density Water Use Energy Use	 Winter Comfort Summer Comfort Ventilation Moisture Control Natural Light Acoustic Performance 	 Inclusive Design Occupant Amenities Eco-friendly Living Sustainable Transport

Healthy Materials



- Renewable Energy •
- Embodied Carbon
- Sustainable Materials
- Construction Waste
- Site, water, Ecology
- Responsible contracting



Mandatory Minimums – 6 Homestar





NABERSNZ Categories





operational water use

operational energy use

performance.

 1 Star
 2 Stars
 3 Stars
 4 Stars
 5 Stars
 6 Stars

 Poor
 Below Average
 Average
 Good
 Excellent
 Market Leading

 NABERSNE

Data Required	Tenancy Rating	Base Build Rating	Whole Building Rating
12 months utility bills	\checkmark	\checkmark	\checkmark
Office floor area	\checkmark	\checkmark	\checkmark
Hours of operation	\checkmark	\checkmark	\checkmark
Computer count	\checkmark		\checkmark



H1 Energy Efficiency

H1/VM3

- H1/AS1 covers the thermal performance of the building envelope for all housing & buildings <u>300m2 or less</u>. It covers <u>schedule and</u> <u>calculation method</u>. NZS4218 has been replaced by H1/AS1.
- H1/VM1 covers the thermal performance of the building envelope for buildings <u>300m2 or less</u> and covers <u>modelling</u> <u>method</u>. Window to wall ratio >40%.
- H1/AS2 describes the thermal performance of the building envelope for large buildings greater than 300m2. It covers the schedule and calculation method. NZS4243 has been replaced by H1/AS2.
- H1/VM2 describes the thermal performance of the building envelope for large buildings greater than 300m2 and covers modelling method. Window to wall ratio >50%.
- Prescribed R-values for fabric elements by climate zone

- H1/VM3 describes the operation and design of HVAC systems in <u>commercial</u> buildings.
- This is a completely new requirement; previously there was no compliance pathway for demonstrating that HVAC systems have been designed to be energy efficiency.
- Now we have to verify the performance criteria for:
 - 1. Mechanical systems controls
 - 2. System design
 - 3. Equipment selection
 - 4. Maintenance access
 - 5. Energy monitoring
 - Increased duct/pipework insulation R-values
 - Regulated plant performance and efficiencies
 - Controls to reduce operational energy use
 - Energy metering requirements

Other Thoughts



MBIE Carbon Emissions Reduction



Whole-of-Life-Embodied Carbon Emissions Reduction

- Maximise new build efficiency, ensure the size and quality of new buildings are proportional to the need, upgrade existing buildings so they can be used effectively.
- Increase building material efficiency, use less material in new buildings including reducing waste and minimizing replacement over the building's life cycle.
- Reduce the carbon intensity of the materials in new buildings, either by using lowcarbon alternatives, and/or reducing the embodied carbon of the construction materials.



Green Leases

Sustainable lease agreement designed to align tenant and landlord interests around energy efficiency, water conservation, and other environmentally friendly measures in the construction, operation, and usage of commercial spaces.

Example inclusions

- Energy efficiency measures
- Water conservation
- Metering and monitoring
- Data / Information sharing
- Onsite/offsite renewables
- Indoor air quality

- Waste reduction
- Reducing transportation-related emissions
- Sustainable procurement
- Green certifications (e.g. Green Star)
- Tuning and energy audits (e.g. NABERSNZ)
- Green maintenance

Environment Management Systems (EMS)

An Environmental Management System (EMS) is a *planned approach to managing environmental impacts*. Organisations identify the significant environmental impacts arising from everything they do and then develop plans to prevent or reduce those impacts.

Toitū enviromark diamond is the ultimate step in the Environmental Management System journey, exceeding ISO 14001 requirements.

Organizations will have:

- Document and procedure control
- Performance audits
- Formalized roles and approaches
- Communication with stakeholders
- Training policies
- Problem, risk and improvement management
- Risk evaluation of all activities, products and services
- Scope and compliance awareness
- Environmental policy statement



Environmental Product Declarations + Certifications

Environmental product declarations (EPDs) demonstrate a commitment to environmental responsibility and transparency through life cycle analysis. They are an environmental assessment and verification of products and services aligned to international standards.

- The EPD is issued in conformance with ISO 14025 or EN15804;
- The EPD must be independently-audited; and
- The EPD must be based on a cradle-to-gate scope as a minimum.

Product certifications are voluntary, third-party schemes conducting product-focused environmental and social assessment of products.

- Assessment of product on multi-criteria, performance-based standards that require an overall product lifecycle approach
- A licence that authorises the use of a label on products
- Label is representative of overall environmental preference of a product within product category

Interface ENVIRONMENTAL PRODUCT DECLARATION CORIAN ME, ADDRESS, LOGO, AND WE fingsten Road Northbrook II 604 https://www.ul.cr CORIAN mental product declaration (ant (LCA) to provide information on a NAL UNIT OR DECLAR Exclusions: EPDs do not indicate th impacts that the ments. 10010 Version tal impacts of raw mat but cannot replace tools a thresholds - e.g. Type 1 certific ents, etc. Accuracy of Results: EPDs regularly rely estimation of effect differs for any particular product line and reported impact. Home Innovation NGRS GREEN CERTIFIED Good Environmente enRate | Level A /----FSC s have been granted the use of the ecolabel and h Autex Industries L

ENVIRONMENTAL PRODUCT DECLARATION

Refrigerant Phase Down

While the Paris Agreement drives lower emission outcomes and energy efficiency initiatives that offer cost savings opportunities, carbon taxes and rising synthetic refrigerant costs offer potential risks to new projects.

The tax of refrigerants in NZ is tied to the NZ Emissions Trading Scheme, costs of refrigerants are proportional to their GWP. With the tax rate increasing year on year.

Considerations for designers and developers:

- Expect to pay more for refrigerant in coming years
- Low GWP refrigerants e.g. R32
- Natural CO2 refrigerant which has 0 ODP and GWP of 1.
- Low refrigerant volume systems e.g. water based or hybrid
- Energy modelling / optimised design





	Phase out limit an and sy	d date: new goods stems	Phase out limit and date: for servicing		
Application	GWP limit <750	GWP limit <150	GWP limit <750	GWP limit <150	
	2023 (new)	2032	2023	2032	
Phase out limit and date: new good and systemsApplicationGWP limit <750GWP limit <15Passenger vehicle air conditioning, eg, trains and buses2023 (new)2032Passenger vehicle air conditioning, eg, trains and buses2023 (new)2032Commercial air conditioning, eg, office 	iciency are s.	R513A (GWP 629)/ R450A (GWP 600) are likely drop-ins.	A GWP <150 drop-in for service is unlikely; this date signals likely replacement.		
Commercial air conditioning, eg, office buildings and retail including VRF systems	2024 Japan shifted to GWP <750 in 2020; readily available options expected soon.	2029 Five-year lead time for GWP <150 as options are uncertain.	2023 R513A (GWP 629)/ R450A (GWP 600) are likely drop-ins.	2032 A GWP <150 drop-in for service is unlikely; this date signals likely replacement.	
soon. Commercial 2023 refrigeration – food Self-contained cabine retail, eg, isobutane (GWP <1) a		2023 ets can shift to and propane quickly. Larger e CO ₂ .	2023 R513A (GWP 629)/ R450A (GWP 600) or similar are likely drop-ins.	2032 A GWP <150 drop-in for service is unlikely; this date signals likely replacement.	



BIM + Energy Modelling

BIM modelling at design stage improves:

- → Collaboration + Information sharing
- → Co-ordination + clash/ issue detection
- \rightarrow Visualising the project

Energy modelling assists with:

- → Optimising mechanical heating and cooling loads
- \rightarrow Testing and optimising building fabric and orientation
- → Energy and electrical demand estimates
- → Overheating risk (CIBSE TM52/TM59 method)
- → Risk assessing daylighting and glare





Education + Knowledge Sharing

When people are learning from each other and have a platform to share their knowledge, that builds a sense of <u>community</u>. Sharing experiences allows others to skip the trial and error phase and get right to <u>productivity</u>.

- ➤ LinkedIn!
- ➢ Roadshows, trainings and presentations
- Mech + Passive Fire Architectural Approach (grab a copy!)
 - What is HVAC? What is Passive Fire?
 - What are some common solutions?
- Videos to communicate code updates
- On the job trainings/ discussions



Paul Carter

Property Strategy Advisor Queenstown Lakes District Council

Action! Part 2 Case Study

Sharing Learning Innovating Together



Luggate Memorial Centre



3 Key Messages

- Provide a focal point for the community heart
- Provide a smart, viable solution for a growing community
- QLDC Vision



Focal point for the community heart

- How did we get to this point?
- What did we learn?
- Where did we go to from there?



Smart viable solution

- Smart building; not just amazing heating, cooling technology, not just automation, wireless systems, connectivity
- It's primarily about a smart building envelope
- Passive House buildings
- Right design
- Right location and orientation
- Right materials and components
- Right process from start to finish



Smart viable solution

- New hall should meet the local community needs
- New hall should meet the wider Upper Clutha community needs
- New hall to form part of the QLDC network of community facilities



QLDC Vision





Summary

- The new Luggate Memorial Centre is the first community facility certified to Passive House Standard in New Zealand
- It is a fit for purpose community venue
- It will restore the community heart back to Luggate
- It can help lead the way to better buildings





Luggate Memorial Centre – Whare Mahana



2023 – Events Programme Q1 & Q2 revised

Meeting / Event	Jan	Feb	March	April	May	June
CCG National Event						
CCG Regional Event – Networking face-to-			1 st Workshop Queenstown			TBC Queenstown
face			15 th Site Visit Northland	5 th Workshop Hamilton Waikato / BoP		21 st Workshop Tauranga Waikato / BoP
			8th Site Visit Christchurch	19 th Mod Pro Event Wellington	10 th Workshop Christchurch	
			29 th Workshop Auckland			14 th Site Visit Auckland
Safety In Design (SID) National Event					TBC	
FMBP National		23rd			25 th	

2023 – Events Programme Q3 & Q4

Meeting / Event	July	August	September	October	November	December
CCG National Event		22 nd 소 Virtual				
CCG Regional Event – Networking face-to- face	19 th Northland	2 nd Mod Pro slot Hamilton Waikato / BoP		11 th Tauranga Waikato / BoP	15 th Northland	
	26 th Christchurch		20th – Mod Pro Christchurch	18 th Wellington	22 nd Christchurch	
	26 th Wellington	9 th Auckland		25 th Queenstown	29 th Auckland	
Safety In Design (SID) National Event		TBC			TBC	
FMBP National		24rd A Virtual			24 th A Virtual	



About

Independent and client-led, the Construction Clients' Group (CCG) focuses on improvement, innovation and knowledge sharing through events, guest speakers and networking opportunities. We believe clients need to lead performance improvement and to do this well, clients must grow and change to engender the supply side changes also n ... see more

See all details

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