



1400 of the world's leading prefabricated wood builders meet in Garmisch, Germany, each December for 3 days of conference and exhibitions. These conferences are a magic world for anyone interested in prefabrication and sustainability. Prefabrication, fast construction times, high quality and using wood for almost any building are second nature to these people. They are being driven to meet ever increasing building code standards, but they take great delight in far exceeding those standards.

Last month's conference included discussions on modern urban wood villages, building a city of wood, using prefabricated wood facades to improve energy performance of existing buildings, and adding space to existing buildings. There was much discussion on urban densification and a fascinating talk on how a group of Swiss residents designed and built a multigenerational building to suit their urban lifestyle.

Can we bring some Garmisch magic to our part of the world? Recent seminars held in Blenheim and Christchurch highlight what we are already doing. The first CLT plant in the southern hemisphere has been set up in Nelson. The earthquake wood building technology developed at Canterbury University is world leading, and so are the hollow timber piles which are a perfect solution for the soft ground of central Christchurch. NZ leads the world in measuring forests for both wood and carbon storage. Tourist resorts from Marlborough supplied to the Maldives show how to attract tourists and build for rising sea levels. See all these presentations at <http://www.marlboroughforestry.org.nz/index.mvc?ArticleID=44>

Melbourne now has the world's tallest wood apartment building. This was featured at the final presentation at Garmisch and showed how cross laminated timber panels from Austria were quickly assembled for the building on the Melbourne waterfront. German architect, Professor Steffen Lehman, now leads research on Green Urbanism in Adelaide. He shows how urban densification using CLT is not only desirable but essential for cities of the future. See [www.mdpi.com/2071-1050/4/10/2707/pdf](http://www.mdpi.com/2071-1050/4/10/2707/pdf)

The following pictures highlight inspiration from Europe for the Christchurch rebuild, and how we can improve the quality of life in all our cities.



### *Central European Climate*

*Advantages for prefabrication and high energy performance*

The Garmisch magic starts in the streets outside the conference centre with Christmas lights in early December. This part of Europe has snow on the ground for 5 months of the year making prefabrication the only way to build. High thermal performance and quality are essential to handle the extreme climate.

# Energy Performance



## *Performance regulation and actually achieved*

This graph shows the drive for ever higher energy performance with the top of the graph showing required performance of 260 kw/m2 in 1977, stepping down to 50 kw/m2 in 2012. The bottom of the graph shows the much better performance of the best buildings with many now generating more energy than they they use. Some now have enough surplus energy to recharge their electric cars.

## *Energy Facades*

There is a big drive to improve the energy performance of existing buildings. B&O is a major German building services company who add prefabricated wood facades to improve the look and performance of dull concrete buildings.



Köln-Riehl „Fordsiedlung“ (Holzbau: Huber & Sohn)

## *Urban Densification*

They also add more living space which increases the value of the 412,000 apartments they manage. See

<http://www.bo-wohnungswirtschaft.de/index.php/timber-constructionnew-construction.html>

## *Zero Energy City*

B&O are building City of Wood on a 70 hectare of ex military base

<http://www.bo->



[http://www.bo-wohnungswirtschaft.de/tl\\_files/Inhalt-Bilder/Unternehmen/Gesch.ber.Engl.2010.pdf](http://www.bo-wohnungswirtschaft.de/tl_files/Inhalt-Bilder/Unternehmen/Gesch.ber.Engl.2010.pdf)

An 8 storey wood apartment building has now been completed. For more see <http://www.holzma.com/en/en/references/referencedatabase/weinmann/Pages/Woodentownhitstheheights.aspx>

# Wooden Urban Villages



## Wooden Urban Villages

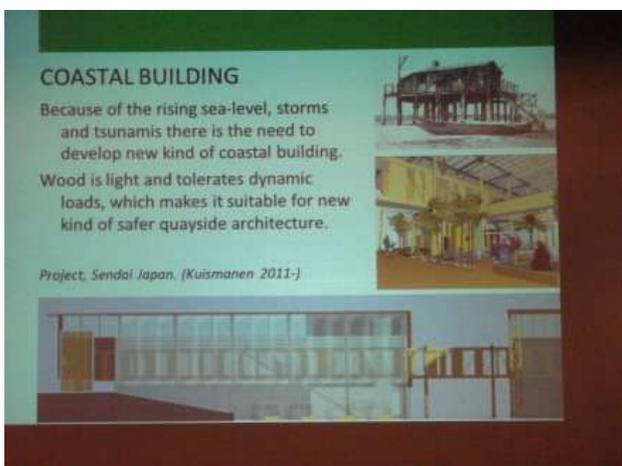
Most of the presentations were in German with great translations by headphone. Kimmo Kuismanen, from Oulu in northern Finland gave one of the few presentations in English.

He looked at traditional wood towns which were dense with all amenities within walking distance. This was changed by fire and urban sprawl.

New wood towns and urban wood villages can now be built economically and be fire safe. See more at <http://www.suomikoti.com/pdf/JaPuRa-English.pdf>



Building on piles is smart for cities near sea level such as Christchurch. Buildings can then be raised as sea levels rise.



# Multigenerational Housing



The Multigenerational house is a fascinating project in Winterthur, 20 minutes by car or train from Zurich. Future residents were involved in the design of this building on an old industrial site. It is very much a "bottom up" design.

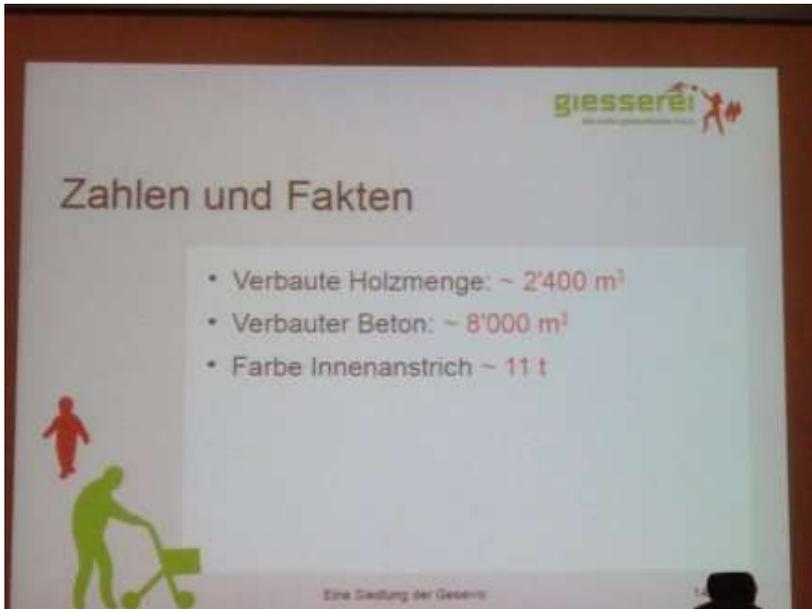
It includes 155 apartments from 1.5 up to 9 rooms, and some commercial areas. There are 30 different floor plans layouts which is no problem for CNC machinery and prefabrication. The building also has 11 joker rooms, which are bedrooms with ensembles available for tenants to use for guests or teenagers returning home on a 1 day to 6 month rental.



The building has parking space for 30 cars and 583. This sounds incredible to a New Zealander but says much about Winterthur and Swiss urban living. Winterthur is a great model for the rebuilding of Christchurch with a population of 100,000. It is a compact city with 7 wooded hills within its boundary, 175kms of dedicated bike paths and great transport links to Zurich and the rest of Europe. For more see

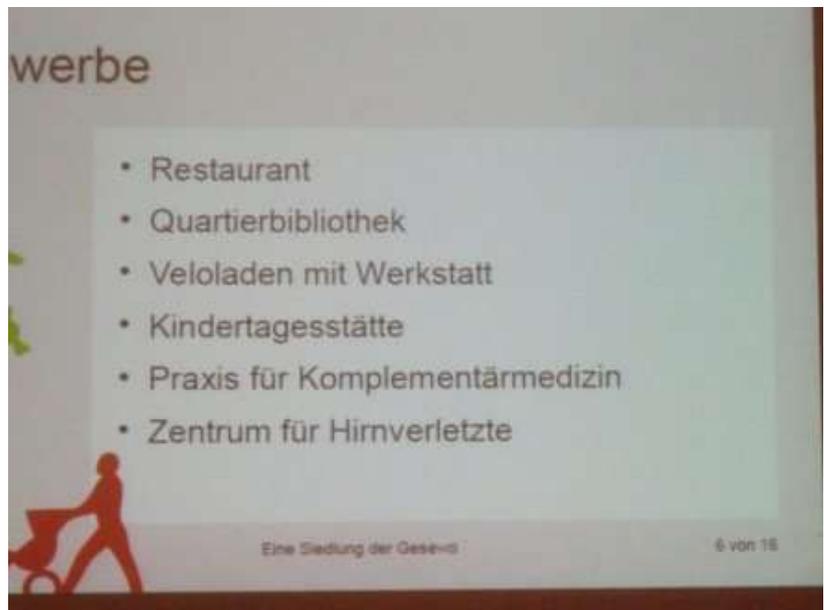


[http://stadt.winterthur.ch/fileadmin/user\\_upload/Portal/pdf/Winterthur\\_E\\_web.pdf](http://stadt.winterthur.ch/fileadmin/user_upload/Portal/pdf/Winterthur_E_web.pdf)



The building is of course made of wood for low energy and sustainability. It uses 2,400 cubic metres of wood, but 8,000 of concrete for the foundations. Using hollow timber piles could reverse these figures. The building also uses 11 tonnes of paint.

The commercial area includes a restaurant, small library, bike repair shop, day care equipment and alternate medicine centres.



The building is due to be finished in February. This picture shows the central courtyard where residents can keep a casual eye on children playing.

# High Performance Windows



A feature of the Garmisch conference is the 80 exhibitors who are actively involved in building with wood, or supplying services to those who do.



One that impressed me was the Energate who were part of 2 winning solar decathlon teams from 2007 and 2009. The team from Victoria University was 3rd last year which was a major achievement for NZ.



Energate produce triple glazed windows which are an important component of high quality energy facades.



Mathias, the manager of Energate, is keen to help raise the standard of the Christchurch rebuild.

Energate windows and doors are now made in the USA following the success in the Solar Decathlon.

# Wooden Concert Hall



I visited Lahti, near Helsinki in Finland, because they have a marvellous concert hall built with wood. Concert lovers come from around the world, attracted by the fantastic acoustics. The designers worked with the local timber industry to create a very cost effective solution.

For more see

<http://www2.hs.fi/english/archive/thisweek/11102000.html>



Adjustable acoustic panels make this hall suit for concerts as well and conferences.



The entrance foyer of the Sibelius Hall makes a great exhibition space.

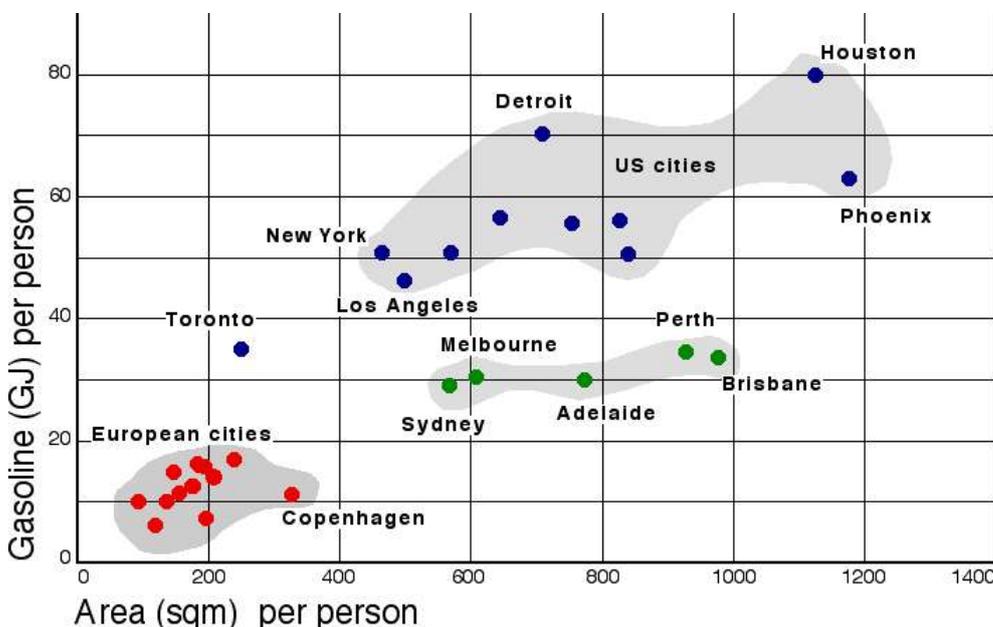
# Treetop Walkway



What could be better than walking to work through the treetops. This inspiration comes from the world's longest treetop walkway in the Bavarian forest. This walkway has a minimal footprint can covers very little ground area. For more see

[http://www.baumwipfeldfad.by/bwp\\_en/index.php](http://www.baumwipfeldfad.by/bwp_en/index.php)

Christchurch, the garden city, already has good tree cover and will soon have much more with the green frames around the central city. There are some great opportunities to allow people to move through the treetops for quick access to Victoria Park and the different precincts of the central city.



*Urban Density and Fuel Use*

This graph from Wikipedia shows urban density in sqm per person, and fuel use to highlight the differences between European, Australian and US cities.

European cities are able to minimise fuel use by have good walking and cycling access to work, cafes, markets, entertainment, and nature.

# Cities of the Future



The final word should go to Professor Steffen Lehman who says that "we should build buildings like trees and cities like forests"

See more of his wisdom about cities of the future on TedX <http://www.youtube.com/watch?v=hRSVR12M-k8>

and talking on Green Urbanism at <http://www.youtube.com/watch?v=1r9bLg2UkZw>

## Opportunities for New Zealand

Can New Zealand add some Garmisch magic to their world leading earthquake proof wood construction and hollow timber pile technologies? We could help build cities of the future with buildings which grow like trees, that are earthquake and fire safe. The buildings could grow to keep above rising sea levels, and grow upwards and outwards to house more people.

CNC machines and robots simplify the process of turning forests of trees into forests of buildings. In the cities of the future people will live much closer to nature, in cities grown and powered by the sun. Who wants to live any other way?

### **Michael Cambridge**

President, Marlborough Forest Industry Association  
and Board Member of PrefabNZ