

# **Methods and tools for increasing constructions in wood – A city perspective**

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## 1. Introduction to Växjö

### 1.1. Facts about Växjö

Växjö is a city of 92.000 inhabitants. In a forest-rich area in the south of Sweden. The region is known for its entrepreneurial spirit and many small and medium sized companies. More than 10.000 companies are active within the municipal area. Strong sectors are IT (software), logistics, building and construction, wholesale and retail, tourism, heavy machinery, clean tech and of course the forest and timber industry.

Växjö has a strong population growth. We grow by approximately 1000-1500 people net every year. Which in turn gives us a high demand for housing, schools, pre-schools, official buildings, hotels, etc. Many people are employed and active in the building and construction sector.

Växjö is also a university city. It is the home of the Linnaeus University, with somewhat 35.000 students, making it the 5<sup>th</sup> largest University in Sweden.

Växjö is the winner of the European Green Leaf Award 2018, which is an initiative of the European Commission. This is a strong recognition of our environmental work, and that we can truly call ourselves the greenest city in Europe. Växjö has since the end of the 60's had a strong focus on the environment, not at least climate change. Our goal is to become a fossil fuel free city by 2030, and compared to the levels of 1993, our CO2 emissions are reduced by 58 %!

The economy in Växjö is stable and very good. Right now, there is a green-centre-right wing alliance governing Växjö.

## 2. Why wood in Växjö

### 2.1. Växjö is building in wood

As mentioned in the introduction, Växjö is located in the middle of the forest in the south part of Sweden. Wood is a local and renewable material. It is natural for us to build our houses in wood. Nowadays the traditional wood house manufacturers are developing very fast. The assembling of houses today is made indoors in factories. The industry is trying to copy the way of the car manufacturers. The building processes on the building-sites are very fast.

Furthermore, the material is light to transport and it is easy to process. We find the material very beautiful and very well-suited for modern building purposes.



## 2.2. Main reason

The main reason for choosing wood is the climate and the environment. We know that somewhat 30% of the CO<sub>2</sub> emissions comes from the building industry in Sweden today. Växjö with its strong focus on emission of course must tackle and handle these CO<sub>2</sub>-emissions as well if we want to improve further.

Thus, building in wood is part of our environmental program, but we also have a separate wood building strategy to improve and influence the municipal organisation and the building industry. Targets in the program and strategy are measured every year.

## 2.3. Other reasons

Of course, there are many other reasons for choosing wood in Växjö. Building costs are increasing. By letting in new actors on the market from the wooden sector to compete with the concrete builders we hope to see a change in prices. With new actors there is also a possibility for new companies to establish on the Växjö market and to start producing here.

Växjö also would like to promote and support the development of a local and renewable product and a new way of manufacture houses. We now have the knowledge and experience that is needed and the support from research and university for realizing all the building projects in wood.

Furthermore, there are already today many companies and actor active in the sector in our region, so the city wants to support and develop the companies established here. It can create new jobs. At least it will change the place of the manufacturing. The sawmills are mostly located on the countryside, where as the building-sites are in the city centre. The industrial production of houses will be located close to the sawmills moving the employments from the city to the countryside. By producing houses indoor in factories, the way of production also opens up for other than the traditional building workers, for instance women, disabled and for new categories of labours, for instance wood assembly worker, rather than carpenters, plumbers, painters, etc.

Another important reason for choosing wood is that Växjö want to take the lead! We want and we dare!!

## 3. The Växjö success story

### 3.1. Unity

One of the success factors in Växjö is just this. From the political left to right all the parties are in agree regarding environmental issues and thereby also the wood building strategy accompanying it. The politicians are also brave enough to want to go further for climate and dare challenge the building sector.

### 3.2. Cooperation

Another success factor in Växjö is the close cooperation between the city, university, and industry. Many of our building projects are cooperation like this. Without this we wouldn't have reach this far and wouldn't have developed so much during the years. There is a win for all parts in this: the cutting-edge research, the new business fields and opportunities and a more attractive and sustainable city.

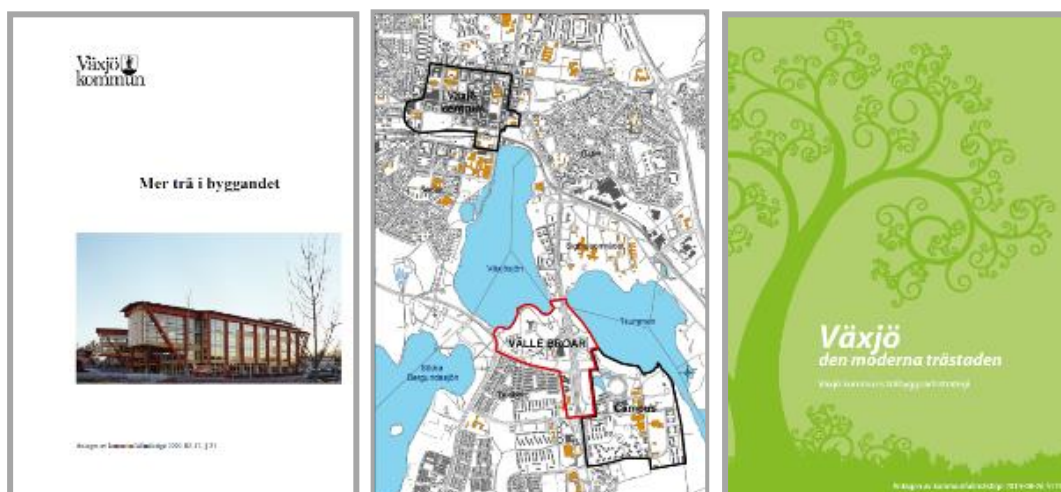
## 4. When and what in Växjö

### 4.1. Early strategy and specific land area for wood buildings

In 1994 Sweden joined the European Union. At the same time the national building code changed. The code stated that it was now possible to build houses higher than 2 floors in wood in Sweden if all other standards were fulfilled, fire protection, etc. Växjö was an early bird in this sense. With a couple of exemptions from the building code, we had already started our wood building journey in the beginning of 1990.

In 2004 the government stated in a proposal that Sweden should promote and increase the wood used in buildings. Växjö quickly followed this proposal and decided on policy in this matter in 2005. In 2006 Växjö decided to allocate an area of the city, called Välle Broar, only allowing buildings in wood (the frame/supporting walls should be in wood). It included both apartments and office space. The university was a strong partner in these projects. We learned a lot from every project and develop new methods and techniques all the time.

In 2013 the city decided on a wood building strategy. In this strategy stated that by 2020 50% of all newly built municipal buildings should be in wood (the frame/supporting walls). Making this the strongest wood building strategy in Sweden.



## 4.2. Buildings and examples from Växjö

There are now many examples of buildings in wood from the Välle Broar and the university campus area. We have examples of apartments, of office buildings and of arenas (for tennis, floor ball and indoor athletics). We also have examples of houses for densifying the city centre and of wooden lobbies.

In 2017 a private developer completed Växjö's first house in massive wood (Cross-Laminated Timber) at Välle Broar.

## 5. Recently built projects in Växjö

Right now, there are many ongoing wood building projects in Växjö. We say that we probably are the largest building site in northern Europe when it comes to building in wood. Following below are some examples of the pending projects.

### 5.1. Vallen

Developer: Växjöbostäder and Midroc

Building systems: Moelven, column-beam and Binderholz, CLT

Architect: Arkitektbolaget

No. of storeys: 8

No. of apartments: 200



## 5.2. Pelarsalen

Developer: HSB Sydost

Building system: Derome/Ahus, panel elements

Architect: Tengboms

No. of storeys: 6

No. of apartments: 200



## 5.3. Docenten

Developer: ICA Fastigheter and Växjöbostäder

Building system: Vida Building, volume elements/modules

Architect: LBE

No. of storeys: 8 (incl. a grocery store and student homes)

No. of apartments: 248





## 5.4. Geologen

Developer: GBJ Bygg  
 Building system: StoraEnso, CLT  
 Architect: Stefan Johansson  
 No. of storeys: 8 (incl. a pre-school)  
 No. of apartments: 143



## 5.5. Ekologen

Developer: Midroc  
 Building system: Martinsons, CLT  
 Architect: Arkitektlaget  
 No. of storeys: 5  
 No. of apartments: 75



## 6. Next step

### 6.1. New train station and city hall

The city council just recently decided to go ahead with the plans of building a new train station and a city hall. Environmental impact and energy consumption is highly considered in this project. Thus, the building should be:

A smart, efficient and sustainable house

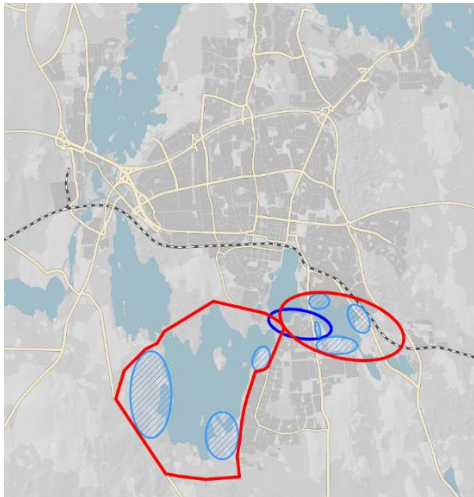
A house for collaboration, with the city, the place and each other

Strengthening and preserving the city's identity

### 6.2. New wood area

The allocated wood building area – Välle Broar – is now more or less completed with buildings. Thus, the city has decided to expand the area to the new Välle Broar 2.0. surrounding two of the city lakes. This means that the construction of wood buildings will continue in Växjö and whole new areas of the city will be built in wood.

The development will be in different steps, which means that the latest planed step might be in 2030-2035. By then all buildings in Växjö might be in wood and we are not referred to a specific wood building area anymore.



### 6.3. Development and research

Växjö is now in the process of updating the wood building strategy from 2013. This will probably be the last wood building strategy in Växjö. Wood as a building material is after this considered equal to concrete and steel (no headway anymore). Instead we are focusing on LCA and LCC, that is on the climate impact and CO2 emissions from each building project. We know today that the national building code will require climate declarations in the near future.

Building costs are still high in Sweden. Thus, Växjö want to see more competition and more actors in the wood building sector in order to facilitate for lower building costs. Closely linked to this is also the material of the façade. Building-owners try to avoid wooden material since it is creating higher costs for maintenance, on the other hand the wood façades create a more beautiful and attractive city. Research is ongoing regarding new solutions for façades.

Still sound and acoustics is an area for further research and development.

New research has indicated that rooms decorated with wood and lots of natural material give more relaxed people. According to a Norwegian study interior like this in a hospital could give 2-day-less in hospitalized people. Studies also shows that students/pupils in a school with a lot of natural interior material perform better and that there is less graffiti on wooden walls. This is research that Växjö is following very closely, although more research is needed in this field.