TIMBERVATION

Business Plan

Cross-Laminated Timber Fabrication USA

Example: CLT Element (Larch and Spruce, residential quality)

Stephan Hillenbrand

Executive Summary

Timbervation will build a state-of-the-art cross-laminated timber plant in the state of Georgia, which will produce standardized elements in both industrial and high-grade visible quality. The plant will process 100,000 m^3 of wood per year.

In North America, the market for cross-laminated timber is in the introduction market phase. High growth rates are to be expected. In the past, the cross-laminated timber market has grown by 10% annually.
If the non-residential and multifamily construction market were to be used as a calculation basis, 5% of the volume would correspond to 5,000,000 m^3, and currently less than 1,000,000 m^3 is being produced in North America.

Unlike its competitors, Timbervation will not rely on order-related production and large-format element sizes, but will instead produce standardized elements. This will allow for continuous year-round production, expand the customer base and will mean that higher quality products can be manufactured at lower production costs.
In addition, the joints in the longitudinal layers are glued, and the visible surfaces can be easily made in high visible quality (similar to a piece of furniture). This represents a unique selling point in the North-American market. So far, throughout the world there is only one factory in Austria that can produce such elements.

The construction phase until production can begin will take around 24 months, which is due to delivery times of the machine manufacturers. Overall, the capital required to take the company up to production is $29,000,000. There will be, however, an annual EBIT of $32,000,000 that will be continually optimized.

The personnel required is 55 employees, the annual cost of which are calculated at $2,871,000. This includes 30% non-wage labor costs which are calculated here somewhat higher, leaving room for future savings opportunities.

Company Description

Timbervation will be founded as an LLC in Georgia and will produce high-quality CLT elements, primarily for the North-American market. The goal is to become the leading manufacturer of high-quality standardized CLT elements. This is possible thanks to the option to mix different types of wood, the use of precise CNC joinery on visible surfaces and a standard width dimension.

Timbervation will draw on the know-how of the founder and that of the company Holzplus GmbH from Austria, who have achieved milestones such as creating the world's first CLT elements as a prototype up to the successful mass production of approved CLT elements. The company was responsible for the first CLT house in Germany with a durable exterior and double-sided visible surfaces and has had an influence on many innovations in Europe. More than 2,000 projects have been completed.

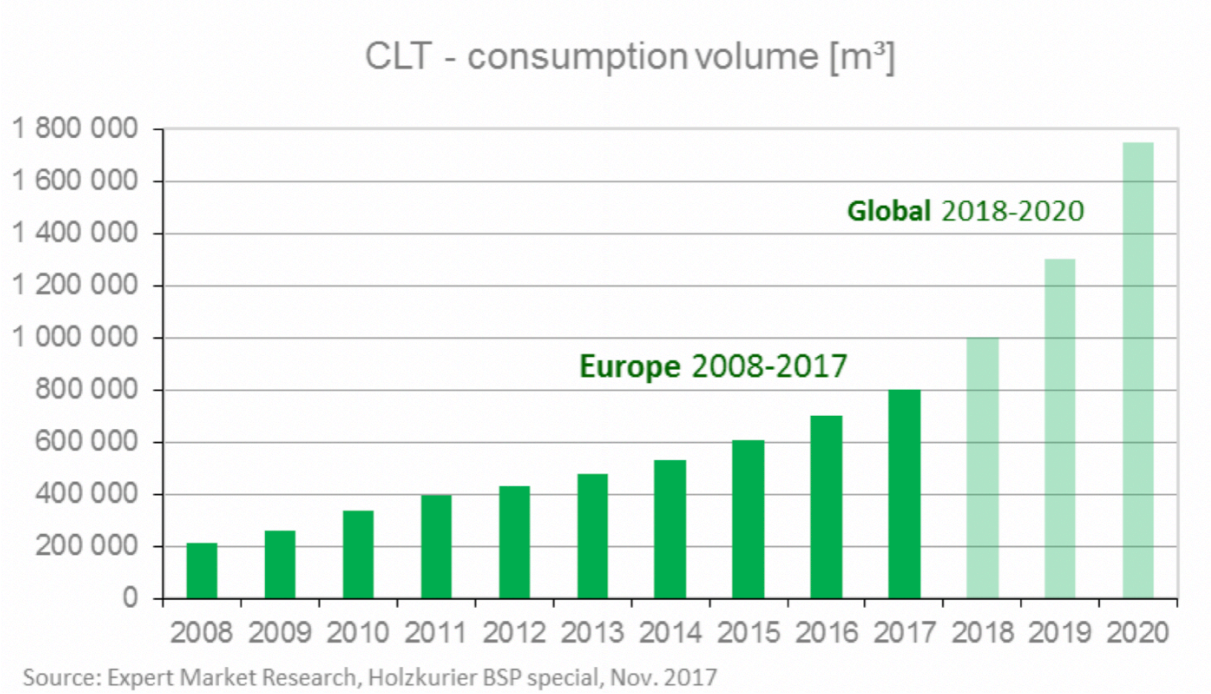
Based on this experience, Timbervation will operate an optimized, highly-efficient CLT plant, which will produce elements in visible (AB) or industrial quality (C). Timbervation will be able to produce 25,000 m^3 p.a. of CLT elements in single-shift operation and will expand this to 75,000 m^3 p.a. in triple-shift operation. The CLT elements will not only be for sale on the North-American market, but will also be distributed internationally.

The plant will be built in the state of Georgia. In addition to its proximity to the coast and to the container port in Savannah, the Georgia site is also attractive because of the native wood available locally as a raw material. Types of wood that are imported can also easily be supplied to the factory via the container port.

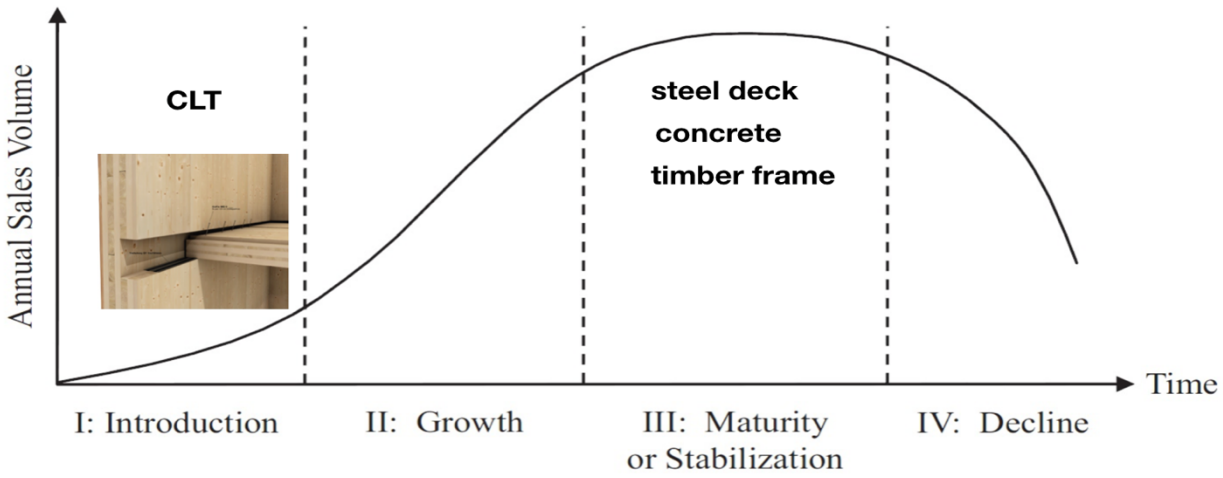
Timbervation will need an investment of $29,000,000 to build the optimized plant and set up the production system. The minimum investment will be $5,000,000.

Market Analysis

Worldwide the market for CLT elements has grown by an average of 10%, even in the crisis years of 2008/2009.



The North-American market is in the introduction stage. This phase is followed by the growth phase and maturity phase until the decline begins. The existing products such as timber-frame construction and steel-deck concrete are in maturity phase and will be displaced by the advantages of CLT elements in certain construction areas.



If the existing non-residential and multifamily construction market were to be taken as a base measure, 5% of its volume would correspond to 5,000,000 m^3 per year. As CLT is still in the introductory phase, further growth is expected. This is without taking the residential-building market, or sophisticated architecture into account. Timbervation can supply the market with either industrial or double-sided, high-quality visible surfaces that are CNC machined.

By the end of 2018, European manufacturers had increased their production capacity to 773,500 m^3. Further new construction and expansions are expected to increase production capacity to approximately 1,700,000 m^3 by the end of 2020. This is in order to meet the increasing demand. Currently, a smaller volume is being produced than is demanded by the market.

This is particularly true in the context of high-quality CLT elements on the American market. Here, approximately 250,000 to 300,000 m^3 will be produced by the end of 2019 and this production is of large-scale element sizes and rather inferior visible quality. Another six production sites in serving the American market are planned, are under construction or are about to begin. Thus, production is expected to double by the end of 2020 to 600,000 m^3 . However, this production will continue to use large-scale element sizes and focus on big or industrial customers.

From the outset, Timbervation will rely on a flexible solution that caters to both industrial and big customers, as well as discerning customers who value high quality, which, of course, are not mutually exclusive. The production of standardized CLT elements accesses not only the classical building market, but also the “do it yourself” market with the companies Home Depot, Lowes, True Value, ACE Hardware and Menards.

As an example, let’s take the market leader Home Depot with 2,000 stores in the U.S. A small garden shed or a small garage requires a CLT quantity of 10 m^3. If only one kit was sold in each store, that would add up to 20,000 m^3 per year. In this example, competitors are not included in the calcuation.

Carpenters and joiners with their own CNC system are also not included; they can obtain the standardized elements through Timbervation and even carry out the CNC joinery for their own customers to complete customized projects. At the moment, this customer group imports elements from Europe.

Timbervation can serve different markets efficiently and flexibly.

Competitors

Through *wooden cabins* a small project inquiry was made to potential competitors in order to acquire information directly and to assess the service and the speed of the inquiry.

The small project had the dimensions of a cabin in 20’ container format, in CLT with visible quality. At Timbervation this request would have been handled in a maximum of half an hour and the quality requirements would have been readily available.

International Beams

Size	11’ 3” wide x 52’ long thickness from 3 layer 4 1/8” to 9 layer 12 3/8”
Quality	one-sided visible surfaces, joints not glued
Price	Each project is customized. In one-sided visual quality ≈ $ 1,100 /m^3
Internet	http://internationalbeams.com/en/product_item/ib-max-core-clt/ Lots of information, but the important information came only upon contacting the company
Service	Replied to the first email after one day but it took three weeks to receive a price quote.

Freres Lumber Co., Inc. (Note: not CLT, but large-format plywood)

Size	7’10”, 9’10”, 11’10” wide and up to 48’ long, thickness from 2” to 12”
Quality	Double-sided visible quality compared to plywood panels
Price	Current pricing is $19 per cu ft CNC time is billed at $20/min
Internet	https://frereslumber.com/products-and-services/mass-plywood-panel/ A lot of information also via PDF download and videos
Service	All information obtained via email within one day

Oregon CLT

Size	10’ x 42’, thickness 3 layer 4.124”, 5 layer 6.875”, 7 layer 9.625”
Quality	One-sided visible surfaces, joints not glued
Price	The email mentioned an approximate base price for rough CLT pricing: 3-PLY $10-12 per square ft., 5-PLY $18-20 per square ft., 7-PLY $25-27 per square ft. In industrial quality, this corresponds to ≈ $1,300 /$m^3$
Internet	www.oregonclt.com Lots of information, but details first given after contact via email
Service	No response after initial contact, second contact via the contact form was answered. The answer: PDF product information and the fact pointed out that there was a lot going on and that a detailed price quote would follow in one or two weeks. No further price quote was sent.

Smartlam

Size	10’ x 54’ thickness from 3 layer 4 1/8” up to 9 layer 12 3/8”
Quality	One-sided visible surfaces, joints not glued
Price	No information given, according to market research this is likely to be over $1,000.
Internet	http://www.smartlam.com Lots of information but details first given after contacting company.
Service	Questions were only answered after second email and phone call after waiting a week. The price inquiry was not answered.

Nordic

Size	Large format
Quality	One-sided visible surface
Price	No information given, according to market research this is likely to be over $1,000.
Internet	https://www.nordic.ca/en/products/nordic-x-lam-cross-laminated-timber-clt Information supposedly via PDF download, but this did not work
Service	Slow, difficult to find contact persons, emails were not answered. After an additional email to other coworkers, an answer and a request to call back, each time only answering machine reached. Telephone conversation stating that they have issues regarding the quality of the visible surfaces and the requirements. After a plan was sent, one week later (after a total of 4 weeks) a cancellation arrived.

Structurelam

Size	9’10.5” x 40.0’ thickness 3.43” to 12.42”
Quality	Double-sided visible surfaces, joints not glued
Price	No information given, according to market research this is likely to be over $1,000.
Internet	https://www.structurlam.com/construction/products/d/cross-laminated-timber-clt/ Product information via PDF download
Service	Difficult to find the right contact person, only after a second email to another employee was there an answer stating that the correct contact person is on vacation for two weeks. Further information was not offered.

Answers were expected within one week’s time; in reality it was four weeks and even then it took multiple requests by email and telephone to receive an answer. Some competitors declined the inquiry and some ignored them altogether. The problems appeared to be: the quality requirement regarding the visible quality, the element size and the fact it was a small project and perhaps did not seem worth the effort.

All in all, the service quality was poor and it became clear that high-quality visible elements could not be delivered. The competitors are unilaterally aiming for mass production and industrial quality.
Timbervation can deliver unrivaled visible quality on both sides (e.g. interior walls) and higher industrial quality. This can be also be achieved at a better price and with better service. The price, however, would not have to be reduced; in the market phases of introduction and growth, the higher quality and better service should suffice for market penetration. A higher price would even be feasible, as a result of the quality.
In terms of visible quality, Timbervation would be unrivaled after market entry. There is also no supplier on the North-American market that offers standardized, solid-wood elements and whose production plant is optimized for and geared towards this market.
This orientation is reflected in the production efficiency and will play a role in the maturity phase when market share needs to be defended. Timbervation can both deliver better quality and produce for less.

Currently, CLT elements are selling for $1,000 up to $1,500. And this in a visible quality that is either industrial or only one-sided and therefore not comparable. Timbervation can deliver high visible quality on both sides and, for a raw material purchase of $300, profitably sell this for $620. With a market price of over $1,000, accordingly higher margins are to be expected.

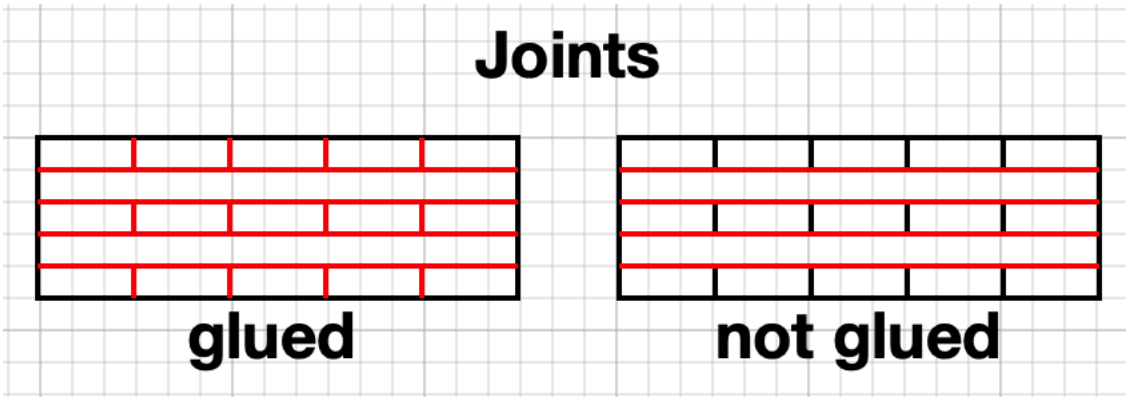
The competitors mainly produce on order. Only when a project is planned will it be put into production. This results in seasonal disadvantages, since production must be halted in months with low order volume, for example in December and January. By comparison, Timbervation can produce continuously and deliver quickly during high-demand periods as a result of the pre-production.

Timbervation will use various raw material suppliers for its purchasing. The required quality is: boards D/B = min. 1:4, strength-graded wood C24 and C16, moisture 12 + -2%. The Southern Pine wood type will be requested in mass at local sawmills. However, due to the optimized production plant, all types of wood can be processed. If Southern Pine is experiencing delivery problems due to pests or bad weather, the proximity to Savannah will allow for the import of all necessary wood. Currently prices, including transport, are listed at around $350. The import of non-native wood types, such as larch, spruce and Swiss pine, for the visible surfaces is possible and is planned. If these are used as the outer layer, durable outer surfaces are possible, which in turn represents a unique selling point that sets Timbervation apart from its competitors.

Product Description

Dimensions and Quality
The CLT plant will manufacture nationally and internationally standardized element sizes in the width of 1.25m, the length can be flexibly adapted up to a max. of 14-24m and in the thickness of 60 to 350mm.
For the American market, the dimensions will be optimized according to customer requirements. Here, the width is slightly reduced to 4ft, the length is a maximum of 52-80ft, which roughly corresponds to the metric-system measurements, the thickness of 2-12 inches varies, but this can be adjusted individually according to customer wishes.

Timbervation will produce various certified CLT elements with various visible surfaces in AB (residential) quality such as pine, spruce, larch and Swiss pine. Again, we can supply the customer with various quality levels from high visible quality (AB) to industrial quality (C). Unlike the competitors, our joints are glued in all longitudinal layers.



The industrial quality lends itself to facades that are covered with various materials both indoors and outdoors. Visible quality is suitable for finished surfaces in order to complete timber construction projects that are architecturally demanding or for discerning customers. Here the natural properties of the CLT elements are of particular advantage.

As a result of the production in the standardized climate of 68° F and 65% humidity, as well as the smaller widths compared to large-format elements, the CLT elements of Timbervation are dimensionally more accurate and have smaller deviations. Also, the respective longitudinal layers in each of the 3-7 layers of the CLT element are glued to the joints.

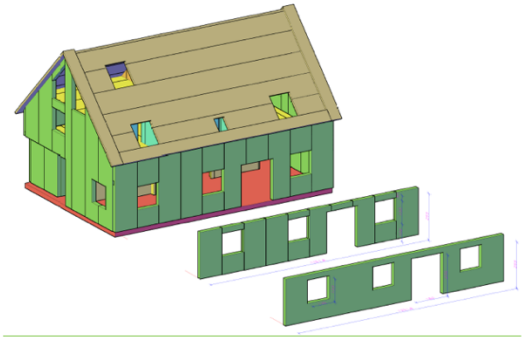
CNC Machining

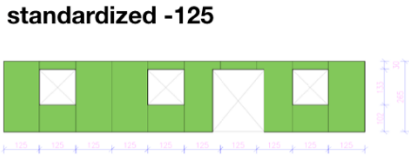
After production, the elements are CNC machined according to individual customer wishes. This makes openings for doors or windows, angles for the roof connection and cut-outs for ceilings or stairs possible. Also, ducting for the electrical system can already be drilled and milled in the factory.

Sophisticated architecture, in which the surfaces do not have to be veneered, is also a possibility. This is particularly suitable for construction with visible quality and high-quality surfaces.

The manufacture to a standard width offers the following advantages:

- Less waste of wood, up to 37% cost savings for the customer
- Better dimensional accuracy and small deviations
- Demanding architecture is possible, especially due to the various lengths of the solid wood elements and the CNC machining in factory
- Easier transport, even in sea containers
- CNC machining by carpenters or joiners possible
- Larger DIY customer group
- Simple prefabrication of walls and construction kits





industrial C to residential AB possible

high quality surfaces possible

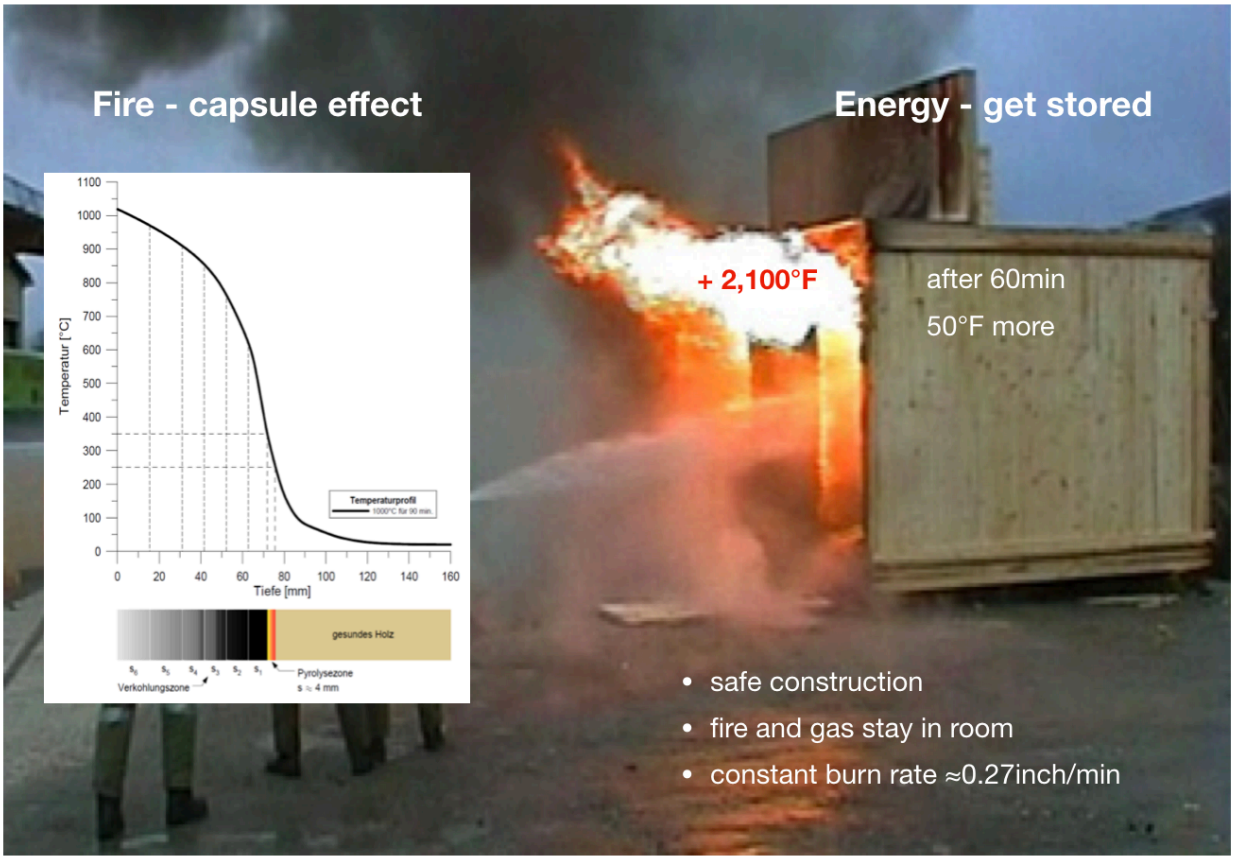
The fact that we can produce standardized and the processes on the construction sites can be adjusted accordingly, resulting in a much shorter construction time than in traditional construction.
For example, a 1000 sqft building may be completed in 7 days with 5 workers when the groundwork and foundation work is complete.
There is also the roofing, doors and windows, as well as the interior. Since it can be started parallel to the construction progress, it is possible to start the interior work within 10 days.

Fire Resistance

Wood is more fire-resistant than stone or concrete? Not necessarily. But when a fire occurs in the household, it doesn't usually start in the walls, but rather in other

flammable materials in the house. Stone or concrete houses, or the timber frame construction widely used in the United States, all have different insulation materials and hollow spaces in which smoldering fires can develop and remain undetected for a long time. A full fire on the inside of a house generates slightly more than 1800°F, which can cause the supporting building elements to lose their stability and the building to collapse.

In all these fire causes and processes CLT showcases its strengths. It conducts heat to the outside poorly. During a full fire inside you can touch the outer wall with your bare hand and the fire and the smoke remain enclosed in the room. Thus, it is a slow, controlled fire and the house retains its constructive stability for a very long time, so that there is plenty of time to get to safety or to save people from the house.
Spruce wood burns at a rate of about 0.7mm per minute. The heat penetrates very slowly into and through the wood. In a fire test, the outside temperature rose by only 50° F after one hour.



Earthquake and Storm Resistance
In an earthquake, a house is like a person trying to balance on a shaky ground. Only those who absorb the movements with them and compensate for them can stay on their feet. If, however, you stand rigid and stiff, you will be knocked over by the first violent jolt.

Here is another area where solid wood elements are ahead of the competition. Not only is the natural elasticity of the wood able to move without breaking, but the stable yet flexible connections of the elements also ensure that additional energy can be absorbed and dissipated. While rigid stone and concrete structures tear, burst and crumble under the impact, the solid wood elements move with the quake. The same advantage also helps them in storms, so they can even withstand hurricanes and the impact of flying objects.

Statics
Over and over we hear about new “miracle materials” that are more durable than steel or harder than concrete. If this impresses you, then you will be amazed at our wooden elements.

Not only are they much lighter than steel-deck concrete and therefore already save money and effort during transport to the construction site. Due to their low weight, they also generally do not require a complex steel-deck concrete foundation, but can be set on ground screws placed at selected points. An additional advantage: house construction only requires either a very small crane or none at all.

Despite their light weight, the static properties of our solid wood elements are in a league of their own when it comes to building materials: a 3.94” thick element with a length of 7.9’ and a width of 4.1’ can bear a load of 125 tons per yard. The load capacity is so high that even multi-story buildings or sophisticated, creative designs can be built without issue. With a thickness of 9.8”, more than 400 tons are possible.

CLT 5-Layers - width 49.21 inch - length 98.4 inch

thickness 3.8 inch

≈ 342,377 lb

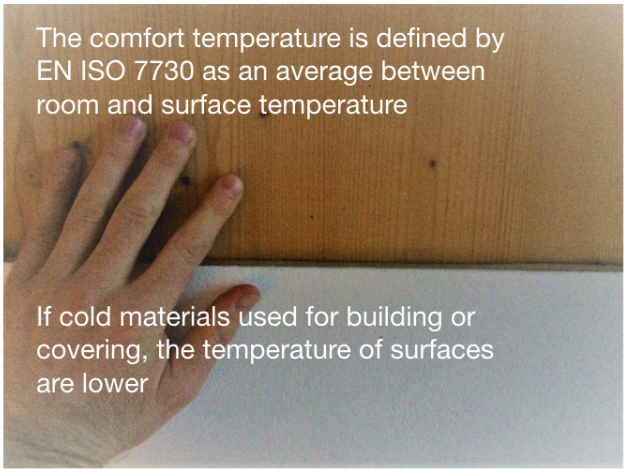
thickness 9.7 inch

≈ 1,102,311 lb

Comfort

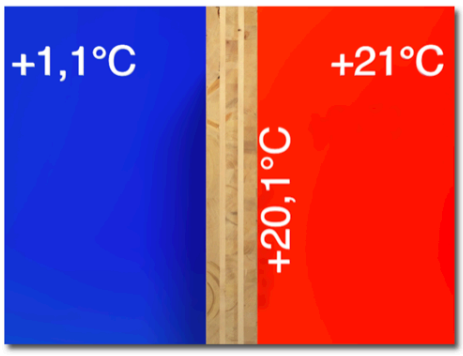
When you spend some time in a solid-wood construction for the first time, you will quickly notice the exceptionally pleasant room climate. This is no coincidence, because the solid wood construction offers invaluable advantages both thermally and in terms of humidity and air purity.

If you have ever sat on a cold stone wall in the winter, which literally sucks the heat out of your body, you can expect a completely different experience in a solid-wood house: here the floors, walls and ceilings are pleasantly tempered both in summer and in winter. There is also less heat under the roof and no damp humidity in the summer and no unpleasantly dry warmed air in the winter. The wood not only provides excellent insulation, it also absorbs moisture and releases it again, thus ensuring a consistently pleasant humidity level. Which, by the way, is a very uncomfortable habitat for dust mites, and thus is even more comfortable for allergy sufferers.



To reach the same comfort temperature of 20,5°C, the room temperature has to be increased approx 2-3°C

In comparison to CLT surfaces you have **higher heating costs**!



Test at the Fraunhofer Institut:
(21 + 20) / 2 = 20,5°C

Because the wood also absorbs bad odors and releases essential oils into the environment, there is also a pleasant smell throughout the house.

The technically dried wood elements have a residual moisture of approximately 12% – this also means that they do not provide a breeding ground for insects, dry rot or mold.

Marketing Plan

We do not sit back and wait for customers to come to us. We go find potential customers. We do not wait until the customer finds a solution, we offer solutions. When the term CLT comes up, Timbervation, and the innovation and support that come with it, should immediately come to mind.

Right at the beginning as the company was founded, a user-friendly website that features all the important product information was created and continues to be improved.

Market research has shown that CLT is currently planned in a comparable way to conservative designs such as timber frame or steel-deck concrete. However, this does not take full advantage of the potential of CLT construction. There is a lack of experience and skilled personnel on the part of planners and contractors. Also, the element quality up until now does not allow for the use of the full design bandwidth. This is a sign of the introduction market phase and provides scope to develop a competitive advantage based on our years of expertise.

This is where Timbervation will come in to oust previous market leaders on the North-American market.

The personal contact is a must, which is why we will set up and train a 10-person sales team. This team is divided into different zones in North America. The team will go straight to potential customers and use examples and samples to demonstrate the quality of Timbervation's CLT elements. They will specifically emphasize the surface quality and the quality of the CNC joinery. The product will not simply be listed in the catalog, but also there for the customers to feel and see the quality for themselves.

Additional documents, such as a manual describing the properties of CLT, as well as design options and detailed solutions, will be given to the customer. This will indirectly highlight the benefits of Timbervation's CLT elements compared to competitors. These documents will target our analog customers.

However, this analog customer group will gradually be replaced by the future digital one. Already today, the Internet is most often used for product or solution research. Thus, Timbervation will have a strong web presence that vividly presents the innovation of our CLT elements. The following domains have already been reserved: timbervation.com and cross-laminated-timber.com.

The website will feature motion graphics or explainer videos as well as diagrams and product explanations. The construction details and handling will be shown, also fire tests, hurricane impact tests, indoor climate comfort, etc. will be explained, in order to make the physical properties more accessible and easier to understand. This should not only make the product more appealing for planners, but also for the end customer.

Demand will arise from needs. Topics will be discussed, such as reduced energy consumption for heating and air conditioning, indoor climate comfort, building biology and environment, as well as fire, storm and earthquake safety. The customer not only buys the product, but also the service with simple and comprehensible examples of how it can be used and what advantages the CLT from Timbervation offers. This is where our years of experience planning CLT buildings come in. Directly and indirectly, the advantages of the CLT elements from Timbervation are relayed to the customer in a fitting and appropriate manner.

There is a clear pricing system that shows costs per m^3, as well as costs for CNC joinery and the types of wood used. Commercial customers are also addressed.

We look after every customer, regardless of whether they order $10m^3$ or 10,000 m^3.

Here, we take advantage of digital process and production control in conjunction with ERP software. Responding to customers quickly, from the inquiry to the quote, and from the production to project completion, is a top priority for us. Here again, Timbervation stands out from the competition. At any time, customer inquiries can be answered in near real time. The customer will always know the phase their order is in and can automatically receive status updates on request. Thus, just-in-time planning is possible and construction site activities can be planned more easily.

Timbervation has a short delivery time as a result of its targeted pre-production of high-demand configurations. When ordering, the pre-produced elements can be provided immediately or first individually configured via CNC joinery as desired. Here, the sales staff knows through the ERP exactly what elements are in stock or planned in production.

An app-based order process is also being developed. The customer can easily enter the dimensions, the type of wood and surface quality, as well as the CNC joinery itself and place an order. After the plausibility check by production planning is complete, an order confirmation is sent and the order is produced after receipt of payment.

The standard dimensions allow for a wide customer base to be gained. For example, in the plywood format 4 x 8 feet in 2 inch thickness home improvement stores can generate kits with their own products for garages, garden sheds, etc. for do-it-yourself customers. Our sales team generates ideas for these customer groups.

Carpenters can also purchase raw elements and even do the joinery themselves due to the standardized element sizes. Simple and flexible pre-production of building parts is possible.

The process of researching small CLT project with the competitors as well as requesting a quote showed that they need a very long time to answer the inquiry and the correct contact person was difficult to find or only answered after several requests. It also took more than three weeks after initial contact to receive a quote; this was not simply an outlier, but rather the response time for the majority. The request referred to a residential container made of CLT with 10 cm wall thickness and a total material of $7m^3$. This is a simple construction, and the inquiry should not have taken more than one hour. In addition, product and construction information was difficult or impossible to find. Even though the quality offered by the competitors was poorer, their prices were all over $1,000. Timbervation could produce for under $500. Our goal is to match our competitor's price and offer higher quality.

This is exactly what Timervation will strive to do: quickly, easily and transparently offer our customers information, quotes and intelligent solutions.

I would also like to mention the aspect of sustainability and greener construction. This will play a role throughout the process:

- Renewable resource wood
- No hazardous waste
- Thermal recovery after the period of use
- Resource-saving in the manufacturing process compared to conventional construction

This will play a stronger role in customer demand in the future than in the past and present.
Do I build a building with a lot of chemical substances which requires a lot of energy, or do I build sustainably with a more natural product and less energy consumption?
This customer group can also be reached.

Personnel Plan

After the company has been founded, the managing director will be hired. It is planned that I exercise this position. He will establish the business and will take care of administrative activities such as acquiring, planning and commissioning land, buildings, machinery and permits.
A timber engineer, or an employee with comparable qualifications, will be hired to support the company. At the same time, the administration, internet presence and advertising documents will be created. During this process, the partner Holzplus will support Timbervation with its planning tools and expertise.

During the machine delivery phase, a second timber engineer or employee with comparable qualifications will be hired, who will also assist in setting up the administration and production planning. Then the sales team will begin selling Timbervation and its product. Initially, 10 employees will be hired with a base salary plus commission. These employees are specially trained so that they can provide assistance with planning.

As the complexity and administration grow, two administrative assistants will be hired.

The structure will be streamlined and the bookkeeping and sales will be supported by the ERP system implemented. If it becomes apparent that this is not enough, more employees will be hired in this area.

At the beginning of the 0-series production, 2 foremen and 12 production employees will be hired. They will get to know and become competent in the first shift and master the production process.

Once the elements are certified, the second shift will be incorporated into the first. To do this, another 2 foremen and 12 production employees will be hired. The two shifts will be mixed in order to guarantee the high quality standards right from the start.

As this is taking place, the third shift will also be implemented in the same way and again 2 foremen and 12 production employees will be hired.

Recruitment Plan

Month	Description		per employee / anno / incl. burden rate 30%
1	1	CEO	$ 155,000 ($ 90,000 before production)
2	1	timber engineer	$ 90,000
19	10	sales persons	$ 33,000
	2	office workers	$ 59,000
	1	timber engineer	$ 90,000
22	12	lower qualified production workers	$ 45,000
	2	higher qualified production workers	$ 78,000
24	24	lower qualified production workers	$ 45,000
	4	higher qualified production workers	$ 78,000

Employees are provided with health insurance, which, after years of employment, is also an option for family members. Likewise, employees will have 26 days paid vacation, paid holidays and paid (medically-attested) sick days.

Since the American labor market is very flexible on both sides, this can be a disadvantage for the company if employee turnover is high. The employees will receive special training in order to meet the high-quality standards. Thus, it is important to keep these valuable employees in the company. At the same time, this also has an external impact on the corporate identity.

This will be adjusted in detail but depends on the circumstances. We are aware that this is not necessarily common on the job market.

Financial Plan

Investment

We have planned for an investment of $29,000,000 to build the Georgia plant and to take it up to production. This starts with the purchase of land and ends with the purchase of raw materials and the production of certified CLT elements.

Land

The property will be acquired near Savannah. We have planned for an area of 50,000m2. This will be used both for additional storage space and later to expand production or the product portfolio. The budget will range from $500,000 to $1,000,000. This depends on the region and district as well as the amount of state support.

Buildings

The buildings are budgeted at $15,500,000. The manufacturing hall will be built on an area 250m long and 50m wide in an open double-hangar construction.

The office and building for socializing will be modularly built onto the production hall so that it can be flexibly expanded as needed in the future.

For energetic, static and corporate identity reasons, both buildings will use CLT.

This includes all planning and approval costs.

Production Plant

The production plant will be optimized by using various machine manufacturers and will cost $11,000,000. 10% planning and launching services by Holzplus are included in this. There are and will be no reimbursements or the like negotiated with the machine manufacturers. The machines will be purchased according to how best to optimize the production line and not according to who gives us the “best offer.”

Administration / Sales

The budget is $500,000 and includes office equipment, hardware, software, software development and consumable supplies.

Start-Up 0 Series up to Series Production
$1,000,000 is budgeted for the prototype production up through the series production, until revenues from the sale of the CLT elements occur and the operation is profitable. This covers the purchase of raw materials and the operating costs including personnel. Higher raw material quantities are assumed at this stage than during series production, which will act as an additional buffer.

Taxes
There is no loss carried forward or states subsidies included. This will be discussed in more detail with the state and the region when the project begins.

Depreciation, Provisions, Distributions
Depreciation is imprecise, as prepayments for machinery or for construction work are presented as a one-off payment. This will be worked out in detail later with the machine manufacturers and with the architect and contractors.

At the beginning, higher provisions are planned in order to be less dependent on borrowed capital. This is also to finance additional projects in the future from our own capital. For this purpose, distributions will be lower in the first few months, until this fundamental capital has been accumulated. Additional future projects will be discussed with and agreed on by the partners.

The profits will be distributed.

Documents
(downloadable at: www.timbervation.com)

Profit and Loss 5 years

	factor [$1000]	year 1	year 2	year 3	year 4	year 5
1.	**revenues**	**-**	**2,062.50**	**62,375**	**75,000**	**75,000**
2.	CNC joinery	-	106	3,194	3,840	3,840
3.	deposit investor	-	-	-	-	-
4.	other operating income -saw dust and other waste	-	8	250	300	300
5.	**sales plus changes in inventories**	**-**	**2,176**	**65,818**	**79,140**	**79,140**
6.	cost of materials and services	-	-	-	-	-
a)	cost of materials -raw wood dry: AB, C, CL [$/m^3]	-	- 2,475	- 29,150	- 30,000	- 30,000
b)	cost of materials -glue approx. 6-8%	-	- 248	- 2,915	- 3,000	- 3,000
c)	cost of energy - electrical production and A/C	-	- 182	- 909	- 917	- 917
d)	other cost of materials and services	- 5,500	- 5,631	- 1,538	- 1,583	- 1,583
e)	personnel expenses produktion	-	- 174	- 2,030	- 2,088	- 2,088
7.	**gross profit**	**- 5,500**	**- 6,533**	**29,276**	**41,552**	**41,552**
8.	personnel expenses	- 165	- 337	- 772	- 783	- 783
9.	depreciation and amortisation of fixed assets (mach	-	- 495	- 1,982	- 1,982	- 1,982
10.	other operation expenses	- 16,500	- 261	- 3,076	- 3,166	- 3,166
a)	selling and distribution costs	- 500	- 261	- 3,076	- 3,166	- 3,166
11.	**earnings before interest and tax (EBIT)**	**- 22,665**	**- 7,887**	**20,370**	**32,456**	**32,456**
12.	investment income / expense	-	-	-	-	-
13.	fixed assets	-	- 560	- 2,240	- 2,240	- 2,240
14.	other financial income / expense	-	-	-	-	-
15.	**earning before tax (EBT)**	**- 22,665**	**- 8,447**	**18,130**	**30,216**	**30,216**
16.	taxes on income	-	- 146	- 5,076	- 8,460	- 8,460
17.	**profit for the period (P/P)**	**- 22,665**	**- 8,593**	**13,054**	**21,755**	**21,755**
18.	+ depreciation and amortisation of fixed assets	-	495	1,982	1,982	1,982
19.	**cash-flow p.a. before investment**	**- 22,665**	**- 8,098**	**15,035**	**23,737**	**23,737**
20.	**Return on Capital (ROC)**	-81%	-28%	73%	116%	116%

Monthly Cash Flow

year 1													
	factor [$1000]	Jan 1	Feb 2	Mar 3	Apr 4	May 5	Jun 6	Jul 7	Aug 8	Sep 9	Oct 10	Nov 11	Dec 12
1.	**revenues**												
2.	CNC joinery												
3.	deposit investor												
4.	other operating income -saw dust and other waste												
5.	**sales plus changes in inventories**	-	-	-	-	-	-	-	-	-	-	-	-
6.	cost of materials and services												
a)	cost of materials -raw wood dry: AB, C, CL [$/m^3]												
b)	cost of materials -glue approx. 6-8%												
c)	cost of energy - electrical production and A/C												
d)	other cost of materials and services		- 5,500.00										
e)	personnel expenses produktion												
7.	**gross profit**	-	- 5,500.00	-	-	-	-	-	-	-	-	-	-
8.	personnel expenses	- 7.50	- 7.50	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00
9.	depreciation and amortisation of fixed assets	(machinery, buildings)					-						
10.	other operation expenses						- 16,500.00						
a)	selling and distribution costs	- 150.00										- 350.00	
11.	**earnings before interest and tax (EBIT)**	- 157.50	- 5,507.50	- 15.00	- 15.00	- 15.00	- 16,515.00	- 15.00	- 15.00	- 15.00	- 15.00	- 365.00	- 15.00
12.	investment income / expense												
13.	fixed assets												
14.	other financial income / expense												
15.	**earning before tax (EBT)**	- 157.50	- 5,507.50	- 15.00	- 15.00	- 15.00	- 16,515.00	- 15.00	- 15.00	- 15.00	- 15.00	- 365.00	- 15.00
16.	taxes on income												
17.	**profit for the period (P/P)**	- 157.50	- 5,507.50	- 15.00	- 15.00	- 15.00	- 16,515.00	- 15.00	- 15.00	- 15.00	- 15.00	- 365.00	- 15.00
18.	+ depreciation and amortisation of fixed assets												
19.	**cash-flow p.a. before investment**	- 157.50	- 5,507.50	- 15.00	- 15.00	- 15.00	- 16,515.00	- 15.00	- 15.00	- 15.00	- 15.00	- 365.00	- 15.00

year 2													
	factor [$1000]	Jan 13	Feb 14	Mar 15	Apr 16	May 17	Jun 18	Jul 19	Aug 20	Sep 21	Oct 22	Nov 23	Dec 24
1.	**revenues**												2,062.50
2.	CNC joinery												105.60
3.	deposit investor												
4.	other operating income -saw dust and other waste												8.25
5.	**sales plus changes in inventories**	-	-	-	-	-	-	-	-	-	-	-	2,176.35
6.	cost of materials and services												
a)	cost of materials -raw wood dry: AB, C, CL [$/m^3]										- 825.00	- 825.00	- 825.00
b)	cost of materials -glue approx. 6-8%										- 82.50	- 82.50	- 82.50
c)	cost of energy - electrical production and A/C										- 60.62	- 60.62	- 60.62
d)	other cost of materials and services									- 5,500.00	- 43.53	- 43.53	- 43.53
e)	personnel expenses produktion										- 58.00	- 58.00	- 58.00
7.	**gross profit**	-	-	-	-	-	-	-	-	- 5,500.00	- 1,069.64	- 1,069.64	1,106.71
8.	personnel expenses	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 22.50	- 22.50	- 22.50	- 59.83	- 59.83	- 59.83
9.	depreciation and amortisation of fixed assets	(machinery, buildings)									- 165.14	- 165.14	- 165.14
10.	other operation expenses										- 87.05	- 87.05	- 87.05
a)	selling and distribution costs										- 87.05	- 87.05	- 87.05
11.	**earnings before interest and tax (EBIT)**	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 22.50	- 22.50	- 5,522.50	- 1,468.73	- 1,468.73	707.62
12.	investment income / expense												
13.	fixed assets										- 186.67	- 186.67	- 186.67
14.	other financial income / expense												
15.	**earning before tax (EBT)**	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 22.50	- 22.50	- 5,522.50	- 1,655.40	- 1,655.40	520.95
16.	taxes on income												- 145.87
17.	**profit for the period (P/P)**	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 22.50	- 22.50	- 5,522.50	- 1,655.40	- 1,655.40	375.08
18.	+ depreciation and amortisation of fixed assets										165.14	165.14	165.14
19.	**cash-flow p.a. before investment**	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 15.00	- 22.50	- 22.50	- 5,522.50	- 1,490.26	- 1,490.26	540.23

year 3												
	factor [$1000]	Jan 25	Feb 26	Mär 27	Apr 28	Mai 29	Jun 30	Jul 31	Aug 32	Sep 33	Okt 34	Nov 35	Dez 36
1.	**revenues**	2,062.50	2,062.50	4,125.00	4,125.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00
2.	CNC joinery	105.60	105.60	211.20	211.20	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00
3.	deposit investor												
4.	other operating income -saw dust and other w	8.25	8.25	16.50	16.50	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
5.	**sales plus changes in inventories**	2,176.35	2,176.35	4,352.70	4,352.70	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00
6.	cost of materials and services												
a)	cost of materials -raw wood dry: AB, C, CL [$/r	-1,650.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00
b)	cost of materials -glue approx. 6-8%	-165.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00
c)	cost of energy - electrical production and A/C	-68.52	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43
d)	other cost of materials and services	-87.05	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90
e)	personnel expenses produktion	-116.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00
7.	**gross profit**	89.77	-955.98	1,220.37	1,220.37	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67
8.	personnel expenses	-59.83	-59.83	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25
9.	depreciation and amortisation of fixed assets	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14
10.	other operation expenses	-174.11	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80
a)	selling and distribution costs	-174.11	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80
11.	**earnings before interest and tax (EBIT)**	-483.42	-1,708.55	462.38	462.38	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68
12.	investment income / expense												
13.	fixed assets	-186.68	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69
14.	other financial income / expense												
15.	**earning before tax (EBT)**	-670.10	-1,895.24	275.69	275.69	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99
16.	taxes on income	187.63	530.67	-77.19	-77.19	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04
17.	**profit for the period (P/P)**	-482.47	-1,364.57	198.50	198.50	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96
18.	+ depreciation and amortisation of fixed asset	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14
19.	**cash-flow p.a. before investment**	-317.33	-1,199.43	363.64	363.64	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10

year 4												
	factor [$1000]	Jan 37	Feb 38	Mär 39	Apr 40	Mai 41	Jun 42	Jul 43	Aug 44	Sep 45	Okt 46	Nov 47	Dez 48
1.	**revenues**	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00
2.	CNC joinery	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00
3.	deposit investor												
4.	other operating income -saw dust and other w	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
5.	**sales plus changes in inventories**	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00
6.	cost of materials and services												
a)	cost of materials -raw wood dry: AB, C, CL [$/r	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00
b)	cost of materials -glue approx. 6-8%	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00
c)	cost of energy - electrical production and A/C	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43
d)	other cost of materials and services	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90
e)	personnel expenses produktion	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00
7.	**gross profit**	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67
8.	personnel expenses	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25
9.	depreciation and amortisation of fixed assets	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14
10.	other operation expenses	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80
a)	selling and distribution costs	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80
11.	**earnings before interest and tax (EBIT)**	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68
12.	investment income / expense												
13.	fixed assets	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69
14.	other financial income / expense												
15.	**earning before tax (EBT)**	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99
16.	taxes on income	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04
17.	**profit for the period (P/P)**	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96
18.	+ depreciation and amortisation of fixed asset	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14
19.	**cash-flow p.a. before investment**	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10

year 5												
	factor [$1000]	Jan 49	Feb 50	Mär 51	Apr 52	Mai 53	Jun 54	Jul 55	Aug 56	Sep 57	Okt 58	Nov 59	Dez 60
1.	**revenues**	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00	6,250.00
2.	CNC joinery	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00	320.00
3.	deposit investor												
4.	other operating income -saw dust and other w	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
5.	**sales plus changes in inventories**	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00	6,595.00
6.	cost of materials and services												
a)	cost of materials -raw wood dry: AB, C, CL [$/r	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00	-2,500.00
b)	cost of materials -glue approx. 6-8%	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00	-250.00
c)	cost of energy - electrical production and A/C	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43	-76.43
d)	other cost of materials and services	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90	-131.90
e)	personnel expenses produktion	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00	-174.00
7.	**gross profit**	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67	3,462.67
8.	personnel expenses	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25	-65.25
9.	depreciation and amortisation of fixed assets	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14	-165.14
10.	other operation expenses	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80
a)	selling and distribution costs	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80	-263.80
11.	**earnings before interest and tax (EBIT)**	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68	2,704.68
12.	investment income / expense												
13.	fixed assets	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69	-186.69
14.	other financial income / expense												
15.	**earning before tax (EBT)**	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99	2,517.99
16.	taxes on income	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04	-705.04
17.	**profit for the period (P/P)**	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96	1,812.96
18.	+ depreciation and amortisation of fixed asset	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14	165.14
19.	**cash-flow p.a. before investment**	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10	1,978.10

Profit and Loss 3 shifts

CLT plant - in advance -

	profit and loss			factor [$1000]	shifts 1		shifts 2		shifts 3	
	nature of expense method			raw wood dry [1000 m³]	33		66		100	
				clt elements [1000 m³]	25		50		75	
1.	**revenues: pine residential quality AB [$/m³]**			1000	**24,750**		**49,500**		**75,000**	
2.	CNC joinery				1,267		2,534		3,840	
3.	deposit investor									
4.	other operating income -saw dust and other waste				99		198		300	
5.	**sales plus changes in inventories**				**26,116**	**100%**	**52,232**	**100%**	**79,140**	**100%**
6.	cost of materials and services									
a)	cost of materials -raw wood dry: AB, C, CL [$/m³]			300 300 300	- 9,900	-38%	- 19,800	-38%	- 30,000	-38%
b)	cost of materials -glue approx. 6-8%				- 990	-4%	- 1,980	-4%	- 3,000	-4%
c)	cost of energy - electrical production and A/C				- 727	-3%	- 822	-2%	- 917	-1%
d)	other cost of materials and services	2%			- 522	-2%	- 1,045	-2%	- 1,583	-2%
e)	personnel expenses produktion				- 696	-3%	- 1,392	-3%	- 2,088	-3%
7.	**gross profit**				**13,280**	51%	**27,193**	52%	**41,552**	53%
8.	personnel expenses				- 783	-3%	- 783	-1%	- 783	-1%
9.	depreciation and amortisation of fixed assets (machinery, buildings)			11,000 16,000	- 1,982	-8%	- 1,982	-4%	- 1,982	-3%
10.	other operation expenses	4%			- 1,045	-4%	- 2,089	-4%	- 3,166	-4%
a)	selling and distribution costs	4%			- 1,045	-4%	- 2,089	-4%	- 3,166	-4%
11.	**earnings before interest and tax (EBIT)**				**8,426**	32%	**20,250**	39%	**32,456**	41%
12.	investment income / expense									
13.	fixed assets 8% current assets 4%		month	2	- 2,240		- 2,240		- 2,240	
14.	other financial income / expense									
15.	**earning before tax (EBT)**				**6,186**		**18,010**		**30,216**	
16.	taxes on income	28%			- 1,732		- 5,043		- 8,460	
17.	**profit for the period (P/P)**				**4,454**		**12,967**		**21,755**	
18.	+ depreciation and amortisation of fixed assets				1,982		1,982		1,982	
19.	**cash-flow p.a. before investment**				**6,436**		**14,949**		**23,737**	
20.	**Return on Capital (ROC)**				**30%**		**72%**		**116%**	

raw material

structure element		
20%	300	60
20%	300	60
20%	300	60
20%	300	60
20%	300	60
100%	$/m³	300

yield	78-80%	75%
by-prod.	4	396
sale	$/m³	1000
cost of sale		40%

glue

glue	$/m³	40
portion	6-8%	7%

energie

electricity	$/kWh	0.07
connected lo	kW	1500
simultaneously factor		45%
cost/h	$/h	47
shift hrs	8	378

fixed assets

machinery	7	11000000
buildings	39	16000000
land	500000 ??	1000000
interest		8%
total		28000000

personnel expenses

CEO	
quantity	1
costs	155

administration	
sales	
quantity	10
costs	33
finance / human resources	
quantity	2
costs	59
enginiering	
quantity	2
costs	90

production		
foreman		
quantity	shift 1	2
	shift 2	4
	shift 3	6
costs		78
lower qualified workers		
quantity	shift 1	12
	shift 2	24
	shift 3	36
costs		45

fabrication days	251

Aircondition		
hall	length	250
	width	50
	height	8
	m³	100000
power	W/m³	30
	kW	3000
consumption	$/h	210
	hrs/day	12
	fd	251
costs	day	2520
	year	632520

CNC joinery		
simple	40%	40
complex	60%	80
$/m³	100%	64
ordered	80%	51.2