

# Quartz

A basecamp for great adventures

Design:  
Project:  
Supervisors:

Matilda Dahlquist  
Bachelor project 2010  
Charlotte Sjödel,  
Claus-Christian Eckhardt  
& Anna Persson



# Table of content

Table of content.....	01
Introduction and brief.....	02
Timetable.....	03
Target group today.....	04
New target group.....	05
Talking to the target group.....	06-07
Market positioning.....	08-09
Competitive analysis.....	10-11
SWOT analysis.....	12-13
Product identity.....	14-15
Function analysis.....	16-17
Justification and communication.....	18-21
Features.....	22-33
Aesthetics.....	34-35
Sketches.....	36-43
Measurements.....	44-45
Process.....	46-49
Final result.....	50-60
Referenses.....	61-62

# Introduction and brief

Whether its accurate or not, there is a certain image connected to people who travel with caravans.

Caravan travelling is for example rarely connected to very active outdoor people, even though a trailer could do a great job fulfilling this target groups needs. A caravan would give any active outdoor person a steady base camp to view the beautiful nature from while weather is rough. It would safely store important gear and give you a nice and dry place to get ready for the days adventure. Since there are a lot of these people that are willing to put a lot of money on buying the perfect gear to be able to pursue their beloved hobbies, why won't they buy caravans?

From talking to people on forums etc. you find that many outdoor people doesn't see themselves as "trailer people".

One reason for this might be that many of todays trailers simply are to comfortable. A TV, a separate bedroom and floor heating are might not the first thing you need. What happens to the feeling of living in nature if your trailer is more like what you have at home but on wheels. Being to dependant on electricity also makes you very vulnerable. What happens if you will run out of electricity?

Apart from these more functional properties we also have of course the aesthetics of the trailer. The colorful rough gear simply don't go with the typical "white-box-look" seen as many caravans today.

The question I asked myself for this project were, can I change these outdoor peoples mind, making them consider a caravan?

The project resulted in a caravan called Quartz. In this booklet you will find out why it's called Quartz, and if you think it manage to differentiate itself from the classic caravan.



The sketch; "Man ska' ha husvagn" (You should have a caravan) is a swedish classic that really pinpointed the image of caravan travellers as a bit hillbilly-like family in matching sweat suits.

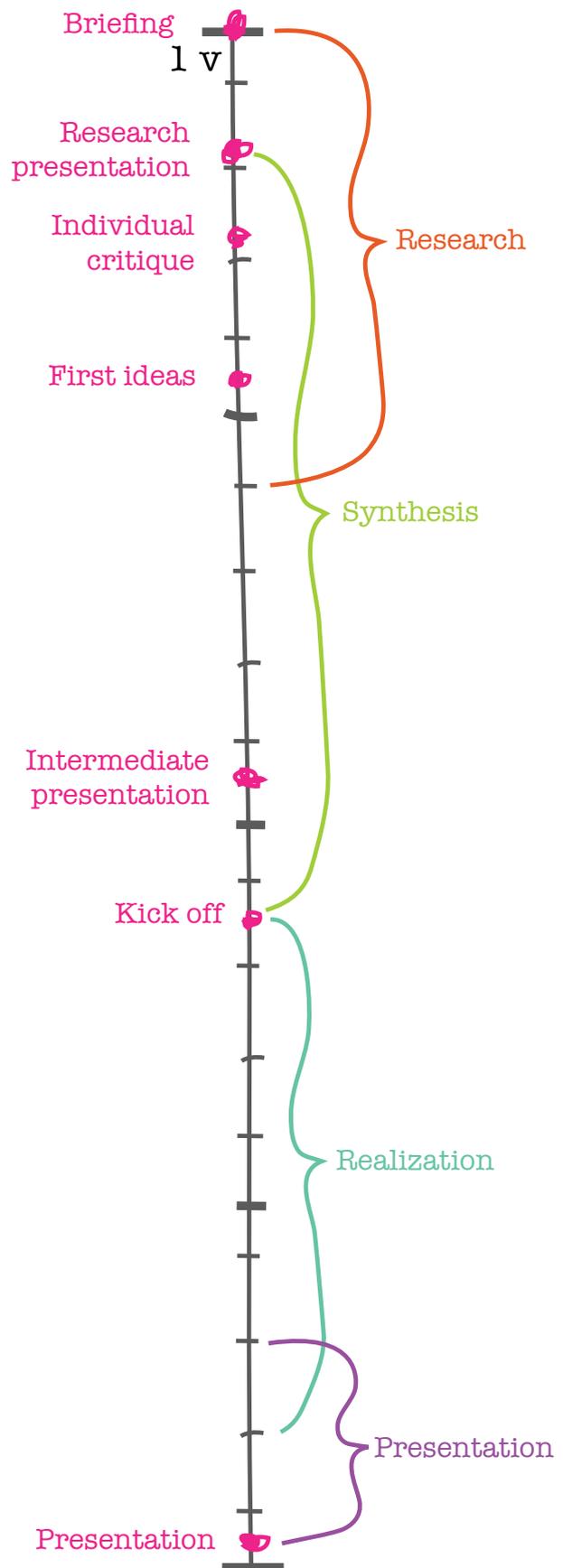
# Timetable

The timetable for this project was built from the scheduled process presentations. Having a lot of different deadlines gave you a good image of whether you were at a good place in the process or not.

All presentations were completed quite successfully and the time limit weren't a threat until the last part of the project was to be designed, the exterior. Up until that the designing had not been a struggle, but since the exterior is what would get peoples attention in the first place, the pressure of succeeding with this made the process more stressful.

The exterior design part took over a month to complete and the realization started a bit later that expected. Being a very detailed product, this of course made the realization very stressful as well. That fact that on top of everything, the more intensive coloring process started just a little bit more than a week before final presentation. Fortunately, because I didn't settle for just good enough and rather prioritized feeling satisfied before sleep the last days, the result felt really good. But as mentioned before, the realization got a bit stressful and there hard to be some rethinking about what was to be presented. But overall the result felt very satisfying.

Although perhaps the designing of the exterior took a bit more time to complete, I had no regret in this. I'd rather have an exterior that I'm very proud of and no physical model than vice versa.



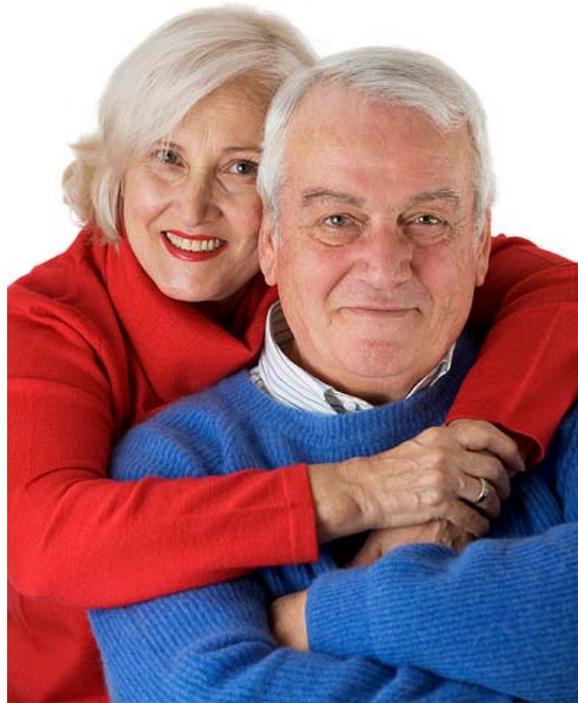
# Target group today

Today there is a very stereotype target group connected to caravans. Whether it is fair to the real target group or not, there is a possibility that this stereotype in a way drives away the more extreme outdoor campers. Since the starting point of this project was to attract the more extreme target group to caravans, and by doing so change the way people look at caravans more or less, it was important to first establish the real (not the stereotype) existing target group.

Having only the stereotype in mind in the beginning of the project, it was interesting to see how a caravan company sees their customers and who their aiming towards.

Therefore Johan Skogeryd whose in charge of marketing at Kabe was contacted. He answered that the target group today is 55+ in age, has a high income, lives in a house and has a good car. They are active and likes travelling, sports such as golf for example. When looking for a caravan they ask for comfort and quality foremost, such as real permanent beds and floor heating etc.

The real target group does of course not really fit the stereotype. One big difference between the stereotype and the real target group would probably be their income. A new caravan can cost about 100.000 SEK (ca 13.900 USD), so it's natural that many caravan customers has a good income. Something that probably doesn't match many peoples perception of people that travels with trailers.



# New target group

There are basically three different target groups for this project. What they all have in common is though that they are very active and loves being in the nature. Apart from this they all have different starting points and reasons for wanting a caravan.

One target group are persons that are very active and has been for a long time. They are very adventurous and has many extreme hobbies. The reason for why they want a trailer is first of all because it's a more robust base camp. It also provides them with water, a shower and the possibility to cook inside. All of these conveniences would probably make it easier to be out camping for a longer time. An other reason for them to buy a caravan is that they can easily bring a lot of gear to where they're practising their hobby. The moving to a new place will also go much faster. Examples of such hobbies are skiing, climbing, hunting och kayaking for example.

An other target group is the older camper that now feels that a tent is far too uncomfortable to sleep in. They want a steady bed and a good table to eat at.

The third target group are people that probably lives in the city with a good income and probably hasn't been camping too much before. They feel that they want that adventurous lifestyle but not at any price. They couldn't imagine going camping tent because they want to be able to take a shower, use a real toilet and not sleeping on the ground for example.



# Talking to the target group

One of the first things that was done in this project was to contact the target group. It was necessary to get their point of view, but most of all to gain confidence in that this caravan really was needed and wanted.

There are two important sides of the consuming group. One are the people who camp with trailers today. Would some of them want to buy a smaller trailer with less conveniences?

The other group are the people who travel with a tent today. Would any of them want to trade their tent to a much bigger caravan with more conveniences?

To find some answers and hopefully some interest in the project, a thread on different forums was started. The forums used were [www.husvagn&camping.se](http://www.husvagn&camping.se) (a web page for people that are interested in caravans and motor homes) and [www.utsidan.se](http://www.utsidan.se) (a web page for people who loves outdoor life and activities) and [www.jaktsidan.se](http://www.jaktsidan.se) (a web page for hunters).

On the page for people that were already camping with a trailer, [www.utsidan.se](http://www.utsidan.se), the question posted was more about whether a more simple caravan was of interest and if there were anyone that felt that today's trailers were "too comfortable". It was also of highest interest to find out if there were any people with travel trailers that didn't only go to camping sites and mainly go sightseeing, but to find out if anyone went out in nature doing more extreme activities. The response from that page

wasn't huge, but there were obviously a target group missing this kind of product. What you did see on the answers from that forum was also that the ones that missed a caravan like this had thought about this a lot and immediately became very interested.

Posting a thread on the site where people mostly travels with tents, the question was more about whether anyone were travelling with a trailer or if they would consider doing so. The answers received were quite mixed. Some people were quite positive to a caravan or even had one from the beginning. Some people were quite scared of the whole thing, considering how they look today and who's travelling with them. What was very clear though was the opinion that people who travels with caravans, aren't real outdoor people. That confirmed the fact that this was something to work with. Maybe a well designed exterior and some smart functions could charm Quartz into these people's heart.

The third web page that were contacted were had a more specific interest, hunting. Hunters are out in the forest a couple of nights in a row and are mostly sleeping in hunting cabins. If you have a dog with you, several rifle guns and are looking for wild animals, you might not want to sleep in a tent. Sleeping in a cabin also makes you quite limited. Because of all this, it wasn't surprising that there was a great positive response from [www.jaktsidan.se](http://www.jaktsidan.se).

So all of the answers from the forums confirmed that there was a need and longing for a caravan like Quartz. But since forums easily get quite messy and people tend to start talking about other things, asking about on the forum about specific design choices didn't seem like a good idea. Therefore, having a source that has a good knowledge on the subject was of great help.

The site [www.frittliv.autonomtech.se](http://www.frittliv.autonomtech.se) is founded by a man named Bo who has been an outdoor person all his life. But when he got older, sleeping in a tent simply was too uncomfortable. So he bought a small caravan and since then he has become very educated and well-read on the subject. When he was contacted he got very interested in the subject and he really thought that this caravan was missing on the market. He wrote very long e-mails on what kind of features that were needed and how you could solve them. A lot of information was received from this and were good to have in mind while designing the caravan. You really understood how much could be done and it's frustrating not being able to solve everything in this project. This was a returning problem with the project, choosing what to put focus on. Everything could be designed to the smallest detail in a caravan, but having so many different parts everything simply couldn't be done within the time limit.



# Market positioning

To get a first overview on what the market looks like, a market positioning was made comparing size the trailer to conveniences.

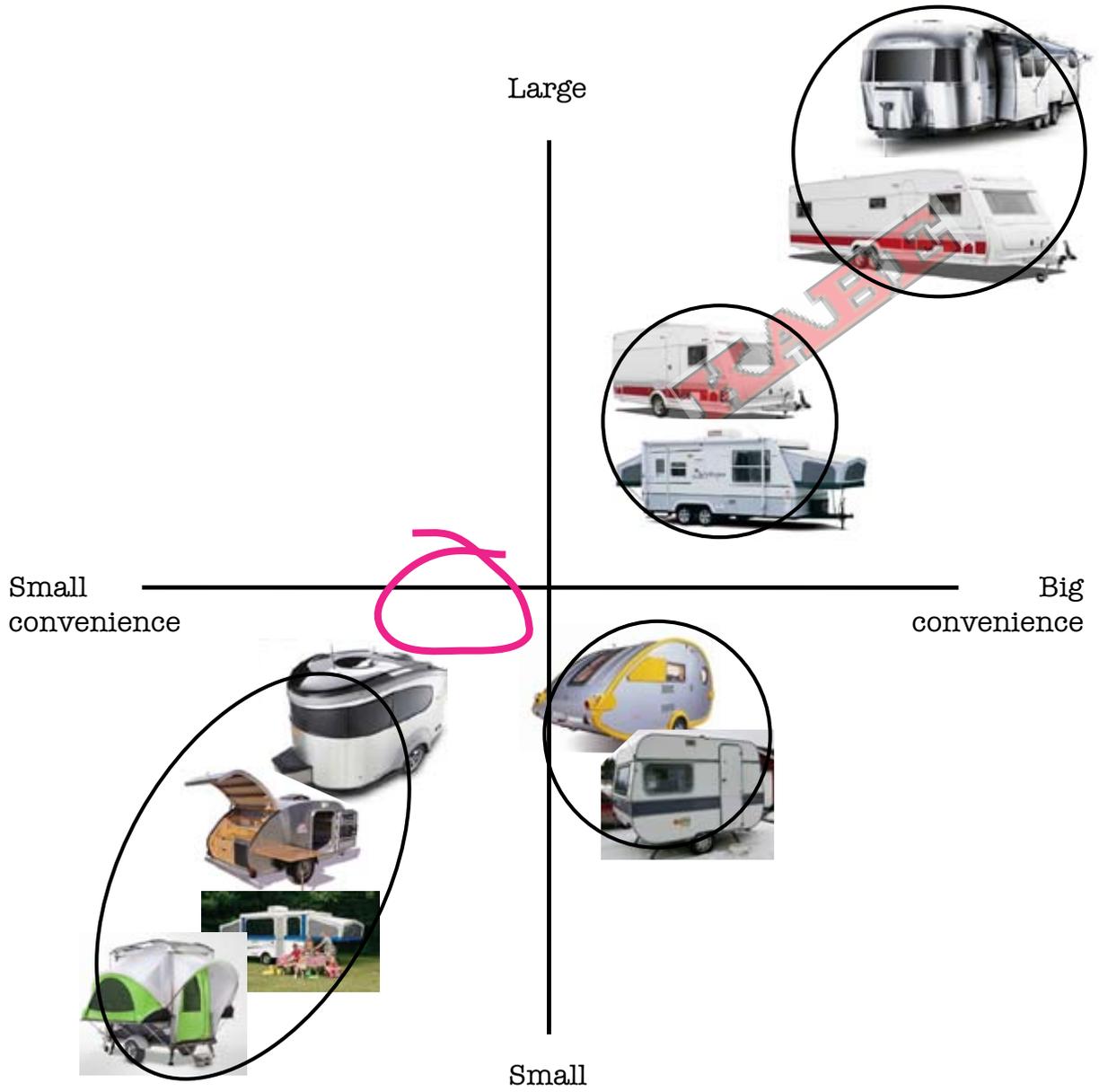
If we look at the chart we notice that apart from Airstreams Basecamp trailer, the trailers with few conveniences and that are less dependant on electricity, only are small fold up trailers. In comparison with the trailer in this project they first of all has too little storing space. Secondly the amount of conveniences are too little. One thing that was important for this project was to be as simple but not be a tent. The resemblance between the fold up trailers and a tent could make you question why you should buy a fold up and not just a tent.

The trailers that are more in the size of the trailer in this project simply has too many conveniences. As mentioned before, this dependency of electricity and too much comfort both makes you vulnerable and takes away the feeling of outdoors life.

The biggest competitor in this project when it comes to function is the Airstream Basecamp. What the Basecamp doesn't have that this trailer have is functions like a WC with a shower, and the interior communicates more only a trailer with the possibility to sleep in. Even though the trailer in this project shouldn't be as your home where you live everyday, it should at least have some feeling of being a home.



Airstream Basecamp



# Competitive analysis

To get an even more precise market positioning of the caravan, a competitive analysis was made. This way the trailer can be analyzed in a bigger spectra, comparing more specific functions. This way you can also see where the big clusters are in the market and in that way know if you are competing with many or not. The bigger clusters are marked with gray in the diagram. The trailers that were compared were first of all the three models considered being the biggest competitors to the trailer; Airstream Basecamp, Tabbert T@b (teardrop) and Fold-up trailers. But all standard trailers such as Kabe brilliant and bigger was also compared seen as one bigger line in the diagram.

The most important features for this trailer is that it should be suited for outdoor activities, having few “conveniences”, having an expressive design, not being too heavy and being environmentally friendly. Therefore it was natural to compare different trailers from these features,

If we start by analyzing the first property; being suited for outdoor activities, there are very few competitors on the market. The only truly suited for these activities found is the Airstream Basecamp. Basecamp is small and has a lot for storing space for gear. Compared to Quartz it has more storing space, but on the other hand its not self sufficient with heat and electricity. These factors are also very important if you are to spend a longer time in nature and therefore you might rather sacrifice some space for that.

Moving on to conveniences we of course have many trailers with a large amount of features considered more than what’s crucial for living in nature. But we also have a lot of the smaller trailers that has on the other hand to few conveniences. A warm shower would probably be preferable for example if your camping in a winter climate, but you might would be willing to pump the water manually to spare some electricity. That kind of balance between having conveniences in the most sustainable way is what this project is all about.

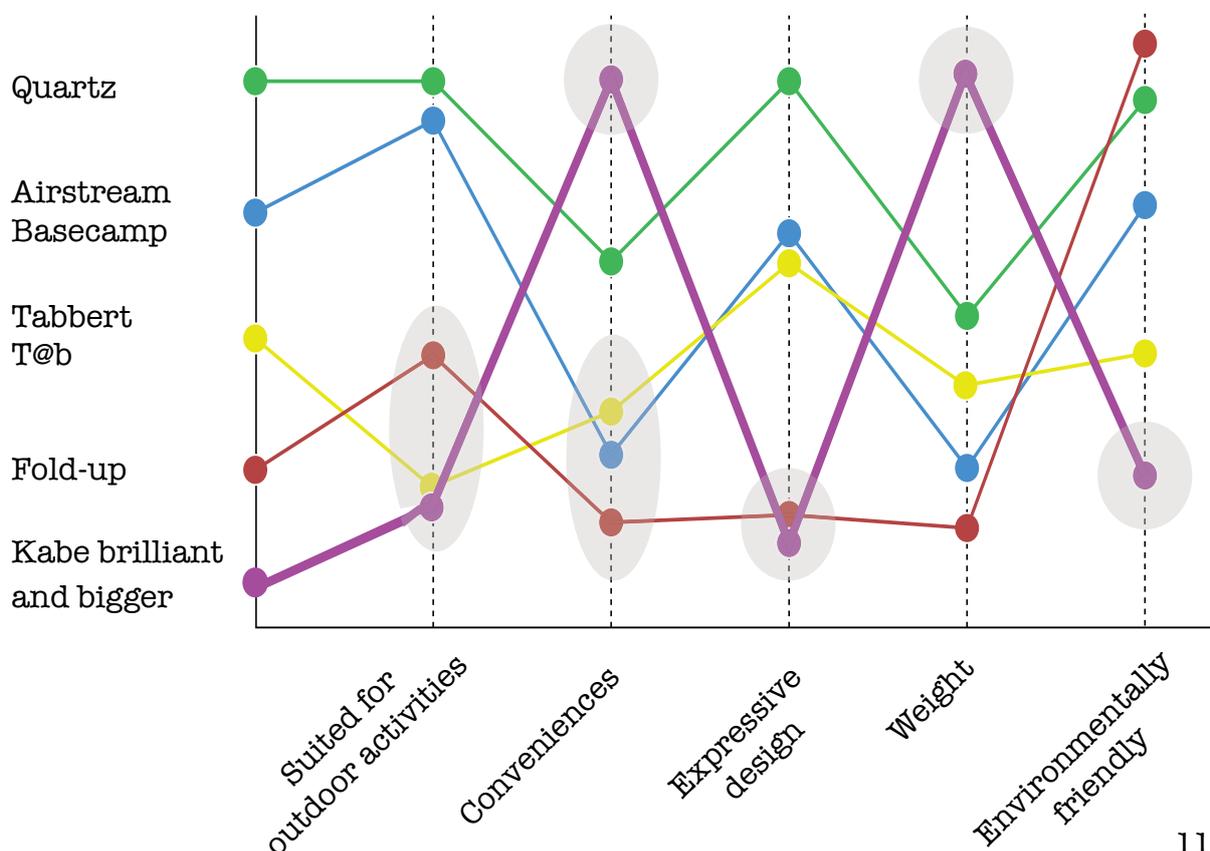
What is very rare on the market today is trailers with an expressive design. Most trailers looks the same in each model category and has done for a long time. Both Tabberts T@b and Airstreams Basecamp has tried to differentiate themselves on the market and has considered the very vague competition on the market, succeed. But these models are still not a very bold step and stays on a quite safe distance from what we’re used to see as trailers.

The weight of the trailer is very hard to predict at this stage and is therefore just a guess based on the fact that a lot of conveniences are removed. It is preferable that the trailer is light weight, but it doesn’t gain too much competitiveness on it.

Being very environmentally friendly is very important for two reasons. One reason, apart from the fact that it should be obvious to care about nature, is of course that being an outdoors person and not caring about simply doesn't go hand in hand. You could be shallow and say that it simply wouldn't suit the image, but hopefully no real outdoors person would not even consider buying a pollutant caravan. The second reason for being a sustainable caravan is as mentioned before that you will be able to survive longer in nature. Most of the things that we pollute nature with is artificial and produced by humans. If the trailer allows you to use energy from nature for example or rather no energy at all we will be able to survive longer. We could also rather keep the heat that we have in the trailer and that we produce with our body heat, rather than letting out a lot and just

producing new all the time. These are just some examples of things that not only are sustainable for nature, but for our survival in nature.

In this diagram Quartz biggest competitor clearly is the Airstream Basecamp. Therefore it's important to really look at what Quartz has that Basecamp doesn't and then work extra hard on those parts. For example the exterior of Quartz needs to be even more expressive to get attention. On the function side Quartz needs to communicate being a sustainable home. Basecamp is very Spartan in that sense quite environmentally friendly. But since this project wasn't suppose to just end up as a cargo trailer with beds in it, the caravan needed to be sustainable on those conditions. Looking at the diagram you find a lot of blue oceans Quartz could fill.



# SWOT analysis

This new trailer will compete with other trailers that attracts people who's looking for a compact alternative to a regular full size trailer. The alternatives could for example be a tent, fold-up trailer, teardrop-trailer or expandable trailer. I could even be a small sized regular trailer. Because of the wide span of trailers, some of the properties can differ compared to different trailers. For example the trailer could be small compared to regular trailers, but big compared to a fold-up trailer.

To assess the new trailer in its competitive landscape a SWOT-analysis was made.

As mentioned above, the size of this is a bit hard to compare. If you go to a camping-site where most caravans are of a standard model, ca 6-7 meters is probably the most common length. They are also mostly at least 2,3 meters wide. Since Quartz is ca 4,4 x 1,8 meters, it's considered a pretty small caravan. If you on the other hand would choose between Quartz and a fold-up trailer, Quartz would of course be considered as very big. So early in the project the decision that Quartz weren't suppose to compete to much with fold-ups had to be taken. Fold-ups are more of a hard top tent than a permanent shelter. The idea with Quartz is that you shouldn't have make such a big effort to move from one place to another. Also all of the features that Quartz was to have and the storing space required makes it hard for Quartz to compete with a fold-up in size and weight.

One of the bigger strengths of Quartz is that it's very energy-smart. There aren't so much environmental thinking in the caravan industry yet so that's truly a competitive advantage. Since this will be achieved partially by taking away some conveniences, some people could look at the trailer as not comfortable enough.

Since this trailer is so much a balance between different functions, it becomes a big opportunity to provide an alternative between different caravans.

Being in the middle also becomes this Quartz threat. Some people will have a tent as a starting-point and will therefore perhaps think that Quartz is to big and expensive. Other people might have a regular caravan as a starting-point and will therefore think that Quartz is an too basic alternative.

The conclusion of the SWOT analysis is quite clearly that Quartz advantage and disadvantage is by being the alternative in the middle. It's not the most basic and not the most function filled either. But since there are a pretty clear division between the alternative there obviously will be a place on the market for Quartz.

Helpful  
to achieving the objective

Harmful  
to achieving the objective

Internal origin  
(attributes of the organization)

- Low weight.
- Smaller than a regular trailer.
- Energy-smart.
- Large storage space.
- Easy maintenance.
- Heat retaining.
- Basic comfort.

- Not lowest weight on the market.
- Bigger than a fold-up.
- Less flexible with location than tent.
- No extra comfort.

Internal origin  
(attributes of the environment)

- Providing an alternative between a fold-up and a regular trailer.
- Entering a market with few competitors.
- Provide a more environmentally friendly travel trailer.

- Being too expensive for people who otherwise would have chosen a tent.
- Being too basic for any caravan customer.

# Product identity

This prism model is more commonly used to analyze brands, but it gives you a very good image on how something that isn't a person communicates with a consumer on a more personal level.

Looking at the analysis we first of all have the product physically which of course is a caravan. Then we look the personality of Quartz. Being simple is connecting to nature and getting away from our comfortable everyday life. As mentioned before, a lot of conveniences takes away the feeling of living in nature. The robustness is necessary for functioning in a rough environment, but it's also important for the consumer that this is clearly communicated. You want to be able to trust your gear and therefore it can't be any doubts about whether the product will last or not.

Original is about finding a unique place on the market and clearly differentiate the product from the common trailers. Since the project is about changing peoples perception of a caravan it really has to be original. Being expressive also has a lot to do with this. Most caravans today aren't really expressive so by not being shy you also go against what we're used to see today.

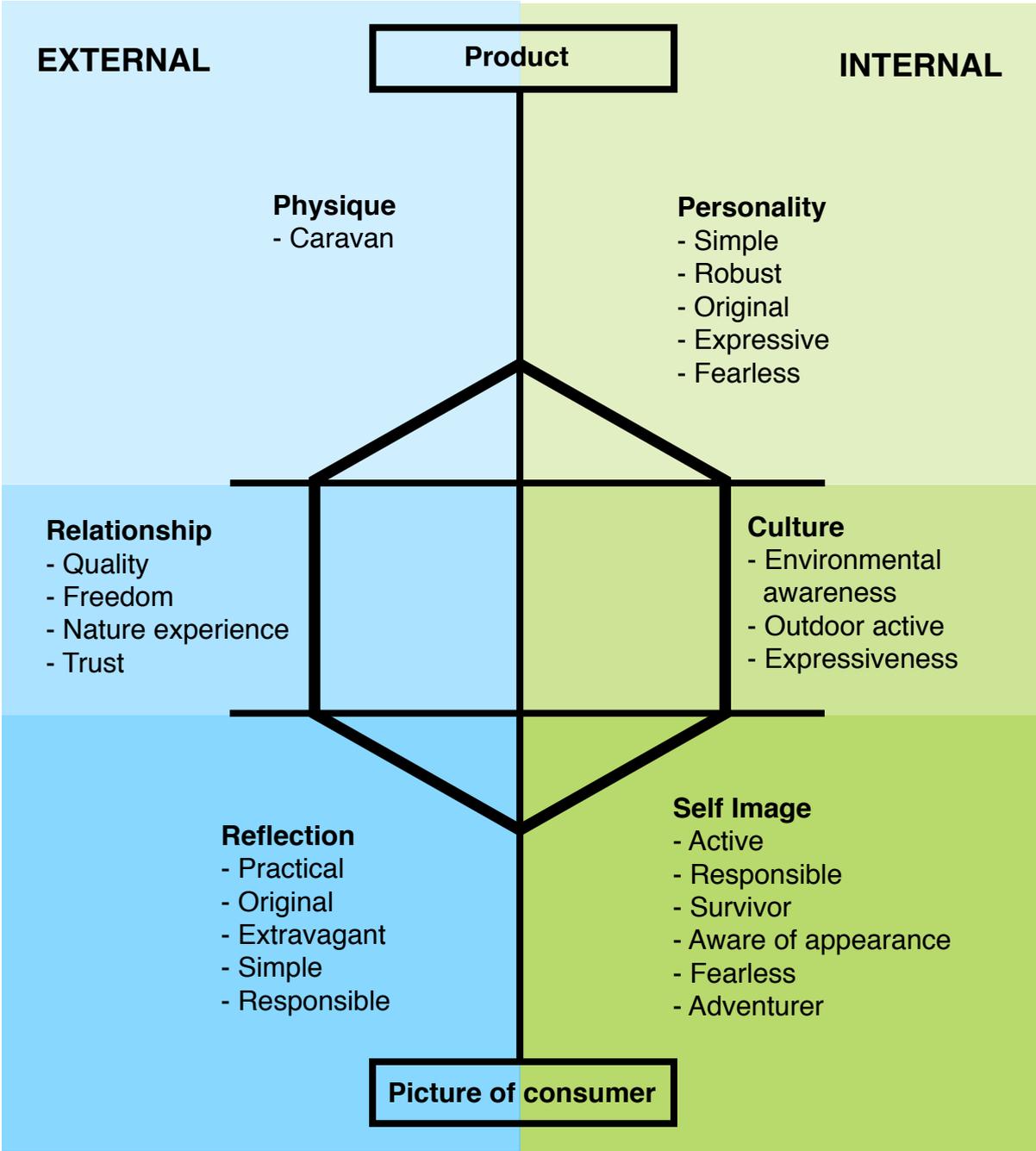
Being fearless is probably what you want to feel when you go out to live in the nature experiencing adventures.

The culture Quartz supports is environmental awareness since that goes hand in hand with loving nature. Outdoor activities is what you would practise while using the trailer preferably. Expressiveness is to not be fearful and to take place and telling

people who you are. A lot of the persons in this target group already has a very clear self image, and this might also be one reason why they not choose caravans today. Because of this it's the caravans job live up to this self image and enable the target group to maintain their self image while using the product.

The reflection of the consumer is that the caravan as a functional product and as a responsible choice amongst caravans. But also the extravagant exterior should make it obvious that the a person choosing that trailer is aware of design.

The relationship between the consumer and the product is that the product provides the consumer with a number of practicalities that enhances the experience of whatever activity the consumer exercises. Those experiences are both simply freedom and nature experiences, but also the feeling of quality and trust. Feeling secure with the fact that your caravan works and are at the foremost quality enables you to enjoy your adventures even more.



# Function analysis

The function analysis was very important for this project. Since the project is so much about balancing functions and choosing to take away certain functions, you really had to question what really is a necessary function and what is not.

The main function of the trailer was established as “satisfying basic needs”. The question what basic needs are, was a dilemma throughout the whole project. Considering that the target group for the project are very independent, a lot of features can be discarded. Cooking for example does might not have to be very central in the caravan. Maybe you could count on the user to cook outside over a fire or with an Trangia kitchen when it’s good weather, and only have a “last solution” inside. Another convenience is heating. If you compare a caravan with a tent, it already is a lot warmer. Of then also consider that a lot of outdoor people are used to dress in a smart and warn way, you might not have to add heat to the trailer. Maybe just preserving the heat from the people living in the trailer could be enough to fulfill the warmth needed.

Although many conveniences needed to be discarded, some needed to be there to really differentiate the caravan from more simple alternatives such as a tent or a fold-up. One conveniences of such kind is having a toilet and a shower with hot water. Using nature as a toilet or cleaning ourself in a lake is of course not impossible for a skilled outdoor person, but it’s a convenience that makes living in nature a lot more comfortable without challenging the experience or, if

done in the right way, demanding a lot of energy.

The need of a lot of storing space collides with another demand which is minimized size. The small size is important to be able to handle the trailer easily, both on roads and while installing yourself where you want to camp.

Since the caravan is a product that provides conveniences, the functions will converge with the ergonomics very much. But also since in this projects, conveniences are discarded and the caravan is becoming less “comfortable”, it’s even more important to focus on the ergonomics of the conveniences that the caravan actually has.

The aesthetics plays a great part in this project. Even though you might not exactly associate outdoor life with vanity and looks, having the best and most attractive gear are fore many outdoor people very important. Also to be able to convince this target group that this caravan is completely new and different from old caravans, this has to be communicated clearly in the aesthetics of the caravan.

**Usage/Basic function**

<u>Functions</u>		<u>Class</u>	<u>Comment</u>
Satisfy	Basic needs	MF	For surviving in nature
Allow	Cooking	D	
Provide	Bed	N	
Provide	Water	N	For cooking and hygiene
Provide	Warm water	D	For shower
Provide	Toilet	N	
Be	Isolated	D	To resist loss of heat
Provide	Seating	D	For eating/working
Provide	Storage	N	Of gear
Dry	Clothes	D	
Provide	Electricity	D	For light and electronics
Be	Sustainable	D	
Be	Secure	D	On difficult roads
Stand	Heat	N	
Stand	Cold	N	
Simple	Setting-up	D	
Allow	Transportation	N	With car
Stand	Environment	N	
Minimise	Weight	D	
Minimise	Volume	D	
Allow	Ventilation	N	Of air
Minimise	Electric usage	D	

**Ergonomics**

<u>Function</u>		<u>Class</u>	<u>Comments</u>
Satisfy	Basic needs	MF	For surviving in nature
Have	Human measurements	N	
Be	Simple	D	To use
Provide	Bed	N	
Provide	Water	N	For cooking and hygiene
Provide	Toilet	N	
Provide	Warmth	N	For health and cooking
Provide	Seating	D	For eating/working
Allow	Movement	N	In trailer
Allow	Ventilation	N	Of air
Enable	Movement	D	Human force
Minimise	Weight	D	
Minimise	Volume	D	
Simplify	Road handling	D	

**Aesthetics**

<u>Function</u>		<u>Class</u>	<u>Comments</u>
Express	Safety	D	
Express	Reliability	D	
Attract	Target group	D	Outdoor people
Express	Quality	D	
Match	Other equipment	D	Outdoor gear
Match	Nature	D	
Respect	Nature	D	
Create	Interest	D	
Encourage	Usage	D	

# Justification and communication

## Introduction

When going through a long design process as this, that takes about five months, you go through a lot of thoughts about many different things. Not only are you dealing with simply design choices, but you are challenging your own ideas about various types of subjects. To not only let these thoughts go by, this will be a description of the design process on a deeper level dealing with subjects such as communication and sustainability etc.

In the article; *Can designers save the world, and should they?*<sup>1</sup>, the authors discuss the delusion of grandeur that designers seem to have sometimes, thinking we could save the world. But is there really something wrong with that, and why even discuss whether somebody should or shouldn't save the world. Thinking about it more closely, it almost seems bizarre to even discuss whether someone should make an effort. Shouldn't everyone make an effort to save the world?

It becomes even more obvious while reading the article; *Ethics in Design*<sup>2</sup>. In this article the argumentation is rather about that designers has to become more aware of the great impact we can have. While working with products for great companies in this materialized world, you as a designer should make an even bigger effort in saving the world. Because of this

moral dilemma, every designer should before any project ask themselves whether this product is necessary or if it will pollute nature rather than having some positive impact. After that the designer needs to work hard to make sure that the product will live up to this justification, and that the values connected to the product will be communicated as good as possible.

So with this little introduction the interesting question is, how can the caravan in this projects existence in the world from a sustainable point of view be justified? If there is an answer to this question, next question is: What will the designer do next?

## The better alternative

The first argument for adding another caravan to the car focused traveling market, is that it's a better alternative than most caravans you'll find today. Most caravans are big, with a lot of energy consuming conveniences and nearly no sustainable thinking. With a smaller energy consumption, solar energy and by being small, this caravan will be a clearly better alternative. In an episode in Viktor Papaneks book, *The Green Imperative*, he writes; *"The job of the designer is to provide choices for people"*<sup>3</sup>. If the choice of a really sustainable, yet fairly convenient caravan isn't on the market, this caravan could be that

- 
1. Dodley & Meading (2001): *Can the designers save the world? (and should they try?)* (2001), newdesign septemberoctober2001
  2. Psusynski (2003). *Ethics in Design*
  3. Papanek, Viktor, 1995. *The Green Imperative*. New York: Thames and Hudson Inc. *Toward the Spiritual in Design*, page 59.

alternative but also to set an example for the caravan companies.

### **Making nature available**

Another argument for this caravan is the fact that it encourage camping in nature. By making camping with a caravan in nature possible by not depending on electricity from a wall outlet etc., and by allude to nature in other ways, people that wouldn't camp in nature otherwise might consider doing so. Some people might think that camping in a tent is too inconvenient for example. Then the caravan is a better alternative. But why so desperately get these "city-people" out in nature, you might ask? The reason for this is that things that are more distance to you, are more rarely of your highest distance. For example you probably would feel more affected if there was an accident in your home country than if it happened in an other country. So by being in nature, people probably would get an other appreciation for nature and hopefully become more environmentally aware.

### **Setting a good example**

The caravan could also be a symbol of something good and a way of as an designer guiding the user towards sustainable living that can be applied on a daily basis. In *Ethics in Design*, mentioned earlier, they say; "*By keeping the discussion alive and educating themselves and others, designers can be forces of change, powerful*

*communicators, and good people.*"<sup>4</sup>. So in this case, the caravan can learn the user about sustainability, and most importantly the users ability of living a simple and sustainable life.

By only running on what nature gives to provide electricity and heat, you could stay in nature for a long time without having to pollute the environment. For the user to be aware of the fact that doing so is achievable and that you as a person can survive in nature, they will get the confidence that they can live sustainable and that they actually can do their part in saving the world.

### **Then what?**

If you've gotten your basic ideas about the product to justify the existence of the product, you as a designer has to make sure that the product lives up to the justification and that the product is communicated in the right way. Communication is not easy, especially not when the communication that a product in it self does, is mostly one dimensional. The article; *Human communication: What happens?* the Resonance metaphor is described. The Resonance method says that; "*The listener is in "harmony" with the speaker and "resonates". The responses from the listener "reinforces" the communications.*"<sup>5</sup>

The resonance of the product in this case would probably be questions

---

4. Psusynski (2003). *Ethics in Design*, page 12.

5. Gårdenfors (1995): *Human communication: What happens?*, Lund University Cognitive Studies. page 3.

6. Gårdenfors (1995): *Human communication: What happens?*, Lund University Cognitive Studies. page 4.

about its functions or purpose. But the designer itself cannot answer these questions directly to each user. This has to be solved in another way. A very clear and describing way would of course be to write a manual that describes all functions etcetera. But people tend to not read manuals that carefully. "On the paper" more information seems better, but as *"Human communication: What happens?"* states; *"The human brain is not like a hard disk that passively accepts the flow of information. The greater the amount of bits that are let through, the more the user needs to struggle to keep up and make sense of a message."*<sup>8</sup> So there is probably a reason for why people rather learn about products practically. If when a product is to be described in words, the information text needed to describe the most simple thing could be surprisingly long. You have to have this in mind every time you design something, the goal for all projects should be not having to have a book of instructions.

To make functions more simple and cognitive ergonomic could be more easily done with the help of symbols etc. But how do you communicate values in a product visually? One of the hard things with this projects is to convince the new target group that it's aiming toward, that this caravan stands for other values than the regular caravans on the market today.

There are a lot of prejudice about people that travels with caravans and caravans in general. So a starting

point for this project was basically that the if the prejudice against users of a product are as strong as in this case, it can actually drive away new users. This phenomenon where marketing or old stereotypes prevents a products move towards a new target group is not uncommon. What makes this project extra interesting is that the prejudices of the current target group are very deeply-seated and the new target group that this project represents has a very distinct image that is the complete opposite of the stereotype. This was heavily confirmed while researching the new target group. So to make the new target group realizing that this caravan was on their side concerning values, a lot of effort had to be put into making this possible. First of all the caravan has communicate things that will attract the new target group and make them interested. It's also important to make them not associate the new caravan too much with the caravans seen on the market today. The qualities that needs to be communicated are robustness, safety, nature and being unique. These are all things that can be communicated in an visual way but in a way be connected to values. Robustness for example is connected to being durable which in a second hand is connected to sustainability. If nature in some way is being communicated, this could be very effective. This type of visual communication works very well and for some target groups this is enough. Depending on how precise the target group are there will even be a few people within the target group that will be

satisfied with the “physical attraction” of the product. For them image of the caravan and who you become while using it, might be more important than function. But for most people in the target group concerning active outdoor people, function and the feeling of using the product is probably very important. Outdoor life for many people might not only be to experience nature, but also to be able to survive in nature. Even though most excursions in nature aren’t dangerous, you still want to preserve the feeling of being a skilled and self sufficient human being. Many of the people that were questioned in the new target group, felt that the caravans today are too comfortable.

There’s no sport in traveling with a trailer if even the most lazy “typical city-person” could do it. Because of this, the new caravan has to sympathize with these values of what “real outdoor-life” is like.

So moving on to what could be done with functions to communicate what values the product should represent. First of all by discarding a lot of conveniences and also making the caravan self sufficient on energy and heat, not only would the user feel more capable of surviving in nature but the caravan would also be more sustainable. The idea “Back-to-basics” in a modern way was also a central part in the designing of the caravan. This is referring to the use of old non electric solutions like a wooden driven stove and an earth closet, but designed in a modern and “clean” way. This makes a clear statement that this caravan

clearly takes a step away from non sustainable products and the user wont be able to miss the fact that this caravan is clearly different from “regular” caravans.

### **Summary**

To summarize you can see the importance of both convincing yourself and the user of the values that the product should stand for. Without convincing yourself you wont be able to convince the user. But you also have to remember that the values has to be communicated clearly to the user. It is crucial that you are convinced but not enough.

# Features

When entering this project the plan for attacking the product was to work with it as anatomy. That means that first doing the rough skeleton and placing everything where it was supposed to be. Then you moved on the muscles that connected everything and made it work. Finally the skin was made that package everything in nice aesthetics.

## Plan view

The skeleton in project was the plan view. The plan view was necessary to start with to see what kinds of features were to be included, and approximately how much space they needed. There were a few things that was to be included inside the caravan already from the beginning. Those were; a bed, a WC, some storage, a big window and an airlock. Most of these things are very basic so it's natural to include them. The airlock was fortunately an early idea about how to make the caravan sustainable, that actually was kept until the end. The big window felt necessary to be able to experience nature even inside the caravan. Since the love for nature is so central in this project, this feature felt crucial to communicate this.

After some sketching by hand and in Adobe Illustrator, there was one plan view that felt very good. Since the project is so big and there were so many things to design, it was early decided that the plan view was the final decision. A kitchen and a fireplace were the to biggest features added later on. They were added to the plan view that had been decided to

the plan view that had been decided to be the final. But something was missing with it that plan view didn't feel right. It was mainly the placing of the window, the size of the window and the height of the roof in the toilet that drove the project to a new plan view.

There was a feeling that a U-shaped couch with windows on three walls was very desirable. Therefore after getting all of the other features to work with the U-shaped couch, the new plan view felt as the best alternative.

The U-shaped couch is also the bed where the table is lower to the same height as the seats while using it. The space inside the couch/bed could be used for storage of clothes and to contain features such as water and a water heater etc. The back of the couch also becomes a smaller storage. Here books or the sheets and pillows.

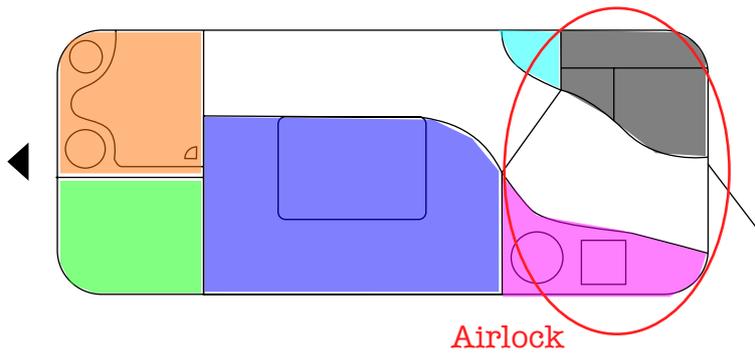
The cooking area was placed in the same "room" as the couch since the fireplace (later explained) was supposed to be near the couch and the cooking area. In the airlock you find a closet and the WC. This is because the WC should be easy to access. The closet is there because while keeping wet clothes only in the airlock you avoid making the rest of the caravan wet and messy. An education is because of this also placed in the floor of the airlock. To get easy access of climbing gear or skis for example, a locker that you could reach from the outside was added.

So as soon as the new plan view was completely established, the project could move on to the "muscles" of the product.

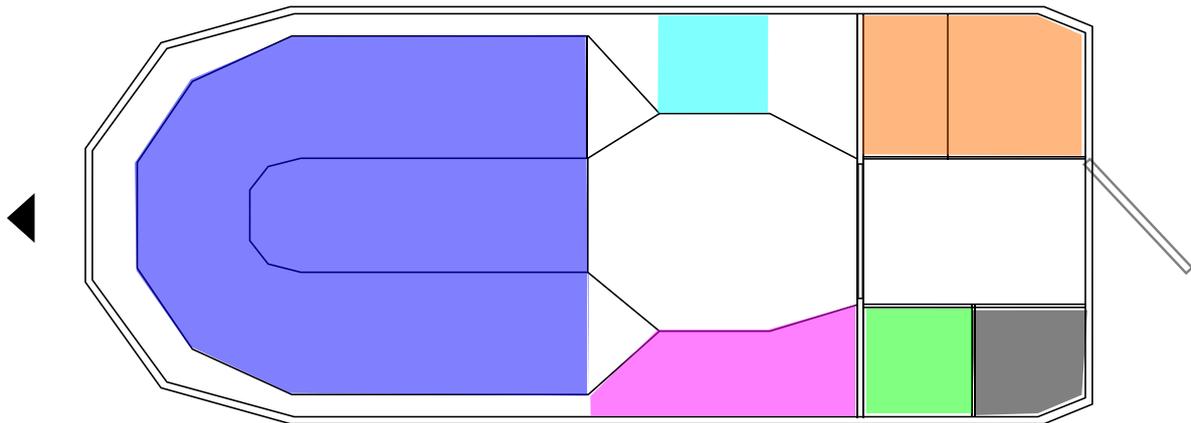
- WC
- Closet
- Bed/Couch and table
- Fireplace
- Cooking area
- Closet/Storage

◀ = Drag direction

**The first “final” plan view**



**Final plan view**



## **Energy and heating**

As mentioned earlier, being sustainable was crucial for this caravan concept. This was because of many reasons. One reason is because the target group probably would demand it partially because of their image and partially because of their environmental engagement. An other reason is because of the ethical aspect that every product should aim towards being sustainable. The third reason is that being sustainable enables the user to survive longer in nature. From the beginning, the most obvious way to get energy was with solar energy. The goal was to be able to survive only on solar energy, but to make that work all of the features that demanded electricity needed to be minimized.

### **Armature**

The armature needed in the caravan could be using LED and in that way demand very little energy. Therefore the lighting of the caravan hardly was a problem energy wise.

### **Water**

Water was a bigger problem. Although the pumping of the water was decided to be solved by manual pumping. Manual pumping is today often used for sinks in boats for example. Using a manual pump for the shower is more rare and a bit more inconvenient. But on the other hand, because of the fact that a shower is an extra convenience that isn't the most necessary feature of the caravan, using energy if not completely necessary felt important to avoid. This is also a way to emphasize and remind of the importance of not showering too long from an environmental aspect. Then, if possible, the user might also rather consider bathing in a lake instead.

The other problem with the water was to heat the water. Since it was decided to have a shower, warm water felt necessary. The possibility of having warm water should be there, but then it's up to the user to decide whether they want to use it or not. It's also a bit inconvenient to always having to heat the water on a hotplate or over a fire if you were to exclude it. It would also probably be less energy efficient than having a water heater. So when it came to the water in the caravan, the only thing that needed some sort of energy, were the heating of the water.

The water would not need energy constantly if not misused, but one feature that would need constant energy would be the refrigerator. The refrigerator is one of the things that demands most energy.

### **Keeping warmth**

The last part of the caravan that could need energy, was heating of the caravan. For a long time in the project, solving this was a struggle. Especially since the refrigerator demanded quite much energy and it wasn't certain that you could receive enough energy for both the refrigerator and heating from solar energy.

But later in the project, the question "Is heating really necessary?" came up. The idea about having an airlock was even before this question came up "on the map", but it really made that concept work.

The arguments for not having heat were the following; Considering that many outdoor people normally are camping in tents, they're used to dress smart and a caravan already is a warmer shelter with its thicker

walls. Upon this, a caravan is a very small space that could be heated by body heat quite quickly if heat is not lost throughout doors or wall.

A good isolated wall has to be ca 40 mm thick and does not only make the caravan maintain heat on cold days, it also keeps it cool in the summer. Another way of not losing heat is as mentioned before, having an airlock.

### **Airlock**

Having an airlock is concept that at least in researching caravans for this project, wasn't. An airlock is a small room that you enter right after entering the front door of the house. This way you have to enter two doors before entering the house. The warm air will only be lost from the vestibule and not the whole house.

The airlock method can be traced way back in history. When heating a luxury, a lot of more simple houses had vestibules before entering the houses. Today we can afford wasting heat, at least economically. In the long run, this is of course not sustainable and all houses should aim towards minimizing unnecessary waste of heat such as having badly isolated walls or windows, or letting the door stay open when not needed. One place where can find this method used in a smart house today is passive houses. There the focus on maintaining important heat is central and an airlock is a good way of doing so.

### **Keeping cool**

Since most people probably would go camping in the summer, the problem would probably more often be the opposite of the caravan being too cold. To be able to avoid the caravan being too hot the following arrangements were done; The windows are one of the areas where most heat are added.

Therefore by having a mirrored window from the outside, this can be avoided. Not having too dark colors on the caravan is also a way to reflect heat away from the caravan.

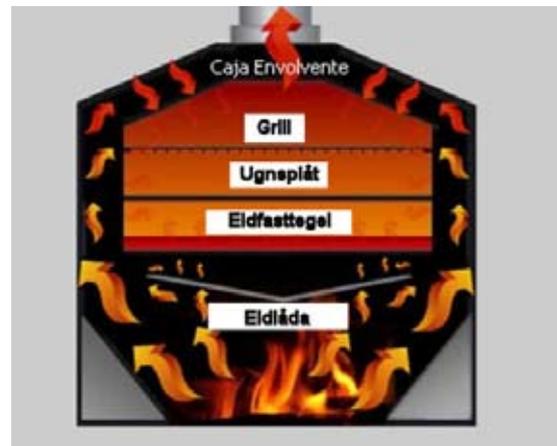
The last very effective way to avoid heat is by having good isolation as mentioned earlier, by having good isolation in the walls.



## Getting heat

So the idea to minimise the need of energy and heat was to only use heating for water and energy to the refrigerator and LEDs, and then try to keep the energy that exists in the caravan. But if it were to be very cold and the user feels that its clothes simply isn't enough, a emergency solution for getting heat felt necessary. To nourish the idea of the user as a strong participant in the usage of the caravan, and the users ability to survive in nature, a solution where the user is getting heat in some way seemed like a good idea. The fuel to create heat had to come from the nature so you weren't compelled to buy fuel from somewhere, and so you easily could get more fuel whit out leaving you camp. Therefore the idea of having a wood driven fireplace in the travel trailer came up. By having a fireplace in the caravan, the users could on their own hand control the heating in the caravan by collecting wood to get more heat. To get the most out of the fireplace, on top of it a wood driven stove and plate are placed. This is an old ancient way of heating food which goes very well with the sustainable thinking. The idea is that the user on warmer days rather cook outside over a fire for example. But when it is colder, you use the heat from the fireplace both for food and simply heating.

The safety regulations for the distance from the fireplace and other objects was 50 mm, but of course you need a little more in the front so the heat can spread efficiently.

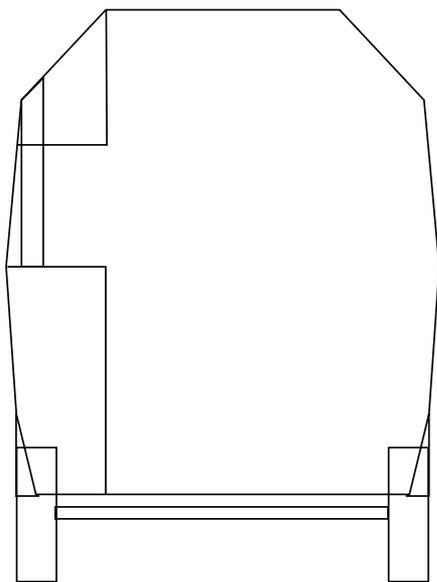


How a wooden fired stove works.

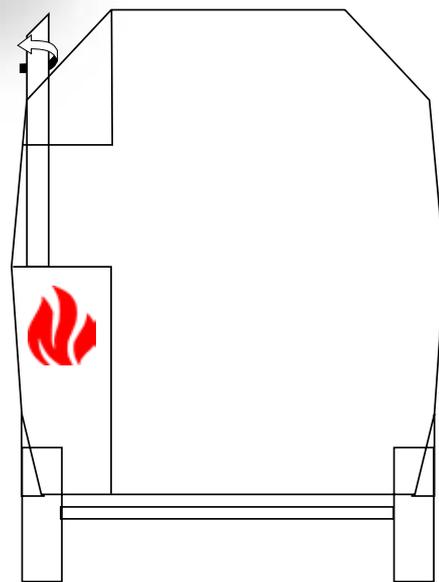


A classic wooden stove.

When not using the fireplace, the chimney will be lowered in the same height as the roof and in that way it won't be visible at all. When the fire is being used, a damper will have to be opened. While doing so the chimney will be turned up on the side of the caravans roof.



Not in use



In use

## Solar energy

Finally we come to the source of the energy and heating. Solar energy is today rarely used on caravans, but it can be bought separately and be put on by the owner of the caravan.

Since solar energy is quite developed, efficient and natural, it felt like a good source of energy. But to find out if the solar energy could be enough for the caravans energy and heat consumption, and to see what possibilities with solar energy were available on the market today, some research was needed.

First of all we need to clear out the expressions.

A solar panel (also called solar cell or photovoltaic module) transforms sunlight into electricity.

A solar thermal collector transforms sunlight into heat.

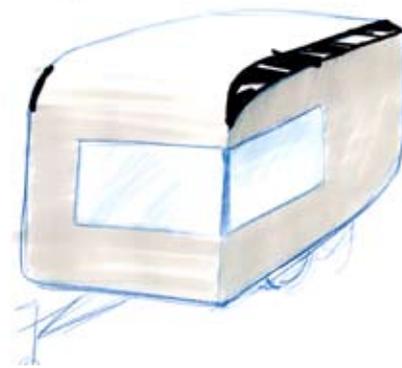
So the question is; Which one will you use and why? The answer to that question is that both will be used, but to different things.

The solar panels will be needed to produce electricity to the refrigerator, the armature and to a wall socket for mobile phones or cameras etc. The solar thermal collector will be used for heating the water heater. You can of course heat this water with the electricity from the solar panels, but the reason for using a solar thermal collector instead is that it has a much better efficiency.

When the solar panels becomes too hot, the loose their efficiency. This can be resisted by cooling them with a water system. This can further on be used to for warm water in the shower or perhaps to dry clothes.

A black or bluish solar panel or solar thermal collector, could be hard to fit the aesthetics for the product. In the

beginning of the design process, some attempts were made, trying to fit in such a solar panel. But the result didn't feel satisfying so the search for an other solution had to be done. There turned out to be quite many new methods today to avoid limiting yourself when designing with solar panels.



Three earlier designs where solar panels were tried to fit in.

First of all solar panels today can be colored as they are. It still looks like a solar panel, but it definitely creates some more possibilities.



A more high-tech type of solar panel has been developed by the company NVL solar AG. They've developed a multi layer thin-film cell the material could be applied to substrates in a transparent or tinted coating. NVL did a collaboration with Koenigsegg and asked them to design a car that would use this technology. The car is named Quant and was presented in 2009. This process is still in development and therefore might not optional when it comes to efficiency. But it gives you a good idea of what options the future could give.



Koenigsegg Quant

### **The chosen solar panel**

With normal solar panels, you need direct sunlight for them to generate power, and if the panels are at all shaded the efficiency drops significantly. But there are some new types of solar panels being developed.

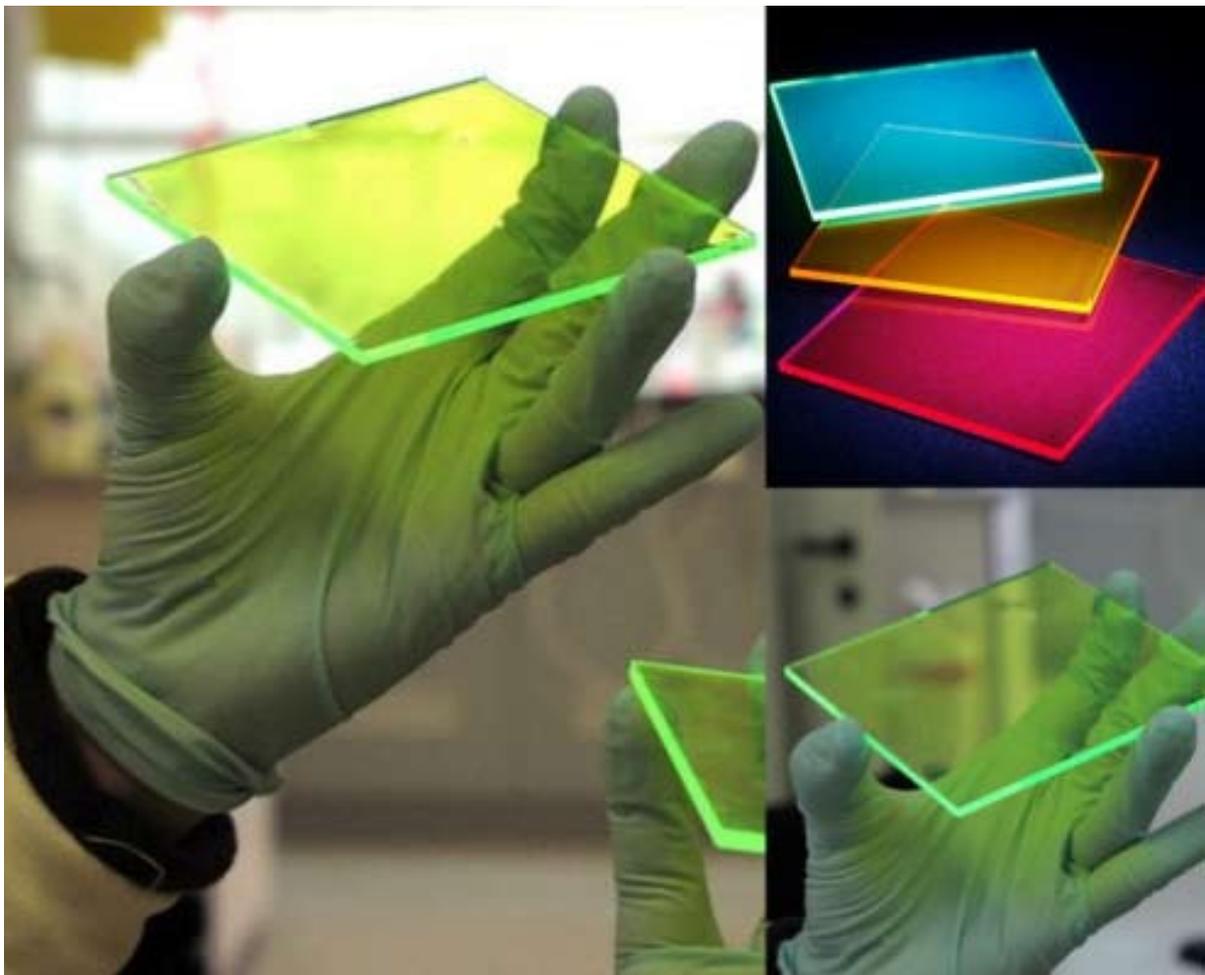
One of them can generate power from diffuse light using a specialized colored panel. They look a bit like colored Plexiglas but are actually panes made with fluorescent dyes and nanoparticle metals, and could possibly eclipse traditional solar panels in terms of price. The smarter panel is being developed by GreenSun Energy, a Tel Aviv-based energy start-up. The new solar panels also use 80% less silicon than traditional solar cells. As the direct or indirect sunlight hits the panels, it diffuses across and the nanoparticles of metal direct and concentrate the sunlight to the edges where the silicon is.

So far, GreenSun has achieved a 12% efficiency rate with their panels and can produce them for \$2.10/W compared to around \$4.54/W for a conventional panel. They can achieve such lower costs because they use so much less silicon. Also in normal cells, there is some efficiency loss due to heat, which cannot be converted into energy. With GreenSun's panels, the sunlight is diffused over the whole panel and the nanoparticles deliver light at the right energy to the edges where it can be converted, which means less efficiency loss due to heat.

GreenSun is still working hard on making their panels more efficient - 12% is good, but it's not great compared to the world's most efficient

solar cell at 43%. They hope to achieve an efficiency of 20% and reduce the cost even further to \$0.94/W.

Because of this solar panels cheap price, good features and flexible aesthetics, they were chosen to use for this project. All these good qualities also makes it possible to use most plane surfaces on the caravans exterior, and in this case that would mean that you almost could use solar panels on the whole exterior surface.



## Cooking area

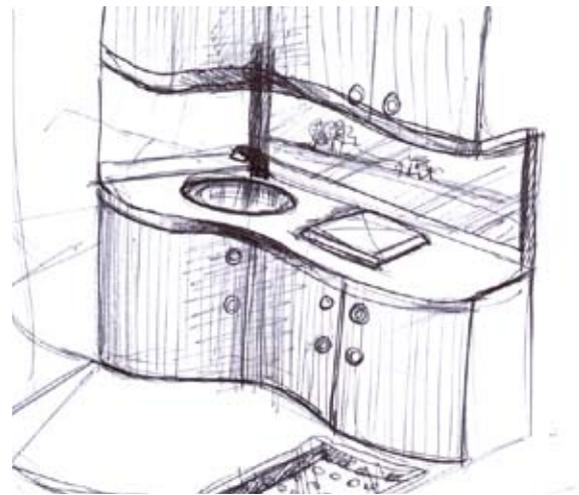
Having a cooking area seems to be one of the essential things to full fill basic needs. But it wasn't always obvious to have a cooking area in the caravan. One problem was how to solve the stove and the hotplate without demanding too much energy or having to bring a lot of camping gas. In the beginning there were some ideas about maybe making an cooking area on the outside of the caravan. This way the inside could be compact even more. But when figuring that many outdoor people might rather set up a fireplace in many cases as a part of the experience, the best solution seemed to be only having a smaller cooking area on the inside that were more as a last solution if the whether was to rough to cook on the outside. Many outdoor people wouldn't have any problem setting up a good fireplace or using a Trangia kitchen for example. Because of this you wouldn't want too much space being used on something that many days might be unnecessary or not used. A sink and a refrigerator were the two things that felt more necessary and obvious to include. A refrigerator could of course be turned off or even excluded if not wanted. But it would probably be a feature that for any long term camper be preferable. A freezer on the other hand needs the double amount of energy and is nit crucial, therefore it was out of the question.

A proper sink to do the dishes in or even clean up dirty gear if preferred, is a good feature when travelling in a colder climate. That way you can avoid having to freeze your fingers while doing the dishes. So for a long time in the project, a stove and hotplate were not included.

But when the fireplace was added to the caravan, the idea of combining these features was bourne.

Looking at old wooden fired stoves and hotplates, the idea of using the heat generated by the fireplace to cook as well felt like a good emergency solution to a camping gas generated stove and hotplate.

Since the time when you rather cook inside mostly is when it's cold outside, this will also be the time when you would use the fireplace. This idea goes hand in hand with the idea of using and saving the heat and energy you have, very well.



Early sketch

## Shower and toilet

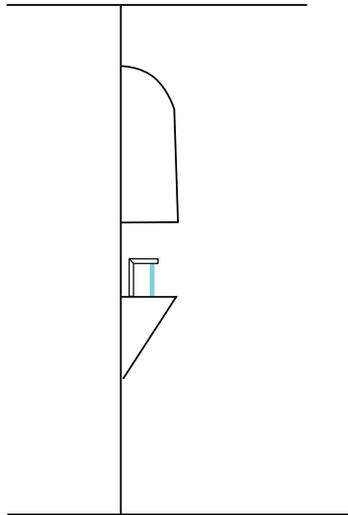
To minimise the area of the toilet, not making extra room for the shower was important. This is because the shower is an extra convenience that should be optional in a way. If you don't want to use the shower, but to bathe in a lake instead, the shower shouldn't steal a lot of space from other things. To to minimise the showers size, first of all when showering, the whole WC will serve as a shower cabinet. By making sure the toilet is retained good, having a run-off in the floor and a higher threshold by the door, this is possible. The tap becomes a shower nozzle and the sink is kept to a minimum size.

The toilet was a bigger struggle to solve. Using a water flushing toilet demands a lot of water, energy and needs to be emptied on special places. With the hope of finding some other non energy demanding and easy to use solution, some researching was done. Earth closets are good in that sense that they doesn't flush with water and they can be very sustainable. But they can also feel very unhygienic. There are some very modern solutions that are both hygienic and sustainable. There was especially one that felt like the best alternative for this caravan.

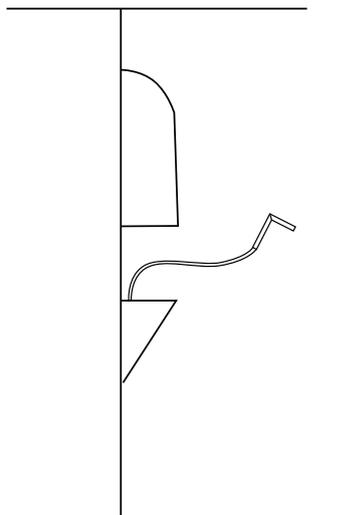
The alternative is called Pacto and is a smell-free and sustainable dry toilet. When using Pacto, the disposal will be packed in a so called flushing-foil, a durable material that covers the toilet-bowl. The foil with the disposal is the feed down in a container below and can be emptied from the outside. Since new foil is being fed all the time, the toilet will stay fresh while using it. The bag is made of cornstarch and can therefore be composted. It's easier to bring and empty Pacto bags than



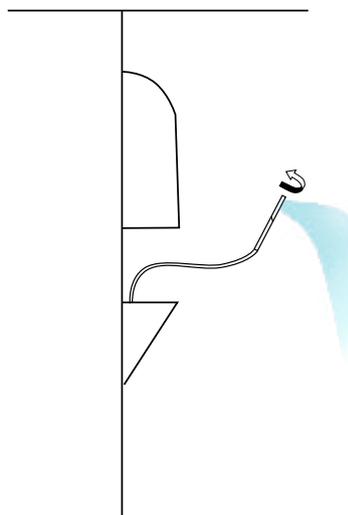
These images shows how the tap becomes a shower nozzle by just twisting the 90° angel to the straight cylinder shaped nozzle.



Used as a tap.



Pulling out the hose.



Twist to use as shower nozzle.

# Aesthetics

Finding the right inspiration for this project was really important. The aesthetics should both reflect the target group and communicate the products purpose. But on top of this, the aesthetics should challenge peoples image of caravans.

When starting to look at inspiring products etc. for the project, the most natural way was to look at the kind of products that would be used next to the trailer. This was of course outdoor equipment. All outdoor equipment mostly have a related design language, but there are still many different styles within the outdoor equipment section.

So to be more specific and to strengthen the target group even more, it seemed like a good idea to establish what kind of outdoor brand they might buy.

The brand that suits the target group the best seemed to be the Swedish brand Fjällräven. Since Fjällräven is both very classic and fairly trendy, the brand attracts both young and older nature lovers. They also use a simple and quite angular design language that leads us to an other big inspiration source.

To get a really robust look that is preferable in a tougher environment, some military vehicles can be a good inspirational source. Especially stealth technology creates really beautiful architectural structure that in some ways resembles the rock crystal.

The rock crystal, as well as stealth technology, is also associated with solid robustness. It's also very inspiring to look at the natural treatment that has created the beautiful structure of the rock crystal. The rock crystal turned out to be the biggest inspiration source in the end because of it's such an interesting natural phenomenon. It shows what beautiful and tough things nature can create. Using triangular shapes in the as facets will make the structure even stronger.

The name Quartz for the caravan was therefore a natural choice to establish the connection between the product and the crystal even more.

Since the crystal shape also is very architectural, looking at glass architecture in that style was very inspiring. Also Sigvard Bernadottes famous pattern Virrvarr has that kind of aesthetic language which therefore was very interesting.

To not get away from the feeling of nature by only using metals and plastic, using some kind of wood felt necessary. Since bamboo is a very strong, beautiful and most of all environmentally friendly material, it was a perfect choice that came very early in the process.

To get a suiting color chart, an inspiring and easy way was to look at Fjällrävens jacket range and from this pick one of each color. This way a nice spectrum of colors could be done and the most common colors suits "clean-outdoor-look" very well.

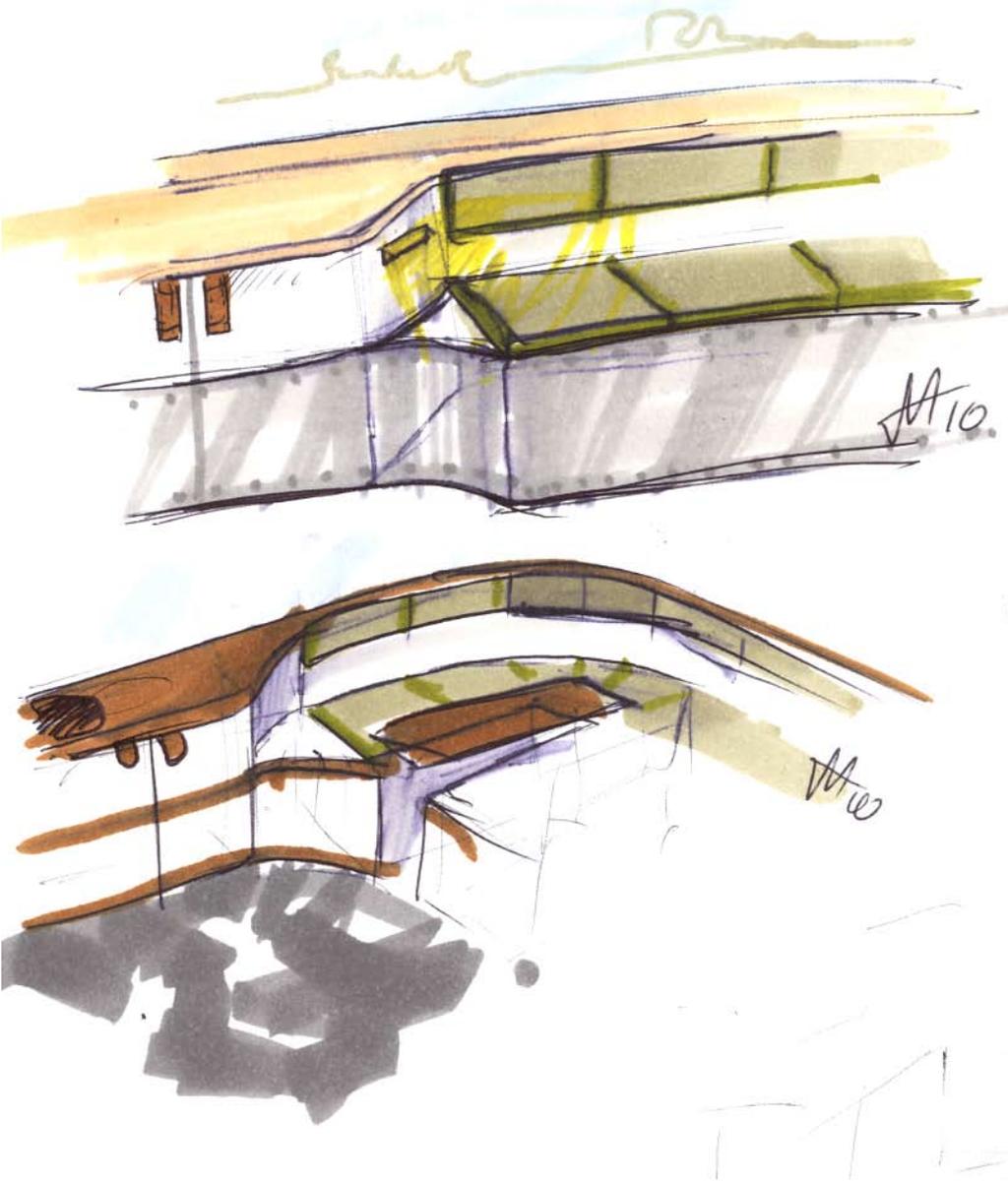


# Sketches

Since the exterior is the first thing that people see and that will make them interested, this needed most focus aesthetically. Because of this it was important to settle for the interior aesthetics as soon as possible and then start sketching on the exterior.

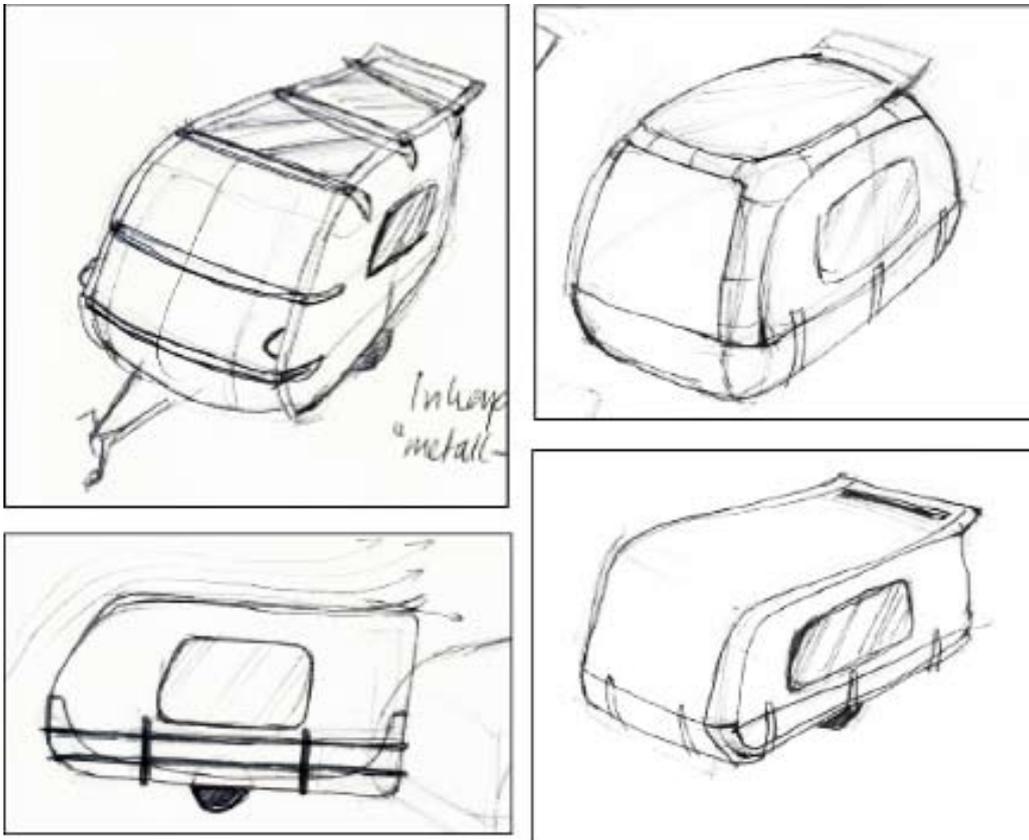
The next pages will therefor show the process that followed while sketching on the exterior.

Below you see one of the few sketches done on the interior. The aesthetics felt satisfying almost immediately so they were pretty much kept throughout the whole project.

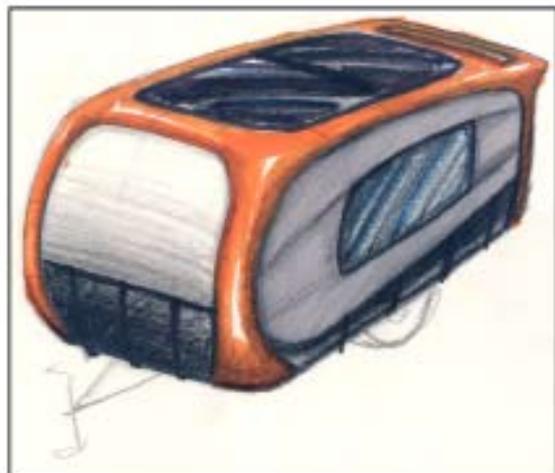
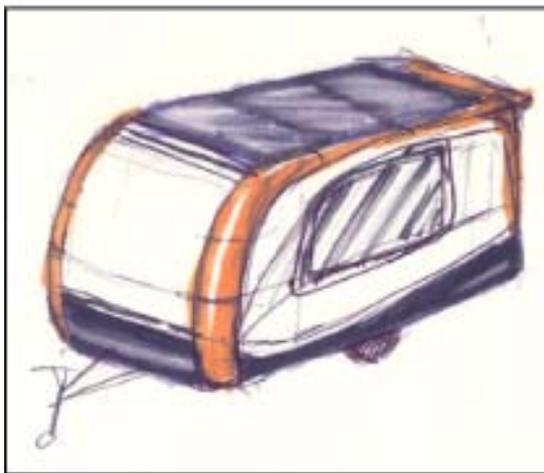
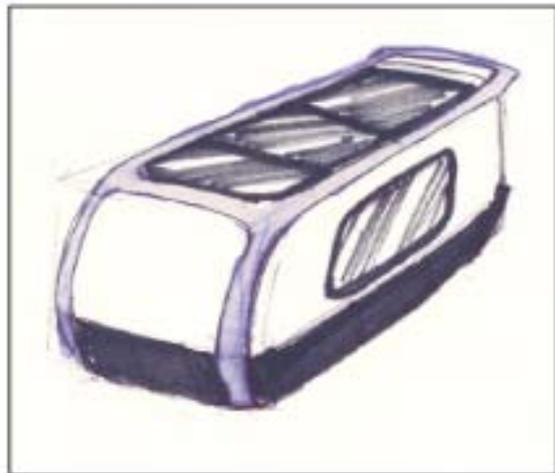
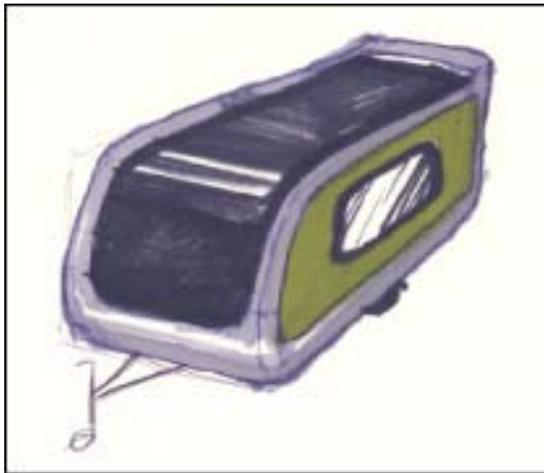


The first sketches were quite insecure and there were no exact focus but more testing different details.

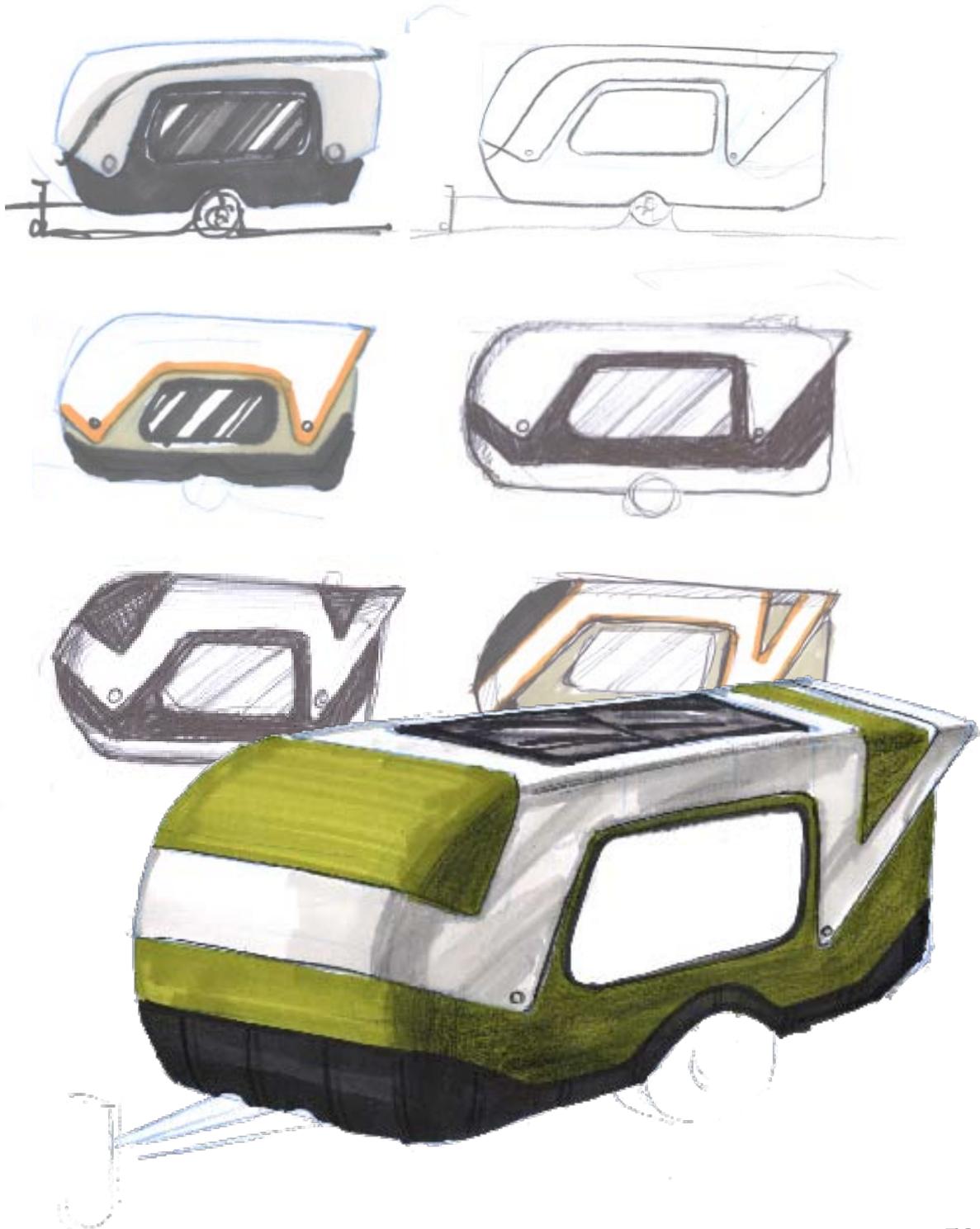
A long time throughout the process, a wing was added to get a better road maintenance but mostly to give the caravan a sport associated look.

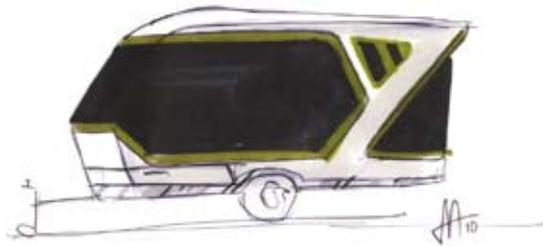
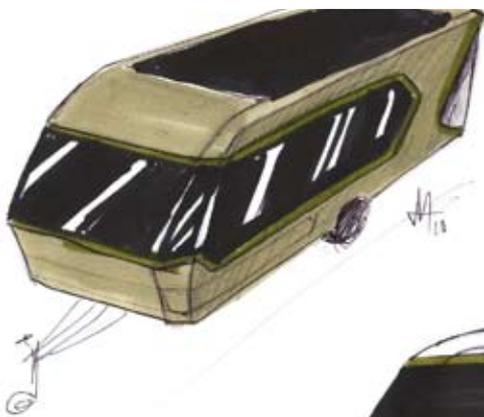
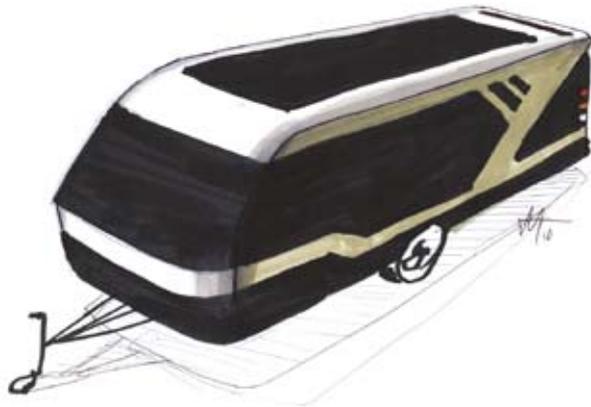
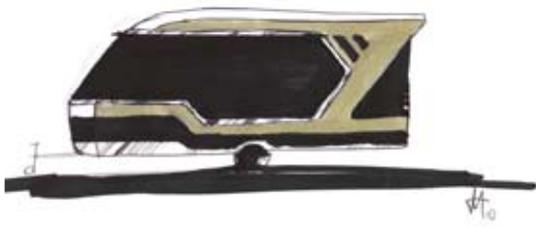
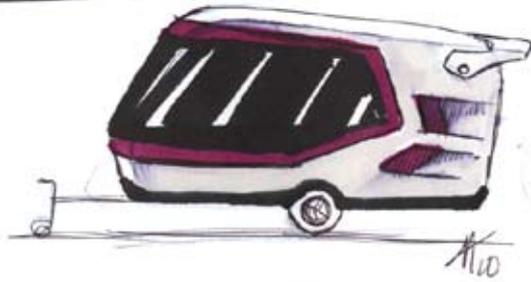
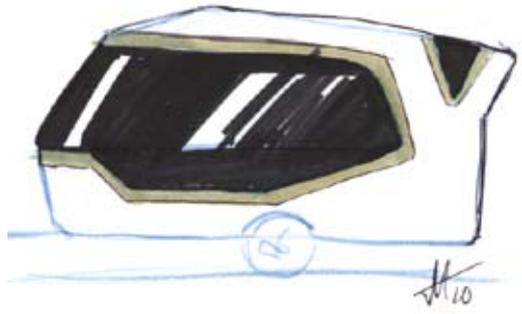
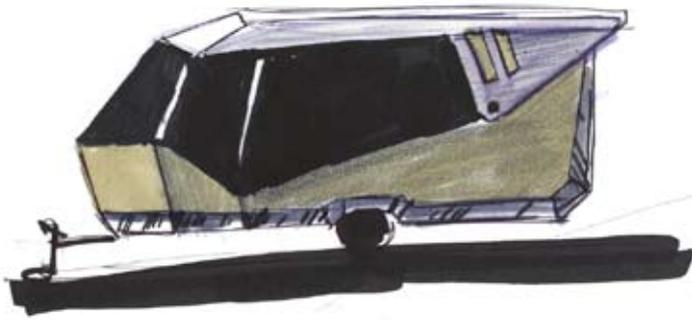


Further on the direction of the sketching became more defined. It was a clear design language but with a few variations. This design language felt good until the feelings changed suddenly and it felt far too much like regular caravans and not extravagant enough.

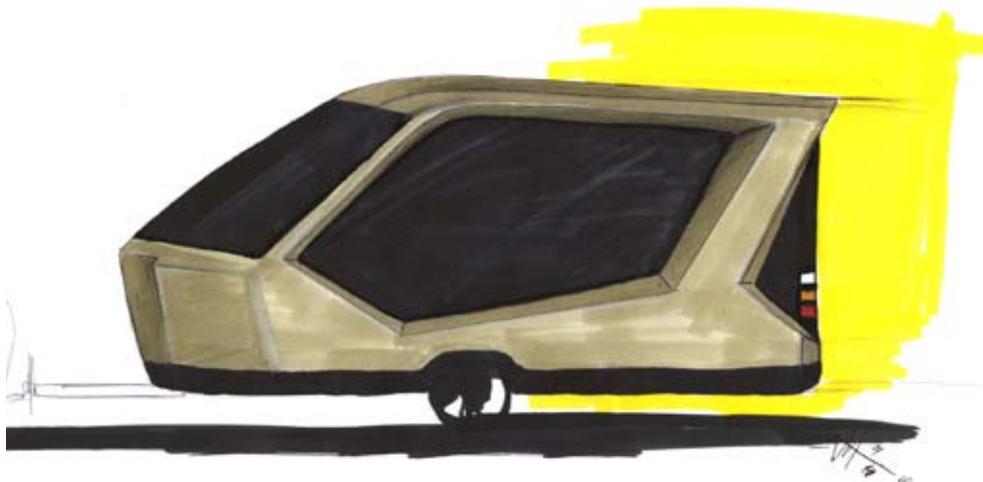
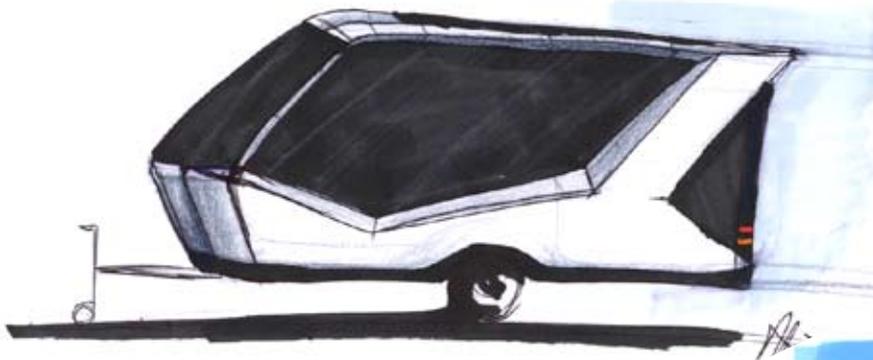
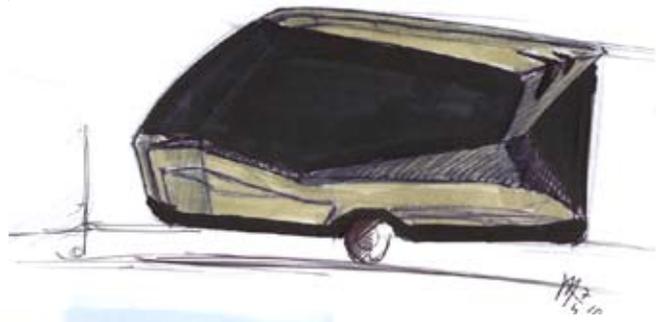


After realizing that the design of the caravan was too similar to the caravans seen on the market today, the exterior took a new direction. The inspiration was taken from skiing helmets in an attempt to get a more sport associated look.

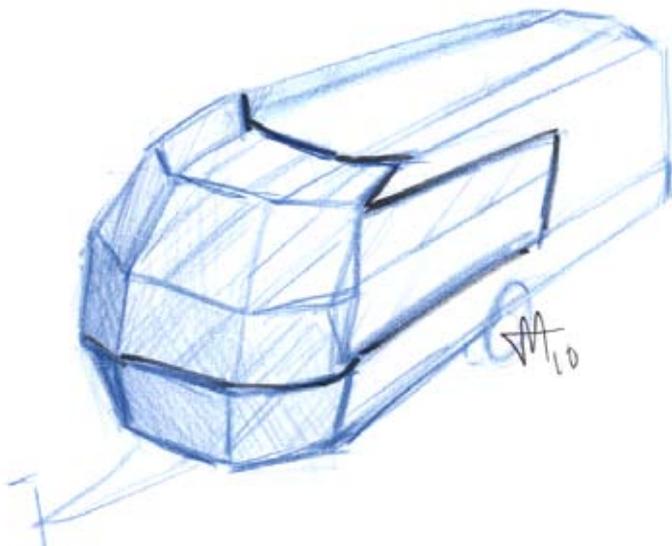
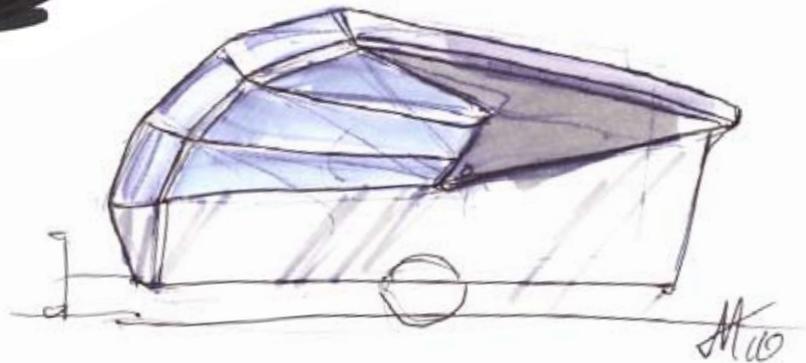
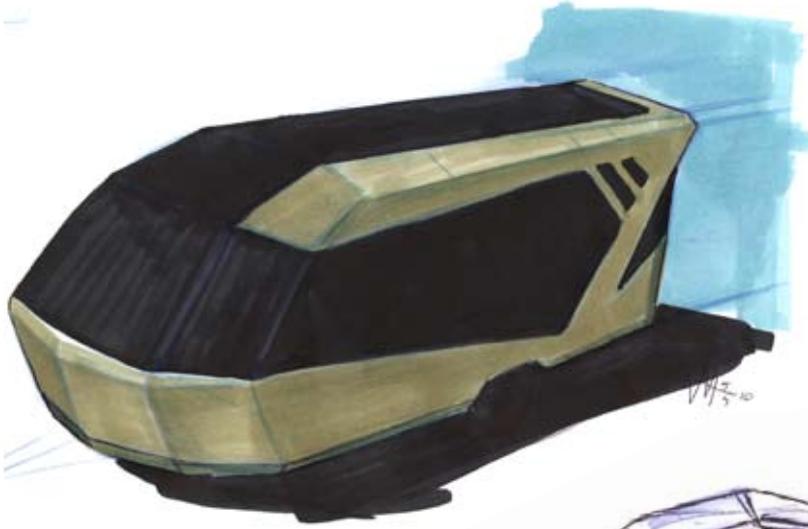




Some inspiration from Lamborghini Reventon opened up for becoming bit more extreme and “car-like”.

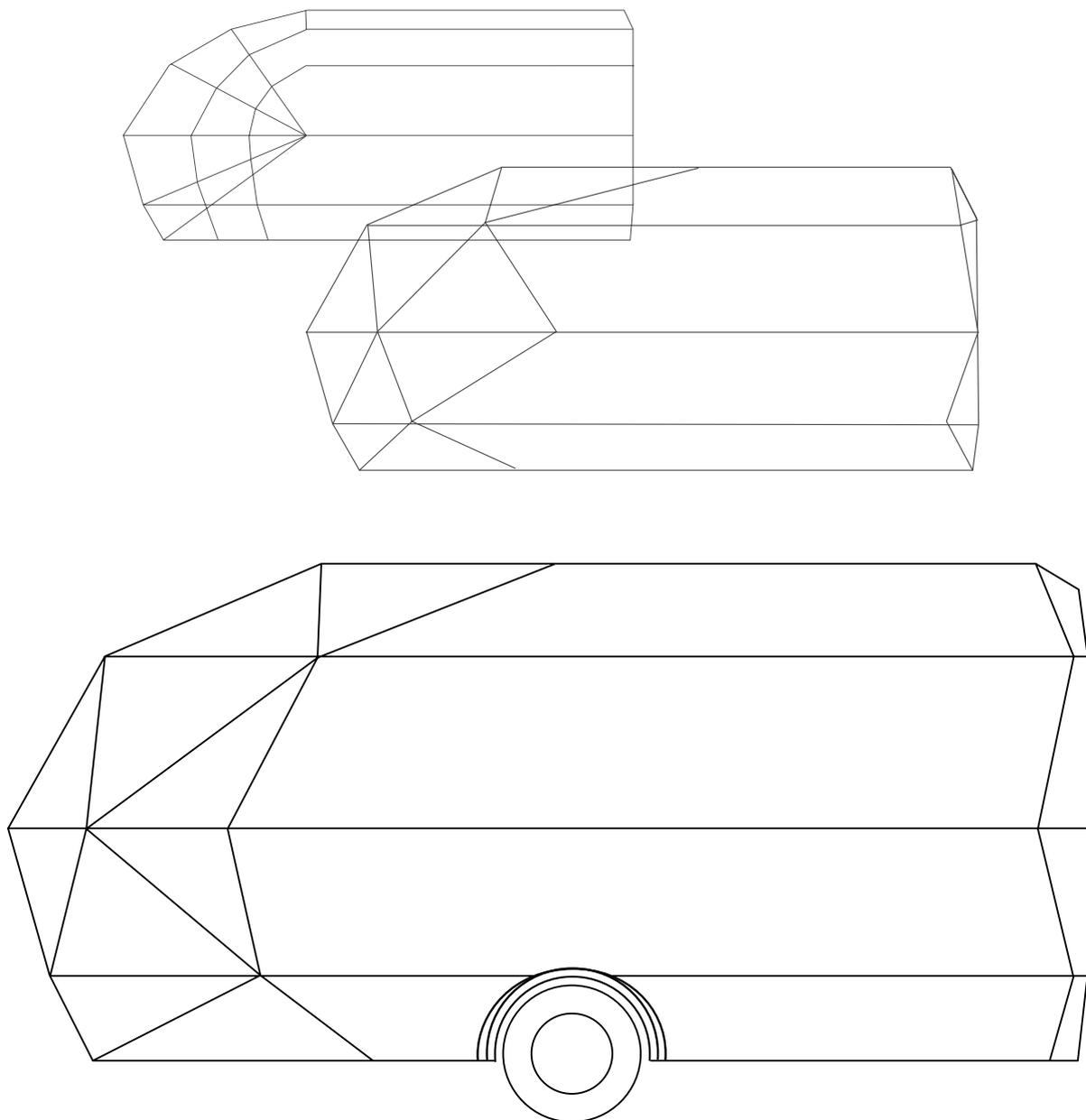


From the more detailed “Reventon”-look, a more crystal inspired simple look started to take shape. This finally lead up to the final design.

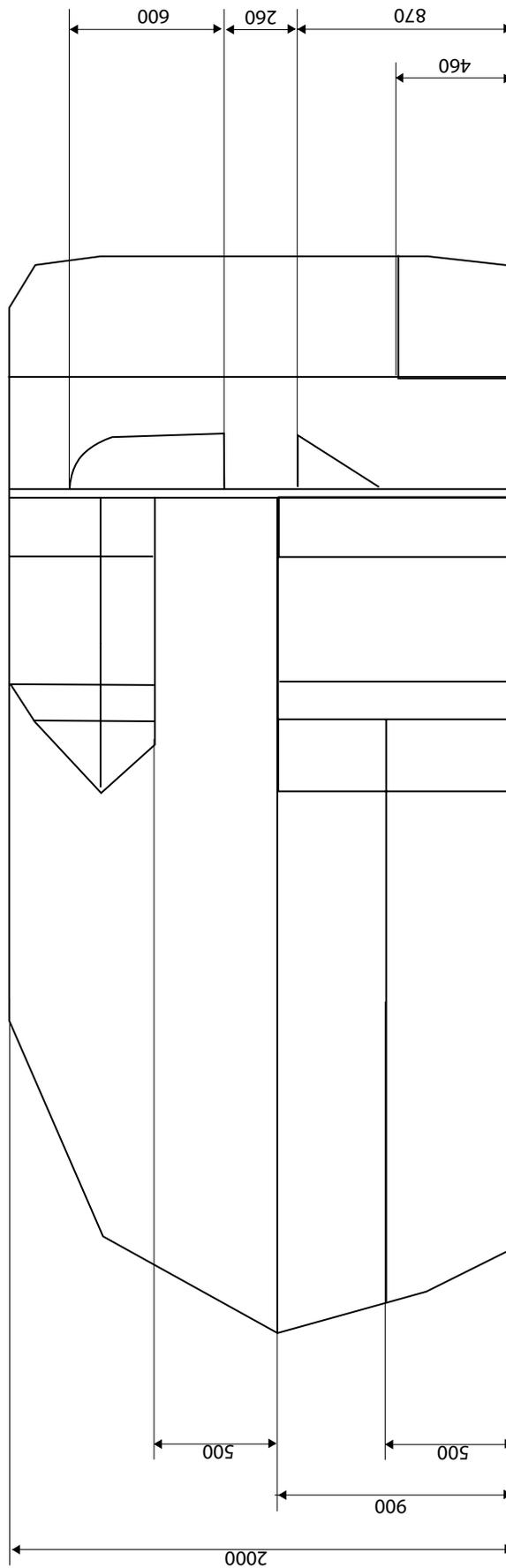


The last designing of the caravans exterior was done in illustrator sketching on the profile of the caravan. When the profile and the outline of the front was finished with way quickly tested in Alias Studiotools to se if it worked three dimensionally.

The design worked very well and was also very satisfying. Therefore that became the final design.

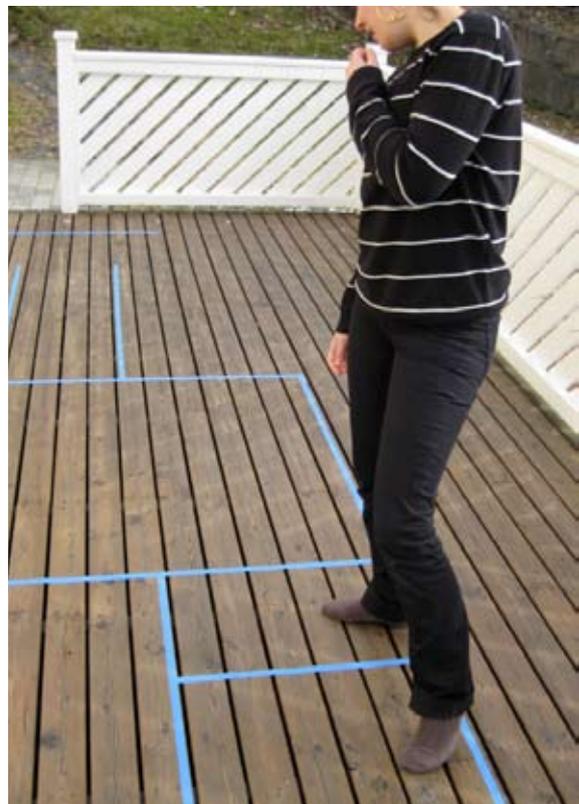
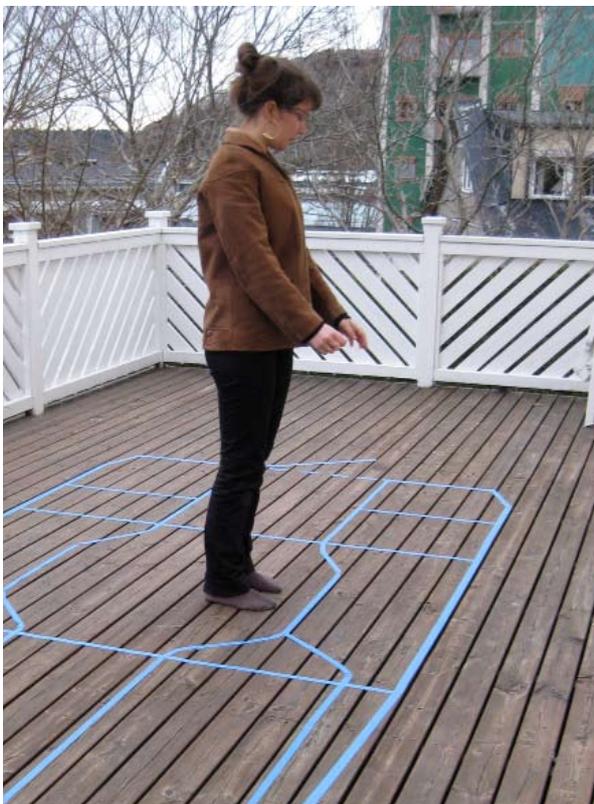


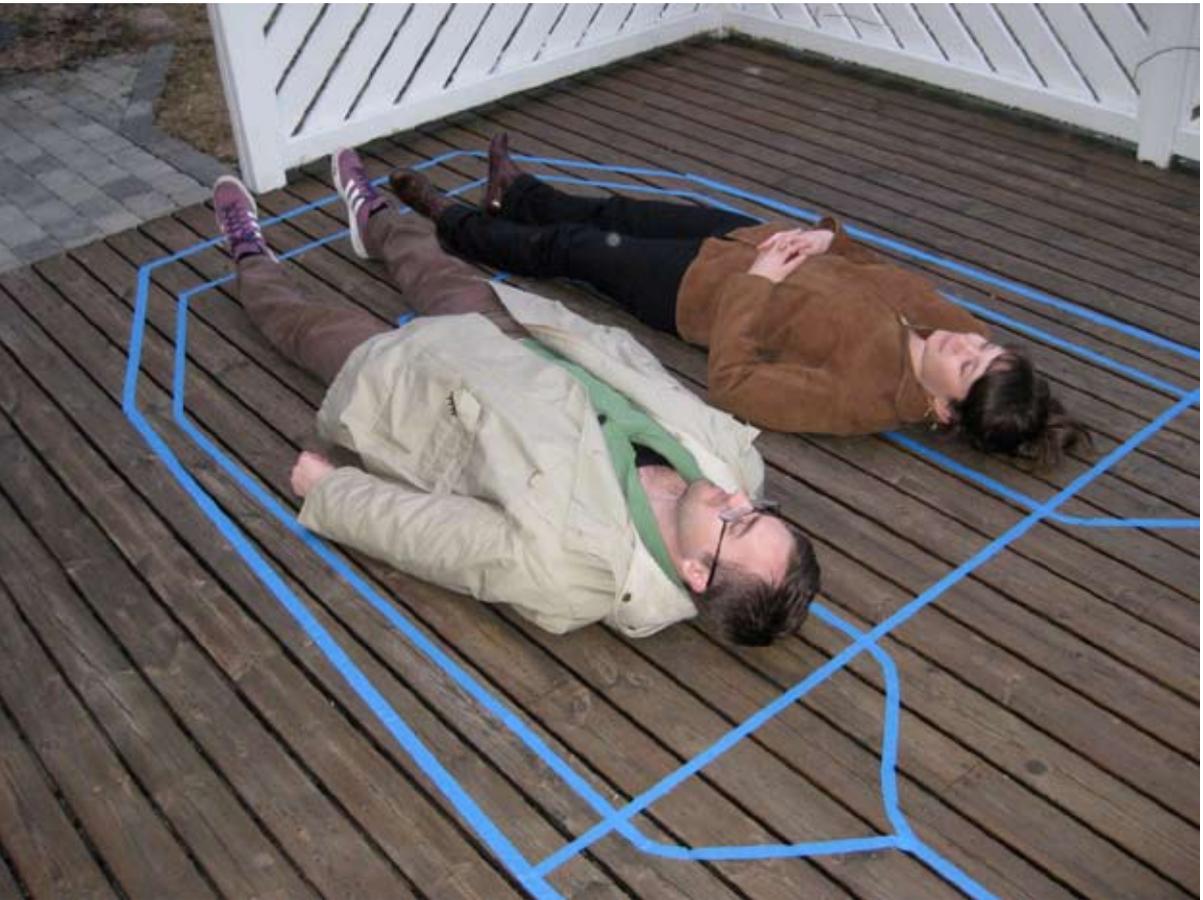
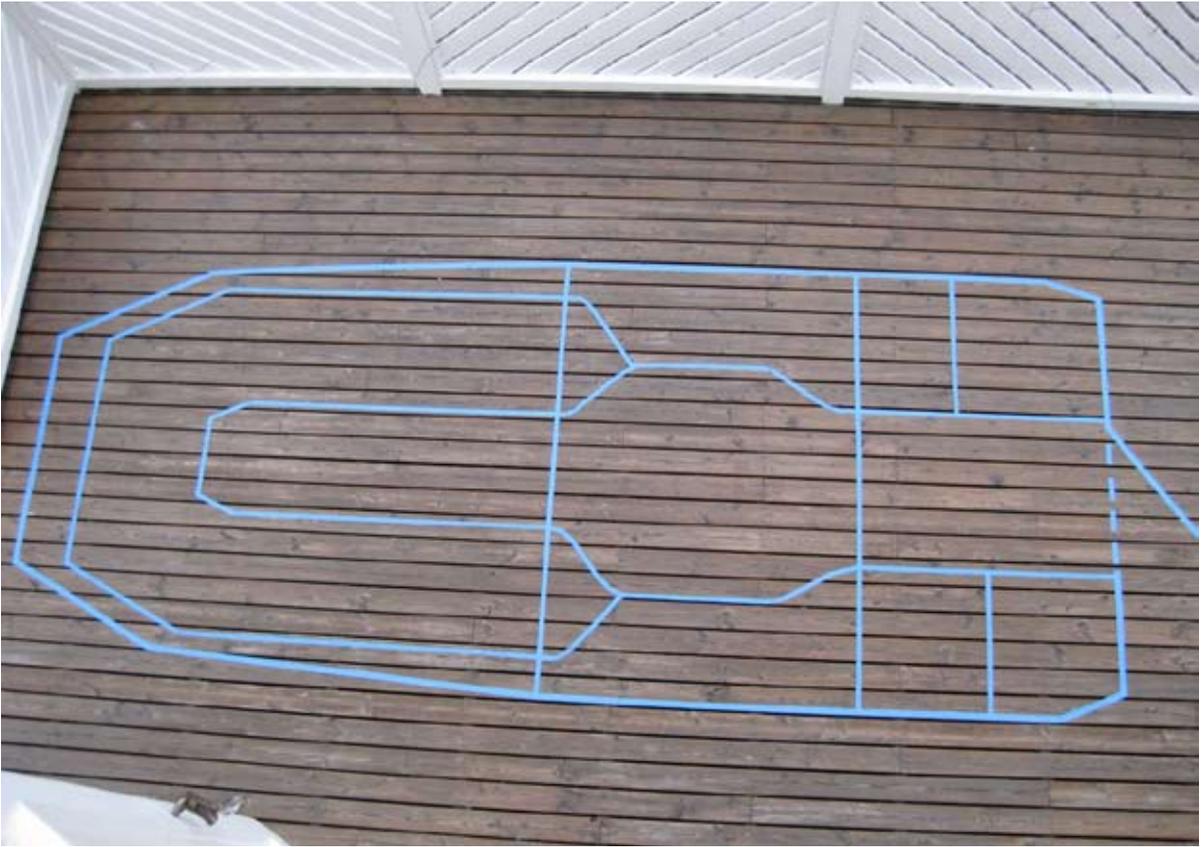
# Measurements (mm)



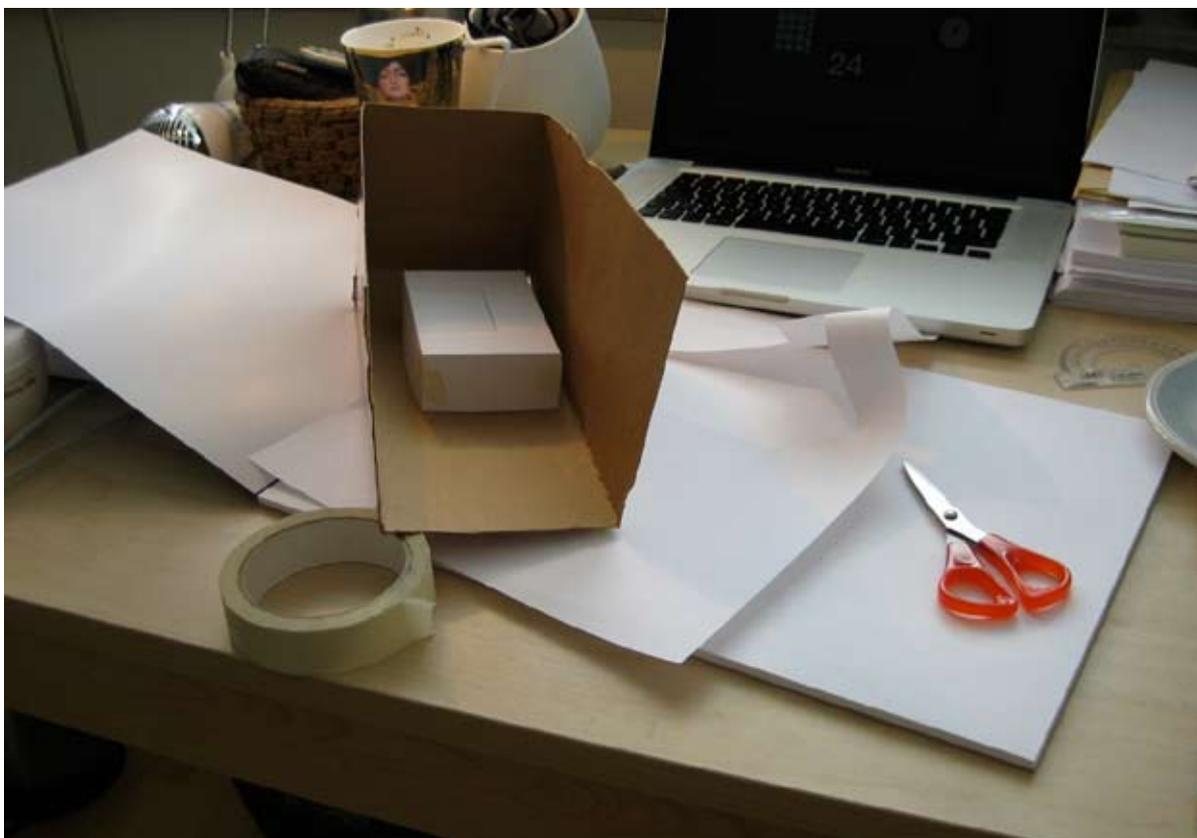


# Process



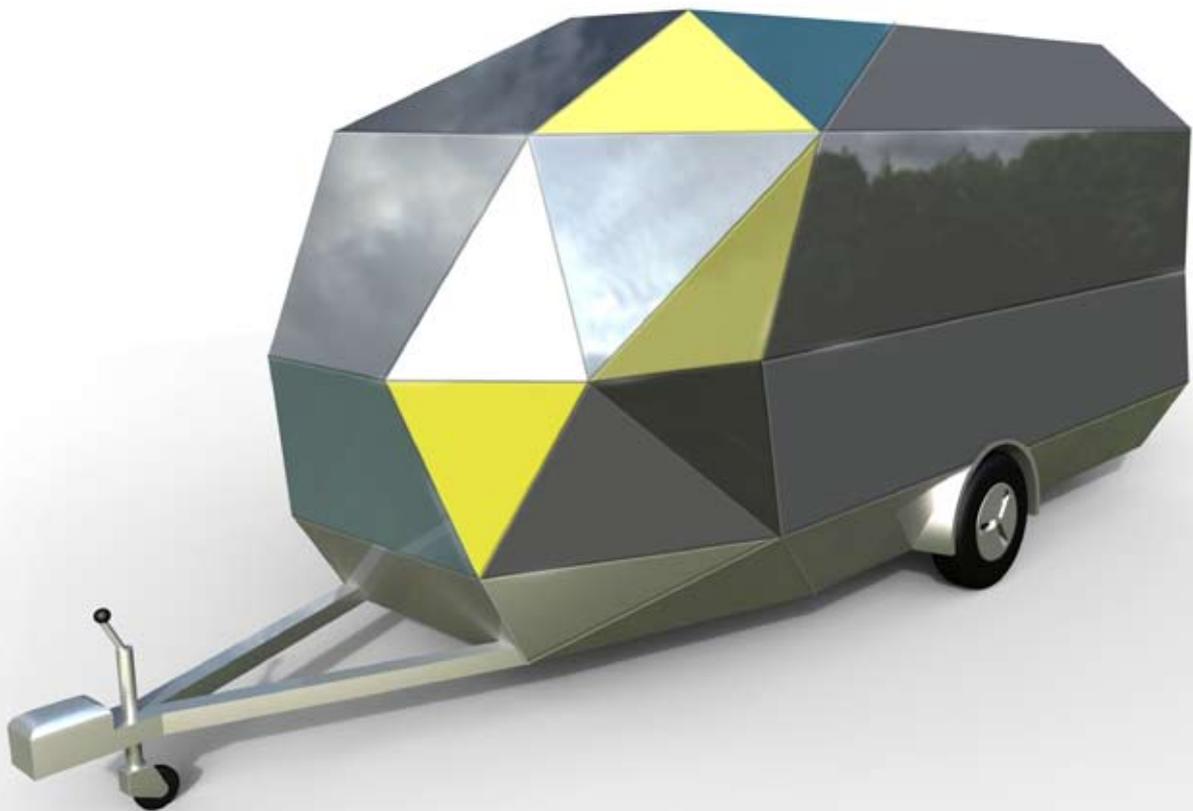


# Process



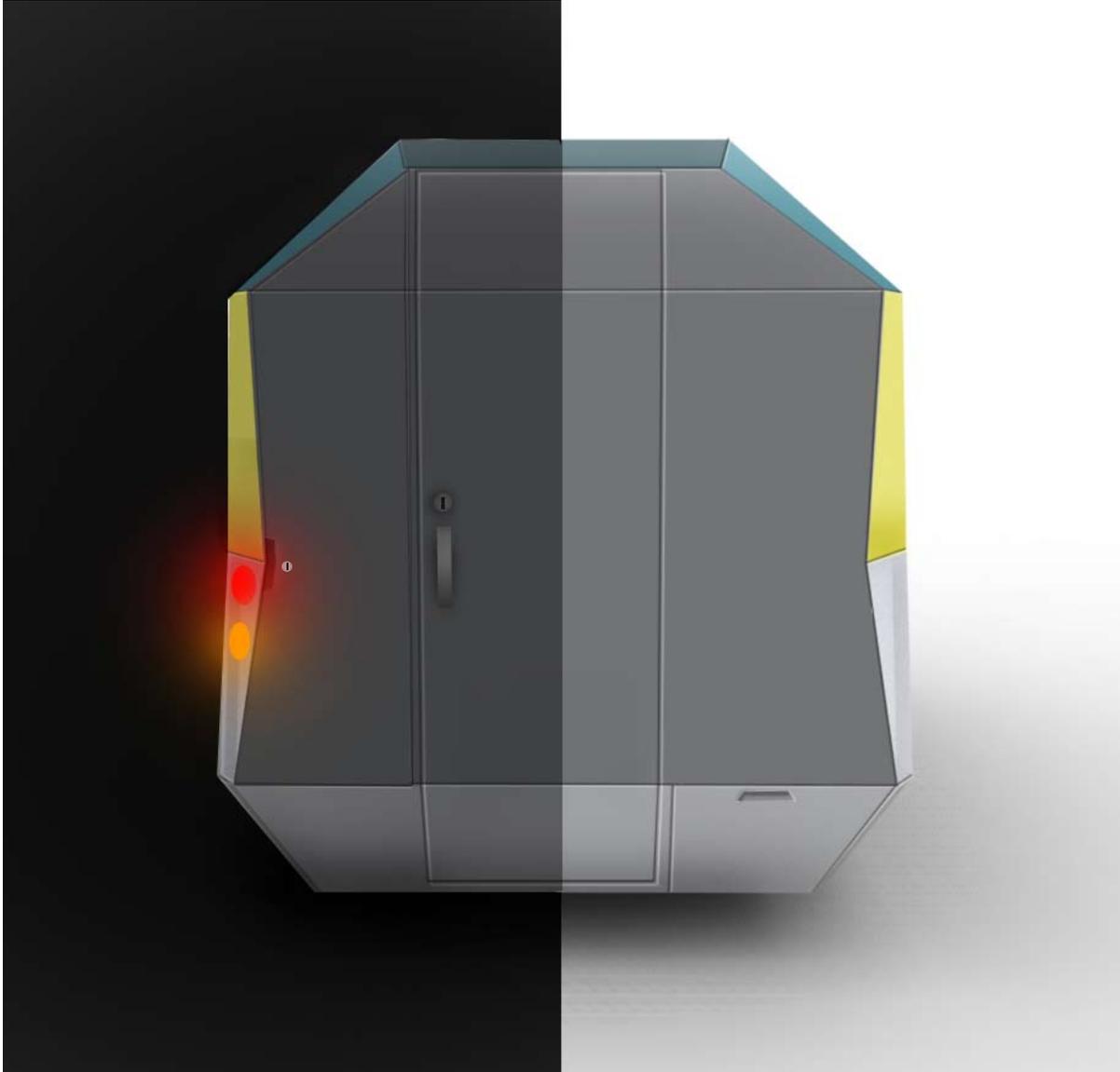


## Final result

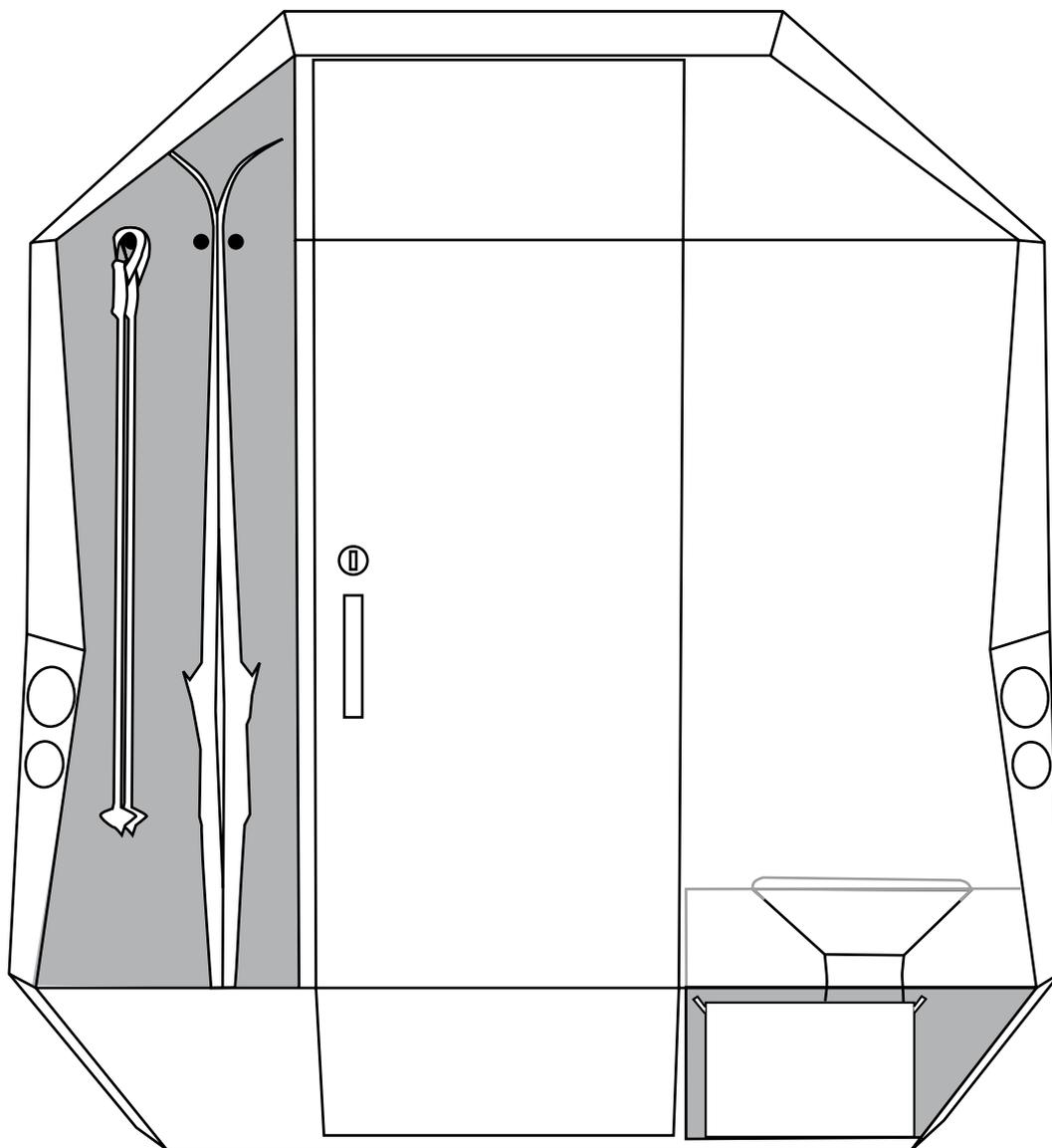


The coloring for the final result was inspired a lot from outdoor gear, mixing both bright colors and darker more modest colors. The different plates are mixing matte and shiny surfaces to get an interesting pattern on the whole caravan. The window is consisting of a semi transparent glass. This will decrease the amount of heat added to the caravan from the sun which often is a problem in caravans on sunny days. The mirrored window, as well as the shiny plates on the exterior, will also pick up structures from the surrounding nature and the sky which will make the caravan partially blend in and partially pop out in nature.





This image of the back of the caravan is showing how the use of LED-lights can make the back lights blend in in the good in the exterior facets.



On the left side there is a cabinet that opens from the outside and can also be locked. The cabinet has hooks on the wall and can store different types of gear such as ski and climbing equipment for example.

On the left side of the door there is an opening for emptying the toilet. By emptying the toilet from the outside you'll get a more hygienic feeling.



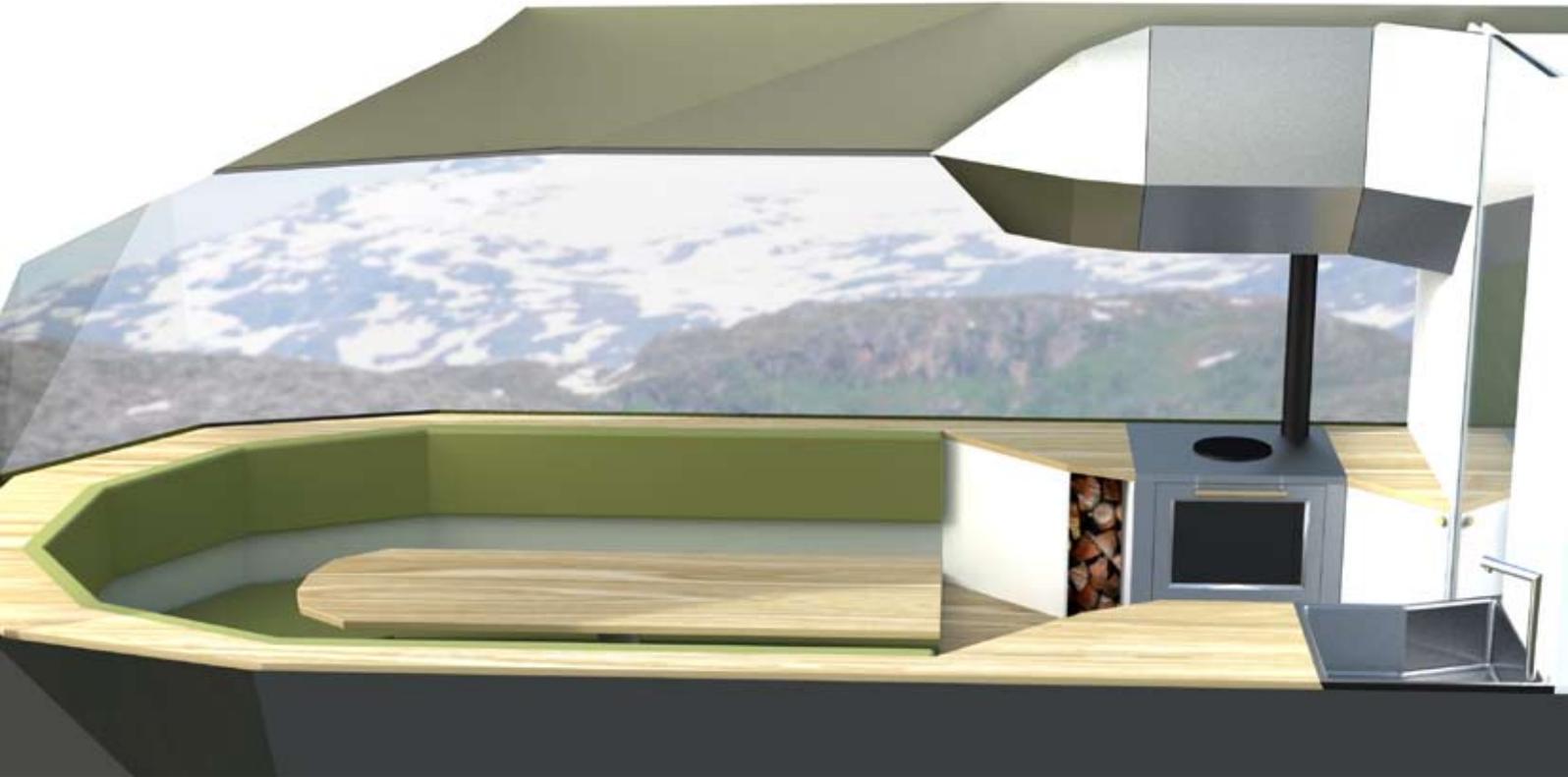
To get a good view of the back of the caravan, the main door is here invisible.







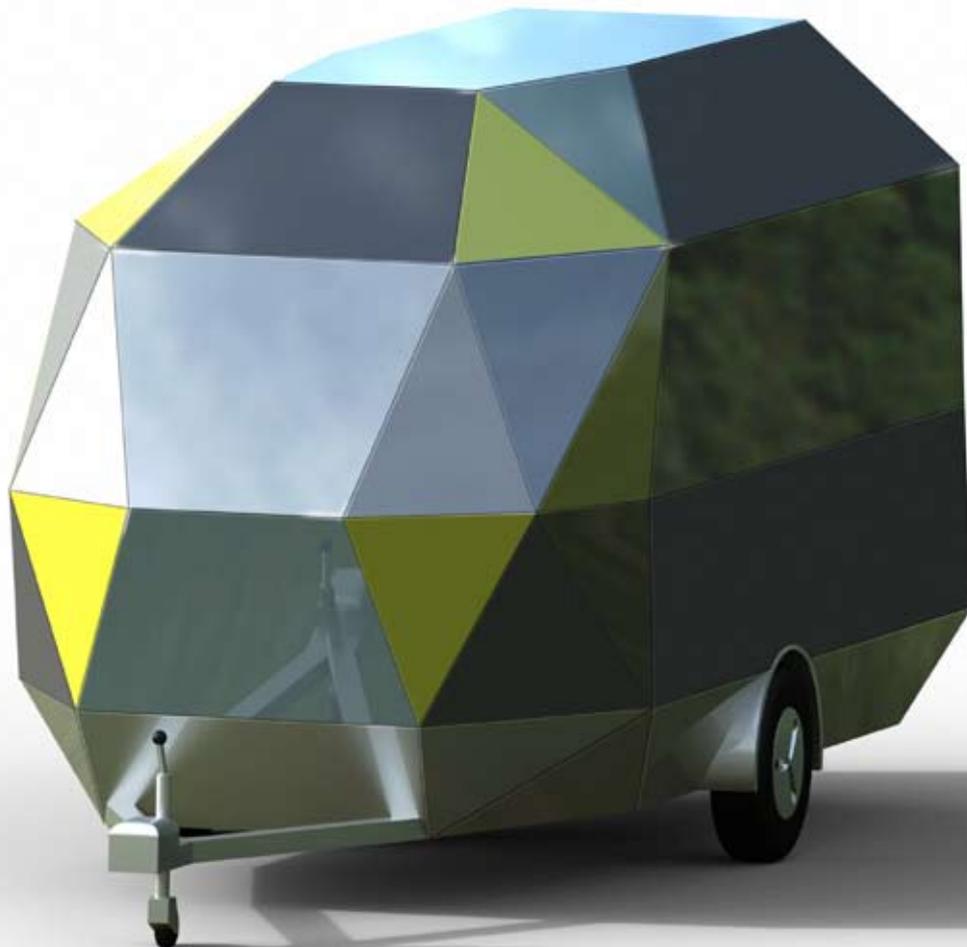
The darker areas in this image are showing where the walls are. But to get a really good image of how the complete window view would look like, the walls were chosen to be transparent in this image.



Notice the slot next to the wooden stove for wood.



Its difficult to get a good image of the toilet because of the small area that it is set in. This image is to show somewhat what it looks like but not from a “real” angle.



Finally I want to thank the following people for support in my project;

Charlotte Sjödel

Anna Persson

Claus-Christian Eckhardt

Bo at <http://frittliv.autonomtech.se/>

My closest friends and family

Helpful classmates

# References

## **Forums:**

<http://frittiv.autonomtech.se/>

<http://www.utsidan.se/>

<http://jaktsidan.se/>

<http://www.husvagnochcamping.se/>

## **Brands and specific trailers:**

<http://www.kabe.se/>

<http://polarvagnen.se/>

<http://www.cabby.se/>

<http://www.solifer.com/>

<http://www.adria-mobil.com/default.cfm?t=SE&d=SE&j=Se&kat=06>

<http://www.smvhusvagnar.se/>

<http://bergholm.com/>

<http://www.clubknaustabbertgroup.se/>

<http://www.airstream.com/>

<http://www.roamingtimes.com/rvreports/airstream-basecamp-small-travel-trailer.aspx>

<http://www.uncrate.com/men/gear/outdoor/2008-airstream-basecamp-trailer/>

<http://www.theworldmatters.org/2010/04/03/15-caravans-to-pimp-your-adventures-with-luxurious-comfort/>

<http://www.campingsverige.se/mehrzeller-camper-futuristisk-husvagn.html>

<http://www.kip-caravans.nl/>

<http://www.thedesignblog.org/entry/colim-separates-the-car-from-the-caravan/>

[http://www.husvagnsforum.com/index.php?option=com\\_kunena&Itemid=67&func=view&catid=32&id=153483](http://www.husvagnsforum.com/index.php?option=com_kunena&Itemid=67&func=view&catid=32&id=153483)

<http://www.examiner.com/x-8310-Trendy-Living-Examiner~y2009m6d10-Bob-Vila-designs-This-Old-Airstream>

<http://www.jurgenssafari.co.za/4.xplorer.html>

<http://www.youtube.com/watch?v=4rPdSSkLRnI>

<http://www.4x4offroads.com/camping-survival-vehicle.html>

<http://roadtripmemories.wordpress.com/2009/09/19/our-new-tb-trailer/>

<http://hem.bredband.net/heavyl/dreamliner/38%20Hela%20ekipaget.JPG>

<http://www.galileorv.com/>

<http://www.gorving.ca/foldingcamping.asp>

<http://www.camp4you.se/husbilar/carthago/>

<http://www.husvagnsimport.se/adrial.html>

## **General info:**

<http://www.gorving.ca/foldingcamping.asp>

<http://www.gocaravanning.com/trailer/>

<http://gypsywaggon.co.uk/varhistory.htm>

<http://americanhistory.si.edu/collections/object.cfm?key=35&objkey=222>

<http://www.timesonline.co.uk/tol/travel/news/article1784734.ece>

<http://www.crva.ca/rvtypes.asp>

<http://www.livbit.com/article/2009/04/19/building-in-spain-that-looks-like-a-crystal-structure/>

<http://www.campingsverige.se/Modeller/Kabe-2003-En-husvagn-byggs.html>

<http://www.flickr.com>

[http://hittaupplevelse.123ehandel.se/search.html?Search\\_Text=nature](http://hittaupplevelse.123ehandel.se/search.html?Search_Text=nature)

### **Inspiration etc:**

<http://www.fjallraven.se/>

<http://store.everestgear.com/>

<http://www.dailytonic.com/not-so-crystal-clear/>

<http://www.livbit.com/article/2009/04/19/building-in-spain-that-looks-like-a-crystal-structure/>

<http://www.premiumposts.com/lamborghini-reventon-more-expensive-than-ferrari-enzof/>

<http://www.quartzpage.de/>

### **Features:**

[http://www.nyteknik.se/nyheter/energi\\_miljo/solenergi/article671685.ece](http://www.nyteknik.se/nyheter/energi_miljo/solenergi/article671685.ece)

<http://www.americanbamboo.org/General-Info.html>

[http://skaffasolcell.se/wp-content/uploads/2009/11/3089060600\\_6362ebb627.jpg](http://skaffasolcell.se/wp-content/uploads/2009/11/3089060600_6362ebb627.jpg)

<http://www.passivhem.se/passivhem.html>

[http://www.treehugger.com/files/2007/06/book\\_review\\_con.php](http://www.treehugger.com/files/2007/06/book_review_con.php)

[http://www.alltombostad.se/Foretag/Pacto/Toalett\\_Miljotoalett/](http://www.alltombostad.se/Foretag/Pacto/Toalett_Miljotoalett/)

[http://www.stovesonline.co.uk/wood\\_burning\\_stoves/Cera-Domino-stove.html](http://www.stovesonline.co.uk/wood_burning_stoves/Cera-Domino-stove.html)

<http://www.sundsvall.se/husochhem/stodo-chradgivning/energioklimatradgivning/ditthusuppvarmingochenergiforbrukning.4.6999ba0910e8304520480003657.html>

<http://www.energymasters.com/solar-panel-fact-vs-fiction.php>

<http://www.renewableenergyworld.com/rea/partner/goldcoastsolar-com/about>

<http://www.inhabitat.com/2009/09/18/colored-solar-panels-dont-need-direct-sunlight/>

<http://www.signazon.com/rear-window-graphics.aspx>

[http://np.netpublicator.com/np/n85029876/o\\_Husvagnsvensson-yes.pdf](http://np.netpublicator.com/np/n85029876/o_Husvagnsvensson-yes.pdf)

<http://translate.google.com/translate?hl=sv&langpair=en%7Csv&u=http://www.tirerack.com/tires/tiretech/techpage.jsp%3Ftechid%3D46>

<http://www.vattenfall.se/sv/kyl--frys.htm>

[http://www.elnordic.se/Produkter/produkt.asp?pid=188&utm\\_source=kelkoose&utm\\_medium=cpc&utm\\_campaign=kelkoclick&utm\\_term=Eco%20spot%20LED%20E14%203x1%20watt%20varmvit%201080-e](http://www.elnordic.se/Produkter/produkt.asp?pid=188&utm_source=kelkoose&utm_medium=cpc&utm_campaign=kelkoclick&utm_term=Eco%20spot%20LED%20E14%203x1%20watt%20varmvit%201080-e)

[http://www.nlv-solar.com/what\\_we\\_do/products/](http://www.nlv-solar.com/what_we_do/products/)

<http://www.teknikensvarld.se/nyheter/090304-koenigsegg-quant/index.xml>

<http://miljoforskning.formas.se/sv/Nummer/December-2006/Innehall/Temaartiklar/Solceller-och-solvarme-i-kombination/>

<http://www.energimyndigheten.se/Global/Solceller/090701-solceller%20broschyr.pdf>

<http://www.iea-pvps.org/>

<http://www.visualisering.cleanshift.se/visualiseringsexempel/>

[http://www.alltombilen.com/dack\\_beskrivning.asp](http://www.alltombilen.com/dack_beskrivning.asp)

<http://www.jacksons-camping.co.uk/cool/wheel.htm>

<http://www.svensksolenergi.se/omsolenergi/fragorochsvar.html#skillnad>