Inspire agriculture industries to a zero-emission future.

MASTER THESIS
PROJECT IN
COLLABORATION
WITH CAKE.

UMEÅ INSTITUTE OF DESIGN
UMEÅ UNIVERSITY

FANNY JONSSON
MASTER OF FINE ARTS.
TRANSPORTATION
DESIGN 2022

Table of Contents.

image 2: . Ian Lavrinovich.

Acknowledgements.

Thank you

First and foremost I would like to thank Cake and Stefan Ytterborn for giving me the opportunity to work with this project with the support from the design team at Cake. For the very helpful supervision and support from both David Gonzales and Oskar Milke throughout the project.

I am also thankful for the tutoring and advice given from UID, good efforts were made to make the remote situation work well. Thank you Demian Horst, Umeå Institute of design for your valuable comments on this thesis, and Jonas Sandström for keeping me on my toes.

Finally I must express my very profound gratitude to my partner Jim, my family and friends for their unfailing support throughout this whole journey of my studies and writing this thesis.

cake

kibb

Program director	Jonas Sandström
Project tutor / UID	Demian Horst
Project mentor / CAKE	David Gonzalez
Project title	Kibb
Author	Fanny Jonsson

UMEÅ INSTITUTE OF DESIGN - UMEÅ UNIVERSITY
MFA IN TRANSPORTATION DESIGN - DEGREE PROJECT
STOCKHOLM - UMEÅ - SWEDEN 2022

Abstract.

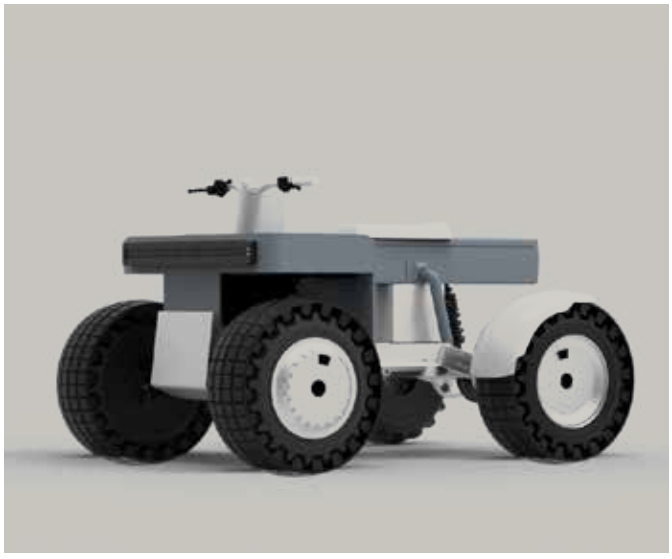
Inspiration

CAKE Kibb is proposing a possible mobility solution for regenerative agriculture that suits better within the values that comes with it. A non disturbing vehicle both physically and chemically that can help through out the day of a farmers lifestyle, in a diverse and modular manner.

Agriculture is now one of the industries that contributes to the most greenhouse emissions in the world. This is slowly killing our soil and prevents a healthy growth, so the industry is at this point slowly killing it self. With Regenerative agriculture the aim is to harness the healing powers of earth itself to have healthy regenerative growth. At this time the access to non pollutant transportation and machines is very limited. With the very diverse tasks that is required, a modular small mobility could be a good solution for the farms going towards regenerative agriculture.

What if this could inspire farmers to choose a more sustainable mobility solution in their daily tasks. Would it be possible to move around on a farm with minimal impact? With the experience the author has from living on a horse ranch growing up she knows the respect you have for the animals and earth. She cant see why this would not be interesting for more farmers or ranchers wanting to respect the things they already spend all day nurturing for optimal growth and well-being.

The process that follows was set out from the research made around the topic and from what was concluded from user interviews. With the projects set time frame (year - 2030) the project is



Process

Result

highly dependent on current technology, rules and regulations. This puts quite tight restrains on what the vehicle can come to be.

If the goal is to reduce the impact agriculture has on our earth is it even ethical to create something more that would move around on it? The conclusion made was that even if this contributes to the consumer society, agriculture is vital for human life on earth. So, here is a chance to inspire towards a more sustainable, zero emission direction of handling agriculture.

In this project it is easy to imagine a whole arsenal of accessories and functions it could have but the author has decided to limit the development of these to a few given scenarios and leave a gap for imagination for other opportunities. The focus will therefore be on the main vehicle and a few accessories connected to the scenarios but not in as high refinement as the main vehicle. There is no ambition in innovating new tools for farming more so create a way to use the current methods in a more sustainable way with the principals of regenerative agriculture in mind.

The concept is an electric ATV that is designed to work with and without a human driver. The vehicle is designed to at all times make as little impact as possible although still provide the user with the power and capability that is needed. It is moving around the farm with a gentle and confident manner respecting the ground and its surroundings.

Background

How can we provide regenerative agriculture ranches with the appropriate small mobility solution?

Agriculture is now one of the industries that contributes to the most greenhouse emissions in the world. The methods that we are using to conduct this industry first started after the second world war and the methods we are using is killing our earth. Which is not strange since we are pumping our crops full of the same substances as was used in the gas chambers (Kisstheground, Josh Tikell, 2020.). Not only this but by trying to manipulate the living matters involved in agriculture to be more efficient and convenient for us we have started desertification. Which is when soil basically turns into dust, and nothing can live in or on it. Poor land and soil lead to, poor people, immigration, extreme weather, and poor survival rates for all living things. But there is hope. If we can change our ways once again. To methods that is not something new but something indigenous communities have been doing for centuries. Regenerative agriculture, where we help the earth to restore itself, as she has done may times before. By promoting a non-disturbing biodiverse way of agriculture. This is when we bring life back to the soil and allow it to restore life.

We must harness the generative power of earth itself. This can be done with the methods of regenerative agriculture. The power lies in biodiversity, and we can no longer operate farms and ranches with only one type of crop or animal. To operate these types of ranches the need to move around on the lands is crucial. Livestock needs to move so that the grass and crops they are walking on is as little disturbed as possible. And keeping multi crop fields requires more supervision. Here comes a need of a vehicle that is non disturbing both physically and chemically. That can tackle unpredicted and diverse tasks that comes with a rancher's life. There is now a lack of sustainable options for transport within agriculture. Why CAKE is the right company for this mission they already state that the three biggest assets of their products is that they are light quiet and clean. In

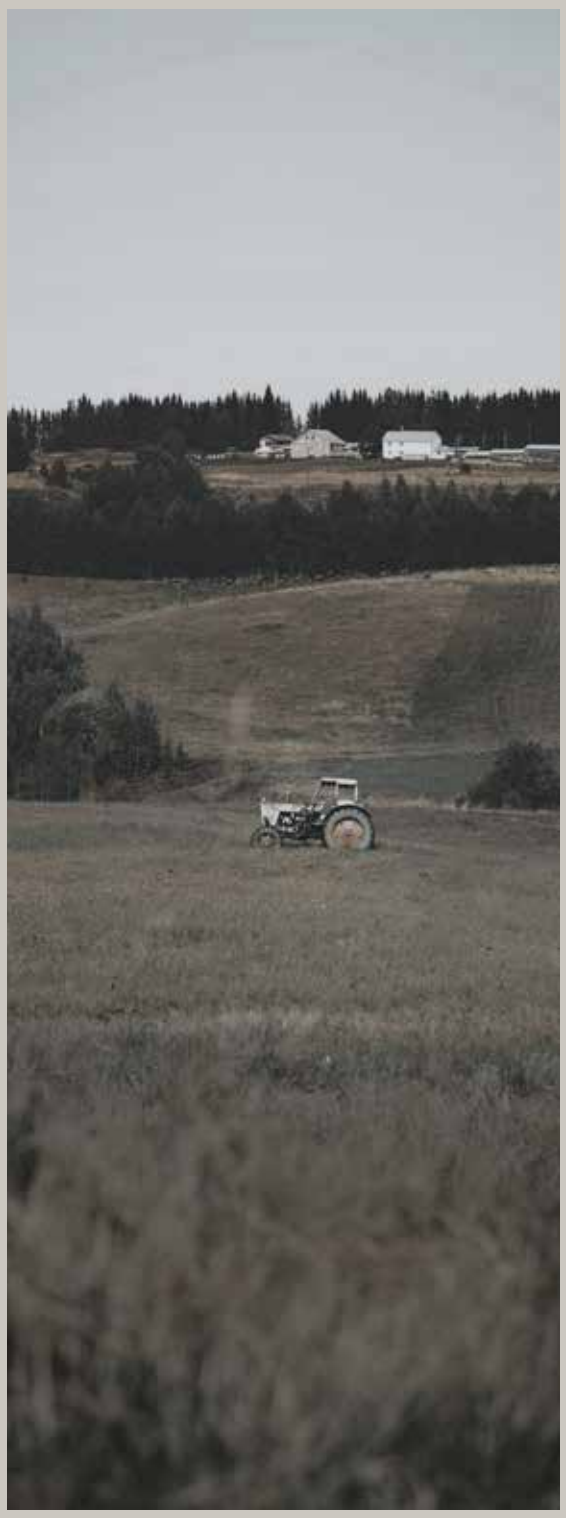


image 3: tractor on field. Ian Lavrinovich.

the case of regenerative agriculture this is exactly what is needed of a vehicle. The heritage of the Kalk bikes off road capabilities and power despite its light weight. The Flexibility and modularity of the Ösa together on a bigger platform of a 4x4 ATV can make up for the need in this scenario.

The general goal for CAKE is to inspire to a zero-emission society. For now, the focus for developing the products has been on leisure, commute and last-mile deliveries. Emissions in the cities and allowing people from the cities to explore nature with respect. Now the next mission could be to treat nature with respect whilst using its fantastic resources.

Society & industry.

This project aims to contribute to society by introducing a more environmentally friendly way of moving around in agricultural industries. Being one of the largest producers of greenhouse gasses, agriculture industries have a long way to go, and this needs to happen in steps. So, introducing something that can inspire to kick start the journey towards zero-emission could be a first step of many on the way to more sustainable ways. With this investigate how to reshape utility ATV's in a more functional driven way, when given new opportunities in the change to electric drive train. Without loosing capability.

Studies show that the agriculture and food industry is now dependent on fossil resources, and there is an opportunity to inspire to and start the change to more sustainable options. Also, global warming itself has an accelerating effect on agriculture which at this point the industry itself is a big part of causing. So, if there is a slight possibility to help this industry save itself, society and the industry should take it. Since our life on earth is dependent on this market and now it is killing us and itself.
Relating to UN SDG 13.1, taking climate action to help to prevent climate change via agriculture. Since with a healthy regenerative agriculture greenhouse gas will naturally be stored in the soil if kept healthy and non-disturbed. With that strengthen resilience and adaptive capacity to climate related disasters. Connected this is also UN SDG 15, life on land. If we can keep a healthy agriculture industry, we can help to restore biodiversity and end desertification.

Image 4: Kei Scampa 2020

Image 5: Kei Scampa 2020

Personal motivation.

From the authors perspective of growing up on the countryside on a ranch, side by side with animals and all that comes with it. She knows that a lot of the work requires heavy fossil driven machinery. Which is a bit contradictory since your biggest focus on the ranch is to take care of the animals and their surroundings, and to do that you are using vehicles that in more than one way disturbs and destroy its surroundings.

Being from the countryside she knows how we always want to respect our land and animals. Also, how much a tractor can disturb with noise or just leaving huge track behind it. Knowing the struggle moving around your properties without leaving to much of a mess behind you, there is room for improvement.
For some time now we have seen a growing interest in sustainability nevertheless in what people choose to eat. Now even more during the COVID.19 pandemic. With a growing interest comes bigger demands on the industry to choose more sustainable solutions. Ecological stamp will soon not be enough, maybe even to get that kind of certification will come with higher demands on the producers. So, the timing to introduce capable equipment that also provides a higher level of sustainability is now.

Process.

Introduction	Package & drive-train
Research	User group
-What is regenerative agriculture.	Mood board & form board
-Post-pandemic sustainability awareness.	Early ideation
-ATV Usage areas	Theme refinement
-Wireless charging	Scenario refinement
-Why CAKE?	Wheel ideation
-Benchmark	Design freeze
Research conclusion	3D modelling
Framing	Detailing

Introduction.

The following section will show, explain and clarify the process leading to the final result of this project. From research to final refinements of the design.

The research started with the authors personal discovery of the principals of regenerative agriculture, and from there digging deeper into what that actually is and how much this method can contribute to fight global warming. Here came a spark of inspiration and drive to find a vehicle that would reflect on similar values and respect for our environment.

From there understanding the need of a small vehicle that was capable of getting around anywhere on a farm and also being able to carry and pull heavy things. The segment of ATV's was researched, and quite quickly realising that the electrification has not yet reached this segment fully. Finding potential in developing something innovative in this segment, with the new possibilities that comes with another type of drive train.

Ideation started with understanding and setting up a few scenarios and from there develop something that could facilitate the daily work of a regenerative rancher. Quite early in the process also setting up inspiration boards to make sure do differentiate from the current products on the market winch in their looks now expression wise deviates from the aim and usage of the set scenario.

When a direction was chosen followed refinement of proportions and fine-tuning of smaller components of the vehicle to work well and have believable technical solutions for the set time target of 2030.

What is regenerative agriculture.

image 6: Tractor tracs in grass. Dastan Khdir.

With the world population continuously growing agriculture has had to become more and more efficient, to the extent that it is constraining itself. The high pace industrial agriculture is draining the lands from nutrients, and it is killing the soil. In the coming decades the world faces the risk of major regional food crises leading to conflicts and mass refugee movements. This is driven primarily by emerging scarcities of all the primary resources required to produce food and a global failure to reinvest in it (Julian Cribb, 2010). Agriculture is something humans have been doing for a very long time and is providing us with the necessary means to survive. However, it is also considered being one of the leading causes of health and environmental issues.
Some of the issues that industrial agriculture can be linked to is: Diminishing biodiversity among plants and animals. Soil, water, and air pollution. Quickened pace of soil erosion. Unsustainable rates of water consumption in many agricultural areas. Development of chronic diseases, cancers, and foodborne pathogens due to animal-based foods, pesticides, and concentrated high-speed meat production. Resistance to antibiotics due to excessive use of antibiotics in animal agriculture. Lack of nutritional value in foods (Chesapeake Bay Foundation 2021).

Most of the methods causing this were invented during the industrial revolution and could now be considered outdated, or at least in the need of some rethinking. Since most of the food we consume is grown in this type of intensive industrial agriculture. Here is where regenerative agriculture comes in. The idea is not only to preserve our lands but to help the soil to regenerate its natural nutrients and minerals. It is a lot about trying to disturb as little as possible. Both physical and chemical. For example avoid tilling, let the soil rest and change type crops. Keeping the soil covered at all times helps to preserve its health. Weather with crops or make sure there are not too many animals that make the grass fields muddy. Bare ground will let CO2 and H2o escape from the soil. A healthy soil will store Co2 and bind it and that means less Co2 will rise to the atmosphere. But an unhealthy soil or even dead soil will not store little to none Co2.

Regenerative agriculture is emerging now, mostly on smaller farms but is starting its journey in industrial size agriculture as well. Some governments already pay farmers for reducing their emissions and help fund new more sustainable technology for helping the industry in the right directions. Regenerative agriculture mostly focuses on interconnecting farming systems and the ecological system as a whole. It is not something new but something indigenous communities have been doing for centuries. There are many ways of achieving this but five principles tie them all together, and most relevant for this project is soil disturbance. Minimizing soil disturbance in physical ways. By not tilling the land and not harming the crops so that as little soil is exposed as possible. Since this in general leads to the soil to degenerate and loose its ability to hold carbon dioxide and water. Chemical and biological disturbances are aspects to minimize or diminish, for example use of fossil-based products. Practices used to accomplish this is through crop rotation to interrupt pests. Plant multiple species of crop to minimize weed and soil erosion. No to low till systems to minimize physical disturbances to the soil will increase water retention, nutrient cycling, and retaining topsoil. Rotational grazing also helps to maintain soil health (Chesapeake Bay foundation, 2021).

Benefits that come with regenerative agriculture is that it helps improve the bio-diverse habitats for animals. It increases the land's ability to filtrate air and water. It helps to sustain the earth's natural resources. It also decreases the amount of pollution we bring to the world.

If we fail to accomplish a more sustainable solution to agriculture the consequences will be profound. Modern wars are often driven by scarcities of food, land and water. Darfur, Rwanda, Eritrea and the Balkans were all destabilized, at root, by squabbles over these resources. Going further back, the French and Russian civil wars both grew out of bread crises (Julian Cribb, 2010). So by creating systems that help keep a healthy land we will not have to compete over what else is left and untouched, and instead contribute to a more sustainable earth.

Farmers not only grow food. Our 1.8 billion farmers, mostly women, also manage half the world's land, three quarters of its fresh water, a third of its atmosphere and much of its wildlife. They need our help to do so. And they need fair prices for their produce to do so sustainably (Julian Cribb and associates 2010).

image 7: tilled and not tilled fields. Lilartsy.

Post-pandemic sustainability awareness.

72% of consumers want to adopt more circular practices (Circular Economy, Resource Management, Sustainability, 2021), but often don't know where to start. As people look to live more sustainably, Companies that lead the way with circular strategies to create products consumers can feel good about buying will build trust and lasting relationships. During the last years of COVID-19 pandemic consumers have now more than ever found an interest and demand for more sustainable products. COVID-19 pandemic has raised awareness of the fragility of our globalized systems and have made the preference shift towards a local and decentralized systems. Nearly
50% of consumers believe that organizations are not doing enough to recycle, reuse, and reduce waste across sectors, and 67% expect organizations to be responsible when advertising products and to not encourage excess consumption. (Circular Economy, Resource Management, Sustainability, 2021). With these consumers are expecting change from companies post pandemic and with this require transparency. Studies have shown that six out of ten people are willing and ready to minimize their environmental footprint via changing their purchasing behaviour. This study suggests that it has intensified during the pandemic (Karl Haller, Jim Lee, & Jane Cheung, 2020). Food and drinks being one of the bigger conversations around sustainability. Here is were the question regarding sustainable solutions around agriculture and how it is one of the most polluting industries comes to account. Consumers now are looking for more sustainably produced and healthy alternatives (WSGN social media data, 2021).

For businesses, being vocal about sustainability commitments will be as important as following with actions. Purpose-driven consumers are participating in changing the world for the better together with the brands they choose. Community and collaboration will be their key values, and hope and compassion will be their key emotions (Mick Haupt / Cottonbro, 2021). Therefore, change needs to happen in every part of the agriculture industries. With consumers being more and more aware of the problem there comes demands for the companies to do what they can to contribute to more and more sustainably produces products for the consumers to choose from.

Today there is a lack of access, convenience, and cost. Which leaves the consumer feeling constrained. Not only does this apply to the buyer of food and produce but also the agriculture industry. To have sustainable growth industrial organizations need to

Image 8: Kei Scampa 2020

lead the way and give the end users the options. The demand is there, and the people are ready to shift their spendings to more circular and sustainable options.

Another consumer group might not be ready to take full action themselves but rely on companies to do it for them, or step in and lead the way. Investing in sustainability can contribute to a great economic growth. Giving the opportunity to transform the financial recovery from the pandemic to a revolution for sustainability and with this restore some hope and trust among this group of consumers. Brands and agriculture producers will need to provide the consumers with a holistic system for sustainability with truthful and reliable content. Companies need to help navigate through the complexities of sustainability in their area.

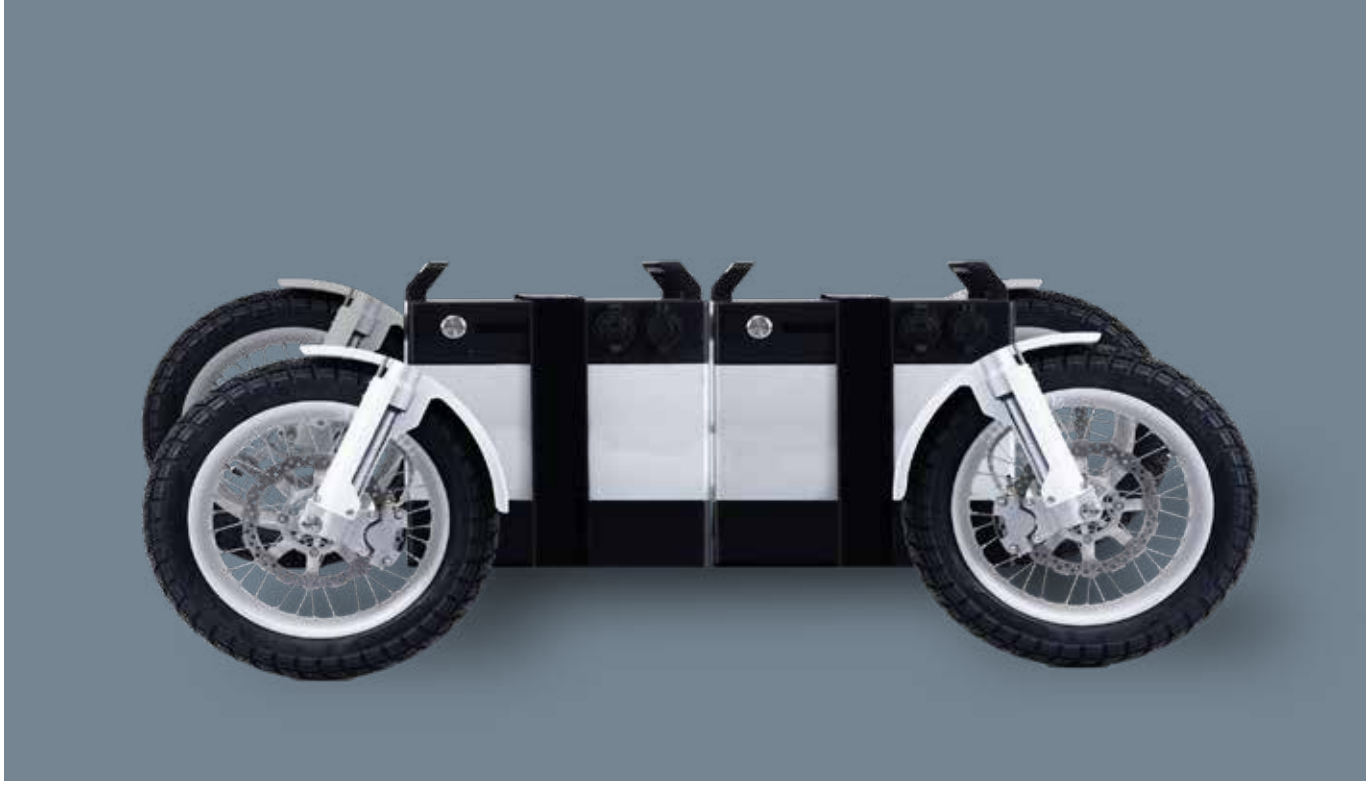
All this will have the agriculture industries to rethink value chains to keep credibility. Regenerative agriculture is already growing. But to close the loop all aspects of the agricultural system need to work in the same direction. Saving soil to help storing Co2 and then releasing fossil gasses with the vehicles used is quite counterproductive. The industry must engage in and support a transition towards greater circularity and to be transparent whilst doing so. These companies will be the new leaders of tomorrow on their markets with a strong consumer relationship and loyalty. In a sustainable journey, circular economy is an investment today for how we should do business in the future (Circular Economy, Resource Management, Sustainability, 2021).

ATV usage areas.

Modern farms have the benefit of autonomous vehicles that makes the days spent inside of a machine dramatically decreased. A lot of the work is simply monitored with different remote devices. This has come to create a need to move around simply to get around your land change. Since you no longer move around your ranch or farm as much to do work the need to inspect crops or animals still is an important aspect of everyday life in agriculture, and a smaller more efficient vehicle comes in handy. Many agricultural industries use ATV's and UTV's to do so.

Agriculture is one of the largest industrial producers of greenhouse gasses, with heavy machinery needing to be in service sixteen hours a day or more. Therefore, the journey to net zero in farming and agriculture will not be a single step but a series of steps that edge the industry closer to zero-carbon emissions (AEM, 2021). The first steps towards electrification or a more sustainable choice should therefore help create trust to a new type of power train, and to create this bond to the product the ATV that now one of the main types of transport on farms could be just the product to create that trust.
All-terrain vehicles (ATVs) often offer a covered, multi-passenger space, powerful engines, cargo beds, and other practical features that suit them for the demands of agricultural work. They are incredibly versatile and can help you accomplish tasks from feeding to mending fences, from ploughing fields to ploughing snow. They offer ample opportunities for recreation at the end of the day as well (Cashman CAT 2020).

Agriculture deals with living things and that creates an unpredictable existence for the personnel. In this working environment you can never predict if things are going to break or if animals break loose. A versatile way of transport is necessary. Ploughing snow, catching animals, fixing fences, repairing autonomous machines and other off-road jobs are things that are required for it to be able to handle. ATVs could be called the modern horse, a growing



number of ranchers are using ATVs for chores such as mending fences, feeding and watering cattle, herding and even lassoing steers, jobs for which they used horses exclusively just a generation ago (John Glionna, 2007). Perhaps the biggest advantage of an all-terrain vehicle is their ability to transport supplies quickly and easily to where they are needed.

There is room to improve, and electrification might be a way to go. To provide an ATV that can fit into the demands of regenerative agriculture it needs to be lightweight to physically damage as little as possible, and versatile to not have a need for many other types of machines. The fact that it does not directly pollute crops and beings is also a benefit that comes with electrification. Durability and long working days in farmer life challenges the capacity and range of the batteries that is now on the market. Finding a balance between weight and capacity of the vehicle can be challenging. Also to keep the advantages of a lightweight vehicle since it is mainly the batteries size that affects the weight of small electric vehicles.

Unpredicted emergencies that need to be dealt with and requires you to move immediately and your batteries devastating problem. Swappable batteries or smart quick charging systems need to bee looked at. People could argue that there are far more polluting vehicles that the ATV on a farm even just the fertilisers often used contributes to the greenhouse effect. In a possible future the bigger machines used on farms are moving towards more autonomy, and then the ATV will play a bigger role. Dealing with living matters there is a need to oversee your lands and animals. Then this type of small yet capable mobility solution is relevant, as it is today, and might play a bigger role when the humans don't need to go around in the bigger harvesting machines anymore. The need to get out and about your lands in other ways will become more relevant.

Wireless charging.

Just like how smart phones can be charged wirelessly the same type of technology can be applied on EV's. Its a resonant magnetic induction technology that allow energy to be transferred between pads once aligned. This type of charging is now on trial from for example Volvo in Gothemburg and in that case charging can take place at 3,3kW, 6,6kW or 20kW speed. This will for sure be an asset on a farm when the ATV is running remotely it can like a robotic lawn mower return to its nest and be charged when needed. As well as if the farmer has big dirty gloves on it can be tricky to handle wires and contacts. Then just parking the ATV in its place will then automatically charge it. There has also since 2020 been a agreement within SAE (Society of automotive Engineers) to implement a standard for this in cars hardware, and this would then allow the user to charge at other places than home as well.

Why CAKE?

Cake is a company trying to promote sustainability with their products. With the motto of creating light quiet and clean products. Light as being light weight to allow a diversity of people enjoy the product, with this project the author wants to bring more meaning to the light being that the product can be light on nature both from sustainable material choices as well as the weight on the ground promoting regenerative agriculture. Quiet as in less disturbance for everyone around it both people and animals. Lastly clean as in no direct pollution. All these values fits right in to what a vehicle for regenerative agriculture needs to be.

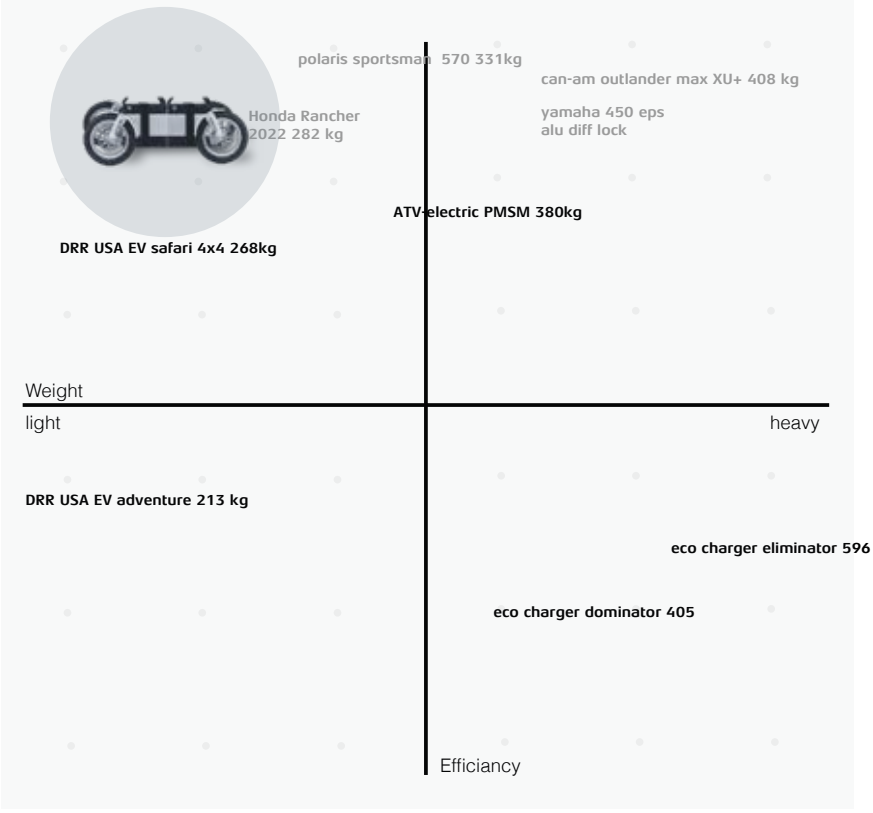
This project as a business case for Cake make sense in the product line as the start of the company was promoting non disturbing outdoor leisure with the Kalk cross bike to the Ösa as working bench for inner-city commuting and light explorations of nature, and the latest Makka which is a clean computer bike for the city people. With all these the mission is to keep our nature safe and our environment clean. So why not take the next step promoting a more sustainable small mobility solution for the people trying to regenerate our earth. Cake has the proper knowledge when it comes to lightweight small mobility. As well as the mindset to make a change in other peoples ways of how we handle our earth. Or just help the people doing their best to do just that with a solution that share their values.

Image 9: Albin Jonsson 2021

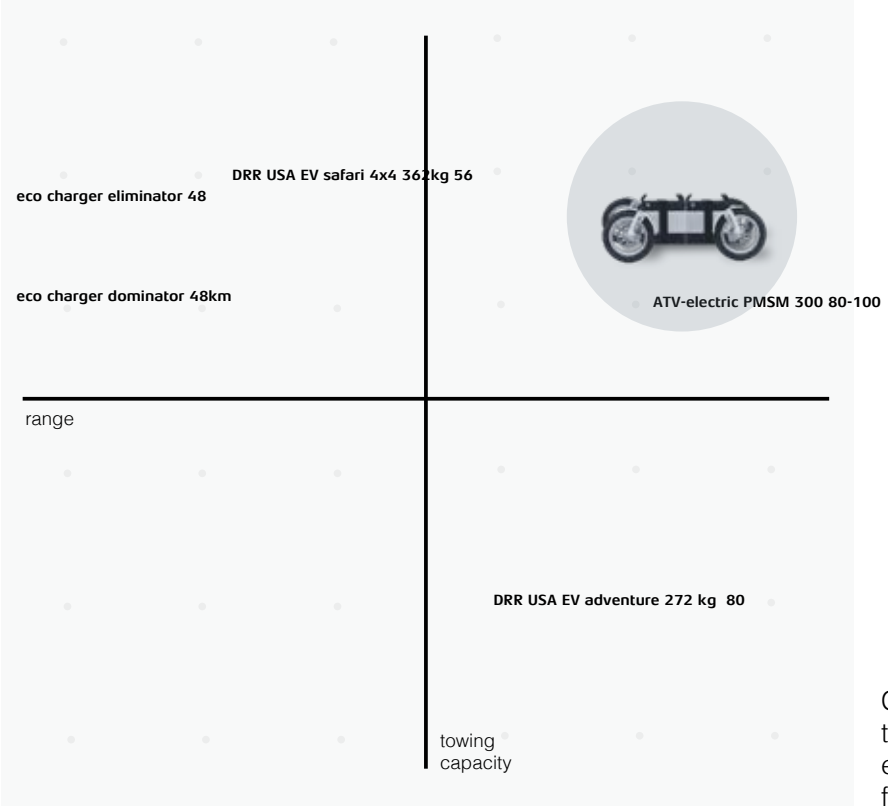
Benchmark.

What has come to show from benchmarking of ATVs on the market is that high weight comes with high towing capacity and vice versa. This shows that if losing to much weight will also compromise some capacity. The electric options that are out there do not share the problem of electric cars with range or is usually equal or better than the fossil-fuel ones.

To conclude the facts gathered from bench marking keeping the weight down to the maximum is not always best, low enough to keep soil destruction down and high enough to not lose to much towing capacity.



Comparing both EV and fossil-fuel ATVs where weight and efficiency being towing capacity.



Comparing electric ATV's on the market now, all built on existing frames from fossil-fuel ATVs.

Image 10: Outi Marjaana Mähönen 2020

Research conclusion.

Efficient mobility on farms and ranches is fundamental for caring and keeping track of the animals and crop. With pastures for bigger animals the accessibility can vary quite a bit.

With society growing bigger awareness of the fragility of our world and realizing that agriculture is one of the biggest factors for global warming there is a need and demand to change the ways of what the food industry is today. We are now restraining the regenerative powers of our earth and we need to stop this. Going back to pre-WW2 ways of agriculture can help restore our earth and even reverse the greenhouse effect. This we call regenerative agriculture. The simplified principal of this is that we need to be gentle to the ground and keep the soil covered at all costs to store the greenhouse gases in the soil and root systems. This will also help the growth and biodiversity in the soil. With this the CO2 stored in the soil acts as a natural fertilizer so the need of chemicals will drastically decrease. This way of agriculture is now growing more and more all over the world, but they now lack a non-pollutant mobility solution that is not heavy and destructive to the ground.

Agriculture is still dependant on fossil driven vehicles since there are such big machinery needed. But on smaller regenerative ranches there is a possible way of introducing a fossil-free solution that can cover many of the mobility needs and more. When the ways of keeping a farm change so does the needs. A more diverse way of keeping a farm will need flexible solutions and the super specialized machines is now to destructive. The old more sustainable ways of farming becomes more and more attractive but can be improved. Can it possibly be handled with less machines and in a non-destructive manner?

Framing.

Design brief

This project has the aim to investigate what a small mobility solution could be for regenerative agriculture ranchers, when given new opportunities in the change to electric drive train.

The project is set in the year of 2030, which makes the technical aspects of what this will come to be quite restrained by both rules and regulations of the society and what type of technology that can be used.

image 11: Tractor tracs in grass. Dastan Khdir.

Goals & wishes

One of the ambitions is to achieve a believable concept that would not be far from possible to achieve within the set time frame of 2030.

The author also hope to bring some awareness around agriculture and sustainability. To achieve this find ways to show a possible utopic scenario of how agriculture could be handled.

There is also an ambition to create scenarios that feels relatable and lively to create a sense of empathy to our world, without creating to much of a dystopic vision on what we might be heading towards if we do not take action also maybe bring people to a deeper realisation that now is the time to take action.

Another ambition is to look into sustainable material choices with as little waste at the end of life of the product. Hopefully then not the end of life of the materials used.

Limitations & focus

With the projects set time frame (year - 2030) the project is highly dependent on current technology, rules and regulations. This puts quite tight restrains on what the vehicle can come to be.

In this project it is easy to imagine a whole arsenal of accessories and functions it could have but the author has decided to limit the development of these to a few given scenarios and leave a gap for imagination for the opportunities. The focus will therefore be on the main vehicle an a few accessories connected to the scenarios but not in as high refinement as the main vehicle. There is no ambition in innovating new tools for farming more so create a way to use the current methods in a more sustainable way with the principals of regenerative agriculture in mind.

Package & drive-train.

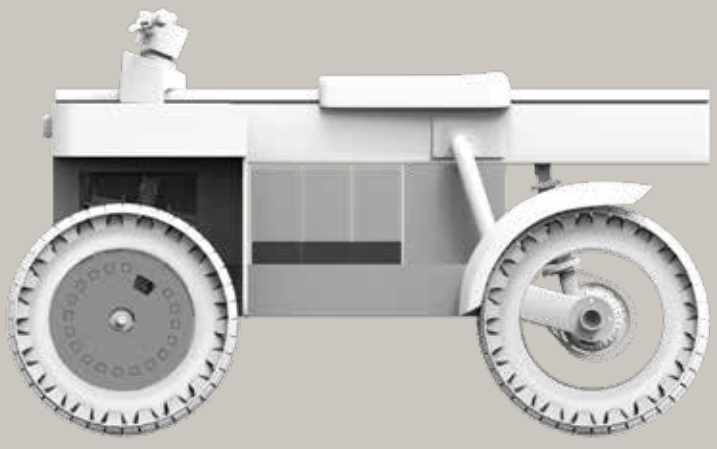
Keeping a similar package as current ATV's used on farm since current equipment for seeds and harvest is made so that the wheelbase can travel on each side of the crop without having to drive over it. Cake is not the company to develop specific farming tools for a new wheelbase. Therefore, that is a good reason to keep current size. Also not making it smaller to keep a wheelbase that creates some stability. With an electric drive train it is possible to place the weight of the vehicle lower than with traditional drive train and with that remove a bit of the tipping risks that ATV's are a bit prone of. Of course, the risk of tipping is still there when riding in very rough terrain.

The vehicle is equipped with two hub motors in front to minimize exposed moving parts these will contribute with 30% of the power. The rear has a chain drive and a stiff rear axle. This is to keep the weight down. If four hub motors would have been used to give the same amount of power the vehicle would require more battery power and weigh more. A stiff rear axle is used because it allows the vehicle to carry more weight both on the actual vehicle but also on the towing hook.

With a electric drive train the amount of moving parts in the drive train is drastically reduced this makes the accessibility if the vehicle better since there is not much previous experience and knowledge needed to understand and be able to repair the things that might break. With a simpler drive train there are not as many parts that might need to be repaired.

Not only does the lightweight package help regenerative farmers to protect the soil and ground, but ATV's are heavy vehicles and can be tricky to drive for smaller people. This opens up for more people to more easily drive around these types of vehicles. Weight reduction won't be taken to an extreme because some weight is needed to not loose capability of pulling and towing other things.

Chain drive
stiff rear axle



Hub motors

Battery floor &
battery magazine

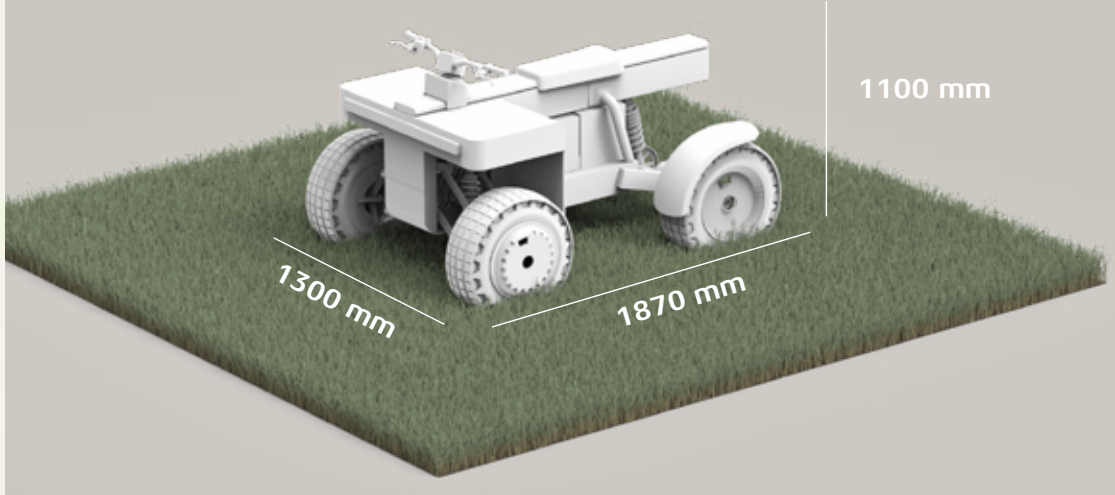
providing energy to tools off the grid on the farm

light weight easy on the ground

NO direct pollution

quiet non disturbing for animals and people.

simple construction. few moving part = less and easier repairs.



User group.

In this project mainly smaller farms that focus on regenerative agriculture is targeted. Traditionally farming is often a family business, and the children of the family will generation after generation continue to take care of the farm. Non dependent on what physical attributes you might have. So, the vehicle needs to promote a divers user group. Nevertheless, half of the farmer on the globe are women and to handle a big heavy quad can be more challenging for women. (The world bank, 2017)

The user group can be known to be quite conservative at times. In the case of regenerative agriculture, the user group has a drive to go back to the old ways of agriculture since the industrial agriculture has proven to be more destructive than helpful. Because of this there might be a resistance to modern technology. Therefore, it is important to keep the analogy feeling and simplistic aesthetics.

For a rancher to switch to regenerative farming shows an understanding for sustainability and awareness of the need to change how agriculture is handled. The user also will have a interest in new more sustainable equipment.

Image 12: Annie Spratt. (2018). Image 13: YS. (2020). Image 14: Gonzalo Facello. (2021).

Mood board.

gentle
diverse

01 Modular

02 Quiet

03 Gentle

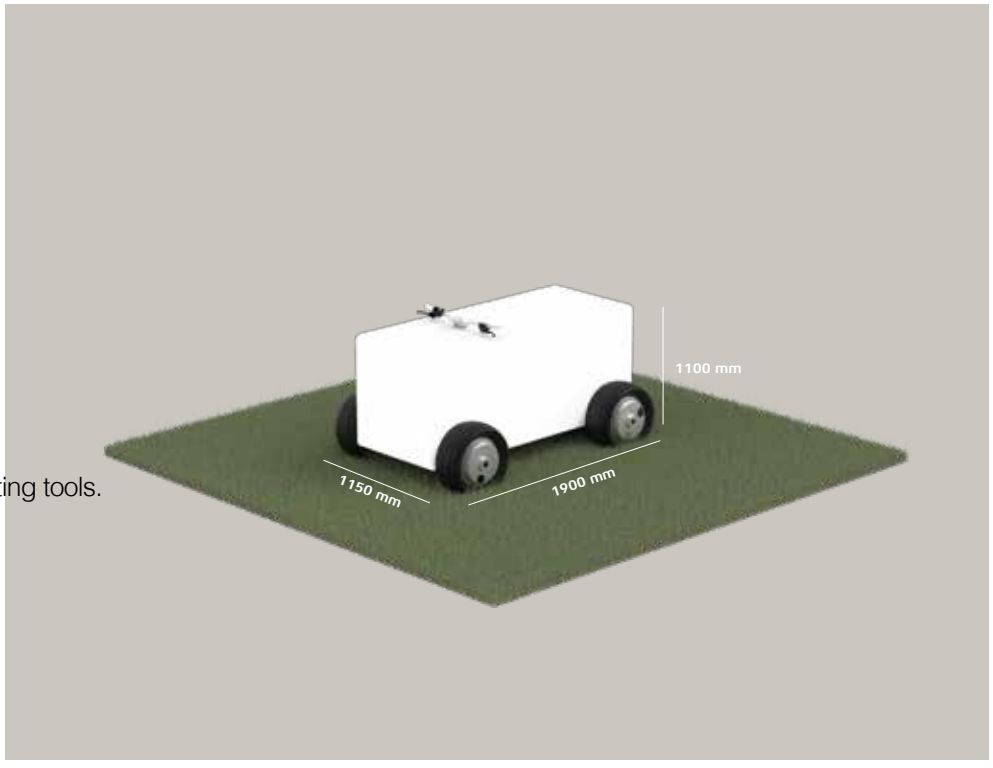
04 Strong

05 Autonomous

06 Compatible with existing tools.

07 Capable of loading

08 Reliable



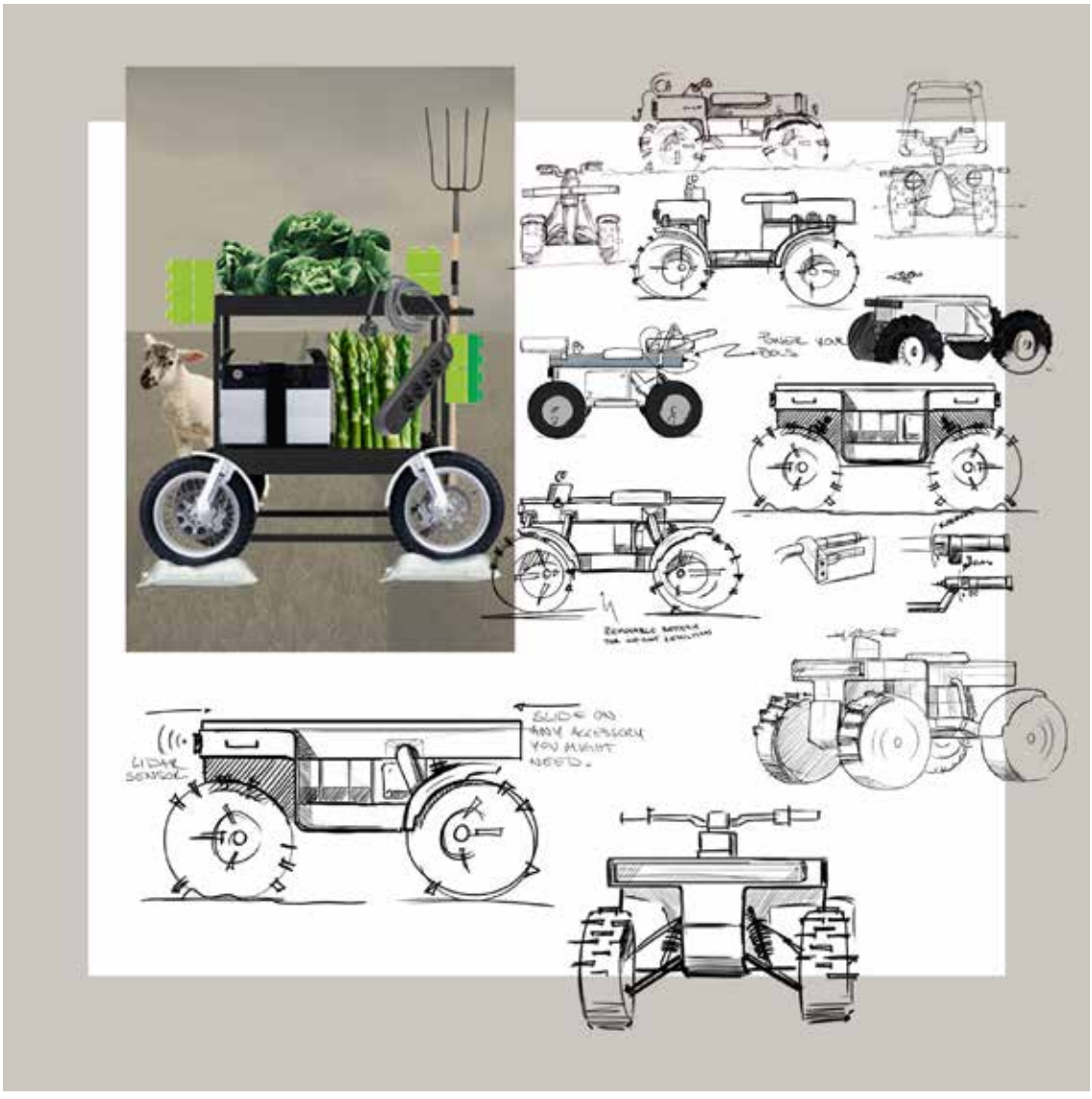
The mood board or aesthetic vision that is seen on the left was created to communicate the authors main idea of what this vehicle should be. A friendly thing that would walk gently on the surface on the earth that is there to help the user bring whatever needed for any situation that can occur on a farm. Amplifying the farmer to be able to do their work in a gentle manner but with some more efficiency that would be brought with clean energy. Might be like a shepherd dog or an ox that would pull the load for you. Together with this a package study was made to understand the size of current ATV's but also some important aspects to consider to meet the demands of the user group.

Early ideation.

Early in the ideation process the author mapped out some scenarios that the vehicle could make a difference. The realisation that a diverse small mobility solution would be able to cover many of the needs, even in some cases better than current vehicles used. Moving cattle being the first scenario considered. Since the animals are kept on the same ground that would then be planted with crops the vehicle need to be gentle and not destroy the ground to much. The vehicle is also used to guide animals to their next pasture so it needs to have a certain presence but not scare the animals. Communication with bother other people and animals is needed for this task so it will be beneficial that the ATV is quiet.

Next scenario that was looked at was at this stage harvesting. When harvesting delicate fruit and vegetables it is often done by hand and a lot of carrying is done. So an early idea was that the vehicle would follow the person doing the harvesting so not as much heavy labour of carrying boxes would have do be done. Again here it is key to be gentle to the ground. The Vehicle can not be to big to take up to much room in-between rows of harvest yet it need to have some size to be efficient when carrying your harvest for you.

Last scenario looked at comes from interviewing Cecilia Nilsson, understanding that unpredictable things happens all the time at a farm and the need to bring things with you is important and from that discussion realising that with the electric drive train the ATV can function as a portable power station and help farmers to make off the grid work more efficient.

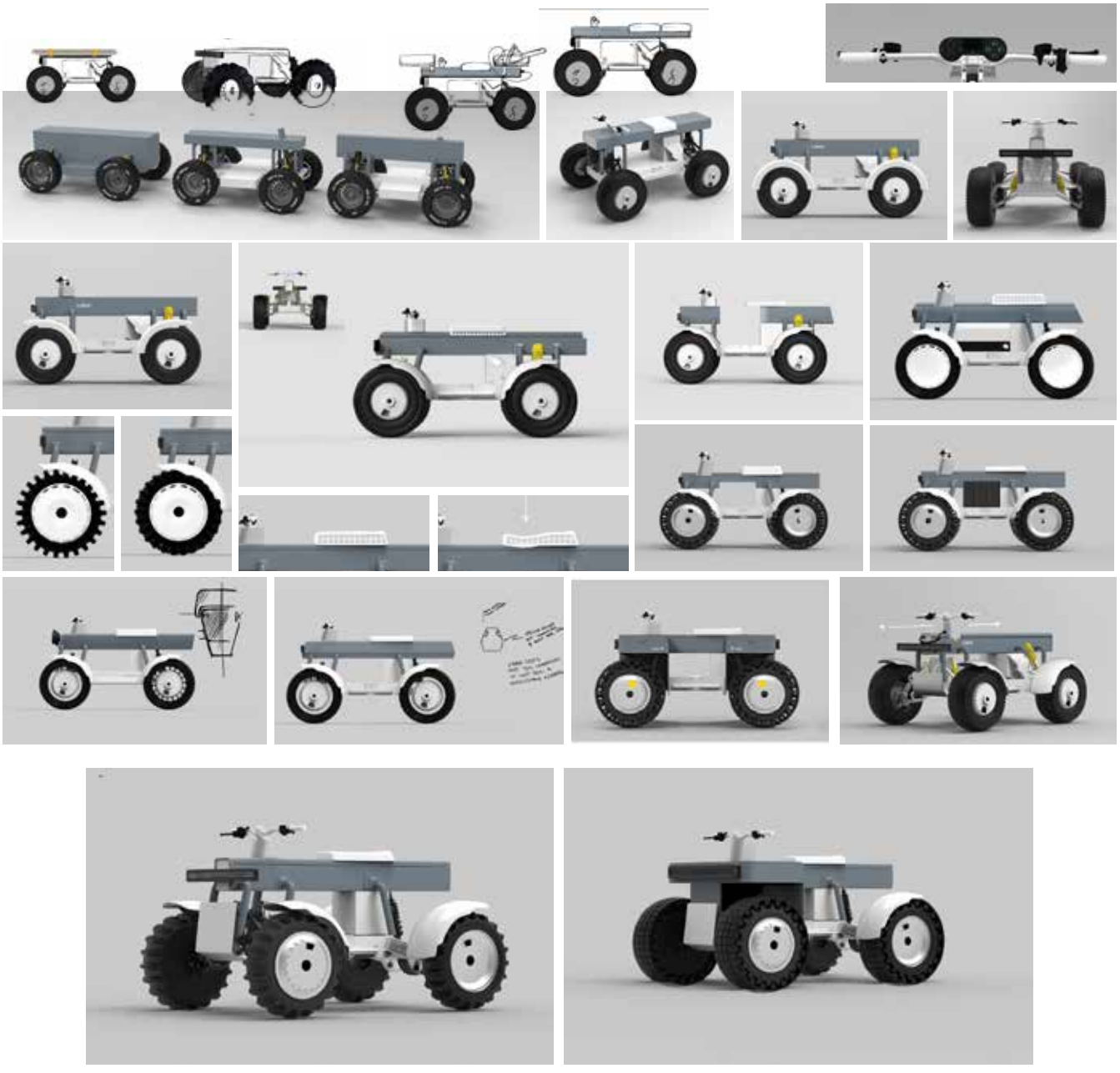

LIDAR SENSOR
SLIDE ON ANY ACCESSORY YOU MIGHT NEED.

Theme refinement.

From understanding the scenarios and basics of the wanted expression from creating a aesthetic vision in the form of a collage, a form and material bard was created with the mission to visualize the authors interpretation of what Cake as a brand will contribute with in this project. This was a challenge since the author has a clear idea of the current brand from having had an internship there for almost a year at this time. Therefore no actual parts of cakes current bikes are used in the mood board but then introducing similarities from other things without losing the strong identity of the brand.

In the part of refining the theme there was i high drive to differentiate from current expressions of the segment. Where the vehicles are called things like “Dominator” and “Eliminator”. The very aggressive attributes these comes with does not speak well with the mission of this project. The goal has been to keep an honest and capable look. Reduction of extra shapes and let the geometries speak for themselves. Some basic sketching was made, but then quite early in the process the author started render research. Since working with very basic geometries, playing with them in 3D to find a interesting geometry of the vehicle has proven to be the most efficient way to understand both proportions and expression.

When basics was set in 3D to find proportions and scale, form studies were made in Photoshop to then find design directions efficiently. With everything from adding or removing big geometries or changing angles and surfaces. By doing this get a bigger understanding of this type of vehicle in what is possible and not. Adding the detail necessary for the vehicle such as saddle handlebar and fenders makes the expression of the bike drastically different.



Various questions were met through the process and feedback from Cake who has great understanding of the challenges of rideability in mobility with similar seating position. Some ideas were eliminated from simply it being difficult to stay on when riding in rough terrain and others from not being comfortable, mainly from becoming too wide either on the saddle or from having to spread your feet to much and therefore losing your balance. Then came stance with very geometric shapes the vehicle became to static and then felt heavy. But with too much chamfers and angles the design vision was not met.

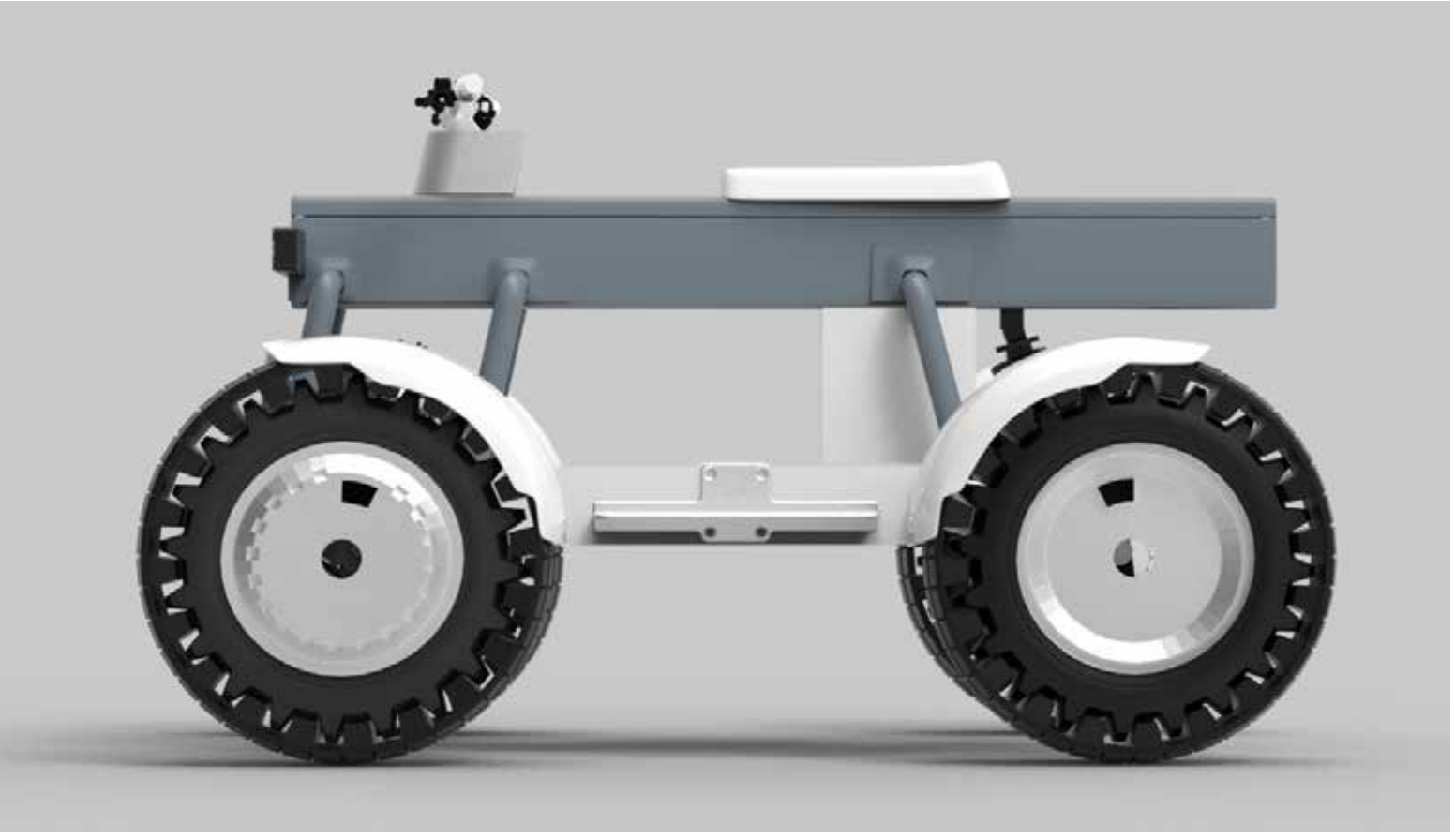
Wheel ideation.

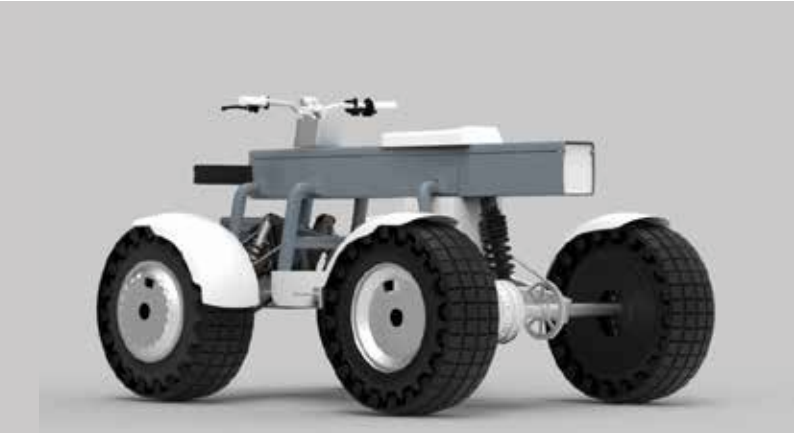
When targeting regenerative agriculture, the consideration of the ground comes to play a big role. The tires can be quite destructive when using big thread. These are not necessary in most conditions but at times riding off road they are needed. Ways of being able to change thread has been looked at with an extra changeable/removable layer. Robotic wheels were also an early option and latest double camber tires where a second layer would provide a lower and gentler thread. The robotic wheel was quickly excluded because of the complexity and weight they will add. Another aspect as the aesthetics with that type of wheel looking to alien in the context.

That left two options first being the double thread that would snap on as a reflex band or like snow chains. Thesis option feels very realistic when using puncture free tires. It gives an interesting look with the pattern the meeting of the materials. Problems with these would be how to properly get them to stay on. The solution with tracks in the tire that would to some extent hinder the extra part to move from side to side the risk of them getting loose whilst driving might cause accidents. They are also quite big and from building them in 3D it was obvious that they would be difficult to bring with you if needed to be removed on a field.

The option left is the dual air chambers which in this case bring an interesting aesthetic to the table being semi-transparent. The would also let the user adjust the thread out on the field without having any extra load to bring back and forward. Air tires is also more lightweight and would use less material. They are quite complex and would need an air compressor to work but with the other positive aspects in mind these where the ones that was chosen to go forward with.

Design direction 1.





The previous parts of the process lead up to 2 design direction this being the first one. Super scaled down only being a frame with all suspension visible. This contributes to a lightweight look and keeps the honesty that is a core brand value. With a simple extruded beam that would carry various types of accessories with a track to connect to which would give the user full control and flexibility on where to place things. Some angle to the legs of the frame gives a better stance that feels more light weight than if they were fully vertical.

The extended light bar looks interesting but adds to the fragility feeling of the vehicle. It might break in it collide with something like a tree or if an animal gets caught on it.

The super exposed suspension adds to the honest and light feeling it also adds to the feel of it being fragile. In the farming conditions this will make it feel less reliable.

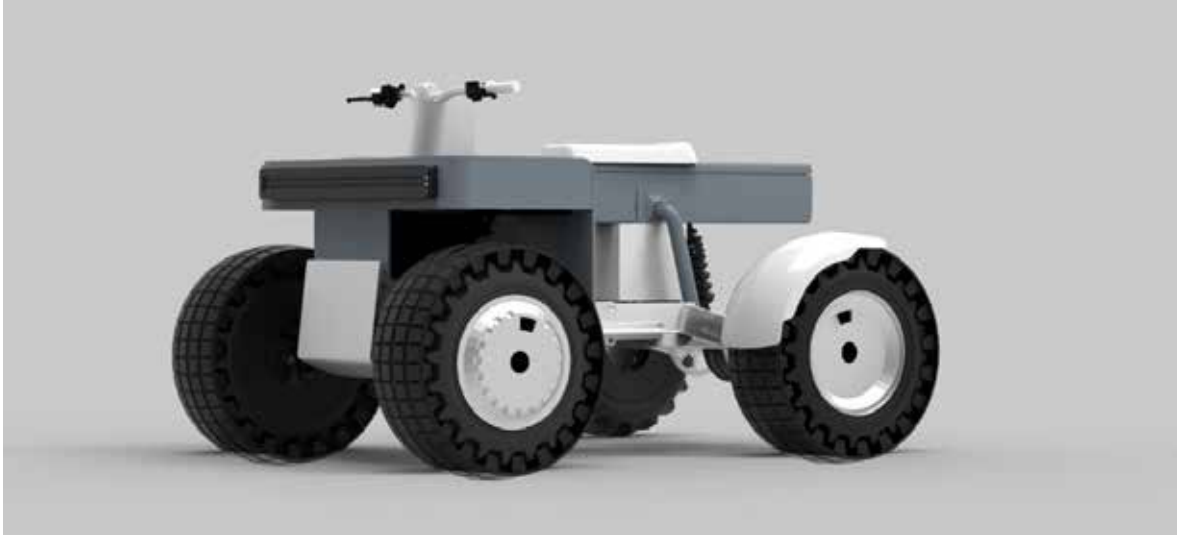
Conclusions wise this version certainly feels flexible and light to the author but not as capable as it would need to be.

Design direction 2.

The second design direction has a similar frame but includes a wide box in the front which acts as fenders storage and a working bench surface. The visual strength of this one in much more present. It plays with a more capable stance with its wide shoulders. This direction add a bit more value to the naked setup, since its already quite a big vehicle the space created could be made useful.

From interviews one thing that occurred as a problem was that when riding on bumpy roads things loaded can easily jump out of open boxes. So it makes sense to supply the user with a closed drawer to put smaller things in, which cant be secured.

Visually this direction does not have as fragile look and represents the feeling of a ox or helper more. It feels more safe and confident whilst the first one feels more alert and efficient. With the aim to for this project The second direction is the better choice, the safer expression of it lets the user know that it will be gentle although with the capability to securely complete the task given.



Scenario refinement.

To gain further understanding of what the concept needs to cover a second analysis of the scenarios was done. To understand if the current chosen direction would fulfil the expected tasks the author once again placed the vehicle in to context.

At this point a fourth scenario was taken into consideration. What if it could be fully autonomous for certain tasks such as plating seeds. This would not mean much to what needs to be added to the design but would make a big difference for the concept and change of how the use of this typology could be. This could free up time for the user to do tasks on the ranch or farm where supervision is needed.
When trying to understand more about the scenarios the concept was put in with what the author would be the best setup for each of them. This was helpful for further decision making along the rest of the project.

For moving cattle long distances might need to cover and the terrain can be muddy. Making the bigger thread relevant and more batteries. In this scenario the user is driving.

When harvesting a lot of carrying containers back and forward needs to be done. Here the follow me function comes in to follow and carry the harvest for you and then when containers are full it can go by itself to deliver the harvest to another person to be placed in storage. When moving on such delicate ground the soil savers are put on, and unnecessary battery weight is removed.

Working on farms many things are worn out or brakes and might be far away. To facilitate this the vehicle would work as a mobile power station. Adding the extra batteries, it would be able to both take the user to the border of their land and power the tools needed to fix things off the grid.

Material choices.

Kibb has a holistic approach to material choices, by utilizing what can already be found in the countryside. It's tires are made out of dandelions which are widespread across Scandinavia and it's plastics made from linseed plants grown locally in Sweden. The linseed plastic considered is made from *A good company* and is 100% bio-based product with a tiny bit of processing. It's also recyclable. If sent back to the producer it can be turned into pellets again and be moulded into something new. To tie the circle, what if the farmers using the ATV also would grow the plants for producing the materials. Creating a mutually beneficial economic transaction for both the farmers and the producers.

Using bio-based plastics would means that if parts break when in the field, the material would eventually break down without the destructive impact on nature the fossil based materials have today. Materials are kept as pure as possible to promote recyclability but without compromising their durability.

Aluminium is the main material used for both frame as well as other details on the ATV. As a material aluminium is a sustainable choice due to it's recyclability without material degradation through multiple life-cycle. Some parts will need more rigidity and will therefore be made of *Vattenfall's* fossil free steel.

When designing the vehicle modularity has been a important aspect. Kibbs technology can be easily replaced thanks to this modular approach, ensuring an up to date product for the end consumer, By keeping allowing users to swap these parts out and update their product the lifetime is extended beyond the regularly planned obsolescence cycles the industry uses today.

01 Natural anodised aluminium, recyclable.

02 Powder painted aluminium, recyclable.
PMS 7544 C

03 Bio-based silica material, dirt, heat & UV resistant

04 Black anodised aluminium, recyclable.

05 Recycled rubber.

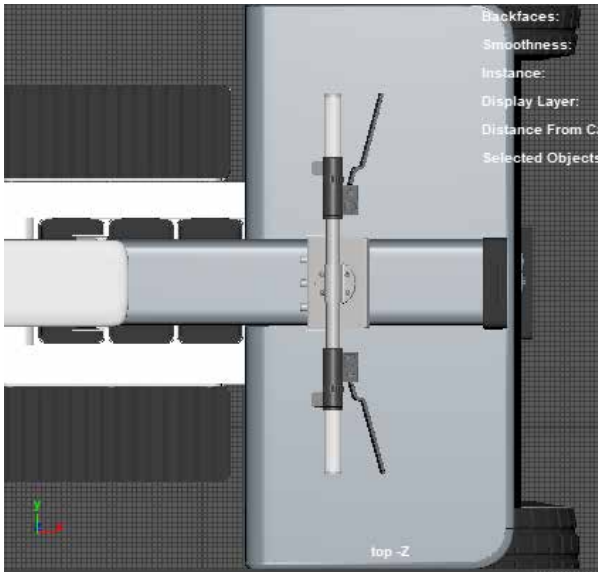
06 Dandelion based rubber.

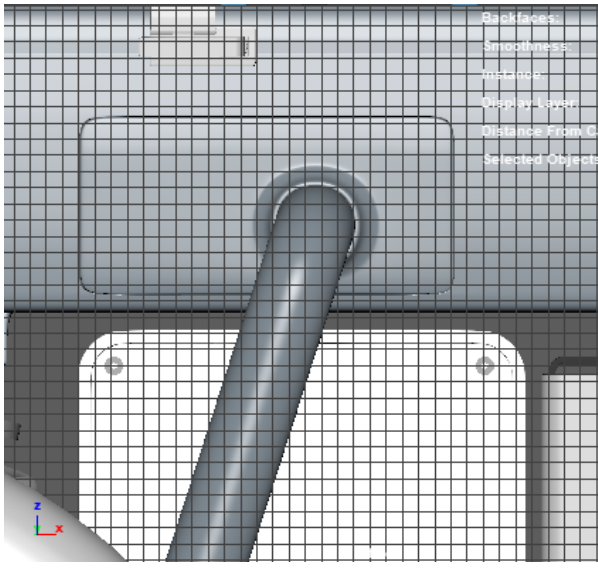
07 Bio-based plastic from linseed
produced in Sweden.

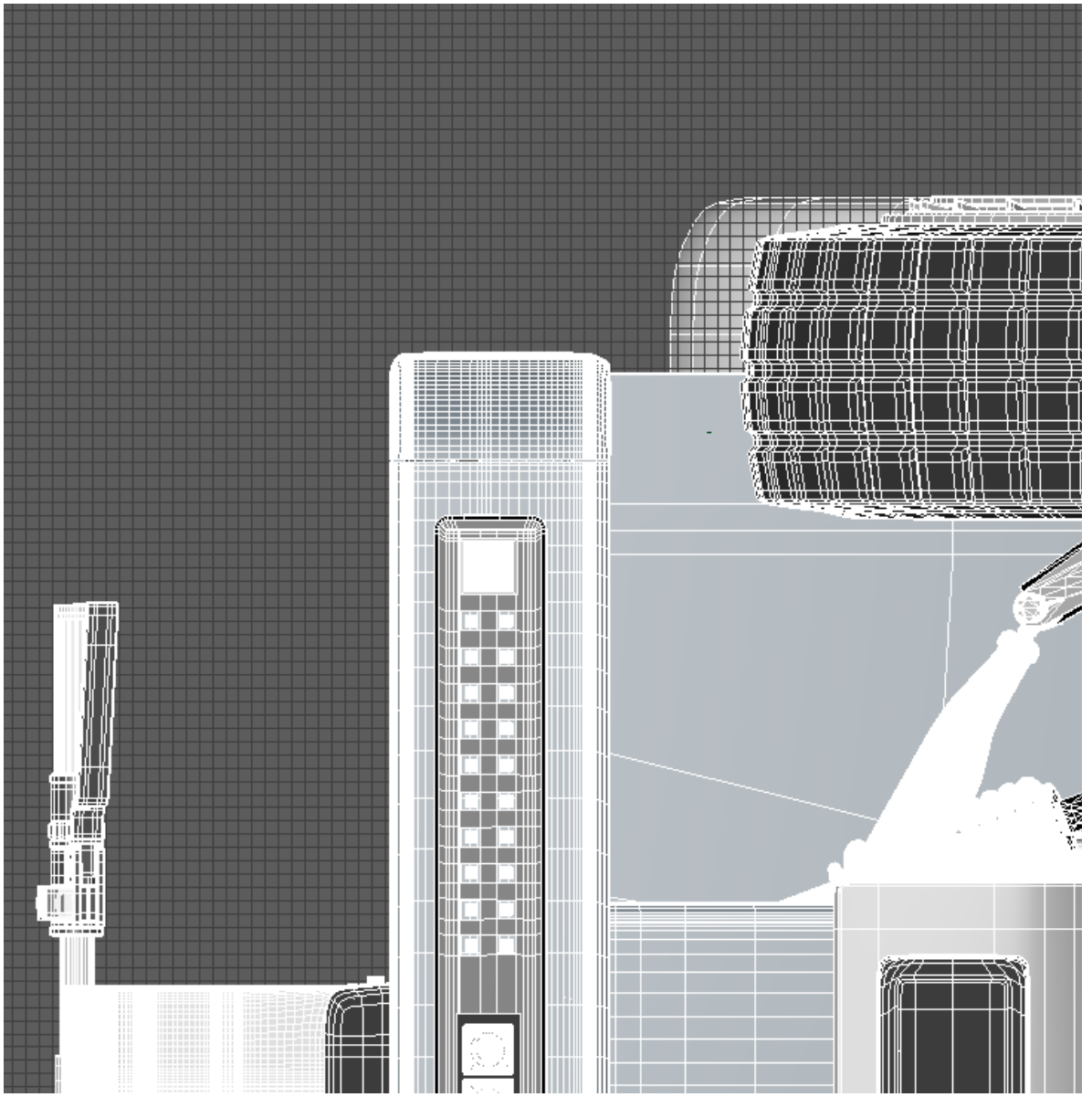
3D modelling.

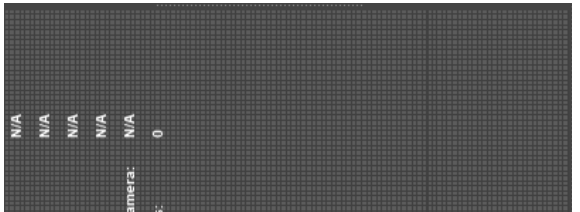
For this project 3D modelling has been vital throughout the process of this project. From the very beginning 3D has been used to easily understand basic geometries and proportions. To the very end of refining and detailing parts of the design.

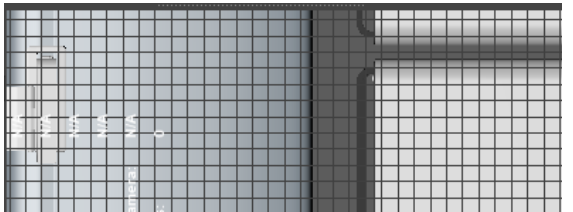
By render research a lot of the design has been figured out quite efficiently. Going back and forward between modelling and renders to understand volumes and expression.








N/A
N/A
N/A
N/A
N/A
0



Theme refinement.

Building on the chosen direction refining the design and proportions to make sure things can fit where they are supposed to and make sense in scale and at the same time starting to level up the 3D a bit more.

Going forward from what is shown here the main goal was to give the vehicle a bit more of a robust and capable feeling. Surface treatment and meeting are a bit to sophisticated and this again has the vehicle look fragile. How surfaces ends with a straight cut gives the impression of it getting chipped. Some areas like the motor box, drawers and fenders does at the moment not harmonise fully whit the theme of brutalist geometric shapes going through the rest of the vehicle. The saddle is at this point not shape wise nicely connected to anything else in a clear way.

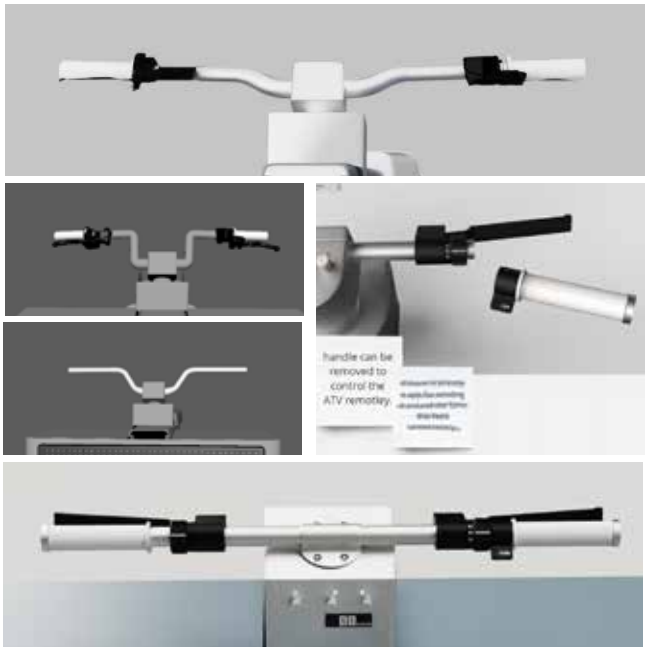
General stance and proportions does at this time speak well with the goals of it being gentle and capable. The surfaces now needs some attention to not be to sophisticated and when taking the basic geometry theme this far it gives a unrefined look in some areas like the side with the drawer. Generally how endings and edges are treated needs attention to bring some robustness to the expression.


cake
Soil savers

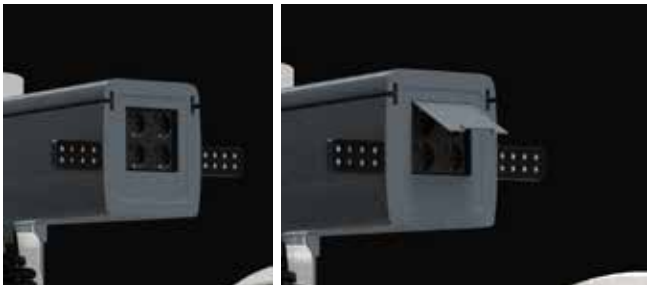
Detailing.

Steering unit

To convey a sense of modularity a new approach to the design of the steering unit was taken. Through using steer by wire technology the conventional structure of it is not needed. There by a opportunity to design something more unconventional and iconic presented itself. This could facilitate the aspect of it being removable and storable, in a better way. Detailing around buttons and other functional parts could then be further refined.

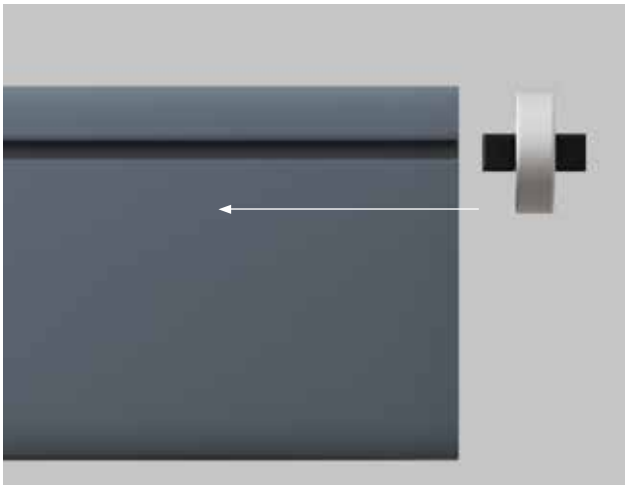


Rear outlets.



To be able to plug in and power tools of the grid some outlets needed to be places on the vehicle. The analogy of the outlets being the exhaust seam like a good metaphor for the concept. With similarities in the round shape but rather than polluting they would provide clean energy.

These would later be further refined and re-designed, to not seem as fragile.



T-rails & clamps

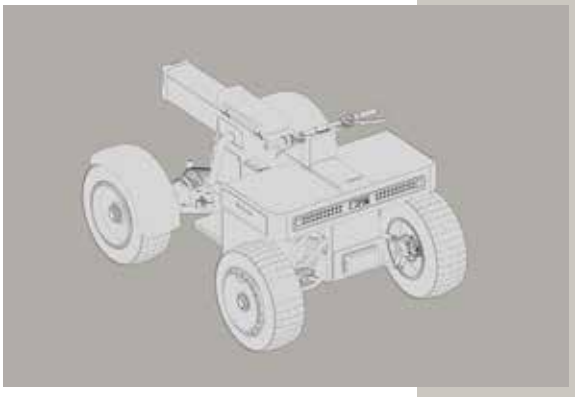
The railing attachment system does as its function make sense but as some other parts it does not harmonise with the rest. It would be beneficial if it would instead of being two separate parts attach on both sides as one unit. This will minimize material use since the accessories being clamped on to the bike could use the same clamps, when one is not in use. With no extra stability or attachment part needed on the accessory more than a cut out for the clamp. This will help to keep each part to a minimum amount of material

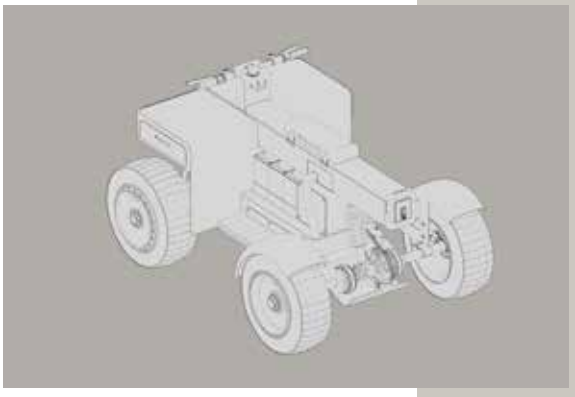
The design shown here is visually and practically clumsy it is bigger than it needs to be.

Package.

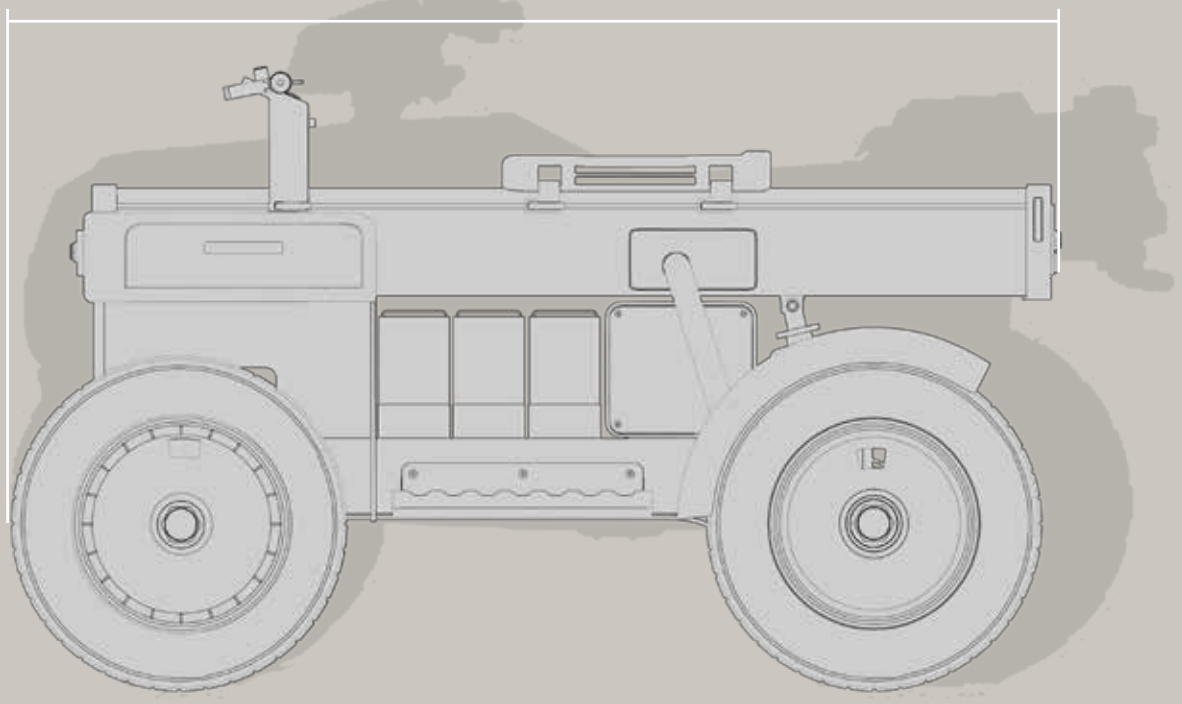
It is powered by 3 motors the main one located in the rear of the vehicle driving the rear axle by chain. the front wheels is equipped with smaller hub motors to provide the vehicle with more power. All wheels is individually controlled by the vehicle computer so that if one looses traction the motor would not continue punching with as high toque. This is to avoid that wheels dig into the ground and by that destroys the important ground covering plants and roots. The vehicle is equipped with differentials so that if it really gets stuck all wheels can be forced to move with similar toque and power.

Main batteries are placed in the floor of the ATV, to keep the weight point low. There is also a possibility to stack extra batteries when needed in the battery magazine. These are exchangeable so that even if the main battery is out of energy the extras can be put in just like a spare tank of gas. To try to avoid long charging times where the vehicle can not be in use there should always be a few extra batteries charging.



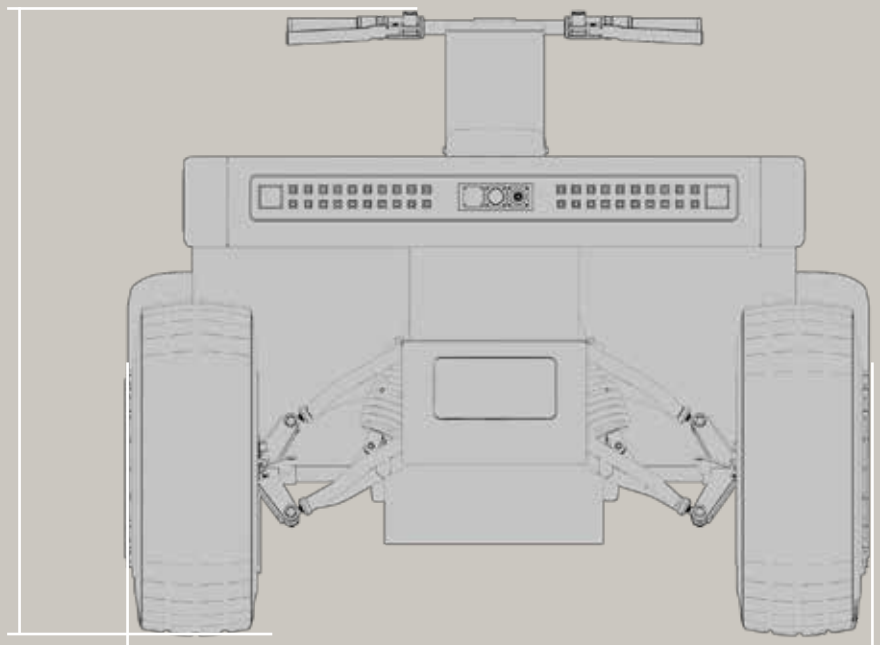


1900 mm



Polaris sportsman 850
H:1190
L:2100
W:1220

1130 mm



1350 mm

Result.

Final design

-Main design

-Set-ups / scenarios

-Details

-Clamps

-Steering unit

-Drawer

-Outlets

-Wheels

-Batteries

-Storage/Delivery

cake

kibb

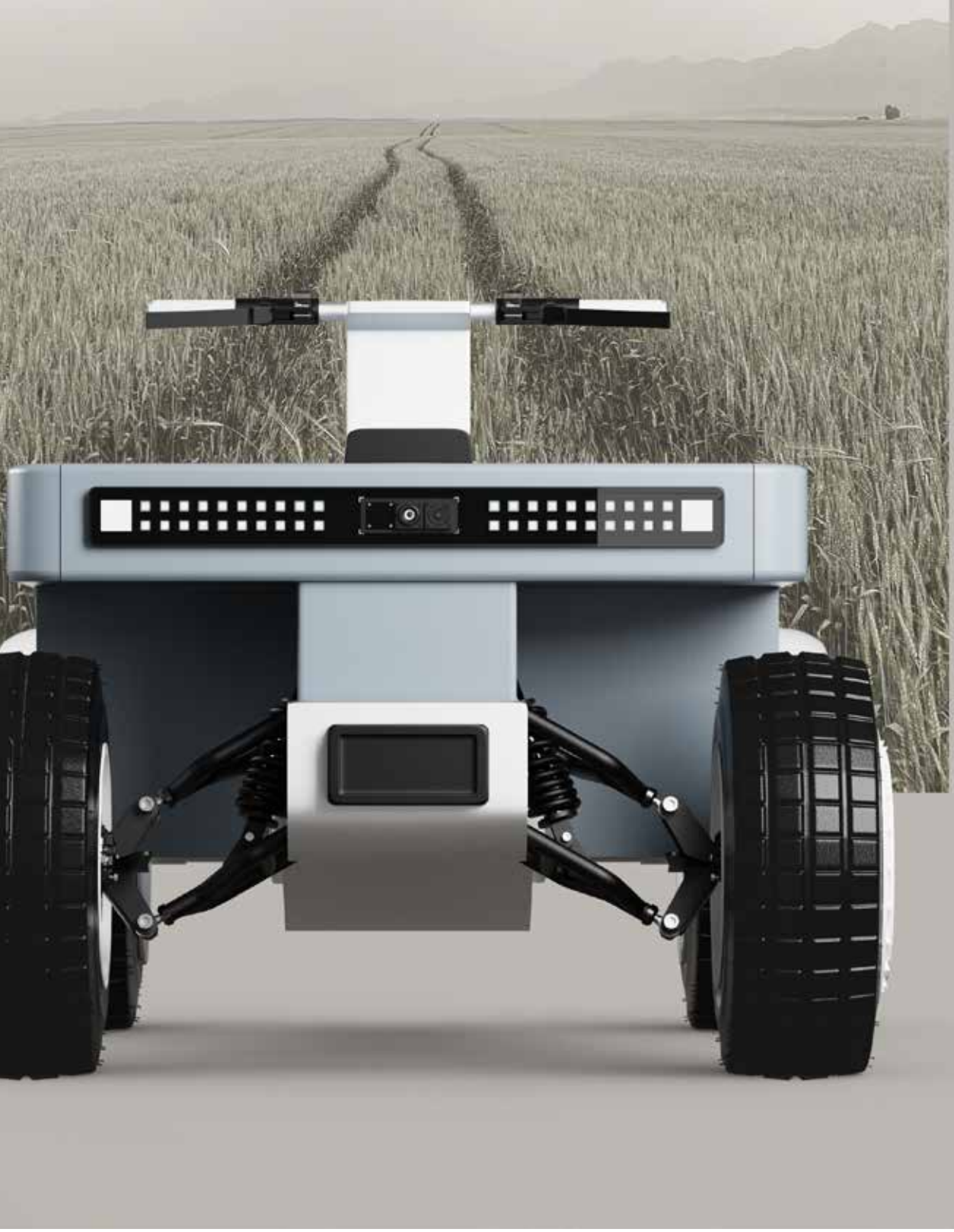
Result.

Main design

The result of this thesis is the Kibb which is a word meaning ox in Gutniska that is a dialect from the Swedish island Gotland. This name is representing the strength of the vehicle as well as the gentleness an animal has on the nature non-dependent on its size.

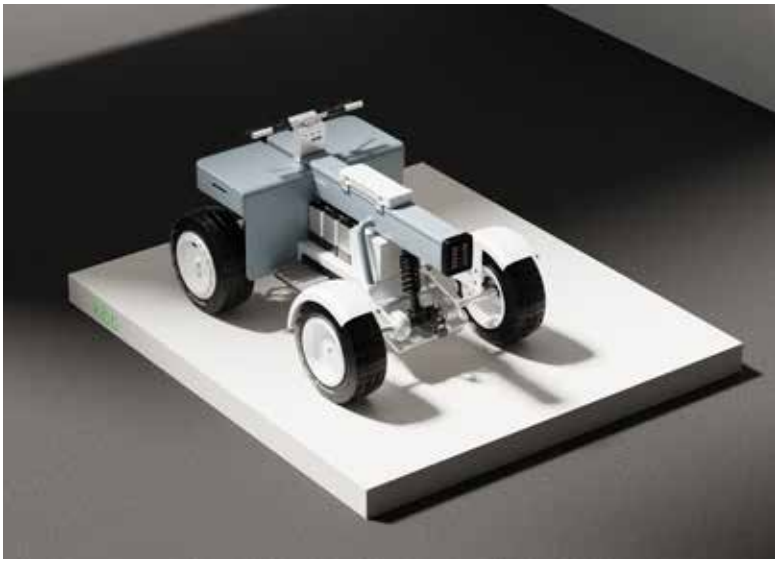
The vehicle itself is a electric ATV with modularity being a important aspect throughout the design. To be able to tackle various tasks that is required at a ranch or farm.

The simplistic design is catching the essence of what is necessary for the vehicle. With this keeping a honest expression.



Front view of the final design of CAKE kibb,

Result



For the final design bigger radius and surface interruptions was added to the front of the ATV to contribute to a more robust expression without making to complex surfacing. The simplicity I the shaping also adds a logic to the design it makes function areas easily located. Some robustness was added with detailing like the rear and front rubber caps.

Result

Set-ups.

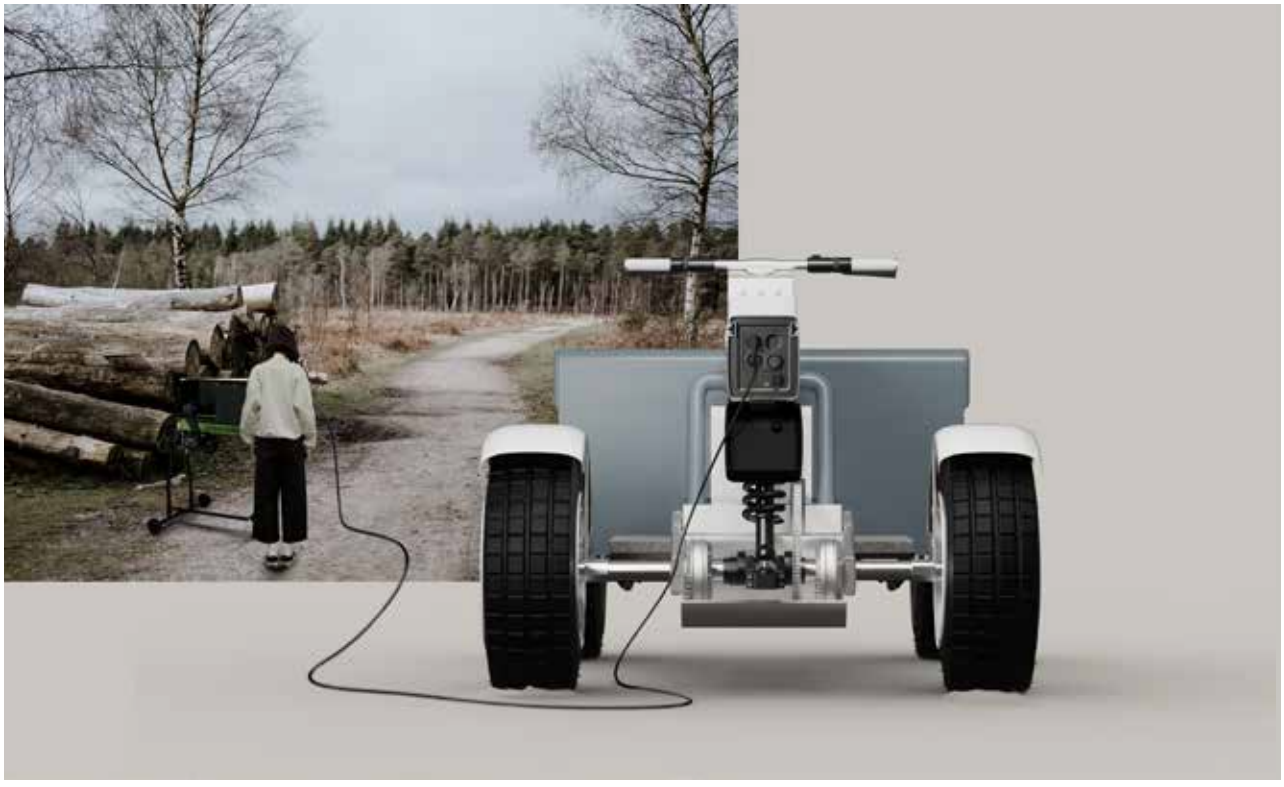
The modularity of the Kibb makes it capable of a diversity of tasks that can occur an a farm. Here three set-ups are shown to understand just how wide its area of use can be.

First one showing the most traditional set up where the user drives. The vehicle does in this case act as a mobile power source for the user to bring power-tools to off the grid parts of the farm and can with the kibb both power tools or charge them on the site.

Second image showing the very other end of the spectrum of use. Where the Kibb autonomously is plating seeds. With lidar sensors it can handle some other wise very time consuming tasks of the farmers life. The when in autonomous mode all the parts not needed like steering and saddle can be removed. Either reduce weight or just to minimize wear and tear.

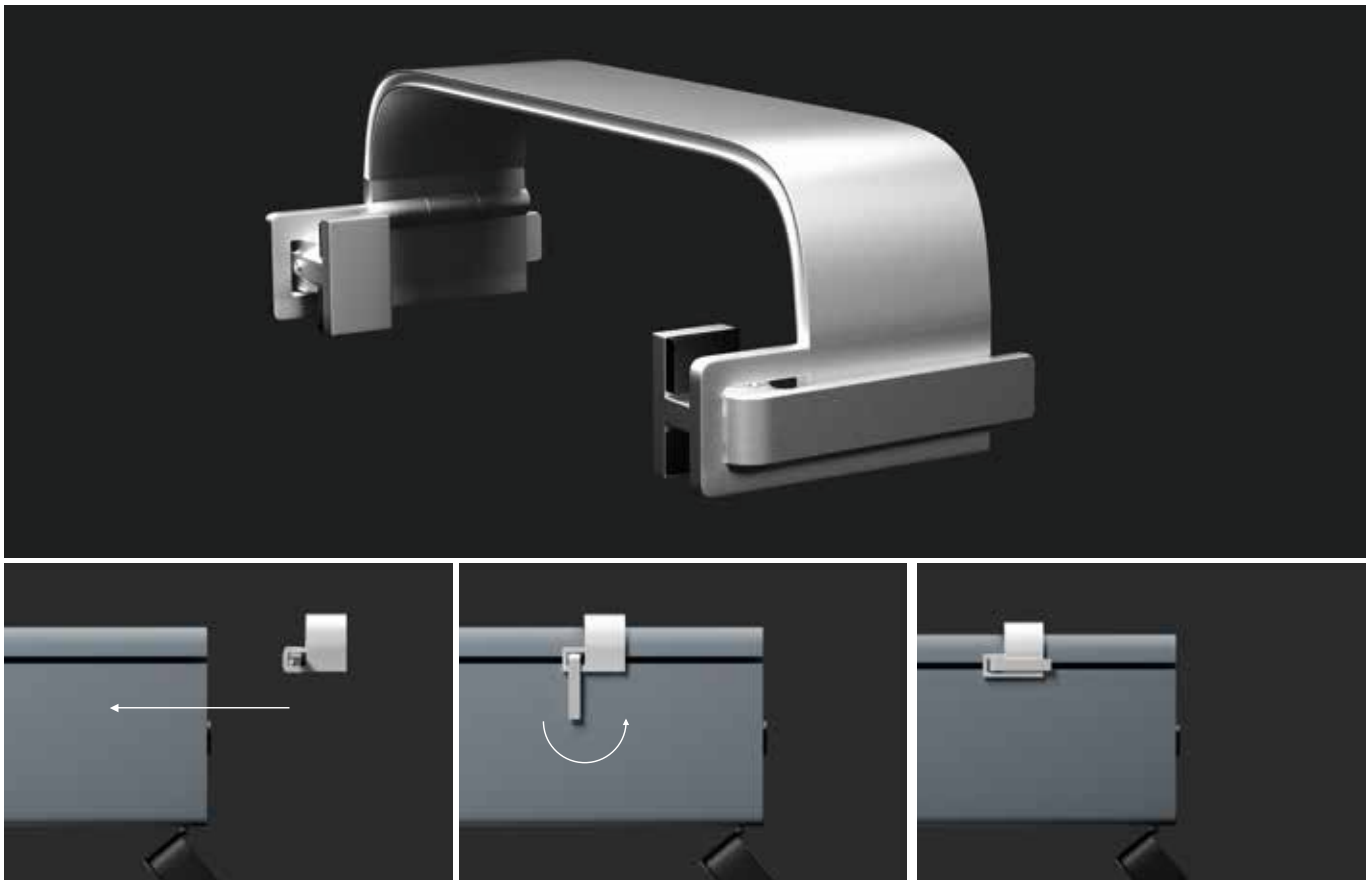
What is shown on the next page is more in the middle of the spectrum. Autonomously working alongside people. Harvesting can be very heavy work so the Kibb will follow and carry boxes for the user to place the harvest in. When boxes are full the Kibb is just told to go with the harvest to the storage where someone else might be to receive and take the full boxes to be stored. To then be sent back to the person doing the harvesting. Or work as a movable power station to be able to easily power tools all around your farm.

Planter



With a this modular system it would mean that a grate variety of tools can be used and connected to Kibb. Anything from a plough and winch to watering tanks and other tools needed to keep a healthy farm. The kibb can then with its level of autonomy do many of these tasks by it self.

Result



T-rail system.

To allow the modularity a t-rail system is used to attach different accessories. The clamps are designed with a hinge to make mounting a little easier. The T's on the clamps are designed with triangular rubber parts for e more secure mount.

Steering unit

The Kibb is controlled with a handle bar that steers the ATV by wire. Those makes it possible to remove the whole unit when in autonomous mode. This is why the unit is so solid to be able to contain technology used and to be east to handle when moved. Controllers for brakes drive and reverse are placed in a conventional way. Controls for differential, power and autonomy mode is also available on the steering unit. These would also be able to control in a app, especially to provide control when in autonomous mode.

Details.

Drawer

The drawer in the front can store the full steering unit when not in use. It comes with a foam interior that can be modified to hold smaller tools or other small things that needs to be brought.

As an extra in other scenarios of use not necessary only farming, the interior of the Drawers could hold other types of units. Maybe a cooking unit for day trips exploring the nature around you.

Outlets

In the rear of the beam protected under the rubber cap, a connector hub can be found. Here is a assortment of outlets for powering and/or charging tools or to connect a trailer for example.

The rubber cap holds the rear lights and sensors needed for autonomous mode.

Result

Soil savers.

The Soil saver wheels contains of two air chambers, where the outer one with a low tread is able to deflate and suck out all the air so that the inner tires rough tread is exposed.

This is allowing the user to easily control the tread of the tire whilst in use. The rougher tread is only used when needed so that the soil is protected from being torn up when the extra traction is not needed.

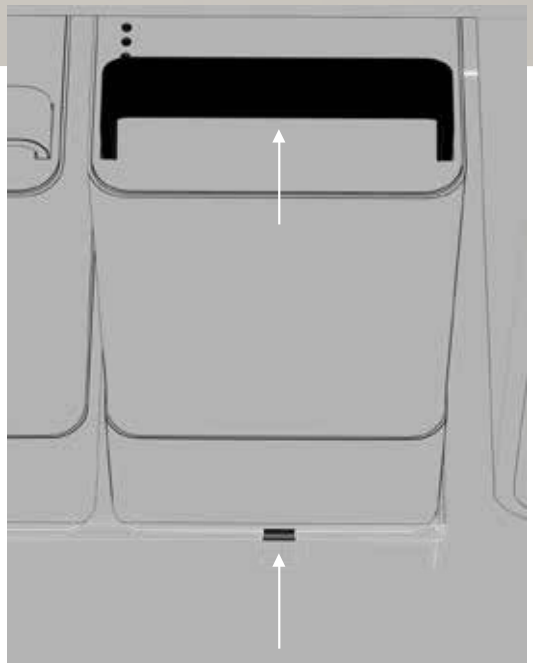
Battery magazine.

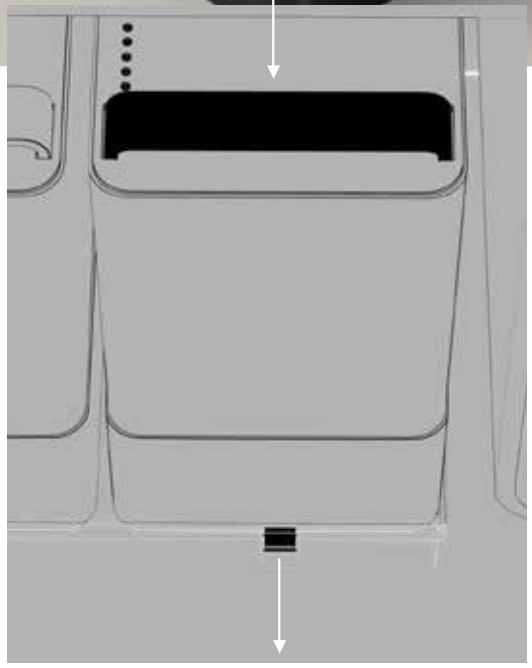
To really be able to optimize the weight to power ratio depending on the task, Kibb has a battery magazine beyond the battery floor with permanent batteries. This is because batteries are one of the thing contributing with the most weight and when doing tasks on delicate ground weight could be removed. However working long days with heavy thing sometimes more power is needed. Therefore the battery magazine was created.

to make sure the batteries stays in place they are sitting in a de-bossed area that has a slight tilting bottom to direct any water to the drainage at the end of the area.

Batteries.

The batteries also has a locking system that assures them being secured whilst driving. When in placed the handle is pushed down, and in the same motion the lock in the bottom comes out into a hole in the battery floor on both sides of the battery. Making it simple also to take them out, reducing the amount of actions needed if they would have had a separate locking system.





Result

Sensors.

To be able to move autonomously or follow a human or other Kibb sensors are needed these ate placed in the front and back of in the light unit where cables already are connected. These like may other thing of the vehicle are modular to easily be replaced if needed to be updated or if they break. Once again this is to extend the lifetime of the product as a whole.

Shed.

The shed is how kibb is delivered and stored using a standardized platform, a container. When bought it comes as a full concept with solar panels for charging and can be a stand alone unit if it need to be off the grid. With the solar panels it becomes self sufficient system, and wont need to cost the owner more than buying price.

The wooden panels can be painted to suit the aesthetics of the rest of the farm where it is placed or kept as is.

The container acts as a charging hub for the vehicle and storage for the equipment it might need. It is also a secure place to store it in during nights.


CAKE - shed 01

The container would be a extra and not a necessity since many farms already has facilities to use as garage and storage it might not be needed. Although the container is not an alien object on a farm. The platform is often used for other things such as manure and or bedding material.

Conclusion & reflection.

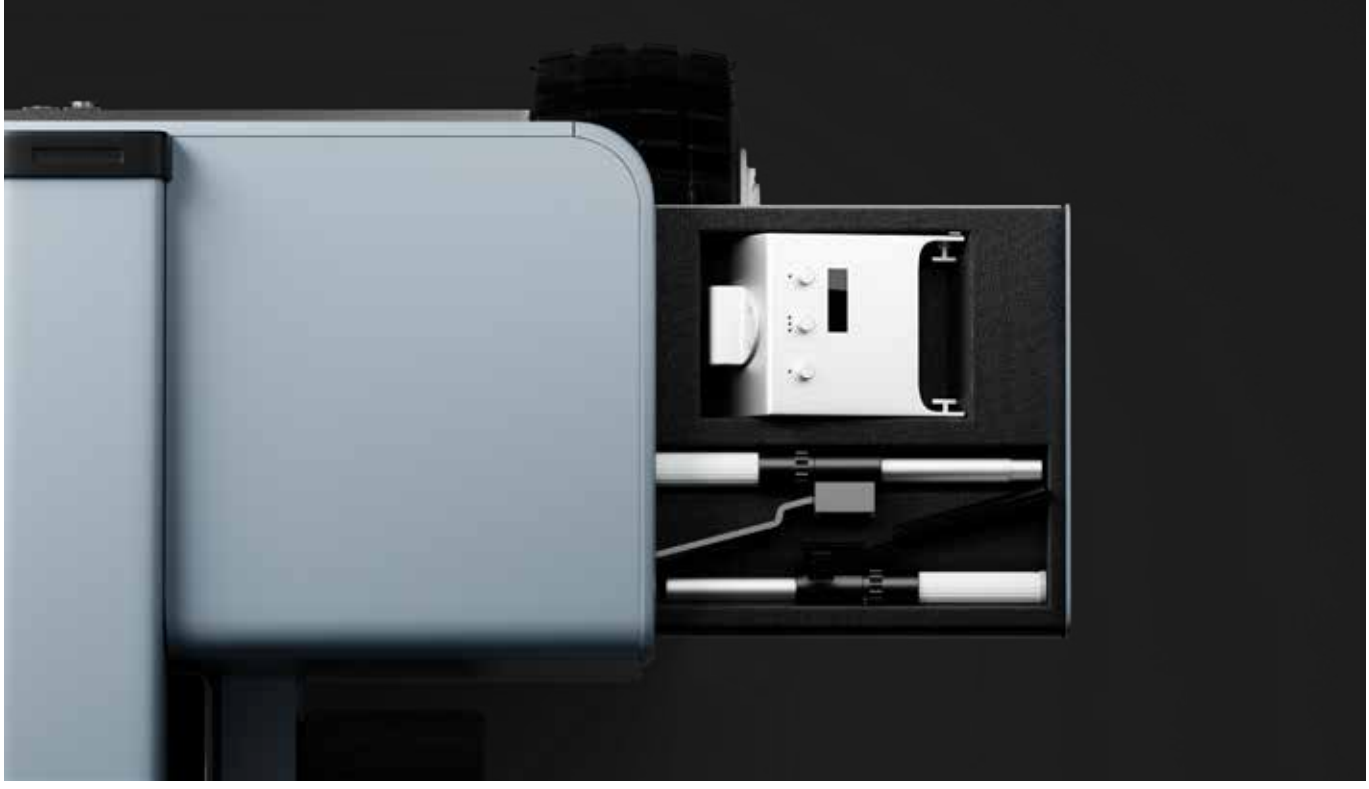
This thesis project has been a very educative, yet at times frustrating journey. Through out the process of the project the author has met many challenges, especially when working with a project that should have a realizable result in quite near future. Having not been working with projects that needs this level of implementable design before.

This created some strains on the flow of creativity and did at times restrain the project development quite a bit. Where the author was afraid to step out of the box too much. This then resulted in the project not being innovative enough to be interesting. Even when the ideas was there the author thought that it would not be thisable enough and then failed to properly communicate them. This created some miss understandings and feedback was at times not so positive. At some point after supportive feedback from both school and CAKE the project did take a swing to the better and with that many other aspect of the creativity came to life again. The learning outcome from this is that confidence and creativity in a process is always positive and to never hesitate to talk about the wilder ideas.

Working with a topic like this has been challenging understanding that the project does not solve the problem of global warming. But can maybe ease the every day workload for the people making it happen with a better option of transport. The author has had the feeling of not doing enough or if it even makes sense to introduce new products in the context. Having conversations with people that are or has been working within the field of agriculture has helped to fully understand the relevance of the project.

Having had the opportunity to work in the Cake office and engaging in rich discussions with people from many different departments has really benefited the outcome of the project. The mots beneficial part of this has been being able to have spontaneous discussions daily with colleges. This if anything gave the confidence to push boundaries and ideas further. Also at times being part of other brainstorming sessions on other projects has helped keep the motivation up. Being in a properly working positive team atmosphere in an evident resource to keep confidence and creativity through a project.

The ideation phase was focused a lot around understanding the scenarios where this the Kibb would be used. It was important to keep the values of CAKE in there and from being at the company the author was at first a little bit to much stuck in the design rules that the company has. Realizing this a bit to late in the process, moving to referring to the values as words instead of the well known shapes was good. Creating new meaning to the project.



The Process has been progressive through the project and set time schedule has been followed for the most of the time. What has mainly disrupted the time schedule has been when creativity and inspiration has had the author change things late in the project.

To conclude the project hat been educative in both personal ways and in creating and developing the design-process. This project has opened up opportunities and reflects well on what the author hopes to do in her professional life.

Working from the office of Cake has helped to work within proper time limits of everyday, knowing from previous experience that its easy to work way to many hours per day when staying at UID.

Looking back now the author feel confident in achieving initial goals of the project if even a bit more than what was expected at first conceptually.

Of-course there is much development potential still in the project. With a little distance to the project other areas of use is clear to the author. Not only in farming but this vehicle could also be beneficial for forestry industry where the ground also needs to be gently handled, and its also a environment that would need a off-road capable and gentle vehicle. With the modularity off Kibb it would be easily adjusted to many needs and situations. Maybe it could carry bags for people in different hotels that may or may not have tricky locations. Or why not just taking your family out for a trip in the forest without disturbing.

Thank you!

ake
11.0
:rim 10R
Soil savers

References.

Advanced Electric Machines. (2021). Delivering sustainable and reliable electrification of agricultural vehicles. https://advancedelectricmachines.com/electrification-agriculture/

Chesapeake Bay foundation. (2021). What is regenerative Agriculture, and why is it Re-emerging now? https://www.cbf.org/blogs/save-the-bay/2021/08/what-is-regenerative-agriculture-and-why-is-it-re-emerging-now.html

Circular Economy, Resource Management, Sustainability. (2021). 72% of consumers want to adopt circular practices, research finds. https://www.circularonline.co.uk/news/72-of-consumers-want-to-adopt-circular-practices-research-finds/

Curtis Moldrich / car, (2022). volvo starts testing wireless charging in Gothemburg. https://www.carmagazine.co.uk/electric/what-is-electric-car-wireless-charging-wevc-and-how-does-it-work-/

Gabriel Popkin. (2020). Can 'Carbon Smart' Farming Play a Key Role in the Climate Fight? https://e360.yale.edu/features/can-carbon-smart-farming-play-a-key-role-in-the-climate-fight

John Glionna, Los Angeles Times. (2007). ATVs replacing horses to herd cattle on the range / Cowboys admit some benefits to versatile vehicles. sfgate.com/bayarea/article/ATVs-replacing-horses-to-herd-cattle-on-the-range-2600148.php

Julian Cribb and Associates. (2010). World's fastest growing economy has the world's most toxic air. https://sustainabletable.org.au/all-things-ethical-eating/intro-to-the-issues/

Karl Haller, Jim Lee, & Jane Cheung, IMB institute for business value. (2020). Meet the 2020 consumers driving change. https://www.ibm.com/downloads/cas/EXK4XKX8?_fsi=LTnjj0mx

Kiss the ground. (2021). A closer look: regenerative agriculture. https://kisstheground.com/a-closer-look-regenerative-agriculture-practices-part-1/

Mick Haupt / Cottonbro, WGSN's Global team of experts. (2021). White paper: Create Better. https://createtomorrowwgsn.com/305165-wp-create-better/

The world bank IBRD IDA. (2017). Women in Agriculture: The Agents of Change for the Global Food System. https://www.worldbank.org/en/news/feature/2017/03/07/women-in-agriculture-the-agents-of-change-for-the-food-system

Images:

Image 1: https://www.pexels.com/photo/a-white-tractor-on-the-field-9454650/.jpg. (2021). [image].

Image 2: https://www.pexels.com/sv-se/foto/ljus-gryning-natur-himmel-5837864/.jpg. (2020). [image].

Image 3: https://www.pexels.com/photo/a-white-tractor-on-the-field-9454650/.jpg. (2021). [image].

Image 4: https://www.pexels.com/sv-se/foto/landskap-natur-falt-sommar-5384055/.jpg. (2020). [image].

Image 5: https://www.pexels.com/sv-se/foto/natur-falt-mork-landsbygden-4380187/.jpg. (2020). [image].

Image 6: https://www.pexels.com/sv-se/foto/landskap-natur-molnig-falt-4958605/.jpg. (2020). [image].

Image 7: https://www.pexels.com/sv-se/foto/vag-solig-falt-by-4749671/.jpg. (2020). [image].

Image 8: https://unsplash.com/photos/M8JAI8fH99g.jpg. (2020) [image].

Image 9: Albin Jonsson, Cake.jpg. (2021) [image].

Image 10: https://unsplash.com/photos/M8JAI8fH99g.jpg. (2020) [image].

Image 11: https://www.pexels.com/sv-se/foto/landskap-natur-molnig-falt-4958605/.jpg. (2020). [image].

Image 12: https://unsplash.com/photos/5JDfwOQfIqg.jpg. (2018). [image].

Image 13: https://unsplash.com/photos/mI16r-CoYhQ.jpg (2020). [image].

Image 14: https://unsplash.com/photos/rghwncQ44l4.jpg (2021). [image].

Dear Participant,

You have been asked to participate at Umeå institute of design (UID) for the main purpose of student degree project research, to engage people in the execution of the project, and create design proposal from the process.

1. **Project overview:** This is a transportation design project focused on mobility in agriculture and ranch life. Student will analyze own life experiences and experiences shared by other people to develop a point of view on the topic. Fore more information about the project please contact course responsible Jonas Sandström via email at Jonas.sandström@umu.uid.se. Or project responsible Fanny Jonsson via email fannyejonsson@gmail.com or by phone 0707181993. The output will be used for Fanny Jonsson's degree work and thesis report that will be posted on Diva portal.
2. **Stakeholder overview:** this project is conducted in collaboration with CAKE zero emission AB. They are interested participating in the project process and the result will be shared in house in research purposes.

Your Personal information: As is common in practices of product and service design, designers use various formats of inquiry such as interviews, observations and home tasks, to explore different user experiences and user perspectives in relation to the topic. Interview responses, photos and videos are used to analyze the topic and to develop new products and services meant to improve quality of life. This personal information is exposed to other students and teachers at UID and tutors at CAKE during presentation and discussions.

Material collected is aimed for a better understanding of how an ATV in agriculture is used for and what can be improved in a mission to be more sustainable.

Check the relevant box for what you consent to:

- ☑ I agree to donate my personal information to be used for this project with student, teachers, and tutors from CAKE whether photos, videos, or text.
- ☐ I prefer NOT to have photos or videos of my life used with other people for this project, but descriptions are ok.
- ☐ I prefer NOT to have any information shared with other students and teachers at UID.

Cecilia Nilsson (Jan 28, 2022 11:21 GMT+1)

Participant signature Date

Designer signature

UMEÅ INSTITUTE OF DESIGN
UMEÅ UNIVERSITY

Interview Cecilia Nilsson

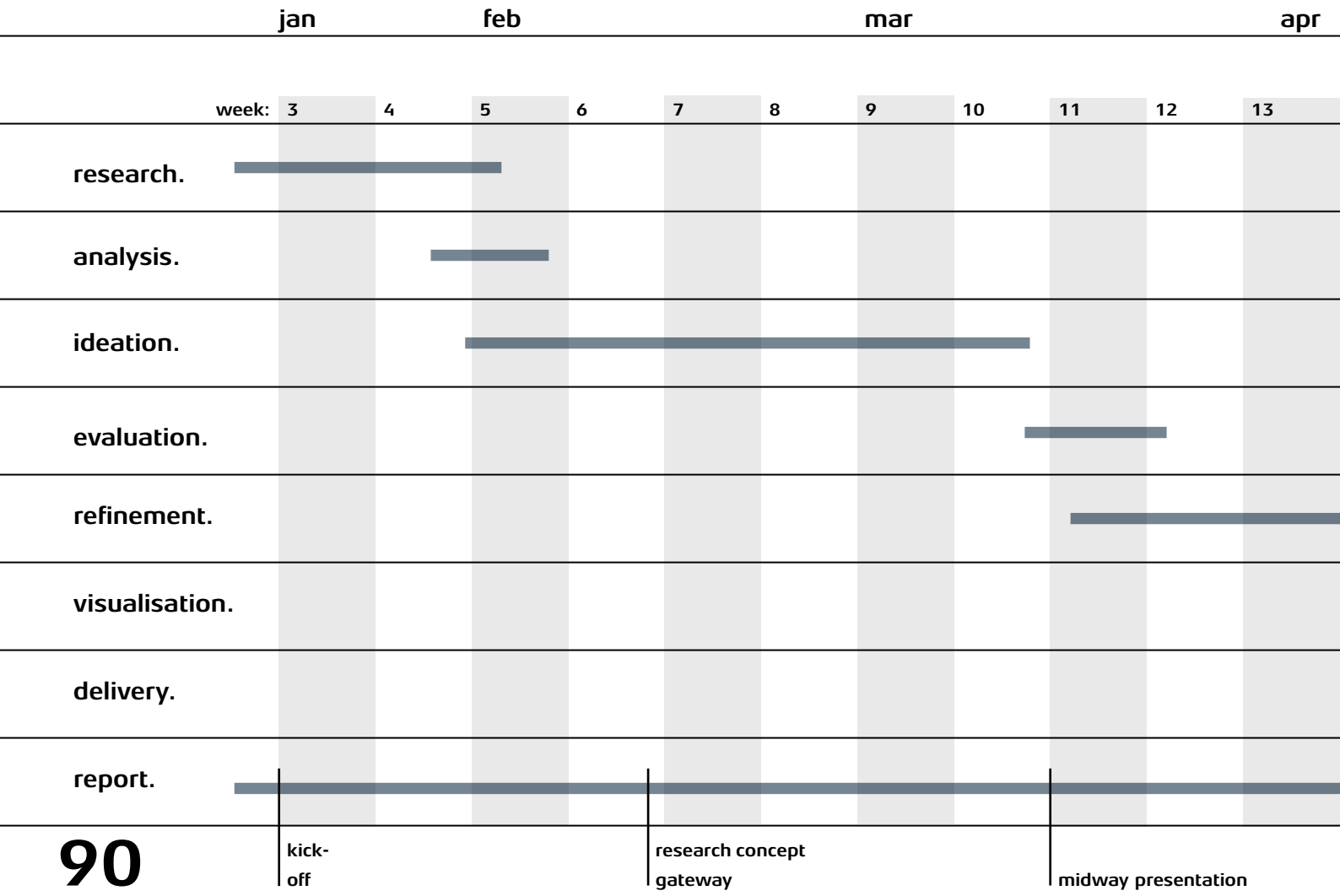
ranch owner Kybacka Gård.

Cecilia is the owner and CEO of Kybacka gård in Gävle. They mainly keep horses and dogs now. But they have been keeping, pigs, ducks, chicken, sheep, and moose. There is a lot of land included in the ranch both fields of crops for feeding the animals and woods. On the facility they also run events and the possibility to sleep over in cabins. This includes a restaurant that caters the events. On the ranch they also grow some vegetables in a green house. The people running the business is mainly family. Cecilia and her husband, her both parents, and her brother with fiancé. There is also one full time employee.

Usage of ATV on the ranch
They use a 2 CAN-AM outlander of different motor strength. Used to have a UTV also Can-AM but it was too heavy for some of the conditions, so it got stuck a lot. But the main reason for changing to ATV's was because of it feeling unsafe riding close to the animals. Since it is more difficult to move from it if an animal would try to kick or bite you or only get to close, and you do have to drive into the pastures quite often. It is crucial that you can move away quickly from the animal if its spooked or angry, and if seated inside a UTV that is much more difficult.
The ATV's are mostly used for feeding animals, bringing out water, keeping track of pastures, wood and fields. They are used daily for these tasks.
Mostly offroad an on their own land, very seldom on roads that does not belong to the ranch. The ATVS are refueled at home, they will drive to get fuel with another vehicle in a container.
She will say that there is no problem getting around with the current ATV's, even though she also states that the winch often comes in handy to pull your self loos in muddy conditions.
Common accessories that are used on Kybacka is a regular ATV trailer. Its quite deep to ensure that stuff put in it does not bounce out when driving. They also always keep a motor saw attachment on the bike. Since driving with this kind of tool can be a risk if it gets loose, it can harm both you and others around you. Both ATV's are equipped with a towing hook a winch. What seams to be key here is that you don't drop things. Another accessory that is used is a tool for cutting grass. That makes the ATV a lawn mower. This it mostly used where the grass doesn't have to look nice since the atvs themselves with terrain tires leaves big tracks. They also have a special water tank trailer for bringing out water to the animals and to water the riding arena. What Cecilia is most happy about as a extra on the ATVS is heated seat and handles!
Everyday use of the ATV's is every now and then. But at times they have full days of driving for certain maintenance. But not for a straight 8 hours. There is a certain place on the farm for them to be parked since there is not one ATV for every person, they need to have a place for them to be accessible for everyone that might need them. And to keep the yard tidy.

Appendix.

Timeplan



and budget.

Resources

Sketch material	700
Adobe	1800
Post it's	300

Research

Travel	1000
Literature	700

UID 22

Travel	1400
Accommodation	2100
Posters	1500

total: 9500 SEK