Smarter Transport Bodø

Smarter Transport Bodø shall reduce climate emissions by changing travel habits. We shall offer a seamless travel experience and give the public access to information and services that contribute to more efficient transport solutions.

By offering open data, we shall also lay the foundation for local and regional innovation.

The project shall:
- reduce climate emissions
- make it easier to get information and to choose between different transport solutions
- increase the use of walkways, bicycle and public transport for traveling
- contribute to increasing local and regional innovation.

This means Mobility as a Service, car share, bicycles and a new payment solution, and more. We shall offer an individual environment-dashboard for the inhabitants, where they can trace their own consumtion and get tips for making changes. By collecting information about municipal and commercial services, we can also make a «friendly push» to inhabitants and visitors and encourage them to use greener transport.

The project is a cooperation between
Nordland County Council, Bodø municipality, Avinor and Telenor.

Our vision is to «create a smart and attractive mobility system that benefits the environment and stimulates innovation»

New City – New Airport

During the last ten years, Bodø has had a fantastic growth and it is one of the fastest growing cities in Norway. Because it is located on a natural peninsula, including the location of the main airport, the residential areas are placed on a narrow band along the coast to the east and the north. Considering the growing population, the municipality has had to decide where the future Bodø citizens were going to live. Would they be able to preserve the border to the countryside? How far could the city spread out? How high rised and how densely would they live? But then something happened. A new runway project started at the airport. The current runway is worn out, it is operated on excemptional permission and it has to be replaced.

It could have stopped there. But then arrived the parliamentary resolution that the military airbase in Bodø will be closed down and the Ørland base will be prioritized. This suddenly creates completely new opportunities for city development. People want to live centrally and avoid having to drive everywhere. When the runway is moved one kilometer to the southwest, 3.400 acres of land become available. This will solve Bodø's problem with space. Here is where we can handle Bodø's growth for the next hundred years.

The resolution «New City – New Airport» has put Bodø on the map both nationally and internationally, and this will create new and encreasing activity in the whole municipality for many years. We see that projects for the development are already lining up. nærmest står i kø.

In our project, we are planning for the new city area – in the «old» part of the city. The new airport will open in 2025. By then, we

– the larger community – will have found out how the airport will be and how the travelers will get to and from the airport.

We also need to know how we want the new city area to develop and how people travel in the future. People's travel habits develop early. That's why we have to be ready in plenty of time BEFORE anybody moves in.

This is the perspective for the project. Smarter Transport Bodø is all about putting people in the centre. We shall offer new services that inhabitants and visitors really need. By focusing on the inhabitants' needs, we will show how the development of mobility solutions for the future will make Bodø and other cities even better places to live and work.

We sincerely believe that we can change people's behaviour by enforcing positive actions. Positive enforcement has become common in schools, in child welfare services, with psychologists and at the workplace. When the boss gives us positive feedback, we want to do more of the same. We believe this also works for people who travel.

That's why we only want to use positive enforcement in this project. Our service will be so attractive that it will be the natural choice. We want to reward those who chose public transport and green alternatives. We want to give them the opportunity to make choices based on updated and available information, and we shall give them a small, friendly push, with a sense of humour and a glimpse in the eye.

The bonus will be a much more enjoyable experience for everybody involved – for those who travel and for theose who operate the service. We think that if we are going to encourage many people to change their behaviour, we depend on «the good story» and a type of «coolness». In this way, these changes will make it a transport technological success story.
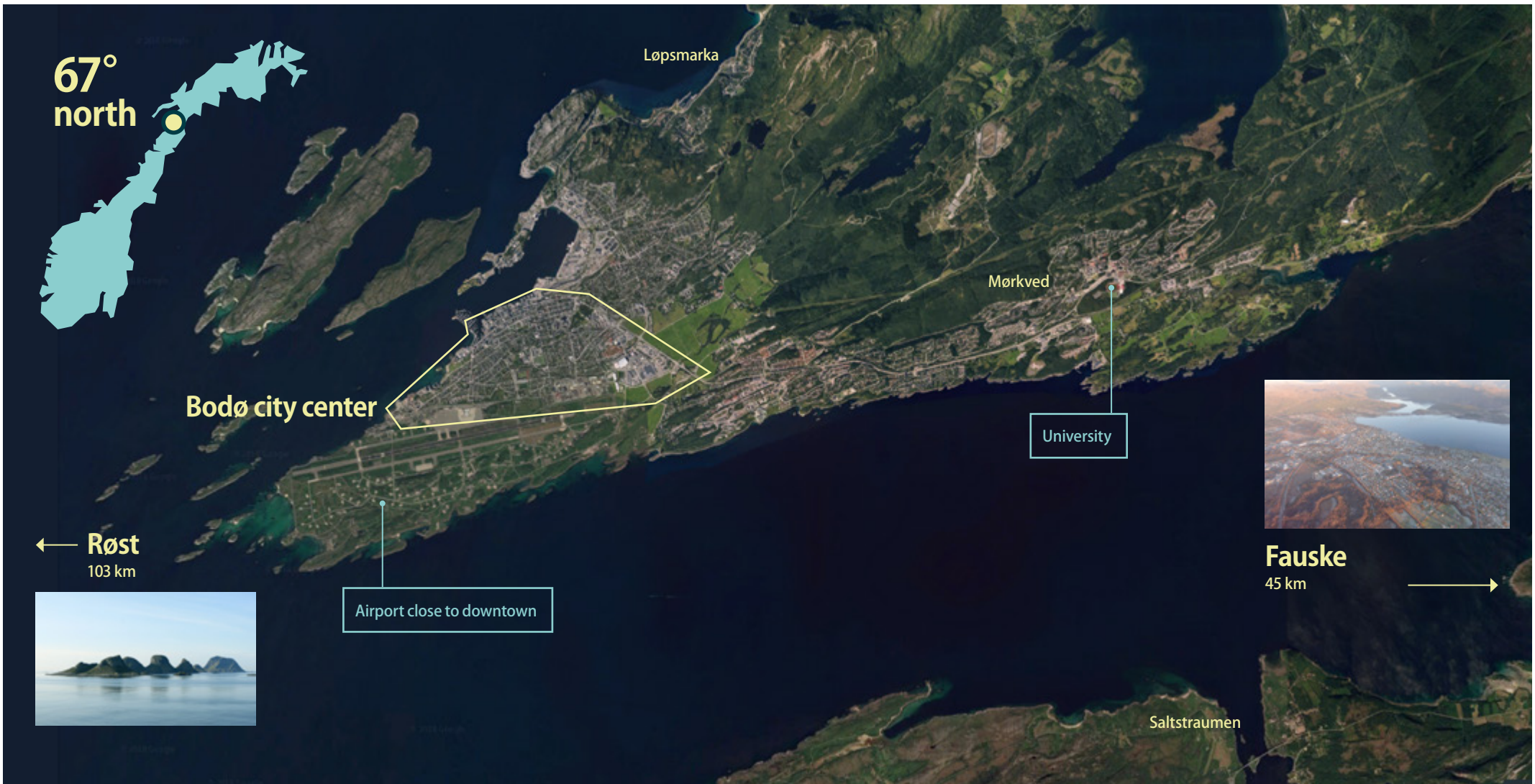
67° north

Bodø city center

← **Røst**
103 km

Airport close to downtown

Løpsmarka

Mørkved

University

Fauske
45 km →

Saltstraumen

BODØ MUNICIPALITY
51.558 residents

RESIDENTS
Under 18 years: 12.000
Over 67 years: 8.000
Number of employed: 28.000
Number of students
living in Bodø: 3.000

INDUSTRIES
• Health and care
• Education and the
  public sector
• The defense
• Tourism
• Transportation
• Trade

**TRANSPORT AND
COMMUNICATIONS
(ANNUALLY)**
Train: 320.000
Bus: 1.2 million
Flight: 1.700.000
Sea: 400.000

VISITOR
Hotel accommodations: 18,000
Residents in the center: 12,000
Employed in the center: 17,000

Road in the center of Bodø: 80 km
Public parking spaces: 1.715

Walk and cycle path in
the center: 6.6 km
Bicycle places: 630

High cycling ratio compared
with other cities

Description of Bodø – opportunities

The start of the New city – New Airport (NBNF) project was the decision to close Bodø Main Air Station and the need for a new runway. This has now become one of the largest city and community development projects in Norway.

Closing Bodø Main Air Station and moving the current civilian airport / runway ca 1 km to the south west will free up 3.400 acres of land near the city for new, innovative and sustainable city development. This area represents the size of around 800 fotball fields and a doubling of the existing area in the city centre and nearby city areas.

The result of the first phase was the parliamentary resolution in June 2017 about moving Bodø airport. The «New City – New Airport» project has now moved to phase II and the formal planning process (spring 2018). The new city area will handle the biggest part of the growth in Bodø in a long term perspective (50+ years). The development of the municipal projects for these areas will start during the spring of 2018. The project shall ensure the facilitation of a future oriented new city area, which is well connected to the existing city areas. At the same time, the new city area shall support a compact and sustainable city development, where the following aspects are essential:

- Zero emissions neighbourhood
- Compact city development
- Combined area use
- Zero growth for private car traffic
- Well facilitated and future oriented public transport system
- Attractive walkway and bicycle road network
- Good living environment
- Robustness related to climate change and good solutions for stormwater management

Bodø's first zero emissions neighbourhood

The «New City – New Airport» development shall contribute to a better environment locally and support national climate targets at the same time. This is a unique opportunity to develop an inter modal transport hub and a new city area from scratch.

Bodø municipality's ambition is that the first neighbourhood in the new city area is to be planned and built as a zero emissions area / neighbourhood. This is pioneer work within such an extensive project in Norway and it demands solid expertise from energy and climate, and not least from the interaction between energy systems, buildings and transport.

Bodø municipality is both a partner and a pilot in FME ZEN (The Research Centre on Zero Emission Neighbourhoods in Smart Cities). FME ZEN shall develop solutions for future oriented buildings and city areas, which support the green shift and contribute to a realization of the zero emission society. The pilot areas in FME ZEN shall be innovation arenas and test areas for technologies and solutions developed by the research centre.

In Bodø, the «New City – New Airport» project gives us the opportunity to test out new innovative solutions for transport and new energy and climate technologies. The new areas shall be a playground for research, development and innovation, and this will create activity and employment locally and regionally and contribute to national and global value creation.

«The world's» smartest city

A smarter Bodø is all about putting people in the centre of attention. The aim for a smart city and municipality is to improve the quality of life for the inhabitants by utilizing new technology.

But it is also about creating change through involvement. These processes have to be anchored in a sustainability perspective, and Bodø shall have a role in implementing the green shift. The future of Bodø shall be developed in a cooperation between the municipality, the inhabitants, business and industry, institutions and volunteers. The inhabitants shall be involved in order to highlight needs and wishes. In this way, we will encourage creativity, involvement and a sense of community. This will create support and legitimacy to the selected solutions.

In both of the big development projects, «New City – New Airport» and «Smart Bodø», the municipality is working actively together with many national and international partners in order to develop innovative project initiatives. All of the projects share a strong connection and degree of innovation and they are often involved in full scale pilot testing.

The municipality of Bodø is involved in several R & D projects under the Smart Bodø umbrella. These are connected to energy efficiency projects in existing buildings, circular economy and waste as a resource. Examples of this are projects within sustainable renovation in the existing city (temporary storage of waste in pressure containers below ground level) and cleaning and recycling of concrete connected to «New city – new aiport». Bodø municipality is also working on a project on sustainable freight transport in Bodø, which represents an important part in strengthening Bodø's position as an intermodal transport hub also in a low emission society. Bodø airport is already a designated pilot for autonomous plowtrucks and remote operated control towers. In additon to this, a new, modern and smart airport will be built in Bodø during the years 2024 to 2026, and the ambition is to be an exhibition of future oriented technology, logistics and innovation.

Artificial intelligence already plays an important part in Bodø municipality's city planning and the planning processes shall be 100 percent digitalized. Furthermore, artificial intelligence will be relevant in CityLab Bodø – a physical and virtual lab – which will be set up at Stormen library during the spring of 2018. CityLab Bodø shall facilitate the citizens' involvement in the development of a smart city today and in the new city area in the future. For example, CityLab Bodø enables the municipality to involve the inhabitants in the planning process in a totally new way. The inhabitants will for instance have the opportunity to «see» proposed solutions and planning documents by using HoloLens.

The target group for our project is wide. It is not a uniform group.
We have therefore selected a few different people to illustrate who we are doing this for. These people are fictitious, but they represent different users of our products and services. It is essential to understand the needs and wishes that we have to fulfill for these people – for the inhabitants of Bodø and for visitors. They simply help us to understand who we are doing this for.

Peder Nikolaisen (38)

**Manager of a sports shop in Bodø.
Partner, one child. Lives in the centre of Bodø.**

Peder is interested in sports and he participates in activities in Bodø and the surroundings. He is innovative, and he wants to expand the shop to include sale and hire of sports equipment, such as bicycles. Deliveries of supplies to the shop are transported by a van and there is a lot of plastic and cardboard waste.

Peder's target: Rent out more bicycles. Increase regular income. Reduce delivery expenses. Improve waste disposal.

Arnt Jensenius (72)

**Retired fisherman. Widower, no children.
Lives at Leknes in Lofoten.**

Arnt lives a quiet life as a pensioner in a retirement home. He has walking distance to the local shops and he does not drive a car. Every month he has to go to the main hospital in Bodø for a check-up. This involves traveling by bus and airplane. He does not have a mobile phone, and changes in travel times and payment methods are stressful.

Arnt's target: Travel to the hospital in Bodø once a month.

Karoline Jakobsen (17)
Student at secondary school. Single.
Lives 5 km outside the centre of Bodø.

Karoline is a student and she travels a lot with public transport. He lives at home with her parents and they pay for her monthly travel pass until she is18. Every other weekend she works at a petrol station. She has friends all over the city and they often meet in the city centre to spend time together.

Karoline's target: Get to and from school quickly. Travel to do sports, see friends and go to work in her spare time. Get home late in the weekends.
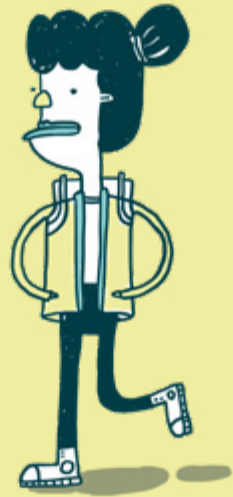
Hanne Olsen (45)
Municipal engineer. Married, two children 5 and 8 years old. Lives 7 km outside the centre of Bodø.

Hanne works for the municipality of Bodø. She drives her car to work, this takes 20 minutes. If she goes by public transport, she has to change buses. This will take 45 minutes each way, which is too long. Her family needs two cars since her husband works in the other end of the city. They have a cabin 1.5 hours' drive outside of Bodø, where the public transport service is not very good.

Hanne's target: Easy and comfortable transport. Get home quickly to have as much time with the children as possible. Improve transport logistics. Travel regularly to the cabin.

Zhou Huan (63)
Data engineer. Married, one grown-up child. Lives in Shanghai.

Zhou is on holiday in Europe and she has two days in Bodø before she goes with the speedboat to Lofoten. There she will go fishing, go on a Rib tour and a sea eagle safari. Zhou does not speak very well English, but she understands a little. She has some time for shopping and a city walk on her own and she want to experience Bodø by night.

Zhou's target: See the most important things in Bodø. Experience an enjoyable evening. Find back to her hotel. Experience clean nature.

Challenges

The city of Bodø is growing. The city centre is changing with the addition of new housing, a city hall, parks and new infrastructure solutions. The objective for the municipality of Bodø is to build a compact city and a strong city centre. A compact city is a sustainable city when we have shorter travel distances and when there is less need to use a private car.

Area

Bodø shall facilitate a sustainable development of the municipality and the community. The city shall not outgrow its borders, but become more compact and expand into a new area. This will increase the demands for transport inside the city. There will also be a strong need for good quality city areas, better accessibility and an improved cooperation between parties, inhabitants and authorities.

In the future there will be a pressure on parking space. Commuters compete with business interests. This can only be solved by people changing their habits, good public transport solutions and good solutions for soft traficants, in order to make it easy to chose other means of transport, rather than driving a car.

The private car

In 2016, there was an average of 487 cars per 1.000 inhabitants. This is a lot of cars, considering the demographics. In other words, Bodø is a car city. This creates unfortunate ramifications, such as pollution, queues, parking problems and a city with poor quality facilities for soft traficants. If we are to develop the compact city further, we have to limit the amount of private cars and encrease the amount of people who use public transport. The use of public transport is low, despite a considerable restructuring of the public transport system in 2012.

Participation

Bodø has become a cultural city. A diversity of culture, sports and other activities exist all over the municipality. The new cultural quarter is the flagship in this cultural initiative. Bodø's plan to become the European Capital of Culture will be a boost that also will be noticed internationally. In order to make all the services available for all the inhabitants in the city, there will be a need for more and better information in the future, as well as the possibility for people to find their way and travel without any problems. All residents must be guaranteed access services and experiences through well-functioningcommunity mobility solutions.

In Bodø, as in many other places, we experience that the population is growing older. This development will continue in the years ahead and we need to be prepared. Facilitation and development of an age friendly society will make it easier for an aging population to participate actively. Good and understandable transport solutions are important.

Pollution

Bodø is situated by the coast and the city has traditionally been «helped» by the windy weather to limit the air pollution. Still, high particle values have been measured. The combination of dry winters, construction work and an increasing use of private cars contribute to the air pollution. Measures to reduce the traffic will therefore help to improve local air quality. These measures will be both longterm and adjusted to shorter time periods, and they will help to strengthen the collective transport system, road pricing, parking restrictions, as well as building walkways and bicycle roads.

Targets

Our vision is to create a smart and attractive mobility that benefits the environment and stimulates innovation. This means that we shall contribute to developing new solutions and services that make it easier for people to not use the private car. We shall also share the knowledge we acquire in the project with other cities and municipalities.

The project's four targets:

Environment

Target

Reduce climate emissions short and long term by changing people's travel habits through positive enforcement and individually customized information, without forcing people.

Effect

Decreased measurement of NO2, PM10 and PM 2.5.

Affected

Inhabitants, visitors, soft traficants, politicians and public administration.

Seamless travel experience

Target

Offer a problem free user / travel experience and encourage other parties to contribute to standardized interfaces (API based).

Effect

An increase of 40 percent on bus travel. Organize city bicycles and car share.

Affected

Inhabitants, visitors, transport companies, county council.

Availability and capacity

Target

Give the public access to realtime information and services at the right time, contributing to a more effective transport, allowing services and experiences by using well functioning common mobility solutions.

Effect

Increase the use of public transport.

Affected

Inhabitants, visitors, county council.

Innovative mobility

Target

Demonstrate and open up for innovative and efficient mobility solutions available for everybody.

Effect

Increased innovation and more private start-ups.

Affected

Innovators, operators, service providers, business and industry.

These targets will solve the following challenges for Bodø: parking, availability, climate emissions, access to services and experiences, public health and city development. By applying technology, platforms and big data, we shall make it safer and easier to move around in Bodø.

The future of transport in Bodø shall be created in cooperation between public administration, inhabitants, business and industry, and volunteers.

Cooperation will be the natural way of working together, and this is how we will create arenas for a wide participation in both planning and implementation. This is essential in order to succeed with the project.

We shall be realistic in what we expect to achieve. Bodø is a small big city. We do not have the same preconditions as Wien or Cleveland or Oslo. But this is also our strength. There are many like us, medium and small cities, that also need new and attractive mobility solutions. We therefore put our prestige into the fact that the solutions cannot be especially developed for Bodø only. The solutions and knowledge that come out of this project shall be an «à la carte menu» for other municipalities and cities. It can scale up so that others can pick and chose according to their needs.

The opthalmologist
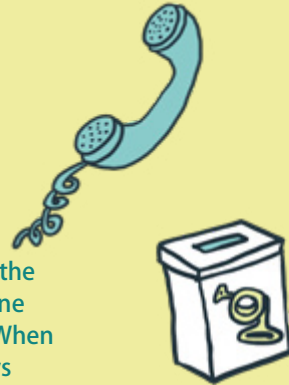
Arnt has received a letter about an appointment with the opthalmologist. He has called Widerøe from his landline and booked a plane ticket. This wil arrive in the post. When Arnt lands at Bodø airport he sees information displays customized for him, with large and clear letters and a signpost for the bus to the hospital.

Arnt knows that he can go straight on the bus, he has been told this in advance. He gets help at the aiport to find the right bus. Arnt goes to his appointment.
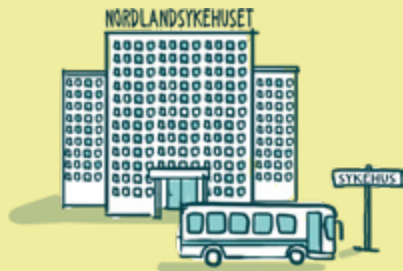
In the lobby at the hospital there are also customized information displays. After the appoinment, he finds the bus and returns to the airport. At the airport they have been informed that Arnt is on the way and they are ready to help him. The bus driver has been informed that Arnt will be on the bus and he makes a stop at the hospital.

Help to find your way - Wayfinding	Assistance services	Seamless ticket without mobile phone

Soon weekend

Today, Hanne is taking her son Ola to the kindergarten. They drive the electrical car. Her husband, Lars is sending their daughter Silje (8) off to school. He then takes the bus to work. At the bus, he has enough environment points to download the newspaper.

On the way home from work, Lars picks up a shared car. Since they are going to the cabin in the weekend, he selects a larger car with plenty of luggage space. He uses the app MoBo and he has a subscripton on shared cars. Lars picks up the kids on the way home. Hanne is already home, where she found the shopping bags by the front door. The big shopping for the weekend has been delivered. They pack everything in the car and set off to Misvær.

Flexible transport: Bus, bicycle, car, plane, taxi	Shared cars/ car collective	Environment-dashboard with rewards	Home delivery/ pick-up

A typical Saturday

It's Saturday. Karoline is going to work. She opens the app MoBo and receives some tips saying that since it is sunny weather and little wind, the electrical bike may be a good alternative. There is one available down the hill. Karoline parks the bike in the city centre.

When she has finished work, it has started to rain. The app informs her that the 17:10 bus from the city centre is completely full. If she waits ten minutes at Stormen library, she can take a bus that is not so full. Karoline follows the advice. She pays for the ticket accordingly.

After dinner Karoline goes to the cinema. She takes the bus to the city centre and discovers that she has earned 200 environment points the last month. She spends them on popcorn. When she is going home, she takes the «take-me-home» bus that drives her straight to her front door – because mum is so worried about her at night.
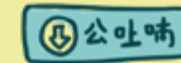
| Flexible and dynamic transport | Environment-dash-board – gameification | Social entrepreneurship |

The tourist

Zhou arrives in Bodø early on a Tuesday. The group is traveling to Lofoten on the Wednesday. When she lands at Bodø airport she sees a signpost in Chinese. It has a QR code, which sends her straight to the «Experience Bodø» app.

In Chinese, she is offered a selection of options. Zhou wants to experience Bodø without the rest of the group. She decides to send her luggage straight to her hotel room. Then she picks an airport bike. She finds it by following the Chinese signposting at the airport. The app guides her around Bodø. First, she uses the bike to get to the city centre, where she takes a walk along the harbour, then via Stormen library to the market and the cathedral.

Then the app helps her to take a bus to the Airport museum and then to Bodøsjøen open-air museum. After a lot of fresh air and many impressions, Zhou takes a bus back to the hotel where her luggage is waiting. She takes a rest and then the app suggests that she can go for dinner at the Roast restaurant on the 17th floor at Havet hotel.

The next day, she sends the luggage from the hotel and walks the short way to the airport. On the way, she reads about the Pier and Pelle Molin's Place in the app.

| Help to find your way – in Chinese – Wayfinder | Seamless transport (bus, airport bike) | Luggage handling | «Experience Bodø» - in your own language |

The foundation

Smarter Transport Bodø gives us an opportunity to be a driving force in creating the future of transport development.

We shall contribute with unique sub-projects that can be adapted to other cities and centres. Bodø is a small big city. Most people in Norway do not live in big cities. We put our prestige into the fact that all our projects can be scaled down or up.

The foundation for the project consists of four pillars. These four pillars shall deliver on all the target areas. They also provide the foundation for all the sub-projects.

1 MoBo
2 Mobility
3 Mobile infrastructure
4 User involvement

Pillar 1 MoBo

Problem to be solved
Etablere felles nav for bestillinger og distribusjon av betaling (friksjonsfritt).

Target
Enkelt for lokale og nasjonale transporttilbydere å tilknytte sine tjenester til en felles plattform for bestilling og betaling.

Scaling
The platform is generic and it is already in use at Avinor airports.

Mobile Bodø (MoBo) is a user interface with services and information that make it easy to not use the private car. We shall collect and process all mobility information about people and goods in one place – and give access to the information to all relevant participants. They can then develop their own interface and facilitate efficient communication between people and machines. All collected data will be presented to the user in a simple and understandable way. The information has to be intuitive in order to reduce the need for training and to avoid misunderstandings. Many people will find this an app on their mobile.

The interface will send notifications to help with planning and purchases. In addition, we shall use MoBo to give advice and a friendly push in the right direction (see also sub-project 8).

The interface will be developed on an underlying architecture made by Avinor, where bookings, information and payments are distributed to the relevant providers. Since many of the basic components are already developed, this will be a good start.

Pillar 2 **Mobility**

Problem to be solved
Fragmented knowledge of mobility patterns to, from and in the city.

Target
Provide updated information and knowledge of mobility patterns of (people and goods) participants.

Scaling
Avinor and Telenor already have information on a national level, and the services can easily be adapted to other places and participants.

We believe that in order to deliver new and better services we need to know how people move in Bodø. Where do they come from and where are they going? What language do they speak? By using several different anonymous data sources – including the mobile net and tracking of luggage and goods – we can develop even better services.

This solution represents the engine for several of the other sub-projects in Smarter Transport Bodø. The information that this creates will give knowledge and decision support for all participants and local service providers. Data will be collected, processed an made available in open interfaces (APIs) for relevant third parties. The information can be used to improve other services: We can adapt the bus service to where the customers are actually coming and going. We can customize information services with the languages required in different places and we can uncover mobility patterns that are relevant to other types of city planning.
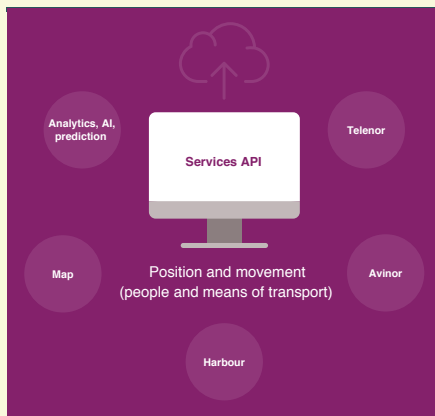
Pillar 3 Mobile infrastructure

Problem to be solved
How do we make mobile network services available on a big scale so that it can be used efficiently by the public and for communication with different types of sensors in a city?

Target
Establish a robust, secure and standardized mobile infrastructure with a high degree of coverage and capacity in cities and in places where the population is more spread out.

Scaling
The solution builds on an already existing 4G net. As of October 2018, this will be expanded with support from sensors and the Internet of Things. The solution will be expanded gradually to also include 5G.

This is a mobility project with the main focus on smarter and more environmentally friendly transport solutions. The project also represents part of a major change of paradigm, where mobility and technology merge. Our solution depends on a good, stable and secure network infrastructure. Things have to be able to communicate with each other, the machines have to talk to each other and people have to talk to both things and machines.

For more than 20 years, Telenor has worked with the automation of Norwegian municipalities by using a machine to machine technology (M2M) and IoT solutions. Today, they deliver solutions to several Norwegian municipalities, in cooperation with more than 100 partners. Around 1.2 million Telenor sim-cards are today integrated in operative Norwegian IoT/M2M solutions.

Here are some examples of operative digital solutions used in notifications, surveillance and operation:
• Water supply network for private households and businesses
• Waste disposal for both private households and businesses
• Preparedness solutions in case of avalanches, floods and fires
• Environmental parametres for public properties
• Road services – i.e. heavy traffic, icy and snowy surfaces, where is the «plow-truck»
• Use and availability on public parking lots
• Counting the amount of cars, bicycles and walkers
• Sensor managed street lights

The Internet of Things (IoT) is about the digitalization and automation of the operation of products, infrastructure and machines in comprehensive systems. These solutions are completely dependent on being online on a stable and secure data network. The most future oriented solutions for IoT will run on the 4G net, and it will gradually be migrated over to 5G with increased speed and minimal delay for critical solutions.

Narrowband Internet of Things (NB-IoT) is a new communication technology running on the existing 4G net (and later 5G). The technology opens up for the possibility of millions of things, such as car sensors, parking lot sensors, environment sensors etc can be connected to the Internet. NB-IoT is characterized by a wider coverage, sensors with a very long battery life and cost effective data communication for different types of sensors. This means that the existing mobile network infrastructure can still be used, and Bodø does

not need to build its own network infrastructure in order to support sensors and IoT based solutions. We expect to be able to start the testing of 5G in Bodø during 2019.

Telenor has an ongoing project together with the Norwegian company Q-Free and The Norwegian Public Roads Administration in order to gain experience with how NB-IoT can be used to encourage more people to use park-and-ride and travel with public transport to the city centre. Telenor's 4G net will support NB-IoT at the base stations in Bodø and Nordland county from October 2018.

Telenor Control Centre (Jasper) facilitates easy self-service and administration of all municipal M2M/IoT subscriptions. The solution is built on a global and market leading platform delivered by Cisco.

In cooperation with NTNU (Norwegian University of Science and Technology), Telenor recently established its own IoT lab, which is going to be a new power hub for the Internet of Things. It will contribute to encreasing innovation, new national competence development and enhance competitiveness among entrepreneurs IoT. The lab is open for start-ups, developers and private and public clients who wish to develop and test new IoT products and services.

This new centre also offers the opportunity to exchange data, share experience and cooperate about existing projects with the Telenor NTNU AI Lab. This lab shall contribute to enhancing competitiveness, stimulate to increasing innovation and create new expertise in artificial intelligence for private and public participants in the municipality of Bodø and the county of Nordland.

Pillar 4 User involvement

Problem to be solved
We need to change the way of thinking in the public sector, from solving the citizens' problems to creating the best solutions together with them.

Target
By focusing on co-creation, we shall invite different participants from a variety of areas in order to work together towards the same goal for the society – already from the first idea.

Scaling
The strong focus on co-creation places Bodø in an excellent position as a pilot for solutions that can be replicated and scaled up or down by bigger and even smaller cities and municipalitied in Norway.

Bodø's inhabitants are the real experts since they use the city every day. We wish that they take part in the development of Bodø to a larger extent than today.

The municipality of Bodø will therefore build a physical and virtual «city laboratory» at Stormen library. City Lab Bodø shall contribute to creating involvement in the development of Bodø and a Smarter city, which is better to live in today and in the future – also when we have a new city area and a new airport.

In City Lab we hope to receive input from the inhabitants and motivate to interaction with local businesses, the university and researches from different projects. This is a test of something that has not been done before and the experience from this may lead to new methods for implementing future oriented involvement that may benefit the rest of the country.

City Lab shall be the natural arena for participation in the large development projects and other projects initiated by the municipality. We also wish that the inhabitants will suggest solutions to how they see Bodø today and in the future.

The municipality of Bodø has started the development of a virtual tool for citizen involvement. This will be further developed and connected to MoBo (pillar 1).

There are just under 4.000 companies registered in Bodø with more than 26.000 employees. This represents a complex and varied business life in the municipality.

Sub-projects

We have ten sub-projects delivering both technological innovation, innovative infrastructure and services with a widespread involvement all over Bodø. It is important that the sub-projects can be implemented independently of each other. All the projects contribute to the vision of a smart and attractive mobility. Some of the projects focus on technology, but they contribute to making it easier to chose public transport. Other projects focus directly on environmental benefits, but they make data available and stimulate innovation.

1 MaaS
2 Environment-dashboard
3 Payment solution
4 User involvement
4 Stimulate innovation in local industry
5 Green geo-fencing
6 Dynamic wayfinder
7 Self-going buses
8 AutoBag
9 Experience Bodø
10 Patient mobility

1 MaaS between big cities

Problem som skal løses
How can we gather all the different services, which could be rather confusing for regular users and visitors?

Target
In the beginning of 2023, there will be a MaaS solution for Bodø. The service will include bus, speedboat, train, car share, taxi and many more.

Scaling
It shall be possible to scale down to typical regional centres (10.000 - 30.000 inhabitants). Special focus will be on the nine other centres in Nordland.

We need to think in a new way regarding mobility services.

«Mobility as a Service» (MaaS) is the future method for mobility services to the public. But will there be enough people in Bodø for a MaaS subscription?

Will a medium size Norwegian city be ready for MaaS and is it possible to scale this into a big city version? This is what we will find out in the sub-project. The aim is to make it possible to implement these solutions in other big and small cities in Norway.

This is about finding out what the actual services will consist of. We think they should consist of traditional public transport services (bus, train and boat), shared cars, city bicycles, taxi and «take-me-home» buses.

It also means that we have to find out how people will pay for the services. An important aspect here is the balance between a «good service experience» and the willingness to pay for it. Medium size Norwegian cities obviously do not have the large populations of big metropoles and neither the same extent of mobility. We therefore have to find solutions that combine all available services, develop complementary new solutions and offer this to a sensible price.

In order to offer a good and flexible service, we shall analyze passengers on every city bus and make this information abailable in realtime. We will acquire various sensors and connect these to the services. The aim is that this information will contribute to changing people's behaviour. The user will get access to the information in MoBo.

Dynamic bus routes will be tested. This is buses without fixed routes, but they collect passengers in one area who are going to the same destination. This is done by predicting how people move by applying mobility data and artificial intelligence.

An extra dimension will be to identify users who may incorporate MaaS in their services and business models, such as housing cooperatives.

2 Environment-dashboard

Problem to be solved
How do we create public awareness and involvement so that people chose environmentally friendly transport alternatives?

Target
Reduce climate emissions as a consequence of the transition to environmentally friendly transport alternatives.

Scaling
The solution is scalable in the county of Nordland and it can be copied in other Norwegian municipalities and counties.

Our project has a clear green profile. In all the sub-projects we will stimulate to reducing the use of private cars and encourage a transition to public transport and other environmentally friendly transport alternatives.

In order to highlight this, we will develop an environmet-dashboard with a simple user interface for inhabitants and municipality / county. We wish to create a product that involves people and inspires and motivates individual citizens to make sensible and environmentally friendly transport choices. It is therefore essential to develop this from a user perspective.

The municipality and the county council will be able to collect information for Bodø and use this on digital platforms. This information will be made available in open interfaces. Air pollution measurements based on sensors (Internet of Things) will be collected continuously and visualized in 3D maps. Good quality measuring tools, analysis and data made available in an understandable format are important in order to implement the correct measures. This will provide the municipality / county council and possible third parties with the opportunity to follow trends and see the effects of different implementations.

The most important thing is how the information and such a dashboard can be used by individuals. The MoBo app will give every user access to his or her environmental account. They will be able to see how their choice of transport method will affect the environment, compared to other alternatives. They can set their own targets (for a day or a week) and follow the development, be it for bus, private car, shared car, cycling or walking. The benefit will show immediately. The users could for instance have competitions in the family, between the inhabitants of Bodø, in school classes or at work.

Information from the environment-dashboard can also be shown on large public displays at for instance the train station, the airport, bus stations, schools and larger workplaces. The environment-dashboard shall also be used to reward those who contribute the most and in this way it will become a bonus scheme for the environment. The bonus money can be used for purchasing services / experiences, such as a day in the waterpark, a visit to the fire station or the airport museum, downlaoding the local newspaper Avisa Nordland, coffee at the airport etc. These things will contribute to enhancing the project's driving force, which is to be an incentive for people through positive enforcement.

3 Payment solutions

Problem to be solved
How can we create a seamless boarding on and off public transport and a more efficient (faster) travel experience?

Target
Passengers with a smartphone shall be able to go on and off the bus without having to do anything to purchase a ticket.

Scaling
The solution can easily be scaled within the county of Nordland and it can be copied by other Norwegian municipalities and counties.

We shall give the inhabitants of Bodø the possibility to travel without cash and without connection. Many people may find public transport a bit scary – simply because they do not know what kind of ticket they need or how to purchase one. What zone, when to buy, which one is the best for me? By using new technology we will find the best solutions for the users. The users will be able to control this themselves or they may chose to let the system take care of it for them.

This sub-project is closely connected to Mobile Bodø (MoBo – pillar 2). The payment solution will be developed in close connection with the development of the user interface. The payment solution will also be very important for some of the elements in the MoBo app.

Together with ticket suppliers and payment services, we will develop new ways of claiming payments. The new method for innovative procurement / innovative partnerships will be tested in the sub-project.

At the same time as we develop future payment solutions, we shall also remember that ca 20 percent of the Norwegian population do not have a smartphone. These people also need good payment services. So we need to have two thoughts in our head at the same time. But when driverless buses are introduced in the future, we cannot have a system that depends on a driver who deals with both ticketing and inforamtion.

The introduction of PSTD2 will create new opportunites for account-to-account transactions, and this may contribute to developing good payment solutions.

The payment solution has to be seen in close connection with both the service design in MoBo and the MaaS consept.

4 Stimulate innovation in local industry

Problem to be solved
The public sector in Norway spends 5 billion a year. A lot of these values can be used in a better way in order to stimulate business development, improve services for the inhabitants and encourage a sustainable value creation.

Target
Contribute to value creation and new local employment. Develop new products and services that may be exported internationally.

Scaling
We wish to fulfill our innovation commitment for climate and environment, as well as the digitization process directed by The National Programme for Supplier Development. By taking the lead and involving other county councils and municipalities in Norway and other international parties, we can spread and scale the solutions developed in our project.

There are many wise people in Bodø and Nordland. We want them to find solutions that we may not know that we need. That is why a significant part of the project will contribute to stimulating local and national industry.

Avinor, Nordland County Council and the municipality of Bodø are partners in a regional programme for supplier development, with access to support and expertise for the whole national network. Through this the public parties also intend to use the method for innovative procurement as a strategic tool. By placing procurement on the agenda with new / high goals, we aim to lift

procurement from being an administrative activity to the stratetic tool we want it to be.

This is about facilitating procurement processes as a base for innovation and as a tool for reaching ambitious goals (in ZEN / the first neighbourhood in the new city area shall have zero emissions) based on an early dialogue with the market and open processes.

During the project period, dialogue meetings and conferences will be organized with potential suppliers. This will encourage the involved parties to implement more innovative procurements and procurements according to the procedures for innovative partnerships. Our ambition is to organize several dialogue meetings in different areas with national and international parties.

We shall facilitate cluster cooperation for parties that are interested. This should include industry, academia and public administration. Local patners such as Bodø Science Park, Nord University, NHO (The Confederation of Norwegian Enterprise), LO (Norwegian Confederation of Trade Unions) and Innovation Norway will be important players.

We shall provide special grants for start-ups. This will stimulate innovation and reduce the risk for those who start up a new business. We know that there are many potential business owners with good ideas, but very often they lack the capital they need to get started. It is important to give them a springboard.

The city lab shall be used to involve citizens, industry and academia (see pillar 4). This will be an informal meeting place for start-ups in the mobility sector and it can help with tools, advice and tips.

5 Green geo-fencing

Problem to be solved
Can V2x technology help to reduce the disadvantages of using private cars in the city centre?

Target
In January, more than 75 percent of the hybrid cars drive on electric only in Bodø city centre.

Scaling
Due to limited use of net capacity and equipment requirements, this can be transferred to everybody.

Geo-fencing is a GPS driven fence or border.

We shall set up a border in the city centre by using GPS coordinates. Some zones will be defined as «green». These can be changed based on data and analyses, according to need. This will then be sent to a cloud based ecosystem, from where rechargeable hybrid cars are directed over to using only electric when they enter the green zones.

This sub-project is in line with the overall objective and it has a positive approach. Bodø is a very compact city with a cleraly defined centre. The geographical sectioning in the geo-fencing system can be the same as in today's toll road system. We wish to develop this technology further in cooperation with the toll road companies. Maybe drivers of hybrid cars with this technology also could be rewarded?

This will contribute to improved air quality, reduced noise levels and a more pleasant the city centre.

In the beginning, this will be developed in cooperation with Volvo Cars AS, but we wish to expand this to all types of cars.

6 Dynamic wayfinder

Problem to be solved
Travelers need information and signposting in their own language. Local parties need to provide information that is understandable to all travelers.

Target
Companies and organizations outside the airport and the harbour receive information about the travelers' nationality and are able to change language on their displays and channels.

Scaling
To be established as generic services with their own location codes.

If the public transport services are to be attractive, the users need to be able to navigate and get information in a language they understand. By using dynamc signposting throughout the whole city and at the airport – dynamically cudtomized in the travelers' own language – we shall make it easier to chose green transport.

By using available data, we can customize information to suit the individual user. We will be able to track the nationality of arriving tourist groups i.e. at the airport or at the harbour and then provide signposting and information displays in the «correct» language. This will be relevant also for buses, trains and not least, the tourist information in the city.

Local businesses may also benefit from the services in this solution. This may contribute to the creation of many new and innovative services for both visitors and citizens. Based on the information we have, we can also make predictions and consequently improve. This will benefit the users. Maybe the library can display books in the relevant languages before the visitors arrive? In this way, the library may save time and resources and people will experience a very welcoming city.

7 Self going buses

Problem to be solved
Can we offer safe, flexible and comfortable journeys without a driver?

Target
In 2022, self-going buses drive without a driver.

Scaling
This will require some infrastructure in roads and road s tandard. The system can be implemented in towns and cities.

We shall test the buses of tomorrow. We wish to pilot self-driving buses in mixed traffic and in ordinary route traffic. In order to be attractive for the users, the buses have to drive them to the centre, get there quickly and efficiently and be reliable.

Our buses shall be able to drive in mixed traffic, be equipped with good quality sensors and a safe and stable control system, and they will have the ability to learn (artificial intelligence).

Avinor has already acquired great expertise in driverless vehicles from their project with driver assisted plow trucks. We want to utilize this knowledge and transfer it to buses.

With the ordinary bid for Bodø (start-up 01.01.2020), NFK (Nordland County Council) is going to purchase / lease self-driving buses. The operator who wins the bid, will have to commit to taking part in an innovation process.

We have already agreed a demonstrator with Acando in order to see if it is possible to cooperate about a pilot. The test distance is decided – it will be from the airport to the city centre – and the municipality will provide the required regulations and planning competence. It will be necessary to cooperate closely with The Norwegian Public Roads Administration region North, as they have extensive ITS knowlegde. The tests at E8 have produced useful knowledge that we would like to benefit from.

The transition to a new public transport system during the autumn 2012 was a success. The amount of journeys with public transport has encreased by 70 percent from 2012 to 2017.

8 AutoBag

Problem to be solved
Make it easier for travelers to chose the prefered transport method to and from the airport.

Target
Provide a greener passenger transport service to and from the airport.

Scaling
Scale nationally in phase 1. Phase 2 will depend on local infrastructure and other conditions.

For travelers who travel far – either in to Bodø or out of Bodø – the luggage may prevent them from traveling on public transport. We therefore need to eliminate this disadvantage. We envision an autonomous and electric transport of luggage and later also goods.

This could be a further development of «bag drop» points in the city. This is being tested today, where the luggage is tagged and checked in. This will free up parts of the travel day for visitors – and maybe enable them to experience more of Bodø. For citizens, this means that they can walk, cycle or take a bus to the airport – without having to worry about the luggage or travel back to the hotel before departure. To continue from this, we will set up a luggage tracking system that follows the luggage from the drop-off point to the airplane and give the traveler a total overview at all times.

When the new Bodø airport is being built, it will be the world's Smartest airport. We are looking into the possibility of setting up a luggage belt in a tunnel from the city centre – a kind of hyper-loop for the luggage. The system may be expanded to also transporting other goods.

The municipality of Bodø is already working on a project in cooperation with TØI (The Institue of Transport Economics) and their research partner SINTEF, called NORSULP – Sustainable Urban Logistics Plans in Norway. The project's objective is to develop guidelines for the planning of urban logistics in Norwegian municipalities. The purpose is to facilitate an efficient and environmentally friendly transport of goods in cities and city areas. This is a competence project for the industry and it is meant to contribute to increasing the level of knowledge and focus on logistics in city planning.

NORSULP is financed by The Norwegian Public Roads Administration, The Directorate of Public Roads and The Norwegian Research Council's Transport 2025 programme. The results from this project will be incoporated in Smarter Transport Bodø.

9 Experience Bodø

Problem to be solved
How can we encourage tourists to use public / green transport services?

Target
By the end of the project (Q2 2023), 20 percent of the visitors have downloaded the «Experience Bodø» app.

Scaling
This is to a large extent a backroom project. It is about collecting knowledge that the municipality / city already has and make it available. It can be scaled up and down.

In order to encourage visitors to experience Bodø in an easy way without using a private car, we shall develop MoBo for visitors. They do not need the same amount of information about for instance public services, but on the other hand, they need more information about Bodø and the region.

A QR code or an equivalent in certain places gives the user access to central points, tourist information, hotels and so on.

The concept is to provide good experiences in the city centre by using innovative mobility solutions. We will invite other participants who may benefit from our knowledge in order to create good services. This could be similar experience packets – perfect for tourists on Hurtigruten. Also packets that are suitable for individual passengers' arrival / departure – and transport locally. It will consist of services like transport, food and drink, sightseeing, showers and more. These services could be made available at Avinor's digital platform, which is able to handle payments directly to different suppliers. Avinor's platform achitecture also makes is possible for other suppliers to offer their services on their own platforms.

We will also facilitate an Airbnb version for people-to-people where volunteers can offer guiding services to visitors.

10 Pasient mobility

Problem to be solved
Fragmented and incomplete coordination of information between the patient and the parties involved.

Target
En easier and more predictable journey for patients or people who need assistance.

Scaling
Nationally.

Every year, more than 300.000 patients are flown to and from hospitals in Norway.

The patients have a variety of needs for assistance and they are moved between different parties who are ready to help them to the next stage. These parties may be able to offer their services in a better way together, if they have access to more information about the need for assistance and if they can receive notifications and predictions before the patient arrives.

This service will offer the patients a much better travel experience, because it will collect, process and share

information between all the involved parties.

Introduction of the participants

Nordland County Council
Nordland county is stretched out geographically. It has 245.000 inhabitants spread over 44 municipalities. Nordland's population and industry are scattered over a long coast – 25 percent of the Norwegian coastline – including many islands and fjords. The county council is responsible for public transport in Nordland. The service includes bus and speedboat, and all production is by tender. Customer focus is essential in the development of public transport. The focus in the future is still going to be to offer the users a good service and simple solutions, such as realtime information and mobile ticketing. Nordland County Council has 440 buses in daily activity, driving ca 14 million kilometres. The operation of the speedboat service in Nordland is extensive and consists of 29 routes. The county council has the responsibility for 4.110 km of county roads and 27 ferry services.

Bodø municipality
Bodø is the county capitol of Nordland and it is the biggest city in the county with ca. 52.000 inhabitants. Bodø plays an important part as the centre of communication for the circulation of both cargo and people. Cars, ships and planes all meet in the middle of the city. The population in the municipality has grown considerably over the last few years. Bodø is the host and administrative centre for many large companies and competence institutions and the city offers a varied and broad labour market. Nord University, Nordland hospital, Nordland County Council, Nordland police district, the operative headquarter of the Norwegian Armed Forces and the Norwegian Civil Aviation Authority are all in Bodø. There are almost 4.000 companies registered in Bodø with more than 26.000 employees, which represent a complex and varied business life. The county of Bodø itself employs more than 4.000 people and has an annual turnover of more than 4 billion. The Bodø community is powerful and it contributes to growth, innovation and development, not only in the county of Nordland, but for the whole region.

Avinor
Avinor has the responsibility for 45 government owned airports, as well as the civil and military aviation security service in Norway. This network binds Norway together – and Norway with the rest of the world.

Avinor is a driving force in the environmental work within aviation and aims to reduce the total climate emissions from Norwegian aviation. The company has a leading role in the development and delivery of bio fuel for aircrafts. Every year, Avinor contributes to safe and efficient travel for ca 50 million air passengers. About half of these travel to and from Oslo airport.

More than 3.000 employees have the responsibility to plan, build and manage a complete airport and aviation security system. Avinor finances this by aviation fees and sales at the airports.

Telenor
Telenor is the biggest supplier of telecom and data services in Norway, both on mobile and landline network. Telenor supplies nationwide services also throughout Scandinavia. Telenor owns the net and produces all the services, even with very high requirements for security, redundance and duplication. Facing increasingly advanced threats, Telenor has developed a high degree of readiness and the security is being strengthened within critical digital infrastructure. Telenor invests more than 4 billion every year in infrastructure. The company has continuous focus on strengthening and improving the networks in order to secure redundancy and back-up power and to reduce the risk of fall-out. Telenor will continue to strengthen cyber security by developing expertise, a strong capacity for analysis and investments in infrastructure.

Infrastructure

The transport needs in the city are partly created by the fact that the residential areas are located in a relatively narrow band along the coast towards the east and north. The need for transport is mostly covered by the use of private cars. When more people live in the city centre, the need for transport will be reduced and the city centre will become more attractive.

Bodø is an important traffic hub for Nordland. Cars, boats, buses, trains and aircrafts all meet in the middle of the city. The labour market is varied and attractive and many people commute into the city centre by airplane, car, bus and train.

The Salten commute between Rognan and Bodø has ca 160.000 passengers every year. The regional train between Bodø – Trondheim also has 160.000 passengers. Bodø airport handles ca 1.7 million passengers and ca. 400.000 passengers travel by ferry or speedboat.
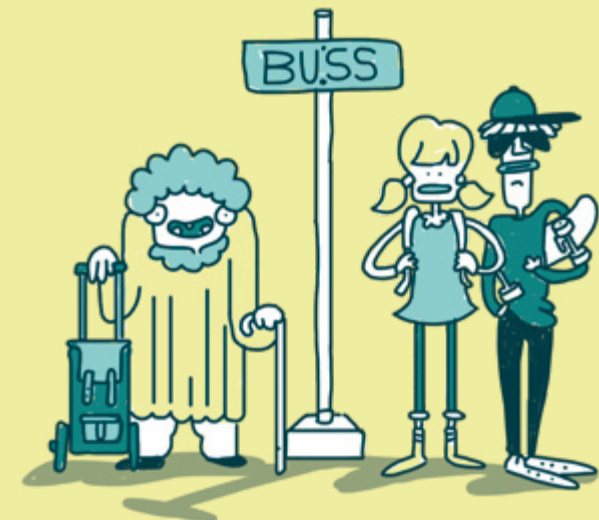
City packet Bodø

City packet Bodø is a common project to develop a safer and more future oriented transport system in Bodø for those who drive, take the bus, cycle or walk. The city packet is a cooperation between the municipality of Bodø, Nordland County Council and The Norwegian Public Roads Administration. The packet consists of more than a hundred initiatives and for instance the new national highway 80, better public transport services and new walkways and bicycle roads. This project will be financed by the public sector and car drivers.

Nordland County Council will invest 60 million NOK in the City packet Bodø in order to put more focus on the public transport service in Bodø. This comes in addition to the infrastructure developments in the City packet.

More and more people use the bus in Bodø. The transition to a new public transport system has made it easier and more straight forward to use the public transport service. The planned developments in the City packet will further improve navigability and reduce travel time.

The transition to a new public transport system in the autumn of 2012 has been a success. Public travel has increased with 70 percent from 2012 to 2017, but the total amount of traveleres is still low. Now even more intitiatives will be carried out in order continue the growth.

This will be done
- New public transport routes are already in place and more are coming
- More universal bus stops are being built
- Navigability for the public transport shall be improved, i.e. by bus priority in light crossings

El-cars and charging

Today there are ca 1.100 electric cars in Bodø. This is five precent of the total amount of cars. This is not a very high number, Bergen has for instance 11 percent el-cars. There are several different charging stations in Bodø, ca 60 charging stations in the city centre / Mørkved axis, 10 of them are speed chargers.

Electronic communication

Today Bodø has a very well developed infrastructure for electronic communication. The mobile net is mainly 4G and it covers all central areas in Bodø. Landline infrastructure is well developed with primarily fibre based connections in the city. Any imperfections can quickly be corrected with new infrastructure delivered by a variety of suppliers.

Standards and Architecture

1. Mobile Network Infrastructure
4G is a technology for the fourth generation mobile services (4G) in mobile nets, which follows 3G and 2G. This technology offers a complete and secure IP-based solution with voice, data and multimedia services for users «everywhere, any time». The fact that the service is IP-based, means that it offers a considerably higher speed for data transmission than earlier generations were able to provide. The international telecommunication union (ITU) has defined and decided to implement the 4G standard over several stages from 2008 and latest in 2011 (3GPP and LTE).

Narrowband IoT and eMTC are standardized radio technology adaptet to communication for sensors and IoT over mobile networks. The standards are managed by ITU and they are supported by all the big mobile operators in the world. Support for the «Internet of Things / sensors / IoT over the 4G nett» (Narrow band IoT / NB IoT) will be prioritized by Telenor for selected municipalities / counties / transport companies. Roll-out is being planned in Bodø now and it is in an early stage in Nordland – this means that Bodø / Nordland will have coverage for IoT over 4G from October 2018 and the roll-out will continue from there.

2. Open and programmable interfaces / APIs
Interfaces for users / end users (inhabitants / citizens / municipal management) and data set (municipality / county / third party data) will be based on open and standardized interfaces through APIs and be made available for everybody who would like to use them. This concerns solutions for inhabitants / industry, internally in the municipality and for the municipal management for the transport sector (typical for county councils and transport / bus companies etc). Interfaces for professional applications for employees in the municipality, the transport sector and solutions for inhabitants and third parties will for instance be made available to everybody who would like to have access to it and use these new solutions in the whole transport area.
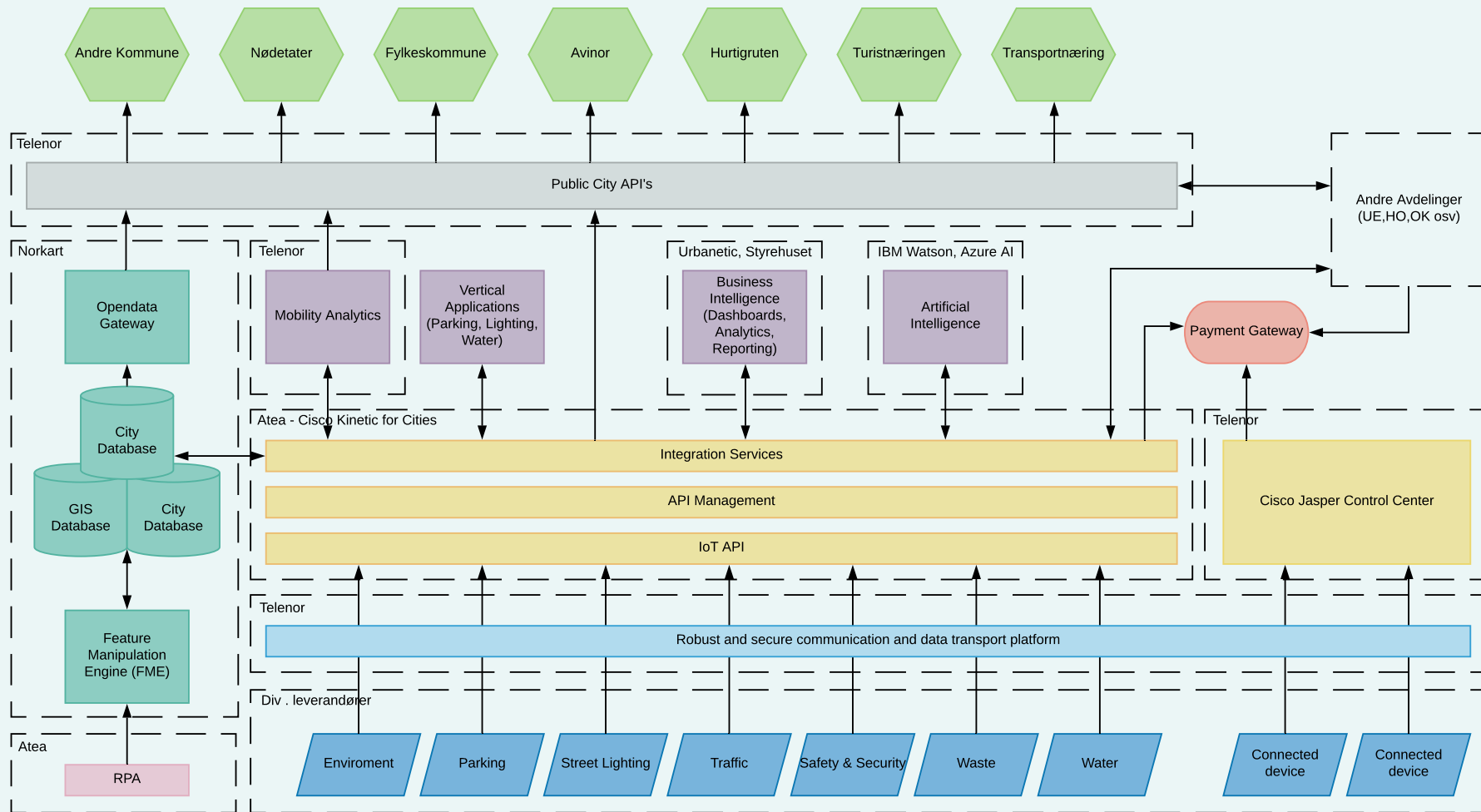
3. Open data
Open data are data that are made freely availabe so that everybody can use them without being restricted by copyright or patents. In Norway, DIFI (the Agency for Public Management and eGovernment) plays a central part in describing open data sources. Smarter Transport Bodø will be based on open data interfaces. Considering the secure use of public data sources, we will predominantly use data from open interfaces, which are made available by DIFI and other public data sources, in solutions that will be available in Smarter Transport Bodø. The Id-port will be integrated in all the solutions where security and confidentiality are important.

4. Module and layer based architecture
The solution will use a socalled layer based architecture pattern, otherwise known as n-tier. This pattern is the factor standard and therefore well known by most architects, designers and developers. The layer based architecture pattern fits well with the traditional IT communication and organizational structure in most of the solutions and this makes it a natural choice for the project.

Components in the stored architectural pattern are organized in horisontal layers. Each layer has a particular function in the application, for instance presentation logic or business logic. Evey layer has its own responsibility. A presentation layer will for instance be responsible for handling user interfaces and browser communication logic, while the business layer will be responsible for implementing particular request related business rules. Every layer in the architecture creates an abstraction in order to fullfil a certain objective. The presentation layer does not have to worry about how to obtain customer data; it only needs to display the information on a screen in a particular format. Likewise, the business layer does not need to worry about how to format customer data for the display or where the customer data even come from; it only needs to collect the data from the persistence layer, implement business logic and send the information up to the presentation layer.

Arkitektur

Andre Kommune Nødetater Fylkeskommune Avinor Hurtigruten Turistnæringen Transportnæring

Telenor

Public City API's

Andre Avdelinger (UE,HO,OK osv)

Norkart

Opendata Gateway

Telenor

Mobility Analytics

Vertical Applications (Parking, Lighting, Water)

Urbanetic, Styrehuset

Business Intelligence (Dashboards, Analytics, Reporting)

IBM Watson, Azure AI

Artificial Intelligence

Payment Gateway

City Database

GIS Database

City Database

Atea - Cisco Kinetic for Cities

Integration Services

API Management

IoT API

Telenor

Cisco Jasper Control Center

Feature Manipulation Engine (FME)

Telenor

Robust and secure communication and data transport platform

Atea

RPA

Div . leverandører

Enviroment Parking Street Lighting Traffic Safety & Security Waste Water

Connected device Connected device

Project organization

All four parties have committed their organizations to the project. The cooperation is regulated in a contract. The project is extensive and demands a lot from everybody involved. The parties already work together today to develop the municipality of Bodø – by moving the airport, City packet Bodø and Smarter City Bodø. This project builds on the existing relationships.

Smarter Transport Bodø shall consist of a main project and selected sub-projects. The main project shall have a governing and coordinating function. The sub-projects shall have a comprehensive focus. Several sub-projects can be organized in the same group if their tasks require a similar approach or solution. For instance, both MoBo and Experience Bodø are based on the same information and it will make sense to manage these two sub-projects together. The development work will mainly happen in the sub-projects and they will deliver the results to the main project. The sub-projects will report to the project manager. The project manager is manager of the project group and reports to the management group. The organization of the sub-projects will vary. For larger projects, it will be necessary to employ / hire in project assistants, but for smaller sub-projects this may not be necessary. This has to be considered for each of the sub-projects.

Project manager County Government			
Management group Nordland County Council (manager), Bodø municipality, Avinor, Telenor			
Project manager			
Project group Project manager and manager for sub-projects			
Sub-project 1	**Sub-project 2 and 13**	**Sub-project 4 and 8**	**Sub-project ...**
Work group IF NEEDED	**Work group** IF NEEDED	**Work group** IF NEEDED	**Work group** IF NEEDED
The respective partners' professional community. Responsible for professional content.			

Co-creation

Co-creation is about active participation and real involvement. Through involvement internally and between the participants, and not least throughout society in general, needs and wishes shall be made visible. Creativity, engagement and a sense of community will be released. All parties in the project have a responisibility to ensure active participation. This will create support and legitimacy to the selected solutions.

We shall use the municipality of Bodø as an arena for co-creation – CityLab Bodø. This is where we will organize formal meeting places with invited participants, but also be available for informal meetings for those who would like that.

We shall also share information. When the project is starting up, we will develop a communication strategy with measureable parametres. This includes brand building for the project, a project website where we publish relevant reports, content on SoMe and media contact. We shall also visit schools and kindergartens and organize open days in the city lab. We will go out and meet people, we will make the information available and we will listen to good ideas from other people.

Pillar and sub-projects

Progress

Year	2018	2019			2020			2021			2022			2023	
Quarter	Q1 Q2	Q3 Q4	Q5 Q6	Q7 Q8	Q9 Q10	Q11 Q12	Q13 Q14	Q15 Q16	Q17 Q81	Q19 Q20					

Pillar and sub-projects	Progress (timeline)	TOTAL KOSTNAD
MOBILITY	Study / Concept → Implementation / beta → Rolling and uniting	7 500 000
MOBILE INFRASTRUCTURE	Sensor/lot → Test 5g, nb-lot, emtc → Test v2x → Rolling out 5g in central areas	4 000 000
MOBO	Study / Concept phases / purchasing → Testing / beta → Rolling and uniting	2 200 000
USER PARTICIPATION	Bylab → School → Kindergarden → Bylab → School → Kindergarden → Bylab → Bylab	1 050 000
MOBILITY AS A SERVICE	Tenders → Startup organization → Investigation and concept phase → Testing / beta	7 100 000
ENVIRONMENT-DASHBOARD	Zero → Pilot → Available mobo	6 450 000
PAYMENT SOLUTION	Development → Purchasing / testing → Implementing	2 200 000
STIMULATE INNOVATION	Startup - cluster and dialogue conference → Procurement, basic subsidy → New products / services	2 100 000
GREEN GEO-FENCING	Development → Testing / beta → Fullscale	1 250 000
DYNAMIC WAYFINDER	Study / Concept → Implementation / beta → Rolling and uniting	5 000 000
SELF-DRIVING BUSES	Demo → Tender / knowledge → Pilot with operator → Purchase / leasing → Pilot	8 190 000
AUTOBAG	Service with carrier → Investigate future infrastructure → Pilot	2 250 000
EXPERIENCE BODØ	Startup / data-collection → Testing / beta → Rolling and uniting	2 000 000
PATIENT MOBILITY	Mapping → Establish → Study → New products / services	5 000 000
PROJECT ORGANIZATION	Appoint-ment → Establish and operate the project organization → Report / End	5 500 000
		61 820 000

Input factors

All parties take part with their knowledge and competence and allocate resources to the project. The biggest effort from each of the participants in the project is data access. If the project is going to succeed, it is essential that all parties share and make available a large amount of data. The project is based on input from all parties.

Bodø municipality

NORSULP's funding is 240.000 NOK and it is to be balanced with at least the equivalent in municipal work hours. The purpose of the city logistics project is to find good solutions for a more efficient and environmentally friendly supply chain.

DA project City and harbour consists of two parts.

DA goods project has a budget of 2.5 million NOK and it is to be balanced with at least the equivalent in work hours. The same applies for the DA project for co-location and coordination of the transport of people. The budget is 2.5 million NOK and it is to be balanced with at least the equivalent in work hours.

Bodø municipality will purchase city bicycles. This is an important part of the MaaS consept, but this purchase is not seen as part of the project expenses. Through the City packet cooperation, Bodø municipality will also contribute with planning resources and possible investments in infrastructure.

Nordland County Council

Nordland County Council will provide the necessary resources in order to carry out the project.

Nordland County Council will also find payment solutions for passengers who do not have or do not wish to use a smartphone. Ca 20 percent of the population of Norway does not have a smartphone. But when self-going buses are introduced in the future, we cannot have a system that depends on a driver who takes care of ticketing and information. Therefore, Nordland County Council will introduce a payment solution via NFC on all buses during 2018.

Nordland County Council is hosting the project and will allocate administration resources for this – including offices and the requied equipment.

Telenor

Telenor will provide the necessary resources in order to carry out Telenor's tasks and repsonsiblities in the consortium and in the different projects.

Avinor

Avinor will provide the necessary resources in order to carry out Avinor's tasks and repsonsiblities in the consortium and in the different projects.
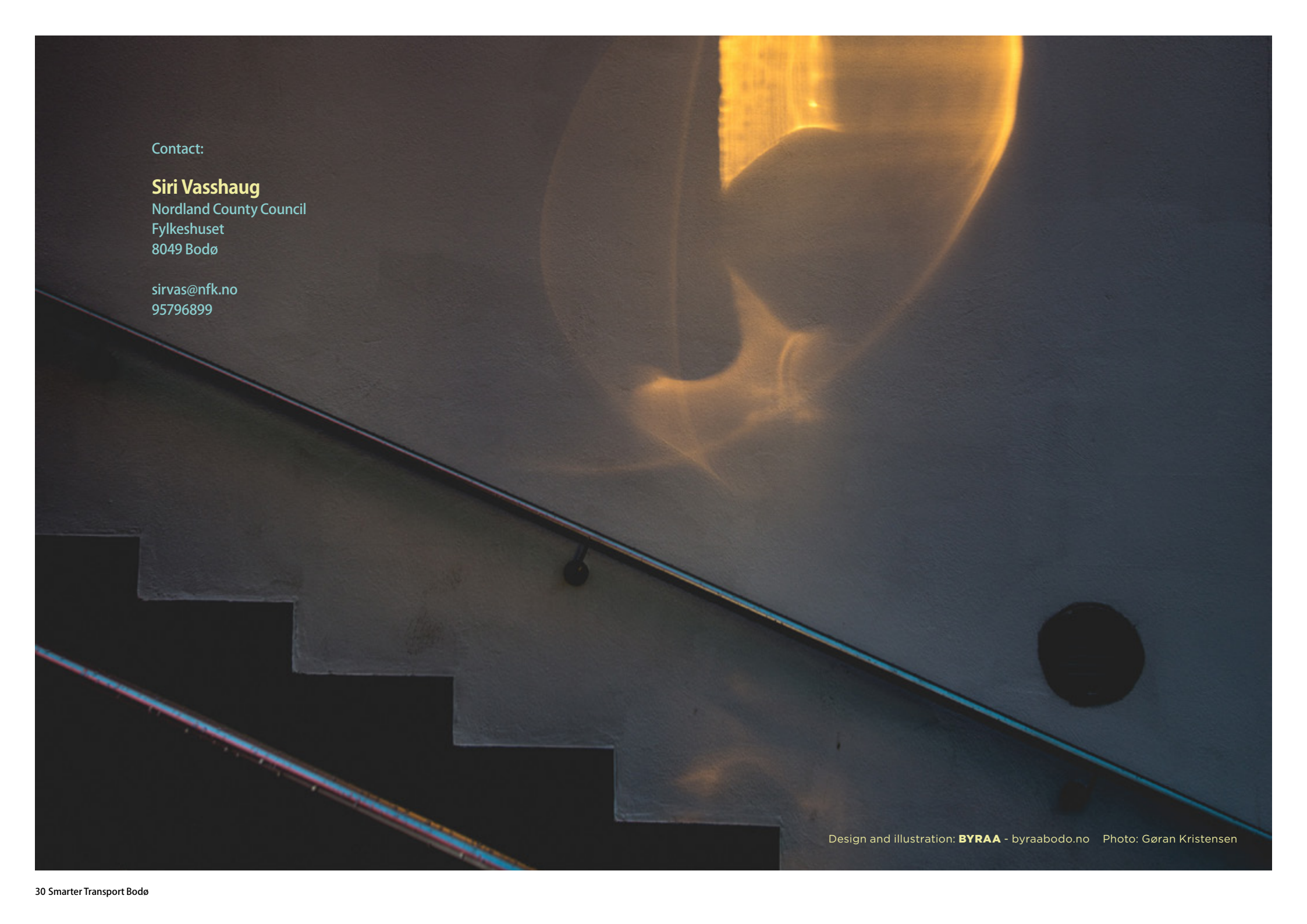
Risk analysis

Description of risk (Probability. Low/medium/high and consequense)	Sub-project involved	Suggested measures
Incomplete offer from consultant/reports. **Probability:** Medium **Consequense:** Medium (delayed project)	**All**	**Start bidding process early. Cooperate with the supplier programme.**
Lack of citizen involvement. **Probability:** Medium **Consequense:** Big (lack of legitimacy)	**All, but especially P4 and DP4**	**Consistent focus on all parts of the project and with all participants. Important for anchoring the project.**
Incomplete zero point analyses. **Probability:** Low **Consequense:** Low (poor result management)	**All, but especially DP2**	**Clarity on prefered result – zero point conformity.**
Lack of interest from local and regional industry. **Probability:** Low **Consequense:** High (insecurity in the potential for scaling)	**P4, DP4, DP9**	**Start cluster cooperation early.**
Price **Probability:** Low **Consequense:** High (insecurity in the potential for scaling)	**All**	**Clarity in tender documents.**
Market friendly business models. **Probability:** Low **Consequense:** High (insecurity in the potential for scaling)	**All, but especially DP1 and DP8**	**Cooperation with Nord university.**
Available bidders for innovation. **Probability:** Low **Consequense:** High (insecurity in the potential for scaling)	**P4, DP4, DP9**	**Start up dialogue conferences early. Cooperation with the supplier programme.**

Competition criteria

		MAAS	AUTOMATION	PAIRED / COOPERATIVE	INTELLEGENT SENSOR BASED INFRA	ARCHITECTURE AND STANDARDS	ANALYSIS	PRODUCT LOGISTICS	COMMITTED RESIDENTS	PARTNERSHIP AND LOCAL/ REGIONAL PRIORITIES	EFFICIENT, SAFE AND ROBUST ICT TECHNOLOGY
P1	MOBO	✓			✓	✓	✓				✓
P2	MOBILITY	✓			✓		✓				✓
P3	MOBILE INFRASTRUCTURE		✓		✓	✓					✓
P4	USER PARTICIPATION	✓							✓		
DP1	MOBILITY AS A SERVICE	✓				✓	✓			✓	
DP2	ENVIRONMENT-DASHBOARD						✓		✓		
DP3	PAYMENT SOLUTION	✓	✓			✓	✓				
DP4	STIMULATE INNOVATION								✓	✓	
DP5	GREEN GEO-FENCING		✓	✓	✓						
DP6	DYNAMIC WAYFINDER		✓				✓				
DP7	SELF-DRIVING BUSES		✓							✓	
DP8	AUTOBAG				✓			✓			
DP9	EXPERIENCE BODØ	✓			✓	✓	✓			✓	✓
DP10	PATIENT MOBILITY						✓		✓	✓	

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