

# Good practice spotlight - Norwegian municipalities: Bergen, West Norway

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## BERGEN – A HISTORIC SHIPPING CITY and an active urban port today.

The historic shipping city Bergen was founded and developed because of its strategic position for trade between Norway and Europe and its good harbour.

The city remains an active urban port and a major cruise ship destination with approximately 250 ship calls a year.

The nationally important, attractive areas around Vågen and Bryggen are worthy of protection and included on the World Heritage List. They represent the heart of the city for its citizens and for the many tourists who visit Bergen each year. Vågen is and shall continue to be the main route of access to the city centre for tourists and people from the regions arriving by sea.

The Market and Fish Market are being developed to become an even better marketplace for fresh food and a showcase for fresh seafood.

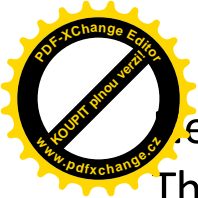






## Risk and vulnerability - extreme weather





Networking and involvement in projects are significant parts of Bergen's climate strategies. The city participates in several national and international networks.

**PUTTING BERGEN ON THE CLIMATE MAP:** The research schools at the Bjerknes Centre for Climate Research is putting Bergen on the international climate map.

Short presentation at the Copenhagen Climate Change Conference, COP 15, Denmark ....

### Acting for the rights of its citizens

[Click here for Climate Change and the Cities of the Future article](#)

#### City of Bergen

With a population of 250,000, Bergen is Norway's second largest city and the capital of western Norway, the leading region for all significant Norwegian export industries. It is participating in Cities of the Future, a national programme around land use and transport, heating, consumption patterns and waste and adaptation to climate change. It has joined and signed the Covenant of Mayors as well and has committed to going beyond EU targets for CO<sub>2</sub> reduction in emissions through enhanced energy efficiency and cleaner energy production.



*The City of Bergen is an international climate test city*

#### Cities of the future

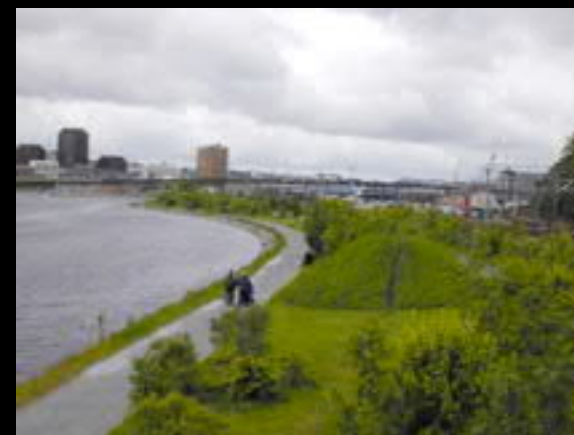
Bergen has conducted analysis, unique in the national context, looking at the city's risk of and vulnerability to floods, powerful winds, high tides, large waves, extreme precipitation and earth and rock slides. This knowledge will be employed to reduce the potential consequences of accidents and disasters. It will play an important role in urban planning and in processing building applications. In the same vein, the city is part of the MARE project, Managing Adaptive REsponses to changing flood risk, part of The Interreg IVB North Sea Region Programme.

The city is cutting its oil consumption with environmental measures that really work. The goal for the oil free project is that oil shall not be used for heating purposes in the city. The emissions from an oil-fuelled heater are the equivalent to the greenhouse gas emissions from one year's car use. We are yearly measuring the progress in the project and updating the goals.

Bergen Light Rail is a gigantic environmental project with extensive building developments alongside its route, so an increasing number of people can benefit from the existing infrastructure. As urban light railways are also environmentally-friendly means of transport, the overall result is lower energy consumption and greater environmental gains.

Bergen is the first municipality in Norway with a comprehensive watercourse plan. We are working to reduce pollution and prevent destructive encroachments in watercourses in order to ensure universal right of use to them as recreational areas. We are aiming to make the city's mountains and coastal areas accessible to everyone. Famous for its rainfall, the city is also at the forefront when it comes to water treatment. All drinking water in Bergen passes two independent hygiene barriers. The water is first subjected to wastewater treatment and then to UV radiation, thus ensuring any parasites are killed.

The council has established a special environment fund and all municipal entities will be environmentally certified. The goals include Green Flag certification of schools and kindergartens.



## Green structure



# Adapting to climate change

Expected climate changes in Bergen:

- Precipitation is expected to increase,
  - Higher risk for flooding
- Sea level and high tide is expected to rise
  - Overflowing the wharf and World Heritage site Bryggen and lower parts of the city
- More strong winds

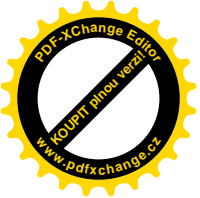




a major challenge:  
**local emissions**

a major challenge:  
**global climate**





# How we address climate adaptation

- Standards and requirements for stormwater management
  - Local management, open solutions, standards are used in land use planning (area plan etc)
- MARE – EU-project
  - Adaptation Strategies and increased competence
  - Cities of the Future – Water in the city
  - Purification of surface water becomes more relevant
  - Focus on Civil Protection – collaboration**  
Cheaper to prevent than to repair
  - Safety and Emergency





# Bergen`s learning alliance and cooperating organisations

- City of Bergen (partner)
- Bjerknes Centre for Climate Research
- Nansen Environmental and Remote Sensing Center (Research)
- University of Bergen
- Norwegian school of Economics
- Tryg (insurance company)
- Bergen Chamber of Commerce
- County - County Governor
- Regional climate council (politicians) and regional professional network
- Norwegian Water Resources and Energy Directorate
- Norwegian Directorate for Civil Protection
- Cities of the Future
- NORADAPT (research project) / Baltcica (Interreg project)
- NGOs

**MAR** 

The Interreg IVB  
North Sea Region  
Programme



# Finance Norway

- Trade and employer federation for all banks and insurers operating in Norway
- More than 230 member firms
- 100 employees working on regulatory, social, industry and employer issues



## Members:

- Savings banks
- Commercial banks
- Life insurers
- Non-life insurers
- Savings bank foundations
- Mortgage companies
- Financial conglomerates
- Other financial firms

 Finance Norway

# Challenges

Which climate scenarios should be used?

-Best case?

-Worst?

-Something in between?

-Several scenarios?

- - Ex: Rising sea level - Assess potential impacts and measures - or the regulations of the municipal area plan?





# Make conscious choices although many questions

- Are the cities equipped for downpour?
- Blue and green structures in the city - how do they function as part of flood risk management?
- Stormwater Management and densification policies – which instruments do municipalities need?
- Small rivers and intense rainfall, water flow and water quality?



# Changes in the past, present and future sea level with special focus on the western coast

a project conducted by the Nansen Environmental and Remote Sensing and UNI  
Reasearch, the Bjerknes Centre for Climate Research, and  
funded by Department of Urban Development, Climate and Environmental Affairs

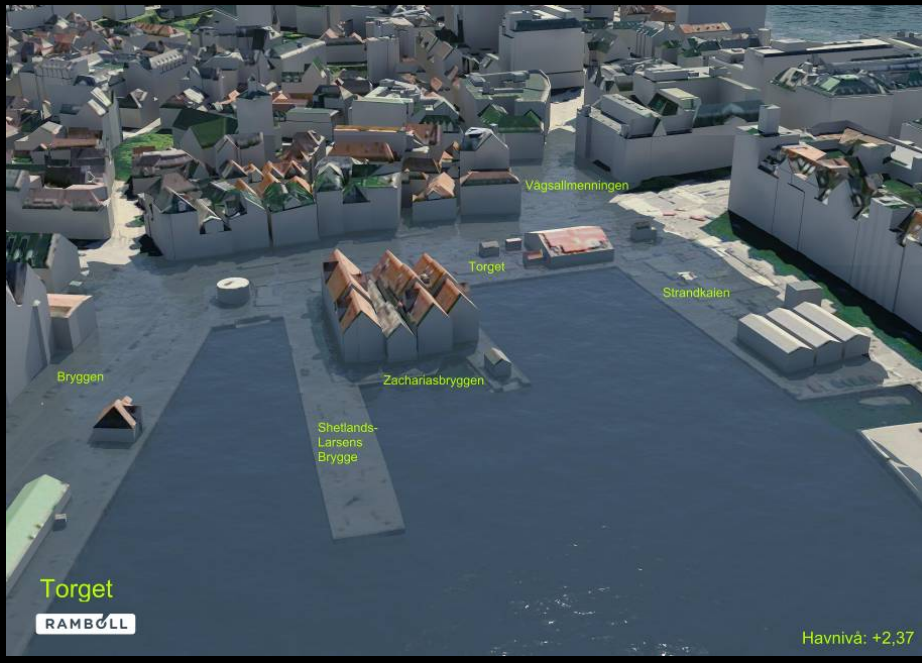


# Bryggen - what will happen?

- Made a big effort with drainage systems - this has stopped the ongoing "surge" into the buildings
- Rising sea levels may pose a problem for large parts of Bergen - not only Bryggen



- Some of the buildings has restored foundations, this has resulted in the elevation of the building, and it has also added jacking point for future jacking up the building if it is needed
- SKINT project (INTERREG) is an international project which has studied water management and cultural heritage - and the experts there are also in a groundwater project at Bryggen - providing valuable experience in the water management



100 years ahead the sea-level will be more than half a meter above today's level - we need to prepare for the changes – and we need to reduce the emissions that cause the climate change

# Risk analysis - Sheltered Food court

- The new Food Hall's lowest threshold is +1.65 above sea level
- The highest measured water levels since registration started in Bergen in 1915, is +1,51 above sea level
- The purpose of identifying and analyzing risk and vulnerability factors associated with spatial planning is to provide a basis for making decisions with regard to the choice of solutions and possible need for risk reduction measures

NorthPhoto.no

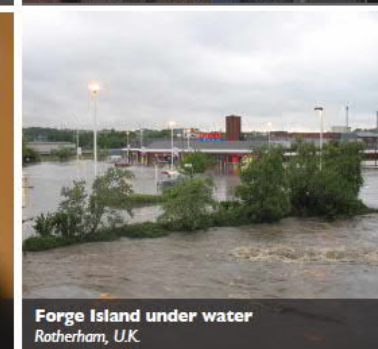
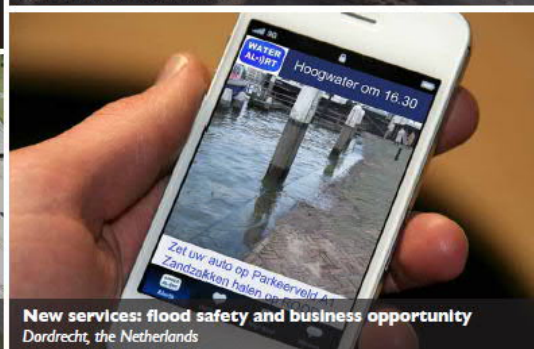




# CAMINO

## Climate Adaptation Mainstreaming Through Innovation

PROGRAMME	Interreg North
YEAR	2013
PROJECT PARTNERS	8
BUDGET	700 K EUR
EC-CONTRIBUTION	350 K EUR
COORDINATOR	City of Dordrecht



### Background

The plans for protecting cities against any kind of flooding often foresee large-scale adaptation of infrastructure.

The current economic circumstances make such investments less feasible causing climate adaptation initiative to stall.

### Aim

Participants from the Interreg projects MARE, SKINT, SAWA, FRC and BaltCICA try to overcome the technical, governmental and financial barriers by supporting the development of innovative products and services and financially feasible governance approaches.

### Approach

Policy makers, industry and researchers collaborate to further develop innovative business cases and governance approaches in 3 steps:

- Mapping investments in infrastructure and maintenance to identify mainstreaming opportunities;
- Identifying synergic projects with climate adaptation;
- Identifying business cases

### Results

CAMINO will help to mainstream climate adaptation by delivering:

- Pilots in six cities that showcase novel governance structures and the use of novel technologies
- Future perspectives describing the potential benefits and challenges for a large-scale uptake of solutions on a local, national and EU-level.

### Impact

The partners work together to demonstrate approaches that reconcile climate adaptation and economic growth.

For other cities the solution could provide new routes to take up.

For involved business the solutions could provide new opportunities for business.



# More precipitation and more intense rainfall in cities and towns

- The need for more knowledge about how different water solutions work: Rainbed, green roofs and walls, flooding roads, permeable surfaces, gravel, custom paving stones, important to take frost, clay and mountains into consideration ....

Bergen municipality cooperates with the Bjerknes Centre - new report on precipitation in Bergen - knowledge is used among others by the Water and Sewerage Works





# Climate Service Office in Hordaland

- Establish a regional center on adaptation to climate change – support the municipalities, government agencies and private sector
- The center will benefit from experience and lessons learnt in MARE and BaltCica projects, particularly from the West precip research – global model for heavy precipitation
- Managed by the Norwegian Metereological Institute, Norwegian Water Resources and Energy Directorate, UniKlima and Bjerknes Centre for Climate Research
- LAA: The city, the county, national bodies, Tryg Insurance Company, Bergen Chamber and Commerce, Norwegian School of Economics, Power Company (BKK), Local agriculture department, fish farming companies
- Want to include Norwegian Public Roads Administration



Climate Adaptation Mainstreaming through Innovation



# 2000 square meters of sedum on the roof of new Ikea in Bergen

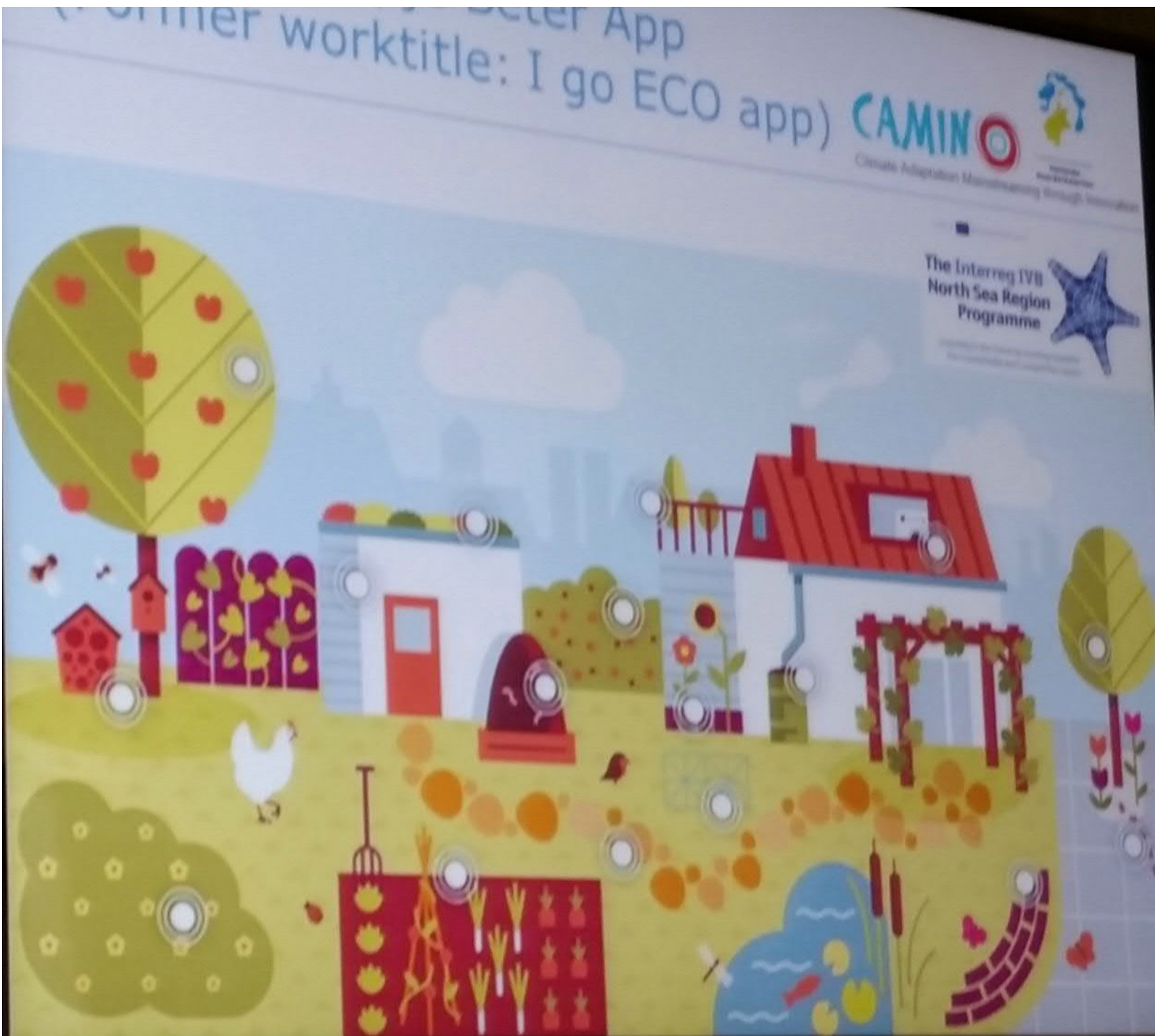
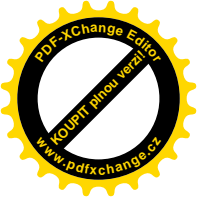
- Saves energy
- To be allowed to build a huge building like that they were forced to have a green roof to blend in
- Works as a great insulator and rain absorbtion system



# Project on Green Roofs – that will work in a rainy city like Bergen

- Lessons learnt from the biggest green roof in Europe – the Ikea building in Åsane – the green roof did not survive the heavy rainfalls in Bergen – so we must find out more about construction and species of plants – what will be the best?
- Managed by the the municipality, a project in the Cities of the Future program, cooperation with private enterprises (building companies, landscape architects)
- LAA: The city, the county, national bodies, Tryg Insurance Company, Bergen Chamber and Commerce, Norwegian School of Economics, private enterprises

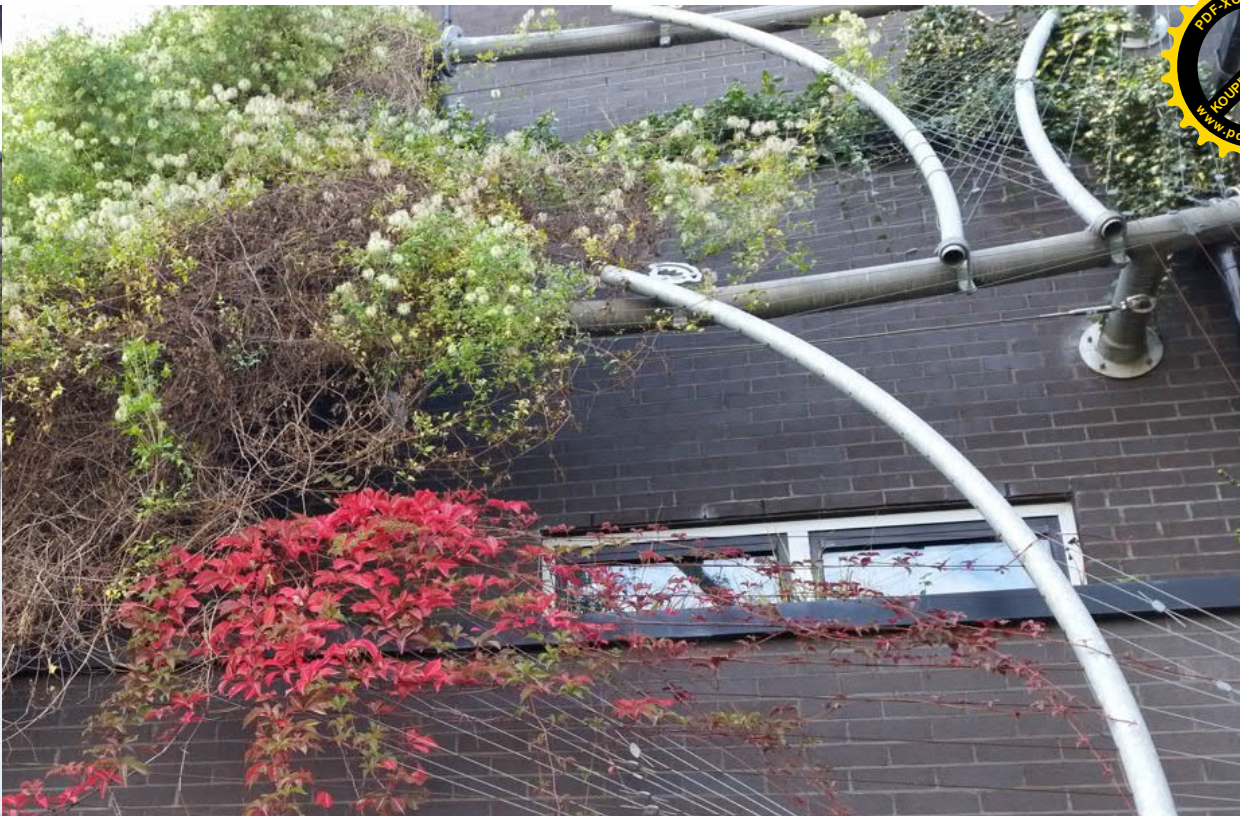




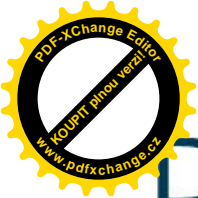












# BEGIN

## Blue Green Infrastructure through social innovation



Programme	NSRF
Duration	2014-2020
Project partners	14
Budget	6.5 mil
EC-contribution	3.25 m
Coordinator	Dordrecht



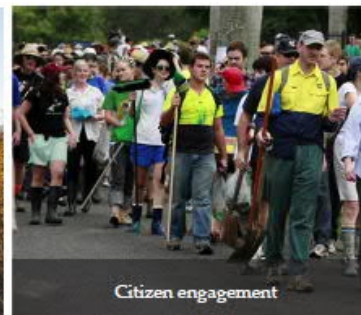
Antwerp Park Spoor Nord



Frihamnen RiverCity Gothenburg Project



MØLLENDAL Redevelopment area, Bergen, NO



Citizen engagement



Mould in middle of lawn to capture rainfalls in UK



Blue green public space in Wiselwijk Dordrecht NL



New governance and collaborative models



Partner:



Hambur



### Background

Cities can't cope with more frequent and intense rainfall due to climate change. In addition to conventional grey infrastructure, we need to make urban areas more pervious through blue-green infrastructures (BGI) that are cheaper and more effective. Many small-scale pilots exist, but multiple financial and governance barriers persist: who is responsible, who pays, who maintains? Social innovation is needed. Citizens can be 'nudged' into action to develop and maintain the eco-system services of BGI. But how?

### Aim

Deliver climate adaptation and protection through blue-green infrastructure and sustain BGIs multiple benefits.

Mainstream BGI into urban planning and operation by developing financially feasible governance approaches, business cases and using social innovation.

### Approach

1. Demonstrate: include BGI measures in urban redevelopment and subsequent service delivery arrangements. Climate hotspots are tackled by focusing on extreme events and exceedance flows, rather than design-events.
2. Customise, apply and validate social innovation methods from other domains such as 'nudging', crowdsourcing and direct democracy for effective climate adaptation,
3. Transition partner cities' planning and operation, and accelerate wider uptake through the city-to-city learning method, using existing all-encompassing local government networks.

### Results

- Implementation of 8 urban redevelopment schemes with BGI measures in public space and private properties: green corridors, permeable paving, bio-swales, rainwater harvesting, downspout disconnection, etc.
- Social innovation toolbox with citizen-empowering and citizen supported tools.

### Impact

BEGIN will create a replicable approach for implementing blue-green infrastructure and maintaining eco-system services in cities. BGI will be established as the dominant strategy for urban climate adaptation, based on validated business models with active citizens' contributions. Hence, the gridlock in climate adaptation due to current economic circumstances can be overcome.

Products, services, management, cooperation

# Best practice examples:

Løvstien – Climate Adaptation

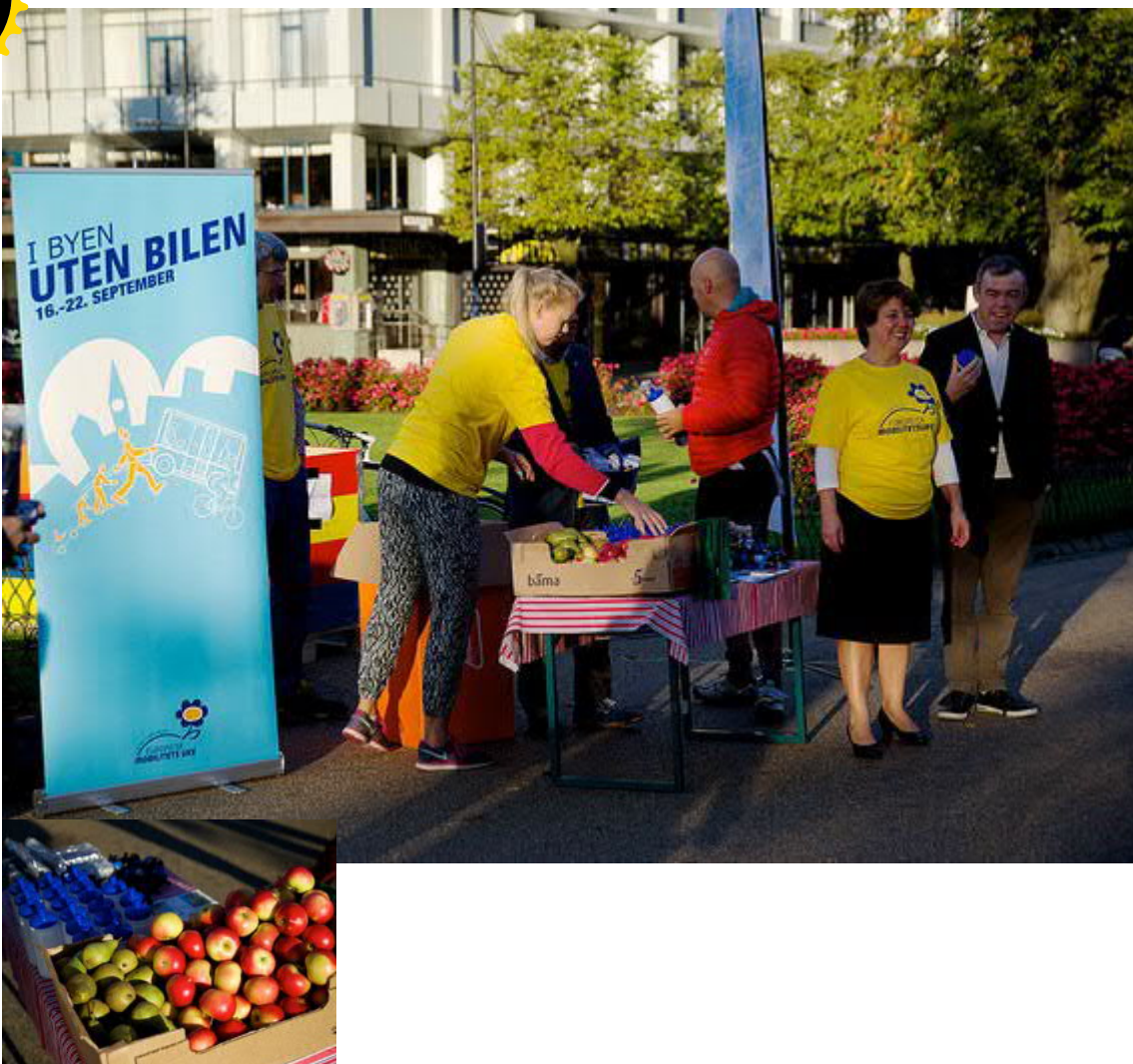


Products, services, management, cooperation

# Best practice examples:

Zero village Bergen – 800 units





## European Mobility week 2014 – opening day

No less than three city commissioners and a county politician handed out gifts and surprises to cyclists and pedestrians on the morning of the opening day.



## European Mobility week 2014 – bicycling day

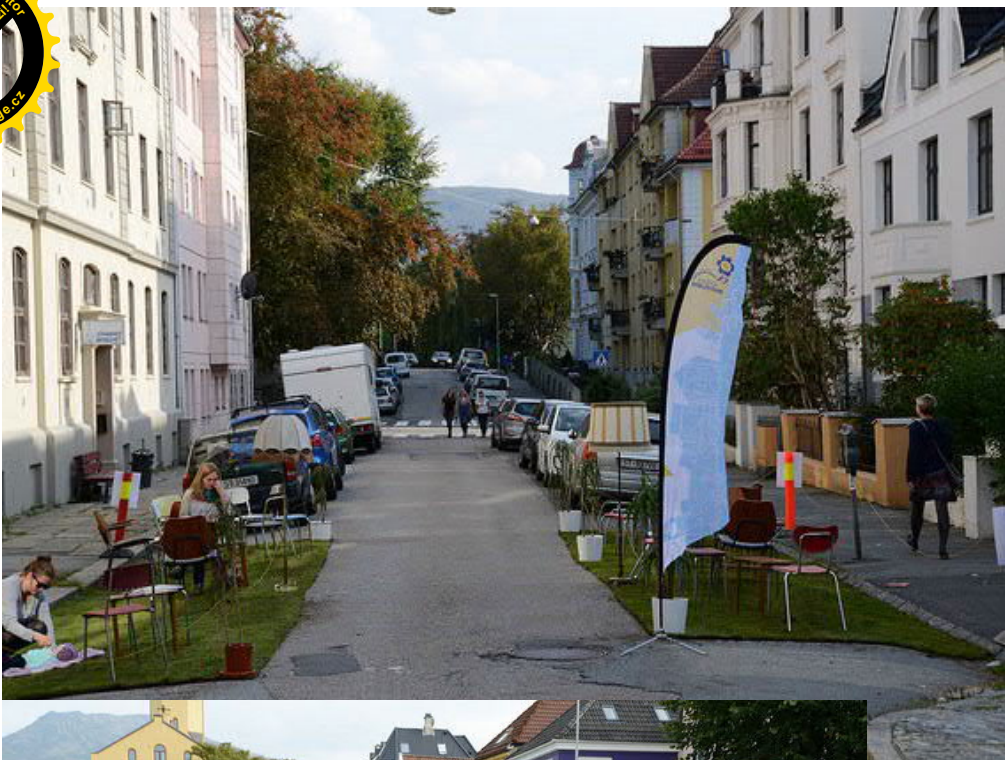
Key stakeholders for bike infrastructure could hear Michael Colville-Andersen from Copenhagenize about bicycle urbanism. Free bike repair was offered on four different locations.



## European Mobility week 2014 – Park(ing) day

About 300 square meters of green grass was rolled out on parking lots in 6 different locations in the city centre. Here a coffee break with jam session and mobility information was included.



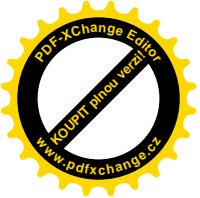


Parking spaces were converted to street cafés, and international artist created a «moss car» with local residents.



## European Mobility week 2014 – Car free day

Despite heavy rain, city dwellers enjoyed a wide variety of street activities on the European Car Free Day



# FROKOSTMØTE



## Grøn mobilitet

Tid og stad: **Onsdag 12. november** i Rådhuskantina  
Kl. 08.00-10.00. Programmet starter kl. 8.15

Møta er gratis og opne for alle.

[Påmelding innan måndag 10. november kl. 12.00](#)

### Program

Velkomen v/ Hordaland fylkeskommune og Nordsjøprosjektet Care North Plus

Inga løjliga bilresor v/Björn Wickenberg, Malmö Stad

Kva kan sykkel-VM i Bergen lære av Tour de France-starten i Leeds? Steve Heckley, West Yorkshire CA

Pause

Bildeling i Belgia v/Jeffrey Matthijs, Autodelen.net

Spørsmål og diskusjon

Mobilisering for miljø- og klimavenleg transport skjer i heile Europa. I samband med EU-prosjektet Care North kjem mange samarbeidspartar til Bergen. Vi nyttar sjansen til å få presentert spennande erfaringar frå Malm Sverige, Flandern i Belgia og West Yorkshire i England på frokostmøte.

**OBS! foredraga vil vere på svensk og engelsk**



## Inspiration and ideas from our partners

Key stakeholders in the field of transport were invited to an open breakfast meeting during the partner meeting in Bergen in November 2014.



BERGEN KOMMUNE





## Inspiration and ideas from our partners

Campaigning in Malmö, Bike inspirations from Leeds, and shared mobility concepts from Autopia and Ghent was shared with the audience from Bergen.

# E-mobility in public transport



The range of electric mobility



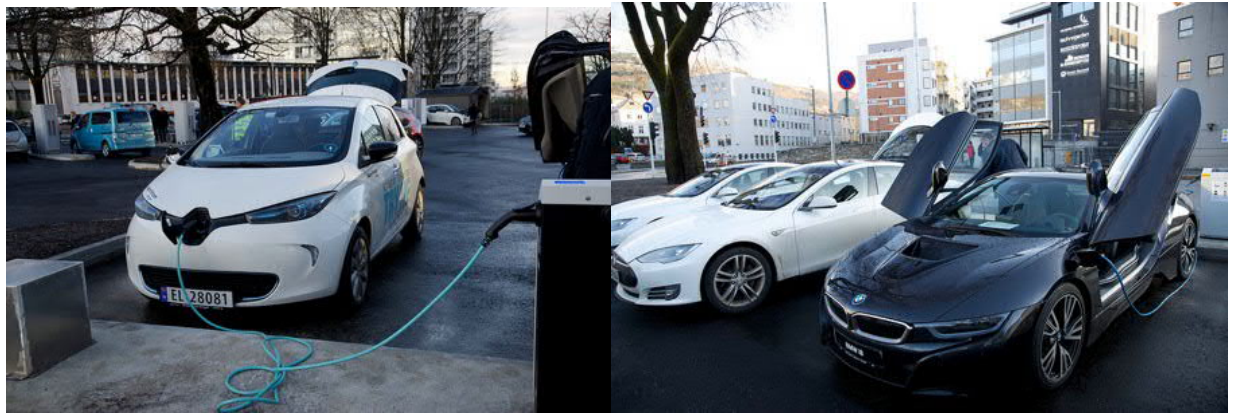
## Green Energy Point – grand opening

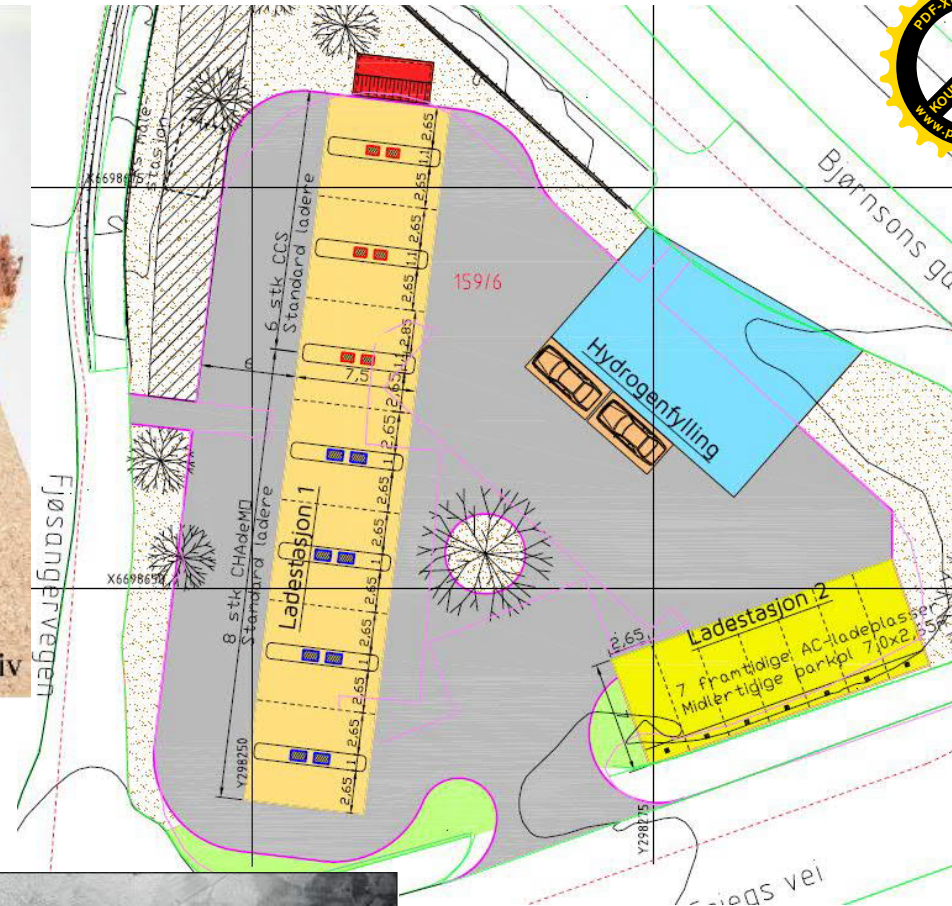
With prominent politicians and good media coverage, the world's largest universal standard rapid charging station was opened on the 19th of January 2015.



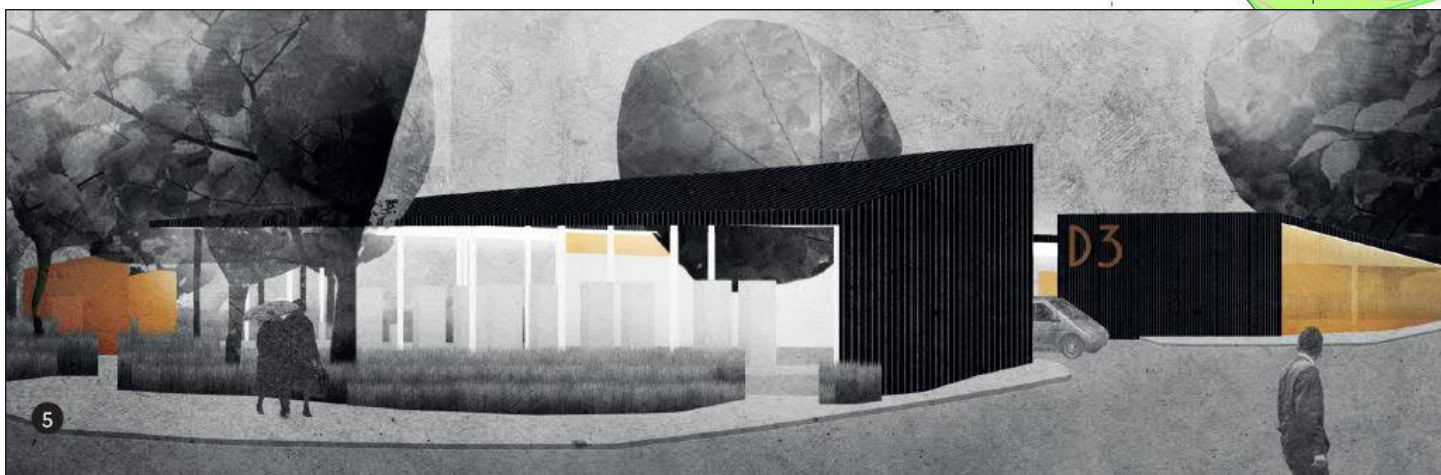
World record? – 13 different electric and plug-in hybrid models are rapid-charging simultaneously. Bergen Light Rail gliding past in the background.

City Commissioner for Urban development, climate and environmental affairs Henning Warloe with deputy County Mayor Mona Hellesnes of Hordaland.



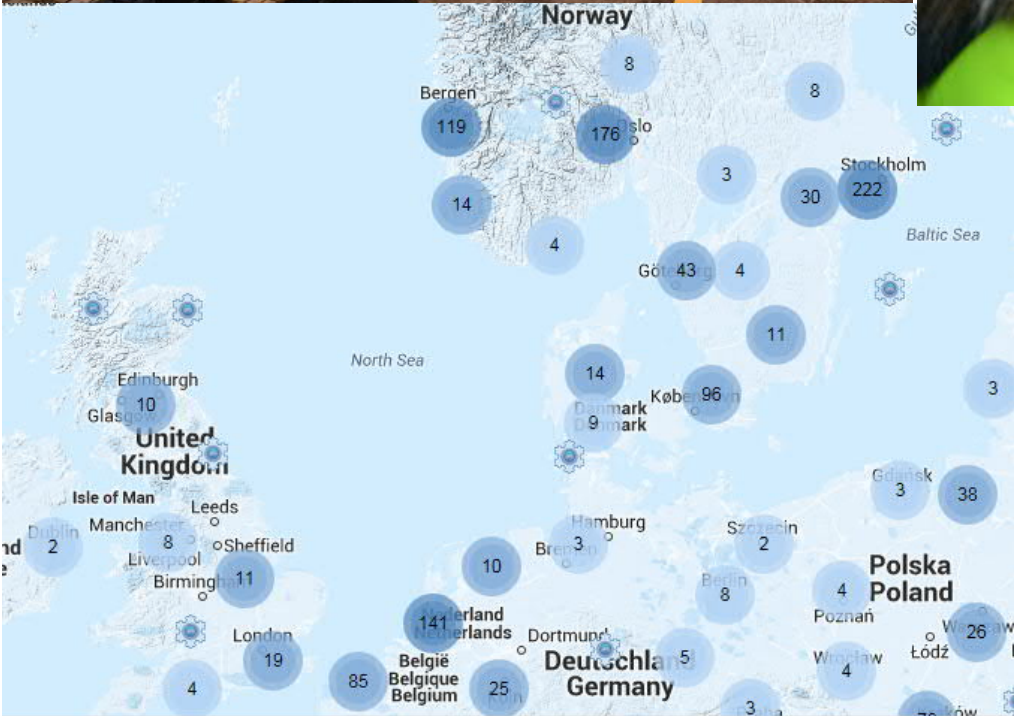


## Green Energy Refuelling Station



Stage one with rapid chargers for electric cars is now in operation. Plans for stage 2 and 3 includes a specially designed roof structure and mobility point (shared cars, ridesharing), and a hydrogen refuelling station.





# Winter bike to work day 2015

On February 13th, we celebrated the global Winter bike to work day by serving warm drinks and gifts to winter bike commuters.





Sammen for en bedre by

BULLITT

elbyen  
ergen

XOFFICE

EL 52974

# Electric – pedal hybrids



The range of electric mobility

# Car and passenger ferries



Products, services, management, cooperation

# Best practice examples:

Air pollution 10 packages: Harbour: Power ships from the dock, power this week, ships test w 16



Products, services, management, cooperation

# Best practice examples:

The world's first electric ferryboat



## Climate Partners Hordaland:



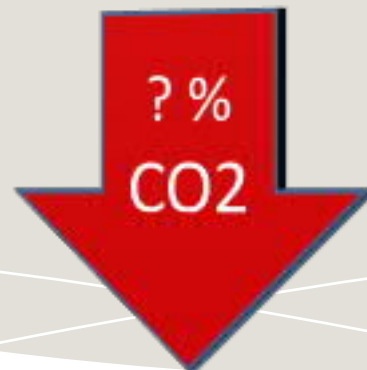
**Largest public-private systematic climate network:**

14 businesses/institutions

More than 40 000 employees

**Huge potential for CO<sub>2</sub>-cuts and reduced energy costs:**

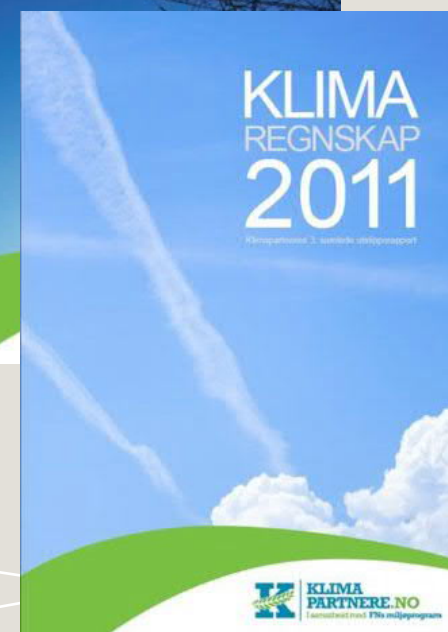
**We are scaling up!**



## Partner Commitment:

- Report climate footprint in annual joint report
- Hold environmental certification
- Implement systematic environmental governance
- Top level management support and involvement
- Pay annual membership fee

Under 20 - 10.000,- NOK  
20 - 50 - 20.000,- NOK  
50 - 300 - 30.000,- NOK  
Over 300 - 50.000,- NOK





Bergen

