

## WORKSHOP REPORTS

### I.V MALMÖ

#### WORKSHOP DATES AND LOCATIONS

The vision workshop was held on November 21 2014 at MINC, Anckargripsgatan 3, in Malmö. The back casting workshop was held on November 26<sup>th</sup> at Media Evolution City, Stora varvsgatan 6a in Malmö.

#### PARTICIPANTS

The following participants joined the workshops:

NAME	ORGANISATION AND ROLE	1 <sup>ST</sup> WS	2 <sup>ND</sup> WS
Per-Arne Nilsson	Malmö city, Head of Environmental dep.	yes	yes
Kerstin Rubenson	Malmö city, Environmental dep.	yes	yes
Tor Fossum	Malmö city, Energy strategy	yes	yes
Jan Rosenlöf	City building council, city planning	yes	no
Mattias Zaunders	Sigma IT and management, Business manager	yes	yes
Johan Bergström	Sigma Civil AB, Head of department for planning, landscape and traffic	yes	no
Hans Söderling	NCC Construction Sverige AB, Project leader	yes	no
Annika Hansson	NCC Construction Sverige AB, Project leader	yes	no
Yuliya Voytenko	International Institute for Industrial Environmental Economics, Lund University, Postdoc PhD	yes	no
Boel Lagerwall	Pågen AB (bakery company), Communication manager	yes	no
Iris Rehnström	Skånetrafiken AB (public transport) Environment- and sustainability strategy	yes	no
Jeanette Green	IVL, Coordinator Malmö office	yes	yes
Hanna Ljungkvist	IVL, Workshop leader	yes	yes

- Reflection on stakeholder participants

The first workshop had diverse participation including city officials (energy, planning and environmental issues), a public transport company, a construction company, local university, IT companies and a large local employer; a bakery company. Missing groups were young and elderly

citizens, immigrants, social scientists and economists, even though the University PhD came from the economic field. In the second workshop only city officials and an IT company was represented, but they had all taken part of the first workshop and could build on the outcomes of that. The mix of men and women was very good in both workshops.

## I.V.I METHODOLOGY AND RESULTS FOR VISION BUILDING

We did not use the KPIs in the workshop, following recommendations from the city officials/representatives. The methodology from the training was followed and worked out quite well with the participants. Some were reluctant to start drawing, but this was overcome rather quickly. The methodology sparked a lot of discussions in the groups, especially when changing between drawings! It is important to remind participants about including all aspects of sustainability in their visioning, not just the environmental part. This worked well, with slightly less emphasis on the economic dimension in the resulting visions.

The work was carried out in three groups at three tables with one vision drawing on each table. The groups took turns at each table so that all groups contributed to all three drawings. At the end, one vision per group was formulated and presented in plenum to the other groups.

## MAIN SECTORS IDENTIFIED IN VISIONING A FUTURE FOR THE CITY

The following sectors/topics were covered in the three visions, more or less to the same extent:

- Energy, with focus on renewables
- Transport sharing & smart logistics
- Food production
- Efficient, ecologic consumption
- Circular and sharing economy
- Green areas including city farming, green roofs and walls
- Social inclusion, safety and networking
- Dense city structure
- Quality of life, the value of time, outdoor activities and culture
- Smart technology and open grid solutions

## THE 2050 POST-CARBON VISIONS FOR MALMÖ

### **Vision 1:**

Sustainable Malmö 2050 is a dense, green, resilient and attractive city with around 500 000 inhabitants. In Malmö it is easy to live a long, happy and climate smart life. Important prerequisites for this are:

- Good mobility
- Efficient, smart and 100% renewable energy system
- Circular and shared consumption and economy

- A city where it is easy to lead a healthy life
- Food
- Social inclusion and security
- Diversified and creative business with a focus on service and culture
- Time to live and work during your whole life with increased flexibility

**Figure 16: Presentation of visions in plenum.**



**Vision 2:**

Malmö in 2050 has a balance between the three dimensions Greener city, denser city and networking. The three sustainability dimensions economy, ecology and social are integrated and all play an equal role in the city development. Development and implementation of smart technology are main pillars in building this city. It is also important that new economic models are allowed to develop.

A slight emphasis was seen towards the dimensions of greener city and networking rather than denser city. Maybe these two dimensions can be seen as extra important for Malmö.

Some important components to enable this Malmö are:

- Investments in social entrepreneurship
- Getting better at matching talent with opportunity
- A new mindset including circular economy

- Sustainable transport and energy supply

City gardening and farming in all forms is a common activity that encourages individuals, areas and the entire city!

**Figure 17: The groups busy working on the visions**



**Vision 3:**

”We are on our way home in Malmö, a city of networking and cooperation. We travel on our bike while a company using cluster logistic services is delivering dinner to our home. We have ordered pick up of our children with the “bicycle bus”, while the teenager uses the driverless taxi that picks up the ecological laundry at the local drycleaner.

Our new job as “Transformation coach” takes us to a common workshop with city actors in the democratic roofed outdoor meeting place.

We optimize the use of arable land by producing food in a resource efficient and large-scale manner outside the city and in small scale inside the city. This enhances green space in the city. The excess energy from large scale and resource efficient industrial production is taken care of and generates new services like greenhouse growing of energy demanding crops. Apart from farming, green plants have taken over roofs, walls and public spaces and help reduce noise in our quiet city.

The city is dense, green and diverse and used around the clock. There is reduced demand for individual travel and car ownership. Travels take place in driverless electric vehicles that are coordinated with transport of goods and take us to nodes for rail bound traffic. These station nodes have become the backbone of the city, enabling meeting places, investment in new housing and services. The biking lane network has a high priority and invites to biking for all citizens year round since the lanes are roofed.

By sharing our consumption and standardizing our products we have reduced the input of virgin resources. We use open grid solutions with standardized connections and input of renewable energy where all excess resources are used and recycled.

All this new development creates new jobs that are distributed equally among the citizens. We work less and hence have more time for meeting each other. The growing numbers of roofed outdoor meeting places improve social integration in all climates. They also encourage consumption and development of culture, which becomes the meaning of life in the new including social space. Everyone is friendly and encourages others to grow and develop.”

## REFLECTIONS

We are very satisfied with the results of the vision workshop. The visions, especially the third one, are diverse and rich in their description of the future, post carbon city. They include innovative solutions and take into account most of the important aspects of city development.

## I.V.II METHODOLOGY AND RESULTS FOR BACK CASTING SCENARIOS

The second workshop had fewer participants, but still achieved the goal of producing a scenario for Malmö in 2050. This was possible due to the fact that the participants had been involved in the first workshop and worked with the visions from that process in mind.

## METHODOLOGY FOR BACK CASTING WORKSHOPS

The technique from the workshop training was followed, using a timeline on a large whiteboard. First, the background BAU scenario was presented to the participants. The normative endpoint/goal chosen for the back casting was:

**“In 2050, the citizens of Malmö only emit 1-2 tons of carbon dioxide per person and year, including the carbon footprint of their consumption.”**

They then went on to identify and list obstacles and opportunities for reaching the goal. The interim milestones and actions were then described on post-it notes and put up along the timeline. The participants were very active and discussed with each other during the exercise. One drawback was the small number of participants, mainly representing the city of Malmö. More stakeholders may have resulted in more detailed and diverse actions. It was also a little difficult to separate what was meant to be milestones and what were actions among all the notes.

## KEY POINTS OF THE SCENARIO

### The following obstacles were identified:

- Difficult to influence the lifestyle of people:  
Some will not change without compensation since we are used to a lifestyle including travel and luxury consumption.
- The role models in society today often drive consumption.
- People collect information selectively and sometimes get too much information.
- There is an uneven economic distribution in society.
- We are depending on goods produced on a global market.
- We need more face-to-face meetings in society!
- We have free movement of people and goods within the EU.
- Malmö cannot influence energy prices.
- Logistic systems are not efficiently adapted.
- Lack of clear national policies/regulations.
- Difficult to replace natural gas in the energy system.
- Owning energy production and distribution systems is not profitable; who should pay for the systems?
- Who pays for spare electricity?
- High prices for electric vehicles and other alternative mobility.

**Figure 18: Back casting workshop.**



### Opportunities identified:

- Improved walking- and cycling opportunities in the city.
- Declining prices of energy efficient technologies and energy storage.

- More circular economy.
- A dense city improves efficiency.
- More spare time!
- Policy incentives for reduced consumption.
- Positive life style role models.
- High status to live in the city center.
- Digitalized world.
- Increased industrial symbiosis.
- Smart grids (solar, wind and earth heat).
- “Steal with pride”: use existing proven solutions from others.
- Increased quality of life.
- Lower price for solar and wind; buy your solar cells at IKEA!
- Environmental awareness is becoming BAU.
- Fewer ruminants on the menu.
- Increased diversified local and regional food production.
- Organic waste is used for biogas production.
- Reduced resource use.
- Distributed small smart grid connectors.
- Economic crisis requires re-distribution.
- Longer life and more time.
- More shared consumption.
- The effects of a better lifestyle are starting to show.
- Possibility to travel without fossil fuels or an own car.
- Small-scale energy production.
- Smaller living space requires fewer products.
- Possibility for education.
- Nordic energy cooperation.
- Environmentally friendly flying.
- Work for more people in small, local businesses.

The following tables describe the actions identified for the Malmö scenario in the short, medium and long term. A list of actions can also be found in Appendix A.

**Table 19: Short term actions for the Malmö scenario.**

TOPIC AREA	SHORT TERM ACTIONS 2015-2025	MAIN ACTORS INVOLVED
<b>Energy</b>	<p>Opportunity for all residents to connect locally produced energy into the grid.</p> <p>Large biogas plant inaugurated.</p> <p>Malmö's first fossil-free / sustainable tanker and service station is opened (the future gas-station).</p> <p>Municipal financing for energy efficiency is introduced; Type Revolving Fund.</p> <p>New energy strategy for Malmö!</p> <p>Thermal gasification plant in Malmö.</p> <p>Malmö's district heating system is fossil free by 2025.</p> <p>"Malmö smarter city" is a success.</p>	<p>Residents &amp; energy companies</p> <p>Energy companies</p> <p>Energy companies</p> <p>Banks/ local policy (?)</p> <p>Local politicians</p> <p>Energy companies</p> <p>Local project (?)</p>
<b>Transport and logistics</b>	<p>Malmö ring inaugurated</p> <p>Trams inaugurated.</p> <p>Well-developed logistics of goods from central and local nodes.</p> <p>The first Sky Cab inaugurated</p> <p>Public transport covers the entire region around the clock.</p> <p>Most residents are part of a car or mobility pool.</p> <p>Subway Malmö-Copenhagen inaugurated.</p>	<p>Local policy &amp; building companies</p> <p>Local politicians &amp; transportation companies</p>
<b>Agriculture/food production</b>	<p>Large-scale cultivation of shrimp, algae and vegetables using residual heat in Malmö.</p>	<p>Local farmers with support from energy companies</p>
<b>Policy</b>	<p>Formulate the 2050 target for politicians.</p> <p>State/national decision on the future of biogas production.</p> <p>Government policy instruments for energy efficiency are introduced.</p> <p>Political decisions are made about the vision for 2050.</p> <p>National instruments introduced for climate</p>	<p>Local politicians</p> <p>National policy makers</p> <p>Local politicians</p> <p>National policy makers</p>

	<p>adaptation, all sectors.</p> <p>Communication and public relations strategy for Malmö 2050 adopted.</p> <p>Government subsidy of fossil-free and sustainable agriculture is introduced.</p> <p>Green tax reforms.</p>	<p>Local politicians</p> <p>National policy makers</p>
<b>Carbon footprint</b>	<p>Baseline carbon footprint for Malmö calculated (CO2 emissions in 2015).</p> <p>Malmö's city organization is climate neutral.</p> <p>"Sege Park" is the first area for "two tons living".</p> <p>Reporting of CO2 including consumption is introduced in Malmö.</p>	Local politicians
<b>Communication /marketing</b>	Housing Exhibition "Solbo 18" in Malmö / Lund.	
<b>Education and life style</b>	<p>Climate Education introduced into the school curriculum.</p> <p>Big campaigns are carried out for climate-smart lifestyle.</p> <p>24 hour school / culture / hobby houses for all ages.</p>	National and local policy makers
<b>Housing</b>	<p>Buildings for shared accommodation are produced.</p> <p>Create a KPI for energy / m2 / year based on energy certification of buildings.</p> <p>The living area is 40% less than in 2015, but with more shared space.</p> <p>Buildings for shared accommodation are produced.</p>	<p>Building companies</p> <p>Local politicians</p> <p>Building companies</p>
<b>Waste &amp; recycling</b>	Large-scale logistics systems for recycling are established.	

**Table 20: Medium term actions for the Malmö scenario.**

Topic area	Medium term actions (2025-2035)	Main actors involved
<b>Energy</b>	<p>30% solar energy.</p> <p>80% energy efficiency of Malmö achieved.</p> <p>Industrial symbiosis agreement in place.</p> <p>50% of households contribute energy to the smart</p>	Energy companies & local policies

	grid. Offshore wind park inaugurated.	
<b>Transport</b>	Driverless vehicles used to transport people and goods within the city.	Transport companies
<b>Agriculture/food production</b>	30% of the food consumed is produced within the city limits. Fossil-free farming.	Local farmers
<b>Policy</b>	Carbon tax on products is introduced. Carbon dioxide tax is introduced per m2 of living space and person.	National policy
<b>Carbon footprint</b>	3.5 tons of CO2 per person per year achieved. Climate impact of food consumption in Malmö is halved compared to 2015.	Result of short term policies and follow up
<b>Communication/marketing</b>	"Malmö in 2050 branding 'entered for all companies and businesses. United Nations holds its climate conference in Malmö.	Business & local policy makers UN
<b>Other</b>	400 000 inhabitants.	

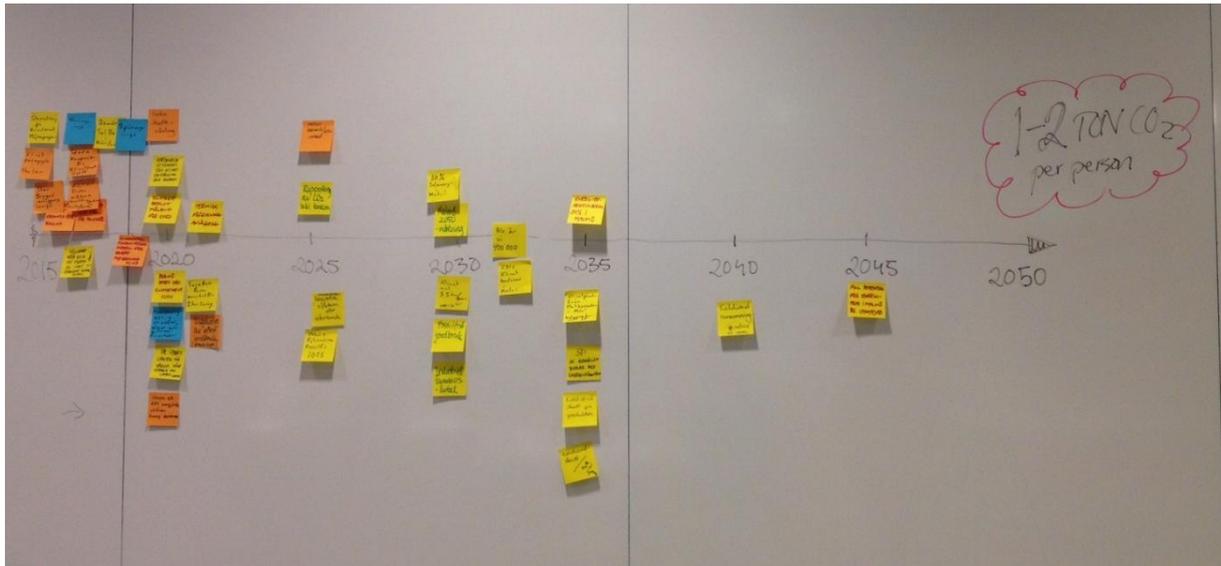
**Table 21: Long term actions for the Malmö scenario.**

Topic area	Long term actions (2035-2050)	Main actors involved
<b>Energy</b>	Full potential for energy production in Malmö is utilized.	Energy companies
<b>Policy</b>	Carbon Rationing introduced per person. KPI reporting and countdown in preparation for 2050.	National policy Local politicians
<b>Carbon footprint</b>	1-2 tons CO <sub>2</sub> per inhabitant achieved in 2050!	
<b>Targets 2050</b>	The population is 500,000 and has stopped increasing. The city's inhabitants are happiest and most climate smart in the country!	

## BACKGROUND SCENARIOS

The three background scenarios were shortly presented at the beginning of the workshop. The BAU scenario was chosen as the background scenario for the exercise. However, the robustness check was less pronounced and rather integrated in the work from the beginning.

**Figure 19: Timeline leading up to the vision of 1-2 tons of CO<sub>2</sub> per citizen and year.**



## ROBUSTNESS OF ACTIONS

No changes were made to the scenario after completion. This may mean that the scenario is less robust, but it does not have to be, since many obstacles and opportunities were considered before developing the scenario.

## FEASIBILITY

Many of the actions require national policy initiatives. It is difficult to say if all these initiatives are feasible under the BAU scenario or not. The actions also require that people change their behavior, but this is probably feasible if the political incentives, like new taxes etc., are implemented. So the main assumption is strong political will, both locally and nationally!

## I.V.III GENERAL REMARKS

The stakeholders seemed satisfied with the workshops, especially the vision workshop where there was better participation. The results of the vision workshop were sent to the participants after the event. Extra interest in the back casting process was noted from one participant (Lund University), who is involved in a similar project. We will try to keep in contact with that project.

For the next workshop and the future of the project, it is important that we present results and keep in contact with our stakeholders. We aim to summarize the outcomes of all workshops and possibly

also the roadmap in a nice graphical format, so that the city officials can use it in their work with stakeholders in the future.

## I.V.IV APPENDIX A: LIST OF ACTIONS FROM BACK CASTING WORKSHOP

**The following actions were identified in the scenario:**

### **2015-2020 (short term):**

- Opportunity for all residents to connect locally produced energy into the grid.
- Major investment in climate smart environmental programs.
- Housing Exhibition "Solbo 18" in Malmö / Lund.
- State/national decision on the future of biogas production.
- Formulate the 2050 target for politicians.
- Baseline carbon footprint for Malmö calculated (CO2 emissions in 2015).
- Large biogas plant inaugurated.
- Climate Education introduced into the school curriculum.
- Malmö ring inaugurated (traffic).
- Big campaigns are carried out for climate-smart lifestyle.
- Malmö's first fossil-free / sustainable tanker and service station is opened (the future gas-station).
- 24 hour school / culture / hobby houses for all ages.
- Government policy instruments for energy efficiency are introduced.
- Municipal financing for energy efficiency is introduced; Type Revolving Fund.
- "Malmö smarter city" is a success.
- Trams inaugurated.
- New energy strategy for Malmö!

### **2020-2025 (short term):**

- Well-developed logistics of goods from central and local nodes.
- Malmö's city organization is climate neutral.
- Sege Park is the first area for "two tons living".
- Political decisions are made about the vision for 2050.
- National instruments introduced for climate adaptation, all sectors.
- Thermal gasification plant in Malmö.
- Communication and public relations strategy for Malmö 2050 adopted.
- Government subsidy of fossil-free and sustainable agriculture is introduced.
- Large-scale cultivation of shrimp, algae and vegetables using residual heat in Malmö.
- Create a KPI for energy / m2 / year based on energy certification of buildings.

- Public transport covers the entire region around the clock.
- Higher energy prices.
- The living area is 40% less than in 2015, but with more shared space.
- Most residents are part of a car or mobility pool.
- Green tax reforms.
- The first Sky Cab inaugurated.
- Buildings for shared accommodation are produced.
- Malmö's district heating system is fossil-free by 2025.
- Large-scale logistics systems for recycling are established.
- Reporting of CO2 including consumption is introduced in Malmö.
- Subway Malmö-Copenhagen inaugurated.

#### **2030- 2035 (medium term):**

- 30% solar energy.
- "Malmö in 2050 branding 'entered for all companies and businesses.
- 3.5 tons of CO2 per person per year achieved.
- 80% energy efficiency of Malmö achieved.
- Fossil-free farming.
- Industrial symbiosis agreement in place.
- United Nations holds its climate conference in Malmö.
- 400 000 inhabitants.
- Climate impact of food consumption in Malmö is halved compared to 2015.
- 50% of households contribute energy to the smart grid.
- Carbon tax on products is introduced.
- Carbon dioxide tax is introduced per m2 of living space and person.
- Offshore wind park inaugurated.
- Driverless vehicles used to transport people and goods within the city.
- 30% of the food consumed is produced within the city limits.

#### **2040- 2045 (long term):**

- Carbon Rationing introduced per person.
- Full potential for energy production in Malmö is utilized.
- KPI reporting and countdown in preparation for 2050.

#### **2050:**

- The population is 500,000 and has stopped increasing.
- The city's inhabitants are happiest and most climate smart in the country!