City Water Stories:
Gothenburg

the international water association

Population
- 550.000 - Sweden's second largest city
- 1.3% population growth in 2013, one of the highest growth figures in the past 40 years. Immigration also at highest levels

Geography
- Coastal city, Scandinavia
- 13 municipalities in Greater Gothenburg
- 10 city districts
- Area: 448 km^2

Main challenge
- More intense rain events and sea level rise
- Increase the attractiveness of the city to people and businesses

Main solution
- Adaptation strategies focused on water sensitive design

The best city when it rains!

Gothenburg, since its founding over 400 years ago, has had a central focus on water. Gothenburg is an important coastal city, with a significant port between Oslo and Copenhagen and one of the largest rivers of Sweden passing through, the Göta Alv. Built in a low-lying swamp area near the Göta River estuary, it is a strategic yet vulnerable place. Sea level rise and heavy rainfall are two risks along the shores of the river, with heavy rainfall the cause of several major landslides in Gothenburg.

Despite these many challenges, the City Planning Authority (CPA), established in 1960 has always invested in planning, and since 2004, has been mandated to coordinate climate adaptation in the municipality. The CPA has been given the task to enable collaboration across the urban sector to foster climate action. Ulf Moback, of the CPA, and Lena Blom, of the City of Gothenburg, can both attest to the CPA's pivotal role in developing urban resilience in Gothenburg.

The Strategic Climate Programme for Gothenburg, coordinated by the Environmental Office, and "Green Gothenburg" are examples of collaboration between city administrations, companies and a range of experts from both the industrial and research worlds. Stakeholders are working together to prevent and adapt to risks of climate change in Gothenburg.

Key challenges for this coastal city

Fortunately, Gothenburg has not had many major crises or natural disasters over the last decades. One important event, however, is the Tuve Landslide that occurred in 1977. Landslides are one of the more common hazards in Sweden following heavy rains. The Tuve Landslide lasted only 6 minutes and destroyed 65 homes, resulting in the evacuation of 700 people from the area. Eight people were killed, and many more were injured. This sharpened people's sensitivity to natural disasters and the necessity of prevention.

"The city has since then ensured better control of landslides. We have made an inventory of risk areas, [and] have also [worked on] landslide monitoring. In sensitive areas where landslides can cause [property damage], we have made [assessments]." Ulf Moback, City Planning Authority.

Flood risks and sea level rise are the two most important challenges facing Gothenburg. The city is currently bracing for a 1 meter rise in sea level by the year 2100, as well as increasing flooding events from the Gota River and heavy rains. Since the city has expanded over wetlands, the city sits on soft sediments and subsidence is also another major issue in the region.

Case Study: Valen Ecology Project

This project was presented by Gothenburg Recreational Authority in 1985 so the Valen Nature Reserve would become a multipurpose park with sports areas for citizens and an area with constructed ponds and wetlands to treat the stormwater coming from industrial areas. The goals are to limit water pollution from industries, to protect and increase biodiversity and to create an inviting area for citizens.

City of Gothenburg

Gothenburg's Journey to Become a Water-Wise City

A closer look at how Gothenburg is satisfying the IWA Principles for Water-Wise Cities

1 Regenerative Water Services

Replenish Waterbodies & their Ecosystems

✓ EPA & Swedish Water Organization developed guidelines and regulations.

Reduce the Amount of Water & Energy Used

✓ CELSIUS Project - sewage heat recovery.

✓ Focus on water loss through reducing water leaks.

Reuse, Recover, Recycle

✓ Freeport - low carbon footprint & green technology.

Apply a Systemic Approach for Integration with Other Urban Services

✓ Stormwater Policy. One city department combining Water and Waste management.

Increase the Modularity of Systems and Ensure Multiple Options

✓ Work is focused to reduce vulnerability and to reach a robust system that resists climate events.

2 Water Sensitive Urban Design

Enable Regenerative Water Services

✓ Rain gardens in the city, swamps and wetlands for stormwater treatment. Planning and building act.

Design Urban Spaces to Reduce Flood Risks

✓ Regulations for minimum floor level for all new construction.

Enhance Liveability with Visible Water

✓ Freeport with increased liveability - water as the strength of this new urban core.

✓ RiverCity - design around water

Modify & Adapt Urban Materials to Minimise Environmental Impact

✓ Environmental construction program to reduce pollution from urban materials. This is inspired by the Chemical action plan for the City.

3 Basin Connected Cities

Plan to Secure Water Resources & Mitigate Drought

✓ Sharing with other users within the Regional Water Plan.

Protect the Quality of Water Resources

✓ Work within the regional water plan e.g. water protection areas, identification of the value of water.

Prepare for Extreme Events

✓ Barrier against high sea levels and higher walls for the Göta älv River. Core strategy in 2009 on recommendations and flood walls and gates. Swedish Crisis Management.

4 Water-Wise Communities

Empowered Citizens

✓ Public consultation processes and community involvement.

Professionals Aware of Water Co-Benefits

✓ Water, Waste and Urban professionals working together.

Transdisciplinary Planning Teams

✓ Example of Freeport developed through co-actor and open access processes.

Policy Makers Enabling Water-Wise Action

✓ Collaboration across sectors – policies created.

Leaders that Engage and Engender Trust

✓ Leaders are aware of risks and are taking action based on a strong vision.

5 Building Blocks for Gothenburg on the journey to water-wise cities

Vision

"The best City when it rains"

Transforming the threat of heavy rainfalls into an opportunity for the city.

Aiming for a City robust against current and future flooding by ensuring basic public functions and societal values.

Governance

A highly transparent government system, providing opportunities for direct citizens' feedback.

CPA in charge of a cross sectoral approach for climate adaptation.

GHG reduction target by based on collaborative efforts.

Knowledge & Capacity

Exchange and knowledge sharing with the City of New Orleans, U.S. This city-to-city learning initiative demonstrates vital learning opportunities between cities across the globe.

Planning Tools

Building permits and development plans to accommodate flood risks.

Gothenburg's Comprehensive Plan to develop liveability.

A Stormwater Policy for the City defines targets on reducing pollution and increasing permeability.

Flood model simulating future water levels, flows, rainfalls, and high sea levels.

Implementation Tools

Cost-benefit analysis of climate adaptation measures performed in 2014, followed by investigation into finance legislation.

Funding disbursed to municipalities to mitigate climate change impacts.

First city in the world to use green bonds to finance water treatment.