Before 2001, Western Harbour in the city of Malmö was a decaying industrial area. It has since been transformed into Europe’s first carbon-neutral neighbourhood – a prime example of sustainable city planning in Sweden.

Sweden’s reputation as an environmental pioneer began with a number of proactive moves in the 1960s and 1970s. Recognising a loss of limited natural resources, Sweden was the first country to establish an environmental protection agency, in 1967.

International commitments
In 1972 Sweden hosted the first UN conference on the environment, which led to the creation of the United Nations Environment Programme (UNEP), the leading global environmental authority to this day. Sweden was also one of the first nations to sign and ratify the international climate change treaty Kyoto Protocol, in 1998 and 2002 respectively.

The Stockholm Convention (2001), a global treaty aimed at phasing out the production and use of persistent organic pollutants, was largely a Swedish initiative. Waste management, acid rain prevention, sustainable city planning and recycling are other environmental areas in which Sweden have made progressive headway and challenged the status quo.

Sweden continues to create momentum and looking to intensify negotiations at international settings such as the annual United Nations Climate Change Conference. Sweden’s stance is that a sustainable and secure energy supply is best achieved by focusing on long-term energy efficiency and a greater supply of renewable energy.

Public awareness
Perhaps what sets Sweden apart is a combination of citizen engagement, high ambition levels and international solidarity. Even when ranked as one of the most sustainable countries in a number of international indices, the focus is not on what has been accomplished but rather on what remains to be done.

Largely this comes from a public that is keenly aware of and concerned with environmental issues and used to stand up for its own clean water and air. Air pollution (PM10) in Sweden is at 10.2 micrograms per cubic metre compared to the OECD average of 20.1. For the 2014 Standard Eurobarometer survey, 27 per cent of Swedes note environment and climate change as a main concern, compared with 7 per cent at EU level.

Aiming high
Climate change caused by the emission of carbon dioxide and other greenhouse gases is one of the foremost global environment problems today. Since
Sweden accounts for less than 0.2 per cent of total global emissions, the country could easily have gone unnoticed in the climate debate. Instead, Sweden has chosen to do more than many other countries on issues regarding energy and the climate.

Recognising that scientific research has become more uniform in its message about climate change resulting from human activity, the government is continuing to set clear domestic goals for the future regarding pollution, clean air, GHG emissions and energy efficiency.

**Roadmap 2050**

Sweden’s goal to reduce GHG emissions compared with 1990 by 40 per cent by the year 2020 and have a vehicle fleet completely rid of fossil fuels by 2030 are stepping stones to the overarching goal of a society with no net GHG emissions by the year 2050.

That is Sweden’s commitment under Roadmap 2050, an EU initiative whose objective is to reduce GHG emissions by at least 80 per cent below 1990 levels for all of EU.

To accomplish the 40 per cent reduction in GHG emissions by 2020, emissions would need to decline by an additional 20 million tonnes. According to current projections, emissions will have decreased by about 16 million tonnes in 2020, so in order to speed up the reduction the government has to come up with more drastic measures.

Looking further ahead, however, a recent study by the Swedish National Institute of Economic Research found that Sweden has strong chances of reaching the 2050 goal, thanks both to developments in the economy and to political incentives.

**Energy efficiency**

Besides moving to less carbon-intensive means of producing energy, efficiency has been a major focus in Sweden. By 2020 the government goal is to make energy use 20 per cent more effective compared with 2008.

One move first introduced in 2005 has been to offer tax reliefs to power-intensive industries in exchange for their drawing up energy plans and taking steps to reduce energy use.

For households, government information on how to save energy is widely available. Each municipality – there are 290 in Sweden – has an energy adviser to whom people can turn for help and guidance. Advice is available on topics such as replacing windows, using low-energy lights and switching to different heating systems.

**Sustainable solutions**

Another way in which Sweden is trying to lead the way to a more sustainable planet is through innovative sustainable solutions. In 2013 expenditure on R&D (research and development) represented 3.3 per cent of GDP, the fourth highest in the OECD.

According to the OECD 2014 Environmental Performance Review, Sweden is one of the most innovative countries when it comes to environment-related technology. Investments in environmental R&D have made Sweden an innovation leader for several clean energy technologies, including biofuels, smart grids and carbon capture and storage.

As a result of these investments, Sweden has developed a competitive advantage in technologies related to sustainability. In 2014, Sweden ranked fourth in the Global Cleantech Innovation Index.

**ONE NEIGHBOURHOOD AT A TIME**

By 2050 two thirds of the world’s population will live in cities, according to the UN.

The global challenge of expanding cities is one where Sweden could inspire, as sustainability has been pivotal in the planning of many Swedish cities.

**Stockholm**

In the mid-1990s, Stockholm decided to turn former industrial area Hammarby into a forerunner of sustainable city planning. Sustainability was incorporated into all aspects of the new neighbourhood Hammarby Sjöstad (left image), from smart electric grids to public transport, bike friendliness and waste management.

**Malmö**

In 2001 began the regeneration of a similar depreciating area in Malmö called Västra hamnen (Western Harbour).

Today, it is a carbon-neutral neighbourhood. Taking city planning to new green heights, the district uses an aquifer thermal energy storage system to store water collected during the summer and pump it up with wind energy to heat the homes during the winter. The chilled water is then reused to cool buildings in the summer.
LEARN MORE

RENEWABLE ENERGY
With 52 per cent of renewables in its energy portfolio (2014), largely hydropower and biofuels, Sweden has the highest percentage of renewable energy in the EU. According to the Swedish Energy Agency’s predictions, that share can be boosted to 55 per cent by 2020.

NUCLEAR POWER
Nuclear power makes up about 40 per cent of Sweden’s electricity generation, the second-highest share among IEA member countries. There are ten reactors at three sites in Sweden, with the future uncertain, as some reactors are nearing retirement and the pros and cons of building new ones remains a hot political topic.

ARCTIC FOCUS
Northern Sweden is home to several environmental research stations, including an atmosphere radar facility and field stations capable of glacier monitoring and permafrost studies.

Global climate change has made the Arctic one of the world’s most vulnerable regions. The average temperature in the region has increased twice as much as the global average temperature over the last 100 years. Changes not only affect local biodiversity and polar ice, but the entire earth through rising ocean levels. As a part of the Arctic region and a member of the intergovernmental Arctic Council, Sweden aims to highlight climate change in the Arctic at international climate negotiations.

www.arctic-council.org

WATER FOR LIFE
Along with climate change, marine pollution and loss of marine habitats is seen as one of the major global environmental problems.

Since 1990, the proportion of acidified lakes in Sweden has been reduced from 17 to 10 per cent, and the downward trend continues. Sweden’s goal of having only natural acidification by 2020, however, will not be met on time due to continued acid emissions from the transport sector.

Sweden works actively to persuade the EU and individual countries in the Baltic Sea region to improve the Baltic marine environment. Measures include water management and fish conservation projects.

The Swedish Agency for Marine and Water Management is a government agency that works for flourishing seas, lakes and streams for the benefit and enjoyment of all.

www.havochvatten.se

GROWING WHILE SUSTAINING
Since the mid-1990s, Sweden is one of few industrialised countries that have managed an absolute decoupling between economic growth and GHG emissions: a rising economy paired with falling emission levels.

Sweden’s GHG emissions are among the lowest in the EU and OECD, whether calculated per capita or as a proportion of GDP.

In 2013, Swedish GHG emissions totalled 55.8 million tonnes of carbon dioxide equivalents, compared with 71.8 million tonnes in 1990 – a 22 per cent reduction. Meanwhile, Sweden’s GDP grew 58 per cent during this time period.

This can be seen in light of many nations struggling to achieve even a relative decoupling, which means that emissions continue to increase, but not as quickly as growth.

Sweden’s reduced emissions have been accomplished in spite of a relatively large domestic process industry, a substantial need for heating during cold winters and long-distance transportation in a large, sparsely populated country.

Carbon tax
Since the 1990s, a shift from oil for heating purposes to district heating, heat pumps and biofuels have drastically reduced the housing and service sectors contribution to GHG emissions.

In 1995, Sweden became one of the first countries in the work to introduce a carbon tax. This excise tax placed on carbon-intense fuels such as oil and natural gas has helped actively reduce dependency on fossil fuels. It is considered one of the least expensive means of reducing CO2 emissions.

In 2012 Sweden’s environmentally related tax revenue was 2.52 per cent of GDP compared with the OECD average of 1.54.

Green incentives
The government has also introduced a number of incentives to help the Swedish economy grow sustainably. The electricity certificate system initiated in 2003 is a market-based support system to increase the production of renewable electricity and make the production more cost-efficient.

Other incentives include public funds available for local climate investments. County councils or private actors can apply for funds to for example district heating or biofuels. The programmes are meant to add local focus to green decisions.
FOUR SWEDISH ACTORS

THE SWEDISH ENVIRONMENTAL AGENCY

Presents proposals for environmental policy and legislation to the government and ensures that environmental policy decisions are implemented. The agency is also concerned with outdoor recreation and hunting issues.

www.swedishepa.se

STOCKHOLM RESILIENCE CENTRE

An international centre for transdisciplinary research into governance of social-ecological systems, with special emphasis on resilience – the ability to deal with change and continue to develop.

www.stockholmresilience.org

VINNOVA

A government agency set up in 2001 to develop Sweden’s innovation capacity for sustainable growth. Vinnova invests about SEK 2.7 billion (EUR 286 million) annually in various initiatives.

www.vinnova.se/en

THE SWEDISH ENERGY AGENCY

A government agency that works for the use of renewable energy, improved technologies, a smarter end-use of energy, and mitigation of climate change.

www.energimyndigheten.se/en

THE NEW CLIMATE ECONOMY

It is possible to strengthen economic performance while reducing the risk of climate change. The report ‘Better Growth, Better Climate: the New Climate Economy’ provides an international action plan for sustainable growth.

The 2014 report is the product of a global partnership of research institutes and world-leading economists. Commissioned by seven countries – one of them Sweden – and overseen by the Global Commission on the Economy and Climate, the report is aimed at influencing both governmental policies and investment decisions in the private sector.

The message? The next 15 years of investment will determine the future of the world’s climate – which should in fact be viewed as a financial opportunity rather than a burden.

The report entails ten global action points for governments and businesses to grow while switching to a low-carbon economy.

www.newclimateeconomy.report

Stockholm Environment Institute

One of the initiators behind the report is the Stockholm Environment Institute (SEI). The research institute, formally established in 1989 by the Swedish government, sets out to accomplish sustainable development by bridging science and policy.

Over the years SEI has been central in the establishment of many important panels and international agreements.

www.sei.se

HELPING THE TRANSITION

For 2015-2018, Sweden has allocated SEK 4 billion (EUR 522 million) – more than any other country per capita – for the United Nations Green Climate Fund, a financial mechanism that will help in the transition to the new climate economy.

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Bees are vital to the world’s ecosystems in their role as pollinators. Research has warned that rising global temperatures could cause species extinctions among pollinating insects – one of countless reasons to switch to a low-carbon economy.

PHOTO: SIMON PAULIN/IMAGEBANK.SWEDEN.SE