Four One Planet communities, four footprints

A summary report by Bioregional
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Bioregional

Four very different communities sharing a journey to sustainability have had their ecological footprints measured, compared and contrasted.

The four – the county of Oxfordshire in the UK and the municipalities of eThekwini in South Africa, Elsinore in Denmark and Saanich in British Colombia, Canada – have widely varying social and economic circumstances.

But when it comes to moving towards sustainable lifestyles for their combined 4.5 million residents, what they have in common is far more important than the differences between them.

The footprint analyses reveal that a great deal has to change if they are to live in balance with the resources our one planet can provide – in terms of food and diet, energy used in homes and other buildings, travel and consumption of goods and services and disposing of waste.

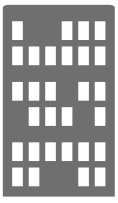
These four communities on three different continents are joined by Bioregional's One Planet Cities initiative, funded by the Danish KR Foundation. This aims to help cities and city regions grow sustainably and boost health and happiness for their residents. Each is creating a sustainability action plan designed to help them move towards a greener, healthier future.

As part of this pioneering initiative, each has had its emissions of climate-changing greenhouse gases assessed and its 'ecological footprints' estimated. A findings and recommendations report has been written for each of them. Here we examine the findings across the four communities.

Key facts about the four communities

Elsinore (Danish Helsingør) is a port city and municipality in Denmark.

Population: 62,400
Area: 122 km²



eThekwini is a municipality in the KwaZulu-Natal province of South Africa. It includes the major port city of Durban and surrounding towns.

Population: 3,678,000
Area: 2,555 km²

Oxfordshire is an inland English county. It includes several towns and the city of Oxford.

Population: 683,000
Area: 2,605 km²

Saanich, part of the greater Victoria urban area, is a municipality on Vancouver Island in British Colombia, Canada.

Population: 114,000
Area: 110 km²

The scope of our research

Greenhouse gas emissions

Carbon dioxide and other human-made gases are building up in the atmosphere, dangerously heating and changing the climate. These gases come mainly from burning coal, oil and gas, agriculture and deforestation.

For this exercise we estimated the **total consumption-based greenhouse gas emissions** per year for the four communities. That means not only the emissions coming directly from within their own boundaries, but also the emissions happening outside (elsewhere in their own country, or overseas) which are caused by those communities' consumption of goods and services.

For example, the thousands of food lines on sale in a supermarket in Oxfordshire will have caused greenhouse gas emissions all over the globe. These consumption-based emissions are generally at least twice as large as the 'territorial emissions' arising directly from within the community. The emissions total for each community is divided by its population to give a per capita annual emissions estimate, allowing comparisons to be made.

Ecological footprint

The ecological footprint is a measure of humanity's demands on nature, developed by the Global Footprint Network. It represents the sum of all of the cropland, grazing land, forest area and marine fishing grounds required to produce the flow of food, fibre and timber which a community or a country consumes. It also includes an estimate of the total area of forest required to absorb the carbon dioxide gas emitted from burning fossil fuels plus land covered in buildings and infrastructure. The footprint is measured using a composite accounting unit called the global hectare.

Across the globe, all of humanity is using around 1.6 times more of these global hectares than Earth can provide. As with greenhouse gas emissions, the ecological footprint of a community can be divided by its population to allow meaningful comparisons to be made. The global average is about 1.7 global hectares per capita.

For this exercise we also estimated the **total ecological footprint** of each community.

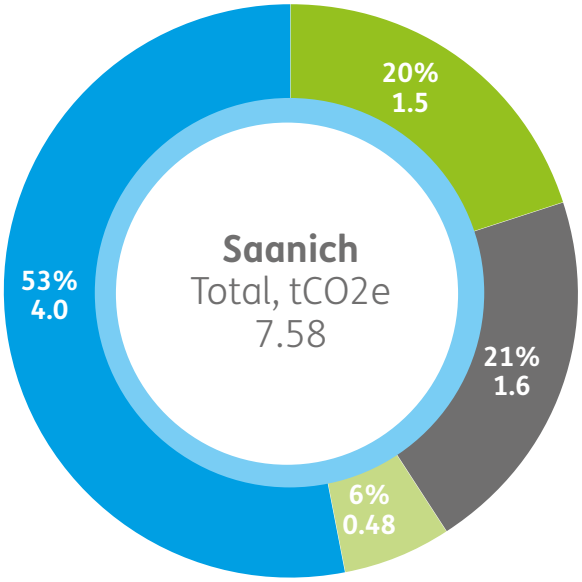
The footprint estimates for the four communities

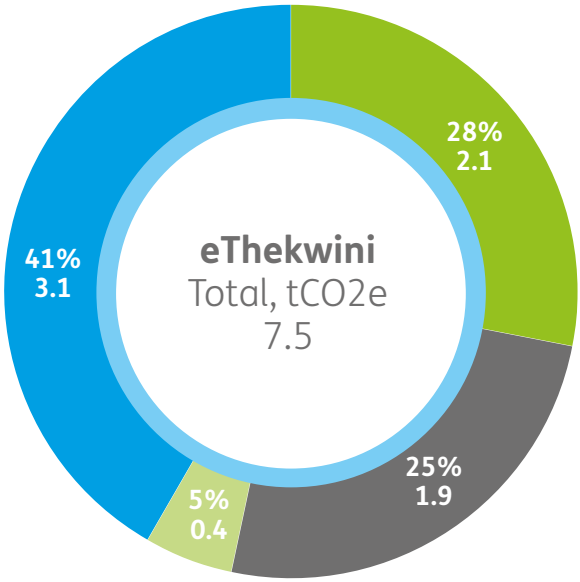
For both greenhouse gas emissions and the ecological footprint, the analysis was undertaken using a bottom-up approach that excludes senior government and related capital formation. This produces an under-estimate relative to the standard ecological footprint following the method advanced by the Global Footprint Network.

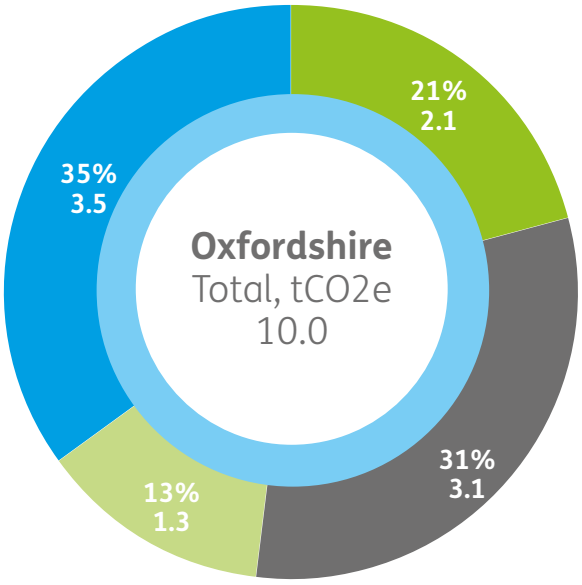
A one-planet threshold of 1.6 global hectares per capita was used to reflect increases in global population reaching 7.4 billion. The data is divided into four sectors – food production and consumption, buildings of all kinds including homes, consumption of goods and locally accessible services and the waste produced from that consumption and transport by road, air, rail and sea. Together these cover almost all activities that require land, consume natural resources, and cause greenhouse gas emissions.

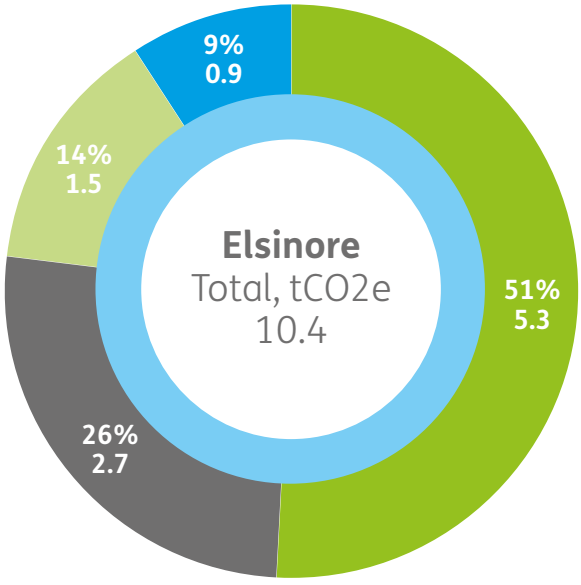
These ecological footprints are produced using bottom-up data from the location, therefore they exclude senior government services such as maintenance of some national infrastructure, the treasury and military. These are excluded because the footprints are intended to help residents and local governments to make changes in the spheres they can influence. If senior government services were added to the footprint, the estimate would likely increase by 18-33%. This shows the need to make even greater reductions in consumption at national level.

Estimates of per capita consumption-based greenhouse gas emissions per annum for the our communities, tonnes (t) of CO2 equivalent









Total greenhouse gas emissions

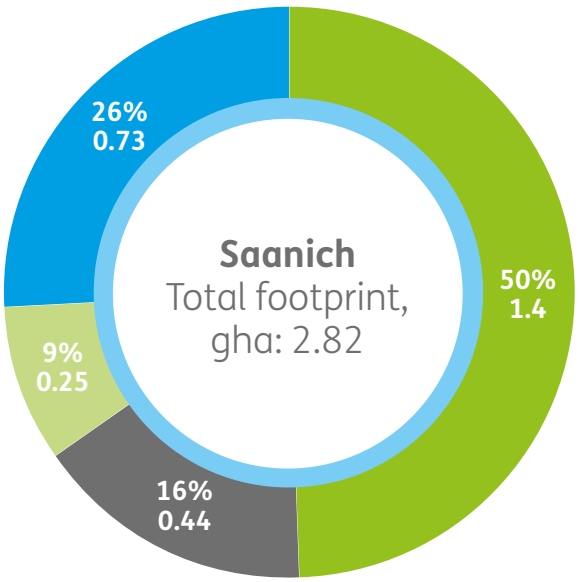
Food, tCO2e and % of total

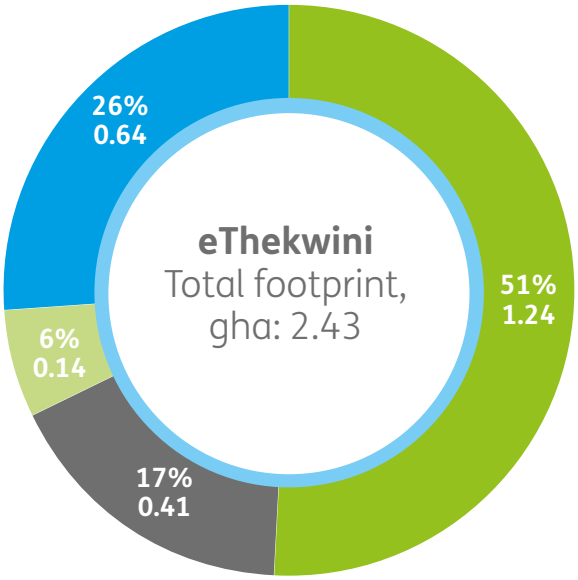
Buildings, tCO2e and % of total

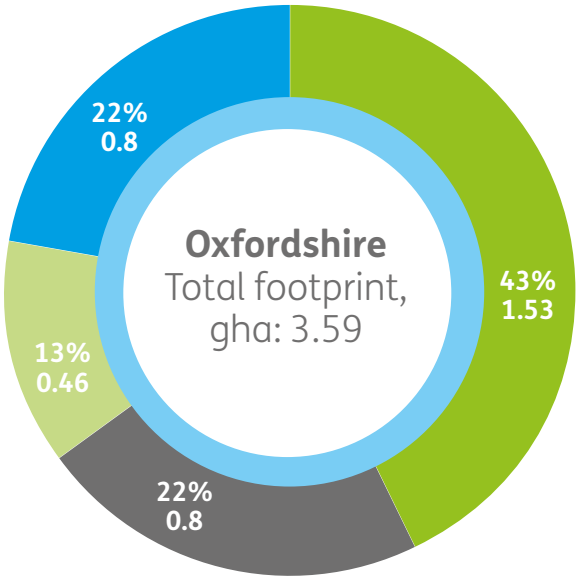
Consumables and waste, tCO2e and % of total

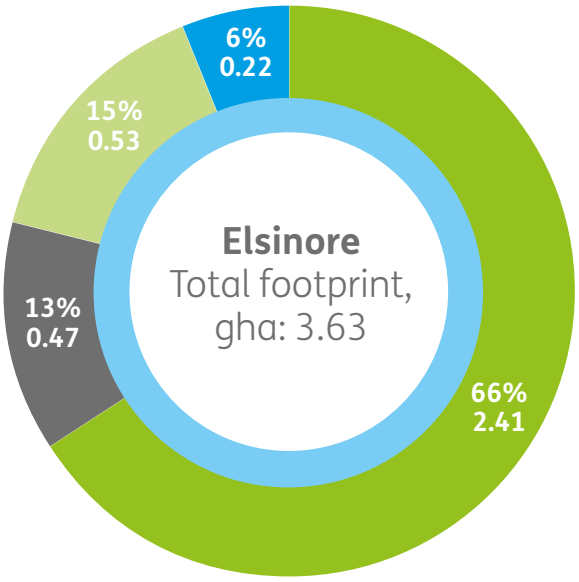
Transportation, tCO2e and % of total

Estimates of per capita ecological footprint for the four communities, global hectares (gha)









Total Footprint, gha

Food, gha

Buildings, gha

Consumables and waste, gha

Transportation, gha

The sustainability gap

The estimates for the four communities' per capita greenhouse gas emissions and ecological footprints are fairly similar considering the large differences in climate and levels of economic development and income among them.

The most important finding from this analysis is that all four are far above sustainable levels of natural resource consumption and greenhouse gas emissions. eThekwini's ecological footprint per capita is nearly double the sustainable level. Emissions are about double for Saanich and approaching three times the sustainable level for Elsinore and Oxford.

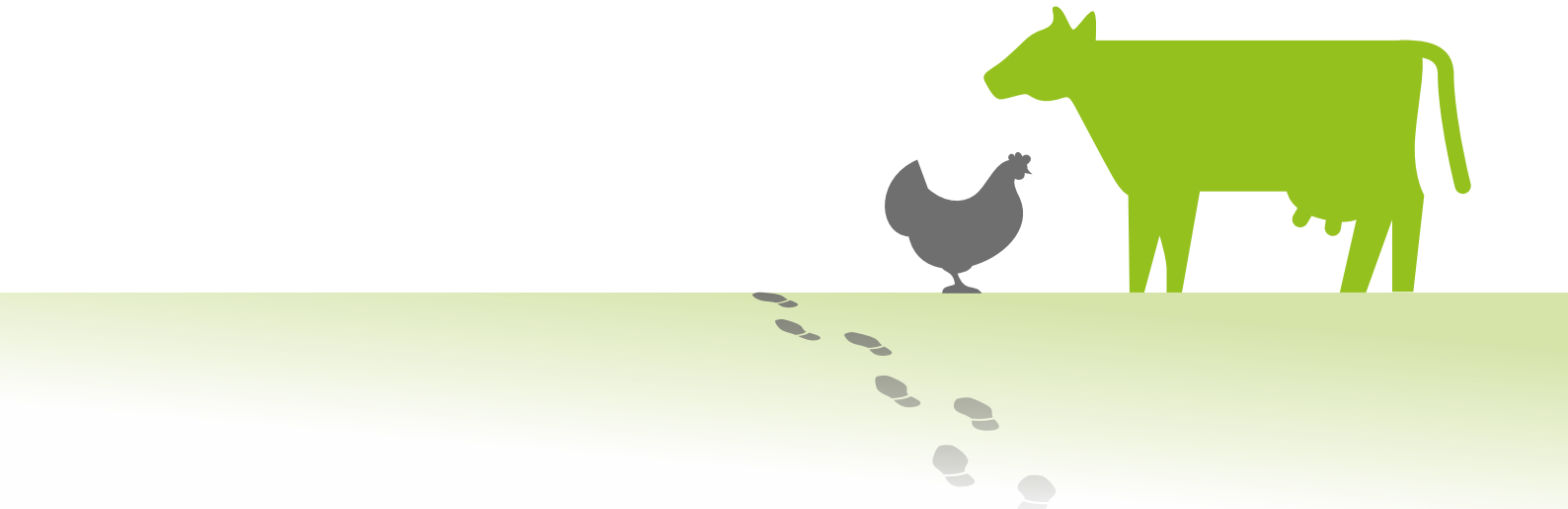
For greenhouse gas emissions exclusively, the sustainability gaps are even wider. Scientists estimate that if the rise in global average temperatures is to be kept to below two degrees above pre-industrial levels, then average emissions per capita across the planet must be held below two tonnes of CO2 per annum. The estimates of consumption-based greenhouse gas emissions for these four communities range from almost four times that level (eThekwini) to six times (Elsinore). Recent studies indicate that three degrees may be unavoidable and average per capita emissions below one tonne of CO2 per annum and even net sequestration may be necessary.

Meat and dairy

There are many different ways to reduce natural resource consumption and greenhouse gas emissions, but the assessment of emissions and ecological footprint for the four communities highlights the importance of livestock farming and meat and dairy production.

The pie charts above show the major impact of food consumption on the planet. This accounts for nearly half or more than half of the ecological footprints of the four communities, and from one fifth (Saanich) to two fifths (Elsinore) of their consumption-based greenhouse gas emissions.

The analysis showed that meat and dairy production and consumption made a disproportionately large contribution to these impacts. For the four ecological footprints, these two sectors accounted for between 49% (Oxfordshire) and 72% (Saanich) of the total number of global hectares attributed to food production and consumption. And for those greenhouse gas emissions related to food consumption, meat and dairy accounted for between 30% (Elsinore) and 78% (Oxfordshire).



Priorities for moving towards One Planet Living

Building on the analysis, the reports for the four communities set out scenarios for moving towards sustainability and One Planet Living. Across all four, the same broad priorities apply:

- Decarbonise electricity grids and move towards renewable energy generation and storage to meet all of people's needs for power.
- Move away from using fossil fuels to heat and cool buildings, including homes, and develop renewable energy alternatives instead.
- Make buildings, including homes, much more energy efficient so that they need less energy for heating and cooling in the first place.
- Reduce fossil fuel use in road transport, both in cars and commercial vehicles, by reducing the need to travel by road, developing low-to-zero carbon alternatives to car travel (public transport, walking and cycling) or switching to electric vehicles charged from renewable energy sources.
- Reduce air travel, which relies on fossil fuels and will continue to do so for decades.
- Reduce meat and dairy consumption and switching some red meat consumption to poultry consumption, which requires less land and produces fewer greenhouse gas emissions.
- Reduce waste, particularly of food, paper, plastic and textiles. Focus on reducing landfilling of waste. Move towards a circular economy, in which far more goods are reused, repaired and recycled, reducing the demand for natural resources.

All four communities are committed to making progress in ways that increase the health and happiness of their people. For example, increasing cycling and walking, reducing meat and dairy consumption and making buildings more energy efficient can all contribute to improving health.

The analysis recognises that there are widespread inequalities within these communities, and some of their residents on low incomes are far closer to, or living at, levels of resource consumption that are already globally sustainable. This is particularly the case for eThekwini, the only one of the four communities outside of a developed nation.

A note about the estimates

The estimates of consumption-based greenhouse gas emissions and ecological footprint for the four communities were made by Dr Jennie Moore using the ecoCity Footprint Tool which she created. The tool makes maximum use of locally available, municipal-level data relevant to material and waste flows, energy consumption and greenhouse gas emissions, moving towards national-level data where there are gaps. In all four communities, local government bodies, partner organisations for the One Planet Cities project and Bioregional helped to gather data. It was not possible to gather the same types of data in all the locations, so care should be taken in making comparisons between these and different estimates of ecological footprint and greenhouse gas emissions, and no estimate should be regarded as precise.

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