

1.5°C in Urban Areas

Contributing to the Paris Agreement through the transport and building sectors

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EXECUTIVE SUMMARY – THE URBAN QUEST FOR 1.5°C

Urban areas: Cities can take lead

Today, world cities occupy just 3% of the Earth’s land,¹ but they account for two-thirds of the world’s energy demand and 70% of CO₂ emissions.

As urbanization continues to increase and the world’s population expands, cities, too, are expanding rapidly. Urban areas serve as hubs of economic and cultural activity and continue to attract people looking to leverage the opportunities cities provide. Today, 55% of the world’s population live in urban areas and the urban population is expected to increase to an almost 70% share by 2050.²

Cities’ large carbon footprint also impacts air quality and health in cities. More than **91% of the world’s population are being exposed to air pollution** beyond the limits set by the World Health Organisation. The sources of air pollution vary - but heating and cooling of buildings and transport based on fossil fuels are main contributors.

Urban areas pose both threats and opportunities when it comes to reaching the Paris agreement, which means that opportunities for cities to make a difference are enormous.

Cities leave a sizeable footprint and need to curb emissions to increase liveability and create an environment for sustainable growth. In other words, cities’ potential impact on climate and health is enormous – which means that opportunities for cities to make a difference is, too.

The good news is that the needed technologies to future-proof our cities, meet the Paris agreement and safeguard air quality for the growing urban population, are already here, or in the pipeline.

Urbanisation has changed the relationship between cities and their immediate surroundings, with cities increasingly impacting pollution and emissions - positive spill over can occur when sustainable solutions are developed in cities.

Cities can act as ambitious and inspirational regional frontrunners that showcase new technology and create attractive places to live and work.

Key results - cities can lead the way to getting the world on track to 1.5°C

Energy efficient buildings and electrified transport - both enabled by sector coupling - can bridge about half of the gap in greenhouse gas emissions reductions needed for 1.5°C.

Buildings and transport are key elements of the urban energy system³. This report shows what is needed for urban areas in Europe, the US, and China to reach the 1.5°C target in the Paris agreement.

The report concludes that:

1) Cities and urban areas can reduce greenhouse gas emissions and air pollution significantly through investments in already existing technology. This would at

the same time improve health, well-being, and productivity in cities.

And 2) that cities need to prioritise investments in energy efficient buildings, electrification of transport both enabled by sector coupling to reach the Paris agreement.

¹ The Earth Institute Columbia University, 2005

² United Nations, 2018

³ International Energy Agency (IEA), 2017

Implementation of existing technology for buildings, transport and sector coupling can bridge about half of the gap in urban and city greenhouse gas emissions reductions needed for a 1.5°C pathway

- By 2050, implemented existing technology solutions for energy efficient heating and cooling of buildings and electrified transport, both enabled by sector coupling, can bridge about half of the gap in urban greenhouse gas emissions reductions needed for a 1.5°C pathway in cities and urban areas. Both sectors have very high shares in total needed reductions, even though we assume that transport will not manage to reach zero emissions.
- Electrifying transport will be the greatest lever to leap from business-as-usual to 1.5°C. If all urban areas in Europe, China and the USA electrified their private and public transport, they would contribute to the 1.5°C target of the Paris agreement with 28%.
- Energy efficient heating and cooling of buildings will be the second greatest lever to leap to 1.5°C. If all urban areas and cities in Europe, China and the USA invested in energy efficient heating and cooling of buildings, they would contribute to the 1.5°C target of the Paris agreement with 20%. Saving energy in buildings will at the same time free energy to electrify transport.
- Sector coupling will enable the untapped potential in transport and buildings.

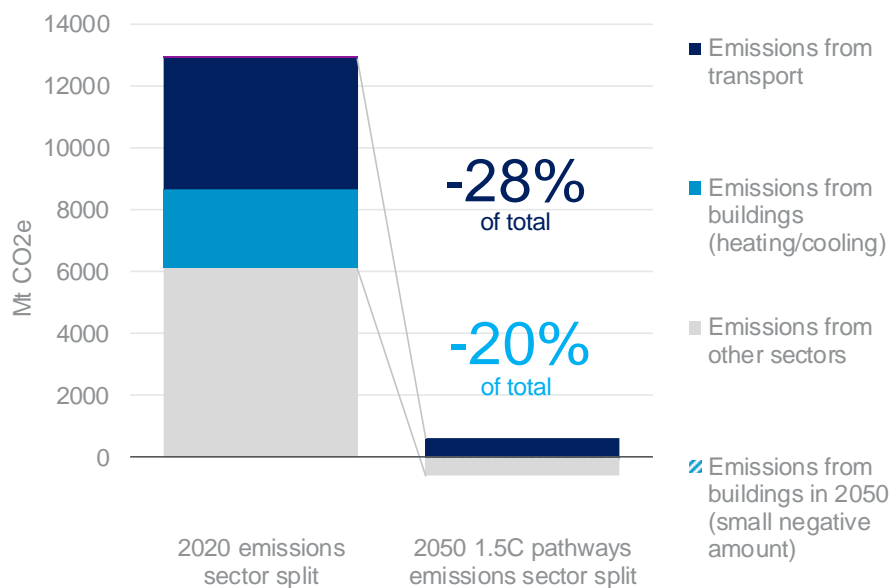


Figure 1. Towards 1.5°C in European, US, and Chinese urban areas⁴

⁴ GABC Global Status Report 2018 arrives at similar shares for global emissions; note: Figure 1 does not include emissions from operating appliances in buildings.

1. WHY THIS STUDY?

This study illustrates the technological transformation that needs to happen when cities and urban areas move to a 1.5°C pathway.

This report assesses how urban areas can get on a 1.5°C pathway while also reducing air pollution. The world's urban areas currently emit 70% of total global greenhouse gas (GHG) emissions, and the share is growing. Urban areas in Europe, the US, and China - which this report focuses on - are responsible for half of these emissions.

Most advanced urban action plans aim at a 2°C pathway, the high temperature end of the Paris Agreement, yet IPCC clearly states that this is not enough, and hence will include monumental risks. While 2°C is already recognised to be very ambitious, the 1.5°C pathway "... would require an immediate ramp-up of all low carbon options at a rate of deployment sustained over the next 25 years..."⁵.

The intention with this study is to illustrate the technological transformation that needs to happen when cities and urban areas move to a 1.5°C pathway. We will explain the necessary technological changes and provide **quantifications for selected technology uptake**.

Based on suitable IEA and IPCC scenarios for different world regions, we have quantified technology uptake on a 1.5°C pathway for a **selection of cities in Europe, the US, and China**: Copenhagen (Denmark), London (UK), Rotterdam (The Netherlands), New York (US), and Shanghai (China).

The city examples are also provided as fact sheets in an annex to this report. These fact sheets can help stakeholders in similar urban areas determine concrete targets, actions, and peer stakeholders on the regional and national levels. The selected cities encompass significant shipping activities within the transport sectors. This highlights the additional challenge with locally restricted air pollution that cities with heavily used harbours or other waterways face.

⁵ International Energy Agency (IEA), 2016c

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