SPARCS

City Vision Leipzig 2050

This project has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement No. 864242
Topic: LC-SC3-SCC-1-2018-2019-2020: Smart Cities and Communities

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Editorial Info

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1. INTRODUCTION

Leipzig carbon-neutral: the city's great transformation by the year 2050 is a complex and long-term undertaking. In this document – *City Vision Leipzig 2050* – we begin with the question of how the future *should* look before addressing how we get there: How do we wish the city will be in 2050– the year, in which we assume Leipzig to become fully carbon-neutral? 32 vision statements, based on five key strategic areas describe what the city of Leipzig should be like. The Leipzig SPARCS unit has developed this, so called, "City Vision." They produced statements and marked them as important and relevant. The statements have been agreed upon jointly. Each vision statement is supplemented by short explanatory texts and some visualisations. The resulting ideal image of climate neutral Leipzig 2050 is called *City Vision Leipzig 2050*. This vision is in the context of the goals and measures of the SPARCS project.

Enjoy reading and get inspired by the *City Vision Leipzig 2050*!

2. OVERVIEW

In Leipzig, the year 2050 will be a year like any other: children will go to school, tourists from all over the world will visit local sights, and the Christmas market will still be widely popular. All will be the same, that is, except for the fact that Leipzig will be a different city. A city, in which people live with carbon neutrality. The consequences of climate change have made the residents reconsider their priorities, and the most urgent goals are climate-friendly and ecological action, sustainable business, and a community oriented towards the common good. Residents are aware of their position in the world and take responsibility for it.

Not only has the attitude of Leipzig's citizens changed: social and technological innovations have been implemented to facilitate ecological and economic advantages in many ways. At the same time, the quality of life for Leipzig's population has been maintained. Almost invisible, yet still of great ecological impact is the climate neutral generation of energy and heat from exclusively renewable sources. Numerous private energy producers, who have installed facilities on their roofs, pay for their own energy and heat demands, sell surpluses or store them for colder seasons. Green hydrogen is used as a key technology for sector coupling between industries, mobility, electricity, and heating.

A comprehensive and optimised energy management system fulfils the increased coordination requirements of a complex network of small producers and large suppliers.

The resulting high amounts of data are processed in underground data centers, which produce waste heat that is also used. The data networks are owned by the municipality and serve the provision of digital public services.

In order to get from A to B, the vast majority of people in Leipzig use their bicycles or the tailored services by the public transport system. Public transport is free, autonomous and climate-neutral. In the city centre and adjacent neighborhoods, cars are no longer visible. Instead, large bicycle lanes connect the city and former parking spaces are available to residents as multifunctional areas.

Leipzig's residential and commercial buildings have been extensively renovated and are at least climate neutral. Efficiency savings benefit the residents and can even be credited through CO_2 trading.

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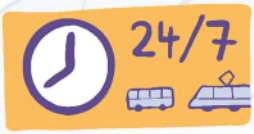
HOUSING

All existing buildings are carbon-neutral and energy-efficient. New buildings are energy positive.

Efficient land use brings significantly more green space for everyone.

MOBILITY



Public transport operates around the clock, quietly, free of charge, one hundred percent autonomously, climate-neutral, need-based, and intelligently controlled.

Microbuses connect the fringe city and city centre as needed. They are an optimal supplement to cars with alternative drive systems.

URBAN SOCIETY

Climate action is the overriding common objective.

Climate-friendly behaviour is the new normal.

ENERGY & HEAT

In summer, climate-neutral heat surpluses are stored in seasonal storage facilities to be used in winter.

Local energy companies sell one hundred percent CO2-neutral heat and electricity from regional sources.

DIGITAL CITY

Digital solutions serve the climate-resilient city and optimal energy management.

The digital transformation process and data networks are part of the municipality's public services.

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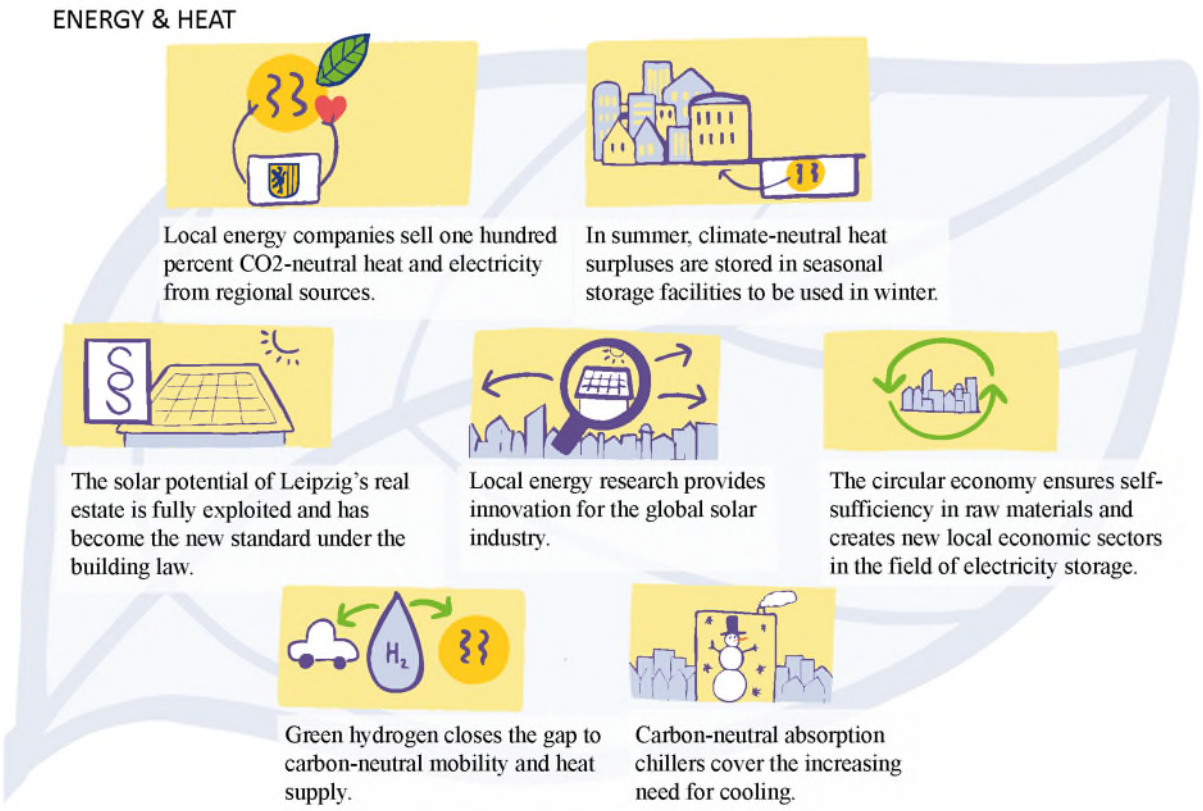
3. ENERGY AND HEAT



Local energy companies sell one hundred percent CO2-neutral heat and electricity from regional sources.

Electricity and heat providers offer energy from one hundred percent carbon-neutral and regional sources.

In summer, climate-neutral heat surpluses are stored in seasonal storage facilities to be used in winter.

Local seasonal storage facilities cover heat demands in winter. Heat is fed into the grid stems from surpluses that are generated in Leipzig during summer months with low heating demand.

The solar potential of Leipzig's real estate is fully exploited and has become the new standard under the building law.

Domestic energy generation represents a significant contribution to the sustainable urban energy balance: every available and suitable surface is used for the generation of solar power and heat. Existing and new private or public buildings are assessed with regard to their potential and upgraded.

Local energy research provides innovation for the global solar industry.

Leipzig as a region for science and business, is closely interlinked with the energy industry. Leipzig's broad innovation landscape is able to provide impulses for innovations in the field of climate-friendly energy supply, both globally and locally.

The circular economy ensures self-sufficiency in raw materials and creates new local economic sectors in the field of electricity storage.

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Due to a circular economy, Leipzig has become largely self-sufficient from imported raw materials. New regional branches of industry have emerged in the field of innovative power storage solutions.

Green hydrogen closes the gap to carbon-neutral mobility and heat supply.

In Leipzig, green hydrogen is utilized as a clean energy carrier for industrial processes, for mobility, for the supply of electricity and heat as well as sector coupling. The electrolytic H2 production is based on renewable energy sources; the only exhaust gas is water vapour.

Carbon-neutral absorption chillers cover the increasing need for cooling.

Leipzig's seasonal mean temperatures have risen significantly. Absorption chillers cover the need for more cooling, especially in summer. Coolers convert carbon-neutral waste heat into useful cooling.

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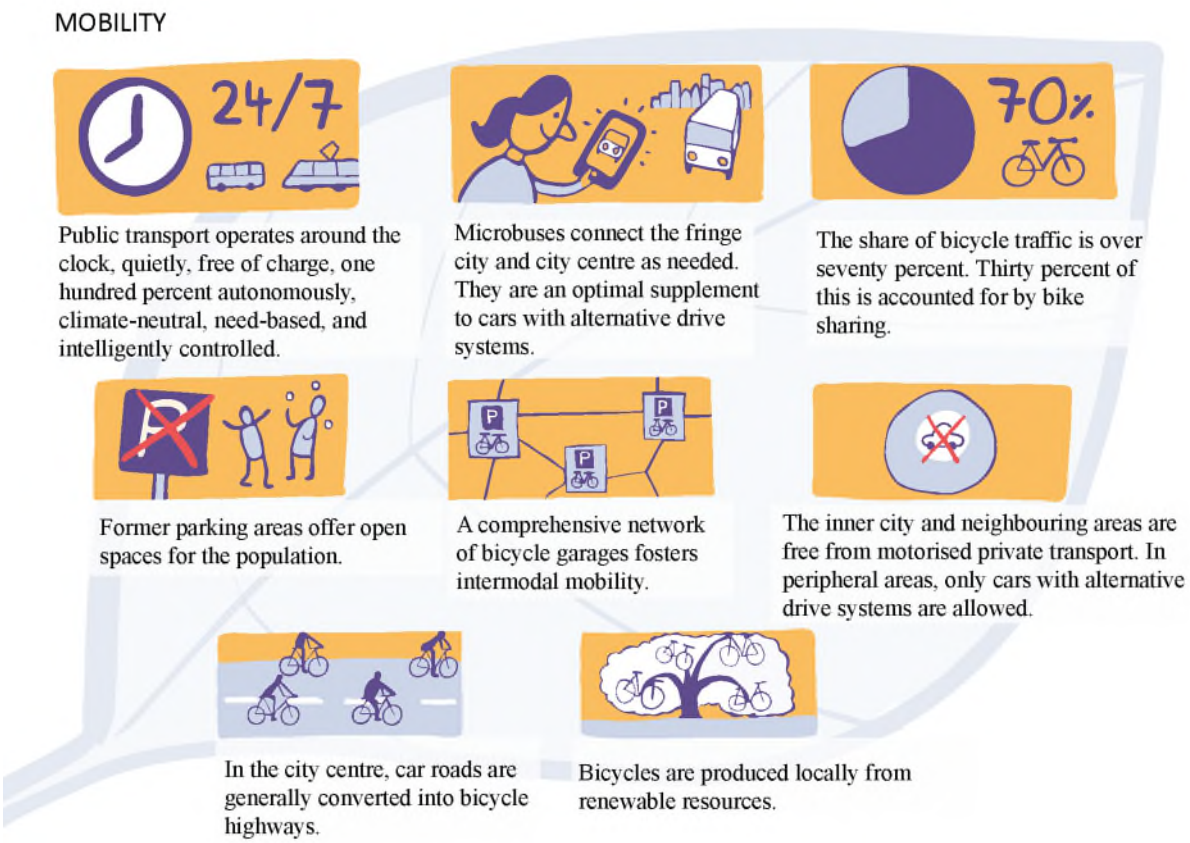
4. MOBILITY



Public transport operates around the clock, quietly, free of charge, one hundred percent autonomously, climate-neutral, need-based, and intelligently controlled.

The backbone of urban mobility is public transport, which offers citizens the possibility to reach all places throughout the city free of charge. A large fleet of autonomous and exceptionally quiet buses and vans enables customers to get from A to B according to their needs – even directly to their front doors. An intelligent control enables the public transport system to meet citywide mobility needs, at different times. The public transport fleet is powered by energy from renewable sources only.

Microbuses connect the fringe city and city centre as needed. They are an optimal supplement to cars with alternative drive systems.

The public transport network is laid out regionally. It connects peripheral sites of the city to urban areas. It offers a needs-based alternative to cars for the customers' highly individual mobility requirements at all times. Thus, it supplements car use with alternative, carbon-neutral drive systems.

The share of bicycle traffic is over seventy percent. Thirty percent of this is accounted for by bike sharing.

Most trips are covered with bicycles. Even ahead of public transport and MIV, the share of bicycle traffic accounts for seventy percent of all trips in urban areas. Bicycle traffic thus makes a significant contribution to carbon neutrality. Rental bikes account for one third of all bicycle trips. They are available in the whole city. They cover the demand for flexible use with different bicycles for various purposes.

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Former parking areas offer open spaces for the population.

Public parking spaces for cars have been removed. They now serve as places for multi-purpose use by the city's population. The need for parking is greatly reduced due to a decline in motorised private transport. The remaining demand is covered by dedicated district parking with areas for sharing providers, bicycles, and private cars. Enjoying public spaces in close proximity to their homes, residents profit from new opportunities, e.g. for places to meet and sit, micro-parks, places of small business and other local businesses.

A comprehensive network of bicycle garages fosters intermodal mobility.

Leipzig's citizens are able to seamlessly use different means of transport. Intermodal mobility has become the norm for all citizens. Bicycle traffic is the most important hub for high intermodal mobility in Leipzig. Therefore, bicycle garages are a widespread and important element. They are located close to residential areas and at important transport nodes. They are safe and offer reliable parking spaces to everyone.

The inner city and neighbouring areas are free from motorised private transport. In peripheral areas, only cars with alternative drive systems are allowed.

Leipzig's city centre and its close surroundings will offer a new quality in public space: they are reserved for public transport, bicycles and pedestrians. With a few exceptions, these parts of the city are free from motorised private transport. Cars are no longer part of the cities landscape. Only in fringe areas of the city, cars with alternative drive systems are allowed.

In the city centre, car roads are generally converted into bicycle highways.

Major streets in the city centre have lost their character as multi-lane car roads. They are now attractive bicycle highways, which, along with public transport areas, shape the image of the cities' major urban lifelines. Expressway cycle paths are the most important form of transport shaping the urban landscape.

Bicycles are produced locally from renewable resources.

Bicycles have become everyday objects, means of transport and status symbols that every Leipzig citizen uses regularly. The necessary resources for bicycles are sourced from regional and renewable raw materials. Bicycles are produced, assembled and sold locally to meet the diverse customers' demands.

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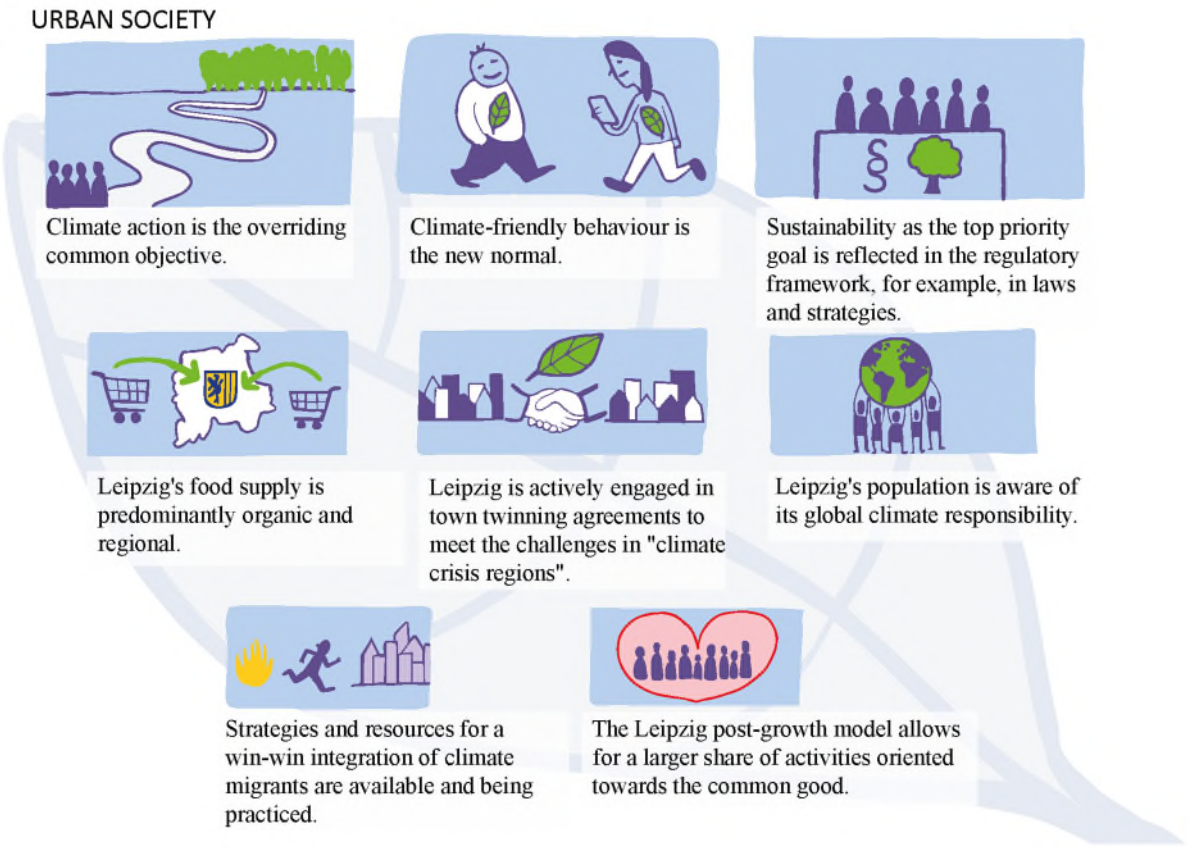
5. URBAN SOCIETY



Climate action is the overriding common objective.

The impacts of climate change are increasingly being felt – worldwide and in Leipzig. The certainty of needing to implement fundamental changes is omnipresent. Climate action and mind-set is focussed on the primary common goal, thus permeating all areas of daily life.

Climate-friendly behaviour is the new normal.

On both individual and institutional levels, people work, drive and live in a climate-friendly manner. In everyday life, the term climate protection is hardly used anymore because it has become the 'new normal' in Leipzig some time ago.

Sustainability as the top priority goal is reflected in the regulatory framework, for example, in laws and strategies.

Legislation has adjusted the regulatory framework towards sustainability as a top priority in all areas of living and economic activities. This enables the city of Leipzig to effectively implement sustainable strategies in balance with social, ecological and economic aspects.

Leipzig's food supply is predominantly organic and regional.

Regional food producers supply Leipzig's citizens with carbon-neutral food. They offer high-quality organic products that complement the product range from imports and urban agriculture. Many foods are increasingly grown where they are consumed. A great variety of fresh products like regional vegetables and fruits are being offered and are well received by consumers.

Leipzig is actively engaged in town twinning agreements to meet the challenges in "climate crisis regions".

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In Leipzig and elsewhere, climate change requires cities to adapt continuously. By cultivating good relations with partner cities, Leipzig benefits from experiences of those living in climate-crisis regions. At the same time, Leipzig gives something back to these localities: challenges in climate crisis areas are actively overcome with the help of town partnerships.

Leipzig's population is aware of its global climate responsibility.

The world in 2050 is globally linked. Products and services from all over the world continue to be imported and used in Leipzig. Leipzig's residents are aware of the effects of global value chains and their influence, which stems from their personal spending power. Unintended consequences, such as regional conflicts and crises, can be consequences of citizen's action. The citizens of Leipzig are aware of their responsibility and act accordingly.

Strategies and resources for a win-win integration of climate migrants are available and being practiced.

The successful integration of new Leipzig citizens is the usual case. Residents and the municipality have resources and strategies at their disposal in order to integrate climate migrants successfully. This works to their mutual advantage.

The Leipzig post-growth model allows for a larger share of activities oriented towards the common good.

With the abandonment of a purely growth-oriented economic model and lifestyle, charitable action and public service become a greater share of all activities.

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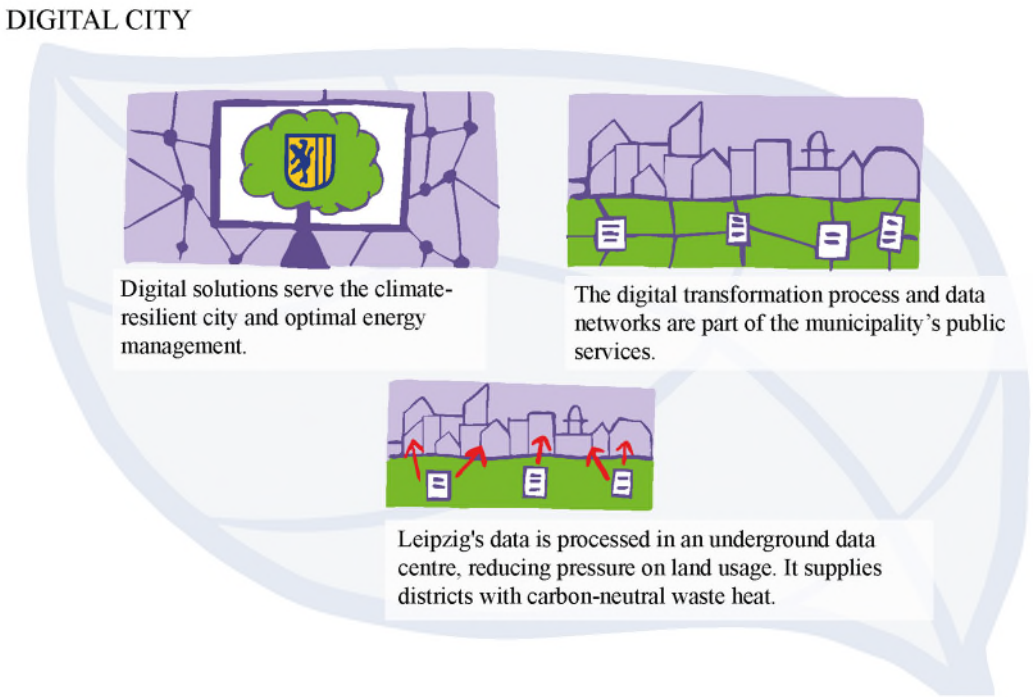
6. DIGITAL CITY



Digital solutions serve the climate-resilient city and optimal energy management.

Efficient digital solutions promote Leipzig's climate resilience and ensure optimal energy management, for example, by linking urban small producers to large producers in virtual power plants.

The digital transformation process and data networks are part of the municipality's public services.

Data storage and data flows are part of the essential urban data infrastructure, such as roads and public transport. The municipality's public services take over substantial tasks of the "Digital Leipzig" into their area of responsibility. The city of Leipzig drives the holistic digital transformation forward through official acts and with the help of municipal companies.

Leipzig's data is processed in an underground data centre, reducing pressure on land usage. It supplies districts with carbon-neutral waste heat.

Local digital data storage and processing is an essential part of the municipal infrastructure. The reuse of waste heat from large underground facilities is sustainable and carbon-neutral. Urban districts are supplied with low-temperature heat.

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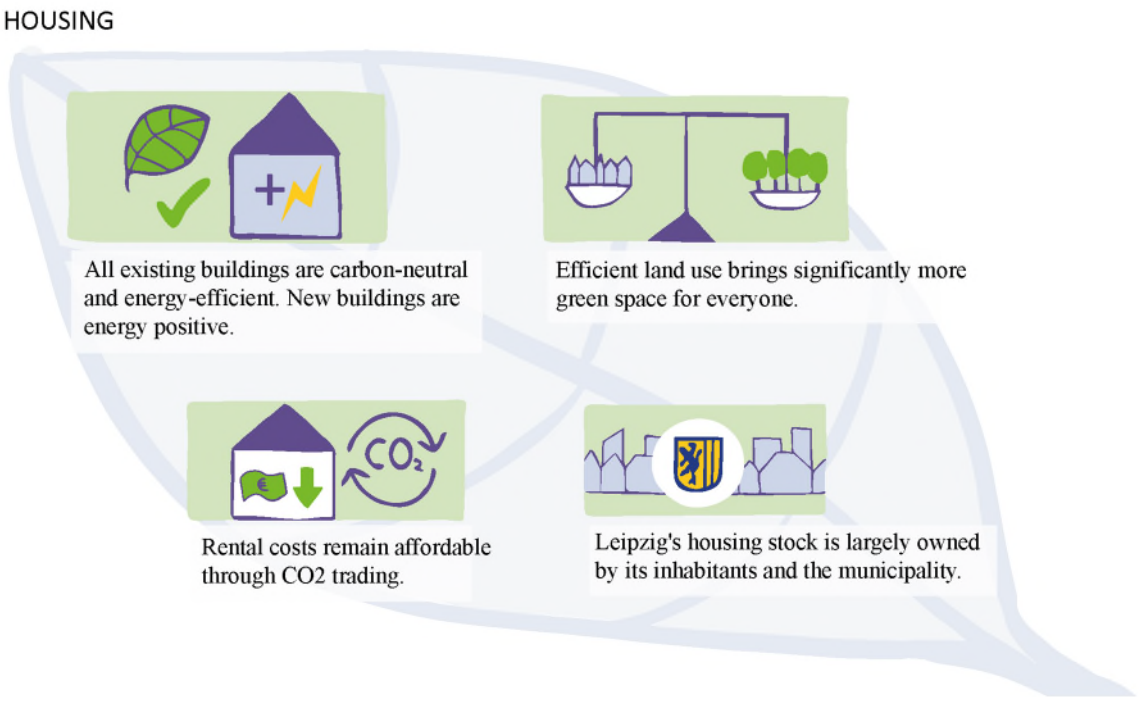
7. HOUSING



All existing buildings are carbon-neutral and energy-efficient. New buildings are energy positive.

The private and public building stock in Leipzig is renovated to carbon-neutral standards and energy efficient. Buildings have a very low energy demand, which is covered exclusively by renewable energies. Carbon-neutral energy standards in construction are established, so that new buildings are always energy positive. Generated efficiency savings are fed into the local grid and can be sold.

Efficient land use brings significantly more green space for everyone.

The city of Leipzig efficiently and sustainably manages potential land areas in the city. Former traffic areas have been reduced and partly replaced by green spaces and multifunctional areas. In some places, residential and commercial uses are "piled up". They thus reduce the pressure on the city's consistently protected green and recreational areas. Some of the renewable energy is produced from the city's roofs. Additional areas from across the region supplement the energy production. Citizens within and around Leipzig participate in land use decisions. Diverging interests between Leipzig and the surrounding areas are balanced.

Rental costs remain affordable through CO2 trading.

Clean energy, e.g. from PV systems on rooftops, provides an energy surplus that can be traded on a market. The residents of Leipzig thus become participants in a CO2 trading system and can offset revenues directly against their rental costs.

Leipzig's housing stock is largely owned by its inhabitants and the municipality.

A large part of Leipzig's residential real estate is possession of its inhabitants and the municipality. The city of Leipzig has a noticeable influence on the residential property market in terms of quality, scope and price level.

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About SPARCS

Sustainable energy Positive & zero cARbon CommunitieS demonstrates and validates technically and socioeconomically viable and replicable, innovative solutions for rolling out smart, integrated positive energy systems for the transition to a citizen centred zero carbon & resource efficient economy. SPARCS facilitates the participation of buildings to the energy market enabling new services and a virtual power plant concept, creating VirtualPositiveEnergy communities as energy democratic playground (positive energy districts can exchange energy with energy entities located outside the district). Seven cities will demonstrate 100+ actions turning buildings, blocks, and districts into energy prosumers. Impacts span economic growth, improved quality of life, and environmental benefits towards the EC policy framework for climate and energy, the SET plan and UN Sustainable Development goals. SPARCS co-creation brings together citizens, companies, research organizations, city planning and decision making entities, transforming cities to carbon-free inclusive communities. Lighthouse cities Espoo (FI) and Leipzig (DE) implement large demonstrations. Fellow cities Reykjavik (IS), Maia (PT), Lviv (UA), Kifissia (EL) and Kladno (CZ) prepare replication with hands-on feasibility studies. SPARCS identifies bankable actions to accelerate market uptake, pioneers innovative, exploitable governance and business models boosting the transformation processes, joint procurement procedures and citizen engaging mechanisms in an overarching city planning instrument toward the bold City Vision 2050. SPARCS engages 30 partners from 8 EU Member States (FI, DE, PT, CY, EL, BE, CZ, IT) and 2 non-EU countries (UA, IS), representing key stakeholders within the value chain of urban challenges and smart, sustainable cities bringing together three distinct but also overlapping knowledge areas: (i) City Energy Systems, (ii) ICT and Interoperability, (iii) Business Innovation and Market Knowledge.

Partners

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