

CASE STUDY



Master Plan for 100 % Climate Mitigation

Frankfurt am Main (DE), strengthening local economy through the energy transition!

“The greatest potential we have, not only in Frankfurt, but basically everywhere, is the ability to reduce our energy consumption”,
Wiebke Fiebig, head of the Municipal Energy Agency in Frankfurt am Main.

The Summary

Frankfurt am Main is one example that shows how local economies can be strengthened through the transition towards 100% Renewable Energy. In total, the city reduced its per capita emissions between 1990 and 2012 by 15%, while the local economy grew by 50%.

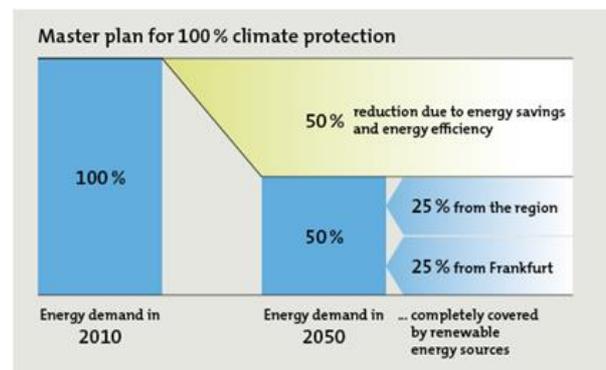
The Context

Frankfurt is known as a global financial and services centre. It is the focal point of the dynamic Rhine-Main region and runs one of the biggest airports in Europe. In 2015 the number of commuters was 348 000. As one of the most densely populated cities in Germany with about 729 000 inhabitants, Frankfurt was importing around 95 % of its energy consumption of a total of 22 600 GWh in 2010.

The measures

In 2008, the City Council adopted an energy and climate action plan comprising a set of 50 concrete measures to reduce GHG emissions. Central elements aimed at decreasing heat and energy demand by rewarding electricity savings in private households, public awareness raising campaigns, modernising residential buildings and promoting energy efficiency in businesses. Subsequently to its early climate mitigation concept, Frankfurt developed a so-called “Master Plan for 100% Climate Mitigation”, envisioned that the city’s energy consumption would be covered by 100 % local and regional renewable energy sources until 2050.

As a first step to implement its Master Plan, Frankfurt’s energy consumption and saving potentials to reduce carbon emissions were comprehensively analysed for each sector.



Source: www.frankfurt-greencity.de



With the support of a feasibility study, tailored recommendations for the subunits (sectors) of Frankfurt were developed - taking the 'local DNA' into account.

From 2014 to 2015 the Fraunhofer Research Institute simulated various energy scenarios on an hourly basis, showcasing that the energy demand can in fact be covered by local renewable energy sources until 2050, while recommending corresponding implementation strategies. With energy scenarios covering each sector, a concrete mapping of renewable energy sources has been defined, resulting in a concrete RE and energy efficiency strategy.

The Challenges

Fraunhofer studies had shown that the city of Frankfurt could not achieve its "100% renewable" target on its own. In order to meet its energy needs, the support of the metropolitan and regional area for wind power and biomass had to be ensured.

A win-win solution was adopted: in exchange of the metropolitan area's renewable energy resources and good practices, the city provided expertise in energy efficiency and passive building standards.

The Model

A core element of Frankfurt's Master Plan is to combine both a top-down and bottom-up approach. The Master Plan was developed in a participatory process starting in 2013. Regional experts were participating in different working groups, such as energy supply of the future, buildings, mobility, education, economy and value chains. In total, about 100 institutions and 150 experts contributed to the pathway towards 100% renewable and local energy supply by 2050, drawing upon strategies and measures

to be taken. For the implementation of Frankfurt's Master Plan a broad coalition of architects, urban planners, engineers, consultants, local businesses as well as local residents are involved. Since 2013 about 100 institutions with about 150 experts have engaged in strategy groups. A citizen dialogue platform with several events, discussions and fora was established to engage stakeholders in urban development. This should ensure a holistic consideration of the 'local DNA', as various local stakeholder groups and experts are profoundly involved in the city's transition plan. Special attention has been made to ensure that there is support for low-income families to benefit



Photo by Christian Salow on Unsplash

from the transition.

The People Behind

Frankfurt city council was the leading force behind the measures. Frankfurt's commitment to fighting climate change is not new: an energy office within the municipality's Building Department was already created in 1983. The city renewed its commitment in 1990, with the establishment of the Energiereferat, the municipal energy agency. Wiebke Fiebig is head of this agency since 2013.



The Clients

The **local community** is the main beneficiary of the plan. A survey in 2015 showed that 85% of Frankfurt's inhabitants consider climate protection as important. The city established a communication office only for climate protection issues in 2015 and developed a unique brand called "Team Frankfurt Klimaschutz 2050" to unite existing initiatives and projects, highlighting common goals and unveiling synergies.

The "DANKE" – initiative for example aims at reaching each inhabitant more than 20 times to appreciate individual climate action. For this, large scale electronic posters (CLPs) were put up at public places across the city, an image film was displayed in the cinemas during the Christmas months, facts and figures as well as recommendations and suggestions for climate action were published on the online platform www.klimschutz-frankfurt.de and disseminated through social media.

"In our current campaign we thank people for their climate protection efforts. I strongly believe that this is the right way to open doors", Wiebke Fiebig, head of Municipal Energy Agency of Frankfurt am Main.

The Money

Since 2013 until 2016, the City of Frankfurt received about EUR 800 000 from the national government for climate protection activities. Frankfurt's 100% Renewable Energy target is also closely linked to the city's climate strategy, as well as the national policy framework. At the national level, the National Climate Mitigation Initiative triggers and supports climate action at the regional and local level from 2013 onwards. Both the federal and the state-level governments have



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provided grants to support this transition.

The Replication Potential

In general, transition towards a fully RE society provides additional benefits to the local population, mainly in terms of the reduction in air, water and land pollution, leading to improved health. Besides the local production of Renewable Energy ensures energy security and opportunities for sustainable economic growth and social development. By enabling the participation of experts as well as residents, a broad coalition was forged, empowering the local people and making the best use of the inherent potential of the city and its region.

The Impact

- ✓ Due to the publicly-owned local utility, mainly driving this energy transition, the city of Frankfurt benefits from savings through increased energy efficiency.
- ✓ Through the initiative 'Frankfurt spart Strom' (Frankfurt saves electricity), private households have saved about 657 tonnes of CO₂, which equals the compensation of about 26 298 trees (City of Frankfurt, 2017).
- ✓ More than 1 600 on-site consultations at private homes between June 2015 and December 2016 result in long-term savings of about EUR 165 800. ([City of Frankfurt](http://www.cityoffrankfurt.de)).



- ✓ Thanks to the “Refrigerator scrapping” programme, between June 2015 and December 2016, about 230 low-income households exchanged their fridge, installing innovative, efficient technologies for half the price.

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The Figures

- ✓ 22 600 GWh energy imported before the masterplan;
- ✓ 95% expected reduction in CO₂ emissions by 2050;
- ✓ EUR 800 000 received from the national government in 4 years.

The Next Steps

The city plans to unlock additional resources to dedicate to the implementation of its plan. With this roadmap, Frankfurt intends to decrease its energy import costs of EUR 2 billion a year to zero. Accordingly, CO₂ emissions should be reduced by 95% until 2050. Instead of remaining dependent from energy imports, Frankfurt aims at using local and regional resources, while creating revenues for investing in the regional economy. In order to be successful, the total energy consumption in Frankfurt needs to be reduced by 50%. The remaining 50% of the current energy consumption will be covered by a local supply of renewable energy sources within Frankfurt and the Rhine-Main region.

