

Essen, Germany

klima|werk|stadt|essen

Creating a new climate culture in times of economic austerity



Essen - located in the German Ruhr Area is historically associated with carbon intensive activities such as heavy industry and mining. Today, the City is determined to create a new climate culture and aims for a 50 percent reduction of its 1990 per capita CO₂ emission levels by the year 2030. The City has incentivized energy and climate stakeholder alliances and has attracted both regional and national funding through cutting edge ideas, bundling smart projects, and an integrated energy and climate approach.

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Abstract

In March 2009 the City of Essen developed their *Integrated Energy and Climate Concept* (henceforth IECC) as an overall strategy for sustainable urban development, climate protection and adaptation to climate change. The IECC serves as an overall framework and evolved under the umbrella brand, klima|werk|stadt|essen to allow flexibility for bottom-up involvement on thematic areas including energy efficiency in buildings, mobility and renewable energy projects. The objective is to cultivate a new climate culture that integrates all stakeholders in urban society to mainstream climate friendly behavior and cultural patterns.

To realize the ambitious goal of reducing carbon dioxide (CO₂) emissions by 40 percent by 2020 in comparison to 1990 levels, all stakeholders actively participate in transforming the city towards a climate-resilient future. Under the motto: "Our City. Our Climate", the deliberate emphasis to increase the quality of life of citizens has resulted in the implementation of over 160 projects in Essen.



Population / Land area

566,862 / 210 km² (2012)

Municipal budget

\$ 3,243 million (2013)
(€ 2,394 million)

Local Economy

Services, trade, media, energy and health

Role of city in the region

Administrative and commercial center within a metropolitan region



Image: Stadtbildstelle Essen



Case Study – City of Essen

Essen in Context

The city of Essen is located in the Ruhr Area, Germany's largest urban agglomeration, lying in the heart of the state of North Rhine-Westphalia. With a population of 566,862 inhabitants (2012 census), it is Germany's ninth largest city. Essen has a strong third sector economy which focuses on services, trade, media, health services and energy. It thus functions as an administrative and commercial center within the greater Ruhr region.

Establishing a new climate culture in Essen

A reliance on technology alone is not enough to meet Essen's ambitious CO₂ reduction goals, nor will it solely solve the challenge of local climate adaptation. Consequently, bottom-up behavior change and a sense of ownership of the environment and community life at all levels of society are essential to cultivate a new climate culture. This is why citizens' engagement across all cultural and socioeconomic backgrounds lies at the heart of Essen's climate initiative and dialogue. Along with the use of collaboration, networking and collective learning as main instruments this has enhanced local climate action.



Image: Universität Duisburg-Essen

Essen's unique and relevant bottom-up approach sets itself apart from many cities and towns and has been supported by significant research on climate culture since 2008. Three major universities in the Ruhr region, in which Essen is situated, are currently analyzing new forms of social change in relation to climate change mitigation and adaptation. Issues such as social responsibility, intercultural differences, the integration of foreign cultures, and cultural memory are investigated and feed into Essen's integrated climate strategy and projects.



klima|werk|stadt|essen– Gateway for engagement

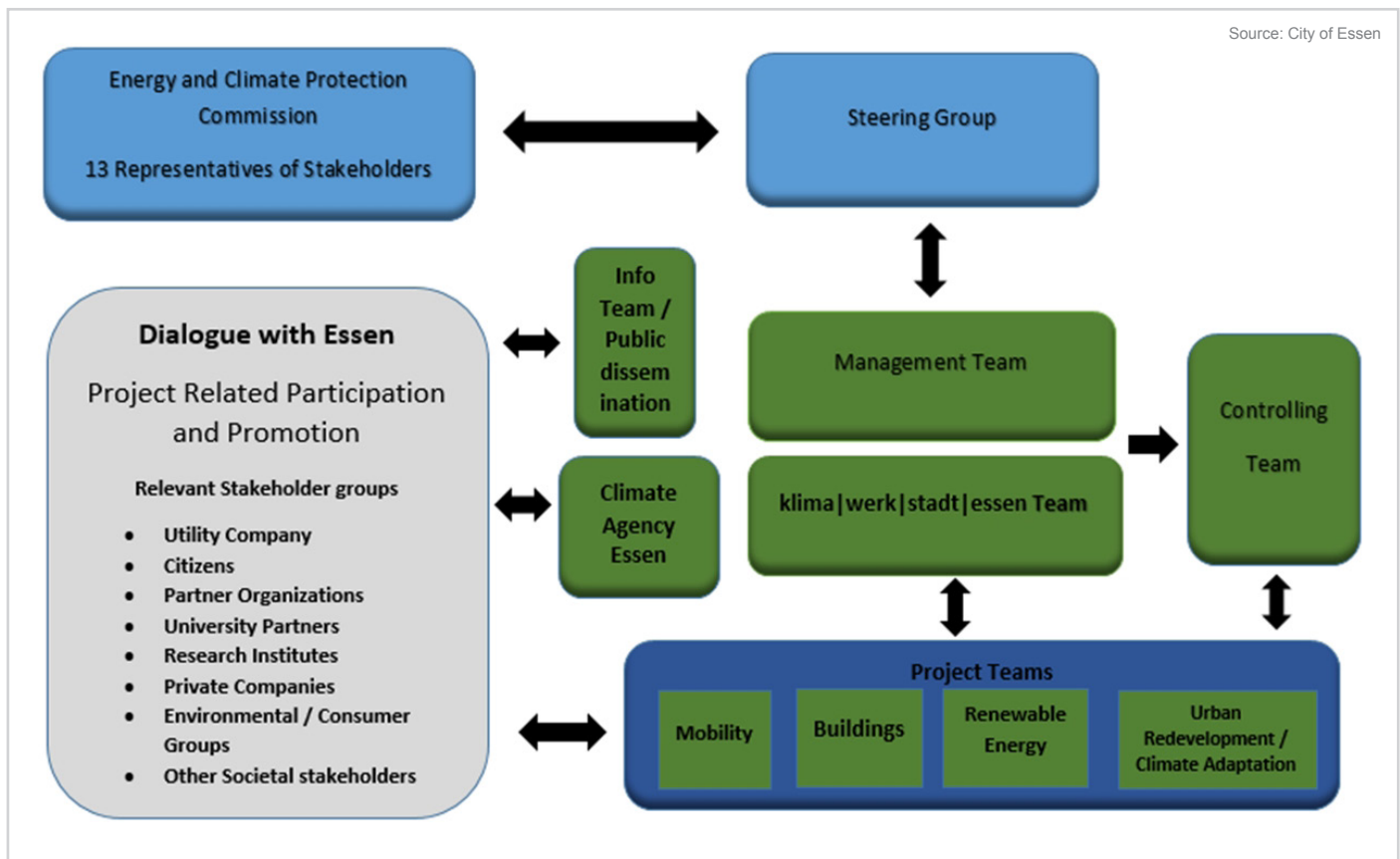
Today the original idea of the IECC has evolved under the umbrella brand klima|werk|stadt|essen. This "climate workshop Essen" seeks to add to the climate strategy and concept via hands-on opportunities for stakeholder involvement and to open up other relevant thematic fields and projects. Under this brand all efforts of the public administration and local climate stakeholders are soundly coordinated without blurring the identity of individual projects and initiatives. The klima|werk|stadt|essen combines activities from science, business and the community, providing initiatives with a joint communication platform for an open debate and field of negotiation for implementing projects for enhanced socio-economic synergies. In doing so, the climate culture becomes tangible to Essen's citizens. The integrated and often creative approaches – due to the involvement of multiple sectors – are able to influence more perceptions and decisions from the public and private sphere.

Administering climate and its finance

The organizational set-up for the klima|werk|stadt|essen was created in 2009 through the IECC. Since, it has been continuously adapted towards its (extended) tasks. Key elements which guarantee multi-stakeholder action include:

- **Steering Group:** responsible for the strategic implementation. Together with the key representatives of the community, the Steering Group defines the essential framework conditions and coordinates the interaction with other major strategic projects of the city, such as Essen 2030 (www.essen2030.de). In this way the city's scarce resources are allocated through synergies between actors and according to priorities. Moreover, climate action is always on the agenda of Essen's budget formulation and counseling.
- **Management Team:** functions as an information and coordination platform and is responsible for the process and implementation of the overall climate concept.
- **klima|werk|stadt|essen Team:** responsible for the exchange of ideas between the various fields of action and the development of interdisciplinary projects.
- **Sub-working Groups:** cultivates expert teams for "urban (re)development", "buildings", "renewable energy" and "mobility" with special expertise for the thematic development and management of sub-projects.
- **Info / Public Relations Team:** established to increase effective internal and external flows of climate related information. It directly supports the management team and is closely connecting staff and content with the Climate Agency Essen.
- **Controlling Team:** responsible for the development and implementation of standards for the consistent management of the concept and its projects.

Figure 1: Organizational Structure of klima|werk|stadt|essen



Climate Bill of North Rhine-Westphalia

In June 2011, the government of North Rhine Westphalia (NRW) brought forth the first German state level climate bill with binding climate protection goals. The bill passed in January 2013 sets concrete reduction targets for greenhouse gas emissions for NRW – 25 percent by 2020 and at least 80 percent by 2050 based on 1990 levels. These goals were then further strengthened by a Climate Protection Plan which consists of specific targets towards increased resource conservation and energy efficiency, energy conservation and renewable energy.

The organizational coordination structure is two-fold. Increased environmental planning and management allows for increased project feasibility, while the systematic involvement of aid and external funding information is able to trigger the development and finance of new projects with higher likelihood. This applies for instance to mobilizing resources from the European Union (EU) Structural Funds available within the context of the *Europe 2020 strategy*, for the purpose of increasing energy and resource efficiency. Together through its combination of different stakeholders, including the greater involvement of the private sector, intensive citizen participation and the network of German state initiatives, present increased opportunities for access to funding.

Climate action under municipal budget restraints

Finances in Essen are tight. In the last years Essen was issued a financial emergency status, meaning that the city is only allowed to make expenditures that are legally required, or necessary for the continuation of projects under way. In spite of these economic setbacks, Essen has been resourceful in funding climate goals by remaining flexible and being creative in how they fund projects. Governmental programs and research initiatives on climate mitigation and adaptation, urban planning or mobility have been funded via private partnerships and through projects benefitting from the EU or federal government stimulus packages (*Konjunkturpaket II*) that aimed to soften the impact of the financial crisis of 2009/2010.

Essen was able to mobilize from the latter, over 70.1 million Euros for infrastructure projects, allowing it to actively pursue cutting edge pilot projects, specializing in experimental urban housing, and urban climate change adaptation. This not only supports Essen's objective and activities to establish a new urban climate culture, but also creates opportunities for visibility. Recently, Essen applied to become Europe's "Green Capital 2016" – showing that even the most challenging financial difficulties can be overcome through multi-stakeholder cooperation across all sectors of urban society, and through tapping into city-to-city and urban-rural synergies.

Essen Climate Initiative

Another example of creative project funding is the Climate Initiative Essen (CIE) – which operates under the klima|werk|stadt|essen. This project is financed by the prize money from the *Energy Efficient City* competition, an award given from the German Ministry for Education and Research. The initiative seeks to integrate sustainable urban development with climate protection and adaptation and has thus become another vehicle to promote a new climate culture in Essen. The award has enabled the City to pursue the bottom-up strategy of the klima|werk|stadt|essen with many gateways for stakeholder involvement and private public partnerships to mainstream environmentally friendly behavior in combination with top-down objectives and legal mandates.

Essen's carbon reduction goals can only be achieved through social change and increased efficiency in operational fields of action such as mobility, retrofitting of existing buildings, renewable energy production and urban (re)development. Moreover, projects need to highlight and address the quality of life of Essen's citizens in order to drive cultural change. In response, the Climate Initiative deliberately targets these areas to build comprehensive management and a cooperative structure for dialogue, networking and consulting services. The Climate Agency Essen is the primary actor of this process.

Climate Protection Start Program

A funding program of the state government of NRW allocates resources to the Climate Protection Plan and its stakeholders including local governments. It provides low interest loans to e.g. support retrofitting of buildings, energy efficiency investments, and power saving initiatives for low income households. The full package contains 22 individual measures in 10 fields of action and provides a volume of several hundred million Euros in grants and loans.

Figure 2: Thematic interaction of the ECI

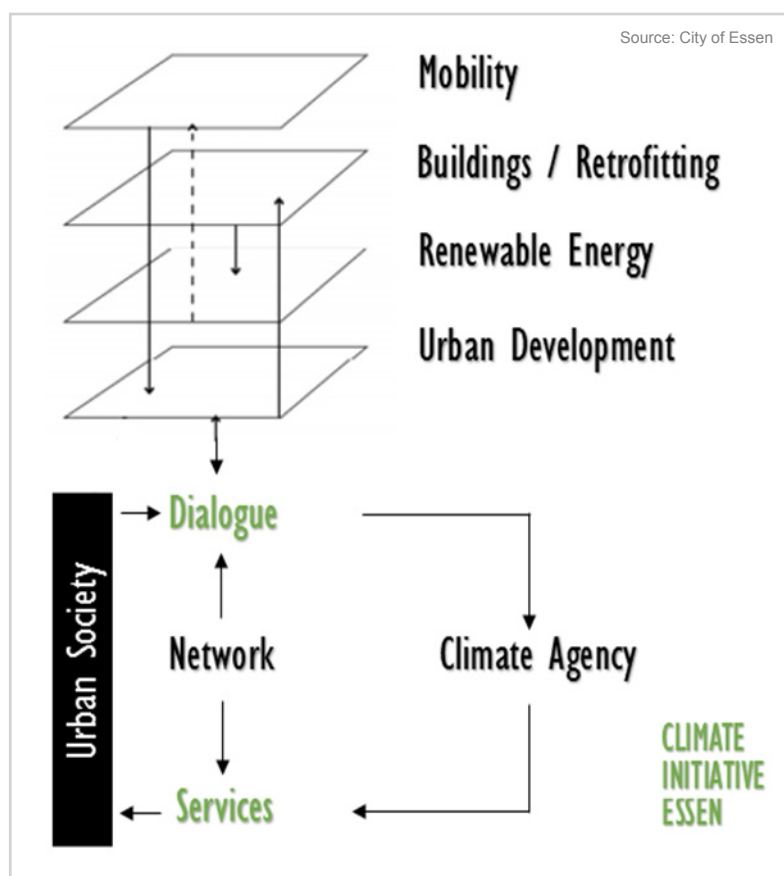




Image: Stadtbildstelle Essen

Climate Agency Essen - learning and creating together

The main operational unit of the klima|werk|stadt|essen is the Climate Agency Essen – a consulting center which serves as both a real and virtual point of contact between internal project management and external coordination with the urban community of Essen.

The agency integrates climate stakeholders' suggestions and experiences into current and future project planning. In doing so, it actively shapes, supports and promotes Essen's climate culture. Moreover the agency is a permanent fixture of the CIE and a neutral, independent service point, as well as an intermediary between Essen's associations and networks, industry and citizens.

Climate Agency Essen's outreach services take many forms, from providing advice to help save energy costs for single households, to developing an individualized action plan to connect customers with a network of vetted, qualified professionals and funding opportunities, to realize these.

Building on a network of energy professionals

The Climate Agency Essen's resources are also limited and are not always sufficient to address all requests. To overcome financial barriers, the Agency, in cooperation with consumer rights associations, has created an energy network of vetted experts, with a proven track record in demonstrating high standards and proficiency in the latest technologies. The network consists of energy consultants, architects, engineers, and craftsmen to implement citizens' projects, or those promoted by the City of Essen.

Essen is well aware that trust is crucial to drive societal change. Thus, all members of the professional network abide by a specially created Energy Codex, to ensure that all experts involved deliver quality work in energy efficiency and ecological optimization to their customers. Experts must advise neutrally on environmentally friendly energy and efficiency products and services. Additionally, members have to apply a holistic approach and are required to be transparent about (dis)advantages, including costs and savings of energy measures.



Image: Udo Geisler

Highlighting cost savings to retrofit buildings

Energy efficient retrofitting of buildings is one of the cornerstone components to reduce CO₂ emissions on the local and global scale. An estimated 80 percent of buildings in Essen can benefit significantly from refurbishment. CIE seeks to raise awareness, offer information and to coordinate retrofitting through the Climate Agency Essen and its network of professionals. This serves as an entrance point for building owners to participate in climate friendly refurbishment and retrofitting, as it saves both energy and money.

One of the main tools to scale refurbishment in Essen is the creation and use of a renovation catalogue, which provides information on the variety of typical buildings in Essen. Thus, the majority of home owners are able to assess retrofit costs independently, due to the assessable and comprehensive catalogue Essen provides. This allows residential property owners with different budgets to realize energy efficient solutions, cost savings and assess payback rates of specific building components. By illustrating how to bundle energy efficient measures best, home owners are able to decide which retrofitting steps, or packages present the most cost-effective approach to cater to their needs, before taking the next step to connect with an energy expert to discuss details of implementation.



Image: Klima-Initiative Essen

Figure 3: Household Heat Loss (by percentage)



Individual Retrofitting Measures	Total Cost	Energy savings / Year	Payback Period
Insulation of Roof (62 m²) Roof insulation with 0.035 W/(mK) thermal conductivity rating	8,990 EUR	2.006 EUR / 41.5 %	4.5 Years
New window installation (15 Windows / 15 m²) 2 layered class UW rating 1.3 W/m ²	5,925 EUR	134 EUR / 2.8 %	44.2 Years
Insulation of Outer Wall 16 cm EPS hard foam – 0.035 W/(mK)	5,140 EUR	759 EUR / 15.7%	6.8 Years
Insulation of Basement Ceiling Insulation from under – 12 cm EPS hard foam - 0.035 W/(mK)	1,210 EUR	395 EUR / 8.2 %	3.1 Years
Installation of new heating system Central heating with condensing boiler 11.3 KW, natural gas, central water heating system	18,000 EUR	2,964 EUR / 61.3%	6.1 Years

Example Retrofitting Combinations	Total Cost	Energy savings / Year	Payback Period
Insulation of outer wall + Basement Ceiling	6,350 EUR	1,154 EUR / 23.9%	5.5 Years
New windows + Ceiling insulation	14,915 EUR	2,140 EUR / 44.3%	7 Years
Complete Retrofitting	39,300 EUR	4,040 EUR / 85.6 %	9.7 Years

Experimental Housing and Urban Development

With pilot projects like Experimental Housing and Urban Development (Experimenteller Wohnungs- und Städtebau, short ExWoSt) Essen seeks to (re) develop and future-proof its urban infrastructure, through the support of federal funding for their innovative ideas. The pilot projects focus on experimental housing design in combination with climate adaptation strategies and the involvement of all levels of urban society.

The project highlights the fact that urban areas are hypersensitive to the consequences of climate change. As a product of climate change, extreme weather such as heat waves, heavy precipitation and flooding are more likely to occur with higher frequency in the future. Essen understands urban infrastructure is

particularly exposed to these pressures and prioritizes the necessity to plan to adapt through new technologies, methods and policies. A significant aspect of this is the involvement of all affected local stakeholders in negotiations, since adaptation is a socio-economic process. ExWoSt drives this approach by testing different strategies of involvement, technologies and policy instruments to build capacity at the local level and establish a permanent network of actors. Moreover, demographic and structural change data specific to Essen is used to feed into the adaptation strategy for sustainable urban development. The result of the ExWoSt is a comprehensive package of tested, integrated measures that can be replicated in other districts within Essen or similar European cities.

Climate culture: diversity and participation

There are many ideas and ways to mitigate and adapt to climate change. klima|werk|stadt|essen aims to provide a dynamic and evolving platform to access and capture these individual experiences and innovative solutions. Essen aims to offer as many options as possible to its citizens, empowering residents with a multitude of new low-carbon lifestyles to create and choose from. An intensive stakeholder dialogue through forums and opportunities for participation ensures that these goals are achieved.

An inclusive ethnographic approach as a basis of networking and campaigns is important, especially in large and diverse cities such as Essen. Cultural sensitivity is absolutely crucial, when approaching local opinion leaders with information regarding climate protection and resilience. Disseminating information on climate and integrating networks of minority groups is essential to the success of e.g. refurbishment or the establishment of sustainable mobility. These local leaders are seen as on-the-ground change agents and pioneers of a new climate and culture. Through Essen's open access approach, the City is able to utilize this potential of diversity and participation for its climate strategy and targets.

Transparency and trust

The underlying principles of the klima|werk|stadt|essen are transparency and trust. Without them the communication amongst internal and external stakeholders would be compromised. Therefore knowledge, results and success factors of the klima|werk|stadt|essen are well documented and accessible to everyone. Furthermore, internal project controlling combined with external audits such as the *European Energy Award Programme* (EEA) and the *Eco-Management and Audit Scheme* (EMAS) provide additional transparency safeguards. Both serve as a quality management system and certification process which enhances interdepartmental planning and evaluation of energy and climate policies in Essen. These management systems have been an integral component of the klima|werk|stadt|essen to ensure that all activities are systematically

Renewable heating

On average, Essen's heating accounts for up to 70 percent of household energy use. Therefore, Essen's goal is to realize the total substitution of fossil fuel based heat with renewable energy (RE) generation. This is achieved through extending current renewable energy implementation, and by establishing data and disseminating information on investment, maintenance and operation of RE projects, as well as providing available funding options. With more than 90 percent in Essen and well above the German average, Combined Heating and Power (CHP) can continue to provide large scale district heating, but with a substantial increase of renewables substituting mainly black coal. However, small scale CHP running on renewables shall play a larger role to replace e.g. oil heating, since they can be funded from the household level.



Image: M. Klimburg, Umweltamt Essen



Image: Via Verkehrsgesellschaft mbH

Integrated mobility strategy

The way citizens move throughout a city has great environmental impacts – also affecting quality of urban life. Thus the Essen Climate Initiative promotes and supports the Climate Agency Essen in the development and expansion of approaches to scaling up sustainable urban mobility such as car and bike sharing and use of public transportation. CIE aims to enhance environmentally conscious mobility by strengthening existing networks of public transportation through combining local transportation tickets with bicycle mobility options, and expanded bicycle parking. This is mainly accomplished in partnership with organizations such as Metropolrad - Germany's largest bicycle rental system. This will help Essen achieve its goal to save 33.6 million tons CO₂ by 2020.

addressed, coordinated and monitored.

Budget and finances

Within the City of Essen's administration, five people in the Department of Environment primarily steer the internal process on climate. However, many other departments allocate and contribute staff resources for coordination and project tasks for the crosscutting issues of energy and climate action.

Through the *Energy Efficient Cities* competition, Essen received a total of €5 million in federal funding for a project period of five years, from 2011 to 2016, of which € 2.1 million are allocated to the City of Essen's climate endeavors. Other project partners from science and research received € 2.9 million.

Lessons learned

Local climate action needs a climate culture. Technology alone will not be enough to meet the ambitious reduction goals that Essen has set for itself neither the challenges of adapting locally to climate change. Bottom-up behavior change and a sense of ownership of climate projects at all levels of society are essential. Supporting a new climate culture means providing hands-on opportunities for stakeholders' involvement and opening avenues for thematic fields and projects. An inclusive ethnographic approach, especially in large and diverse cities such as Essen, should be the basis of climate campaigns. In this sense cultural sensitivity and the engagement of minority groups is absolutely crucial. Finally, Essen confirms that climate action needs to place quality of life at the centre of discussion in order to effectively reach out to citizens and drive cultural change.

No need to back down from active local climate commitments, even when facing serious budgetary constraints. During times of scarce financial resources, it is important to incentivize stakeholder alliances for energy and climate. Essen has attracted regional to international funding through smart project bundling and developing cutting-edge ideas. Further, prize money and awards were an effective source of finance.

Synergizing urban policy priorities through an internal steering process and strategic implementation of projects help bring about resource efficiency. Both climate mitigation and adaptation should be addressed. Essen proves the effectiveness of including and budgeting for climate efforts on the agenda. Moreover, well-structured coordination allows a systematic involvement of aid and external funding information which makes the identification of suitable funding lines more effectual. In addition, the greater engagement of the private sector, citizens as well as a more intensive participation of networks demonstrates that a more diverse combination of different stakeholders results in higher success rates to access finance.

The success of a climate concept depends on its operational counterpart. The creation of an umbrella brand and platform such as klima|werk|stadt|essen which is able to provide different projects with a unique and high recognition factor, to facilitate stakeholder dialogue, project negotiation and practical engagements has been instrumental to Essen's success. The establishment of an operational unit like the Climate Agency Essen as a permanent, direct and neutral service point has proven to be useful. Moreover by actively placing itself as an intermediary



Image: Stadtbildstelle Essen

between vetted experts (that follow an Energy Codex), local energy service companies, craftspeople and citizens, Essen is able to scale implementation, while investing a limited amount of resources into the process.

Providing comprehensive and accessible information to residents, helps empower homeowners to independently assess cost-effective opportunities for retrofitting. Essen is a model for driving refurbishment through the use of communication tools, like the creation of the renovation catalogue which provides an easy overview of common building types and energy efficient solutions to residential property owners with varying budgets. The catalogue enables residents to learn about efficient technologies, cost savings and payback times of specific building components.

Transparency and trust is important for creating and acting in a new climate culture. Without these underlying principles, communication amongst internal and external stakeholders can be compromised. Therefore knowledge, results and success factors of the klima|werk|stadt|essen are well documented and accessible to the public. Furthermore Essen experienced that internal project controlling combined with external audits is helpful to achieve and maintain a high quality performance on urban climate action.

Replication

Essen's klima|werk|stadt|essen was planned during a time of financial strain, faced by many urban regions throughout Europe and the world. However, despite this, Essen's climate action plans and initiatives are highly replicable for other cities to learn from and adapt. A key success factor for Essen was the extraordinary cooperation between Essen and the Ruhr region due to the City's nomination as the *European Capital of Culture* in 2010. Essen being at the heart of the cooperative planning continued this approach for developing new flagship initiatives through applying and becoming a finalist of the *European Green Capital* 2016, as well as

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Authors: James Henderson and Carsten Rothballer, ICLEI European Secretariat.

hosting the *Climate Expo 2020* in cooperation with the Ruhr metropolitan area. Essen intends to continue showcasing projects of the klima|werk|stadt|essen and share good practices to other cities, encouraging replication.

Further, Essen has been cooperating not only regionally, but also nationally and internationally to fund and implement climate projects and share experiences through networks for increased connectivity and replication. Essen has demonstrated its political commitment to sustainability as a signatory of the Covenant of Mayors and participant in important international mitigation initiatives, like the carbonn City Climate Registry (cCCR).

The Covenant of Mayors is the mainstream European movement involving local and regional authorities, voluntarily committing to increasing energy efficiency and using renewable energy sources on their territories. By their commitment, Covenant signatories aim to meet and exceed the European Union 20% CO₂ reduction objective by 2020.



The cCCR is the leading global reporting platform of local climate action. It enables cities and local governments

to demonstrate their power and potential to reduce climate risks and move towards global low-emissions and climate resilient development through the reporting of energy and climate commitments, greenhouse gas emissions as well as mitigation and adaptation actions.



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