

TITLE: TRANSCITY: A CROSS DISTRICT EMISSION TRADING SCHEME IN ESSEN, GERMANY

ISSUE AREAS

- ICT and SMART technology
- Sustainable mobility
- Land use and nature-based solutions
- Clean energy
- Sustainable solid waste management
- Building energy efficiency
- Innovative urban governance**
- Behavioural change**

OVERVIEW

The TRANSCITY project established a cross-district emissions trading scheme between two districts of the city of Essen (Altenessen and Werden), as an instrument to spur climate protection from a socio-spatial inclusion perspective. The participating neighbourhoods represent very different socio-economic structures and milieus. Based on concrete indicators, an emission trading scheme (ETS) has been set up with the emission certificates budgeted, distributed, and traded between the districts. The financial resources activated in the process are reinvested in social and ecological climate protection projects in the neighborhoods (City of Essen, 2021a).

In addition to supporting the City of Essen in advancing municipal climate protection goals from a social perspective (City of Essen, 2021a), TRANSCITY contributes to raising socio-ecological awareness and translating that into concrete inner-city cooperation.

THE CHALLENGE - WHY HAS THE CITY TAKEN ACTION

Social inequality between the south and north of Essen. The northern part of Essen is relatively poorer, more densely populated with fewer green areas, and more polluted compared to the south, creating a 'north-south' divide (Kerr, 2017). The south of Essen benefitted from coal mining and industrialization in the eighteenth and nineteenth centuries. The technological advancement, such as steam pumps and electricity, made it possible for miners to get into deeper depths of the coal mine. Therefore, the coal-centred economic development of Essen moved from the Ruhr river in the south to the Emscher river in the north. As the coal mining activities shifted north, the urban regeneration process and economic shift began in the south. Moreover, when the main supporting industries became obsolete, the north part of Essen suffered from economic depression, high unemployment rates, deserted buildings, and air pollution. The different development trajectories in the north and south of Essen led to distinct socio-economic disparity.

The city also needs to tackle the climate change challenge in an inclusive and just manner. As Essen intends to reduce CO₂ emissions by 40% by 2020 (UNFCCC, 2017), the challenge is how to realise a just and inclusive transition engaging the two districts. Therefore, the boundaries of the city districts need to be opened up, and residents should be made aware of the social imbalances in conjunction with climate protection measures (RheinMain University of Applied Sciences, 2021). In addition to reducing carbon emissions and achieving its climate goals, TRANSCITY will create a newly flourishing exchange between two very different social milieus that overcome the challenges.

GOALS AND OBJECTIVES

The city aims to address both carbon reduction and inclusive transition through multilateral collaboration and create public awareness to social imbalances in climate protection issues through investment at the local level (Bundesnetzwerk Verbraucherforschung, 2021).

Some of the more concrete goals include:

- Reduce greenhouse gas emissions
- Raise socio-ecological awareness
- Enhance inner-city cooperation and exchange
- Invigorating climate-sensitive urban publics
- Desegregation of districts
- Encourage other cities to participate

HOW DID STI PROVIDE A LOW CARBON AND CLIMATE RESILIENT SOLUTION?

(STI as a means of implementation)

- Improved decision making Offering a low-cost solution **Inclusive decision making**
 Improved governance **Behavioural change**

(STI as a direct technical solution)

- Cleaner/more eco-friendly infrastructure Cleaner/more eco-friendly equipment
 Faster/better/larger data availability/processing

- How was it innovative? (What enabling policies were employed? What were the local/national government's policy targets, goals and strategies? Were new S&T approaches developed or existing S&T approaches enhanced? Was the cities geography/culture capitalised upon?)

While Essen has undergone a massive urban transition process from a coal to green city, one of the challenges remains is the socio-economic disparity between the communities residing in the north and south of Essen. As such, the residents in both neighbourhoods have differentiated opportunities and responsibilities to participate in climate protection measures.

Against this background, the TRANSCITY project creates a Social Urban Emission Trading System (SUETS), which enables residents in the north and south of Essen to participate in the district development while protecting the climate in the process. The focus of the ETS is at the district-level, and not at the European level or city-level. Compared to the European Union Emission Trading System (EU ETS), which is too abstract for residents to comprehend, the SUETS is a concrete and tangible trading scheme with ecological and social components (Thiesen & Fishedick, 2020). The two districts of Werden and Altenessen were selected due to the drastic difference in the social structure (income and education levels, unemployment rate, etc.).

The approach of SUETS is highly innovative because it taps on the emission reduction potential of the inner city area, where the wealthy usually reside, as well as the underprivileged districts. The assumption is that economically weaker residents are involuntarily practicing a low-carbon lifestyle due to low consumption patterns and purchasing power. On the other hand, the richer and more

environmentally conscious district residents can actively participate in the carbon market and lead the transformation process (Thiesen, 2016).

- What science and technologies were used? (What does it do? How does it work? How does it address the challenge?)

The backbone of the SUETS is the emission trading empowered by a smartphone application. With the help of an easy-to-use App, the municipality of Essen first determines the “ecological footprint” of the two urban districts. Based on this, the city sets the spatial climate protection targets and distributes the emission in both parts of the city, which can be traded on a virtual “emission exchange”. The certificates have the character of a “voucher”, which can be sold on the emission exchange, thus giving the districts incentives to reduce emissions (City of Essen, 2021b).

Each participating district has a set climate target by the municipality. If the districts do not meet the climate protection requirements, they will voluntarily compensate and pay to the municipal budget. As the wealthier district presumably has a higher carbon footprint, more certificates will be needed to meet the climate target, which they can purchase and trade from socio-economically weaker districts. At the same time, both districts can sell their certificates to the municipality and private investors for investments.

The investment incentivisation mechanism makes SUETS even more attractive because it gives the districts a variety of choices and thus, prevents the certificates from being “hoarded” and incentivizes climate-friendly practices. The more residents participate in the two districts, the greater the climate impacts. The proceeds from the local emissions trading will be channelled into sustainable, social and ecological projects in both neighbourhoods (City of Essen, 2021a).

Figure 1 shows that the basis of SUETS is the exchange of emission certificates between the two urban districts with different social structures.

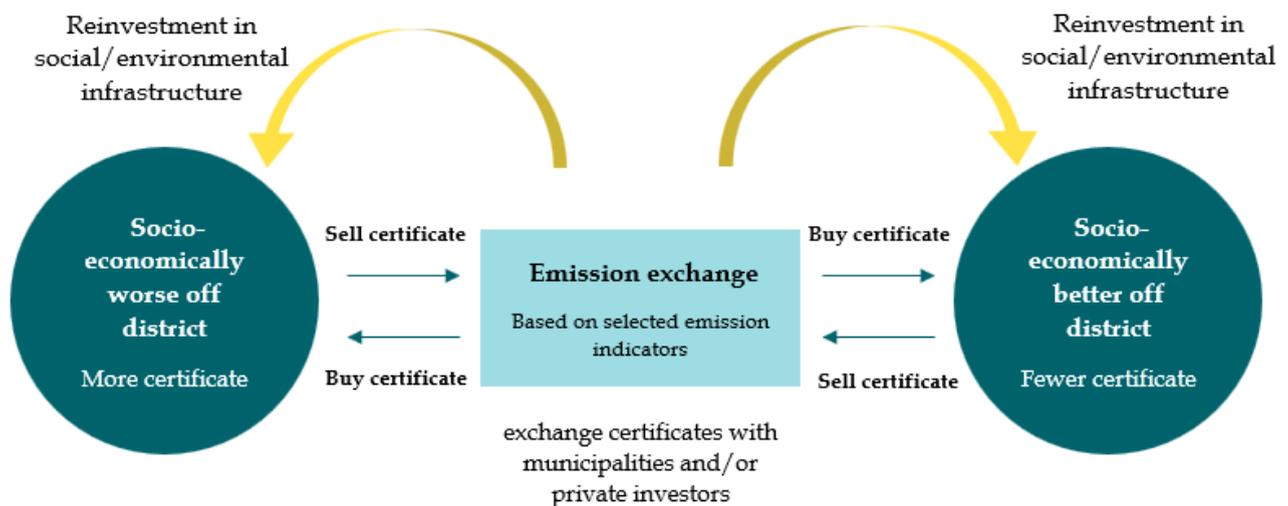


Figure 1: The mechanism of SUETS (Source: Thiesen, Steizer, & Weber, 2021)

KEY AREAS OF CONSTRAINT/SUPPORT

INFRASTRUCTURE REQUIREMENT POLICIES AND REGULATIONS THE SCALE OF THE PROGRAMME/PROJECT

The participating districts are Altenessen and Werden as shown in Figure 2. Altenessen is located in the north of the city with 44,000 residents (City of Essen, 2021c) taking much stronger hit from the coal industry phased out and therefore more economically disadvantaged. Meanwhile, the historical district, Werden, is located in the south of the city. Unemployment rate is 10% in Altenessen, while the rate is only 2.8% in Werden, showing the significant difference in the socio-economic structure.



Figure 2: Essen City with Altenessen and Werden districts marked (Adapted from: Wikimedia Comms)

TECHNOLOGY CAPACITY

A simple application is required to calculate emissions and facilitate emission trading.

COST AND FINANCING /BUSINESS MODEL

The TRANSCITY project is funded 250,000 euros by the Mercator Foundation (Clemens, 2021).

HUMAN RESOURCE CAPACITY

The project was initiated as a research project. During the project term, the Wuppertal Institute takes a leading role in evaluating the technical implementation process of the certificate trading and provides the necessary data, while the RheinMain University of Applied Sciences takes a leading role in evaluating the participation process in the districts (City of Essen, 2021c). The City of Essen provides staff and organizational support on site (Clemens, 2021).

POLITICAL COMMITMENT INSTITUTIONAL SET-UP

A working alliance has been set up including the Wuppertal Institute, the RheinMain University of Applied Sciences and the city of Essen (City of Essen, 2021c).

KEY BENEFICIARIES

People resides in the two participating districts benefited from (City of Essen, 2021c):

- Quarter opening and revitalization of climate-sensitive residents
- Practical application of the national emission criteria for 2030 and mitigation of additional costs
- Pioneering role in creating concrete measures for climate protection

TIMELINE

TRANSCITY Project running time (Stiftung Mercator, 2021): 01.03.2021 - 31.08.2022

The SUETS implementation timeline:

October 2019	18 months	5+ years
Exploration	Transfer phase <ul style="list-style-type: none"> • Activation • Dialogue • Data collection • Investment catalogue • Climate target setting • Acquisition 	Emission trading

IMPACTS

CARBON REDUCTIONS

The project contributes to the greenhouse gas emission reduction by encouraging residents from both districts to adopt a low carbon lifestyle. In addition, the proceeds received from the ETS will flow into social and environmental projects that involve both districts, as illustrated in Table 1.

Table 1: Social and environmental projects and their climate protection contributions (Source: Thiesen, Steizer, & Weber, 2021)

Projects	Short-term climate protection contribution	Medium-term climate protection contribution	Long-term climate protection contribution
Replacement of inefficient devices	Reducing electricity bills		
Renovation of buildings without adequate insulation		Measurable increase in building energy efficiency and living quality	
Targeted	Reducing electricity		Changing consumer

empowerment of energy awareness	bills		behaviour
Workshops and labs for cross-milieu capability building	Breaking cultural barriers through the establishment of small workshops, such as repair cafés		
Expansion of pedestrian and bike lanes network		Reduction of CO ₂ emissions through curbing motorised traffic	

- o RESILIENCE
- o CO-BENEFITS (e.g. JOB CREATION, AIR POLLUTION REDUCTION ETC.)

As social equity is an important component for the SUETS, the socio-economic benefits achieved are:

- A sustainable form of inner-city competition motivates city dwellers across the city, to change their climate and cultural practices;
- In the mid-term, with socio-economic and socio-ecological added value for the municipality;
- Change the overall view and perception of disadvantaged neighbourhoods as a result of disstigmatization

FACTORS FOR SUCCESS

Take the social considerations as a policy lever

Instead of taking the common approach of making the analysis of climate change's social impacts, the project takes the social perspective into account and intelligently leverages on the differences when considering the climate protection efforts. It considers the social aspect as the actual prerequisite for effective climate actions.

Financial incentives for the residents to adopt a sustainable lifestyle

Increasing awareness, openness and willingness of urban climate for the residents to cooperate and engage in climate actions. In addition, the project also creates financial incentives for sustainable development projects that improve the overall quality of life.

LESSONS LEARNED

OPPORTUNITIES, CHALLENGES, AND SCALING UP

The opportunities for scaling up projects like TRANSCITY and the setup of SUETS is possible because they bring immense benefits. For short, medium and long-term steps, the timeline for SUETS can be taken as a good example.

SUSTAINABILITY

Even though the TRANSCITY project will terminate by August 2022, the SUETS is planned for a longer term. The key is to secure a longer-term funding for the project and increase community engagements.

TRANSFERABILITY

The key to transferability of SUETS is that at least one better-off neighbourhood or district is ready to take on the role of a “net payer”. For this reason, it is preferred that the neighbourhood partnerships are established based on a voluntary basis. The legal mechanism is also considered in this process. Apart from this, the innovative and practical format has made SUETS highly transferable.

EFFICIENCY/EFFECTIVENESS

INSTITUTIONAL CONSTRAINTS/SUPPORTS

It is crucial that the project receives support from the local government, both politically and in terms of human resources. In addition, the establishment of a working alliance or group joined by academia and think tanks are also significant to support in the technical emissions. In TRANSCITY’s case, the RheinMain University of Applied Sciences and the Wuppertal Institute contributed to the success of the project.

FURTHER INFORMATION / CONTACT

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<https://www.essen.de/leben/umwelt/klima/klimaschutz/transcity.de.html>

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