



Sino-German Pilot Studies

FOR A LOW CARBON URBAN DEVELOPMENT

– the City of Wuxi and the Düsseldorf+ Region

OBJECTIVES / KEY FINDINGS / CONCLUSIONS



LOW CARBON FUTURE CITIES

**A Sino-German Cooperation on an Integrated Climate
and Resource Proof Urban Development**

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1. THE LOW CARBON FUTURE CITIES PROJECT

Background and Objectives

Increasing urbanisation and climate change are two of the great challenges of the 21st century. Cities are home to 50%–60% of the global population. It is estimated that up to 80% of global greenhouse gas emissions originate in urban areas, meaning that there is good potential for mitigation. At the same time, with their high population and infrastructure density, as well as a concentration of economic activity, cities are particularly vulnerable to the impacts of climate change and, therefore, must learn to adapt.

Against this background the Sino-German Low Carbon Future Cities project, funded by Stiftung Mercator, aims to:

- Develop an integrated low carbon, circular economy and adaptation strategy for pilot areas in China (the city of Wuxi) and in Germany (the Düsseldorf+ region) that addresses the needs of local stakeholders.
- Demonstrate good practice examples of sustainable urban development that have good potential for implementation and replication in other urban areas.
- Initiate a stimulating dialogue among stakeholders from the two pilot areas to enable and actively support mutual learning and information exchange between China and Germany.

Accordingly, the project follows an integrative and participatory approach combining three major elements:

- **Scientific analysis**, which actively links greenhouse gas mitigation to adaptation and resource efficiency and encompasses both quantitative and qualitative methods as well as status quo assessments and exploration of future pathways.
- **Sino-German stakeholder dialogues** for discussing preliminary project outcomes with practitioners and decision-makers from both regions and for stimulating an exchange of know-how and experiences between decision-makers in Wuxi and the Düsseldorf+ region.
- The development of **integrated business models** and other tools that aim to involve specific urban entrepreneur stakeholders.

CA.
6 MIO INHABITANTS
IN WUXI

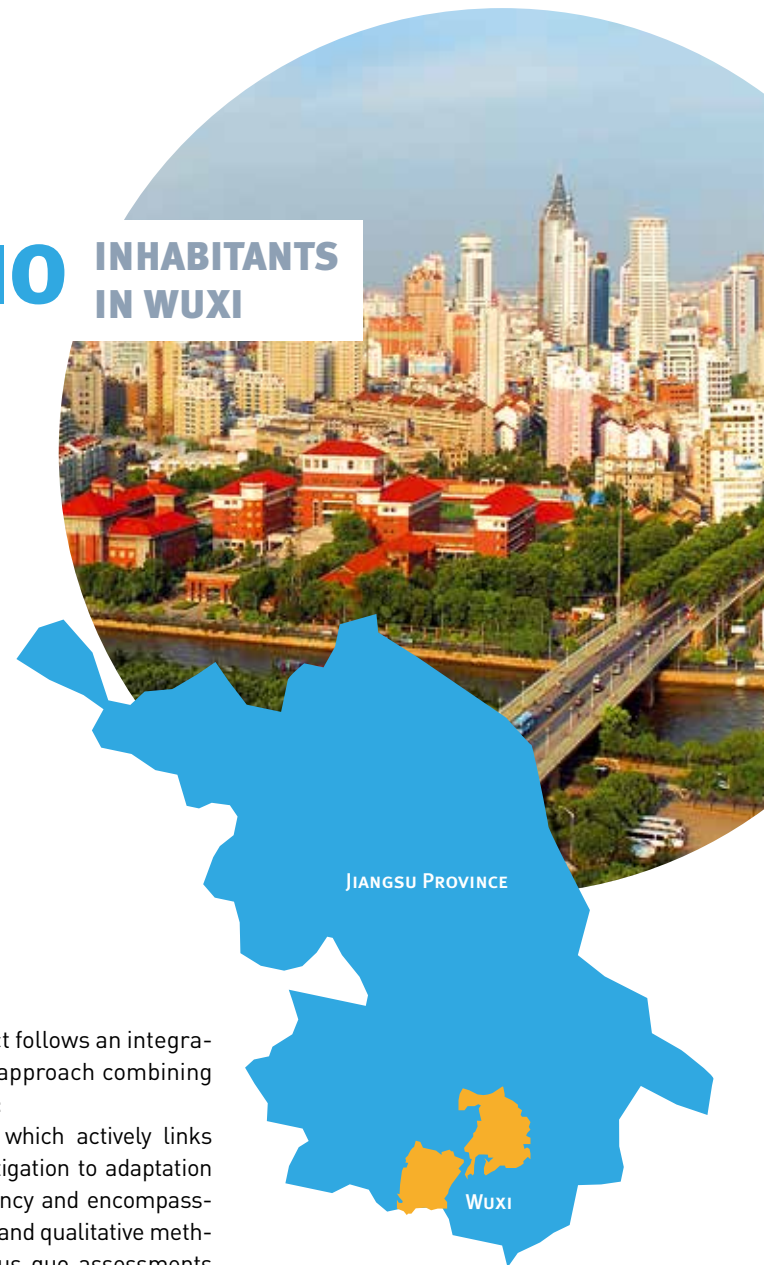


FIG. 1: CITY OF WUXI AND DÜSSELDORF+ REGION

ATTENTION: MAPS DON'T SHOW REALISTIC PROPORTIONS. WUXI IS 4 TIMES LARGER THAN THE DÜSSELDORF+ REGION

CA.
1.5 MIO INHABITANTS IN THE
DÜSSELDORF+ REGION



LCFC Pilot Cities – Wuxi and the Düsseldorf+ Region:

The two pilot areas of the LCFC project are the city of Wuxi in China and the Düsseldorf+ region in Germany. The city of Wuxi, located in the south of Jiangsu Province in China, has about six million inhabitants and is an industrial centre within the province. It has been faced with rapid economic growth and recently started its transition to low carbon development through economic structural change and a variety of policies and measures. The Düsseldorf+ region,

located in the federal state of North Rhine-Westphalia (NRW) in Western Germany, covers the cities of Düsseldorf, Neuss and Ratingen, as well as the districts Rhein-Kreis Neuss and Kreis Mettmann. The region has about 1.5 million inhabitants. It is characterised by a high level of economic and industrial development and has long been on a transition path to low carbon development. For example, Düsseldorf city has been going through structural economic

change with a significant growth of the tertiary sector since the 1960s.

The project aims to provide a number of opportunities for the city of Wuxi to learn about the rich experiences of the Düsseldorf+ region and, consequently, to support and accelerate its transition to low carbon development. Meanwhile, the project creates an important impetus for potential collaboration on low carbon practices between the two pilot regions.

2. STATUS-QUO

in Wuxi and the Düsseldorf+ Region

In both case studies, the LCFC team started with a comprehensive status quo assessment covering key questions relating to low carbon development. The assessments took into account available studies and data, as well as knowledge gaps in both pilot regions, and tried to fill these gaps. Therefore, different analyses were used as starting points for Wuxi and the Düsseldorf+ region.

Wuxi

For Wuxi, the status quo assessment included the following elements:

- The development of a greenhouse gas (GHG) emissions inventory for Wuxi.
- Status quo resource utilisation assessment of the energy transformation and residential building sector in Wuxi.
- An institutional analysis of current low carbon development in Wuxi.

The status quo assessment of GHG emissions and resource utilization established the basis for identifying the four key sectors, which are the focus of an integrated low carbon strategy for Wuxi as developed in this project: **power and heat, buildings, transport, and industry.**

GHG EMISSIONS INVENTORY IN WUXI

Being a preliminary status quo assessment, the development of the GHG emissions inventory in the project followed the methodological guidelines of the International Panel on Climate Change (IPCC). The major data source was Wuxi's Statistical Yearbook, published by the Wuxi Statistical Bureau.

Energy-related CO₂ emissions are the focus of the inventory. For other GHG emissions, qualitative description and primary estimation were given in order to raise the city authorities' awareness.

Energy-related CO₂ emissions

Our results show that local energy-related CO₂ emissions, which largely result from the combustion of coal (95%), make up the highest share of Wuxi's total emissions. Electricity and heat production are the main source for energy-related emissions, representing about half of the current CO₂ emissions. In the manufacturing industries, energy-intensive sectors, such as the iron and steel industry and the chemical industry, are currently most relevant (each of these accounts for 13.5% of Wuxi's total emissions). However, other sectors, such as road transportation, also produce considerable emissions.

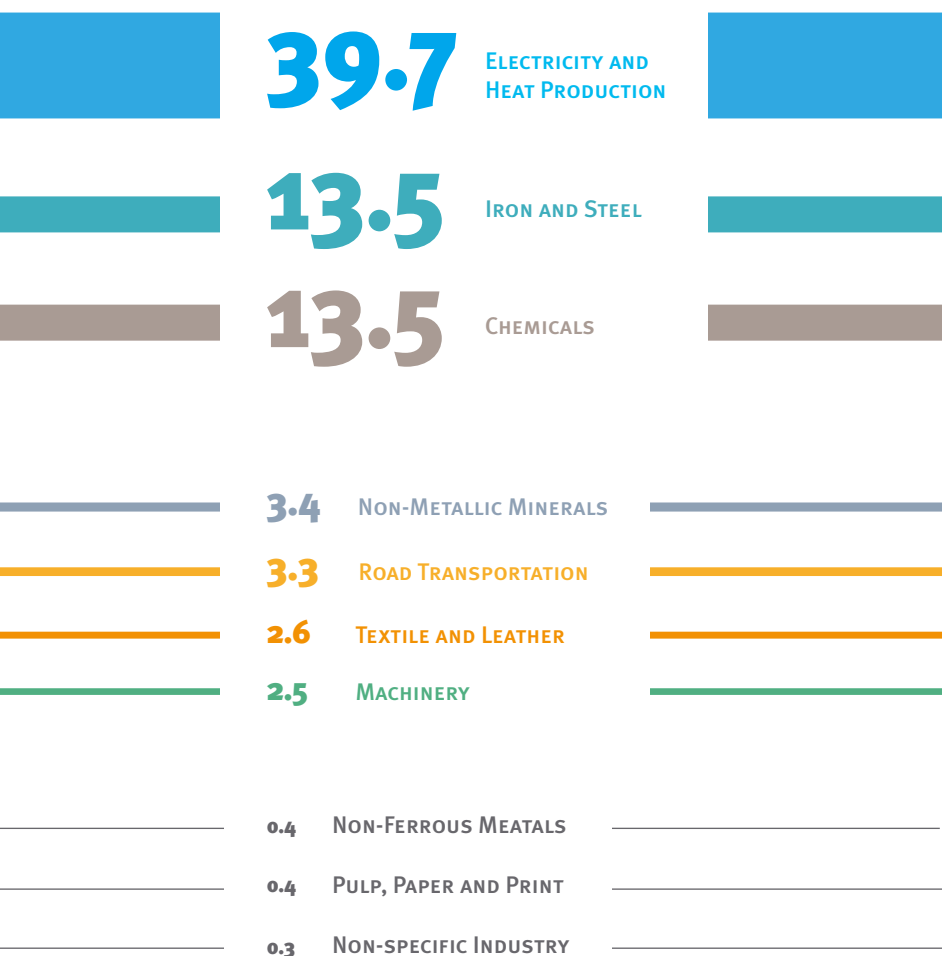


FIG. 2: WUXI'S TOTAL DIRECT CO₂ EMISSIONS (IN MILLION TONNES) IN THE IPCC-ENERGY SECTOR IN 2009

Other GHG emissions

Wuxi has several industries with potentially high process-related emissions, such as the steel industry, cement industry, chemical industry or electronics. Due to the limited availability of data, these emissions were assessed in a qualitative way in the project. We recommend that Wuxi city government quantifies these emissions in future inventories, if data is available. In agriculture, non CO₂-related emissions were assessed in certain sub-sectors such as livestock and manure management. Despite its importance, emissions were not measured in the waste sector as no data was available.

RESOURCE UTILIZATION OF THE ENERGY TRANSFORMATION AND RESIDENTIAL BUILDING SECTORS IN WUXI

Solutions for mitigating GHGs often imply synergies or trade-offs with resource efficiency. For this reason, the LCFC project does not focus solely on mitigation but also tries to link it with the resource efficiency dimension.

As an example, the use of resources in Wuxi's energy transformation and residential building sectors was examined. This followed two material flow analysis (MFA) methods: material input per unit of service (MIPS) and economy-wide material flow analysis (EW-MFA). All natural resource inputs (direct or indirect, economically used or unused, domestic or foreign) that are activated by human activities in Wuxi were considered.

Resource utilization of the energy transformation sector

As well as the significant direct raw coal input (17 million tonnes) of Wuxi's energy transformation sector, there are two types of enormous hidden material and water flows behind the direct coal inputs: (1) those activated by the extraction of the raw coal; (2) indirect material flows linked to imported electricity. These hidden flows resulted in a further 59 million tonnes of material consumption and 332 million tonnes of water consumption.

Resource utilization of the residential building sector

In 2005, Wuxi's residential buildings represented a stock of 464 million tonnes of materials. Urban residential buildings consumed 174 million tonnes of materials and rural residential buildings consumed 292 million tonnes.

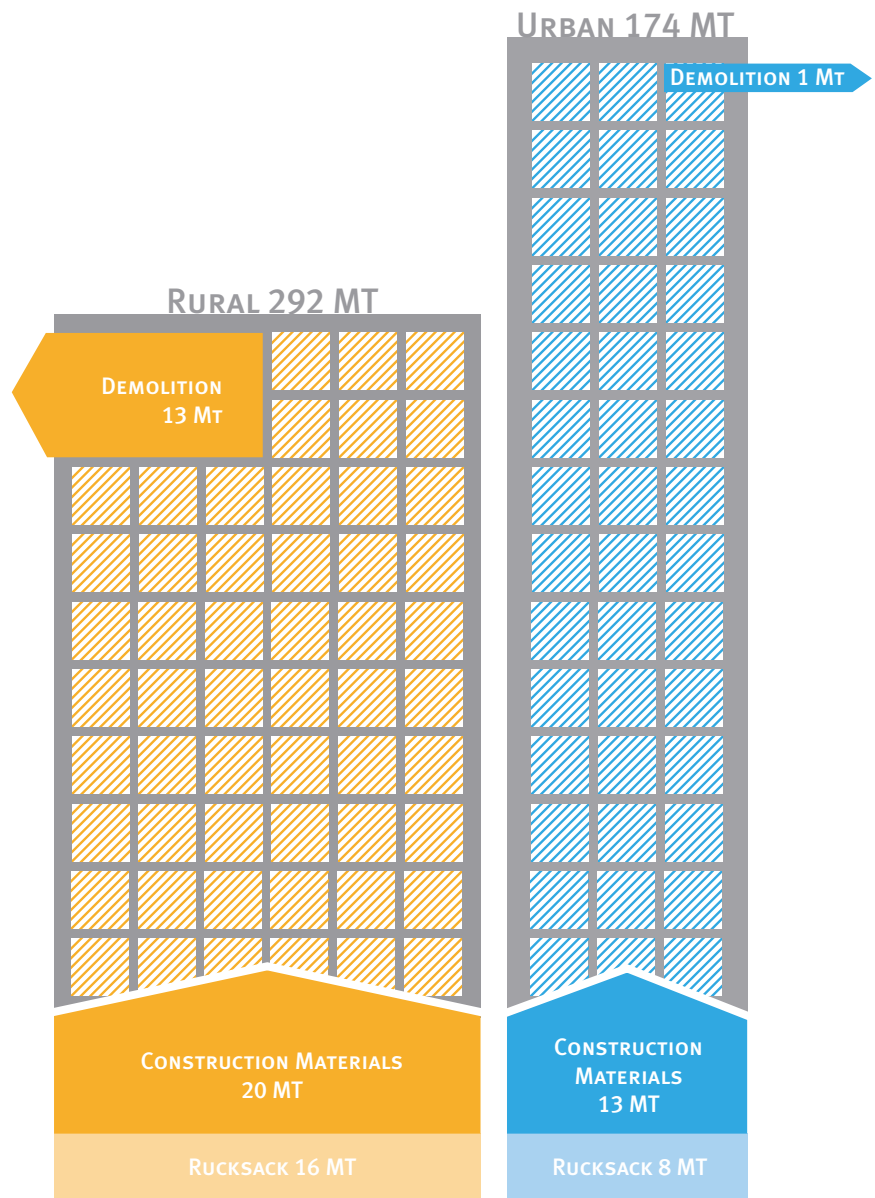


FIG. 3: MATERIAL STOCKS AND FLOWS IN RESIDENTIAL BUILDINGS (2005)
* RUCKSACK REFERS TO HIDDEN (INDIRECT) MATERIAL FLOWS

FOR INTERESTED READERS:

Further details on the status quo of material flows and greenhouse gas emissions in Wuxi are available in the LCFC report "Integrated Status Quo and Trends Assessment" (www.lowcarbonfuture.net).

CURRENT INSTITUTIONAL FRAMEWORK OF LOW CARBON DEVELOPMENT IN THE KEY SECTORS IN WUXI

Our quantitative assessments were framed with a qualitative analysis of Wuxi's current institutional setting in order to understand its capacities and the political leeway for pursuing low carbon development at local level. The institutional analysis shows that Wuxi has already initiated a process aiming towards low carbon development that integrates both mitigation and resource efficiency. This is demonstrated in the recent structural economic change from energy-intensive industries to a stronger service sector, ambitious low carbon targets set by the government and the formulation and enforcement in various key sectors of a wide range of policy instruments that address climate mitigation and resource efficiency. Adaptation, on the other hand, has not yet been explicitly addressed by the city authorities, with the result that institutions and processes for adaptation need to be established.

We identified the opportunities and barriers for coping with climate mitigation and resource efficiency in the following three dimensions: policy instruments, actor constellation and financial and human resources.

Policy instruments:

- Regulatory top-down instruments are still dominant in policy-making in Wuxi. These can be very effective but can also

have distorted effects if used in isolation.

- There is an emerging use of market-based instruments, such as the promotion of energy performance contracting as well as various information and supportive instruments.
- However, additional policy instruments, especially those which facilitate investment and knowledge sharing among experts from politics, business and science, are needed to facilitate the transition towards a low carbon future in Wuxi.

Actor constellation:

- Government units that co-ordinate activities from different departments to implement low carbon strategies do exist.
- However, their effectiveness is impeded by institutional complexity and overlapping responsibilities. Further concentration and/or clarification of responsibilities may be necessary.

Resources:

- Public funding has been devoted to low carbon development in each key sector.
- However, there is a lack of skilled staff in the municipal government to promote mitigation and resource efficiency. We recommend further actions to improve staff knowledge and expertise.
- Financing mechanisms need to be further diversified and collaboration between the public and private sectors, as well as within the private sector, needs to be facilitated.

Example of the institutional analysis:

Municipal administrative units responsible for mitigation policies in Wuxi's transport sector (The centre is the organization responsible for low carbon development in the sector; the periphery indicates the relevant stakeholders, ranging from the leading actors of specific actions to participating actors).

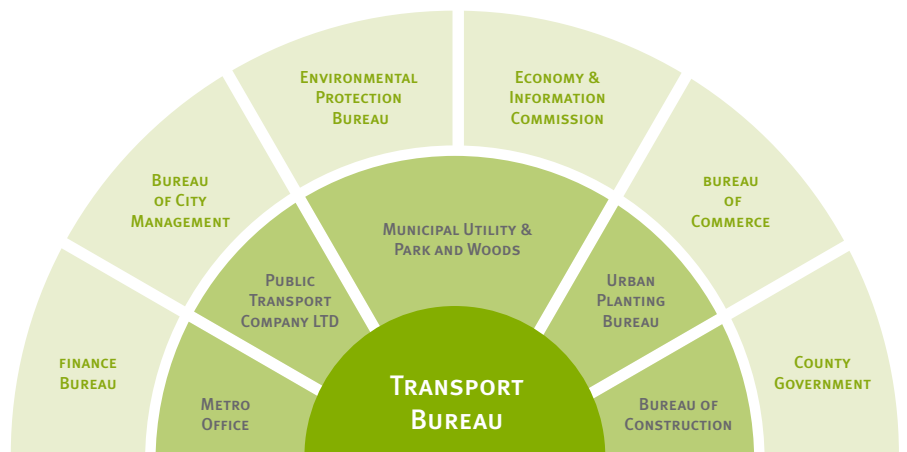


FIG. 4: EXAMPLE OF THE ACTOR ANALYSIS: MUNICIPAL ADMINISTRATIVE UNITS RESPONSIBLE FOR MITIGATION POLICIES IN WUXI'S TRANSPORT SECTOR

FOR INTERESTED READERS:

Further details on Wuxi's current policy and institutional framework for low carbon development are available in the LCFC report "Institutional Analysis of Wuxi Low Carbon Development" (www.lowcarbonfuture.net).

Düsseldorf+ Region

As the region of Düsseldorf+ possesses a broader database of GHGs, the status quo assessment of the Düsseldorf+ region focused mainly on socio-economic and institutional analyses, including :

- An analysis of regional socio-economic factors, identifying potential interrelations between general trends and the low carbon pathway.
- An institutional analysis to evaluate the capacities to act on climate and energy policy at local level in Germany and to evaluate the established policies and activities, focusing on the Düsseldorf+ region.

REGIONAL ANALYSIS OF SOCIO-ECONOMIC FACTORS IN THE DÜSSELDORF+ REGION

Due to its dynamic nature and economic strength, the Düsseldorf+ region is well-suited overall to the successful development and implementation of a low carbon strategy. Some actions are, however, particularly relevant in order to reach ambitious low carbon objectives:

- A low carbon strategy needs to address the regional traffic situation, largely made up of commuter flows using cars, with integrated, intelligent and flexible mobility concepts.
- With decreasing construction of residential and office buildings, activities need to focus on fostering the modernisation of the building stock.
- Due to the high share of energy-intensive industries (chemical and metal industries) in the region, innovative resource-efficient technologies and processes in the manufacturing sector are a key factor in the success of a low carbon strategy and need to be fostered.
- Demographic change will have a major impact on a range of demand and consumption patterns with indirect and, in some cases, hard to define impacts on carbon emissions. A consistent low carbon strategy needs to take these effects into consideration.

These findings deliver starting points for a discussion on the development of stronger regional links between the city of Düsseldorf and the surrounding areas.

CURRENT INSTITUTIONAL FRAMEWORK OF LOW CARBON DEVELOPMENT IN GERMANY AND THE DÜSSELDORF+ REGION

Institutional structures in the fields of mitigation, adaptation and resource efficiency

are currently at different stages of development within different administrative levels in Germany. Regarding mitigation targets and strategies, policies at European and national level strongly influence activities at local and regional level. The regimes of adaptation to climate change and resource efficiency are currently under development.

In the Düsseldorf+ region, the stage of implementation of climate policies varies significantly from area to area. The city of Düsseldorf has set very ambitious reduction targets and has implemented a broad spectrum of policies and measures for different target groups. The adjacent districts of Mettmann (in the East of Düsseldorf) and Rhein-Kreis Neuss (in the West) have not yet developed any mitigation action plans but have implemented some measures in selected fields of action. Activities in the fields of adaptation and resource efficiency are much less developed across the whole region. The city of Düsseldorf has initiated a few such measures, but the adjacent districts have not yet developed programmes focused on adaptation and resource efficiency.

As a result, creating a low carbon future in the Düsseldorf+ region, as well as in other German cities, requires better “integration” in the following areas:

- An integration of mitigation, adaptation and resource efficiency. In the Düsseldorf+ region, integrated regional climate and adaptation plans are a key activity for improving co-operation and integration at regional level.
- An integration of local climate policy with other fields of urban development, for example business development, transport, land use and energy supply planning.
- An integration of quantitative targets with narrative and spatial future images of the region in a consistent road-mapping process.
- Regional collaboration between the city of Düsseldorf and its surrounding areas.

FOR INTERESTED READERS:

Further details on the regional socio-economic factors in the Düsseldorf+ region are available in the LCFC report “Regional Analysis of Socio-Economic Factors in the Düsseldorf+ Region” (www.lowcarbonfuture.net).

Further details on the current institutional framework of low carbon development in Germany and the Düsseldorf+ region are available in the LCFC report “Institutional Analysis of the Düsseldorf+ Region” (www.lowcarbonfuture.net).

3. LOW CARBON FUTURE

An integrated low carbon strategy for Wuxi

The status quo assessment of Wuxi and the Düsseldorf+ region provided a sound basis for developing low carbon strategies in both pilot areas.

Wuxi needs to develop an understanding of the long-term challenges and solutions. Therefore, for Wuxi we explored various low carbon future development pathways using scenario analysis. Combined with stakeholder dialogue, we provided an

integrated low carbon strategy with concrete examples from Germany.

Düsseldorf has already developed a 2050 low carbon scenario. However, our status quo assessment indicates that stronger regional links between the city of Düsseldorf and its surrounding areas is essential for a low carbon future. Accordingly, we offered recommendations and examples of regional collaboration.

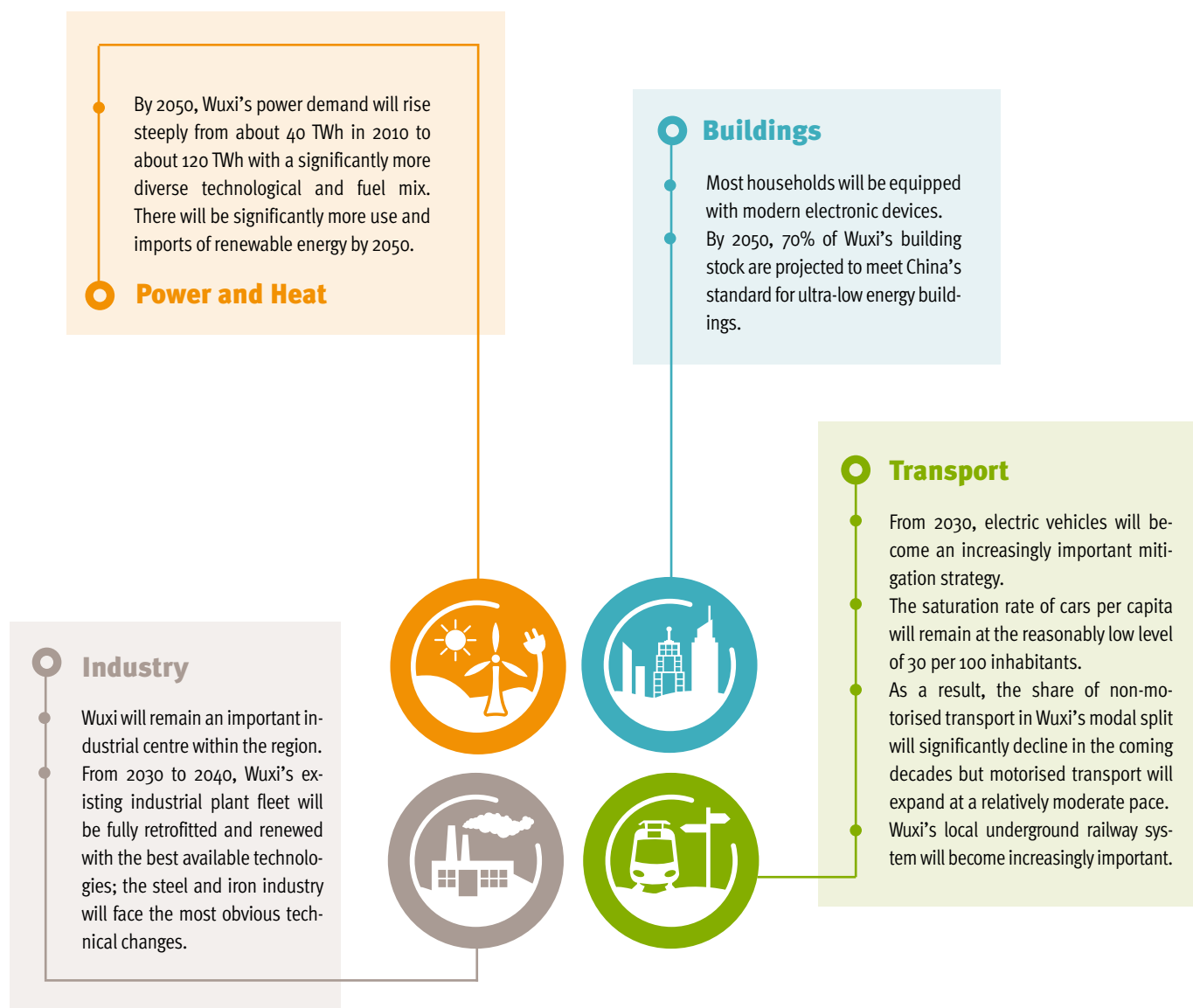


FIG. 5: KEY ASSUMPTIONS MADE ABOUT THE FOUR KEY SECTORS IN THE EXTRA LOW CARBON SCENARIO

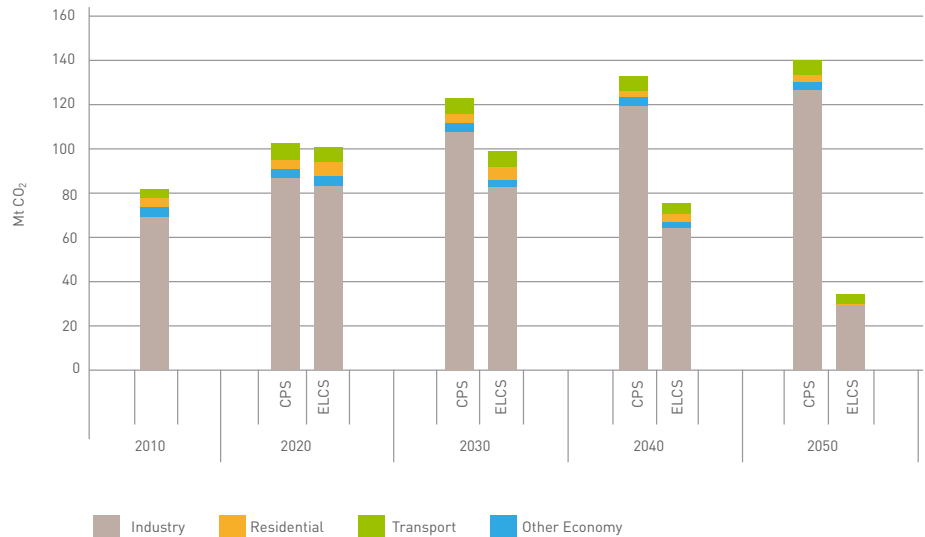


FIG. 6: WUXI'S DIRECT AND INDIRECT CO₂ EMISSIONS IN THE CURRENT POLICY SCENARIO (CPS) AND THE EXTRA LOW CARBON SCENARIO (ELCS), 2010-2050.

POTENTIAL DEVELOPMENT AND GHG EMISSIONS IN KEY SECTORS IN WUXI

Three quantitative long-term low carbon scenarios for Wuxi in the period up to 2050 were developed for the four key sectors identified in the status quo assessment (**power and heat, building, transport and industry**). These were based on multiple assumptions made by the Low Carbon Future Cities team in consultancy with local stakeholders. The three scenarios are:

- **Current Policy Scenario (CPS):** the targets and policies set in Wuxi's existing low carbon plan served as the basis for the assumptions in this scenario.
- **Low Carbon Technology Scenario (LCTS):** this scenario assumes an accelerated diffusion of best available technologies for mitigation, tailored to local potential.
- **Extra Low Carbon Scenario (ELCS):** this scenario consists of even more ambitious assumptions for low carbon development in the key sectors, such as the substantial use of advanced mitigation technologies and behavioural changes.

Across all three scenarios, it was assumed that Wuxi would be a highly developed and prosperous city by 2050. Its economic structure will be dependent on energy-intensive industries but this change may possibly be offset by the growth of more high-tech and service-oriented products.

To foster ambitious low carbon development in Wuxi, the integrated low carbon strategy for Wuxi was developed based on the **Extra Low Carbon Scenario**.

In the **Extra Low Carbon Scenario**, Wuxi's CO₂ emissions are expected to peak at 100 million tonnes between 2020 and 2030. The ambitious measures in this scenario lead to

a gradual decline in emissions to a level of 36 million tonnes by 2050, which equates to 6.4 tonnes CO₂ per capita. Compared to 2010, this would be equivalent to a reduction of 56%. Of the four key sectors, industry has the highest mitigation potential. However, 6.4 tonnes CO₂ per capita is still well above the IPCC's target level (2 tonnes CO₂ per capita). This means that carbon neutral development will be difficult to achieve even with the very ambitious assumptions made in the **Extra Low Carbon Scenario**.

RESOURCE UTILIZATION AND ADAPTATION TO CLIMATE CHANGE IN A LOW CARBON FUTURE WUXI

What would the pattern of resource utilization be in a low carbon future Wuxi under the **Extra Low Carbon Scenario**? The Low Carbon Future Cities team conducted a quantitative long-term scenario of the resource utilization in the energy transformation sector and residential building sector.

Another relevant question relates to climate change trends in Wuxi and their impact on a low carbon Wuxi. To examine this we first projected changes of climate parameters until 2100, based on a comprehensive set of climate data available for Wuxi as well as a set of global and regional climate models. This served as a basis for exploring potential adaptation measures as well as their economic impacts and their synergies with mitigation measures.

Resource utilization in a Low Carbon Future Wuxi

Power and Heat

In the **Extra Low Carbon Scenario**, there will be a significant increase in renewable energy and a shift in energy generation from a coal-dominated fuel mix to a gas-dominated mix with a significant share of renewable energy. Consequently, despite the significant energy demand, the material and water demand will not increase correspondingly because of the lower resource footprint of renewable energy and gas compared to that of coal. The material demand of Wuxi's power and heat sector in the **Extra Low Carbon Scenario** is about four times lower than in the **Current Policy Scenario**.

Buildings

Due to the expected growth in population and the increase in demand for urban living space, the material demand for urban residential buildings will increase by about 70% compared to 2010. However, the amount of materials trapped in rural buildings will decrease by almost half. Overall, the environmental pressures that result from the demand for construction materials and disposal of building waste will continue to be significant in the **Extra Low Carbon Scenario**.

Implications of adaptation to climate change to low carbon future in Wuxi

The number of annual heating degree days (HDDs) in Wuxi is projected to decline in the future. By 2050, HDDs are expected to decline by a further 11 days and will amount to less than 15 HDDs in 90 years' time. The number of annual cooling degree days (CDDs) is projected to increase by about 20 by 2050.

The increased CDDs suggest a likely increase in energy demand for air conditioning, which could potentially result in high energy costs and a higher level of GHG emissions. This shows that there is a strong link between the mitigation of GHG emissions and adaptation to climate change. Consequently, energy efficient cooling devices and systems become essential for tapping synergies between adaptation and mitigation, as well as for stabilizing energy costs for air conditioning.

BEYOND SCENARIOS: POTENTIAL ACTIONS FOR INTEGRATED LOW CARBON DEVELOPMENT IN WUXI

The **Extra Low Carbon Scenario** and other scientific analyses formed the basis for the development of an integrated low carbon strategy for Wuxi. To go beyond scenarios, the Low Carbon Future Cities team aims to support Wuxi city government by offering examples of possible low carbon solutions from Germany, particularly from the German pilot region, Dusseldorf+.

To ensure that the examples selected are relevant for Wuxi, the Low Carbon Future Cities team followed a step by step approach. Firstly, based on comprehensive scientific analyses of the project and intense dialogue with city representatives from Wuxi, we identified challenges and needs across and within the four key sectors. In a second step, we derived strategic approaches to address these challenges and needs. Thirdly, we selected examples of good practice from the Dusseldorf+ regions and beyond. These examples could help to implement the strategic approaches if transferred to Wuxi, based on the experiences of the Wuppertal Institute in low carbon city projects in Germany and the Dusseldorf+ region. Finally, we provided concrete recommendations for measures to take and next steps to facilitate replication in Wuxi of the German examples.

FOR INTERESTED READERS:
Further detailed information on the Extra Low Carbon Scenario, further scenario pathways, as well as their implications on resource efficiency and adaptation, are available in the full reports "Integrated City Strategy for CO₂ Emission Reduction, Resource Efficiency and Climate Resilience" and "Integrated Status Quo and Trends Assessment" (www.lowcarbonfuture.net).

Further detailed information on the integrated low carbon strategy for Wuxi are available in the full report "From Scenarios to Action - Facilitating a Low Carbon Pathway for Wuxi" (www.lowcarbonfuture.net)

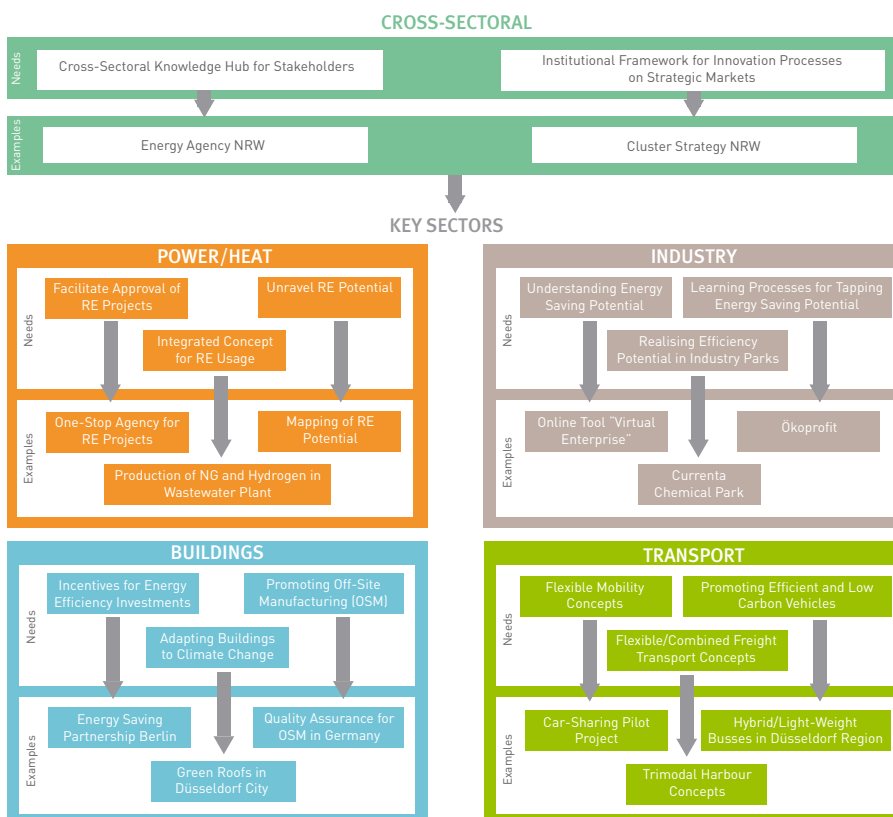


FIG. 7: NEEDS AND POSSIBLE SOLUTIONS FOR LOW CARBON DEVELOPMENT IN WUXI

4. REGIONAL TRANSFORMATION

A strategy for Energy transformation in Düsseldorf+ Region

The Düsseldorf+ region is characterized by strong links between outlying areas and the city of Düsseldorf as its metropolitan core. These links, which have a significant impact on settlement structures, traffic patterns and infrastructure development, promote substantial regional co-operation. Such co-operation will play an important role in achieving energy transformation in the Düsseldorf+ region.

The Low Carbon Future Cities team identified the following two possible collaborative pathways of regional co-operation on energy transformation and climate protection in the Düsseldorf+ region:

- Collaborative Pathway 1 – regional networking and information exchange, which include intensifying current information exchange, setting up regional network organisations/platforms, fostering specific collaboration under various grant programmes for climate protection and developing a regional climate action plan.
- Collaborative Pathway 2 – institutionalizing regional collaboration, which starts from those in the Düsseldorf+ region and scales up to those fostering the joint efforts of the metropolitan region covering Düsseldorf, Cologne, and Bonn. The areas of collaboration can cover economic development, energy supply and energy efficiency, tourism, land use, transport, as well as other issues of regional significance.

The following three factors are essential for both pathways:

- Energy transformation needs a long-term strategy, such as a climate action plan that systematically addresses the challenges and impacts of energy transformation in the region.
- Collaboration needs a common long-term regional roadmap, which includes shared visions and aligns different innovations. The roadmap should include benchmarking as well as active monitoring.
- Innovation needs partnership and dialogue in order to identify the common interests and win-win strategies among stakeholders.

- Energy transformation is a societal transformation that embraces different stakeholders. Given the good potential for action in the Düsseldorf+ region, it is essential to bring together different stakeholder groups in a proactive way. This requires an organizational structure that builds upon the on-going initiatives and existing structures to stimulate dialogue and organize projects. Co-operation can start with flagship projects in specific fields.

In 2013, we hosted the workshop “possible benefits of stronger regional co-operation in the fields of climate protection and energy transition in the Düsseldorf+ region” in Düsseldorf. Participants from the municipal administration, scientific institutes and business associations in the Düsseldorf+ region discussed issues such as economic benefits and mechanisms as well as funding opportunities for regional co-operation in the Düsseldorf+ region. As a next step, the municipal representatives were invited to identify possible issues and opportunities for a regional flagship project in their municipalities.

FOR INTERESTED READERS:

Further detailed information about the strategy for energy transformation in the Düsseldorf+ region is available in the full report (www.lowcarbonfuture.net)

5. CONCLUSION

The Low Carbon Future Cities project delivered short to long-term low carbon strategies tailored to the local needs and challenges of both pilot areas, the city of Wuxi in China and the Düsseldorf+ region in Germany. For both pilots, strategy development was based on rigid scientific analysis and intensive dialogue between the LCFC team and local and regional stakeholders. The latter significantly enhanced the sense of ownership of the strategies by the local authorities in both pilot areas, with the result of increasing the likelihood of the strategies being implemented. Meanwhile, the project team promoted a series of Sino-German dialogues between both pilot regions. It linked up decision-makers from different administrative offices and departments in Wuxi with municipal and district representatives from the Düsseldorf+ region. The aim of the dialogue process was to facilitate mutual learning about low carbon practices and to create impetus for potential collaboration between the two regions.

Both pilot studies have shown that technological solutions for low carbon development should be embedded in a well-developed institutional framework to foster their deployment and implementation. Therefore, recommendations for Wuxi include examples of innovative and integrated technical projects for increasing energy and resource efficiency (such as the use of sludge from a waste water treatment plant for natural gas and hydrogen production) with recommendations for the development of institutional frameworks. The creation of this type of framework, such as a local Energy Agency in Wuxi, would offer support and expertise to potential investors in low carbon technologies and help to systematically integrate low carbon issues into related policy. In the Düsseldorf+ pilot, the strategic focus was on institutional structures and mechanisms for improving inter-municipal collaboration in order to address challenges that reach beyond administrative boundaries. An analysis of the socio-economic trends as well as of the current institutional setting for low carbon development within the region underlined that stronger collaboration is key for regional low carbon development and needs to be strengthened through common lighthouse projects and/or an institutional framework. This insight is also of high relevance for Wuxi where collaboration with the provincial level and adjacent cities is also an important prerequisite for an ambitious low carbon strategy.

FOR MORE INFORMATION:

Please visit our website:
www.lowcarbonfuture.net



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