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## ICLEI
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# URBAN TRANSITIONS
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**Sustainability Transition Pathways from Industrial Legacy Cities**

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**Industrial legacy.**
**Sustainable future.**

**This publication is a project report from the Urban Transitions Alliance.**

The Urban Transitions Alliance, an initiative led by ICLEI and funded by the Stiftung Mercator, presents an opportunity for industrial legacy cities across the world to demonstrate their commitment to sustainable urban development.

The Alliance is a city network and knowledge-exchange hub of innovative urban transition policies and projects. It supports industrial legacy cities from across the globe to identify common challenges, share knowledge and develop solutions to successfully guide their individual sustainable transitions. Current cities and urban districts represented in the Alliance are:

- City of Baltimore, USA
- City of Buffalo, USA
- City of Cincinnati, USA
- City of Dortmund, Germany
- E-Town, City of Beijing, China
- City of Essen, Germany
- City of Gelsenkirchen, Germany
- Huairou District, City of Beijing, China
- City of Katowice, Poland
- City of Pittsburgh, USA
- Yuhua District, City of Shijiazhuang, China

Local government representatives from the Alliance members have jointly decided to explore the key topics of Infrastructure, Energy, Mobility and Social Transition. The knowledge captured from the Urban Transition Alliance exchanges between November 2017 and March 2019 has been summarized in these Urban Transition Alliance Roadmaps.

Read more: www.urbantransitions.org

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# INTRODUCTION

The Urban Transitions Alliance is made up of a group of cities across borders and oceans that share a similar transition history, physical infrastructure and demographic structure. These are cities that prospered and grew quickly in the heyday of industrialization and had to cope with the impacts of their economic centers of gravity fading away. The Alliance was built on the premise that by connecting industrial legacy cities from the US, Europe and China through their transition stories and visions of sustainable urban development, common challenges and transition pathways would emerge. The Urban Transitions Alliance has been designed to provide the infrastructure and support to identify such challenges, share knowledge and co-create solutions for local action. Over the past two years, the Urban Transitions Alliance has grown into a strong network of city practitioners built on regular exchanges on topics of interest driven by local priorities. In thematic panel discussions and workshops, webinars and exchange calls, the Alliance members have shared and discussed their historical context, local priorities and forward-looking projects. Throughout the cooperation, it showed more and more that despite specific local and regional contexts, these cities speak the same language and can relate to each other's conditions and transition barriers. The following section outlines overarching development trajectories with consideration of regional specifics.



Arial view of the Consolidation coal mine industrial complex in the City of Gelsenkirchen.

The picture was taken in the year of 1929.

The Urban Transitions Alliance engages mid-sized cities - or urban districts in some cases - whose development was or is strongly linked to industrial growth based on fossil fuel extraction, heavy manufacturing, and depleting resource use. The development patterns in these cities are closely intertwined in national and regional contexts: In Europe and the US, industrialization gathered momentum in the early 19th century. Strategic locations, often close to waterways, and natural resource deposits turned the German Ruhr area, the Upper Silesia region in Poland, and the US "Rust Belt" into the industrial powerhouses of their national economies, experiencing rapid job growth and population influx. In the second half of the 20th century, these regions were increasingly faced with the decline or progressive phase-out of their signature industries. Reasons for this trend are manifold and complex, including growing environmental pressures and globalization coupled with trends of digitalization and automation. The impact of deindustrialization on local economies relying on singular industrial sectors was huge and caused a fundamental crisis that will be further detailed below. In the Chinese context, high industrial growth has been spurred by the Chinese economic reform that started in 1978. Although growth rates have started to slow in recent years, the Beijing and Shijiazhuang metropolitan regions have not seen the

same boom and bust dynamic as their western peers, but rather a different, by no means less radical transition: The Alliance members Beijing E-Town and Shijiazhuang Yuhua District have transformed from agricultural areas to industrial hubs in less than thirty years. Despite differences in how they experience industrialization, all regions represented in the Alliance are united by the common need to create sustainable and resilient systems.

In line with the trajectories illustrated above, Alliance cities and districts have not only experienced interrelated growth of economy, employment and population, but also faced the other side of the coin: environmental pollution that particularly impacted parts of the city close to mines and production sites, where a large share of factory workers had their homes. When industrial decline in the Ruhr area, in Upper Silesia and the Rust Belt caused severe job and population loss, urban landscapes began to show industrial wastelands, abandoned buildings, brownfields and vacant lots. Ensuing images of poverty and pollution reinforced trends of underinvestment and often lead to a loss of identity for the city. Again these phenomena were particularly visible in workers' neighborhoods like Over-the-Rhine in Cincinnati, Bismarck and Schalke-Nord in Gelsenkirchen and Nikiszowiec in Katowice. Chinese members in the Alliance that strongly rely on industrial production but have not experienced a phase of decline face similar challenges linked to environmental degradation, most specifically air pollution, and social inequality.

The fundamental transition industrial legacy cities experienced was happening without choice: Citizens and local governments had hoped in vain for the glorious past to return, while they had also seen the environmental impacts from heavy industrial production. Recognizing the need to re-structure their social and economic systems, Urban Transitions Alliance members have learned to embrace transitions that lead to new opportunities but in a way that prioritizes the needs of their local populations. It has clearly been a key challenge and priority for local governments across the Alliance to foster green, healthy urban environments and opportunities for all citizens to thrive, specifically including underserved communities. While developing their own paths towards more vibrant, sustainable economies and more resilient urban systems, they have designed inclusive programs and policies to support their transition.

Throughout the project, the industrial legacy lens has been beneficial to guide the conversations and highlight specific challenges and assets. The knowledge captured in these Urban Transitions Alliance Roadmaps is based on local transition programs and informed by the many exchanges that took place throughout the project. Reflecting the thematic priorities of the Alliance members, the chapters subsequently focus on challenges and solutions in the fields of Infrastructure, Energy, Mobility, and Social Transition.[1] Each topic is explored in terms of background, barriers and opportunities related to the industrial legacy context. Transition priorities and innovative approaches from the different regions are outlined in key pathways and exemplified in case studies from the Alliance cities and districts. Some of the conditions described might apply in various degrees to cities beyond the industrial legacy context - that is why transition experiences and pathways from the Urban Transitions Alliance can be of value to cities around the globe.



Pittsburgh Mayor Bill Peduto, Katowice Vice Mayor Mariusz Skiba, and ICLEI East Asia Regional Director Shu Zhu in conversation at Urban Transitions Forum in Montréal, June 2018.



Sebastian Schlecht, City of Essen and Jiayi Mu, Huairou District attending a site visit during Urban Transitions Alliance workshop in Beijing, October 2018.



Alliance representatives Oluwole A. McFoy, City of Buffalo and Michael Leischner, City of Dortmund participating in a panel discussion with Alex Chapman, City of Guelph at Urban Transitions Forum in Montréal.

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1. For general reflections on how the respective thematic areas relate to the historical context and current challenges of industrial legacy cities, please refer to: ICLEI (2018). Urban Transition Insights from Industrial Legacy Cities. This publication is online available at: https://urbantransitions.org/publications/

# Leveraging adaptive reuse and infrastructure redevelopment for urban renewal

Extractive and manufacturing industries have profoundly shaped urban landscapes. In Europe and the US, industrialization resulted in the large-scale development of physical infrastructure. Factories, warehouses and offices were built together with roads, railway tracks and harbors. Residential buildings including employer-owned workers' housing settlements sprung up to accommodate rapidly growing urban populations.

Deindustrialization, in turn, led to the widespread decommissioning of mining sites and the closure of manufacturing plants, leaving urban centers with idle factory buildings and vast expanses of industrial wastelands. In 2011, Alliance cities Dortmund, Gelsenkirchen and Essen were still faced with 725, 460 and 290 hectares of brownfield sites within their administrative boundaries respectively.[1] The accompanying population loss additionally resulted in large quantities of abandoned buildings. Within the United States, the 2010 residential vacancy rates of Alliance cities Cincinnati and Buffalo still constituted 16.7% and 15.4% respectively compared to the national average of 11.4%.[2] European and US Alliance cities have thus targeted both disused industrial infrastructure as well as idle residential property as part of their urban renewal efforts.

While Chinese Alliance cities and districts have not been subject to the same processes of rapid industrialization and subsequent deindustrialization, they too have leveraged industrial infrastructure transitions as opportunities to transform their local economies to address pressing environmental issues such as air pollution.

As the three pathways illustrate, industrial legacy cities have a spectrum of options at their disposal to drive their infrastructure transitions. These range from strict industrial heritage conservation to complete demolition with various hybrid approaches in between. In addition, they can either be the ones directly financing and implementing these measures or those that enable other stakeholders to put them into practice. Thereby, they need to balance economic, environmental and social considerations and take into account the historical and cultural value of the physical infrastructure in question.

## PATHWAYS

### SPEARHEADING INFRASTRUCTURE REUSE

Utilizing adaptive reuse to preserve industrial heritage and foster a shared identity

### DRIVING INFRASTRUCTURE REDEVELOPMENT

Replacing outdated infrastructure to remake urban space and create a new identity

### ENABLING INFRASTRUCTURE TRANSITIONS

Facilitating infrastructure conversions through city-led initiatives, matchmaking and financial incentives

1. Berief, K. & Pankratz, E. (2012). Erhebungen über das Brachflächenrecycling in Nordrhein-Westfalen. Auftraggeber: Landesamt für Natur, Umwelt und Verbraucherschutz Nordrhein Westfalen. Retrieved from: https://www.lanuv.nrw.de/fileadmin/lanuv/boden/pdf/Endbericht20121109.pdf

2. Griffin, T.L., Yang, E., Flournoy, M. & Bartocci, J. (2015). Mapping America's Legacy Cities. J. Max Bond Center on Design for the Just City. Retrieved from: https://ssa.ccny.cuny.edu/wp-content/uploads/2015/12/MappingAmericanLegacyCities_15Dec2015.pdf

# SPEARHEADING INFRASTRUCTURE REUSE

Cities and districts in the Alliance have identified industrial infrastructure elements as key assets for urban renewal and development. There are several reasons that speak in favor of holding on to decommissioned colliery buildings, disused warehouses and former workers' settlements. From an environmental perspective, repurposing existing infrastructure is preferable to new construction due to the embodied energy and resources. Most importantly, industrial infrastructure elements lend character to a neighborhood and constitute important reminders of an industrial past and shared local identity.

In order to protect historically and culturally-significant industrial-era artifacts from demolition, local planning authorities can designate entire conservation areas or place selected features under preservation order. Both Alliance cities featured below took appropriate measures in this respect. Katowice included its whole Nikiszowiec district in the list of historical monuments. Gelsenkirchen preemptively put several infrastructure elements of its Consol mine under protection prior to the site's decommissioning.

When it comes to retaining industrial heritage buildings, adaptive reuse constitutes the most common choice. Adaptive reuse projects often still encompass the restoration of historic building envelopes and signature structures – particularly if mandated by heritage conservation requirements. In contrast to strict preservation approaches, however, it provides greater leeway for modifications and allows for an entirely new use plan. As such, industrial legacy cities can leverage adaptive reuse to retain buildings' historic value while simultaneously providing for current and future needs such as community space and cultural opportunities.

## City of Gelsenkirchen: Consolidation 3/4/9 coal mine industrial complex



Revitalized Consolidation 3/4/9 coal mine industrial complex.

© City of Gelsenkirchen, photo: Hubert Harst

Gelsenkirchen's Bismarck district owes its origins to the rise of the coal industry. Opened in 1863, the Consolidation 3/4/9 coal mine industrial complex formed the center of economic activity of Bismarck for over 130 years. As a result, the district was heavily impacted by the coal mine's step-by-step decommissioning and subsequent population decline, unemployment and urban decay.

To counteract the gradual degradation of the area, the City of Gelsenkirchen launched an urban renewal program for the two districts Bismarck and Schalke-Nord in 1995. The state-supported pilot program combined infrastructure and socio-cultural projects together with job creation measures. All activities were centrally coordinated by a newly-established district office and implemented in close coordination with the city's culture and urban planning departments, the private sector, local NGOs and other relevant actors.

The revitalization of the 27-hectare-large brownfield site of the former Consol mine was one of the flagship infrastructure projects. While much of the above-ground infrastructure was demolished following the mine's closure in 1993, several signature buildings and structures could be preserved as part of the project. The former fan house of mine shafts 3 and 4 was turned into the Consol-Theater and the winding engine house of mine shaft 4 was repurposed into a music rehearsal space with 39 sound-proof rooms. The 53-meter-high steel headframe and pit bank towering above mine shaft 9 were refurbished and the shaft's northern and southern winding engine buildings now house an art exhibition and an industrial heritage museum respectively. Job skills training and placement measures were an integral part of the reconstruction works, which were finalized between 2001 and 2006. In addition to the refurbishment of the colliery buildings, the adjacent 17 hectares of industrial land were remediated and rehabilitated. Since 2003 residents can access ConsolPark and its multitude of recreational amenities and green space.

Through the redevelopment and partial reuse of the Consolidation 3/4/9 brownfield site, the city-driven program was able to provide Bismarck with a new district center. The successful integrated and participatory urban renewal approach has since been replicated in other districts in Gelsenkirchen.

## City of Katowice: Nikiszowiec district

Commissioned by the nearby Wieczorek (formerly Giesche) coal mine, Katowice's Nikiszowiec district presents a prime example of a miners' settlement of the early 20th century. Nikiszowiec was designed as a self-sufficient neighborhood: The district's signature red-brick buildings with inner courtyards provided housing for the workers and their families. This was complemented by a broad range of amenities and services such as a school, post office, church, cultural center and bath house. The coal mine acted as a patron and guardian of Nikiszowiec, taking care of infrastructure maintenance, providing health care, educational and community services and offering favorable lease agreements. In the mid-1990s, however, the coal mine came under increasing economic pressure. The resulting discontinuation of support to the housing estate led in turn to the gradual degradation of Nikiszowiec. Socio-economic problems started to emerge and the built environment began to deteriorate.

Recognizing the need for urban renewal, the City of Katowice included Nikiszowiec in its Local Revitalization Program and launched a variety of measures to revitalize the district. Most notably, Katowice implemented "The Heart of Nikiszowiec. Revitalization of the Historical Museum of Katowice building at Rymarska 4 street." between 2005-2007 and 2009-2010. The project converted the former laundry and mangle building into a mixed-use development. Situated at the market square of Nikiszowiec, the exterior shell of the city-owned building was preserved while gradually adapting its interior for alternative uses. It now houses a branch of the Museum of the History of Katowice, a tourist information center as well as a cultural center for the local community. Further city-led infrastructure measures included the

refurbishment of Nikiszowiec's roads and market square and the provision of co-funding to one of the estate's housing associations to change the method of heat supply from coal-burning stoves to central heating. In addition to modernizing the built environment, numerous activities aimed at addressing social issues and strengthening community engagement were implemented as part of the Local Revitalization Program.



Construction works as part of "The Heart of Nikiszowiec" project.

© Katowice City Hall

The city's efforts, supported by local actors and NGOs, were successful in transforming Nikiszowiec from a decaying neighborhood into a vibrant place to live and an attractive tourist destination.

# DRIVING INFRASTRUCTURE REDEVELOPMENT

Many industrial legacy cities have been faced with an immense scale of industrial wasteland following their economic decline. Due to the sheer number and size of these brownfields, demolition and redevelopment are either used in conjunction with adaptive reuse or present often selected alternatives to it. When buildings and structures are beyond repair, too contaminated with hazardous substances or too specialized to allow for a different usage, demolition constitutes the only viable option to revitalize vacant and underutilized areas. Prior to any redevelopment, brownfields need to undergo an environmental site assessment to identify their levels of contamination and define the set of actions required to clean them. These are in part determined by their intended future land use. Areas designated for residential or green space redevelopment are subject to a higher level of remediation compared to conversions to industrial or commercial land uses.

Despite the efforts and costs associated with brownfield redevelopment, it constitutes an important urban renewal strategy for many industrial legacy cities, particularly where sites are centrally located. Alliance cities and districts have strategically replaced disused infrastructure and industrial wastelands to redevelop urban space and shape a new identity for their citizens as depicted by Dortmund's case example below. Further examples from the Alliance include E-Town's conversion of a former landfill site into a near-natural ecosystem and Buffalo's replacement of an old railway track with a recreational multi-use path.

# City of Dortmund: PHOENIX West and PHOENIX Lake

At the turn of the 21st century the Phoenix blast furnace plant and steel works were decommissioned after nearly 160 years of industrial activity. The heavily contaminated industrial wasteland that was left behind to the east and west of the center of Dortmund's Hörde district encompassed a total area of 210 hectares. This presented the city administration with a major redevelopment challenge that it decided to turn into an opportunity for economic restructuring and urban renewal: The western site would be converted into a technology park while the eastern site would become a residential area with a lake.

PHOENIX Lake in 2014.

© City of Dortmund,
photo: Stefanie Kleemann



In line with the administration's plans, the PHOENIX West project constituted the large-scale demolition of disused factory buildings and the construction of an industrial complex for future technologies. Selected industrial heritage buildings such as the blast furnace plant were retained, refurbished and brought to a new use. In contrast, the entire steel plant situated on the eastern site was disassembled and shipped to China. The resultant 98-hectare parcel of barren land was purchased by the City of Dortmund for the PHOENIX Lake project.

The key component of the large-scale project was the creation of a 24-hectare artificial lake. To this end, 2.5 million m³ of soil were dug out between 2006 and 2010. The heavily contaminated material was moved to PHOENIX West, while the soil that was only slightly polluted was used on-site to create an embankment for lakeside property and a 50-meter-high hill with a viewing platform. The remediated basin was subsequently flooded and opened to the public in 2011. Since then, various residential and commercial zones have been developed around the lake.

The implementation of the PHOENIX Lake project has been overseen by a development company, set up and fully-owned by the municipal utility. The company has been in charge of the entire development process as well as the re-financing of the project through the sale of property to private owners and investors. It has also organized regular roundtable meetings with citizens and local stakeholders to ensure buy-in for the conversion of the brownfield site.

# ENABLING INFRASTRUCTURE TRANSITIONS

It is evident that industrial legacy cities cannot implement their ambitious infrastructure transitions alone. Instead, they need to engage in strategic partnerships with national and regional governments, foundations and NGOs, the private sector as well as their citizens to overcome the lack of funding and capacity needed to transform their urban environment. As demonstrated by Alliance cities Gelsenkirchen and Dortmund, cities can set up dedicated management entities to effectively coordinate the multitude of different stakeholders involved in such large-scale, multi-year revitalization projects.



Repurposed Consol buildings.

© City of Gelsenkirchen

In addition, cities can act as key enablers rather than direct drivers of infrastructure transitions. The below examples from Alliance city Baltimore and Alliance district Huairou showcase some of the intermediary services, financial incentives and regulatory measures that cities can put in place to this end. For example, cities can provide prospective investors and home owners with valuable advice on legal frameworks, funding opportunities or potential strategic partners. Similarly, they can offer financial incentives in order to lower barriers to infrastructure conversions. These can either come in the form of grants and subsidies to increase access to capital or through tax breaks. Streamlining the enforcement of property code and putting favorable regulatory changes in place constitute further measures that cities can introduce to catalyze infrastructure transitions.

## City of Baltimore: Vacants to Value program and Project C.O.R.E.

With close to one million inhabitants, Baltimore was one of the most populous cities in the United States in the mid-20th century thanks to its booming industrial economy. Deindustrialization and the associated decrease in factory jobs, however, resulted in a decline in population, rise in poverty and crime, and falling property values. This has led to an imbalance between supply and demand resulting in an extensive vacant and abandoned building stock scattered throughout Baltimore's neighborhoods.

Faced with almost 17,000 abandoned and blighted properties, the Baltimore City Department of Housing and Community Development launched the Vacants to Value (V2V) program in 2010 in an effort to spur urban renewal. The program aims to attract new residents and businesses, increase property values and boost municipal tax revenue by reducing the number of neglected properties. As part of the program, the city has strategically targeted neighborhoods that are distressed but possess market potential. Within these neighborhoods – designated as community development clusters – the city has identified neglected privately-owned whole-block areas in need of rehabilitation and used code enforcement to mandate owners to fix their properties. If no action is being taken, ownership is ultimately auctioned off to developers that commit to renovating the properties within one year of purchase. In addition, the V2V program has streamlined the process of and accelerated the pace at which city-owned vacant properties can be transferred to developers. This has been complemented by a number of homeownership incentives. The V2V Booster Program, for example, offers prospective home buyers $10,000 for the down payment and closing cost for the purchase of a formerly vacant, renovated house.

Recognizing that not every abandoned building can be rehabilitated, strategic demolition has constituted another key element of the city's strategy to revitalize neighborhoods. The city has funded the removal of over 1,700 buildings. To accelerate the strategic demolition of whole-block properties that are beyond repair, the city – in collaboration with the State of Maryland – launched Project C.O.R.E. (Creating Opportunities for Renewal and Enterprise) in 2016. The four-year program aims at converting blighted properties into green community spaces and new affordable and mixed-use housing.

## Huairou District, City of Beijing: Facilitating adaptive reuse of factory buildings

Huairou District's burgeoning film industry has become a key hub for domestic film and television production. To accommodate the increased demand for film production space, the Huairou Film & Television Industry Park was officially announced in 2014. Spanning a total area of 18 km², the district's strategic plan for the Industry Park has foreseen the construction of a new site. In addition, it has focused on promoting the conversion of existing industrial building stock within the area for film industry purposes.

To this end, Huairou District first conducted a thorough analysis of the area concluding that there were over 2.4 km² of idle land and factory buildings with potential for conversion. In addition, the district carried out extensive research comprising interviews and surveys with factory owners to identify the key barriers to transition. These included legal difficulties in terms of adjusting land use rights and transferring property rights. A lack of technical guidance of how to adapt buildings to their new use cases as well as the high costs associated with the refurbishments presented further challenges.

In an effort to address these barriers, Huairou District has implemented various measures to facilitate and encourage adaptive reuse. After comprehensive evaluation, the district implemented a timely policy change relaxing regulations and stipulating appropriate land use adjustments. Huairou District provides assistance to support factory owners in familiarizing themselves with the legal frameworks and relevant policies. Furthermore, the district acts as a matchmaker between factory owners and interested investors. Matched collaborations between new investors and old factory owners can take forms such as joint ventures or pilot enterprises. To reduce the financial burden of infrastructure upgrades, Huairou launched a fund in 2016 through which owners could apply for up to 10 million RMB (approx. $1.5 million) in subsidies towards the repurposing of idle properties. In 2018, another policy further secured rental and renovation subsidies specifically aimed at creative industries.

As a result of Huairou District's support measures, many under-utilized properties have gradually turned into unique assets for the film industry. These include creative campuses, broadcasting facilities and office space for post-production.

Huairou Film & Television Industry Park.
© Shanshuihuairou

# Setting the foundation of sustainable energy systems with energy efficiency

Industrial legacy cities and districts in the Alliance have set ambitious climate targets that require drastic cuts in carbon emissions and announced plans for rapid expansion in renewable energy generation. However, the Alliance cities, conscious of their legacy challenges and equally focused on achieving equitable outcomes through their sustainability actions, also emphasize energy efficiency as one of the most crucial components of their sustainable transition strategies.

Energy efficient cities provide the strong foundation on which sustainable energy systems can be built. Renewed economic growth, increased digitalization and the shift towards the electrification of urban environments contribute to rapid energy demand growth. Hence, in order to meet future energy demand while transitioning to renewable sources, cities need to identify a course of action that reduces energy consumption and improves the city's overall energy performance.

By investing in energy efficiency upgrades and advocating for sustainable energy consumption at municipal, residential, commercial and industrial levels, local governments help to increase city's resilience and secure long-term prosperity. The role energy efficiency plays at the local level should not be underestimated. While often not flagship sustainability initiatives – they are one of the most robust and multi-faceted tools cities can utilize to cut carbon emissions.

Energy efficiency initiatives within the Alliance cities and districts have taken all shapes and forms, and most importantly have engaged large numbers of stakeholders. Examples on how cities apply and adapt energy efficiency programs within municipal buildings, citizens' homes and large-scale commercial and industrial infrastructures are illustrated in this solution roadmap. These diverse and collaborative initiatives showcase how energy efficiency programs and investments, no matter how large or small, help to reinforce the Alliance cities' commitment to improving their sustainability and building inclusive communities.

## PATHWAYS

### PIONEERING CITY-LED ACTION

Setting the example for energy efficiency by investing in city-owned infrastructure

### EMPOWERING LOCAL COMMUNITIES

Bringing value to residents by increasing access to energy efficiency support programs

### SUPPORTING PARTNERSHIPS THAT SCALE

Achieving scale and impact through multi-stakeholder energy efficiency initiatives

# PIONEERING CITY-LED ACTION

Cities planning to use energy efficiency measures to reduce urban energy demand or energy-related GHG emissions can take the first step by addressing the energy consumption of municipal buildings. Publicly owned infrastructure provides an easily accessible start point to pilot energy efficiency initiatives, test new technologies and invest using public funds. The importance of municipal building efficiency as a core sustainable transition pathway lies in its ability to lead to quick $CO_2$ emission reductions. Building efficiency additionally has economic benefits for industrial legacy cities with constrained budgets, as upfront costs can be refinanced through public savings from reduced utility costs.

Within the Alliance – municipal building efficiency is often part of a bigger sustainability vision. This is why comprehensive strategies include not only infrastructure investment in energy efficiency projects, but also softer and creative initiatives. Actions include training city employees in sustainable energy consumption practices and developing energy efficient building management guidelines. Illustrated by Buffalo's experience, this multi-angle approach yields stronger results and also provides knowledge and data that can inform other energy efficiency initiatives at the city-level. Furthermore, by retrofitting and upgrading municipal facilities in line with ambitious energy efficiency policies, regulation and ordinances set at the local level, local governments are also able to demonstrate their commitment and set an example that businesses and residents can follow.

## City of Buffalo: Strategic investment in municipal building efficiency



Upgrading city-owned facilities to reduce municipal energy consumption in the City of Buffalo.

© City of Buffalo

Energy demand in Buffalo is increasing spurred by renewed economic growth, but energy affordability is simultaneously a growing municipal challenge. Taking swift action, the City of Buffalo chose to lead by example with an energy efficiency push, setting a target to reduce municipal energy consumption by 20% by 2020. To date, Buffalo has spent $6 million to upgrade 56 city-owned facilities. These investments have led to $820,000 in annual cost savings and have a GHG emissions reduction potential of 865 metric tons of $CO_2$ equivalent per year.

Buffalo's commitment to sustainable energy consumption is also supported by several other initiatives highlighted in Buffalo's 2015 Energy Master Plan. These include:

• The promotion of energy awareness through outreach and training;

• Updating the City's lease arrangements to promote energy conservation;

• Implementing energy conservation measures;

• Improving energy management through preventative maintenance and retro-commissioning;

• Optimizing use of space in municipal buildings; and

• Participating in a demand response program.

The size and impact of city-led energy investments may seem limited; Buffalo's combined public agencies' energy consumption amounts to only 6% of the city's total. However, city-led action is often the catalyzing first step that helps to provide the necessary example for energy saving practices that will lead to city-wide adoption and investment in energy efficiency. In particular, Buffalo's energy efficiency initiatives also include community-focused projects. This is an important approach as these investments tangibly demonstrate the city's commitment to energy efficiency to Buffalo residents. Examples include upgrading systems at Lafayette Ice Rink, implementing lighting improvements to Kleinhans Music Hall and illuminating historic buildings including the City Hall Dome with LED. These energy efficiency investments not only save energy and cut $CO_2$ emissions and operating costs, but also create community value by preserving and improving local facilities and landmarks that citizens love.

Still, more work lies ahead for the city. The city is already half way to achieving its energy consumption reduction goal of 20% and at present plans to accelerate the conversion of streetlights to LED. Municipal energy efficiency initiatives are also being integrated with multi-level energy initiatives. Knowledge and good practices developed through city-level energy efficiency improvements can be used to help guide new initiatives, including the multi-stakeholder Renewable Energy Purchase Agreement, and enhance the support of community energy efficiency initiatives such as those of PUSH Buffalo.

# EMPOWERING LOCAL COMMUNITIES

Local governments should not fail to recognize citizens' contribution to reducing energy consumption and $CO_2$ emissions through small-and-medium-scale energy efficiency investments. All Alliance cities and districts demonstrate good practices for providing vital support that enables citizen participation in energy efficiency programs. A diverse range of local policies and incentive schemes has encouraged citizens to become more conscious of their energy consumption. Action examples include: Self-monitoring energy use, applying energy saving techniques and investing in technological solutions that enhance the energy performance of residential buildings.

Alliance cities also value the interconnection between energy efficiency and health benefits. The renovation of residential and community buildings improves insulation, thereby decreasing the need for heating/cooling homes. This in turn creates better living environments that promotes wellbeing and reduces health risks that stem from poorly insulated homes.

Citizen-led energy efficiency investments also yield direct economic benefits through reduced utility costs and monthly savings, helping to strengthen economic wellbeing at the local level. This is a vital tool for cities in the Alliance that have placed importance on tackling energy poverty. By increasing low-income households' access to energy efficiency opportunities, local governments are able to empower communities to play a bigger role in the city's energy transition. Support programs such as the Green and Healthy Homes initiative in Buffalo, the Greater Cincinnati Energy Alliance and Katowice's recent Municipal Energy Center demonstrate how much value community-driven approaches to energy efficiency have.

## City of Katowice: Municipal Energy Center – An access hub for energy efficiency

Energy efficiency improvement in Katowice has enormous potential to tackle carbon emissions and improve air quality and urban health in the city. However, the implementation of energy saving initiatives within residential pockets of the city has been limited due to a lack of knowledge and information on support programs amongst local constituents. To spread awareness and empower local communities to take action within their own homes, Katowice's Department of Energy Management and Municipal Office Environmental Management set up The Municipal Energy Center (MCE).

The MCE was launched during 4th Katowice Energy Days on 22 September 2018 by the Mayor of Katowice and with substantial local media attention. The initiative, the first of its kind in Poland, is an information point and knowledge hub that residents can visit to learn more about: energy saving; installing renewable energy; replacing heating systems and overall sustainability education. The center also provides information to residents about available support schemes. Located in the city center next to the City Hall of Katowice, the MCE allows citizens to meet directly with experienced energy consultants that can provide expert advice tailored to individual needs and context.



The Municipal Energy Centre that opened in 2018 is located nearby Katowice's City Hall.

© The Municipal Energy Center – The City of Katowice

One of the largest programs is a subsidy available to residents to replace old heating systems. The program is worth over 250 million PLN (approx. $65 million), and will last up to 2027. Another initiative is focused on the renovation and modernization of heating systems in public buildings. This program, which runs until 2021, will fully retrofit 44 public buildings including schools, preschools, and nurseries.

The center also creates a physical space in the city where events, exhibitions and workshops that are relevant for Katowice's sustainable energy initiatives can take place. At present there is a small exhibition created by artists

in cooperation with city hall staff. Regular community meet-ups are also organized twice a month. Information and updates about these meetings are communicated through multiple channels including: social media, the city hall newspaper, and engaged local government councilors.

# SUPPORTING PARTNERSHIPS THAT SCALE

In order to scale energy efficiency investments beyond public buildings, local governments have focused on building and supporting partnerships that encourage the private sector to play a leading role on accelerating energy efficiency. Diverse collaboration initiatives with business stakeholders enable cities to take giant strides forward when it comes to expanding investment and achieving citywide energy savings.

For most cities, commercial buildings have the highest electricity demand and produce the most $CO_2$ emissions. However, stimulating the market uptake of energy efficiency continues to be a challenge for municipalities. Cities and districts in the Alliance have made an effort to work hand-in-hand with the private sector and service providers to find ways to stimulate energy efficiency investment through multiple tools such as setting fair regulation, offering tax abatements or providing other incentive schemes.

Cities have emphasized that identifying the right partners and investing in growing collaborative relationships with multiple stakeholders has resulted in successful projects that have a long-term future. The Chinese districts in the Alliance have chosen to especially prioritize partnerships that foster green industrial development. Due to their regional context and transition needs, shifting the industrial sector towards greener and energy efficient practices has been earmarked as the key to unlocking scalable energy saving investments and vast $CO_2$ emission reductions.

## Cities of Pittsburgh and Cincinnati: Scaling energy efficiency through 2030 Districts

Both Pittsburgh and Cincinnati regularly collaborate with private sector-led initiatives to broaden and speed-up local energy transition strategies. In particular, both cities are part of the 2030 Districts Network. 2030 Districts are a part of a North American initiative that creates a network of property owners who collectively commit to advancing the sustainability of a densely-occupied commercial area within a city. Each district aims to reduce energy and water consumption, as well as transport-related carbon emissions by 50% by 2030. To achieve these goals, the stakeholder group works together to leverage finance and shared resources in order to renovate and retrofit existing building stock, foster efficient facilities management and integrate sustainability principles in new construction projects.

Pittsburgh's 2030 District launched in 2012 and is currently the largest in the network with over 508 commercial buildings participating. Within six years, the district has already achieved a 12% decrease in energy and 14.5% in water consumption. Dedication and commitment to the 2030 District goals also saved building owners $85.4 million in utility costs. Energy efficiency innovation is a particularly strong point of the district and the city as a whole. However, much of the innovation being explored in Pittsburgh isn't only high-tech, but also practical and simple civic-minded solutions that can be easily replicated. Collective energy savings at such scale have helped the city as a whole to make progress on its larger sustainability goals. Following the success of Pittsburgh's 2030 District, the city government has also developed a Building Benchmarking Ordinance that will encourage even more private building owners to play an active role in curbing energy consumption at the local level.
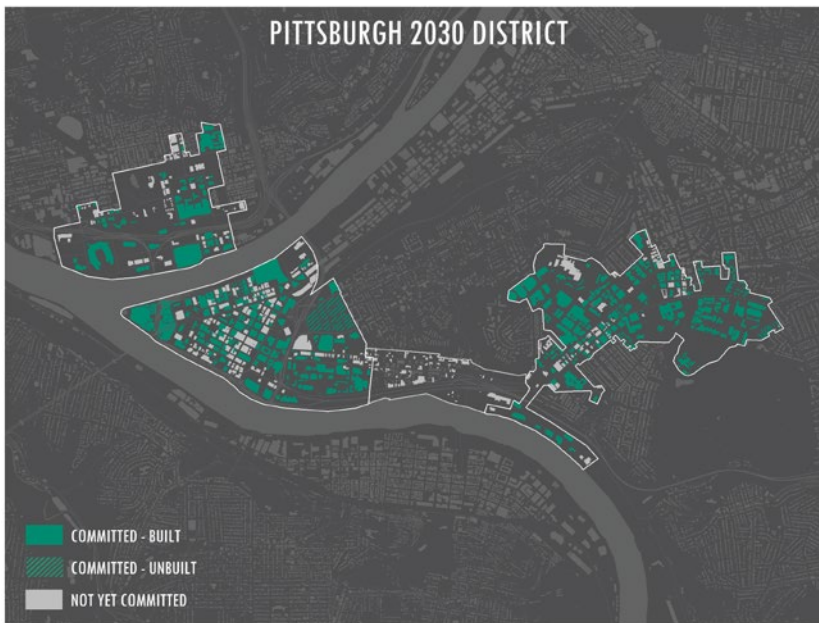


Pittsburgh's 2030 District is currently the largest in the network with over 508 commercial buildings participating.

© Pittsburgh 2030 District

Cincinnati, on the other hand, recently launched their 2030 District in 2018 becoming the 21st District in the network. Pittsburgh's successful example provided the case study that helped Cincinnati to develop its own 2030 District vision. A key driver for Cincinnati to launch their own 2030 District was to improve the competitiveness of the city, and to attract and retain professionals by offering a sustainable and healthy working environment. Cincinnati's 2030 District has rapidly grown to 158 buildings comprising over 20 million square feet, including the Cincinnati City Hall, and is actively planning progressive initiatives for 2019. Energy efficiency is set to be a core aspect of upcoming projects.

Cincinnati's 2030 District has rapidly grown to 158 buildings comprising over 20 million square feet.
© Cincinnati 2030 District
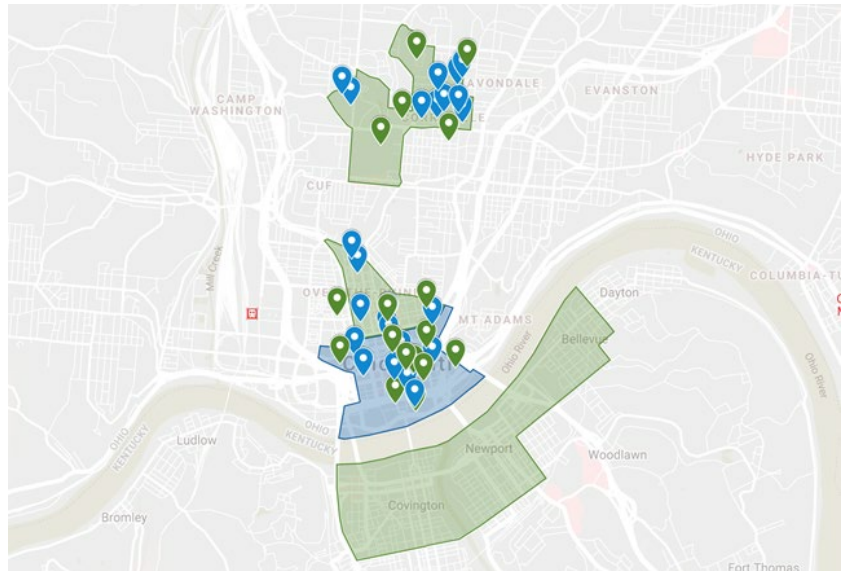


To spur the market for energy efficient design, Cincinnati has implemented a policy that offers up to 15 years property tax abatement for buildings that achieve Leadership in Energy and Environmental Design (LEED) certification. This incentive has helped lead to over 400 LEED certified projects, improving the performance of Cincinnati's building stock.

The individual experiences of both cities partnering on such initiatives, and the strong ties developed through the Urban Transitions Alliance have enabled both Pittsburgh and Cincinnati to share good practices and support one another to take strides towards a more resilient and inclusive energy future.

## E-Town, City of Beijing: Expanding energy efficiency principles through green industrial building guidelines

Facility of BOE Technology Group, a certified green industrial building in E-Town.
© E-Town Construction and Development Bureau
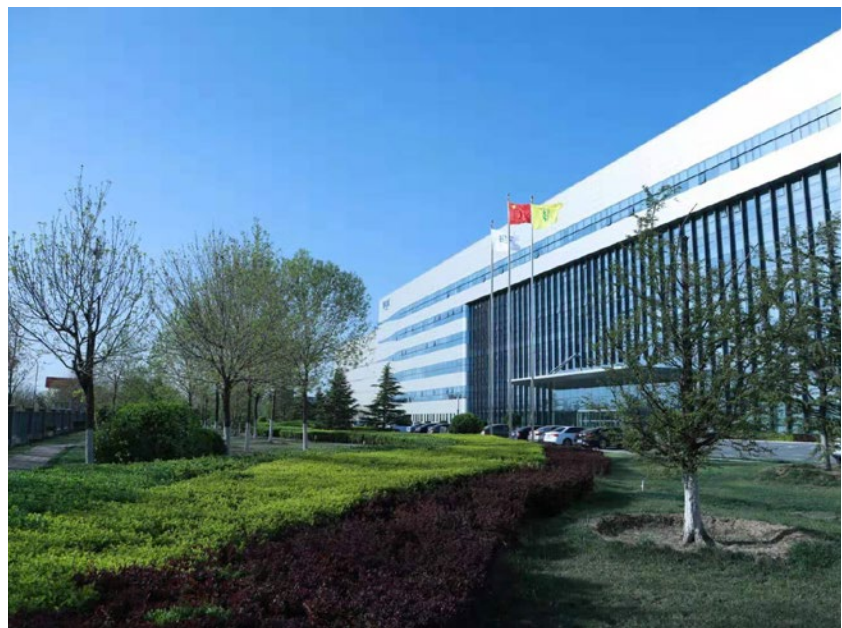


Still experiencing growth in its industrial sector and growing energy demand, E-Town recognizes the critical role of energy efficiency not only for residential, but also industrial buildings. Over the past few years, E-Town has initiated

several pilot projects focusing on green residential buildings, green industrial buildings, passive housing, and energy efficiency retrofitting. Through pilot experimentation, greening industrial buildings and infrastructure is viewed as the most effective and scalable solution.

However, to further enhance the district's overall energy efficiency standard, transforming a handful of certified buildings is not enough. It requires a district-level approach, implemented through partnership and collaboration with relevant stakeholders to scale-up the impact. To achieve this, E-Town has invested substantial time and resources, working together with the private sector to conduct a careful analysis of the current energy efficiency levels in industrial buildings. These efforts provided a clear understanding of: 1) the transition barriers; 2) the existing government regulation, policies and practices in the construction sphere; 3) the essential incentives to support the best practices; 4) the required standard-setting activities for advancing energy efficiency in the E-Town context.

After years of preparation, E-Town recently released its own Green Industrial Building Guidelines to accelerate its green and efficient industrial transition. Starting from 2019, the guidelines require all new constructions to achieve a 2-star rating, and all factory expansions to achieve 1-star. By 2025, all new construction projects need to achieve 3-stars and an additional 3-star green operation certification. This level of public-private cooperation on green industrial development is well ahead of the national mandate, which only requires half of all new buildings to be certified by 2020.

E-Town's guidelines will also provide comprehensive multi-phase management support to private actors, including financial incentives through an incremental subsidy to encourage industrial adaptation. With its progressive purpose and vision, E-Town is highly likely to become the front runner of green development throughout China and showcase the potential of using a district level approach to upscale energy efficiency and sustainability goals.



© E-Town Construction and Development Bureau

# Overcoming barriers that prevent a change of modal split

In driving their mobility transition, cities and districts in the Urban Transitions Alliance have recognized that less car-centric transport systems lead to better air quality, reduced congestion, and more community space. Building on legacy assets like railway lines and spacious streets, many local governments in the Alliance have implemented policies to support cycling and walking infrastructure and expand public transport. In the German Ruhr area, industrial railway tracks have been repurposed into a network of well-connected and comfortable bike lanes. By removing minimum parking requirements for buildings, the US City of Buffalo has freed up road space for public use. In China, Shijiazhuang's Yuhua District has invested in bike share to serve for the "last mile" from bus stops or train stations.

However, such efforts have not yet achieved to accelerate a change of modal split. The Ruhr area, still one of the most densely populated regions in Germany, struggles to overcome high car-dependency and traffic congestion. In the City of Essen, the number of citizens relying on cars for inner-city travel has decreased only slightly from 55% to 54% between 1989 and 2011.[3] Likewise, individual motorized transport accounts for almost half of all trips within the City of Dortmund.[4] Other Urban Transitions Alliance focus regions show a similar picture: In the City of Pittsburgh, single occupancy car commuting has even increased between 2010 and 2014 at the expense of walking and public transport use.[5] And although cycling rates in Shijiazhuang are strong, motorized travel contributes significantly to the city's issue of poor air quality.[6]

What can cities do to leverage infrastructure investments to their full potential? Clearly a missing piece is citizen buy-in. Without support of local residents, sufficient progress is frequently stalled. In many German cities, EU air pollution limits are constantly being exceeded. Still, pending policy responses such as diesel car bans and lower speed limits are facing firm opposition from the public and political sphere. Cycling lane installations in the US Cities of Baltimore and Pittsburgh have triggered heated "bikelash" controversies, with residents criticizing lost parking spaces and reduced driving space for cars. In China, private car ownership has exploded over the past years. These examples illustrate that policies aiming to achieve a mobility transition need to be developed in consultation with local communities and acknowledge individual habits and preferences. The following pathways reflect diverse approaches from the Urban Transitions Alliance to increase public support and instigate wider behavioral change across the population.

3. Stuhm, J.-M. et al. (2018). Masterplan Verkehr Essen 2018. Auftraggeber: Stadt Essen. Retrieved from: https://media.essen.de/media/wwwessende/aemter/61/dokumente_7/verkehrsthemen/Masterplan_Verkehr_Essen_2018.pdf

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# PATHWAYS

## RAISING AWARENESS

Sparking sustainability conversations and fostering real-life visions of green urban mobility

## INCREASING CONVENIENCE

Improving connectivity and providing well-accessible transport alternatives across the city

## CHANGING HABITS

Promoting active lifestyles and collaboratively shaping sustainable and healthy urban mobility cultures

# RAISING AWARENESS

A first approach to improve citizen support for green urban mobility is creating awareness for the needs and benefits of environmentally friendly transport systems. This can be achieved by sharing information and recommendations via different communication channels available to the city, including community meetings, events and campaigns. Links to individual behavior are more tangible if facts and figures – for example on health risks linked to traffic generated air pollution – are applied to the local context and voices from relevant stakeholders are included. Cincinnati's "A Year of Living Sustainably" campaign featured below shows that social media is a valuable tool for this purpose that can be used to spark conversations, encourage participation and invite views and examples from across the community. However, as seen in Cincinnati's case, digital tools work best when linked with other means of outreach that create personal engagements and include citizens who have limited access to new media.

In many cases, individuals refrain from using certain transport options because of reservations resulting from a lack of experience. In order to change the perspective and inspire new ideas, Alliance members have organized public events that engage citizens in alternative means of transport. Examples are plenty across the Alliance and include carfree days in Essen and Dortmund, bike tours in Buffalo and Baltimore, and green lifestyle plays in Yuhua District. Such initiatives create real-life visions of sustainable urban mobility and demonstrate how a change of modal split can lead to accessible streets, free-up community spaces and improve quality of life.

## City of Cincinnati: Declaring a year of living sustainably



Commuting by bike is one option to pledge for living sustainably.

© Cincinnati Red Bike

The 2018 Green Cincinnati Plan outlines 80 strategies to reduce Cincinnati's carbon emissions by 80% by 2050. Built on themes of sustainability, equity, and resilience, the plan emphasizes engagement of the city's diverse residents. Although the city is implementing large-scale projects in relevant fields like energy, natural systems, and transportation, this ambitious goal will not be achievable without buy-in from local residents. To build community support, the plan's strategies include the expansion of environmental education efforts and the development of a brand and communication strategy.

To increase awareness and spark eco-friendly behavior change, the "Year of Living Sustainably" campaign invites individuals to consider their individual role in creating a more sustainable city. The campaign keeps participants engaged by focusing on a different theme from the Green Cincinnati Plan each month. The program taps into residents' collective knowledge and capacity for social support through in-person community conversations, and connects individuals with local resources and events via social media. Apart from receiving information and inspiration on sustainable lifestyle choices, participating citizens are called to take action – by engaging in community activities and pledging to adopt one sustainable behavior for 30 days, with the hope that it will generate positive experiences. The month of September 2019 will focus on transportation, directly relating to the city's Green Plan goals to reduce fossil fuel use and increase passenger miles traveled by public transport. An example commitment could be commuting to work by bus or bike, and encouraging co-workers to do the same.

The campaign is led by the municipal Office of Environment and Sustainability. Key partners are the Civic Garden Center, a local educational hub for community gardens, and the Environmental Studies department at the University of Cincinnati, conducting associated research on pro-environmental behavior change. Local nonprofit organizations and transport providers offer additional support in the form of cross-promotion or in-kind donations: Every month, theme-related prizes like Cincy Redbike memberships or Metro bus passes are raffled among participants. Additionally, a community-nominated "Leader in Sustainability" award is issued to individuals who inspire others to live more sustainably. Including social media recognition and a "Mayoral Declaration" that declares a day in their honor, these awards have sparked positive responses and generated attention for the initiative.

## Yuhua District, City of Shijiazhuang: Sparking behavioral changes through green mobility campaigns

Air pollution resulted from industrial development is among the most pressing transition challenges of Shijiazhuang's Yuhua District. The district's annually updated "Emergency Plan for Heavy Pollution" identifies the transport system as a key sector to reduce emissions and improve air quality. A tangible target towards green mobility is the "Mobility Mode 1-3-5". The 1-3-5 approach encourages citizens to walk short distances (1 km), cycle or use electric scooters for medium distances (3 km), and take public transport for longer journeys (5 km and more). In line with central government's "Three Year Action Plan for Cleaner Air" and World Car Free Day, Yuhua has identified three key strategies to drive their mobility transition: 1) Strengthening the collaboration among different district departments for efficient organization and implementation; 2) Exchanging experiences and good practice examples with peer cities and districts, and applying learnings to long-term public transportation planning; 3) Implementing a variety of promotion and advocacy programs to generate buy-in from citizens.

To increase public awareness for sustainable transport choices, Yuhua has rolled-out large campaigns that focus on information and experience. For public information purposes, the district is reaching out to citizens via digital screens and billboards in public spaces, and also through theatre plays that showcase eco-friendly lifestyles. In addition, targeted content including short videos is posted on websites, social media platforms and mobile applications to create a

comprehensive public understanding about the benefits of green mobility. The second pillar of public campaigns is creating positive experiences. The district organizes recurrent activities including walking tours, bicycle races, and charity rides. Participation is steadily increasing as a growing number of citizens realize the importance of low-carbon and active lifestyles.

In order to expand the impact of awareness campaigns, the district government is seeking to collaborate with local stakeholders and media organizations. For example, through the cooperation with a clinic and a local newspaper on the "Green Mobility – Bring Beauty to Your City" campaign, Yuhua was able to raise funds for 10,000 sharing bicycles free for citizens to use. In line with the district's transition strategy, the campaign emphasized people's individual role in environmental protection, and encouraged the citizens to make their own contributions to a greener city. By creating tangible models of sustainable lifestyles, Yuhua inspires more and more residents to integrate green mobility into their daily lives.



Public walking and cycling tours are part of the green mobility campaign in Shijiazhuang's Yuhua District.

© Yuhua District

# INCREASING CONVENIENCE

Even if awareness for sustainable lifestyles is growing, questions of convenience constitute a second type of hurdles that may still prevent a larger shift towards eco-friendly mobility options. Many cities in the Alliance struggle to overcome a high car-dependency because their transport systems were built with private vehicles as the primary means of transport. Even though cities have increasingly invested in public transport and bicycle infrastructure, it has proven challenging to address the advantage in convenience attributed to cars. Weather conditions might cause a choice against cycling or walking, while the distance to the next bus or tram station might be far and public transport services might not be frequent or reliable. Acknowledging this issue, Alliance cities have started to holistically re-think their mobility systems and identify strategic investments that improve the overall network of transport alternatives. Pittsburgh's Downtown-Uptown-Oakland electric bus project combines the revitalization of a former industrial worker's district with the improvement of transit speed and reliability in a heavily congested transport corridor. Shijiazhuang's Yuhua District has established electric bus lines and bike share in urban areas that are not sufficiently served by the local subway network. As illustrated below, the City of Essen is taking this integrated approach one step further to a citywide program mutually aimed to provide better connectivity between different

transport options and improve accessibility across all parts of the city. Essen's efforts are increasingly embedded in regional approaches: in Germany's Ruhr area, where commuting puts a strong pressure on public transport systems, traffic planning is increasingly addressed on the regional level. Current priorities include capacity increases for on-board carriage of bicycles and the construction of the inter-city cycling highway RS1.

## City of Essen: Providing well-connected transport options through integrated mobility stations



Integrated mobility station at the "Landgericht" stop in Essen.

© City of Essen, photo: Joachen Tack



To increase convenience through connectivity, Essen's transport network is being expanded by integrated mobility stations that bundle different transport alternatives in strategic locations, easily recognizable by a distinct design. Two completed transport hubs already combine access to train/tram and bus services, bike share, car share, and taxi. The concept also includes covered bicycle parking as well as leasable bike and ride boxes, making it easy and convenient to switch between different modes of transport. A second pillar of the program is integrated ticketing: Monthly public transport passes contain free bike share and car share contingencies. "Zäpp", a mobile application providing door-to-door trip planning, ensures easy access to different fares as well as integrated, multi-modal navigation.

The concept was developed by the local transport association Ruhrbahn in cooperation with the municipal traffic authority and planning department and is highlighted as a key component of Essen's 2018 mobility plan. The physical construction of the mobility stations is substantially funded by the Federal Environment Ministry's National Climate Initiative (NKI) – 50% in case of the first two stations and 40% for upcoming sites. One requirement for NKI funding is that associated car sharing providers are certified with the "Blue Angel" ecolabel. This made car share company stadtmobil an ideal implementation partner along with bike share provider nextbike.

By creating a well-connected and comprehensive network of sustainable transport alternatives designed to meet travelers' individual demands, the authorities hope to decrease the number of cars on Essen's streets. Initial observations show positive acceptance from residents, although it takes time to establish substantial car and bike sharing participation in new locations. While the program envisions a total of twelve transport hubs with a special

focus on currently underserved neighborhoods, concrete planning for two additional stations has already started. Depending on available space and electricity supply, potential expansions of the concept include sheltered seating for waiting passengers and charging points for electric cars and bikes. Additionally, the city is looking into the integration of delivery services into the inter-modal transport concept: Central collection points at the mobility stations could reduce cargo trips and mileage, further increase convenience for customers and provide additional incentives for public transport use.

# CHANGING HABITS

As a third pathway towards a change of modal split, cities in the Alliance are supporting sustainable and active mobility cultures, especially focusing on daily routes like journeys to work and school. By pursuing the interconnected environmental and health-related benefits of alternative transport choices hand in hand, political support can be strengthened and the range of partnerships expanded. More specifically, cities across the Alliance are exploring three key fields of action to shift the local climate: As a first step, local governments are setting a good example by encouraging their employees to cycle to work and by including bikes in the municipal fleet as regular choice for short business trips. Secondly, city-led programs focus on creating conditions that enable active, self-determined and sustainable transport choices early-on, including the improvement of perceived and actual traffic safety. Thirdly, local governments often take on a strong coordinating role between different transport providers and additional stakeholders. Partnerships with advocacy organizations and health care providers, stakeholder consultations and institutionalized engagements through transport advisory boards have supported inclusive policy-making, strengthened local support and increased outreach. Both cases below show how these fields of action can work together to enable healthy and eco-friendly transport habits.



Cycling programs pursue the interconnected environmental and health-related benefits of active mobility cultures hand in hand.

© City of Essen, photo: R. Oberhäuser

## City of Buffalo: Supporting sustainable and active lifestyles from an early age





Kids participating in a Recycle-A-Bicycle workshop.
© GoBike Buffalo

Thanks to Recycle-A-Bicycle programs, so far 2,844 bikes have found new enthusiastic owners.
© GoBike Buffalo

In line with municipal targets to support sustainable and healthy modes of transport, the City of Buffalo convenes key stakeholders, including strong community partners. In 2005, the Bicycle and Pedestrian Advisory Board was established to help the city find collaborative solutions for various problems experienced by cyclists, pedestrians and persons with disabilities. The city regularly engages the Advisory Board and local bicycle advocacy organization GoBike Buffalo on numerous projects that research, promote, implement, and evaluate initiatives, including bicycle facility installation and cycling education projects. A shared priority is to enable green and healthy mobility for children by increasing traffic safety, teaching cycling skills and introducing bicycles as a regular transport option from an early age. Projects on this include:

Safe Routes to School is a federal, state and local effort to enable and encourage children, including those with disabilities, to walk and cycle to school. By making routes to school safer and more appealing as well as reducing traffic and air pollution around schools, the program seeks to improve quality of life for students. The framework for Safe Routes to School in Buffalo encompasses five key steps: engineering, education, encouragement, enforcement and evaluation. At the local level, the program is led by public schools in cooperation with the City of Buffalo and local neighborhood organizations. The Buffalo Public School District Superintendent and Buffalo's Mayor have demonstrated their support and emphasized the program's value as a community revitalization tool.

GoBuffalo's Recycle-A-Bicycle program takes a holistic approach by combining cycling and traffic training with the development of problem-solving, teamwork and technical skills. Participating children are taught to take apart and fix a bicycle, so they understand its mechanics and are able to run quick safety checks. After learning how to ride confidently and safely across the city, the students receive the self-assembled bike as a gift, together with safety gear including lights, a lock, and a helmet. Recycle-A-Bicycle programs have been realized at city-led events and also through partnerships with charities and youth organizations, local refugee resettlement agencies, and at least 10 schools in the Buffalo Public School system. Since the start of the project, 2,844 bikes have found new enthusiastic owners.

Such programs support cycling as a habitual choice early-on, inducing health benefits and increasing mobility for low-income groups. In recognition of these efforts, Buffalo has been certified as a bronze-level bicycle friendly community by the League of American Bicyclists, and is striving for silver status.

# City of Dortmund: Tackling mental barriers and supporting bicycle culture

The City of Dortmund has defined the reduction of transition barriers as a main priority in the Mobility Master Plan 2030. A key strand of action is focused on creating a "cycling climate" by bundling initiatives and education programs to increase attractiveness and acceptance of cycling across the city.

In the hope that small habits lead to bigger change, several activities address everyday trips, including commutes to work or school. Setting a good example, the municipality has centralized and diversified its mobility management by pooling vehicles of all sizes, including bicycles, and providing recommendations for the most efficient vehicle and route for each trip. Cycling is not only established as the go-to option for shorter business trips, but also for the commute to work when feasible. City employees are encouraged to participate in the "cycling to work" program that is hosted every year throughout Dortmund with full support of the city councilor for the environment. The program invites commuters to pledge individually or in teams to ride their bike to work for at least 20 days within the summer months of May to August. Successful participants are rewarded with cycling-related prizes – in addition to obvious benefits for health and well-being. Other city-led activities include cycling days and events, the promotion of cargo bikes as well as a program to support self-determined, safe and sustainable mobility for school kids.

In order to scale up the impact, the City of Dortmund has teamed up with strong implementation partners. Supported by the German cycling association, national health insurance providers and the Chamber of Commerce, the municipality is working with local employers and organizations to strengthen corporate mobility management and foster active, healthy and sustainable mobility habits. To ensure that mobility transition plans and policies are informed by the habits and concerns of Dortmund's citizens, the city is conducting a large-scale mobility behavior survey that will interview 37,600 households between April and May 2019. The survey will cover habitual transport choices, how often participants use which modes of transport and the motivations behind their decision making process. The survey results will help the city evaluate current programs and inform the implementation of the Mobility Master Plan 2030.



Bicycles and cargo bikes as part of the municipal fleet in the City of Dortmund.
© City of Dortmund

# Building inclusive communities by reconnecting citizens to resources at the local level

The industrial age profoundly shaped how societies interact with resources such as minerals, fuels, food, construction materials or water. Industrial growth relied heavily on the over-consumption of such resources, thereby often causing significant environmental damages. At the same time, industrial growth lifted millions of people out of poverty and provided a growing urban population with employment opportunities and increased access to consumer goods and services.

Deindustrialization, in turn, has had a significant impact on cities that relied on industrial growth for their overall social development. The Alliance cities have recognized the challenge of reorienting their economic model in a way that benefits both people and the environment.

The potential synergies between environmental concerns and social considerations are particularly visible when it comes to resource consumption at the local level. This roadmap therefore looks at how Alliance cities implemented strategies that changed the way resources are consumed and managed in order to protect the environment and benefit the local population. The roadmap explores the question of access to sustainable resources, awareness of the impacts linked to everyday consumption and employment opportunities generated by resource management at the local level.

Each initiative outlined in this roadmap delivers tangible benefits for local communities and especially for vulnerable social groups. These initiatives also seek to reconnect local economies with the environment during production, consumption and disposal to ensure negative impacts are minimized. In that way, they demonstrate that environmental, social and economic concerns can be mutually reinforcing when cities are intentional about designing projects that play on these synergies.

## PATHWAYS

### LOCAL PRODUCTION

Incentivize the local production of sustainable resources and enabling equitable access

### COLLABORATIVE CONSUMPTION

Support local collaborative consumption initiatives that stimulate a sense of place

### RESOURCEFUL JOBS

Use untapped resources to create job and training opportunities locally

# LOCAL PRODUCTION

One of the avenues industrial legacy cities can use to ensure resources are managed and accessed in an equitable and sustainable manner is to localize their production. Producing locally not only uncovers the direct impacts of production by making them more visible and traceable but also creates levers to redesign how resources are distributed spatially. This is especially relevant in the context of industrial legacy cities, where the lack of geographic access to sustainable resources is often a result of the spatial inequalities brought about by deindustrialization.

Along with geographic considerations, financial and cultural barriers also prevent an equitable access to locally produced sustainable resources. Creating favorable market conditions for local producers to thrive and designing financial incentives for consumers to buy local are often needed to ensure financial difficulties don't impair the local production of sustainable resources. Finally, a lack of awareness on the positive environmental, social and economic benefits of local production may deter consumers from favoring local options.

To better understand how industrial legacy cities can incentivize the local production of sustainable resources and enable equitable access, this chapter looks at strategies to address the challenge of food deserts. These urban areas, where residents have limited access to affordable and nutritious food, are often located in former industrialized parts of the city, making them a prime illustration of the impacts of legacy infrastructures and urban planning on resources access. The complementary strategies Alliance cities and districts have pursued help to incentivize the local production of healthy and affordable foods by addressing the geographical, financial and cultural obstacles that disconnect residents from local, sustainable food products.

## City of Pittsburgh: Turning vacant lots into productive assets



Urban farm managed by the United Somali Bantu of Greater Pittsburgh.

© City of Pittsburgh

Pittsburgh's deindustrialization left the city with 27,000 vacant lots. While the city has begun to grow in population again and is taking steps to redevelop neighborhoods of very low market demand, a significant number of properties are likely to remain vacant for the foreseeable future. These vacant lots can compromise quality of life for residents. Meanwhile, their maintenance is estimated to cost Pittsburgh $3-4 million per year.

Launched in 2015, Pittsburgh's Vacant Lot Toolkit is an implementation initiative of the city's Open Space Plan. Designed with community stakeholders, open space specialists and the finance, public works and sustainability departments of the city, the toolkit includes a streamlined process to temporarily and permanently reuse vacant lots for food, flower, or rain gardens. It is accompanied by numerous online resources and trainings on key considerations such as site selection, planning, budget and maintenance.

Through the Adopt-a-Lot program, the city has been supporting local projects in more direct ways, for instance by providing initial labor and maintenance for larger-scale projects - such as the redevelopment of a long abandoned baseball field into a community farm by the non-profit organization Grow Pittsburgh. The department of city planning has also been working with the forestry department to collect discarded wood chips and donate them to community groups to help enrich the soils of the adopted lots.

Another project developed under the Adopt-a-Lot program is a market stand managed by a Somali Bantu refugee community. Many Somali refugees living in Pittsburgh are former farmers and the transition to the "Steel City" has been difficult. Most of them reside in public housing complexes and face poverty. Thanks to the Adopt-a-Lot program, a community of Bantu is now farming on 15 lots (equivalent to three quarters of an acre) and is able to sell their produce in Perry South neighborhood, one of Pittsburgh's largest food deserts.

With over 130 vacant lots "adopted" to date, the program has been successful and helped to address the challenge of food deserts and provide livelihoods to disadvantaged communities. Key to its success is the ability of the Adopt-a-Lot program to constantly evolve and adapt to community needs.

## City of Cincinnati: A token system for low-income households to access locally produced sustainable food

Cincinnati's Green Plan underlines the necessity to design food systems that can mitigate and adapt to climate change and ensure the long-term availability of food resources. One of its core strategies is to facilitate a shift to more local and plant-based diets. Yet for the 18.5%[7] of Cincinnati residents who are food insecure, the price of local organic produce represents a major obstacle to developing more sustainable food consumption patterns.

At the Hamilton county level, 62% of families are considered income-eligible for federal Supplemental Nutrition Assistance Program (SNAP). The Produce Perks Program was developed to build on SNAP and ensure that vulnerable groups in the Hamilton County have access to sustainable and healthy foods. This program allows residents on SNAP to earn a one-dollar token for fruits and vegetables for each dollar they spend on produce, allowing up to an additional ten dollars to be spent on these food items daily.

The program is not limited to grocery stores and allows for Produce Perks tokens to be spent at participating farmers markets and Community Supported Agriculture programs. This creates a stronger market for local food producers to sell their products, which is especially important in food deserts where the additional revenue from nutrition incentives may allow a farmer's market to operate.

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7. City of Cincinnati (2018) 2018 Green Cincinnati Plan. Retrieved March 2019 from https://www.cincinnati-oh.gov/oes/assets/File/2018%20Green%20Cincinnati%20Plan(1).pdf

Produce Perks was developed through a combination of federal and philanthropic funding and was highly beneficial to local farmers. 73.9% of participating farmers reported increased revenue after joining the program.

Produce Perks has been growing steadily since its launch in 2014 and the City of Cincinnati is working with local food organizations to expand the number of food distribution points throughout the city by 25% each year for the next five years. Beyond keeping money in the local economy and developing green jobs in the food sector, the program is providing tangible health and monetary benefits to the county's most vulnerable residents and helping the City of Cincinnati achieve its goal to ensure convenient access to healthy, affordable foods to 100% of the citizens.



The Produce Perks Program allows residents on SNAP to earn a one-dollar token for each dollar they spend on fruits and vegetables.

© Produce Perks Midwest

# COLLABORATIVE CONSUMPTION

Collaborative consumption has gained momentum in recent years as a way to save people money while cultivating social links. Collaborative consumption can refer to initiatives that extend a product's life span through community-based repairs and reuse or ones that pool resources in a common platform, allowing for people to lease them instead of owning them. In both cases, they have the potential to nurture a more cohesive society.

Repair workshops are examples of such initiatives. "Dare to Repair" workshops are flourishing in many industrial legacy cities and districts. They are community events, where individuals can bring broken items (lamps, vacuums, toys, etc.) to repair cafes and have expert volunteer "fixers" try to repair the item alongside them for free.

The City of Dortmund hosts yearly the "Trash Up!" festival and other collaborative consumption events aiming at extending the life span of products and shifting individual consumption to more sustainable patterns. These events go beyond raising awareness and aim at empowering residents to think differently about how they interact with materials in their everyday life.

Collaborative consumption spans a wide variety of initiatives. When driven by local communities and supported by local authorities, these low cost programs have the potential to reconcile industrial legacies with a new economy that builds on cohesion and collaboration. Industrial legacy cities can then build on this community momentum to support effective placemaking and the co-design of neighborhood revitalization plans.

## City of Buffalo: From sharing tools to constructing together

Bordering the University of Buffalo's South Campus in the north of the city, the University Heights is a dynamic neighborhood that has seen incredible changes over its lifetime. The highly walkable, diverse, and affordable neighborhood has begun to experience the neglect and disinvestment common to older urban neighborhoods in industrial legacy cities. Low-to-moderate households and students renting properties in the neighborhood often face improper housing conditions and absentee landlordism. In 2011, the experience of a local student renting from a negligent landlord spurred the creation of the University Heights Tool Library. This non-profit program was set up to lend tools out to community members to help them maintain and fix-up their homes and gardens - a time investment that some tenants were then able to financially deduct from their rent.

The Tool Library received a majority of its seed funding through the City of Buffalo's Community Development Block Grant. The city has been a sustaining sponsor of the initiative ever since while revenue continues to be generated through membership dues. In addition to having loaned out over 17,000 tools since 2015, the Tool Library has been evolving from a physical space for individuals to rent tools to a social space, the Tool Library Community Laboratory (CoLab).

From planting trees and building community gardens, to boarding up buildings and painting public art, the CoLab sponsors and facilitates community initiatives that enhance the quality of life within the University Heights. The CoLab works with residents, property owners, block clubs, university staff and students, business owners and elected officials in order to coordinate and develop resources and responsibilities within the community. As an example, the CoLab was instrumental in bringing key stakeholders together to help turn an underutilized rail corridor into a multi-use recreational green space as part of a Rails to Trails project.

North Buffalo Rails to Trails.
© University Heights Collaborative



Buffalo's "34 & More" initiative, which aims at increasing the city's recycling rate and reducing waste, regularly engages with the CoLab. The facility hosts various events in support of the initiative, including Dare to Repair Cafes throughout the year which are sponsored by the city and advertised by the Mayor of Buffalo himself.

Started as a collaborative consumption initiative, the Tool Library has become a lever of change in University Heights. It is also a platform for the city to support community-based initiatives and to scale its own projects related to resources consumption.

# RESOURCEFUL JOBS

From the rainwater that enters the sewage system to the single-use minerals and metals used in the construction industry, a profusion of valuable resources ends up being wasted at the local level. In industrial legacy cities as in other localities, vulnerable communities are adversely impacted by the linear management of resources, in which waste is part of production processes and ultimately ends up being discarded in ecosystems, landfills or burnt. Oftentimes, waste incineration takes place close to poorer neighborhoods, which already house a disproportionate number of other polluting facilities and legacies from the city's industrial past.

Letting valuable resources go to waste is also a missed opportunity to provide people with much needed job and training opportunities. In legacy cities, unemployment is not necessarily attributable primarily to a lack of jobs. Rather, unemployment often stems from a set of factors combing higher rates of poverty and lower levels of educational attainment than in other cities.

By rethinking how resources are managed locally, cities can support employment opportunities for the most disadvantaged groups while taking full responsibility over the waste and pollution they produce. Furthermore, each step a community takes towards reuse and recycling means more private expenditure on supplies and services, and more money circulating in the local economy through spending and tax payments. Finally, managing resources in a more regenerative manner is also a way to revitalize neglected neighborhoods and ecosystems, as demonstrated by the City of Essen's "New Ways to the Water" program. The experiences of Baltimore and Essen show that environmental, social and economic benefits are maximized when the city identifies high potential resources flows locally and deliberately targets most vulnerable groups when designing programs to better manage these flows.

## City of Baltimore: Creating wealth from waste



Camp Small, Baltimore's collection facility for removed and downed trees on public land.

© City of Baltimore

The Waste-To-Wealth Program aims to grow businesses in Baltimore while reducing the city's overall waste. By supporting businesses that are making products out of valuable materials captured from the waste stream, the city aims at creating jobs to support the expected growth in population. The program is designed to achieve this by targeting three high-value waste streams: Construction and demolition waste, food waste and wood waste.

Construction and demolition materials account for more than 40% of Baltimore's solid waste. In order to create entry-level construction jobs and reduce demolition waste, Baltimore City Housing and the Office of Sustainability have teamed up to make deconstruction a component of housing demolition contracts to salvage and recycle building materials from homes slated for demolition and sell reprocessed materials. The city has been working with two nonprofits, Details Deconstruction and Brick+Board, which hire people with criminal records or facing difficulties finding employment and prepare them for jobs in the construction industry. Since 2014, there have been about 200 deconstructions in the city where over 185 individuals have been employed and more than 1.2 million bricks and 425,000 board feet of lumber have been salvaged.

Other Waste-to-Wealth projects include a variety of community composting activities, such as the Filbert Street Garden, a space dedicated to promoting urban agriculture and providing educational opportunities in Curtis Bay, a district with a legacy of environmental contamination and high unemployment. In 2016, the Filbert Street Garden joined forced with the Institute for Local Self-Reliance and the Chesapeake Center for Youth Development to create the Baltimore Compost Collective, a food scrap pickup and composting service. This composting program provides employment and mentoring to local youths year round.

Finally, Baltimore's City Recreation and Parks' Forestry Division and the Office of Sustainability started the Camp Small Zero Waste Initiative in 2016. This initiative sorts and distributes the variety of wood products at Camp Small - the local collection facility for removed and downed trees on public land. Repurposed wood is now used on construction sites, sold to local businesses, incorporated in a new recreational center as well as used in soil remediation activities.

## City of Essen: New Ways to the Water and to increase employment

Rainwater catchment systems in Segeroth Park, Essen.
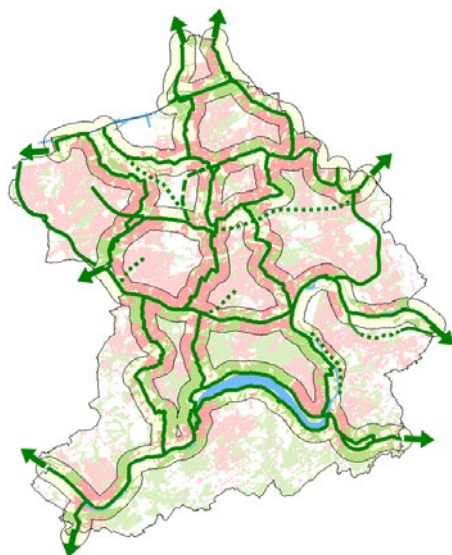© City of Essen



Flowing through the Ruhr area in Germany's North Rhine-Westphalia, the Emscher River carries the legacy of the many industries that used to populate its shores. Long considered as Germany's dirtiest river, the Emscher served as an open sewer for industrial and household wastewater and its groundwater levels were severely impacted by extensive mining. Since the early 1990s, efforts to restore the Emscher to its natural state have been making headway,

with the Emschergenossenschaft, Germany's biggest public water board located in Essen, investing massively in remodeling the River and building decentralized wastewater treatment plants.

In 2005, the Emschergenossenschaft, Essen and the 16 other cities neighboring the Emscher set the common goal to decouple 15% of storm water runoff from the sewage system before 2020. The water is then redirected to catchment areas of the river in order to restore groundwater levels.

The City of Essen built on this regional momentum to design the "New Ways to the Water" program, which aims at developing green space and renaturing the Emscher and its tributaries. At the same time, a core component of the program is to provide employment opportunities to the long-term unemployed in the city, increasing the value of real estate and triggering investments in areas that have suffered heavily from deindustrialization. Storm water collection projects have been implemented on the rooftops of the Assmanweg residential quarter as well as around different municipal facilities in the northern part of the city, where deindustrialization took its strongest toll. Another dimension of the program is the creation of new water routes between the Ruhr River in the south of the City and the Emscher in the North to ensure inhabitants have access to a green space within a 500 meters radius. These new water routes are depicted in green in the map below.

© City of Essen



By preventing a key resource from being wasted, the city was able to revitalize an entire neighborhood, create direct and indirect jobs and guarantee access to a healthy and green living environment to its residents.

"New Ways to the Water" was implemented through public-private partnerships between the City of Essen, the Emschergenossenschaft, local job and training centers and housing companies. Municipal and regional subsidies were leveraged to create employment and offer trainings.

In the long-term, the program has demonstrated its ability to balance upfront costs by triggering local investments and down-scaling the need for future sewer systems while at the same time creating jobs and training opportunities for residents facing barriers to employment.

# OUTLOOK

Throughout the project exchanges, the initial premise that connecting cities with an industrial legacy yields great potential has grown into a clear understanding of how this frame of reference helps to establish relationships and identify common priorities across local and regional differences. From the roadmaps and pathways outlined in the previous chapters, several key learnings can be taken away:

- **Small actions can instigate big changes.** Urban transitions are complex, ongoing, and have different layers of dynamics and development cycles. Thus, quick wins are not feasible but strategic investments have the potential to create wider impacts. The whole system can be positively affected when actions or projects are designed to build on critical leverage points, even when these initially seem small in their scope and reach.

- **Urban transitions are holistic, not sectoral processes.** Framing the knowledge creation within the Alliance, the thematic areas of Energy, Mobility, Infrastructure and Social Transition have worked well to steer the focus, but are in no way mutually exclusive; neither challenges nor impacts of programs or initiatives addressing these challenges are one-dimensional. Integrated approaches that acknowledge that urban transitions concern all systems and communities in a city ensure that municipal projects and policies reach their full potential.

- **Partnerships provide support at all stages.** Across all roadmaps, strategic partnerships have been highlighted as key aspects to build expertise, leverage funds, support implementation and scale impacts. Local governments in the Alliance worked with various stakeholders including advocacy groups, community organizations, private sector companies and health insurance providers. They have seen that cooperation not only improves program design, but creates long-term buy-in for municipal programs.

- **Community engagement can enable cross-benefits.** Alliance cities have been exploring innovative ways to ensure that their policies are informed by the diverse concerns and visions of their citizens, especially of those whose voices are often not heard. Inclusive policy-making ensures that everyday realities are addressed and helps to identify multiple benefits of transition programs, in turn strengthening support and impact.

Baltimore's "Every Story Counts" campaign is designed to give citizens a voice in defining resilience and sustainability on the community level.
© City of Baltimore

- **The unique local fabric is an asset to build on.** Shared visions that reconcile industrial legacies with new sustainable pathways are essential to build identity and a strong sense of place. Many Alliance cities have populations still connected to the industrial heritage – while others promote a new modern identity for the city. When re-thinking their urban systems, many Alliance cities have transformed legacy infrastructure into new assets that benefit local communities. By preserving and creatively leveraging the industrial heritage, they value their unique local fabric and build a shared identity that is rooted in their history.

- **Economic diversity increases resilience to future challenges.** Since it has not proven sustainable to rely on large industries as single drivers of growth, Alliance cites are committed to build more resilient economies by promoting a diverse, de-centralized landscape of enterprises and strengthening local value chains. Building on local assets like local resource flows and citizen's creative potential, such policies support local job creation while reducing transport emissions.

- **Urban Transitions are here to stay.** Industrial legacy cities were once home to innovation, technological developments and new ideas. Change is still engrained in their identity – just now they use these characteristics to achieve new transition goals. Alliance cities have learned to embrace the opportunities of ongoing urban transitions and actively shape their local environments.



Former mining district Gelsenkirchen Schalke.
© Stefan Kalweit

The true potential unfolds where activities and programs are designed to benefit all communities and social groups. From the Urban Transitions Alliance members' individual transition stories and also from their forward-looking plans and programs towards a sustainable future, equitable and inclusive development has stood out as a joint concern and priority. Throughout the exchange and cooperation, a common understanding of municipalities' role in the urban transition process has taken shape. Alliance cities and districts have designed their transition programs to address the city not only as a physical infrastructure, but also as a community of people. By taking an inclusive approach and emphasizing a strong sense of place, local governments in the Urban Transitions Alliance seek to reconcile these two dimensions and navigate their transition in a holistic way. For industrial legacy cities, the vision of a sustainable future implies clean, healthy environments and just opportunities for all members of their local communities.

# URBAN
# TRANSITIONS
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