

Governing city infrastructure: Who drives the urban project cycle?

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An analysis of Hamburg, Manchester and Pittsburgh

July 2017

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About this report

This report has been prepared by the Center of Competence for Cities at Siemens, the Copenhagen Business School, and the Brookings Centennial Scholar Initiative. Across the world, cities are grappling with climate change and crafting solutions that aim to reduce carbon emissions and advance innovative, sustainable, and inclusive growth. The primacy of cities requires us to understand how they are governed—not just in general but at the granular scale, where projects literally touch the ground.

To that end, we have selected a small group of cities – Hamburg, Germany; Manchester, United Kingdom; and Pittsburgh, Pennsylvania—that we believe are first-movers in their regions for sustainable urban

solutions. While most comparative analyses have focused on the differences between national, state, or even city policies, we have decided to dig deeper and ascertain the differences between city practices, given that cities operate under radically different regimes of government and governance. We have identified a series of emblematic projects in each city in the focus areas of urban transit, energy efficient buildings, and decentralized renewable energy. For each project we have investigated the different actors that design, plan, finance, deliver, and manage concrete developments and initiatives. Such an inquiry provides, for the first time, an understanding of how entities in the public, private, and civic sectors interact on all the core elements of successful projects.

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This report shows that there are enormous differences in how the same kind of project (for example, a new transit line or an energy-efficient building) is carried out in different cities. We believe that these findings should spark harder thinking about how cities actually organize themselves, individually and collectively, to deliver sustainable projects as efficiently and effectively as possible. The devil, in essence, is in the details.



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Introduction

The 21st century will be a city-driven century.



Introduction

The 21st century will be a city-driven century.

Cities are on the rise at a scale and speed unprecedented in human history. They have become the undisputed engines of national economies and the centers of global trade and investment. They sit on the front lines of disruptive forces like population migration, demographic transformation, economic restructuring, income inequality, and climate change. And with many national and state governments mired in gridlock, cities are increasingly the vanguard of problem-solving and policy innovation.

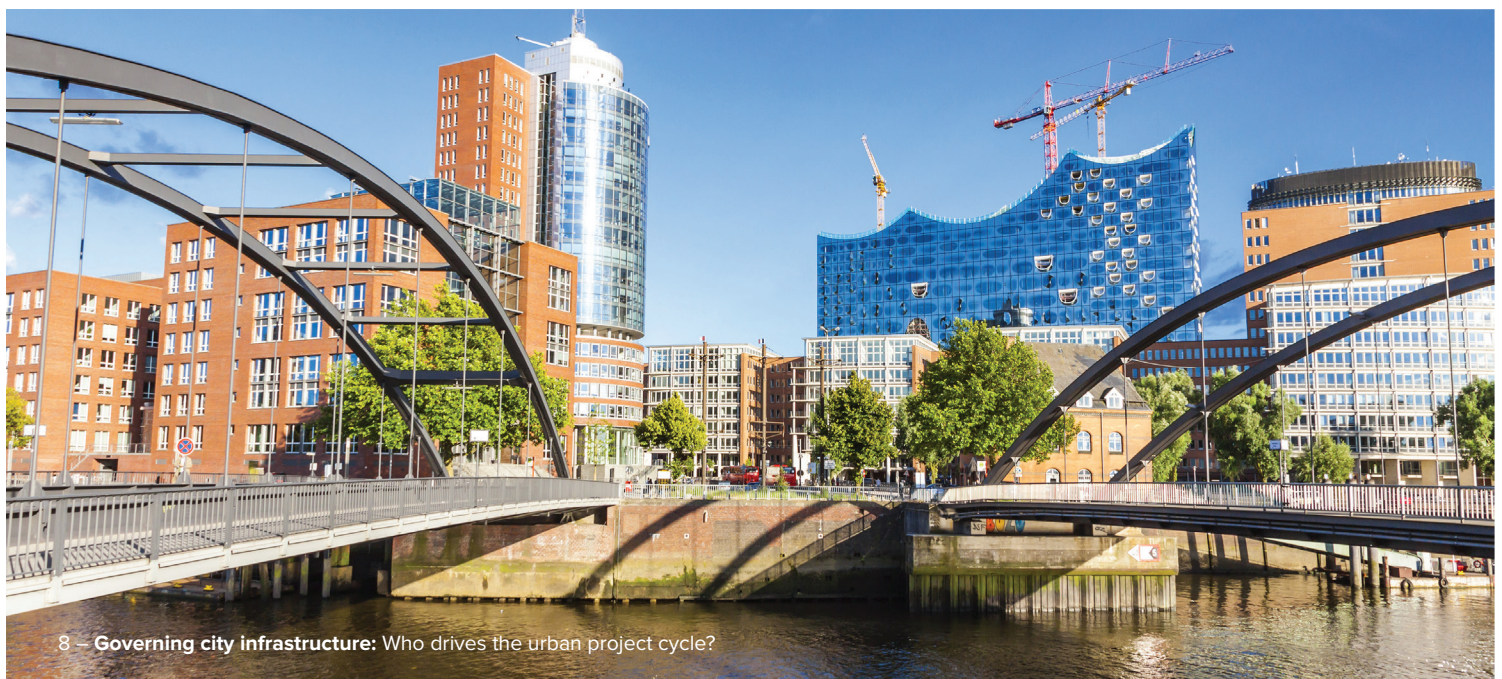
Sustainable urbanization reflects one of the most critical areas for urban solutions today. While half of the world's population now lives in cities, more than 70 percent of carbon emissions originate in cities. The unbalanced growth of megacities like Beijing, Lagos, and New Delhi is already precipitating severe levels of environmental degradation, air and water pollution, and deleterious health outcomes. This is why the 2015 Paris climate agreement and the UN's recent Sustainable Development Goals recognized that cities will need to be a key part of the world's response to climate change.

If cities are to grow in more sustainable ways, major interventions in the transport, buildings, and energy sectors will be necessary. Transport and buildings constitute the bulk of greenhouse gas emissions in cities, and cities consume over two-thirds of the world's energy, primarily through non-renewable sources. The technologies for radically changing this reality—such as state-of-the-art mass transit, energy efficiency, and distributed renewable energy—already exist. The challenge lies in deploying these technologies at scale across cities with radically different regimes of government and governance.

This report represents an effort to show in granular terms how different cities are innovating in distinct ways around sustainable urbanization. Over the last decade, long-term sector-specific plans in energy, transportation, and urban development have become the standard way through which many municipal governments try to influence sustainable development for the medium and long term. We believe practice must move beyond the realm of good planning and into accountability. Is a city delivering on its long-term targets and policies? Is it forging new forms of governance that foster collaboration across the public, private, and civic sectors and at all levels of government—city, suburban, state, and federal? And is it doing so in a way that can be rapidly adapted by other cities and scaled by national governments and global markets?

We hope this inquiry will both sharpen understanding about the nexus between smart governance and sustainable urbanization at the project level and unveil a series of practical lessons and solutions that can be applied to cities in the United States, Europe, and ultimately beyond to cities in Africa, Asia, and Latin America where urban growth is primarily occurring. As the report shows, cities provide a natural experiment since they undertake the same projects with radically different stakeholders and approaches. This enables us to assess benefits and drawbacks, identify best practices that might be ripe for adaptation and replication, and move closer to norms of behavior and financing that can be easily routinized.

The path to sustainable urbanization, in short, lies in granular application as much as grand policy.







Research Methodology



Research Methodology

To build a more detailed understanding of sustainable development across countries, the report explores how similar sustainable projects are delivered in three mature cities with radically different regimes of government and governance: Hamburg, Germany; Manchester, United Kingdom; and Pittsburgh, Pennsylvania USA. Our inquiry is deceptively simple: What roles do the public, private, and civic sectors play in carrying out sustainable projects and at what level—local, regional, national, or global?

Through an analysis of over 20 individual projects in the energy, transport, and buildings sectors and based on workshops with city officials responsible for development, the study investigates how each stage of the project cycle is impacted by different actors and how the city steers such public, private, and civic involvement.

Hamburg, Manchester, and Pittsburgh were chosen as the focus cities because of their reputations for innovative governance and the varying degrees of power and influence the municipalities have over projects in the transport, energy, and buildings sectors. Hamburg is a city-state with both political and fiscal powers to influence and steer sustainable development. By contrast, Manchester is in an important transition of devolution, with increasing political and fiscal powers being transferred to a new metropolitan authority. Finally, while Pittsburgh has comparatively weak fiscal powers, the city is able to achieve sustainable development through a strong reliance on the private and civic sectors to initiate finance and deliver sustainable projects.

We also selected these cities based on the differences of amalgamation of sub-metropolitan authorities. Hamburg is a single municipal entity with control over its entire functional area. Manchester is made up of a series of local authorities that is taking steps towards a new collaborative relationship including the election of a metro mayor in 2017. Pittsburgh is a balkanized mix of central city, urban county, surrounding counties, and hundreds of small suburban municipalities (although coordination on transportation is carried out through a federally mandated metropolitan planning organization).

Our aim is to look beyond how these cities do strategic planning and see how they work at a more micro-level on individual projects. The selected projects were chosen based on project size (above €5 million of investment) and the availability of data. For each project, we identified the organizations involved in each stage of a traditional project cycle:

- **Design stage:** The early inception and design of the project, both architecturally and conceptually.
- **Planning stage:** The planning application and approval of a project.
- **Financing stage:** The funding and financing of the project.
- **Delivery stage:** The execution, construction, and building of the project.
- **Management stage:** The operations of the project after its completion.



These organizations were then categorized according to their sector (public, private, or civic) and where their main offices are located—local (in the city itself), regional (in the region or state), country (in the same country as the city), or international (located abroad). To represent this data visually, we created a governance matrix that illustrates where decisions on major issues are being made (whether at the supra-national, national, regional, or city level) and by whom (local governments, public administration entities, the private sector, civic actors, etc.). This matrix offers a practical tool for cities to understand their starting point on issues of geographic scale, subject-matter responsibility and power, and public-private-civic collaboration.

The categorization of the organizations is illustrated in the matrix in the following ways:

- Type of organization (color): blue for public, yellow for private, and green for civic
- Scale of organization (gradient): lightest for local and darkest for global, with the regional and national levels assigned gradients in between
- Degree of influence of organization at each stage: most influential at the top and least influential at the bottom

When possible, our assessment of organizational influence was based on conversations with the project delivery teams.

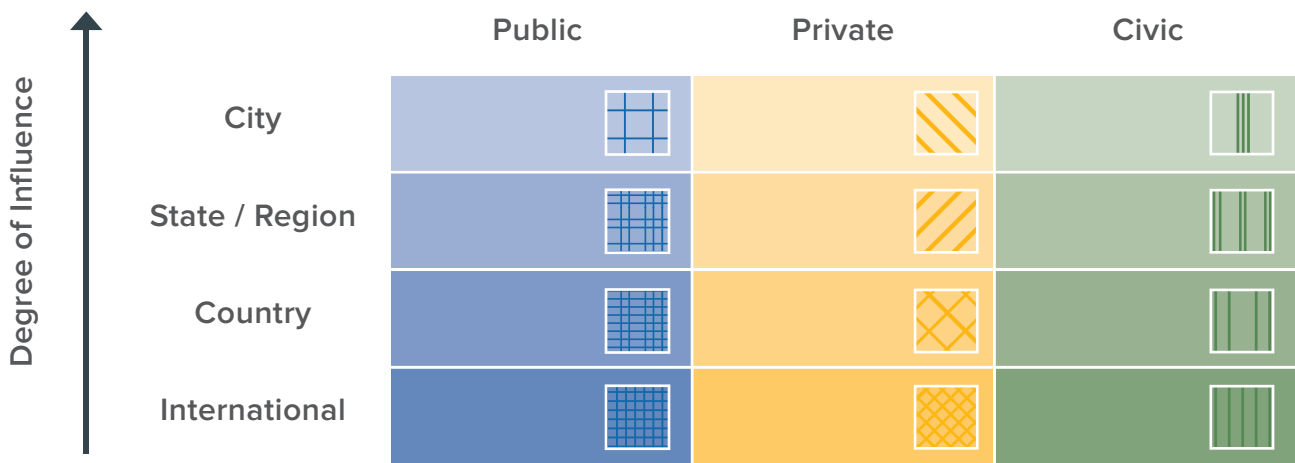


Figure 1: Governance matrix with color coding to categorize stakeholders by type, scale, consistency of presence, and partnerships



Research Methodology

While our research provides a methodology for understanding the ability of cities to deliver large-scale transformative projects, the sample size of projects is small and may not be representative of the overall state of projects citywide. Because the projects we examined were of different scale and scope, the number of actors at each stage of the project cycle varies from project to project. This created some distortions when we averaged the percentage of public, private, and civic actors involved at each stage of the scheme.

Projects

More than 20 projects were selected in the public transport, renewable energy, and sustainable buildings sectors for analysis. The projects are listed in Table 1, and a description of each project is included in the Appendix.

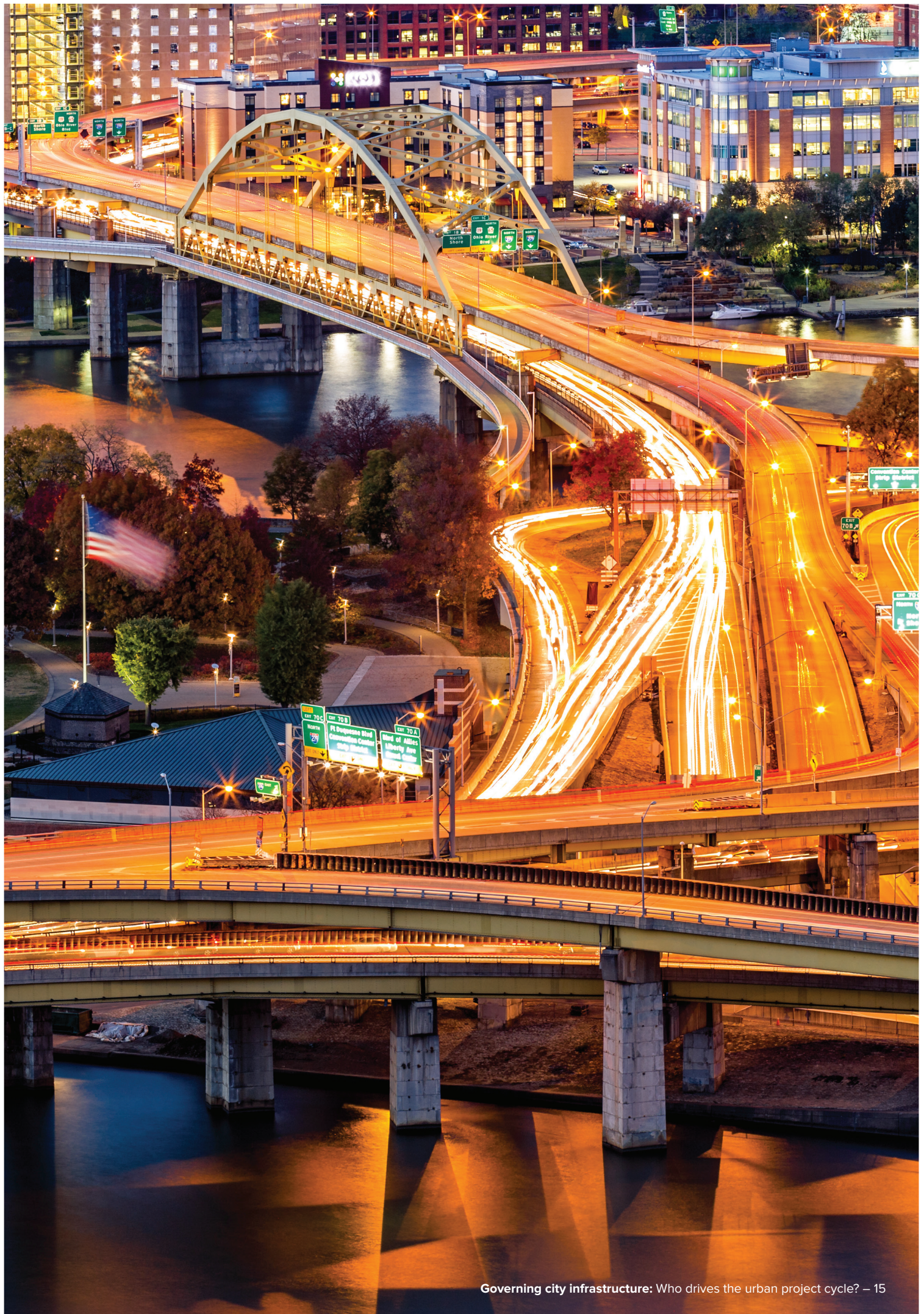
In the transport sector, three metro or light rail projects were selected to facilitate direct comparison: Hamburg’s U4 line, Manchester’s East Line, and Pittsburgh’s North Shore Connector.

In the decentralized energy sector, we looked at three solar projects: Hamburg Port’s rooftop project and the IKEA solar rooftop installation and Millvale Community Library solar installation in Pittsburgh. Hamburg’s energy bunker, which provides heat and electricity to more than 3,000 households, was also assessed in this sector. Due to lack of data availability, we were unable to source a decentralized energy project in Manchester.

Lastly, 16 sustainable building projects were analyzed using the governance matrix. These included both new buildings and retrofit projects that featured some aspects of energy efficiency.

	Hamburg	Manchester	Pittsburgh
Transport	U4 Line	East Manchester Line	North Shore Connector
Decentralized Energy	Hamburg Port Rooftop Energy Bunker		IKEA Pittsburgh Millvale Library
Buildings	BIQ House Emporio Kaispeicher B	MMU Business School Brookes building City Hall Bruntwood’s St James’ Place 1 Angel Square CIS building Eithad Campus One St Peter	Console Energy Centre PNC Hot metal flats Gardens at Market Square Pittsburgh Glass Centre Phipps Conservatory

Table 1: Selected Projects



Key Findings and Observations

The delivery of similar projects differs markedly across cities.

Hamburg's status as a German city-state with substantial fiscal powers has enabled the municipality to plan for the long term as well as drive investment forward across the transport, energy, and buildings sectors through a rich network of publicly owned subsidiaries. In Manchester, by contrast, the profound power exercised by the central government, as well as London's status as a premier global city, led to the substantial involvement of international firms across multiple areas of activity. Finally, Pittsburgh illustrated the power of networks, with both strategic planning and project governance steered by coalitions of public, private, and civic entities.

The cities are innovating on sustainable urbanization in distinctive and instructive ways.

Hamburg, like Copenhagen and other Northern European cities, benefits from a strong tax base and is using an innovative corporate vehicle to leverage public assets and finance the large scale regeneration of urban districts. Manchester is modelling a new kind of devolution that promises more integrated solutions at the sector and metropolitan scale. Meanwhile, Pittsburgh offers the potential for nimble and practical innovation, with philanthropies and other local organizations inventing new models and spurring progress in the face of federal and state government drift.

The different models for project delivery could have multiple economic, social, and fiscal implications.

More local ownership and control of solutions could naturally create greater community benefits, including more jobs for local workers and small businesses, greater tax capture by local jurisdictions, and greater value capture for public reinvestment. There are also efficiency effects from simplifying and routinizing the different elements of the project cycle and lowering transaction costs.

Cities that are first movers on sustainable urbanization could gain in several ways.

First movers could have unprecedented opportunities to export skills, expertise, and solutions to booming cities across the world. They could be more competitive and attractive to future businesses, research institutions, and other key players. And they could reduce the future costs of climate disruptions, including health costs imposed by pollution and congestion.





City Analyses

Hamburg, Germany



City Analyses

Hamburg—officially the Free and Hanseatic City of Hamburg—is the second largest city in Germany, after the capital city Berlin. As one of the city-states of Germany, Hamburg has both the powers of a state (Länder) and a local municipality. The German Constitution, or Basic Law, stresses the importance of the principle of subsidiarity; local governments are thus given a fair degree of discretion over social and economic issues within the city jurisdiction. A large and well-regulated public sector, comprehensive welfare policies and redistribution, and a high degree of civic involvement have supported the city’s rapidly growing economy.

The city has long had one of the most robust economies in Germany, with its harbor area ranking as one of the largest container ports of the world. In fact, the Port Area of Hamburg accounts for 10 percent of the metropolitan area. The city is one of the largest trading centers in the world as well as a leading location in the global civil aviation industry (Airbus employs around 12,000 people in the area).¹ As a major transportation hub, Hamburg has also developed broader financial and infrastructural systems that have helped raise employment in the city. As a result, Hamburg has a comparatively low unemployment rate of just over 7 percent.²

Today, Hamburg’s leadership must focus on maintaining and extending its envied economic position. Furthermore, Hamburg—and Germany as a whole—must manage the influx of large numbers of refugees from Syria, Iraq, and Afghanistan. In light of the refugee crisis, it will be crucial for Hamburg and Germany to focus on expanding sustainable infrastructure—not only as a source of employment for migrants but also in order to adapt to the demands and contingencies of a larger urban population.

Governance Characteristics

As a federal republic, Germany is distinct in the degree to which it devolves considerable powers and resources to states and cities. Yet the country’s politics is also notably consensus-driven. In the Bundesrat, the upper chamber of the federal legislature, the states meet every Wednesday to discuss the state of affairs across states and within the nation. Within each Länder, cities and boroughs meet every Tuesday to discuss the state of affairs in the individual states. Furthermore, Germany’s existing financial equalization system redistributes tax revenues among the Länder. In the national redistributive index, Hamburg is indexed at 120, meaning that it contributes 20 percent of its revenue to cross-state redistribution. Thus, a close-

knitted social and fiscal network seeks to ensure collaboration, consensus, and advancement across and within German states.

Another important characteristic of governance lies in the government’s collaboration with the private sector, resulting in projects that combine public interests and private capacity. This is illustrated by the city’s “cluster policy”—an integral component of the city’s technology and innovation efforts.³ The cluster approach advocates for cohesive, geographically clustered innovation hubs that connect businesses, suppliers, workers, and educational institutions in a particular field.⁴ A key example of the cluster strategy is Hamburg’s energy sector. The energy cluster has a membership organization that is part publicly owned by local government (51 percent) and part privately owned by industry partners (49 percent). The focal point of this cluster strategy is the Energy Campus Bergedorf, which is home to Siemens’ Wind Power Division. (In addition to Siemens, the Hamburg region is home to more than 180 companies employing 25,000 workers in the renewable energy sector.⁵) Local government has also set up an environmental partnership consisting of 1,000 business, political, and administrative entities to foster dialogue and collaboration, resulting in savings to Hamburg of €50 million a year in operating costs. In 2013, the citizens of Hamburg voted to re-municipalize the energy sector, and today the city owns 100 percent of the stock of its energy distribution company.

Like Copenhagen, Hamburg has also adopted the model of a publicly owned and privately run corporation. HafenCity—the most extensive harbor front redevelopment project in Europe—is a prime example of this innovative model. HafenCity will expand Hamburg’s city center by 40 percent and create 7,000 new housing units and 45,000 jobs. The project relies entirely on the publicly owned urban development corporation, HafenCity GmbH. Public investment in the HafenCity U4 metro line was €2.4 billion, which was primarily financed by the sale of land in HafenCity. Local government exerts a degree of control over the development of HafenCity, as illustrated by the requirement that private developers reserve 30 percent of the building stock for social housing in order to meet the city’s target of having a third of HafenCity’s housing accessible to low-to-middle income groups.

These two models—the cluster strategy and publicly owned, privately run corporations—are integral to understanding the entry points for the development of sustainable infrastructure in Hamburg.



Strategic Planning in Hamburg

With its strong fiscal powers and city-owned development companies, Hamburg is in a unique position to implement its key strategic plans. The following sections introduce some of the strategic plans the city has set in the transport, energy, and buildings sectors in order to drive sustainability in the city.

Transport

Hamburg's vision for transportation involves improvements in sustainability, utility, and attractiveness to users. In 2014, Hamburg became the first German city to join the World Business Council for Sustainable Development's Sustainable Mobility Project to address the city's mobility challenges.⁶ Transport—especially passenger car transport—accounts for 25 percent of all of Hamburg's carbon emissions. The city has adopted an “avoid-shift-improve” approach to reduce emissions: avoiding or reducing travel, shifting to more climate-friendly modes of transport, and improving efficiency through vehicle technology.

The city hopes to be fully sustainable by 2050. To achieve this, Hamburg will focus its efforts on encouraging non-motorized private transport (walking and cycling), expanding public transportation, including the extension of rapid-transit railway lines U4 and S4, implementing innovative technologies such as electric vehicles and LED traffic lights, fostering comprehensive mobility, improving transport management, and promoting the shared transport economy.^{7,8} In addition to increasing the attractiveness of sustainable transport by improving and expanding infrastructure, Hamburg is interested in reducing the length and need to travel all together.

Energy

According to Hamburg's Climate Action Plan, by 2050 the city's energy requirements will be supplied by competitive and reliable renewable energy sources, primarily wind energy generated outside of Hamburg.⁹ The city aims to position the North German region as one of the world's leading renewable energy sites. Hamburg plans to increase wind power generation by redesigning areas, replacing existing plants with more powerful ones, and incorporating systems into the existing port, industrial, and commercial infrastructure. Investments will also be made to install solar panels on roofs, treat biomass from green spaces and landscape management, and build systems to digest biogenic residual materials and origin waste.

The systematic integration of renewable energy into the supply structures will advance virtual power plants and measures for load management. Among the most important measures are using gas and steam power for district heating generation, bioenergy funding, solar energy funding, and the construction and repowering of wind turbines.

A number of projects in HafenCity have also proven fruitful. For example, the Active Customer Demand and Control (ACDC) system helps customers discern and regulate their energy consumption. The system is also integrated into other sustainability initiatives in the city, such as hydrogen filling stations for fuel-celled public transport and decentralized, computer-controlled power stations.¹⁰

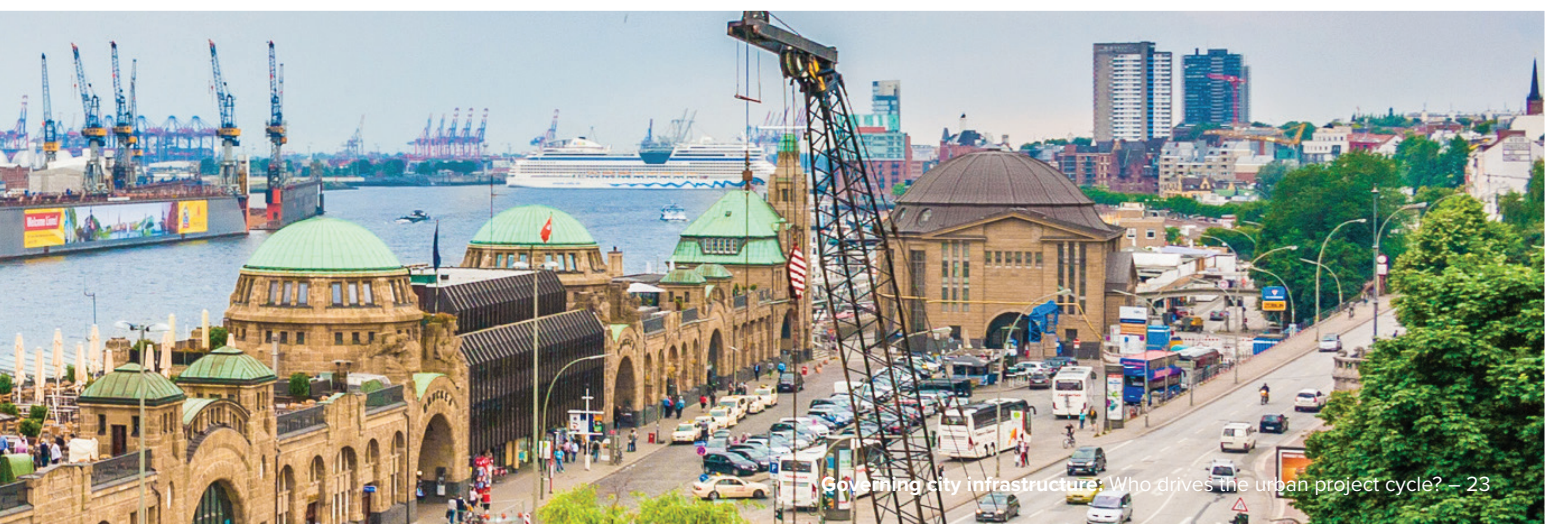


Buildings

Hamburg's Climate Action Plan aims to reduce energy consumption and increase the energy efficiency of buildings, with priority given to the insulation of the building envelope and the use of energy-efficient heating systems. One of the main initiatives is retrofitting and insulating old buildings, which make up 85 percent of Hamburg's building stock. The plan also calls for additional laws and regulations—including, for example, that all new buildings constructed meet strict energy consumption limits by 2021.

To support sustainable development and green building construction, Hamburg has developed other notable schemes as well. The Hamburg Investment and Development Bank (IFB), a central investment and development institution owned by the city, provides public support for business development and housing and offers innovation support and promotion of environmental protection with low-interest loans, direct subsidies, grants, and advice on funding from the Bundesrat, the federal government, and the European Union.¹¹ To encourage voluntary investment in energy and resource efficiency enterprises, a partnership program was established that provided a match of €1 from the local government for every €10 contributed by participating companies. The program, which saves 134,000 tons of carbon emissions a year, has generated €146 million in private investment matched by municipal support of €15 million to date.

One of the most prominent examples in which the city actively financed green and energy-efficient buildings with the support of the business sector was the International Building Exhibition (IBA). IBA has entirely altered the landscape of Hamburg's Elbe Islands and Upriver Port. From its start in 2006, IBA presented a variety of built solutions and plans demonstrating the benefits of sustainable housing to residents and companies alike, thus bringing a variety of stakeholders to the table. Although IBA was a subsidiary of the city of Hamburg and was financed by special investment programs of the city, most of its projects were jointly financed by community organizations, private developers, and the city housing authority. Since the end of the exhibition in 2013, IBA Hamburg GmbH continues to build on its legacy and has been active as an urban developer in the south of the city.¹²

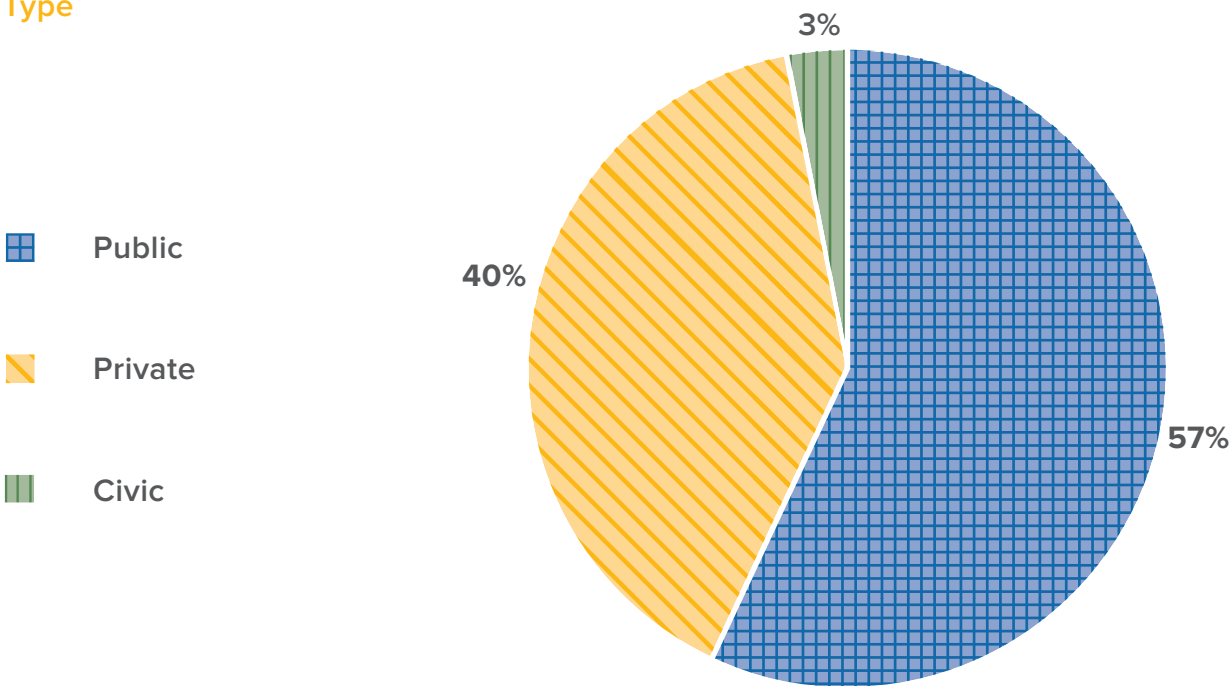


Project analysis

The project analysis below examines both the nature and variety of stakeholders involved in sustainable infrastructure projects in Hamburg as well as the degree of influence they assert over these projects. Using case study analysis, we will look at several of the projects involved in this study, examining how they exemplify Hamburg’s approach to sustainable infrastructure.

Broadly, we conclude that the city’s strategic planning is ambitious, well-integrated, and linked to clear goals around environmental sustainability. Stakeholders in the projects we analyzed were primarily local and public entities. Of the six projects analyzed in Hamburg, the city’s publicly owned subsidiaries were almost always involved in the finance stages of the project. As the in-depth case analyses will show, this likely played a defining role in the planning and execution of the city’s sustainable projects.

Stakeholder Type



Location of Stakeholders

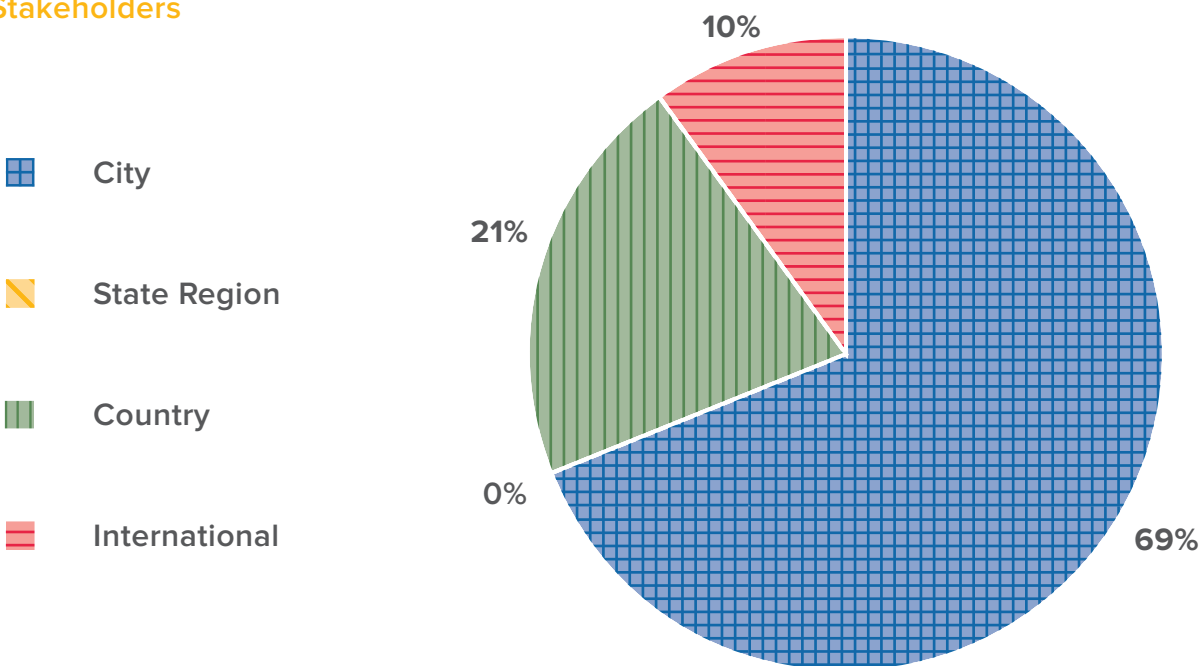


Figure 2: Description of key stakeholders





Case 1

Hamburg Energy Bunker

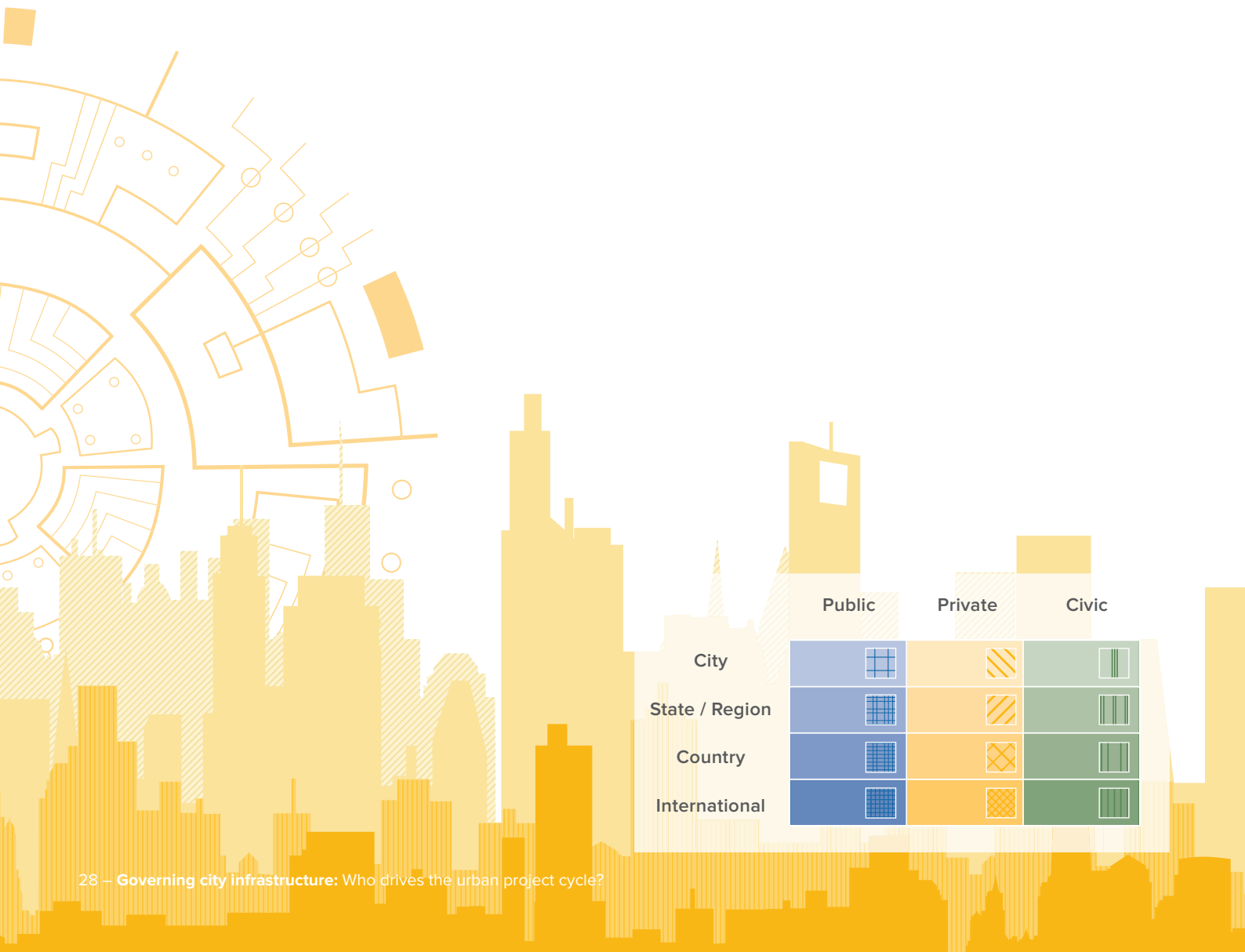


Case 1: Hamburg Energy Bunker

In the energy sector, we looked at Hamburg’s Energy Bunker project, which converted a disused, World War II-era air-raid bunker into a combined heat and power generation station as part of the International Building Exhibition. In its center sits a 2-million-liter water reservoir that acts as a large heat buffer, fed by heat from a biomass thermal power plant, a wood burning unit, a solar thermal system positioned on the roof, and waste heat from a nearby industrial facility. The energy bunker currently produces about 22,500 megawatt-hours (MWh) of thermal energy as well as 3,000 MWh of electrical energy, which is sold to the public grid. The bunker has become a major tourist attraction and includes a viewing platform, a permanent exhibition, and a cafe.

The €26.7 million project was principally funded by Hamburg Energy along with contributions from IBA Excellence, the city-owned subsidiary set up to deliver the exhibition, the city of Hamburg, and the European Regional Development Fund. Hamburg Energy, the energy and utilities company owned by the city, was highly involved in all stages of the project other than planning.¹³ The only international actors involved were the European Union, which provided funding, and the private companies that delivered the project.

As the predominance of light blue squares shows in Figure 3, the project was primarily led by local and public entities.



Design	Planning	Finance	Delivery	Management
IBA 	Free and Hanseatic City of Hamburg 	IBA Hamburg GmbH 	Hamburg Energie 	Hamburg Energie 
Hamburg Energie 	State office for Real Estate Management and Landed Property 	Hamburg Energie (€9.8m) 	Pinck Ingenieure Consulting GmbH, Hamburg 	Waterkant – Hamburg Event & Solutions 
State Ministry for Urban Development and Environment 	IBA 	ERDF (€3.1m) 	Averdung Ingenieurgesellschaft 	
Free and Hanseatic City of Hamburg 	Specialists from the local Association for Implementation of Major Construction Projects 	City of Hamburg (€1.3m) 	Neumann Krex & Partner 	
HHS Hegger Hegger Schleiff Planer 	State Ministry for Urban Development and Environment 	Hamburg climate protection funds 	EGL Entwicklung und Gestaltung von Landschaft 	
Bartram und Partner 	Hamburg–Mitte District Authority 		HG Merz Architekten Museumsgestalter, Stuttgart 	
Averdung Ingenieurgesellschaft 	Hamburg Monument Protection 		Ritter XL Solar 	
			Solon 	
			Waterkant – Hamburg Event & Solutions GmbH 	

Figure 3: Project cycle analysis of Hamburg's Energy Bunker



Case 2

Hamburg Port Rooftop

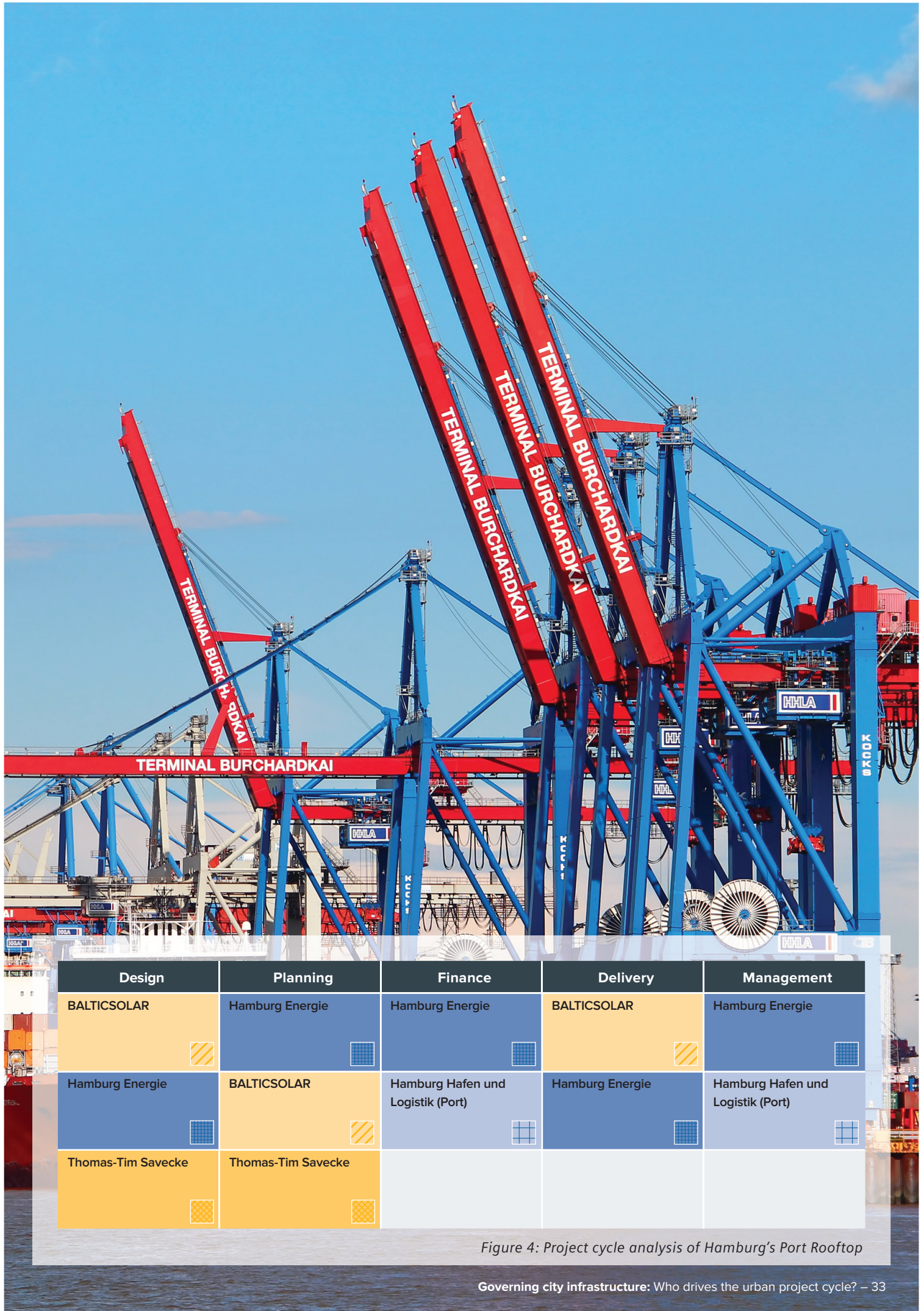


Case 2: Hamburg Port Rooftop

The Hamburg Port Rooftop project was planned and executed in a manner similar to the Energy Bunker. Over 460 MWh of electricity is produced through an installation of more than 4,000 photovoltaic (PV) panels on the roof of the logistics center in Altenwerder.

The two owners of the port area—Hamburg Hafen und Logistik, a publicly owned company, and Hamburg Energy—were both key financial backers of the project. In fact, Hamburg Energy was involved in all five project stages. The only actor outside of Hamburg was the Lithuanian company BalticSolar, which participated in the design, planning, and delivery stages.

















Design	Planning	Finance	Delivery	Management
BALTICSOLAR 	Hamburg Energie 	Hamburg Energie 	BALTICSOLAR 	Hamburg Energie 
Hamburg Energie 	BALTICSOLAR 	Hamburg Hafen und Logistik (Port) 	Hamburg Energie 	Hamburg Hafen und Logistik (Port) 
Thomas-Tim Savecke 	Thomas-Tim Savecke 			

Figure 4: Project cycle analysis of Hamburg's Port Rooftop



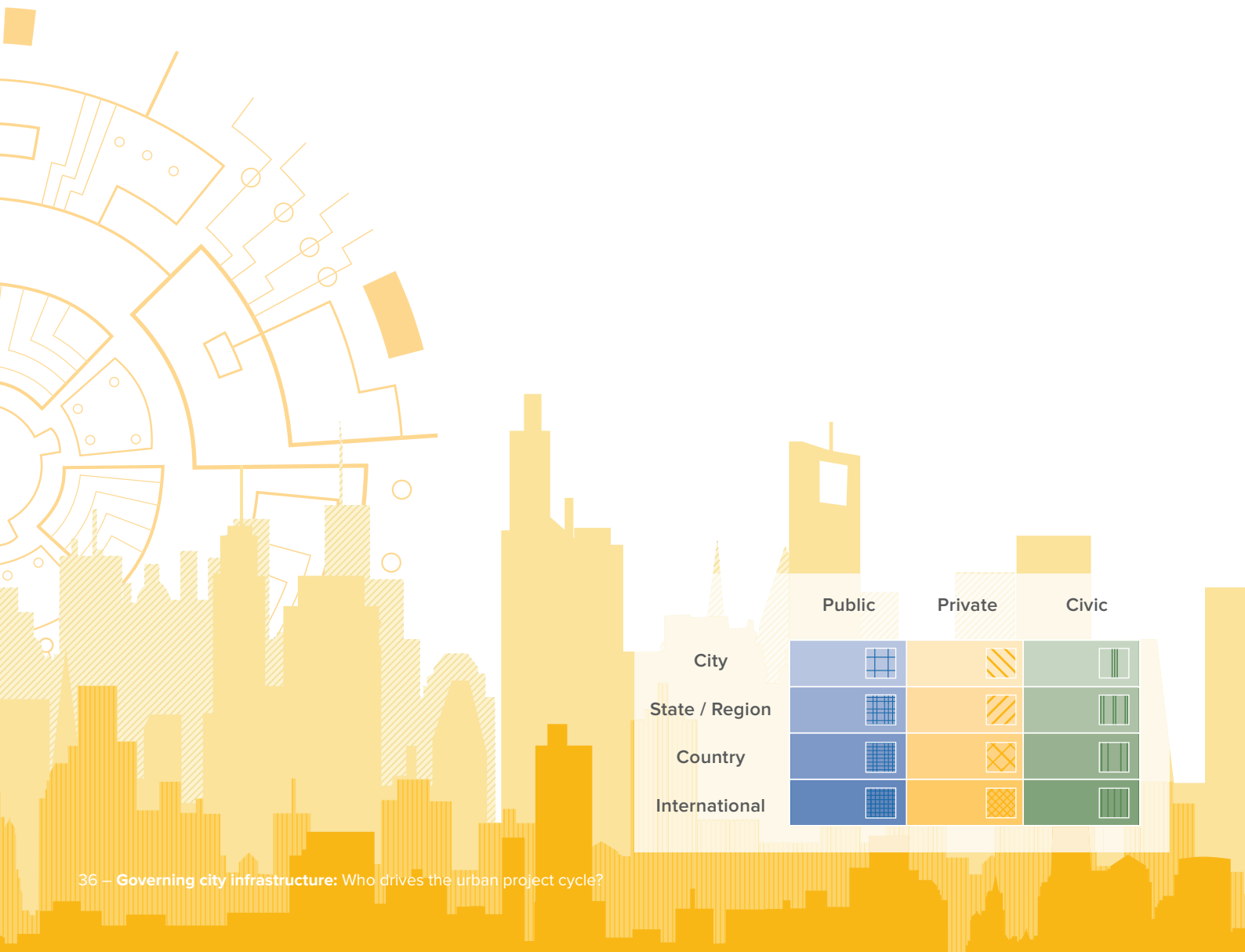
Case 3

BIQ House



Case 3: BIQ House

The BIQ House is the world’s first algae-powered building. The algae produces its own energy, controls light, and provides shade.¹⁴ The €4.5 million, five-floor residential house was completed in 2013 as part of the IBA. While the BIQ House project was primarily led and funded by the private sector, municipalities were involved in providing planning approval. Additional funding was secured through the municipally-run Hamburg Climate Protection Concept, which tapped into the IBA’s energy-efficient buildings fund. It is worth noting that this project’s actors were more diverse than those in the Hamburg renewable energy sector. As figure 5 shows, a mix of local, national, and international private-sector parties were supported by mostly local public actors.





Design	Planning	Finance	Delivery	Management
Splitterwerk 	Arup 	Hamburg Climate Protection 	Arup 	Hamburg Energie 
Arup 	Sprenger Von der Lippe 	Otto Wulff Bauunternehmung 	Strategic Science Consult 	Immosolar 
B + G Ingenieure, Bollinger und Grohmann 	Otto Wulff Bauunternehmung 	Strategic Science Consult 	Colt International GmbH, Kleve 	
Immosolar 	Feverabend + Gunnder GmbH, Goslar 	Federal Ministry of Transport, Building and Urban Development 		
Hamburg Strategic Science Consult GmbH 	City of Hamburg 			
IBA 	IBA 			
City of Hamburg 				

Figure 5: Project cycle analysis of Hamburg's BIQ House



Case 4

Kaispeicher Museum and Emporio Tower



Case 4: Kaispeicher Museum and Emporio Tower

Other building projects demonstrate a somewhat more typical divide between strong municipal involvement for state-owned assets and private involvement for commercial buildings, as seen in the renovations of the Kaispeicher B warehouse and the Emporio Tower, respectively.

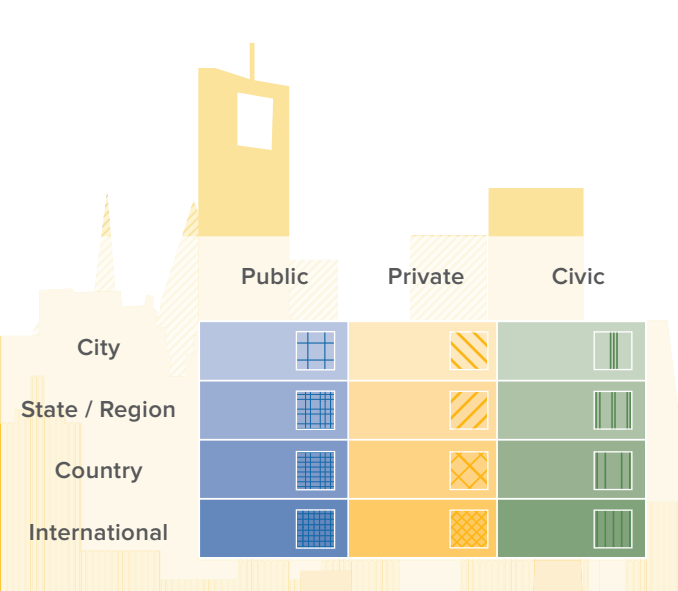
The Kaispeicher waterfront warehouse—now the International Maritime Museum Hamburg—was retrofitted in 2008 by the Peter Tamm Sen. Foundation, and today houses Tamm’s private collection of model ships, uniforms, maritime art, and other items. Although the foundation led the initiative to buy and convert the warehouse into a museum, the city backed the project with a €28 million grant and provided the foundation with a free, 99-year lease to the property.¹⁵

Figure 6 shows the key role that the city of Hamburg played in the design, planning, and financing stages of the 144,000-square-foot rehabilitation project. There was almost no international involvement in the project. The leadership provided by the Peter Tamm Sen. Foundation, a civic actor, was unique but is understandable given the foundation’s control of the property and its goal of establishing a public institution.

The Emporio Tower project, on the other hand, saw the city taking on the more traditional role of a public body as the entity responsible for granting planning permission. This landmark-protected office tower was retrofitted in 2012 to become a mixed-use building. The retrofit resulted in savings of 64 percent on cooling and heating and a 2,000-ton annual reduction of carbon emissions.¹⁶ The Emporio is occupied by its owner, Union Investment Real Estate AG, along with other tenants.

With the exception of the Hamburg City Council’s presence as the planning authority, the Emporio project was spearheaded by the private sector, with Union Investments driving planning, finance, and management.

The Kaispeicher and Emporio projects could signify Hamburg’s desire to take on a leading role in projects that drive innovation in sustainability while providing basic support to proven sustainability efforts by the private sector. It is also important to note that almost all stakeholders in these projects in the planning, finance, and management stages were either local or national actors.





Design	Planning	Finance	Delivery	Management
Peter Tamm Foundation 	Hamburg City 	Hamburg City 	MRLV Architekten 	Foundation Peter Tamm Sen. Stiftung (99 year lease) 
Hamburg City 	Hamburg City Parliament 	Peter Tamm Foundation 	Plock Elektro GmbH 	
MRLV Architekten 	Hamburg Ministry of Culture and Media Department of Heritage Preservation Ministry of Urban Development and Environment, Co-Operation Centre for Climate Issues 		ESSER by Honeywell 	
	CoolBricks Project – EU 			

Figure 6: Project cycle analysis of Hamburg's Kaispeicher B conversion



Conclusion

Hamburg, Germany



Conclusion

Based on this case study analysis, we can see that local government actors have been especially active participants in projects that are innovative and sustainable and bring together diverse stakeholders. The model arguably advocates for the combined efforts of private finance and public will. The city's projects rely heavily on local public funds or private partners but retain significant oversight and control by the city-owned corporations involved in planning and execution. Financial backers are found among businesses and developers who are eager to take part in sustainable projects either because of business interests or a desire to demonstrate leadership in the burgeoning green industry.

In short, the key trends observed in Hamburg's governance are:

- A strong presence of local stakeholders (private and public) throughout project delivery,
- Substantial municipal oversight throughout the project cycle,
- A tendency to establish subsidiaries that are either wholly publicly owned or joint ventures between local government and local business stakeholders.





City Analyses

Manchester, United Kingdom



City Analyses

The city of Manchester has just over half a million inhabitants. A variety of sectors make up the city's major areas of employment, including historic manufacturing and engineering clusters as well as newly growing health and social care sectors, which today employ 177,000 people. Since 2012, Manchester's economy has grown by 3.8 percent a year, almost twice the national average of 2 percent. Today, Manchester is considered a "beta" global city and is rated the second-most globally influential city in the United Kingdom after London. The region is also a knowledge hub, with research and enterprise clustered around the University of Manchester. Typical industry areas include digital and creative, financial, legal and business services, biotechnology, advanced manufacturing, environmental technologies, tourism, global sports brands, media, and real estate. Greater Manchester's creative and digital industry is one of the largest in the country, employing 63,500 people and generating gross value added of £3.1 billion each year.

A 2011 census indicated that Manchester is the fastest growing city in the country. This rapid urbanization has likely contributed to the city's current socioeconomic stratification: Manchester is home to some of the United Kingdom's most deprived and most affluent neighborhoods. According to the 2015 Index of Multiple Deprivation, Manchester is the fifth most deprived local authority in England, while at the same time being home to more multimillionaires than anywhere outside London.¹⁷ Manchester's economic growth is predominantly driven by the rapid expansion of the financial and professional service sectors. Experts anticipate that this private-sector growth will help buffer the impact of expected public-sector cuts in coming years.¹⁸

Governance Characteristics

Unlike other Continental European models, the United Kingdom's system of governance has traditionally been highly centralized. Most decisions regarding public finance emanate from the national government and are gradually translated across the country's many diverse regions. The national government constrains local governments' borrowing for housing purposes and limits property taxes and fees on planning applications. At the same time, local income tax contributes entirely to national tax revenues, cities are thus more heavily reliant on national funding for public welfare projects

and improvement. While this makes it difficult to discuss a "Manchester governance model" per se, there have been key efforts toward privatization, devolution, and decentralization in the last 20 years that provide an interesting context to our understanding of the status quo today.

From Margaret Thatcher's move to privatization as a means of reducing unemployment to Tony Blair's "New Labour" and David Cameron's "Big Society," the United Kingdom has seen a distinct move toward the creation of quasi-markets and privatization in the last forty years. Coupled with this move toward the partial privatization of public services and amenities, the national government has sought to increase the autonomy and accountability of local governments with regard to their growth and management. Enacted in 2000, the Local Government Act (LGA) empowered U.K. city councils and encouraged cities to adopt procedures for the direct election of officials. However, 80 percent of U.K. councils opted for cabinet and the indirect-elected council leader model.

In 2014, under Chancellor of the Exchequer George Osborne, the central government began orchestrating, assisting, and negotiating with cities to produce "City Deals." These deals were a collaborative undertaking between cities and Whitehall to discuss the ideal degree and range of the devolution of powers to cities. In many cases, cities formed "Combined Authorities" and "Local Enterprise Partnerships," which included both private and public actors, to allow for the local customization of projects and investments. The Manchester City Deal included provisions to address the issues of transportation, youth job creation, and the fiscal devolution of the management of Manchester's portion of the National Health Service budget. In 2014, Manchester entered into a ten-year partnership with Abu Dhabi United Group to build more than 900 new homes in the boroughs of Ancoats and New Islington in East Manchester. The Manchester City Deal also included a provision to directly elect the metropolitan mayor in 2017. As a result, the Greater Manchester area has had more power devolved to it than any other British city. It is hoped these new types of collaboration will bring together public officials, politicians, private business representatives, and civic actors.



Strategic Planning in Manchester

Manchester recently published the “The Manchester Strategy,” which sets a variety of long-term goals for the city in the areas of social, environmental, and economic improvement and sustainability.¹⁹ Creation of the plan

was overseen by the Leaders Forum, an all-sectors local stakeholders group. The plan emphasizes the importance of Manchester interacting and exchanging with partners beyond the city’s limits and creating

Transport

Transport for Greater Manchester (TfGM) is the organization responsible for transportation infrastructure in Greater Manchester.²¹ The authority is made up of 33 councilors appointed from the 10 districts that make up Greater Manchester. TfGM owns Manchester Metrolink, the largest light rail network in the country, and is currently delivering a £1.4 billion expansion and improvement program.²² Metrolink is operated and maintained under contract by the RATP Group, a state-owned public transport operator headquartered in Paris.

According to TfGM’s 2040 vision, transformational investment in High Speed 2 (HS2) and new, fast east-west rail connections across the North will establish Greater Manchester as a modern, pedestrian- and cycle-friendly city region.²³ To support sustainable economic growth and achieve its 2020 carbon reduction goals, Greater Manchester aims to tackle congestion, improve access to skills and markets make road journeys more reliable, ensure that transport networks are well-maintained, and create an efficient, seamless public transport system with improved

walking and cycling environments. To achieve this, the region must incorporate technology, expand its rapid transport network, and expand Metrolink, tram trains, and bus rapid transit.

Looking beyond Manchester, TfGM seeks to address issues of connectivity in the North and between major city centers in the South. Transportation is viewed as key for the region to function as an integrated economy and is critical to its future, and so the strategy also focuses on growing Manchester’s international reputation. It calls for investments in the airport, including its surroundings and transportation connections. The emphasis on the airport is especially interesting, due to the fact that the Manchester Airports Group (MAG) is publicly owned by the ten local authorities of Greater Manchester (55 percent is owned by the Council of the City of Manchester) and is privately managed on their behalf.²⁴ MAG is one of the largest airport groups in Europe; between 2013 and 2014 it paid £14.5 million in dividends to the city of Manchester.²⁵

strong partnerships with other cities in the region. Two of the strategy's principal themes are the importance of sustainability ("A Liveable and Low-Carbon City") and infrastructure ("A Well-Connected City"). Manchester aims to reduce its carbon emissions by 41 percent by

2020, but it also must follow U.K. legislation of reducing national emissions by 80 percent by 2050.²⁰ In the coming years, it will be interesting to see the tangible effects of devolution on the realization of these goals.

Energy

While the city council acknowledges the need to move toward renewable energy sources, the council lacks the powers to manage energy-efficiency projects and renewable energy sourcing. The government acknowledges a specific need to exert greater control over energy generation and supply from affordable, locally produced low- and zero-carbon energy.²⁶ Yet the city has no formal statutory responsibilities for energy or low-carbon transition, which in turn has made it difficult to develop a comprehensive climate strategy.²⁷

A few attempts at such strategies have been made, however. There has been some evidence of discourse around more efficient heating, and in 2010 a decentralized and zero-carbon energy master plan was published.²⁸ The council agreed to the terms of this plan in 2012, but it seems that no visible action was taken. By contrast, privately-led projects are beginning to see results. For instance, a geothermal heat plant on Devonshire Street, supported by GT Energy and E.ON, will be the first of its kind in the United Kingdom. Nevertheless, it can be concluded that more overarching strategic policies are needed in the building sector if Manchester is to meet its lofty sustainability goals.

Buildings

Manchester City Council has made concerted efforts to produce long-term plans for sustainable buildings. For example, in its Low Carbon City Strategy, the city commits to transitioning to a low-carbon economy, supporting low-carbon goods, technologies, and services, and improving the resource efficiency and environmental performance of all business sectors.²⁹ An important point to note, however, is that there is little integration of sustainable building and new housing projects or recognition of the importance of energy efficiency within those projects.³⁰

Financial support for the energy-efficiency program comes from the Home Energy Loan Plan (HELP), which provides interest-free loans that can be used for heating, insulation, renewable windows, and glazing.³¹ Between 2000 and 2013, approximately £2 million of loans were granted to 782 households.³² The Manchester Green Deal delivery partnership also played a role in funding energy-saving home improvements, though this deal was terminated in 2015 with no sufficient replacement in place.³³

The city council, in particular, has emphasized the importance of pioneering the construction of energy-efficient buildings in the region. Given the fact that two-thirds of the city council's own direct carbon emissions come from their buildings this is both an unsurprising and welcome move. Yet while the council's plan calls for the successful retrofit of City Hall, it does not stress any other public building goals.




Project analysis

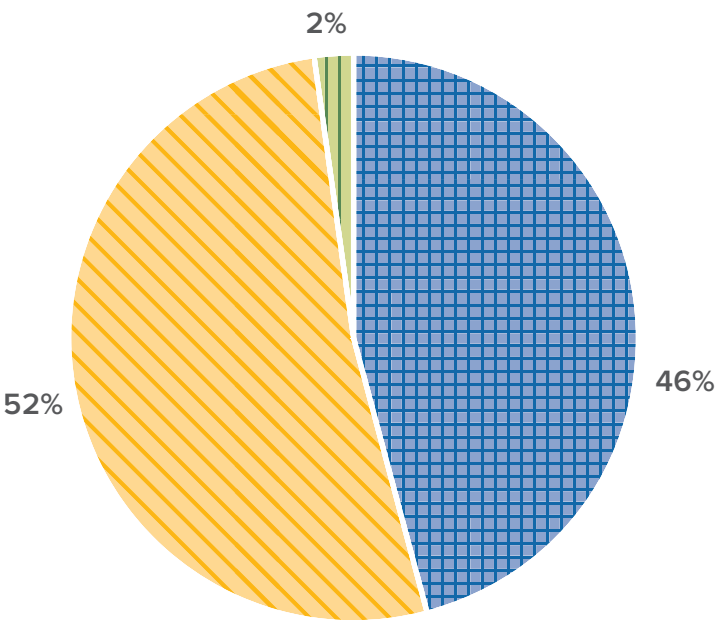
Manchester is a growing and ambitious city, clearly asserting its status as the next major city in the country after London. The highly centralized governance system and ongoing (but incomplete) devolution has made it difficult for many of these ambitions to be realized. As a result, our analysis shows that the city has few tools to directly influence the building, energy, and transport sectors and often must rely on business and central government inputs for change. This section analyzes a series of projects to determine which organizations engage with transport and buildings and how. With the exception of the East Manchester LRT Line, all of the

projects analyzed in Manchester were in the buildings sector, with a mix of public and private buildings in the analysis. The charts in Figure 7 offer a broad picture of all the projects analyzed in Manchester.





Based on our analysis, the city plays a focal planning role in approving projects and occasionally leads the project either at the inception or financing stages. The city authority usually takes on a traditional role in planning and approval, allowing private-sector investors to take the lead in the inception and financing stages.

Stakeholder Type

-  Public
-  Private
-  Civic



Location of Stakeholders

-  City
-  State Region
-  Country
-  International

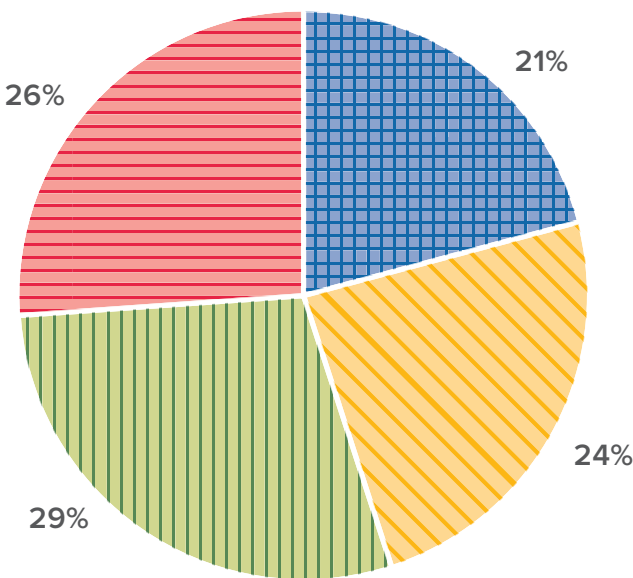


Figure 7: Manchester project stakeholders





Case 1

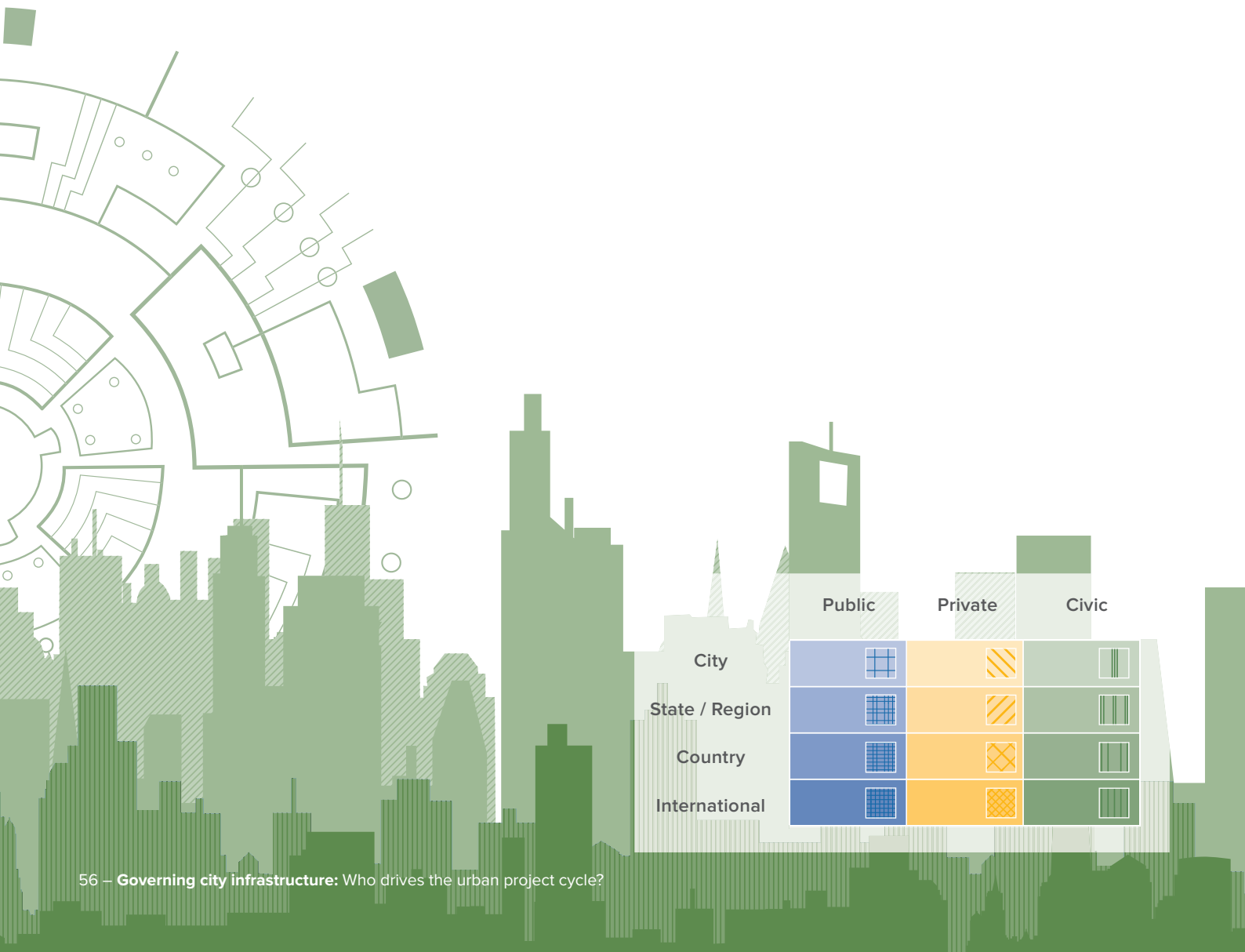
East Manchester Line



Case 1: East Manchester Line

The East Manchester Line is a £1.5 billion expansion of the city’s public transport network, connecting the urban core to the city’s football stadium and large areas of growth and regeneration east of the city. The project was led by the Greater Manchester Passenger Transport Executive and the Association of Greater Manchester Authorities, which both have larger spatial remits than the city authority. In contrast to the substantial involvement of the municipality in the U4 Line in Hamburg, these projects relied on the

involvement of broader administrative entities. The Greater Manchester Passenger Transport Executive—which is made up of representatives from each of Manchester’s local authorities—was a key organization at all strategic stages of the project. As figure 8 shows, the public and private bodies involved were predominantly not from the city of Manchester itself, but rather from Greater Manchester and elsewhere in the United Kingdom and beyond.





Design	Planning	Finance	Delivery	Management
Greater Manchester Passenger Transport Executive	Greater Manchester Passenger Transport Executive	Department for Transport	Thales Group	Transport for Greater Manchester (ex-GMPTE)
Parsons Brinckerhoff	Association of Greater Manchester Authorities	Greater Manchester Passenger Transport Executive	Laing O'Rourke	RATP Group (to 2017)
Thales Group		Association of Greater Manchester Authorities	VolkerRail	Thales Group
Laing O'Rourke		European Investment Bank	Bombardier	Laing O'Rourke
VolkerRail		Public Works Loan Board	Vossloh Kiepe	VolkerRail
			PL Civil Engineering	

Figure 8: Project cycle analysis of the East Manchester Line



Case 2

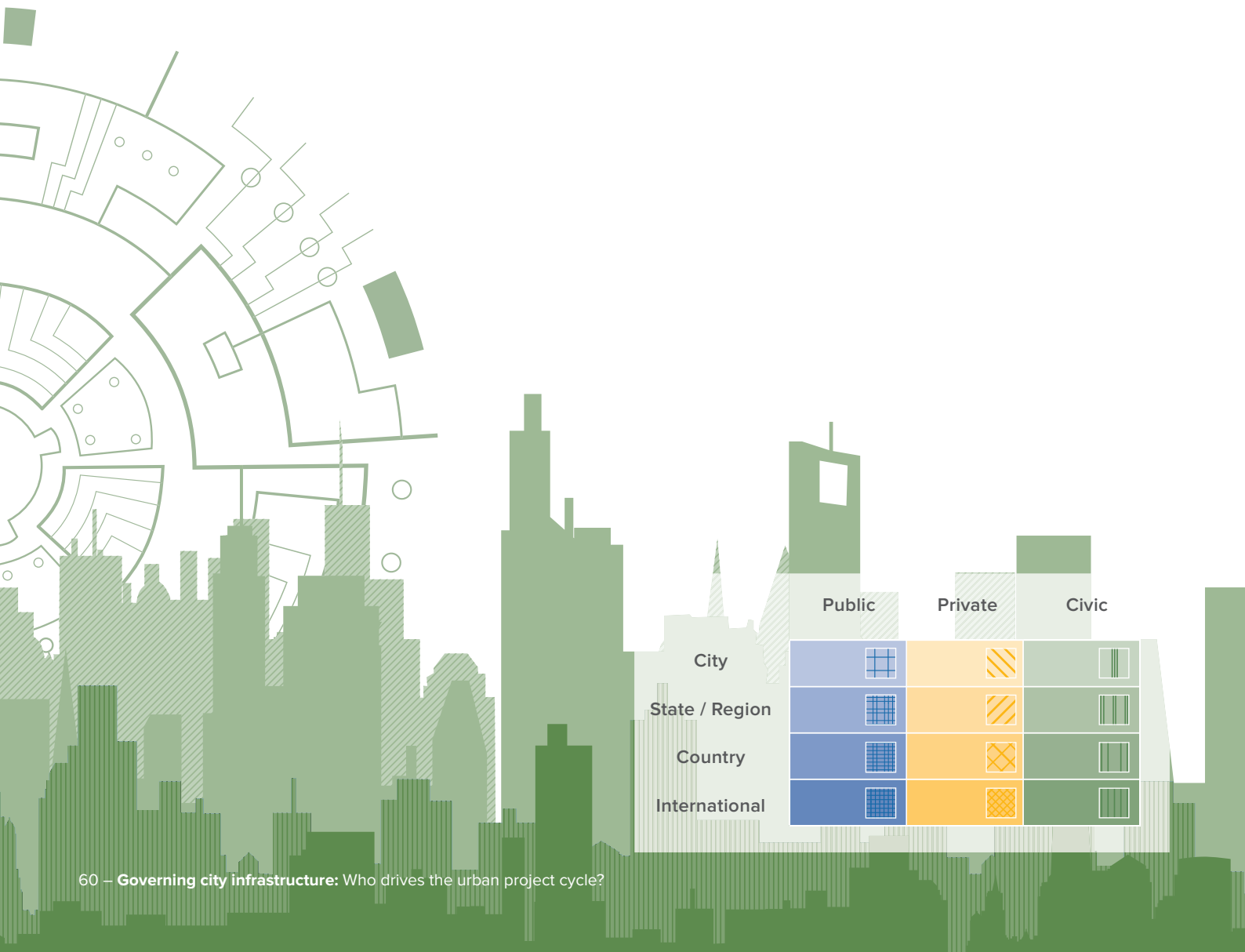
One Angel Square



Case 2: One Angel Square

A notable case study is the One Angel Square building developed by the Manchester-based Co-operative Group. The building played a vital role in the regeneration of a 20-acre site in the north of the city, part of the North of Manchester (NOMA) initiative. The world-record BREEAM-scoring building provides a 50 percent reduction in energy consumption and an 80 percent reduction in carbon emissions, leading to a reduction in operating costs of up to 30 percent.³⁴ Completed in 2013, the building cost £105 million to construct and was sold by the Co-op, which subsequently became the building’s tenant, for £142 million.

As figure 9 shows, the One Angel Square development also had a significantly large number of non-local actors involved in the delivery of the project, with the majority located outside of Manchester (predominantly in London). In fact, almost none of the main delivery companies are headquartered in Manchester. This is perhaps worth noting, as the Manchester City Council claims that more than 50 percent of the workforce used in its construction were based within Greater Manchester and 108 of the onsite contracts were awarded to Greater Manchester firms. While this might be true, it is important to consider that the contractors’ headquarters are located outside of Manchester, and this might be to where most of the value extraction has flown.



Design	Planning	Finance	Delivery	Management
Co-op	Co-op	Co-op	Bam Construction	Co-op
3D Reid Architects	Manchester City Council	Manchester City Council	Buro Happold	
	Arup		Gardiner & Theobald	
	Greater Manchester Passenger Transport (GMPTE)		Waagner Biro	
	English Heritage		Mecanoo	
	Environment Agency		Royal Haskoning	
			Waagner Biro	
			Charles Henshaw	
			PMJ Masonry	
			Helix Roofing	
			Icopal	
			Alternative Access Logistics	
			Solinear	
			Taurus Littrow	
			Jazo Zevenaar NL	
			Fisher Engineering	
			Thorp Precast	
			PC Harrington	
			D Wilson Architectural Metal Work	
			Solinear	
			Taurus Littrow	
			Jazo Zevenaar NL	
			Fisher Engineering	
			Thorp Precast	
			PC Harrington	
			D Wilson Architectural Metal Work	
			Delta Balustrades	
			Rotary North West	
			Pro AV	

Figure 9: Project cycle analysis of the 1 Angel Square development



Conclusions

Manchester, United Kingdom



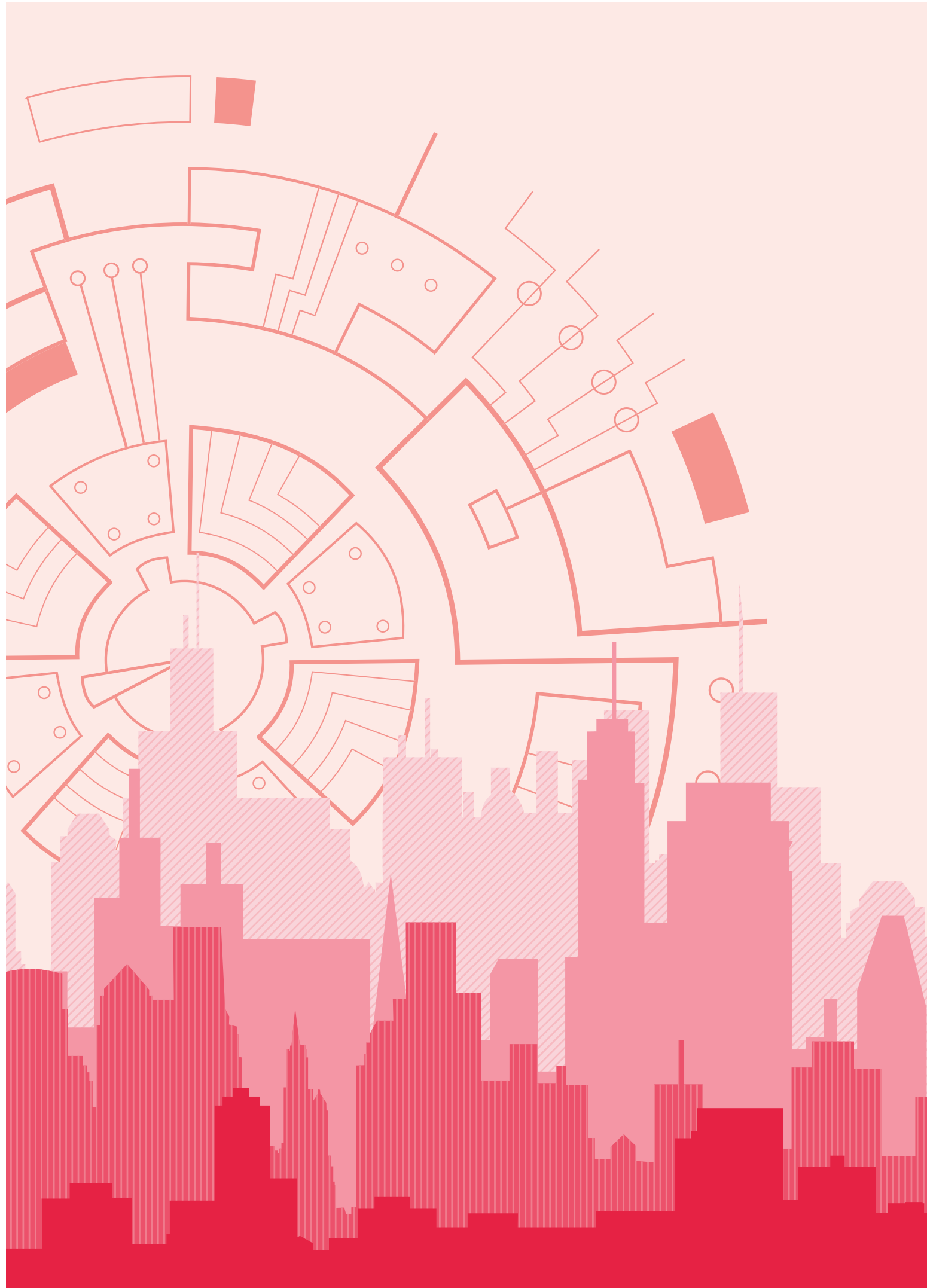
Conclusions

Manchester's building projects and the East Manchester Line transport project indicate a greater reliance on private and national expertise across all stages of the project cycle. The key trends in the delivery of large-scale sustainable infrastructure are:

- A mid-level presence of private-sector stakeholders throughout project delivery,
- A reduced presence of local players throughout the project cycle,
- Consistent presence of international private stakeholders throughout the project cycle,
- Limited access to public funding for local government versus the high funding capabilities of private-sector actors.







City Analyses

Pittsburgh, Pennsylvania



City Analyses

Pittsburgh is an American Rust Belt city in the midst of reinventing itself. With an economy all but built on steel manufacturing, Pittsburgh was dealt a significant blow by deindustrialization in the 1980s. The economy bottomed out in 1983, when unemployment peaked at over 17 percent. It is estimated that the region lost 100,000 manufacturing jobs alone during that decade, with further consequences for secondary supply chains and the service and retail sectors. The city was also left with the unfortunate legacy of environmental degradation, with Pittsburgh's air and water ranked as some of the most polluted in the country. Furthermore, as a steel town with close ties to the auto industry, there were few public transit infrastructure investments made during the 20th century.

In the 21st century, however, the city's urban core has benefited from the large demographic and economic shifts that have accompanied globalization and, like many other older industrial cities, has begun to revitalize. Advanced research institutions such as Carnegie Mellon University and the University of Pittsburgh collectively enroll 49,000 students and, along with the University of Pittsburgh Medical Center, attract over \$1 billion in annual research and development funding to Pittsburgh's core. These dynamics have enabled the city to attract an educated workforce: 35.5 percent of the adults in Pittsburgh have bachelors degrees, well above the national average of 28.8 percent. Spurred by its institutional research platform and entrepreneurial job creation, Pittsburgh's economy has come back to life. From a peak unemployment rate of 9.2 percent in the aftermath of the 2008 recession, the city's unemployment rate had fallen to 4.7 percent by the end of 2016, in line with the national average.

Today, regional leadership is committed to changing the image of the former factory town into a modern, sustainable metropolis with the infrastructure to match its increasingly advanced economy. However, the rebranding of Pittsburgh is not without challenges. The city is working to transmit the dynamism of its urban core throughout the rest of the metropolis, where lagging per-capita income and labor force participation rates are the norm.

Governance Characteristics

Delivering sustainable infrastructure in the United States is a complicated affair. The United States is a fragmented federal republic that, now more than ever, has left many cities to fend for themselves in the absence of reliable national and state leadership.

In Pittsburgh's home state of Pennsylvania, the state government sets the rules of the game for municipalities and counties, fixing their boundaries and determining their powers. Intense localism across the state's 2,566 municipalities—compounded by the fragmentation of the state bureaucracy—has often caused jurisdictions to

compete against each other rather than collaborate on tough problems like land-use planning and economic development. (Allegheny County, for example, consists of 130 municipalities, of which Pittsburgh is but one.) These fractures make it hard for local economies to respond collectively and comprehensively to the economic, environmental, and social challenges at hand. In past decades, the state subsidized the decentralization of population and jobs through a variety of spending and tax incentives leading to periods of rapid sprawl: Pennsylvania's population grew by just 2.5 percent between 1982 and 1997, but its urbanized footprint grew by 47 percent over that period.

Pittsburgh has traditionally succumbed to this highly fragmented political culture. The public sector has multiple centers of authority—the county government, the city government, the local school authority, federally mandated structures, and numerous public authorities. The private and civic sectors are also fragmented across business associations, philanthropic foundations, large educational and medical institutions, and a plethora of neighborhood groups and nonprofit organizations. Yet in recent years the ascendance of new leadership to multiple private and civic groups have led to a more common and coherent vision for the city, including larger urban redevelopment projects and efforts to help disconnected youth.

Still, Pittsburgh's local government faces significant structural fiscal issues. It has a relatively small geographic footprint, a large number of nonprofit institutions that do not pay property taxes, older infrastructure that requires constant investment, higher shares of poverty in surrounding communities, and large pension liabilities. In the absence of a strong or well-resourced government, collaborative local efforts have taken on the challenge of stewarding the city's economy. Sometimes, the local government leads the way; often they support the development of new markets and placemaking through land use, flexible planning, and other policies. Other times, special institutions such as a business improvement district or an economic development corporation are called upon to facilitate the process. These efforts have been financed by a combination of public, private, and civic capital rather than by government subsidies predominately. Capital from local institutions—philanthropies, universities, corporations—is being deployed to improve the public realm and spark business growth and job creation. This “metropolitan finance” aggregates not only the public balance sheet of the city and traditional municipal finance tools but also the private balance sheets of anchor institutions, corporations, and philanthropies. Simply put, Pittsburgh, like cities across the United States, are co-governed; their market revival is co-produced with private and civic sectors in ways that make them more nimble and pragmatic than federal and state governments would have the capacity to be in the current political climate.



Strategic Planning in Pittsburgh

Pittsburgh, like Hamburg and Manchester, has introduced a variety of sustainability initiatives focused on climate change. The Pittsburgh Climate Action Plan articulates the initiatives required by the city to achieve its goal of reducing greenhouse gas emissions by 20 percent below 2003

levels by 2023. The plans include recommendations for achieving energy and climate goals by increasing energy efficiency and improving recycling and waste management, transportation, green building practices, and citizen engagement.³⁵

Transport

Public transportation in Pittsburgh is coordinated by the Port Authority of Allegheny County (PAT). The Port Authority is governed by an 11-member board of directors—unpaid volunteers appointed by the Allegheny County executive, leaders from both parties in the Pennsylvania legislature, and the governor of Pennsylvania. The Port Authority budget is funded by fares, advertising revenue, and county, state and federal sources. PAT does not have any strategic plan documents, but allows transport issues to guide many of its development planning projects, including efforts to increase ridership, revenue, rider satisfaction, employment, and a sense of community around transit.

Much of Pittsburgh's infrastructure is actually owned by higher levels of government, such as the state of Pennsylvania or Allegheny County. Hence, major infrastructure projects (highways, bridges, mass transit) are typically led by other agencies. The city is usually responsible for low-scale infrastructure projects, such as bike lanes and road works. In some instances, however, the city will manage larger infrastructure projects (such as a bridge replacement) if that infrastructure is already owned by the city.

The city of Pittsburgh has a transportation planning department, but currently it does not work according to a strategic plan. At the beginning of 2017, however, the city created an Office of Mobility and Infrastructure that will

be tasked with creating a mobility plan as part of the city's first comprehensive plan.³⁶ The forthcoming plan will guide transportation decisions and spending for the next 25 years.³⁷ Currently the only available transportation plans for the city are a complete streets policy and a bike plan. The complete streets policy encourages the use of a variety of modes of transport, highlighting the need for city planners to take the needs of pedestrians, bicycles, public transit, and private vehicles into account, while simultaneously attempting to make the transportation network safer and better for more people living in the city. The plan also calls for the incorporation of green infrastructure and the efficient use of streets, including the adoption of sensors that allow for inter-vehicle communication, transit signal priority, and bicycle/pedestrian detection.

In recent years, Pittsburgh has adopted Transit Oriented Development (TOD) policies that focus on growth and development around local public transportation hubs. As a result, it has articulated small neighborhood-level plans centered around public transport stations.³⁸ Importantly, these plans do not emphasize the creation of new infrastructure but call for surface improvements such as lighting, landscaping, land management near stations, and improvement of pedestrian connections at junctions.

While the city is currently working on an update of the Climate Action Plan, it is important to note that Pittsburgh is one of the few large American cities that lacks an overarching, comprehensive master or strategic plan to guide its projects. This may soon change, with some new

plans in the pipeline (described below) that will guide the city in its planning, financing, and implementation of infrastructure projects.

Energy

Today, Pittsburgh is a national leader in the field of energy. Seven energy industries have a significant presence there, including coal, natural gas, nuclear, solar, wind, transmission and distribution, and high-performance building design. More than \$1 billion per year in government-funded research flows through the region's academic, corporate, and governmental energy research centers.³⁹

In 2015 Pittsburgh signed a memorandum of understanding with the U.S. Department of Energy to develop a clean energy plan focused on district energy systems. The city has identified four potential district energy clusters across the city, with ground breaking on the first of the four set for early 2017.⁴⁰ As noted above, the initial Pittsburgh Climate Action Plan committed the city to reducing carbon emissions to 20 percent below 2003 levels by 2023 and outlined strategies for local government, businesses, higher education institutions, and communities to help achieve this goal. The plan was developed by the Pittsburgh Climate Initiative (PCI), a coalition of local government, nonprofit, business, and institutional organizations formed to implement, assess, and update climate action strategies. They were sponsored by the Heinz Endowments, the Pittsburgh Foundation, PurBlu Beverages, the GIVE Energy Pittsburgh Prize, and the Surdna Foundation. The PCI is one of a few local climate programs led by a coalition of organizations rather than by a traditional government top-down model.⁴¹

While the climate plan focuses more on the reduction of demand-side energy use and the cost of renewable energy consumption and less on alternative and green energy generation, it is important to take notice of Pittsburgh's commitment to adopt a goal of 10 megawatts of renewable energy capacity by 2020 and to increase solar energy systems by 2020 (specific targets for solar energy are not mentioned). In addition, the plan calls for developing incentives for clean energy businesses to locate in Pittsburgh through financing mechanisms such as tax abatements, reduced fees, and/or expedited permitting, and finding ways to increase renewable energy generation from homes, businesses, and schools within city limits.⁴²

Buildings

Pittsburgh has recently adopted green building legislation: A density bonus for Leadership in Energy and Environmental Design (LEED) certified buildings allows them to rise 20 percent higher and include 20 percent more floor area than other buildings in their zoning districts. The legislation includes a requirement that all publicly financed developments over \$2 million or 10,000 square feet attain LEED Silver certification.⁴³

However, it is the nonprofit civic sector that plays a dominant role in shaping Pittsburgh's policy as well as the discourse on renewable energy and green buildings. Their efforts are centered largely on increasing the demand for renewable energy and energy-efficient technology, either by changing public preference and perception or by using the purchasing power of civic bodies to create markets for clean energy and services at early stages when private markets lack both the willingness and the ability to do so.

One of the main nonprofits in the field is the Green Building Alliance (GBA). Originally funded by the Heinz Endowments, the GBA created the first nonprofit organization in the country to focus exclusively on the greening of the region's commercial building sector. Today, the organization is funded by civic bodies as well as by the local and federal government. It is interesting to note that while it is a nonprofit organization, the Green Building Alliance's vision has become the de facto vision of the city.




One of the GBA's main projects is the Pittsburgh 2030 District challenge, which Allegheny County is taking part in. This voluntary program, launched in downtown Pittsburgh in 2012, seeks 50 percent reductions in energy use, water use, and transportation emissions by the year 2030. In addition, the city has committed 1.9 million square feet to the DOE Better Buildings Challenge as a municipal partner.⁴⁴ Pittsburgh has set a target to improve energy efficiency in city-owned buildings by 20 percent, but it has not yet set a goal to reduce energy intensity across private building stock, nor are privately owned buildings subject to green building requirements.

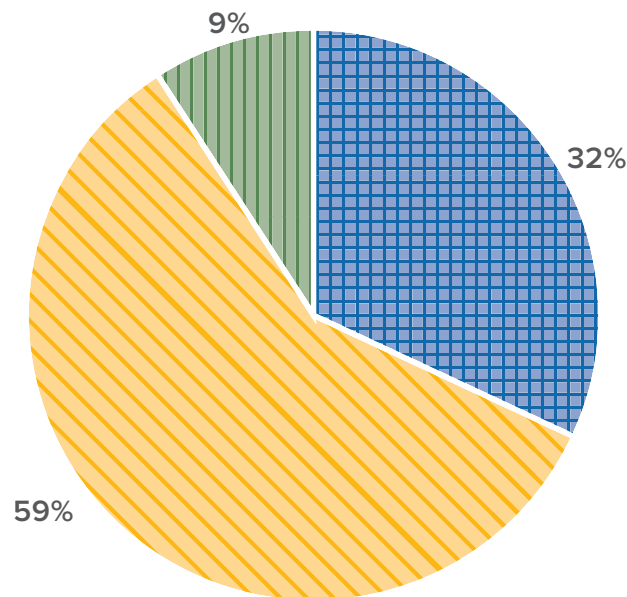
Project analysis

Given the fragmented governance structure in Pittsburgh, this study anticipated projects that had limited metropolitan involvement but a high degree of coalition building across public, private, and civic sectors. We found evidence of this model in both city politics and declarations as well as in the more long-term strategic planning with green buildings. Pittsburgh’s delivery of sustainable infrastructure appeared to predominately involve private local





bodies, as shown in Figure 10. But as our individual case study analysis shows, simple categorizations of the bodies involved masks the level of coordination required between public, private, and civic actors. Our analysis of the Pittsburgh projects reveals a city that is undergoing major changes by bringing together a variety of stakeholders invested in both the planning and financing stages of the city’s growth and rebirth.

Stakeholder Type

-  Public
-  Private
-  Civic



Location of Stakeholders

-  City
-  State Region
-  Country
-  International

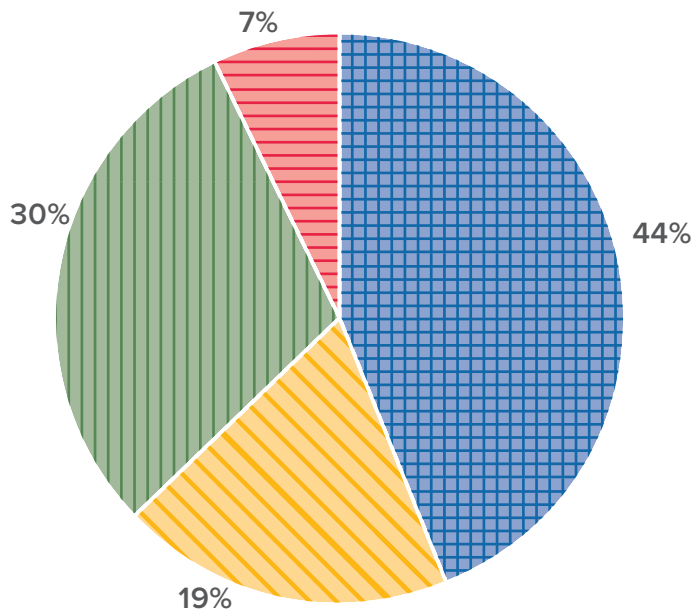
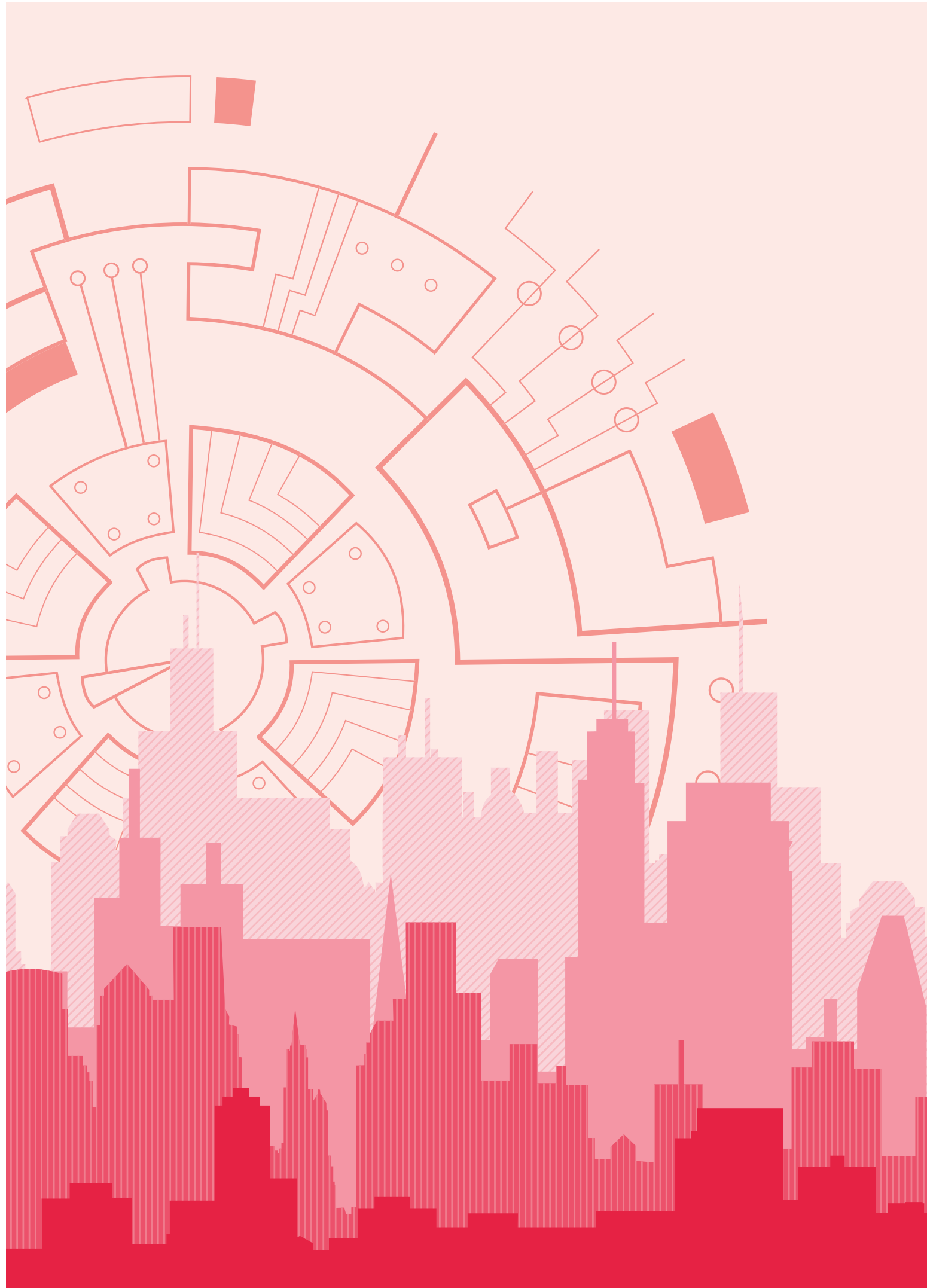


Figure 10: Pittsburgh project stakeholders





Case 1

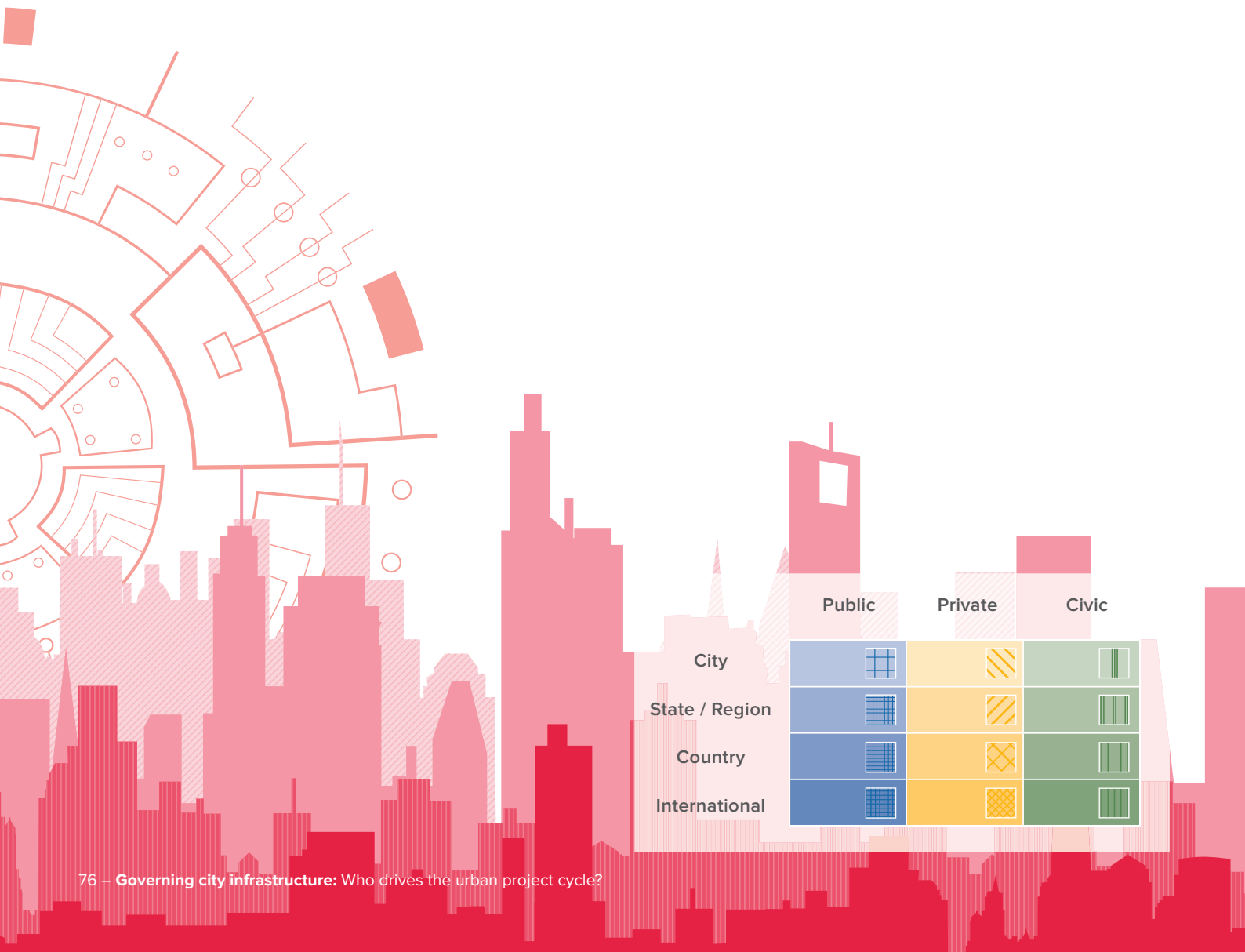
Pittsburgh's North Shore Connector



Case 1: Pittsburgh's North Shore Connector

This project demonstrates a high level of reliance on and influence of the private sector. The North Shore Connector is a two-station light rail line linking the city's downtown to an entertainment area with a stadium, casinos, and museums across the river. The connector is free to use. Its construction was 80 percent federally funded, and its operation is fully subsidized by private actors, which hold a 20 percent stake in the capital investment of the scheme, which cost around \$500 million.

As figure 11 shows, there is also a noticeable absence of municipal involvement in the design and inception stages, where the main strategic partner was the Port Authority of Allegheny County.



Design	Planning	Finance	Delivery	Management
Port Authority of Allegheny County	Port Authority of Allegheny County	Federal Transit Administration	Trumbull Corporation	Port Authority of Allegheny County
DMJM Harris New York (now AECOM)		Pennsylvania Department of Transportation	Obayashi Corporation	
Gannett Fleming		Allegheny County	DMJM Harris New York (now AECOM)	
Boscardin Consulting		Pittsburgh Steelers	GEI Consultants	
GEI Consultants		River Casino	DRM International	
GeoMechanics		Alco Parking	Nicholson Construction Company	
		Pittsburgh Stadium Authority	Herrenknecht AG	
			HDR Engineering	
			Jacobs Engineering Group	
			Kwame Building Group	
			Wellington Power Crop.	
			Engineered Products Incorporated	
			Halfen	
			Brayman Construction Corporation	
			Gannett Fleming	
			Tensor Engineering	
			High Steel Structures	
			Advantage	
			A.C. Miller Concrete Products	

Figure 11: Project cycle analysis of Pittsburgh's North Shore Connector Line



Case 2

IKEA Rooftop Project



Case 2: IKEA Rooftop Project

The IKEA rooftop energy generation project, a collaboration between the company and REC Solar, is utilizing the roofs of IKEA stores across the country to generate electricity. Nearly 3,000 panels deliver over 850 MWh of electricity to the grid. The new solar energy system replaced a 10-year-old 30-kilowatt system hosted by IKEA but owned and operated by Sun Power Electric, a nonprofit organization dedicated to promoting the use of solar electricity.⁴⁵ The matrix below shows that IKEA is the main beneficiary in the project, but also reveals that the main financing incentives come from the federal and state level. The only local representation comes from the planning approval granted by Robinson Township, a suburb of Pittsburgh.



	Public	Private	Civic
City			
State / Region			
Country			
International			













Design	Planning	Finance	Delivery	Management
IKEA 	Robinson Township 	IKEA 	REC Solar 	IKEA 
REC Solar 	Philadelphia Electric Company 	Federal Solar Tax Credits 		REC Solar 
		Pennsylvania Alternative Energy Credit Program 		

Figure 12: Project cycle analysis of Pittsburgh’s IKEA rooftop project



Case 3

Consol Energy Center
(now, PPG Paints Arena)



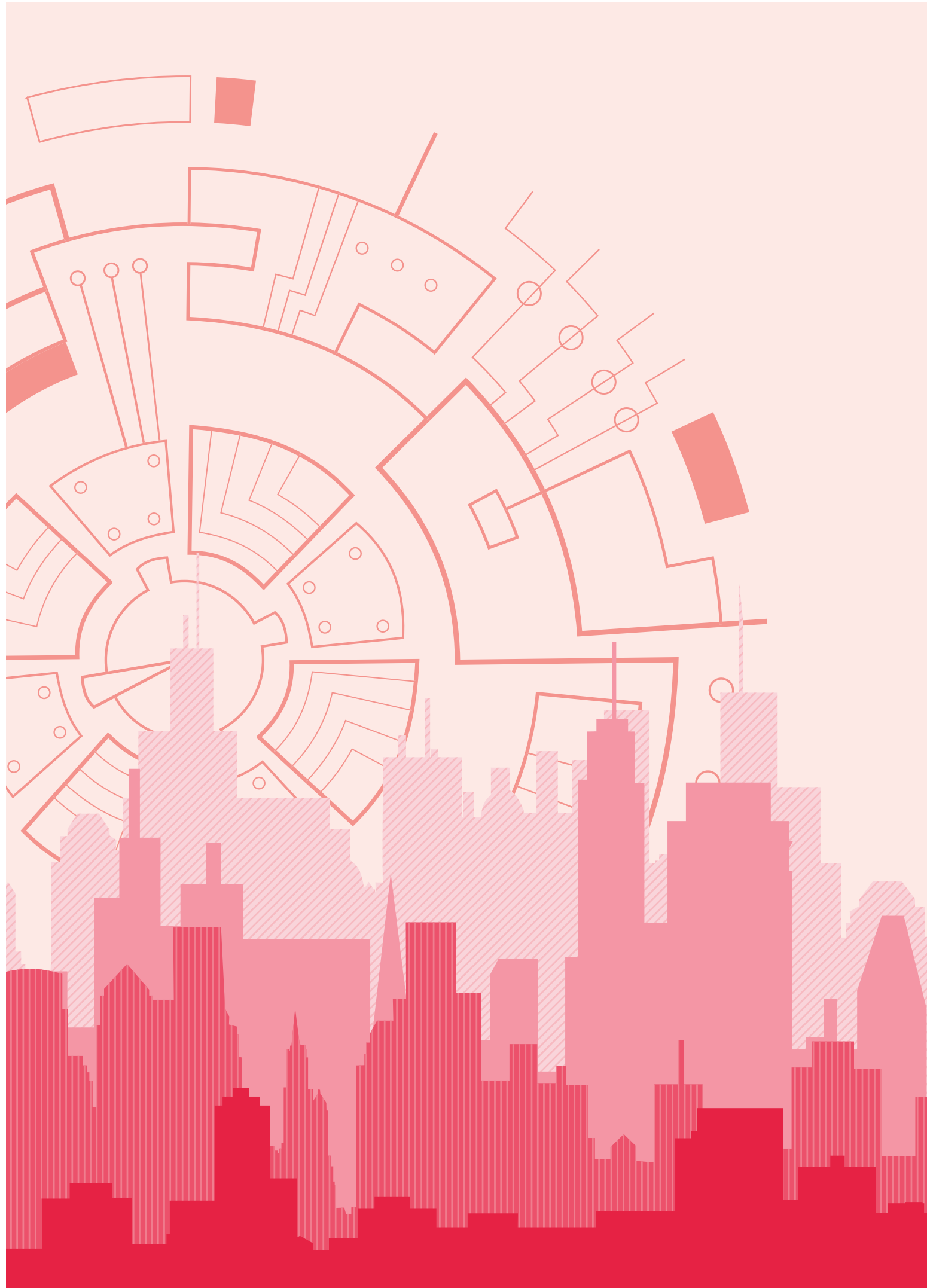
Case 3: Consol Energy Center (now, PPG Paints Arena)

The Consol Energy Center, the arena for the Pittsburgh Penguins of the National Hockey League, is owned by the Sports & Exhibition Authority of Pittsburgh and Allegheny County. The stadium project highlights a model in which the regional government and other parties are involved in financing and the local government is involved in planning. The arena development is owned by the city and benefits from a dedicated funding stream from casino revenue. Although ownership of the arena development is quasi-public, it was the Penguin franchise that bore most of the weight in the design and financing stages of the project, with the city council itself only taking on the role of planning approval agency. The matrix in figure 13 shows the predominance of the private sector but also the active participation of a mix of local and non-local actors, all from the United States.



Design	Planning	Finance	Delivery	Management
The Penguins	The Penguins	Majestic Star Casino	Thornton Tomasetti, Inc.	AEG Facilities
Populous	Sports and Exhibition Authority of Pittsburgh and Allegheny County	The Penguins	PJ Dick	SMG
Astorino	Pittsburgh City Council	Sports and Exhibition Authority of Pittsburgh and Allegheny County	Hunt Construction	Pittsburgh Penguins
ICON Venue Group	Populous	Pennsylvania state	ICON Venue Group	
	Pittsburgh City Planning Commission		ME Engineers	
			Oxford development	
			Alcoa	
			Universal Glass & Metals	
			D-M Products	
			Kawneer	

Figure 13: Project cycle analysis of Consol Energy Center



Case 4

Phipps Conservatory



Case 4: Phipps Conservatory

The philanthropic sector plays a pivotal role in driving sustainable building projects in the Pittsburgh area. This is evident in the Phipps Conservatory and Pittsburgh Glass Center projects. Completed in 2012, the Center for Sustainable Landscapes (CSL) at Phipps Conservatory and Botanical Gardens is one of the world’s greenest buildings. The \$15.5 million building generates 100 percent of its own energy, thus achieving a reduction in energy usage of 68.7 percent.

An effort was made to keep the knowledge local: The primary architects and engineers were required to come from Pittsburgh, and the entire design team was from Pennsylvania. Almost all of the funding for the project came from local sources, as did the majority of building’s materials and products.⁴⁶ Pittsburgh (or at least Pennsylvanian actors) were involved in all stages, with very few of the delivery actors from outside the region, and none from outside the United States.

The city of Pittsburgh once again took on the role of planning authority, as shown in figure 14. Other public agencies driving the project were state-level actors, with the Pennsylvania Department of Community and Economic Development providing state-level funding for the project.






































Design	Planning	Finance	Delivery	Management
Phipps Conservatory and Botanical Gardens 	City of Pittsburgh 	R.K. Mellon Foundation 	Turner Construction 	Phipps Conservatory and Botanical Gardens 
Civil & Environmental Consultants INC. (CEC) 	County of Allegheny 	Heinz Endowments 	Allegheny Installation 	
Andropogon 	State of Pennsylvania 	Pennsylvania Department of Community and Economic Development 	Allied Waste 	
Atlantic Engineering Services 	Phipps 	Colcom Foundation 	Aquascape Automated Logic 	
The Design Alliance Architects 	Pittsburgh Water and Sewer Authority (PWSA) 	Federal – Department of Energy 	Berner International Corp 	
CJL Engineering 	PA Department of Environmental Protection 	Individuals 	Brayman Construction 	
Evolve EA 		Business 	Tom Brown Contracting 	
7 Group 		PNC Bank 	Burns and Scalo 	
Sundrive 			Compu-site 	
Green Building Alliance 			Continental Building Systems 	
H.F. Lenz 			S.A. Comunale 	
Kolano Design 			Definis Mechanical Contractors 	
Massaro Corporation 			D-M Products 	
Carnegie Mellon University 			Dubin and Company Solutions 	
Chatham University 			Energy Independent 	
Duquesne University 			Engineered Products 	

Figure 14: Project cycle analysis of Phipps Conservatory



Conclusions

Pittsburgh, Pennsylvania



Conclusions

Compared with Hamburg and Manchester, Pittsburgh's sustainable infrastructure efforts indicate a greater reliance on private, civic, and local/regional entities across all stages of the project cycle. Some of the key trends observed in our analysis of the projects are:

- High-level involvement and investment of private-sector stakeholders throughout the delivery of projects,
- High-level involvement of local stakeholders, both private and civic, throughout the project cycle,
- A significant absence of international private stakeholders throughout project cycles, and
- Active civic, local stakeholders.







City Comparisons

Building, Transport
and Energy



City Comparisons

This study set out to understand the players and the mechanisms involved in driving sustainable infrastructure projects in three cities with varied styles of governance and strategic interests. The selection of the three cities—Hamburg, Manchester, and Pittsburgh—sought to highlight the different nature of the processes involved in the delivery of these kinds of projects. Through focused case study analysis, we gained a granular understanding of the dispersion and exertion of agenda-setting power—based on varying degrees of political and financial influence—at the local level.

Our research has unveiled that Germany’s federalism, along with Hamburg’s status as a city-state with devolved fiscal powers, has created a culture where the municipality not only engages in long-term planning but also drives investment forward across the transport, energy, and buildings sectors through a rich network of publicly owned subsidiaries.

Our limited research on Manchester shows the profound influence exercised by the central government and by London as the premier global city, given the substantial involvement of international firms across multiple areas of activity.

Finally, in Pittsburgh, we found a city where both strategic planning and project governance are steered by coalitions of public, private, and civic entities. In the energy and buildings sectors, the private and civic sectors take on important design, inception, and financing roles that were played largely or partly by public entities in Hamburg and Manchester.

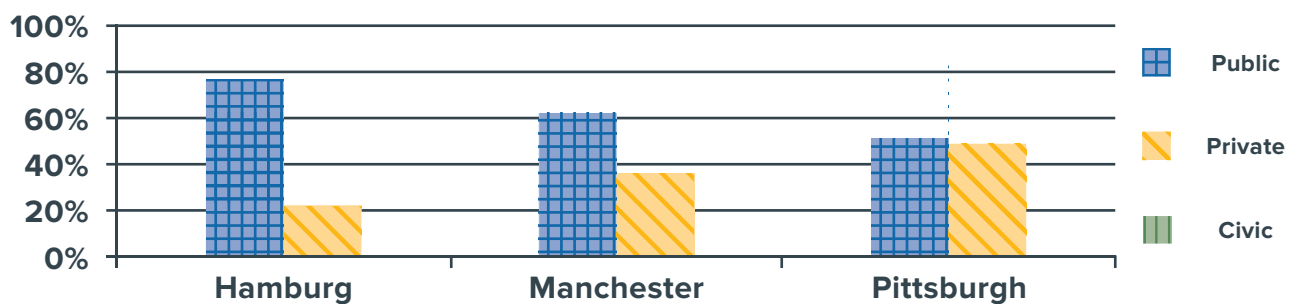


Transport

In the transport sector, Hamburg had more public-sector organizations driving change than Manchester or Pittsburgh, with most of them based at the city level. None of the cities had any civic-sector involvement in the transport case studies. Hamburg had the highest public-sector involvement, while Pittsburgh had the lowest. The location analysis of the stakeholders in the transport

case studies reveals that Hamburg had the most city-based stakeholders. Manchester had the highest country-based and international stakeholders (with some local representation). Pittsburgh also had a high level of city-based stakeholders (almost the same as Hamburg) but the lowest level of international stakeholders.

Stakeholders in the Transport case studies by sector



Stakeholders in the Transport case studies by location

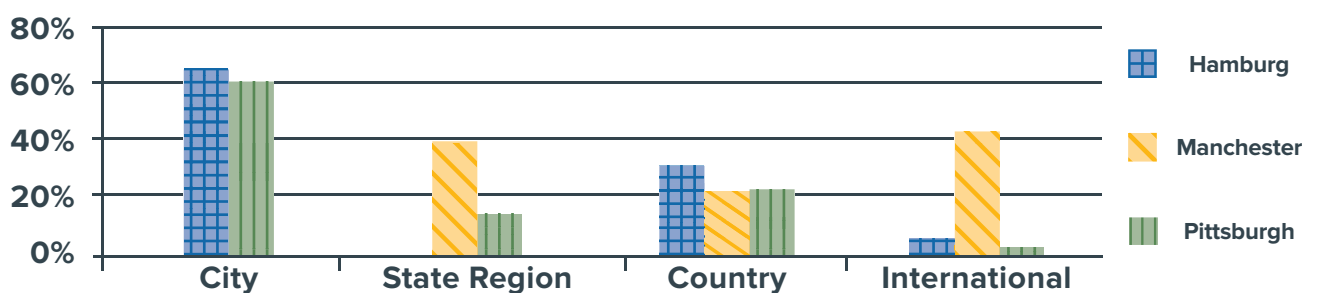


Figure 15: Comparison of organizations in the transport sector

Building

Similar evidence is drawn from the analysis of the building projects in figure 16. The most striking difference is that in the building sector the civic sector engages in the project cycle. Of the three cities, Pittsburgh has the strongest representation of civic stakeholders in the building sector. Hamburg has the highest public-sector involvement. The difference between the three cities is less dramatic than in the analysis of the transport sector.

The location analysis of the stakeholders in the buildings case studies concludes that Manchester has the most national and international stakeholders and the fewest public stakeholders, whilst Hamburg has the highest level of city-based public stakeholders. Pittsburgh has the least international involvement.

Stakeholders in the Building case studies by sector



Stakeholders in the Building case studies by location

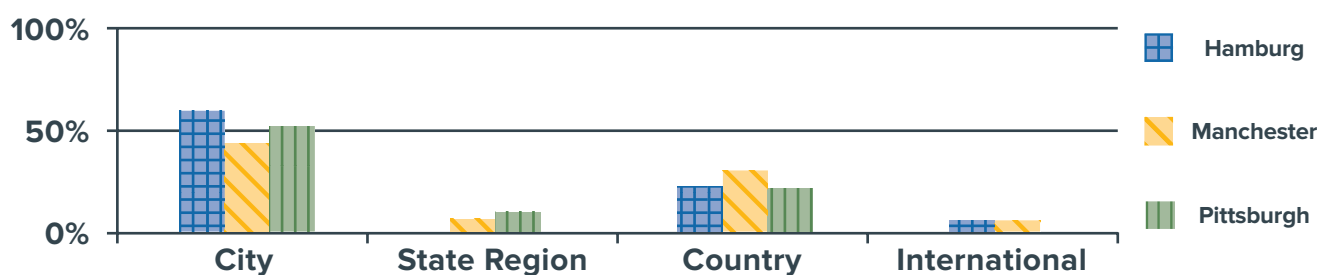


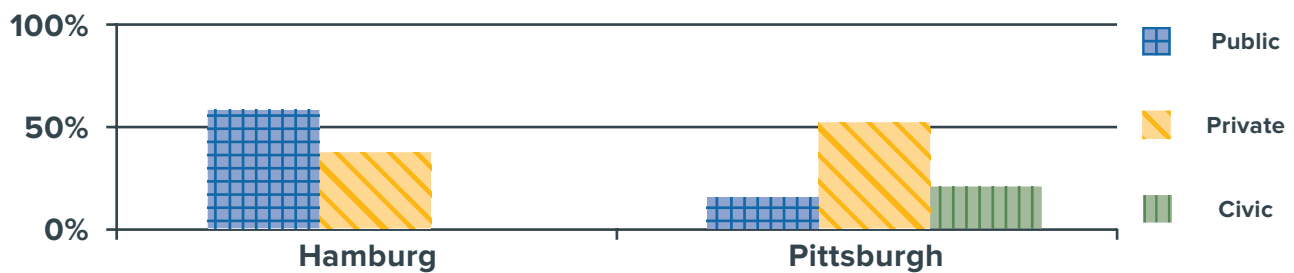
Figure 16: Comparison of organizations in the buildings sector

Energy

The energy sector comparison is lacking a Manchester project and includes only three projects. Still, the projects analyzed in Hamburg and Pittsburgh reveal the same trends as in the transport and building sectors:

Hamburg has the highest level of private and city-based public stakeholders while Pittsburgh relies on a high level of civic-sector participation and has low levels of international stakeholders.

Stakeholders in the Energy case studies by sector



Stakeholders in the Energy case studies by location

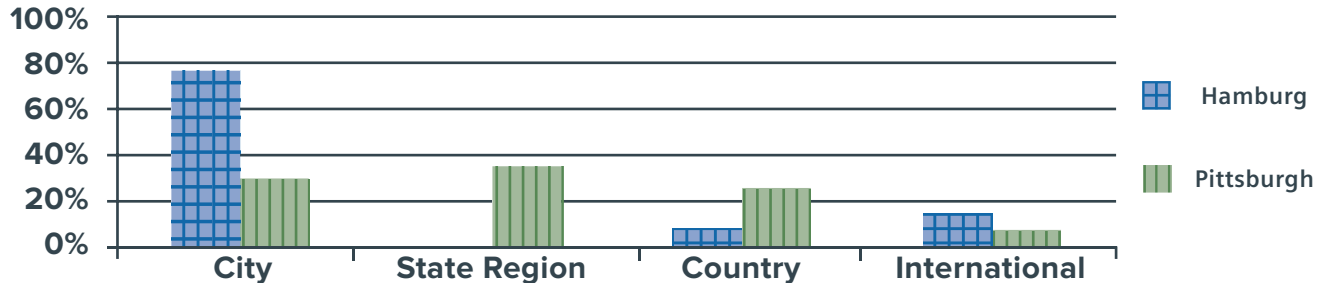


Figure 17: Comparison of organizations in the energy sector





Conclusion

An analysis of Hamburg,
Manchester and Pittsburgh



Conclusion

The challenge of sustainable urbanization will only continue to grow as the world continues to urbanize. This report represents an early effort to understand how sustainable projects are actually designed, planned, financed, delivered, and managed across the public, private, and civic sectors as well as different levels of government and geography. The result paints a more nuanced and complex picture of sustainable urbanization than is generally portrayed by the media or understood by multiple constituencies. Going forward, we believe that these kinds of studies will help cities and other key stakeholders identify, replicate, and routinize best practices across all elements of the project cycle and, in the end, pave the hard path to sustainability.





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