**Bijlage 5: Case studies IAB**

**Circular Economy**

**London Waste and Recycling Board—An active investor and institutional hub to accelerate the transition to a circular economy**

For most of the modern era, patterns of resource use have been linear. Natural resources are extracted, used in manufacturing processes, sold as products, then sent to landfills. As the world’s population grows and natural resources become strained, consuming in this fashion is becoming increasingly unsustainable. If we can somehow make our approaches to natural resources more circular, re-using and recycling materials already in the marketplace, we can significantly reduce our environmental impact.

Because metropolitan regions have tremendous market power, they have the potential to drive significant progress toward a more circular economy. This is strongly within metropolitan areas’ own self-interest—more circular approaches to resources will help reduce the heavy burden of waste management, lighten environmental costs, and help strengthen regional economies.

How can metropolitan regions use their influence to move markets in a more circular direction? **London’s Waste and Recycling Board (LWARB) is an interesting example of how public funds can be deployed to influence and encourage circular market activity.**

The LWARB was created in 2007 with the passing of the Greater London Authority Act. This piece of national legislation—negotiated with London’s local authorities—was a significant devolution of power to the city. The bill provided London with substantially more discretion over planning, housing, skills training, and waste management, and it included around £75 million to create the LWARB.

As articulated by the Greater London Authority Act, the LWARB has three primary goals—to help the region produce less waste, to increase the proportion of waste that is re-used and recycled, and to implement methods of collection, treatment, and disposal that are more beneficial to the environment. The city has created specific targets related to circularity, and if it is able to accomplish its goals, it estimates that it will save £7 billion and create 40,000 new jobs.

These goals are taken on by three main programs.

First, Resource London has created a more cohesive approach to waste management and recycling throughout London’s 33 boroughs. Before the LWARB came into existence, the city’s waste management landscape was highly decentralized, and different boroughs employed very different collection, sorting, and treatment practices. Resource London has implemented a “one agency approach” that has made collection and recycling protocol more uniform. This has been essential for driving greater efficiencies in citywide recycling. The program seeks to reduce the city’s waste footprint by recycling 65 percent of material by 2030.

Second is Circular London, which serves as an intellectual hub for topics related to the circular economy. This program provides thought leadership to the region, brings the public and private sectors together, and publishes research like the recently-released “Circular Economy Route Map,” a document that provides detailed plans to advance circularity along 5 resources streams, including the built environment, food, textiles, electricals, and plastics.

Third is Advance London, an investment fund and business support organization. This program is an active investor in businesses and infrastructure related to the city’s circular economy goals, and it helps a wide range of circular-oriented SMEs from the seed capital stage through to maturity. To date, it has deployed over £50 million in investment capital and leveraged nearly £100 in private sector backing. It has invested in projects and businesses ranging from advanced waste treatment or collection facilities (to improve recycling capabilities, for example) to companies using recycled material in their production of furniture.

These operations are conducted by a relatively small staff. The LWARB has a central staff of four people. Resource London has six full-time staff members, Circular London has one full-time staff member, and Advance London has seven full-time staff members, though its numbers may expand as its accelerator program grows.

The leadership of the LWARB consists of 8 members. It is chaired by the Mayor of London or a representative of his choosing. There are four councilor members and two independent members of the board, all appointed by various London councils. There is one additional Board member that is appointed by the mayor. Other than the Chairperson, members of the Board can only serve two terms.

To date, the activities of the LWARB have helped the city divert 185,000 tons of waste from landfills, created several hundred jobs and traineeships, and attracted over £100 in private sector investment in circular businesses and initiatives. It no longer requires any public funding—its operations are now entirely run on returns from its investments.

**The Partnership for Green Public Procurement in Denmark—Demonstrating the value of shared objectives between national government, municipalities, and the private sector**

The public sector has tremendous purchasing power—it is estimated that the governments in Europe spend nearly 15% of public GDP on the procurement of goods and services. If the public sector is purposeful in the way it goes about purchasing decisions, it can nudge commercial markets in directions that have a positive impact on society. Designing procurement policies based on environmental and circular criteria can strengthen the market for sustainable products and services and help businesses focused on sustainability become more commercially viable.

The problem is that a single public organization—even a national one—lacks the financial clout to move markets by itself. To maximize market influence, public bodies need to combine their spending power, agglomerating their purchasing decisions in ways that align with specific objectives. Establishing this degree of cooperation is no easy task, but the benefits of such an approach are tremendous.

**Denmark’s Partnership for Green Public Procurement is a leading example of how national and local governments can come together to advance their mutual goals related to the circular economy.**

Danish public procurement is valued at around €39 billion per year. Given the country’s highly decentralized governance system, municipalities represent around two-thirds of this spending. In 2006, the Danish national Ministry of Environment joined with the country’s three largest municipalities—Copenhagen, Aarhus, and Odense—to create the Partnership for Green Public Procurement. The core of this partnership is a collective decision making process where joint, mandatory green procurement objectives are established every year. Members of the partnership are expected to follow the specified green procurement objectives, incorporate various environmental considerations into their independent procurement protocols, and make their procurement policies publicly available.

Since the formation of the Partnership, nine other municipalities, two regional governments, and one large water supply and wastewater management company have signed on to the agreement. Together, these groups represent the vast majority of all public procurement spending in the country.

To date, the Partnership has developed specific procurement criteria for ten product groups, including building and construction supplies, transportation, food, timber, children’s products, information technology, paper and printing, cleaning supplies, kitchen and cooking supplies, and lighting. In addition to providing guidance to public bodies on purchasing and procurement in these product groups, the Partnership serves as a forum for knowledge sharing and collaboration on various procurement challenges.

The administrative, coordinating, and organizational elements of the partnership are largely handled by a designated secretariat, the environmental consulting firm Plan Miljo. This highly specialized organization provides leadership in designing new purchasing goals, implementing new procurement strategies, providing technical assistance to members, monitoring yearly progress, and communicating and sharing knowledge across the network. The Danish Ministry of Environment pays Plan Miljo €150,000 per year for these services. That being said, all goals and product-specific criteria are developed in collaboration with members of the Partnership, and all parties need to agree before new standards are set.

The partnership operates with three levels of governance.

First is the Ambassador level, composed of the political leaders of the member groups. These mayors and ministers meet at least every two years to launch new purchasing goals, communicate the Partnerships objectives to the broader public, and to provide political support for the Partnership’s ambitions.

Second is the Steering Committee, which is made up of the procurement and environmental managers of the Partnership members. This group meets at least twice annually, leading the overall decision making process and ensuring that Partnership guidelines and targets are being met. The Steering Committee also proposes new areas of work, new working groups, and identifies new potential members for the Partnership.

Third is the Working Groups, which are composed of at least three representatives of each member group. These groups meet several times per year to focus on specific products and resource streams. They share knowledge and experiences with current policy and criteria and help develop new goals or practices

Individual members of the Partnership do not pay membership fees, but abiding to the tenets of the partnership requires significant allocations of time, energy, and resources. In Copenhagen, for example, where public procurement amounted to €11.4 billion in 2013, the decentralized approach to procurement means that many different administrations and agencies need to abide to the Partnership objectives. The City Council and the Finance Committee are politically responsible for the city’s overall performance, but the actual administration of Partnership policies falls to more policy-specific agencies.

In addition to the Partnership for Green Public Procurement, Denmark has also created the Forum for Sustainable Procurement, an initiative that promotes environmentally-conscious procurement practices for both public and private organizations. There is no binding agreement to this initiative; rather, it seeks to be a knowledge hub and convener for actors interested in green procurement. The Forum began in 2011 and now has over 800 members.

**Talent for the future**

**Berlin Partner for Business and Technology—Attracting international talent by lowering the barriers to housing, office space, and professional services**

When entrepreneurs, startups, and companies are deciding between locations, what makes them choose one city over another? The availability of talent, the strength of the corporate community, the local venture capital scene, and market reach are all crucial factors, but even the strongest business ecosystems can have difficulty attracting new players. The logistical complexities of moving to a different city or country can be enough to deter newcomers.

**In Berlin, an organization called the Berlin Partner for Business and Technology provides an interesting example of how cities can attract new talent and businesses by radically simplifying the moving and transition process**. Through partnerships with housing corporations, office space providers, lenders, government agencies, and professional services firms, this organization has been a key component of the rapid ascent of Berlin’s business and startup community.

The organization offers a series of products aimed at enticing entrepreneurs, startups, and businesses to move to Berlin.

Most notable is the “Berlin Welcome Package,” which is made possible by the organization’s connections to residential and commercial real estate companies. For €4500, entrepreneurs are provided with a furnished and serviced apartment, centrally-located and well-equipped office space, and access to a range of consulting services for three months. This provides potential newcomers with an invaluable, low-risk opportunity to “try out” Berlin before fully committing to a move.

Next is the “Business Location Package,” which provides a range free services for companies contemplating a relocation. It has a custom-tailored real estate portal, offers research and support on location options, organizes location tours, makes introductions to property owners, and helps map out access to transit, childcare, and other concerns. It also arranges neighborhood tours and provides apartment information for individual employees.

The organization also offers assistance in helping businesses secure private investment, public funding, local talent, and legal help.

Berlin Partner is a large organization with over 200 employees. It has partnerships with over 200 companies and 30 scientific institutions. It is jointly funded by Investitionsbank Berlin, the business development bank of the Federal Land of Berlin; Technologie Stiftung Berlin, the primary technology foundation in the city; and the marketing agency for the city of Berlin. The organization takes a sectoral approach, with individual programs for energy and mobility; life sciences and healthcare; digital businesses and services; and manufacturing industries and photonics.

**Mobility**

**MaaS Global in Helsinki—Can the world’s foremost MaaS provider prove itself in Finland?**

Across the world, urban populations are growing rapidly. While this is good news for city economies, it is putting unprecedented stress on transportation infrastructure. In particular, private automobile ownership is becoming increasingly problematic. With so many cars on the road, traffic congestion has dramatically worsened, diminishing productivity levels and emitting harmful greenhouse gasses. Roads and parking are consuming space that could be used for housing, community amenities, or other transit modes. Infrastructure requirements for cars have made human-centered urban planning more difficult, diminishing the quality of life that cities can offer their residents.

Cities that are able to shift their transportation ecosystems away from private automobile use and toward public transportation, ridesharing, cycling, and walking will see many benefits. They will be better positioned to accommodate population growth, ensure adequate multi-modal transportation coverage, and help their residents enjoy a higher quality of life. The question is, how can local and regional actors help spark this transition?

**In Finland, and particularly in Helsinki, rapid progress is being made on developing a concept known as “Mobility as a Service” (MaaS**). Building on the pervasiveness of internet and communications technology, the spread of car and bike sharing providers, and the preexisting network of public transit options, MaaS seeks to provide individuals with coordinated access to every transportation mode at the touch of a button.

**MaaS Global, a Helsinki-based company, has led the city’s charge**. It has developed an app, Whim, which serves as a “one-stop-shop” for users to optimize travel routes, schedule trips across several transportation modalities, and purchase a full range of transportation services or tickets via their mobile phone. The overall aim is to provide complete coverage of individuals’ transportation needs, thus eliminating the need for individuals to own a car. Finland’s national government and Helsinki’s municipal authorities have played an immense role in creating the conditions for MaaS Global to succeed, rapidly adopting regulatory changes, creating systems of data sharing across public transit authorities, and encouraging private transportation providers to collaborate.

Whim has operated in Helsinki since the fall of 2016. It has developed partnerships with taxi operators, rental car companies, and nearly all public transit operators, ranging from buses to rail to ferries. Bicycles will also soon be made available. Customers can pay for services on an as-needed basis, or they can buy monthly subscriptions for 89 or 149 euro. These subscriptions provide unlimited access to public transportation and a set quantity of taxi coverage. Though the app has only been in service for less than a year, it has already made a substantial impact on users’ transportation choices. Before Whim, users rode in private cars for 40 percent of the time and used public transportation for 48 percent of the time. Now, they utilize private cars for 20 percent of their trips, and take public transportation 74 percent of the time.

Several interlinked factors will determine cities’ ability to successfully implement MaaS initiatives, whether provided by MaaS Global or another company.

Most fundamentally, MaaS will only succeed the service offers a superior option to car ownership. Much of this will depend on the public sector’s previous investments in mobility. Cities that have already created sufficient transit coverage, robust cycling infrastructure, and walkable neighborhoods will be much better positioned to implement MaaS initiatives.

Assuming these conditions exist, MaaS initiatives must demonstrate a clear “value add” to consumers. Subscription to the service must be cheaper, more efficient and more convenient than car ownership, and its route planning and optimization features must be superior to more specifically tailored transportation distribution services. The public sector can help tilt the playing field toward MaaS by making car ownership more expensive and/or less convenient—congestion pricing schemes, higher tolls and parking fees, and road infrastructure that favors mass transit or cycling would all be effective ways of doing this.

Next, MaaS providers must make a compelling case for private transportation providers (like taxi companies) to join in. Without enough providers on board, consumers will not see MaaS as a potential replacement to their preexisting routines. Companies will likely need some persuading before coming on board—after all, part of the idea behind MaaS is to steer customers toward one service or another depending on travel conditions, so customers will often be steered away from specific providers. And few companies will likely be immediately comfortable with the idea of sharing their data with a third party. MaaS providers must demonstrate the growth potential of their customer base—they must show that companies who join will reap greater profits, while companies who do not will lose access to a significant segment of the population.

Finally, regulatory frameworks must be revamped to reflect the multi-modal, public-private nature of MaaS. Resolving issues like individual privacy, data sharing and compatibility, liability and insurance, etc. will be essential for MaaS to function smoothly. Governments have the most influence over the way that public bodies share data, but they should also consider ways to influence private sector behavior to help facilitate their participation in MaaS initiatives.

Ultimately, successful implementation of MaaS will come down to trust. Controlling the ways that transportation services are distributed throughout an entire city is an enormous amount of power for one organization to wield. It remains to be seen if customers, companies, and governments will be willing to put their fate (and their data) in the hands of a single actor. That said, the case for MaaS seems strong—if it is done well, it offers clear benefits to individuals and society as a whole.

**Fossil fuel-free Stockholm—A multifaceted approach to eliminating greenhouse gas emissions in urban transportation**

Cities occupy a unique position when it comes to climate change. On the one hand, they are the most significant contributors to the problem—urban areas generate the vast majority of global greenhouse gas emissions. On the other hand, they have many tools at their disposal to significantly reduce humans’ environmental footprint. With smart policies, strategic regulations, and efficient approaches to land use, cities can substantially reduce their emission levels. This is particularly true in the transportation sector, which is often among the most carbon-intensive activities in urban areas.

The city of Stockholm has long been recognized as a leader in reducing carbon emissions. The city has built on this legacy with its “**Roadmap for a fossil fuel-free Stockholm 2050**” **which lays out a comprehensive plan for the city to eliminate the use of fossil fuels within its boundaries over the next three decades**. Originally commissioned by the city’s Environment and Public Health Committee in 2012, the plan was approved by the Municipal Assembly in March of 2014. Many of its individual proposals focus on major changes to the city’s transportation network.

The plan takes a highly multifaceted approach, addressing issues like public transit capacity, neighborhood design, urban freight delivery, fuel standards, and others. All specific recommendations have been made under the assumption that Stockholm’s population will rise to 1.2 million by 2050, a 40 percent increase from current levels.

One of the roadmap’s most significant focus areas is reducing citizens’ reliance on private automobile transport. It takes several approaches to this issue. The first is significantly improving the city’s public transportation offerings. The plan calls for nearly doubling the city’s public transportation capacity, with the intention of accommodating 350,000 new passengers by 2050. Subway, tram, and bus lines will be expanded into new areas, services will be more frequent, a substantial amount of road capacity will be devoted exclusively to public transit, and transit vehicles will be given strict signal priority, among other reforms.

Next, the city will enact a series of regulations that actively discourage the use of private automobiles. It will significantly reduce on-street parking availability throughout the city, raise citywide parking fees, convert many streets into transit-only thoroughfares, create higher taxes on workplace parking structures, and expand the city’s congestion pricing scheme, which has been in place since 2007.

Next, as Stockholm prepares for major population growth, it has adopted urban planning strategies that will make driving less necessary on a day-to-day basis. The city plans to build 190,000 new housing units in the coming decades, many of which will be created in yet-to-be-constructed neighborhoods. For each new neighborhood development, the city has instituted criteria that demands high-density housing clustered around a central area that contains all key local functions, like grocery stores, banks, post offices, medical facilities, etc. Neighborhoods will be built to be transit accessible, walkable, and bikeable, and the city plans to create incentives for companies to allow their employees to work remotely for part of the work week, lessening the total number of trips made across the city in the aggregate.

Another area of reform identified in the roadmap is urban freight transportation. As it stands, deliveries within the city account for 35 percent of the city’s transportation-related greenhouse gas emissions, and the stress that deliveries place on the city’s road network will only increase as population rises. The plan identifies several promising strategies to make goods distribution more efficient, coordinating and optimizing delivery routes and times throughout the city’s boundaries.

Finally, Stockholm’s municipal government is leveraging its purchasing power to drive further reductions of greenhouse gasses. For several years, the city’s procurement policy for new public sector vehicles has demanded that they are “clean.” Under the roadmap, the city will institute minimum criteria in 2030 that demands that all city contractors do not use fossil fuels in their operations. By 2050, the city plans to completely ban the sale of fossil fuels within its boundaries.

**Health**

**Boston’s Center for Clinical Data Science—Fostering cross-disciplinary collaboration to leverage the power of artificial intelligence in healthcare**

Despite rapid technological progress in medical treatment, healthcare costs are rising across the world. This has become a major concern to both governments and individuals. Why have costs risen? While healthcare systems vary significantly from country to country, in many places, healthcare infrastructure emphasizes treatment over prevention, encourages unnecessary medical visits, and forces patients to undergo a range of redundant tests and procedures.

Unlike previous technological breakthroughs, artificial intelligence is seen as having enormous potential to bend the healthcare “[cost curve](http://www.xconomy.com/san-diego/2017/07/03/whats-the-business-model-for-artificial-intelligence-in-healthcare/)” downwards, providing better, faster, cheaper healthcare to a larger number of patients. The technology promises to better coordinate patient records, boost clinical productivity, provide more accurate diagnostic services, and help patients deal with medical conditions on their own, among other benefits.

The application of artificial intelligence in healthcare is among the world’s fastest-growing industries—the market is projected to be worth [$6.6 billion](https://www.fastcompany.com/3055256/paging-dr-robot-the-coming-ai-health-care-boom) by 2021. While many companies have made forays into this space, Boston is seen as being home to the most innovative players in the market. It is home to IBM’s Watson program, now largely geared [towards healthcare](https://www.ibm.com/watson/stories/quest-with-watson.html), and more recently, the site of an unprecedented collaboration between General Electric, Partners Healthcare Systems, the Massachusetts General Hospital and the Brigham and Women’s hospital. These parties will create the new **Boston Center for Clinical Data Science, a ten-year project that will bring together doctors, healthcare management experts, engineers, and developers to prototype, validate, and share AI healthcare innovations with medical providers across the world**.

The partnership seeks to bring artificial intelligence capability to all sides of the hospitals’ operations. [Multi-disciplinary teams](http://newsroom.gehealthcare.com/the-team-behind-the-future-of-ai-in-healthcare/)—AI and data experts, clinical staff, management professionals, medical device engineers etc.—will collaborate to develop artificial intelligence-based improvements to every step of patients’ experience at the facilities. New applications will be developed to diagnose CT and X-Ray images with greater accuracy, help doctors identify alternative treatment options, decrease the need for biopsies, streamline administrative workflows, and increase the amount of time that medical staff spend with patients. All new solutions will be built on an open platform, allowing third parties to develop and prototype their own innovations. AI capability will be built into new GE medical devices, and all will be connected to the GE Health Cloud.

The most immediate priorities of the Center for Clinical Data Science will emphasize processes that occur at the hospital—short-term focus areas will include prognosis technology, emergency room management, cancer detection, and cancer treatment analysis. But the partnership eventually hopes to [expand](https://www.bostonglobe.com/business/2017/05/17/partners-have-plan-bring-more-technology-health-care/PManzvp9lmErPY6yssMzZO/story.html) to the full spectrum of medical care, including remote diagnostic and checkup capability, genomic analysis, and disease pathology.