Case Study Report

From City Parks to Park-City
The Antwerp Case

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Abstract

Inspired by promising design research—such as Brainport Smart District and Regenvillages—this project explores pilot projects that integrate material flows and energy systems, in the Belgian city of Antwerp. The Design Sciences Hub [DSH] of the Antwerp University together with Jan Bunge conducts this design research. While the capping of the existing ring road is decided policy, organising the priority agenda—which part of this mega project to execute first—is still subject of ongoing design interpellations. These interpellations follow the methodology of 'rebuild by design' resulting in broad consensus for executing certain parts. Following this logic, however, the residual spaces are often more likely to remain as such. Nevertheless, studying these residual spaces unveils potential projects in multi-layering the necessary components of the city metabolism, making residue into resources—and unlocking efficiencies by connecting infrastructure systems which too often are planned in isolation. This project serves as an incubator of innovative research and a test case in a quest for the future healthy city.

Keywords

Future Urban Health, Urban Metabolism, New Living Typologies, Systemic Change, Multi-layered Districts, Waste and Energy Flows.

1. Multi-layered Districts: integrating all flows

Today's material flows are too wasteful. The EU states that "The 20th century's era of seemingly plentiful and cheap resources is coming to an end." In order to meet the needs of a growing global population within the sustainable limits of the planet's natural resources and ecosystems, the EU argues that we need to achieve an economy and society that is resilient to climate change. The EU further pleads for the sustainable management of natural resources and raw materials. Finally, we are starting to acknowledge the real financial and environmental costs.

In order to get closer to achieving these goals we have to start optimizing water, food, energy, and material flows by thinking in circular and interconnected flows. Therefore, we need to design new living typologies and economic models.

Current policies often persist in consuming too much (hinter-) land with large monofunctional resource plants or big infrastructure. Coping with resource, waste and energy flows as separate and unidirectional phenomena, they all require transport to the city and the consumers, and back. To counter this policy we have to start creating cross-functional spaces on a hyperlocal scale. Spaces that mingle various functions and programs, integrating multiple flows in a hyperlocal setting, and finding new symbiotic configurations

at once. Europe already looks to Farm to Fork strategies to promote urban farming, local production / economies, shortening the chain of production and transport. Inspired by promising design research—such as the Brainport Smart District project and the Regenvillages—this project explores the viability of integrated material flows and energy systems for pilot projects in the Belgian city of Antwerp.

Current research in preventive healthcare and wellbeing has shown us the importance of access to green outdoor spaces. The recent pandemic has highlighted this importance. According to John Surico, journalist and urban planning researcher, 'for city residents, equitable access to local green space is more than a coronavirus-era amenity. It is critical for physical, emotional, and mental health.' Sociologist and spatial expert Pascal De Decker underlines this importance and argues that if the city is no bigger than a balcony and a courtyard, the obligation to keep people in house makes city dwellers dream of the countryside. The architect Rem Koolhaas goes even further: 'In the city, you are no longer the winner, but the loser—packed together too much. We have been too snobbish in the city. It is high time we look the other way.' The Brussels city architect, Kristiaan Borret states that the crisis can help us mitigate the densification hysteria, recognise the open space as an indispensable outlet, and make the city more crisis-resistant. By including more public space in our developments, we are making the city more climate-robust.

Increasing cohabitation in cities, intensifying local production and providing more open space appear mutually exclusive. Because traditionally more city activity brings more flows. Treat these flows independently and a city of congestion will be the outcome. The key must be a smart combination of multiple flows. A green network that integrates material flows and energy systems accounting for **multi-layered districts** with **integrated (and hyperlocal) material flows and energy systems**, providing clean air and green beneficial spaces , and new living typologies, as part of the metabolism of the city. Turning a city park towards a park city regarding these challenges, is exactly what this paper is talking about, taking Antwerp as a case.

Beyond the Ring Road

Antwerp is exemplary for many mid sized European cities that find themselves located between a driving economic area such as the Antwerp port and the hinterland with patches of nature intertwining a less diverse urban sprawl. The meandering perimeter that delineates this intertwined urban fabric serves as a membrane crucial for a healthy metabolism of the city nucleus. In a policy to densify cities this perimeter is often considered as a potential area of innovation. During these strategic developments, however, the most defining role these areas play for the city's vitality cannot be overlooked.

The Antwerp ring project has the ambition to realise a super park covering the sunken motorway and circumventing the inner city—which compared to for example the Madrid Rio project is triple in length. This intergenerational project—called this way because it will take decades to fully realise the project—portrays itself as the new central city park with tangential veins protruding various districts, changing the historic reading of the city: from an historic centre with satellite districts and suburbs, towards one unified urban tapestry with the ring park organising a new centrality.

Ultimately, we are convinced that this approach can lead to a "multiplier" effect, not only affecting the immediate environment of the Ring, but influencing the city far and beyond. The Ring can evolve into a metropolitan hybrid of park and city, grafted on a diverse infrastructure. The final park figure is not a geometrically isolated form, but rather an organic figure with branches and veins protruding the city fabric. The enormous strength of an organic figure with a meandering perimeter is that precisely this perimeter is ten times the circumference of geometric parks. This means that in the future Antwerp will be known for

the longest park edge environment. Where the capping of the ring road is a means, the park edge and the park space that defines it are the strongest assets.

The new perspective 'from infrastructural ring road to metropolitan park,' however, puts pressure on this new "terrain vague". The new park environment becomes the space neighbouring districts turn to for compensating their lack of functions and qualitative open space. At the same time entrepreneurs see a new possible area of expansion. It will be crucial to maintain the frayed edge as an exemplary solution for future infrastructure works, adding an 21th-century meaning as well.
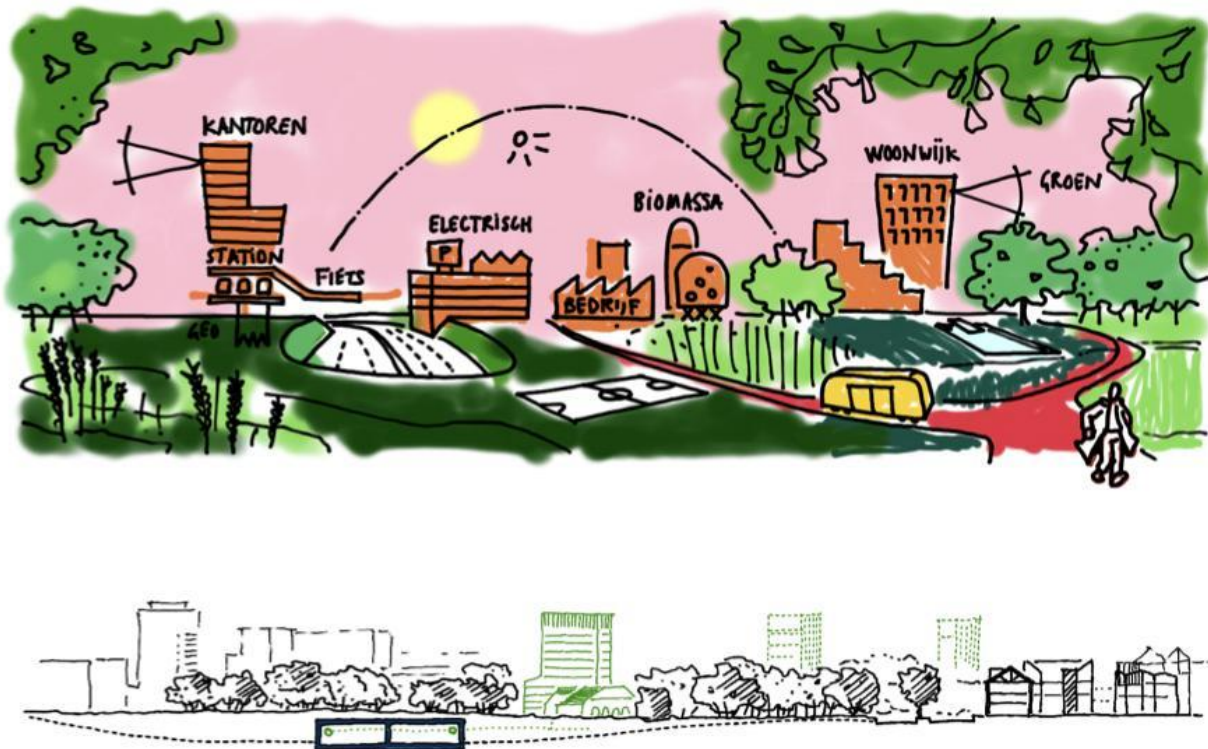

Figure 1. The ambition for a 21st century park environment. Source: sketched by Sven Verbruggen.

Beyond A 19th Century Park

A 19th century city park is often a well planned park with more aesthetic then stringent infrastructural or functional challenges. These parks were designed primarily for romantic strolling and showcasing patches of nature. A park of the 21st century will play a strategic and crucial role in a transition towards sustainable and healthy cities that require the parks to serve beyond strolling or showcasing alone. The park of the 21th century incorporates infrastructure such as water and air filter installations, service roads, and smoke exhausts. The green elements will be more diversified in function: serving as sound barriers, natural filtering systems, local food production, stepping stones for biodiversity, or forming greenhouses, seasonal gardens, wetlands and buffer zones.

This kind of park investigates the necessity to create decentralized systems on the neighbourhood level to create more resilient cities. As previously argued, the park edge plays a crucial role in this. The park edge is the mediating frame where the change from city to park must remain legible and recognizable. Introducing building projects in these parks will be the key to start a process of transformation towards multi-layered districts with integrated (and hyperlocal) material flows and energy systems interacting with

the intended ecological and sustainable setting.. It is crucial to research what these projects are, how they look, what they represent, and how they add value to the system and the community (healthcare, research, education, training, community centres, start-up incubators, living laboratory, spaces to explore and test future solutions and grow new businesses,…). This requires design research and typological studies. If we meet these challenges, Antwerp for instance will not only have a huge park, but the city will grow as a 'park city'.

The incubating Blue Sky Studio

But how to try an experiment like that? We pursue design research to investigate the scale and feasibility of strategic (pilot) projects that considerably improve the city's metabolism. The primary goal of this report is to draw full attention of investors and policymakers to these crucial sites and their potential. Insights of what makes these projects fit for implementation will be used to progress the ongoing design research captured by the overall impetus: 'From City Parks to Park City'.

The Blue Sky Studio of the Design Sciences Hub [DSH] is a twelve months high level design inquiry pinpointing crucial challenges in tackling wicked problems. In 2019 the DSH proposed to focus the first Blue Sky Studio on a transforming healthcare system—noticing a trend of hospitals being relocated in the vicinity of highway systems and becoming more megastructures. Considering possible countertrends in mobility, logistics and housing development—moving away from the highway system—the DSH questions the current trend in hospital real estate. The COVID19 only enhanced the topicality of the first Blue Sky Studio focus, resulting in 3 leading innovation themes. These innovation themes align with big systemic changes such as evolving from an oil driven and waste producing economy to a green energy driven and circular economy, and from a centralized to a decentralized and demand driven distribution system, all enhanced by smart data, technology and communication.

The Blue Sky Studio chose to explore innovation themes through a virtual test case—in size equal to a real locoregional network serving 500.000 inhabitants—that allows to design, visualise, and test a variety of innovating components. The virtual test case focuses on the future Ring park. Within this future Ring Park the Blue Sky Studio investigates a 1,5 km by 0,6km area, East Antwerp, part of the Ring project, that even in the most promising designs remains a residual space.
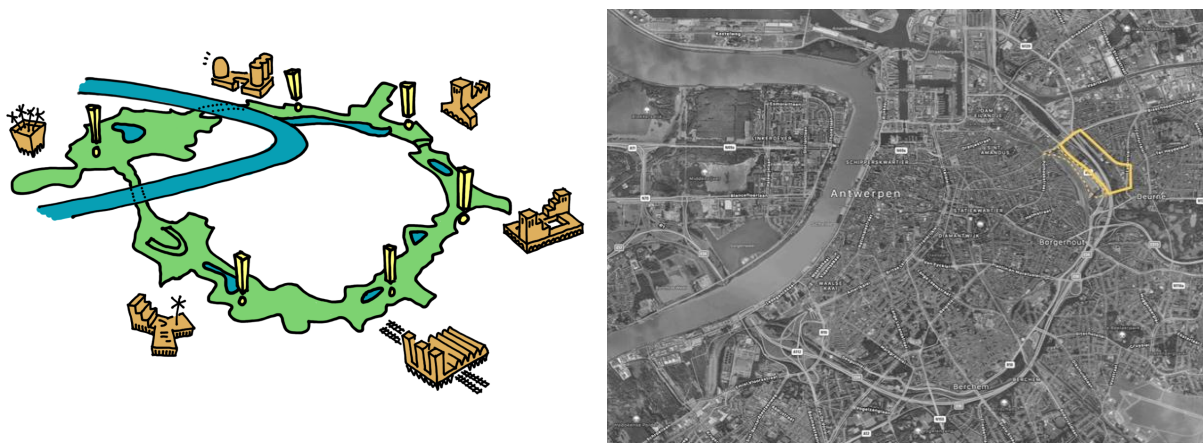

Figure 2. The virtual test case within the future Ring park. Source: sketched by Sven Verbruggen.

Because, this area exists out of multiple barriers: the ring road to be sunken and covered, a wastewater treatment plant, an old railway yard, the local ring road, and the existing railway bed. On top of that a new above regional node needs to be integrated serving primarily the district of Merksem but also connecting

other remote areas. It seems that all hope for this site to outgrow its residual character is lost. Yet, to make a successful ring park with interconnected ecosystems redesigning and incorporating these residual spaces will be crucial.

The Blue Sky Studio set itself the design challenge to transform this residual space into a new healthy district, concretizing the innovation themes and integrating incentives from the farm to fork strategies promoting local food production, waste to energy systems, and new modes of transport. In the end this virtual living lab should promote solutions for a more circular, hyperlocal and healthier "park city"—hauled by the Sinatra mantra 'if we can make it there…'

Considering this design research, it is crucial to stipulate that rather than imagining the design as a realistic masterplan, we should recognize the design proposal as a virtual living lab or test site that incubates a variety of setups, further research and showcases. The Blue Sky Studio operates as an incubator showing possible futures. The collage is crucial to provide an overview and cause serendipity to maximize design research goals.

Combining water filtering, waste to energy, and urban farming

Any design for the test site ultimately should guarantee a green belt continuity and crossings of multiple barriers. Rather than discussing the iterative design process it seems more productive in this setting to describe the triggering insights, solutions spaces and research hunches that emerges: (1) a modern Ponte Vecchio as transferium, (2) dispersed healthcare components, (3) the permeable, green and filtering coverage of the ring, (4) the multi-layered service road connected to the local waste and energy plant, (5) the urban farming on top of the wastewater treatment plant, (6) the specific symbiotic green that emerges as seasonal gardens, greenhouses, sound barriers, wetland and recreational area.

For starters: the car park located next to the above regional node proposes one way of crossing some barriers, serving quite literally as a bridge stretching from the green belt to the old train yard for which the new design anticipates a further connection to park Spoor Noord protruding the district of Borgerhout. Not only would this location comply with practical arguments—being that close to the ring road and the event infrastructure called Sportpaleis—planning this car park here anticipates a larger ambition: demanding a transition to clean transport leaving behind the motorised vehicles at the 'gate'. The mineral surfaces dedicated to cars can therefore be reduced to a minimum for the entire site. The carpark typology should be designed with a second life in mind anticipating a future with changed mobility and transport.

Figure 3. Testsite 'Antwerpen Oost: From Residual Space to Health City.' Source: Collage by Sven Verbruggen.

The dispersed healthcare components connect to the covered ring road and the above regional node—complying with the high accessibility requirements. Situated next to the carpark nullifies any further need of roads on the campus keeping the surrounding landscape as natural as possible. The overall ambition of the ring park prioritizes the campus model as the preferable typology to guarantee the continuation of green spaces. At the same time the constraints of this specific setting account for a unique relation to the surroundings that, although highly crucial, is often lacking in contemporary hospital developments. Imagine the quality of spending your time in a geriatric component with a beautiful view on nature, close to your friends and family.

The popular understanding of a covered ring road is a total encapsulation of the polluting traffic, swapping it for a green and healthier environment. The culprit, current traffic, is cast away to the underworld. This binary thinking surfs on the idea that traffic is bad and nature is good. Unfortunately the reality is more complex. We are the drivers that we condemn to the underworld. The traffic industry works towards innovations that will reduce pollution. Next to the knowledge about a spiking in exhaust at all entrances and exits, we would create a non-qualitative underworld that comes with a maintenance burden for future generations. And finally, current morphology makes it infeasible at several locations to cover the ring road anyway. For all these reasons, we pursue design research for a semi-coverage where green decks account for natural primary sound barrier, air filter, and visual screen, still allowing light to penetrate the lower areas.

Transforming the residual space into a healthy district with 3000 inhabitants and maintaining the continuity of the park environment, requires a smart way of integrating buildings and infrastructure. A well planned multi-layered service road will guarantee that no other roads are needed in the park. The service road integrates connections to the energy grid, water and data supply, district heating, and grey water system. It connects the waste to energy plants, local buffers for peak loads, garbage collectors, health checkpoints, and distribution hubs. It allows small electric vehicles of all types, and logistic carriers to reach all facilities for transport and for those who have difficulties to walk or take a bike.
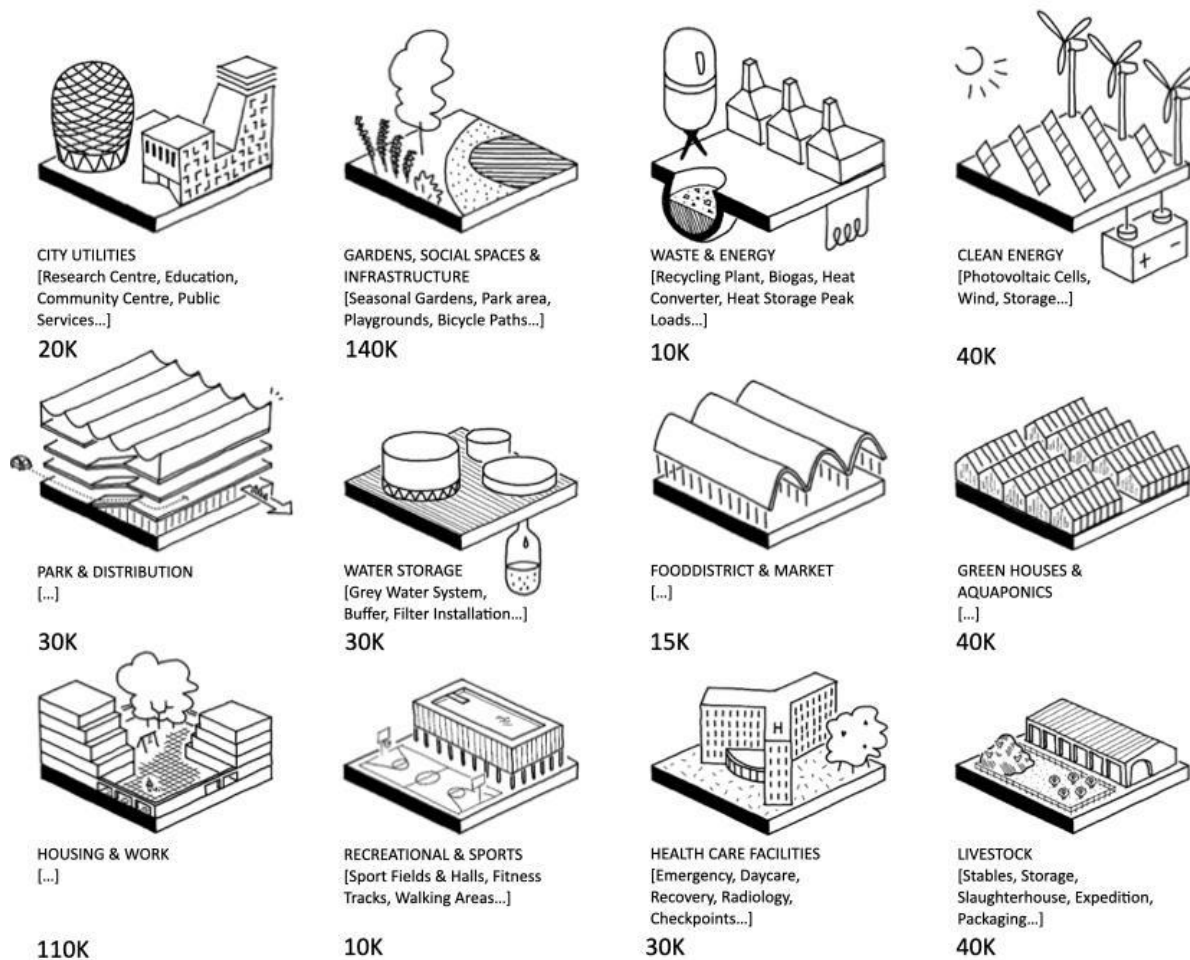
CITY UTILITIES
[Research Centre, Education, Community Centre, Public Services…]

20K

GARDENS, SOCIAL SPACES & INFRASTRUCTURE
[Seasonal Gardens, Park area, Playgrounds, Bicycle Paths…]

140K

WASTE & ENERGY
[Recycling Plant, Biogas, Heat Converter, Heat Storage Peak Loads…]

10K

CLEAN ENERGY
[Photovoltaic Cells, Wind, Storage…]

40K

PARK & DISTRIBUTION
[…]

30K

WATER STORAGE
[Grey Water System, Buffer, Filter Installation…]

30K

FOODDISTRICT & MARKET
[…]

15K

GREEN HOUSES & AQUAPONICS
[…]

40K

HOUSING & WORK
[…]

110K

RECREATIONAL & SPORTS
[Sport Fields & Halls, Fitness Tracks, Walking Areas…]

10K

HEALTH CARE FACILITIES
[Emergency, Daycare, Recovery, Radiology, Checkpoints…]

30K

LIVESTOCK
[Stables, Storage, Slaughterhouse, Expedition, Packaging…]

40K

Figure 4. An overview of programmatic components for the case study. Source: Sven Verbruggen.

As a symbolic gesture we designed the aquaponics and urban farming on top of the wastewater treatment plant, only to raise the ambition of recuperating our waste water to its full capacity. By upgrading the treatment infrastructure and the vicinity of different end-users the residual space can become a resource for a variety of water use: from sanitary use, cleaning, and gardening to urban farming, animal drinkwater and swimming.

In the end the pursued symbiosis of merging a health district with a continuous park results depends on multiple guises of greenery: seasonal gardens, greenhouses, sound barriers, wetland and recreational area. A district transforming from a residual park space towards a multi-layered district within a sustainable setting, becoming a healthy park-city.

Upscaling: from residue to resource

The 15 minutes city of late reminds us of the city of clusters as argued for by Team X or the walkable city as promoted by the traditionalists since the seventies. But what gains actuality is the idea of decentralised neighbourhoods, districts with local economies, to be more resilient. At least if we guarantee the high quality of spatial design and better living environment.

Integrating flows is familiar to us given the multiple small examples such as grey water experiments on the level of a building or research on urban metabolisms. What urges is the upscaling of integrated flows to

the level of a district. Making a building circular or a building ensemble autarkic might never become viable, but on thinking on the level of districts these zero-waste, energy positive or carbon neutral ambitions can be within reach.
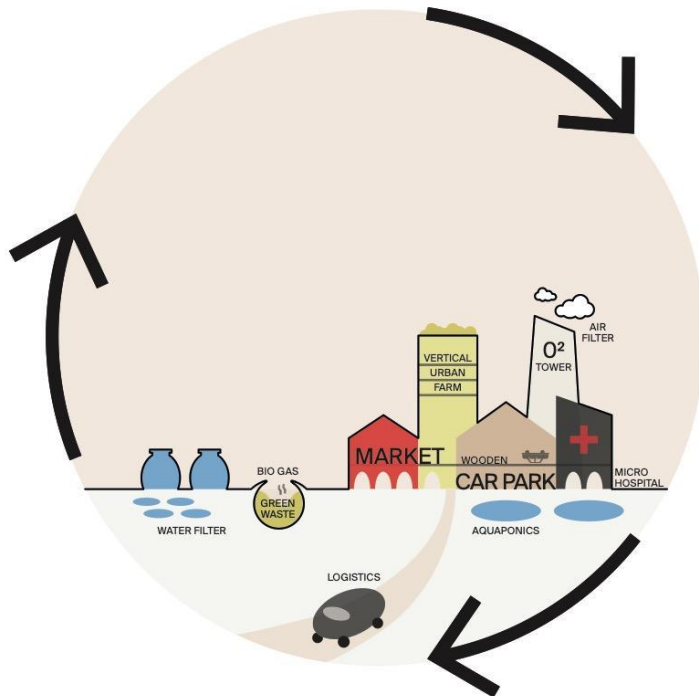

Figure 5. A multi-layered district with integrated material flows and energy systems. Source: DSH.

Improving singular systems or flows (approaching it one-dimensionally) builds towards low increase of efficiency rates. While the efficiency leap we are hoping for is only reachable if we approach systemic change multi-dimensional. With these experiments in the virtual living lab we are convinced to approximate these efficiency rates on the level of the district. We will need to change our mindset and start thinking of integrating for example a waste to energy plants or water filter installations and urban farming into our living environment and daily routines. We argue thinking in microgrids and hyper localities as a design challenge.

Systems rely on subsystems—for example, a contractor's procedures rely on a habitual relation to its suppliers, who have established their own routines and methodical behaviour. Systemic change therefore has impact on multiple levels and might primarily be about risk management. Therefore, every pilot project needs science communication, visualisation of possible outcomes, open data for research, and experience centres. These settings need a low-regulated, low-legislated character to avoid roadblocks in generating new business opportunities.

Designing, testing and realising these multi-layered flows, integrated systems, and interdependent functions, requires a specific skill set from whomever takes on the role of mediator or translator between the various disciplines.

Conclusion

If we want to increase cohabitation in cities, intensify local production and provide more open space we cannot treat these challenges independently. City development should be a smart combination of multiple flows, as part of the metabolism of the city. The aim is designing a green network that integrates material

flows and energy systems accounting for multi-layered districts with integrated (and hyperlocal) material flows and energy systems, providing clean air and green beneficial spaces. Turning a city park towards a park city, by envisioning, testing and setting-up new possible futures.

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