CIRCULAR DESIGN ATLAS

SCHOONSCHIP

Design & Development:
Marjan de Blok, Thomas Sykora / Space & Matter, various architects

Year:
2008 - 2015

Location:
Amsterdam, The Netherlands

More info:
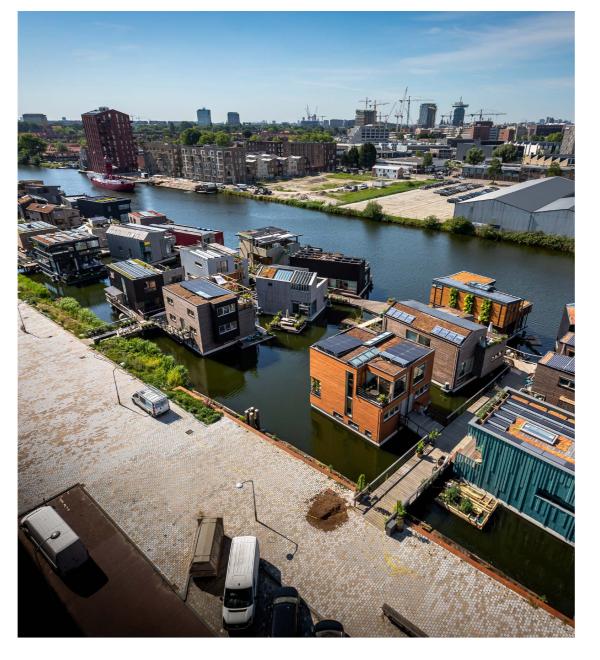www.schoonschipamsterdam.org

Scales:
Neighbourhood

Resources:
Energy, Water, Biological Materials, Reclaimed Materials, Technical Materials

Design Approaches:
Regenerative Design

R-Strategies:
Reuse, Refurbish, Remanufacture, Repair

Aspects:
Design, Resource Flows, Stakeholders

SCHOONSCHIP, which means "FairSkippers", is a unique floating urban development in the Circular Living Lab Buiksloterham, a post-industrial area in Amsterdam North, where the De Ceuvel is located (- Buiksloterham is an in-the-making circular neighbourhood and is a pioneering project for Amsterdam's transformation to a future-proof city). The original and primary idea of realising a floating area on water based on circularity principles dates to 2008. It was a group of individual idealists who joined forces to create this unique community living on the water called Schoonschip and, thus, fitting perfectly into the overall framework and idea of Buiksloterham From notion to completion, the project took 12 years, starting 2008 on paper and adding the last households 2020. Finally, 46 families with about 144 people live together in 30 single or double-family houseboats in the Johan van Hasseltkanaal.

1. Conceptualization of Circularity

What is the circular idea, theory and approach behind this project? What is the aim and purpose of it?

The overall concept of the Schoonschip project was and is to design a floating living community through a holistic approach and implementation of sustainability and circularity.

The major aim of this project was to create Europe's most sustainable floating community.

This circular neighbourhood was initiated and developed by a group of enthusiasts with a shared dream: to build a sustainable, close-knit community on the water. The initiators of Schoonschip commissioned Space&Matter design studio to develop an urban plan. Space&Matter together with a team of multidisciplinary experts and future residents. These included architectural firms 31architects, Amber Architecture & KUUB, Chris Collaris Design & I29 interior architects, BO6 Architecten, Hans Kuijpers, Hollandshuis, Jeroen Apers Architect, John Kusters, KPMV Architects, Loco-Motief, Metabolic, MTBarchitecten, Studio Valkenier, Smeele Architecture, Space & Matter, TWWB and Waterstudio design the urban plan and plot passport and smart jetty that unite this inspiring community.

Simultaneosly The company Metabolic consulted the community and created a circularity concept that would fit their ideals and needs. Part of that was, for example, using renewable energy such as PV-panels linked to a smart grid (an energy system that connects all housing units with each other, allowing a smart exchange of excess). Additionally, each individual developer of the single houseboats aimed to use and reuse local or circular materials to build as sustainably as possible.

2. The Sectoral Dimension

On which economic areas is the circularity focusing? What kind of system, supply chain, and flows is the project addressing?

Although SCHOONSCHIP is mostly a pure housing operation designed through a systemic and holistic approach, it involves nine main integrated key areas: circular and smart, energy, food and nutrients, water, ecosystems and biodiversity, materials, health and well-being, economic and financial, social and governance.

The project was initially conceived with the idea of building on water and later designing urban water flows between households.

From the construction sector, the site is designed to be self-sufficient, employing circular building practices and reusing existing building materials, especially timber and former ships, showcasing sustainable living. Each house was manufactured off-site, incorporating the prerequisites of the plot passport conceived by the leading urban design firm Space&Matter, who also designed two floating houses. Residents had three lists of potential materials to integrate into their floating homes:

• The red list was off-limits (e.g., aluminium).
• The materials on the orange list were acceptable.
• The green list was the best choice of materials (e.g., wood).

Simultaneously from the energy sector, a smart jetty integrated with a smart grid-project connects the 46 floating households and the quay. On the top surface, the jetty is a social connector where people meet. The jetty below the surface is a functional and sustainable connector with all the energy, waste and water lines attached to every household connected.

The project features a smart grid of solar panels that helps residents trade energy among themselves. Schoonschip has taken several measures to ensure its energy consumption is as low and sustainable as possible. The community owns 502 PV panels, consisting of over 150kWp of PV production, as well as over 30 solar thermal collectors, 30 inverters, solar boilers, 31 heat pumps, 30 batteries (7,5kW) that operate in a cluster as one, a central energy management system, multiple smart meters per building, and a community platform dashboard for visualizing. Schoonschip runs a so-called "private smart grid", which optimizes the supply and demand of sustainable energy locally and shares only one connection with the grid operator. In 2016, they obtained an exemption from the Dutch Energy Law for experimentation purposes, which has proven crucial for

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establishing a well-functioning smart grid.

Lastly, the development also incorporates submerged heat exchangers for heating, cooling, and water treatment technologies to retrieve energy and nutrients from wastewater. The community also strives to achieve local loop closure by lowering water consumption and installing (waste) water systems. Residents have incorporated shared mobility and are considering the social aspects, health and well-being, and ecology – in addition to carefully populating the once-bare riverbanks, Schoonschip's jetties are bustling with green. At the same time, a third of each rooftop is dedicated to a roof garden.

3. Sustainability Framework & Transition Concepts

What is the context of the project? What is the socio-economic, legal, and political structure established to develop the project?

Schoonschip and De Ceuvel are some of Amsterdam's first circular and sustainable neighborhood projects. They were initiating projects for the Circular Living Lab Buiksloterham manifesto to create an urban ecosystem embedded into the city's urban fabric. In particular, Schoonschip is designed around a specific set of values defined by the community of residents and represents an architectural vision responsive to climate change and transitioning towards sustainability. This sustainability transition is guided by goals in the nine key areas mentioned:

• *100% renewable heat and hot water supply*
Installing electric power generation capacity and the heat collection system's expansion allows Schoonschip's households to have a renewable heat and hot water supply. An electric microwave or hybrid heat pump/ boiler will provide top-up heating.

• *100% renewable electricity*
With the aim to reduce energy consumption while sourcing renewable energy, the neighborhood has shared washing machines powered by solar panels. This saves 20% of electricity. Moreover, lighting is optimized by using low-consuming LEDs.

• *100% wastewater and organic waste treatment*

Each houseboat collects two streams of human waste, which are pumped to the modular treatment system installed in the jetty.

• *100% water self-sufficiency*
Using rainwater for toilet flushing and plant irrigation. Moreover, each house can choose between a municipal water supply or a fully self-sufficient water purification system at a higher cost for drinking water.

• *60 - 80% nutrient recovery*
Nutrients from the wastewater and organic waste treatment system can be used on-site, creating a closed cycle between nutrient collection and food production.

• *50 – 70% reduction in electricity demand over conventional*

• *60 – 70% vegetable & fruit production using locally recovered nutrients*
The community can use the various rooftop gardens and greenhouses to produce food. Residents could have approximately 30,000 kg of local fruit and vegetables per year, satisfying their demand.

• *sensor network and real-time system performance displays*

• *community facilities for resource sharing and support of group cohesion*

• *electric mobility capacity*

• *support of biodiversity*
Lastly, the founders considered partially doing their food production and collaborating with local farmers.

4. The Social Dimension

Is this project bottom-up or top-down in its approach, and what role do local inhabitants, stakeholders, and circular innovators play? Does it have a flagship / pioneering character for others? Does this project view people as consumers, users, or pro-sumers in the context of a circular economy? Does it have a pioneering role, with impact beyond its region?

To achieve this pioneering transition, creating a highly involved community was crucial. Schoonschip is one of the first projects of its kind, not just on a technical but also on a social level. Fundamental to the development of this iconic circular

urban project has been the passionate involvement of its inhabitants. Each resident shared the dream of building a sustainable, close-knit community on the water.

The residents self-organised themselves for the design and construction phases with the support of several consultants which did several feasibility studies, such as Metabolic, Space&Matter and Waterloft. nl and a wide range of other partners, including research institutions, legal firms, utility companies, and the municipality.

During its realization, this bottom-up approach involves responsibility and coordination. Due to some of the participants' lack of construction skills, the project realization encountered challenging legal, economic, and ecological standards to realize a high degree of circularity – both in terms of construction materials and operational aspects. To support similar future initiatives, each phase was documented in-depth. Detailed information is available on this open-source platform: https://greenprint.schoonschipamsterdam. org/).

Even though Schoonschip was seen as a bootup initiative, it had one major social limitation. No apartment units for low-income classes were designed and the costs ended up far beyond the reach of social housing. Additionally, access to the property of the apartments in Schoonschip is exclusive. In the sense that if a house becomes available, it is first advertised to friends from the community before it goes on the market, one of the residents explained.

5. The Territorial & Spatial Dimension

What is the scale of the project? Are urban planning policies design strategies cross scale? If yes, how and which flows are involved? What is the role of space and territory in this circular project?

The project focuses physically on the neighborhood scale on water. However, ideologically it has a much broader scope due to its pioneering character. It sets a start to a new way of building sustainable communities based on a circular economy.

Despite being private property, the neighborhood is publicly accessible,

although cycling is forbidden, and no animals are allowed to enter. The walkways through the neighborhood are semi-public including a lot of plants and opportunities to sit, but as a visitor it feels as if you enter a private residential zone that is reserved for Schoonschip's residents. From the jetties, it is possible to watch the tenants in everyday activities such as working, cooking, playing with kids, etc. One of the residents explained that there was resistance to the project by people who lived in the area before the project started because it used to be cheap and empty and now it gets full and more expensive.

6. Assessment & Monitoring

How are strategies and policies monitored and evaluated? How is the qualitative and quantitative success of a project evaluated?

Schoonschip is part of the circular neighborhood Buiksloterham, but there is no official assessment made by, for example, the Municipality. This is because the circular development of Buiksloterham is run under a policy which intentionally leaves space for innovation and the creativity of the community, who will live and work there in the upcoming decades. Despite that, the residents have a digital system to monitor the performance of energy, waste, water (of each household) and biodiversity in the neighborhood.

What the group describes on their website *Greenprint* is that they also sometimes needed to adjust or change some goals and ideals in the process for the sake of the bigger picture, since it is one of the first projects of its kind that have been translated into reality.

Overall, although it wasn't an easy process, it's a successful project with a high level of circularity and sustainability. It won for example the *European Solar Award* in 2019.

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