Adding value to the city of Amsterdam:

A new sustainability strategy for the urban spatial domain

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Executive summary   "Adding value to the city"

Due to new financial realities and the increasing importance of participatory forms of governance, the city of Amsterdam is confronted with the problem that it cannot continue its current strategy to tackle sustainability problems any longer. In this paper we want to answer the questions of what role bottom-up initiatives should play to contribute to sustainable urban development in the city of Amsterdam and what recommendations can be given to the municipality to involve and stimulate these initiatives. Contribution of bottom-up initiatives is not only seen as a low-budget solution for the funding problems of the municipality but also as an innovative and local way of addressing sustainability-related problems in the city of Amsterdam.

We develop a conceptual framework that shows that different major problem streams should be included into the specific functional spaces that can be seen as the most pressing issues regarding certain sustainability problems within the city of Amsterdam. In our research we deal with wastelands, vacant offices, residential housing problems, congestion and bicycling problems as the most pressing sustainable development issues within the city of Amsterdam. Furthermore, the framework is guided by a concise sustainability concept and the good governance principle that reveals the importance of bottom-up initiatives for an interactive governance mode. With the help of the framework, we can assess how and why the current strategy for sustainable urban development is not optimal and which added value bottom-up initiatives can be provided to improve and complement the current strategy.

Especially the fact that the municipality can be largely characterized as a top-down initiative that does not use an interactive approach together with market AND civil society actors with the lack of integrative solutions for the sustainability problems within the functional spaces show that alternative solutions are urgently needed. As we can show, in all these functional spaces bottom-up initiatives can be identified for developing promising solution strategies by integrating guiding principles as well as the specifically important problem streams water, waste, energy and ecosystems into the functional spaces economic, residential and infrastructure. Reviews of both scientific articles and reports and semi-structures interviews with civil servants from the municipality and participants of local bottom-up initiatives provide useful insights in current top-down and bottom approaches and show how an integrative sustainability strategy from bottom-up can be conducted in practice. These methods helped us furthermore to find the examples of bottom-up initiatives. Examples of bottom-up initiatives we come up with are Breakland, Farming the city, Youth Food Movement, CITIES, Besparen met de buren, Wij krijgen kippen, Samen Elektrisch and Car2Go.

Based on the literature review we identify certain general non-monetary roles governments should take over in order to foster and promote the potential of bottom-up initiatives. These theoretical insights are used to categorize recommendations we want to provide to the city of Amsterdam for their work with the bottom-up initiatives. Complementary to this procedure we also developed practical recommendations for the city of Amsterdam again with the help of literature reviews and interviews of the concerned bottom-up initiatives. We identify the following roles the municipality can take, namely vehicle role, networking role, expertise role, and accountability role, and give recommendations for each of the identified functional spaces with regard to these roles. The practical recommendations are based on the insights from the interviews we have carried out with the bottom-up initiatives. The municipality should interact with the initiatives and build up networks and platforms, where interaction and involvement of citizen is important. Empowering the people, crowd sourcing and common learning processes are incentives the municipality should implement.

It is important to mention that we argue for an interactive mode of governance bringing together the potential of the municipality that can be seen as a top-down initiative, as well as the potential of market actors and civil-societal actors, especially bottom-up initiatives. By no means we want to promote bottom-up initiatives as the most important actor since these initiatives not always provide solutions for sustainability problems according to our framework, but a paradigm shift is needed to solve the problems. In turn we do not want to neglect the importance of the municipality within the decision-making process since only in a truly interacting way sustainability can be achieved.

Samenvatting "Adding value to the city"

Als gevolg van de nieuwe financiële realiteit en het toenemende belang van betrokkenheid van de gemeente wordt de stad Amsterdam geconfronteerd met het probleem dat de huidige strategie om duurzaamheidsproblemen op te lossen niet langer effectief is. In dit onderzoek willen we een antwoord vinden op de vraag welke rol bottom-up initiatieven kunnen spelen bij duurzame stedelijke ontwikkeling in de stad Amsterdam en welke aanbevelingen kunnen worden gedaan om deze initiatieven erbij te betrekken en verder te stimuleren. Het gebruik maken van bottom-up initiatieven is niet alleen een low-budget oplossing voor de financieringsproblemen van de gemeente, maar ook een innovatieve en lokale oplossing voor het aanpakken van duurzaamheid gerelateerde problemen in de stad Amsterdam.

We hebben een conceptueel raamwerk ontworpen waarbij de belangrijkste duurzame stromen worden opgenomen in specifieke functionele stadsgebieden waar dringende kwesties spelen met betrekking tot duurzaamheidsproblemen in Amsterdam. In dit onderzoek behandelen we wastelands (braakliggende terreinen), kantoorleegstand, woningbouw problemen, congestie en problemen met de fietsinfrastructuur als de meest dringende duurzame ontwikkelingsproblemen binnen de stad Amsterdam. Het raamwerk wordt begeleid door het concept van duurzaamheid en het 'good governance' principe om het belang van bottom-up initiatieven voor een interactief bestuur te verduidelijken. Met behulp van het raamwerk kunnen we beoordelen hoe en waarom de huidige strategie voor duurzame stedelijke ontwikkeling niet optimaal is en welke toegevoegde waarde en verbetering bottom-up initiatieven kunnen hebben als aanvulling op de huidige strategie.

Vooral het feit dat de gemeente wordt gekarakteriseerd als een top-down institutie zonder interactieve benadering met de markt én maatschappelijke organisaties en het gebrek aan integrale oplossingen voor de duurzaamheidsproblemen binnen de functionele gebieden, laat zien dat alternatieve oplossingen dringend nodig zijn. We laten zien dat in alle functionele stadsgebieden bottom-up-initiatieven kunnen worden geïdentificeerd als veelbelovende oplossing en als verbetering voor de strategie. Dit wordt gedaan met behulp van de principes en specifieke probleemstromen water, afval, energie en ecosystemen binnen de functionele stadsgebieden economische omgeving, woningbouwomgeving en infrastructuuromgeving. Door middel van wetenschappelijke artikelen, wetenschappelijk rapporten en interviews met ambtenaren van de gemeente en oprichters van de lokale bottom-up initiatieven hebben we nuttige inzichten gekregen in de huidige top-down en bottom-up benadering en laat zien hoe bottom-up kan brijdragen aan een integratieve strategie voor duurzame ontwikkeling en hoe het kan worden uitgevoerd. Dit heeft ons geholpen om belangrijke bottom-up initiatieven te vinden. Voorbeelden van bottom-up

initiatieven die we behandelen zijn Breakland, Landbouw van de stad, Youth Food Movement, CITIES, Besparen met de buren, Wij krijgen Kippen, Samen Elektrisch en Car2Go.

Op basis van de literatuurstudie identificeren we een aantal niet-monetaire rollen die de gemeente kan spelen om de potentie van bottom-up initiatieven te bevorderen. Deze theoretische inzichten worden gebruikt om aanbevelingen te doen (theoretisch en praktisch) voor de samenwerking tussen de bottom-up initiatieven en de gemeente Amsterdam. We identificeren de volgende rollen die de gemeente kan vervullen: 'vehicle role', netwerk rol, expertise rol en de verantwoordelijke rol. Hiermee worden aanbevelingen gedaan voor de rol binnen elk geïdentificeerde functionele gebied. De praktische aanbevelingen zijn gebaseerd op de inzichten uit de interviews die we hebben gevoerd met de bottom-up initiatieven. De gemeente zou moeten inspelen op de initiatieven en netwerken en platformen moeten opzetten waarbij de interactie en betrokkenheid van de burger centraal staat. Het betrekken van mensen, 'crowd sourcing' en gemeenschappelijke leerprocessen zijn prikkels die de gemeente zou moeten invoeren.

Table of Contents

1. Introduction

Today, more than half of the world's population lives in cities and current trends show that this percentage will probably increase to around two-thirds by 2050 (UN, 2009). Most of these people choose to live in a city because they want to have a better quality of life. Not surprisingly, cities present most of the major sustainability challenges that society is faced with today. Problems related to energy use, food security, greenhouse gases, water management, congestion, air pollution, nuisance and social tensions all merge together within the confines of the urban environment (UNEP, 2012). These sustainability challenges threaten the current way of life of citizens and those of future generations. A sustainable development strategy is needed to tackle these sustainability challenges in order to maintain the quality of life in cities.

Urban areas are often perceived that they can play both a positive and a negative role in sustainable development. When taking their ecological footprint and their direct[1] and indirect[2] discharge of GHG-emissions into account, it is clear that they are one of the largest contributors to those problems (City of Amsterdam, 2011; IPCC, 2007; UNEP, 2002; WWF, 2010). On the other hand they can play a significant role in mitigating and adapting to climate change and in reducing resources and land needed to fulfil their needs, due to their innovative potential and their authority over related key policy fields including land-use, building codes, waste management and transportation (Broto & Bulkeley, 2012; Bulkeley, 2010; Corfee-Morlot et al., 2009).

In light of these sustainability challenges, the municipality of Amsterdam has set a number of sustainability goals with the main focus on energy and related CO_2-emissions (GAO, 2008). By 2025 the municipality wants to reduce the city's CO_2-emissions by 40% in 2025 as compared to 1990 levels (City of Amsterdam, 2011). To achieve those goals the city of Amsterdam rests its sustainability strategy on four pillars, namely: climate and energy; sustainable mobility and air quality; a sustainable and innovative economy; and materials and consumers (City of Amsterdam, 2011).

At the same time, the economic crisis, which started in 2007, poses some great barriers for realizing these sustainability goals by the city of Amsterdam. Enormous state investments to buffer the financial system have led to significant increases in state deficits, which in turn led to a budgetary crisis of the municipality (Engelen & Musterd, 2010). New urban developments, especially essential infrastructure projects, have to face a significant reduction in funding for many years to come. Before the crisis in times of economic upswing,

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[1] Resulting from burning fossil fuels within the municipality.

[2] Resulting from energy production outside the municipality mainly based on fossil fuels to meet the demand of economic activities within the city.

the municipality has taken on too many public-building projects[3] simultaneously and many of those projects are facing significant budgetary and planning problems, leading to additional pressure on the municipal budget (Engelen & Musterd, 2010).

The current development policies of the Amsterdam municipality are not prepared to face these realities of complex sustainability problems within Amsterdam on the one hand and lack of development funding on the other. Therefore, we argue that a new sustainability strategy for the city of Amsterdam must entail an integrative way of tackling sustainability problems within the city. In that manner we use so called functional spaces within the city, namely residential spaces, infrastructure spaces and economic spaces as well as the concept of major problems streams, namely water, waste, energy and ecosystems, that manifest themselves in the functional spaces. A new strategy needs to integrate the streams into the spaces in order to approach the complexity of sustainability problems. Although the municipality emphasizes the importance of stakeholder inclusion to reach sustainable urban development goals (City of Amsterdam, 2011; GAO, 2008; DRO, 2011; Gemeente Amsterdam, 2010), the current urban planning approach can still be characterized as decentralized and top-down governance[4], which is closely related to the ownership of land. The city owns over 80% of the land on the municipal area (Arnoldussen, 2005), which generates resources that are used in a variety of policy fields, such as the housing-market that is characterized by a 'climate of regulation' and 'government-led interventions' (Engelen & Musterd, 2010; Janssen-Jansen, 2011). This poses a great problem because although the municipality still has the power to develop city areas (in a sustainable way), they currently lack the necessary funding.

In order to find a solution for this problem, the case study problem needs to be situated within the ongoing debate on (new) governance. Currently, a shift has taken place among policymakers and in the public perception that views top-down policy approaches as coercive and authoritative and as focusing too much on technocratic expert knowledge. There is an institutional and societal pressure for bottom-up approaches, which entail elements from interactive, public-private and self-governing governance modes. In recent years, the demand for bottom-up initiatives resulted into an actual rise of bottom-up initiatives. This rise is at least partly fostered by the development of information and communication technology (ICT) and the Internet in the last years, which opened up unforeseen possibilities for initiatives of citizens and market actors to organize, but also for

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[3] For example the Noord-Zuid Subway Line, the Riijksmuseum and the Stedelijk museum.

[4] Based on expert interviews, scientific papers and an analysis of policy documents. See for example: (Benner et al., 2010; City of Amsterdam, 2011; DRO, 2011; Gemeente Amsterdam, 2011; van Leeuwen, 2009; OECD, 2007) and Interview with Jurgen Hoogedoorn and Juliane Kürschner.

the governmental sphere to engage those actors. Gibson and Ward (2008) for example argue that online consultation and discussion techniques may be relatively low-cost mechanisms for democratic institutions to target and include previously ignored or difficult-to-reach target groups in the political process. Besides being involved by public actors, individuals can freely inform themselves, form networks and organize themselves around a certain interest they want to pursue and are thus potentially able to locally foster social capital, by producing community interest, -trust and –activity (Best & Kruger, 2006; Dutton & Eynon, 2009; Gibson & Ward, 2008).

Furthermore, we see that bottom-up initiatives provide highly innovative ideas and solutions strategies that tackle sustainability problems in an integrative way. They are working locally on problems in specific functional spaces and develop ideas on how to include the so called problem streams into these problems, which can be often seen as an improved strategy compared to the current state-of-the-art of the city.

In light of the developments, it could be argued that the Amsterdam municipality could engage in a more interactive form of governance in which bottom-up initiatives could be used and fostered to help reaching the sustainability goals the municipality has set itself. Therefore we were asked by our client Jurgen Hoogendoorn to explore the possibilities of connecting bottom-up with top-down approaches in the city of Amsterdam to come up with recommendations for a new sustainability strategy for sustainable urban development. Jurgen Hoogendoorn works as a researcher, policy advisor and developer in the think tank of the Amsterdam Development Cooperation (OGA) under responsibility of de deputy director/CEO Annius Hoornstra. His task is to get (state) subsidies for the development of the City and to search for new business models and adding value models after to the economic crisis hit in.

The aim of this research is therefore to give recommendations to the City of Amsterdam how to tap on bottom-up initiatives for a sustainable urban development and moreover to give recommendations on what actions the municipality may take to foster those initiatives. Therefore the research question is the following:

> *What role should bottom-up initiatives play to contribute to sustainable urban development in the city of Amsterdam and what recommendations can be given to the municipality to involve and stimulate these initiatives?*

In order to answer the research question we will introduce our conceptual research framework in a theory section, to show how we approach the problem and to give a brief overview on the concepts we used. After that we will elaborate on the used concepts, i.e. sustainable urban development, good governance, problem streams and functional spaces, in more detail to clarify on what grounds we conducted the analysis. Second, we will provide
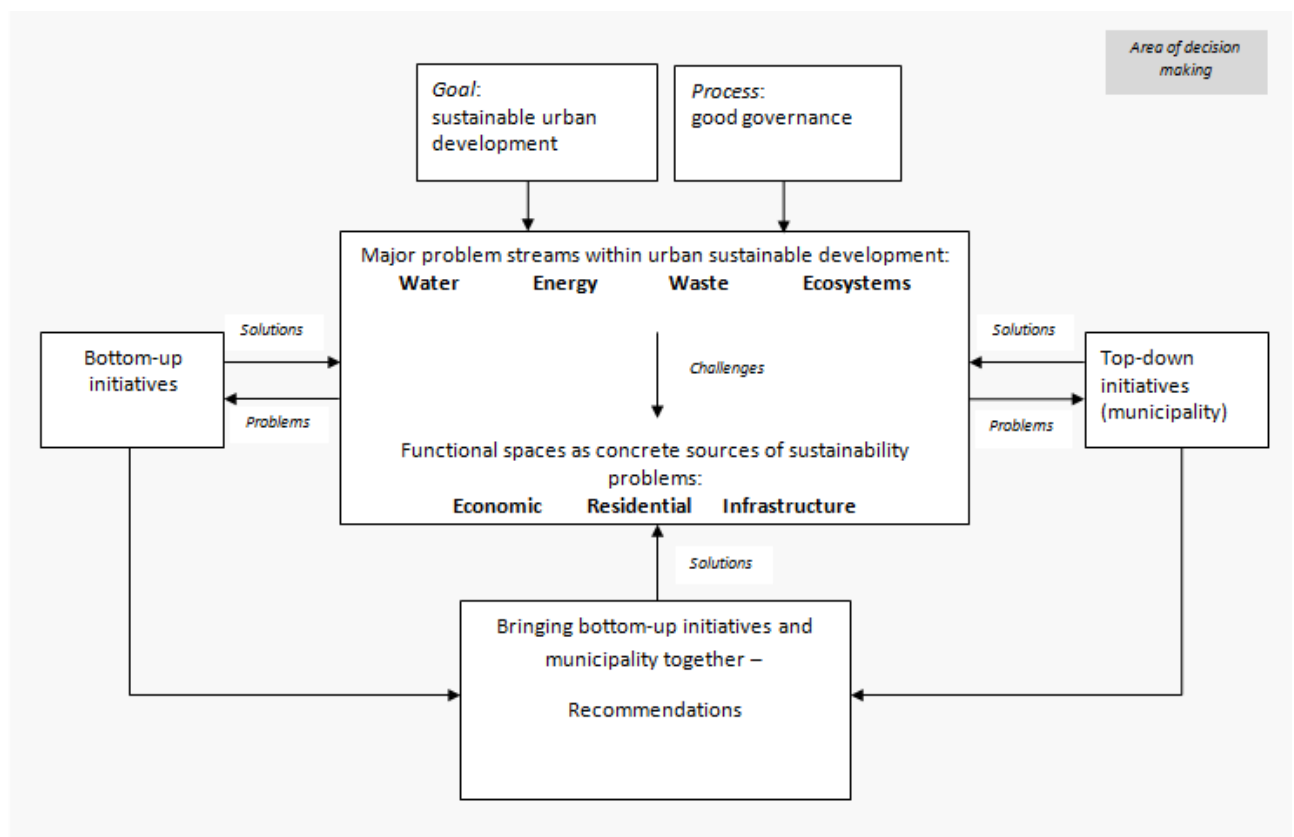
a methodology part to introduce the methodologies applied. Third, we will analyse the problems of the relevant functional spaces we identified, namely for economic spaces, residential spaces and infrastructure spaces. In each section we will elaborate on the Amsterdam specific problems with reference to the problem streams and in how far the respective streams, i.e. energy, water, waste and ecosystems are integrated in the current municipality's approach. Moreover, we identify selected bottom-up initiatives or collaborative arrangements between bottom-up actors and the government, to highlight potential benefits of bottom-up or collaborative approaches to tackle the respective sustainability problems manifested in the streams within the functional spaces. Fourth, we will summarize the recommendations of each functional space in a separate section, to give an overview on how the municipality could potentially foster or work together with bottom-up initiatives in general. Finally the paper will end with a conclusion in which the most important findings and recommendations for the future research will be given.

2. Theoretical framework

2.1 Conceptual framework

In this section, we will give a brief overview on our conceptual research framework, by providing a general description of the composition of the framework and its elements. In the following parts of the paper, the concepts used in the framework are further explained and elaborated upon. For a quick overview see figure 1.

Figure 1: Conceptual research framework

The first layer of our conceptual framework covers both the sustainability concept and good governance principles which are supposed to lead the solutions of the major sustainability problems within urban development in a normative sense, related to the claims and assumptions of these guiding principles. In order to reach our main goal –sustainable urban development - good governance principles have to be applied throughout the whole process of decision-making. The second layer of the conceptual framework depicts the major problem streams within urban sustainable development, namely water, energy, waste and ecosystems which manifest themselves differently in various urban functional spaces (economic, residential, public, infrastructure). The streams are overarching in a sense that each respective stream touches upon several topics, problems and the functional spaces in the urban environment. For example energy plays an important role in transport, buildings

and production of goods and services, just to name a few. Also, major problem streams overlap in the functional spaces, such as energy and waste.

We included bottom-up initiatives and municipality as the objects of our research. Here, we mainly focus on how bottom-up initiatives through good governance can contribute to urban sustainable development and tackle major issues within various urban functional spaces. To this end, we identified the most pressing issues within each functional space the city of Amsterdam is facing now and searched for the bottom-up initiatives that (potentially) contribute to solve the streams-related problems. It should be noted that even though some streams may be more important for certain functional space than the others, preferably all of the streams should be taken into account while tackling the pressing issues in the city.

The end goal of this framework, and the research in general, is to provide recommendations for the city of Amsterdam on how to make use and foster the potential of bottom-up initiatives for a sustainable urban development. We do this by integrating the streams with functional spaces guided by the sustainability and good governance principles. We developed a set of recommendations that, we hope, would be useful for the city planners as well as for citizens who are considering developing their own initiatives.

2.2 Sustainable urban development

Sustainable urban development is one of the central concepts for looking into what role bottom-up initiatives can play in a sustainable urban development strategy. There are many reasons why a city should incorporate a sustainable urban development strategy. On the one hand cities experience pressure in population growth which leads to problems related to energy use, air pollution, nusaince, social tensions, greenhouse gases. These sustainability challenges threaten the current way of life of citizens and those of future generations. A sustainable urban development strategy therefore has to tackle these sustainability challenges in order to maintain the quality of life in cities.

Fortunately, the concentrated environment of a city offers many possibilities to address sustainability challenges. At the local level, sustainability challenges can be more easily identified and tackled than on a global level, as solutions can be easily adapted to the specific characteristics of the urban environment (ICLEI, 2010). Cities therefore also require a more specific definition of sustainable development, labelled here as sustainable urban development. On the other hand, a definition of sustainable urban development should not be too specific as it should still be operationalizable within the case study. Therefore, to come to a definition of sustainable urban development, this section starts with an exploration of some of the general sustainable development definitions to arrive at a more

specific definition of sustainable urban development that suits the purposes of the case study.

2.3.1 Defining sustainable urban development

Sustainable development can be defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs (WCED, 1987). However, this definition was broadened by including the notion of the three pillars of sustainable development: environmental protection, social progress and economic development in the 2002 Johannesburg Plan of Implementation (WSSD, 2002).

For the purposes of the case study, the three-pillar-approach certainly has its value. It could be argued that a sustainable urban development strategy for the city of Amsterdam requires a holistic approach that improves the quality of life in the city as whole, in an integrative way. The three-pillars-approach reflects this holistic approach by assessing the effects of development in a social, economic and environmental domain (Elkington, 1997). So, were previous city development policies not holistic? Not exactly. Much of the focus of city development in recent decades was focussed on improving social progress and economic development (Elkington, 1997). It was only during a few decades ago that some attention was raised for the third pillar of sustainable development, namely environmental protection (Campbell, 1996). Therefore, there is still an imbalance between the three spheres that make up the vitality of a city. Sustainable urban development is then about improving the quality of life in the city by sustaining the political, the economic and the ecological urban systems simultaneously and in balance (Campbell, 1996). Quality of life refers here to "high spatial, physical and natural quality, where people can develop themselves well, both economically and socially (as to amenities and safety) and where the environment is considered optimally" (Benner et al., 2010).

However, a further refinement can be made by pointing out how the political, the economic and the ecological urban systems can be sustained. A more specific definition of sustainable urban development for the city of Amsterdam can be derived by turning towards the main pillars of the ICLEI activities. ICLEI (International Council for Local Environmental Initiatives) – Local Governments for Sustainability is an international organisation that binds local governments from around the world that have committed to the goal of sustainable development. With their Local Action 21 programme they spur local governments to realize sustainable development planning, together with local stakeholders, by focussing on four initiatives: resilient communities and cities, just and peaceful communities, viable local economies and eco-efficient cities (ICLEI, 2012a). Although each of these initiatives have their significance, it is argued here that the most pressing issue for the city of Amsterdam and for drafting recommendations for a new sustainable urban development strategy for

Amsterdam's city development, is the path towards becoming an eco-efficient city, while the other pillars are either should not be of real concern for the city of Amsterdam or is outside the scope of the argument. To be more specific, Amsterdam's sustainability challenges rather relate to environmental problems than to problems of social welfare and governmental capacity problems. This is why a stronger focus on the environmental dimension is more relevant for the purposes of the case study.

The concept of 'eco-efficiency' went public during the World Business Council on Sustainable Development in 1992 and combines economy and ecology. It refers to a reconciliation of carrying capacity, which can be defined as "a negotiation between human consumption and the rate of ecological regeneration", with human environmental impact (ICLEI, 2012b). It is the challenge to "use fewer resources to produce more goods and services while at the same time reducing society's negative effects on the environment. Essentially, it's the capability to creat [sic] more with less" (ICLEI 2012b). The concept of eco-efficiency is applied here as the means by which sustainable urban development is shaped, ultimately improving the quality of life, and also prompts the focus on the streams of energy, waste, water and ecosystem, as eco-efficiency mostly addresses environmental issues, integrating those with economic reasoning. As will be shown later on, the decision to focus on eco-efficiency for the sustainable urban development concept is reflected in our selection of streams within the city of Amsterdam.

2.3.2 Current sustainable urban development in Amsterdam

The city of Amsterdam has already set itself several sustainability goals. One of the ambitions for instance is to reduce its carbon emissions by 40% in 2025 compared to the baseline year of 1990. The current sustainable development strategy of the city of Amsterdam is outlined in two documents. The policy document 'Amsterdam Uitgesproken Duurzaam. Perspectief voor 2040' outlines its long-term sustainability strategy, while 'Amsterdam: Definitely Sustainable' presents a sustainability programme for the 2011-2014 period (City of Amsterdam 2010; 2011). The current sustainability strategy consists of four pillars, which are climate and energy; sustainable mobility and air quality; sustainable, innovative economy; and materials and consumers. The main focus here lies on the pillar 'climate and energy' including the sub focus-fields energy savings in existing buildings, climate-neutral new-buildings[5], sustainable electricity, sustainable heating and cooling with

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[5] The municipality defines carbon neutral as meeting the related energy demand (heating, cooling, hot tap water, ventilation and lighting) of the house, without using fossil fuels (Ontwikkelingsbedrijf Amsterdam, 2009).

thermal storage and electric transport (City of Amsterdam, 2011). Next to energy related issues the municipality is also focusing on sub-fields of the other pillars such as sustainable procurement of materials needed for its operations, fostering the Cradle to Cradle (C2C) approach in commercial as well as in residential districts and improving the separate collection of waste (City of Amsterdam, 2011). For every respective goal within the pillars the sustainability strategy aims at connecting and creating synergies between the different goals (City of Amsterdam, 2011). Although our preliminary research shows that these four pillars take into account the economic and environmental domains, the current sustainability strategy outlines top-down solutions and also does not provide a process outline or roadmap for achieving the goals, as will be empirically shown in the spaces sections. The case study aims to address the roadmap gap by providing recommendations that help planners to develop the city of Amsterdam in a sustainable manner. However, it is our argument that sustainable urban development also requires many cooperative arrangements between different actors in society, such as businesses, NGOs, scientists and citizens in the form of bottom-up initiatives (Roorda et al., 2011). So, in realizing sustainability goals new collaborations are needed on the way towards their realization. However, this reality does not diminish the role of the local authorities. The local government still has an important role to play in sustainable urban development as a regulating authority and as a facilitator for these new collaborations between different stakeholders, thus combining a top-down with a bottom-up approach. The principle of good governance ensures that important stakeholders for sustainable urban development are involved in a meaningful way, on which will be further elaborated in the following 'good governance' section.

2.3 Good governance as a precondition and outcome of sustainable urban development

As shown in our conceptual framework, good governance is a central concept to approach our question which role bottom-up initiatives should play in sustainable urban development strategy of cities, i.e. Amsterdam. Good governance is a normative concept that helps us to understand how a sustainable urban development should look like and why bottom-up initiatives are a promising approach to reach this development. Together with our concept of sustainability, we see good governance as a lens for developing a new way of approaching sustainability problems in Amsterdam as these two concepts both influence streams and functional spaces of the conceptual framework. Bottom-up and top-down initiatives are closely related with the concept of good governance. This interrelatedness needs further explanation that we want to provide in this section. Before we explain the concept of good

governance, we will firstly define bottom-up and top-down approaches respectively in order to facilitate the understanding.

2.3.1 Top-down

Top-down governance can be conceptualized as a form of hierarchical coordination that takes the form of authoritative decisions with claims to legitimacy (e.g. laws, administrative ordinances, court decisions). Hierarchies are based on institutionalized relationships of domination and subordination, which significantly constrains the autonomy of subordinate actors (Börzel and Risse, 2010). Referring to Driessen et al. (2012), we apply top-down governance as a mechanism of social interaction based on command-and-control of the governmental institutions. In our case the city of Amsterdam as the local government can be seen as a top-down agency since it is currently taking the lead in the urban planning processes, while the market and civil society are the recipients of the government's initiatives. Furthermore, the municipality is partly dependent on the Dutch national government but also on European legislation (SEO, 2009). However, there can already a shift from a sole top-down approach be observed, as we show with the help of some examples in this case study. Nevertheless, we argue, that the top-down approach with the municipality as a main actor is still dominant and could be complemented by bottom-up initiatives.

2.3.2 Bottom-up

In contrast, bottom-up based governance can be placed in the context of an on-going debate about new modes of governance (NMGs), which argues that there is a shift away from top-down governance in recent years. Craig and De Búrca (2007) identify three characterizing elements of an NMG. The first element is a shift away from central top-down governing towards involving lower-level actors as well as stakeholders. Second, policy rules are less rigid and prescriptive, and are less difficult to revise. Also, they are less uniform but more flexible and therefore allow for more diversity. The third element refers to the absence of or a reduced role for binding instruments and compulsory legal enforcement. However, it is stressed that this move towards more flexibility in governance does not necessarily mean that there is no legal commitment in NMG policies. Instead, the shift away from top-down governance implies that the main institutional actors have to share their policy-making space with other actors, notably local actors and stakeholders. This leads to greater room for input, adaptation and revision of policies in which NMGs are applied.

With this context in mind, bottom-up based governance can be further narrowed down to a policy mode that comprises non-governmental initiative, implying that it is not initiated by any authority, that brings together civil society actors and which can be both for profit

and non-for-profit motives (Driessen et al., 2012). In that manner, every grass-root activity, from neighbourhood associations to small and medium-scale enterprises producing collective goods in the field of sustainability is potentially covered by our project. In the literature about bottom-up initiatives, stakeholder theory argues that bottom up approaches are preferable over authoritative or top-down approaches, because they are more likely to reach their objectives (Wilson & Irvine, 2012). A comparative analysis of bottom-up initiatives from a Local Agenda 21 organisation with top-down approaches from a public authority in the same geographical entity, focussing on energy reduction, shows that "bottom-up approaches have more impact on behaviour change outcome than top-down approaches" (Wilson and Irvine, 2012, p.9). Bottom-up approaches are often simply more effective than top-down initiatives. This is one of the reasons why we think that bottom-up initiatives provide a viable supplement or even in some cases alternative to the current top-down approach. It is important to mention that this does not mean that the (local) government should play no role in the policy process. A bottom-up approach does not only include bottom-up initiatives as the only actors but can also be an interplay of government, market-actors and civil society actors. We will clarify this interplay in the next section with the help of the work of Driessen et al. (2012) about different modes of governance.

In the following paragraph we want to show in how far bottom-up initiatives are interrelated with the concept of good governance and how they can help to build up an alternative sustainable urban planning strategy for the city of Amsterdam.

2.3.3 Conceptualizing good governance

According to the UN, good urban governance should be characterized by "the interdependent principles of sustainability, equity, efficiency, transparency and accountability, security, civic engagement and citizenship" laid down in the Good Urban Governance Index (UN Habitat, 2012). Sustainability is a main concept within good governance and even though we introduced sustainable development as an independent guiding principle it is also part of the good governance principle. Therefore, it requires urban stakeholders to balance the social, economic and environmental demands of the present and future generations. Equity means the inclusion of all stakeholders to access decision-making processes and the basic necessities of urban life (UN, 2009). Efficiency is the guarantee of the delivery of essential services and optimal and cost effective resource utilization in the management of city resources. Transparency is needed in the operations, activities and resource utilization of all sectors of society. The goal is to create an environment of trust and openness with the high standards of professionalism and personal integrity, which results in collaboration and partnerships in addressing urban challenges (UN, 2009). Security means the guaranteed protection of the inalienable right to life, property

and liberty. Lastly, civic engagement and citizenship include the active participation and contribution of the civil body with the engagement and empowerment also of marginalized groups to participate effectively in decision-making processes (UN, 2009).

It is important to state that the single good governance criteria are often interlinked, for instance equity can never be reached if there is no active engagement of the citizens. Moreover, we argue that this civic engagement is crucial for a new sustainable urban development in the city of Amsterdam and represents therefore the link between good governance and a bottom-up approach. Since we furthermore have to specify and narrow the focus of our project and will in the following mainly refer to the inclusion of the citizens representing good governance. In the next part, we will make clear how civic engagement as a 'pars pro toto' for good governance can be reached with bottom-up initiatives and how it can be implemented in the context of Amsterdam.

To detect the link between good governance and bottom-up initiatives in the context of Amsterdam, we refer to the elaboration upon different governance modes developed by Driessen et al. (2012). Driessen et al. (2012) make a distinction between several modes of governance, namely centralized, decentralized, interactive, public-private and self-governance, that all have certain characteristics and coexist in the political sphere. This distinction can be used as a tool to identify which kind of governance is dominant in the decision-making process and to identify 'good governance' since some governance modes entail more aspects of it than others. So far, the dominant governance mode in Amsterdam is a decentralized mode, with a local city government that is regulating the issues in a top-down manner with fixed rules and procedures. Especially in the infrastructure management, the city makes decisions about major projects without any involvement of citizens organized in bottom-up initiatives. Bottom-up initiatives can only react on the decisions of the municipality but they cannot influence the agenda-setting process for instance.[6] Stakeholders are involved but are not acting in an equal position but rather under the control of the governmental authorities. These procedures in the water, waste, ecosystems and energy management focusing on the government are traditional and were considered as efficient and the only way of tackling these issues (Driessen et al., 2012). In that manner, top-down approaches tend to neglect the principle of civic participation, which is essential for the good governance principle. However, in the last years there was a shift in the public perception now criticizing this top-down approach based on coercion and authority and focusing on technocratic expert knowledge and demanding rather bottom-up approaches, entailing elements from interactive, public-private and self-governing governance modes. These governance modes include elements suitable with the aspects of

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[6] Interview with Bart Stuart and Klaar van der Lippe

good governance. They have in common that they bring together knowledge from experts from several disciplines and sectors and connect it to the local context, especially to the knowledge, values and perspectives of local stakeholders that are seen as the main tasks for the sustainable urban development. Therefore, local governments play an important role "(…) not only as a regulating authority or provider of regular public services (e.g. infrastructure), but also as a large customer (of buildings, energy, paper etc." (Roorda et al., 2011, p.31). The government acts "as a facilitator or initiator of new collaborations and public-private partnerships that cooperate to realize sustainable developments. To fulfill such roles and ambitions properly, (local) governments need to develop new competencies and skills like participatory technology development, building innovative alliances and learning for sustainability" (Roorda et al., 2011, p.31). The focus lies on a stronger role of the private and the societal actors, interaction and also competition is the base of power. Innovative solutions are more likely to be found due to the equal role of stakeholder, experts, policy makers and the society. In this manner, the principle of good governance can be met. Nevertheless, the shift from the dominant decentralized governance modes towards these new forms is not at all without controversy and also still in its beginnings due to the traditions of governmental centered top-down approaches in the decision-making process (Driessen et al., 2012). Furthermore, it is possible that agencies as the city Amsterdam that act in a top-down manner can adapt to a bottom-up approach by including especially bottom-up initiatives in their decision-making process. In the following we will show what the bottom-up initiatives can contribute to a sustainable urban development in practice in the context of Amsterdam and moreover, what the city of Amsterdam can do promote this potential by and in order to make a shift from top-down to more bottom-up approach towards good governance.

2.4 Problem streams

Sustainable urban development calls for a sound approach to improve the quality of life in the city as whole and in order to achieve that, the most pressing issue is addressing a new approach for sustainable urban development and in which the ultimate goal is to transform into an eco-efficient city. Therefore we identify some main 'problem streams', which optimally reflect the direct interrelations between human activities and the anthropogenic impacts on the urban environment.

There are a vast number of criteria and indices that have been proposed as measures to assess the sustainability of cities. These criteria thereby can be regarded as useful guidelines to point out the urgent problem streams in terms of sustainable urban development. We therefore refer to the European Green City index, which measures and rates the environmental performance of 30 leading European cities (Shields & Langer, 2009).

Since the target of the case study is the city of Amsterdam, using an index specifically aiming at European cities seems to be useful. Eight categories are listed in the index, namely CO2, energy, buildings, transport, water, waste and land use, air quality, and environmental governance. These categories are often interconnected and therefore, after merging and selecting, we decided to focus on four main categories as problem streams. These include energy, solid waste, water and ecosystems. CO2, buildings and transport are not considered as independent streams due to the fact that they partial overlap with energy use. Air quality is not entirely left out either, since a majority of emitted pollutants and particles can be traced back to the consumption of energy, based on fossil fuels, and waste treatment. In addition, the governance category has already taken into account in the upper level thus is not adopted here.

In the following we will further elaborate on the identified problem streams. First of all, energy usage has been recognized as one of the main problems of the 21th century (Roorda et al., 2011) especially within urban areas, which play an important role with reference to energy demand. On average cities hold a share of 67% of the worldwide primary energy demand[7] with the largest share used for office and residential buildings followed by the transport sector[8] (UN-HABITAT, 2008). Given that currently most of the energy consumed in urban areas is based on fossil fuel, the problems connected with climate change become apparent when looking at energy production at the national level. In the Netherlands, the generation of electricity and heat are the largest producers of CO2-emissions[9] with a total share of 32,5% for heat and electricity generation (OECD/IEA, 2011). However, currently less than 4% of all produced energy in the country is based on sustainable sources (Dobbelsteen et al., 2011: 2). As the result, energy consumption is heavily reliant on the combustion of fossil fuels, producing large amounts of greenhouse gases, thus contributing to human-induced climate change (IPCC, 2007; OECD/IEA, 2011). The consumption and production of energy in urban areas is therefore considered as a main problem stream for a sustainable urban development.

Urban areas also generate a large volume of solid waste, which is costly and uses a lot of energy to deal with. This is not only due to the high population in cities, but also because of the pursuance and maintenance of a high-quality of life which is usually in line with the changing patterns of consumption that subsequently drives an increase in solid waste

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[7] Refers to 2006.

[8] Refers to high-income urban areas in industrialised economies (e.g. London, Tokyo, Berlin etc.) for the time period between 1999 and 2004.

[9] The total amount of CO_2-emmissions in the Netherlands is based on numbers from 2009 and amounts 176.1 million tonnes of CO_2.

volumes (GDRC, 2012). Moreover, inappropriate dumping of solid waste also leads to pollution and damage of the urban environment. Therefore, the waste management in urban areas is a large, complex, costly, and potentially pollutant service (Ahmed and Ali, 2006). In a relatively dense and urbanized city such as Amsterdam, the amount of solid waste is an important issue. Each year Afval Energie Bedrijf (AEB), an energy and waste company in Amsterdam, processes more than 1.4 million tones of solid waste (Afval Energie Bedrijf, 2011), around 60% of which originated from economic sectors (Gemeente Amsterdam, 2011). This amount represents 20-25% of the total annual quantity of waste in the Netherlands (Afval Energie Bedrijf, 2011). As the development of future urban development relies on preserving and improving the quality of life in the city, urban solid waste management should be regarded as an important stream and be seriously tackled.

The third stream refers to water. It is also vital because the decreasing water availability and the shifts in the rainfall patterns coupled by population growth, rapid pace of urbanization and improved standards of living in a city results in a growing pressure on urban water management. Moreover, unsustainable resource consumption (energy and chemicals) in the wastewater treatment and dispersion of nutrients such as phosphorus are most frequently regarded as problems of the more closed urban water-loops and its management. Water is inseparable from urban life, yet it could also bring undesirable waste and potential pollution to the urban environment if it is not tackled in a proper way during the supplying and proceeding processes. Therefore, the case study considers the water issue as a vital stream in order to improve the living quality as well as the urban environment in the city.

The last stream, ecosystem, refers to "green land use" which is originally categorized in the European Green City Index. Increasing urbanization and urban growth continuingly contribute to the degradation of ecosystems, what is more, the urban ecosystem is often absent in contemporary city planning. Urban theorists have mostly conceived of cities as human spaces resulting in an exclusive humanism (Francis et al., 2012). However, a 'better' urban ecosystem cannot only improve human health and well-being (Tzoulas et al., 2007), but also provides a range of ecoservices, such as air filtering and noise reduction (Bolund & Hunhammar, 2007). Last, but definitely not least, it would increase the level of biodiversity making the urban environment more resilient (Stewart, 2012). As a result, urbanization presents many opportunities to restore the quality of the urban ecosystem and the natural ecosystems in general (EEA, 2010). A plan of sustainable urban development should therefore consider the role of the urban ecosystem in an integrated way in its new urban development plan.

The above-mentioned streams as such are overarching due to that each respective stream is compatible with each other. For instance, the solid waste management cannot be
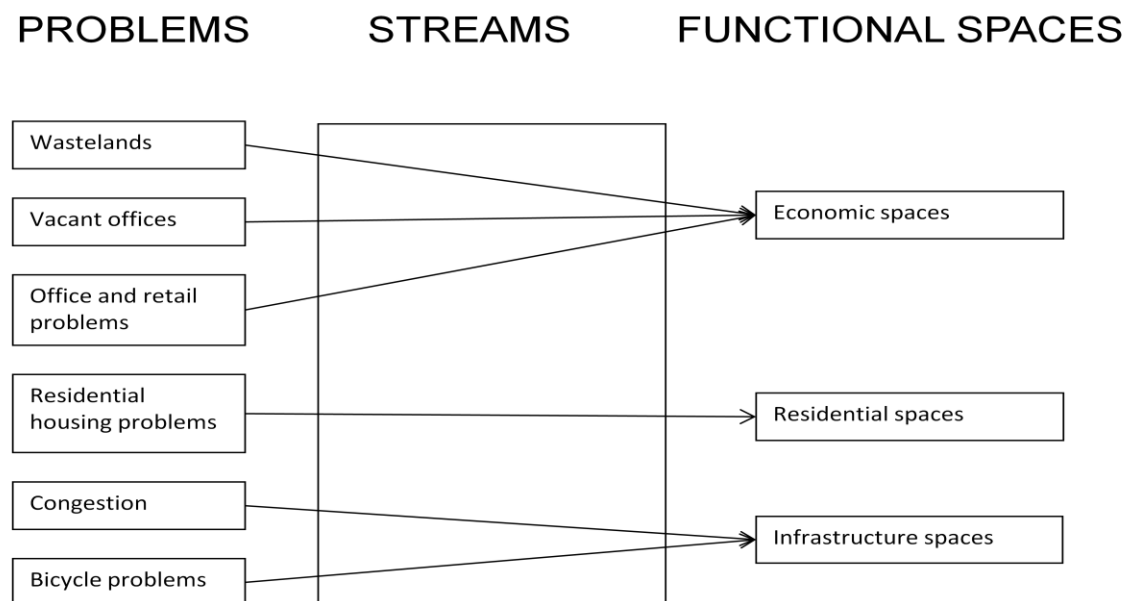
optimized without taking into account the energy and water-use during the proceeding and treatment processes. Furthermore, each stream will further touch on several topics and problems in functional spaces in a city. For example energy use plays an important role in transport, residential housing as well as the production of goods and services. These streams are influenced by the guiding principles identified before, namely the sustainability concept and the principle of good governance. In that manner, the way the streams are applied to the functional spaces, which will be elaborated in the following chapter, needs to fulfill the requirements of sustainability and good governance.

2.5 Functional spaces

In order to clarify the current state of a city and its problems, it is useful to look at specific spaces according to their function within a city. The functions of those spaces within a city can be divided in certain categories, with their own performance and specific sustainability problems. Therefore, we consider these categories and areas of a city as 'functional spaces', Functional spaces are interrelated with the streams since they reflect the issues and problems and the connection with the environment. In each functional space major problem streams are manifested and can be observed. Even if each functional space is in some way related to every single problem stream, some problem streams are more important than others in the respective functional spaces.

In order to make a division of the functional spaces, we first identified the most important sustainability problems and the most pressing issues within the city of Amsterdam. To identify these issues we reviewed strategic papers of the city of Amsterdam and consulted our client, Jurgen Hoogendoorn. We came up with the following problems for Amsterdam: wastelands, vacant offices, problems resulting from office and retail buildings, problems related to residential housing, congestion and the bicycle problems (Gemeente Amsterdam, 2010). These problems were then devoted to functional spaces, because every space has its own characteristics in terms of functions and services. Thereby every functional space needs a different approach. Also based on the study of Roorda et al. (2011) 'Urban development: the state of the sustainable art' and the study of Shields and Langer (2009) about 'European Green City Index: Assessing the environmental impact of Europe's major cities' we developed the following functional spaces occurring in a city, where problem streams manifest (Drift, 2011):

Figure 2: Connection between specific problems, streams and functional spaces

PROBLEMS   STREAMS   FUNCTIONAL SPACES

Problems	Functional Spaces
Wastelands	Economic spaces
Vacant offices	
Office and retail problems	
Residential housing problems	Residential spaces
Congestion	Infrastructure spaces
Bicycle problems	

These functional spaces are selected because we think it is a useful way to approach the sustainability problems within the city of Amsterdam, also because every area needs its own approach. The important themes 'social', 'economical' and 'environment' are represented in within these spaces and this is essential, because 'Sustainable urban (re)development contributes to an ecologically sustainable, socially livable and economically healthy environment' (Benner et al., 2010, p. 9). The functional spaces embrace the following:

Economic spaces encompass all kind of economic activities within the city, such as manufacturing and providing specific services, and the concrete spaces where these economic activities take place. The physical settings of the urban landscape: streets, parks and squares (Melik, 2008) will be discussed here. Residential spaces refer to all available dwellings (self-contained unit of accommodation). Infrastructure spaces refer to the organizational structure and services needed for operation, where the focus in this research is on transportation infrastructure (Monstadt, 2008).

Public spaces are also a functional space within an area, but since there are no pressing problems within public spaces in Amsterdam we leave this space disregarded and do not deal with it. The other functional spaces with their own sustainability problems will be described in specific chapters. Each functional space will be approached in the same manner, starting with defining the functional space and what it embraces. Then the main problems within this functional space will be described and the most pressing issues will be addressed and connected to the problem streams. Subsequently bottom-up initiatives within Amsterdam will be identified that deal at least with one of the problem streams or, in the best case, deal with two or more problem streams in an integrative manner. If no

bottom-up initiatives exist for Amsterdam, international examples will be employed, from which recommendations for bottom-up inclusion can be derived. In the end there will be a sort conclusion with the main finding.

3. Methodology

In order to answer the research question, we first want to identify what sustainability problems are currently threatening the urban development of the city of Amsterdam. By means of a review of strategic Amsterdam policy papers and after some consultation with our client, we are able to compose an overview of the most pressing sustainable urban development problems in the city of Amsterdam. Based on the identified problems and on our research question, we could start with constructing a conceptual framework to approach the case study. By reviewing the literature and taking into account the pressing problems, we could tailor the sustainable urban development concept to the case study and decided to ground the relevance of bottom-up initiatives in the debate on good governance, as part of a process towards the goal of sustainable urban development. Together, they form the guiding principles that help us to identify, in a deductive way, the potential of bottom-up initiatives for sustainable urban development in the city of Amsterdam. The integration of streams and functional spaces in the conceptual framework is chosen in order to be able to assess to what extent the current top-down approach is failing and bottom-up initiatives can do better in different areas of Amsterdam. It helps to identify an integrative strategy with a focus on bottom-up initiatives besides the top-down manner in an attempt to narrow down the focus of the project. So, in conducting the research this implies that we firstly detected which streams are most relevant and assessed the current state-of-the-art municipal policies in a functional space, based on the literature and the pressing problems, and then continue with identifying bottom-up initiatives that aims to solve the problems in the relevant streams in an integrative way, tackling several streams at the same time. However, it is important to stress here that bottom-up initiatives are not generally a provider of integrative solution strategies. Furthermore, the top-down involvement of the municipality is in some functional spaces and streams more important than in others and we want to stress that a top-down approach can still help to arrive at positive sustainability outcomes. Our aim is to find what bottom-up initiatives have to contribute to provide solutions that might be complementary to the current municipality's approach. As we will show there are examples of initiatives working according to our guiding principles and applying streams into functional spaces. In this sense we do not conduct a classical stakeholder analysis but rather want to strengthen our theoretical argument with empirical evidence from some relevant stakeholder representatives of both the bottom-up and the municipality. So first, we needed to identify relevant representatives or stakeholders of both

the municipality and the bottom-up initiatives. Stakeholders can be defined as 'any group or individual who can affect or [be] affected by the achievement of an organization's objective' (Freeman, 1984). Since our project covers four different streams influencing functional spaces, we can identify many different potential stakeholders, for instance the governmental departments of the city of Amsterdam, the citizens, bottom-up initiatives, companies, urban planners and architects, scientists et cetera. However, an assessment of all stakeholder positions is due to the limited time and resources of our group not possible. We also identify the involvement of market actors in the government activities, such as major energy companies, but decide not to consider the role that non-bottom-up enterprises should play in the sustainable urban development of the city of Amsterdam, as they only exert an indirect influence, at the most, in the bottom-up initiative examples. In addition, our research question mainly addresses two important stakeholders: the bottom-up initiatives and the Amsterdam municipal government. This is why we decide to focus only on bottom-up initiative stakeholders working on solutions for the identified problems in the functional spaces and on different city planning departments dealing with the identified problems. Nevertheless, we argue that we still gained valuable results and give valuable recommendations for the city of Amsterdam by narrowing down the amount of people and groups we focus on. For each functional space, we are able to select at least one prominent example of a bottom-up initiative that shows how bottom-up initiatives can complement the current approach of the municipality in an integrative way, following our guiding principles. The identification of relevant bottom-up initiatives is mostly guided by internet research, but also our client proves to be very useful in pointing out and directing us at several bottom-up initiatives. He suggests for instance the wasteland initiative 'Breakland' to gain insights in recent redevelopment strategies. After identifying the relevant stakeholders, we carry out a literature review of position papers and reports of both municipality departments and the bottom-up initiatives and conducted semi-structured interviews with representatives of different departments of the government of the city of Amsterdam, which are the physical planning Department and the city development corporation, and also with the different bottom-up initiatives manifesting themselves in the three functional spaces. In the table 1 we provide an overview of the experts we got in contact with. Although we contacted more bottom-up initiatives and civil servants in the Amsterdam municipality than listed in the table below, we were not able to arrange interviews with all our contacted stakeholders.

Table 1: Bottom-up initiatives in Amsterdam and municipality agencies dealing with problems in the functional spaces

Functional spaces	Name of the initiative	Contact person(s)	Sustainability problem	Solution strategy
Residential spaces	Besparen Met de Buren		Energy use in households	Stimulating incentive to save energy use
	Wij Krijgen Kippen		Energy use	Generation of renewable energy through innovative approaches
Economic spaces	Breakland Zeeburgereiland	Bart Stuart, Klaar van der Lippe	Wastelands	Platform for diverse redevelopment projects
			Wastelands	Urban farming etc
	Farming the city	Anke De Vrieze	Wastelands	Urban farming
	Youth Food Movement	Joris Lohman	Wastelands	Urban farming
Infrastructure spaces & Residential spaces	Dienst Ruimtelijke Ordening	Juliane Kürschner	Too much (unsustainable) energy use	'Besparen met de buren' and 'Wij krijgen kippen'
Infrastructure spaces	Dienst Infrastructuur, Verkeer en Vervoer	Michiel Bassant	Congestion and bicycle problems	Electric transport
Infrastructure spaces	Samen Elektrisch		Congestion and unsustainable transport	Promoting electric transport and sharing cars
Infrastructure spaces	Car2Go		Congestion	Sharing small (less emitting) vehicles

After collecting data on the current activities of the municipality in a more top-down manner, as well as the existing bottom-up initiatives we derive general characteristics of

both strategies and then analyze how bottom-up initiatives can, at least potentially, address the sustainability issues in Amsterdam and in a last step, which is referred to as "recommendations" in the conceptual framework, how the municipality can use this potential and foster these bottom-up initiatives. We gather extra literature on the effective interplay of top-down and bottom-up governance to help us filter out general recommendations out of the empirical findings on the bottom-up initiatives. By comparing both the theoretical and the empirical value of bottom-up initiatives for sustainable urban development, we arrive at recommendations for further fostering bottom-up initiatives by the Amsterdam municipal government, which are presented in a table.

4. Functional spaces

4.1 Economic spaces

First of all, it is essential to lay down what is meant with the core terms and concepts used for the functional space 'economic spaces'. The term economic spaces encompasses both all kind of economic activities within the city, such as manufacturing and providing specific services, from small scale to large scale and the concrete spaces where these economic activities take place. Economic activities entail both positive and negative influences on the city, such as working opportunities and economic growth for the whole region but also greenhouse gas emissions, water and air pollution threatening human health. Economic spaces are a vital part of a city, since they not only provide jobs but also give the inhabitants of a city the opportunity to meet their specific needs (Quigley 2008, EU, 2010). Important examples of economic spaces are: existing industrial spaces, (e.g. harbor and small and medium enterprises), abandoned industrial sites and areas (e.g. wastelands) as well as the service industry with its occupied and vacant office buildings. Wastelands can be defined as *"(…) an empty area of land, especially in or near a city, which is not used to grow crops or built on, or used in any way and/or a place, time or situation containing nothing positive or productive, or completely without a particular quality or activity' (Shelang, 2011).* It is important to state that the harbor is the only actual industrial area within the boundaries of the city of Amsterdam. Therefore, we decided to use a broader understanding of this functional space and to include also small to medium scale enterprises and abandoned industrial areas. With reference to our framework, we want to detect how bottom-up initiatives contribute to a strategy that integrates the guiding principles as well as the streams into the economic spaces to tackle the challenges arising from the specific problem structure.

4.1.1 Problem description

In the following part we will identify the main problems in the area in terms of sustainable

development within the economic spaces in general as well as for the city of Amsterdam in specific and further point out which streams are most important in the economic spaces. It is important to identify the current approach or state-of-the-art of the city of Amsterdam to deal with the sustainability related problems manifesting themselves in the economic spaces. Afterwards, some specific problems of those relevant streams in the area should be elaborated. We differentiate here between the problems concerning office buildings and retailers on the one hand and the problems of wastelands on the other, as both require different solutions.

As an economic driving force in the Netherlands, the city of Amsterdam has acquired an international name as one of the most dynamic regions in the world given that many national and international companies, such as Philips, Heineken and KPMG located their headquarters in Amsterdam (City of Amsterdam, 2012; Janssen-Jansen, 2011).   Currently the city of Amsterdam hosts around 91,628 work places for about 475,277 people. The biggest four employers are the consultancy and research sector with a share of 16.84% of all working people, followed by the health and welfare sector with a share of 13.94%, the trade sector with a share of 11.7% and the financial sector with a share of 8.9%. Together the consultancy and research sector (25.1%), the trade sector (13.7%) and the financial sector (3.5%) account for about 42.3% of all actual workplaces, meaning that a large number of workplaces in the city of Amsterdam are in the service sector and thus in some form of office buildings (Gemeente Amsterdam, 2012). Within the service sector the fastest growing industries are the creative industry and the IT-sector. In the last years Amsterdam has become a prominent ICT-cluster within Europe and has the highest concentration of IT companies in the Netherlands. The industry sector on the other hand is rather marginal with a share of only 2.3% of all workplaces and a share of 2.5% of all working people. While there are still many small to medium sized offices in the city centre, until recently a lot of companies started to relocate their offices outside the city centre in office clusters. A good example for this is the Zuidas, which lies between the city centre and the Schiphol Airport and has become the new financial and legal hub of the City of Amsterdam (Janssen-Jansen, 2011).

Energy use problem

As the service sector takes up a large part of the Amsterdam economy, office and retail buildings make up a large share of the energy demand of the city next to the transport sector and residential buildings. The average office building needs a lot of electricity for lighting and cooling, since people, computers and other devices in the bureaus produce a lot of heat. Especially the cooling devices demand a large share of the electricity used in an office (DRO, 2011; Gemeente Amsterdam, 2012). The IT sector alone makes up for about 10% of the energy use for businesses in Amsterdam due to for the operation and cooling

needs of data centers (Gemeente Amsterdam, 2012). For an overview of the average consumption of gas and electricity per square meter of different office building types see Table 2.

Table 2: Average energy demand per square meter for different office types

Average energy demand for different office types		
Office Building Type	Gas (m^3/m^2)	Electricity (kWh/m^2)
Office 200-500 m^2	21	109
kantoor 500-10.000 m^2	13	85
kantoor > 10.000 m^2	10	79

Source: (DRO, 2011)

Turning towards retail buildings, it is important to distinguish between non-food retailers and supermarkets. While non-food retailers show similar consumption patterns as residential housing units in terms of heating and electricity use, supermarkets use a significantly larger amount of electricity due to their cooling need, which amounts to 529 GJ per annum. For an overview on the average consumption of gas and electricity per square meter of different retail types see Table 3.

Table 3: Average energy demand per square meter in retail

Average energy demand per m^2 in retail		
Shop types	Gas (m^3/m^2)	Electricity (kWh/m^2)
Retail non-food < 19 employees	18	81
Retail non-food > 19 employees	7	72
Supermarkets	16	467

Source: (DRO, 2011)

From these tables it can be concluded that in terms of the presented streams one of the most pressing and promising issues related to sustainability, is thus the management of energy in office and retail buildings.

In order to address the energy use problem related to office and retail buildings the city has taken several measures. At the moment a long-term energy storage (LTES) system is being implemented in the eastern port area of Amsterdam (Oosterdoks), to provide heat or

cold to local commercial building clusters and other dwellings in the area, by using distribution pipes connected to the ground water. Compared to traditional installations for heating and cooling, the new system saves up to 3,200 tons of CO_2 per year (Shields & Langer, 2009). In the South of Amsterdam (Zuidas) the energy company Nuon was commissioned in 2006 to connect the office building clusters to a cooling grid that is drawing water from a nearby lake (Nieuwe Meer) and is now providing the connected buildings[10] with cold water for cooling saving up to 70% of CO_2-emissions compared to conventional cooling (C-40, 2012; Shields & Langer, 2009). Moreover, the municipality aims to supply one third of their energy demand from locally sourced renewable energy by 2025. To realize this goal the municipality wants to invest in photovoltaic (PV), wind energy and a smart electricity grid in close cooperation and joint investment with businesses and housing associations (Benner et al., 2010).

Nevertheless the concrete implementation plans for the latter aim are still absent in recent policy documents. It can also be criticized that other streams such as waste and water management are not incorporated in making office buildings more sustainable. Although for example cradle-to-cradle solutions for businesses are mentioned in the city's sustainability strategy and sought to be fostered (City of Amsterdam, 2011), no evidence could be found that this policy is actually being implemented in the city of Amsterdam.

Vacant offices problem

Due to the economic crisis Amsterdam is confronted with the problem that many former industrial and other economically used spaces are not in use anymore. This is problematic because potentially valuable land within the city is abandoned and decrease in their economic value. Despite the many workplaces in the service sector, the city is facing a significant problem, given that currently around 18% of all the offices in the municipality are vacant (Janssen-Jansen, 2011; NVM Business, 2012). This phenomenon can be traced back to the following circumstances: in many cases the municipality owns the land on which developments can be realised and selling/leasing developable land is the main source of income for the municipal government (Janssen-Jansen & Salet, 2009; Ploeger, 2004). After the a certain project is realized, the municipality also earns yearly property taxes and due to the Amsterdam land lease system they continue collecting taxes from the owners, even if the offices are empty and remain unused. Moreover, the municipalities often require new developments to finance municipal services such as restructuring of social housing. Thus there is no monetary incentive for the municipality to change the function of the buildings besides keeping the city an attractive place to live and work, since offices are in general

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[10] Up today the ABN-AMRO and KPN building and the Eurocenter are connected.

more profitable elements than for example residential dwellings due to the higher tax income they generate (Janssen-Jansen & Salet, 2009; Janssen-Jansen, 2011).

The municipality is currently attempting to transform the existing empty stock for other uses, such as hotels and student housing, to minimize new constructions. One instrument to deal with the problem is a vacancy regulation that requires owners of a vacant building to report to the local authority, if the building lies empty for longer than six month. After the local authority obtains a report a meeting with the owners is held in an attempt to solve the vacancy problem. Most of the buildings are owned by mixture of large and small investors and the city has set up a transformation team to collaborate with the owners in looking for alternative uses of their property. Here the transformation team is especially helping by dealing with the structural difficulties and the complex regulations that are affecting the repurposing of an office complex to alternative use. Moreover, the local government is also able to relax some building regulations and grant customized leases for the conversions (I Amsterdam, 2012).

Wastelands problem

Another problem caused by the economic crisis are the increasing amounts of unused plots, referred to here as wastelands. As the municipality of Amsterdam has already indicated, the temporary use of these so-called wastelands by initiatives stemming from society is becoming more and more subject of societal and governmental attention (City of Amsterdam, 2012b). Not including the smaller wastelands for now, the city is already left with 27 wastelands with a size of at least 10.000 square meters. This situation amounts to significant losses for the municipality by leaving the plots unconstructed and there are thus great incentives for temporary use of these wastelands[11]. Wastelands can be found in almost every part of the city; especially the wastelands in the districts of Nieuwe West, Oost, Zuidoost, Zuidas, Zeeburgereiland, or the area of the NDSM wharf in Amsterdam-Noord are relevant (City of Amsterdam, 2011).

So far the city of Amsterdam addresses the wasteland problem with an initiative founded in 2011 to support the temporary use of wastelands by interested residents, organizations or companies. The department for spatial planning developed an interactive map with locations, size and availabilities for these interested parties (City of Amsterdam, 2012b). With that approach the city intends to make wastelands usable also for short-term projects. In that manner, the city includes bottom-up initiatives for the use of wastelands, which corresponds with our concept of good governance. In general, the city acknowledges the relevance of consulting bottom-up initiatives to develop ideas for redevelopment of

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[11] Interview with Jurgen Hoogendoorn.

wastelands. However, the city develops general plans about the future use of wastelands on its own; in that manner, the city decides if wastelands should be used for residential districts or as a public space for instance. Therefore, the bottom-up initiatives have only a very limited frame in which they can develop concepts for redevelopment. Moreover, the initiative does not focus on sustainability projects even though they could be included in there. Furthermore, the city does not use an integrative approach about how to apply and implement a sustainability concept and the identified relevant streams into wasteland project.

4.1.2 Reference to the streams

Given the different nature of office and retail buildings in comparison to wastelands, we will integrate the identified streams separately for each area. The most important stream for office and retail buildings is clearly energy, since not only the building's energy consumption and the related CO_2 emissions are problematic, but also the energy use related to economic activities.   This is also reflected in the current strategy of the municipality in for this sector, with its main aim to reduce energy production related CO2 emissions and to reduce the energy demand of the buildings. Nevertheless, it can be criticized that the stream waste is clearly underrepresented in the cities current strategy in this sector, given that economic activities clearly contribute to the production of waste. Although the city is connecting the streams of waste and energy by using waste to produce heat and electricity, a better alternative would be to aim at reducing the total amount of waste. Since the municipality is even importing waste from Germany and the United Kingdom to fuel their AEB combustion plant (WEC, 2012), it is clear that the municipality is currently following a different approach. It could be stated that the strong focus on waste incineration as a relatively cheap resource for energy production might also produce an inertia for the municipality to support the more sustainable but also more expensive on-site generation of renewable energy, through PV, solar heating and micro-wind turbines.

It is crucial to integrate the identified streams into the management of the wastelands of the city of Amsterdam. Especially the building block 'ecosystems' plays an important role, since the sites with the abandoned buildings et cetera hamper a re-naturalization of the place. A redevelopment of the wastelands should aim at a development of the local ecosystems and biodiversity. In wastelands within Amsterdam such as Zeeburgereiland the stream of ecosystem can be included in terms of urban farming, where we will put special emphasis on in this section (Breakland, 2011). Furthermore the idea of setting up community gardens to foster biodiversity is a promising way of integrate this stream into economic spaces. Besides this stream, the redevelopment of these places should also take into consideration a modern waste-, water- and energy management depending on the

specific future use. Possible links to the energy streams are for instance small-scale biogas systems and the installation of windmills and solar panels in the empty areas (Breakland, 2011). A redevelopment plan should furthermore consider the possibility of including a waste-to energy approach as it can already be found in the residential sector of the city of Amsterdam (Afval Energie Bedrijf, 2011) and also consider sustainable water management systems with harvesting rain-water for re-use for instance. Wastewater from the domestic sector can also be reused in urban agriculture in confined urban spaces, such as roof-gardens, terraces, back yards or small gardens. Sustainable urban development offers the chance to enlarge the positive aspects and decrease the negative ones. Moreover, the existing economic industrial areas need to fulfill current economic, environmental and social standards. The installation of new industries requires a stronger focus on energy efficiency whereas the use for urban gardening puts more focus on ecosystems and water use.

4.1.3 Bottom-up initiatives

In this part we want to present examples of how the identified problems and challenges can be tackled according to our guiding principles and with an incorporation of the streams. Therefore, new strategies are required for a successful redevelopment of abandoned areas and maintenance of the current sites to tackle the negative environmental and social problems of industrial activities. Furthermore, there is a need for innovative and creative new businesses in the city area, in that manner the city of Amsterdam needs to provide incentives for companies to come to the city (Quigley, 2008). So far, relevant actors to take into consideration are the policy planning actors such as the Dutch Ministry for Economic Affairs, the Physical Planning Department, the Economic Affairs Department and several citizen initiatives. Therefore, we show examples of successful bottom-up initiatives and enterprises in the city of Amsterdam. These initiatives can contribute to a new sustainability strategy in the city of Amsterdam since they can integrate the four streams into the functional space 'economic spaces' in a bottom-up and sustainable way.

Climate Street (Klimaatstraat)

An example for a bottom-up initiative in the retail sector is the 'Climate Street' project, which is part of the Amsterdam Smart City programme. The project was initiated by the Union of Entrepreneurs of the Utrechtsestraat and is executed in conjunction with the municipality and Amsterdam Smart City. It aims to transform the Utrechtsestraat into a showcase for a more sustainable shopping street, by focusing on various measures such as saving heating, lighting and cooling energy through the application of new technologies and retrofitting of shops and bars. The project is sought to be a leading example for other shopping streets in and around Amsterdam, to provide lessons and experience to be learned

from. (Amsterdam Smart City, 2012; OU, 2011). It is dealing with three issues, namely entrepreneurs, public space and logistics, with the main focus on energy and CO_2 reduction. Thus energy scans are being carried out in the shops to map out saving potentials for lightning, heating and cooling. In every participating shop smart meters are installed to measure energy consumption and are connected to energy saving devices, such as smart plugs that automatically dim or shut down unused lights and appliances. To provide advice on potential energy savings, energy displays are installed that provide the entrepreneur with the important information on consumption patterns gathered by the smart meter (Amsterdam Smart City, 2012; OU, 2011). The other initiatives dealing with public space and logistics are focused on energy savings in street lightning and installing solar powered lights to tram stops. Also PV powered big-belly waste bins with integrated garbage compactors are used to minimize the frequency of emptying. The generated waste is then collected by electric vehicles from a single provider, to minimize CO_2 emissions (Amsterdam Smart City, 2012; OU, 2011).
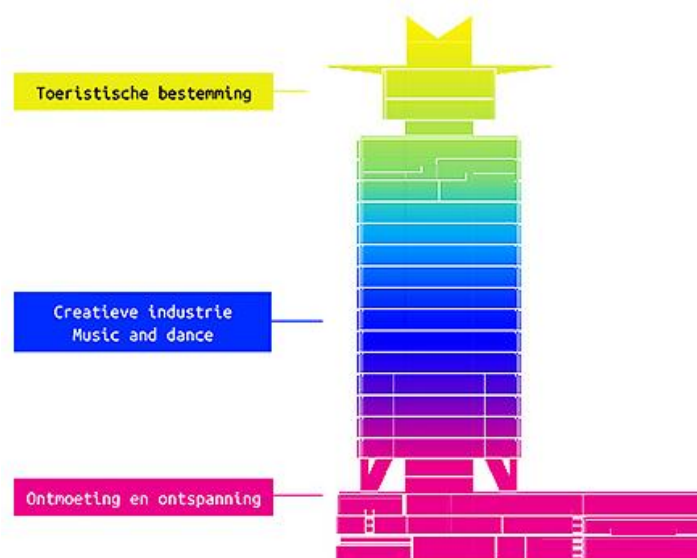
The New Energy Docks

Another good way to tackle the sustainability problems in economic spaces is to foster sustainability entrepreneurs or 'ecopreneurs'. The New Energy Docks is a good example of how the government and big market actors can provide a breeding ground for ecopreneurs in Amsterdam. New Energy Docks is a business complex, which is providing 30 offices designated for start-up ecopreneurs as well as meeting rooms and a larger auditorium for network meetings and informal networking. Among the ecopreneurs a variety of SMEs are dealing with a range of sustainability issues, such as energy management, reusing materials and recycling. It was initiated by Green Metropole, a broad partnership between a large number of small to big enterprises and several municipal actors, with the goal to create an internationally attractive innovation, knowledge and company cluster in the field of clean technology and sustainability transitions in the Amsterdam Metropolitan area (Green Metropole, 2012; New Energy Docks, 2012). As the city of Berlin has shown, the fostering of ecopreneurs can be key towards urban sustainability transitions. Before and still after the opening of the energy market in Germany in 1998, Berlin's energy market used to be dominated by two major energy companies, namely BEWAG and GASAG, which showed "considerable inertia in opening up new markets for energy efficiency services, for the decentralized generation of electricity and heating, and for environmental technologies" (Monstadt, 2007, p. 333). Thus policy initiatives for ecological modernization of the companies often failed, due to their vested interests and their limited governability by the municipality. Therefore the city increasingly focused on the promotion of innovative SMEs that were specializing in the production and use of environmental technologies as well as

supplying low-carbon electricity and heating. In the starting phase the green low-carbon markets were mainly promoted through R&D programs, loan/funding, but in the course of the budgetary crisis in the early 00's funding had to be drastically cut. But the municipality came up with creative solutions. Despite the slim budget, the city offered the often very large roof areas of the municipal buildings free charge to project managers and PV-cooperatives to set up PV-systems on a medium scale. Moreover, Berlin offers a variety of Universities and affiliated R&D Institutes that have a strong focus on sustainability issues within their programs, providing a good breeding ground for ecopreneurs. Thus, not only thanks to German Renewable Energy Act and European climate policy reforms, these ecopreneurs have professionalized and became important promoters of industrial transformations and an ambitious climate policy, and have succeeded to open new markets and to establish themselves especially in the combined heat and power (CHP), solar and energy services industry (Monstadt, 2007).

Twenty4Amsterdam

A good example of a bottom-up initiative that deals with reusing vacant office buildings is the Twenty4Amsterdam initiative at the former Shell Tower located at the northern riverbank of the IJ. The former Shell Tower or Toren Overhoeks is a currently empty office building and a landmark of the city of Amsterdam. Now it is planned to transform the tower into a publicly accessible multi-purpose event centre as can be observed in Figure 2.

Figure 2: Future use of the Toren Overhoeks

Source: (Twenty4Amsterdam, 2012)

The initiators of the project are Twenty4Amsterdam, a joint venture between AIR Amsterdam, Lingotto and ID&T. The companies are also the most important tenants and

financers of the project. Nevertheless, it needs to be stated that the initiative for the transformation of the tower was not company driven, but instead out of personal interest and involvement of the owners of AIR Amsterdam and ID&T, namely Sander Groet and Duncan Stutterheim. In the course of transforming the building it is their aim to integrate the three dimensions of sustainability in the reconstruction plans, in order to create a showcase for reusing vacant office buildings and abandoned industrial areas for a wide public. Thus concrete goals are the reduction of building related CO_2 emissions, by connecting it to the close by CHP plant and to integrate PV and solar thermal heating into the building. Moreover, the energy demand is planned to be reduced by installing LED-lighting and using natural ventilation systems as opposed to conventional air-conditioning appliances. Additionally the initiators want to reduce the amount of water and waste produced by economic activities in the tower. In order to measure their progress, the owners and tenants want to monitor their progress by quantifying sustainability goals, e.g. through close metering heating and electricity use in the building. Although the initiators of Twenty4Amsterdam are the project managers and future owners of the building, the future tenants are thought to play a key role for the long-term and sustainable use of the building. To make sure the initiative does not lose momentum, it is planned to include the future tenants into the planning process, to first make sure that the restructuring of the offices is tailored around their specific needs, but moreover to not unnecessarily waste materials right from the start. To contribute to the goals the future tenants have already made plans in various areas to reduce to reduce their ecological footprint, such as installing water saving taps, waste separation and reducing CO_2 from transportation to events by providing for the guests with event buses, information on biking routes, and carpooling opportunities (Twenty4Amsterdam, 2012).

Wastelands and Urban Agriculture

Given that the city of Amsterdam currently is facing the issue of wastelands and the important stakeholders willing to tackle this problem, urban agriculture (UA) can be seen as one of the alternatives to create ecologically sound, productive and community-involving urban space. As already indicated in the problem description, wastelands can be tackled in many different ways since all kind of streams could be integrated for the redevelopment strategy depending on the specific purpose chosen. We will focus on bottom-up initiatives for urban agriculture since it is a solution strategy for embracing all types of streams identified in our theoretical framework. Urban agriculture can be practiced at different scales, from small (e.g. green roofs, backyards, community gardens etc.) to large (e.g. commercial scale farms, greenhouses etc.) scale with private or public ownerships. Pearson et al. (2010) argued that scale is related to the benefits: economic and social benefits occur

already at a smaller scale, whereas large-scale publicly owned activities produce greater environmental benefits. Thus, urban agriculture not only opens a way to a higher productive use of the land with associated social, ecological and economic benefits, but also could be a possibility to reclaim vacant lots and create gardens to provide food but also accessible public spaces, contributing to livability of the neighborhood and foster community ties. Moreover, it is a low-cost and efficient option to deal with.

With regard to the streams, urban agriculture solutions can be integrated within the waste stream, more precisely food waste. Singh et al. (2011) argue, that composting is one of the most preferred methods of solid waste management (SWM), because of the high percentage of organic material, which can be used in agriculture and horticulture. Composting and recycling can reduce the volume of food waste, prevent the loss of nutrients and reduce CO_2 emissions. Moreover, it is a low-cost option. Secondly, also the water management can be integrated in urban farming related solutions for waste water management. Rainwater can be collected and stored for the use in UA. Wastewater from the domestic sector can also be reused in urban agriculture in confined urban spaces, such as roof-gardens, terraces, back yards or small gardens. Instead of using pesticides or chemical fertilizers, waste products can be reused. Organic waste includes fallen leaves, fruit and vegetable waste (Rojas-Valencia et al., 2011). Furthermore, also the integration of ecosystems can be an important solution. Issues related to urban heat and air quality can be tackled by increased vegetation. Also vegetation, especially trees, is attenuating city noise. With regard to the ecosystem stream, urban farming may also be particularly useful as habitats for wild pollinators in urban areas. Pollinators form an important functional group for sustaining food production within the city and for maintaining many wild plants. Mobile species, such as bees, may help to functionally connect different patches of urban agriculture and green zones which helps to sustain other fauna as well. This kind of species movement is not only critical for pollination, but also for seed dispersal, and even translocation of nutrients and organic matter, thereby upholding resilience of food production within the urban area (Colding et al., 2006).

In the city of Amsterdam, the most prominent type of UA is community gardens in the residential areas but there also are initiatives for the large-scale food production, involving universities, NGOs and business.[12] The main aim of UA is not scaling up and mainstreaming UA as a way to achieve self-sufficiency in city's food production; the Netherlands has a highly productive agricultural sector and food production efficiency in the urban context is quite hard to reach. Though UA can contribute to food production and shorten food miles, broader view than food production is needed. So, in the context of Amsterdam, UA can add

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[12] Interview with Jurgen Hoogendoorn.

value by (temporally) transforming the vacant lands by creating community gardens or "showrooms" for the educational purposes. In the next part we introduce bottom-up two initiatives for UA that are good examples to show how bottom-up initiatives provide new integrative solution strategies for the sustainable urban development of the city of Amsterdam complementing the current state of the art. We got further backup about wasteland redevelopment from the initiative 'Breakland' that works as a platform for different bottom-up initiatives concerning wasteland and that gave us some insights in recommendations.

Farming the City

Farming the City started in 2009 as a response to the rise of urban agriculture. In the beginning it focused on global research mostly, but gradually the focus shifted to the possibilities for urban farming in the city of Amsterdam. The local research for urban farming in Amsterdam is based on global examples and research, culminating in a website and an exhibition. Farming the City therefore mostly focuses on the creation of strategies and not so much on initiating initiatives themselves. Their goal is to create more visibility for urban farming and to support its further development by providing a platform for discussion, debate and action. For the start-up of Farming the City, their early involvement in 'Proeftuin Amsterdam', a municipal food policy program that ran from 2006-2010, in 2009 was essential. Proeftuin Amsterdam brought together professionals with different backgrounds, such as architects and farmers, which provided the missing links between relevant stakeholders. Not only were these people sitting for the first time around a table, there was also a map on the table, showing where the potential areas for urban farming could be. Currently, the Farming the City project and their website has taken over that role by bring together a range of stakeholders involved urban food production, including "community activists, local politicians, computer geeks, planners, policy-makers, farmers, gardeners, shopkeepers, social workers, developers, landlords, engineers, designers, health professionals and academics", and by becoming a hub for all kinds of bottom-up initiatives related to urban agriculture (Farming the City, 2012). It informs about issues of land ownership and land use designation, economic and planning policies and city-wide urban design initiatives. It also offers a platform for advice, ideas, practical know-how about and a knowledge-sharing forum for urban farmers (Farming the City, 2012). Farming the City indicates that there is a lack of a municipal food policy after Proeftuin Amsterdam ended in 2010. According to the initiative, a new food policy would need to be transdisciplinary by involving professionals from different parts of the food cycle, from production to waste treatment. Second, it should become easier to start bottom-up initiatives by providing licensing to grow on allocated land and infrastructure to run the food cycle. Third, the

community needs to be more involved by creating a municipal platform to discuss the food vision. There is a need for more inclusive decision-making and public hearings, and for valuation of community initiatives by giving credits to people who start up these initiatives.

For Farming the City itself, creating local food systems, where sustainable food production, processing, distribution and consumption all come together, is the most important. In their view, food production can be used as a tool for development, such as for wastelands, and should be part of a larger food cycle where the focus is not just on production. Rather the food cycle needs to be integrated in the urban system. Wastelands form a temporal possibility for integration with the food cycle. First, it would add economic value to the land. Second, in a more educational sense, it could create a "showroom" for urban farming. Third, it would connect food processing and production in smaller urban food cycle which would reduce the need for transportation of food.

The Youth Food Movement

The Youth Food movement is a youth food organization, bringing together different bottom-up initiatives focusing on a fairer and healthier food system. One of the many initiatives the Youth Food Movement employs is related to urban agriculture. Currently, the Youth Food Movement is overseeing a 300 square meter terrain used for urban agriculture in the eastern part of Amsterdam. The terrain is also used by several schools to grow food. The initiative by the Youth Food Movement was explicitly set up for educational purposes in order to bring citizens closer to nature again. Currently, the maintenance of the terrain is performed by volunteers and works with volunteers. There is also no need for governmental support, as the organization does not have to pay for the ground and only needs some seeds and fertilizer.[13]

4.2 Residential spaces

First of all it is important to define and clarify the core terms and concepts used for "residential space". The residential space refers to all available dwellings, by "dwelling" we mean a self-contained unit of accommodation. According to its tenure the dwelling can be classified into three types. The first type is an owner-occupied dwelling that is built by private developers and these dwellings are for own occupiers and private landlords. The second type, privately rented dwelling, implies non-owner-occupied property except those rented from local authorities and housing associations (Department for Communities and Local Government, 2012). The last type of dwelling is social housing referring to the housing owned by housing associations or local authorities (Whitehead and Scanlon, 2007). In

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[13] Interview Joris Lohman

Amsterdam almost half of the dwellings are social housings (Whitehead and Scanlon, 2007; I Amsterdam, 2011). It also should be noticed that in the following "private housing" is used to indicate both the first two types, the owner-occupied as well as privately rented dwelling. In addition, "household" will be used to mean a single dwelling occupied by a person or a family (Department for Communities and Local Government, 2012).

4.2.1 Problem description

In this part we will elaborate on what the most urgent problems are in the residential district in terms of sustainable development. The city of Amsterdam accommodates a population of approximately 0.78 million. It is estimated that the population will reach 0.85 million by 2030 (Gemeente Amsterdam, 2011). However, despite the growing population and subsequently the demand for dwelling, the production of new dwellings has declined significantly since the economic crisis in 2008. The decrease of rebuilding and replacing residential buildings is leading to several problems in term of urban sustainability.

First of all, parts of new dwellings in the city are built by replacing the old dwellings, which usually are less energy efficient and have a better sewage system and a connection to the urban heat grid. Since most of the new dwellings are constructed through diminishing old dwellings and as there are currently less projects for building new dwellings, this situation implies there are less opportunities to replace those unsustainable buildings. Secondly, because of the growing of the middle class population, the existing condition of dwellings is no longer meeting potential residents' expectations. Yet with limited availability as a result of less new constructions, prospective inhabitants are unable to buy or rent desirable housings (Gilderbloom et al., 2009; I Amsterdam, 2011). Thirdly, in terms of social perspective, as Amsterdam is an ethnically mixed city, some social concerns would emerge if the inhabitants with diverse backgrounds are unsatisfied with their dwellings and neighborhoods. These concerns include a low extent of public participation in communal affairs (Aalbers et al, 2005), as well as a high population turnover as a result of dissatisfaction of housing conditions, weak social structures within neighborhoods, and a lack of identification with the neighborhood (Parkes and Kearns, 2003).

Generally speaking, the problems of the residential district in the city of Amsterdam could be concluded in three dimensions: the insufficient quality and quantity of environmentally friendly dwellings (environmental dimension), the deficient amount of available and affordable dwellings (economic dimension), and the lack of social cohesion within neighborhoods (social dimension).

4.2.2 Reference to the streams

While connecting the problems of the environmental dimension to the four problem streams identified in our framework, we consider energy and solid waste management as particularly essential streams in this area. Energy use is highly related to the amount of carbon dioxide emitted. In 2007 the energy consumption of residential buildings in the city of Amsterdam was around 720 MJ/m^2, whereas the amount of CO_2 emission per year per capita in Amsterdam is 6.7 tones, performing 12th out of the other 30 European leading cities (Shields & Langer 2009). The statistic result points out that one of the weak points in terms of urban sustainability of Amsterdam, comparing with other resemble European cities, is the excessively high emission of carbon dioxide. A great number of buildings are for residential use, for instance there are 2,399 apartments per square kilometer in 2012 (Gemeente Amsterdam, 2012), that the city therefore urgently needs a more aggressive CO_2-reduction strategy in which improvement of dwellings should be seriously considered.

Speaking of solid waste in Amsterdam, currently a great part of solid wastes in Amsterdam is processed by AEB, which has implemented waste-to-energy project for years. 99% of waste arriving AEB is either recycled or used to produce energy (Afval Energie Bedrijf, 2011). However, as AEB belongs to the city of Amsterdam a lack of PPP as well as public participation in term of waste management in the city is evident. As residential districts are one of the main sources of solid waste in the city, the residents could have contributed more to sustainable urban waste management. However, citizens in most modern societies usually have no clear notion of what happens to the waste after being picked up from their houses. This is due to solid wastes generated from households are transported to large landfills and incinerators located far away from residential areas. If the citizens lack awareness about how the waste they made is treated, reducing waste volume and implementing waste recycle at the household level would be hardly realized (McCarthy, 2004). As the most desirable and fundamental solutions for managing urban solid waste better is to reduce waste at source (Arc 21, 2006), namely, at a household level, residential spaces   as well as individual households should be regarded as a vital factor in solving the problem of solid waste in the city.

4.2.3 Bottom-up initiatives

Currently residential spaces in the city of Amsterdam are governed through a more public-private partnership approach. The latest housing policy in the municipality is Housing Vision project, in which several goals are set up to be achieved in 2020. It establishes ten aims containing emancipation, affordability, non-segregation, housing and care, renewal, top city and sustainability. In order to carry out the policy and to achieve those goals, the municipality has collaborated with several housing associations which have possession of

the majority of residential housings (I Amsterdam, 2011). Nevertheless, for the sake of overcoming the challenges the residential spaces in Amsterdam is facing, it calls for an integration of more multiple levels of stakeholder. Namely, as a non-governmental role, not only housing associations but also individual neighborhoods and inhabitants should actively become part of bottom-up initiatives targeting at improving the quality of residential housing and the neighboring environment.

Regarding the two streams, energy and solid waste, in fact some bottom-up initiatives aiming at saving residential energy use and at managing residentially generated solid waste in the city of Amsterdam are proceeding at present. In the following these examples will be introduced, and the strengths and weaknesses of these initiatives will be scrutinized afterwards.

Besparen Met de Buren

"Besparen Met de Buren" is an initiative aiming at saving residential energy use in Amsterdam Noord. It is initiated by Amsterdam Steunpunt Wonen en Twinstone, and is financially supported by the city of Amsterdam and Ymere, a decisive and innovative housing association. The content of activity is like a game that every household joining in the activity will receive a box of energy-saving domestic products. The more the energy-saving products are in use by a household, the more possibly the household will win the game. Some voluntary residents are trained to become "handymen (klussers)" assisting households in making use of the green products. The activity was started at the end of September 2012, and the deadline is set in January next year (Besparen Met de Buren, 2012).

In terms of promoting bottom-up energy-saving initiatives in residential area, the main strength of Besparen Met de Buren is that it widely takes into account the potential contribution the residents could make. Noticing that the most fundamental way to save energy is to reduce energy use at a household level, the activity succeeds in steering residents to be more aware of their energy use and subsequently turn that into practice. Nevertheless, the residents in this case are still passive participants in that they are excluded from the organizing processes of the initiative. Moreover, individual households will participate in the activity for the purpose of attractive game rewards they probably will receive. Thereby it would be hard to ensure that the awareness of reducing energy use and its contribution to urban sustainability is held up among these household participants. These potential problems are all due to the fact that resident individuals have not been able to actively enter the decisive arena of rule-making of the initiative.

Wij Krijgen Kippen

Another bottom-up initiative carried out in the city in order to improve energy use is "Wij Krijgen kippen". The project it calls for collaboration between residents, businesses, government officials and other organizations in the southern district of Amsterdam to work together on the production of clean, local sources generated, and energy. Implementation of the project is financially supported by NL Agency, as well as companies and individuals. One of the ultimate ambitions of the initiative is to realize the technically clever design of housings and to turn Amsterdam South into the cleanest and the most livable district in the Netherlands (Wij Krijgen Kippen, 2012).

Although Wij Krijgen Kippen is not a bottom-up initiative specifically targeting at residential areas, it regards residential housings as one of potential objects to contribute to green energy production. This is absolutely true since that residential buildings account for a great percentage of the housing stock in the city. In addition, the initiative provides various pragmatic guidelines for different stakeholders with regard to how to generate renewable energy by using own buildings. For instance, for individual tenants of social housing, they suggest that tenants could try to discuss with their housing associations about the possibility to set up solar panels on the roof. Numerous housing associations have joined in the project as well, which could potentially increase the possibility of transforming residential housings into renewable-energy-generating buildings. Apparently, in comparison to Besparen Met de Buren, both housing owners and tenants are welcome to participate in Wij Krijgen Kippen and to contribute to renewable energy production. Namely, they could all have chances to serve as active drivers stimulating the improvement of housings as well as the realization of urban sustainability.

Westpoort Warmte

Currently a great part of solid wastes in Amsterdam are processed by Afval Energie Bedrijf (AEB), which has implemented waste-to-energy project for years. There is an ongoing collaborated project, called Westpoort Warmte, conducted by AEB and Dutch energy company Nuon that aims at connecting more households to the district heating system. The district heating system is a system of which 25% comes from heat produced by incinerating waste in AEB. Nowadays approximately 50,000 households in the city of Amsterdam benefit from the district heating and around 4,000 new homes are added to the line per year. The project targets at connecting 200,000 households to the system in the future (Afval Energie Bedrijf , 2011).

One might argue that the project Westpoort Warmte is not an entirely bottom-up approach to manage solid waste in the city. It is true that both companies are huge

companies and particularly AEB can be seen as part of the municipality. However, in comparison with the traditional way of urban management which used to be promoted through (re)orientation of national policies in order to ensure the implementation of reducing, sorting and recycling (Buclet and Godard, 2001), the mode of public-private partnership (PPP) could have more contributions to sustainable waste management. This is due to the PPP arrangement implying that both public and private sector agencies are responsible for providing the service (Ahmed and Ali, 2006). Furthermore, the promotion of the project stills need cooperation between two waste and energy companies, as well as other actors from lower level such as housing associations and households, and therefore a process of negotiation and discussion involving different stakeholders is necessary. Nevertheless, even though the negotiation process is conducted, the residents are still playing a passive role because they lack of funds, skills and accesses (Ahmed and Ali, 2006). Moreover, the project ignores the most desirable way to management solid waste, namely, reducing waste at source. It does not provide sufficient incentives to households to curtail their waste generation. If the project has included that as one of its targets, the individual residents would have more significant contribution as well as more opportunities to actively participate in the process.

4.3 Infrastructure spaces

The term 'infrastructure space' refers to the organizational structure and services needed for operation. The focus in this research is on transportation infrastructure. This embraces road and highway networks, railways, tramways, bicycle paths, pedestrian walkways et cetera including structure and facilities (Monstadt, 2007). Since Amsterdam is densely populated, infrastructure spaces is an important aspect of the city because people need to be mobile and connected (Gemeente Amsterdam, 2011). Especially the transport system and its infrastructure are important and that is the part within infrastructural spaces we are focusing on here. There is more pressure on the transport system and the infrastructure, because the city of Amsterdam is growing fast. Spatial planning processes need to be reconsidered and revised in order to deal with this increasing pressure. This is important for Amsterdam to remain a vital city in the future and make the city attractive, also in order to maintain the economic competitiveness through connecting residential and economic spaces in a sustainable way. Since several headquarters of multinationals are stationed in Amsterdam the accessibility is essential and there should be sufficient transport and infrastructure capacity and modes. Furthermore, it will give Amsterdam a stronger (international) position in the social and economic sector (Tieben & Smid, 2009).

In the 2040 Energy Strategy it is stated that Amsterdam has several ambitions with the main goal: be a clean and habitable city. In this document it is seen that Amsterdam wants

to be a climate-neutral municipal organization in 2015 and have 40% reduction in CO_2-emissions in 2025, compared to 1990. Green public transport and electric vehicles are transport modes that the municipality wants to promote among citizens. Reducing the greenhouse gas emissions will have a positive effect on air quality and nature. This is important for the 'future' Amsterdam (City of Amsterdam, 2010, p. 5).

4.3.1 Problem description

The current infrastructure and transport system in Amsterdam is functioning pretty well in the sense that public transport, bicycling and walking are becoming more popular transport modes in the city. However, private transport and car use are also still popular, which results in traffic jams and congestion in the city centre and around the highways (A10) and the Coentunnel (SEO, 2009, p.11). Congestion is therefore the main pressing issue in this functional space. The high pressure on the private transport system has to do with the 189,000 people commuting to Amsterdam for work every day and the 89,000 inhabitants of Amsterdam leaving the city to work somewhere else. Infrastructural projects of Amsterdam to improve the accessibility are the Noord/Zuid metro line, renovating the area of Wibautas and building a new tunnel beneath the river IJ (SEO, 2009, p. 10-11). In order to remain a vital city, it is essential to optimize both the private and the public transport system in Amsterdam. The city of Amsterdam is trying to optimize the system, but it does not work since we see the amount of motor vehicles in Amsterdam increasing every year. The total amount of motor vehicles in Amsterdam increased from 241,836 in 1995 to 266,784 motor vehicles in 2012 in total (Gemeente Amsterdam, 2012a). Because the current approach is not working, it is desirable to have a different approach and that is why the focus will be on the bottom-up initiatives since we have the expectation that this can contribute to improving the system.

Cycling is an important and popular transport mode in Amsterdam, since it performs well in environmental, social and economic sustainability. Moreover, the cycling conditions are good in Amsterdam and Amsterdam is also known as one of the cities in Europe that performs well in terms of bicycling and its infrastructure. It is also one of the frontrunners for bicycling over the world (Gemeente Amsterdam, 2010). In 2008, 38% of all vehicle trips in Amsterdam were by bicycle (Buehler & Pucher, 2010, p.36). More residents of Amsterdam are in the possession of a bicycle than in the possession of a car, respectively 73% and 50% (Gemeente Amsterdam, 2012a). In the infrastructural sector there are problems regarding congestion, increased greenhouse gas emission, and the worsening air quality. Bicycling is therefore a good and sustainable alternative which is less harmful to the environment. However, since bicycling is becoming more popular, more pressure is put on the cycling infrastructure. This manifests itself in the following problems: more bicycle theft, shortage of

safe bike parking facilities and reduced traffic safety. The main issues with regard to the bicycle mode are the overload along bicycle lanes and its infrastructure which cause also long waiting times at signalized intersections and traffic lights. Another important aspect is that since bicycling is so popular, there are a lot of bicycles in Amsterdam, of which a certain part is abandoned and left behind. Therefore these bicycles do not have an owner anymore and thus have no function since they are not used. Still after introducing the bicycle policy plan 'Choosing for cyclist: 2007-2010' these problems exist (Buehler & Pucher, 2010, p.37) so there is a need to really solve these problems.

4.3.2 Reference to the streams

Having these problems in the city of Amsterdam, the streams that have to do with these problems are important and therefore will be described here. The most relevant stream for the problems within this space is energy, since energy and transport (infrastructure) are interrelated with each other and the one is depending on the other. The overall transport sector holds a large share, about 35%, of the total energy consumption and this is likely to increase in the next years, just like the fast rise in unsustainable energy demand in the transport sector. This has negative effects for the livability in the city centre due to CO_2-emissions and noise pollution, where private vehicles are the biggest polluters (Butera, 2008). In the Netherlands transport is one of the largest producers of CO_2-emissions with a total share of 18,6% for transport (OECD/IEA, 2011). This is why it is important to face this and take action, also because the municipality wants to become climate neutral and the 'beating heart' of a sustainable metropolis by 2040 by meeting the energy demand in a more sustainable way. This is a challenge since currently only 5.8% of the cities energy demand is covered by locally produced renewable energy (City of Amsterdam, 2010). Thus, a transition is inevitable in Amsterdam's energy and infrastructure and transport sector in order to become a more sustainable city. Improved energy efficiency, promising energy strategies, renewable energy, optimal matching of energy demand and supply are possibilities that can contribute to this. However, there are still many infrastructural, economic, social, regulatory, political and administrative barriers (Manfren et al., 2010). Energy should become an integral part of area development since it is a sector with challenges and opportunities. Therefore appropriate policy instruments are important (Dobbelsteen et al., 2011, p.2). Since private cars are the biggest polluters and congestion is a main problem in Amsterdam, it is important to look for alternatives with regard to fossil fuels and the usage of cars, which will have a positive effect on the energy demand. For the bicycle problems the stream energy is not negatively involved since cycling is a sustainable transport mode with low energy use (for traffic lights).

The second most important stream within these issues in infrastructure is ecosystems. Ecosystems and infrastructural spaces are often in conflict with each other, because of the need of infrastructure or transport through a certain area where complete ecosystems and species exist. In Amsterdam this is also the case and the question is what is more important, the infrastructure or the environment and ecosystems. Ecosystems are being destroyed, because of the need of infrastructure in certain areas. The main issue of congestion with regard to ecosystems is that congestion causes pollution, because cars are emitting greenhouse gases into the air. The infrastructure sector is mainly depended on fossil fuels, which is problematic since oil and gas are running out and thus increasing the depletion of resources. Building new highways, to solve the congestion problem, and pollution is bad for the environment, it is degrading ecosystems and biodiversity is reduced. Next to air pollution, there is also noise pollution (Droege, 2008). Therefore there should be a stronger focus on the awareness of this and appreciation of the beauty of nature and the environment, and also to think of future generations. In order to become sustainable there should be 'green' transport and 'green' infrastructure, which is less harmful for the environment and ecosystems. The municipality has incentives to become greener and involve more people (Gemeente Amsterdam, 2010). The conditions of ecosystems are not that much affected through bicycles as through private cars and congestion. However, since there is more pressure on the bicycle system and the bicycle lanes are busy, this can affect ecosystems in the sense that the municipality will possibly construct new bicycle lanes and use environmental spaces for it. The issue of abandoned bicycles is that it relates to ecosystems in a way that these bicycles are sometimes thrown away into nature and use environmental space (Gemeente Amsterdam, 2011).

Pollution from vehicles is a kind of waste when taking the problem of congestion, fossil fuels are emitted to the air. For abandoned bicycles in Amsterdam this is a kind of waste, since the bicycles are left behind and have no further function and it uses valuable land. District West presented a report called 'Fietsparkeernota 2012-2014' that examines the amount of bicycles and also the abandoned ones. There are current estimations of about 4,000 wrecks and 6,700 abandoned bicycles in district West in Amsterdam (Gemeente Amsterdam, 2011). This implies that this is critical, also because the total area it takes in Amsterdam, which is really valuable.

Water is not a noteworthy stream for congestion, neither for the bicycle issues. Water is a function in this area in a way that transport is possible over water and bridges and tunnels are built to make it possible to travel over and beneath rivers and seas. There is no such thing that the infrastructural spaces are depended on the water availability.

4.3.3 Bottom-up initiatives

Although Amsterdam is performing pretty well in the infrastructure spaces, there are still things that can be improved, also in order to keep a leading position in this field. This implies that there should be changes in the infrastructural spaces in order to become more sustainable and solve certain problems. Most solutions have a top-down approach, but through focusing on bottom-up initiatives there can be other and maybe better solutions. Solutions for the main problem in this space, congestion, are needed and some bottom-up initiatives will be discussed here. Also some bottom-up initiatives for the bicycling problem will be described. The last years there were a lot of improvements regarding energy efficiency and renewable energy. Since oil and gas are running out, it is important to make a shift in the transport modes and the energy sources. Furthermore, the primary energy consumption should be minimized and the transport systems need to be optimized (Butera, 2008). In order to reduce congestion, Amsterdam is having incentives to support electric transport. Currently there are about 300 charging points in Amsterdam and this amount will probably increase to 700 charging points in public spaces and 600 charging points in private areas (Gemeente Amsterdam, 2012b). Bottom-up initiatives to reduce congestion are in place through the concept of 'Car2Go' and 'Samen Elektrisch' ('Together Electrically') which encourages people to share electric cars. Currently there are 300 electric Smarts from Car2Go available in Amsterdam, which are environmentally friendly since it is emission-free and they can be shared with other people. Another advantage of these cars is that driving is less expensive than a car that runs on gasoline (Gemeente Amsterdam, 2012b). 'Samen elektrisch' is a network of companies that want to contribute to becoming sustainable. These companies focuses on improving and stimulating co-operation, creating a platform on the demand side of the market and creating transparency (Samen Elektrisch, 2012). Car sharing and car pooling has the advantage of less cars needed in total, which means less cars on the road and less emission. This is having a positive effect on reducing congestion and on the energy streams. Moreover, the bicycle will be used more often. Examples of car sharing platforms are MyWheels, GreenWheels and Utrecht deelt (Santos et al., 2010). Through this more people will be involved and residents can learn about the consequences of their actions.

For the bicycling issues, lessons can be learned from experiences and examples in other cities and countries. Copenhagen for instance has the most cycle lanes and least car use. Furthermore, Copenhagen has a renewable energy production of 19%, which is higher than most other countries. This has to do with ongoing investment in cycle tracks, consequent policies, a holistic approach and citizen dialogue (Drift, 2011). Bicycling can be promoted through supporting the free access to public city bikes, ample parking lots for bicycles and improve parking facilities. It should be a normal and important transport mode in each social

level of the community. Next to that, there should be easy access to public transport with low costs, high frequency and improved quality. These solutions are possible through participation and co-creation with residents and businesses, which is also seen in Copenhagen. Leadership with courage and ambition is here essential (Drift, 2011). The majority of Amsterdam is frustrated by the abandoned bicycles which are all over the city and degrade the beauty of the city. Residents can collectively do something to counter these issues, then there will be less waste and the state of ecosystems can be improved (Buehler & Pucher, 2010).

5. Recommendations

In this paper we shed light on new realities in sustainable urban development and the challenges municipalities - precisely the city of Amsterdam- are confronted with to tackle these challenges. Due to the financial crisis and sustainability problems that become more and more complex, the municipalities need an alternative strategy to address future developments. As we show with answering our research question, bottom-up initiatives develop and provide innovative solutions according to our sustainability concept that integrate different streams into the functional spaces but fulfill also the normative criteria of good governance. We argue furthermore that the government needs the bottom-up initiatives urgently as the government is not able to address the sustainability problems in an appropriate manner due to the financial crisis. Moreover, the city is lacking so far an integrative strategy for sustainable urban development and misses the chance to follow a participatory, bottom-up approach in the sense of good governance. The potential we can identify in bottom-up initiatives within the city of Amsterdam needs to be used by the municipality to be able to react on the sustainability challenges. In turn, we also see that governments can provide their expertise and potential in the field of urban planning that can be very useful and facilitating for the work of the bottom-up initiatives. Therefore, we want to give recommendations about how the city of Amsterdam can use these bottom-up initiatives for sustainable urban development. In order to do so, we consulted the literature on the roles governments can generally play in the collaborations with bottom-up initiatives. In the end of this report, we will give practical recommendations for the city of Amsterdam according to our Amsterdam-related literature review and especially to the insights we gained from our interviews. It should be noted that we include only low-cost-monetary measures due to the budget problems of the municipality.

In a synthesis we give some recommendations based on the literature of how the city government and the bottom up initiatives can collaborate and which role the government should play in this collaboration.

5.1 Literature review

Firstly, municipalities should fulfill a vehicle role for bottom-up initiatives enabling them to express and act on existing concerns. In that manner, government should create the base for appropriate interaction with the initiatives, including consultations on a regular basis and building up partnerships in the sense of platforms that mediate bottom-up involvement and the city's legal responsibilities (Wu & Gong 2012, Manzini, 2005; Cavaye, 1999). Therefore, personal relationships between the civil servants and the representatives of the bottom-up initiatives are crucial since they build up mutual trust and bridge social capital (Agnitsch et al., 2005; Cavaye, 1999). In this respect, the risk of co-opting bottom-up initiatives should be considered (Cavaye, 1999).

Closely related to this vehicle role is secondly the networking role of public servants in communities and initiating contact with a greater diversity of stakeholders (Wu & Gong 2012; Cavaye, 1999). In that manner, the municipality fosters the relationships between residents and civil servants, external experts, initiatives and companies. It is crucial that the departments of the city governments send their staff in the communities for a vital interaction with local people., Based on this networking role, the municipalities can coordinate different 'agencies based on valuing existing cooperation, common goals and values, and joint projects' (Cavaye, 1999, p. 3).

Thirdly, the municipality is seen less as a pure provider of services than as a facilitator of bottom-up initiatives' activities by sharing their expertise and experience. This expertise role requires a redefinition of the work of municipalities as 'a dual delegation and community role where delegated work is achieved in a way that supports community networks and partnerships' (Cavaye, 1999, p.2). This means that public servants keep their role within their area of expertise or responsibility and share their expertise with the initiatives. For instance, the municipalities could support the initiatives by providing legal, technical or public relational advice. This approach can improve the value of technical expertise and bring the work of the initiatives to a broader audience.

Fourthly, the municipalities should take over an accountability role for the process of the interaction with the bottom-up initiatives and also the outcomes of this process due to the constitutional and legal responsibilities of the city governments have in democracies. Since community outcomes can take years to foster and it involves government time and money with community control and a risk that beneficial outcomes may not be reached there is a need to assess the measures taken. This accountability includes for instance appropriate qualitative and quantitative methods of assessment, e.g. by performance

indicators and methods of measurement (Cavaye, 1999). In that manner, the quality of the process can be assessed and optimized. The literature differentiates between three forms of accountability: "concrete" service delivery outcomes such as infrastructure provided; the quality of the process with which the municipalities interact with the community; and community capacity including the organisation, networks, cooperation and capability of communities (Cavaye, 1999).

In the following we give recommendations for the municipality in each functional space based on the literature review and interviews with the participants of bottom-up initiatives. We specifically focused on the expectations bottom-up initiatives have about the collaborations with the municipality and what the government can specifically do for them. Afterwards we provide a table that brings together the general roles of the governments for a better collaboration with the bottom-up initiatives and the practical recommendations. In this table we can give an overview for each functional space about the main actors, the identified streams to be integrated and the recommendations for the municipality according to the categories of the general roles of the government.

5.2 Practical recommendations

5.2.1 Economic spaces

Referring to retail and offices the following recommendations can be given to the city of Amsterdam. As the climate street project has shown, the municipality can play an important role as an initiator of showcases, to set an example for other stakeholders. While the Union of Entrepreneurs of the Utrechtsestraat was willing to tackle their members' energy problems, the municipality could provide them with the specific technology needed for a more efficient energy use and for monitoring to adjust their behavior accordingly. It is yet to see in how far the climate street project will affect the behavior of other retailers, but the climate street as a showcase for significant reductions in energy use and affiliated costs, through relatively low-cost appliances, seems to be a promising way to attract the attention of other stakeholders. This showcase approach can potentially also be translated to other streams and related projects in the city. Moreover, the showcase approach could also be used to present how streams can potentially be combined within one showcase project.

The New Energy Docks initiative shows that the municipality can be an important provider of breeding ground for ecopreneurs that can come up with innovative solutions for the respective streams in the city. While the city of Amsterdam followed the strategy to cluster ecopreneurs at one point to enable exchange between the ecopreneurs, it can moreover also draw on examples from Berlin, which is in a comparable desolate situation with their budget. Accordingly the municipality can focus on encouraging the implementation of more sustainability programmes at their respective Universities and

affiliated R&D institutes. Moreover, Amsterdam can follow approaches such as offering their municipal roofs free of charge for ecopreneurs to install medium to large PV-systems. Due to the lack of sufficient funding for PV, the latter might only be possible until the near future, when PV-technology has reached grid-parity.

The Twenty4Amsterdam initiative shows the potential of bottom-up initiatives to deal with the problem of vacant offices in a sustainable and creative manner. First of all, it shows how bottom-up initiatives may offer a different angle on sustainability by dealing with different streams such as waste, energy and water at the same time. Second, it shows how the early inclusion of stakeholders in the decision-making process, here especially future tenants, can positively contribute to sustainable solutions, tailored around the needs of the future users, while saving energy and material at the same time. Moreover, it can ensure that a user is likely to stay in the building, since their needs have been taken into account at an early stage, minimizing the incentives to leave to a more 'suitable' premise. A similar approach could be applied to vacant offices not only where the city has the tendering right but also privately tendered vacant office buildings, where the municipality could potentially act as a promoter of the Twenty4Amsterdam approach.

Regarding the recommendations concerning urban agriculture, first, the municipality of the city of Amsterdam should open up more to include the different parties, from the civil society groups to the market actors, to discuss the food vision of the city, in this way also ensuring that all parties can play an active role in the decision-making process. It could take a form of food councils. Also, the municipality should play an active role in providing the needed infrastructure for the start-ups, especially land, which can be seen as a tool to redevelop the vacant lots. Moreover, the added value in terms of livability and greening the residential areas of the already existing bottom-up initiatives, such as community gardens, should be recognized and in return municipality can offer credits (e.g. reinvestment) for the neighborhoods. Also, municipality can provide the space for the meetings, such as club houses and meeting rooms and share the knowledge with the initiatives by informing them about the existing juridical and other boundaries.[14] Furthermore, it is crucial to include bottom-up initiatives into the agenda-setting of the policy process in order to ensure that the initiatives can raise their concerns about the sustainability problems already in the beginning and become familiar with possible boundaries in the process. In that manner, it would be possible to develop plans for spatial planning with the input of the bottom-up initiatives. In this inclusive procedure, plans about the use of certain areas can be negotiated. Lastly, municipality should make use of the ideas brought up by the initiatives not only by including them in the decision making process but also keeping up the processes

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[14] Interview with Bart Stuart and Klaar van der Lippe

after the solutions to the specific problems the city of Amsterdam is facing now are proposed.

5.2.2 Residential spaces

After presenting three initiatives intending to improve residential energy use and solid waste management through a relatively bottom-up approach, recommendations regarding residential spaces to become more environmentally friendly are proposed. Before going into the concrete recommendations, the role of housing associations will firstly be emphasized. This is due to two reasons that, firstly, currently 48% of the dwelling stocks in Amsterdam are social rented housing (I Amsterdam, 2011), of which the housing ownership mostly belongs to housing associations (Scanlon & Whitehead, 2007). Furthermore, in most Dutch cities like Amsterdam (re)construction of social housings often becomes a driver of urban renewal and other urban issues (Scanlon and Whitehead, 2008). This reflects that housing associations often play a crucial role in initiating urban renewal and other bottom-up initiatives with regard to residency issues. Therefore, while considering stimulating a bottom-up approach in governing residential spaces, the key position housing associations are taking should be taken into account. However, housing associations can be so influential that the potential of individual residents contributing to improving the living quality would be considerably eclipsed. As a result of that most residents are usually controlled by the housing contracts and therefore sometimes they can only do something allowed by the housing associations. As stated before, we see the active participation and involvement of citizens from bottom-up as a vital driver for a new sustainability strategy and thereby as the most important criteria for a better urban governance principle. Furthermore, the citizens are the "real users" of the residential spaces and their participation in the improvement of the areas should be given more weight by a new governance strategy.

As a result, in terms of sustainable energy use and solid waste management in residential spaces in the city of Amsterdam, firstly we identified that, on the one hand, the public and private sectors such as the Department of Physical Planning and Afval Energie Bedrijf provided energy and waste service since they possess enough funds, skills and equipment. On the other hand, both housing associations and individual households should also become active participants in the process of decision-making and implementation. Such public-private-people interactive mode could better ensure the efficiency, effectiveness and cleanness of the services since not only suppliers, but also users should be involved in the discussion and collaboration, leading to better service provision (Ahmed and Ali, 2006). Moreover, while including households into the discussion and implementation arena, individual residents would be more likely to change their own behaviors in order to act more

environmentally friendly. As an active participant, rather than as a passive rule-receiver, one would be more aware of what should be doing and thereby put it into practices.

Regarding energy use, we recommend that saving residential energy use could be realized by a twofold strategy. On the one hand, residential buildings could be transformed into greener buildings by connecting to a district heating system, replacing traditional electric equipments with energy-saving ones, and so on. This process needs sufficient collaboration with energy companies and housing associations which possess ownership of most buildings. On the other hand, environmental education for residents is also necessary. This can be carried out by holding communal meetings, civil activities, handing out flyers, or even using mass media such as advertisements on TV and local newspapers. Concrete campaigns such as Besparen Met de Buren could also be effective since residents will have stronger incentives to save energy. The strategy for solid waste management resembles that for energy management. Waste treatment companies are still playing vital roles, but they should be more open to opinions from housing associations and residents. By doing so they could provide more adequate services, such as establishing solid waste collecting and recycling stations at the right locations where most of the residents have access to. The education of residents regarding recycling and reduction of waste volume is important and hereby communal committees and, probably, housing associations could contribute to it.

5.2.3 Infrastructure spaces

From this elaboration there are several recommendations that can be given to the municipality of Amsterdam. The municipality is willing to reduce congestion and become climate neutral, which is good for the cooperation with the initiatives. Since the city is promoting electric transport, a common ground can be found with several bottom-up initiatives and the municipality can help in involving more people. Through involving more people, the city will perform better in terms of sustainability and reducing problems, such as congestion and pollution. An essential point is that people need to be involved in an earlier stage, where it is important to discuss and think about solutions together. People need to be encouraged and the municipality should network with the bottom-up initiatives 'Samen Elektrisch' and 'Car2Go' and create a larger platform. These bottom-up initiatives should be on the policy agenda, where the streams energy, ecosystems and waste will mainly benefit from these initiatives.

Another thing the municipality can do to solve the problems, is through providing the right infrastructure by creating public-private partnerships with car and energy companies and ecopreneurs to make it easier for people to change and adapt. In that sense it becomes clear that the market sector cannot be left out when it comes implement large scale infrastructure projects. Nevertheless, also here, SMEs can contribute in terms of integrative

and innovative sustainability strategies. For instance improving the infrastructure for electric cars (increase charging points) will get people engaged and encouraged, as well as provided a better infrastructure for cyclists, with better bicycle paths, less waiting time for traffic lights and more (safe) parking places for bicycles. This improved infrastructure and the possible solutions for congestion, bicycle problems and unsustainability should be promoted by the government. This can be done through education, media or information meetings in certain districts with influential persons. The municipality of Amsterdam should organize these things in order to succeed.

A general conclusion from these recommendations from each functional space is that we would like to stress that while we praise the effectiveness of bottom-up initiatives for sustainable urban development, it is not our aim to exclude the municipal government from this process. There should be cooperation between municipality and bottom-up initiatives and the municipality should incorporate the initiatives and their ideas in the municipal policies. Instead of producing a top-down versus bottom-up argument, our idea is that the municipality of Amsterdam shifts towards a "top-up" approach. This approach combines the best elements of the two policy approaches which will evolve in relevant solutions and opportunities. An integrative approach with tackling problems in several streams and integrated solutions is needed at the same time.

The following table gives an overview of the recommendations (who, what and how) for each single functional space:

Table 4: Recommendations

		Functional spaces		
		Economic space	**Residential space**	**Infrastructure space**
WHO?	Which actors should be involved?	*Municipality*: Department of Spatial Planning; City Development Cooperation.	*Municipality*: Department of Physical Planning (DRO).	*Municipality:* Department of Infrastructure, Traffic and Transport (DIVV); Rijkswaterstaat; Department of Planning (DRO).
		Civil society groups: Breakland; Youth Food Movement; CITIES etc.	*Civil society groups:* Housing associations; individual households.	*Civil society groups*: Samen Elektrisch; Car2Go; GreenWheels.
		Market sector: Owners of vacant offices and land; architects; energy companies.	*Market sector:* Afval Energie Bedrijf (AEB); Energy suppliers such as Nuon.	*Market sector*: Owners of gas stations; car companies.
WHAT?	Which major problem streams should be addressed?	Water Waste Energy Ecosystems	Energy Waste	Energy Ecosystems Waste

HOW? (recommendations for the municipality)	How to facilitate bottom-up initiatives?	*Vehicle role:* Give credits (e.g. reinvest) for communities who practice UA; Provide land for the community gardens etc.; Involve civil society in discussing the food vision by creating a platform /food council; Agenda setting process.	*Vehicle role:* Provide economic incentives to households to reduce energy use; Involve households as renewable energy generators; Motivate household to reduce waste at source.	*Vehicle role:* Provide benefits for electrical driving and installing electric charging points; Involving people to increase the platform from Samen Elektrisch; Incorporate electric transport in urban planning.
		Networking role: Crowd sourcing; common learning processes; Providing club-houses and meeting rooms.	*Networking role:* Provide a space for negotiation between public and private sectors and people as well; Educating a stimulating the awareness of the sustainability issue	*Networking role:* The municipality should provide an area where people can network and find out about solutions; Involve citizens from the beginning and give them a voice; Network with bottom-up initiatives and cooperate with them.

HOW? (recommendations for the municipality)	How to facilitate bottom-up initiatives?	*Expertise role:* Government needs to inform initiatives about possible boundaries (e.g. juridical boundaries).	*Expertise role:* The municipality and private sector should improve the living quality by using their funds, equipment and skills.	*Expertise role:* The municipalities should use their knowledge in order to let the bottom-up initiatives succeed.
		Accountability role: Process accountability (make use of the ideas that were proposed by bottom-up initiatives to keep up the process).	*Accountability role:* Housing associations as house owners, households as house users should be involved to ensure the quality of the services.	*Accountability role:* Use performance indicators to assess the quality of the initiatives

6. Conclusion

In answering the research question what role bottom-up initiatives should play to contribute to sustainable urban development in the city of Amsterdam and what recommendations can be given to the municipality to involve and stimulate these initiatives, we hope to have provided a first step in the exploration towards the use of bottom-up initiatives for sustainable urban development. We do not claim to have provided and exhaustive assessment of bottom-up initiatives in the field of sustainable urban development in the city of Amsterdam. In that respect, it is probable that some useful recommendations for the municipality of Amsterdam have not been identified during the case study. However, we made clear from the outset that the goals of the research were more modest. We sought for a selection of bottom-up initiatives that exemplify the integration of different streams to work towards solutions for sustainability problems and that are in line with our guiding principles. Together with the state-of-the-art literature on the effectiveness of bottom-up

and top-down interplay in policies, we were able to derive some initial recommendations for a new, more effective and more sustainable urban planning strategy for the future. The municipality can play a vehicle role, networking role, expertise role and/or an accountability role in order to solve the problems and cooperate with bottom-up initiatives.

At this point we would like to stress once again that while we praise the effectiveness of bottom-up initiatives for sustainable urban development, it is not our aim to exclude the municipal government from this process. Rather, we hope to have made clear that the Amsterdam city government should seek for collaboration with bottom-up initiatives and incorporate the initiatives and their ideas in the municipal policies. So, instead of producing a top-down versus bottom-up argument, it is our hope that the municipality of Amsterdam shifts towards a "top-up" approach that combines the best elements of the two policy approaches. In addition to this point, we also hope to have made clear the need for integrative solutions, tackling problems in several streams at the same time. Therefore the conceptual framework is an important tool to understand the interrelations. We observe that current sustainable urban development policies in the city of Amsterdam focus on the energy stream mostly, but we argue that the energy stream solutions should be integrated with other water, waste and ecosystem streams within the city for a truly sustainable urban development strategy.

It is our conviction that the initial results can be used as a basis for further research in the field of bottom-up initiative value for sustainable urban development. In addition, while the case-study is focussed on Amsterdam only, it is imaginable that some of the proposed recommendations can be to a certain extent applied in other major cities as well, although we need to be careful in drawing that conclusion too easily. In any case, the need for more sustainable urban development is there and we should keep searching for better, more effective solutions towards a vital urban future.

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