

Innovation for Sustainable Development at local level: instruments and examples to get started



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To Prof. Klaus Rennings (in memoriam)

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Reading guide

This Guide emphasizes the [local dimension of innovation for sustainable development](#). Our claim is that local action is one of the essential responses to the global sustainability challenges such as climate change and biodiversity loss. Cities and local communities are to some extent responsible for these problems and should also be part of their solution.

Hence, this Guide is aimed at [local administrations and communities](#). Our target group includes local policy makers and practitioners, but also businesses and citizens interested in learning and contributing to sustainability through local innovation.

Given that there is not a single community unconcerned by sustainability challenges, the Guide has a [global outreach](#). Even if the manifestations of sustainability challenges are very different across regions, local administrations worldwide share similar responsibilities in terms of local governance.

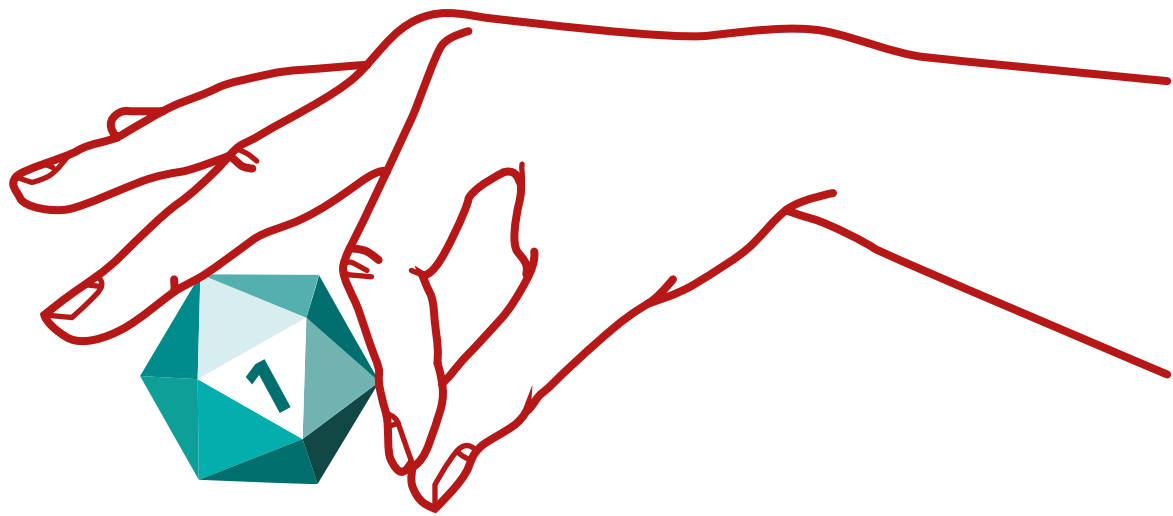
This Guide is an [introductory document](#). It is delivered as an entry-level text written in simple language that provides basic information on what innovation entails at the local level. This Guide can be used as a basis for further reading and documentation. The reader will find references to other tools, manuals and guides throughout the document.

This Guide as a [flexible document](#) that can be used by different people in different ways. It is not meant to be used as a procedural manual based on stage-based implementation mechanism and it is definitely not a prescriptive document either. The Guide builds on open interpretations of the concepts and policies discussed.

The Guide builds on a collection of [illustrative examples](#). We gather and analyze innovative approaches for sustainable development at the local level, making such innovations more accessible to other local administrations. Certainly, we are not expecting that such examples can be seamlessly transferred to other areas without prior adaptation. Some of the examples would not even make sense if applied in different

contexts to those where they were originally developed. Still, we are convinced that all the practical examples compiled in this Guide have a learning component that can inspire other communities to develop their own solutions.

In terms of structure, the Guide is divided in [four sections](#). Section 1 introduces a few conceptual definitions that will allow safer and more pleasant navigation throughout the remaining chapters. Section 2 delivers short descriptions of the essential policy areas and informs on how innovation for sustainable development is being materialized at the local level. Section 3 links theory and practice through a summary matrix that defines and categorizes different innovations and best practices through practical examples from different cities. Section 4 includes a collection of additional guiding documentation that can be useful for the design of innovative local policies for sustainable development.



Introduction

Cities already shelter more than a half of world's population and will absorb virtually all population growth over next decades. This means that 2.5 additional billion people will be added-up to the world's urban population by 2050 (UN, 2018b). Urban areas occupy just 3% of the planet's land but account for 60-80% of all energy consumption and 75% of the planet's carbon emissions (UN, 2019).

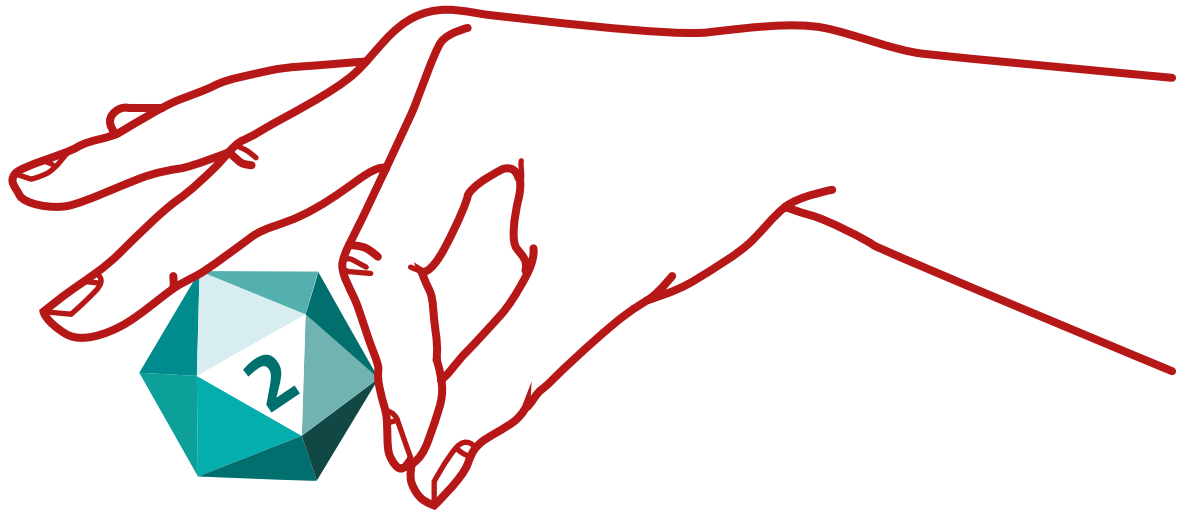
These pressures exert impacts at regional and global scale and need responses at the local level. Local communities around the world are confronted to a number of social, environmental and economic challenges of similar matrix. For instance, rapid urbanization is putting pressure on fresh water supplies, sewage, the living environment and public health. Most cities, particularly larger urban areas, are experiencing congestion, a lack of basic services, a shortage of adequate housing, and declining accessibility to basic infrastructures.

Albeit the intensity of these problems varies between areas, most local administrations have comparable administrative structures and manage limited resources to design and apply solutions to the various challenges faced by local communities. Business as usual simply is not an option anymore. Local administrations need to find innovative ways to deliver on urban sustainability goals.

Sustainable innovations allow cities to explore alternative or complementary solutions to existing problems and also prepare for future challenges. Still, innovation for sustainable development does not necessarily consist in inventing totally new ways of dealing with existing problems. It can also be about learning from others and adapting the solutions developed elsewhere to their own contexts. And it certainly is about opening the innovation processes up to the local communities.

For this, local policy makers and stakeholders need guidance to identify, design and implement purposeful innovations. Local communities need support to understand the relevance of innovation for sustainable development to address their own challenges, as well as to design, plan and implement the necessary policies

and interventions aimed at supporting innovation processes. We hope that this Guide can make a relevant contribution to this aim.



The basics of innovation for sustainable development

This section presents an overview of the main concepts and definitions surrounding the idea of innovation for sustainable development as a necessary step towards the interpretation of the policy areas, practices and innovation determinants presented in the practical sections of the document.

2.1. Key concepts and definitions

The notion of Innovation for sustainable development is a somehow elusive concept. The reason is that the concept results from a combination of two expressions – innovation and sustainable development – that are not simply defined themselves. Both concepts are more easily perceived than understood and operationalized. In this Guide we will refrain from adding-up to the endless policy and academic debates around their exact meaning and adopt widely accepted and mainstreamed definitions based on state-of-the-art policy documents (see Text Box 1).

The definitions presented in Text Box 1 are the building blocks used to characterize **innovation for sustainable development**. This concept may be defined as *any form of innovation that leads to a sustained and harmonic improvement of the environmental, social and/or economic conditions of a given community*. Our definition emphasizes three key features of the notion of innovation for sustainable development:

The first one is that, like any other form of innovation, those aimed at sustainable development also require **change**. Innovation for sustainable development entails some sort of modification in the way things are done, assets are organized, resources are consumed, or people behave. In all these situations change should be assessed in relation to the previous and proximate circumstances of local communities rather than to remote or distant references or benchmark situations. Innovation may be an iterative process that can impact

Text Box 1: Some definitions

According to the Oslo Manual, “an innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations” (OECD & Eurostat, 2005).

In the Maastricht Manual for Measuring Eco-Innovation for a Green Economy, which is one of the key outputs of our GREEN.EU project and the Inno4sd network over its initial years of existence, eco-innovation is defined as “a new or improved product or practice of a unit that generates lower environmental impacts, compared to the unit’s previous products or practices, and that has been made available to potential users or brought into use by the unit” (Kemp et al., 2018).

(Eco) innovations are traditionally classified into five broad categories of market-oriented developments, including product, process and organizational forms of (eco)innovation, plus marketing and business model (eco)innovations. Among the non-commercial forms of (eco) innovation, the literature usually differentiates between social and systemic transformations.

Following the standard definition by the United Nations, sustainable development is a form of development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It is widely accepted that sustainable development can only be achieved if its core elements, namely economic growth, social inclusion and environmental protection, are harmonized. These tightly interconnected elements of sustainable development all are crucial for the well-being of individuals and societies (UN, 2018a).

local communities in different ways, showing various degrees of transformation capacity depending on the frequency and intensity of the changes that are experienced.

The second one is that innovation for sustainable development implies a *beneficial impact*. This means that these forms of innovation lead to a measurable improvement in the social, economic and/or environmental conditions in which local communities evolve. Ideally, positive progress may be simultaneously experienced on all the sustainability spheres, namely the environment, society and economy. However, occasionally enhancements may only affect one dimension, or on two of them but not the third one. Still, genuine forms of innovation for sustainable development may never compromise or weaken any of the sustainability spheres. Innovation for sustainable development can never act a burden-shifting mechanism. Improvements in one dimension cannot be achieved at the expenses of any of the remaining sustainability pillars.

The third feature implicit in the definition above, and perhaps the most important one in this framework, is that innovations for sustainable development are extremely *context-specific*. This ultimately implies that such innovations can have very different manifestations depending on when, where and how they are applied:

- In terms of *novelty*: even if innovation for sustainable development involves new ways of doing things in one specific context, such processes do not need to be absolutely new to the world. In certain situations, innovation for sustainable development may materialize as totally new solutions or technologies, whereas in other contexts innovations can build on already established approaches that are simply transferred – with or without previous adaptation – to a different setting, be it spatial, temporal or functional.
- In terms of *disruption capacity*: innovations for sustainable development may consist on gradual improvements or slight alterations of existing ways

of doing things – incremental innovation –, or rest on deep and abrupt reconfigurations of social systems, leading to previously unexplored development trajectories – disruptive innovation.

- In terms of *technological load and physical expression*: Sometimes, comparable outcomes can be reached by investing on hard technologies and infrastructures, like for example autonomous electric vehicles or new recycling infrastructures, or on softer and socially-driven solutions, like informal car-sharing or participatory collection and separation practices.
- In terms of *leading actors and motivations*: innovation for sustainable development is not only promoted by private and public institutions, such as firms and governments seeking to increase competitiveness or address sustainability challenges, but also by social groups and networks of people that may be motivated by issues that have little connection to sustainability challenges.
- In terms of *planning and formalization mechanisms*: many innovations require thorough planning, in particular those forms of innovation that base on harder technological solutions. These need to be designed, developed, incubated and tested over long periods of time before they can be finally adopted by vast communities of practice. But innovation for sustainable development can also materialize as spontaneous responses to ad-hoc problems without any ambition to become mainstream approaches – but sometimes having massive impacts on local communities –, like various forms of frugal innovations.
- In terms of *adoption speed*: occasionally, innovation for sustainable development have very short diffusion and adoption periods, whereas other times innovation take a much longer time to diffuse. Diffusion speed may be challenged by various factors, ranging from cost factors to vested interests, as well as by cultural motivations.

■ In terms of **diffusion processes**: traditionally, technology-based innovations are first adopted by the most advanced organizations and societies and subsequently transferred to others. But this is not always the situation. The expression reverse innovation was coined by Immelt et al. in 2009 to refer to innovations that are first adopted in deprived areas and are then transferred to developed economies. The fact that this concept was developed in the business literature is no surprise, if considered that many of the technologies and innovations developed in developing countries are frequently more cost-efficient than the equivalent solutions developed in the more developed countries.

One important aspect implicit on the previous characterization is that there are many different approaches and possible ways of innovating for sustainable development. Whilst in general the traditional literature on innovation economics had previously put the focus on technology developments and firm-driven innovation, recently more flexible forms, processes and approaches on innovation have attracted increasing attention by academics and practitioners alike.

All these aspects emphasize a conceptualization of innovation for sustainable development that goes well beyond standard, institutionalized, technology and market-centered visions, to broaden the scope of innovation for sustainable development to alternative forms of innovation that are driven by social action and community engagement. This broader conceptualization is the one advocated in this Guide.

If anything, all the above aspects emphasize the diversity and potential complexity of local innovation processes, which are enabled by a combination of mutually-dependent factors. Quite often, innovations for sustainable development can only be materialized when they are part of a broader systemic change, as the one advocated by the Sustainable Development Goals (see Text Box 2). In this sense, innovative technologies, products and organizational practices can become sustainable

only when they are part of larger socio-economic shift towards sustainable future ([see Inno4SD Policy Outlook no. 1 - Why Should Public Policy Support Transformative Eco-innovation?](#)).

2.2. Innovation for sustainable development: policy instruments and enabling factors

This section provides an overview of some of the most established policy instruments available at the local level to support innovation process and shed light on their key enablers. Subsequently, this section provides a brief introduction to the semi-institutionalized and community-led alternatives endorsed in the last few years by the literature of innovation for sustainable development. The goal is not to promote any approach in relation to other, but simply to illustrate the variety of instruments that are currently available to advance in sustainable development through local innovation.

2.2.1. Some policy instruments available to promote innovation for sustainable development at the local level

This Paragraph provides an overview of the most traditional instruments or approaches for policy innovation.

Economic instruments: public administrations, including local but also federal/regional authorities, can utilize a number of economic-based instruments for stimulating innovation for sustainable development. Public authorities can mobilize vast resources and re-configure their own **direct expenditure** for sustainable innovation. For example, using the purchasing power of regional and municipal governments via public procurement, local administrations may foster growth and competitiveness of more sustainable products, business models and organizations, acting as a launching customer to stimulate the market for technological and social innovations. Similarly, public authorities can also contribute to ensure a sustainable and fair access to resources.

Box. WBCSD Vision 2050

The Sustainable Development Goals (SDGs) are a set of 17 goals and 169 targets that were adopted on 25 September 2015 at the United Nations Sustainable Development Summit. The SDGs were jointly defined and developed among UN Member States, local authorities, civil society, the private sector, and other stakeholders over a long consultation period, building on the Rio+20 outcomes and the Millennium Development Goals.



The SDGs are universal, meaning they apply to every country in the world. Local and regional governments played an important role in influencing the definition of the SDGs, successfully campaigning for a stand-alone goal on Sustainable Cities and Human Settlements (SDG 11), and for international recognition of the pivotal role of local and regional government in sustainable development.

Besides direct expenditure, public authorities may also mobilize a variety of **indirect economic levers** to help companies, in particular SMEs, overcome capital cost barriers to sustainability improvements. These include tools like:

- **Financial incentives** to shift consumer preference and promote socially and environmentally-responsible consumption, and sustainable investments and innovations among firms;
- **User fees and user taxes** as mechanisms for recovery of the costs that local governments pay for providing infrastructure and services (like utility on-bill financing, property tax-assessed financing, revolving funds, etc.);

- Limited exemptions and relaxation of **standards and rules** (for example relating to development limits or taxes owing) to achieve specific sustainability goals.

Access to financing is one among the key factors underpinning innovation for sustainable development in the private sector, particularly among smaller companies. Access to financing may for example allow firms to overcome the so-called 'Valley of Death' of innovation processes, which refers to challenging process of bringing new innovations to the market. But access to financing may also allow social enterprises and other organizations to introduce social-oriented innovations. Local administrations may contribute to increase access to **financial support instruments** like, for example:

- Support **private financing**, including specific regulations providing a solid legal basis for financial instruments geared towards sustainable investments;
- Deploy **innovative financing instruments** such as micro-financing, project financing, corporate debt, development finance, etc.
- Increase access to **development cooperation** assistance, which in some regions can significantly strengthen the enabling environment for private investment for sustainable technologies and business practices;

Alternative financial instruments, such as **crowdfunding**, are becoming increasingly popular as complementary to traditional and more established forms of funding, such as micro-credit and venture capital. These innovative forms of accessing to funding render also a side benefit to the traditional bank and capital market, which are the preferred channel when businesses become gradually successful.

Whereas innovative forms of financial support can boost green transformations at an early stage of innovation projects, a more supportive enabling framework within the 'traditional' global and national capital markets is still central to mainstream sustainable investments. This is the main reason why local administrations should also push for resources and reforms adopted at the upper governance levels – national and supra-national –. These may for example include:

- The definition of **fair taxation** mechanisms that ensure the price of goods and services reflect their social and environmental value;
- The implementation of **subsidy reforms** aiming at the enablement of green and social transformations, including the phasing-out of fossil fuel subsidies and harmful agriculture subsidies;
- The provision of well-designed **financial regulations** providing better access to financial and banking services by socially and environmentally-responsible firms.

Regulatory instruments: local administrations can introduce innovative policy reforms aimed at sustainable innovation within their own areas of competence and administrative structures. A good combination of policies and laws is also necessary to level the playing field for sustainable innovation in the private sector and amend potential market failures.

Portfolios of measures to address near-term sustainable development challenges and longer-term sustainable goals can be designed. Such portfolios may enable a **supportive regulatory environment** for sustainable entrepreneurship and innovation, including measures such as the protection of intellectual property, the designation of 'free zones' for responsible investment, which can be an effective way to neutralize local barriers to entrepreneurship, or the provision of proper supervision and enforcement of existing environmental and social normative.

Knowledge, education and skill development: knowledge and education are critical enablers of innovation for sustainable development. This holds both for the external workforce as well as for in-house staff within the public administration. The availability of internal knowledge, skills and expertise determine the innovation capacity of organizations of any kind. In-house staff within local administrations should be capable of understanding and monitoring innovation processes with limited and supervised use of external expertise. This holds also for top decision makers.

Internal expertise can be assured through **transparent and fit-to-purpose hiring procedures**. In parallel, the implementation of stable **training and capacity-building schemes** aimed at the upskilling of the workforce is key to retain the innovation capacity within public administration and businesses alike.

Beyond single organizations, education is also a powerful tool to alleviate poverty, fight inequalities and enhance environmental consciousness. This requires education systems that create the skills required for sustainable innovations to flourish. But standard education systems can also be complemen-

ted by novel forms of education based on open schemes that gather, share and create knowledge through active participation and mutual learning processes.

Awareness, engagement and participation: local community members, including administrations, businesses, non-profits and citizens need to be encouraged to work together and engage in sustainability transformations. For this is also crucial that behavioral change is promoted, so that new sustainable habits can be endorsed by all actors. All this is only possible if awareness on the relevance of innovations for sustainable development among local communities is raised.

The level of **awareness** towards sustainable innovations and sustainable development goals depend on the existence of reliable and accurate information on the current challenges faced both within and outside local communities, as well as on the extent to which progress towards the predefined goals, such as the SDGs, is actually taking place and at what pace. In this respect, working to collect good quality data, to make information accessible and understandable to the general public and enable other organizations to use and share the data in open and innovative ways is one among the most relevant contributions that municipalities can make to increase awareness at the local level.

Similarly, local administrations could aim at increasing the **competence of customers**. These may play a role of demand-setters, but also get involved in the design and production phases of new innovations. In practice, lowering the information deficit on new technologies, and raising consumer awareness about the overall benefits of alternative solutions can increase demand and therefore be an important factor for the success of those business based on socially responsible and eco-innovative products and services.

All these actions should be complemented by effective **communication schemes** targeting sustainable challenges and actions. These should base on selected messages to be delivered in acces-

sible language and through the right channels, but without compromising the reliability and accuracy of the information.

2.2.2. Factors enabling policy innovation for sustainable development

As mentioned, innovation for sustainable development is a context-specific process. Frequently, it is supported by new or existing policies that are reformed in pursue of a given sustainable development goal. And, regardless of which is the demand and who is the leading actor, this process does not take place in an abstract policy and practice space but in the very specific contexts where local administrations operate.

Hence, like any other public intervention aimed at the local level, local policies for sustainable innovation have a number of requisites for successful implementation. When these conditions are met, they can yield very positive results. On the contrary, when innovations are introduced without taking into consideration local policy contexts, these are unlikely to be successful.

The list of factors that may hinder local policies for sustainable innovation is very extensive and varies between geographies and periods. Still, traditional determinants may fall in any of the six broad categories listed in Table 1, which are seen as the key factors affecting the implementation of policy innovations aimed at sustainable development.

Besides the relevance of the factors presented on Table 1, which are all critical for successful introduction of policy innovations, one additional issue is precisely the lack of awareness on all these factors. It is therefore crucial that local determinants are elicited and mapped prior to the introduction of any local policy innovation aimed at sustainable development, particularly in those situations where tolerance to failure is less acceptable, for example due to the sensitivity of the policy area in question and/or the lack of legitimization that it might bring about.

Table 1: Factors conditioning policy innovation

Factors	Description
Consistent policy design	<ul style="list-style-type: none"> ▪ Presence of stable, persistent, clear, unambiguous, coherent, cohesive, harmonic and consistent policy designs (for example through policy redundancy and alignment of policies and existing traditions).
Leadership, political will and commitment	<ul style="list-style-type: none"> ▪ Balance between political will and resistance within the administration, for example through the intervention of multiplicity of attitudes, motivations, beliefs, strength of enforcement rules and veto players at various governance levels. ▪ Prone-to-riskiness of policy agendas, which may be conditioned by excessive caution of politicians in supporting innovation as they carry responsibility for failure ▪ Communication issues such as media interest that can exaggerate failure in public services and the difficulties of achieving and conveying on unambiguous success.
Availability of resources, including knowledge and skills	<ul style="list-style-type: none"> ▪ Availability of staff, operational and/or financial resources, including legal and technical knowledge, skills and information. ▪ Access to guidance and capacity to assemble and absorb knowledge.
Organizational intelligence, management and coordination	<ul style="list-style-type: none"> ▪ Balanced distribution of competences between the different governance levels. ▪ Capacity to create complementarities between specialized public sector functions, overcoming potentially complex and/or insufficient implementation structures. ▪ Managerial practices (like potential outsourcing of project, organizational memory, etc.). ▪ Ability to establish relationships between the legal and technical approaches embedded in organizational structures and to learn from policy processes.
Social support, legitimization and participation	<ul style="list-style-type: none"> ▪ Capability to contribute to develop a shared understanding of the main challenges, participate in policy design and coordinate, complement and customize policies during the implementation phase. ▪ Recognition of local communities and their issues; acknowledgment of the needs of local communities. ▪ Capacity to build, lead and facilitate networks, engage with stakeholders, including public and private actors, and facilitate participation of all these stakeholders to build support and trust, find common ground, and broker exchanges to generate resources.
Existence of vested interests	<ul style="list-style-type: none"> ▪ Influence of 'power-mediated policy networks' and 'advocacy coalitions', which are nothing but actors holding similar interests and ideas who come together to argue for policy change against other loose coalitions.

Source: own elaboration based on literature review

2.3. Innovation for sustainable development: an overview of community-led and experimental governance approaches

So far, we have introduced a range of horizontal measures and approaches led by local administrations. Still, public administrations and businesses are not the only actors enabling sustainable innovation, whilst not all forms of innovation are market-driven. Nor should citizens be simply considered to be final consumers or absorbers of innovations. Local networks of citizens and non-business actors may be very active agents of innovation as well.

Local communities are integrated by a wide range of organizations and social movements representing a multiplicity of views and sensitivities that exercise strong influence on innovation and development choices. Many of those organizations may certainly contribute to the development of a range of innovations for sustainable development. Some of those groups may be even considered forms of innovation in themselves – think for example about the ‘repair cafes’, which are citizen-driven initiatives to enable the fixing of products at community level (Charter, 2018).

Similarly, most forms of **social innovation** are linked to bottom-up developments that are not necessarily formalized in innovation programs and projects. Some of them are actually spontaneous – or almost spontaneous – expressions of self-developed solutions for sustainable developments. Most of these forms of innovation can be grouped in any of the following categories:

- **Open innovation:** open innovation is a pretty established approach that rides on the idea that opening up innovation processes for knowledge and ideas from outside organizations – both private and public – helps them to cope with changing environmental conditions and to compete effectively in the market. The innovation process should not only be opened to external knowledge at the initial stages, but all stages should be open to the continual partici-

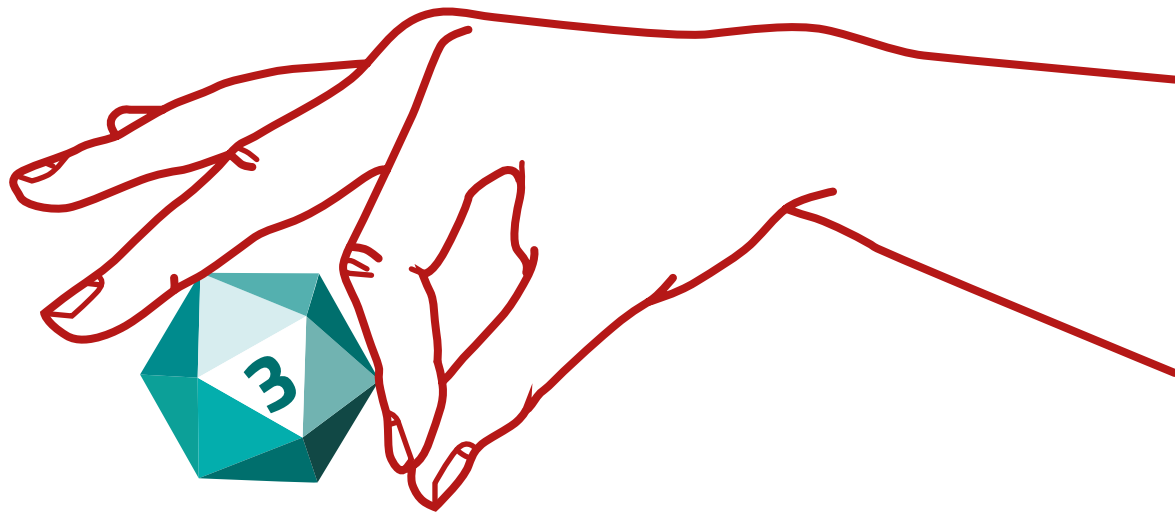
pation of internal and external stakeholders (Schwepker et al., 2015). The open innovation concept was one of the first steps towards the embracement of more participatory and cooperative frameworks including enlarged networks of organizations and other stakeholders in the innovation process.

- **Grassroot innovation:** according to Seyfang and Smith (2007), this form of innovation is shaped by networks of activists and organizations generating novel bottom-up solutions for sustainable development. In contrast to mainstream market-driven innovation – like traditional business greening –, grassroots initiatives operate in civil society arenas and involve committed activists experimenting with social innovations as well as using greener technologies. As a consequence, the solutions developed respond to the local situation and the interests and values of the communities involved.

- **Frugal innovation:** this is an innovation approach in which the needs of the citizens with very limited or no economic resources are satisfied by developing products and services that are appropriate, adaptable, affordable and accessible solutions, according to the circumstances of those same citizens (Basu et al., 2013). In this way, the growth delivered by frugal innovations is usually more inclusive, in the sense that it better satisfies the needs of the poor. From a financial perspective, frugal innovations are generally less expensive to develop and may themselves be good instruments to defeat poverty, particularly among the most deprived communities.

- **Experimental local governance:** this is an approach to local and urban innovation that emphasizes the role of the public sector – in the role of promoter, enabler or partner – in the multi-actor collaborations that characterize the approach (Kronsell & Mukhtar-Landgren, 2018). The best known expression of experimental urban governance are the **urban living labs**, which have been defined as a very diverse manifestations of collective urban governance and experimentation to address the sustainability challenges and opportunities created by urbanization (Voytenko et al., 2016).

By definition, all these approaches are highly transparent and participatory. They also tend to prioritize social and organizational responses to the sustainability challenges over technological solutions, and usually give more space to experimentation and testing compared to the more closed and institutionalized forms of innovation. Furthermore, the approaches are generally more centered on the needs of the individuals than on economic considerations. In this sense, their legitimization stems from an obvious sense of social purpose rather than from market or competitiveness motivations. All these characteristics bring these forms of innovation closer to local communities and to the areas of intervention of local administrations.



**Enabling sustainable innovation
at the local level**

3.1. The role of local innovation-towards sustainable development and the SDGs

As stated by Bulkeley (2003) when referring to the Local Agenda 21 programme, “local authorities construct, operate and maintain economic, social and environmental infrastructure, oversee planning processes, establish local environmental policies and regulations, and assist in implementing national and subnational environmental policies. As the level of governance closest to the people, they play a vital role in educating, mobilizing and responding to the public to promote sustainable development”. Time has not greatly modified Bulkeley’s statement. Local authorities have an even greater role to play in addressing sustainability challenges. As drivers of global change, cities and local communities have a tremendous responsibility to contribute to tackle major sustainability problems and progress towards the SDGs.

However, the situation today suggests that there is not yet a specific and clear mandate on how to contribute to SDGs from the local level. A structured governance framework empowering local governments is still needed. This may help local governments to act in more autonomous and efficient manner in compliance with national aims. SDG targets can only be met if harmonized and integrated solutions are provided through good governance across international, national, regional and local governments. In this sense, the SDGs may act as a structural element for multi-level governance.

As a response to expectations of local governments to contributing to the SDG agenda, in 2014 the UNDP, together with the global task force of local and regional governments and UN Habitat, developed the Localizing the SDGs platform. This platform is aimed at supporting local governments in transforming SDGs into concrete local policies and actions. The platform provides guidance on how to integrate SDGs in the planning processes and a forum to share good practices and lessons learned at local level. Related initiatives have developed more procedural guidance. A relevant contribution

has been issued recently by the Sustainable Development Solutions Network. This material provides a stage-based guide helping local administrations with the implementation of SDGs.

The guidance materials provided by these and other platforms (see Section 4) may help local governments define local frameworks to plan for the SDGs. Our Guide represents a complementary contribution to these efforts that highlights practical and instrumental examples of local innovations for sustainable development in nine specific **competence areas**, namely:

- Area zoning
- Building codes
- Transport planning
- Water and sanitation
- Waste management
- Energy and electricity
- Local economic promotion
- Community development
- Environment and climate

In the following pages the reader will find a number of illustrative examples on how local administrations are currently contributing to the global sustainability agenda through practical examples in each of the above policy areas. Innovations are classified in any of the following **categories**:

- Economic and market-based instruments
- Planning and regulatory instruments
- Research, training and skills
- Awareness, engagement and participation

Our hope is that such examples could inspire local action in understanding **why** local innovation is important for achieving SDGs, what local policies, strategies and actions could be more suitable in each **local** context and **how** should the good practices be adapted to maximize impact at the local level.

3.2. Key areas for local policy action

3.2.1. Area zoning

Overview

Area zoning, also called land use planning, physical planning or simply urban planning, is perhaps the most relevant policy area under direct control by local administrations. Most local authorities, particularly those in larger cities, have significant authority over area zoning policies and regulations.

Area zoning addresses two critical domains for urban futures, namely **urban forms** and functions. These two domains configure a continuum where the various approaches to this policy area can be positioned. Approaches range from those with an exclusive focus on physical planning – urban form –, to those carried forwards with a more strategic outlook, hence putting more emphasis on **urban functions**.

Regardless of the planning culture, **Master Plans** are the documents summarizing local planning approaches. These plans translate the broad, long-term strategies set out in other policy documents into spatially-explicit designs for physical implementation. As such, Master Plans are the documents providing the strategic framework for a city in the distant future, determining the physical uses of space that influence how citizens will live, communicate and move.

Potential contribution to sustainable development and SDGs

Area zoning is by definition a cross-cutting policy area that has very direct links to virtually all the remaining local policies and strategies. It has for example a direct influence on housing, water, sanitation, transport and energy planning, and it may also exercise an indirect influence on energy, environment and even local economic promotion and community development. Area zoning also limits

the impacts of natural disasters and enables a rational urban development, contributing to achieve a balanced territorial development at the upper territorial levels.

Consequently, area zoning can be identified as one of the key policy areas for local action when it comes to the implementation of SDG targets. Alongside Goal 11, this competence is key to deliver on those SDGs that are more directly connected to infrastructure provision at the local level, such as Goals 6, 7 and 9, as well as those that are related to environmental management and biodiversity conservation. The influence in this latter case is exerted through land and maritime spatial planning, respectively.

Most relevant SDGs in this policy area:



Innovation potential in this policy area

Current trends in sustainable urbanism advocate for mixed uses of space and buildings, increased compactness and densification to minimize environmental externalities, naturalization of urban infrastructures, more inclusive safe and resilient designs, as well as liveable and comfortable spaces. Pursuing these goals may require drastic reconfigurations of the functional and formal structures of the city and disruptive innovations in the planning processes. Still, given that area zoning is a very established policy area that relies on long-standing and highly standardized administrative procedures and protocols, innovation often implies slight – in-

cremental – modifications or improvements of such administrative procedures.

One ongoing generalized transformation of the planning processes is that it is becoming increasingly [participatory](#). This is materialized through the introduction of a number of participation tools and more inclusive approaches over the whole planning process. But innovation in this area can also show other expressions. For example, given that this area is tightly connected to other local policies, it has also witnessed transformations linked to hybridization and convergence with those other policies, leading to more synergic, [holistic or strategic](#) planning approaches.

In terms of [economic and market-based incentives](#), innovations may for example aim at achieving a more rational use of land, taxing vacant plots that could otherwise be developed. This is for instance the case of Melbourne's [Vacant Residential Land Tax](#). In terms of specific planning instruments, [Newton's Inclusionary Zoning ordinance](#) that aims at leveraging private development for the creation of affordable housing to low income households, is a good example of established and effective inclusionary instruments that can be transferred to other settings with relative ease.

In terms of [planning and regulatory instruments](#), innovative examples showcase very different planning cultures and tactics. For example, [Singapore's long-term planning process](#) aims at strategic urban development in a context of severe resource scarcity and land limitations. This long-term planning approach is helping Singapore to become one of the leading sustainable champions in urban planning. [Medellin's urban regeneration plan](#) based on infrastructure for social integration is a very good example of how a city can be cohesively transformed in the light of sustainability challenges.

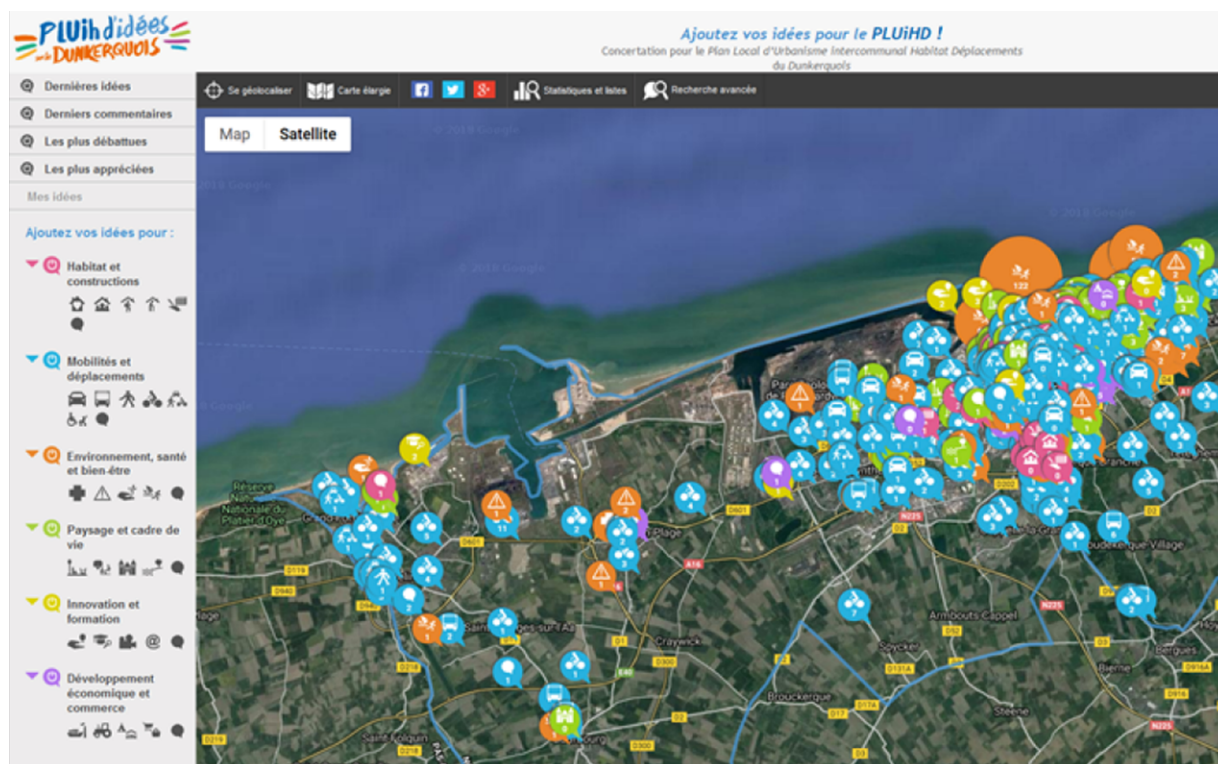
Traditional planning has witnessed increasing openness to citizen involvement and participation. Different spatial planning approaches, solutions and tools have been developed for that purpose by planners in different cities. [Participatory](#)

[mapping](#) is a good example of one successful participatory tool supporting conventional urban planning processes. By making use of this tool, citizens have the chance to propose urban interventions and vote for the best proposals from other citizens. For example, in November 2018, the [city of Dunkerque](#) in France had an on-going participation process facilitated by an IT participation tool (see Figure 1).

On a different level, [community-led approaches](#) combine public participation, the principles of flexible urban planning, and IT tools to plan design and manage public spaces. Placemaking is one of such approaches. Its main goal is to create livable public spaces that promote people's health, happiness, and wellbeing. But, contrary to standard planning, it does so by adopting a bottom-up approach, based on local communities' involvement, capacities and potentials. [Placemaking](#) can be combined with other community innovation approaches, such as crowdfunding. The [Renew Hempstead initiative](#) in New Hempstead (NY), USA, is a community-driven project to ensure that the future of the Village of Hempstead downtown is vibrant, inspiring and representative of its people's aspirations. The initiative is based in the [crowdsourced placemaking](#) approach, which ensures that local developments are funded by a committed community. Under this approach, projects for future developments are funded in the form of an open call answered by communities instead of traditional developers or government entities.

In practical terms, most community-led initiatives seek to give a complementary or alternative new use to urban spaces. New uses can be conceived as temporal or definitive solutions. [Tactical urbanism](#) falls in the first category. This form of alternative bottom-up urbanism aims at temporal transformations of public space – a compilation of good examples is available from [the CSMP Group](#) –. Many of these projects are founded using crowdsourcing methods. [SpaceHive](#) is an initiative that crowdfunds local urban projects in the UK.

Figure 1: Snapshot of the GIS-based participatory tool of the City of Dunkerque. Accessed 2018-12-05



Innovation in urban research [training and skills](#) development has an expression on university programs for innovative urban design – a good example being the training initiatives by the [Centre for Urban Design and Innovation at the University of Nairobi](#) –, as well as on innovative demonstration projects where cities explore, test and show-case their most innovative planning projects – such as Boston’s [New Urban Mechanics](#) initiative.

Main innovation enablers in this policy area

Area zoning does not generally require substantial economic resources to be implemented. Planning is essentially materialized as a set of documents and tools that can be produced with limited financial resources. Hence, the administrative obligations can be afforded by most local authorities, even by the smaller ones.

Still, area zoning is a knowledge-intensive policy area. It requires technical knowledge from different backgrounds and it also requires knowledge integration for effective implementation. Hence, the main enablers for innovation in this area are those related to the availability knowledge within the administration itself. Additionally, as any other policy area that ends up in long-term planning, political commitment, stability and vision are also a must for effective implementation.

When it comes to enabling open and participatory schemes, the right mindset is needed within the administrations, but this needs to be coupled with a supportive approach among the local population. Sometimes, participation is difficult to activate and requires long-term commitment by public authorities.

Key challenges in this policy area

The main challenges for this policy area vary according to the type of approach. Given the longer-application periods of the most conventional approaches, any innovation introduced needs to prove enough flexibility and legitimization, two features that are difficult to achieve with standard approaches. On their side, community-led approaches seem to struggle with the formalization of the new ideas and spatial designs, which are difficult to transfer to other contexts.

3.2.2. Building codes

Overview

The residential sector is one of the major contributors to climate change at the global level. Buildings account for at least 6 per cent of global emissions of greenhouse gases². On average, the residential sector is responsible for 15 to 40 per cent of total GHG emissions within individual cities. Hence, acting on the energy efficiency of buildings can have a major influence on global sustainability pathways. Additionally, sensitive, smart and friendly housing designs can also have a very positive impact on human physical and mental health and may contribute to increase the liveability of cities. Local administrations across the globe share comparable responsibilities for the definition of building codes and building standards in most countries, within the limitations set by national technical regulations.

Potential contribution to sustainable development and SDGs

Millions of people over the world are excluded from the property market due to low income, limited access to financing and high property prices. As a result, informal settlements proliferate in external or inner peripheries of many urban agglomerations. Most of these areas lack the basic infrastructures and services, leading to health and sanitary problems, safety issues and environmental damage.

From a social perspective, informal settlements often create ghettos where social promotion is virtually impossible. This creates poverty traps from which it is very difficult to escape. Hence, building codes may pay a very relevant contribution to alleviate both the direct and indirect effects of housing problems. Building coding policies have a direct impact on SDGs 1, 6, 9, 11 and 13. Other SDGs such as SDGs 3 and 7 are also indirectly affected as well.

Relevant SDGs in this policy area:



Innovation potential in this policy area

Defining safe and affordable housing schemes has traditionally been one of the most relevant responsibilities that are partially or totally in the hands of local administrations. Housing is key to ensure decent living standards for the population, granting communities access to basic services such as sanitation and clean water. But housing codes, together with urban planning, can also support community development through the provision of more liveable and secure housing designs. These are usually combined in the form of *integrated housing and planning* projects. The City of Cape Town, for example, has joined forces with the Swiss-based architecture research studio [Urban Think Tank](#) and [Ikhayalami](#), a local NGO, to set up an innovative housing project in the Khayeltisha area, one of Cape Town's largest townships. The project goes beyond traditional housing projects to deploy a multi-level intervention program that encompasses micro-financing, renewable energy, water management

and skills development. This integrated housing and planning approach allows more efficient land use, promotes spatial integration and social participation, ensures financial security of local communities and guarantees all residents the right to remain in the area. Similar partnerships have rendered positive outcomes in other cities as well. The [casas melhoradas](#) project in Maputo, Mozambique, is one relevant example.

Beyond integrated housing projects, local administrations can drive new housing developments and refurbishment projects towards increased material and energy efficiency. A number of innovative [economic instruments](#) can support this goal. Municipalities can for example provide financial support for the renovation of the housing stock. The [Retrofit Chicago Plan](#) by the Municipality of Chicago, in the United States, is a comprehensive scheme to increase energy efficiency in the housing sector, in commercial, residential and municipal

buildings. The plan provides households with easy access to free energy-saving products and installation, rebates for energy efficient appliances and other products, financing tools such as income qualifying grants for bungalow and vintage homeowners, energy savers loans, and on-bill financing, among other advantages. The Retrofit Chicago Plan also supports commercial buildings the chance to join the [Energy Challenge](#) scheme. Participants to Energy Challenge commit to reduce energy use by at least 20% within five years of joining the program, track and share energy efficiency progress and serve as ambassadors to other buildings interested in saving energy.

As part of their administrative duties, cities regularly design and update [regulations](#) defining [building and construction codes](#). Examples of innovative reforms include the introduction of obligatory certification schemes focused on building energy efficiency, the definition of regulations based on innovative efficiency-driven strategies and measu

Figure 2 Empowershack social housing project in Khayelitsha, Cape Town, South Africa. Photo: ETHZ UTT



res, such as those based on nature-based solutions, and the definition of new regulations for the reduction and reutilization of construction and demolition waste. This can be illustrated by the pioneering normative work done by [Mexico City](#) in the field of energy efficiency in the housing sector. A [specific norm](#), dating back to 2008, establishes the technical specifications for the installation of green roofs and renaturing projects in the city. The norm covers all the technical parameters and requirements to ensure correct operation of the infrastructure in order to satisfy the desired energy efficiency goals.

In the [City of Seattle \(WA\)](#), USA, local government and public utility operators are working together to increase recycling and recovery rates of secondary construction and demolition materials. From 2014 onwards each construction project with a work area greater than 750 square feet is requested to submit a [Waste Diversion Plan](#) disclosing what “waste” materials are likely to be produced, which facilities will manage banned materials appropriately, who is going to take them there and, for works including demolitions, which of the materials identified in the plan are potentially re-usable. This initiative is part of an integrated [Zero Emissions Building Plan](#) that covers different policy areas and strategies to curb emissions from the building sector.

Municipalities can also develop, support and engage in specific [training schemes](#) focused on in-house practitioners and private developers. Programs can be developed by municipalities themselves or rely on existing resources. [ICLEI Africa](#), for example, provides [detailed green building training pack](#) for municipalities and developers. Training on new building standards and certification schemes, like the [International Green Construction Code](#) and [LEED building standards](#), is particularly important to avoid barriers on green innovations.

Local administrations may also develop [communication tools](#) to persuade local communities and developers on the benefits of green buildings.

For example, [EDGE Buildings](#), the certifying body of IFC, part of the World Bank Group, has developed a [tool](#) to help to determine the most cost-effective options for designing green buildings within a local climate context. The EDGE App can be used for buildings of all vintages, including new construction, existing buildings and major retrofits. The [repower map tool](#) is a non-profit initiative to promote renewable energies and energy efficiency by making visible real-world examples and related local information across Europe. Training and communication initiatives may be combined and delivered from a centralized repository. For example, the Environment Department of the [City of San Francisco \(CA\)](#), USA, maintains a [web platform](#) providing comprehensive information on green building practices, including basic information, legal considerations, financial support, etc.

[Community-led initiatives](#) in this policy area generally focus on sustainable and alternative building solutions ranging from cooperative developments to the use of [alternative designs and materials](#). Many of these innovations have been subsequently mainstreamed to local policies. For example, the principles of the [tiny house movement](#) have inspired many local administrations over the world to ease access to housing. The [Community First Village!](#) In [Austin \(TX\)](#), USA, builds on these principles to deliver affordable, permanent housing and a supportive community for men and women coming out of chronic homelessness. Similar principles have inspired several [Dutch cities](#), challenged by rocketing property prices. Here, [temporary housing schemes](#) have been proposed as an answer to the housing crisis. For instance, the housing association of [Nijkerk](#) has recently completed a complex of [28 tiny houses](#) that provides locals with a temporal access to housing at reasonable prices.

Figure 3: Tiny houses installed in Nijkerk, The Netherlands. Image: Woningstichting Nijkerk (WSN)



Main innovation enablers in this policy area

More than in any other policy area, building codes are fundamental enablers for community development. Housing not only provides local communities with adequate shelter, but also creates the necessary conditions to fulfil other basic needs like access to sanitation and personal development. Moreover, this policy area is also responsible for the creation of safe and liveable spaces for community interaction. This is absolute condition for community development, which in turn is a key enabler for sustainable innovations. This is a positive reinforcing loop that local policies should aim to facilitate.

Key challenges in this policy area

A key challenge in this policy area is the lack of market drive for green solutions. There is an extended and wrong perception that green housing solutions are more expensive than traditional alter-

natives. Even if sometimes upfront costs are higher, total cost of ownership, which also include maintenance and energy costs, is generally lower. This misperception is something local administrations could contribute to address by making use of innovative financing support and communication tools.

Building codes themselves can be a major obstacle to disruptive innovations. This is because building codes tend to be very specific about the materials and construction techniques to be used in development projects. As a result, they can obstruct the introduction of innovative housing solutions or the utilization of fully natural materials, especially if there is anything experimental about the design concept or building technology⁴. Innovation capacity is limited by the very strict parameters that regulate every component of the building, from the foundations to the roof. Excessively rigid building codes are just an illustrative example of how a compliance-oriented and conservative approaches can block sustainable innovations. This is a self-imposed limitation that local administrations should absolutely try to avoid.

3.2.3. Transport planning

Overview

According to the City Survey developed by the LSE's Going Green initiative, 63% of all policy tools used for urban mobility are implemented by city governments. Hence, local governments have tremendous potential to contribute to this goal, considering the number of policy instruments within their areas of competence. These include road safety, cycle and walking paths (i.e. Belo Horizonte's Urban Mobility Plan (PlanMob-BH)), density promotion, Bus Rapid Transit schemes - BRT (e.g. BRT of Porto Alegre, Dhaka) traffic-free zones, 'car-free days', congestion-pricing schemes, and shared-mobility platforms (i.e. free floating electric car sharing Copenhagen, Madrid). These initiatives reduce reliance on private transport and address urban pollution alongside 'nationwide' measures such as fuel taxes and enhanced rail infrastructure.

As support instruments for local authorities are the so called Sustainable Urban Mobility Plans (SUMPs). These are support instruments for local authorities that provide a clear framework for implementation of sustainable urban transport systems. SUMPs are yet not developed systematically across the globe. The EU has actively promoted this concept since several years, i.e. with the development of guidelines. Other countries around the world, like Brazil, have given this instrument high value at national scale for empowering local governments to take action. The instrument provides local authorities with a clear framework for the development and implementation of such plans. Brazil has made urban mobility plans a precondition for cities for receiving transport infrastructure financing⁵. In the EU context, it is up to Member States to promote those practices at national level and to ensure the right legislative and support conditions for their local authorities are provided.

Figure 4: Bus Rapid Transit system in Bogotá, Colombia. Photo: Alcaldía Mayor de Bogotá



Potential contribution to sustainable development and SDGs

The transport relevance of the SDGs and their targets can be both direct and indirect. Transport stimulates economic and social development, ensures accessibility to opportunities but is also associated with a number of direct and indirect externalities such as traffic congestion, air pollution and road accidents. The 2030 Agenda for SDGs states that “sustainable transport systems, along with other policies that increase productive capacities, would build strong economic foundations for all countries (2030 Agenda, para 27⁶) Although sustainable transport is not represented by a standalone SDG in the 2030 Agenda, it is mainstreamed into many of the proposed SDGs. In a study published by the Partnership on Sustainable Low Carbon Transport (SLoCaT) in 2015, links between SDG targets and transport are identified. There, it is reported that 5 and respectively 7 SDG targets are directly or indirectly linked with the transport sector. The results of this study are shown in the figure below.

Relevant SDGS in this policy area:



Innovation potential in this policy area

It is estimated the potential for innovation in the transport sector is considerable. This innovation may happen at system level (i.e. boost transitions towards new forms of mobility, i.e. making bike sharing, car sharing and transport on demand systems more attractive and accessible, improve management, organization and logistics of transport), or at technical/applications' level (improved efficiency of thermic and electric transport, autonomous driving etc.). From a social perspective, innovation can improve the safety and affordability of transport options and can enhance transport accessibility for people with reduced mobility due to disability, age or other factors. From an environmental perspective, innovation offers new and enhanced opportunities for cleaner, more climate-friendly transport, emitting less pollution. And the economic drivers are clear: with more efficient transport technology and systems cutting down on waste and wait times, comes higher potential for economic growth. It is considered that to be effective, technological innovations will need to be embedded in broader sustainable transport policies that is another area in which innovation will be required.

Main innovation enablers in this policy area

Innovation in this area is enabled to a great extent by the collaboration between public and private entities. For innovation to happen it is critical that policy and investment frameworks adapt to the new reality of transport needs at the local level, and that decision makers work to integrate technological innovations into society in a strategic way, with long range vision and an emphasis on safety, equity and environmental sustainability. Innovation towards sustainable mobility may be supported by decision support tools for local governments, economic actors and the knowledge community. An interesting initiative in this sense is the Urban Mobility Innovation index UMii⁷ which provides a framework that assesses the maturity of a city's innovation ecosystem in urban mobility, using a collection of

indicators that capture multiple features of the innovation value chain.

Figure 5: An electric bus in charge at a stop in the city of Göteborg, Sweden. Photo: Electricity



Key challenges in this policy area

As for other key sectors, there is a need for the transport sector to translate overall sustainable goals into specific actions and targets for the sector. In order to monitor the impacts of transport policies, specific monitoring systems and indicators need to be developed. The development of a shared vision among relevant stakeholders would be necessary for this. In this sense, removing institutional barriers that impede coordination between land-use and transport policies is crucial. Land-use decisions are central to the ability of transport systems to enable accessibility (SDG 11.2) and contribute to the range of environmental, economic and social goals set by

the SDG framework. Thus, coordination between authorities in both sectors is key to advancing the Sustainable Development Agenda. Within the transport sector, a first step would be to move from policies that focus on increasing traffic and mobility to those that concentrate on creating accessibility⁸. This has been already experimented in some cities across the globe (i.e. [Belo Horizonte strategy for urban mobility](#)⁹, [Copenhagen free floating car sharing systems](#)¹⁰).

3.2.4. Water and sanitation

Overview

Huge progress has been made in the past 3 decades to provide people with safer water. As of 2010, over 6 billion of the world's population has access to improved drinking water sources, up from 4 billion in 1990. Despite these progresses, it is estimated over 1.1 billion individuals still lack access to a water from a clean, safe source, and over 2.6 billion people do not have access to toilets and other adequate sanitation facilities. This is a primary cause of water contamination and water-borne diseases¹¹. Citizen led initiatives as for example in India have given poor communities and especially women the possibility to have access to sanitation services (see Figure 6). UNICEF, with its [WASH programme \(Water Sanitation and Hygiene\)](#) supports actions in this area with specific dedication to SDG6 that seeks universal, sustainable, and equitable access to safe drinking water, sanitation and hygiene, as well as the elimination of open defecation by 2030.

With the increasing urbanisation these problems have been made even more burning and turned cities into virtual concentration hubs of nutrient and energy flows carried by water. Access to safe water and sanitation are essential for unlocking economic growth and productivity and provide significant leverage for existing investments in health and education. The demand of water for sanitation represents another major source of water consumption worldwide along with industry and agriculture. The spreading of modern flush toilets, connected to wastewater treatment plants (WWTP),

has solved severe health and environmental problems that densely populated communities have suffered for thousands of years.

Water resources are increasingly stressed in many geographical locations including Europe due to pressures from, e.g., rapidly growing populations, rising industrial and agricultural demand and a changing climate. Competing demands increases the risk of localized conflicts and may lead to increasingly difficult allocation decisions and limit the expansion of sectors critical to sustainable development. By 2050, global water demand is projected to increase by 55%, mainly from demands related to growing urbanization in developing countries¹². These countries account for 93% of urbanization globally, 40% of which is the expansion of slums. Mexico City, with the implementation of a rain water harvesting system has shown how to enhance water supply and address water needs in a densely populated and fast-growing urban area.

Figure 6: Toilets save lives. Photo: WaterAid



To help shine a light on how communities can overcome gender-blind sanitation provision, WaterAid, UNICEF and WSUP have produced [Female-friendly public and community toilets – a guide for planners and decision makers](#). Designed for those responsible for providing, building or maintaining these toilets the guide includes descriptions of practical features, supporting evidence and guidelines to ensure toilets are designed and adapted to be female-friendly.

By 2030, it is estimated the urban population in Africa and Asia will double¹³. Under these premises, cities will have to go further or dig deeper to access water or will have to depend on innovative solutions or advanced technologies to meet their water demands. Success experiences for implementing innovation for water supply around the globe are emerging. This is the case of the city of Windhoek in Namibia, the driest sub-saharan african country, largely depending on groundwater resources. The city optimized potable water reclamation from municipal sewage. The New Goreangab Water Reclamation Plant, completed in 2002, should help the city meet rising water demand due to an annual population growth of 5%.

Potential contribution to sustainable development and SDGs

Water and sanitation are specifically covered by SDG-6 Clean Water and Sanitation. The targets set under this SDG are the following:

- By 2030, achieve universal and equitable access to safe and affordable drinking water for all.
- By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations.
- By 2030, improve water quality by reducing pollution, eliminating dumping and minimising release of hazardous chemicals and materials, halving the proportion of untreated waste water and substantially increasing recycling and safe reuse globally.
- By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable with drawals and supply of fresh water to address water scarcity and substantially reduce the number of people suffering from water scarcity.
- By 2030, implement integrated water resources management at all levels, including through trans-boundary cooperation as appropriate.

- By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes.
- By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, waste water treatment, recycling and reuse technologies.
- Support and strengthen the participation of local communities in improving water and sanitation management.

Either directly and/or indirectly this policy area and SDG 6 is linked with all other SDGs and in particular to those that may have direct links with housing, energy, land, health, climate change and sectors directly depending and impact on water, i.e. agriculture/food and industry, that manifest through the water-energy-food-climate nexus.

Figure 7: Goreangab Water Reclamation Plant, Namibia



Relevant SDGs in this policy area:



Innovation potential in this policy area

From a technology perspective, the innovation potential is manifold, i.e. optimizing treatment, recycling and reusing (waste) water, including the recovery of useful materials such as proteins, organic matter and nutrients as the [city of eThekweni in South Africa](#) has done over the last years with a treatment process that has resulted in a new business opportunities for local stakeholders.

According to UNEP, each day, 900 million m³ of municipal wastewater and 9,5 million m³ of human excreta is generated globally. This waste

contains enough nutrients to replace 25% of the nitrogen currently used to fertilize agricultural land in the form of synthetic fertilizers, and 15% of the phosphorus, along with enough water to irrigate 15% of all the currently irrigated farmland in the world (some 40 million hectares). An example of decentralized wastewater excreta management and local greywater reuse in a peri-urban community is the one of [El Alto, Bolivia](#), where systems installed by the project collect and treat urine and faeces for resource recovery and agricultural reuse.

In the emerging context of a circular and more resource efficient economy, water, sanitation and waste water utilities – often in symbiosis with public and industrial consumers – have recently started to value residual water as a medium of valuable resources and to identify new roles for themselves in the circular economy. To varying degrees, water utilities in Europe and world wide have therefore started to take steps towards a new “sanitation paradigm” focused on increasing the local resource recovery and, e.g., the reutilisation of energy and nutrient contents of urban solid waste and waste water. China’s cities have also explored this route. [The example of Xian-gyang in Hubei’s province](#) shows how the combined efforts of public and private institutions can accelerate a system transition of sewage treatment.

In terms of *economic and market-based instruments*, pollution taxes have served as incentive for innovations to be implemented. Other instruments may consist in incentivising technology implementation that may improve current water management performances under specific public procurement schemes (e.g. high performance water sanitation technologies, improved processes with reduced water consumption, improved maintenance of piping systems to reduce leaks etc.).

Subsidies can be used to encourage service-providers to serve poor communities, or others that are not economically attractive. Traditionally, subsidies have been paid in advance, or at predictable intervals. However, an emerging subsidy model for service provision, *output-based aid (OBA)*, ties disbursement to outputs. The service providers need to pay costs up front, often through private-sector credit, giving them a strong incentive to perform.

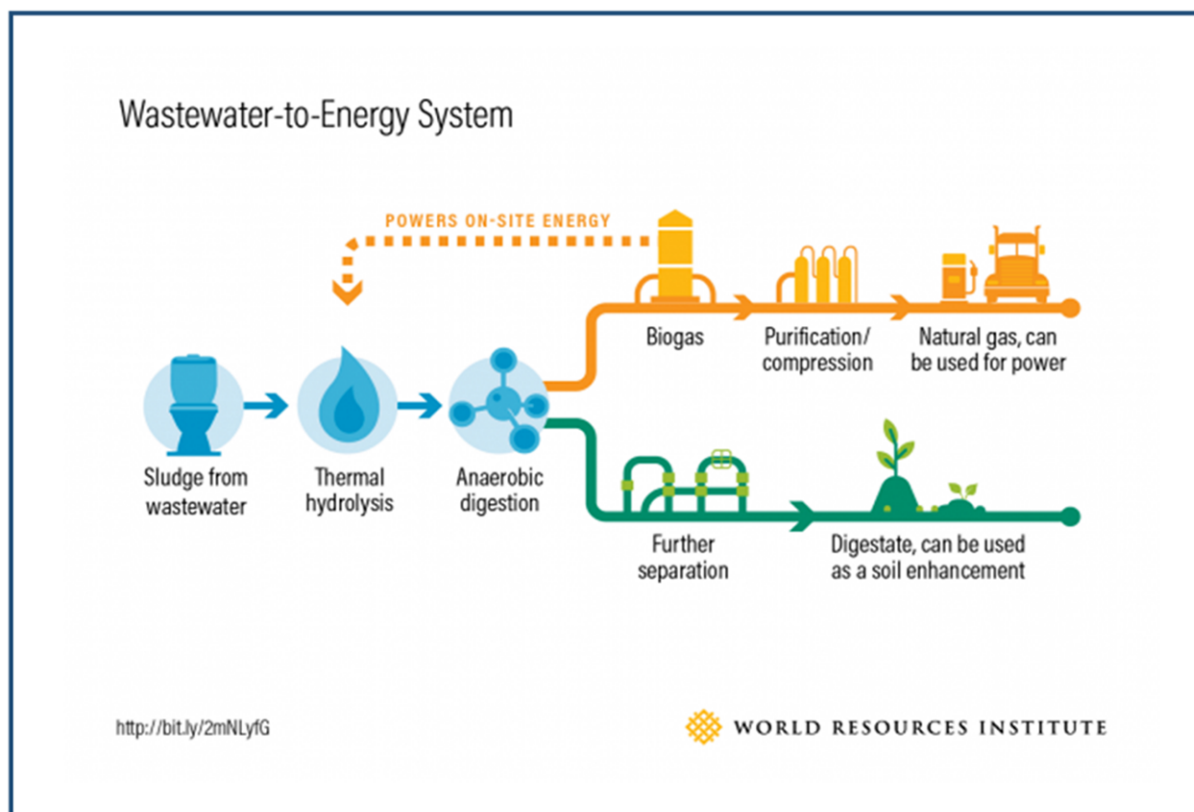
Examples of implementation of waster sanitation projects under OBA systems can be found here: <http://www.gpoba.org/what-we-do/sectors/water-and-sanitation>

Main innovation enablers in this policy area

Thanks to technological innovation for sustainable water and sanitation, major benefits for communities have been reached and economic resources been unlocked for economic growth and productivity. Beyond such progress and benefits, the World Bank has observed across developing countries that performance improvements in the sector have been achieved by reforming the sector's governance and institutional roles, to such extend that for example in Senegal reforms implemented achieved near-universal access (98 %) to safe water in urban areas.

Besides institutional and governance reforms, it is estimated that the unlocking of private funding in the sector is a major innovation enabler and booster for achieving SDGs in developing countries. Multiple instruments exist already¹⁴ and have potential to be implemented in the water sector as for example blending¹⁵ (i.e. strategic use of development finance and philanthropic funds to mobilize private capital flows to emerging and frontier markets, OECD). Such financial instrument has proven to be effective for unlocking private funding in developing countries to reach SDGs. An illustrative example of experimenting Scaling Up Blended Financing of Water and Sanitation Investments can be found in Kenya. However, blending has yet not been extensively implemented in the water and sanitation sector.

Figure 8: Xyangyang wastewater to energy system.
Source WEI



Key challenges in this policy area

Tools for cross-disciplinary and cross-sectoral collaboration and novel governance approaches towards co-developing business models linking the supply and demand side under urban water symbiosis initiatives are still lacking. This is likely to be a main barrier for a systemic transition towards a circular water economy in the area of municipal sewage treatment. This challenge has already been recognized by the European Commission and is currently being addressed in the work programme for 2016-2017 of Societal Challenge 5 through the topical call CIRC-02 -2016-2017: Water in the context of a circular economy.

At the international level, the International Water Association IWA highlights that the paradigmatic shift towards multifunctional symbiotic collaboration with other industries has been very slow and estimates this being a critical barrier in terms of turning waste water treatment plants into efficient engines for the circular economy. Hence, there is a great need for radical rethinking and 'rebranding' of Waste water Treatment Plants as multifunctional 'biorefineries', which provide raw materials, energy and water services, as opposed to the current situation where other than water treatment functions are generally regarded as mere by-products of public water treatment services (IWA, 2016)¹⁷.

3.2.5. Waste management

Overview

The amount of individual solid waste grows daily, accounting for a large portion of local government budgets. Poor solid waste collection and disposal results in uncontrolled dump sites and waste burning, negatively affecting public health. It also leads to polluted air and water.

Although recent changes in public attitudes and regulation increased recycling and reusing in most countries, substantial improvements are still necessary in this field. In some cases, the chal-

is not so much at the technological level but on the social / regulatory level. This can be exemplified by the Belo Horizonte example, in Brazil. Here substantial progress could be made through the implementation of its *Integrated Solid Waste Management (ISWM)* that recognised the crucial role waste pickers were playing in waste management. Their recognition, legitimization and constitution as cooperative enabled improving their overall productivity and helping to reach the city's environmental and socio-economic goals.

Adequate funding and sound solid waste planning (including adequate landfill sites planning) are key drivers to help cities improving the current state of solid waste management and save money at long term.

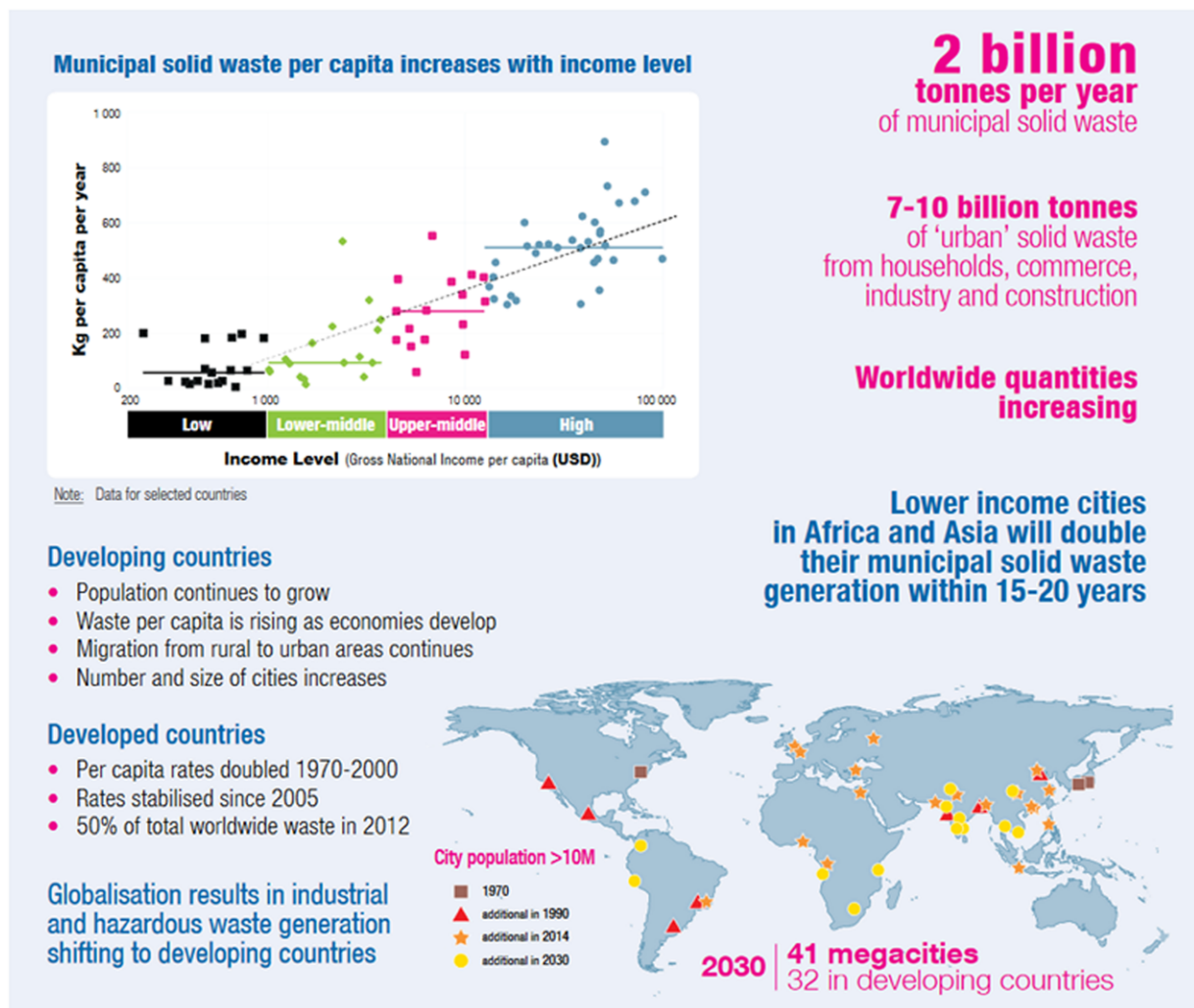
Potential contribution to sustainable development and SDGs

Municipal solid waste management (MSWM) is a crosscutting issue that touches on multiple aspects of society, the environment and the economy. MSWM is closely associated with the numerous development goals identified under the Sustainable Development Goals (SDGs), including healthy lives, sustainable cities, poverty reduction, food and resource security, consumption and production, decent work, and climate change (UNEP and ISWA, 2015¹⁸). Especially SDG 12 is closely linked with waste management. Under this SDG following specific targets are addressed:

- 12.3: by 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.
- 12.4: by 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment.

- 12.5: by 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse

Figure 9: The waste heap. Source: Global Waste Management Outlook UNEP/ISWA, 2015



Relevant SDGs in this policy area:



Innovation potential in this policy area

The formal waste management sector is estimated to employ 20 million people globally. The sector provides opportunities in science, technology and engineering, humanities, business studies and information technologies. The sector is a major contributor to economic growth.

As already sketched above, the innovation potentials in this policy area are manifold. They may e.g. refer to the technology sphere, with improved collection, disassembly, sorting, processing (i.e. crushing/milling and separation) systems and recycling. Digitalization of urban waste management systems is an emerging technology in different parts of the world (e.g. Rotterdam with the implementation of an innovative waste data analysis and route planning systems based on ICT). However, sustainable waste management also provides ideal opportunities to collaborate and work in partner-

ship, i.e. communities, businesses, governments and the international donor community also integrating innovative funding schemes. An illustration of the later can be taken from Nepal where Output-Based Aid for Municipal Solid Waste Management has been successfully implemented. Another example related to funding is the case of Bo-City in Sierra Leone which illustrates how international aid flows can efficiently be used to facilitate and support tailored local solutions for urban waste management¹⁹.

In recent years, the emergence of circular economy paradigm and associated policy agendas in line with sustainable development goals have given rise to alternative concepts of management, governance, collaborations (like public private partnerships, as illustrated by the city of Dhaka and its Decentralized Composting Approach). Other examples of innovative practices in the waste sector are urban mining, industrial symbiosis and innovation labs. These are conveying innovations in waste management practices with the clear objective of generating economic, social and environmental benefits. Emerging business opportunities, reduced environmental impacts, new governance models (e.g. community centered initiatives in Colombia), social benefits gained in pioneer countries may serve as inspiration for third countries (e.g. initial foresight in India) to embrace more systemic approaches on solid waste management as the sustainability benefits are tangible. In this sense, China has put cities at the heart of its national waste plan.

In the field of new business opportunities an interesting example is Cape Town and its industrial symbiosis model. The Western Cape Industrial Symbiosis Programme (WISP) is the first industrial symbiosis program in Africa. It connects companies so they can realize the benefits of exchanging underutilized or wasted resources. WISP contributes to the city's zero waste-to-landfill activities and through its enterprise development program, creates new businesses via an incubation program linking entrepreneurs to raw material supply agreements.

Figure 10: City volunteers as part of Bengaluru's innovative waste management strategy.
Photo: Sustainia 2017.



Main innovation enablers in this policy area

Certainly, legislation is one of the key enablers for the sector to develop. As a matter of fact, the waste industry essentially exists because of legislation; without it, waste would be dumped at the lowest cost. Without strong laws and regulations, together with their rigorous enforcement, legitimate businesses would be undermined by criminal operators, causing huge costs to society through health impacts, pollution and clean-up costs³. To assure enforcement of legislation adequate public institutions and governance structures are a must. A good example of enforcement is the city of Milan in Italy, which has achieved highest recycling rates in densely populated cities in Europe. Any innovation in the sector is estimated to be highly dependent on the willingness of citizens to collaborate, hence community centered initiatives are key enabler for innovative strategies to be implemented, be it for its operational feasibility as for its economic viability, an interesting example for this is located in Bengaluru (India), where a domestic waste segregation program driven by community volunteers was able to provide valuable resources for farmers. Seeking compliance with legislation, opportunity to

generate win-win-win contexts for institutions, service providers and citizen form the adequate environment for boosting innovation in the sector.

Waste management should be also incentivized through adequate economic instruments which may either have dissuasive or stimulating effect. Among such instruments are taxes (i.e. on landfilling), polluter pays principle, pay-as you throw, tax reduction on investments made in sustainable waste management systems, deposits. For instance, the city state of Singapore has introduced a pay as you throw system to reduce its waste and greenhouse gas emissions.

Key challenges in this policy area

In many parts of the world, key challenges in this policy area are still linked with the urgent need to deal with open dumping of waste. Such practices still cause serious health problems due to air, water and food contamination, leading to spreading of infectious disease and poisoning- For example, uncollected solid waste clogs may drain and cause flooding and subsequent spread of waterborne diseases.

The modernization challenge that low and middle-income country cities are facing consists in being capable to extend collection coverage to unserved parts of the city where waste management infrastructures and capacity to pay are less extended or scarce. Technology transfer from industrialized countries towards developing countries is a challenge as technologies are designed for their own local social, economic and environmental circumstances, generally in developed countries, characterized by higher costs, higher technical capacities, compliance with strict regulation etc. Clearly, importing waste management technology from developed countries to a low- or middle-income country, without considering how they will work under local conditions, is highly inefficient and may rather lead towards negative environmental and economic impacts²⁰. An example of such failed technology transfer is the Timarpur Incinerator in Delhi. In the mid-80', the Municipal

Corporation built an incinerator to process 300 tons per day of solid waste and produce 3MW of power, technique imported from Denmark, at a cost of around US\$3.5 million. The plant was designed for segregated waste as input, which was not practiced by the households or promoted by the municipality. The plant had to be closed-down within a week of its opening as the waste had a very low heating value and a high percentage of inert materials²¹.

3.2.6. Energy and electricity

Overview

Currently, there are still approximately 3 billion people lacking access to clean-cooking solutions and are exposed to dangerous levels of air pollution. Progress has been made in the past decade regarding the generation of (renewable) electricity from water, solar and wind power. In terms of energy efficiency also, it has been observed that the ratio of energy used per unit of GDP is declining. Global energy demand grew by 2.1% in 2017, this represents a 40% growth in comparison to the year 2000 (IEA 2017).

Cities dominate energy demand, and by extension are responsible for a significant share of carbon emissions. In 2013, the world's urban areas accounted for about 64% of global primary energy use and produced 70% of the planet's carbon dioxide emissions. It is to be expected that energy demand and GHG emissions will increase in the future as cities grow and urban economic activity expands. Hence, it is essential that cities take a leading role in the energy transition in order to curb GHG emissions and tackle climate change. Cities offer great opportunities to steer the global energy system towards greater sustainability. Different actions supporting this transition can be taken at the local level.

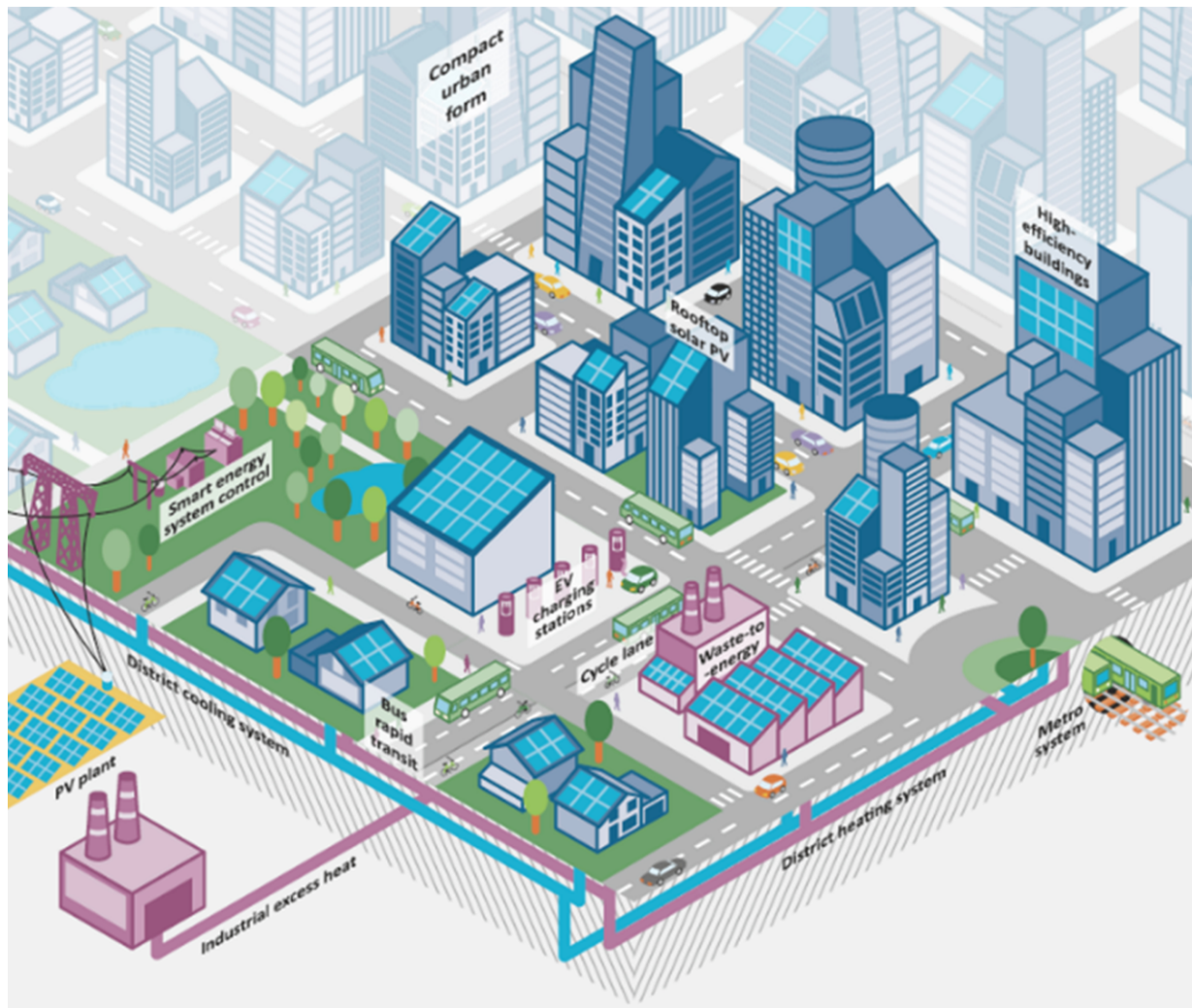
Potential contribution to sustainable development and SDGs

Energy is central to nearly every major challenge and opportunity the world faces today, including transport, sustainable cities, adaptation to climate change, water, food security and also health, jobs, poverty eradication and education.

In the last years special attention has been dedicated to understanding the interactions across energy, food and water sectors. Other nexus such as transport and energy have also emerged. Establishing such connections allows finding effective and efficient solutions to tackle key challenges in these sectors from a holistic and integrated perspective. The 2030 UN Agenda for Sustainable Development highlights the need to think a common approach for the implementation of nexus-linked SDGs. In fact, a 'nexus perspective' (i.e. such as the water-energy-food nexus) is essential for promoting the integration of goals across sectors and reducing the risk of sector-specific SDG actions with possible major trade-offs. The nexus approach therefore serves as a vehicle that boosts implementation of the 2030 Agenda. As well as contributing to the SDGs, the nexus seeks to maximise poverty reduction and achieve economically and environmentally sustainable outcomes. For example, the water-food-energy nexus and the SDGs are guided by overarching common principles:

- Promotion of sustainable and efficient resource use.
- Access to resources for vulnerable population groups .
- Maintenance and support of underlying ecosystem services .

Figure 11: Opportunities for energy transition at urban level. Source: International Energy Agency



Relevant SDGS in this policy area:



Innovation potential in this policy area

The innovation potential in the energy sector is estimated as considerable. In the context of the transition towards low carbon energy systems and higher liveability in cities, various sectors of activity play a key role for the implementation of integrated innovative solutions that combine aspects of urban sustainability, low GHG emissions, and integration of high share of renewables into the energy system of a city. Meeting GHG and climate targets acts as a booster to foster the development of renewable energy production and is set as a strategy in many cities around the world. If such strategy is aligned with a sound development of green transport systems, the impacts on climate are multiplied. The example of Copenhagen shows how the city's performance in renewable energy production contributed in the rapid development of an innovative Free Floating Electric Car Sharing system.

Besides transportation, major innovation trends focus to expand the capacity to increase the share of renewable energy (e.g. energy from solar, wind, biomass, geothermal, waste and waste water), and energy efficiency across all sectors (e.g. efficient public lightning, Seoul energy planner, energy efficiency in office building, urban heating and cooling systems).

Besides the above innovation areas, other may rather focus on transition governance (like the city of Münster and its 2050 roadmap) and new forms of collaboration across stakeholders. An example of the later is the emergence of so called energy cooperatives (i.e. consumers, hence, community based initiatives, associations of stakeholders also including energy producers, who cooperate for their mutual social, economic, and cultural benefit). Energy cooperatives generally aim at planning, developing, managing and financing renewable energy sources and energy efficiency projects. At European level, the renewable energy cooperatives are represented by a federation, REScoop.eu. Concrete examples of innovation for the funding of local renewable energy projects is materialized by municipal solar bonds. These bonds are issued to provide low-interest financing for the development of local renewable energy technologies such as solar power. New Delhi has implemented such funding scheme.

Other innovations are embedded in the integration of energy generation systems, ranging from the development of autonomous mini-grid systems (e.g. decentralized energy systems), up to integrated systems at urban level, e.g. small scale embedded generation. Examples of such innovations are showcased by the city Brasov (Rumania) or Cape Town. Exhaustive additional documentation around small scale embedded generation is provided by Urban Energy Support.

The strong interlinkages and nexus across sectors concerned by energy and energy transitions require horizontal approaches involving public, private and non-profit sectors that in turn will enable to address energy, climate, mobility and

Figure 12: Solar water heating devices on the roofs of residential shack in the Alexandra township outside Johannesburg, South Africa. Photo: Waldo Swiegers - Bloomberg



production challenges in a holistic way. An interesting example of approaching the energy transition from a collaborative perspective is shown by the German Marshall Fund and its [Transatlantic Multi-stakeholder Dialogues for the Local Energy Transition](#).

In relation to innovation on energy markets, new trading systems enabled through blockchain technology have emerged in recent years. These consist in connecting directly energy producers with consumers (e.g. peer to peer trading) without transiting through power companies. This type of business model allows consumers accessing to renewable energy at lower costs. As such, [peer to peer trading](#) acts as driver for the development of renewable, decentralized energy generation at local level, creating local energy markets.

Main innovation enablers in this policy area

As observed in other sectors addressed above, innovation in the energy sector at urban level needs to be planned and coordinated in order to deliver expected results in an efficient way. Undoubtedly, sound planning, design and implementation of strategies are necessary steps to sustain innovation in this policy area, especially as the energy sector is fundamental for many other sectors undergoing rapid and essential transitions (i.e. transport, building, waste management, water management, industry etc.).

Besides technical challenges, the implementation of innovative energy systems may also face regulatory challenges and complex pricing models. In order to help local governments, overcome

these barriers, guidance is of crucial importance. An example of such guidance is the one provided by the National Energy Regulator of South Africa or the city of Cape Town. More guidance for South Africa has been provided Sustainable Energy Africa and is directed towards local governments to support the implementation of renewable energy and energy efficiency options at municipal level. In Europe, Covenant of Mayors has developed specific guidance for local governments on how to develop Sustainable Energy Action Plans (SEAP). A concrete example of strategic planning may be featured by the city of Edmonton, in Canada, that presents a framework for reducing greenhouse gas emissions, increasing energy efficiency and promoting resilient energy systems.

Key challenges in this policy area

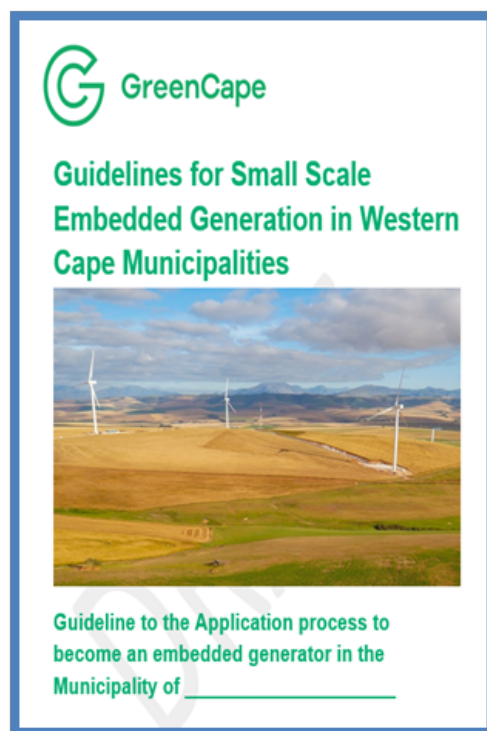
Despite recent progress made to pave the way for urban energy transitions, still there are multiple obstacles to overcome for accelerating the pace. The following could be estimated as most representative:

- Non-harmonized regulatory frameworks are holding back the energy transition
- Lack of technical and financial knowledge and capacity to deliver the radical transition required
- Lack of data and access to available data that can inform and enable appropriate and focused projects and programs
- Low prices of and subsidies for fossil fuel energy
- Low price of carbon in Emission Trading System and lack of price of carbon in non-Emission Trading System sectors effectively creates no market driver for low and zero carbon sources
- Low involvement of consumers and communities

- Complex ownership structure of many types of buildings, both residential and non-residential does not favour governance for energy transitions;
- Lack of capacity for cost-effective and efficient energy storage solutions, both at the building and system level.

Regulatory Indicators for Sustainable Energy (RISE) is an analysis framework developed by World Bank/Sustainable Energy for All / ESMAP/ Climate Investment Fund provides an innovative scoreboard for 111 countries worldwide. The scoreboard focuses on 3 topics: access to modern energy, energy efficiency, and renewable energy. This scoreboard shall help decision makers to identify major regulatory barriers in their local context and help overcome these by adapting regulatory frameworks consequently.

Figure 13: guideline for small scale embedded generation



3.2.7. Local economic promotion

Overview

This policy area is responsible for the mobilization of all the economic actors and assets. Local economic promotion also contributes to the development a supportive framework to the so-called local systems of innovation¹. This implies that local economic promotion is the single local policy that is most closely concerned with the promotion of innovations among business actors in the municipality, including small and medium enterprises.

Local economic promotion is generally done by ad-hoc administrative departments that often formalize their policy objectives in specific plans or economic strategies. These documents set the goals to reinforce local economies and make them more competitive. Most plans include sustainability considerations, and the relevance of sustainable sectors – such as green, circular, inclusive sectors – is generally increasing. However, trade-offs between economic, social and environmental priorities may exist in some cases. In particular, many strategies for local economic promotion still struggle to build strong business cases for sustainable solutions and even to create supportive environments for various forms of sustainable innovation.

Potential contribution to sustainable development and SDGs

Local economic promotion is mostly connected to the SDGs that are closely related to the economic well-being of the population, such as SDGs 1,2 and 4, as well as to those priorities that have a direct link to the local economic structure, including SDGs 8 and 9. This policy area is also key to deliver on the targets under SDG 11 on sustainable urbanization. Moreover, local economic promotion is also responsible for the creation of an enabling framework for the implementation of most other SDGs, at least when it comes to the generation of the economic resources that are needed to support

the specific policy agendas. Ultimately, the availability of such resources depends on the strength and supportive capacity of local economies.

Relevant SDGs in this policy area:



Innovation potential in this policy area

As mentioned, innovation for sustainable development and local economic development are closely related concepts. It is generally assumed that innovation is key for economic growth and competitiveness²³. Hence, the promotion of innovation capacity has become one of the essential components of many local economic development strategies since at least mid-1990s.

A number of documents from various international organizations provide guidance on how to build local development strategies. Perhaps the most known is the Local Economic Development (LED) series by UN-HABITAT. Complementing this work, the World Bank has also developed a train-the-trainer guide for local economic development. A number of those documents stress the relevance of innovation for local development and provide specific guidance on those aspects. For example, the OECD has published an Innovation Strategy with various links to the local level.

In the last few years a new generation of place-based and *place-sensitive policies* have emerged. These policies seek to unleash local economic potentials by relying on bottom-up solutions. Being place-specific, these strategies have also adopted broader conceptualizations of the role of innovation for sustainable development and more realistic understanding on what and how local innovation systems can deliver in terms of sustainable development. A paradigmatic example of such policies are the *Smart Specialization Strategies* in the European Union. *Smart specialization* is an innovative planning approach that aims to boost growth and jobs by enabling each – sub-national – region to identify and develop its own competitive advantages. Smart Specialization Strategies are also known as S3 strategies because they require local actors to identify their own's strengths and comparative assets – Smart –, prioritize research and innovation investment in competitive area – Specialized – and define a shared vision for regional innovation – Strategic –.

S3 strategies are not always formalized at the municipal level. Still, they do nonetheless provide a very relevant example on how local assets, potentials and innovation capacity can be leveraged in promotion of economic growth and sustainable development. S3 strategies are also a good example that illustrates how multi-level and multi-actor cooperation can support innovation processes at the subnational levels. For example, the *S3 strategy of the city of Sofia*, in Bulgaria, outlines the sectoral specialization of the local economy in accordance with the innovative potential and provide guidelines for the development of scientific research and innovations in the urban region. By the end of 2018, more than 120 S3 strategies have been already formalized in the EU.

In the United States, the Environmental Protection Agency also provides a good step-by-step guide to building a place-based economic development strategies that is called *Framework for Creating a Smart Growth Economic Development Strategy: A Tool for Small Cities and Towns* (2016). This document uses the term “smart growth

economic development” to refer to a strategy that builds upon existing assets, takes incremental actions to strengthen communities, and builds long-term value to attract a range of investments. It is intended for small and mid-sized cities, particularly those that have limited population growth, areas of disinvestment, and/or a struggling economy.

Besides planning, local administrations can also play a direct role in support of innovation for local economic development and introduce innovations to traditional procedures. A very effective strategy to boost sustainable innovations is using the purchase power of local administrations, which in some cases can be significant. A good tool for implementing this strategy is *Green Public Procurement*. ICLEI manages an *European Sustainable Procurement Network* that collects a number of inspiring examples of procurement initiatives across the continent.

Another strategy builds on the tremendous power of *green finance*, and particularly green bonds. *Green bonds* are generally issued by governments, multinational funding organisms or corporations. The issuing entity guarantees to repay the bond over a certain period of time, plus either a fixed or variable rate of return. *The green bond initiative by the city of Gothenburg*, in Sweden, is a pioneering initiative in this respect. The first local green bond was issued by the city of Gothenburg in 2013. Since then, the city has extended and improved its green bond program, which receives high credit ratings from all big rating organizations. On 2017 the city issued its fifth green bond, and the transaction amounted to SEK 1,2 billion. Other cities all over the world, like *Cape Town*, *Mexico City* and *Wuhan Metro Group* have followed this example. Green bonds have become an increasingly viable form of finance with issuance from cities and municipalities. This *UNDP site* provides some general background information on green bonds. *The Climate Bonds Initiative* has collected and classified the most important green bonds' programs worldwide. This initiative also has a guide to issue green bonds, called *How to Issue a Green City Bond*.

Figure 14: Summer in the City, a project supported by the ioby crowdfunding platform in the city of Detroit (MI), USA. Photo: ioby.org



Cities can also do much to encourage citizen involvement and participation. An innovative tool are the various [participatory budgeting](#) programs promoted by different local administrations worldwide. Participatory budgeting essentially entails that a given share of the budget that each local administration manages is allocated to projects or priorities proposed and or chosen by citizens themselves. Three good examples of participatory budgeting can be found in the cities of [New York](#), [Porto Alegre](#) and [Madrid](#).

At [community level](#), a very popular tool are the various [crowdfunding](#) initiatives. Such initiatives have also been used to propel local development across the world through specific campaigns and ad-hoc tools. Crowdfunding programs are generally enabled by web platforms. The [ioby](#) platform is one relevant example providing financial support to civic projects led by local communities. The platform is very active in North America, having funded projects in five different cities across United States.

As most community-led initiatives, crowdfunding should not be used to maintain core public services or establish formal organizations. Its power rests on the creation of shared experience and impact²⁴. The Spanish organization [Goteo](#) has developed a whole platform around this idea. All its projects are open, so that other social organizations can freely replicate and build on them. Some Spanish cities including Barcelona, Donostia-San Sebastian, Madrid and Zaragoza participate by co-funding some of the projects listed in the platform with equal amount to the funds available from other investors – a mechanism known as [match funding](#)–.

Main innovation enablers in this policy area

The innovation potential in this policy area mostly depends on the capacity of the available planning instruments and resources to be responsive to the needs of local businesses and innovative ideas. Often, this implies that the strategies and plans should become increasingly selective in terms of the sustainability priorities that are promoted and are more directly connected to local assets and potentials when formalizing long-term strategic choices. Those businesses and projects aligned to such local priorities could be more easily identified and supported through ad-hoc economic instruments, such as sustainable public procurement and green bonds.

But innovation for sustainable development also requires that local communities are empowered to develop smaller projects outside the main economic circuits. These forms of innovation may have very different manifestations, ranging from small businesses to civic projects promoting sustainable development. In the long run, they may acquire a big business dimension, like some successful collaborative and sharing platforms prove. Furthermore, decentralized forms of innovation can also have a

very positive impact on sustainability targets and make a very relevant contribution to achieve SDGs at the local level.

Key challenges in this policy area

Local economic promotion policies must be very selective when it comes to designing effective strategies for economic growth, particularly while defining economic development priorities. In most situations, 'less is more'. To be successful, local economic strategies should be developed around a limited number of priorities, focusing on those sectors having a greater growth and innovation potential at the local level.

Often, policy makers are confronted with the difficult task of prioritizing certain sectors and activities over other possible options. This is not an easy task, as a number of trade-offs between sectors, temporal terms and even geographies may emerge. Moreover, trade-offs between sustainable spheres may also occur. Usually, in this process policy makers face pressures from different groups embodying a variety of vested interests. By definition, these groups are very resistant to innovations, which can lead to conservative policy designs that undermine the innovation potential of local economies. Ill-designed local economic promotion policies can in fact create additional barriers for sustainable innovations.

Currently, the approaches to innovation in most local economic development strategies and programs are rather narrow. To begin with, most strategies focus on innovations that rely on technical and technological solutions. Local economic development strategies tend to neglect the social and institutional expressions of innovation, on the assumption that these forms of innovation do not have a direct impact on economic prospects. Moreover, local economic strategies tend to adopt approaches on innovation that are sometimes disconnected from sustainability priorities. As a result, policies often promote innovations that are believed to have a direct economic impact in the short run, but not necessarily those innovation processes that are socially and environ-

mentally sound. Additionally, by focusing on technology-driven innovations, local economic strategies could sometimes be disconnected from local assets and conditions, leading to failure.

3.2.8. Community development

Overview

Community development activities strive to build stronger and more resilient communities, addressing the basic development needs of local citizens by engaging in an iterative process of asset identification and priority investment. Focus areas include basic social services, like health care, housing and rehabilitation, installation of basic infrastructures (e.g. sanitation), personal assistance, etc. All these investments and interventions are community-driven and community-centred, addressing in particular the most deprived and vulnerable groups, including the poor, elder people and children, groups with specific needs, etc. Importantly, in this guide we focus on those community development initiatives designed and implemented at community level by local administrations. We do not specifically address international cooperation schemes, which have different characteristics and implementation logics.

Potential contribution to sustainable development and SDGs

Community development directly addresses the social needs of vulnerable local communities. Hence SDGs 1, 2, 3, 4, 5 and 8, 10, 11 and 16 have specific objectives that are intrinsically linked to this policy area. Other SDGs, such as 7, 8 and 9 are indirectly connected to it as well. There is a growing awareness on the relevance of social factors, such as poverty and basic education, as determinants to other issues, such as health.

Relevant SDGs in this policy area:



Innovation potential in this policy area

Policies for community development are ones among the most traditional forms of public intervention. These policies tackle the incumbent needs of local communities, particularly those of vulnerable groups. Social issues are generally addressed through the provision of basic infrastructures and services, such as health care. These are sensitive and traditional sectors in which innovation is still possible. Innovation in this area has two possible expressions: one is materialized through the utilization of innovative technologies or tools to support local communities (e.g. innovative water purification technologies in remote rural areas); another one focuses on the promotion of *social innovations* for the delivery of community assistance. In this subsection we focus on the latter form of innovation, as the former is covered by other paragraphs in this same section.

Social entrepreneurship is one of those tools contributing to community development through facilitation by local administrations and other public bodies. This form of entrepreneurship supports businesses providing sustainable solutions to local needs in social (e.g. poverty alleviation, health care, access

to culture, etc.) and environmental domains (e.g. recycling, climate resilience or pollution control). Social entrepreneurship can be driven by for-profit or non-profit principles, but in both cases they generate a social return to society in the form of social inclusion and environmental benefits, together with the potential economic profits.

Local administrations may support social enterprises by giving access to funding, tax incentives, or other measures contributing to leverage the playing field to make social companies stand on equal grounds as traditional businesses. For example, the Town Development Fund of the Municipality of Kathmandu, in Nepal, provides long term financing of social infrastructures and revenue generating projects. The Social Economy Division of Seoul Metropolitan Government, in South Korea, has designed a multilateral cooperation mechanism (Public-Private-Community Partnership) to provide support to social entrepreneurship. The scheme supports the Co-op City project that fosters Seoul's social cohesion through social businesses aiming to 'democratize Seoul's economy'.

Beyond entrepreneurship, local administrations can support the *social economy* by designing ad-hoc plans and strategies. The Impetus Plan for the Social and Solidarity Economy of the Municipality of Barcelona, Spain, develops a transformative socio-economic vision of the urban reality. It includes an action plan for reducing social and territorial inequalities, while promoting an economy at the service of people and of social justice. The city of Ghent in Belgium, requested a Commons Transition Plan to document the emergence and growth of the commons in the city, and to determine what kind of public policies should support them, based on consultation with the active citizens in Ghent.

Local communities are not only characterized by a set of similarities and by sharing a common 'living space', but also by the relationships that are established among the people that form them. The quality of such relations determines the strength and resilience of local communities. The most innovative community development initiatives seek to strengthen

such relations in various ways. Local administrations may e.g. support on-going processes by engaging in platforms building new models of working together between the public sector and social economy. For example, the Chantier de l'économie sociale in Quebec drives the development of social economies in the region by linking all actors, including academics, institutions and practitioners.

Local administrations can also promote platforms where innovative ideas linked to social entrepreneurship can be incubated and supported. The MARES project promoted by the City of Madrid, Spain, is one of those initiatives. MARES seeks to achieve long-term urban transformation through the development of a social and solidarity economy. MARES supports the creation of new business ideas built around social entrepreneurship in five areas: mobility, food, recycling, energy and social care. Business projects are supported by MARES in different ways, ranging from the initial evaluation and general orientation to the provision of financial support. By end-2018, the social care platform of MARES has already contributed to launch 16 business projects focused on elder assistance, psychological support of vulnerable groups, youth protection, healthy food habits, etc.

One key aspect is the reinforcement of technical capacities and skills for the support of community development initiatives. Local governments can foster strategic alliances with academic and research institutions to acquire knowledge for the design of better policies. The Institute of Design and Technological innovation (IDIT), a joint initiative of the Municipality of Puebla, Mexico, and the Technical University of that city, promotes the creation of social economy businesses as a strategy to prevent social exclusion in areas with high poverty risk and high level of violence.

Local administrations may also engage in communities of practice on the social economy involving peer public organizations, the civil society, the academy and other stakeholders. These communities of practice can be established at different scales, ranging from international knowledge hubs to very

localized initiatives. The International Centre for Innovation and Knowledge Transfer on the Social and Solidarity Economy C.I.T.I.E.S. is one example of a global network of local administrations. C.I.T.I.E.S. gathers, shares and transfers international knowledge and best practices in the field of the social economy. It focuses on collaborations between local governments and civil society that enable territorial development. The EUCLID Network has a European continental range. It creates connections between civil society and social enterprise leaders, shares professional and entrepreneurial knowhow, influences European policy and raises the visibility and understanding of the social economy.

Coordination can also be thematic or specialized on specific sectors or policy areas. In Canada, the Réseau d'Investissement Social du Québec (RISQ) provides adapted financing for social economy enterprises in the start-up, consolidation, expansion, or restructuring phase through capitalization and technical assistance. When a critical mass is needed to support local intervention, one option is to cooperate with other local governments in the same area. For example, the Plaine Commune from the Grand Paris region is a joint initiative of nine municipalities in the Paris agglomeration that work together in a number of topics, including social innovation projects targeting deprived communities.

Most of the examples presented so far are institutionally-driven. But there are countless community development initiatives that are originated and promoted by individual citizens and collectives, and subsequently institutionalized in various ways. One illustrative example is the Popular financing collective Kofip, in Port au Prince, Haiti. Kofip was founded back in 1997 by four community organizations. The initiative grew on a steady basis until it was recognized as a relevant actor by the Ministry of Social Affairs. In recent years, the Kofip has matured the idea of Mutual Societies of Solidarity and Local Development (MUSO). These societies (also called MUSO) are formed by a restricted group of around 30 individuals that jointly save money to finance different projects in their neighborhoods. Each MUSO has three saving mechanisms that provide credit,

insurance and refinancing. They also create a space for exchange and dialogue with the local authorities and other civil society stakeholders around the development priorities for the areas. For a collection of relevant social economy initiatives beyond those already listed here, the reader may check other resources, particularly Sociogeo.org.

Main innovation enablers in this policy area

Social innovation processes, such as social entrepreneurship, are the outcome of long-term participative processes involving collaborative activities between the private, public, and third sectors. Hence, the key factors enabling social economies and community-centered innovations relate to the capacity of stakeholders to organize, link and cooperate. Relations of trust and feeling of belonging are essential requirements for such relational mechanisms to be activated. Another necessary ingredient is an 'open mindset' by the administration, in particular at the local level. Diversity of standpoints should be favored, as innovations occur at the interfaces be-

tween different perspectives. Citizens need to be entitled to participate in community policy designs and empowered to lead such policy processes. Operational obstacles conditioning small resource-constrained organizations can also be removed through adequate financial support by the administration. The same holds for the provision of knowledge and technical skills, that are key to provide sufficient and balanced support to local communities.

Key challenges in this policy area

Innovation in community development requires strong and empowered communities. But communities cannot be engineered. Strong communities are the outcome of long processes of constructive social relations founded upon shared values. Such processes can be facilitated but never replaced by administrative intervention. These are typically long processes, difficult to reconcile with short term planning procedures. Moreover, solidarity and cooperation principles implicit in social economies can sometimes challenge traditional commercial perspectives. All these aspects require a sensitive policy

Figure 15: Forêt nourricière de Saint-Félicien is one project carried out by EUREKO, one of the initiatives supported by the RISQ. Photo: eureka.ca



approach by local administrations, which should seek to reconcile various legitimacies for the sake of stronger, more resilient communities through innovative community development processes.

3.2.9. Environment and climate

Overview

The concentration of infrastructures, people and natural capital in cities renders them extremely vulnerable to the effects of extreme climate events. When disasters occur in urban areas, they threaten the lives of large numbers of people, assets and finally, the economy. 70% of cities are already dealing with the effects of climate change, and nearly all are at risk. A great majority of all urban areas are coastal, putting most cities on earth at risk of flooding from rising sea levels and powerful storms. Unexpected expenditures due to extreme climate events can lead to major impacts in business operations and city budgets.

Ecosystems play a critical role in regulating the world's climate through their function as 'natural carbon sinks'. Healthy ecosystems also help vulnerable communities adapt to the adverse effects of climate change and offer protection against climate-related disasters. Protected areas and effective area-based conservation measures play a critical role in addressing climate change, both through *mitigation* by sequestration and storage of carbon in terrestrial and marine vegetation, soils and peat and through providing *ecosystem services for adaptation* to existing and projected climate change in terms of food and water security, livelihoods and disaster risk reduction.

Potential contribution to sustainable development and SDGs

Climate and environmental issues are tightly interconnected. Both are vital to sustain life on earth and influence greatly the economy. Maintain climate and environmental balance is among the greatest

Figure 16: Flood in Bangkok. Photo: tastythailand.com



challenges humanity will be facing in the coming decades in order to sustain all other activities and services. The recent development in climate change adaptation focused on nature-based solutions shows how intrinsically climate and humans are connected as the environment and natural assets are managed in order to prevent major damages due to climate change while providing in the same time other valuable services (i.e. carbon sequestration, landscape improvement, biomass, leisure etc.). Climate and energy are another concrete example of strong interlinkage as there is a causal relationship between human population growth, rising energy consumption and land use and the resulting greenhouse gas emissions and climate change. The concern for climate change control and mitigation has motivated policy makers and scientists to address energy and climate as a nexus and create various initiatives for a high-level approach of the nexus, i.e. European Union Climate and Energy Package²⁵, United Nations Foundation²⁶.

Relevant SDGS in this policy area:



Innovation potential in this policy area

The innovation potential in the area is manifold. Driven by the urgency to implement strategies and actions to mitigate climate change and adapt to the adverse effects of climate change, cities have been very active in innovating in this field as a mean to improve the overall value and benefits of actions. Well planned, early adaptation actions have the potential to save money and must be seen as an investment for the future. Examples of *adaptation measures* include: using scarce water resources more efficiently; adapting building codes to future climate conditions and extreme weather events (i.e. City of Basel's Building and Construction Law as driver for development of green roof applications); making use of *nature-based solutions* to enhance defences against flooding (example of Kamen climate corridor, Resilient Bangkok), developing extreme climate resilient crops; implementing land use practices less vulnerable to storms and fires (i.e. selection of specific tree species, adapted forestry practices etc.).

Ahead to the implementation of climate actions are the sound planning strategies cities may develop. As an example of such plans is Melbourne's interactive climate adaptation strategy. The strategy is aimed to address the city's multiple climate risks simultaneously and inform optimal adaptation planning. Another interesting innovation is how Auckland has adapted and developed its means to support its urban planning and strategy for climate change adaptation in a coastal zone (i.e. Wynyard Quarter waterfront development) with the integration of smart sensors and local communities. Another interesting innovative approach for combatting climate change impacts through the strong implication of local communities is given by the city of Medellin and its strategy to protect vulnerable peri-urban areas from flooding and landslides by adopting a socially inclusive approach for restoring ecosystems²⁷. In Europe, the city of Barcelona, in Spain, can be taken as an example on involving citizens in the design and implementations on climate action through its citizen-led initiative "Commitment to Climate Change" (see also in <https://ajuntament.barcelona.cat/ecologiaurbana/sites/default/files/Barcelona%20Commitment%20to%20Climate.pdf>)

Figure 17: Green roof and wall installed by the social enterprise Efecto Verde Modular on the roof of one building of the Ministry of Public Education in México City



In terms of innovations for funding climate-change solutions, climate bonds or also called Green bonds represent an attractive instrument. An example of such financing tool with a strong focus on climate action is given by Mexico City's green bond scheme. The city has been the location for the deployment of an ambitious rainwater harvesting system capable to mitigate effects of water scarcity.

Other instruments used for funding climate actions and actions for ecosystem conservation are the so-called *PES (i.e. payment for ecosystem services)*. Payment for Ecosystem Services (PES) programmes have been developed in the last decade. This market-based instrument is used to finance nature conservation and maintain services provided by ecosystems. PES programmes translate services provided by ecosystems into financial incentives for their conservation. Those in charge of the ecosystems are often local actors who own or manage the natural resources. Benefits gained can be of high relevance for both the beneficiaries who generate additional income and for the entities demanding the services to be maintained, i.e. private companies, local authorities or municipalities. Guidance on how to implement PES are provided by the Ecosystems Knowledge Network. An example of PES can be found at Pickering (UK) where the scheme helped

funding flood protection measures in addition to improvement of water quality, wildlife and soil protection.

Main innovation enablers in this policy area

Climate actions may be addressed from different angles and sectors, i.e. land use planning, nature conservation, transport, renewable energy, agriculture etc. Across these sectors, policies aiming at reducing GHG emissions and adapting to the adverse effects of climate are all contributing towards enabling innovation in this area. The emphasis put on climate change actions is evident since several years and has been concretized for example through the creation of the Inter governmental Panel on Climate Change in 1988. The objective of the IPCC is to provide governments at all levels with *scientific information* that they can use *to develop climate policies*. As such, the IPCC contributes to the development of innovative strategies from local to national and international level, i.e. also including *international agreements* to which countries, regions and cities commit on the long term, like the Paris agreement. Cities play a key role in the development of *climate strategies* and implementation of concrete climate actions and the numerous experiences around the

world show the leading role of cities in this field. Some of them have dedicated considerable resources to create specific departments with municipal governance, like Paris, others by developing elaborated integrated climate strategies, like Barcelona, or making citizens participant in their creation, like Wroclaw. On the journey towards implementing actions for addressing climate change, several *international and national initiatives* have been created in the past years. Among other objectives, these may directly or indirectly help local administrations help to find support in the form of information, guidance, exchange of good practices, policy perspectives (i.e. OECD, Cities and Climate Change) and training. The following may be some relevant examples of such initiatives: covenant of mayors, global covenant of mayors, cities4climate, C40Cities, Climate KIC, UNhabitat, Cities and Climate Change Initiative, Cities Alliance, ICLEI Global Climate Action Summit. In the case of C40, network of the world's megacities committed to addressing climate change, the initia

tive supports cities to collaborate effectively, share knowledge and drive meaningful, measurable and sustainable action on climate change.

Key challenges in this policy area

In this policy area the major challenge may be the *urgency* of the actions needed to be implemented as the issues at stake are major at medium term. Actions need to be taken in such a way that *trade-offs with other sector policies are minimized and benefits maximized*, i.e. policies in transport, land use planning, agriculture, water management, transitions towards renewable energy, nature conservation, sustainable industry and efficient resource management are all of concern. *Strategies and actions* taken by local administrations need to be *integrated* horizontally across sectors and vertically with other policy and governance levels, regional, national and international.

Figure 18: schematic figure illustrating the concept of PES (payment for ecosystem services), source OPPLA

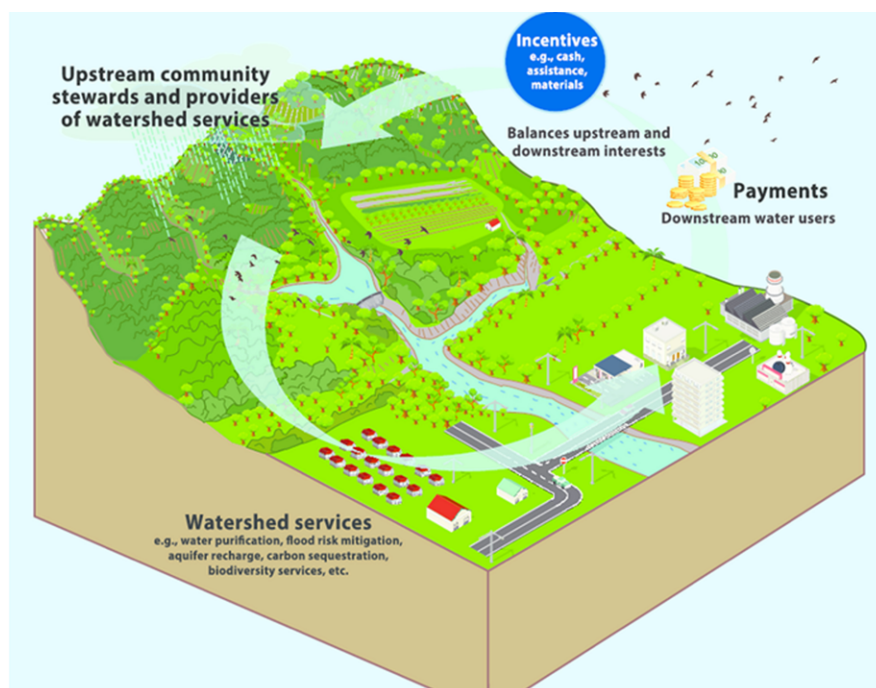
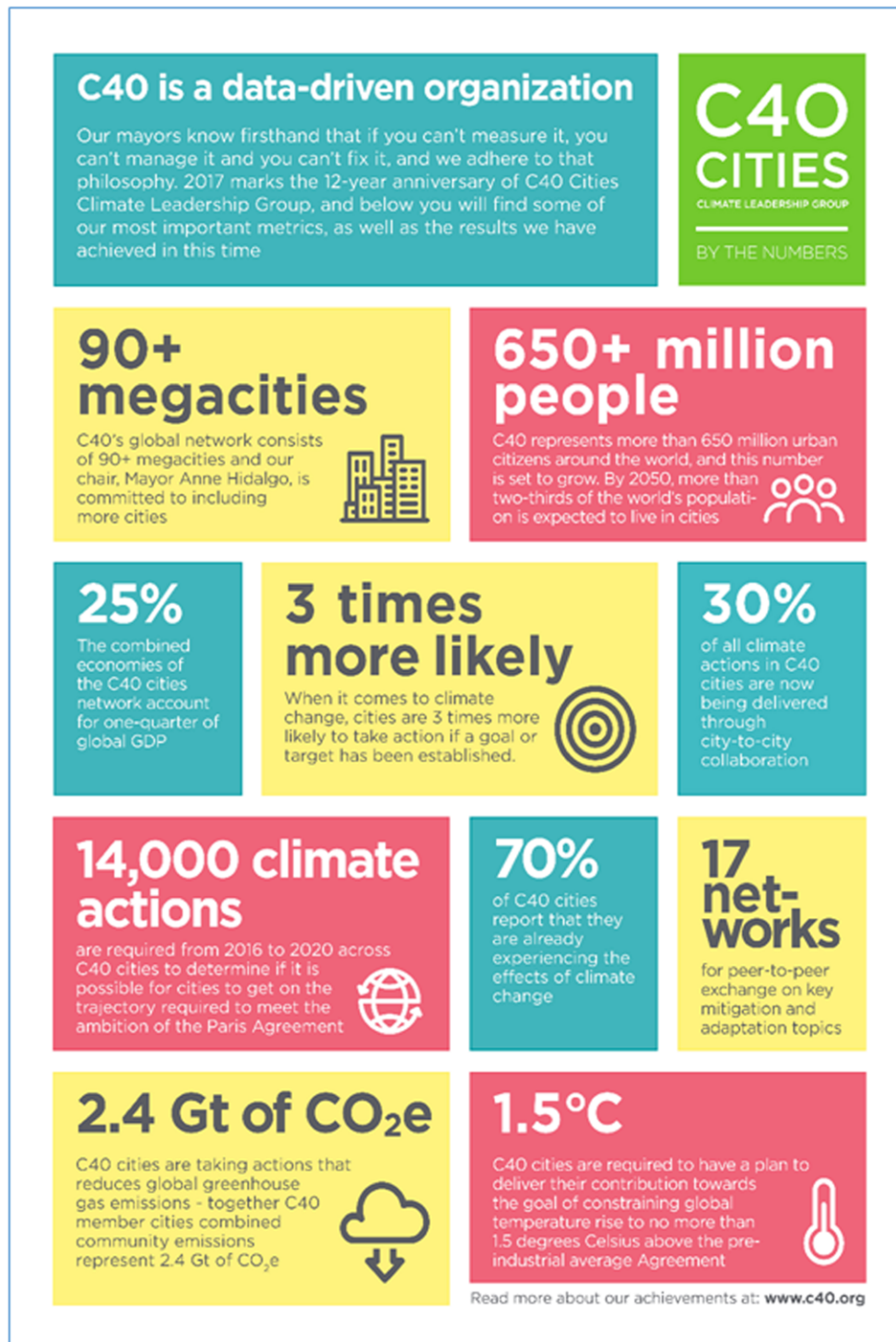
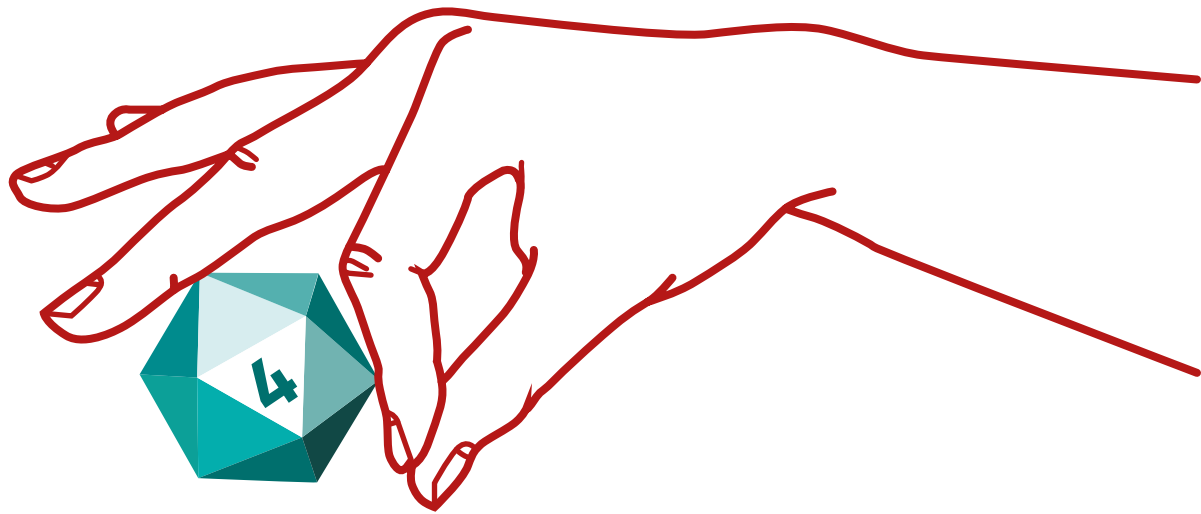


Figure 19: C40Cities facts. Source
<https://www.c40.org/>





The local innovation Matrix

This section aims to showcase a number of illustrative examples on how innovation can be supported at the local level. In order to guide the reader throughout all the potential interventions within each policy area in a concise and visual way, we have developed a *local innovation matrix*. The matrix links the various local policy areas – the lines – with the traditional categories of innovation enablers found in most classifications – the columns –.

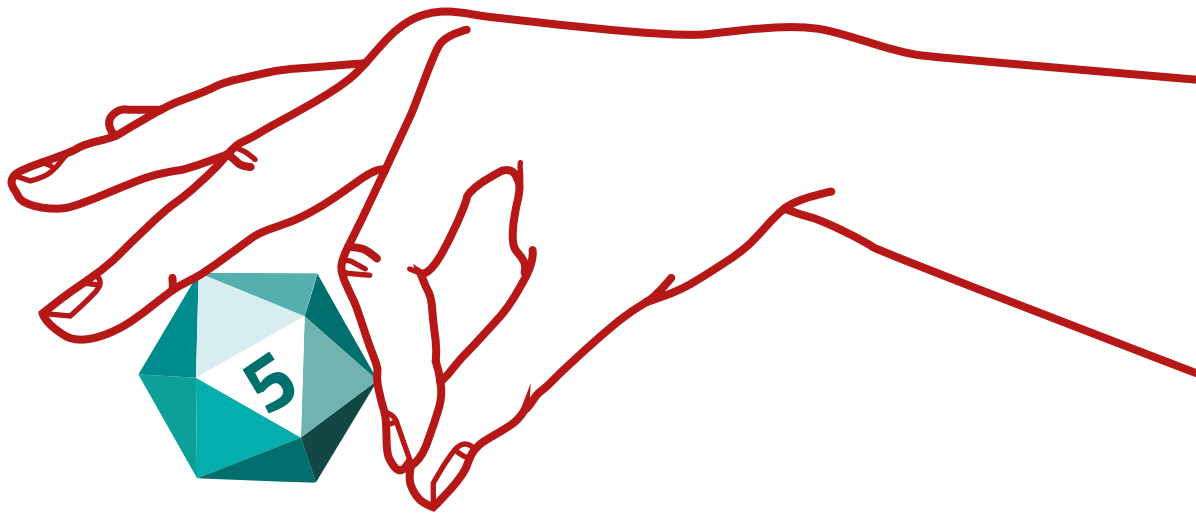
The overlaps between the two levels are then illustrated through effective, innovative and/or promising policy and community-led instruments. These are presented in the cells of the matrix, which include examples of relevant interventions currently under implementation somewhere in the world that can be of inspiration to other administrations and communities interested in getting involved in innovation processes at the local level, either by providing external support to such processes or by directly engaging in them. By following the links provided, the readers can obtain more in-depth information on the examples.

Instruments or approaches supporting innovation for sustainable development at local level

	Economic and market-based instruments	Planning and regulatory instruments	Research, training and skills	Awareness, engagement and participation	Others Community-led initiatives – PPPs – experimental initiatives and pilots
Area zoning	<ul style="list-style-type: none"> - Smart economic incentives/disincentives for land use control (e.g. vacant land taxation)²⁸ 	<ul style="list-style-type: none"> - Holistic/integrated planning³⁹ - Social urbanism³⁰ and equitable/inclusionary zoning³¹ - Flexible urbanism and space reprogramming³² 	<ul style="list-style-type: none"> - Townhall innovation offices³³ - Centre for urban design and innovation at the University of Nairobi³⁴ 	<ul style="list-style-type: none"> - Participatory spatial planning³⁵ - Participatory tools³⁶ 	<ul style="list-style-type: none"> - Placemaking and tactical urbanism³⁷ - Crowdsourced placemaking³⁸ and urban projects³⁹
Building codes	<ul style="list-style-type: none"> - Integrated urban/slum upgrade and safe, affordable housing schemes^{40, 41} - Financial support schemes and economic incentives for green building renovation plans, including energy efficiency⁴² 	<ul style="list-style-type: none"> - Building regulations, including obligatory certification schemes⁴³ - Legal preparedness for e.g. nature-based solutions like green roofs⁴⁴ - New regulations on construction and demolition waste⁴⁵ 	<ul style="list-style-type: none"> - Green building training programmes⁴⁶ 	<ul style="list-style-type: none"> - Standards and certification schemes^{47, 48, 49} - Communication tools to promote sustainable innovations in the residential sector^{50, 51, 52} 	<ul style="list-style-type: none"> - Alternative housing schemes, such as tiny houses⁵³ - Sustainable architecture and green building initiatives^{54, 55} - Other initiatives⁵⁶
Transport planning	<ul style="list-style-type: none"> - Free public transport in the city of Dunkerque (F)⁵⁷ - <i>Tax breaks, subsidies and other benefits to promote 'alternative mobility' and public transports</i>⁵⁸ (e.g. electric transportation)⁵⁹ - Disincentives to fossil-based mobility, i.e. urban road tolls⁶⁰ 	<ul style="list-style-type: none"> - Bus Rapid Transit system – example of Porto Alegre⁶¹ - Road safety plans⁶²: Buenos Aires - Improving Safety for Cyclists and Pedestrians⁶³ Sustainable Urban Mobility Plan⁶⁴ – Brazil's approach for SUMP⁶⁵ Belo Horizonte Mobility Plan⁶⁶ 	<ul style="list-style-type: none"> - Study and research on flexible, smart transport systems; i.e. <i>urban transport system for smart cities, India</i>⁶⁷ <i>Innovation in urban mobility</i>⁶⁸ 	<ul style="list-style-type: none"> - Promotion of public transport (e.g. innovative apps for public transport⁶⁹, sharing transports⁷⁰) <i>Wuhan carbon credit scheme</i>⁷¹ European Mobility Week⁷² 	<ul style="list-style-type: none"> - ElectriCity – Electric novel public transport system in Göteborg⁷³ - Clean Mobility system (Loja, Cape Town: with focus on elderly and disabled people)⁷⁴ ESCAP (Economic and Social Commission for Asia and the Pacific) Sustainable Urban Transport Indicator – SUTI⁷⁵

<p>Water and sanitation</p>	<ul style="list-style-type: none"> - Output based Aid, example of Casablanca⁷⁶ - Blended Financing of Water and Sanitation Investments - Kenya⁷⁷ - UNICEF WASH programme on water sanitation and hygiene⁷⁸ 	<ul style="list-style-type: none"> - Republic of Rwanda – National Sanitation Policy Implementation Strategy⁷⁹ - Innovative Contracts, Sound Relationships: Urban Water Sector Reform in Senegal⁸⁰ - Decentralized Wastewater Treatment Systems⁸¹, case of Bangkok⁸² - Guide for planners and decision makers for community sanitation⁸³ 	<ul style="list-style-type: none"> - Introduction of smart water management technologies⁸⁴ - Training and capacity building by IWA⁸⁵ – International Water Association 	<ul style="list-style-type: none"> - Guide for planners and decision makers for community sanitation⁸⁶ - Community Slum Sanitation in India a Practitioner's guide⁸⁷ 	<p>Community-led initiative on urban water sanitation, examples⁸⁸</p>
<p>Waste management</p>	<ul style="list-style-type: none"> - Waste taxation schemes including landfill and incineration tax fees⁸⁹ - Result based financing – example of Jamaica⁹⁰ 	<ul style="list-style-type: none"> - Systemic approaches on solid waste management - China⁹¹ - Landfill ban Scotland⁹² 	<ul style="list-style-type: none"> - Efficiency of waste collection Rotterdam⁹³ - ISWA (International Solid Waste Association) A roadmap for closing waste dumpsites⁹⁴ - ISWA scholarship programme⁹⁵ 	<ul style="list-style-type: none"> - WasteAid programmes⁹⁶ - ISWA - International Waste Manager Certification⁹⁷ - World Habitat Day⁹⁸ – Municipal Solid Waste Management 	<ul style="list-style-type: none"> - Belo Horizonte (Brazil)⁹⁹ - Community-centred alternative for sustainable management of solid waste in Columbia¹¹⁰
<p>Energy and electricity</p>	<ul style="list-style-type: none"> - Incentives for renewables¹⁰¹ (e.g. subsidies for the installation of wind turbines, PV solar, etc.)¹⁰² - Solar bonds¹⁰³ - Leasing of solar panels¹⁰⁴ 	<ul style="list-style-type: none"> - Guidelines for local authorities – example of Green Cape guidelines for small scale embedded generation¹⁰⁵ - RISE, (Regulatory Indicators for Sustainable Energy)¹⁰⁶ - Feasibility for district heating and cooling grids¹⁰⁷, smart grids - Covenant of Mayors, specific guidance for local governments on how to develop Sustainable Energy Action Plans¹⁰⁸ 	<ul style="list-style-type: none"> - EMEurope Research and Innovation (R&I)¹⁰⁹ - Urban Innovative actions¹¹⁰ 	<ul style="list-style-type: none"> - Sustainable Energy for all¹¹¹ - Urban SDG platform (case study database)¹¹² - International Renewable Energy Agency - IRENA¹¹³ - EnergyCities (The European Association of local authorities in energy transition)¹¹⁴ 	<ul style="list-style-type: none"> - Energy Cooperative¹¹⁵ - Renewable energy cooperative federation REScoop¹¹⁶ - Community Innovation in Sustainable Energy CISE¹¹⁷

<p>Local economic promotion</p>	<ul style="list-style-type: none"> - Green procurement¹¹⁸ - Green Bonds¹¹⁹ 	<ul style="list-style-type: none"> - Strategic planning targeting sustainable local economic development¹²⁰ - Smart Specialization Strategies (SS)¹²¹ 	<ul style="list-style-type: none"> - Promotion of local knowledge and innovation hubs¹²² - Guidance from national governments on LED¹²³ - Guidance from international organizations¹²⁴ 	<ul style="list-style-type: none"> - Collaborative strategic management based on a 'partnership approach' - Marketing and promotion activities like e.g. site brochures¹²⁵ - Participatory budgeting¹²⁶ 	<ul style="list-style-type: none"> - Civic crowd-funding and match-funding platforms¹²⁷
<p>Community development</p>	<ul style="list-style-type: none"> - Financial support to ensure access to basic services, such as affordable housing, health, education and sanitation^{128, 129, 130} - Public-Private Partnerships for a social economy¹³¹ 	<ul style="list-style-type: none"> - Planning and regulation for socially inclusive and sustainable community development^{132, 133} 	<ul style="list-style-type: none"> - Training, research and an incubation spaces for socially innovative initiatives¹³⁴ - Local platforms for social economy¹³⁵ 	<ul style="list-style-type: none"> - Social innovation platforms and communities of practice¹³⁶ - Cooperation with other municipalities from the same area¹³⁷ 	<ul style="list-style-type: none"> - Social enterprises contributing to community development^{138, 140}
<p>Environment and climate</p>	<ul style="list-style-type: none"> - Payment for ecosystem services, PES-Pickering¹⁴¹ - Mexico City's green bonds for climate action¹⁴² - economic and market-based instruments, TEEB¹⁴³, and Climate policy info hub¹⁴⁴ 	<ul style="list-style-type: none"> - Melbourne's interactive climate adaptation strategy¹⁴⁵ Climate proofing in Denmark, the case and example of Copenhagen¹⁴⁶ 	<ul style="list-style-type: none"> - Intergovernmental Panel on Climate Change, IPCC - Basque Research Centre on Climate Change, BC3¹⁴⁷ - Potsdam Institute for Climate Impact Research - PIK¹⁴⁸ - Tyndall¹⁴⁹ Centre for Climate change Research - US Environmental Protection Agency, EPA climate¹⁵⁰ 	<ul style="list-style-type: none"> - International initiatives, covenant of mayors¹⁵¹, global covenant of mayors¹⁵², cities4climate¹⁵³, C40Cities¹⁵⁴, Climate KIC¹⁵⁵, UN-habitat Cities and Climate Change Initiative¹⁵⁶, Cities Alliance¹⁵⁷, ICLEI Global Climate Action Summit¹⁵⁸ - Climathon¹⁵⁹, citizen engagement on climate action 	<ul style="list-style-type: none"> The Basque Declaration¹⁶⁰ Barcelona citizen-led initiative" - Commitment to Climate Change"¹⁶¹ Medellin socially inclusive approach for restoring ecosystems^{162, 163} Wynyard Quarter waterfront development¹⁶⁴



Additional resources

The following table includes a non-exhaustive list of the most relevant initiatives where users can collect more information:

5.1. Generic guidance initiatives

Name of the initiative	Lead organization	Description
Localizing SDGs	UNDP	This platform was aimed at supporting local governments in transforming SDGs into concrete local policies and actions. The platform provides tools (consisting on training modules on how to integrate SDGs in the planning processes) and guidance, but also a forum to share good practices and lessons learned at local level across the UN member states.
Urban Sustainability Framework (USF)	World Bank	The Urban Sustainability Framework (USF) is an integrated approach to help cities understand their urban sustainability status, define their vision, and formulate and implement an action plan. The USF is delivered as a textbook manual for urban sustainability planning.
The Global Platform for Sustainable Cities (GPSC)	Global Environment Facility (GEF)	GPSC, is a knowledge platform and collaborative space enables aspiring cities to pursue sustainable and inclusive urban development – and an overall agenda of long-term sustainability. Its web has a knowledge and resources section including vast documentation and tools for sustainable urban planning.
The Reference Framework for Sustainable Cities (RFSC)	French Ministry of Housing and Sustainable Homes	A web application to guide cities on their own path towards sustainability. RFSC helps key city actors develop and implement plans and strategies for attractive and sustainable cities, hence its name, the Reference Framework for Sustainable Cities. This online European framework of 30 sustainable objectives supports the delivery of the Leipzig Charter and of the European common vision for sustainable cities. Its agenda: fostering integrated urban development for small, medium and big cities all across Europe.
Getting started with the SDGs in Cities – A guide for local stakeholders	German Cooperation and UNSDSN	Getting Started with the SDGs in Cities outlines how cities can get started with implementing the Sustainable Development Goals (SDGs) in cities and human settlements. Effective and decisive action on sustainable development at the local level, within all cities and human settlements, is crucial to the success of Agenda 2030.
UN-Habitat – Urban Themes and Urban knowledge	UN-Habitat	UN-Habitat is the United Nations programme working towards a better urban future. Its mission is to promote socially and environmentally sustainable human settlements development and the achievement of adequate shelter for all. Urban themes provide information on specific foci and initiatives launched at UN and nation level to address specific challenges related to the specific themes.
The Innovation Policy Platform	World Bank and OECD	The Innovation Policy Platform (IPP), is a web-based interactive space that provides easy access to knowledge, learning resources, indicators and communities of practice on the design, implementation, and evaluation of innovation policies. The Platform helps users learn how innovation systems operate, identify good practices across different countries, conduct statistical benchmarking and devise and apply effective policy solutions. More broadly, it facilitates knowledge exchange and collaboration across countries and regions. Albeit not specifically addressed at the local level, it also includes relevant resources for local policy making.

5.2. Compilations of best practices

Name of the initiative	Lead organization	Description
UN-HABITAT Best Practices	UN-HABITAT	UN-Habitat's Best Practices Unit coordinates, identifies, documents and disseminates best practices and enabling policies on urban development within, and for, the Agency. The Unit identifies sources of information and knowledge derived from practical experience in support of the monitoring and implementation of the New Urban Agenda and the urban-related SDGs . It also manages the flagship Dubai International Award for Best Practices to Improve the Living Environment in collaboration with the Dubai Municipality.
Futurepolicy.org	The World Future Council	FuturePolicy.org is an online database designed for forward-thinking policy-makers, to simplify the sharing of existing and proven policy solutions to tackle the world's most fundamental and urgent problems. FuturePolicy.org highlights the most exemplary policy solutions uncovered by the World Future Council.
European Sustainable Cities Platform	Various cities and organizations	The European Sustainable Cities Platform was launched in 2016, following the <u>8th European Conference on Sustainable Cities & Towns</u> in the Basque Country. Supported by the City of Aalborg, Denmark; the Basque Country, and ICLEI Europe, it focuses on the uptake of <u>The Basque Declaration</u> , which is the main outcome of the 8th European Conference on Sustainable Cities and Towns. The European Sustainable Cities Platform includes the <u>Transformative Actions Database</u> , which presents existing transformative actions in line with the Basque Declaration as good practice.
SparkNews		Sparknews, spots and evaluates innovations with social and environmental impact, works with leading media institutions to foster the creation of solutions-based news pieces and develops business networks around positive social and environmental innovation. Sparknews also manages the Impact Journalism Day, and keeps a record of <u>all the stories</u> published by 60-medial groups over the world on inspiring positive stories on social innovations.

5.3. Initiatives enabling networking and participation

Name of the initiative	Lead organization	Description
Global Taskforce of Local and Regional Governments	Global	The Global Taskforce of Local and Regional Governments is a coordination and consultation mechanism that brings together the major international networks of local governments to undertake joint advocacy work relating to global policy processes. It was set up in 2013 to bring the perspectives of local and regional governments to the SDGs, climate change agenda and New Urban Agenda in particular.
Urban Agenda for the European Union	European Union	The Urban Agenda for the EU was launched in May 2016 with the Pact of Amsterdam . It represents a new multi-level working method promoting cooperation between Member States, cities, the European Commission and other stakeholders in order to stimulate growth, liveability and innovation in the cities of Europe and to identify and successfully tackle social challenges. Among other resources, this initiative provides a one-stop-shop for cities .
ICLEI	Global	ICLEI is the leading global network of 1,500+ cities, towns and regions committed to building a sustainable future. Through the collective efforts of its active members, ICLEI impacts more than 25 percent of the global urban population
C40 Cities	Global	C40 is a network of the world's megacities committed to addressing climate change. C40 supports cities to collaborate effectively, share knowledge and drive meaningful, measurable and sustainable action on climate change.
International Urban Cooperation (IUC)	European Union	The International Urban Cooperation (IUC) supports the achievement of bilateral policy objectives between the European Union and other regions. IUC also supports major international agreements on urban development and climate change, such as the Urban Agenda, the Sustainable Development Goals, and the Paris Agreement. The IUC program engages with major international financial institutions and partners to link city decision-makers with potential funders. Component 1 of the IUC supports city-to-city cooperation. EU cities are paired up with peers from other regions facing related sustainable development challenges. Chosen cities are supported to share knowledge and best practices on sustainable urban solutions. Target countries beyond the EU include China, India, Japan, Canada, Mexico, USA, Argentina, Brazil, Chile, Colombia and Peru. In November 2018 there are 64 city pairings already in place.
Eurocities	Global	Eurocities is the network of major European cities. Its members are the elected local and municipal governments of major European cities. Eurocities was founded in 1986 by the mayors of six large cities: Barcelona, Birmingham, Frankfurt, Lyon, Milan and Rotterdam. Today it brings together the local governments of over 140 of Europe's largest cities and over 45 partner cities, that between them govern 130 million citizens across 39 countries.
Cooperative Councils Innovation Network	UK	The Cooperative Councils' Innovation Network is a collaboration between local authorities committed to community sustainable transformations

5.4. Other relevant initiatives

Name of the initiative	Lead organization	Description
The Mashariki Innovations in Local Governance Awards Programme (MILGAP)	Africa	The Mashariki Innovations in Local Governance Awards Programme (MILGAP) is a biennial national and sub-regional awards programme to recognize, support and encourage innovative practices in local governance in East Africa. MILGAP aims to contribute to the alleviation of poverty in the sub-region by rewarding innovative practices aimed at enhancing local democracy and decentralization.
The European Capital of Innovation (iCapital) Award	European Union	This prize recognizes and advances innovation in European cities. This prize enables European cities to showcase their contribution to developing local innovation ecosystems for the benefit of businesses and the wellbeing of their citizens.
Global Public Innovation Network	Multi-regional	The Global Public Innovation Network, established in 2002, is a collaborative network of ten public policy awards programs from around the globe. The Innovation Network gathers and disseminates knowledge about innovations in public service provision, public action, and governance.
ISWA – International Solid Waste Association	International	ISWA is a global, independent and non-profit making association, working in the public interest and is the only worldwide association promoting sustainable, comprehensive and professional waste management. ISWA is the only worldwide waste association, which allows members to network with professionals, companies and institutional representatives
WasteAid	International	WasteAid is an independent UK charity (non-profit), set up by waste management professionals to share practical and low-cost waste management know-how with communities in low-income countries.

End notes, references and links

- ¹ Getting Started with the SDGs in Cities: <http://unsdsn.org/wp-content/uploads/2016/07/9.1.8.-Cities-SDG-Guide.pdf>
These can be defined as a concentration of actors and relations of all kinds – economic, so-cial, political and institutional – that generates a collective learning process within certain technological and/or functional areas.
- ² <https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data>
- ³ <https://thetinylife.com/what-is-the-tiny-house-movement/>
- ⁴ http://www.greenhomebuilding.com/building_codes.htm
- ⁵ <http://wrirosscities.org/news/brazilian-cities-seek-new-paths-sustainable-urban-mobility-plans>
- ⁶ http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E
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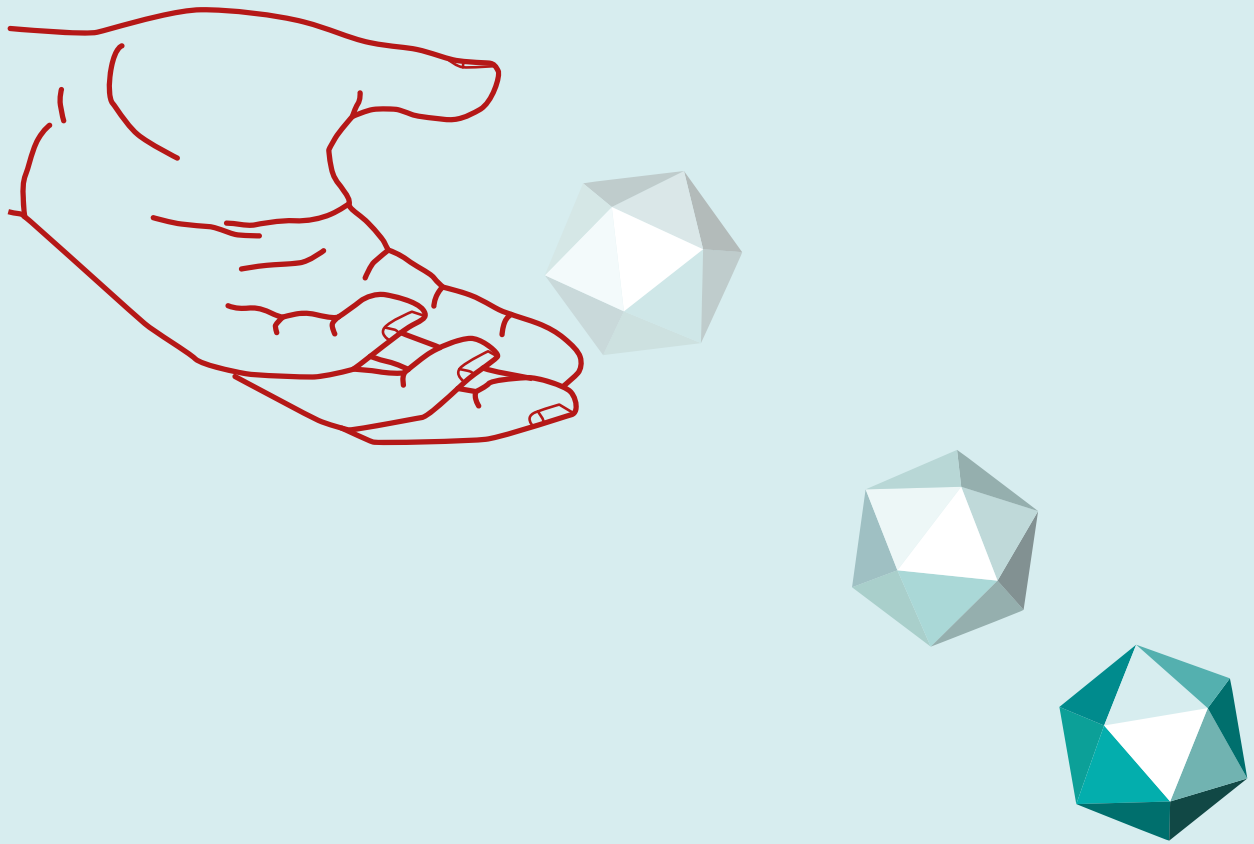
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