



URBAN GreenUP

**D7.6: Table of exploitable results, business models and
financial instrument to implement NBS for public
sectors**

WP7, T7.3

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0 Abstract

The ***D7.6 Table of exploitable results, business models and financial instrument to implement NBS for the public sector*** identifies opportunities for public stakeholders to implement NbS at the urban scale to create social value and engage private stakeholders to contribute to funding these solutions. At this purpose, the role of public stakeholders in business models (BM) to deliver NbS is assessed.

This deliverable is highly integrated with ***D7.5 Table of exploitable results, business models and financial instrument to implement NBS for the private sector*** as identified BM are unique while, the perspective of public and private actors is differentiated. So, there are common sections in the two deliverables.

D7.6 makes an in-depth analysis of public stakeholders that are involved in NbS development and considers: i) their roles, ii) their stakes, and iii) the benefits. Business models are defined through canvas methodology. Their classification is based on two dimensions: i) stakeholders' role; and ii) financial instrument. Considering both features the following categories of business models are identified:

- ***Regulation-based – 4 business models***
- ***Incentive-based - 2 business models***
- ***Voluntary-based - 6 business models***

Finally, a table that links the typologies of NbS with categories of business models that can be used for their implementation has been created.



1 Introduction

1.1 Purpose and targets groups

D 7.6 Table of exploitable results, business models and financial instrument to implement NBS aims to clearly identify the business model categories that can be adopted to implement NbS, based on the experience of NbS implemented in Urban GreenUP project. At this purpose, the deliverable capitalizes on the results obtained during the project implementation and more specifically it builds on the analysis carried out in the whole WP7 for the identification of the main exploitable results and of the market opportunities for the upscaling and deployment of NbS in different countries. WP6 has also been considered as a reference to assess the main barriers and enabling factors for the NbS implementation in different cities and involving different stakeholders. Finally, results of WP2, WP3, and WP4 have been analysed to better understand the approaches used for NbS implementation in front-runner cities and for the identification of innovative approaches for stakeholders’ engagement in NbS financing.

It must be highlighted that the results of other H2020 projects focused on NbS topic have also been considered and have been useful to enrich the case studies developed in Urban GreenUP. The participation in the Task Force for Governance and business models, launched by the European Commission to systematize the results obtained by different H2020 projects and to create synergies between them, has been used to consolidate the outcomes of the Urban GreenUP project.

1.2 Contributions from other partners

The following Table describes the main contributions of participant partners in the development of this deliverable.

Partner	Contribution
UB	Data analysis, methodology definition, conceptualization, and realisation of the deliverable. Systematisation of Urban GreenUP results.
RMIT	Assessment of exploitable results and analysis of market opportunities in other countries.
VAL	Provision of data regarding the impacts generated by NbS in cities and response to the socio-economic assessment survey.
LIV	Provision of data regarding the impacts generated by NbS in cities and response to the socio-economic assessment survey.
IZM	Provision of data regarding the impacts generated by NbS in cities and response to the socio-economic assessment survey.

Table 1: Contribution from project partners



1.3 Connection with other project activities

The following table summarises the main relationship of this deliverable to other activities (or deliverables) developed within Urban GreenUP Project and that should be considered along with this document for deepening its contents.

Partner	WP	Relation
VAL	WP2	Implementation of NBSs in the city and definition of financing schemes for the co-financing of nature-based solutions. Monitoring and analysis of the performances. Stakeholder engagement analysis.
LIV	WP3	Implementation of NBSs in the city and definition of financing schemes for the co-financing of nature-based solutions. Monitoring and analysis of the performances. Stakeholder engagement analysis.
IZM	WP4	Implementation of NbS in the city and definition of financing schemes for the co-financing of nature-based solutions. Monitoring and analysis of the performances. Stakeholder engagement analysis.
RMT	WP6	Characterization of front-runner cities Cluster of cities to foster transferability Link with other SSC-02 projects

Table 2: Relation to other project activities

2 NbS Business model definition

The business model concept was born in the corporate world to describe “the rationale of how an organization creates, delivers, and captures value” (Osterwalder and Pigneur, 2010). Over the years, the concept of “value” has changed and broadened beyond the aspects of financial performance and profits of business activities, comprising also the creation of social value. This enlarged concept of value is particularly suitable for NbS, as they are expected to contribute to better, more sustainable, resilient and low-carbon lifestyles and society (Tokoro, 2016; Dameri, Rosenthal, 2014). Social value from NBS projects comprises different types of values benefitting different stakeholders, each one with specific interests and motivations (Dameri, Rosenthal, 2014).

We define a business model as the mechanisms through which a specific NBS (or a combination of interrelated solutions) is able to “create, deliver and capture” private and social value REF.

The concepts of value proposition, value delivery, and value capture are three fundamental elements of business models. A specific feature of NbS Business Models is that the city government has a role in the value chain, which can be direct (e.g. involvement in the design/provision/management of the solution), or indirect (e.g. setting the regulatory/incentivation/facilitation framework for private actors to deliver the solution).

Different stakeholders can be engaged in the process of design, implementation, and management of NbS (see section 3). These stakeholders can be categorized into three main groups: public sector, business sector, and community.

- **Public sector.** public sector consists of governments and all publicly controlled or publicly funded agencies, enterprises, and other entities that deliver public programs, goods, or services;
- **Business sector.** business sector encompasses all for-profit actors;
- **Community:** citizens, NGOs, associations.

Each stakeholder group has different goals regarding impacts generated by NbS at the urban scale. In the following table (Table 1) the main objectives and motivations that drive different stakeholder categories in the pursuit of value from NbS have been summarised:

Stakeholder	Economic and social value
<i>Public sector</i>	Economic development Quality of life Urban regeneration Climate change mitigation Climate change adaptation Cost-to-serve the citizen Environmental sustainability Social sustainability

<i>Business</i>	Supply chain management Business opportunities Emissions reduction Risk reduction Brand recognition Corporate social responsibility
<i>Community</i>	Well-being Health protection Aesthetic improvement Neighbourhood regeneration Social inclusion Cost savings Increase in property values

Table 1: Value proposition in NBS projects

The motivations for city governments to participate in NBS projects depend on several factors, like to promote economic development, improve urban quality of life, increase urban environmental sustainability, contribute to urban regeneration, mitigate climate change and adapt, increase the efficiency and cost of city services for the municipality and for citizens, increase social sustainability.

2.1 Urban GreenUP business model canvas

The following business model canvas has been defined within Urban GreenUP project (Figure 1).

The canvas identifies a set of key parameters, which are usually named in literature as “business model dimensions”, “business model building blocks”, or “business model elements” (Ballon, 2007). The number of parameters used can vary from two to several, and these diverse classification systems lead to several different typologies and taxonomies of business models. The business model canvas defined in Urban GreenUP project capitalizes on the assessment of innovative case studies (see D7.4) and on the work done by other H2020 projects. It is composed of the following elements:

1. **Implemented Nbs:** detailed description of the solution including the phases for its implementation (planned intervention, project scale, objectives, realisation time, duration, asset ownership);
2. **activities:** key activities necessary to deliver value proposition;
3. **value proposition:** value that the solution intends to create for stakeholders and needs that the solution aims to address and satisfy;
4. **stakeholders:** list of the stakeholders involved in the solution and their role;
5. **NbS users and beneficiaries:** identification of possible target users of the NbS and of the stakeholders that will benefit from the impacts. Considering the multifunctionality of NbS, ES generated by the NbS need to be considered to assess multiple benefits.



6. **resources:** resources necessary to deliver the solution value proposition (time, expertise, labour, assets, etc.);
7. **risks:** risks associated with the implementation process;
8. **financial instrument:** description of the financial mechanism to fund investment and ensure return;
9. **cost structure:** capital expenses and management/maintenance costs;
10. **revenues stream:** revenue streams associated with the implemented solution (asset transfer, economic efficiencies (cost savings), fees for the use of service. The funding sources can be: own capital, debt (loan and bond), and grants. Furthermore, local governments can finance investments through transfers from EU, State, Region, or raise taxes, charges, fees;
11. **ecosystem services provided:** ES provided can be supporting, regulating, provisioning, and cultural services. The identification of ES can facilitate the involvement of stakeholders in the implementation and management of the NbS;
12. **social benefits:** non-financial aspects of the business model that are beneficial to society, such as: job creation, business generation, social inclusion, climate risk reduction, etc.;
13. **environmental impacts:** NbS can generate a wide range of positive environmental impacts such as: GHG emissions savings, resource efficiency, vulnerability reduction, pollution decrease, urban heat island effect mitigation, etc.

NBS	Activities	Value proposition	Stakeholders engaged	Resources
<i>project description (interventions planned, project scale, objectives, realisation time, duration, asset ownership)</i>	<i>description of the key activities necessary to deliver your value proposition</i>	<i>description of the value that the action intends to create for citizens/city-users/local government/other stakeholders and of the needs that the action aims to address and satisfy.</i>	<i>list of the stakeholder involved in the project activities and their role</i>	<i>description of the resources necessary to deliver your value proposition and to maintain it (time, expertise, working hours, etc.)</i>
			Target users	Risks
Financial instrument	Cost structure		Revenue stream	
<i>on-budget/off budget innovative/traditional</i>	<i>capital expenses (€), and maintenance costs Capital expenses - are incurred to acquire fixed assets or add value to them in view of creating future benefits. The benefits derived from capital expenditure extend beyond the accounting period of the actual spend. The assets acquired in question might be tangible or intangible</i>		<i>identification (and quantification) of the revenue streams associated with the project implemented (asset transfer, economic efficiencies (cost savings), payments/tariffs for the use of the service, other)</i>	
Ecosystem services	Social benefits	Environmental benefits		
<i>provisioning regulating, cultural, supporting</i>	<i>non-financial aspects of the business model that are beneficial for stakeholders and for the city (Diaz-Diaz et al., 2017), such as: job creation, business generation (e.g. activation of startups or innovative businesses), social inclusion)</i>	<i>non-financial aspects of the business model that are beneficial for stakeholders and for the city (Diaz-Diaz et al., 2017) such as: energy/GHG emissions saved, resource efficiency, contribution to vulnerability reduction and resilience.</i>		

Figure 1: Urban GreenUP business models' canvas



3 Typologies of business models for NbS development

Providing a categorization of the main business models oriented to NbS development can be useful to different stakeholders, including policy makers, business developers, practitioners, and researchers to replicate and adapt solutions to a specific context. However, as highlighted in Deliverable 7.4., a comprehensive categorization of NbS business models is currently lacking.

The scientific literature has identified “archetypes” of business models, where an archetype can be intended as a general model, which is representative of a set of mechanisms. Different criteria can be adopted to identify and describe business model archetypes, which also depend on how a business model is defined and which building blocks are considered. For example, Gassmann et al. (2013) define 55 patterns or archetypes of business model innovation in firms, considering four main components of business model structure (1. *Who*: target customer; 2. *What*: value proposition towards the customer; 3. *How*: value chain needed to create the value; 4. *Value*: revenue model that captures the value).

We identify two main elements as key parameters to differentiate business models used to develop NBS at the urban level:

- 1) the **role of stakeholders** in each of the key phases that characterize the process;
- 2) the **financial mechanism** to sustain and repay the investment.

As previously highlighted, stakeholders can be categorised into three main groups: public sector, business sector and community. Table 2 summarizes the stakeholders under the three main groups.

GROUP	STAKEHOLDER
Public	Municipalities, Regional government, National government, EU
Business	Designers (architects, landscapers, agronomists, etc), developers of NbS (nurserymen, green infrastructure integrators, and installers and maintainers), and financial actors (banks, insurance companies, etc.)
Community	Citizens, NGOs

Table 2: Stakeholders' groups

The main phases to implement and deliver an NBS project can be defined as:



- **Design**: refers to the definition of the NBS features based on the context in which it will be implemented,
- **Build**: refers to construction works needed to effectively implement the Nbs,

- **Operate:** refers to the management and maintenance operations needed to preserve and enhance the NBS over time.

Public actors can play different roles in each NBS project phase, which are influenced by several elements including their legislative and administrative competences and powers, political priorities, skills and knowledge available in the public administration. In particular, local governments can play different roles in NBS implementation.

- **Direct provision:** a city government may have the capacity, the financial, and human resources to directly invest in and create new NBS, in-house.
- **Public procurement:** a city government may decide to procure some services needed for the NBS implementation through a competitive public tendering process or other procurement procedures.
- **Regulation:** a city government can define rules for new urban developments, redevelopments, or improvements that foresees mandatory creation of new NBS. A city government can also adopt other forms of regulations that provide incentives to private actors for the creation of new NBS.
- **Facilitation:** a city government may create the conditions to facilitate the involvement of business actors or engage community in NBS implementation and management (through public recognition or rewarding).

Private actors can act as direct implementers of NbS (developers, land and property owners, real estate asset managers) to increase the value of their assets, or as market operators in the value chain connected to NbS. In the design phase, architects, engineers, and urban planners operate. In the building phase, plant nurseries, constructors, system integrators, and installers operate. In the operations phase, managers and maintainers of NbS operate. In all phases, actors can work for public or private actors which develop solutions.

Table 3 summarizes the main activities that each stakeholder group can perform in each project phase:

NBS project phase	Public	Business	Community
Design	In-house design Procurement	Design provision and consultancy to public authorities/developers	Co-design
Build	In-house construction Procurement	Provision and implementation construction works	Realisation of simple local solutions
Operate	In-house management & maintenance Procurement	Management & maintenance	Local maintenance

Table 3: Project phases and stakeholders' related activities

The second element that has been identified as meaningful to differentiate NBS business models is the **financial mechanism**, that enables sustain and repay investment in the NbS.



If the benefit generated by an NBS is clearly perceived by the user, the business model can rely on setting a fee and make users pay for this benefit (e.g. fee for using facilities in an urban park). In other cases, the benefit can take the form of budget savings for municipalities or costs savings for public or private actors. Value can also be captured through taxes aimed to monetize positive externality. For example, a city government can ask citizens to pay for an additional tax in light of the benefits perceived by the implemented NbS (e.g.: increase in property value).

In the last years, several innovative financing instruments have been developed which are based on the recognition of the value generated by NbS and their services and their monetization. Financial mechanisms that allow the investment to be repaid can be managed by public or private actors listed in Table 4 (and described in detail in D7.4). Considering public stakeholders, financing instruments are of a different nature: transfers, taxation. Furthermore, public administrations can use regulatory tools (standards, building rights) and incentive tools as leverage towards developers and the community (e.g.: reduction of land development fees, floor area ration increase, tax deduction) against the creation of NbS.

Private stakeholders, on the other hand, can voluntary develop NbS to increase revenue generation. They can also use Payment for Ecosystem Services (PES) or other innovative tools such as biodiversity-positive credits to get the investment repaid.

The selection of the most suitable financial instruments in developing NbS depends on many factors, including: the main actor leading the business model; the main objectives that the business model aims to achieve; the funding available to support the business model; the typologies and functioning rules of financial instruments according to the specific country regulation; availability of skills, knowledge and time resources needed to put into operation a specific financial scheme. Finally, it must be highlighted that not all financial instruments listed above can be used by all stakeholders mentioned above. Table 6 shows which are the instruments that can be used by the different groups of stakeholders.

Instrument	Public	Business	Community
Purpose tax	X		
Tax deduction	X	X	X
Building rights incentive	X	X	X
Development charge	X		
Tax Increment Financing	X		
Carbon offset		X	
Biodiversity-positive carbon credit		X	
Business improvement district	X	X	
Payment for ecosystem services	X	X	X
Sponsorship	X		
Crowdfunding		X	X

Table 4: Financial instruments and stakeholders' groups



3.1 Social value of NbS and the role of public actors

Public actors have different motivations and roles in the implementation of NbS. As described in section 2 the motivations are linked with environmental sustainability, climate change mitigation and adaptation, economic development and improvement of health and well being in cities. In fact, NbS operationalize the ecosystem services approach within spatial planning policies and practices, to fully integrate the ecological dimension and, at the same time, to address current social challenges in cities.

Based on this it can be said that functioning ecosystems provide flexibility to build capacity to adapt and to cope with different urban challenges. In fact, there are different ways to classify NbS as providers of ES to society. Raymond et al. (2017) - present an impact evaluation framework for NbS across ten identified challenge areas related to climate resilience in urban areas. Dumitru and Wendling (2021) expand the challenge areas to 12: Climate Resilience, Water Management, Natural and Climate Hazards, Green Space Management, Biodiversity Enhancement, Air Quality, Place Regeneration, Knowledge and Social Capacity Building for Sustainable Urban Transformation, Participatory Planning and Governance, Social Justice and Social Cohesion, Health and Wellbeing, New economic opportunities, and green jobs. All these direct and indirect contributions of NbS to social, economic and environmental dimensions generate high social value that can be perceived by all stakeholders. For this reason, public actors aims to foster NbS implementation at the local scale.

Despite this, the implementation of NbS in cities is mainly promoted by public actors but, considering the municipal budget constraints, the implementation of such solutions requires the involvement of private stakeholders. In fact, though the role of public finance is dominant, it is not sufficient to ensure the necessary investments in nature-based solutions. As said governments can put in place the right regulatory environment, incentives, and market structures to catalyse financial flows from the private and to generate social value for different stakeholders. Additionally, public actors can also have other roles in the implementation of NbS, based on the different business model in which are involved. The next sections better highlight the different typologies of BM and the role of public actors.



4 Business models' categories for NbS

Considering the two elements mentioned above – stakeholders' role and financial mechanism – three categories of business models have been identified: i) regulation-based; ii) incentive-based; iii) voluntary-based. In the following sections the different BM are described following the above categorisation.

4.1 Regulation- based business models

The regulation-based BM type includes 4 different business models:

- Urban development standard
- Development charge
- Purpose tax
- TIF

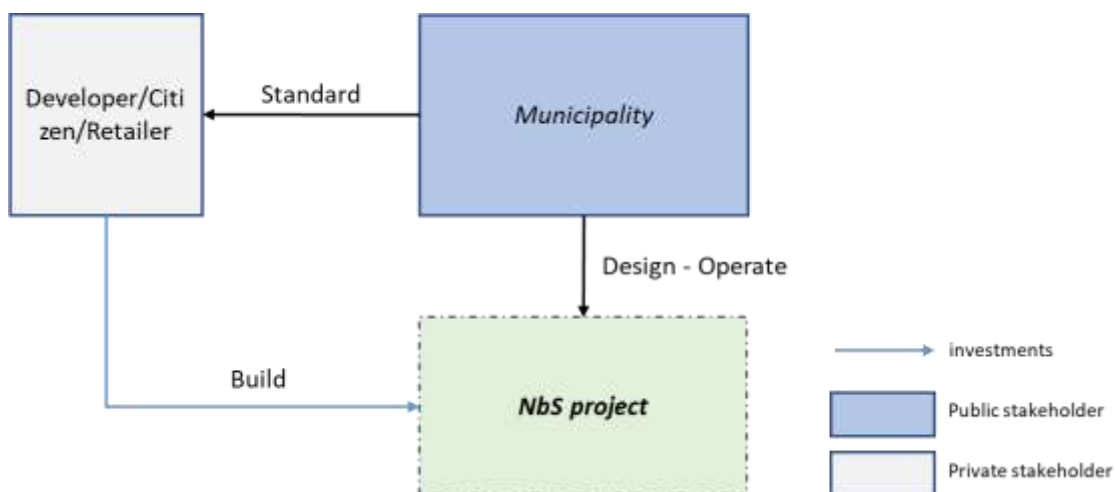


Figure 2: BM based on Urban development standard

Figure 2 represents a BM based Urban development standard. The local government defines an obligation to implement a designed NbS to be respected by the land or property owner/developer. After the implementation, the Municipality will operate the NbS.

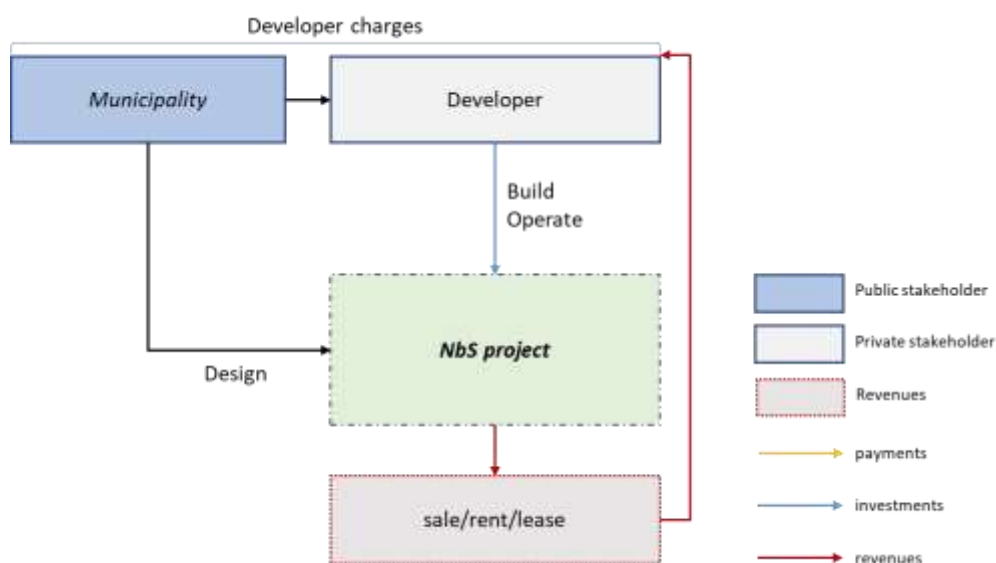


Figure 3: BM based on Developers charge

Figure 3 represents the BM based on Developers charges. A development charge is a fee imposed on developers to fund a public facility, such as an NbS, against the right to develop an area. The developer will built and operate the NbS following specific design rules defined by the Municipality.

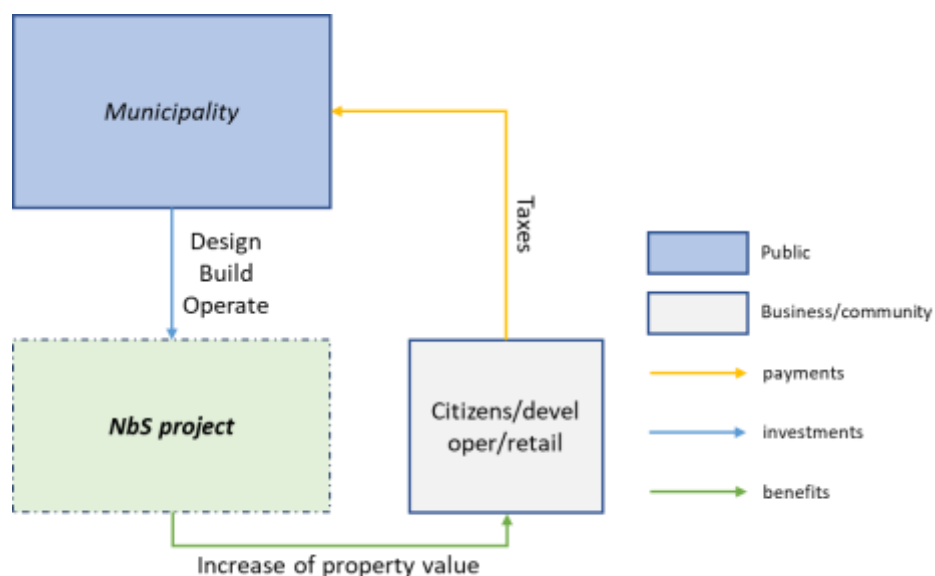


Figure 4: BM based on Purpose tax or TIF

Figure 4 represents a BM based on a purpose tax or TIF. In the first case, the BM is based on a tax defined by the local government that community/business have to pay against the benefits received by the implementation of a NbS. In the case of the TIF, municipalities typically divert future property tax revenue increases from a defined area or district toward a development project or public improvement project. The Municipality will use tax revenues to design, implement, and operate the NbS. The benefit generated to the community/business ordinary is the increase in the property values.

4.2 Incentive-based business models

The incentive BM type includes two different business models:

- Tax deduction
- Building rights incentive.

In the first case, the Municipality will reduce the tax payment to community/business that decide to contribute to the implementation of a NbS. In this case, the Municipality will design the NbS and the community/business will build and operate the NbS (Figure 6).

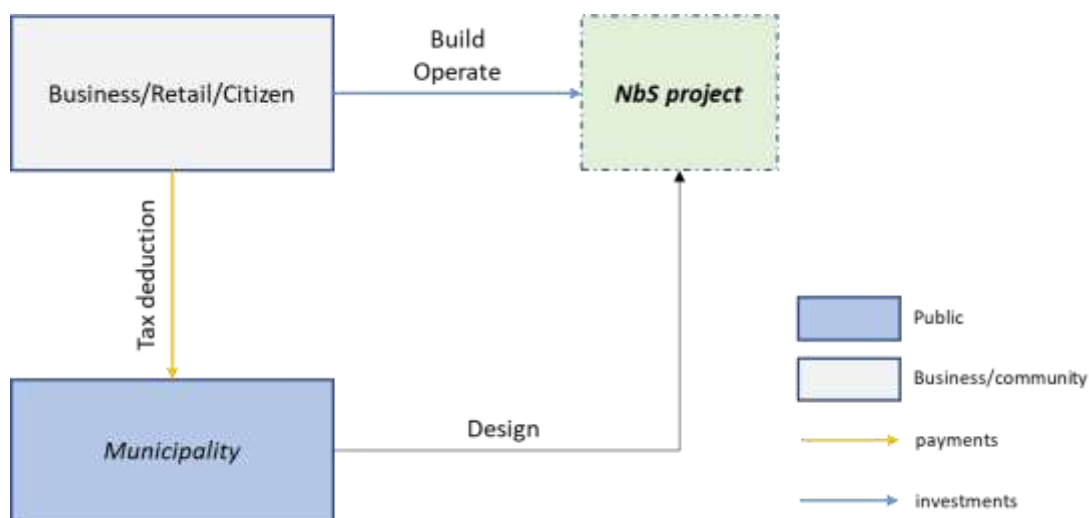


Figure 5: BM based on Tax deduction

In the second case - Building rights incentive - the Municipality allocates extra floor area to a developer against the implementation of a NbS. The Municipality will design the NbS and the developer will build the NbS which ordinary will be operated by the property owner (Figure 7).

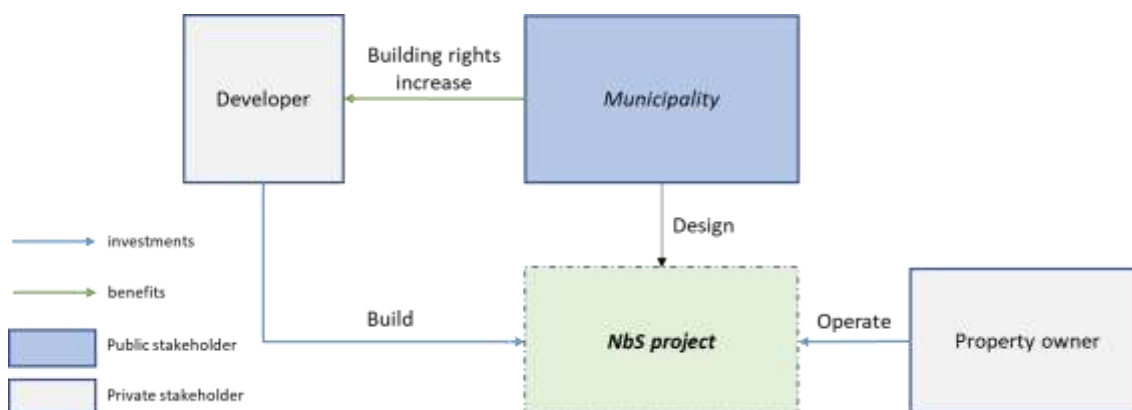


Figure 6: BM based on Building rights incentive

4.3 Voluntary-based business model

The voluntary-based BM type includes six different business models:

- PES;

- Biodiversity-positive credit;
- Carbon credits;
- BID;
- Crowdfunding;
- Sponsorship.

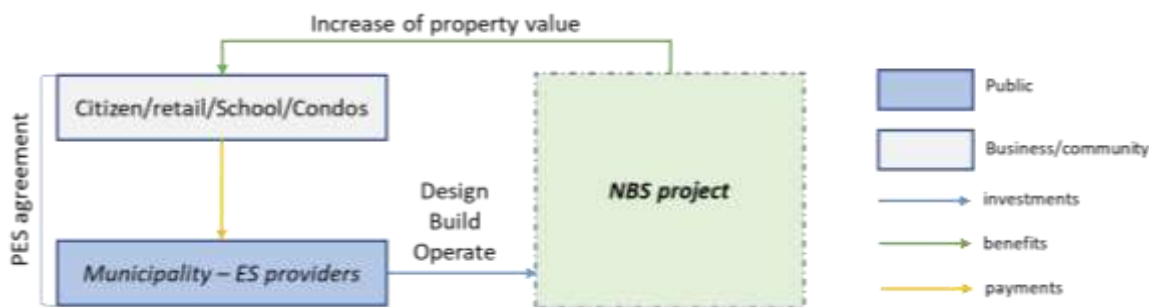


Figure 7: BM based on PES

Figure 8 summarizes a BM for NbS implementation through the use of a PES. A PES is a “voluntary transactions between ecosystem service users and ecosystem service providers that are conditional on agreed rules of natural resource management for generating offsite services”. PES schemes allow service buyers to pay for the safeguard of a natural resource and the services it provides on which they are reliant, hence preventing the risk it becomes scarce. In this way the community/business pays the Municipality for the design/building/operation of the NbS.

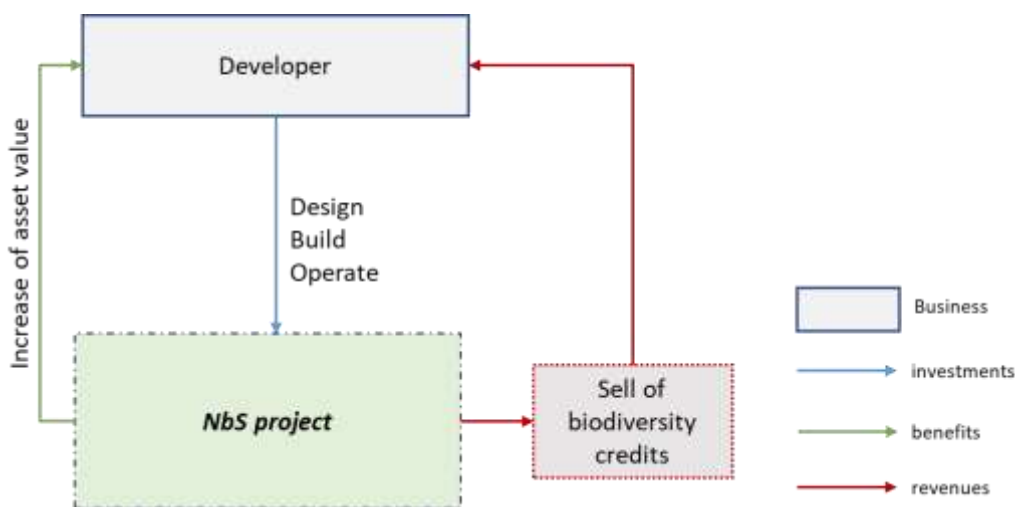


Figure 8: BM based on Biodiversity-positive credit/carbon credit

Figure 9 represents two typologies of BM: based on carbon credit and based on biodiversity-positive credits. The BM carbon credit is based on the generation of emission reduction certified credits which have a market value for companies wishing to offset carbon emissions. The business/community can design, build and operate the NbS. Biodiversity-positive credits are defined as carbon credits that include additional and specific management actions linked to the enhancement, conservation, and/or restoration of biodiversity and nature. Biodiversity credit is an economic instrument used to finance activities that deliver net positive biodiversity gains. Unlike carbon or biodiversity offsets, which are payments made by a business to compensate for its damaging impacts on location-specific ecosystems, biodiversity credits allow companies

to support nature-positive action, funding long-term conservation and restoration of nature, a higher order contribution than simply offsetting negative impact.

Figure 10 represents a BM based on a BID. A Business Improvement District (BID) is a business-led organisation mainly composed by retailers in a defined geographical area where local business has decided to collectively invest to improve the environment. BIDs are funded by a mandatory levy on all eligible business following a successful ballot. This business then helps decide the spending priorities and provide additional or improved services in the BID area such as Nbs.

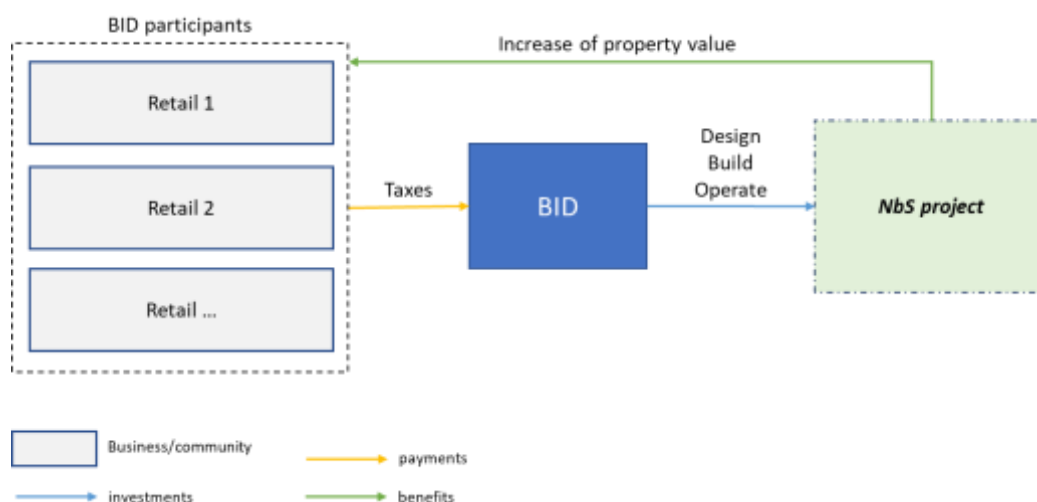


Figure 9: BM based on BID

Figure 11 shows a BM based on Crowdfunding mechanism. Crowdfunding consists in raising funds for a project through the donation of small amounts from a large number of individuals, or in exchange for some form of reward. The gathering of funds takes place through a platform, which is often internet-based. Crowdfunding can be used to implement Nbs.

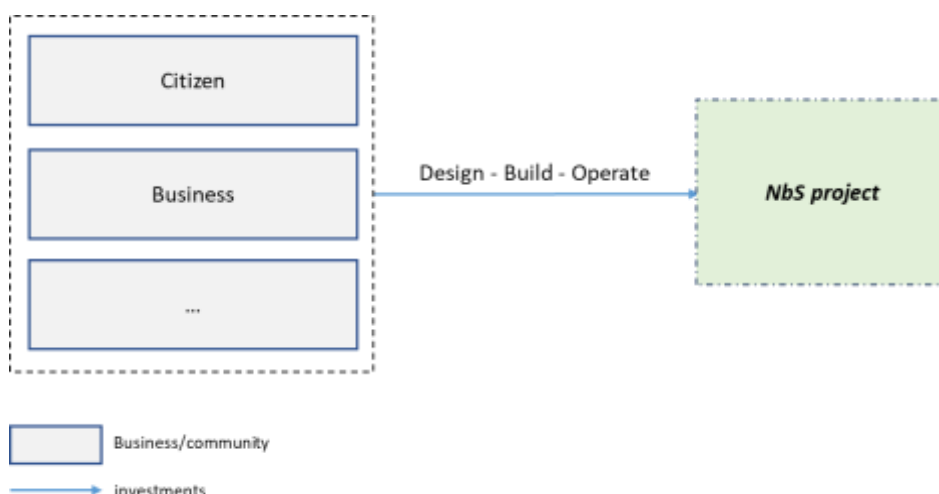


Figure 10: BM based on Crowdfunding

Figure 12 represents a BM based on Sponsorship. A sponsorship is a mutually beneficial exchange whereby the sponsor receives value in return for cash or goods or services-in-kind

provided to the organization. The relationship requires a formal written agreement or confirmation setting out the terms of the sponsorship, including any recognition to be provided to the sponsor. So, business can finance the implementation of NbS and the Municipality/property owner will give visibility and will design, build, and operate the NbS.

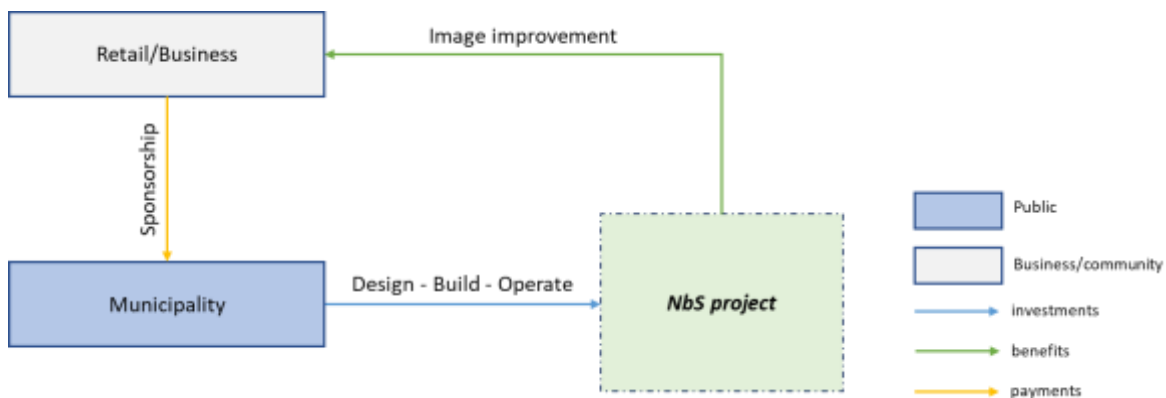


Figure 11: BM based on Sponsorship

5 Business model table for public actors

Identified business models can be used by public actors to implement NbS at the urban scale. As emerged from the description of each business model categories, it can be said that some of them are better targeted for the private sector and some others for the public one. Furthermore, the different types of business models cannot be adopted for the implementation of all categories of NbS. To facilitate the various stakeholders in choosing the most suitable business model a table for public stakeholder is provided. The table relates the different categories of NbS implemented with the different types of business models. The NbS categorization proposed is the one adopted for the ES economic valuation in the Urban GreenUP project. In order to avoid overlapping or repetitions in some case, NbS have been re-categorized. The following table summarizes the NbS categorization adopted and the correspondence with Urban GreenUP NbS.

NbS category	Urban GreenUP NbS
Green roof/wall	Horizontal GI, Vertical GI
SUDs	SUDs, Flood actions, Smart soils, Water treatment
Urban forest	Arboreal interventions, Carbon capture
Urban Parks	Urban Parks
Urban wetlands	Urban wetlands
Permeable pavement	Permeable pavement, Green pavements
Technological green	Pollutant filters, Resting areas
Green Route	Green Route
Pollinators	Pollinators
Urban farming	Urban farming

Table 5: NbS categorization

5.1 Table of business models and financial instrument to implement NBS for the public sector

BM types	Financial mechanism	Green roof/wall	SUDs	Urban forest	Urban Parks	Urban wetlands	Permeable pavement	Technological green	Green Route	Pollinators	Urban farming
	Purpose tax/TIF	X			X	X					X
Regulative	Standard						X	X			
	Developer charges	X	X	X	X	X		X			
Incentive	Tax deduction	X	X				X	X		X	
	Building rights incentives	X	X	X	X	X	X	X			X
	PES										
	Carbon credit	X		X	X	X					X
Voluntary	Biodiversity-positive credit										
	BID										
	Crowdfunding										
	Sponsorships										

Table 6: Table of business models and financial instrument to implement NBS for the public sector

All in all, public stakeholder can use different business models based on regulation or based on incentives. In these cases, the public stakeholders can engage developers, land and property owners, in NbS implementation in order to generate social value. On the other hand public stakeholders can also be involved in other typologies of business models for the implementation of NbS that are voluntary initiated by business/community.



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