



URBAN GreenUP

**D7.5: Table of exploitable results, business models and
financial instrument to implement NBS for private
sectors**

WP7, T7.3

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Authors: UBO, SPI, IFO

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0 Abstract

The ***D7.5 Table of exploitable results, business models and financial instrument to implement NBS for the private sector*** identifies opportunities for private stakeholders to participate to different phases in the development of NbS at the urban scale based on their characteristics and goals. At this purpose, the role of private stakeholders in business models (BM) to deliver NbS is assessed.

This deliverable is highly integrated with ***D7.6 Table of exploitable results, business models and financial instrument to implement NBS for the public 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.

D7.5 makes an in-depth analysis of private 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 7.5 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

Focusing on private stakeholders we consider both business and community.

Business can have different roles in each NBS project phase, which are influenced by their activity area, their position in the NBS value chain, their knowledge and competences, equipment and technologies in use, business strategy and objectives, commitment to sustainability goals, and other factors. Business actors can be driven by different motivations to participate in an NBS project, which include supply chain management, find and exploit business opportunities, reduce energy costs, reduce emissions and achieve other environmental objectives, reduce risks, increase the value of its own properties or assets, obtaining credits for CO2 offsetting which can be traded in the market, increase brand recognition, as well as for Corporate Social Responsibility purposes.

Communities, also, can be involved in each phase of NBS project: taking part in the co-design of NBS and providing their inputs on the features that NBS should have; directly participating in the construction activities, through voluntary engagement (e.g. planting trees or other forms of vegetation) or contributing to the maintenance of the NbS over time.

Additionally, their motivations to participate in such projects can depend on different social, environmental and economic elements, like wellbeing, health/aesthetic improvement, neighbourhood regeneration, social inclusion, and increase in property values.

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 <i>project description (interventions planned, project scale, objectives, realisation time, duration, asset ownership)</i>	Activities <i>description of the key activities necessary to deliver your value proposition</i>	Value proposition <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>	Stakeholders engaged <i>list of the stakeholder involved in the project activities and their role</i>	Resources <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 <i>on-budget/off budget innovative/traditional</i>	Cost structure <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>		Revenue stream <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 <i>provisioning regulating, cultural, supporting</i>	Social benefits <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>		Environmental benefits <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, engineers, urban planners, agronomists, etc), developers, land and property owners, real estate asset managers, NbS constructors (plant nurseries, green infrastructure solutions providers and integrators, and installers and maintainers), retailers, enterprises, 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 Business and community roles and benefits

As described in the analysis performed in D 7.7, NbS can also be developed by private actors, in particular business and community. The first category operates in different phases of NbS development, offering services and works at market conditions, while the second category provides services and works on a voluntary basis for a social purpose. In recent decades, there has been a growing interest from private stakeholders in NbS development, for different reasons, including: market growth, compliance with regulatory requirements, cost-effectiveness, reputational goals, and philanthropic reasons. The potential interest of private stakeholders in NbS has been further described in D 7.7

Private stakeholders are mainly divided into two categories: business and communities. The former are: NbS designers, Developers/ land and property owners/real estate asset managers, NbS constructors, Retailers, Enterprises, Banks/Financial and insurance institutions. The main interest that drives these stakeholders to participate in the implementation of NbS is to generate revenues directly or indirectly. For example, the implementation of a park within a property development can directly increase the value of homes and at the same time can improve the appearance of the area and therefore attract more investment. At the same time, this type of private actor can be pushed to implement NbS based on the presence of standards or incentives. The role they can play in the project can vary according to the type of stakeholder. The direct and indirect benefits generated can be different. Some of these are: property value increase, sales, the attraction of investments, reputation improvement, climate resilience increase, and health and well-being improvement.

The community includes: NGOs, Condominiums, School/University, Citizens. The motivations that push these stakeholders to participate in the implementation of NbS are linked to the improvement of the quality of life in their neighborhood of residence, to social inclusion, and the improvement of the provision of some cultural and leisure services. The roles they can play in implementing NbS vary. NGOs and citizens can operate, and Condominiums and Schools/Universities can design, build and operate.

The table below describes the list of private stakeholders, their motivations in developing NbS, their role and their potential direct and indirect benefits.

Stakeholder		Motivation	Role	Direct and indirect benefits
Business	NbS designers	Consultancy to municipalities Consultancy to private stakeholders	Design	Professional fees
	Developers/ land and property owners/real estate asset managers	Asset improvement Area attractiveness increase Provision of services Compliance with local regulations Public incentives	Design Built Operate	Property value increase Revenues increase Attraction of investments Well-being improvement Climate resilience increase
	NbS constructors	Sale of services Public incentives	Built Operate	Sales
	Retailers	Property value increase Area attractiveness increase	Design Built Operate	Attraction of customers Well-being improvement Attraction of investments



		Compliance with local regulations Public incentives		Increase of tourism Climate resilience increase Reputation improvement
	Enterprises	Property value increase Compliance with local regulations Public incentives Sponsorship	Design Built Operate	Reputation improvement Climate resilience increase
	Banks/Financial and insurance institutions	Business opportunities Image improvement	Built Operate	Revenues
Community	NGOs	Health/well-being improvement Increase of cultural and leisure services Environmental improvement Social inclusion	Operate	Increase of property values Quality of life improvement Increase of climate resilience Increase of area attractiveness
	Condominium	Building refurbishment Improvement of local landscape Increase of cultural and leisure services Compliance with local regulations Energy efficiency	Design Built Operate	Increase of property values Quality of life Increase of climate resilience Energy bill reduction
	School/University	Increase of property value Building refurbishment Improvement of area aspect Compliance with local regulations	Design Built Operate	Increase of property values Quality of life Increase of climate resilience Energy efficiency improvement
	Citizens	Health/well-being improvement Increase of cultural and leisure services Environmental improvement	Operate	Increase of property values Quality of life Increase of climate resilience Energy bill reduction

Table 5: Private stakeholder motivations, roles and the potential direct and indirect benefits

The engagement of business and community stakeholders in developing NbS can respond to regulative obligations or incentives defined by the public actor. Consequently, it can be binding or voluntary. Furthermore, their role can vary depending on the specific business model for NbS implementation. The next sections better highlight the different typologies of BM and the role of business and community.

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

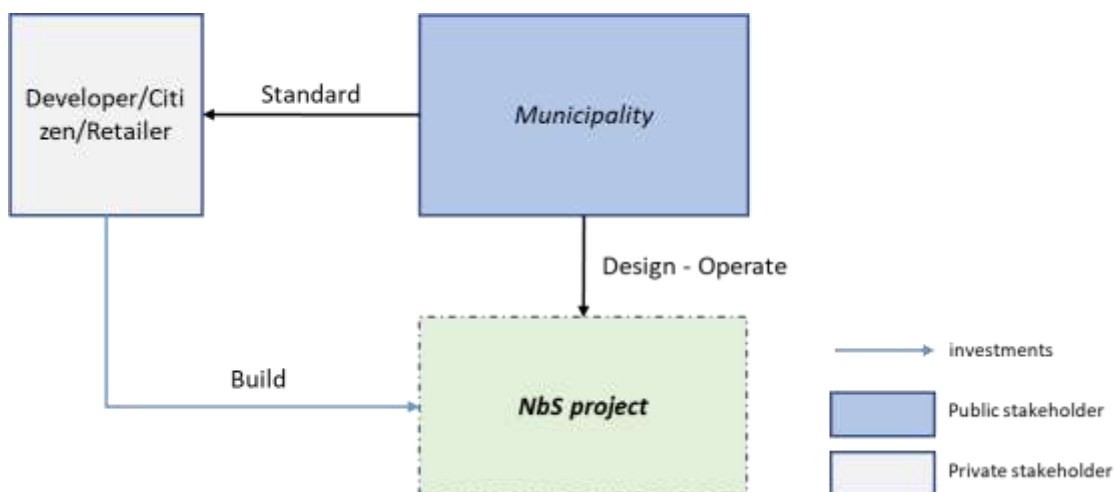


Figure 2: BM based on Urban development standard

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.

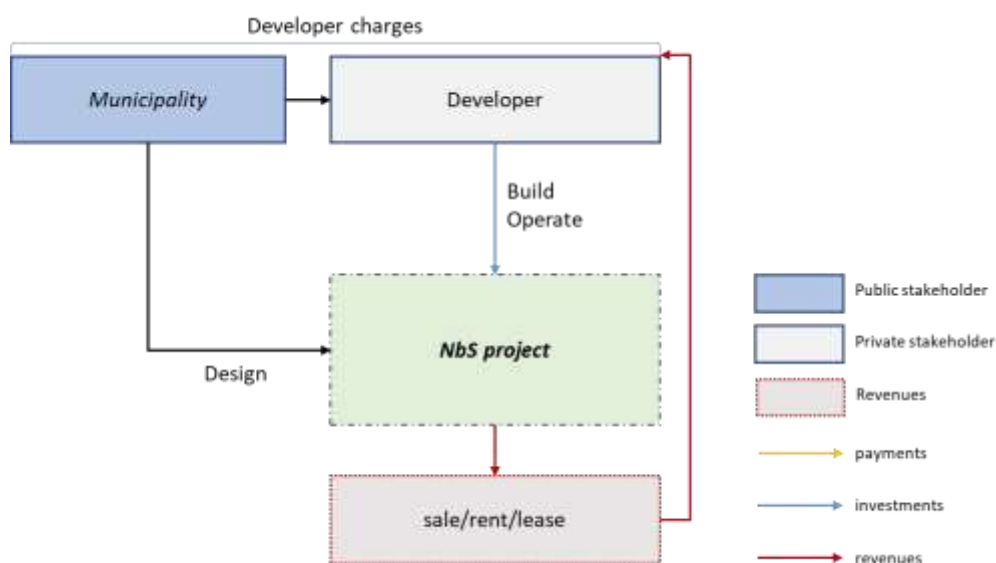


Figure 3: BM based on Developers charge

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.

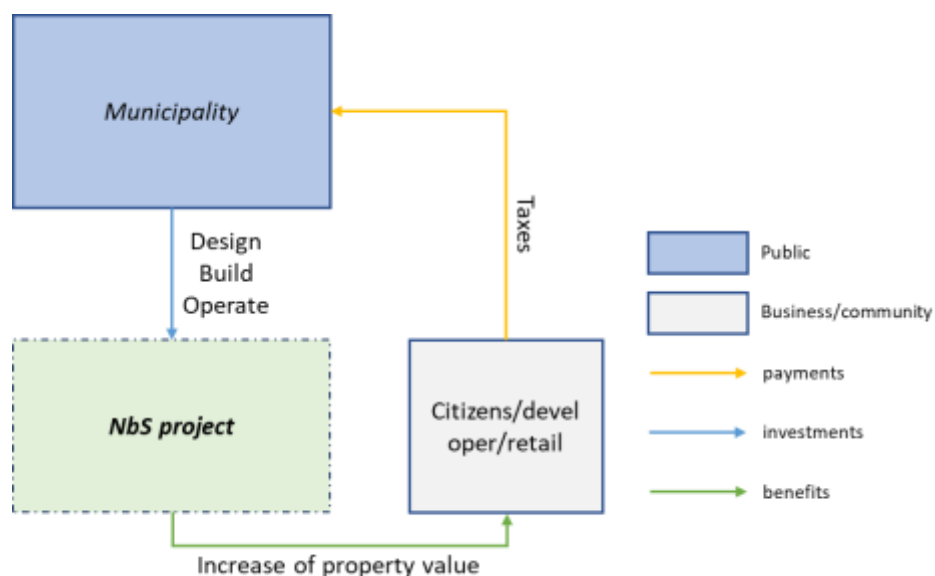


Figure 4: BM based on Purpose tax or TIF

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).

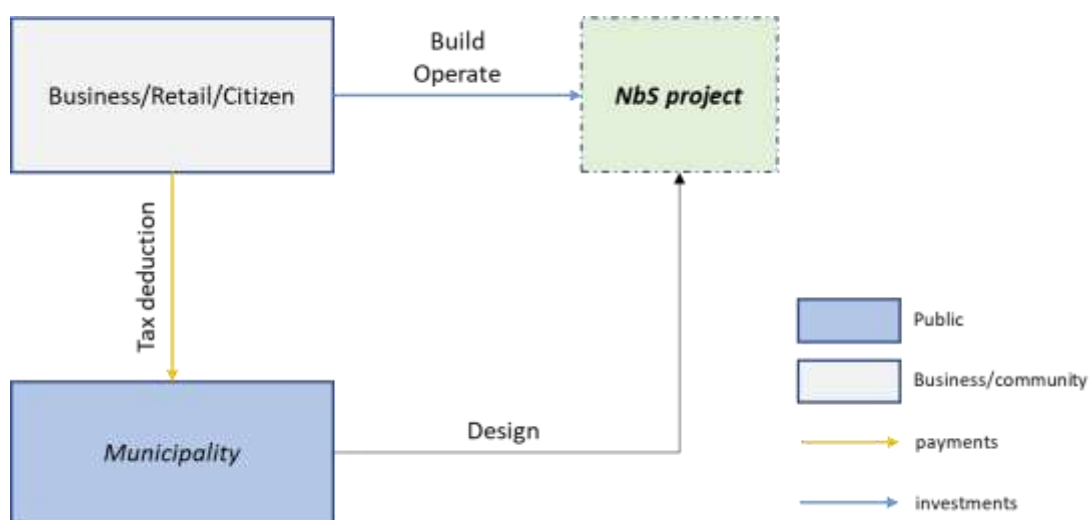


Figure 5: BM based on Tax deduction

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).

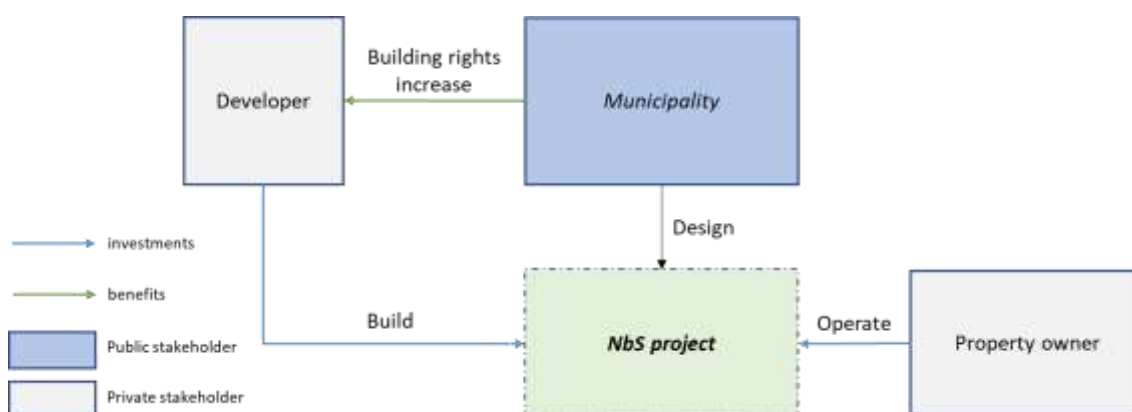


Figure 6: BM based on Building rights incentive

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.

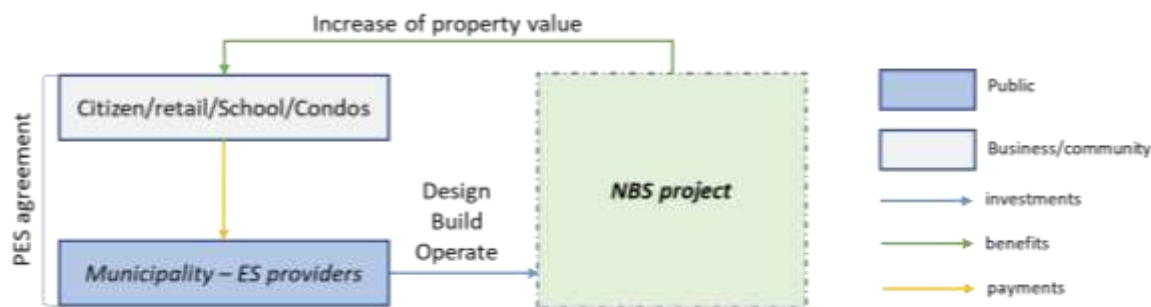


Figure 7: BM based on PES

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.

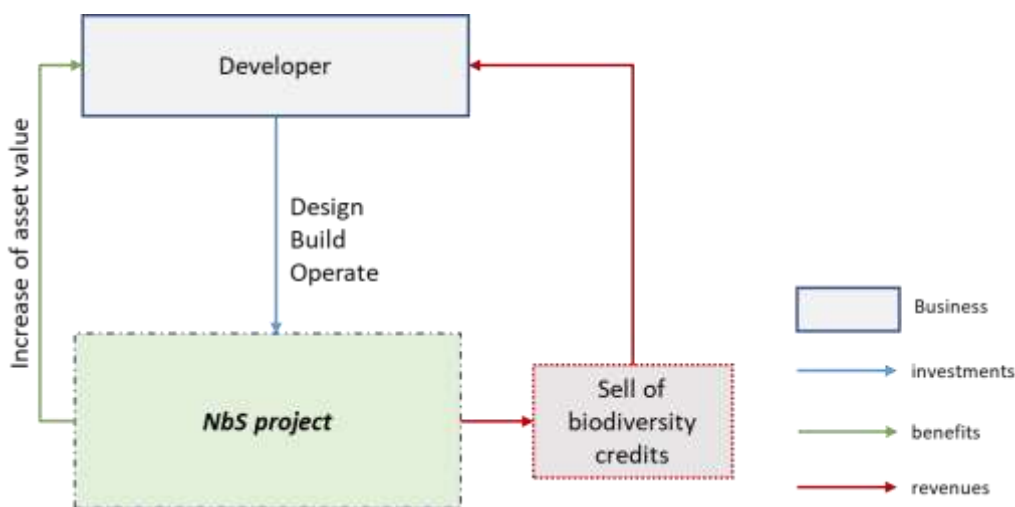


Figure 8: BM based on Biodiversity-positive credit/carbon credit

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.

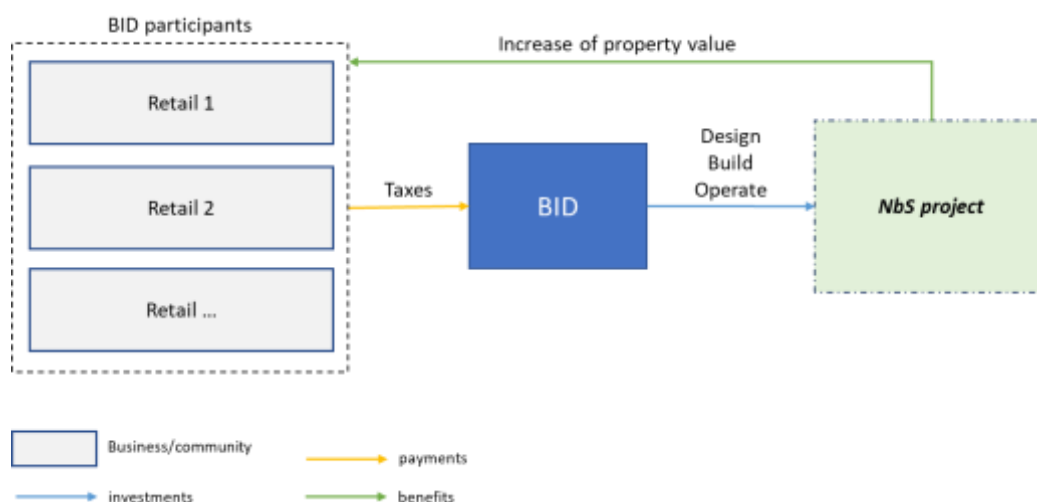


Figure 9: BM based on BID

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.

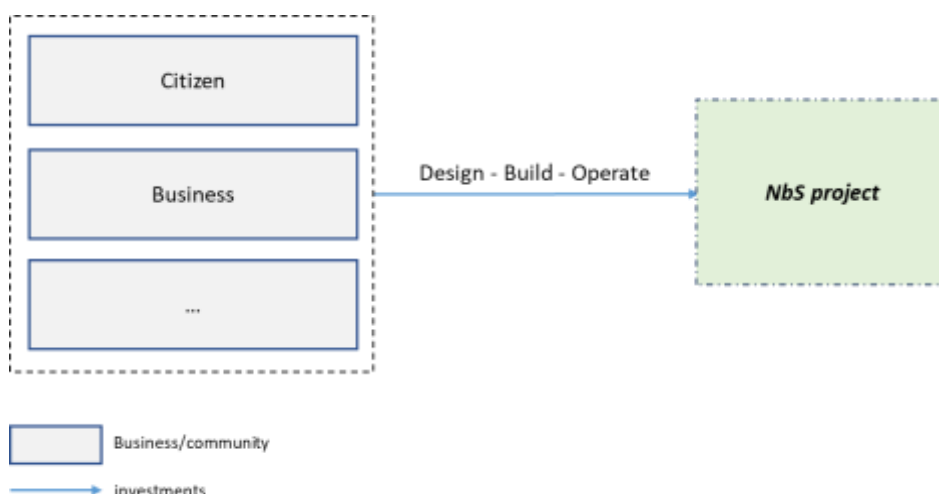


Figure 10: BM based on Crowdfunding

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.

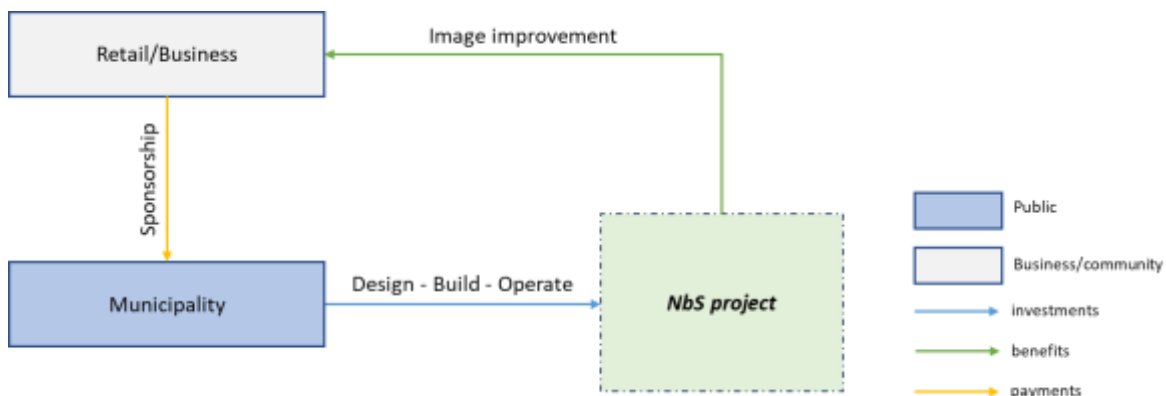


Figure 11: BM based on Sponsorship

5 Business model table for private actors

Identified business models can be used by private 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 private 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 6: NbS categorization

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

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

Table 7: Table of business models and financial instrument to implement NBS for the private sector



All in all, private actors can make use of different BM. In particular, developers, land owners and property owners operate within the regulatory business models in which they compulsorily provide NbS incentives based on advantages on the value of their assets. Instead, other private actors - companies, retailers, condominiums, associations and citizens - operate with BM based on incentives to increase the value of their assets or reduce their costs. Additionally, these can act with voluntary BM in response to improvements in the quality of life in their neighborhoods or for social recognition.



6 Conclusions

The implementation and uptake of NBS that can improve human health and wellbeing in cities will require new investments, which however are difficult to retrieve from public sources because of the tightness of public budgets. As highlighted, new financing sources, strategies of cooperation between public and private actors, as well as new business models will play a key role in supporting this transformation.

The analysis has been conducted through literature review, case studies review and capitalises on Urban GreenUP results. In this way, it has been possible to individuate the main elements that are necessary to identify business models suitable for the implementation of NbS by private actors. Finally, tables with the main business models' typologies for private actors have been reported.



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