CLEVER Cities Innovation Pathway

Application of the Local Innovation Screening Tool (LIST)

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List of Acronyms

CAL	CLEVER Action Labs
EC	European Commission
FE	Fellow-Cities
FR	Frontrunner-Cities
GA	Grant Agreement document
H2020	Horizon 2020
HEU	Horizon Europe
IA	Innovation Actions
IRL	Innovation Readiness Level
LIST	Local Innovation Screening Tool
NbS	Nature-based Solutions
RIA	Research and Innovation Actions
UIP	Urban Innovation Partnership
SROI	Social Return of Investment

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1. Introduction

CLEVER Cities Project (hereafter, CLEVER Cities)[1] primarily aims to regenerate some deprived urban districts by implementing different types of solutions through a co-creation process. Besides the co-creation, the *innovation* behind the process of implementing an NbS is also a mainstream element contemplated in the project.

Innovation means different things to different people but fundamentally innovation occurs when an idea is turned into value. We could generally argue that urban regeneration or providers of ecological solutions invest in the *Innovation*, which they then deploy to generate a Social Return on Investment (SROI) that can be converted into a benefit and then in turn, into wealth, as an answer to the urban challenges. Basically, users and citizens look for ways to improve their lives. This common view of innovation assumes that there are two main aspects of innovation: the perspective of those creating or providing the innovation and the one of those using it.

In the context of CLEVER Cities, and considering the aims and vocation of the project, innovation if focused from a flexible and less orthodox perspective, where the cities (as planners), the citizens (as users), and the private sector and knowledge providers come together in a co-creation process to co-design and invest in innovative regeneration processes and solutions aiming to address certain challenges and problems, achieving social, economic and environmental benefits, towards improvement of society, resilience and better quality of life.

To understand the implementation of innovative aspects within a given action (in CLEVER Cities, the implementation of NbS to regenerate urban areas), and to identify the innovation pathway taken to reach a final product, TECNALIA developed a Local Innovation Screening Tool (LIST). This webtool was adapted and applied to respond to the needs of the project, and its goals are twofold: (i) to identify the innovation pathway along the timespan of the project in terms of NbS implementation, considering aspects such as materials, methods, monitoring, and management, and (ii) to provide inspiration and knowledge about different types of innovation along the NbS co-created process for the implementation (i.e., co-creation, co-design, co-implement, co-monitoring, co-maintenance).

In CLEVER Cities, the LIST gives support to its Frontrunner-Cities (FR) (London, Milan, and Hamburg) moving towards a new and significantly improved urban regeneration through NbS implementation, that responds to four challenges: Human health and well-being, Sustainable economic prosperity, Social cohesion and Environmental justice, and Citizen security. It also aids Fellow-Cities (FE) (Malmo, Madrid, Larissa, Belgrade, Sfântu Gheorghe, and Quito) to create value considering innovation in the process of NbS ideation and their future action plans.

The LIST is based on an innovation pathway assessment from the technological, economic, social, and legal feasibility points of view, emerging as result of a reflection process within each city. For that, both Ex-Ante and Ex-Post evaluation are foreseen, counting on associated functionalities embedded in the tool. The innovation covers three different evaluations: Innovation Readiness Level (IRL), the innovation model, and the feasibility for implementation.

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[1] www.clevercities.eu

It is worth noting that the innovation criteria to be evaluated which are included in the LIST are not always and necessarily to be considered `absolute´ (i.e., never previously implemented), but are mostly to be considered `relative´. Relative innovation may be either a novelty defined against a more conventional solution used up till then, or a transfer of the implementation of an idea from a different place, as long as it has never been applied earlier for integration of NbS into urban regeneration.

To comply with its goals, and to facilitate the identification of the innovation pathway, the LIST is based on a set of pre-established criteria, organized in four hierarchical levels: Tiers, Spheres, Components, and Criteria. The almost 150 criteria included were initially elicited from project partners, then defined and crystallized by a group of experts and were concluded by an in-depth review process supported by different professionals.

All in all, the analysis of the results following the application of LIST offer valuable insights to directly inform urban planning, and more precisely, to contribute to the replication strategy and the development of a more refined NbS action plan. Some considerable learnings fostered by LIST are to identify the innovation opportunities in advance, to be able to redesign a more innovative technical proposal, to know options on how to nurture co-creation, to recognize possibilities of optimising resources, to support the preservation of the biodiversity and provision of ecosystem services, among others. Particularly for CLEVER Cities, these learnings may contribute to improve the urban regeneration in deprived areas, promoting a more sustainable societal transformation.

1.1. Definition of innovation

The word "innovation" is derived from the Latin noun *innovatio*, derived from the verb *innovare*, which means to introduce something new. In essence, the word has retained its meaning up until today. In general, innovation means to improve or to replace something, e.g., a process, a product, a service. However, in business, innovation is a process by which a domain is renewed and updated by applying new processes, introducing techniques, or establishing successful ideas, aiming to the creation of new value.

Certainly, the definition of innovation can vary depending on the source. A selection of key examples is included in the Table 1, which indicate the wide variety regarding the understanding of the concept, and the different context to which it can be applied. In some cases, it is discerned according to existing solutions in place.

SOURCE	DEFINITION
European Commission Glossary[2]	An innovation is the implementation of a **new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method** in business practices, workplace organisation or external relation. The minimum requirement for an innovation is that the product, process, marketing method or organisational method must be new (or significantly improved) to the firm.
Smart Cities (FAQ)	Innovation will be primarily in new uses and in new processes. Adaptation of technology may be required but not completely new technological developments. Innovation (and the related first mover risk) is particularly related to the **innovative combination of mature innovative technologies at large scale**, as well as embedding this demonstration into a suitable planning and financing framework to ensure achieving long-term scale effects: integration into ambitious urban plans, validated business models, replication models and securing additional private funding.
Innovation Union[3]	There is no one single definition. But innovation as described in the Innovation Union plan broadly means change that **speeds up and improves the way we conceive**, develop, produce and access new products, industrial processes and services. Changes that create more jobs, improve people's lives and build greener and better societies.
EFQM* Framework for Innovation	The practical transformation of ideas into new products, services, processes, systems and social interactions.

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[2] http://ec.europa.eu/enterprise/glossary/index_en.htm
[3] http://europa.eu/rapid/press-release_MEMO-10-473_en.htm?locale=en

UNE** 166000:2006[4]	Activity whose result is the obtaining of new products or processes or **substantially significant improvements of existing ones**.
Smart Innovation: a practical guide to Evaluating Innovation Programmes[5]	Innovation in industry is a matter of doing new things or finding new ways of doing familiar things. Much of the discussion of innovation revolves around product innovation (the creation of new or improved goods and services) and process innovation (new ways of producing goods and services).

<div align="center">
* European Foundation for Quality Management
** The Spanish Association for Standardisation
</div>

Table 1.   Definition of innovation according to different sources.

In addition to the presented, there are also innovations in terms of interfaces between organisations and between suppliers and users of products (marketing, e-commerce, new systems for delivering goods and services, after sales services, interactions between suppliers and users concerning product design and specification, etc.). Organisational innovations are sometimes differentiated from technological ones, though they are aligned in most of the cases.

Another remarked distinction is between incremental innovations (minor modifications to products and processes) and more radical innovations (major changes in how processes are organised and how products work). Incremental innovation often emerges from the experience of making and delivering products, while radical innovation frequently requires R&D (Research and Development) or similar efforts to bring new knowledge to bear on the product or process. In this case, an idea or project is not an innovation unless it is applied in processes, put onto the market, or used in the public sector. In the business field it is common to restrict the use of the term "innovation" to "successful applications", although we consider there may be important learnings regarding innovation, also coming from unsuccessful solutions, in terms of attaining expected markets, or meeting technical specifications.

Innovation in terms of NbS refers to the development and implementation of new and creative approaches to address environmental challenges using nature-based approaches. NbS involve the use of ecosystems and natural resources to address societal and environmental challenges, such as climate change, biodiversity loss, water scarcity, and land degradation. Innovation in this context may involve designing new technologies, systems, or processes that leverage natural systems to provide sustainable solutions.

Besides, innovation in NbS can also include the development of new financing mechanisms, policy frameworks, and governance models that support the implementation of such solutions. Overall, innovation is critical for advancing the adoption and scaling of NbS to meet complex and interconnected environmental challenges.

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[4] https://www.en.une.org/

[5] http://cordis.europa.eu/innovation-policy/studies/pdf/sar1_smartinnovation_master2.pdf

1.2. Innovation in EU Projects

Innovation is a significant consideration in the European Commission's Horizon Europe (HEU) calls. Its framework emphasizes the importance of research and innovation for addressing societal challenges and driving economic growth in the EU. Overall, the HEU calls consider innovation as a fundamental aspect of the funded projects. The program aims to support projects that not only generate new knowledge through research but also have the potential to create tangible innovation outcomes, foster economic growth, and address societal needs. Two of the financing streams of the EC are Research and Innovation Actions (RIA) and Innovation Actions (IA), which have distinct characteristics:

- RIA (Research and Innovation Actions): RIA calls focus on research and innovation activities aimed at generating new knowledge and developing innovative solutions. RIA projects typically involve a significant research component and are expected to advance scientific understanding, explore new concepts, and produce tangible research outputs. RIA projects are often collaborative efforts involving multiple partners from different countries or sectors.

- IA (Innovation Actions): IA calls prioritize activities that aim to bring innovative solutions closer to the market or to achieve broader societal impact. IA projects focus on the implementation and demonstration of innovative products, services, or processes, with a clear objective of reaching the market, scaling up, or fostering societal uptake. IA projects are typically more application-oriented and emphasize the practical implementation of research and innovation outcomes.

While both RIA and IA projects contribute to research and innovation, the key difference lies in their focus and objectives. RIAs are primarily focused on generating new knowledge and advancing the frontiers of research, while IAs are more oriented towards the practical application and commercialization of research results. However, it's worth noting that there can be overlaps between RIA and IA calls, and some projects may incorporate elements of both research and innovation activities.

2. CLEVER Cities approach to innovation

CLEVER Cities is a project framed in the H2020 Programme (in EC new phase, this homonymous program is the HEU). As stated above, innovation is a key and transversal element that should be considered. In CLEVER Cities, innovation understanding is aligned with the approach presented in the project, where innovation is potentially present in different solutions and processes, emerging from the decisions and activities taken along its development. Within the project, we use this term to broadly refer to new ideas or methods that can be somehow turned into value.

More specifically, the project defines innovation as "the capacity to promote an ecosystem where the cities (from the planner's perspective), citizens (from the user's perspective), private sector and knowledge providers work together in a co-creative process". The main goal of this process is to foster innovative regeneration and support solutions which address a city's challenges, thereby achieving social, economic, and environmental benefits for increased resilience and improved quality of life.

The **Local Innovation Screening Tool**, or in its abbreviated form, LIST, can support city urban planners and administration teams in their ambitions to increase innovation within the context of NbS implementation. While designed for the CLEVER Cities, the LIST can be useful for wider stakeholders to know, and better understand, what kind of innovation aspects they may consider in each part of the process of NbS implementation. Material choices, methodologies, management and monitoring of the impacts are some of the items included in the tool where cities could potentially innovate. After establishing a given starting point and the expectations in terms of innovation, the LIST can also be a useful tool to identify the pathway over which the innovation is traced, and to reflect on the levels of success related to the trajectory of the implemented actions.

The LIST is an interactive and easy-to-use webtool created to respond to the innovation potential in CLEVER Cities. The tool's goals are two-fold, namely:

- Inspire cities to innovate in NbS implementation processes by offering a detailed list of criteria to be contemplated.

- Help cities to identify and understand innovation pathways and recognise their transformation during the project lifetime.

Having all these in mind, the LIST is proposed in order to define the innovative character of the implementation of urban regeneration plans (developed by FR and FE cities in the context of WP2 and WP3), the solutions (specified in terms of Business, Governance and Financial models, described in WP5) and their associated processes (monitoring and evaluation is considered in WP4).

- WP2: *Co-creating CLEVER Cities for Urban Regeneration*, in Frontrunners cities, which also coordinates the related management activities
- WP3: *CLEVER Fellows – Taking the lead in transferring and customising NbS*
- WP5: *CLEVER Solutions – From Innovation to Market* which builds a CLEVER Solution Basket and analyses the marketability criteria to be transformed into novel products
- WP4: *Assessing NBS impact through the CLEVER Monitor*

The most relevant attributes for considering innovation in CLEVER are:

- Implement a **new or significantly improved** urban regeneration process or NbS (good or service), integrated on the process
- Give answers to the **urban regeneration challenges** (Human health and well-being; Sustainable economic prosperity; Social cohesion and environmental justice; Citizen security) and create value.
- Be **technological, social, economic and legally viable**.
- Considered either as "**absolute**" (first ever in the whole world) or as "**relative**" (when the novelty is defined against more conventional solutions that the institution has previously applied, or when it refers to the application of an idea from another place to the specific context, if the idea has never been applied for integration of NbS in regeneration).

The CLEVER Cities framework for innovation aims to capitalise on synergies between the NbS interventions (in terms of monitoring, management, methods, and materials used) and local capacities (place, people, and platforms). These elements are outlined in a grid within which new innovations may emerge at the interventions-capacities intersections (explained along this document). As such, CLEVER Cities pursues the idea that innovation is present both in the technology of the NbS itself as well as during the NbS co-creation process, so that the innovation framework allows for the identification of specific actions where innovation may emerge.

2.1. Fields of analysis

The way Innovation is understood by CLEVER Cities, as explained in the previous session, definitively goes beyond the mere consideration of the technological readiness level of the NbS to be implemented. The innovative character can be found in different fields. On that sense, the PM-Grid (Table 2) is the basis to identify in which intersections innovation can be raised.

CLEVER Cities	Place -based regeneration	NbS for and by People	Real and virtual Platforms	Models for Prosperity
Monitoring	Use of sensors, establish stations and conduct censuses	Drive community-based monitoring using face-to-face and virtual formats (surveys, apps, interviews, etc.)	Use city platforms for data collection presentation (e.g., Smart City Platform in HH, Urban Data Platform in GLA, SMART Sharing Cities Platform in MIL)	**CLEVER measures**
Management	Co-implement and monitor NbS based on conceptual processes	Co-manage NbS led by civil society groups (GLA), SME or utilities (HH), public-private partnerships (MIL)	Strengthen management through open city-driven platforms	**CLEVER Ways**
Methods	Use/establish structures to co-design green space in ULLs and Action Labs	People-driven, developer-led, or city-driven co-design of NbS intervention	Outline actors, formats, and processes for community-based monitoring	
Materials	CLEVER Stimuli: Roofs, Ways (GLA), Walls (MIL), Buffer Green (all)	Co-design and landscaping of green space	Place-based monitoring and assessment	**CLEVER Things**

Table 2.   PM-Grid fields – components of the innovation matrix (copied from the GA).

Horizontal axis: P-Tier (Places + People + Platforms = Prosperity)

In the CLEVER Cities innovation framework, NbS is composed by three highly contextualized capacities (**P-Tiers**) which play a key role as enablers of social prosperity:

- A physical intervention to **Place-based** regeneration

- Created for and driven by **People.**

- With the city as a **Platform** to support and inform delivery (such as plans, organizational structures and funding mechanisms to drive regeneration.)

The logic behind this structure, based on local capabilities, relies in the interaction between **People, Places** and **Platforms** as an enablers of urban regeneration processes. When shaping the public urban space of streetscapes, entire neighbourhoods and cities (**Places**), **People** will be central forces in driving the design, implementation and management of the NbS interventions. Cities serve as **Platforms** (both real and virtual; as well as accessible and interactive) that enable communities to unite in addressing urban challenges through the effective design and deployment of NbS. The interplay between local capacities and the

innovation aspect, based on the **M-tier** (**Management, Materials, Methods & Monitoring**) enhances the social **Prosperity** for citizens, by creating new opportunities offered by NbS to deliver holistic economic, social, and environmental outcomes.

Vertical axis: M-tier (Materials + Methods + Management + Monitoring)

The second fundamental compound in the CLEVER Cities innovation framework are the tiers which, through co-creation, can drive innovation at each level of the 'P-tier:

- **Materials:** Novel ways of developing new or repurposing existing technologies or products; referring to specific solutions and their degree of technological innovation (e.g., green roofs, green facades, sustainable urban drainage systems)

- **Methods:** All methods, tools and approaches that can be applied to support decisions, boost social innovation of technologies or apply to design and planning. These tools, instruments, and approaches for co-creating/monitoring NbS can include innovative concepts such as Social Return on Investment or Natural Capital Accounting and/or co-creation support tools, co-design and co-planning methods.

- **Management:** NbS integration and application in existing governance and legislative, business and financing frameworks or co-delivery models, long-term co-management process (including maintenance and monitoring) with an emphasis on co-creation; referring to innovative methods to develop models for business, financing, investment, governance and institutional coordination, public participation, regulatory frameworks, procurement.

- **Monitoring:** Evaluation of effectiveness and cost-effectiveness to:
  - o Assess the performance and effectiveness of NbS to solve current and foreseeable urban challenges
  - o Establish how the co-led processes worked in practice
  - o Provide adjustments, improvements and future orientation; referring to innovative methods .(including public engagement), devices and data management tools used for co-monitoring and evaluation of NbS effectiveness and impact (co-monitoring be linking up to smart city platforms, integration with EU reporting mechanisms, sensoring, modelling, real-time analysis, citizen science, etc.)

In summary, the CLEVER Cities approach is built on capitalising on local capacities (P-tier) and innovative solutions (M-tier). The project applies this PM-Grid to allow FR (and its UIPs) to find innovative NbS, systemising them and 'harvesting' CLEVER Solutions along the way. It provides the framework for innovations to capitalise on synergies between the NbS interventions and local capacities at each of its nodes.

2.2. LIST Structure and content

As a response to the first goal, a co-creation process with the consortium partners was employed to define a set of innovative criteria which could be applied along the NbS process. This list (link to pdf document with content) was later improved through iterative reviews with thematic experts, who generated a structure with more than 150 innovative criteria, following a hierarchical order to facilitate understanding and to ease the navigation through the tool (link or include figure with structure). The content included in the LIST may be considered the core and main value of the tool, providing useful insights to any city in terms of innovation aspects of NbS monitoring, management, methods and materials.

For example, there are six criteria under the component "green/blue roofs", that is part of the sphere "interventions in buildings" from the tier "material" (Table 3).

TIER	SPHERE	COMPONENT	CRITERIA
MATERIAL	Interventions in buildings	Green/blue roofs	Count on the volume of storage for water treatment
			Consider water retention
			Use of smart flow control through a weather app
			Use of smart drip irrigation systems in green roofs
			Qualify roof areas with wild bee and nesting aids
			Combine solar panels and green-blue roofs
		Green facades and living walls	Build a green wall trellis
			Grow edible plants in façades and walls
			Use of smart drip irrigation systems in green facades and living walls
	Sphere…	Component…	Criteria
			Criteria…
TIER…	Sphere…	Component…	Criteria
			Criteria…
	Sphere…		

Table 3. Hierarchical structure on which the criteria tree is based.

In the tool, each individual criteria contains a brief introduction and - in most of the cases - also some references and links to good practices and existing case studies. These additional resources provide the user with a sufficient degree of confidence in the innovation in terms of its usability. Moreover, they might offer considerable support whilst a city defines its replication strategies or reviews its planning instruments.

2.3. LIST Evaluation of innovation pathway

The second goal is more focused on the understanding of the trajectory of each city along the project timespan, indicating their Innovation Pathway, i.e., identifying the criteria which were effectively implemented from those they initially expected to innovate. Toward this purpose, the LIST envisions three types of evaluation: Innovation Readiness Level (IRL), Innovation Model, and Feasibility (technical, economic, legal and social). After concluding an ex-ante and an ex-post analysis, some relevant questions are automatically answered, e.g., *What kind of innovation was considered?, What were the challenges behind the non-implementation of an innovation, despite being expected?, Which of the Spheres have shown the highest number of innovation actions during CLEVER Cities?*, etc.

2.3.1. Innovation Readiness Level (IRL)

The M-tier applies a NbS Innovation and Implementation Readiness Framework (IRL), based on the Technology Readiness Level (TRL) framework. The purpose of the IRL is to assess the capacity and maturity of the innovative solutions to achieve impacts, benefits and co-benefits in urban regeneration and, specifically, the innovation potential of CLEVER Solutions, which may address physical interventions, and governance and management procedures.

Technology Management Models as a basis for innovation[6,7]

The Technology Management Model contemplates the effective identification, selection, acquisition or development, protection and exploitation of the technologies (of product, process, etc.) necessary to maintain a position in the market, and some results of the business, in accordance with the objectives of the company. It is based on five generic activities: Identification, Selection, Acquisition, Exploitation, and Protection.

The Innovation process evolves along these five activities, although it begins in the first activity of *Identification*, necessary with respect to technologies throughout the life cycle of development and market launch. It contemplates market changes as well as technological developments. The *identification* stage includes searches, technological audits, data collection and intelligence processes for technologies and markets.

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[6] TEMAGUIDE: Methodological guidelines for the Management of Technology and Innovation for companies (1998) - http://www.cotec.es/index.php
[7] ISAEP (University of Cambridge) - European Institute for Technology and Innovation Management http://www.eitim.org/

The innovation processes

The general description of the innovation process, directly applicable for the development of products, goes from the identification of opportunities to the desirable end of the process, reaching the commercialization of the product[9].

To describe the status of the development of products in terms of innovation, the classic approach is the TRL index, adopted by the EC to advise EU-funded research and innovation projects in Horizon 2020 program, organized in nine levels (Figure 1).

In the Table 4 there is a more detailed description of each of the steps in the TRL scale.

Figure 1.   Technology Readiness Levels[8].

TRL	Description
1. Basic principles observed and reported	Lowest level of technology readiness. Scientific research begins to be translated into applied research and development. Example might include paper studies of a technology's basic properties.
2. Technology concept and/or application formulated	Invention begins. Once basic principles are observed, practical applications can be invented. The application is speculative and there is no proof or detailed analysis to support the assumption. Examples are still limited to analytic studies.
3. Analytical and experimental critical function and/or characteristic proof of concept	Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative.
4. Component and/or breadboard validation in laboratory environment	Basic technological components are integrated to establish that they will work together. This is relatively "low fidelity" compared to the eventual system. Examples include integration of 'ad hoc' hardware in a laboratory.
5. Component and/or breadboard validation in relevant environment	Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so that the technology can be tested in a simulated environment. Examples include 'high fidelity' laboratory integration of components.
6. System/subsystem model or prototype demonstration in a relevant environment	Representative model or prototype system, which is well beyond the breadboard tested for TRL 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a high fidelity laboratory environment or in simulated operational environment.
7. System prototype demonstration in an operational environment	Prototype near or at planned operational system. Represents a major step up from TRL 6, requiring the demonstration of an actual system prototype in an operational environment, such as in an aircraft, vehicle or space. Examples include testing the prototype in a test bed (aircraft).
8. Actual system completed and 'flight qualified' through test and demonstration	Technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental test and evaluation of the system in its intended (weapon) system to determine if it meets design specifications.
9. Actual system 'flight proven' through successful mission operations	Actual application of the technology in its final form and under mission conditions, such as those encountered in operational test and evaluation. In almost all cases, this is the end of the last "bug fixing" aspects of true system development. Examples include using the system under operational mission conditions.

Table 4.   Detailed description of the steps in the Technological Readiness Level scale.

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[8] www.cloudwatchhub.eu

[9] Fuzzy frond end: effective methods, tools and techniques". The PDMA Tool Book for New Product Development, pp 5-35.

The IRL here presented indicates a specific dimension that produce and informative value of using TRL, as an impact evaluation exercise. Mirroring that, other dimensions have been adopted with the same train of logic[10], such as the *Societal Readiness Level* – SRL (integrating social aspects in technology modelling and experimentation, with an eye on the readiness to adopt the resulting innovation), the *Organisational Readiness Level* – ORL (considering possible organisational impacts of testing and/or adopting that innovation, leading to e.g. infrastructure, process and/or human skills related requirements, or the *Legal Readiness Level* – LRL (interacting with the legal and ethical values system, including pressure to modify it because of the new innovative solution).

For the aims of CLEVER Cities, and trying to simplify the analysis, the scale of IRL was summarized from the original one with nine levels from the TRL, to the final one with five levels (Figure 2).

1 NOT YET CONSIDERED
(this criterion has never been thought of yet)

2 CONCEPTUAL
(conceptualisation formulated but not yet applied in practice)

3 DEMO/PILOT
(formulated and already tested and applied in real cases)

4 APPLIED IN SPECIFIC ENVIRONMENTS
(not generalised and/or with options for)

5 OPERATIONAL
(being used/applied on regular practice)
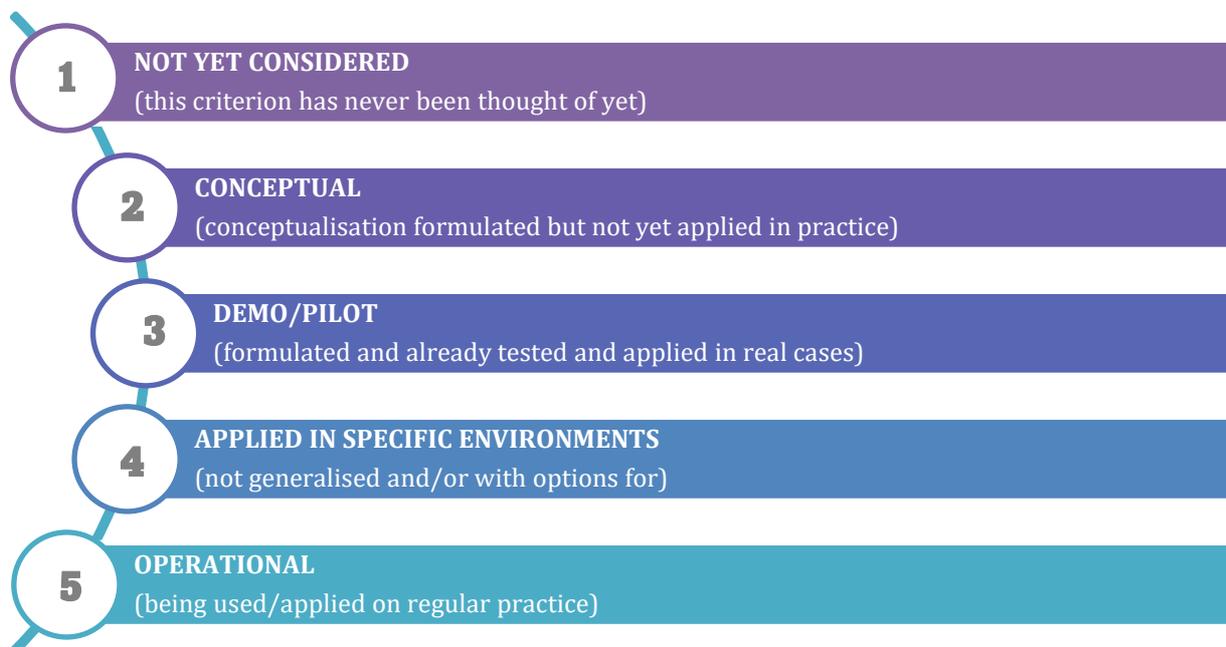
Figure 2.   Scale of the Innovation Readiness Level proposed in CLEVER Cities and included in the LIST.

2.3.2. Innovation Models

Considering that relative innovation can occur through new applications, but also through application transfer, improvement, and combination, it is very relevant to understand what kind of replicability model the cities expect to follow in terms of innovation. On that sense, the LIST defines four different innovation models (Figure 3) that implies specific challenges and risks.

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[10] https://ec.europa.eu/isa2/sites/isa/files/technology_readiness_revisited_-_icegov2020.pdf

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MODEL 1

Application of existing innovative solutiosn or processes/**methods into new context (spatial/sectorial)**

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MODEL 2

Upgrading for improvement the functionality of existing innovation: significantly improved NBS (Materials) or implementation process (Management and Monitoring)

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MODEL 3

Combination and/or integration of existing innovative solutions resulting in a new one: significantly improved NBS (Materials) or implementation process (Management and Monitoring)

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MODEL 4

Application of **completely new solution or approach**

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Figure 3.   Description of the Innovation Models proposed in CLEVER Cities and included in the LIST.

To be faithful to that flexibility, each of these models may present different levels of innovation. The description of the innovation process in each CAL may also include a reflection on the Innovation Model applicable for each sphere and component. This approach aims to support the identification of innovation opportunities and anticipate potential challenges in the process and the possible responses.

2.3.3. Innovation Viability: Technical, Economic, Legal, and Social

This third access for evaluation of the innovation is the viability, that as the name says, represents how feasible it is to have the innovation criteria implemented. The LIST enables the scoring of four viabilities in terms of NbS implementation, ranking from low to high from a technical, legal, social, and economic perspective, with the following specific criteria:

- **Technical**
  - *Low:* Procedures and resources of advanced specialization / limited providers
  - *Medium:* Non-conventional procedures and resources / multiple providers at international level
  - *High:* Standard procedures and resources / multiple providers including local
- **Economic**
  - *Low:* Implies >5% cost of the intervention in CAL and/or only public funding
  - *Medium:* Implies 2-5% cost of the intervention in the CAL and/or only public-private funding
  - *High:* Implies <2% cost of intervention in the CLA and/or all additional funding

- **Legal**
  - o *Low:* Extra-municipal procedures are required (personal data management)
  - o *Medium:* Municipal action is required (permits for activities in urban areas)
  - o *High:* Do not have legal requirements
- **Social:**
  - o *Low:* Previous failed approach (not social accepted)
  - o *Medium:* Burn out situation (previous plans/project not implemented for several reasons)
  - o *High:* Answers to a need already addressed by citizens

2.4. LIST Design of the webtool

As previously mentioned, the LIST webtool has a two-folded objective. One of them is to identify and record the innovation pathway along the timespan of the project by allowing an ex-ante and ex-post evaluation. The other objective is to provide inspiration and knowledge about different types of existing innovative elements by understanding the innovation model, viability and readiness level. The main goal of the webtool is the innovation tracking, at several stages of the implementation and considering the various innovative elements regarding NbS implementation.

For complying with those established objectives, the tool counts on a series of goal-oriented functionalities designed in function of specific user-flows, and defined based on a city profile, which are presented in the following sub-sessions.

The brief introduction to the theory behind the LIST, as well as its functionalities and functioning is presented in a 10minute-tutorial video available in the CLEVER Cities repository[11].

2.4.1. Webtool functionalities

The webtool enables the creation of databases for innovation pathway evaluation, by recording different levels of information in an ex-ante and ex-post analysis. The structure of the webtool enables the identification of the innovation pathway based on the mentioned structure: Tiers, Spheres, Components and Criteria. The webtool allows each user (FR and FE) to select the needed criteria (that belongs to a specific component, sphere, and tier) and provide information about the innovation characteristics of the NbS implementation process. The three types of analysis of innovation for each criterion are available, to create an ex-ante and ex-post database by city:

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[11] The link to the tutorial video will be available at CLEVER Guidance, to be accessed through CLEVER Cities official webpage.

- **Innovation Readiness Level (IRL):** The webtool allows to choose IRL for each criterion in a range from 0 to 4 (Figure 4)

Figure 4. LIST interface: window of evaluation of the Innovation Readiness Level in the LIST.

- **Innovation Model:** The innovation criteria can be either considered as `absolute´ (never previously implemented) or as `relative´ (Figure 5).

Figure 5. LIST interface: window of evaluation of the Innovation Model in the LIST.

- **Viability:** The webtool enables the scoring of four viabilities in terms of NbS implementation, ranking from low to high from a technical, legal, social and financial perspective, with the following specific criteria (Figure 6).
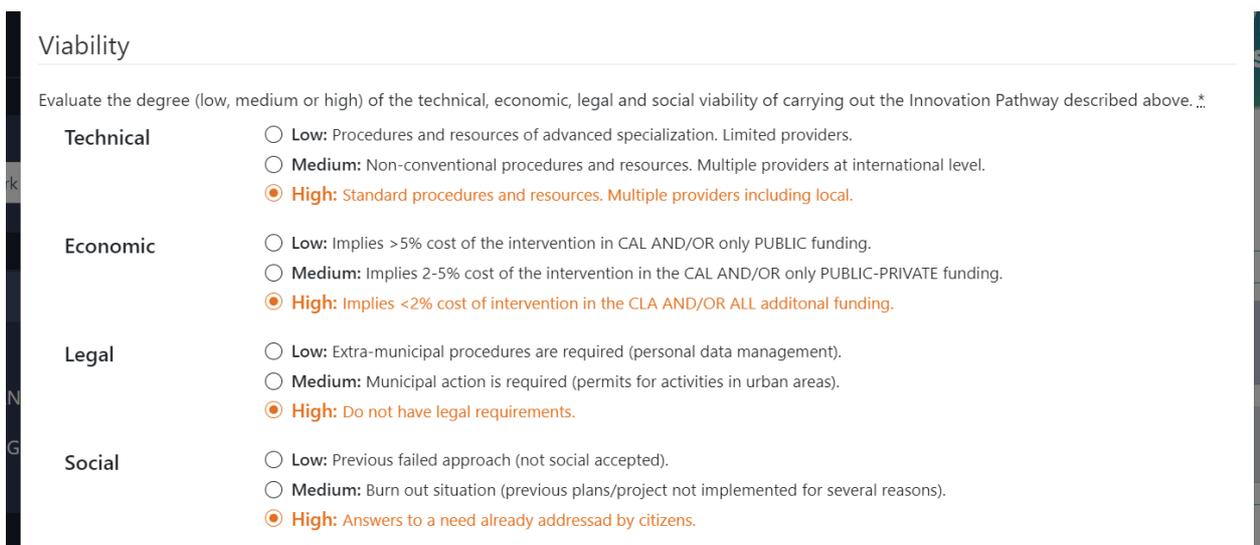
Figure 6. LIST interface: window of evaluation of the technical, economic, legal, and social viability in the LIST.

2.4.2. User flow of the webtool

One of the main characteristics of the webtool is the type of users that will determine the available functionalities depending on the profile. There are two main profiles:

- **City:** The city profile is for those users that want to evaluate the innovation pathway through scoring the criteria that belong to each of the CALs. The users that correspond to a specific City profile will be able mainly to add data to the pre-stablished data-gathering structure for the CLEVER Cities project.
- **Administrator:** The Administrator profile allows the same functions as the city profile, but it also allows management functions, primarily editing the tool and the users.

The first steps regarding the tool are related to the creation of a user and login of the webtool:

1. The access to the tool, both for administrators and users, must be done through the login screen[12].
2. The user must enter the email address and password on the initial screen to access the tool and click on the login button. Depending on the user's profile, the following screens will have a different behaviour.
3. In case the user has forgotten the password, it can be reset through a specific function.
4. The procedure would allow to enter to the general layout. The purpose of the main page is to enable the display of the tier, sphere, component, and criteria structure so users can browse through it. The Figure 7 identifies the common aspects in most of the screens of the tool: a main menu with the available options for the current user profile, the tool instructions, a logout button, and the main working area.

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[12] https://innovationtool.tecnalia.com/login.php
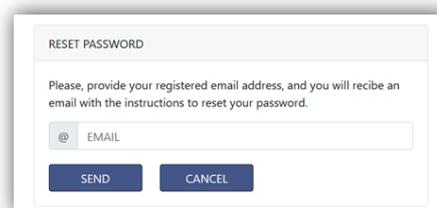
Figure 7.   LIST interface: login screen, recover-password functionality, and general layout.

2.4.3. City Profile and the assessment functions

The city profile enables the innovation assessment procedure. The goal of this profile is to enable users to score or evaluate the model of the innovation pathway regarding specific Cities and their CALs. To access the main working area and start the assessment, the next steps should be done:

- When a user logs in with a city profile, a menu allows to access the main working area where the following options are available: The City Name, CAL selector, tier selector and the Export data to CSV/Excel option.
- To load the main working area (Figure 8), the desired CAL and tier in the city profile section needs to be selected. By selecting both, first the CAL and after the tier, the user can access the correspondent assessment section.
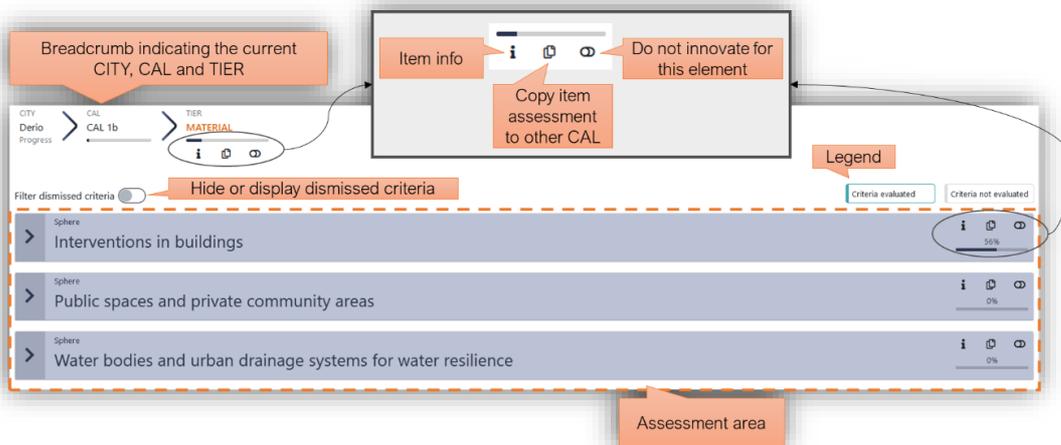
Figure 8.   LIST interface: main work area.

- The user can browse through the structure of the model displaying all the elements that compose it (tier → sphere → component), until reaching the criteria (Figure 9).
- Each group of assessment elements (CAL, tier, sphere, and component) has a progress bar, above or below, indicating the percentage of criteria completed (evaluated or marked as disabled to track the assessment) and the following controls:
  - *Item info:* displays associated information
  - *Copy assessment:* the function enables copying the assessment of all criteria from one CAL to another. A modal window will be displayed to select the destination CAL among the available CALs in the city. It rewrites the assessment for those criteria in the selected CAL, so any previous data will be lost.
  - *Disable criteria:* disables all the criteria that belong to the group, flagging them as do not innovate in this criterion

Figure 9.   LIST interface: browsing the model.

- Each criterion has its own card (Figure 10) showing its name and state (evaluated or not evaluated). It also has the following controls to manage its evaluation:
  - Criterion info: displays associated information.
  - Copy evaluation: copies the assessment of this criterion to another CAL.
  - Innovate in this criterion: flag to indicate whether to innovate in this criterion or not.
  - Evaluate: shows the form to be filled in to evaluate the criterion (**¡Error! No se encuentra el origen de la referencia.**). The user must complete all the required fields and click on the 'save' button to register the filled in data. If any of the required fields is empty, an error will be displayed. Until everything is correct, none of the data will be saved.
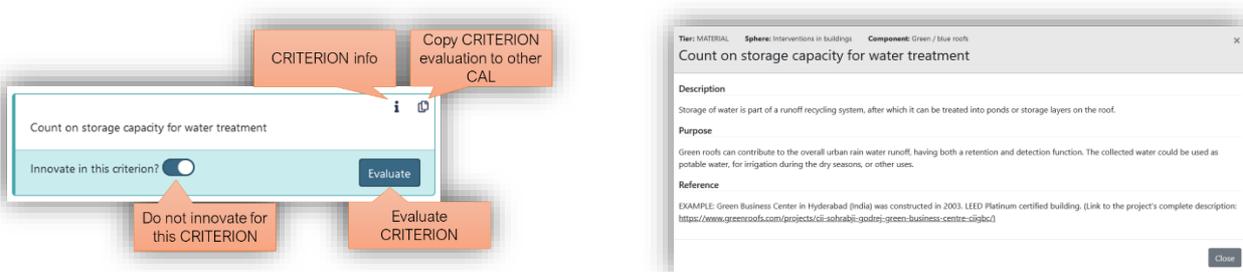
Figure 10.   LIST interface: criterion card and criterion information.

3. Analysis of the results

The CLEVER Cities frontrunner cities (FR) – Milan, Hamburg, and London –, have gone through a complete NbS implementation co-created process, and thus have contributed to filling in the four tiers of the LIST (materials, monitoring, management, and methods). In turn, the CLEVER Cities fellow cities (Malmo, Madrid, Belgrade, Larissa, Sfântu Gheorghe, and Quito), given their more narrowed role (developing an NbS plan), have limited their analysis to the Management tier only (for them, physical NbS implementation was not envisaged).

The analysis of the ex-ante and es-post results were done separately. The ex-ante evaluation is more extended, indicating the expected pathway to be traced by the cities, according to their vision at the beginning of the project. The ex-post evaluation is two folded: on one the one hand, there is an interpretation of the achieved innovation. On the other hand, there is an analysis of the transformation pathway, which enables a comparison between the expectations and final outcomes of the innovation.

Overall, the analysis was conducted according to the various Innovation levels, starting from the general Tier perspective until the specificity of the applied criteria. For example, while the innovation ecosystem could be better understood through the tier and component level, the replicability for innovation pathways could be better explained through a criteria granularity.

3.1. Ex-ante analysis: an interpretation of innovation opportunities and expectations

The analysis of the results of the ex-ante will contribute to a better understanding of the Innovation pathway through the CLEVER Cities project. Those analysis allow to extract conclusions from three main perspectives to enable an understanding of opportunities and expectations at the starting phase of the innovation process.

- The expected **Innovation Ecosystem** to be created during the project through an overall picture of the selected tiers, spheres, components, and criteria, which results show the correspondent expectation of each city.

- The expected **Innovation Feasibility** during the CLEVER Cities, which results are based on the current and expected IRL, and the four viabilities (economic, technical, social, and legal).

- The **Innovation Replicability** analysis, which results show the most constant and repeated innovation criteria selected for being applied.

3.1.1. Innovation Ecosystem

The innovation criteria selected within each of the four tiers in the LIST were specifically related to the CLEVER Cities objectives which are diverse; therefore, for each tier the number of criteria available varies. While Materials, Methods and Monitoring tiers have similar number of available criteria (26, 24 and 26 respectively), Management counts with almost 70 of them. Due to that, while some of the conclusions were extracted from absolute values, others were interpreted based on relative values.

Existing and expected-to-be-innovated criteria by tier

This first part of the analysis may explain how successful the LIST was for cities to enhance innovative criteria for NbS implementation. As previously mentioned, the LIST provides a wide range of criteria to be applied, which may serve as an inspiration for cities to innovate on different stages of the NbS implementation process. Figure 11 shows how many criteria by tier (compared to all the available criteria) were selected by FR and FE cities.
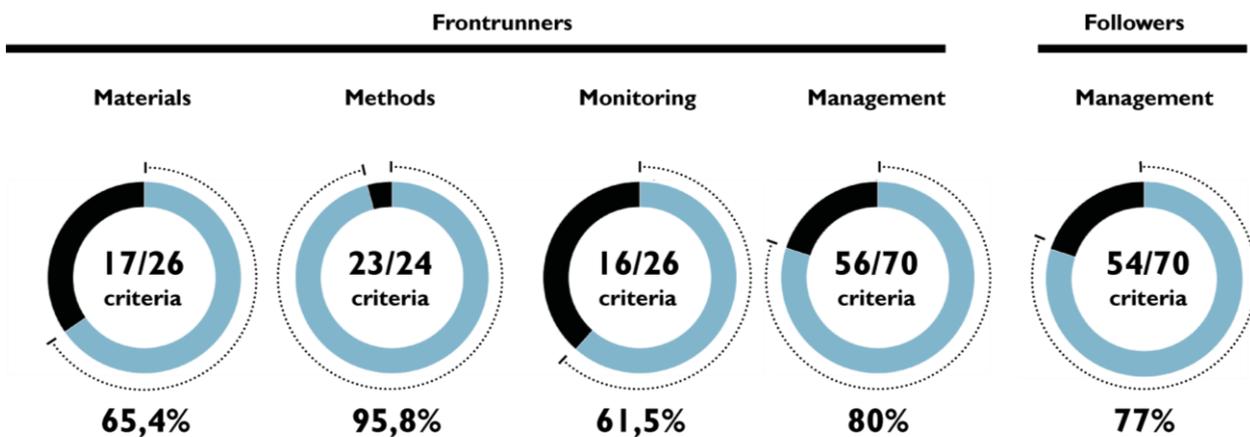
Figure 11.   Existing and expected-to-be-innovated criteria by tier.

An idea of the significant expected innovation proposed by the cities at the first stage of this analysis is given by the number of criteria selected, which are of 112 out of the 146, totalising 76.71%. It means there are many aspects from the process of their NbS implementation where the solution are considered to be somehow innovative.

> *The important number of criteria selected may respond to the essence of CLEVER Cities to focus on co-creation and innovation; besides, that the criteria included in the tool are easily implemented and useful for the cities may also lead to that high motivation and interest for innovating.*

From the four tiers, the highest number of criteria selected was in the Management one for both frontrunner and fellow cities, respectively 56 and 54, out of the 70 available. Nonetheless, it must be considered the high number of criteria available in the LIST for this tier in comparison to the other three. If we consider the percentages instead of absolute value, a much surprising percentage in the Methods tier were selected by the FR, 95.8% (23 out of 24) against the 80% in the Management one.

Number of selected criteria

While the previous analysis depicts the selection of criteria by tier from all the available ones, the following analysis helps understanding the specific opportunities of innovation screened by the cities at the beginning of the innovation process. The goal here is to understand which windows of innovation were the most attractive for FR and FE cities by identifying the perseverance of selecting a criterion under a specific tier, sphere, or component. Therefore, the following analysis not only consider the selection of the criteria, but also how often they have been selected by different cities.

Frontrunner Cities

Figure 12 summarizes the distribution of the criteria selected by different tier, sphere, and component by FR.
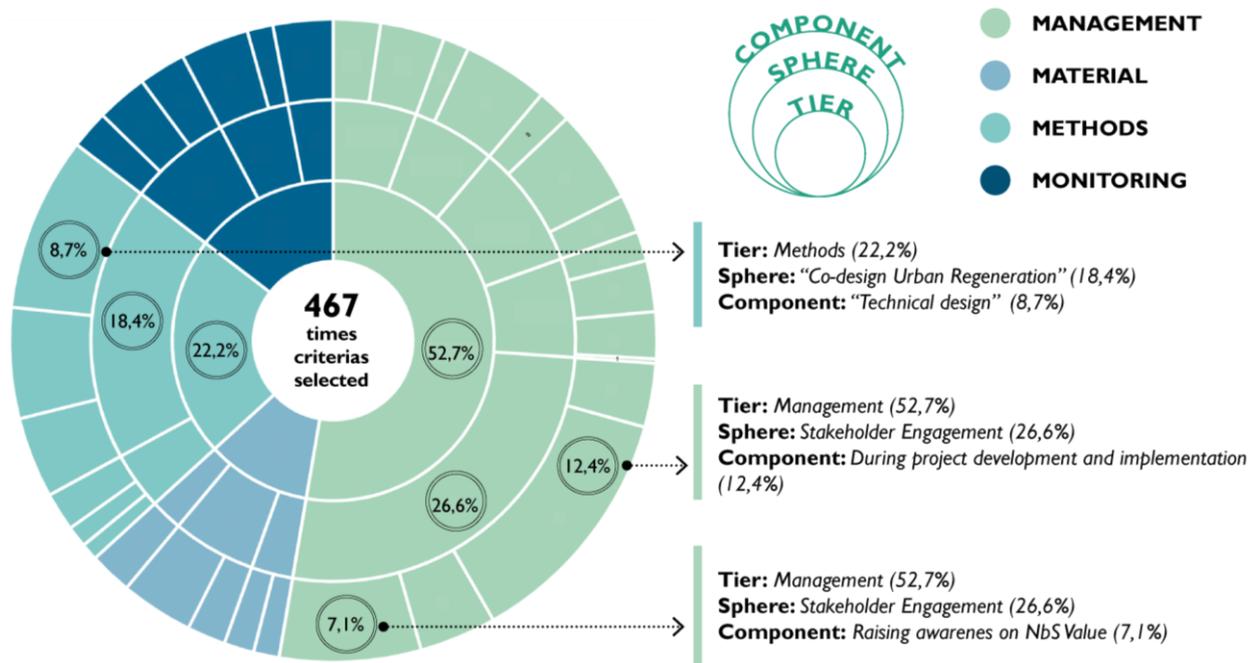
Figure 12.   Summary of the distribution of criteria selected by different tier, sphere, and component by FR cities.

Regarding Methods (corresponding to 22.2% of the criteria selected), most of them belong to the "Co-design urban regeneration (meso and micro scale)" Sphere (18.4%), where the most selected criteria are part of the "Technical design" Component (8.7%).

Again, co-design is a core phase in the process of co-creation proposed by all cities in the implementation process of their NbS, and for that, it may have received special attention in terms of potential innovation.

The remaining 25% of the criteria selected were distributed almost evenly between Material and Monitoring tiers.

Fellow Cities

Figure 13 summarizes the distribution of the criteria selected by sphere and component of the Management tier by FE.
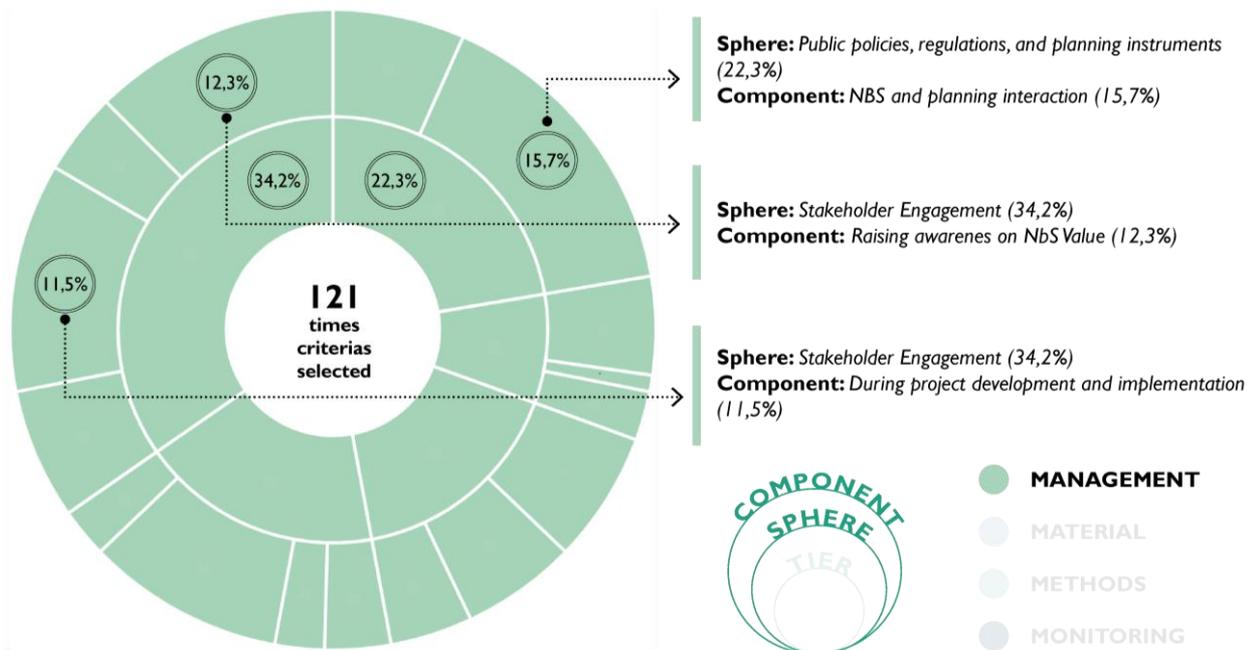
Figure 13.   Summary of the distribution of criteria selected by sphere and component of the Management tier by FE cities.

From all the criteria chosen by the FE for the Management tier, 34.2% were part of the "Stakeholder engagement" sphere. Inside that, 11.5% criteria belonged to the "During Project Development and Implementation" component, and 12.3% to the "Awareness raising on the value of NbS" one. The reasoning follows the same logic than the FR, indicating that the co-creation process is a key element for the project.

However, for the FE, the "Public policies, regulations, and planning instruments" sphere also stands out (22.3% criteria selected). The most influential component of all from the Management is the "NbS and planning interaction", representing 15.7% of the selected criteria.

Given that the FE essence in the project is to propose a roadmap to incorporate a robust NbS Plan into their planning system, it is coherent that this sphere represents an important innovation inspiration for them.

3.1.2. Innovation Readiness Level and Feasibility

The main goal of the LIST is to measure the innovation pathway, and the ex-ante analysis represents an opportunity not only to understand the expectations of the cities in terms of implementing innovative criteria and advancing their status (IRL), but also to recognise the feasibility for putting them into action. To do so, after defining for each selected criteria, the initial and expected IRL at the given starting point of the process, the viability for their implementation regarding economic, technical, social, and legal aspects was also evaluated by the cities.

Analysis on Expected IRL Improvement and Viability

The proposed innovation pathways during CLEVER Cities are indicated by the cities by indicating those two values for IRL: initial (on the left of the Sankey diagrams) and expected (on the right of the Sankey diagrams). The highest the jump between IRLs, the most courageous were the cities in terms of proposing innovative actions in their NbS implementation process. In general terms, the results show a high level of motivation and willingness to innovate.

The following analysis of results were proceeded only for FR, since the FE did not participate of a complete analysis of implementation of innovation in all tiers, as previously explained.

In terms of selection of innovation criteria in **Management**, the percentages for current IRL were IRL2: 32.8%, IRL3: 42.8% and IRL1: 30.1%, while very few were selected as IRL4 (4.6%). On the other hand, the expected IRL4 (38.4%) was the most selected one, followed by IRL3 (32.8%), IRL2 (16.7%) and finally IRL5 (12.1%).

The Table 5 shows the most common values for the expected improvement (from current to expected IRL). Overall, in the Management tier, the diagram (Figure 14) shows that cities expect to improve by one level their IRL (66.8%). The diagram also illustrates that the most common goal is to jump from a demo/pilot (IRL3) to their application to specific environments (IRL4). In general, it can be concluded that from the management perspective, cities from the CLEVER Cities expect to innovate in very early stages of management, where certain innovations for implementation are not even considered or in an infancy phase.

MANAGEMENT

Current IRL	Expected IRL	Criteria (%)
IRL3	IRL4	28.2%
IRL2	IRL3	22.0%
IRL1	IRL2	16.6%

IRL1: Not yet considered

IRL2: Conceptual

IRL3: Demo/Pilot

IRL4: Applied in Specific Environ.

IRL5: Operational

Table 5. Management – initial and expected IRL selected by FR.

Figure 14.   Expected transition from current to future IRL for the Management tier, by FR.

There are some results that draw the attention regarding a very high expected improvement in terms of IRL. The Figure 15 shows those percentages of criteria from Management that jump from IRL1 to IRL5 (3.6%), from IRL2 to IRL5 (6.6%) and from IRL1 to IRL4 (5.4%). To illustrate those noteworthy results, the mean viability was calculated for those prominent criteria (represented in dark) and compared to the mean viability of the sum of the management criteria (represented in light). The first two cases present a very high viability in the four types (social, technical, legal and economic) which can justify this high expected improvement. Nevertheless, the third case (IRL1 to IRL4) shows a low mean viability, which might affect the real outcome of the innovation pathway, without fulfilling the expected IRL improvement. It may be considered as a potential inconsistency, although a definitive conclusion can only be taken after analysing the ex-post results.
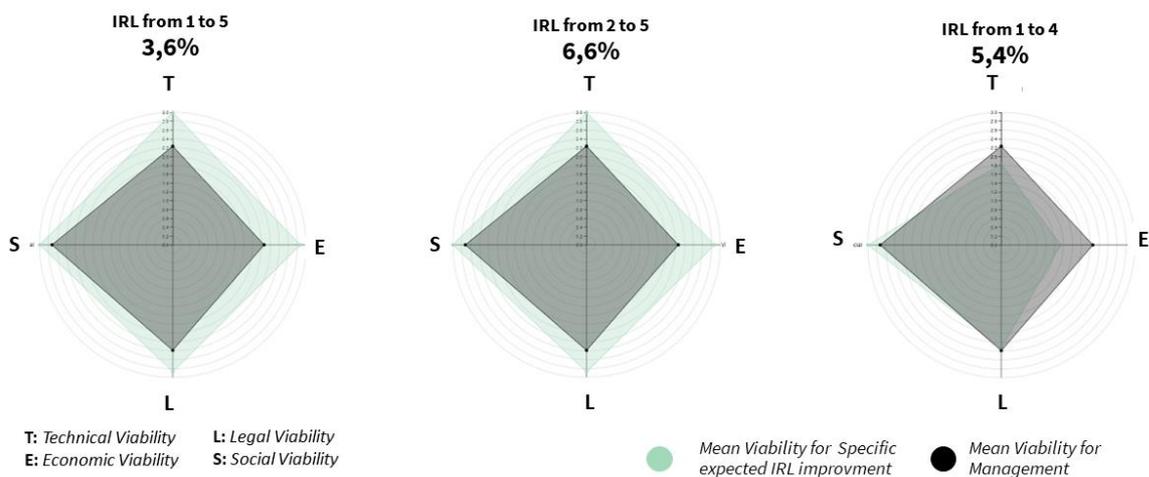
Figure 15.   Social, technical, legal and economic mean viability for the higher expected IRL improvements in Management.

As far as the **Materials** is concerned, the percentages for current IRL regarding the innovation criteria were IRL3: 52.9%, IRL2: 23.5% and IRL 1: 21.6%, while there were very few with a current IRL4 (2.0%). On the other hand, the expected IRL4 (64.7%) and IRL5 (25.5%) outstand in this specific tier, since it implies that 90.2% of the innovation criteria is planned to be applied in specific environments or even fully operational.

The Table 6 shows the most common values for the expected improvement (from current to expected IRL). In Materials, cities expect either to improve their IRL by one level (52.9%) or to improve it for IRL3 or IRL4 levels (23.6%). While the most common goal is (as in the Management) to jump from a demo/pilot (IRL3) to their application to specific environments (IRL4), the Figure 16 shows that the efforts of cities are also oriented to fulfil operational objectives

MATERIALS		
Current IRL	Expected IRL	Criteria (%)
IRL3	IRL4	52.9%
IRL2	IRL5	11.8%
IRL1	IRL5	11.8%
IRL1: Not yet considered		
IRL2: Conceptual		
IRL3: Demo/Pilot		
IRL4: Applied in Specific Environ.		
IRL5: Operational		

Table 6. Materials – initial and expected IRL selected by FR.

(from IRL1 or IRL2). In general, it can be concluded that, from the Materials perspective, FR are very ambitious in terms of NbS implementation, given that the Materials is usually very closely related to specific technologies and products.
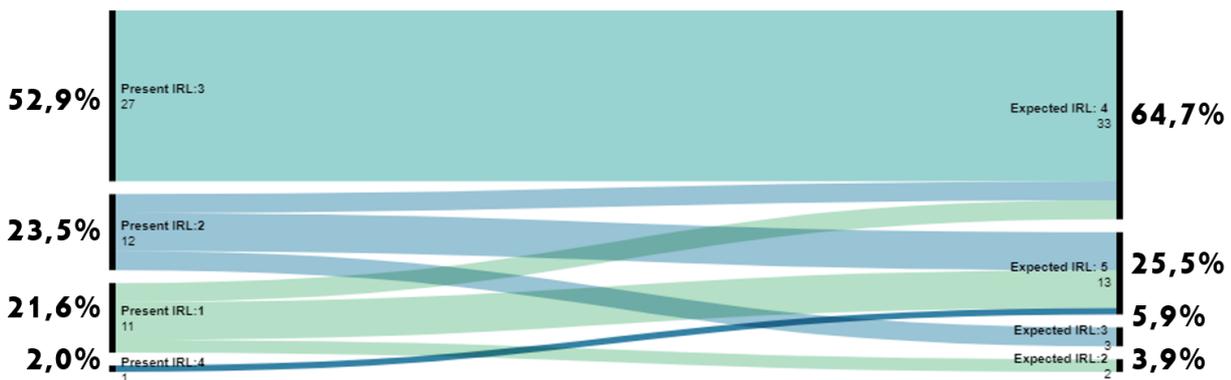
Figure 16. Expected transition from current to future IRL for the Materials tier, by FR.

Considering these observations, the mean viability analysis was conducted, taking the three most remarkable cases of high level of expected improvement regarding IRL. The Figure 17 shows the percentages of criteria of the Materials tier that jump from IRL1 to IRL5 (11.8%), from IRL2 to IRL5 (11.8%) and from IRL1 to IRL4 (5.9%). For the first two cases (IRL1>IRL5 and IRL2>IRL5), the cities have indicated a very high social, technical, legal, and economic viability, which could be considered as an enabler in terms of implementation, and a solid justification of the high expectations on the IRL improvement. The third case (IRL1 to IRL4) shows a low mean viability compared to the other two. Despite the high viability considered, the expectations regarding innovative NbS implementation (and considering the nature of the Materials tier) are still very high and might bring certain drawbacks in the implementation process.

IRL from 1 to 5
11,8%

IRL from 2 to 5
11,8%

IRL from 1 to 4
5,9%

T: *Technical Viability* **L:** *Legal Viability*
E: *Economic Viability* **S:** *Social Viability*

Mean Viability for Specific expected IRL improvment

Mean Viability for Materials
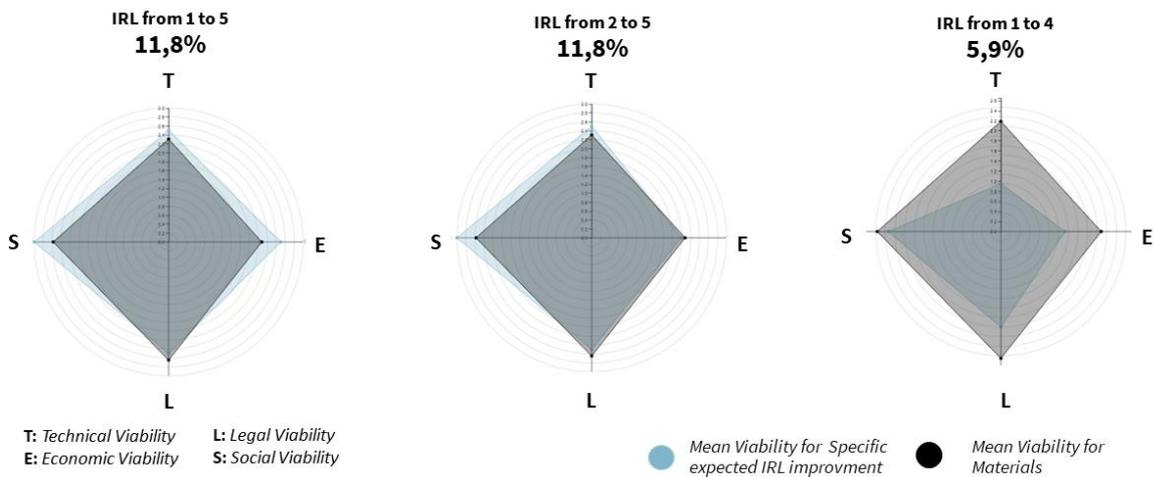
Figure 17.   Social, technical, legal and economic mean viability for the higher expected IRL improvements in Materials.

The same analytical procedure was conducted for the **Methods** tier. The highest percentages for current IRL regarding the Innovation Criteria were IRL3: 60.6% and IRL2: 29.8%. On the contrary, IRL1 (7.7%) and IRL4 (1.9%) were suggested to a very few criteria. The expected IRL4 (64.4%) and IRL5 (29.8%) outstand in this specific tier, since it implies that 94.2% of the innovation criteria are expected to be applied in specific environments or even fully operational. Very few criteria are expected to be only considered or applied through a demo/pilot.

In the Methods, cities expect to improve the IRL mostly by one level (55.8%), and in 17.8% of the cases by three levels (Table 7). While the most common goal is (as in Management and Materials) to jump from a demo/pilot (IRL3) to have them applied to specific environments (IRL4), the efforts of cities are also oriented to arrive to operationalised methods (IRL5) from conceptualised ones (IRL2) (Figure 18).

METHODS

Current IRL	Expected IRL	Criteria (%)
IRL3	*IRL4*	*55.8%*
IRL2	*IRL5*	*17.8%*
IRL1: Not yet considered		
IRL2: Conceptual		
IRL3: Demo/Pilot		
IRL4: Applied in Specific Environ.		
IRL5: Operational		

Table 7. Methods – initial and expected IRL selected by FR.
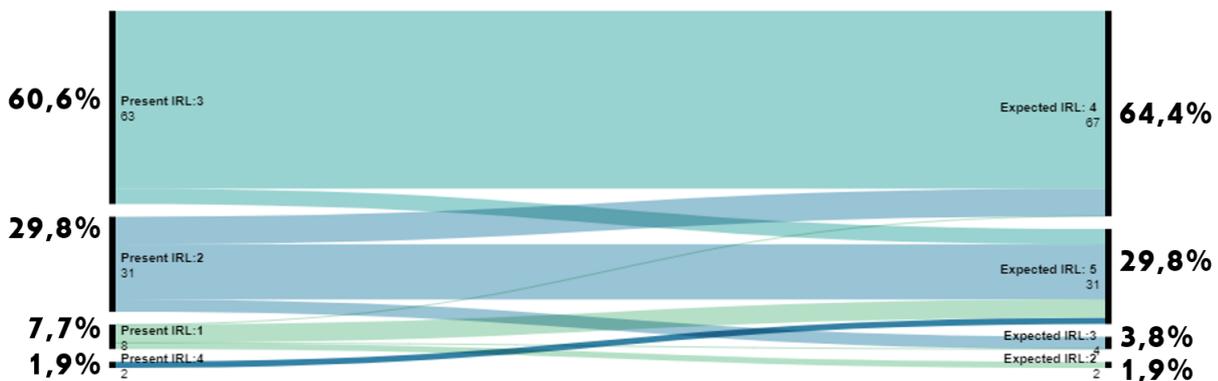
Figure 18.   Expected transition from current to future IRL for the Methods tier, by FR.

The Figure 19 shows those percentages of criteria from the Methods tier that jump from IRL1 to IRL5 (5.8%) and from IRL2 to IRL5 (11.8%); nonetheless, there are no expected IRL improvements from IRL1 to IRL4. Both group of criteria show a very high expectations in terms of viability in the four types (social, technical, legal and economic). Specifically for Methods, it outstands the high expectations and viability varying from a conceptual IRL to a fully Operational IRL.
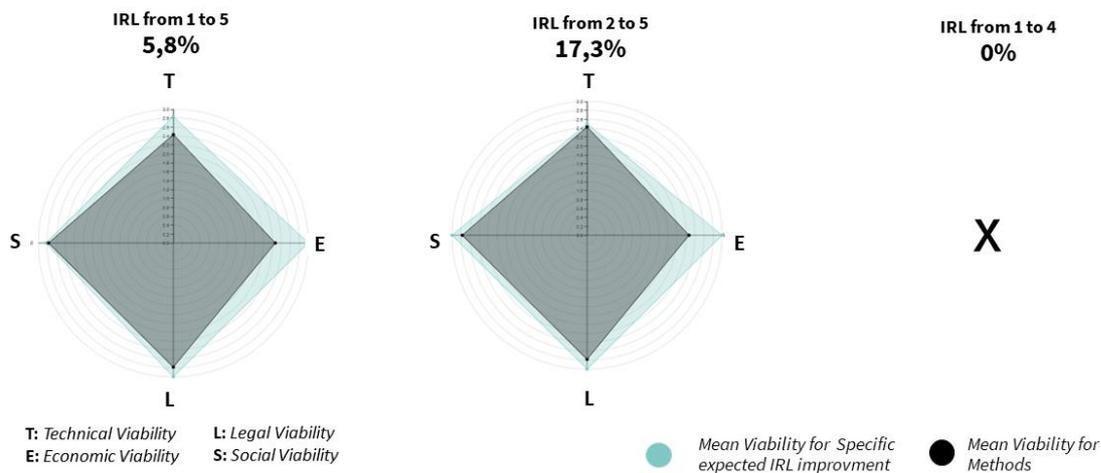
Figure 19.   Social, technical, legal, and economic mean viability for the higher expected IRL improvements in Methods.

Finally, for the **Monitoring**, the percentages for current IRL regarding the innovation criteria are quite different if compared to previous tiers. The current IRL were the following: IRL4: 37.7%, IRL2: 30.4% and IRL3: 27.5%, while there were very few innovation criteria with a current IRL1 (4.7%). On the other hand, the expectations that falls in IRL5 must be emphasised, since it means that 55.1% of the Monitoring criteria are expected be fully operational by the end of the project. The rest of the expected IRL are: IRL3: 26.1%, IRL4: 18.8% and IRL2: 0%, this last value meaning that no city expects to jump from a non-considered innovation to a conceptualization for Monitoring purposes.

In Monitoring, cities expect to improve the IRL mostly by one level (69.5%) (Table 8). Differently from the other tiers, the most common goal here is to go from a IRL4 to IRL5, having them all

MONITORING

Current IRL	Expected IRL	Criteria (%)
IRL4	IRL5	30.4%
IRL2	IRL3	21.7%
IRL3	IRL4	17.4%
IRL1: Not yet considered		
IRL2: Conceptual		
IRL3: Demo/Pilot		
IRL4: Applied in Specific Environ.		
IRL5: Operational		

Table 8. Monitoring – initial and expected IRL selected by FR.

operationalised by the end of the project (Figure 20). In general, it can be concluded that from the Monitoring perspective the highest efforts are restrained compared to other tiers. Among the soundest reasons for that, is the fact that the project has a strong focus and support on monitoring activities, with specific tasks and commitments signed by the cities from the beginning, setting the vision, defining the strategy, establishing expert teams, and producing reports on that matter.
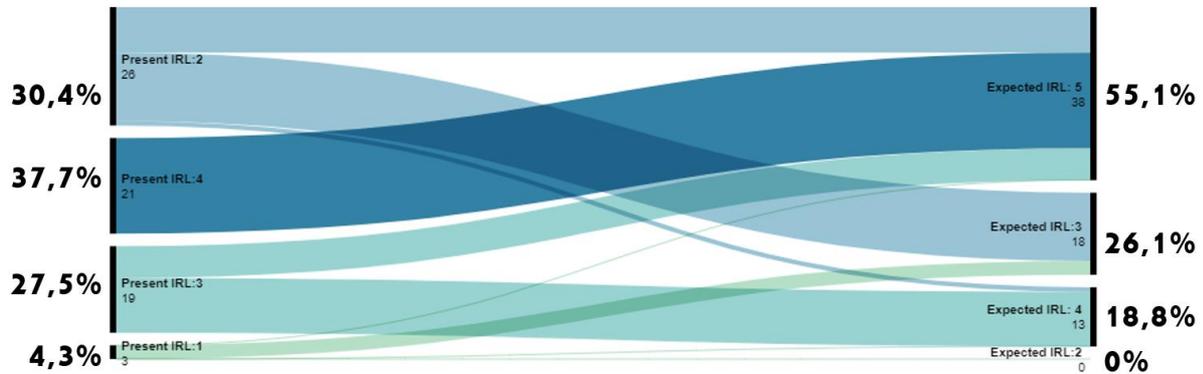
Figure 20. Expected transition from current to future IRL for the Monitoring tier, by FR.

The Figure 21 shows those percentages of criteria of the Monitoring tier that have a high expected IRL improvement. Considering the aforementioned information, Monitoring also presents some remarkable results when compared to the results of the rest of the tiers. Only one group of criteria presents a difference of three levels (IRL2 to IRL5), although their specific viability is still quite like the other tiers. It can be assumed that, in general, the results of Monitoring regarding IRL expectations are quite conservative (or maybe present a more realistic expectations) in relation to the rest of the tiers. Again, this conclusion can only be reached after analysing the ex-post results.
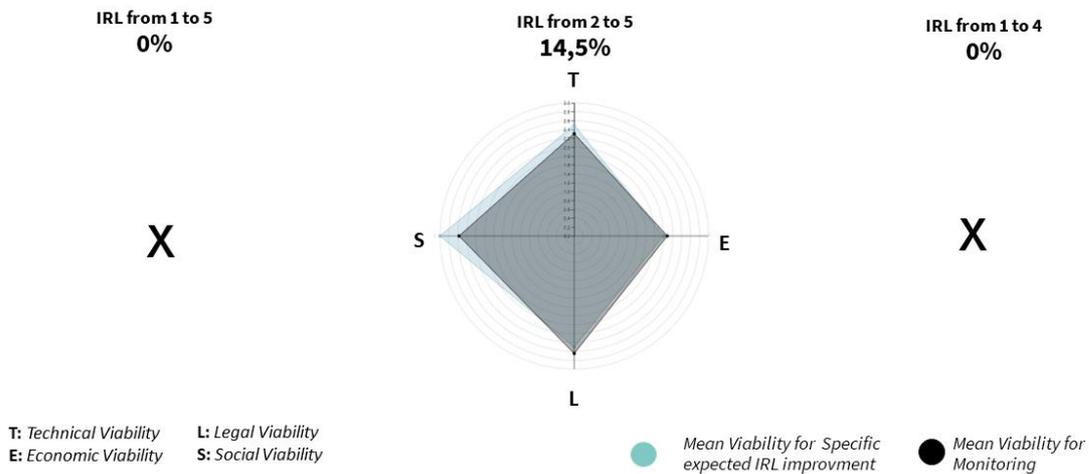
Figure 21. Social, technical, legal and economic mean viability for the higher expected IRL improvements in Monitoring.

3.1.3. Innovation Concurrence

The following analysis indicates the innovation concurrence and depicts which criteria for each tier have been selected by all three FR cities concurrently. Those criteria coincident by all cities will be referred here as "multipliers". This interpretation enables us to know which NbS criteria are, besides expected to be applicable to a certain place, also replicable to other contexts. The common interest by all the CLEVER Cities´ cities and their specific action labs may lead to slightly different interpretation. On the one hand, it may mean the character of the innovation respond to a coincident common interest; on the other hand, the specific innovation may be proposed along the activities of the project; or still, it may result to be of extreme importance, and should be considered an element to be always account in future implementation of NbS. In any of the cases, the following results indicate those concurrently selected innovation criteria.

The **Management** was the tier with the highest number of multipliers, i.e., criteria selected by all three FR cities concurrently (Figure 22). It may have possibly happened for two main reasons: the first due to the strong correlation existing between management and co-creation processes, and the second related to the fact that, from the four tiers, Management is the one with significantly more criteria available. Nonetheless, considering the relative values for the analysis, 37.5% of the selected criteria of the Management tier (21 out of 56) were chosen by all the FR at one time. The sphere "Stakeholder engagement" may be specially underlined, since 66% of their criteria are multipliers. Within the components of that sphere, there are 4 multipliers in "Awareness-raising on the value of NbS", 2 in "Post project", 6 in "During project Development & Implementation" and 2 in "Capacity Building". Components of other spheres also present a few multipliers (1 in "Maintenance", 2 in "Procurement", 2 in "Institutional Governance", 1 in "Collaborative Governance" and 1 in "Value generation").

The high number of multipliers in this tier, specifically related to the "Stakeholder engagement" sphere reinforces the link of co-creation processes and management in terms of NbS implementation. Most of the multipliers are related to different strategic matters, such as stakeholder capacity building, learning reinforcement, and target groups involvement. Other multipliers have a stronger connection with governance aspects, mostly related to coordination issues, procurement innovation and new approaches to maintenance.

Figure 22. Distribution of multipliers (criteria concurrently selected by all FR cities) for Management.

Still considering the **Management** tier, but now with an analysis of the multipliers of FE, results were, as expected, slightly different (Figure 23).

> *Results of FE innovation occurrence differ from FR due to the double number of cities represented (six). Nonetheless, while there is only one criterion that can be considered multiplier, many of them have been chosen by 5 or 4 cities, which may be also considered as an important level of agreement.*
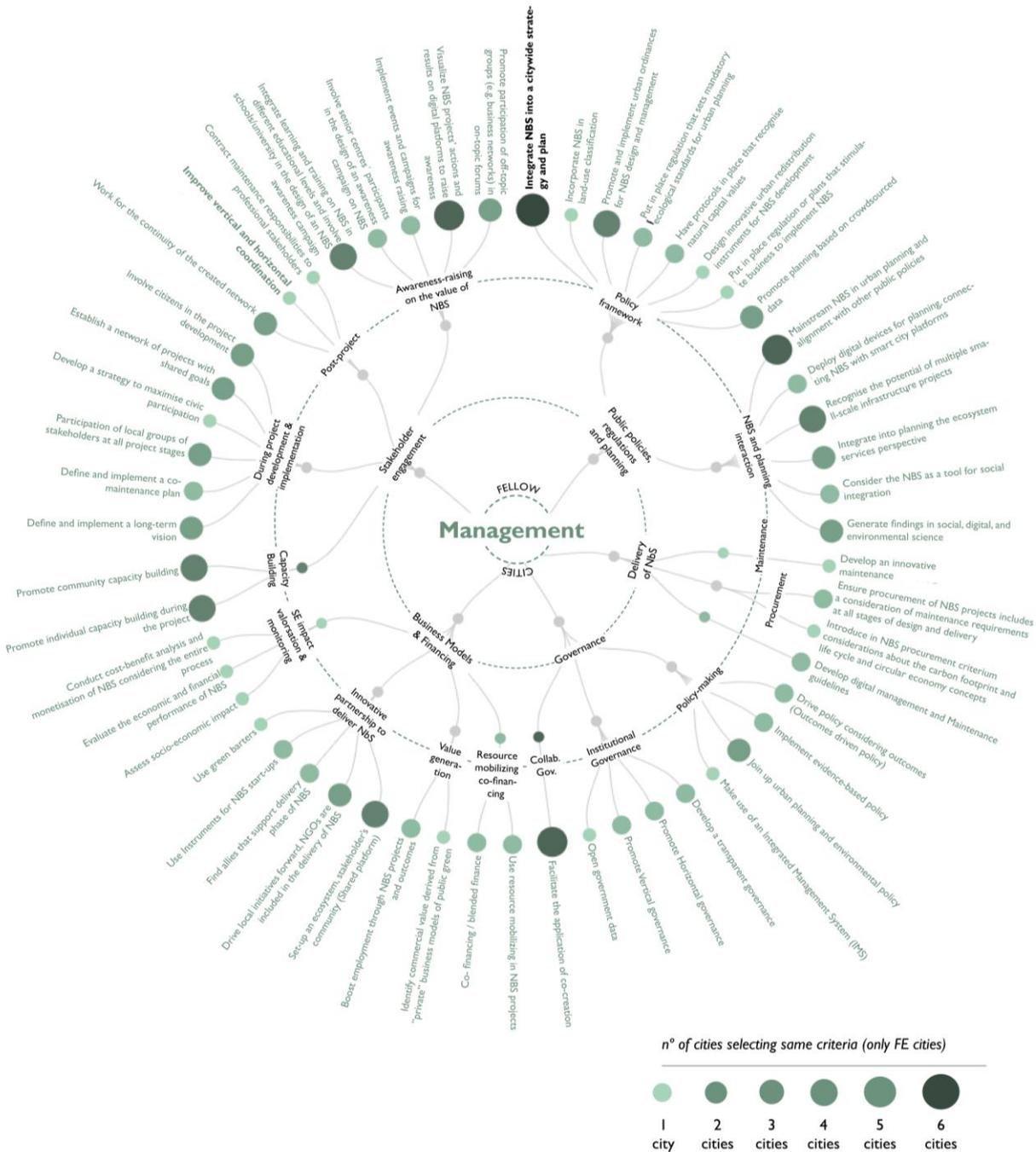
Figure 23.   Distribution of multipliers (criteria concurrently selected by all FE cities) for Management.

The **Methods**, although much lower than Management, in terms of both absolute and relative values, is the second tier which has the most multipliers (29.2%) (Figure 24). Those multipliers are evenly distributed through the spheres, considering that all spheres have at least one criterion chosen for all FR. Yet, due to the uneven distribution of the original innovation criteria inside the spheres of this tier, only 1 multiplier belongs to the "Spatial Analysis for Urban Planning", while the remaining 6 belong to the "Co-design urban regeneration (meso- and micro-scale)".

Considering the component level, the "Technical design" component outstands with 3 multipliers). The next component would be "Socioecological Urban Design" with 2 multipliers, followed by "Supporting tools for improving planning and NbS integration" and "Supporting mechanisms to enable co-creation process", both with only 1 multiplier.

One of the main characteristics of the criteria that belong to this tier are their adaptation capacity to diverse contexts, so the high number of multipliers identified could potentially be related to this factor. Methods to enable highly contextualized implementation, to use novel tools, to base actions on digital approaches, and to considering vulnerable social groups have been the focus for all cities.
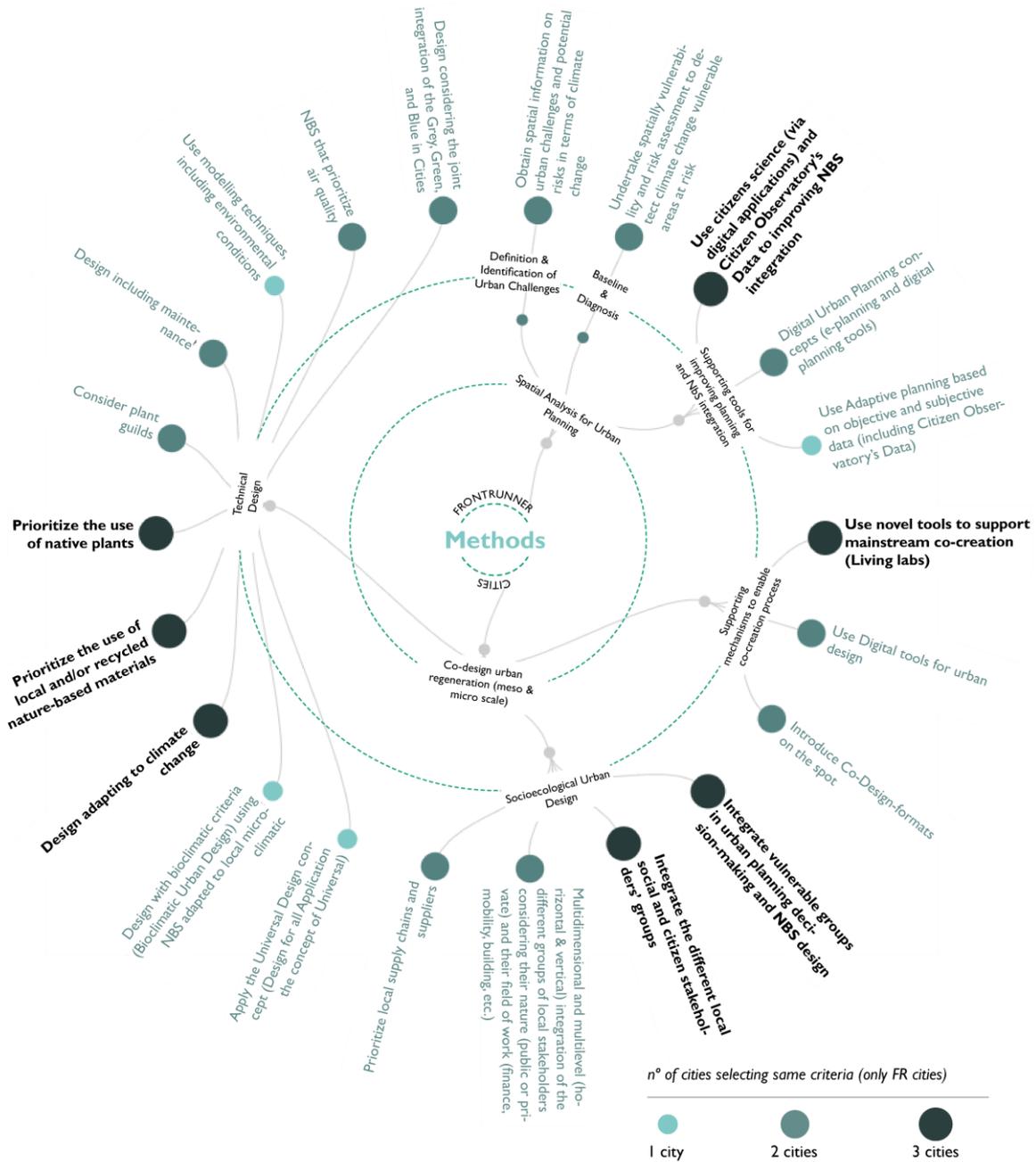
Figure 24. Distribution of multipliers (criteria concurrently selected by all FR cities) for Methods.

Regarding **Materials**, the number of multipliers decrease remarkably – only 7.7% (2 out of 26) have been selected by all FR (Figure 25). Both multipliers belong to the spheres "Interventions in buildings" and "Public spaces and private community areas", while the "Water bodies and urban drainage systems for water resilience" sphere presents no multiplier. From the first sphere mentioned, the component is "Green facades and living walls". For the second, the "Community Garden (public or private)" sphere.

One of the reasons of a low number of multipliers in this tier might be related to the fact that the criteria belonging to the Materials are very related to physical implementation, which means that a specific context is required for these criteria to be successfully applied. In this case, the multipliers chosen are related to the irrigation system or strategies for activities (such as kitchen gardens), that would require a physical implementation associated to the success of the innovation to be applied.
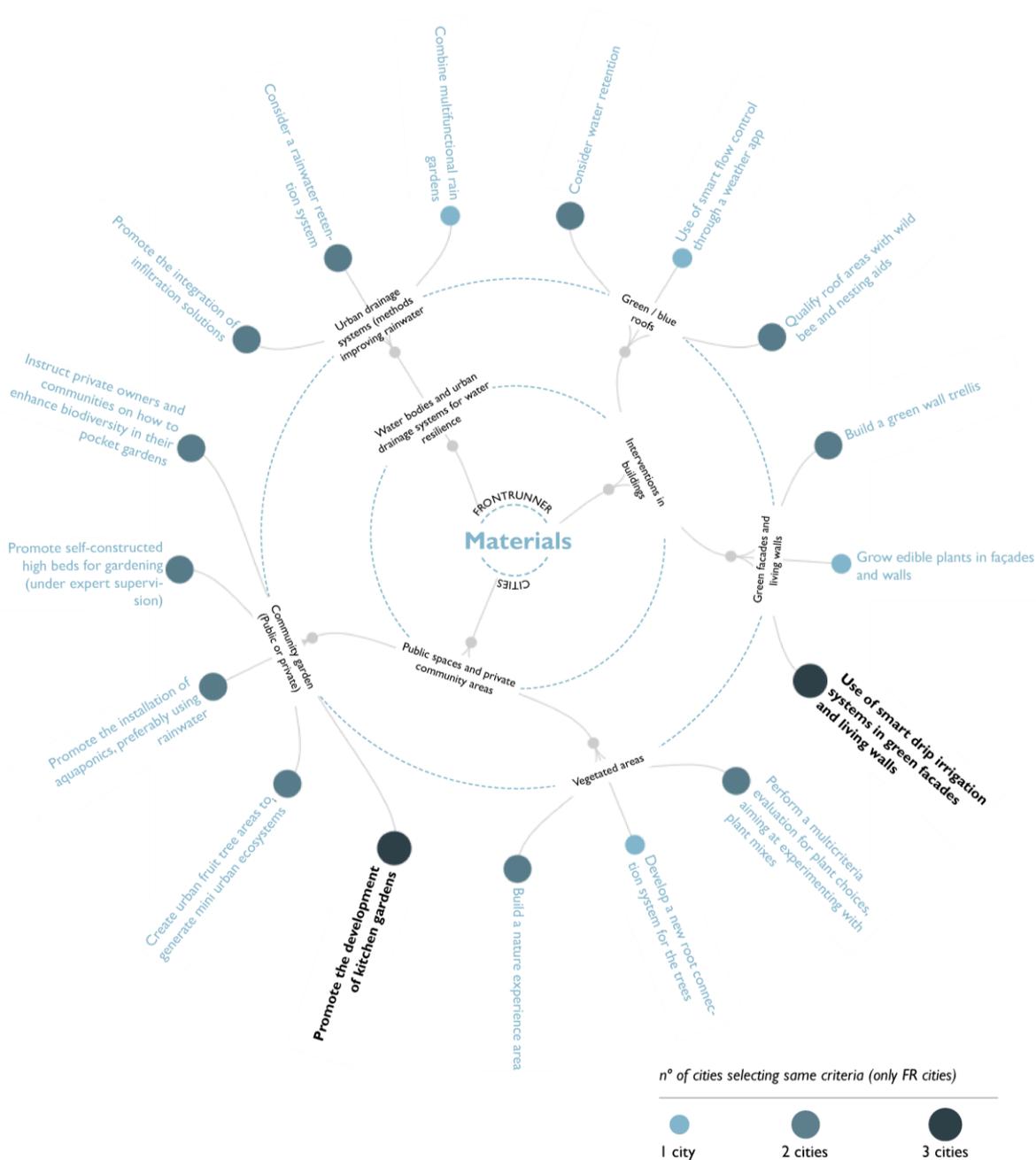
Figure 25.   Distribution of multipliers (criteria concurrently selected by all FR cities) for Materials.

Finally, regarding the **Monitoring**, the multipliers are as few as in the Materials – 7.7% (2 out of 26) (Figure 26). Both multipliers belong only to the "Data gathering" sphere, respectively in the components "Data management" and "Monitoring devices". The two other spheres – "Results & decision-making" and "Evaluation Framework" – don´t have any multiplier.

While most of the multiplies related to other tiers does not have a strong digital connection, in the Monitoring, the two existing multipliers have a clear focus on digitally enhanced innovation.

Figure 26.   Distribution of multipliers (criteria concurrently selected by all FR cities) for Monitoring.

3.2. Ex-post analysis, interpretation achieved innovation

The analysis of the ex-post results will contribute to measure and evaluate the achieved innovation through the CLEVER Cities. The information which set the stones for reaching the conclusions on the CLEVER Cities Innovation Pathway are the final IRL levels indicated by the cities towards the end of the project, for each of those initially selected criteria. The results of this analysis, which is outcome-oriented, is subdivided in two main perspectives:

- **Achieved IRL** for both FR and FE – it offers a general picture by tier of the status of innovation at the end of the CLEVER Cities.

- **Improvement of the innovation level** (only for FR), obtained from the comparison between the initial and final IRL – it enables us to generate some conclusions regarding the improvement in terms of innovation accomplished throughout the project.

It is worth considering that, regarding the data collection, few criteria for the final IRL level were scored as not applied (n/a) as initially expected. n/a score diverges from criteria that present coincident initial and final IRL, which in this case are related to the occurrences in which the innovation was applied, but the IRL was not improved.

3.2.1. IRL Achieved

As in the ex-ante "Innovation Ecosystem" analysis, the number of criteria available in each tier diverge, and therefore, the distribution depends directly on this variability. FR scored a total of 592 criteria (considering that one same criterion could be repeated up to three times, depending to which CAL they were proposed), where only 1.4% of them (8 Criteria) did not have any innovation applied during the project. Regarding FE and considering that they could only worked on tier Management tier, 129 criteria were scored with any of them indicated as n/a (Figure 27).

For FR, IRL4 (Demo/Pilot) was the most reached level by criteria, being 32.6% of all criteria, followed by IRL5 (Operational), with 21.5% of the criteria. In third and fourth position, are IRL3 (Demo/Pilot) with 19.1% of and IRL2 (Conceptual) with 3.4% the criteria. Only one

Figure 27. Achieved innovation percentages by Final IRL.

criterion was scored as IR1, i.e., "Not yet considered" (0.1%). FR have achieved high levels of innovation since most of the criteria have ended up in IRL4 and IRL5 levels. Nonetheless, there is a high variability depending on the tier (Figure 28); while for Management, the most achieved levels were IRL4 or IRL3, for Monitoring they were IRL5 and IRL4.

On the contrary, for FE the IRL2 was the most achieved level of innovation with 39.6% of the criteria, followed by IRL3, with 33.3% of the criteria. The remaining levels are, in this order, IRL4 (16.3%), IRL1 (6.2%) and IRL5 (5.4%).
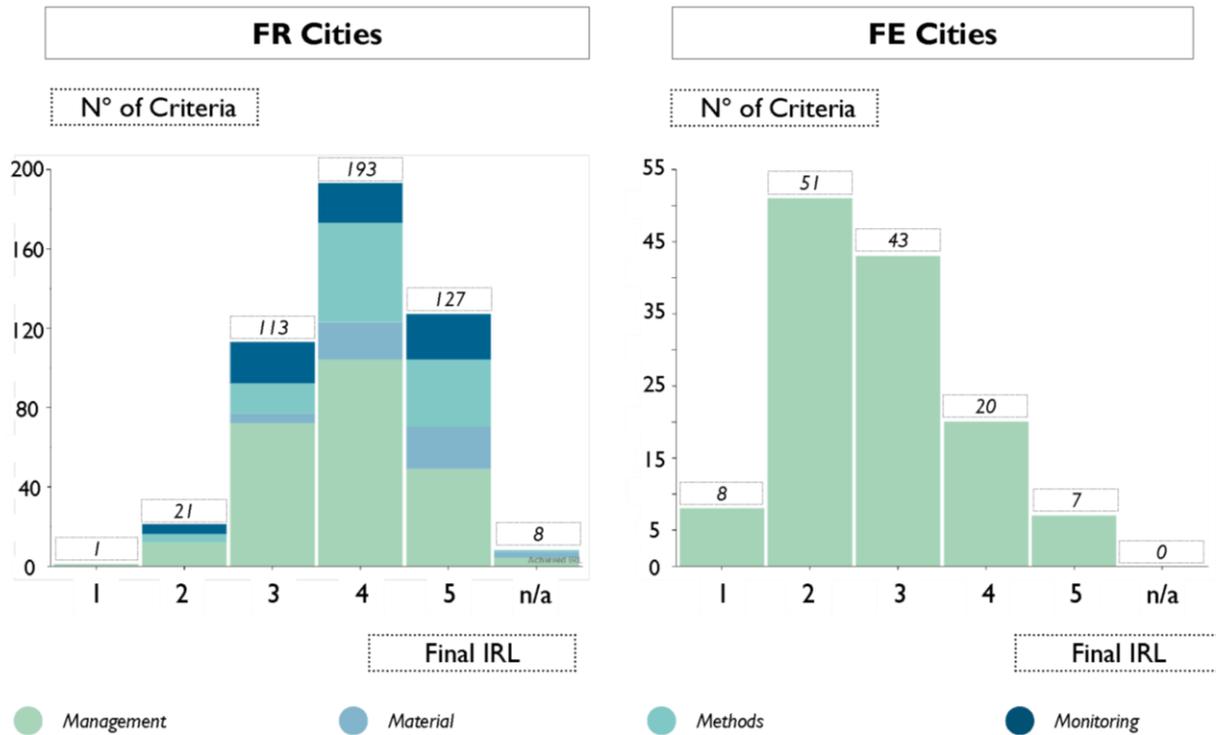
Figure 28.   Achieved innovation levels by FR and FE cities.

The result of this analysis represents explicit evidence of the impressive innovation levels achieved during CLEVER Cities. Although, while FR show results of high IRL achievement, with most of the criteria either applied in specific environments or reached operational levels, FE have remained in a more conceptual level, in some cases developing pilot cases. This might be a result of the nature of the city goals in CLEVER Cities, in which only FR committed to NbS implementation, while FE have focused on the design of the roadmap and related NbS plans.

3.2.2. Improvement of the innovation level

The improvement of the innovation level was analysed only for FR and aims to detail the overall variation of the initial and final IRL. The evaluation was based on the comparison of this variation by tier, which starts from diverse initial conditions. Since the final conditions are usually dependant on the initial ones, the Figure 29 illustrates both starting point, and final value allowing us to easily visualise the leap in terms of innovation considered along the CLEVER Cities.

- Management – approximately the same number of criteria starts at IRL3 (33.7%), IRL2 (31.2%), and IRL1 (30.2%), but only 4.9% of them is initially an IRL4, indicating an early level of maturity in terms of innovation. The initial curve did not change their shape significantly, although it is clear its displacement by one IRL level, which is a successful indicator of the reach and implementation of innovation along the project. It is worth to highlight the 15.1% of the criteria that reached the highest level of the IRL scale.

- Materials – two facts stand out in this analysis: (1) a 56.2% of the criteria starts at IRL3, indicating a launch of the project with an already existing demo/pilot, and (2) any of the criteria have remained in the basic levels (IRL1 or IRL2), meaning that all of them have suffered remarkable advances. The curves of general initial and final IRL have moved impressively, showing at least a leap of two levels, indicating a high level of success in terms of innovative criteria in terms of materials in CLEVER Cities. Again, an important number of criteria have ended in IRL5 (43.7%), showing the accomplishment of the consideration of the innovation proposed.

- Methods – the curve of innovation has moved in a similar way than at the Materials tier, with a successful leap of approximately two IRL levels. Around 60% of the evaluated criteria have started in IRL3, and together, more than 80% ended up in IRL4 and IRL5.

- Monitoring – in this tier the shape of the curve is slightly different, less as a peak and more towards a square. The high number of criteria centred in the intermediate IRL (IRL2, IRL3 and IRL4 for the initial state, and IRL3, IRL4 and IRL5 for the final state) outstands, probably for having monitoring as a committed task in CLEVER Cities. The implementation of monitoring framework and measurement of KPI were supported by a knowledge partner, which made the effort of proposing innovative actions along the process.
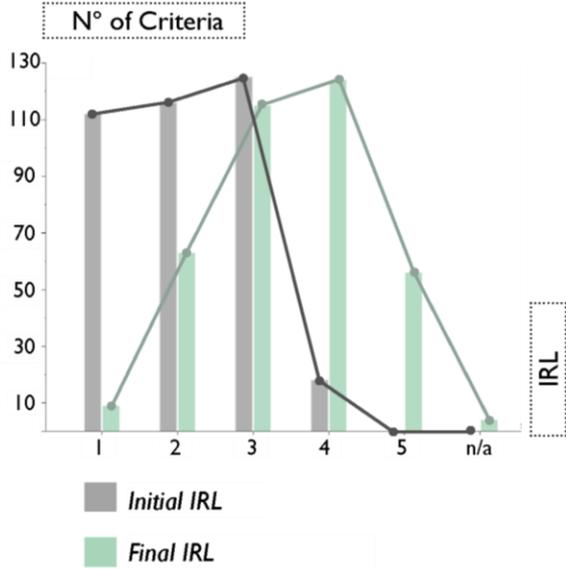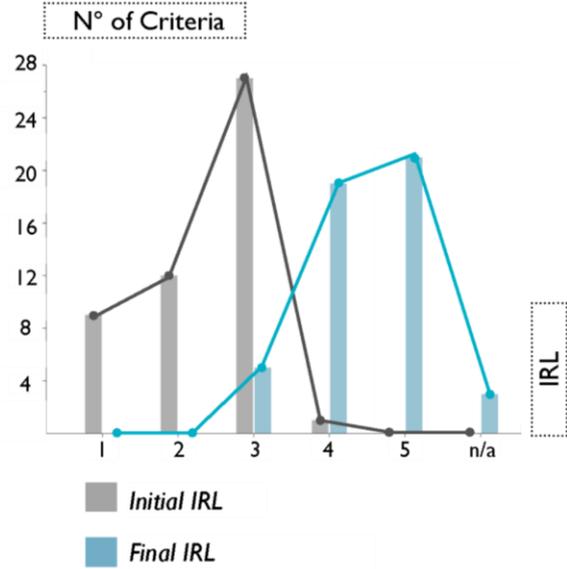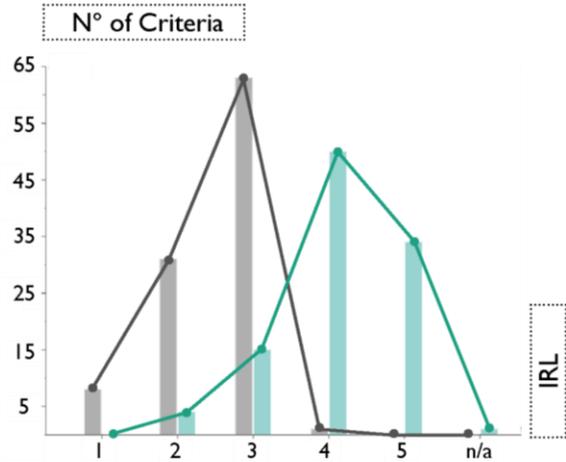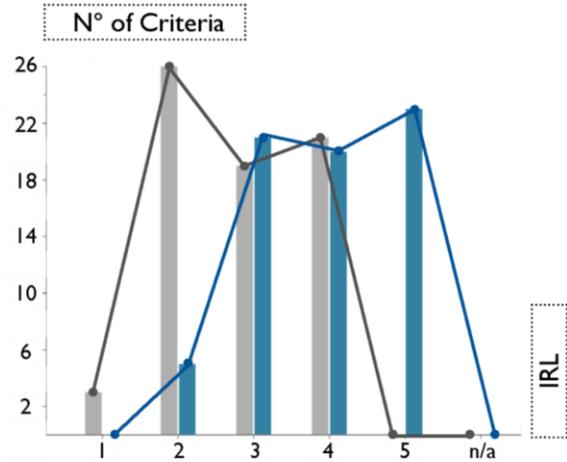
Figure 29. Initial and Final IRL comparison by tier.

As a general overview, Materials and Methods had a similar behaviour in terms of achieved innovation - for both, the initial IRL by far was IRL3, which mean that many criteria were already implemented as a demo/pilot. Just in Management, at the end of the process, there remains many criteria in the early stages of innovation (IRL1 and IRL2), although it is key to consider the number of criteria available to be evaluated was much higher than in the other tiers. Although in Monitoring the high ending levels are evident, for all tiers the prominent transformation may be featured, reaching a mature innovation level and improvement, with special emphasis on the operationalisation of innovation aspects (IRL5).

3.3. CLEVER Innovation Pathways based on IRL improvement

The analysis of the ex-post results enables to measure and assess the accomplishment of the main goal of the LIST, i.e., the innovation pathway crossed through the CLEVER Cities. The information that lay the foundation on the CLEVER Innovation Pathway are the final IRL levels indicated by the cities at the ex-post, compared to the expected IRL, scored at the start of the project. By crossing those data and analysing each criterion individually and aggregated, it was possible to verify the fulfilment of the goals.

The results of this analysis are evolution-oriented and done at a tier scale, and they are represented in two types of matrixes, which indicate:

- The *expected IRL improvement* (comparison between the initial and expected IRL, obtained from the results of the ex-ante analysis)

- The *real IRL improvement* (changes between the initial and final IRL, combining and comparing the initial IRL indicated in the ex-ante, and the final IRL provided by the ex-post analysis)

Management

The innovation pathway for Management presents curious results (Figure 30), of which some interpretations are presented in the following bullet points:

- Those criteria that had an initial IRL1 and IRL2 have exceeded expectations, going from an expected improvement of 1 or 2 stages of IRL, to the real improvement reaching levels distributed to those IRL equal or superior to IRL3.

- Although there were high expectations of implementing innovation criteria, changing from IRL3 to IRL4 (106 Criteria), most of them stayed in the same IRL3 (21 Criteria), while only 70 evolved to IRL4.

- For those criteria starting at IRL4, the expectations were not totally fulfilled, where only 3 criteria reached an operational status.

- In general, the expected improvement was not very audacious, considering that the real improvement has reach impressive levels, with many criteria finalising at being fully operational (IRL5).

This may be a result of the lack of possibility for capacity building along CLEVER Cities, and maybe aiming to avoid committing to innovate in management issues, since it would strongly depend on the administration support and internal processes, which is usually difficult to change.
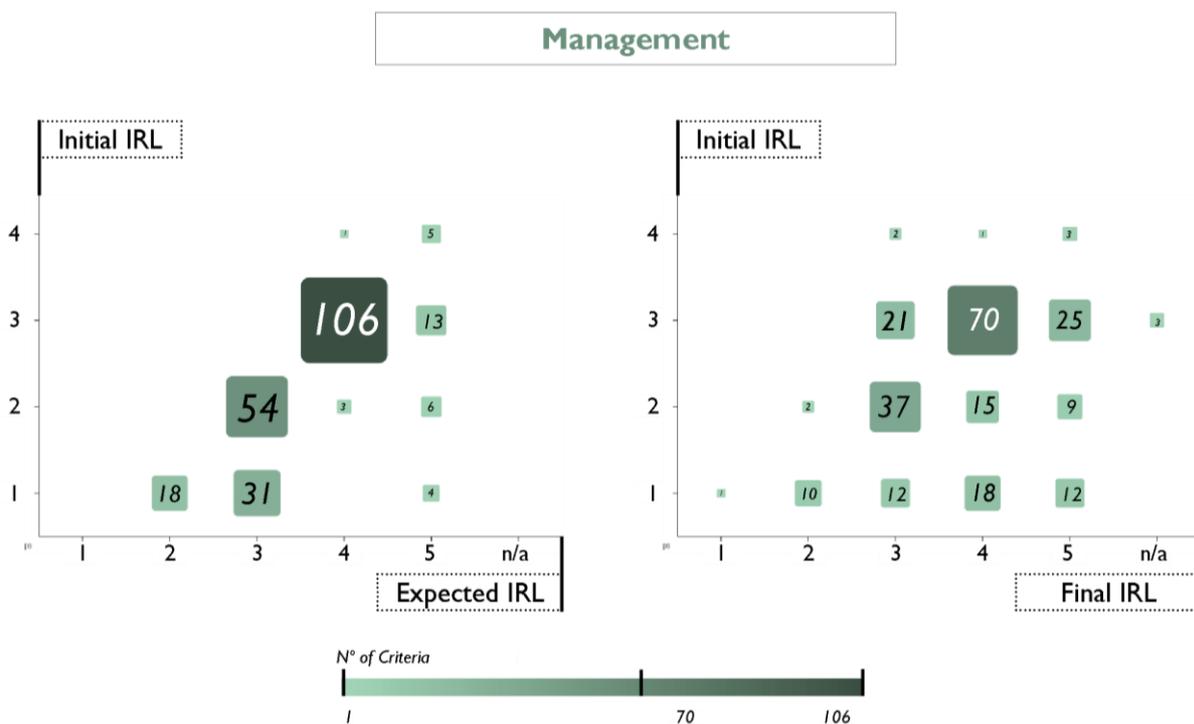
Figure 30. Diagram of expected and real IRL improvements, indicating the innovation pathway in Management.

Materials

The innovation pathway for Materials (Figure 31) differs from Management in various aspects, starting by the fact that while for those criteria starting at IRL1 and IRL2 the real improvement was lower than expected, those starting at IRL3 ended up at a much higher level.

- Those criteria starting in IRL1 did not reach the expected improvement, although it is very difficult to fulfil the expectations of such an important change, starting from not having considered a specific criterion, to transform it into applied in specific environment or fully operational.

- The transition towards innovation was very positive for both initial IRL2 and IRL3, where the results overcome the expectations.

Some of the not-fulfilled expectations would not be critical and should not be really considered a failure, but maybe more as a misunderstanding of the initial expectations indicated that are very ambitious.
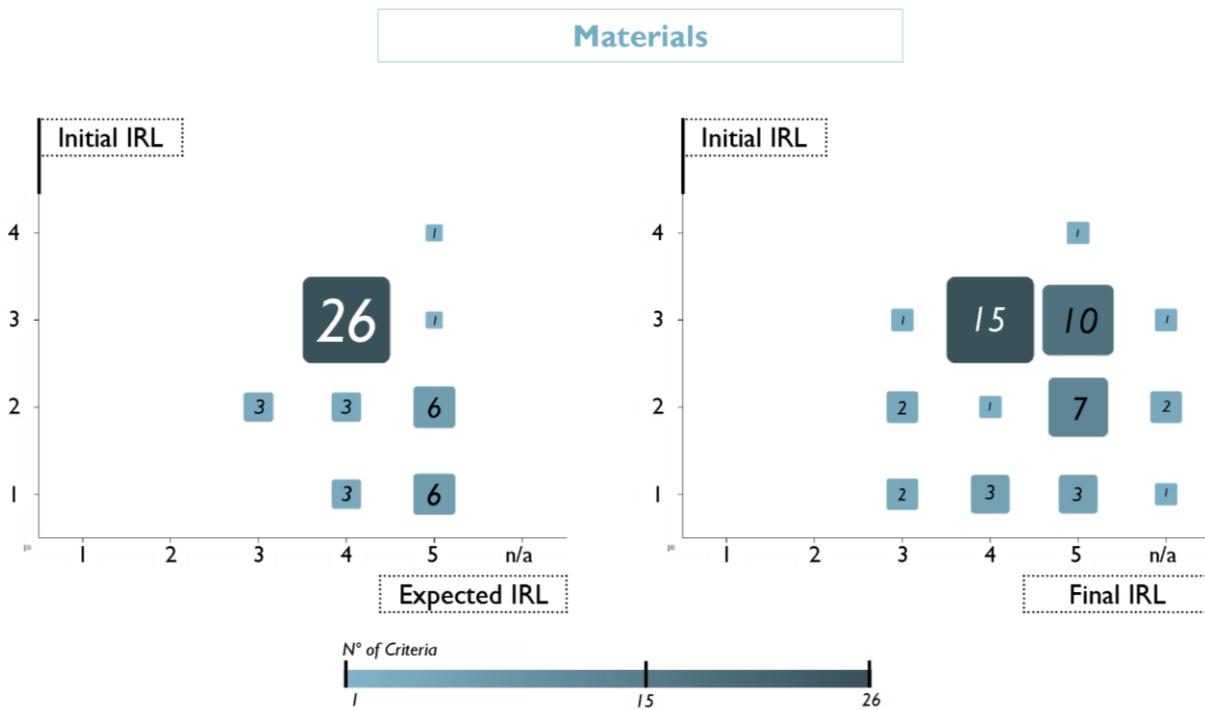
Figure 31. Diagram of expected and real IRL improvements, indicating the innovation pathway in Materials.

Methods

The improvements of IRL for Methods (Figure 32), again, shows different paths than the previous tiers.

- In general, while in criteria of initial IRL1 and IRL2, the improvement was lower than expected, whether for those with initial IRL3, it was the opposite, and the final improvement far exceeded the expectations.

- Even though, 11 of the criteria started at IRL3 do not present any innovation along the development of the project, either because innovation could not be applied, or because, even presenting some evolution, it was not enough to be situated in the following level.

- Even assuming that the change from IRL2 to IRL4 or IRL5 in some cases are not very realistic, in Methods there is a high number of criteria that fulfilled those indicated expectations.

Further details, not available through the LIST, would have to be analysed to confirm if some very ambitious achievements are truthful.
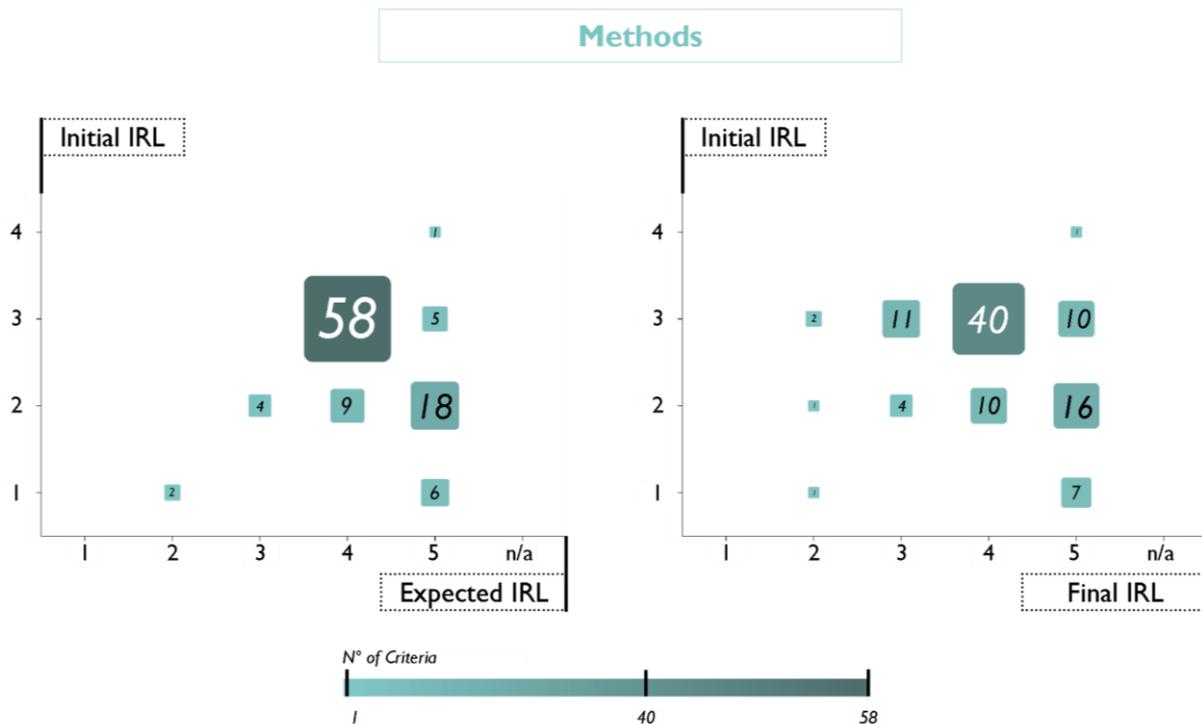
Figure 32.   Diagram of expected and real IRL improvements, indicating the innovation pathway in Methods.

Monitoring

Monitoring is, as mentioned before, a tier in which tasks were part of the commitments of the CLEVER Cities, and so, there was a better understanding on the topic, and a clear vision on the actions to be taken, and so, the types of innovation possible to be applied – and finally implemented – are more evident (Figure 33).

- Mirroring the analysis done for Methods, 3 of the criteria started at IRL3 do not present any innovation along the development of the project, either because innovation could not be applied, or because, even presenting some evolution, it was not enough to be situated in the following level.

- In general, Monitoring was the tier that less fulfil the expectations.

- However, the real improvement is a fact to be highlighted regarding the real improvement to IRL5; it means that, in total, 23 criteria ended up at being fully operational, which could be considered an important added value in the project.

The low expectation is probably because FR were motivated and ranked the expected improvement very high (most expected to reach IRL5 by the end of the project), but mainly because the project has suffered some issues of timing (among which is the COVID-19 pandemics) regarding the implementation plan.
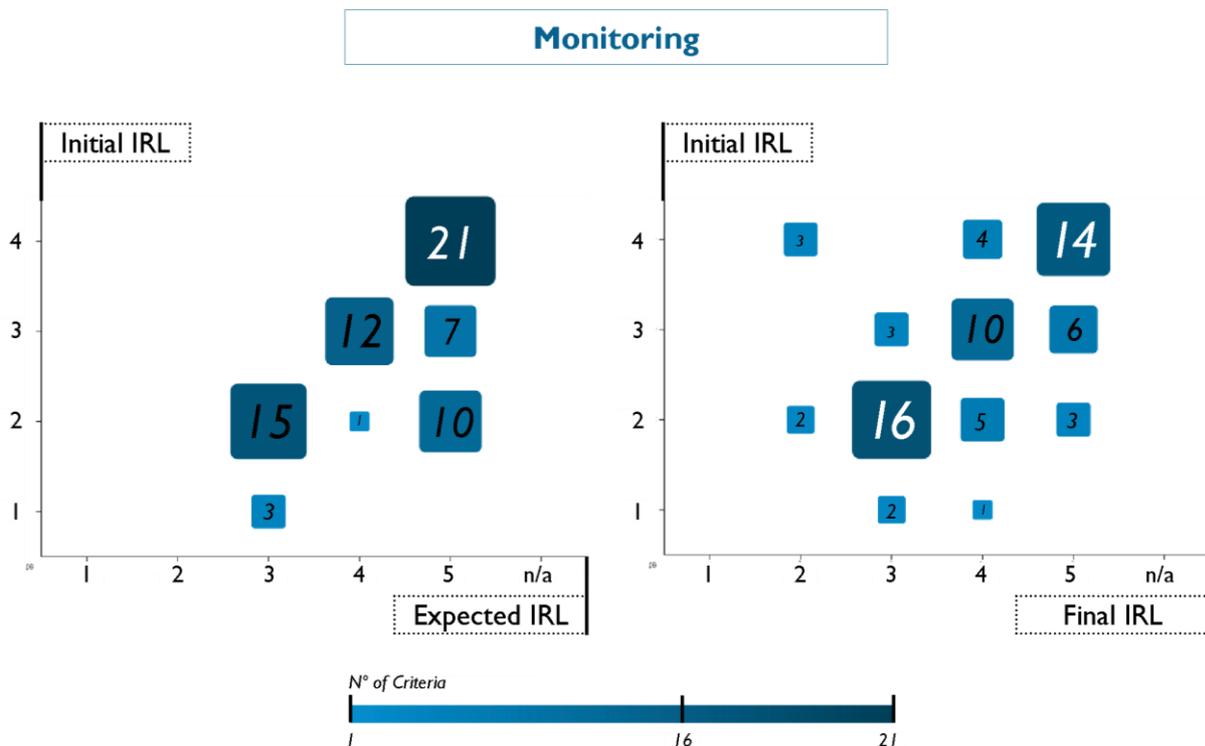
Figure 33.   Diagram of expected and real IRL improvements, indicating the innovation pathway in Monitoring.

A general overview of the innovation pathway

Evaluating the data extracted from each tier together and in conjunction, and comparing the expected and real IRL improvements, provide a nice picture of the overall innovation pathway. In general, the most relevant results from this analysis are represented in Figure 34, with special focus on the data highlighted diagonal. Those are the innovation criteria that have effectively evolved by one or two IRL levels, which may be counted as the most coherent and realistic leaps considering the scope and extension of CLEVER Cities (5 years). Higher jumps may occur (IR1>IRL4, IRL2>IRL5, an even IRL1>IRL5) and indeed, some have been identified on many occasions, which could be an outstanding result for the project, and undoubtedly an added value to the cities. However, they are neither established as a goal, nor a typical result to be found.
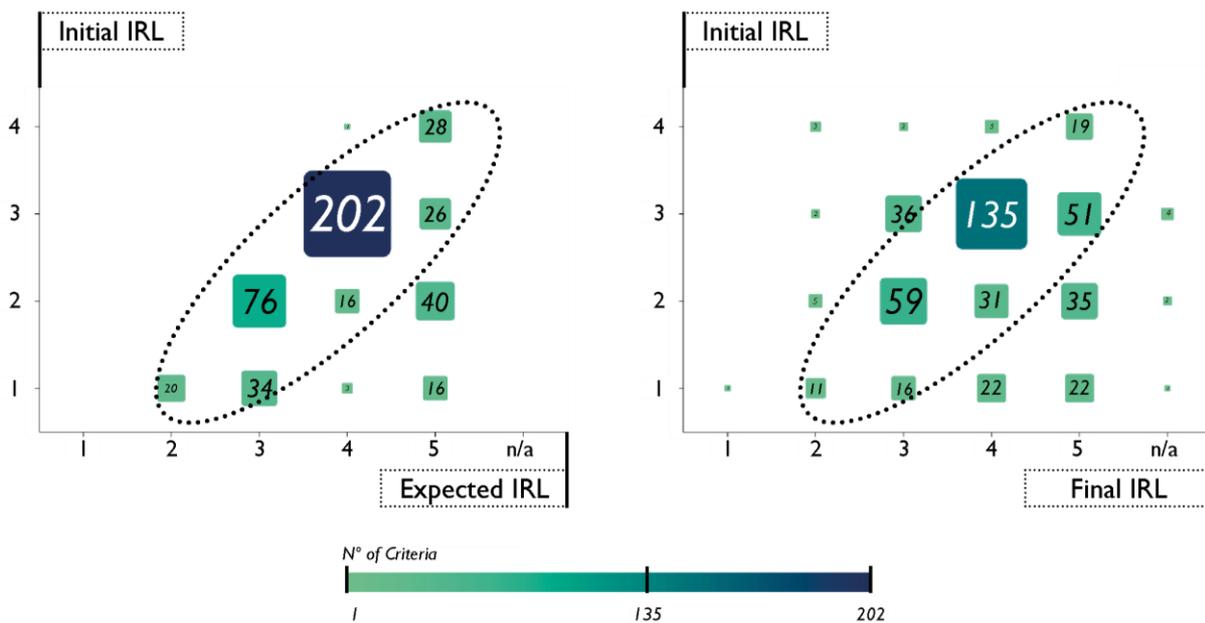
Figure 34.   Diagram of expected and real IRL improvements, indicating the CLEVER Innovation Pathway.

Some conclusions regarding the final CLEVER Innovation Pathway are as follow:

- As indicated in the highlighted boxes, many of the expected IRL improvement were fulfilled by the end of the CLEVER Cities, with a considerable number of criteria even surpassing the expectations, increasing their IRL improvement by two levels. In general, the cities were cautions on their expectations, given that at the end the real improvement were superior to that initially predicted. This may be a result of a level of carefulness, maybe led by a lack of confidence, knowledge, or aiming not to commit to some result they were not sure they would be able to achieve by the end of the project.

- Some criteria were initially at IRL1, which means that these innovation criteria have never been considered by the cities before CLEVER Cities. Thus, the second objective established regarding the development of the LIST was accomplished: to inspire cities through the available content. That sum may represent a valuable indicator of the achievement of the proposed goal.

- There are some indications of a possible incorrectness on the results, such as the criteria which have decreased their level of IRL (on the top-left of the highlighted area); indeed, it is unlikely to happen. This can be interpreted from two perspectives: (i) small errors in the data collection and management process may have happened, and since the aim of the LIST is to show the pathway, a revision in-depth of the information included were not done, and we have taken for granted that the city inputs were correct along all the process, and (ii) the long timespan of the project has driven that different teams of the city might have been part of the process, having different people completing the ex-ante and ex-post evaluation. Assuming that the LIST is constructed over a qualitative measure, the interpretation might have varied from one evaluator to another.

- There are also some criteria that have kept the same level of innovation along the project. Again, it may be assumed the ex-ante and ex-post analysis were done by different members with different knowledge of the process and thus, with different criteria, or it also may be due to the timing challenges suffered by CLEVER Cities. There were some limitations regarding the development of NbS solutions, not only because of the COVID-19 pandemics, but also because we have realized that an effective co-creation process may take longer than expected to be put into action. Those time limitations may have led to a certain progress on the innovation applied, but not enough to change IRL, so that the levels have kept identical in both the initial and final evaluation. The definition of the 5 IRL may be a shortcoming, and perhaps sublevels would have to be considered to minimize that condition.

- Although a few, there are some criteria indicated as not-applied (n/a), indicating that they were not considered by the city in the process, although initially expected. This may be due to the project delays, considering some NbS implementation were not even implemented, or changed plans along the project development. It affects mostly the monitoring and materials tiers.

In general terms, one of the conclusions raised from this analysis is that these innovation pathways have been diverse, and some of them might have been improved throughout the project at expenses of others. These inferences reflect that innovation pathways can be easily redirected when adverse situations (as was the COVID-19 pandemics), technical unviability or timing issues raise.

Each city innovates in those areas which sounds and interests them the most – the LIST does not include any compulsory criteria, and the tool does not imply any obligation to innovate. Therefore, the conclusions of the analysis included in this document are simply result of the figure and facts gotten from the values indicated by the cities, without further assessment or verification. The judgement and precise evaluation of the implementation of the innovation *per se* is not part of the scope of this report. Some of the actions realised by the cities are included in specific implementation reports (e.g., D.2.4 of FR). However, it is still useful from the perspective of a self-assessment on where they are, where they wanted to be, and where they ended up by the end of the project. The design of future NbS plans could perfectly take those conclusions into consideration.

4. Conclusions and main messages

The LIST – Local Innovation Screening Tool – was developed in CLEVER Cities to compile valuable information on multiple innovation criteria regarding the implementation of NbS, especially those aimed at urban regeneration. Besides offering the users a set of criteria with description, examples, and good practices, which may be useful to inspire the application beyond the project context, the results obtained after the cities proceed with the evaluation provide key information on the pathway followed along the development of the project.

Cities and urban planners may want to make use of the tool and analyse the results to better understand their own starting point and be aware of the existing possibilities of applying some of the criteria in their specific context. Therefore, they may be able to increase innovation in the process of NbS implementation.

As presented along this document, Material choices, Methodologies, Management, and Monitoring of the impacts (the four tiers) are some of the items included in the tool, where cities could potentially innovate. The tool is created under those four core elements, which groups of criteria can be evaluated according to the IRL (initial, expected, and final), Innovation model, and Viability (technical, economic, legal, and social).

Some brief conclusions regarding the analysis of the results and the process to gather them are presented in the following bullet points and consecutive reflections.

- Regarding the *innovation ecosystem*, which presents the distribution of the criteria selected by the FR within the different tiers, the numbers show a clear tendency to a high level of innovation proposed by most of the cities in all environments available. It indicates the criteria were well accepted, with remarkable marked options in terms of Management and Methods. Specifically for Management (the only tier evaluated by both FR and FE), the sphere related to stakeholder engagement was the most popular for innovating, what makes sense given the essence of CLEVER Cities that bases its development on co-creation. The same rationale may be considered for the selection of some criteria within the Methods tier, that are mostly pointed to the technical design, indicating the desire to propose novel solutions of NbS for their urban regeneration. The ex-post analysis revealed that most of the selected criteria were not only accurate, but also practically fully applied, with a high rate of success regarding the real improvement of the innovation when compared to the expected one indicated during the ex-ante. **It could be concluded, therefore, that the tool achieved a successful approach of measuring innovation application, while also enhancing inspiration towards more innovative NbS implementation for urban regeneration.**

- In terms of *improvements and feasibility-to-implement* of the selected innovation criteria, the results show a more conservative approach, mostly expecting to leap their initial IRL by one level. It is curious that while in Management, cities consider the evolution of IRL around early stages, in Monitoring, they expect to achieve more consolidated levels, maybe since this is a key transversal activity of the project committed by contract. Changes from a low to a high level of IRL along the 5 years of the project, although they may seem not to be very realistic, were still proposed – and in some cases achieved – by some cities. While the ex-ante analysis revealed IRL expectations to be mostly moderate, the ex-post analysis confirmed that, for the Management, Materials and Methods tiers, a prominent innovation pathway. **Although in some cases the expectations were not achieved for a certain criterion, the final IRL improvement was compensated by others which had a higher level of innovation than initially stated.**

- The *viability for implementing the innovative actions* selected are mostly close to the mean and just a few registers may be considered critical. Viabilities fluctuate among similar values, with Management and Materials tiers tending to have a lower viability, while Methods and Monitoring tiers seem to be considered more viable. In terms of the types of viability analysed, it seems that it the innovation are faintly more socially and legally viable than technically or economically. Some curious results have raised, such as in the Monitoring tier, that despite being considered the one with the highest mean viability, it has proven to be the less successful in terms of achieved innovation and IRL improvements. **To take more precise conclusions, further analysis would be needed in order to evaluate the reasons behind that and the specificities of each evaluation (which is not the scope of the present exercise). However, some reflections and interpretations of some surprising results could be done, at this stage, by the cities themselves.**

- In relation to the *multipliers*, i.e., criteria selected by all FR cities concurrently, they are mainly present in the Management and Methods tiers. Materials and Monitoring presented a relative low number of multipliers. **A remarkable achievement is that, at the end of CLEVER Cities, very few criteria were indicated as not applied, and only 3 of them ended up by not being effectively a multiplier, what may be an indicator of consonance and alignment among the three FR.**

In general, the main strength of the results is that they allow a reasonable identification of the innovation pathway committed in CLEVER Cities. For the cities, the information presented may be used as a self-assessment, as well as a basis for the proposition of actions aligned with innovation in their NbS implementation process in progress, as well as in future NbS plans. The possibilities presented through the exhaustive set of criteria included in the tool may inspire and motivate them to be more innovative and creative in their actions. Although some results may show a relatively low level of advance, it is indeed a seed that may growth beyond the CLEVER Cities timespan, and that may be considered for further implementations.

Not only the results have to be considered to assess the success of the task, but also the development of the tool itself and the process of applying it by the cities. Some burdens were faced along the process, although they are mostly related to the optimistic timeline and recognised challenges related to the project itself. One of the biggest difficulties were the coordination of the city teams to deliver the information on time. In some cases it was due to lack of time and loads with other tasks; in other, due to the absence of a deep understanding of the tool (possibly related to the fact that some members were not able to participate of the numerous capacity building and information sessions); still, because of the continuous fluctuations of CLEVER Cities´ teams in different institutions, making it difficult to keep the needed constancy and correct flow of information. The holistic understanding of the project – the goals, the implementation process, and the city context –, is critical so that the information introduced in the LIST are the most robust and coherent possible.

Some limitations faced may be related to the measurement of qualitative processes, considering the methodologies implemented and the schedule proposed. A huge effort was put in trying to provide an important number of measurable criteria organized in a clear tree structure. Nonetheless, the qualitative status that LIST tries to measure in several innovation aspects (such as viabilities or innovation improvements) can lead to a subjective interpretation at the scoring and choice process. Besides, the common evolution of such long projects as H2020 ones counts on changes on the teams involved in different tasks, and in the completion of this analysis it was not different. Although ideally the ex-ante and ex-post should be evaluated by the same individual, in most of the cases it has been done by a different person, which contributes to the lack of coordination of the already subjective process.

The systemic perspective of the LIST, and the noteworthy conclusions seen under that broad perspective, offer valuable information that allows to understand the CLEVER Innovation Pathway traced by the cities along the development of the project, considering both the related strengths and their inherent limitations. The LIST results provide important evidence about in which topics and in which direction a city has innovated the most. As previously mentioned, this information may serve as a self-assessment, and it is a valuable basis for planning future activities.

It is worth mentioning that the LIST tool was implemented for the first time in CLEVER Cities, and as expected, it counts with an important margin for improvements in terms of content, functionalities a methodology. Some potential improvements may be, for example, related to enhancing the current functionalities, facilitating a better understanding of the process, or providing a friendlier application to the cities. Additional reviews in terms of the criteria and new features may be considered in a potential future version of the tool.

In summary, the CLEVER Innovation Pathway presented in this document, result from the application of the LIST in both FR and FE, contributed to the understanding on which, how, and by whom, the innovation aspects were tacked along the project timespan. These are basis outputs to be led to a reflection to be done at city level, reasoning on the success and/or limitations, to be either replicated or overcome. For instance, the development of the cities´ NbS plans could perfectly use the presented LIST results as a reference, while focusing on a vision on what kind of future they want.

5. References

Cantergiani, C., Aguirre, A. (2023). ECCA.

CLEVER Guidance (2022). CLEVER Cities project results. Available at: www.clevercities.eu (last access: July/2023)

Deliverable 8.2 – Innovation Strategy: Approach to define the innovative character of the ecological urban regeneration and their associated processes

Deliverable 2.4 – NbS Implementation in FR

6. Anexes

Annex 1: List of criteria

MATERIAL

Material refers to innovations in the specific type of physical NBS intervention (e.g.: green roofs, green corridors, urban farming), and its technical and place-based aspects (challenges, needs, status quo) (Source: PMGRID REPORT).

A	Interventions in buildings	1	Green / blue roofs	01	Count on the volume of storage for water treatment
				02	Consider water retention
				03	Use of smart flow control through a weather app
				04	Use of smart drip irrigation systems in green roofs
				05	Qualify roof areas with wild bee and nesting aids
				06	Combine solar panels and green-blue roofs
		2	Green facades and living walls	01	Build a green wall trellis
				02	Grow edible plants in façades and walls
				03	Use of smart drip irrigation systems in green facades and living walls
B	Public spaces and private community areas	1	Vegetated areas	01	Perform a multicriteria evaluation for plant choices, aiming at experimenting with plant mixes
				02	Generate a digital database of native plants and related local providers
				03	Create sensory gardens
				04	Develop a new root connection system for the trees
				05	Build a nature experience area
		2	Community garden (Public or private)	01	Provide appropriated vertical walls for farming
				02	Promote the development of kitchen gardens
				03	Create urban fruit tree areas to generate mini urban ecosystems
				04	Promote the installation of aquaponics preferably using rainwater
				05	Promote self-constructed high beds for gardening (under expert supervision)
				06	Instruct private owners and communities on how to enhance biodiversity in their pocket gardens
C	Water bodies and urban drainage systems for water resilience	1	Urban drainage systems (methods improving rainwater retention and infiltration)	01	Promote the integration of infiltration solutions
				02	Consider a rainwater retention system
				03	Combine multifunctional rain gardens
		2	Water bodies	01	Integrate helophyte filters into the multifunctional gardens
				02	Promote multifunctional water reuse (irrigation, heating…)
				03	Install flooding beds for water retention

MAT-A Interventions in buildings

Innovation in interventions related to building envelopes (roofs and façades).

MAT-A-1 Green / blue roofs

Improve spaces on top of buildings covered with vegetation planted in a growing substrate including the use of new systems that facilitate water management (storage and use), the promotion of biodiversity, or the generation of energy.

MAT-A-1-01 Count on the volume of storage capacity for water treatment

Storage of water is part of a runoff recycling system, after which it can be treated into ponds or storage layers on the roof. Green roofs can contribute to the overall urban rainwater runoff, having both a retention and detection function. The collected water could be used as potable water, for irrigation during the dry seasons, or for other uses.

EXAMPLE: Green Business Centre in Hyderabad (India) was constructed in 2003. LEED Platinum-certified building. Link to the project's complete description: https://www.greenroofs.com/projects/cii-sohrabji-godrej-green-business-centre-ciigbc/

MAT-A-1-02 Consider water retention

Drainage systems enable water to flow along a winding route from one chamber to another. During heavy rainfall, the chambers of the board are filled with water, and it passes from one chamber to the next diminishing and optimizing the discharge of excess water.

EXAMPLE: The refurbishment of Gomeznarro park in Madrid focused on stormwater retention. Link to the example: https://climate-adapt.eea.europa.eu/metadata/case-studies/the-refurbishment-of-gomeznarro-park-in-madrid-focused-on-storm-water-retention

MAT-A-1-03 Use of smart flow control through a weather app

A weather app activates a smart control to discharge the flow when rain is expected. The rainwater outlet can be open, so that stormwater volume is drained off, creating space in the retention box for the expected volume of new rainfall to be stored.

MAT-A-1-04 Use of smart drip irrigation systems in green roofs

Smart drip irrigation system is a precise technique based on determining the real-time irrigation needs of the green roof, that is activated when a threshold in the substrate water content is reached.

REMARK: Recent breakthroughs in open-source hardware components open the door to new ways of developing smart irrigation systems that can connect to transmission devices via the Internet, thus providing high space-time data coverage of substrate water and of other multiple sensors installed in the green roofs, measuring air temperature and humidity.

MAT-A-1-05 Qualify roof areas with wild bee and nesting aids

Recreation of natural habitats (for example, by mimicking the surrounding environment, using native plants) to support a variety of birds and other animals, including invertebrates (such as insects, worms, etc.) . Logs, sand, water bodies, and boulders provide habitats for various species of insects and birds providing food sources for local wildlife.

MAT-A-1-06 Combine solar panels and green-blue roofs

Combination of biodiverse and extensive green/blue roofs with photovoltaic systems, in a synergy of technologies (e.g. bio-solar roofs) that could provide power to smart systems.

EXAMPLE: Bellême Hospital. Located in Normandy, France, the design intent of the extension of the Bellême Hospital was to provide a sustainable building, LEED certified (HQE). According to various research, the implementation of a green roof underneath solar panels can increase the productivity of electricity by up to 15% as the green roof is limiting temperature fluctuation on the roof as well as decreases the temperature in the summer. Combining a green roof with solar panels is becoming a more and more common approach to increase the benefits of the vegetated roof.

MAT-A-2 Green facades and living walls

Use facades, walls, and vertical structures to improve bioclimatic conditions and introduce biodiversity including the promotion of new irrigation systems.

MAT-A-2-01   Build a green wall trellis

Trellis solution for green wall usually separated from the building wall.

REFERENCE: Maria Manso. João P. Castro-Gomes (2015). Green wall systems: A review of their characteristics. Renewable and Sustainable Energy Reviews 41:863–871. DOI:10.1016/j.rser.2014.07.203. Link https://www.researchgate.net/publication/266078897_Green_wall_systems_A_review_of_their_characteristics

MAT-A-2-02   Grow edible plants in façades and walls

Vertical structures (for example trellis construction that aims for easy access to the building facade) that have vegetables, fruits, and herbs attached to them instead of plants in a different way of growing fresh produce. The structures can be installed either indoors or outdoors.

EXAMPLE: Atlanta Botanical Garden Edible Garden Green Wall. The Atlanta Botanical Garden opened its Edible Garden Green Wall and Outdoor Kitchen on May 1, 2010, showcasing the farm-to-table concept of cultivating and consuming fresh local and sustainably grown food. Link to the project's complete description: https://www.greenroofs.com/projects/atlanta-botanical-garden-edible-garden-green-wall/

MAT-A-2-03 Use of smart drip irrigation systems in green facades and living walls

Smart drip irrigation system is a precise technique based on determining the real-time irrigation needs of the green roof, that is activated when a threshold in the substrate water content is reached.

REMARK: Recent breakthroughs in open-source hardware components open the door to new ways of developing smart irrigation systems that can connect to transmission devices via the Internet, thus providing high space-time data coverage of substrate water and of other multiple sensors installed in the green roofs, measuring air temperature and humidity.

MAT-B Public spaces and community areas

Innovation in the design and conception of green areas including the promotion of biodiversity and/or the proactive participation of the community.

MAT-B-1 Vegetated areas

Use new criteria (multicriteria, accessibility, comfort, shades, etc.), tools (digital base of natives plants), and systems (new root connection system) to improve the design of vegetated areas by introducing new garden concepts (sensory garden, nature experience area, etc.).

MAT-B-1-01 Perform a multicriteria evaluation for plant choices, aiming at experimenting with plant mixes

Use decision-makers' preferences (shadow, colour, etc.) in multicriteria evaluation to choose different plants in public space areas.

EXAMPLE: Multi-criteria decision making for plant location selection: an integrated Delphi-AHP-PROMETHEE Methodology. Sana Mousavi, Reza Tavakkoli-Moghaddam, Mojtaba Heydar, Sadoullah Ebrahimnejad. Link to the reference: https://www.researchgate.net/publication/257803253_Multi-criteria_decision_making_for_plant_location_selection_an_integrated_Delphi-AHP-PROMETHEE_Methodology

MAT-B-1-02 Generate a digital database of native plants and related local providers

Create a digital database that includes the native plant species of each place so that their use is prioritized in NBS projects and a list of the local suppliers that have or work with each of the species, to promote local trade.

EXAMPLE: Native Plants Finder. Link to the project: https://www.nwf.org/nativeplantfinder/

RELATED TO: MET-B-3-06 Prioritize the use of native plants

MET-B-2-04 Prioritize local supply chains and suppliers

MAT-B-1-03 Create sensory gardens

Design comfortable and accessible gardens, considering the correlation between pedestrian mobility and patterns of use of space and the creation of shelters from sun, rain, and wind (for example, generated/delivered shadows).

REFERENCE: How to design a sensory garden - Sensory Trust. Link to reference: https://www.sensorytrust.org.uk/resources/guidance/sensory-gardens-design-guide

MAT-B-1-04 Develop a new root connection system for the trees

Promote the use of products that help to build a specific underground structure for the root of the trees, compatible with other underground networks (water, electricity, digital services).

MAT-B-1-05 Build a nature experience area

Build large natural and "wild" free spaces for children and adolescents, in which they can play independently and unattended. The nature experience possibilities in these spaces include all forms of play, physical activity, and tranquillity that rely neither on infrastructure nor on playground equipment (Source: HNEE).

EXAMPLE: Pearlmutter, David et alt. (2019). Enhancing the circular economy with nature-based solutions in the built urban environment: green building materials, systems, and sites. Blue-Green Systems. 2. 10.2166/bgs.2019.928. Link: https://www.researchgate.net/publication/337737446_Enhancing_the_circular_economy_with_nature-based_solutions_in_the_built_urban_environment_green_building_materials_systems_and_sites

MAT-B-2 Community garden (Public or private)

Promote the generation of different elements (vertical walls for cultivation, orchards, urban fruit areas, aquaponics, etc.) to enhance biodiversity, encourage active participation in the community and increase the sense of ownership.

MAT-B-2-01 Provide appropriated vertical walls for farming

Provide vertical walls for farming that are based on "*growing crops in controlled indoor environments, with precise light, nutrients, and temperatures*" (Brikby, 2016).

REFERENCE: Birkby (2016) Vertical Farming. ATTA Sustainable Agriculture. NCAT Link https://attra.ncat.org/product/vertical-farming/

EXAMPLE: Vertical farming is a summary of approaches to growing skywards. Link to ttps://www.researchgate.net/publication/331130061_Vertical_farming_a_summary_of_approaches_to_growing_skywards

MAT-B-2-02 Promote the development of kitchen gardens

Promote kitchen gardens that are areas where vegetables, fruit, or herbs are grown for domestic use in public spaces.

MAT-B-2-03 Create urban fruit tree areas to generate mini urban ecosystems

Creating urban fruit tree areas is a good way of growing in urban walls (vertical urban fruit trees) or soils to generate mini urban ecosystem.

REFERENCE: Grow Veg: 3 Ways to Train Fruit Trees (Link: https://www.growveg.co.uk/guides/3-ways-to-train-fruit-trees/)

EXAMPLES: Urban food forestry. Fruit Tree Initiatives. Link: http://urbanfoodforestry.org/initiatives/

MAT-B-2-04 Promote the installation of aquaponics, preferably using rainwater

Promote the installation of aquaponics which is a portmanteau that is a combination of aquaculture (a place for farming fish crustaceans, molluscs, and other aquatic organisms) and hydroponics (a place-growing plants in a soil-less environment). Rainwater is the best choice of water to use in it.

REFERENCE: Small-scale aquaponic food production Integrated fish and plant farming. Link: http://www.fao.org/3/i4021e/i4021e.pdf

MAT-B-2-05 Promote self-constructed high beds for gardening (under expert supervision)

Promote (by workshops, hackathons, etc.) people's self-construction of high beds for public spaces gardening. It is a "leaning-by-doing" approach for students and locals acting as co-carers.

EXAMPLE: Boulevard gardening guidelines. The city of Vancouver. Link: https://vancouver.ca/home-property-development/gardening-guidelines.aspx
Prinzessinengärten.DIY Integrated Approach: learning from Prinzessinengärten. https://urbact.eu/diy-integrated-approach-learning-prinzessineng%C3%A4rten

MAT-B-2-06 Instruct private owners and communities on how to enhance biodiversity in their pocket gardens

Offer expert support and training to private owners and communities on how to enhance biodiversity in their pocket gardens (use of native plants to recreate natural habitats, installation of elements that can provide foraging and nesting for birds and insects, etc.). Evidence-based support to motivate private owners on the benefits of such actions.

EXAMPLE: Hanging Gardens Oberlaa: "Pupils of the elementary school Oberlaa plant a 5sqm, free-standing wall construction with herbs. The children themselves sow herbs and they were involved in the implementation right from the start. They learn how to grow, nurture and harvest plants as well as how seasons and weather conditions affect the vegetation. In addition to a lot of fun, an exciting change in everyday school life, and a lesson in organic farming, it is a nice experience for children to be able to literally reap the rewards of their own work". Link to the project: http://implementation-models.nature4cities-platform.eu/NBS.php?sid=42

MAT-C Water bodies and urban drainage systems for water resilience

Innovation in methods and systems to improve rainwater and water bodies management and their quality.

MAT-C-1 Urban drainage systems (methods improving rainwater retention and infiltration)

Develop innovative urban drainage systems (considering retention and infiltration methods and systems).

MAT-C-1-01 Promote the integration of infiltration solutions

Promote solutions such as infiltration basins, which are facilities designed to capture and retain runoff and allow it to infiltrate rather than discharge directly to surface water. Infiltration basins may be integrated into private gardens, in basic street design, etc.

REFERENCE: Wsdot (Washington State Department of Transportation Technical Monitor) (2003). Implementation of Infiltration Ponds Research. A design manual for sizing infiltration ponds. Final Research Report. Research Project Agreement No. Y8265. Link to the reference: https://www.wsdot.wa.gov/research/reports/fullreports/578.2.pdf

MAT-C-1-02 Consider a rainwater retention system

Take into consideration solutions such as the transformation of the bike lanes into high-volume rainwater retention systems by incorporating water storage channels under or next to cycle tracks.

EXAMPLE: The Copenhagener Current (proposal). "It involves digging trenches under existing cycle tracks, implementing precast, concrete containers and covering them with pre-fab, concrete slabs". Link to the proposal: http://www.copenhagenize.com/2015/03/the-copenhagenize-current-stormwater.html

MAT-C-1-03 Combine multifunctional rain gardens

Combine different functions such as an area that combines a playscape and a rain garden, where kids have fun while the landscape's design helps control stormwater runoff.

> EXAMPLE: The Promenade at the Metropolitan (Columbia). "A 40,000-square-foot park open space serving a mixed-use multifamily building: a hybrid playscape and rain garden intended to be a didactic showcase for stormwater retention and native plantings. The Promenade encourages kids to have some rambunctious fun while learning a thing or two about how these landscapes can shepherd rainwater from the sky to the ground".Link to the project: PLAYING IN THE RAIN (GARDEN) | Landscape Architecture Magazine: https://landscapearchitecturemagazine.org/2019/07/25/

MAT-C-2 Water bodies

Integrate innovative systems in small areas of water in city gardens, lakes, and wetlands (big areas of water in the rural and peri-urban areas).

MAT-C-2-01 Integrate helophyte filters into the multifunctional gardens

Integrate helophyte filters, that is sand filter that is generally planted with reeds, into the multifunctional gardens. The actual treatment of the water is done by bacteria living in the roots. The reeds serve principally to aerate the roots and to capture nitrates and phosphorous.

(Ref: https://www.urbangreenbluegrids.com/measures/vertical-helophyte-filters/).

> EXAMPLE: Helophyte filter on Erasmusgracht, Amsterdam. "Rainwater is discharged into a separate sedimentation reservoir in the canal, after which it passes through the helophyte filter. It is subsequently discharged into the canal.". Link to the project: https://www.urbangreenbluegrids.com/projects/helophyte-filter-on-erasmusgracht-amsterdam/

MAT-C-2-02 Promote multifunctional water reuse (irrigation, heating…)

Reuse of treated wastewater which is placed into a water body source such as a lake (natural or artificial) and then some of it retrieved for later uses: as agriculture and irrigation, potable water supply, groundwater replenishment, industrial processes, and environmental restoration.

> REFERENCE: Guidelines on water reuse. Link to the reference: https://ec.europa.eu/environment/water/pdf/Guidelines_on_water_reuse.pdf

MAT-C-2-03 Instal flooding beds for water retention
It refers to the renaturation of the riverbed and riverbanks using natural solutions to increase the roughness of the terrain and therefore reduce flooding in the surrounding low-lying areas. The main solutions include the restoration of the banks with riparian vegetation or the elimination of transversal infrastructures that hinder the natural flow of water.

METHODS

Methods refer to the knowledge and evidence generation supporting co-design and informing decision making. This tier considers the innovation in the spatial analysis informing decision-making, such as modelling, tailored cartography, ecosystems analysis, natural capital accounting, etc.

ATTENTION: Stakeholder engagement, financing strategies, and spatial management are addressed under the MANAGEMENT tier; and co-monitoring, is under the MONITORING tier.

A	Spatial analysis for urban planning	1	Definition and identification of urban challenges	01	Obtain spatial information on urban challenges and potential risks in terms of climate change
		2	Baseline and diagnosis	01	Undertake spatially vulnerability and risk assessment to detect climate change vulnerable areas at risk
				02	Identify potential adaptation options to cope with the urban challenges and threats, with an ecosystem-based approach.
		3	Supporting tools and mechanisms for improving planning and NBS integration	01	Use citizens science (via digital applications) and Citizen Observatory's Data to improve NBS integration
				02	Digital Urban Planning concepts (e- planning and digital planning tools)
				03	Use Adaptive planning based on objective and subjective data (including Citizen Observatory's Data)
B	Co-design urban regeneration (meso and micro-scale)	1	Supporting mechanisms to enable the co-design process	01	Use novel tools to support mainstream co-creation (Living labs)
				02	Use Digital tools for urban design
				03	Introduce Co-Design-formats on the spot
		2	Socioecological Urban design	01	Actively include vulnerable groups in urban Planning decision making and NBS design
				02	Integrate the different local social and citizen stakeholders' groups (e.g. citizens or social associations)
				03	Multidimensional and multilevel (Horizontal & vertical) integration of the different groups of local stakeholders taking into consideration (public or private) their sector (finance, mobility, building, etc.)
				04	Prioritize local supply chains and suppliers
		3	Technical design	01	Apply the Universal Design concept (Design for all)
				02	Design with bioclimatic criteria (Bioclimatic Urban Design) using NBS adapted to local micro-climatic
				03	Design adapting to climate change
				04	Prioritize de use of local and/or recycled nature-based materials
				05	Prioritize de use of renewable and local energy
				06	Prioritize the use of native plants
				07	Consider plant guilds
				08	Design including maintenance
				09	Apply modelling techniques, including environmental conditions
				10	Deploy NBS that supports air quality
				11	Design considering the joint integration of Grey, Green, and Blue in Cities

MET-A Spatial analysis for urban planning

Innovation in spatial analysis to inform decision making (urban scale, macro-scale) considering diagnosis (baseline) and supporting tools.

MET-A-1 Definition and identification of urban challenges

Define and identify urban challenges and potential risks.

MET-A-1-01   Obtain spatial information on urban challenges and potential risks in terms of climate change

Spatial information and spatial analysis of urban challenges, climate threats and hazards, potential vulnerability, and risks. This would imply hazards and risk maps, and urban indicators on social, environmental, and economic dimensions. Better informed decision making and planning, anticipating future risks, and preventing impacts towards better adapted and resilient cities.

REFERENCE: IVAVIA Impact and Vulnerability Analysis of Vital Infrastructures and built-up Areas RESIN-CITIES Project: "The document offers a practical guideline for conducting a risk-based process for assessing impacts and vulnerabilities of urban areas and their infrastructure related to consequences of climate change (CC)". Link to the project: https://resin-cities.eu/fileadmin/user_upload/Resources/Design_IVAVIA/IVAVIA_Guideline_v3_final__web.compressed.pdf

MET-A-2 Baseline and diagnosis

Analyse and evaluate the current situation to identify areas vulnerable to climate change that can integrate NBS as adaptation measures.

MET-A-2-01 Undertake spatially vulnerability and risk assessment to detect climate change vulnerable areas at risk

Assess vulnerability and risk on the territory to detect areas vulnerable to climate change at risk, so that adaptation can be planned at the local level.

REFERENCE: Grow Green: Climate change, vulnerability, and risk in urban areas. Link to the reference: http://growgreenproject.eu/climate-change-vulnerability-and-risk-in-urban-areas/

MET-A-2-02 Identify potential adaptation options to cope with the urban challenges and threats, based on an ecosystem-based approach

"Spatial analysis for the identification of current and potential urban green assets, to cope with different urban challenges under climate change. This implies an analysis of accessibility, connectivity, and multifunctionality of urban green, and the use of different methods such as Natural Capital Accounting, Ecosystem Services Evaluation, and valorisation of urban green.

Acknowledging the existing adaptation assets, green areas, green infrastructure, and their values. Different methods are available (i.e. natural capital accounting, ecosystem services assessment, economic valorisation of green areas, the functionality of green spaces, etc).

REFERENCES: Natural Capital Accounting. Link to the project: https://ec.europa.eu/environment/nature/capital_accounting/index_en.htm
Mapping and Assessment of Ecosystem and Their Services MAES. Link to the project: https://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/index_en.htm
Integrated valuation of ecosystem services and trade-offs INVEST. Link to the project: https://naturalcapitalproject.stanford.edu/invest/#invest-models
i-tree. Link to the project: www.itreetools.org

MET-A-3 Supporting tools and mechanisms for improving planning and NBS integration

Use supporting tools and mechanisms for improving planning and NBS integration.

MET-A-3-01 Use citizens science (via digital applications) and Citizen Observatory's Data to improving NBS integration

Using digital applications for example for finding and prioritizing urban spaces for the deployment of nature-based interventions (people feed in data for spatial analysis). Suitability of NBS based on people´s needs and expectations to guarantee acceptance.

RELATED TO:
MAN-A-1-09 Promote planning based on crowdsourced data
MON-B-1-05 Create a Citizen observatory: objective and subjective data

EXAMPLE: Cos4Cloud, a European Horizon 2020 project to boost citizen science technologies. Link: https://cos4cloud-eosc.eu/

MET-A-3-02 Digital Urban Planning concepts (e-planning and digital planning tools)

Application of Urban e-Planning concepts: the use of IT-based systems such as geographical information system (GIS), database management system (DBMS), and planning support system (PSS) for managing urban planning and development processes (within the framework of a post-positivist planning theory). Improvement of Integrated Management System.

RELATED TO:
MET-B-1-02 Use Digital tools for urban design
MET-A-3-03 Use Adaptive planning based on objective and subjective data (including Citizen Observatory's Data)

MET-A-3-03 Use Adaptive planning based on objective and subjective data (including Citizen Observatory's Data)

Plan adapted to the different urban regeneration needs detected by continuous diagnostic monitoring (quantitative and qualitative analysis and assessments, monitoring objective and subjective data during the execution).

RELATED TO: MET-A-3-02 Digital Urban Planning concepts (e-planning and digital planning tools)
MON-B-1-05 Create a Citizen observatory: objective and subjective data

REFERENCE: Jack Ahern, Sarel Cilliers, Jari Niemelä (2014) The concept of ecosystem services in adaptive urban planning and design: A framework for supporting innovation, Landscape and Urban Planning, Volume 125, 2014, Pages 254-259,
ISSN 0169-2046,https://doi.org/10.1016/j.landurbplan.2014.01.020. Link to the reference: https://www.sciencedirect.com/science/article/pii/S0169204614000346

MET-B Co-design urban regeneration (meso and micro-scale)

Innovation in mechanisms, criteria, and approaches to improve the co-design of urban regeneration.

MET-B-1 Supporting mechanisms to enable the co-design process

Use supporting mechanisms to enable the co-design process (living labs, digital tools, etc.).

MET-B-1-01 Use novel tools to support mainstream co-creation (Living labs)

Application of novel tools (e.g. IT citizens' platform, serious – or app-lied gaming, etc.) to support mainstream co-creation / living lab approach using the quadruple helix model for innovation, that considers civil society and the media as components of the innovation process.

> RELATED TO:
> MAN-C-3-01 Facilitate the application of co-creation
>
> REFERENCE: UNaLAB. Urban Nature Labs (2020) Living lab handbook for urban living labs developing nature-based solutions. Link to the reference: https://unalab.eu/system/files/2020-07/living-lab-handbook2020-07-09.pdf

MET-B-1-02 Use Digital tools for urban design

Use of digital tools, such as IT-based systems such as database management systems (DBMS), to make participation and design processes easier.

> RELATED TO: MET-A-3-02 Digital Urban Planning concepts (e-planning and digital planning tools)

MET-B-1-03 Introduce Co-Design-formats on the spot

Introduce Co-Design-formats on spot at the location of intervention (outreach participation).

> EXAMPLE: Joana Dabaj, Andrea Rigon, and Hanna Baumann, 2020, Participatory Spatial Intervention: How can participatory design and a diversity lens help address vulnerabilities in Bar Elias, Lebanon? Beirut: CatalyticAction & University College London. Link to the example: https://progireg.eu/fileadmin/user_upload/Deliverables/D2.10_Guidelines_for_co-designing_proGIreg_ICLEI_200804.pdf

MET-B-2 Socioecological Urban design

Design with an urban socio-ecological approach (integrating different groups of social actors and local citizens -as vulnerable groups- in a multidimensional and multilevel way).

MET-B-2-01 Integrate vulnerable groups in urban planning decision-making and NBS design

Real and effective integration of groups at risk of discrimination or exclusion in Spatial Planning procedures and participative NBS design: for example, people of colour, women, young and elderly, people with sensory and motor functional diversity, and people with low socioeconomic status (for example, using the Clever Inclusivity Index).

More inclusive decision-making process. Real or more active integration of these groups (not only consulted).

MET-B-2-02 Integrate the different local social and citizen stakeholders' groups

Real and effective integration of the different stakeholders in urban planning procedures and participative NBS design: local associations especially related to the environment, neighbourhood, and culture (e.g. Citizens or social associations).

Improvement of the bottom-up approach in the decision-making process. Real or more active participation of these representative groups (not only consulted).

RELATED TO: MAN-E-2-04 Participation of local groups of stakeholders at all project stages

REFERENCE: Arlati, Alessandro & Rödl, Anne & Konjaria-Christian, Sopho & Knieling, Jörg. (2021). Stakeholder Participation in the Planning and Design of Nature-Based Solutions. Insights from CLEVER Cities Project in Hamburg. Sustainability. 13. 10.3390/su13052572. Link to the reference: https://www.researchgate.net/publication/349771954_Stakeholder_Participation_in_the_Planning_and_Design_of_Nature-Based_Solutions_Insights_from_CLEVER_Cities_Project_in_Hamburg

MET-B-2-03 Multidimensional and multilevel (horizontal & vertical) integration of the different groups of local stakeholders considering their nature (public or private) and their field of work (finance, mobility, building, etc.)

Real and effective integration of the different stakeholders in NBS design: public administration, professionals related to urban planning and design, participation and/or social sciences, academia, companies, etc.

Improvement of the multidimensional and multilevel integration of the different groups of local stakeholders.

RELATED TO: MAN-E-2-04 Participation of local groups of stakeholders at all project stages
MAN-E-3-02 Improve vertical and horizontal coordination
MAN-C-2-02 Promote Horizontal governance
MAN-C-2-03 Promote Vertical governance

REFERENCE: European Commission (2020) Handbook of Sustainable Urban Development Strategies. Link to the reference: https://urban.jrc.ec.europa.eu/urbanstrategies/cross-sectoral-integration#the-chapter

MET-B-2-04 Prioritize local supply chains and suppliers

Prioritise local supply chains and local suppliers, boosting local development, saving energy, and reducing greenhouse gas emissions.

RELATED TO:
MET-B-3-06 Prioritize the use of native plants
MAT-B-1-02 Generate a digital database of native plants and related local providers

MET-B-3 Technical design

Design NBS including and prioritizing environmental criteria and considering bioclimatic criteria and universal design.

MET-B-3-01 Apply the Universal Design concept (Design for all Application the concept of Universal)

Design through the principles of Equitable Use, Simple and Intuitive Use, Flexibility in Use, Perceptible Information, Tolerance for Error, Low Physical Effort, and Size and Space for Approach and Use (The Centre for Universal Design, 1997). Raise the standard of its environments and services by making them more and more suited to the diversity of its citizens.

EXAMPLE: Acquire the "Flag of Towns and Cities for All". Better level of implementation of Design for All in the city. Design for all foundations. Link to the foundation http://designforall.org/index.php

MET-B-3-02 Design with bioclimatic criteria (Bioclimatic Urban Design) using NBS adapted to local micro-climatic

Design of NBS considering the real micro-climatic, taking into account the relation between the natural environment (hydrography, geomorphology, topography, wind, climate, and vegetation) and the built environment (orientation of the structure and urban fabric, adaptation or not to the topography, geometric conditions of the built environment, size, shape, location, orientation, building density, maximum occupancy of plots and patios, buildable area, formal building conditions, construction characteristics and conditions of use). For example, differentiating the vegetation at the bottom and upper parts of a green facade to consider wind and sun exposure differences.

REFERENCE: Design with Climate: Bioclimatic Approach to Architectural Regionalism. Link to the document: https://www.researchgate.net/publication/285610217_Design_with_climate_Bioclimatic_approach_to_architectural_regionalism_New_and_expanded_edition

MET-B-3-03 Design adapting to climate change

Consider adaptation to climate change in the design and choice of NBS.

REFERENCE: IHOBE (2016) Klimatek Project 2016 'Soluciones Naturales' para la adaptación al cambio climático en el ámbito local de la Comunidad Autónoma del País Vasco. Link: https://www.euskadi.eus/documentacion/2017/klimatek-soluciones-naturales-para-la-adaptacion-al-cambio-climatico-en-el-ambito-local-de-la-comunidad-autonoma-del-pais-vasco/web01-a2ingkli/es/

MET-B-3-04 Prioritize the use of local and/or recycled nature-based materials

Design prioritizing 100% local materials. Support sustainable production by building a nature experience area using recycled nature-based materials.

MET-B-3-05 Prioritize the use of renewable and local energy

Design that prioritizes the use of 100% renewable energy and is produced locally.

MET-B-3-06 Prioritize the use of native plants

Design prioritizing 100% autochthonous vegetation.

RELATED TO: MAT-B-1-02 Generate a digital database of native plants and related local providers
MET-B-2-04 Prioritize local supply chains and suppliers

MET-B-3-07 Consider plant guilds

Design that considers the application of plant guilds. A plant guild is "a beneficial grouping of plants that support one another in all their many functions" (Halsey, Ruddock, Weiseman 2014).

REFERENCE: Halsey, Daniel; Ruddock, Bryce; Weiseman, Wayne (2014) Integrated Forest Gardening. The Complete Guide to Polycultures and Plant Guilds in Permaculture Systems

MET-B-3-08 Design including maintenance

Design viable solutions from the point of view of maintenance and ongoing maintenance costs.

RELATED TO: MAT-B-1-02 Generate a digital database of native plants and related local providers

MET-B-3-09 Use modelling techniques, including environmental conditions

Use modelling techniques, including environmental conditions for benchmarking design alternatives. Use of visual simulation applications and/or dashboards for rendering.

MET-B-3-10 NBS that prioritize air quality

Green roofs and walls prioritizing the improvement of the (outside) air quality.

MET-B-3-11 Design considering the joint integration of the Grey, Green, and Blue in Cities

"Comparative analysis of green/blue versus grey infrastructures in urban areas that includes a documented analysis of interdependence between technological solutions (advancement of existing products used in applied ecology and bioengineering) and social benefits (job creation via e.g. urban farming, entrepreneurial opportunities linked to food ecosystems, social inclusion of vulnerable groups, improvement of public health)".

A better understanding of urban functions and services being delivered by grey and by green/blue solutions and their benefits towards better integration.

REFERENCE: Integrating the Grey, Green, and Blue in Cities: Nature-Based Solutions for Climate Change Adaptation and Risk Reduction. Link to the document: https://www.researchgate.net/publication/317236775_Integrating_the_Grey_Green_and_Blue_in_Cities_Nature-Based_Solutions_for_Climate_Change_Adaptation_and_Risk_Reduction/link/59a954200f7e9b279011ef11/download Exploring trade-offs among the multiple benefits of green-blue-grey infrastructure for urban flood mitigation. Link: https://www.sciencedirect.com/science/article/pii/S0048969719349721"

MANAGEMENT

Management refers to the overall governance of NBS. Primarily this includes how NBS are integrated and consolidated in existing governance, legislative, business, and financing frameworks. It also considers formalized or non-formalized roles and responsibilities in place for NBS; procedures and protocols that regulate design; the implementation and monitoring of NBS; and the management and maintenance arrangements in the long run, such as city plans and strategies. Policy and governance innovation are included within this tier.

A	Public policies, regulations, and planning instruments	1	Policy framework	01	Integrate NBS into a global eco systemic planification at a city scale
				02	Incorporate NBS in land-use classification
				03	Promote and implement urban ordinances for NBS design and management
				04	Put in place regulations that set mandatory ecological standards for urban planning
				05	Have regulation in place that acknowledges the natural capital value of green spaces
				06	Design innovative urban redistribution instruments for NBS development
				07	Put in place regulation that stimulates business to implement NBS to reduce charges
				08	Develop and implement a gentrification mitigation mechanism
				09	Promote planning based on Citizen Observatory
		2	NBS and planning interaction	01	Mainstream NBS in urban planning and alignment with other public policies
				02	Deploy digital devices for planning connecting NBS with smart city
				03	Beware of small-scale infrastructure projects
				04	Integrate into planning the social benefits of ecosystem and biodiversity values
				05	Consider the NBS as a tool for social integration
				06	Generate scientific findings in social, digital, and environmental science
B	Delivery of NBS	1	Maintenance	01	Develop an innovative maintenance
		2	Procurement	01	Promote outcome-based procurement
				02	Integrate technical support for NBSs in the procurement procedure
				03	Use procurement models that include maintenance
				04	Reduce bureaucracy in procurement procedures.
				05	Introduce as a procurement criterium consider the carbon footprint and life cycle and circular economy concepts (Circularity and carbon footprint)
		3	Resources	01	Develop digital management and Maintenance guidelines
C	Governance	1	Policy-making	01	Drive policy considering outcomes (Outcomes driven policy)
				02	Implement evidence-based policy
				03	Join up in urban planning and environmental policy
				04	Make use of an Integrated Management System (IMS)
		2	Institutional Governance	01	Develop a transparent governance
				02	Promote Horizontal governance
				03	Promote Vertical governance
				04	Open government data
		3	Collaborative governance	01	Facilitate the application of co-creation
D	Business models and financing	1	Resource mobilizing and co-financing	01	Co-finance NBS projects through public-private-partnerships
				02	Use Revenue-generating instruments
				03	Use Green Debt

				04	Use Grant funding and donations
				05	Promote investment standards
				06	Finance NBS projects through Environmental or Social impact bonds
				07	Consider market-based financing instruments
		2	Value generation	01	Use a natural capital account
				02	Base finance in outcomes (Outcomes-based finance)
				03	Identify monetary value from monitoring data
				04	Identify commercial value derived from "private" business models of public green space
				05	Boost employment
		3	Innovative partnership to deliver NBS	01	Set up an ecosystem, stakeholders' community (Shared platform)
				02	Drive local initiatives forward, NGOs are included in the delivery of NBS
				03	Find allies that support the delivery phase of NBS: Close interaction between NBS firms and city representatives
				04	Use Instruments for NBS start-ups
				05	Promote crowdsourcing for implementing and monitoring the project
				06	Use green barters
		4	Socioeconomic impact valorisation & monitoring	01	Assess socio-economic impact
				02	Evaluate the economic and financial performance of NBS
				03	Conduct cost-benefit analysis and monetisation of NBS considering the entire process
E	Stakeholder engagement	1	Capacity building	01	Promote individual capacity building during the project
				02	Promote community capacity building
		2	During project development and implementation	01	Define and implement a long-term vision
				02	Define and implement a co-maintenance plan
				03	Contract maintenance responsibilities to professional stakeholders
				04	Foster the participation of local groups of stakeholders at all project stages
				05	Develop a strategy to intensification participation
				06	Use of incentives for motivation and engagement activities
				07	Establish a network of projects with shared goals
				08	Use ICT to improve citizen engagement during project
				09	Involve citizens in the project development
		3	Post-project	01	Work for the continuity of the created network
				02	Improve vertical and horizontal relations
		4	Awareness-raising on the value of NBS	01	Integrate learning and training on NBS at different educational levels and involve schools /universities in the design of an awareness campaign on NBS
				02	Involve senior centres participants in the design of an awareness campaign on NBS
				03	Implement events and campaigns for awareness-raising (such as competitions or gamification campaigns)
				04	Visualize NBS projects' actions and results on digital platforms to raise awareness
				05	Promote participation of off-topic groups (e.g. business networks) in on-topic forums

MAN-A Public policies, regulations, and planning instruments

Innovation in the set of principles that frame the development of public policies and regulatory instruments or tools, including the use of indicators and new criteria in urban plans; improvements in the implementation of territorial adaptation strategies, promotion of sustainability; improved coordination at the regional level, etc. For instance: Building Regulations, Public Procurement, Urban Planning Regulations, Certification Schemes, Strategies, and Action Plans and the potential interactions between them.

MAN-A-1 Policy framework

Develop an integrated framework and coherent narrative of the main planning instruments and regulations to promote and coordinate the implementation of NBS.

MAN-A-1-01 Integrate NBS into a citywide strategy and plan

Integrating NBS into the economic and development principles that underpin the city's economic strategy and development plan, to protect and enhance existing natural areas and to expand and reinforce an urban ecological network.

MAN-A-1-02 Incorporate NBS in land-use classification

Classify land by NBS function, and/or potential NBS function, as well as of typology. To include land suitable for climate adaptation techniques (such as flood storage or sustainable drainage, for example) as well as new typologies such as green roofs. NBS classification to be applied in masterplans.

REMARK: For example, including new types of green land-uses of including green roofs in building codes in cities

MAN-A-1-03 Promote and implement urban ordinances for NBS design and management

Planning policies and building regulations are in place, that are explicitly directed toward NBS integration.

EXAMPLE: Policy measures for green roofs, Basel. Reference Unalab Project (link to reference: https://unalab.eu/en/node/156)

REFERENCE: Higueras, Ester (2013) Las ordenanzas ambientales como instrumento para la eficiencia energética de los barrios residenciales

MAN-A-1-04 Put in place regulation that sets mandatory ecological standards for urban planning

Regulation that set mandatory ecological standards for urban planning, such as the biotope area factor green standards improvement, including green infrastructure as a structural element.

EXAMPLE: The biotope area factor, for example, Berlin Biotope Area Factor. More information on the Implementation of guidelines helping to control temperature and runoff. Link to example: https://climate-adapt.eea.europa.eu/metadata/case-studies/berlin-biotope-area-factor-2013-implementation-of-guidelines-helping-to-control-temperature-and-runoff

MAN-A-1-05 Have protocols in place that recognise natural capital values

Ensure that the economic value of NBS is understood and factored into decisions about design and management.

EXAMPLE: Stormwater fee or charge.

REFERENCE: Silvennoinen, Sveta & Taka, Maija & Yli-Pelkonen, Vesa & Koivusalo, Harri & Ollikainen, Markku & Setälä, Heikki. (2017). Monetary value of urban green space as an ecosystem service provider: A case study of urban runoff management in Finland. Ecosystem Services. 28. 17-27. 10.1016/j.ecoser.2017.09.013. Link: https://www.researchgate.net/publication/320264327_Monetary_value_of_urban_green_space_as_an_ecosystem_service_provider_A_case_study_of_urban_runoff_management_in_Finland

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MAN-A-1-06 Design innovative urban redistribution instruments for NBS development

Design innovative urban planning instruments so that, based on the rainfall generated by new developments, it is possible to obtain public land or facilities for the development of NBS.

MAN-A-1-07 Put in place regulation or plans that stimulate business to implement NBS

Regulation or plans that stimulate business to implement NBS, indirectly through regulation such as planning policy, building regulations, or urban taxation, or directly by stimulating apprenticeship schemes or other training or R&D programmes.

RELATED TO:
MAN-D-3-04 Use Instruments for NBS start-ups

MAN-A-1-08 Develop and implement a green gentrification mitigation mechanism

Development of equity-driven policy that considers access to nature as a fundamental human right for urban residents, attuning the attention on relevant incentives or support. Mitigation of the negative green gentrification consequences (rise in housing prices, expulsion of the native population) by introducing mechanism as real estate market control, high public participation, etc.

REFERENCE: Contested Cities project. Link to the project: http://contested-cities.net/ ; https://www.mdpi.com/2071-1050/12/23/10020/htm
BCNUEJ Barcelona Lab for Urban Environmental Justice and Sustainability. Critical Sustainability Studies.Green Gentrification. Link: http://www.bcnuej.org/green-gentrification/

MAN-A-1-09 Promote planning based on crowdsourced data

Promote the consideration of crowdsourced data to inform the planning process (e.g., citizens observatories, citizens science, big data, etc...).

REFERENCE: We Observe. Link to the project: https://www.weobserve.eu/about/citizen-observatories/

RELATED TO: MET-A-3-01 Use citizens science (via digital applications) and Citizen Observatory's Data to improving NBS integration (e.g. finding suitable urban spaces to deploy nature-based interventions)
MON-B-1-05 Create a Citizen observatory: objective and subjective data

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MAN-A-2 NBS and planning interaction

Identify and understand the interaction of NBS policy and planning with other public policies (using digital devices and platforms, considering social benefits or scientific findings, etc.).

MAN-A-2-01 Mainstream NBS in urban planning and alignment with other public policies

Identify and promote synergies between NBS in urban planning with practical outcomes of other public policy objectives. (e.g. adaptation to climate change, disaster risk reduction; health equity).

EXAMPLE: Valencia NBS Strategy in Grow Green project. Link to the reference: http://growgreenproject.eu/

MAN-A-2-02 Deploy digital devices for planning, connecting NBS with smart city platforms

Deployment of digital devices for engagement, consultation, and informing planning decisions. (e.g. dynamic reporting, data visualisation, virtual reality) and connect NBS projects with ICT data (e.g. from existing smart city projects).

RELATED TO:
MAN-E-4-04 Visualize NBS projects' actions and results on digital platforms to raise awareness
MON-B-2-02 Integrate data into city data and smart city platforms

MAN-A-2-03 Recognise the potential of multiple small-scale infrastructure projects

Pay attention to small-scale infrastructure projects (small-scale interventions might have a significant influence on urban areas).

MAN-A-2-04 Integrate into planning the ecosystem services perspective.

Using the ecosystem services to improve social welfare and social cohesion, as well as documenting the achieved benefits.

RELATED TO:
MAN-D-4-01 Assess socio-economic impact
MAN-D-4-03 Conduct cost-benefit analysis and monetisation of NBS considering the entire process

MAN-A-2-05 Consider the NBS as a tool for social integration

Using newly built infrastructure as a tool for social integration (connecting poor and wealthy neighbourhoods, for example).

EXAMPLE: Connecting poor and wealthy neighbourhoods, as Integrated Sustainable Urban Development Strategies (ISUDS) Eix Besòs with the Sarajevo Bridge. Link to the reference: https://www.youtube.com/watch?v=5Y7RY4Y-X1Q

MAN-A-2-06 Generate findings in social, digital, and environmental science

Incorporation and/or consideration of scientific findings in social, digital, and environmental science.

MAN-B Implementation of NBS

Innovation in obtaining resources through procurement and funding models and mobilising expertise.

MAN-B-1 Maintenance

Promote innovative maintenance.

MAN-B-1-01 Develop an innovative maintenance

Develop innovative maintenance that identifies the impact of maintenance changes and secondary benefits found through analysis of the operation of the NBS and associated systems.

RELATED TO: MAN-B-3-01 Develop digital management and Maintenance guidelines

MAN-B-2 Procurement

Promote procurement models based on new criteria that ensure environmental, social, and economic outcomes that can be delivered through NBS.

MAN-B-2-01 Promote outcome-based procurement

Outcome-based procurement "seeks innovation from the supply market by focusing on the agency outcome required rather than defining how the outcome should be achieved."

REFERENCE: Innovation Procurement. Link: https://ec.europa.eu/digital-single-market/en/innovation-procurement

MAN-B-202 Ensure NBS expertise is embedded in the procurement procedure

Procurement procedures to include NBS multidimensional expert criteria to guarantee the environmental, social, and economic multifunctionality outcomes. and facilitate co-design and the co-implementation processes.

REFERENCE: Innovation Procurement. Link: https://ec.europa.eu/digital-single-market/en/innovation-procurement

MAN-B-2-03 Ensure procurement of NBS projects includes a consideration of maintenance requirements at all stages of design and delivery

Procurement models are used that include maintenance or provision of training for maintenance.

REFERENCE: Innovation Procurement. Link: https://ec.europa.eu/digital-single-market/en/innovation-procurement

MAN-B-2-04 Simplify and digitalise procurement procedures

Reduction of bureaucracy (less paper and energy) in procurement procedures.

REFERENCE: OECD digital government toolkit. Link: https://www.oecd.org/governance/digital-government/toolkit/

MAN-B-2-05 Introduce in NBS procurement criterium considerations about the carbon footprint and life cycle and circular economy concepts (Circularity and carbon footprint)

Procurement criterium valuate the carbon footprint and the life cycle and circular economy concepts.

REFERENCE: Buying green. A handbook on green public procurement, 3rd Edition. Link: https://ec.europa.eu/environment/gpp/pdf/Buying-Green-Handbook-3rd-Edition.pdf

MAN-B-3 Resources

Mobilizing expertise.

MAN-B-3-01 Develop digital management and Maintenance guidelines

Digital tools for green infrastructure management and maintenance are available based on public-private local experience and needs.

REFERENCE: I-Tree tools for management and assessment. Link: https://www.itreetools.org/

RELATED TO: MAN-B-1-01 Develop an innovative maintenance

MAN-C Governance

Innovation in institutional and collaborative governance.

MAN-C-1 Policymaking

Implement innovative policies (based on evidences and outcomes, that join urban planning and environmental issues, integrated in an IMS, etc.).

MAN-C-1-01 Drive policy considering outcomes (Outcomes driven policy)

Implement an outcome driven policy i.e. setting measurable objectives for policies to work towards and measure success.

RELATED TO: MET-B-1-03 Introduce Co-Design-formats on the spot

MAN-C-1-02 Implement evidence-based policy

Implement evidence-based policy, i.e. policy decisions are informed by rigorously established objective evidence. Project-oriented thinking, or project-oriented mindset towards effective governance [each agent is disciplined (constrained by resources), flexible (to adapt to progress), focused (responsibilities distributed within a scope) and in action (follow clear milestones and schedule)].

REFERENCE: Big Policy Canvas project. Link to the project: https://www.bigpolicycanvas.eu/

RELATED TO
MET-B-1-03 Introduce Co-Design-formats on the spot
MAN-C-1-01 Drive policy considering outcomes (Outcomes driven policy)

MAN-C-1-03 Join up urban planning and environmental policy

Develop a joined up urban planning and environmental policy. E.g. building levies on new developments that are ringfenced for development of NBS.

REFERENCE: Integrated Sustainable Urban Development. COHESION POLICY 2014-2020 Link: https://ec.europa.eu/regional_policy/sources/docgener/informat/2014/urban_en.pdf

RELATED TO
MAN-A-1-06 Design innovative urban redistribution instruments for NBS development

MAN-C-1-04 Make use of an Integrated Management System (IMS)

Making use of an Integrated Management System (IMS), integrating all an organization´s systems and processes into one complete framework Multilevel/sectoral.

MAN-C-2 Institutional Governance

Promote a transparent and multilevel (horizontal and vertical) institutional governance in the implementation and development of the NBS.

MAN-C-2-01 Develop a transparent governance

Transparent governance with frequent updating of transparent data.

MAN-C-2-02 Promote Horizontal governance

Cross-sectorial governance, between disciplines, cross departmental policy.

RELATED TO:
MET-B-2-03 Multidimensional and multilevel (horizontal & vertical) integration of the different groups of local stakeholders considering their nature (public or private) and their field of work (finance, mobility, building, etc.)
MAN-E-3-02 Improve vertical and horizontal coordination

MAN-C-2-03 Promote Vertical governance

Multi-level governance, between administration and their responsibilities.

RELATED TO
MET-B-2-03 Multidimensional and multilevel (horizontal & vertical) integration of the different groups of local stakeholders considering their nature (public or private) and their field of work (finance, mobility, building, etc.)
MAN-E-3-02 Improve vertical and horizontal coordination

MAN-C-2-04 Open government data

Open Government Data promotes transparency, accountability, and value creation by making data available to all (Open government data. Data shared with citizens).

REFERENCE:
OCDE Open Government Data. Link to reference: https://www.oecd.org/gov/digital-government/open-government-data.htm

MAN-C-3 Collaborative governance

Promote collaborative governance that improves the co-creation process.

MAN-C-3-01 Facilitate the application of co-creation

Guidance to facilitate the application of co-creation methodology / shared governance (responsive, equitable & inclusive, consensus oriented) and tools to follow-up its implementation.

RELATED TO:
 MET-B-1-01 Use novel tools to support mainstream co-creation (Living labs)

MAN-D Business models and financing

Innovation in business models and financing (resource mobilizing and co-financing including innovative partnership to deliver NBS and value generation).

MAN-D-1 Resource mobilizing and co-financing

Use resource mobilizing and co-financing instruments in NBS projects.

MAN-D-1-01 Use resource mobilizing in NBS projects

Use resource mobilizing in NBS projects, such as (i) Revenue-generating instruments (e.g.: taxation, inter or intra municipal ecological fiscal transfers, sponsorships, private company co-financing and co-operating in the process)**,** (ii) Green Debt (long term funding for projects: loans, concessional financing, green bonds, crowdfunding-debt, Natural Capital Financing Facility/NCFF), , (iii) Environmental or Social impact bonds, where NBS projects are embedded in and financed through EIB's Natural Capital Financing Facility (EIB and SIB refer to the same scheme of an outcome-based contract: Private investment is put in upfront to fund the NBS and is then repaid by public bodies on achievement of pre-specified outcomes), (iv) market-based financing instruments (reduction of user charges of grey infrastructures-property owners are encouraged to install NBS to reduce their charges).

EXAMPLE: Public bid integrating a co-financing scheme from different mechanisms: European Structural and Investment Funds (ESIF), Program for the Environment and Climate Action (LIFE), Horizon 2020, Regional & national government grants, Philanthropic contributions, Crowdfunding donation or investment, Endowment funds

MAN-D-1-02 Co- financing / blended finance

Blended finance resulting a mix of grants, charges, and investments and promote investment standards (e.g. the environmental, social and governance business case evaluator), financial alternatives, co-finance NBS projects through public-private-partnerships (e.g. grant funding and donations (public bid integrating a co-financing scheme from different mechanisms)

EXAMPLE: Environment, social and governance (ESG) investing. Link:
https://www.oecd.org/finance/esg-investing.htm

MAN-D-2 Value generation

Identify and improve the generation of value (the value proposition, the generated and delivered value and the value capture are not considered).

MAN-D-2-01 Use a natural capital account

A natural capital account is prepared and used to inform future decision-making.

EXAMPLE: "Natural Capital Accounting (https://ec.europa.eu/environment/nature/capital_accounting/index_en.htm)
The   INCA   project.   Link:
https://ec.europa.eu/eurostat/documents/1798247/6079569/Leaflet+2019+%E2%80%93+The+INCA+project/
The framework: https://seea.un.org/ecosystem-accounting "

MAN-D-2-02 Promote outcomes-based finance

Outcome-based can drive value generation.

MAN-D-2-03 Identify monetary value from monitoring data

Monetary value from data monitoring. NBS project provides additional revenues from data monitoring.

MAN-D-2-04 Identify commercial value derived from "private" business models of public green space

Create commercial value when green space is not publicly used (renting out for events).

RELATED TO:
MAN-D-3-06 Use green barters

MAN-D-2-05 Boost employment through NBS projects and outcomes

NBS project generating new jobs (e.g. teachers are employed for gardening lessons).

MAN-D-3 Innovative partnership to deliver NBS

Promote innovative partnership to deliver NBS.

MAN-D-3-01 Set-up an ecosystem, stakeholder's community (Shared platform)

Setting-up an ecosystem or stakeholders' platform for bringing about the supply and demand alignment for NBS design. Creation of an appropriate ecosystem to create synergies and accelerate the NBS launch process.

MAN-D-3-02 Drive local initiatives forward, NGOs are included in the delivery of NBS

Local initiatives, NGOs are included in the delivery of NBS. NGOs as stakeholders which will provide social benefits with the delivery of NBS.

MAN-D-3-03 Find allies that support delivery phase of NBS

Healthy interaction between city representatives and NBS businesses to ensure that city policy nurtures innovation and investment (e.g. through repeated workshops or roundtables).

REFERENCE: Clever Deliverable 5.3 Business, Financial and Governance Models. Link: https://clevercities.eu/fileadmin/user_upload/Resources/D5.3_Governance_business_and_finance_models.pdf

MAN-D-3-04 Use Instruments for NBS start-ups

Instruments for NBS start-ups as policy instruments (public incentives) or financial instruments (public-private procurement), etc.

REFERENCE: MAN-A-1-07 Put in place regulation that stimulates business to implement NBS

MAN-D-3-05 Use green barters

Green barters are used (maintenance or development obligation in exchange for commercial profit from green space).

RELATED TO:
 MAN-D-2-04 Identify commercial value derived from "private" business models of public green space

MAN-D-4 Socioeconomic impact valorisation and monitoring

Measure, monitor and consider the socioeconomic impact in the different stages of the process, facilitating the cost / benefit analysis.

MAN-D-4-01 Assess socio-economic impact
Carry out a socio-economic impact assessment (SEIA). It could help quantify the impacts at different stages of the process and understand the potential impacts of proposed changes and the likely responses of those affected if the change occurs. (Reference: Australian Government. Department of Natural Heritage 2005).

MAN-D-4-02 Evaluate the economic and financial performance of NBS
Evaluate the economic and financial performance of NBS, which would contribute to a greater promotion of investments in NBS and to an acceleration of market uptake.

MAN-D-4-03 Conduct cost-benefit analysis and monetisation of NBS considering the entire process
Conduct cost-benefit analysis, taking into account the economic, social and environmental benefits and integrate, and consider it throughout the entire process.

MAN-E Stakeholder engagement

Innovation in the stakeholders` engagement process and strategies (during and after the project), including the promotion of individual and community capacity building and awareness raising on value of NBS.

MAN-E-1 Capacity building

Focus efforts on the building capacity of community groups and active citizens to participate in the NBS project (co-design, production, or implementation).

MAN-E-1-01 Promote individual capacity building during the project

Individual capacity building during the project: including the provision of training opportunities, access to materials and support services (including students, older people, vulnerable people, professional stakeholders, etc.).

MAN-E-1-02 Promote community capacity building

Community capacity building: as above, but also including proposals to strengthen the expertise of small businesses and/or local grassroots movements.

EXAMPLE: Green guerrilla. Link: https://www.greenguerillas.org/

MAN-E-2 During project development and implementation

Use innovative strategies, instruments, or methods to create, intensify and maintain citizen participation during the project.

MAN-E-2-01 Define and implement a long-term vision

Define and implement a plan to promote sustainable actions with the participation of all local stakeholders and vulnerable groups.

MAN-E-2-02 Define and implement a co-maintenance plan

Define and implement a co-maintenance plan with the involvement of all local stakeholders and vulnerable groups. Target commission.

MAN-E-2-03 Contract maintenance responsibilities to professional stakeholders

Contracting maintenance responsibilities to professional stakeholders.

MAN-E-2-04 Participation of local groups of stakeholders at all project stages

Involve citizens from the earliest opportunity e.g. in developing the concept and the project brief.   Maintain involvement throughout the project development stages.

RELATED TO
MET-B-2-03 Multidimensional and multilevel (horizontal & vertical) integration of the different groups of local stakeholders considering their nature (public or private) and their field of work (finance, mobility, building, etc.)

MAN-E-2-05   Develop a strategy to maximise civic participation

Recruitment strategies adapted to the different needs of interest groups; considering different requirements to ensure an inclusive approach (e.g. varying time of meetings, creating accessible communication materials, in person and on street recruitment).

MAN-E-2-06   Use of incentives for motivation and engagement activities

Use of incentives for motivation and engagement activities. Incentives can include, but are not limited to, paying an agreed hourly rate for work done, one off payments, vouchers for food shopping, free food and entertainment, and access to training and mentoring opportunities.

MAN-E-2-07 Establish a network of projects with shared goals

Focus efforts and resources to create networks that connects different groups of stakeholders (ECHO Effect) with different capacities, facilitating exchange and interaction between them.

MAN-E-2-08 Use ICT to improve citizen engagement during project

Citizen engagement is done with the help of ICT: Putting ICTs at the service of citizens (and not the other way around).

RELATED TO
MET-A-3-01 Use citizens science (via digital applications) and Citizen Observatory's Data for improve NBS integration
MET-B-1-01 Use novel tools to support mainstream co-creation (Living labs)
MAN-A-2-02 Deploy digital devices for planning, connecting NBS with smart city platforms
MAN-E-2-06 Use of incentives for motivation and engagement activities
MON-B-1-05 Create a Citizen observatory: objective and subjective data

MAN-E-2-09 Involve citizens in the project development

Use creative methods to Involve citizens in the project development as guided tours visiting NBS targeted to citizens (first) and professionals (e.g. Designer/company involved shows their benefits), oral history, community wealth mapping, etc.

MAN-E-3 Post-project

Use innovative strategies, instruments, or methods to maintain citizen participation when the project has finished.

MAN-E-3-01 Work for the continuity of the created network

Continuity of the network created during the development of the project, allowing mutual support and exchange of ideas to be maintained.

MAN-E-3-02 Improve vertical and horizontal coordination

Improve vertical (municipal x resident) or/and horizontal coordination (community x community) created.

RELATED TO
MET-B-2-03 Multidimensional and multilevel (horizontal & vertical) integration of the different groups of local stakeholders considering their nature (public or private) and their field of work (finance, mobility, building, etc.)

MAN-E-4 Awareness raising on value of NBS

Develop different methods to raise awareness on value of NBS.

MAN-E-4-01 Integrate learning and training on NBS in different educational levels and involve schools/university in the design of an NBS awareness campaign

Inclusion in different levels of the educational curriculum (free credits in university, extra curricula activities, etc.) and involve schools in the design of an awareness campaign on NBS: Students as active agents that disseminate the value of the NBS.

RELATED TO:
 MAN-E-1-01 Promote individual capacity building during the project

MAN-E-4-02 Involve senior centres´ participants in the design of an awareness campaign on NBS

Involve people from senior centres in the design of campaigns in social networks about the value and co-benefits of NBS.

MAN-E-4-03 Implement events and campaigns for awareness raising (as competitions or gamification campaigns)

Design of competitions and/or activities with a diverse range of participants: a) school, b) university, c) older people, d) small businesses, Gamification campaigns to invite citizens finding, experiencing, and learning facts about NBS.

EXAMPLE: Geocaching (link to the example: https://www.geocaching.com/play)
Second Green Roof Competition (link to the reference: https://ajuntament.barcelona.cat/ecologiaurbana/es/concurso-cubiertas-verdes

MAN-E-4-04 Visualize NBS projects' actions and results on digital platforms to raise awareness

Presence of NBS projects on digital platforms (smart platforms, GIS databases, Augmented Reality, etc.).

EXAMPLE: i tree. Link: https://www.itreetools.org/
RELATED TO
MON-B-2-02 Integrate data into city data and smart city platforms
MAN-A-2-02 Deploy digital devices for planning, connecting NBS with smart city platforms

MAN-E-4-05 Promote participation of off-topic groups (e.g. business networks) in on-topic forums

Promote participation of off-topic groups (e.g. business networks) in on-topic forums (nature forum, blue-green forums).

MONITORING

Monitoring implies the indicators, devices and local data collection and management tools used for co-monitoring and citizen based NBS impact assessment, (open data) platforms employed to support co-monitoring, dissemination, and presentation of results.

A	Evaluation framework	**1**	Goals, objectives & indicators defined in collaborative way	**01**	Develop /Use a Co-Monitoring or Reflexive monitoring approach	
				02	Deploy Monitoring Infrastructure	
		2	Integration of different knowledge & information dimensions	**01**	Consider different spatial levels in the Local Monitoring Plan (LMP)	
				02	Consider economic, social and environmental dimensions and/or ecosystem services and biodiversity in the LMP	
				03	Consider future urban regeneration scenarios in the LMP	
				04	Consider future climate, social and economic scenarios in the LMP	
				05	Consider monitoring un-wanted impacts and trade-offs and interdependencies	
				06	Develop a sustainable monitoring	
		3	Selection of KPIs	**01**	Monitor the impact and performance of the processes	
				02	Propose and use new social KPIs	
				03	Integrate temporal and spatial dimensions	
				04	Use of composite indicators to assess the impact	
B	Data gathering	**1**	Monitoring devices	**01**	Use new sensors for real time	
				02	Use sensors integrated into the NBS	
				03	Integrate real time and simulations data with other data techniques	
				04	Use of remote sensing	
				05	Create a Citizen observatory: objective and subjective data	
		2	Data management	**01**	Use Standardized Data Models and AI	
				02	Integrate data into city data and smart city platforms	
C	Results and decision-making	**1**	Impact evaluation	**01**	Integrate data in decision support system	
				02	Introduce an economic approach to evaluate societal, health and environmental impacts	
				03	Integrate social dimension to evaluate societal, health and environmental impacts	
				04	Include impact assessment that accounts for gender equality and /or environmental justice	
				05	Develop modelling exercises and simulations	
				06	Use virtual and/or augmented reality	
				07	Reporting decision-making	

MON-A Evaluation framework

Collaborative definition of an evaluation framework that establishes goals, objectives and KPIs and integrates different knowledge, information, and dimensions.

MON-A-1 Goals, objectives and indicators defined in collaborative way

Include the definition of goals, objectives and indicators through collaborative processes that allow continuous reflection and adaptation and the deployment of monitoring infrastructures.

MON-A-1-01 Develop /Use a Co-Monitoring or Reflexive monitoring approach

Definition of Monitoring and Evaluation goals, objectives, indicators, and variables in a collaborative way, involving different stakeholders to define the Monitoring Framework in different steps and cycles using participatory and co-designing methodologies such us Theory of Change.

EXAMPLE: Reflexive Monitoring Guidebook (2020) Connecting nature. Link: https://connectingnature.eu/sites/default/files/images/inline/Reflexive%20Monitoring.pdf

MON-A-1-02 Deploy Monitoring Infrastructure

Definition of the data management will contribute to the City´s monitoring strategy and includes different methods for monitoring as digital sensors (model, location, metrics.), questionnaires and Interviews experimental measures, observations or laboratory (when, where and who?) and other data sources (earth observations, Copernicus, big data, documents, links).

MON-A-2 Integration of different knowledge and information dimensions

Consider and Integrate in the Local Monitoring Plan (LMP) different knowledge and information (future scenarios, un-wanted impacts, etc..) dimensions (economic, social, and environmental variables and/or ecosystem services and biodiversity) and spatial levels.

MON-A-2-01 Consider different spatial levels in the Local Monitoring Plan (LMP)

The Monitoring and Evaluation Plan considers different spatial levels (building, district, city-level). Upscaling possibilities for monitoring has been explored.

MON-A-2-02 Consider economic, social, and environmental dimensions and/or ecosystem services and biodiversity in the LMP

The Monitoring and Evaluation Plan recognises co-benefits (social, economic, and environmental), such as ecosystem services. Assessing all the dimensions will provide the holistic impact identifying potential synergies across the topics.

MON-A-2-03 Consider future urban regeneration scenarios in the LMP

The Monitoring and Evaluation Plan considers future alternative urban regeneration scenarios (depending on the type of interventions - integrated, partial, or sectoral -, their intensity or degree of action, and their development over time).

MON-A-2-04 Consider future climate, social and economic scenarios in the LMP

The Monitoring and Evaluation Plan considers future climate (i.e. the four scenarios – RCP 2.6, 4.5, 6.0 or 8.5 – established by the IPCC to assess climate change), social (i.e., demographic developments, and social changes, such as those brought about by gentrification) and economic scenarios (i.e., the possibilities for economic recovery or possible impacts at global and local levels).

MON-A-2-05 Consider monitoring unwanted impacts and trade-offs and interdependencies

Monitoring captures unintended consequences, trade-offs and, unwanted or negative aspects.

MON-A-2-06 Develop a sustainable monitoring

Specifics opportunities are identified and established in long-term monitoring plans such as: identification of meaningful KPIs, considering of reference areas, replicating or upscaling devices or monitoring techniques.

MON-A-3 Selection of KPIs

Include KPIs that consider different impacts (environmental, economic, and social) and integrate the different dimensions (spatial, temporal, and thematic-sectoral).

MON-A-3-01 Monitor the impact and performance of the processes

Define impact assessment evaluation through KPIs to monitor the progress or the process (co-design, co-implementation, and co-management activities of the intervention).

MON-A-3-02 Propose and use new social KPIs

Incorporation of new indicators or variables that measure key issues related to health, social issues, etc.

MON-A-3-03 Integrate temporal and spatial dimensions

Consideration of temporal and spatial dimensions in the selection of parameters and in the definition of the methodology to monitor NBS performance (e.g: Digital twin approach, monitor an area with similar conditions as a refence area, etc.).

EXAMPLE: #DigitalTwin in #Cities. Tecnalia. Link: https://www.youtube.com/watch?v=mWdEYWYxhpc

MON-A-3-04 Use of composite indicators to assess the impact

Establish a scheme of composite indicators (combination of indicators forming an index) to assess the NBS impact assessment.

EXAMPLE: Use Thermal stress as indicator. Link: https://research.usu.edu/ehs/thermal-stress/ ; Combining thermal stress with vulnerable groups prevalence to define a composite KPIs about the health risk

MON-B Data gathering

Process of collecting (deploy of monitoring devices), measuring and managing information.

MON-B-1 Monitoring devices

Use different sensors (integrated in NBS, remote control, in real time, etc.) or citizen's data collection systems and integrate them with other data collection techniques.

MON-B-1-01 Use new sensors for real time data gathering

Use new, innovative or prototype sensors and devices for real time data gathering.

MON-B-1-02 Use sensors integrated into the NBS

Monitoring devices are integrated (physically included out of the box) into the NBS implemented.

MON-B-1-03 Integrate real time and simulation data with other data techniques
Use real time data and simulations (are being used) jointly as complementary techniques to obtain data (as big data platforms, city science observatory, Copernicus services, complex modelling, etc.).

MON-B-1-04 Use of remote sensing

Use of remote sensing to do the monitoring of green interventions and infrastructures (urban forestation and tree canopy monitoring). Map and plan the greening evolution in cities.

MON-B-1-05 Create a Citizen observatory: objective and subjective data

Use Citizens engagement for objective and subjective data gathering (i.e. citizens observatories to gather real time data by means of specific portable sensor/device/APPs, respecting data privacy issues, subjective/perception throughout surveys, APPs, etc.).

> RELATED TO:
> MAN-A-1-09 Promote planning based on crowd sourced data
> MET-A-3-01 Use citizens science (via digital applications) and Citizen Observatory's Data for improve NBS integration (e.g. finding suitable urban spaces to deploy nature-based interventions).

MON-B-2 Data management

Develop a process of collecting, organizing, and maintaining the data (using new techniques as Standardized Data Models, AI, etc.) and integrate them into city/smart city platforms.

MON-B-2-01 Use Standardized Data Models and Artificial intelligence (AI)

The use of Standardized Data Models harmonizes the data structures for measurements, indicators, real time, and context data in alignment with INSPIRE Directive (i.e. FIREWIRE, ISO8601). Use of Artificial intelligence for data capturing and management.

MON-B-2-02 Integrate data into city data and smart city platforms

Integrate data are integrated into the smart city's platforms/ city existing data platforms.

> RELATED TO:
> MAN-E-4-04 Visualize NBS projects' actions and results on digital platforms to raise awareness
> MAN-A-2-02 Deploy digital devices for planning, connecting NBS with smart city platforms

MON-C Results and decision-making

Analysis and information process on present and future impacts to support decision-making considering the monitored data.

MON-C-1 Impact evaluation

Assess the present and future changes that can be attributed to an intervention, integrating different approaches (economic, social, environmental) to evaluate societal, health and environmental impacts, and use them to report decision-making.

MON-C-1-01 Integrate data in decision support system

The analysis of data is (will be) supported by the same tool used to support the whole monitoring and evaluation framework (i.e. decision support system).

MON-C-1-02 Introduce an economic approach to evaluate societal, health and environmental impacts

Inclusion of Social Return of Investment (SROI) and/or similar economic techniques to evaluate societal, health impacts, as well as environmental. (cost-benefit and cost-effectiveness).

MON-C-1-03 Integrate social dimension to evaluate societal, health and environmental impacts

The impact assessment integrates analysis of data of social acceptance and perception and changes in well-being and social justice, pre and post project.

MON-C-1-04 Include impact assessment that accounts for gender equality and /or environmental justice

Targeted analysis of monitoring data about environmental/health/cultural factors in vulnerable areas or population.

MON-C-1-05 Modelling exercises and simulations

The monitoring activities are (will be) supported by modelling exercises and simulations.

MON-C-1-06 Use virtual and/or augmented reality

Use virtual and/ or augmented reality to assess impact.

MON-C-1-07 Reporting decision-making

Use the results of the monitoring and evaluation for informing decision making in planning processes. Urban network concept - developing a network for citizens to inform and get information (feedback system). The Urban e-Planning concepts (digital participation and other participatory tools) are also supporting the reporting. Reporting within the communication strategy of the City involving the community manager via i.e. website, press, radio/tv, social media.

RELATED TO
MET-A-3-02 Digital Urban Planning concepts (e-planning and digital planning tools)
MET-B-1-03 Introduce Co-Design-formats on the spot
MAN-C-1-01 Drive policy considering outcomes (Outcomes driven policy)

Annex 2: Ex-ante compiled results

City type	City	CAL	Code	IRL present	IRL expected	Innovation model	Viability technical	Viability economic	Viability legal	Viability social
			EXANTE ANALYSIS							
Frontrunner	Hamburg	CAL 2	MAN-A-1-01	3	4	3	1	1	3	3
Frontrunner	Milan	CAL 1	MAN-A-1-01	3	4	2	3	3	2	3
Frontrunner	Milan	CAL 2	MAN-A-1-01	2	3	1	1	1	2	3
Frontrunner	Milan	CAL 1	MAN-A-1-02	3	4	2	3	3	2	3
Frontrunner	Milan	CAL 1	MAN-A-1-03	2	3	2	3	3	2	3
Frontrunner	Milan	CAL 1	MAN-A-1-04	3	4	2	3	3	2	3
Frontrunner	Milan	CAL 2	MAN-A-1-04	3	4	1	1	1	2	3
Frontrunner	London	CAL 1	MAN-A-1-05	3	4	1	1	3	3	3
Frontrunner	London	CAL 2	MAN-A-1-05	3	4	1	1	3	3	3
Frontrunner	London	CAL 3	MAN-A-1-05	3	4	1	1	3	3	3
Frontrunner	Milan	CAL 1	MAN-A-1-07	3	4	4	2	3	2	3
Frontrunner	Milan	CAL 1	MAN-A-2-01	2	3	2	3	3	2	3
Frontrunner	Milan	CAL 1	MAN-A-2-03	3	4	2	3	2	2	3
Frontrunner	Milan	CAL 2	MAN-A-2-03	2	3	1	1	1	2	3
Frontrunner	Milan	CAL 3	MAN-A-2-03	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MAN-A-2-04	3	4	2	3	3	2	3
Frontrunner	Hamburg	CAL 2	MAN-A-2-03	3	4	2	1	2	3	2
Frontrunner	Hamburg	CAL 1	MAN-A-2-05	3	4	1	2	2	3	3
Frontrunner	Hamburg	CAL 2	MAN-A-2-05	3	4	1	3	2	3	1
Frontrunner	Hamburg	CAL 3	MAN-A-2-05	3	4	1	2	1	3	3
Frontrunner	Hamburg	CAL 1	MAN-A-2-06	2	3	1	3	1	3	1
Frontrunner	Hamburg	CAL 2	MAN-A-2-06	3	4	3	1	2	3	3
Frontrunner	Hamburg	CAL 1	MAN-B-1-01	3	4	1	2	1	3	1
Frontrunner	Milan	CAL 1	MAN-A-2-05	2	3	4	2	2	3	3
Frontrunner	Milan	CAL 2	MAN-A-2-05	3	4	1	1	1	2	3
Frontrunner	Milan	CAL 3	MAN-A-2-05	3	4	2	2	2	3	3
Frontrunner	Hamburg	CAL 1	MAN-B-2-01	3	4	1	1	1	2	1
Frontrunner	Milan	CAL 1	MAN-A-2-06	3	4	2	3	3	3	3
Frontrunner	Hamburg	CAL 1	MAN-B-2-02	3	4	1	1	1	2	1
Frontrunner	Hamburg	CAL 2	MAN-B-2-02	3	4	2	1	3	3	3
Frontrunner	Hamburg	CAL 1	MAN-B-2-03	3	4	1	3	1	2	3
Frontrunner	London	CAL 1	MAN-B-1-01	2	3	1	2	3	2	3
Frontrunner	London	CAL 2	MAN-B-1-01	2	3	1	2	3	2	3
Frontrunner	London	CAL 3	MAN-B-1-01	2	3	1	2	3	2	3
Frontrunner	Milan	CAL 1	MAN-B-1-01	2	3	2	3	2	3	3
Frontrunner	Milan	CAL 2	MAN-B-1-01	3	4	1	1	1	2	3
Frontrunner	Hamburg	CAL 1	MAN-B-2-04	3	4	1	3	2	2	3
Frontrunner	Hamburg	CAL 3	MAN-B-2-04	3	4	1	3	2	2	3
Frontrunner	London	CAL 1	MAN-B-2-01	3	5	2	3	3	3	3
Frontrunner	London	CAL 2	MAN-B-2-01	3	5	2	3	3	3	3
Frontrunner	London	CAL 3	MAN-B-2-01	3	5	2	3	3	3	3
Frontrunner	Milan	CAL 1	MAN-B-2-01	2	3	2	2	2	3	3
Frontrunner	London	CAL 1	MAN-B-2-02	3	5	1	3	3	3	3
Frontrunner	London	CAL 2	MAN-B-2-02	3	5	1	3	3	3	3
Frontrunner	London	CAL 3	MAN-B-2-02	3	5	1	3	3	3	3

			EXANTE ANALYSIS							
City type	City	CAL	Code	IRL present	IRL expected	Innovation model	Viability technical	Viability economic	Viability legal	Viability social
Frontrunner	Milan	CAL 1	MAN-B-2-02	2	3	3	3	2	2	3
Frontrunner	Milan	CAL 1	MAN-B-2-03	2	3	2	2	3	3	3
Frontrunner	Milan	CAL 2	MAN-B-2-03	2	3	1	1	2	2	3
Frontrunner	Milan	CAL 1	MAN-B-2-04	3	4	2	2	3	2	3
Frontrunner	London	CAL 1	MAN-B-2-05	2	5	1	3	3	3	3
Frontrunner	London	CAL 2	MAN-B-2-05	2	5	1	3	3	3	3
Frontrunner	London	CAL 3	MAN-B-2-05	2	5	1	3	3	3	3
Frontrunner	London	CAL 1	MAN-C-1-01	2	3	3	3	3	3	3
Frontrunner	London	CAL 2	MAN-C-1-01	2	3	3	3	3	3	3
Frontrunner	London	CAL 3	MAN-C-1-01	2	3	3	3	3	3	3
Frontrunner	Milan	CAL 1	MAN-C-1-01	2	3	2	3	3	3	3
Frontrunner	Hamburg	CAL 1	MAN-C-2-01	3	4	1	2	1	3	3
Frontrunner	Hamburg	CAL 3	MAN-C-2-01	3	4	1	3	2	3	3
Frontrunner	Hamburg	CAL 1	MAN-C-2-02	3	4	1	3	1	3	3
Frontrunner	Hamburg	CAL 2	MAN-C-2-02	3	4	3	1	1	3	3
Frontrunner	Hamburg	CAL 3	MAN-C-2-02	3	4	1	2	2	3	3
Frontrunner	Milan	CAL 1	MAN-C-1-02	2	3	2	3	3	2	3
Frontrunner	Hamburg	CAL 1	MAN-C-2-03	3	4	1	3	2	3	1
Frontrunner	Hamburg	CAL 2	MAN-C-2-03	3	4	4	1	1	3	3
Frontrunner	Milan	CAL 2	MAN-C-1-02	1	2	1	1	2	2	3
Frontrunner	Hamburg	CAL 1	MAN-C-2-04	3	4	1	1	2	1	3
Frontrunner	Hamburg	CAL 1	MAN-C-3-01	3	4	1	2	2	3	1
Frontrunner	Hamburg	CAL 2	MAN-C-3-01	3	4	1	1	2	3	1
Frontrunner	Hamburg	CAL 3	MAN-C-3-01	3	4	1	2	2	3	3
Frontrunner	Milan	CAL 1	MAN-C-1-03	2	3	2	2	2	3	3
Frontrunner	Milan	CAL 2	MAN-C-1-03	1	2	1	1	1	2	3
Frontrunner	Hamburg	CAL 1	MAN-D-1-02	3	4	1	3	2	2	2
Frontrunner	Hamburg	CAL 2	MAN-D-1-02	3	4	1	3	2	3	3
Frontrunner	Hamburg	CAL 3	MAN-D-1-02	3	4	1	3	2	2	3
Frontrunner	London	CAL 1	MAN-C-2-01	2	5	4	3	3	3	3
Frontrunner	London	CAL 2	MAN-C-2-01	2	5	4	3	3	3	3
Frontrunner	Hamburg	CAL 1	MAN-D-2-02	3	4	1	3	2	3	3
Frontrunner	London	CAL 3	MAN-C-2-01	2	5	4	3	3	3	3
Frontrunner	Milan	CAL 1	MAN-C-2-01	3	4	2	3	3	3	3
Frontrunner	Hamburg	CAL 1	MAN-D-2-05	3	4	1	2	2	3	3
Frontrunner	Milan	CAL 2	MAN-C-2-01	3	4	1	1	1	2	3
Frontrunner	Hamburg	CAL 3	MAN-D-3-01	3	4	1	3	2	3	3
Frontrunner	Hamburg	CAL 1	MAN-D-3-02	3	4	1	3	2	3	3
Frontrunner	Hamburg	CAL 3	MAN-D-3-02	3	4	1	3	2	3	3
Frontrunner	Hamburg	CAL 1	MAN-D-3-03	3	4	1	2	2	3	3
Frontrunner	Hamburg	CAL 2	MAN-D-3-03	3	4	1	1	2	3	3
Frontrunner	Hamburg	CAL 3	MAN-D-3-03	3	4	1	3	2	2	3
Frontrunner	London	CAL 1	MAN-C-2-02	1	3	2	2	3	3	3
Frontrunner	London	CAL 2	MAN-C-2-02	1	3	2	2	3	3	3
Frontrunner	London	CAL 3	MAN-C-2-02	1	3	2	2	3	3	3
Frontrunner	Milan	CAL 1	MAN-C-2-02	3	4	2	3	3	2	3
Frontrunner	Milan	CAL 2	MAN-C-2-02	3	4	1	1	1	2	3
Frontrunner	Milan	CAL 1	MAN-C-2-03	3	4	2	3	3	1	3

			EXANTE ANALYSIS							
City type	City	CAL	Code	IRL present	IRL expected	Innovation model	Viability technical	Viability economic	Viability legal	Viability social
Frontrunner	Milan	CAL 2	MAN-C-2-03	2	3	1	1	1	2	3
Frontrunner	Hamburg	CAL 1	MAN-E-1-01	2	3	2	1	1	2	3
Frontrunner	Hamburg	CAL 3	MAN-E-1-01	3	5	4	2	1	2	3
Frontrunner	Hamburg	CAL 1	MAN-E-1-02	3	4	3	1	1	2	3
Frontrunner	Milan	CAL 1	MAN-C-2-04	3	4	2	3	3	1	3
Frontrunner	Hamburg	CAL 3	MAN-E-1-02	2	4	3	2	1	2	3
Frontrunner	Milan	CAL 2	MAN-C-2-04	4	5	1	3	2	2	3
Frontrunner	Hamburg	CAL 1	MAN-E-2-01	3	4	2	1	1	2	3
Frontrunner	Hamburg	CAL 3	MAN-E-2-01	2	3	2	2	1	2	3
Frontrunner	Hamburg	CAL 1	MAN-E-2-02	1	2	1	1	1	1	2
Frontrunner	Hamburg	CAL 2	MAN-E-2-02	4	5	1	3	3	3	3
Frontrunner	Hamburg	CAL 3	MAN-E-2-02	1	5	4	2	1	3	3
Frontrunner	Hamburg	CAL 1	MAN-E-2-04	2	3	3	1	1	2	3
Frontrunner	Hamburg	CAL 3	MAN-E-2-04	3	5	4	2	1	3	3
Frontrunner	Hamburg	CAL 1	MAN-E-2-05	3	4	3	1	1	2	3
Frontrunner	Hamburg	CAL 2	MAN-E-2-05	3	4	1	2	2	3	1
Frontrunner	Hamburg	CAL 3	MAN-E-2-05	2	3	4	2	1	2	3
Frontrunner	Hamburg	CAL 1	MAN-E-2-06	1	2	2	1	2	1	2
Frontrunner	Hamburg	CAL 2	MAN-E-2-06	3	4	1	3	1	3	2
Frontrunner	Hamburg	CAL 3	MAN-E-2-06	1	2	1	1	1	1	1
Frontrunner	Hamburg	CAL 1	MAN-E-2-07	2	4	3	1	1	2	3
Frontrunner	Hamburg	CAL 3	MAN-E-2-07	2	3	2	1	1	2	2
Frontrunner	Hamburg	CAL 1	MAN-E-2-08	2	3	4	2	1	2	3
Frontrunner	Hamburg	CAL 2	MAN-E-2-08	3	4	2	2	1	3	1
Frontrunner	Hamburg	CAL 3	MAN-E-2-08	2	3	2	1	1	2	1
Frontrunner	Hamburg	CAL 1	MAN-E-2-09	2	3	3	3	1	1	3
Frontrunner	Hamburg	CAL 2	MAN-E-2-09	4	5	1	2	1	3	1
Frontrunner	Hamburg	CAL 3	MAN-E-2-09	3	4	3	2	1	2	3
Frontrunner	Hamburg	CAL 1	MAN-E-3-01	1	2	1	1	1	1	1
Frontrunner	Hamburg	CAL 3	MAN-E-3-01	2	4	3	2	1	2	3
Frontrunner	Hamburg	CAL 1	MAN-E-3-02	2	3	2	1	1	2	3
Frontrunner	Hamburg	CAL 2	MAN-E-3-02	3	4	2	2	1	3	3
Frontrunner	Hamburg	CAL 3	MAN-E-3-02	2	3	2	1	1	2	2
Frontrunner	Hamburg	CAL 1	MAN-E-3-03	2	3	2	1	1	2	1
Frontrunner	Hamburg	CAL 2	MAN-E-3-03	4	5	1	3	3	3	3
Frontrunner	Hamburg	CAL 3	MAN-E-3-03	1	2	1	1	1	2	3
Frontrunner	Hamburg	CAL 1	MAN-E-4-01	3	4	2	1	1	1	2
Frontrunner	Hamburg	CAL 2	MAN-E-4-01	3	4	2	1	2	3	1
Frontrunner	Hamburg	CAL 3	MAN-E-4-01	3	5	4	2	1	3	3
Frontrunner	Hamburg	CAL 1	MAN-E-4-02	2	3	2	1	1	2	3
Frontrunner	Hamburg	CAL 3	MAN-E-4-02	1	2	1	1	1	1	1
Frontrunner	Hamburg	CAL 1	MAN-E-4-03	3	4	2	1	1	2	3
Frontrunner	Hamburg	CAL 2	MAN-E-4-03	4	5	1	3	1	3	2
Frontrunner	Hamburg	CAL 3	MAN-E-4-03	2	3	2	1	1	2	2
Frontrunner	Hamburg	CAL 1	MAN-E-4-04	3	4	4	1	1	2	3
Frontrunner	Hamburg	CAL 2	MAN-E-4-04	3	4	2	2	1	3	3
Frontrunner	Hamburg	CAL 3	MAN-E-4-04	1	2	1	1	1	2	3
Frontrunner	Hamburg	CAL 1	MAN-E-4-05	1	2	1	1	1	1	1

			EXANTE ANALYSIS							
City type	City	CAL	Code	IRL present	IRL expected	Innovation model	Viability technical	Viability economic	Viability legal	Viability social
Frontrunner	Hamburg	CAL 3	MAN-E-4-05	1	2	1	1	1	1	1
Frontrunner	Hamburg	CAL 2	MAT-A-1-02	2	4	3	1	2	3	1
Frontrunner	Hamburg	CAL 2	MAT-A-1-03	2	3	2	1	2	3	1
Frontrunner	Hamburg	CAL 1	MAT-A-1-05	3	4	1	3	2	3	1
Frontrunner	Hamburg	CAL 2	MAT-A-1-05	3	4	1	3	2	3	1
Frontrunner	Hamburg	CAL 3	MAT-A-1-05	3	4	1	3	2	3	3
Frontrunner	Hamburg	CAL 2	MAT-A-2-01	3	4	1	3	2	3	1
Frontrunner	Hamburg	CAL 1	MAT-B-1-01	2	4	2	1	1	1	3
Frontrunner	Hamburg	CAL 2	MAT-B-1-01	3	4	1	1	2	3	1
Frontrunner	Hamburg	CAL 3	MAT-B-1-01	3	4	1	3	1	3	3
Frontrunner	London	CAL 1	MAN-C-3-01	1	5	4	3	3	3	3
Frontrunner	Hamburg	CAL 1	MAT-B-1-04	3	4	1	3	1	2	3
Frontrunner	Hamburg	CAL 1	MAT-B-1-05	2	4	1	1	1	2	3
Frontrunner	London	CAL 2	MAN-C-3-01	1	5	4	3	3	3	3
Frontrunner	London	CAL 3	MAN-C-3-01	1	5	4	3	3	3	3
Frontrunner	Hamburg	CAL 1	MAT-B-2-02	3	4	1	2	2	3	1
Frontrunner	Hamburg	CAL 3	MAT-B-2-02	3	4	1	1	1	3	3
Frontrunner	Hamburg	CAL 1	MAT-B-2-03	3	4	1	3	2	3	1
Frontrunner	Hamburg	CAL 3	MAT-B-2-04	3	4	2	1	1	3	3
Frontrunner	Milan	CAL 1	MAN-C-3-01	2	3	2	3	3	3	3
Frontrunner	Hamburg	CAL 1	MAT-B-2-05	3	4	1	3	2	3	3
Frontrunner	Milan	CAL 2	MAN-C-3-01	2	3	1	2	1	2	3
Frontrunner	Milan	CAL 3	MAN-C-3-01	3	4	2	2	2	3	3
Frontrunner	Hamburg	CAL 3	MAT-B-2-05	3	4	1	2	2	3	3
Frontrunner	London	CAL 1	MAN-D-2-01	3	4	1	2	3	3	3
Frontrunner	London	CAL 2	MAN-D-2-01	3	4	1	2	3	3	3
Frontrunner	London	CAL 3	MAN-D-2-01	3	4	1	2	3	3	3
Frontrunner	Milan	CAL 1	MAN-D-1-01	3	4	3	3	1	2	3
Frontrunner	Hamburg	CAL 2	MAT-C-1-01	2	3	3	1	2	3	1
Frontrunner	Milan	CAL 1	MAN-D-1-02	3	4	3	3	1	2	3
Frontrunner	Hamburg	CAL 2	MAT-C-1-02	2	3	2	1	2	3	1
Frontrunner	Hamburg	CAL 2	MET-A-1-01	2	4	3	1	1	3	3
Frontrunner	Milan	CAL 2	MAN-D-1-02	2	3	2	2	2	2	3
Frontrunner	Hamburg	CAL 2	MET-A-2-01	2	4	3	1	2	3	3
Frontrunner	Hamburg	CAL 2	MET-A-2-02	2	4	3	1	1	3	3
Frontrunner	Hamburg	CAL 3	MET-A-3-01	3	4	1	3	2	3	3
Frontrunner	Hamburg	CAL 1	MET-A-3-02	3	4	1	1	1	2	3
Frontrunner	Hamburg	CAL 3	MET-A-3-02	3	4	1	3	1	3	3
Frontrunner	London	CAL 1	MAN-D-2-05	3	5	1	3	3	3	3
Frontrunner	Hamburg	CAL 1	MET-B-1-01	2	4	3	1	1	2	3
Frontrunner	London	CAL 2	MAN-D-2-05	3	5	1	3	3	3	3
Frontrunner	Hamburg	CAL 2	MET-B-1-01	3	4	1	2	2	3	2
Frontrunner	Hamburg	CAL 3	MET-B-1-01	3	4	1	2	2	3	3
Frontrunner	Hamburg	CAL 1	MET-B-1-02	3	4	1	3	1	3	3
Frontrunner	Hamburg	CAL 3	MET-B-1-02	3	4	1	3	1	3	3
Frontrunner	London	CAL 3	MAN-D-2-05	3	5	1	3	3	3	3
Frontrunner	Milan	CAL 3	MAN-D-1-02	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MAN-D-2-03	2	3	3	2	1	2	3

City type	City	CAL	Code	IRL present	IRL expected	Innovation model	Viability technical	Viability economic	Viability legal	Viability social
EXANTE ANALYSIS										
Frontrunner	Hamburg	CAL 1	MET-B-1-03	3	4	1	1	2	3	3
Frontrunner	Hamburg	CAL 2	MET-B-1-03	3	4	1	2	2	3	2
Frontrunner	Hamburg	CAL 3	MET-B-1-03	3	4	1	3	2	3	3
Frontrunner	Hamburg	CAL 1	MET-B-2-01	3	4	2	2	1	1	2
Frontrunner	Milan	CAL 1	MAN-D-2-04	2	3	2	2	1	1	3
Frontrunner	Hamburg	CAL 3	MET-B-2-01	3	4	1	3	1	3	3
Frontrunner	Hamburg	CAL 1	MET-B-2-02	3	4	2	1	1	1	3
Frontrunner	Milan	CAL 1	MAN-D-2-05	2	3	2	3	2	3	3
Frontrunner	Milan	CAL 2	MAN-D-2-05	2	3	1	1	1	2	3
Frontrunner	Hamburg	CAL 2	MET-B-2-02	3	4	1	3	2	3	2
Frontrunner	Hamburg	CAL 3	MET-B-2-02	3	4	1	3	1	3	3
Frontrunner	Hamburg	CAL 1	MET-B-2-03	1	2	3	1	1	2	3
Frontrunner	London	CAL 1	MAN-E-1-01	1	3	3	3	2	3	3
Frontrunner	London	CAL 2	MAN-E-1-01	1	3	3	3	2	3	3
Frontrunner	London	CAL 3	MAN-E-1-01	1	3	3	3	2	3	3
Frontrunner	Hamburg	CAL 2	MET-B-2-03	2	3	1	2	2	3	1
Frontrunner	Hamburg	CAL 3	MET-B-2-03	3	4	1	3	2	3	3
Frontrunner	Hamburg	CAL 1	MET-B-2-04	1	2	1	1	1	1	1
Frontrunner	Hamburg	CAL 3	MET-B-2-04	3	4	1	2	2	3	3
Frontrunner	Hamburg	CAL 1	MET-B-3-03	3	4	1	3	1	3	3
Frontrunner	Hamburg	CAL 2	MET-B-3-03	2	4	2	1	2	3	1
Frontrunner	Hamburg	CAL 1	MET-B-3-04	3	4	3	1	2	3	2
Frontrunner	Hamburg	CAL 1	MET-B-3-06	3	4	1	3	2	3	3
Frontrunner	Hamburg	CAL 2	MET-B-3-06	3	4	1	1	2	3	1
Frontrunner	Hamburg	CAL 3	MET-B-3-06	3	4	1	3	1	3	3
Frontrunner	Hamburg	CAL 3	MET-B-3-07	3	4	1	3	1	3	3
Frontrunner	Hamburg	CAL 1	MET-B-3-08	3	4	1	2	1	2	3
Frontrunner	Hamburg	CAL 2	MET-B-3-08	3	4	1	3	2	3	3
Frontrunner	Hamburg	CAL 3	MET-B-3-08	3	4	1	3	2	3	3
Frontrunner	Hamburg	CAL 2	MET-B-3-09	2	3	3	1	1	3	3
Frontrunner	Hamburg	CAL 1	MET-B-3-10	3	4	1	3	1	3	3
Frontrunner	Hamburg	CAL 2	MET-B-3-10	3	4	1	1	2	2	2
Frontrunner	Hamburg	CAL 1	MET-B-3-11	2	3	3	1	2	3	1
Frontrunner	London	CAL 1	MAN-E-1-02	1	3	3	3	2	3	3
Frontrunner	London	CAL 2	MAN-E-1-02	1	3	3	3	2	3	3
Frontrunner	London	CAL 3	MAN-E-1-02	1	3	3	3	2	3	3
Frontrunner	Milan	CAL 3	MAN-D-3-01	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MAN-D-3-02	3	4	2	3	2	3	3
Frontrunner	Milan	CAL 1	MAN-D-3-03	2	3	2	3	2	1	3
Frontrunner	Milan	CAL 2	MAN-D-3-03	3	4	1	1	2	2	3
Frontrunner	Hamburg	CAL 2	MET-B-3-11	2	3	3	1	2	3	1
Frontrunner	Hamburg	CAL 1	MON-A-1-01	1	3	1	3	1	3	1
Frontrunner	Milan	CAL 1	MAN-D-3-05	2	3	2	2	2	2	3
Frontrunner	Milan	CAL 2	MAN-D-4-02	2	3	1	1	2	2	3
Frontrunner	Milan	CAL 1	MAN-E-1-01	3	4	2	3	2	3	3
Frontrunner	London	CAL 1	MAN-E-2-01	2	3	3	3	3	3	3
Frontrunner	London	CAL 2	MAN-E-2-01	2	3	3	3	3	3	3
Frontrunner	London	CAL 3	MAN-E-2-01	2	3	3	3	3	3	3

			EXANTE ANALYSIS							
City type	City	CAL	Code	IRL present	IRL expected	Innovation model	Viability technical	Viability economic	Viability legal	Viability social
Frontrunner	Hamburg	CAL 2	MON-A-1-01	1	3	1	3	1	3	1
Frontrunner	Milan	CAL 2	MAN-E-1-01	3	4	1	1	1	2	3
Frontrunner	Milan	CAL 1	MAN-E-1-02	3	4	2	3	3	3	3
Frontrunner	Hamburg	CAL 3	MON-A-1-01	1	3	1	3	1	3	1
Frontrunner	London	CAL 1	MAN-E-2-02	1	2	2	2	2	2	2
Frontrunner	London	CAL 2	MAN-E-2-02	1	2	2	2	2	2	2
Frontrunner	London	CAL 3	MAN-E-2-02	1	2	2	2	2	2	2
Frontrunner	Milan	CAL 2	MAN-E-1-02	3	4	1	3	2	2	2
Frontrunner	Milan	CAL 3	MAN-E-1-02	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MAN-E-2-01	3	4	2	3	1	3	3
Frontrunner	Milan	CAL 2	MAN-E-2-01	2	3	1	1	2	2	3
Frontrunner	Milan	CAL 1	MAN-E-2-02	3	4	2	3	2	2	3
Frontrunner	Milan	CAL 2	MAN-E-2-02	2	3	1	1	2	2	3
Frontrunner	Milan	CAL 3	MAN-E-2-02	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MAN-E-2-04	3	4	2	3	3	3	3
Frontrunner	London	CAL 1	MAN-E-2-04	2	3	2	3	2	3	2
Frontrunner	London	CAL 2	MAN-E-2-04	2	3	2	3	2	3	2
Frontrunner	London	CAL 3	MAN-E-2-04	2	3	2	3	2	3	2
Frontrunner	Milan	CAL 2	MAN-E-2-04	2	3	1	1	1	2	3
Frontrunner	Milan	CAL 2	MAN-E-2-05	3	4	1	1	1	2	3
Frontrunner	London	CAL 1	MAN-E-2-05	1	3	3	3	3	3	3
Frontrunner	London	CAL 2	MAN-E-2-05	1	3	3	3	3	3	3
Frontrunner	London	CAL 3	MAN-E-2-05	1	3	3	3	3	3	3
Frontrunner	Milan	CAL 3	MAN-E-2-05	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MAN-E-2-07	3	4	2	2	3	3	3
Frontrunner	Milan	CAL 2	MAN-E-2-07	3	4	1	3	2	2	2
Frontrunner	London	CAL 1	MAN-E-2-06	1	3	1	3	3	3	3
Frontrunner	London	CAL 2	MAN-E-2-06	1	3	1	3	3	3	3
Frontrunner	London	CAL 3	MAN-E-2-06	1	3	1	3	3	3	3
Frontrunner	Milan	CAL 3	MAN-E-2-07	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MAN-E-2-08	3	4	2	3	3	3	3
Frontrunner	London	CAL 1	MAN-E-2-08	1	3	2	3	2	3	2
Frontrunner	London	CAL 2	MAN-E-2-08	1	3	2	3	2	3	2
Frontrunner	London	CAL 3	MAN-E-2-08	1	3	2	3	2	3	2
Frontrunner	Milan	CAL 1	MAN-E-2-09	2	3	3	3	3	1	3
Frontrunner	Milan	CAL 2	MAN-E-2-09	3	4	1	1	1	2	3
Frontrunner	Milan	CAL 3	MAN-E-2-09	3	4	2	2	2	3	3
Frontrunner	London	CAL 1	MAN-E-2-09	1	3	2	3	2	3	3
Frontrunner	London	CAL 2	MAN-E-2-09	1	3	2	3	2	3	3
Frontrunner	London	CAL 3	MAN-E-2-09	1	3	2	3	2	3	3
Frontrunner	London	CAL 1	MAN-E-3-01	1	3	3	3	2	3	3
Frontrunner	London	CAL 2	MAN-E-3-01	1	3	3	3	2	3	3
Frontrunner	London	CAL 3	MAN-E-3-01	1	3	3	3	2	3	3
Frontrunner	London	CAL 3	MAN-E-3-02	1	2	2	3	3	3	3
Frontrunner	London	CAL 1	MAN-E-3-02	1	2	2	3	3	3	3
Frontrunner	London	CAL 2	MAN-E-3-02	1	2	2	3	3	3	3
Frontrunner	London	CAL 1	MAN-E-4-01	1	2	1	2	3	3	3
Frontrunner	London	CAL 2	MAN-E-4-01	1	2	1	2	3	3	3

				EXANTE ANALYSIS						
City type	City	CAL	Code	IRL present	IRL expected	Innovation model	Viability technical	Viability economic	Viability legal	Viability social
Frontrunner	London	CAL 3	MAN-E-4-01	1	3	1	2	2	3	3
Frontrunner	London	CAL 1	MAN-E-4-03	1	3	2	3	2	3	3
Frontrunner	London	CAL 2	MAN-E-4-03	1	3	2	3	2	3	3
Frontrunner	London	CAL 3	MAN-E-4-03	1	3	2	3	2	3	3
Frontrunner	London	CAL 3	MAN-E-4-04	1	3	2	2	2	3	3
Frontrunner	London	CAL 1	MAN-E-4-04	1	3	2	2	2	3	3
Frontrunner	London	CAL 2	MAN-E-4-04	1	3	2	2	2	3	3
Frontrunner	Milan	CAL 1	MAN-E-3-01	2	3	2	3	3	3	3
Frontrunner	Milan	CAL 2	MAN-E-3-01	3	5	1	3	3	3	3
Frontrunner	London	CAL 1	MAT-B-1-01	1	4	1	3	3	3	3
Frontrunner	London	CAL 2	MAT-B-1-01	1	4	1	3	3	3	3
Frontrunner	London	CAL 3	MAT-B-1-01	1	4	1	3	3	3	3
Frontrunner	Milan	CAL 1	MAN-E-3-02	3	4	2	3	3	3	3
Frontrunner	Milan	CAL 1	MAN-E-3-03	3	4	2	3	2	3	3
Frontrunner	Milan	CAL 2	MAN-E-3-03	2	3	1	1	2	2	3
Frontrunner	Milan	CAL 1	MAN-E-4-01	3	4	2	3	2	3	3
Frontrunner	Milan	CAL 2	MAN-E-4-01	2	3	1	1	1	2	3
Frontrunner	London	CAL 1	MAT-B-2-02	2	5	1	3	2	3	3
Frontrunner	London	CAL 2	MAT-B-2-02	2	5	1	3	2	3	3
Frontrunner	London	CAL 3	MAT-B-2-02	2	5	1	3	2	3	3
Frontrunner	Milan	CAL 1	MAN-E-4-02	2	3	2	3	3	3	3
Frontrunner	Milan	CAL 1	MAN-E-4-03	2	3	2	3	2	3	3
Frontrunner	Milan	CAL 2	MAN-E-4-03	2	3	1	1	1	2	3
Frontrunner	Milan	CAL 1	MAN-E-4-04	1	3	4	2	2	2	3
Frontrunner	London	CAL 1	MAT-B-2-06	1	5	1	3	3	3	3
Frontrunner	London	CAL 2	MAT-B-2-06	1	5	1	3	3	3	3
Frontrunner	London	CAL 3	MAT-B-2-06	1	5	1	3	3	3	3
Frontrunner	London	CAL 1	MAT-C-1-01	1	5	3	2	2	2	3
Frontrunner	London	CAL 2	MAT-C-1-01	1	5	3	2	2	2	3
Frontrunner	London	CAL 3	MAT-C-1-01	1	5	3	2	2	2	3
Frontrunner	London	CAL 1	MAT-C-1-03	2	5	1	2	2	2	3
Frontrunner	London	CAL 2	MAT-C-1-03	2	5	1	2	2	2	3
Frontrunner	London	CAL 3	MAT-C-1-03	2	5	1	2	2	2	3
Frontrunner	London	CAL 1	MET-A-1-01	3	5	1	2	3	3	3
Frontrunner	London	CAL 2	MET-A-1-01	3	5	1	2	3	3	3
Frontrunner	London	CAL 3	MET-A-1-01	3	5	1	2	3	3	3
Frontrunner	London	CAL 1	MET-A-3-01	2	5	3	3	3	3	3
Frontrunner	London	CAL 2	MET-A-3-01	2	5	3	3	3	3	3
Frontrunner	London	CAL 3	MET-A-3-01	2	5	3	3	3	3	3
Frontrunner	London	CAL 1	MET-B-1-01	2	5	1	3	3	3	2
Frontrunner	London	CAL 2	MET-B-1-01	2	5	1	3	3	3	2
Frontrunner	London	CAL 3	MET-B-1-01	2	5	1	3	3	3	2
Frontrunner	London	CAL 1	MET-B-1-03	2	5	2	3	3	3	3
Frontrunner	London	CAL 2	MET-B-1-03	2	5	2	3	3	3	3
Frontrunner	London	CAL 3	MET-B-1-03	2	5	2	3	3	3	3
Frontrunner	London	CAL 1	MET-B-2-01	1	5	4	2	3	3	3
Frontrunner	London	CAL 2	MET-B-2-01	1	5	4	2	3	3	3
Frontrunner	London	CAL 3	MET-B-2-01	1	5	4	2	3	3	3

			EXANTE ANALYSIS							
City type	City	CAL	Code	IRL present	IRL expected	Innovation model	Viability technical	Viability economic	Viability legal	Viability social
Frontrunner	London	CAL 1	MET-B-2-02	1	5	4	3	3	3	3
Frontrunner	London	CAL 2	MET-B-2-02	1	5	4	3	3	3	3
Frontrunner	London	CAL 3	MET-B-2-02	1	5	4	3	3	3	3
Frontrunner	London	CAL 1	MET-B-2-04	2	4	1	3	3	3	3
Frontrunner	London	CAL 2	MET-B-2-04	2	4	1	3	3	3	3
Frontrunner	London	CAL 3	MET-B-2-04	2	4	1	3	3	3	3
Frontrunner	London	CAL 1	MET-B-3-03	2	5	1	3	3	3	3
Frontrunner	London	CAL 2	MET-B-3-03	2	5	1	3	3	3	3
Frontrunner	London	CAL 3	MET-B-3-03	2	5	1	3	3	3	3
Frontrunner	London	CAL 1	MET-B-3-04	2	5	2	2	3	3	3
Frontrunner	London	CAL 2	MET-B-3-04	2	5	2	2	3	3	3
Frontrunner	London	CAL 3	MET-B-3-04	2	5	2	2	3	3	3
Frontrunner	London	CAL 1	MET-B-3-06	2	5	1	3	3	3	3
Frontrunner	London	CAL 2	MET-B-3-06	2	5	1	3	3	3	3
Frontrunner	London	CAL 3	MET-B-3-06	2	5	1	3	3	3	3
Frontrunner	London	CAL 1	MON-A-1-02	2	5	3	3	3	3	3
Frontrunner	Milan	CAL 3	MAN-E-4-04	3	4	2	2	2	3	3
Frontrunner	London	CAL 2	MON-A-1-02	2	5	3	3	3	3	3
Frontrunner	Milan	CAL 1	MAN-E-4-05	3	4	2	3	2	3	3
Frontrunner	Milan	CAL 1	MAT-A-1-02	3	4	1	3	3	3	3
Frontrunner	London	CAL 3	MON-A-1-02	2	5	3	3	3	3	3
Frontrunner	London	CAL 1	MON-A-2-02	2	5	3	2	3	3	3
Frontrunner	London	CAL 2	MON-A-2-02	2	5	3	2	3	3	3
Frontrunner	Milan	CAL 1	MAT-A-1-05	3	4	1	3	3	3	3
Frontrunner	Milan	CAL 1	MAT-A-1-06	3	4	1	3	3	3	3
Frontrunner	London	CAL 3	MON-A-2-02	2	5	3	2	3	3	3
Frontrunner	London	CAL 1	MON-A-2-06	2	3	3	2	3	3	3
Frontrunner	London	CAL 2	MON-A-2-06	2	3	3	2	3	3	3
Frontrunner	Hamburg	CAL 2	MON-B-1-01	3	4	3	3	1	2	3
Frontrunner	Hamburg	CAL 1	MON-B-1-01	3	4	3	3	1	2	3
Frontrunner	Milan	CAL 1	MAT-A-2-01	3	4	1	3	3	1	3
Frontrunner	Milan	CAL 3	MAT-A-2-01	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 3	MAT-A-2-02	3	4	2	2	2	3	3
Frontrunner	Hamburg	CAL 3	MON-B-1-01	3	4	3	3	1	2	3
Frontrunner	Hamburg	CAL 2	MON-B-1-02	2	4	3	1	2	3	2
Frontrunner	London	CAL 3	MON-A-2-06	2	3	3	2	3	3	3
Frontrunner	London	CAL 1	MON-A-3-01	2	5	2	3	3	3	3
Frontrunner	London	CAL 2	MON-A-3-01	2	5	2	3	3	3	3
Frontrunner	Milan	CAL 1	MAT-A-2-03	3	4	1	3	2	3	3
Frontrunner	London	CAL 3	MON-A-3-01	2	5	2	3	3	3	3
Frontrunner	London	CAL 1	MON-A-3-02	2	3	3	3	3	3	3
Frontrunner	London	CAL 2	MON-A-3-02	2	3	3	3	3	3	3
Frontrunner	Milan	CAL 2	MAT-A-2-03	4	5	1	1	2	2	3
Frontrunner	Milan	CAL 3	MAT-A-2-03	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 2	MAT-B-1-05	3	4	2	3	3	2	3
Frontrunner	London	CAL 3	MON-A-3-02	2	3	3	3	3	3	3
Frontrunner	London	CAL 1	MON-A-3-04	2	3	2	3	3	3	3
Frontrunner	London	CAL 2	MON-A-3-04	2	3	2	3	3	3	3

	EXANTE ANALYSIS									
City type	City	CAL	Code	IRL present	IRL expected	Innovation model	Viability technical	Viability economic	Viability legal	Viability social
Frontrunner	Milan	CAL 2	MAT-B-2-02	3	4	2	3	2	2	3
Frontrunner	Milan	CAL 2	MAT-B-2-03	3	4	1	3	2	2	3
Frontrunner	Hamburg	CAL 2	MON-B-1-05	2	5	2	1	2	3	3
Frontrunner	London	CAL 3	MON-A-3-04	2	3	2	3	3	3	3
Frontrunner	London	CAL 1	MON-B-1-01	2	3	4	1	2	3	3
Frontrunner	Milan	CAL 2	MAT-B-2-05	3	4	1	3	2	2	3
Frontrunner	Hamburg	CAL 1	MON-B-1-05	2	5	2	1	2	3	3
Frontrunner	Hamburg	CAL 3	MON-B-1-05	3	4	1	3	2	3	3
Frontrunner	Milan	CAL 2	MAT-B-2-06	3	4	2	3	2	3	2
Frontrunner	Milan	CAL 3	MAT-B-2-06	3	4	2	2	2	3	3
Frontrunner	London	CAL 2	MON-B-1-01	2	3	4	1	2	3	3
Frontrunner	London	CAL 3	MON-B-1-01	2	3	4	1	2	3	3
Frontrunner	London	CAL 1	MON-B-1-02	4	5	4	1	3	3	3
Frontrunner	Milan	CAL 3	MAT-C-1-01	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 3	MAT-C-1-02	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MET-A-2-02	2	3	1	3	3	3	3
Frontrunner	London	CAL 2	MON-B-1-02	4	5	4	1	3	3	3
Frontrunner	London	CAL 3	MON-B-1-02	4	5	4	1	3	3	3
Frontrunner	London	CAL 1	MON-B-1-05	2	3	4	2	3	3	3
Frontrunner	Milan	CAL 2	MET-A-2-02	3	4	2	3	2	2	2
Frontrunner	Milan	CAL 3	MET-A-2-02	3	4	2	2	2	3	3
Frontrunner	London	CAL 2	MON-B-1-05	2	3	4	2	3	3	3
Frontrunner	London	CAL 3	MON-B-1-05	2	3	4	2	3	3	3
Frontrunner	Milan	CAL 2	MET-A-3-01	4	5	1	3	2	3	2
Frontrunner	Milan	CAL 3	MET-A-3-02	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 2	MET-A-3-03	2	4	2	3	2	2	2
Frontrunner	Milan	CAL 1	MET-B-1-01	3	4	2	2	3	1	3
Frontrunner	Milan	CAL 2	MET-B-1-01	3	4	2	3	2	2	2
Frontrunner	Milan	CAL 3	MET-B-1-01	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MET-B-1-02	3	4	1	2	3	3	3
Frontrunner	Milan	CAL 3	MET-B-1-02	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MET-B-2-01	3	4	1	3	3	3	3
Frontrunner	Milan	CAL 2	MET-B-2-01	3	4	1	3	3	3	3
Frontrunner	Milan	CAL 1	MET-B-2-02	3	4	1	3	3	3	3
Frontrunner	Milan	CAL 2	MET-B-2-02	3	4	2	3	1	3	3
Frontrunner	Milan	CAL 3	MET-B-2-02	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MET-B-2-03	3	4	1	3	3	3	3
Frontrunner	Milan	CAL 2	MET-B-2-03	3	4	2	3	2	3	3
Frontrunner	Milan	CAL 1	MET-B-3-01	3	4	1	3	3	3	3
Frontrunner	Milan	CAL 1	MET-B-3-02	3	4	1	3	3	3	3
Frontrunner	Milan	CAL 2	MET-B-3-02	3	4	1	3	3	2	3
Frontrunner	Milan	CAL 3	MET-B-3-02	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MET-B-3-03	3	4	1	3	3	3	3
Frontrunner	London	CAL 1	MON-B-2-02	4	5	1	2	3	3	3
Frontrunner	London	CAL 2	MON-B-2-02	4	5	1	2	3	3	3
Frontrunner	London	CAL 3	MON-B-2-02	4	5	1	2	3	3	3
Frontrunner	Milan	CAL 2	MET-B-3-03	3	4	1	1	2	2	3
Frontrunner	Milan	CAL 1	MET-B-3-04	3	4	1	3	2	3	3

City type	City	CAL	Code	IRL present	IRL expected	Innovation model	Viability technical	Viability economic	Viability legal	Viability social
			EXANTE ANALYSIS							
Frontrunner	London	CAL 1	MON-C-1-03	3	4	1	3	3	3	3
Frontrunner	London	CAL 2	MON-C-1-03	3	4	1	3	3	3	3
Frontrunner	London	CAL 3	MON-C-1-03	3	4	1	3	3	3	3
Frontrunner	Milan	CAL 2	MET-B-3-04	3	5	1	3	3	2	3
Frontrunner	Milan	CAL 1	MET-B-3-06	3	4	1	3	2	2	3
Frontrunner	London	CAL 1	MON-C-1-07	4	5	1	3	3	3	3
Frontrunner	London	CAL 2	MON-C-1-07	4	5	1	3	3	3	3
Frontrunner	London	CAL 3	MON-C-1-07	4	5	1	3	3	3	3
Frontrunner	Milan	CAL 2	MET-B-3-06	3	4	2	3	3	2	2
Frontrunner	Milan	CAL 3	MET-B-3-06	4	5	3	2	2	3	3
Frontrunner	Milan	CAL 1	MET-B-3-07	3	4	1	3	3	3	3
Frontrunner	Milan	CAL 1	MET-B-3-08	3	4	1	3	3	3	3
Frontrunner	Milan	CAL 2	MET-B-3-08	3	5	1	3	3	2	3
Frontrunner	Milan	CAL 3	MET-B-3-08	3	4	2	2	2	2	3
Frontrunner	Milan	CAL 2	MET-B-3-09	3	5	1	3	3	2	3
Frontrunner	Milan	CAL 3	MET-B-3-09	3	4	2	2	2	3	3
Frontrunner	Hamburg	CAL 2	MON-C-1-07	3	5	2	1	2	2	3
Frontrunner	Hamburg	CAL 1	MON-C-1-07	3	5	2	1	2	2	3
Frontrunner	Milan	CAL 1	MET-B-3-10	3	4	1	3	3	3	3
Frontrunner	Hamburg	CAL 3	MON-C-1-07	3	5	2	1	2	2	3
Frontrunner	Milan	CAL 1	MET-B-3-11	3	4	1	3	3	3	3
Frontrunner	Milan	CAL 1	MON-A-1-01	3	5	2	2	3	2	3
Frontrunner	Milan	CAL 2	MON-A-1-01	3	5	2	2	3	2	3
Frontrunner	Milan	CAL 3	MON-A-1-01	3	5	2	2	3	2	3
Frontrunner	Milan	CAL 3	MON-A-1-02	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MON-A-2-02	4	5	1	2	3	3	3
Frontrunner	Milan	CAL 2	MON-A-2-02	4	5	1	2	3	3	3
Frontrunner	Milan	CAL 3	MON-A-2-02	4	5	1	2	3	3	3
Frontrunner	Milan	CAL 1	MON-A-2-06	3	4	1	2	3	3	3
Frontrunner	Milan	CAL 2	MON-A-2-06	3	4	1	2	3	3	3
Frontrunner	Milan	CAL 3	MON-A-2-06	3	4	1	2	3	3	3
Frontrunner	Milan	CAL 1	MON-A-3-02	4	5	1	2	3	3	3
Frontrunner	Milan	CAL 2	MON-A-3-02	4	5	1	2	3	3	3
Frontrunner	Milan	CAL 3	MON-A-3-02	4	5	1	2	3	3	3
Frontrunner	Milan	CAL 3	MON-A-3-04	3	4	2	2	2	3	3
Frontrunner	Milan	CAL 1	MON-B-1-02	4	5	1	3	3	3	3
Frontrunner	Milan	CAL 3	MON-B-1-02	4	5	1	3	3	3	3
Frontrunner	Milan	CAL 1	MON-B-1-04	4	5	1	3	3	3	3
Frontrunner	Milan	CAL 1	MON-B-2-02	4	5	1	3	3	3	3
Frontrunner	Milan	CAL 2	MON-B-2-02	4	5	1	3	3	3	3
Frontrunner	Milan	CAL 3	MON-B-2-02	4	5	1	3	3	3	3
Frontrunner	Milan	CAL 1	MON-C-1-03	3	4	2	2	3	3	3
Frontrunner	Milan	CAL 2	MON-C-1-03	3	4	2	2	3	3	3
Frontrunner	Milan	CAL 3	MON-C-1-03	3	4	2	2	3	3	3
Frontrunner	Milan	CAL 1	MON-C-1-04	3	5	1	2	3	3	3
Frontrunner	Milan	CAL 2	MON-C-1-04	3	5	1	2	3	3	3
Frontrunner	Milan	CAL 3	MON-C-1-04	3	5	1	2	3	3	3
Frontrunner	Milan	CAL 1	MON-C-1-05	3	4	1	3	3	3	2

			EXANTE ANALYSIS							
City type	City	CAL	Code	IRL present	IRL expected	Innovation model	Viability technical	Viability economic	Viability legal	Viability social
Fellow	Belgrade	CAL	MAN-A-1-01	1	4	2	1	1	3	3
Fellow	Larissa	CAL	MAN-A-1-01	1	2	3	3	1	3	3
Fellow	Madrid	CAL	MAN-A-1-01	1	4	4	2	3	2	3
Fellow	Malmo	CAL	MAN-A-1-01	1	2	1	2	3	3	2
Fellow	Quito	CAL	MAN-A-1-01	2	4	1	2	3	1	2
Fellow	Sfantu	CAL	MAN-A-1-01	1	2	4	1	1	1	1
Fellow	Quito	CAL	MAN-A-1-02	2	3	1	2	3	2	2
Fellow	Belgrade	CAL	MAN-A-1-03	1	2	1	1	1	1	3
Fellow	Madrid	CAL	MAN-A-1-03	2	4	2	2	2	2	3
Fellow	Malmo	CAL	MAN-A-1-03	1	2	1	2	1	3	2
Fellow	Quito	CAL	MAN-A-1-03	2	3	1	3	3	2	2
Fellow	Madrid	CAL	MAN-A-1-04	2	4	1	2	2	3	3
Fellow	Quito	CAL	MAN-A-1-04	2	3	3	3	3	2	2
Fellow	Madrid	CAL	MAN-A-1-05	2	3	1	2	2	2	2
Fellow	Quito	CAL	MAN-A-1-05	1	3	1	1	3	2	2
Fellow	Quito	CAL	MAN-A-1-06	3	5	3	3	3	2	3
Fellow	Quito	CAL	MAN-A-1-07	4	5	3	3	3	2	3
Fellow	Belgrade	CAL	MAN-A-1-09	3	4	2	2	3	2	2
Fellow	Madrid	CAL	MAN-A-1-09	2	3	1	3	2	2	3
Fellow	Quito	CAL	MAN-A-1-09	4	5	3	3	3	2	3
Fellow	Belgrade	CAL	MAN-A-2-01	2	3	1	1	1	3	3
Fellow	Larissa	CAL	MAN-A-2-01	1	2	3	3	1	3	3
Fellow	Madrid	CAL	MAN-A-2-01	2	4	3	2	3	2	2
Fellow	Malmo	CAL	MAN-A-2-01	1	2	1	2	1	1	2
Fellow	Quito	CAL	MAN-A-2-01	3	5	3	3	3	2	2
Fellow	Madrid	CAL	MAN-A-2-02	1	2	2	2	2	2	2
Fellow	Quito	CAL	MAN-A-2-02	3	4	3	3	3	3	3
Fellow	Belgrade	CAL	MAN-A-2-03	2	3	2	2	3	2	2
Fellow	Larissa	CAL	MAN-A-2-03	1	4	1	3	1	2	3
Fellow	Madrid	CAL	MAN-A-2-03	2	4	3	2	2	2	3
Fellow	Quito	CAL	MAN-A-2-03	1	2	3	1	3	2	2
Fellow	Madrid	CAL	MAN-A-2-04	2	3	3	3	2	3	3
Fellow	Malmo	CAL	MAN-A-2-04	1	2	2	2	3	2	2
Fellow	Quito	CAL	MAN-A-2-04	4	5	3	3	3	2	3
Fellow	Larissa	CAL	MAN-A-2-05	1	2	3	3	1	3	3
Fellow	Madrid	CAL	MAN-A-2-05	2	4	3	2	2	2	3
Fellow	Madrid	CAL	MAN-A-2-06	2	4	3	2	2	2	2
Fellow	Malmo	CAL	MAN-A-2-06	1	2	2	2	1	3	2
Fellow	Quito	CAL	MAN-A-2-06	1	2	1	3	3	2	2
Fellow	Madrid	CAL	MAN-B-1-01	1	2	2	2	1	1	3
Fellow	Madrid	CAL	MAN-B-2-03	2	4	3	2	2	2	3
Fellow	Quito	CAL	MAN-B-2-03	1	2	1	3	2	2	3
Fellow	Madrid	CAL	MAN-B-2-05	1	2	3	2	2	2	2

EXANTE ANALYSIS										
City type	City	CAL	Code	IRL present	IRL expected	Innovation model	Viability technical	Viability economic	Viability legal	Viability social
Fellow	Madrid	CAL	MAN-B-3-01	2	4	3	3	3	2	3
Fellow	Quito	CAL	MAN-B-3-01	1	2	3	3	2	3	3
Fellow	Madrid	CAL	MAN-C-1-01	2	4	3	3	2	1	3
Fellow	Quito	CAL	MAN-C-1-01	4	5	3	3	3	2	2
Fellow	Madrid	CAL	MAN-C-1-02	2	3	3	2	2	2	3
Fellow	Quito	CAL	MAN-C-1-02	4	5	3	3	3	2	3
Fellow	Larissa	CAL	MAN-C-1-03	2	5	2	3	2	2	3
Fellow	Madrid	CAL	MAN-C-1-03	2	4	3	2	2	2	2
Fellow	Quito	CAL	MAN-C-1-03	4	5	3	3	3	2	3
Fellow	Madrid	CAL	MAN-C-1-04	2	3	3	2	2	2	2
Fellow	Madrid	CAL	MAN-C-2-01	2	4	3	2	2	3	3
Fellow	Quito	CAL	MAN-C-2-01	4	5	3	3	3	2	3
Fellow	Madrid	CAL	MAN-C-2-02	2	4	3	2	2	2	3
Fellow	Quito	CAL	MAN-C-2-02	4	5	3	3	3	2	3
Fellow	Madrid	CAL	MAN-C-2-03	2	4	3	2	2	2	3
Fellow	Quito	CAL	MAN-C-2-03	4	5	3	3	3	2	3
Fellow	Quito	CAL	MAN-C-2-04	4	5	3	3	3	2	3
Fellow	Belgrade	CAL	MAN-C-3-01	1	3	2	2	3	1	1
Fellow	Larissa	CAL	MAN-C-3-01	1	2	4	2	1	3	3
Fellow	Madrid	CAL	MAN-C-3-01	2	4	3	2	2	2	3
Fellow	Malmo	CAL	MAN-C-3-01	1	2	4	2	2	2	2
Fellow	Quito	CAL	MAN-C-3-01	1	3	1	3	3	3	3
Fellow	Malmo	CAL	MAN-D-1-01	3	4	2	2	1	2	2
Fellow	Quito	CAL	MAN-D-1-01	1	2	3	3	3	2	3
Fellow	Madrid	CAL	MAN-D-1-02	2	3	3	2	1	2	2
Fellow	Quito	CAL	MAN-D-1-02	1	2	3	3	3	2	3
Fellow	Madrid	CAL	MAN-D-2-04	1	2	3	2	1	2	3
Fellow	Larissa	CAL	MAN-D-2-05	1	2	1	1	2	1	2
Fellow	Madrid	CAL	MAN-D-2-05	1	2	3	2	2	1	3
Fellow	Belgrade	CAL	MAN-D-3-01	1	3	2	2	1	1	1
Fellow	Larissa	CAL	MAN-D-3-01	1	2	1	3	1	3	3
Fellow	Madrid	CAL	MAN-D-3-01	2	4	3	2	2	2	3
Fellow	Quito	CAL	MAN-D-3-01	1	2	4	3	3	3	3
Fellow	Belgrade	CAL	MAN-D-3-02	2	3	2	2	3	1	1
Fellow	Madrid	CAL	MAN-D-3-02	2	4	3	3	3	2	3
Fellow	Quito	CAL	MAN-D-3-02	1	2	1	3	3	3	3
Fellow	Madrid	CAL	MAN-D-3-03	2	3	3	2	2	2	2
Fellow	Quito	CAL	MAN-D-3-03	1	3	1	3	3	2	3
Fellow	Madrid	CAL	MAN-D-3-04	1	2	2	2	2	1	3
Fellow	Quito	CAL	MAN-D-3-04	1	2	1	3	2	1	2
Fellow	Quito	CAL	MAN-D-3-05	4	5	3	3	3	2	3
Fellow	Madrid	CAL	MAN-D-4-01	2	4	3	2	2	3	3
Fellow	Madrid	CAL	MAN-D-4-02	2	4	3	2	2	2	3
Fellow	Madrid	CAL	MAN-D-4-03	2	3	3	1	2	2	3
Fellow	Belgrade	CAL	MAN-E-1-01	2	4	4	2	3	3	3
Fellow	Larissa	CAL	MAN-E-1-01	1	4	2	3	1	3	3
Fellow	Madrid	CAL	MAN-E-1-01	2	3	3	1	2	2	3
Fellow	Quito	CAL	MAN-E-1-01	1	2	1	3	3	3	3

City type	City	CAL	Code	IRL present	IRL expected	Innovation model	Viability technical	Viability economic	Viability legal	Viability social
			EXANTE ANALYSIS							
Fellow	Belgrade	CAL	MAN-E-1-02	2	3	2	2	3	3	3
Fellow	Madrid	CAL	MAN-E-1-02	2	3	3	2	2	1	3
Fellow	Malmo	CAL	MAN-E-1-02	2	3	2	2	1	1	2
Fellow	Quito	CAL	MAN-E-1-02	1	2	1	3	3	3	3
Fellow	Larissa	CAL	MAN-E-2-01	2	4	1	3	1	3	3
Fellow	Madrid	CAL	MAN-E-2-01	2	3	3	2	2	2	3
Fellow	Quito	CAL	MAN-E-2-01	1	2	3	3	3	3	3
Fellow	Madrid	CAL	MAN-E-2-02	1	2	3	1	2	1	3
Fellow	Quito	CAL	MAN-E-2-02	1	2	1	3	3	3	3
Fellow	Larissa	CAL	MAN-E-2-04	2	4	3	3	1	3	3
Fellow	Madrid	CAL	MAN-E-2-04	2	3	3	1	2	2	3
Fellow	Quito	CAL	MAN-E-2-04	1	2	1	3	3	2	3
Fellow	Madrid	CAL	MAN-E-2-05	1	2	3	1	2	1	3
Fellow	Larissa	CAL	MAN-E-2-07	3	5	2	3	1	3	3
Fellow	Madrid	CAL	MAN-E-2-07	2	4	3	2	2	2	3
Fellow	Quito	CAL	MAN-E-2-07	2	5	3	3	3	3	3
Fellow	Larissa	CAL	MAN-E-2-09	1	2	4	2	1	3	3
Fellow	Madrid	CAL	MAN-E-2-09	2	4	3	2	2	2	2
Fellow	Quito	CAL	MAN-E-2-09	1	2	1	3	3	3	3
Fellow	Larissa	CAL	MAN-E-3-01	2	4	1	2	1	3	3
Fellow	Madrid	CAL	MAN-E-3-01	2	4	3	2	2	1	3
Fellow	Quito	CAL	MAN-E-3-01	1	3	3	3	3	3	3
Fellow	Madrid	CAL	MAN-E-3-02	2	4	3	2	2	1	3
Fellow	Madrid	CAL	MAN-E-3-03	2	3	3	2	2	2	2
Fellow	Belgrade	CAL	MAN-E-4-01	1	3	3	3	3	3	3
Fellow	Madrid	CAL	MAN-E-4-01	2	4	3	2	2	2	3
Fellow	Quito	CAL	MAN-E-4-01	1	2	3	3	2	2	3
Fellow	Sfantu	CAL	MAN-E-4-01	1	2	4	1	1	1	1
Fellow	Madrid	CAL	MAN-E-4-02	1	2	3	2	2	2	3
Fellow	Quito	CAL	MAN-E-4-02	1	3	3	3	3	2	3
Fellow	Belgrade	CAL	MAN-E-4-03	1	4	4	1	1	1	3
Fellow	Malmo	CAL	MAN-E-4-03	2	3	2	3	3	3	3
Fellow	Belgrade	CAL	MAN-E-4-04	1	3	2	2	1	3	3
Fellow	Larissa	CAL	MAN-E-4-04	1	2	2	2	1	3	3
Fellow	Madrid	CAL	MAN-E-4-04	1	2	3	1	2	2	3
Fellow	Malmo	CAL	MAN-E-4-04	4	5	2	3	3	3	3
Fellow	Sfantu	CAL	MAN-E-4-04	1	2	4	1	1	1	1
Fellow	Belgrade	CAL	MAN-E-4-05	1	4	1	1	1	3	3
Fellow	Madrid	CAL	MAN-E-4-05	2	4	3	2	2	2	2
Fellow	Belgrade	CAL	MAT-A-1-02	1	2	1	2	2	2	3
Fellow	Belgrade	CAL	MAT-A-1-03	1	2	1	1	1	2	3

Annex 3: Ex-post inputs from the cities

				EXPOST ANALYSIS			
City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
Frontrunner	Hamburg	MAN-A-1-01	CAL 2	3	4	5	1
Frontrunner	Hamburg	MAN-A-2-03	CAL 2	3	4	5	1
Frontrunner	Hamburg	MAN-A-2-05	CAL 1	3	4	3	-1
Frontrunner	Hamburg	MAN-A-2-05	CAL 2	3	4	4	0
Frontrunner	Hamburg	MAN-A-2-05	CAL 3	3	4	4	0
Frontrunner	Hamburg	MAN-A-2-06	CAL 1	2	3	3	0
Frontrunner	Hamburg	MAN-A-2-06	CAL 2	3	4	5	1
Frontrunner	Hamburg	MAN-B-1-01	CAL 1	3	4	4	0
Frontrunner	Hamburg	MAN-B-2-01	CAL 1	3	4	4	0
Frontrunner	Hamburg	MAN-B-2-02	CAL 1	3	4	3	-1
Frontrunner	Hamburg	MAN-B-2-02	CAL 2	3	4	5	1
Frontrunner	Hamburg	MAN-B-2-03	CAL 1	3	4	4	0
Frontrunner	Hamburg	MAN-B-2-04	CAL 1	3	4	3	-1
Frontrunner	Hamburg	MAN-B-2-04	CAL 3	3	4	3	-1
Frontrunner	Hamburg	MAN-C-2-01	CAL 1	3	4	4	0
Frontrunner	Hamburg	MAN-C-2-01	CAL 3	3	4	4	0
Frontrunner	Hamburg	MAN-C-2-02	CAL 1	3	4	3	-1
Frontrunner	Hamburg	MAN-C-2-02	CAL 2	3	4	4	0
Frontrunner	Hamburg	MAN-C-2-02	CAL 3	3	4	4	0
Frontrunner	Hamburg	MAN-C-2-03	CAL 1	3	4	4	0
Frontrunner	Hamburg	MAN-C-2-03	CAL 2	3	4	5	1
Frontrunner	Hamburg	MAN-C-2-04	CAL 1	3	4	3	-1
Frontrunner	Hamburg	MAN-C-3-01	CAL 1	3	4	5	1
Frontrunner	Hamburg	MAN-C-3-01	CAL 2	3	4	5	1
Frontrunner	Hamburg	MAN-C-3-01	CAL 3	3	4	5	1
Frontrunner	Hamburg	MAN-D-1-02	CAL 1	3	4	3	-1
Frontrunner	Hamburg	MAN-D-1-02	CAL 2	3	4	3	-1
Frontrunner	Hamburg	MAN-D-1-02	CAL 3	3	4	3	-1
Frontrunner	Hamburg	MAN-D-2-02	CAL 1	3	4	3	-1

				EXPOST ANALYSIS			
City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
Frontrunner	Hamburg	MAN-D-2-05	CAL 1	3	4	n/a	n/a
Frontrunner	Hamburg	MAN-D-3-01	CAL 3	3	4	5	1
Frontrunner	Hamburg	MAN-D-3-02	CAL 1	3	4	5	1
Frontrunner	Hamburg	MAN-D-3-02	CAL 3	3	4	4	0
Frontrunner	Hamburg	MAN-D-3-03	CAL 1	3	4	4	0
Frontrunner	Hamburg	MAN-D-3-03	CAL 2	3	4	3	-1
Frontrunner	Hamburg	MAN-D-3-03	CAL 3	3	4	4	0
Frontrunner	Hamburg	MAN-E-1-01	CAL 1	2	3	4	1
Frontrunner	Hamburg	MAN-E-1-01	CAL 3	3	5	4	-1
Frontrunner	Hamburg	MAN-E-1-02	CAL 1	3	4	4	0
Frontrunner	Hamburg	MAN-E-1-02	CAL 3	2	4	4	0
Frontrunner	Hamburg	MAN-E-2-01	CAL 1	3	4	4	0
Frontrunner	Hamburg	MAN-E-2-01	CAL 3	2	3	3	0
Frontrunner	Hamburg	MAN-E-2-02	CAL 1	1	2	3	1
Frontrunner	Hamburg	MAN-E-2-02	CAL 2	4	5	3	-2
Frontrunner	Hamburg	MAN-E-2-02	CAL 3	1	5	5	0
Frontrunner	Hamburg	MAN-E-2-04	CAL 1	2	3	4	1
Frontrunner	Hamburg	MAN-E-2-04	CAL 3	3	5	5	0
Frontrunner	Hamburg	MAN-E-2-05	CAL 1	3	4	4	0
Frontrunner	Hamburg	MAN-E-2-05	CAL 2	3	4	3	-1
Frontrunner	Hamburg	MAN-E-2-05	CAL 3	2	3	5	2
Frontrunner	Hamburg	MAN-E-2-06	CAL 1	1	2	2	0
Frontrunner	Hamburg	MAN-E-2-06	CAL 2	3	4	3	-1
Frontrunner	Hamburg	MAN-E-2-06	CAL 3	1	2	2	0
Frontrunner	Hamburg	MAN-E-2-07	CAL 1	2	4	3	-1
Frontrunner	Hamburg	MAN-E-2-07	CAL 3	2	3	3	0
Frontrunner	Hamburg	MAN-E-2-08	CAL 1	2	3	3	0
Frontrunner	Hamburg	MAN-E-2-08	CAL 2	3	4	5	1
Frontrunner	Hamburg	MAN-E-2-08	CAL 3	2	3	4	1
Frontrunner	Hamburg	MAN-E-2-09	CAL 1	2	3	4	1
Frontrunner	Hamburg	MAN-E-2-09	CAL 2	4	5	5	0
Frontrunner	Hamburg	MAN-E-2-09	CAL 3	3	4	5	1
Frontrunner	Hamburg	MAN-E-3-01	CAL 1	1	2	2	0

City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
			EXPOST ANALYSIS				
Frontrunner	Hamburg	MAN-E-3-01	CAL 3	2	4	3	-1
Frontrunner	Hamburg	MAN-E-3-02	CAL 1	2	3	3	0
Frontrunner	Hamburg	MAN-E-3-02	CAL 2	3	4	4	0
Frontrunner	Hamburg	MAN-E-3-02	CAL 3	2	3	3	0
Frontrunner	Hamburg	MAN-E-3-03	CAL 1	2	3	3	0
Frontrunner	Hamburg	MAN-E-3-03	CAL 2	4	5	5	0
Frontrunner	Hamburg	MAN-E-3-03	CAL 3	1	2	2	0
Frontrunner	Hamburg	MAN-E-4-01	CAL 1	3	4	3	-1
Frontrunner	Hamburg	MAN-E-4-01	CAL 2	3	4	5	1
Frontrunner	Hamburg	MAN-E-4-01	CAL 3	3	5	4	-1
Frontrunner	Hamburg	MAN-E-4-02	CAL 1	2	3	2	-1
Frontrunner	Hamburg	MAN-E-4-02	CAL 3	1	2	2	0
Frontrunner	Hamburg	MAN-E-4-03	CAL 1	3	4	5	1
Frontrunner	Hamburg	MAN-E-4-03	CAL 2	4	5	3	-2
Frontrunner	Hamburg	MAN-E-4-03	CAL 3	2	3	3	0
Frontrunner	Hamburg	MAN-E-4-04	CAL 1	3	4	5	1
Frontrunner	Hamburg	MAN-E-4-04	CAL 2	3	4	5	1
Frontrunner	Hamburg	MAN-E-4-04	CAL 3	1	2	5	3
Frontrunner	Hamburg	MAN-E-4-05	CAL 1	1	2	1	-1
Frontrunner	Hamburg	MAN-E-4-05	CAL 3	1	2	2	0
Frontrunner	Hamburg	MAT-A-1-02	CAL 2	2	4	5	1
Frontrunner	Hamburg	MAT-A-1-03	CAL 2	2	3	3	0
Frontrunner	Hamburg	MAT-A-1-05	CAL 1	3	4	5	1
Frontrunner	Hamburg	MAT-A-1-05	CAL 2	3	4	5	1
Frontrunner	Hamburg	MAT-A-2-01	CAL 2	3	4	4	0
Frontrunner	Hamburg	MAT-B-1-01	CAL 1	2	4	4	0
Frontrunner	Hamburg	MAT-B-1-01	CAL 2	3	4	4	0
Frontrunner	Hamburg	MAT-B-1-01	CAL 3	3	4	5	1
Frontrunner	Hamburg	MAT-B-1-04	CAL 1	3	4	5	1
Frontrunner	Hamburg	MAT-B-1-05	CAL 1	2	4	5	1
Frontrunner	Hamburg	MAT-B-2-02	CAL 1	3	4	3	-1
Frontrunner	Hamburg	MAT-B-2-02	CAL 3	3	4		-4
Frontrunner	Hamburg	MAT-B-2-03	CAL 1	3	4	5	1

EXPOST ANALYSIS							
City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
Frontrunner	Hamburg	MAT-B-2-04	CAL 3	3	4	4	0
Frontrunner	Hamburg	MAT-B-2-05	CAL 1	3	4	5	1
Frontrunner	Hamburg	MAT-B-2-05	CAL 3	3	4	5	1
Frontrunner	Hamburg	MAT-C-1-01	CAL 2	2	3	5	2
Frontrunner	Hamburg	MAT-C-1-02	CAL 2	2	3	3	0
Frontrunner	Hamburg	MET-A-1-01	CAL 2	2	4	4	0
Frontrunner	Hamburg	MET-A-2-01	CAL 2	2	4	4	0
Frontrunner	Hamburg	MET-A-2-02	CAL 2	2	4	3	-1
Frontrunner	Hamburg	MET-A-3-01	CAL 3	3	4	3	-1
Frontrunner	Hamburg	MET-A-3-02	CAL 1	3	4	5	1
Frontrunner	Hamburg	MET-A-3-02	CAL 3	3	4	3	-1
Frontrunner	Hamburg	MET-B-1-01	CAL 1	2	4	3	-1
Frontrunner	Hamburg	MET-B-1-01	CAL 2	3	4	3	-1
Frontrunner	Hamburg	MET-B-1-01	CAL 3	3	4	3	-1
Frontrunner	Hamburg	MET-B-1-02	CAL 1	3	4	3	-1
Frontrunner	Hamburg	MET-B-1-02	CAL 3	3	4	3	-1
Frontrunner	Hamburg	MET-B-1-03	CAL 1	3	4	5	1
Frontrunner	Hamburg	MET-B-1-03	CAL 2	3	4	2	-2
Frontrunner	Hamburg	MET-B-1-03	CAL 3	3	4	5	1
Frontrunner	Hamburg	MET-B-2-01	CAL 1	3	4	4	0
Frontrunner	Hamburg	MET-B-2-01	CAL 3	3	4	4	0
Frontrunner	Hamburg	MET-B-2-02	CAL 1	3	4	4	0
Frontrunner	Hamburg	MET-B-2-02	CAL 2	3	4	3	-1
Frontrunner	Hamburg	MET-B-2-02	CAL 3	3	4	4	0
Frontrunner	Hamburg	MET-B-2-03	CAL 1	1	2	5	3
Frontrunner	Hamburg	MET-B-2-03	CAL 2	2	3	3	0
Frontrunner	Hamburg	MET-B-2-03	CAL 3	3	4	4	0
Frontrunner	Hamburg	MET-B-2-04	CAL 1	1	2	2	0
Frontrunner	Hamburg	MET-B-2-04	CAL 3	3	4	4	0
Frontrunner	Hamburg	MET-B-3-03	CAL 1	3	4	3	-1
Frontrunner	Hamburg	MET-B-3-03	CAL 2	2	4	5	1
Frontrunner	Hamburg	MET-B-3-04	CAL 1	3	4	4	0
Frontrunner	Hamburg	MET-B-3-06	CAL 1	3	4	4	0

EXPOST ANALYSIS							
City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
Frontrunner	Hamburg	MET-B-3-06	CAL 2	3	4	2	-2
Frontrunner	Hamburg	MET-B-3-06	CAL 3	3	4	4	0
Frontrunner	Hamburg	MET-B-3-07	CAL 3	3	4	4	0
Frontrunner	Hamburg	MET-B-3-08	CAL 1	3	4	4	0
Frontrunner	Hamburg	MET-B-3-08	CAL 2	3	4	5	1
Frontrunner	Hamburg	MET-B-3-08	CAL 3	3	4	4	0
Frontrunner	Hamburg	MET-B-3-09	CAL 2	2	3	5	2
Frontrunner	Hamburg	MET-B-3-10	CAL 1	3	4	3	-1
Frontrunner	Hamburg	MET-B-3-10	CAL 2	3	4	3	-1
Frontrunner	Hamburg	MET-B-3-11	CAL 2	2	3	3	0
Frontrunner	Hamburg	MON-A-1-01	CAL 1	1	3	3	0
Frontrunner	Hamburg	MON-A-1-01	CAL 2	1	3	3	0
Frontrunner	Hamburg	MON-A-1-01	CAL 3	1	3	4	1
Frontrunner	Hamburg	MON-B-1-01	CAL 1	3	4	5	1
Frontrunner	Hamburg	MON-B-1-02	CAL 2	2	4	4	0
Frontrunner	Hamburg	MON-B-1-05	CAL 1	2	5	3	-2
Frontrunner	Hamburg	MON-B-1-05	CAL 3	3	4	4	0
Frontrunner	Hamburg	MON-C-1-07	CAL 1	3	5	5	0
Frontrunner	London	MAN-A-1-05	CAL 1	3	4	3	-1
Frontrunner	London	MAN-A-1-05	CAL 2	3	4	4	0
Frontrunner	London	MAN-A-1-05	CAL 3	3	4	3	-1
Frontrunner	London	MAN-B-1-01	CAL 1	2	3	4	1
Frontrunner	London	MAN-B-1-01	CAL 2	2	3	4	1
Frontrunner	London	MAN-B-1-01	CAL 3	2	3	4	1
Frontrunner	London	MAN-B-2-01	CAL 1	3	5	5	0
Frontrunner	London	MAN-B-2-01	CAL 2	3	5	5	0
Frontrunner	London	MAN-B-2-01	CAL 3	3	5	4	-1
Frontrunner	London	MAN-B-2-02	CAL 1	3	5	5	0
Frontrunner	London	MAN-B-2-02	CAL 2	3	5	5	0
Frontrunner	London	MAN-B-2-02	CAL 3	3	5	3	-2
Frontrunner	London	MAN-B-2-05	CAL 1	2	5	5	0
Frontrunner	London	MAN-B-2-05	CAL 2	2	5	5	0
Frontrunner	London	MAN-B-2-05	CAL 3	2	5	3	-2

City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
			EXPOST ANALYSIS				
Frontrunner	London	MAN-C-1-01	CAL 1	2	3	5	2
Frontrunner	London	MAN-C-1-01	CAL 2	2	3	5	2
Frontrunner	London	MAN-C-1-01	CAL 3	2	3	5	2
Frontrunner	London	MAN-C-2-01	CAL 1	2	5	5	0
Frontrunner	London	MAN-C-2-01	CAL 2	2	5	5	0
Frontrunner	London	MAN-C-2-01	CAL 3	2	5	5	0
Frontrunner	London	MAN-C-2-02	CAL 1	1	3	5	2
Frontrunner	London	MAN-C-2-02	CAL 2	1	3	5	2
Frontrunner	London	MAN-C-2-02	CAL 3	1	3	5	2
Frontrunner	London	MAN-C-3-01	CAL 1	1	5	5	0
Frontrunner	London	MAN-C-3-01	CAL 2	1	5	5	0
Frontrunner	London	MAN-C-3-01	CAL 3	1	5	5	0
Frontrunner	London	MAN-D-2-01	CAL 1	3	4	n/a	n/a
Frontrunner	London	MAN-D-2-01	CAL 2	3	4	4	0
Frontrunner	London	MAN-D-2-01	CAL 3	3	4	n/a	n/a
Frontrunner	London	MAN-D-2-05	CAL 1	3	5	5	0
Frontrunner	London	MAN-D-2-05	CAL 2	3	5	5	0
Frontrunner	London	MAN-D-2-05	CAL 3	3	5	4	-1
Frontrunner	London	MAN-E-1-01	CAL 1	1	3	4	1
Frontrunner	London	MAN-E-1-01	CAL 2	1	3	4	1
Frontrunner	London	MAN-E-1-01	CAL 3	1	3	4	1
Frontrunner	London	MAN-E-1-02	CAL 1	1	3	4	1
Frontrunner	London	MAN-E-1-02	CAL 2	1	3	4	1
Frontrunner	London	MAN-E-1-02	CAL 3	1	3	5	2
Frontrunner	London	MAN-E-2-01	CAL 1	2	3	4	1
Frontrunner	London	MAN-E-2-01	CAL 2	2	3	4	1
Frontrunner	London	MAN-E-2-01	CAL 3	2	3	3	0
Frontrunner	London	MAN-E-2-02	CAL 1	1	2	2	0
Frontrunner	London	MAN-E-2-02	CAL 2	1	2	3	1
Frontrunner	London	MAN-E-2-02	CAL 3	1	2	4	2
Frontrunner	London	MAN-E-2-04	CAL 1	2	3	3	0
Frontrunner	London	MAN-E-2-04	CAL 2	2	3	3	0
Frontrunner	London	MAN-E-2-04	CAL 3	2	3	3	0

City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
			EXPOST ANALYSIS				
Frontrunner	London	MAN-E-2-05	CAL 1	1	3	3	0
Frontrunner	London	MAN-E-2-05	CAL 2	1	3	4	1
Frontrunner	London	MAN-E-2-05	CAL 3	1	3	4	1
Frontrunner	London	MAN-E-2-06	CAL 1	1	3	4	1
Frontrunner	London	MAN-E-2-06	CAL 2	1	3	4	1
Frontrunner	London	MAN-E-2-06	CAL 3	1	3	4	1
Frontrunner	London	MAN-E-2-08	CAL 1	1	3	3	0
Frontrunner	London	MAN-E-2-08	CAL 2	1	3	3	0
Frontrunner	London	MAN-E-2-08	CAL 3	1	3	3	0
Frontrunner	London	MAN-E-2-09	CAL 1	1	3	5	2
Frontrunner	London	MAN-E-2-09	CAL 2	1	3	5	2
Frontrunner	London	MAN-E-2-09	CAL 3	1	3	5	2
Frontrunner	London	MAN-E-3-01	CAL 1	1	3	3	0
Frontrunner	London	MAN-E-3-01	CAL 2	1	3	3	0
Frontrunner	London	MAN-E-3-01	CAL 3	1	3	4	1
Frontrunner	London	MAN-E-3-02	CAL 1	1	2	4	2
Frontrunner	London	MAN-E-3-02	CAL 2	1	2	4	2
Frontrunner	London	MAN-E-4-01	CAL 1	1	2	2	0
Frontrunner	London	MAN-E-4-01	CAL 2	1	2	3	1
Frontrunner	London	MAN-E-4-01	CAL 3	1	3	4	1
Frontrunner	London	MAN-E-4-03	CAL 1	1	3	3	0
Frontrunner	London	MAN-E-4-03	CAL 2	1	3	4	1
Frontrunner	London	MAN-E-4-03	CAL 3	1	3	4	1
Frontrunner	London	MAN-E-4-04	CAL 1	1	3	3	0
Frontrunner	London	MAN-E-4-04	CAL 2	1	3	3	0
Frontrunner	London	MAT-B-1-01	CAL 1	1	4	4	0
Frontrunner	London	MAT-B-1-01	CAL 2	1	4	4	0
Frontrunner	London	MAT-B-1-01	CAL 3	1	4	4	0
Frontrunner	London	MAT-B-2-02	CAL 1	2	5	5	0
Frontrunner	London	MAT-B-2-02	CAL 2	2	5	n/a	n/a
Frontrunner	London	MAT-B-2-02	CAL 3	2	5	5	0
Frontrunner	London	MAT-B-2-06	CAL 1	1	5	3	-2
Frontrunner	London	MAT-B-2-06	CAL 2	1	5	3	-2

			EXPOST ANALYSIS				
City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
Frontrunner	London	MAT-B-2-06	CAL 3	1	5	5	0
Frontrunner	London	MAT-C-1-01	CAL 1	1	5	5	0
Frontrunner	London	MAT-C-1-01	CAL 2	1	5	5	0
Frontrunner	London	MAT-C-1-01	CAL 3	1	5	n/a	n/a
Frontrunner	London	MAT-C-1-03	CAL 1	2	5	5	0
Frontrunner	London	MAT-C-1-03	CAL 2	2	5	5	0
Frontrunner	London	MAT-C-1-03	CAL 3	2	5	n/a	n/a
Frontrunner	London	MET-A-1-01	CAL 1	3	5	5	0
Frontrunner	London	MET-A-1-01	CAL 2	3	5	5	0
Frontrunner	London	MET-A-1-01	CAL 3	3	5	5	0
Frontrunner	London	MET-A-3-01	CAL 1	2	5	4	-1
Frontrunner	London	MET-A-3-01	CAL 2	2	5	4	-1
Frontrunner	London	MET-A-3-01	CAL 3	2	5	4	-1
Frontrunner	London	MET-B-1-01	CAL 1	2	5	5	0
Frontrunner	London	MET-B-1-01	CAL 2	2	5	5	0
Frontrunner	London	MET-B-1-01	CAL 3	2	5	5	0
Frontrunner	London	MET-B-1-03	CAL 1	2	5	5	0
Frontrunner	London	MET-B-1-03	CAL 2	2	5	5	0
Frontrunner	London	MET-B-1-03	CAL 3	2	5	5	0
Frontrunner	London	MET-B-2-01	CAL 1	1	5	5	0
Frontrunner	London	MET-B-2-01	CAL 2	1	5	5	0
Frontrunner	London	MET-B-2-01	CAL 3	1	5	5	0
Frontrunner	London	MET-B-2-02	CAL 1	1	5	5	0
Frontrunner	London	MET-B-2-02	CAL 2	1	5	5	0
Frontrunner	London	MET-B-2-02	CAL 3	1	5	5	0
Frontrunner	London	MET-B-2-04	CAL 1	2	4	4	0
Frontrunner	London	MET-B-2-04	CAL 2	2	4	4	0
Frontrunner	London	MET-B-2-04	CAL 3	2	4	5	1
Frontrunner	London	MET-B-3-03	CAL 1	2	5	5	0
Frontrunner	London	MET-B-3-03	CAL 2	2	5	5	0
Frontrunner	London	MET-B-3-03	CAL 3	2	5	5	0
Frontrunner	London	MET-B-3-04	CAL 1	2	5	4	-1
Frontrunner	London	MET-B-3-04	CAL 2	2	5	4	-1

				EXPOST ANALYSIS			
City type	**City**	**CAL**	**Code**	**IRL present**	**IRL expected**	**Final IRL**	**IRL difference**
Frontrunner	London	MET-B-3-04	CAL 3	2	5	5	0
Frontrunner	London	MET-B-3-06	CAL 1	2	5	5	0
Frontrunner	London	MET-B-3-06	CAL 2	2	5	5	0
Frontrunner	London	MET-B-3-06	CAL 3	2	5	5	0
Frontrunner	London	MON-A-1-02	CAL 1	2	5	3	-2
Frontrunner	London	MON-A-1-02	CAL 2	2	5	3	-2
Frontrunner	London	MON-A-1-02	CAL 3	2	5	3	-2
Frontrunner	London	MON-A-2-02	CAL 1	2	5	3	-2
Frontrunner	London	MON-A-2-02	CAL 2	2	5	3	-2
Frontrunner	London	MON-A-2-02	CAL 3	2	5	4	-1
Frontrunner	London	MON-A-2-06	CAL 1	2	3	3	0
Frontrunner	London	MON-A-2-06	CAL 2	2	3	3	0
Frontrunner	London	MON-A-2-06	CAL 3	2	3	3	0
Frontrunner	London	MON-A-3-01	CAL 1	2	5	5	0
Frontrunner	London	MON-A-3-01	CAL 2	2	5	5	0
Frontrunner	London	MON-A-3-01	CAL 3	2	5	5	0
Frontrunner	London	MON-A-3-02	CAL 1	2	3	3	0
Frontrunner	London	MON-A-3-02	CAL 2	2	3	3	0
Frontrunner	London	MON-A-3-02	CAL 3	2	3	3	0
Frontrunner	London	MON-A-3-04	CAL 1	2	3	3	0
Frontrunner	London	MON-A-3-04	CAL 2	2	3	3	0
Frontrunner	London	MON-A-3-04	CAL 3	2	3	3	0
Frontrunner	London	MON-B-1-01	CAL 1	2	3	2	-1
Frontrunner	London	MON-B-1-01	CAL 2	2	3	2	-1
Frontrunner	London	MON-B-1-01	CAL 3	2	3	3	0
Frontrunner	London	MON-B-1-02	CAL 1	4	5	2	-3
Frontrunner	London	MON-B-1-02	CAL 2	4	5	2	-3
Frontrunner	London	MON-B-1-02	CAL 3	4	5	2	-3
Frontrunner	London	MON-B-1-05	CAL 1	2	3	4	1
Frontrunner	London	MON-B-1-05	CAL 2	2	3	4	1
Frontrunner	London	MON-B-1-05	CAL 3	2	3	4	1
Frontrunner	London	MON-B-2-02	CAL 1	4	5	4	-1
Frontrunner	London	MON-B-2-02	CAL 2	4	5	4	-1

City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
		EXPOST ANALYSIS					
Frontrunner	London	MON-B-2-02	CAL 3	4	5	4	-1
Frontrunner	London	MON-C-1-03	CAL 1	3	4	3	-1
Frontrunner	London	MON-C-1-03	CAL 2	3	4	3	-1
Frontrunner	London	MON-C-1-03	CAL 3	3	4	3	-1
Frontrunner	London	MON-C-1-07	CAL 1	4	5	5	0
Frontrunner	London	MON-C-1-07	CAL 2	4	5	5	0
Frontrunner	London	MON-C-1-07	CAL 3	4	5	5	0
Frontrunner	Millan	MON-C-1-07	CAL 1	3	4	4	0
Frontrunner	Millan	MON-C-1-07	CAL 2	2	3	3	0
Frontrunner	Millan	MAN-A-1-02	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-A-1-03	CAL 1	2	3	4	1
Frontrunner	Millan	MAN-A-1-04	CAL 1	3	4	3	-1
Frontrunner	Millan	MAN-A-1-04	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-A-1-07	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-A-2-01	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-A-2-03	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-A-2-03	CAL 2	2	3	3	0
Frontrunner	Millan	MAN-A-2-03	CAL 3	3	4	4	0
Frontrunner	Millan	MAN-A-2-04	CAL 1	3	4	5	1
Frontrunner	Millan	MAN-A-2-05	CAL 1	2	3	4	1
Frontrunner	Millan	MAN-A-2-05	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-A-2-05	CAL 3	3	4	4	0
Frontrunner	Millan	MAN-A-2-06	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-B-1-01	CAL 1	2	3	4	1
Frontrunner	Millan	MAN-B-1-01	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-B-2-01	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-B-2-02	CAL 1	2	3	4	1
Frontrunner	Millan	MAN-B-2-03	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-B-2-03	CAL 2	2	3	3	0
Frontrunner	Millan	MAN-B-2-04	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-C-1-01	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-C-1-02	CAL 1	2	3	2	-1
Frontrunner	Millan	MAN-C-1-02	CAL 2	1	2	2	0

City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
		EXPOST ANALYSIS					
Frontrunner	Millan	MAN-C-1-03	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-C-1-03	CAL 2	1	2	2	0
Frontrunner	Millan	MAN-C-2-01	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-C-2-01	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-C-2-02	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-C-2-02	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-C-2-03	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-C-2-03	CAL 2	no	no	n/a	n/a
Frontrunner	Millan	MAN-C-2-04	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-C-2-04	CAL 2	4	5	5	0
Frontrunner	Millan	MAN-C-3-01	CAL 1	2	3	4	1
Frontrunner	Millan	MAN-C-3-01	CAL 2	4	4	4	0
Frontrunner	Millan	MAN-C-3-01	CAL 3	3	4	4	0
Frontrunner	Millan	MAN-D-1-01	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-D-1-02	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-D-1-02	CAL 2	2	3	3	0
Frontrunner	Millan	MAN-D-1-02	CAL 3	3	4	4	0
Frontrunner	Millan	MAN-D-2-03	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-D-2-04	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-D-2-05	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-D-2-05	CAL 2	2	3	3	0
Frontrunner	Millan	MAN-D-3-01	CAL 3	3	4	4	0
Frontrunner	Millan	MAN-D-3-02	CAL 1	3	4	3	-1
Frontrunner	Millan	MAN-D-3-03	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-D-3-03	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-D-3-05	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-D-4-02	CAL 2	2	3	3	0
Frontrunner	Millan	MAN-E-1-01	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-E-1-01	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-E-1-02	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-E-1-02	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-E-1-02	CAL 3	3	4	4	0
Frontrunner	Millan	MAN-E-2-01	CAL 1	3	4	4	0

City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
Frontrunner	Millan	MAN-E-2-01	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-E-2-02	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-E-2-02	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-E-2-02	CAL 3	3	4	4	0
Frontrunner	Millan	MAN-E-2-04	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-E-2-04	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-E-2-05	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-E-2-05	CAL 3	3	4	4	0
Frontrunner	Millan	MAN-E-2-07	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-E-2-07	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-E-2-07	CAL 3	3	4	4	0
Frontrunner	Millan	MAN-E-2-08	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-E-2-09	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-E-2-09	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-E-2-09	CAL 3	3	4	4	0
Frontrunner	Millan	MAN-E-3-01	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-E-3-01	CAL 2	3	5	5	0
Frontrunner	Millan	MAN-E-3-02	CAL 1	3	4	3	-1
Frontrunner	Millan	MAN-E-3-03	CAL 1	3	4	3	-1
Frontrunner	Millan	MAN-E-3-03	CAL 2	2	3	3	0
Frontrunner	Millan	MAN-E-4-01	CAL 1	3	4	4	0
Frontrunner	Millan	MAN-E-4-01	CAL 2	3	4	4	0
Frontrunner	Millan	MAN-E-4-02	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-E-4-03	CAL 1	2	3	3	0
Frontrunner	Millan	MAN-E-4-03	CAL 2	2	3	3	0
Frontrunner	Millan	MAN-E-4-04	CAL 1	1	3	4	1
Frontrunner	Millan	MAN-E-4-04	CAL 3	3	4	4	0
Frontrunner	Millan	MAN-E-4-05	CAL 1	3	4	4	0
Frontrunner	Millan	MAT-A-1-02	CAL 1	3	4	4	0
Frontrunner	Millan	MAT-A-1-05	CAL 1	3	4	4	0
Frontrunner	Millan	MAT-A-2-01	CAL 1	3	4	5	1
Frontrunner	Millan	MAT-A-2-01	CAL 3	3	4	4	0
Frontrunner	Millan	MAT-A-2-02	CAL 3	3	4	4	0

EXPOST ANALYSIS							
City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
Frontrunner	Millan	MAT-A-2-03	CAL 1	3	4	5	1
Frontrunner	Millan	MAT-A-2-03	CAL 2	4	5	5	0
Frontrunner	Millan	MAT-A-2-03	CAL 3	3	4	4	0
Frontrunner	Millan	MAT-B-1-05	CAL 2	3	4	4	0
Frontrunner	Millan	MAT-B-2-02	CAL 2	3	4	4	0
Frontrunner	Millan	MAT-B-2-03	CAL 2	3	4	4	0
Frontrunner	Millan	MAT-B-2-05	CAL 2	3	4	4	0
Frontrunner	Millan	MAT-B-2-06	CAL 2	3	5	5	0
Frontrunner	Millan	MAT-B-2-06	CAL 3	3	4	4	0
Frontrunner	Millan	MAT-C-1-01	CAL 3	3	4	4	0
Frontrunner	Millan	MAT-C-1-02	CAL 3	3	4	4	0
Frontrunner	Millan	MET-A-2-02	CAL 1	2	3	2	-1
Frontrunner	Millan	MET-A-2-02	CAL 2	3	4	4	0
Frontrunner	Millan	MET-A-2-02	CAL 3	3	4	4	0
Frontrunner	Millan	MET-A-3-01	CAL 2	no	no	n/a	n/a
Frontrunner	Millan	MET-A-3-02	CAL 3	3	4	4	0
Frontrunner	Millan	MET-A-3-03	CAL 2	2	4	4	0
Frontrunner	Millan	MET-B-1-01	CAL 1	3	4	4	0
Frontrunner	Millan	MET-B-1-01	CAL 2	3	4	4	0
Frontrunner	Millan	MET-B-1-01	CAL 3	3	4	4	0
Frontrunner	Millan	MET-B-1-02	CAL 1	3	4	3	-1
Frontrunner	Millan	MET-B-1-02	CAL 3	3	4	4	0
Frontrunner	Millan	MET-B-2-01	CAL 1	3	4	4	0
Frontrunner	Millan	MET-B-2-01	CAL 2	3	4	4	0
Frontrunner	Millan	MET-B-2-02	CAL 1	3	4	4	0
Frontrunner	Millan	MET-B-2-02	CAL 2	3	4	4	0
Frontrunner	Millan	MET-B-2-02	CAL 3	3	4	4	0
Frontrunner	Millan	MET-B-2-03	CAL 1	3	4	4	0
Frontrunner	Millan	MET-B-2-03	CAL 2	3	4	4	0
Frontrunner	Millan	MET-B-3-01	CAL 1	3	4	4	0
Frontrunner	Millan	MET-B-3-02	CAL 1	3	4	4	0
Frontrunner	Millan	MET-B-3-02	CAL 2	3	4	4	0
Frontrunner	Millan	MET-B-3-02	CAL 3	3	4	4	0

				EXPOST ANALYSIS			
City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
Frontrunner	Millan	MET-B-3-03	CAL 1	3	4	4	0
Frontrunner	Millan	MET-B-3-03	CAL 2	3	4	4	0
Frontrunner	Millan	MET-B-3-04	CAL 1	3	4	4	0
Frontrunner	Millan	MET-B-3-04	CAL 2	3	5	5	0
Frontrunner	Millan	MET-B-3-06	CAL 1	3	4	5	1
Frontrunner	Millan	MET-B-3-06	CAL 2	3	4	4	0
Frontrunner	Millan	MET-B-3-06	CAL 3	4	5	5	0
Frontrunner	Millan	MET-B-3-07	CAL 1	3	4	4	0
Frontrunner	Millan	MET-B-3-08	CAL 1	3	4	4	0
Frontrunner	Millan	MET-B-3-08	CAL 2	3	5	5	0
Frontrunner	Millan	MET-B-3-08	CAL 3	3	4	4	0
Frontrunner	Millan	MET-B-3-09	CAL 3	3	4	4	0
Frontrunner	Millan	MET-B-3-09	CAL 1	3	4	4	0
Frontrunner	Millan	MET-B-3-11	CAL 1	3	4	4	0
Frontrunner	Millan	MON-A-1-01	CAL 1	3	5	4	-1
Frontrunner	Millan	MON-A-1-01	CAL 2	3	5	5	0
Frontrunner	Millan	MON-A-1-01	CAL 3	3	5	5	0
Frontrunner	Millan	MON-A-2-02	CAL 1	4	5	4	-1
Frontrunner	Millan	MON-A-2-02	CAL 2	4	5	5	0
Frontrunner	Millan	MON-A-2-02	CAL 3	4	5	5	0
Frontrunner	Millan	MON-A-2-06	CAL 1	3	4	4	0
Frontrunner	Millan	MON-A-2-06	CAL 2	3	4	4	0
Frontrunner	Millan	MON-A-2-06	CAL 3	3	4	4	0
Frontrunner	Millan	MON-A-3-02	CAL 1	4	5	5	0
Frontrunner	Millan	MON-A-3-02	CAL 2	4	5	5	0
Frontrunner	Millan	MON-A-3-02	CAL 3	4	5	5	0
Frontrunner	Millan	MON-B-1-02	CAL 1	4	5	5	0
Frontrunner	Millan	MON-B-1-02	CAL 3	4	5	5	0
Frontrunner	Millan	MON-B-1-04	CAL 1	4	5	5	0
Frontrunner	Millan	MON-B-2-02	CAL 1	4	5	5	0
Frontrunner	Millan	MON-B-2-02	CAL 2	4	5	5	0
Frontrunner	Millan	MON-B-2-02	CAL 3	4	5	5	0
Frontrunner	Millan	MON-C-1-03	CAL 1	3	4	4	0

City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
				EXPOST ANALYSIS			
Frontrunner	Millan	MON-C-1-03	CAL 2	3	4	4	0
Frontrunner	Millan	MON-C-1-03	CAL 3	3	4	4	0
Frontrunner	Millan	MON-C-1-04	CAL 1	3	5	4	-1
Frontrunner	Millan	MON-C-1-04	CAL 2	3	5	5	0
Frontrunner	Millan	MON-C-1-04	CAL 3	3	5	5	0
Frontrunner	Millan	MON-C-1-05	CAL 1	3	4	4	0
Fellow	Belgrade	MAN-A-1-01	CAL	1	4	4	0
Fellow	Belgrade	MAN-A-1-03	CAL	1	2	2	0
Fellow	Belgrade	MAN-A-1-09	CAL	3	4	4	0
Fellow	Belgrade	MAN-A-2-01	CAL	2	3	3	0
Fellow	Belgrade	MAN-A-2-03	CAL	2	3	3	0
Fellow	Belgrade	MAN-C-3-01	CAL	1	3	4	1
Fellow	Belgrade	MAN-D-3-01	CAL	1	3	3	0
Fellow	Belgrade	MAN-D-3-02	CAL	2	3	3	0
Fellow	Belgrade	MAN-E-1-01	CAL	2	4	4	0
Fellow	Belgrade	MAN-E-1-02	CAL	2	3	3	0
Fellow	Belgrade	MAN-E-4-01	CAL	1	3	3	0
Fellow	Belgrade	MAN-E-4-03	CAL	1	4	4	0
Fellow	Belgrade	MAN-E-4-04	CAL	1	3	3	0
Fellow	Belgrade	MAN-E-4-05	CAL	1	4	4	0
Fellow	Larissa	MAT-A-1-02	CAL	1	2	2	0
Fellow	Larissa	MAT-A-1-03	CAL	1	2	2	0
Fellow	Larissa	MAN-A-2-03	CAL	1	4	2	-2
Fellow	Larissa	MAN-A-2-05	CAL	1	2	2	0
Fellow	Larissa	MAN-C-1-03	CAL	2	5	2	-3
Fellow	Larissa	MAN-C-3-01	CAL	1	2	2	0
Fellow	Larissa	MAN-D-2-05	CAL	1	2	2	0
Fellow	Larissa	MAN-D-3-01	CAL	1	2	1	-1
Fellow	Larissa	MAN-E-1-01	CAL	1	4	4	0
Fellow	Larissa	MAN-E-2-01	CAL	2	4	4	0
Fellow	Larissa	MAN-E-2-04	CAL	2	4	2	-2
Fellow	Larissa	MAN-E-2-07	CAL	3	5	4	-1
Fellow	Larissa	MAN-E-2-09	CAL	1	2	2	0

City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
			EXPOST ANALYSIS				
Fellow	Larissa	MAN-E-3-01	CAL	2	4	2	-2
Fellow	Larissa	MAN-E-4-04	CAL	1	2	1	-1
Fellow	Madrid	MAN-A-1-01	CAL	1	4	2	-2
Fellow	Madrid	MAN-A-1-03	CAL	2	4	2	-2
Fellow	Madrid	MAN-A-1-04	CAL	2	4	2	-2
Fellow	Madrid	MAN-A-1-05	CAL	2	3	2	-1
Fellow	Madrid	MAN-A-1-09	CAL	2	3	2	-1
Fellow	Madrid	MAN-A-2-01	CAL	2	4	3	-1
Fellow	Madrid	MAN-A-2-02	CAL	1	2	2	0
Fellow	Madrid	MAN-A-2-03	CAL	2	4	2	-2
Fellow	Madrid	MAN-A-2-04	CAL	2	3	3	0
Fellow	Madrid	MAN-A-2-05	CAL	2	4	3	-1
Fellow	Madrid	MAN-A-2-06	CAL	2	4	3	-1
Fellow	Madrid	MAN-B-1-01	CAL	1	2	2	0
Fellow	Madrid	MAN-B-2-03	CAL	2	4	2	-2
Fellow	Madrid	MAN-B-2-05	CAL	1	2	1	-1
Fellow	Madrid	MAN-B-3-01	CAL	2	4	2	-2
Fellow	Madrid	MAN-C-1-01	CAL	2	4	3	-1
Fellow	Madrid	MAN-C-1-02	CAL	2	3	3	0
Fellow	Madrid	MAN-C-1-03	CAL	2	4	2	-2
Fellow	Madrid	MAN-C-1-04	CAL	2	3	2	-1
Fellow	Madrid	MAN-C-2-01	CAL	2	4	3	-1
Fellow	Madrid	MAN-C-2-02	CAL	2	4	3	-1
Fellow	Madrid	MAN-C-2-03	CAL	2	4	3	-1
Fellow	Madrid	MAN-C-3-01	CAL	2	4	3	-1
Fellow	Madrid	MAN-D-1-02	CAL	2	3	2	-1
Fellow	Madrid	MAN-D-2-04	CAL	1	2	3	1
Fellow	Madrid	MAN-D-2-05	CAL	1	2	3	1
Fellow	Madrid	MAN-D-3-01	CAL	2	4	3	-1
Fellow	Madrid	MAN-D-3-02	CAL	2	4	3	-1
Fellow	Madrid	MAN-D-3-03	CAL	2	3	3	0
Fellow	Madrid	MAN-D-3-04	CAL	1	2	3	1
Fellow	Madrid	MAN-D-4-01	CAL	2	4	3	-1

City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
			EXPOST ANALYSIS				
Fellow	Madrid	MAN-D-4-02	CAL	2	4	2	-2
Fellow	Madrid	MAN-D-4-03	CAL	2	3	2	-1
Fellow	Madrid	MAN-E-1-01	CAL	2	3	3	0
Fellow	Madrid	MAN-E-1-02	CAL	2	3	3	0
Fellow	Madrid	MAN-E-2-01	CAL	2	3	2	-1
Fellow	Madrid	MAN-E-2-02	CAL	1	2	2	0
Fellow	Madrid	MAN-E-2-04	CAL	2	3	2	-1
Fellow	Madrid	MAN-E-2-05	CAL	1	2	2	0
Fellow	Madrid	MAN-E-2-07	CAL	2	4	3	-1
Fellow	Madrid	MAN-E-2-09	CAL	2	4	3	-1
Fellow	Madrid	MAN-E-3-01	CAL	2	4	2	-2
Fellow	Madrid	MAN-E-3-02	CAL	2	4	3	-1
Fellow	Madrid	MAN-E-3-03	CAL	2	3	2	-1
Fellow	Madrid	MAN-E-4-01	CAL	2	4	3	-1
Fellow	Madrid	MAN-E-4-02	CAL	1	2	1	-1
Fellow	Madrid	MAN-E-4-04	CAL	1	2	1	-1
Fellow	Madrid	MAN-E-4-05	CAL	2	4	2	-2
Fellow	Malmo	MAN-A-1-01	CAL	1	2	2	0
Fellow	Malmo	MAN-A-1-03	CAL	1	2	2	0
Fellow	Malmo	MAN-A-2-01	CAL	1	2	2	0
Fellow	Malmo	MAN-A-2-04	CAL	1	2	2	0
Fellow	Malmo	MAN-A-2-06	CAL	1	2	2	0
Fellow	Malmo	MAN-C-3-01	CAL	1	2	2	0
Fellow	Malmo	MAN-D-1-01	CAL	3	4	3	-1
Fellow	Malmo	MAN-E-1-02	CAL	2	3	3	0
Fellow	Malmo	MAN-E-4-03	CAL	2	3	3	0
Fellow	Malmo	MAN-E-4-04	CAL	4	5	3	-2
Fellow	Quito	MAN-A-1-01	CAL	2	4	4	0
Fellow	Quito	MAN-A-1-02	CAL	2	3	1	-2
Fellow	Quito	MAN-A-1-03	CAL	2	3	4	1
Fellow	Quito	MAN-A-1-04	CAL	2	3	5	2
Fellow	Quito	MAN-A-1-05	CAL	1	3	5	2
Fellow	Quito	MAN-A-1-06	CAL	3	5	4	-1

City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
EXPOST ANALYSIS							
Fellow	Quito	MAN-A-1-07	CAL	4	5	5	0
Fellow	Quito	MAN-A-1-09	CAL	4	5		-5
Fellow	Quito	MAN-A-2-01	CAL	3	5	5	0
Fellow	Quito	MAN-A-2-02	CAL	3	4	3	-1
Fellow	Quito	MAN-A-2-03	CAL	1	2	2	0
Fellow	Quito	MAN-A-2-04	CAL	4	5	4	-1
Fellow	Quito	MAN-A-2-06	CAL	1	2	3	1
Fellow	Quito	MAN-B-2-03	CAL	1	2	2	0
Fellow	Quito	MAN-B-3-01	CAL	1	2	2	0
Fellow	Quito	MAN-C-1-01	CAL	4	5	4	-1
Fellow	Quito	MAN-C-1-02	CAL	4	5	4	-1
Fellow	Quito	MAN-C-1-03	CAL	4	5	5	0
Fellow	Quito	MAN-C-2-01	CAL	4	5	5	0
Fellow	Quito	MAN-C-2-02	CAL	4	5	4	-1
Fellow	Quito	MAN-C-2-03	CAL	4	5	4	-1
Fellow	Quito	MAN-C-2-04	CAL	4	5	5	0
Fellow	Quito	MAN-C-3-01	CAL	1	3	3	0
Fellow	Quito	MAN-D-1-01	CAL	1	2	2	0
Fellow	Quito	MAN-D-1-02	CAL	1	2	2	0
Fellow	Quito	MAN-D-3-01	CAL	1	2	2	0
Fellow	Quito	MAN-D-3-02	CAL	1	2	3	1
Fellow	Quito	MAN-D-3-03	CAL	1	3	3	0
Fellow	Quito	MAN-D-3-04	CAL	1	2	2	0
Fellow	Quito	MAN-D-3-05	CAL	4	5	4	-1
Fellow	Quito	MAN-E-1-01	CAL	1	2	3	1
Fellow	Quito	MAN-E-1-02	CAL	1	2	3	1
Fellow	Quito	MAN-E-2-01	CAL	1	2	4	2
Fellow	Quito	MAN-E-2-02	CAL	1	2	2	0
Fellow	Quito	MAN-E-2-04	CAL	1	2	2	0
Fellow	Quito	MAN-E-2-07	CAL	2	5	4	-1
Fellow	Quito	MAN-E-2-09	CAL	1	2	3	1
Fellow	Quito	MAN-E-3-01	CAL	1	3	3	0
Fellow	Quito	MAN-E-4-01	CAL	1	2	2	0

City type	City	CAL	Code	IRL present	IRL expected	Final IRL	IRL difference
			EXPOST ANALYSIS				
Fellow	Quito	MAN-E-4-02	CAL	1	3	2	-1
Fellow	Sfantu	MAN-A-1-01	CAL	1	2	2	0
Fellow	Sfantu	MAN-E-4-01	CAL	1	2	1	-1
Fellow	Sfantu	MAN-E-4-04	CAL	1	2	1	-1

Annex 4: Poster presented at ECCA