NATURE 4 CITIES

Be Part of the Green Transition

WP4: NBS socio-economic value assessment

NBenefit$

Event – GM7, Brussels
10 December 2019

Work Package 4 Storyline

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1 Identification of UC-ES-NBS relationships

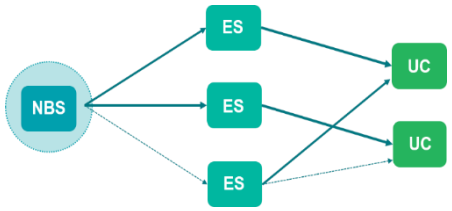
2 Identification of ES structures, processes & ES indicators

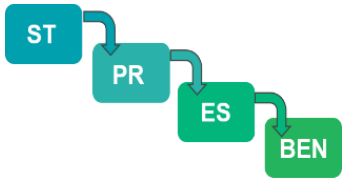
3 Representation of NBS in urban contexts

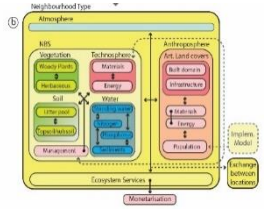
4 Accounting for life cycle costs & benefits in the NBS model

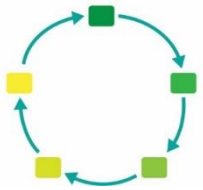
5 Development of urban NBS Models

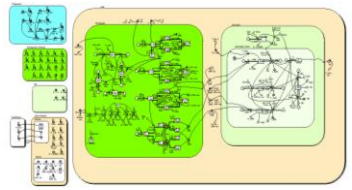
6 Development of online DST (NBenefit$)











NBenefit$

1. Basic principles observed
2. Technology concept formulated
3. Experimental proof of concept
4. Technology validation in laboratory
5. Technology validation in relevant environment
6. Demonstration in relevant environment

Technology Readiness Level (TRLs)

Work Package 4 Contents

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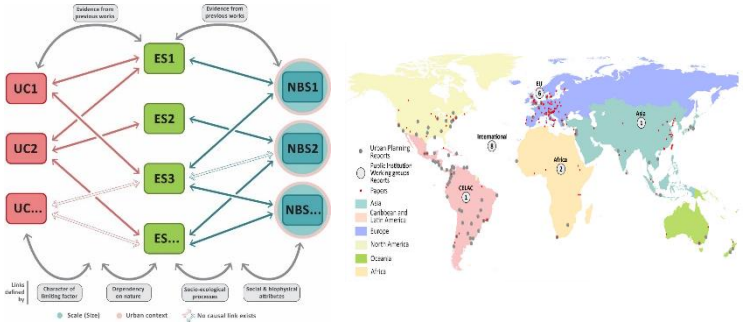
CONCEPT

1 Identification of UC-ES-NBS relationships

2 Identification of ES structures, processes & ES indicators

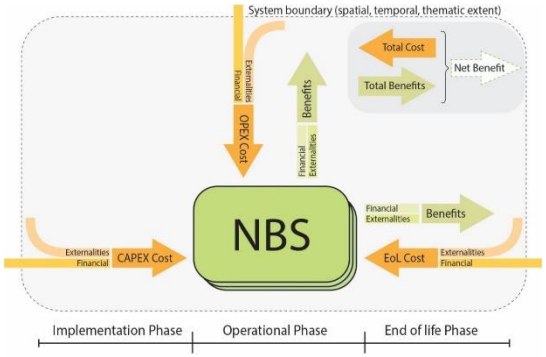


Development of a novel modelling concept and framework for the assessment of ecosystem services associated with NBS

METHODOLOGY

3 Representation of NBS in urban contexts

4 Accounting for life cycle costs & benefits in the NBS model

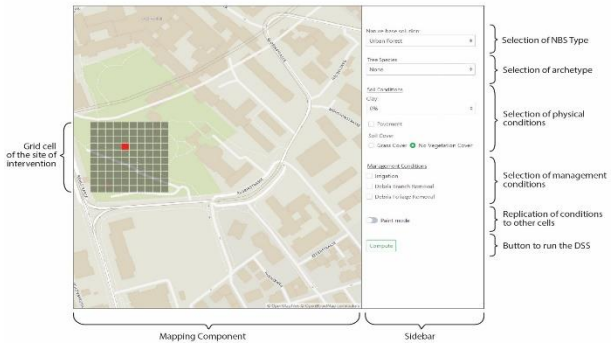


Methodology for benefits-costs analysis of NBS based on the coupling between life cycle costing (LCC) and ecosystem services assessment approaches

TOOL

5 Development of urban NBS Models

6 Development of online DST (NBenefit$)



Decision support system made by a user-friendly web-based tool running a complex system dynamics model of NBS (proof-of-concept on urban forest NBS)

NBenefit$ Components and Workflow

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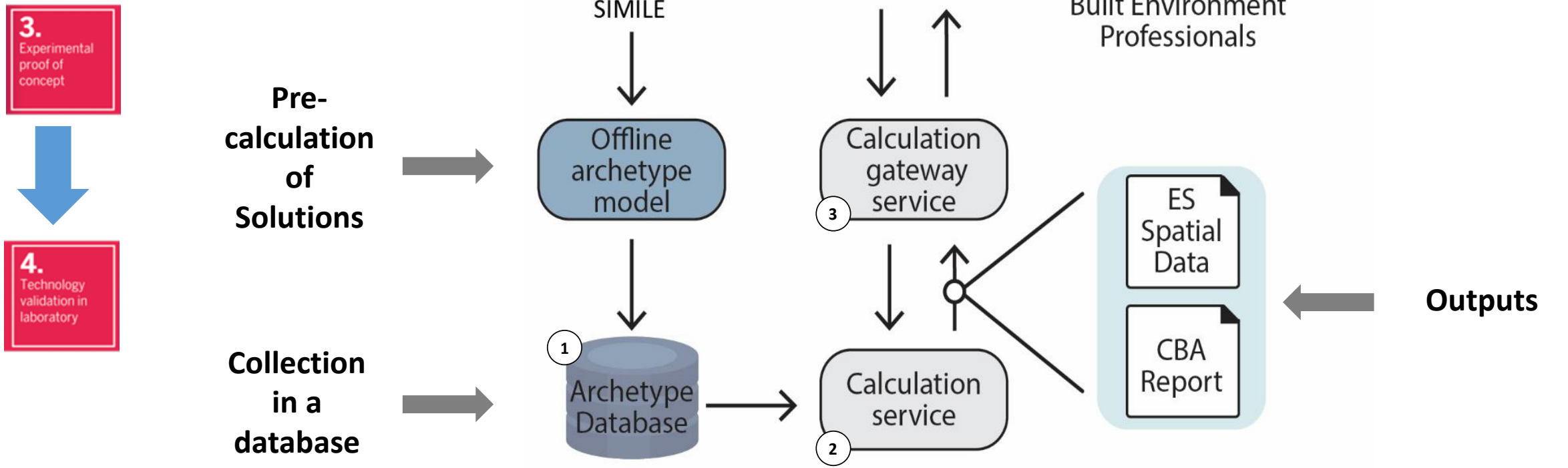

NBenefit$ DEMO

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NBenefit$ Next Steps (1/3)

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The team will keep working on the development of the NBS models and their application to use cases across the pilot cities during the course of WP7 of Nature4Cities. This period will allow the team also refining the functionalities of NBenefit$ to bring it from the current prototypal TRL 3/4 state, to the future TRL 5/6 state at the end of Nature4Cities, ensuring full integration of the tool in the Nature4Cities Platform. To this end, the team will handle the following key-elements:

- optimisation of the computational power of NBenefit$ and user-friendly interface, adding a higher number of parameterisation features in order to facilitate users definition of alternative scenarios;
- debugging of some technical issues currently occurring within the IT infrastructure system and calculation routine;
- graphical refinement of the visualisation interface, improving the output frames with more sophisticated space-time evolution diagrams showcasing biophysical changes in ecosystem services provision, etc.;
- better definition of a “Net-Benefit” target (allowing to calculate the time at which – if reached – benefits result to be higher than costs), which can be understood as a KPI for the pilot cities implementing the investigated NBS;
- development of an NBS-green roof model and (possibly) an NBS-urban wetland model, based on the same modelling framework of the current NBS-urban forest model, but more simplified to ensuring a concrete integration into the Platform;

NBenefit$ Next Steps (2/3)

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- application of the tool to the selected NBS use cases from the pilot cities;
- integration of new ecosystem service flows/indicators and economic conversion factors into the calculation routine of the NBenefit$ benefits-costs ratio. So far only three informative ecosystem services are included in the tool (what the team calls “carbon credits, cooling effect and social benefits”). Those services were part of the first version of the urban forest model and used as test-bed flows in NBenefit$ because providing the most accurate, understandable and robust outputs to perform a preliminary trade-offs and synergies analysis. However, the urban forest model has undergone some relevant improvements in the latest months, allowing to consistently handle a larger number of ecosystem services. These, listed here, will be included in the next version of NBenefit$: climate regulation (which replaces the current item “carbon credits”); reduction of heat island effect (which replaces the current item “cooling effect”); floods protection; air quality regulation; water quality regulation; recreational services (which replaces the current item “social benefits”); natural habitats enhancement; and biomass production;
- during WP7, a series of webinars for the consortium members from the Nature4Cities pilots can be organised to training them into the use of NBenefit$, and to collect inputs and feedback for enhancing the tool functions and making those meaningful to support NBS implementation and decision-making;

NBenefit$ Next Steps (3/3)

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- revision of seminal urban assessment and monitoring reports and studies on socio-economic patterns and their evolution will be performed, in order to set out a list of relevant socio-economic elements not currently accounted for in the proposed socio-economic assessment approach underpinning NBenefit$ (e.g. social costs and benefits associated with mobility changes due to the implementation of the NBS in one or another location; increase in the price of houses associated with the effect of greening the cities; etc.). This list of items will be formulated in spreadsheet format, provided with web-references to related definitions, developer team's comments if required, and made accessible in NBenefit$ as an accompanying informative document for users;
- last but not least, it is worth remarking that some modifications were recently performed on the urban forest model formulated and illustrated in the Deliverable D4.2 in order to ensure a first estimation of costs and benefits in every European location. Despite this will not provide best-in class outputs to support decision-making, future users of NBenefit$ and the Nature4Cities Platform will have the possibility to play with the socio-economic assessment module to gathering some basic information in support of follow-up project developments (achievement of TRL 6 for NBenefit$). The team is currently working on introducing "default" meteorological input data, socio-economic parameters and spatial configurations for any European country in order to allow preliminary estimations of NBS benefits and costs in every EU cities.