



Green cities for climate and water resilience, sustainable economic growth, healthy citizens and environments

Presentation of the Compendium of Nature-based and 'grey' solutions to address climate- and water-related problems in European cities

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Introduction to the Compendium



- Developed to guide our *Market Analysis* work for GrowGreen
- Presents 36 nature-based and 32 'grey' solutions that can address climate- and water-related challenges in European cities:

	NBS	'Grey' solutions
Heat stress	8	5
River flooding	9	10
Surface water flooding	18	9
Coastal flooding	5	12
Water scarcity	13	4
Water quality	16	1
Total	36	32

- The solutions are presented in individual factsheets
- Serve as a reference for local authorities and other stakeholders

NBS and 'grey' solutions summary tables



Nature-based solutions	Heat 	Floods			Water	
		River 	Surface water 	Coastal 	Scarcity 	Quality
1. Green roofs						
2. Vertical Greening Systems						
3. Vertical forest						
4. (Per-)Urban parks and other green spaces						
5. Green urban furniture						
6. Greening linear transport infrastructure						
7. Urban gardens						
8. Restoration and management of inland wetlands						
9. Restoration and management of floodplains						
10. River restoration for flood control						
11. Restoration and reconnection of seasonal streams						
12. Re-meandering						
13. Reconnection of oxbow lakes						
14. Re-naturalization of polder areas						
15. Lake restoration						
16. Floodplain and riparian woodland creation						
17. Managed realignment						
18. Restoration and management of coastal wetlands						
19. Sand dunes construction and strengthening						
20. Shore and beach nourishment						
21. Sustainable Drainage Systems (SuDS)						
22. Rain water harvesting						
23. Pervious surfaces						
24. Infiltration Basins						
25. Infiltration trenches						
26. Soakaways						
27. Rain Gardens						
28. Swales						
29. Planted channels and ribs						
30. Detention Basins						
31. Retention Ponds						
32. Geocellular systems						
33. Filter strips						
34. Blue roofs						
35. Subsurface groundwater recharge systems						
36. Constructed wetland						

Grey solutions	Heat 	Floods			Water	
		River 	Surface water 	Coastal 	Scarcity 	Quality
1. Passive cooling of buildings						
2. Cool or white roofs						
3. Cool facades						
4. Cool pavements						
5. Cooling water fountains						
6. Dikes						
7. Floodwalls						
8. Longitudinal barriers (Dams)						
9. Temporary and demountable barriers						
10. High-water channel						
11. Compartmentalisation						
12. Storm surge barriers (or gates)						
13. Groynes, breakwaters and artificial reefs						
14. Higher quays						
15. Quay walls / sheet pile walls						
16. Sluices and pumping stations						
17. Dry flood-proofing						
18. Wet flood-proofing						
19. Floating and amphibious housing						
20. Floating or elevated roads						
21. Raising coastal land						
22. Upgrading drainage systems / increasing pipe capacity						
23. Flow regulators						
24. Smart regulation of the sewage system						
25. Flood control channels						
26. Surface water storage						
27. Underground water storage						
28. Backflow blocker						
29. Pump well with check valve						
31. Greywater recycling systems						
32. Desalination						

NBS and 'grey' solution factsheets



- The factsheets for both the NBS and the 'grey' solutions provide the following information:
 - Description of the solution
 - Problems (climate hazards) addressed
 - Scale
 - Effectiveness
 - Typical co-benefits
 - Cost information
 - Potential disadvantages/ negative impacts/ trade-offs
 - Challenges/requirements for implementation
 - References and other relevant sources
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Who and how to use the compendium



- An index for all the available NBSs that address certain climate and water problems and some corresponding ‘grey’ solutions
 - The users of the compendium could be local authorities and researchers
 - How to use:
 1. Identify the climate/water-related problem to be addressed
 2. Use the summary tables to identify all the potential NBSs that can tackle it
 3. Read their description and characteristics to spot the NBSs that fit local needs and specificities
 4. Identify which of the competing NBSs can offer the greatest (co-)benefits
 5. Select the most suitable NBS
 6. (Compare with the benefits and costs offered by ‘grey’ solutions)
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Thank you for your attention!