



Green Roof policies for stormwater retention in cities around the world – A Literature review

 #WATEFCON 2018

Paulo Pallha – ANCV Portuguese Association for Green Roofs

presidencia@greenroofs.pt

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THE GOAL OF ANCV

TO PROMOTE GI'S IN CITIES, ESPECIALLY THOSE SUITABLE TO BE INSTALLED ON NEW OR EXISTING BUILDINGS, **SUCH AS GREEN ROOFS AND GREEN WALLS**. ANCV ACTIONS AIMS TO ENHANCE THE ENOURMOUS BENEFITS ASSOCIATED WITH GI'S, IN ORDER TO **CREATE HEALTHY AND SUSTAINABLE URBAN LANDSCAPES**.



GREEN ROOF BENEFITS

- INCREASE BIODIVERSITY AND WILDLIFE
- WATER MANAGEMENT
- IMPROVE RUNOFF QUALITY
- IMPROVE AIR QUALITY
- MITIGATION OF HEAT ISLAND EFFECT
- REDUCE NOISE POLLUTION
- INCREASE THE ROOF LIFE
- COOLING, INSULATION AND ENERGY EFFICIENCY
- GREEN BUILDING ASSESSMENT AND PUBLIC RELATIONS
- FOOD PRODUCTION

STORMWATER RETENTION



Sustainability of urban
drainage systems

Water holding capacity
of a GR with 10 cm
substrate:

90% summer precipitation
75% winter precipitation

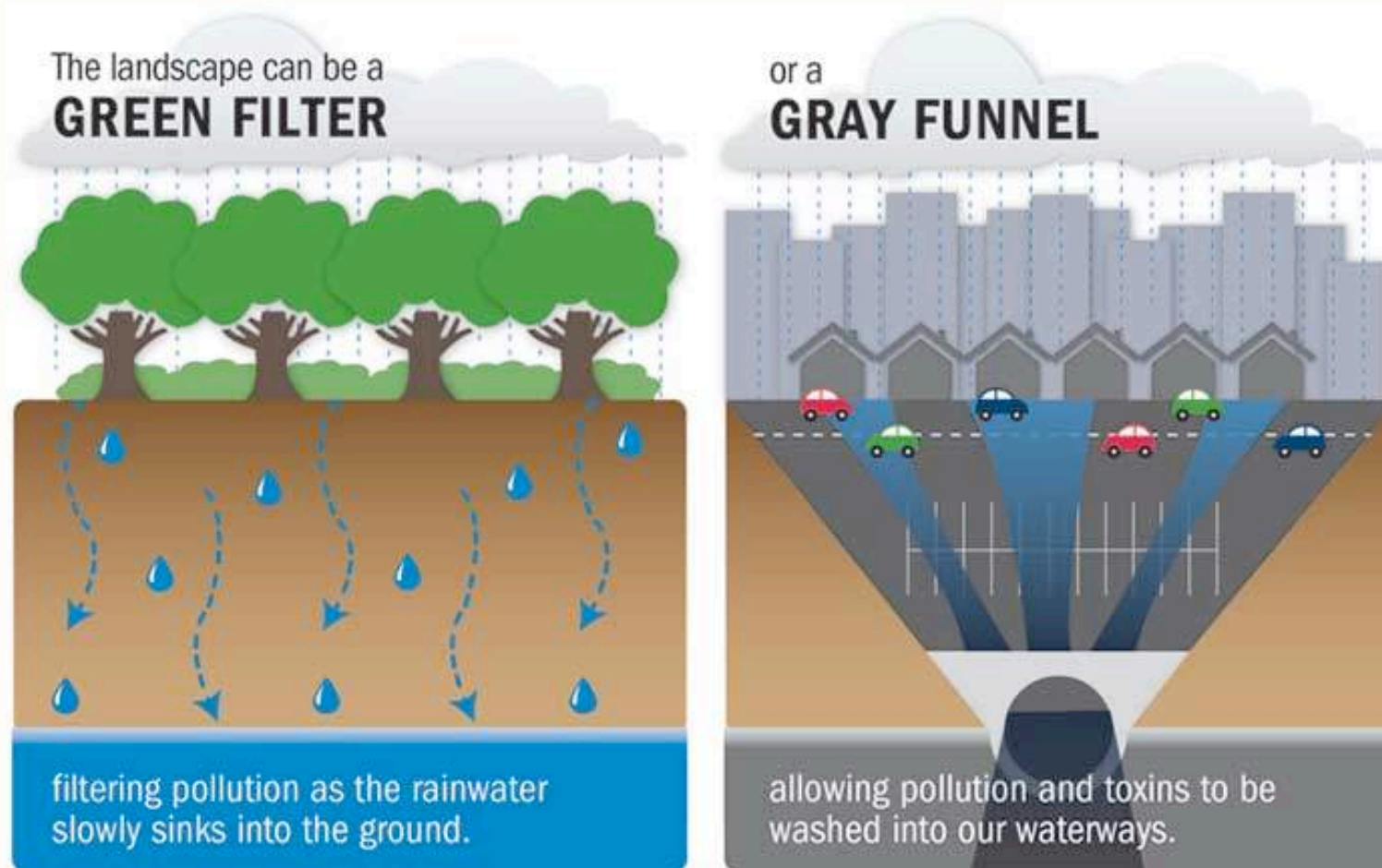
STORMWATER RETENTION



Lisboa

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STORMWATER RETENTION



INTRODUCTION

- Accelerated urbanization
- Increase of impermeable surfaces in cities
- Reduced area of natural soils available to absorb rain
- More extreme rain events





GREEN ROOF POLICIES

STUTTGART • VIENNA • LINZ • PORTLAND • ROTTERDAM
COPENHAGEN • TORONTO • HON KONG • BUENOS AIRES
DUSSELDORF • NIEUWEGEIN • NIJMEN • DUBLIN
LONDRES • PARIS • BOLZANO • MALMÖ • EINDHOVEN
TÓQUIO • DELFT • ACHIEDAM • VANCOUVER • MUNICH
SIDNEY • PHILADELPHIA • COLOGNE • DUISBURG
ALPELDOORN • HARDERWIK • WASHINGTON • CAPELLE
HANOVER • NOVA YORK • BEIJING • BASEL

As a consequence many cities worldwide started to develop green roof policies

OBJECTIVE OF THE STUDY

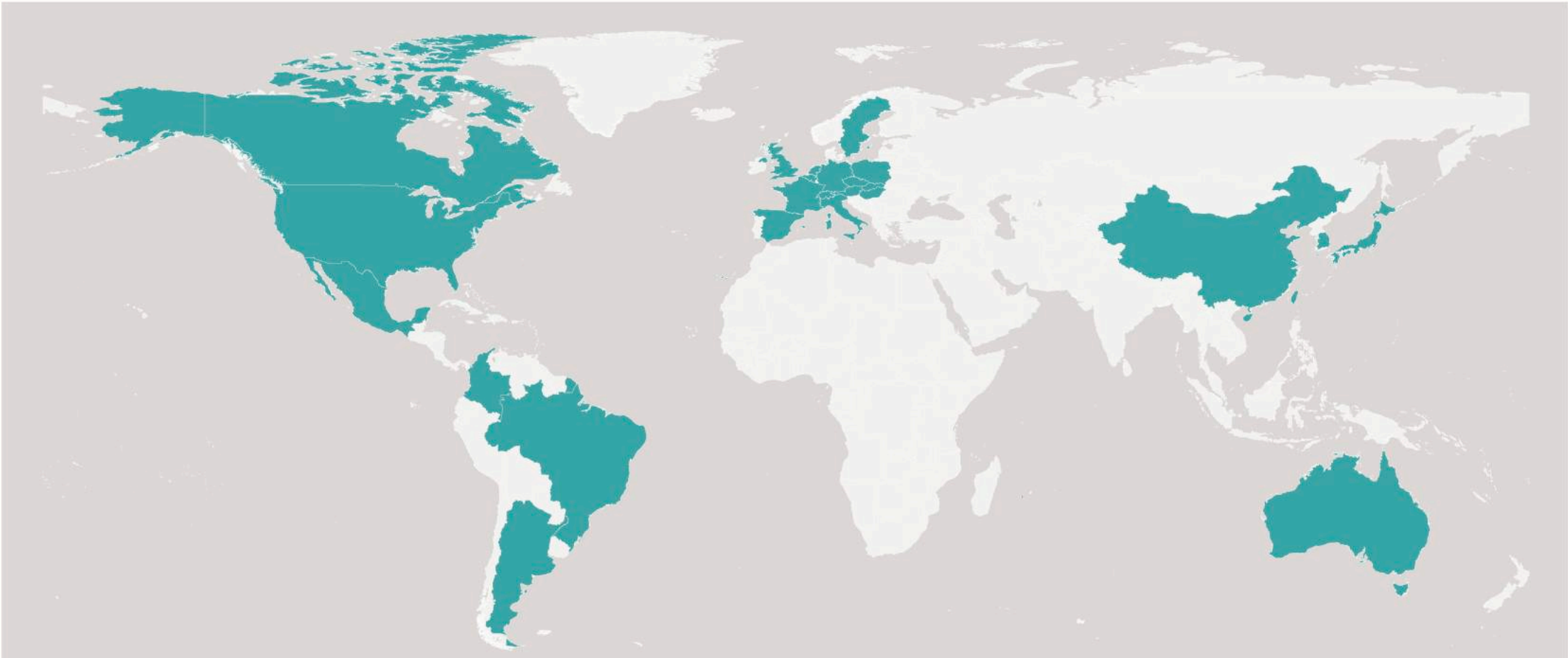
A review on green roof policies for water management, in order to understand the different policy models implemented by cities with different characteristics and present conclusions for future in the portuguese context.



METHODOLOGY

Gathering, reading and analysing more than **100 green roof policy documents** during the period between January and August 2017, in order to select **which cities have GR policies for storm water retention around the world and the nature of such policies**





Countries where green roof policies were identified

From this literature review 65 cities were identified as having green roof policies (figure 1), in which 18 present storm water issues as its main motivation.



The Fifth Facade Project (PQAP) is a project between **ANCV** and the **Porto City Council**

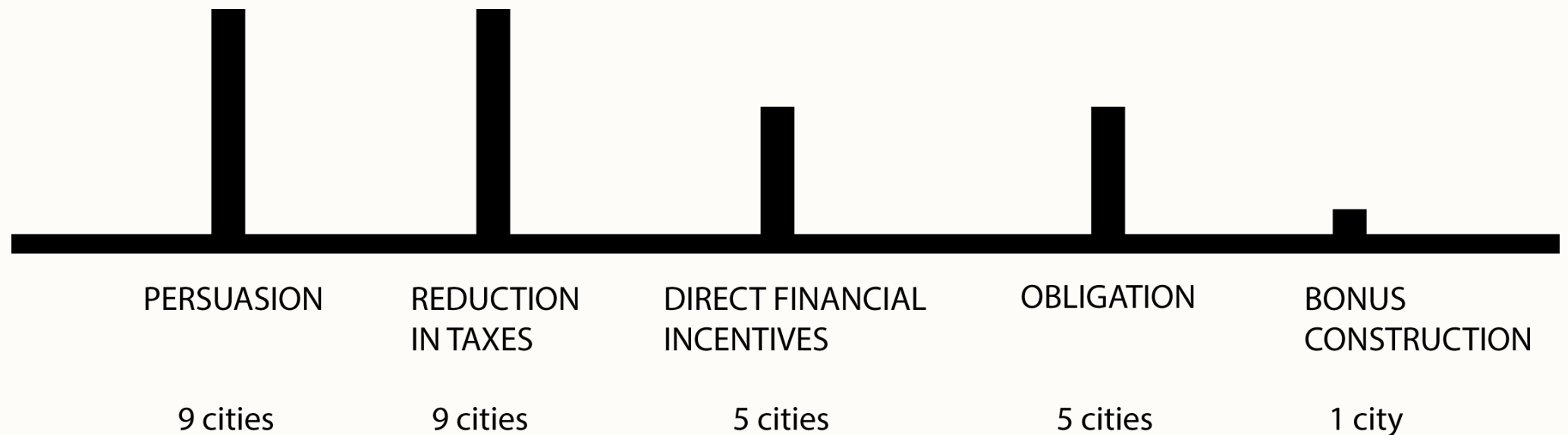


The database of cities including green roof policies is available at the official website of the Portuguese association for green roofs (greenroofs.pt)

RESULTS AND DISCUSSION

The majority of the cities identified use a combination of different policies.

The main policies identified were



RELEVANT DATA

The analysis of the different green roof policies for stormwater retention reinforced the importance of some parameters that should be taken into account in the Portuguese context, such as:

- _The definition of the green roof performance.
- _The use of green roof guidelines for project, construction and maintenance of green roofs
- _Maintenance control

A decorative vertical image on the left side of the slide. It shows a modern glass skyscraper in the background and large, bright pink industrial pipes in the foreground, curving upwards.

CONCLUSION

Stormwater retention will remain a priority in the political agenda of urban centres for the next years. Specific for the Portuguese context it will be important to define innovative and creative ways to deal with this situation. Green Roofs can play an important role in this issues, as it was reinforced by some case studies presented in this article.

From this literature review analysed in this study it was possible to identify some aspects that would be relevant for the implementation of a green roof policy in the portuguese context, such as: the performance of the green roofs, the use of guidelines and the fiscalization of the maintenance/performance of green roofs.

WHAT'S NEXT?

CITIES ARE CONCERN WITH WATER ISSUES AND GREEN ROOFS CAN PLAY AN IMPORTANT ROLE IN THIS CONTEXT



RESULTS AND DISCUSSION

NEW SYSTEMS ALREADY ALLOW US TO CHOOSE THE AMOUNT OF WATER WE WANT TO KEEP IN THE SYSTEM, MEANING RESULTS WILL BE EVEN BETTER IN THE FUTURE.

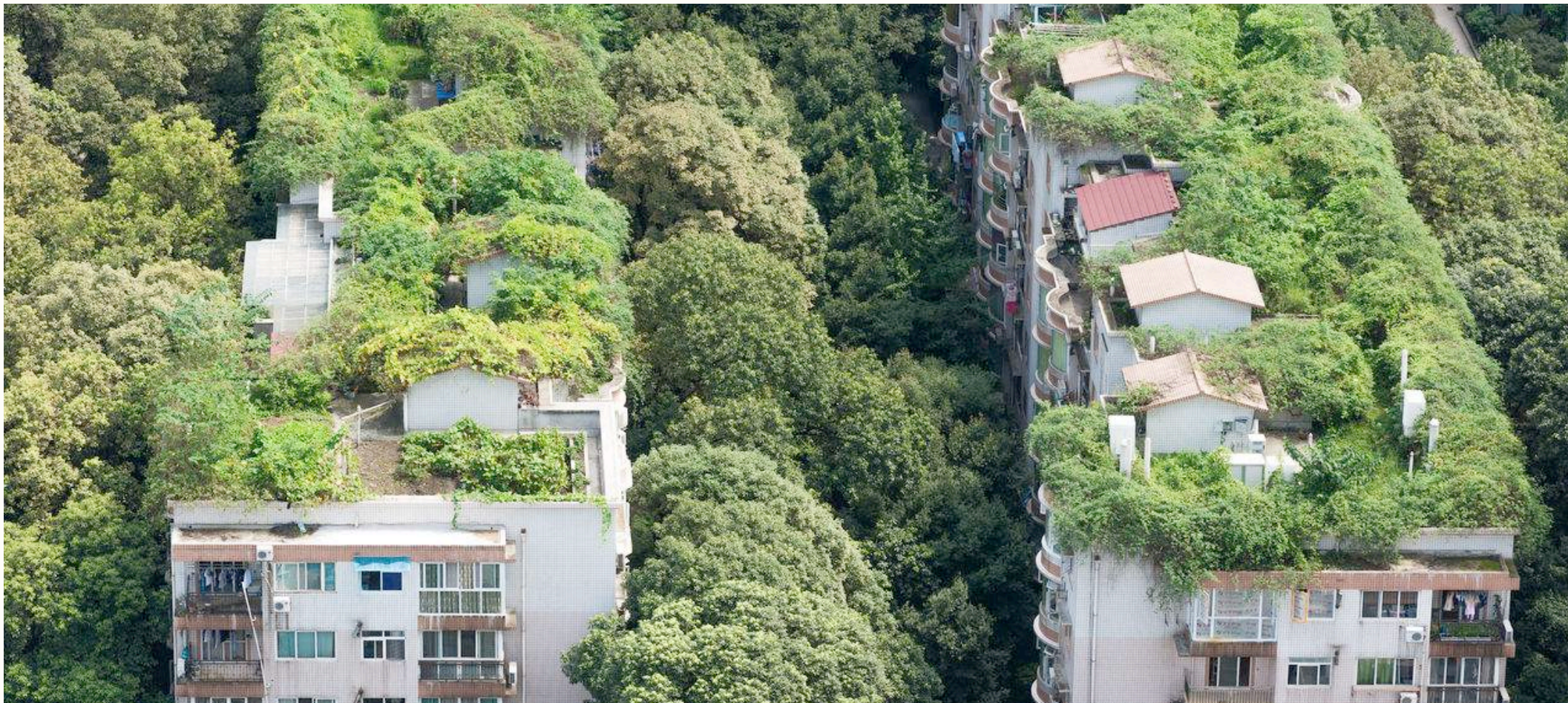


WHY GREEN ROOFS?



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BECAUSE WE NEED!



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