

How to get city trees to  
live longer and create  
a healthy green urban  
canopy

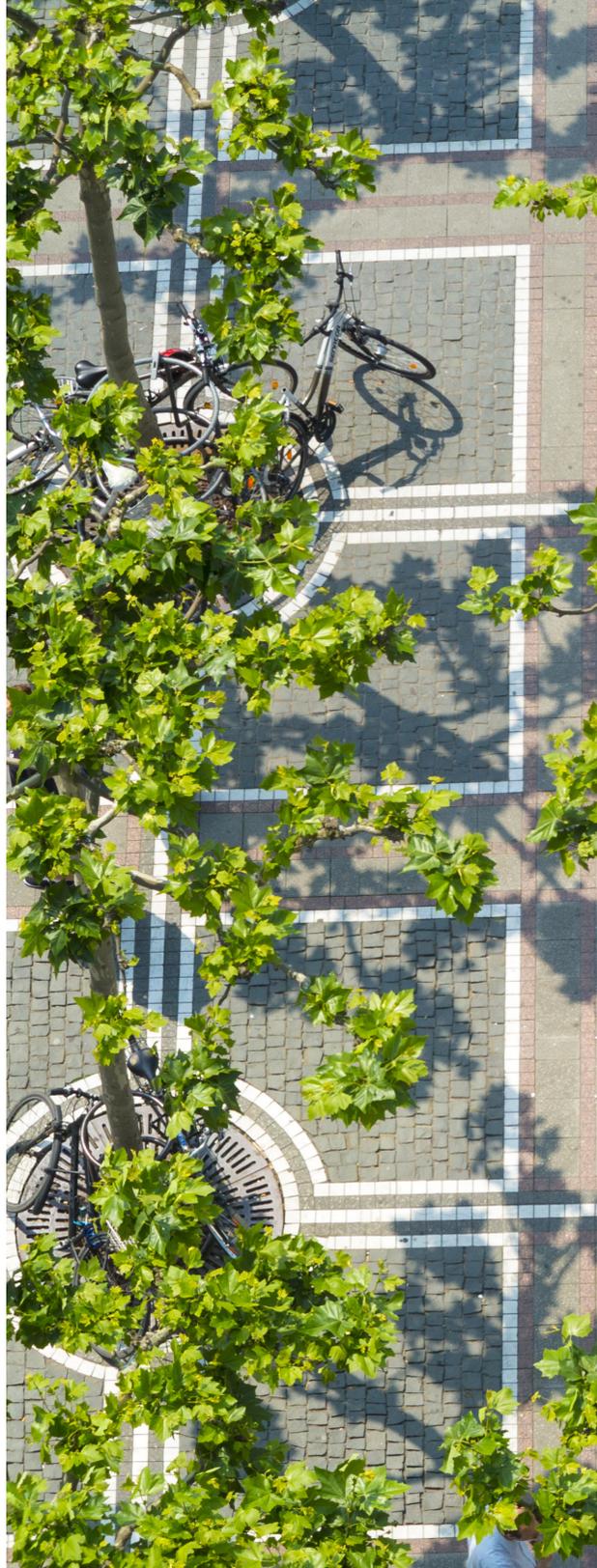
# Planting urban trees with biochar

**carbo  
culture**

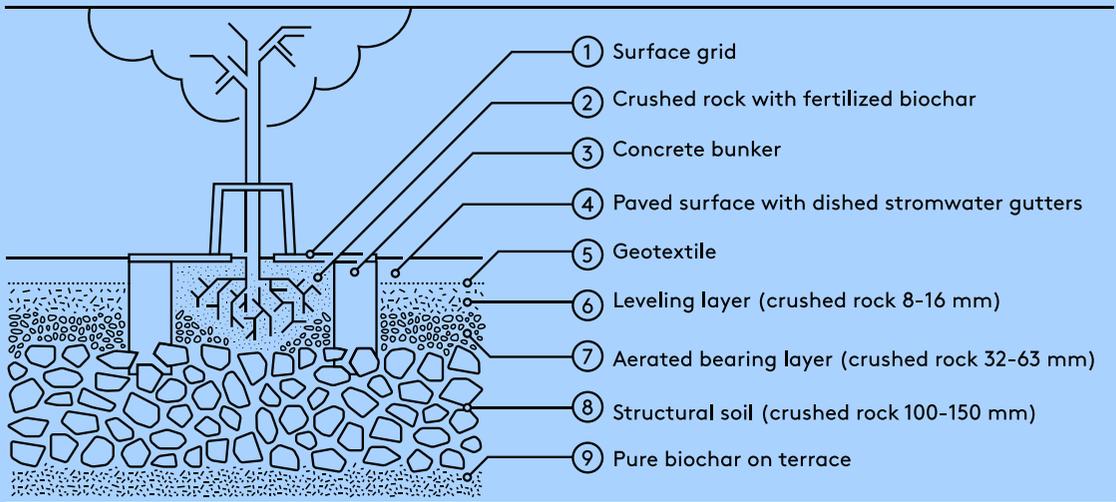


# The Stockholm Model

Carbo Culture set out to find where biochar would be the most helpful - and found that many cities had a target to plant a lot of trees, but were facing issues in tree maintenance and die-off. We found the Stockholm model, which helped keep trees alive with a new method of using structured soils and biochar to plant trees. In addition to biochar being carbon sequestered, it helps the tree grow and stay healthy, providing an array of benefits to the city ecosystem, from citizens' health to the city maintenance budget.



## Biochar for cities



The Stockholm model is a method to build and remake urban plant beds. By compacting large rocks from construction sites, Stockholm creates stable plant beds with space to allow the roots to grow. This also improves air exchange and water drainage.

A mix of gravel, biochar and compost is flushed down with water into the stable structure made of larger rocks or concrete bits creating a long term supply of nutrients for the plant. The structured soils alleviate the compaction and promote air flow to roots, while the biochar retains nutrients, bacterial life and water, while holding its structure.

The development of the plant beds got started in the City of Stockholm when the city noticed that two-thirds of their newly planted hard surface trees were dying. The use of structural soils with biochar in new and restored plant beds started as a trial to improve the conditions of urban trees growing in compacted soils. The result has shown healthier, stronger trees and more beautiful plantings. The positive results became the start of the Stockholm Biochar Project which won the Bloomberg Philanthropies' innovation prize in the 2015 Mayor's Challenge. Structural soils with biochar is now the standard for all public plant beds in the City of Stockholm.

# What is biochar?



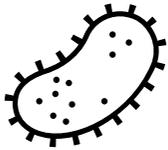
Biochar is a clean and sustainable plant material that has been carbonized through the process of heating the material until it becomes charred. Biochar is to the soil what coral reefs are to the ocean - a structure for soil microscopic life to thrive on.

The structure of biochar absorbs nutrients and when applied to the planting soil, it makes the nutrients available for the plants. The structure and composition of biochar resembles a sponge. It is full of small pores, which gives it the ability to hold water, air and nutrients. And thanks to the stable nature of biochar, it does not need to be reapplied.

# What is plant bed?

A plant bed is the space where the roots of a plant can spread, find nutrients and water. In urban settings the space for plant beds can be very limited. In a natural environment the plants' roots will coexist with stones, bedrock and other root systems. Water and nutrients enter the soil to fulfil the needs of the roots and holes in an uncompacted soil enables the crucial exchange of oxygen and carbon dioxide.

Biochar improves the soil utilised in urban plant beds:



Cultivating soil micro-organisms needing access to carbon, hydrogen, nitrogen, phosphorus and oxygen.



Biochar can substitute finite resources often used in plant beds, like sand, peat and clay.



Improving water filtration - securing water supply to plants by creating a water reservoir, and preventing stormwater flooding.



# How to get started

1

Find a champion within in your city! Doing a trial with biochar should be taken forward by a person or team creating positive momentum and curiosity towards using this new method.

2

Meet with a local biochar provider, or email [trees@carboculture.com](mailto:trees@carboculture.com) and draft out the trial. Find out where would be a good spot for new plantings, or where old trees are being taken out, or where a street is being opened and repaired.

3

Find budget and inform your usual providers/contractors who work with planting trees about the trial.

4

For the first two years, Nitrogen Phosphorus Potassium (NPK) 0.001 % solution water needs to be added to the trees.

5

No added maintenance required after the first two years!