



POLITECNICO
DI TORINO

Honors thesis

Master of Science in Sustainable Architecture

Abstract

**Timber construction.
Use of carbon sinks to reduce and store GHG
emissions present in the atmosphere.**

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by

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From the time of the industrial revolution to 2018, the world population released over 1,500 billion tons of CO₂ into the atmosphere, only in 2019 another 37 billion were released, equal to more than double those released in 2000 (24 billion) and almost three times as much as in 1970 (14 billion).

Combined with the other greenhouse gases, the total world emissions are equal to 51 billion tons of CO₂ equivalent every year (data published by CAIT Climate Data, referring to 2017), values that continue to increase causing: fires, melting of ice, increase in sea levels, hurricanes, rising temperatures and numerous other environmental and consequent social cataclysms.

Starting from these data, the thesis develops as a critical text in which the problems and strategies proposed by the various states are presented to counter what today is one of the most current and forthcoming problems ever faced.

By examining the various national and international policies, one quickly realizes that the expectations for reducing emissions are too high and that the objectives are almost completely unattainable within the short pre-established terms, sometimes due to a great lack of collaboration between the various countries and others due to a lack of funds.

Precisely for this reason the elaborate aims to provide a possible short-term solution in the field of architecture, proposing a change in the “typical” design through the passage from the classic steel and concrete construction to the wooden one that presents the inherent ability to store carbon.

The writing is therefore divided into 4 parts, each of which focuses on a specific theme:

- PART 1: THE ENVIRONMENTAL SITUATION

In this first part, the evidence and causes of climate change and the various policies adopted by individual countries to combat it are analyzed. The main focus of this first chapter falls on the choices, old and new, adopted at the building level to combat emissions from buildings.

- PART 2: CLIMATE EFFECTS GENERATED BY CITIES AND POSSIBLE SOLUTIONS TO MITIGATE THEIR EFFECTS

Some of the strategies adopted to reduce emissions through the proposals of natural and artificial carbon sinks are analyzed. The new proposals of wooden constructions such as carbon sinks and some examples of tall structures that exploit their advantages.

- PART 3: THE PROJECT AND ITS ISSUES

Introduction to the tower designed in Argentina and the calculation of its emissions given by the production of its materials compared with those produced by a hypothetical identical building designed in wood.

- PART 4: POTENTIAL OF LARGE-SCALE STORAGE

Calculation of the square meters built in Buenos Aires and in Italy in 5 years and the relative emission given by the new buildings compared with the quantity of missing CO₂ that could have been stored. The scenarios proposed by Nature Sustainability and the possible future global storage in the next 30 years that would be able to enforce the Paris agreement on schedule.

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