# Draft

**Emerging Building Technology (Indoor Greenery System) Evaluation for Urban Weather Under the Climate Change Context.**

Climate change is the key issue of present and future days. Climate change is considered as one of the main challenges facing humankind in the 21th century, with serious and global consequences for the environment, human health and the economy.

The Representative Concentration Pathways (RCPs) describe four different 21st century pathways of greenhouse gas (GHG) emissions and atmospheric concentrations, air pollutant emissions and land use, originally RCP2.6, RCP4.5, RCP6, and RCP8.5 are labelled after a possible range of radiative forcing values in the year 2100 (2.6, 4.5, 6, and 8.5 W/m2, respectively).

The reduction of pollution emissions and environmental degradation can only be achieved through a holistic approach, since effective mitigation strategies demand that, all agents contributing to the negative effects of development, globalisation and environmental erosion must coordinate and perform better.

All residential and commercial buildings are connected to conventional electricity, gas, and water supply lines to meet their vital needs, which causes severe environmental crises. This implies that buildings built today need to be designed to work successfully in both the current and future climate.

Emerging technologies: Green science, Zero Energy Buildings. At the same time, the performance of buildings depends on the climate they are exposed to.

However, there is a research gap to evaluate those state-of-the art building technologies for urban scale analysis under the climate change context. (Indoor greenery systems, Controlled Agriculture Techniques)

# Climate Change Model

The tool is Microsoft® Excel based and transforms ‘present-day’ EPW weather files into climate change EPW or TMY2 weather files which are compatible with the majority of building performance simulation programs.

Two software tools, namely CCWorldWeatherGen and WeatherShift™, are today available on the market and enable individual end-users, to generate future projection weather data that can be used for executing building performance simulation.

The Representative Concentration Pathways (RCP): they include a stringent mitigation scenario (RCP2.6), two intermediate scenarios (RCP4.5 and RCP6.0), and one scenario with very high GHG emissions (RCP8.5).

Diagram

Description automatically generated

Timeline

Description automatically generated

# Technologies in Model Types

An energy model for an indoor farming facility was created using building energy simulation software EnergyPlus and calibrated based on measurements. (Vertical Farming)

# Critical review for other technologies (Literature Review)

Instead, in the case of the climate projections the operative temperature is between 31 °C and 34 °C without significant differences between the scenarios RCP4.5-90th and RCP8.5-90th.

Green Science:

a blackbody assisted photovoltaic (PV) panel

in-house treatment processes

closed anaerobic detention tank

separated wastewater is treated in the cellar by applying primary, secondary, and tertiary processes