

The Urban Challenge — Buildings for a Clean Tomorrow

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Major states across the United States are pledging to combat global warming and significantly reduce carbon emissions within the next decade. There is thus a call for change that is clearly gaining momentum. But as crucial as it is for a state to prioritize climate change and establish actionable ways to achieve zero emission goals, there will be no success if the cities within that state do not follow suit and proactively take the lead.

While cities are often known as centers of culture, diversity, and innovation, they are also centers of consumption, production, and pollution. As a company based in New York City and invested in finding practical solutions for urban energy needs, we are perpetually motivated by the unique set of environmental challenges cities face today. With New York State aiming for carbon-free electricity by 2040 and a net-zero carbon economy by 2050, here is what is on our minds: How can cities promote the changes

necessary to limit global warming to 2 degrees Celsius in such a short amount of time?

According to C40, a network of 94 of the world’s major cities committed to addressing climate change, “Buildings in urban areas are one of the largest sources of greenhouse gas emissions, and typically account for over half of a total city’s emissions on average.”¹ According to the Urban Green Council, buildings alone account for 95 percent of NYC’s electricity use, making energy efficiency in buildings a cause well worth tackling. In simple terms, there is no way for a state, country, or global community to curb the rise of global temperatures to less than 2 degrees Celsius without addressing buildings — one of the largest contributors to their carbon footprints.

Below are two major ways NYC is targeting buildings to achieve its ambitious **80 percent cut to carbon emissions by 2050**.



Figure 1. Jeddah Tower. Reprinted from Smith and Gills. http://smithgill.com/work/jeddah_tower/



Figure 2. Central Park Tower. Reprinted from Smith and Gills. http://smithgill.com/work/central_park_tower/

Figure 3. Empire State Building Renovation. Reprinted from CBS This Morning. <https://www.cbsnews.com/news/empire-state-building-massive-renovation-exclusive-look-inside-new-observatory/>



Reinventing the Standard for New Buildings

According to Maureen Guttman, architect and green building expert at the Alliance to Save Energy, “Heating, cooling, hot water and lighting are the primary loads in most buildings.”² For buildings still in the planning stages or recently approved for development, the complexity of how a building uses energy will have to take precedence over aesthetic and other less environmentally influential concerns.

One example of the pragmatic shift from appearance to functionality is New York City’s proposed plan to “ban on all glass facades in new construction unless strict performance guidelines are adhered to”.³ Designing structures with energy efficiency in mind will inevitably add another layer to the already stringent permit process. But the idea is that new buildings should be focused on long-term sustainability and how they fit into the bigger picture of our planet’s environmental needs.

Design firms such as Smith and Gill, the firm responsible for Central Park Tower, are embracing the changing landscape and leading the way with the architectural philosophy they call Global Environmental Contextualism. “The resulting buildings, such as the Jeddah Tower and the Central Park Tower in New York City, will be ‘super sustainable,’ using state of the art engineering techniques to improve energy efficiency and reduce emissions through means such as travel impact, air circulation, and internal climate control.”⁴

Retrofitting Existing Buildings

Many of the buildings that have gone on to become trademarks of NYC’s architectural and cultural legacy were born out of a pragmatic way of thinking — build up rather than out and take advantage of the limited amount of space at the city’s disposal. But while the innovators behind these groundbreaking buildings focused on the complexity of such high buildings at the time, the lasting impact their final product might have on the environment wasn’t any part of their concern.

According to one source, “Some 90 percent of the 2050 building stock in the city has already been built....There is no way for NYC to reach its long-term goal of 80 percent carbon reductions by 2050 without tackling existing buildings.”⁵ To give a sense of what this means in numbers, there are approximately 50,000 existing buildings affected by the Green New Deal policies. All of them meet or exceed 25,000 square feet and are thus required to undergo large-scale energy efficiency upgrades.

With the introduction of this policy, the idea that history cannot be changed is being challenged with iconic buildings such as the Empire State Building undergoing very expensive and extremely thorough green upgrades. According to the building’s official site, the retrofit just recently completed included replacing the building’s windows and installing an energy-efficient heating and cooling system. It claims these changes will help cut the building’s energy consumption by more than 38 percent. An impressive 88 years after it was first completed in 1931, the building once known for being the tallest in the world is now qualified for a new distinction: one of NYC’s greenest.

Redefining the Urban Jungle — Building Green

The addition of a new skyscraper to an otherwise fixed skyline used to be a unique event, something to marvel at and reflect on. But with cities across the world experiencing explosive growth in the last half century, expanding vertically is no longer a matter of choice but rather necessity. Building tall to keep up with population growth and building efficiently to keep up with decarbonization needs are two challenges in their own rights, each requiring a unique set of skills and tools. But with climate change knocking on our door with a tremendous sense of urgency, cities need to adopt new ideas quickly and adapt them even faster. By 2022, 11 extremely high buildings will become fixtures on the NYC skyline, one of the most renowned skylines in the world.

NYC is leading the way to transform not only what its skyline will look like from the outside but how the buildings that make up its silhouette will function on the inside. And while skyscrapers only make up a small percentage of the overall building stock of the entire city, symbolically they have always represented the direction in which the city is headed. The benchmark for success was once determined by height with iconic buildings such as the Chrysler Building and the

Empire State Building. But the skyscrapers of today are reflecting a new type of barometer for success — energy efficiency. One could argue that the growing emergence of luxurious high buildings has no bearing on the everyday lives of the average city dweller. But their ability to significantly reduce emissions will directly affect everyone and drive more cities to build according to this new unquestionable standard.

Changing the way we do things is never without a natural resistance. Grappling with the changes laid out by NYC’s progressive “Green New Deal” and finding a way to implement the growing demands on building developers and owners are undoubtedly challenging tasks. The good news is that if 70 percent of carbon emissions in cities like New York are caused by buildings, solutions that address building efficiency have the potential to reduce emissions dramatically. And while the task of retrofitting old buildings and reinventing the way we build new buildings is a formidable undertaking may seem like an impossible feat, implementing permanent and fundamental changes to our buildings will undoubtedly serve everyone’s best interest.

¹ 19 global cities commit to make new buildings ‘net-zero carbon’ by 2030. *C40 Cities*. https://www.c40.org/press_releases/global-cities-commit-to-make-new-buildings-net-zero-carbon-by-2030.

² L. Poon. To curb carbon emissions, cities need more efficient buildings. *Pacific Standard*. <https://psmag.com/environment/more-efficient-buildings-make-more-efficient-cities>.

³ <https://www.newyorkconstructionreport.com/nyc-green-new-deal-calls-for-end-to-glass-facade-buildings-retrofits-to-existing-structures/>

⁴ J. MacAvoy. The future of skyscrapers: Green engineering. *Interesting Engineering*. <https://interestingengineering.com/the-future-of-skyscrapers-green-engineering>.

⁵ D. Roberts. The Green New Deal aims to get buildings off fossil fuels. These 6 places have already started. *Vox*. <https://www.vox.com/energy-and-environment/2019/3/20/18269356/green-new-deal-building-electrification-states-cities>.