

## The Sustainable City - Al Qudra Road, Dubai, United Arab Emirates

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The 3000-resident Sustainable City in Dubai—by Diamond Developers and Baharash Architecture—is a 46-hectare sustainable micro-city established in 2015. It features 500 villas, 89 low-income apartments, 20 organic farms, an international school, an equestrian center, a sustainability institute (SEE), a retail hub, and more. All this is connected by lush greenery (60% of development), shared recreational areas, and car-free shaded streets. As Dubai's first-ever net-zero and sustainable megaproject, it aligns itself with the UAE Vision, the Paris Agreement, the UN Sustainable Development goals, and Dubai's Clean Energy Strategy. Its two main visionaries, Faris Saeed and Wassim Adlouni, wanted the development to be socially, environmentally, and economically sustainable. By using sustainable building methods and materials, and integrating renewable energy, waste reduction, sustainable transportation, water reuse, and urban farming, they created a sustainable community, while not exceeding the cost of a regular development. Maintenance costs are much lower too, showing developers worldwide that sustainable does not have to mean expensive, as long as you design sustainably from the start. Part of what made this project possible was keeping solutions smart but simple.

Each of the development's buildings was designed to rigorous environmental performance standards. The villas have most of their glazing North-oriented and use passive house shading design methods to reduce solar heat gain, and therefore cooling load, significantly. All buildings and hardscape materials have a solar reflective index of at least 78, preventing the urban heat island effect, reducing indoor cooling load, and improving outdoor comfort. This was achieved through UV reflective paint, lots of greenery, light colors, and both built and natural shading. Each structure's roof was well-insulated, and all windows were double-glazed. All this led to a 50% reduction in energy consumption. The modularity of the design, reduced cost and complexity. Precast wall panels, with crumb rubber and other recycled materials cast into them, lowered each building's carbon footprint and increased their longevity. Each component of this project was studied, to ensure the best specifications were used, and the most sustainable choices were made.

This net-zero energy development integrates a total of 40,000 solar energy panels onto the roof of each structure, and as a canopy over each parking lot, to produce 10 MWh/day of electricity at peak. Some days this 600,000 square feet array of panels produces more than the development uses. On these, the development sells back to the grid, and earnings are used to maintain common grounds. Hence, no HOA fees. On average days, 60% of a resident's energy consumption is generated by the panels, so residents save on their utility bills. Part of the success is due to the efficient design of each building, but also due to the systems used. Light-pollution reducing LED lighting, Variable Refrigerant Flow HVAC systems, electric car charging grids, and energy storage allow the solar energy to be used efficiently and effectively.

Water-efficiency and greenery are the development's next strong suit. Each built structure is designed with water-saving fittings, reducing consumption by 40% per resident compared to the UAE's average. Consumed water is divided between greywater (showering, washers, etc.) and blackwater (toilets). Greywater is filtered, and stored in natural ponds in which it is mixed with collected rainwater. The ponds help recharge natural groundwater, and are tapped into to irrigate the compound's interior landscaping and the 3,000 square meters of urban farms. Greywater is even used for evaporative cooling purposes in the 11 urban farming biome pods. Here, fans pull hot air through screens that are kept wet by greywater. As the air is pulled through, it cools and keeps the biomes at a consistent temperature. Cleaned blackwater is used for the buffer zone vegetation around the whole compound. This zone is 10 meters tall and 30 meters wide, and defends the interior from pollutants, dust storms, and noise, while providing habitat to native trees, plants, and animals. The Sustainable City's incorporation of ecological solutions into its architecture and engineering, shows the project's commitment to its local environment.

The Sustainable City is a prime example of how we already have enough expertise and technology to achieve large-scale, affordable, sustainable living—if it can be done in the desert, it can be done anywhere.

## Information Sources -

1. <https://www.youtube.com/watch?v=WCKz8ykyI2E&t=1s> (video tour)
2. <https://www.thesustainablecity.ae/home/>
3. [https://en.wikipedia.org/wiki/The\\_Sustainable\\_City](https://en.wikipedia.org/wiki/The_Sustainable_City)
4. <http://www.baharash.com/architecture-design/dubai-sustainable-city/>
5. <https://www.cnn.com/style/article/the-sustainable-city-dubai/index.html>
6. <https://www.thesustainablecity.ae/home/2019/06/30/faris-saeed-the-man-who-built-utopia/>
7. <https://www.thesustainablecity.ae/home/2021/10/10/see-institute-launch/>
8. <https://www.thesustainablecity.ae/home/2021/07/01/the-sustainable-city-joins-the-climate-pledge-a-commitment-to-net-zero-carbon-by-2040/>
9. <https://www.thesustainablecity.ae/home/2021/07/01/the-sustainable-city-partners-with-efate-to-recycle-toxic-electronic-waste/>
10. <https://www.businessinsider.com/dubai-sustainable-city-uae-2018-1>
11. <https://www.kingspan.com/meati/en-in/product-groups/ductwork/case-studies/the-dubai-sustainable-city>
12. <https://inhabitat.com/dubais-sustainable-city-will-be-powered-by-600000-square-feet-of-solar-cells/>
13. <https://meconstructionnews.com/21952/project-profile-the-sustainable-city-dubai>
14. <https://www.jeetcontracting.com/projects/>



Photo Source - <https://www.businessinsider.com/dubai-sustainable-city-uae-2018-1>



Map Source - <https://www.nationalgeographic.com/environment/article/dubai-ecological-footprint-sustainable-urban-city>