

Highway to Sustainability

The Highway to Sustainability (HWS) has designed the Net-Zero new City Hall to be a welcoming and open communal space for the people of San Diego, while weaving into it a multitude of sustainability and resiliency elements in the face of climate change and uncertainties. A 3-storey atrium provides ample space at the heart of the City Hall where green walls, skylight and natural breeze can be discovered. A spacious semi-outdoor area can be found on the 4th floor, where occupants can perform fitness activities overlooking the streets of San Diego.

A defining element of the HWS' design approach is the deployment of EnergyBox, an in-house web platform which speeds up design exploration by automating processes and encouraging collaboration by effective visualization. Such approach has allowed us to perform analysis on various designs simultaneously, effectively boosts the efficiency of designing. Overall, our team has adopted a total design approach, bringing together minds from different disciplines, such as structural engineering, building sustainability engineering, building service engineering etc., which has given the design the characteristic of being all-encompassing.

A permeable and highly visually transparent design have allowed natural ventilation and daylighting to drastically reduce the energy consumption of the building; the consumption is further minimised when combined with features such as passive house standard building envelope, earth tube, daylight sensors and automatic blinds. The minimal amount of energy consumed is well covered by clean energy generated from a sizable outdoor solar car park and an innovative gym power generator that converts occupant activities in the gym into electrical energy. Trees have also been planted to lessen cooling demand, it would also enhance thermal comfort.

Various resiliency strategies have been implemented in the new City Hall to ensure safe and smooth operation during emergency scenarios. The City Hall is located on a 500-year floodplain with minimal flood hazard and would also be free from the threat of sea level rise. Base isolators and Fluid Viscous Dampers (FVD) will safeguard the building against seismic activities; innovative fire-rated building materials, as well as hurricane-resistant glazing and wall systems are deployed to combat the increasing risks and unpredictability of wildfire and hurricane/typhoon. Moreover, under emergency scenarios where external potable water and energy supply are no longer available, the City Hall has been designed to be self-sufficient for 14 days with energy from water-based lithium-ion batteries recharged by the PV system and gym power generator, and potable water stored during the building's normal operation in the twin tanks on the rooftop.

Quality human health and wellness are, last but not least, without a doubt an integral puzzle piece in perfecting the new City Hall, hence our wellness-centric design approach. Biophilic design features such as green walls and skylight have further bonded occupants with nature, benefiting them emotionally and psychologically. The novel Nano-Confined Catalytic Oxidation (NCCO) air filtration technology is adopted in the HVAC system to remove a wide range of pollutants such as VOCs, PM10, PM2.5, formaldehyde etc., efficiently and effectively enhancing the indoor air quality for the occupants.