2023 AIA DC Chapter Design Awards

Project Title: APEX CLEAN ENERGY HEADQUARTERS Location: CHARLOTTESVILLE, VIRGINIA

Date of Completion: MAY 2022

Project Statement: Apex Clean Energy is now headquartered in Virginia's tallest Mass Timber building. Mass Timber products exhibit natural beauty and allow for transparency in material sourcing, material health, material reutilization and carbon management. Mirroring Apex's work at the forefront of the new energy economy, the new building harvests enough energy from the sun, through 875 roof-and canopy-mounted solar panels, to provide net-zero energy use for the Apex offices. The design prioritizes energy efficiency, occupant well-being, excellent views, and natural daylighting; Cradle to Cradle Certified[™] products were incorporated throughout the building. Apex Plaza is also a good neighbor, setting a contemporary standard for healthy, mixed-use, urban density in downtown Charlottesville that will accommodate changing use needs over time.

Design Narrative:

How does this project address Design for Integration, Wellbeing, and Discovery?

Apex Clean Energy, a developer and operator of wind energy and solar power facilities across North America, is the anchor tenant of a new eightstory, mixed-use infill development in downtown Charlottesville, Virginia. Apex's headquarters, also known as Apex Plaza, is a physical manifestation and integration of the company's mission to speed and shape the energy transition, pioneer new deployment of clean energy technologies and decarbonize the grid.

The building massing respects neighboring view corridors and orients to views of the Blue Ridge Mountain foothills. The design prioritizes occupant well-being, offering excellent natural light, lighting controls and operable shades. The mass timber structure is Cradle to Cradle Certified[™] and contributes to the thermal mass of the building, which tempers fluctuations in indoor temperature and moisture.

The use of mass timber reduced construction time and construction traffic in the neighborhood. Apex Plaza is currently Virginia's tallest timber building.

Community Engagement: How does this project address Design for Equitable Communities and Economy?

Apex Plaza is located in Charlottesville's Strategic Investment Area and includes retail, office, and living spaces adjacent to the Downtown Mall. The development replaces 44,000 sf of paved surface parking with a submerged, off-street vehicle parking garage, more than a dozen electric vehicle charging stations fueled by the building's solar array, indoor bicycle storage facilities and pedestrian-friendly ground level retail.

While the upper level floor plates currently accommodate office space, the building was also designed for next use. The flexible structural grid and optimized massing allows the building to convert to housing, if needed in the future, in an effort to support community and economic resilience.

The MT structure was assembled with only mechanical fasteners and therefore designed for disassembly, which allows the timber members to retain their material asset. The MT could potentially be reused or recycled endlessly and contribute to the circular economy.

Sustainability and Resillience: How does this project address Design for Ecosystems, Water, Energy, Resources, and Change?

Apex Plaza features thermally broken window frames and rain screens, Solarban® 90 glass, a DensElement[™] weather barrier, and Thermafiber insulation. The high-efficiency VRF mechanical systems, such as refrigerant flow equipment and an energy recovery ventilator, result in low energy consumption and low operating costs. MT structures sequester CO2 and allow little to no waste on site during construction.

Apex tenant offices were projected to consume 331,000 kWh/year of electricity on an annual basis. The solar array is projected to generate 364,000 kWh/year of electricity, representing 110% of Apex's annual energy demand, providing net-zero electricity use. The project will also provide an on-site battery energy storage system, which provides a day's worth of electricity to the company's Remote Operations Control Center (ROCC) and data center, should an outage occur.

The third floor roof terrace features a green roof and plantings that support habitat, biodiversity and stormwater retention.

Would you like this project to be considered for a Jury Citation in any of the following categories?: ENERGY & RESOURCES



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Apex's new offices will bring the company's more than 200 renewable energy experts into one building designed for collaboration, health and wellbeing.

In addition to office space, the flexible structural grid and optimized massing allow the building to convert to housing and meet future needs.



DESIGNED FOR NEXT USE: HOUSING











SITE + ROOF PLAN





LEVEL 3 WITH ROOF TERRACE

LEVEL 4 (TYPICAL 5-6)





What if our **buildings were designed like trees** as living organisms participating productively in their surroundings?

OOD ENERGY

- **Rooftop Solar PV Array** Annual production 436 MWh of energy - Zero Net Energy use for Apex offices
- 2 Solar Array - PV Canopy Provides shade and renewable energy
- 3 **High-Performance Glazing** Thermally broken window frames, SOLARBAN 90 insulated glazing unit
- **High-Performance Opaque Envelope** Cross-laminated timber (CLT), DensElement™ weather barrier, Thermafiber rigid insulation, thermally broken rainscreen structure, rainscreen cladding
- 5 **High-Efficiency Mechanical Systems** Variable refrigerant flow equipment, energy recovery ventilator — low energy consumption and low operating costs



Green Roof Terrace

4

Provides habitat, biodiversity and stormwater retention



8



GOOD MATERIALS

Mass Timber Structure - CLT

Sustainably harvested FSC and Cradle to Cradle Certified[™] mass timber provides carbon sequestration, low embodied carbon footprint and fast construction

Cradle to Cradle Certified[™]

Materials and products assessed for ecological and human health

R GOOD LIVES

Daylight and Views + Indoor Environmental Quality

Excellent access to natural light, rooftop landscape and views, lighting controls, occupancy sensors and operable shades

💋 GOOD ECONOMY

10 Workplace Performance Efficient, large and flexible floor plates --interconnected workplace engages associates and fosters collaboration

11 CLT Framing - Designed for Disassembly Modular, adaptable and cost-effective structure



Net-Positive Energy, a model high-performance building

Based on the load analysis APEX tenant office are projected to consume 331,000 kWh/year of electricity on an annual basis. The new building mounted solar installations are projected to generate 364,000 kWh/year of electricity representing 110% of APEX's annual energy demand, providing APEX with net-zero electricity use. The project will also provide an on site battery energy storage system.

Apex's Estimated Electrical Energy Consumption -331,000 kWh per year

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Solar Panel System Electrical Energy Production 364,000 kWh per year

33,000 kWh **Electricity Surplus** (includes 10% consumption buffer)

Designed for Disassembly in the Circular Economy

By assembling the building using only mechanical fasteners, the high-value MT elements can be disassembled and then reused or recycled to be endlessly recirculated in a safe, then **circular, economy.** The MT structure provides an interior tactile benefit while also allowing rapid installation of the structural frame and envelope and decreasing the building's carbon footprint.



20' - 8 1/4" X 18' - 4" Typical Bay with Brace



20' - 8 1/4" X 18' - 4" Exploded Bay

16 WEEK ERECTION VS. 20 WEEKS FOR STEEL

O% WASTE ON SITE (LITTLE TO NO ON-SITE WASTE)

20% SCHEDULE SAVINGS 50% LESS CREW NEEDED VS. STEEL 90% LESS CONSTRUCTION TRAFFIC







Carbon Stored in Wood 2,091 metric tons of CO2



Greenhouse Gas Emissions Avoided (use of CLT vs. concrete/steel) 809 metric tons of CO2



2,990 metric tons of CO2 Potential Carbon Benefit



Glue-laminated timber as a finished product brings natural beauty to occupants



Safe and healthy materials in a collaborative, flexible workplace



By prioritizing material and human health, Apex Plaza aims to bring people together in abundantly daylit, flexible spaces. In addition to natural beauty, incorporating Mass Timber from Nordic Structures allows for transparency in material sourcing. Nordic is a vertically integrated company that owns the forest from which Apex's FSC Black Spruce was sourced. They sustainably manage the timber, use all timber in their renewable powered factory and emphasize their employees' experiences.

Nordic achieved Cradle to Cradle Certified[™] for several of their products — a first for the North American market — as part of a commitment to safe, healthy and circular building materials.





LOW CARBON FOOTPRINT | Mass Timber vs. Concrete

Concrete Option

2-way flat slab at office levels:
10" concrete slabs at office levels
18 x 24 concrete perimeter columns
24 x 24 concrete interior columns

Concrete podium: 26x26 concrete interior columns 168x168x36 interior footings



Mass Timber Option

CLT floor slab at office levels: 6 5/8" thick CLT slabs at office levels 12 7/8 x 12 7/8 Glulam perimeter columns 12 7/8 x 18 Glulam interior columns

Concrete podium:

24x24 concrete interior columns 144x144x36 interior footings



Cradle to Cradle Certified[™] Silver and Bronze Mass Timber products by Nordic Structures

Total Mass Timber area: 123,730 sq ft.



*Carbon stored in wood from Woodworks™ *'Cradle to Gate' Global Warming potential from Tally®







