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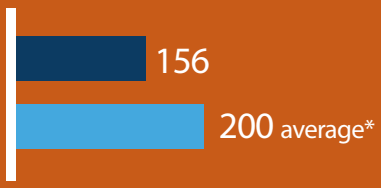
Case Study: Southrise, Hillside Center for Sustainable Living

Southrise is an 12-unit, net-zero, low embodied carbon development currently under construction by Design, Build and Own firm Hall & Moskow. Located in Newburyport, Massachusetts, it is currently the largest hempcrete multifamily building in the United States. Combining airtightness, heat recovery ventilation and solar energy, the units produce very little operational carbon. Previously a coal ash dump, this cleaned-up site will now include rainwater collection for irrigation and toilet flushing, native edible landscaping, onsite farming, low volume plumbing fixtures, and an electric vehicle charging network.

Embodied Carbon

Cradle-to-gate, kg CO_2e/m^2



*Average based on report from 2022.

Reduction Strategies

Tilt-up hempcrete walls assembled on-site to reduce transportation costs and emissions

Carbon Storage

Cellulose insulation in roofs store 17,053 kg CO_2

Hempcrete in exterior walls stores 70,712 kg CO_2e

Bamboo flooring stores 5,384 kg CO_2e

93,148 kg of CO_2e stored

Photos by Sadie Woodward

> Hillside Center for Sustainable Living manifests a holistic approach to low carbon construction, and low carbon living, creating community building around urban agriculture for an urban infill project.
>
> –David Hall, Owner, Hall & Moskow Corp.

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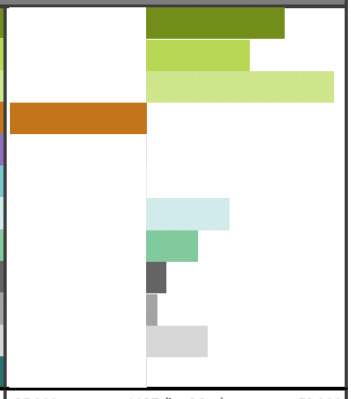
Southrise development has surpassed PHIUS standards for air tightness, making it extremely efficient to heat and cool the 18 units. Heat recovery ventilation systems cycle fresh air into the units and conserve the temperature-regulated air inside. Nearby solar panels supply all the electricity needed to power the units. Rainwater will be collected on site for use in toilet flushing and irrigation. Low-volume plumbing fixtures will be installed. Residents will also enjoy an electric vehicle charging network, and fresh fruits, veggies, and herbs grown on site.

- Passive House level airtightness
- Heat recovery ventilation systems
- Low-flow plumbing fixtures

PROJECT INFORMATION			
Project Name	Hillside Center for Sustainability	**Construction Year**	2023
Design Firm(s)	Moskow/Linn Architects	**Number of Bedrooms**	18
Engineering Firm(s)	Siegel Associates	**Stories Above Grade**	2
Builder / Developer	Hall and Moskow Corp		
Development Project		**CONDITIONED AREA**	
Street Address	17 Cottage Ct.	**Above Grade**	9136 ft²
City	Newburyport	**Below Grade**	0 ft²
Province / State	Massachusetts	**Total**	9136 ft²
Country	United States		
		GROSS AREA	
Building Type	Townhouse (all units)	**Excluding Garage**	9136 ft²
Construction Type	New Construction	**Garage**	0 ft²
Project Stage	Construction in Progress	**Total**	9136 ft²

The above photo showcases Cottage Court, another project by Hall and Moskow. This neighboring project resembles the completed look of Southrise.

MATERIAL CARBON EMISSIONS BY SECTION	
Footings & Slabs	**35,176** kg CO_2e
Foundation Walls	**26,417** kg CO_2e
Structural Elements	**47,970** kg CO_2e
Exterior Walls	**-34,704** kg CO_2e
Party Walls	**0** kg CO_2e
Exterior Wall Cladding	**0** kg CO_2e
Windows	**21,247** kg CO_2e
Interior Walls	**13,003** kg CO_2e
Floors	**4,917** kg CO_2e
Ceilings	**2,618** kg CO_2e
Roof	**15,599** kg CO_2e
Garage	**0** kg CO_2e
NET TOTAL	**132,243** kg CO_2e



LOWEST CARBON MATERIAL APPLICATIONS		
SECTION	**kg CO_2e**	**MATERIAL**
Exterior Walls	-35,775	Hempcrete / Cast in-situ / IsoHemp / Europe / R 2
Roof	-11,693	Cellulose / dense pack / R 3.7/inch / CIMA [Indus
Floors	-2,433	Laminated Bamboo flooring / MOSO / Bamboo Eli

Adding up to a total 93,148 kg CO2e stored, the use of these materials keeps our CO2e emissions down. Hempcrete and bamboo are fast-growing natural fibers that sequester large amounts of carbon efficiently before being used as building materials. Cellulose insulation is made up of recycled newsprint.

Lessons Learned

1. Exterior natural plaster finishes must be adapted better to be applied in cold weather climates.

2. Installation of Zip R sheathing before interior partitioning offers a highly effective means of air sealing for a hempcrete building.

3. Building with hempcrete tilt up wall panels at this scale requires large amounts of shelter for hempcrete curing. Temperatures constrain the timing in which hempcrete can be placed into the walls.

Project Information

Project name: Southrise, Hillside Center for Sustainable Living

Location: Newburyport, Massachusetts

Builder: Hall and Moskow Corp.

Year built: 2023

Typology: Townhouse

Size: 12 units | 7 one-bedroom units and 5 two-bedroom units

Cost: $3,576,073