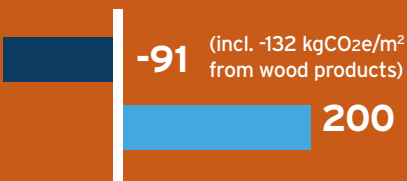


Case Study: Strawtegi CO2ttage

The Strawtegi CO2ttage demonstrates how natural materials like straw, hemp, and wood fiber can be used to build a cozy, well-insulated home with a negative carbon footprint, while meeting and exceeding standards for health, safety, comfort and environmental sustainability. These materials eliminate fossil fuel inputs in favor of sustainably harvested biomass. This tiny house uses 5.5 tons sequestered CO₂ in the building shell and provides impressive thermal performance with walls at R-30 and the roof assembly at R-49. It's the first permitted structure of its kind in the United States to be insulated with chopped straw. The home's passive solar design works together with rooftop solar panels toward achieving net zero energy.

Embodied Carbon

Cradle-to-gate, kg CO₂e/m²



*Average based on report from 2022.

Reduction Strategies



Prefabricated wall-assembly



Lower cement concrete mix for foundations



Locally produced Hess natural perlite insulation



Reclaimed barn beams for floor joists

Carbon Storage



Chopped straw insulation



Hemp wool insulation in roof assembly



Certified wood in finishes and siding



Wood fiberboard structural sheathing

15

tons of CO₂ stored



“

This tiny house stores 15 metric tons of CO₂ for the next 100+ years. Imagine how much more climate impact we can collectively realize at scale by building with materials that naturally sequester carbon.

Susan Klinker, Strawtegi Co-Founder

Operational Carbon | The passive solar design is complimented by rooftop solar panels. An R-32 refrigerant efficient mini split heat pump, electric fireplace and ERV heat, cool and ventilate the space with clean, filtered fresh air, even in the worst outdoor air quality days. The hybrid heat pump water heater and appliances were selected to maximize energy and water efficiency. Triple glazed windows provide solar heat gain in the winter, when the sun sits lower in the sky, while 100% of the south facing glazing is shaded by overhangs in summer.



Triple-glazed windows and overhangs

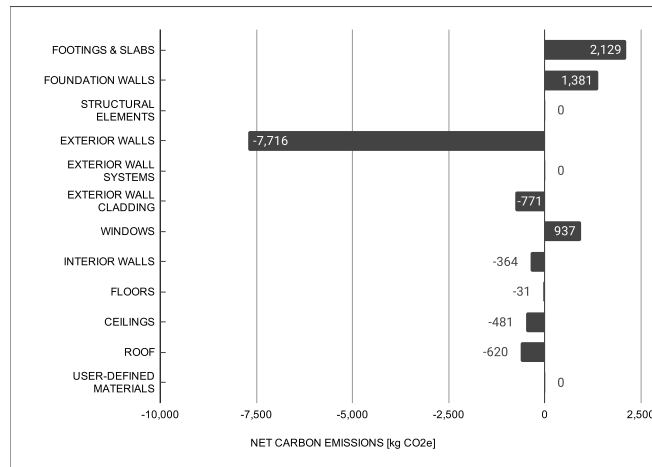


Mini-split heat pump and ERV system



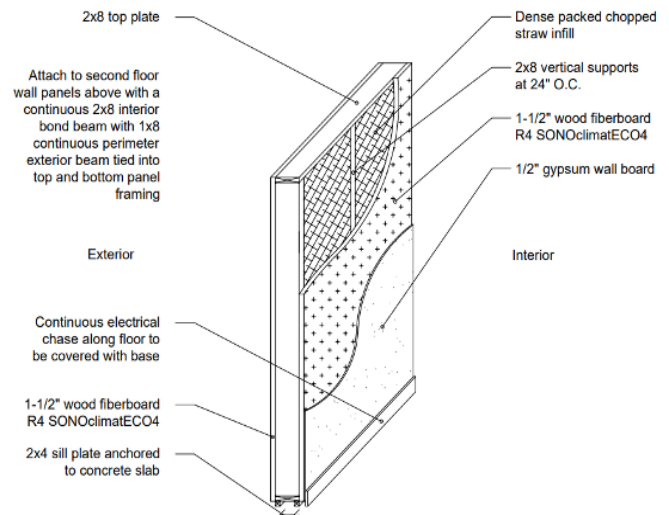
Passive solar design with rooftop solar

SECTION	NET CARBON EMISSIONS [kg CO ₂ e]
FOOTINGS & SLABS	2,129
FOUNDATION WALLS	1,381
STRUCTURAL ELEMENTS	0
EXTERIOR WALLS	-7,716
EXTERIOR WALL SYSTEMS	0
EXTERIOR WALL CLADDING	-771
WINDOWS	937
INTERIOR WALLS	-364
FLOORS	-31
CEILINGS	-481
ROOF	-620
USER-DEFINED MATERIALS	0
NET TOTAL	-5,535
NET TOTAL PER SQ. METRE	-117



Carbon Footprint Calculations (above) | The exterior wall assembly using agricultural waste in the form of dense packed chopped straw insulation and wood fiberboard sheathing is responsible for the lowest negative carbon footprint numbers. These help to balance out higher emissions related to the use of other durable high-performance materials such as concrete, metal roofing, and windows, achieving a net 5.5 tons CO₂ stored in the building shell.

Wall Panel Assembly (right) | 2x8 framing is wrapped with 1.5 inch thick food fiberboard creating an R-4 thermal break at both the interior and exterior wall planes. The panel core is insulated with locally produced dense packed chopped straw. Typical panels are 4'x8' to maximize material efficiency. At roughly 300 lbs, the panels can be manually tilted up in place, or set with a mechanical lift.



Lessons Learned

1. Allow extra time to evaluate and obtain healthy and sustainable secondary building supplies (adhesives, fillers, finishes, sealants, etc.)
2. Help educate your local building officials along the way.
3. Select natural latex or CertiPUR upholstery and OekoTex Certified textiles for all furnishings.

Project Information

Project name: Strawtegi CO₂ttage
Location: Salt Lake City, Utah
Architect: Love Schack Architecture
Builder: Strawtegi, with Peterson Associates Builders
Year built: 2024
Typology: Detached Accessory Dwelling Unit
Size: 650 SF GFA
Cost: \$250,000 - \$350,000