

PROJECT SUMMARY

Phillips ReGen is a deep-energy retrofit that aims to preserve the original character of a century-old masonry building while meeting current global environmental demands and the local need for affordable, durable, and resilient housing. Originally built in 1904 and vacant since the 1990's, the existing building is a sadly deteriorated 3-story brick structure located in the Phillips Neighborhood of Minneapolis. In collaboration with the City of Lakes Community Land Trust and Hope Community, the University of Minnesota NorthStar Retrofit Team has developed a strategy to "ReGenerate" this neglected property into a lasting community asset. The overarching goal of this project is to develop a solid Net Zero Energy retrofit solution based on a systems-guided approach and sound building science principles in a way that can be replicated for other buildings of this iconic archetype in cold climates.

DESIGN STRATEGY

The overall design strategy for Phillips ReGen is defined by the needs of the community, building preservation techniques, and net zero design principles. Compared to Minneapolis averages, this neighborhood has twice the population density and half the median household income. 20% of households have elderly dependents and 40% of households have children, making affordable multifamily and intergenerational housing a priority. The living space has been split into eight units of varying size to accommodate these family types and needs. Rehabilitating this building, rather than demolishing it, symbolizes the importance of community revitalization. Restoring the facade of the iconic, highly-visible property aims to preserve and respect the architectural and cultural history of the neighborhood. Through a combination of climate-specific enclosure assemblies, the NorthStar Retrofit Team has identified an approach that allows for the original decorative brickwork on the building's south face to remain for all to enjoy without compromising overall energy and hygrothermal performance.

Preservation | Reclamation | Innovation | Replication



South Facade of 628 E Franklin

PROJECT DATA

LOCATION:	MINNEAPOLIS, MN, USA
CLIMATE ZONE:	6A
BUILDING SIZE:	14589 SF
HOUSING UNITS:	6 W/ 2 ATTACHED STUDIOS
AVG. UNIT SIZES:	1,475 SF 3BR, 960 SF 2BR, 560 SF STUDIO
AVG. UNIT UTILITY COST:	WITHOUT PV: \$ 226/MONTH WITH PV: \$110/MONTH (ENERGY, WATER, SEWER)
CARBON EMISSIONS:	OPERATIONAL: 1,314 LB CO2/YR EMBODIED: 647 US TONS CO2
CONSTRUCTION:	\$5,602,858.74
EUI:	15 kBtu/SF
HERS:	WITHOUT PV: 30 WITH PV: -2

TECHNICAL SPECS

ENCLOSURE SYSTEMS

SLAB: R-12	FOUNDATION: S: R-19; N,E,W: R-22
ROOF: R-50	WALLS: S: R-20; N,E,W: R-27
INTERIOR FLOORS: R-13	WINDOWS: S: U-0.18; N,E, W: U-0.24

MEP SYSTEMS

HTG/CLG: GSHP w/ water-to-air VRF & in-unit air handlers
VENTILATION: Balanced ERV FILTRATION: MERV 12
MUA: 150 cfm w/ preheat DHW: GSHP w/ central storage
APPLIANCES: Energy Star or better LIGHTS: 100% LED

ROOFTOP PV: 45 KW fixed panel system



PROJECT HIGHLIGHTS

ARCHITECTURE

To preserve the architectural character of the 1904 street facade, Phillips ReGen is preserving the Chaska brick that is unique to this region. Keeping the buildings' beautiful quoining and replicating the iconic cornice is also important for the front facade. By retrofitting this building, we honor the history of the Phillips community and maintain the vernacular architecture of the neighborhood. Using community-based design practices, this building meets diverse local housing needs and modern living standards.

ENGINEERING

The enclosure and mechanical systems for Phillips ReGen are selected using climate-specific criteria, constructability, user friendliness, and a wide variety of performance, environmental, and cost analysis based on net-zero design principles. Due to enclosure challenges and PV size limitations, this project was forced to lean heavily into the efficiency of the MEP systems to achieve Net Zero Energy. The zoned HVAC system utilizing ground source heat pump technology is being explored for its solar compatibility and cold-climate performance.

MARKET ANALYSIS

Phillips ReGen builds off of the City of Lakes Community Land Trust's affordability framework and local demographic data to provide housing that serves the needs of the local community. Initial costs will be funded through a variety of public and private financing sources while operating costs and mortgages will be affordable for families at 60% of the Area Median Income.

DURABILITY & RESILIENCE

The underlying mission of Phillips ReGen is to preserve a century-old building for both present and future generations. By acknowledging the hygrothermal properties of masonry, the retrofit strategy synthesizes concepts of energy performance and material durability to establish a robust design solution that ultimately increases the building's usable lifespan.

EMBODIED ENVIRONMENTAL IMPACT

Insulation retrofits are one of the most carbon-intensive aspects of this project. By mindfully using a combination of insulation types based on the enclosure assembly, the embodied carbon of the Phillips ReGen is minimized without compromising operational carbon.

INTEGRATED PERFORMANCE

All of the retrofit solutions for Phillips ReGen will be optimized to balance the existing conditions with performance, occupant health, and environmental impact – all within the context of affordability.

OCCUPANT EXPERIENCE

By combining vintage architectural features with modern living standards, Phillips ReGen creates a sensation of belonging and wellness. The property will have multiple community spaces and accessibility measures to make all occupants feel at home.

COMFORT & ENVIRONMENTAL QUALITY

To combat the health and comfort impacts of local urban pollution and Minneapolis' drastic climate, Phillips ReGen incorporates lighting design, air filtration, healthy interior materials, and occupant-centered controls.

ENERGY PERFORMANCE

Based on its 1990's condition and occupancy the building was estimated to have an EUI of 78 kBtu/ft². With the proposed enclosure and MEP upgrades, Phillips ReGen is estimated to have an EUI of 15 and a HERS score of 30 without PV. The roof-mounted photovoltaics have been optimized to provide an estimated 49 MWh/yr of solar energy and brings the HERS to -2.