Description of Project
The project includes the third phase of a round residential design that will exceed ENERGY
STAR standards and be engineered with the capacity to meet net-zero goals. Construction
methods, materials, and production efficiencies achieved during the project will result in a
renewable energy home kit and ready to manufacture at an affordable price.

Project Tasks
There have been delays in the project and several of the objectives are being accomplished
later than anticipated. Most of the delays in reaching the objectives as per the timeline are
COVID-19 related either directly, as for a time many services were not available due to
temporary business closures, or indirectly, in that once these businesses started again they
had a backlog of jobs to catch up on.

OBJECTIVE 1
Create a Renewable Energy Plan for Modifying Living Stone Lodge Home Design
Progress Achieved:

Task: Modify Architectural & Structural Drawings
QTR 5
Architectural drawings were completed in QTR 4. Structural drawings are still 90% complete as
of QTR 4. There has been no progress on the structural drawings due to changes made in the
designs to improve construction efficiency and affordability. The changes need to be reviewed
and the drawings still need to be created by a structural engineer. Since the end of COVID, the
engineers have been backlogged.

Task: Design & Engineer Energy Corridor
QTR 5
This task was completed in QTR 4.

Task: Design & Engineer Electrification Conversion
QTR 5
This task was completed in QTR 2.
Task: Create Renewable Energy Plan

QTR 5
The Renewable Energy plan is completed and all products have been selected but some of the required components are not currently available. We have been notified they should be sent to the construction site by the end of September. This will delay the home construction as the sheetrock and other finish work cannot be completed until the components are installed.

OBJECTIVE 2

Develop manufacturing process and affordable efficiencies for commercialization

Progress Achieved:

QTR 5
All the shop drawings are complete except the SIPS roof panels which are under design for more efficiency and affordability. We’ve contracted a SIPS expert who is consulting on the design.

Task: Detailed Mechanical & Electrical shop drawings and specifications
QTR 5
All the mechanical and electrical shop drawings have been completed.

Task: Develop ICF Custom Mold
QTR 5
The Custom Mold was completed in QTR 4.

Task: Engage Manufacturers for parts and production bids
QTR 5
This task was completed in QTR 3.

Task: Manufacture and production for home parts to be delivered June/July
QTR 5
This task was completed in QTR 2.

Task: Create a Builder's Manual
QTR 5
This task is ongoing with development of the content.
OBJECTIVE 3

Build Two Model Homes

Progress Achieved:

QTR 5

In QTR 4 all the windows, doors and siding were completed for both homes as well as the roofing and interior framing. The electrical wiring was 70% complete.

We’re currently waiting to receive components to finish and install the mechanical systems and then be able to complete the sheetrock; the last 30% of the electrical wiring; and add flooring, cabinets and finishes.

OBJECTIVE 4

All Objective 4 tasks include activities that will be accomplished when the project is completed.

Task: Complete Energy Audit & Comparison Report
Progress Achieved: TBD

NOTE:
Two Preliminary blower door tests were completed to verify the airtightness of the construction. Corrections were made when air leaks were identified in test 1. Blower door test 2 showed the airtightness to be above the goal set.

Task: Verify Energy Performance Goals
Progress Achieved: TBD

Task: Prepare & Publish Case Study
Progress Achieved: TBD
Deliverables

Renewable energy strategy for electrification

Electrification is 100% complete. The research and modeling for ground performance for geothermal and air-to-water heat pump have been completed.

Model homes constructed with renewable energy (geothermal ground source heat pump, air to water source heat pump, passive solar energy, and solar electric pv system with battery backup.)

The decision was made to use solar energy as the primary electrical renewable source. The system will be based on a 6 KW electrical load using 16 solar panels and an 18 KW lithium ion battery storage. These components when calculated for the system in the conditions of Western ND will provide a net zero solution.

Renewable energy corridor capable of adding solar or wind energy easily

The Structural & Architectural engineers have agreed on the energy corridor design and drawings are completed.

Custom mold for 22.5-degree ICF Corner Blocks

The mold has been completed and shipped to the manufacturer in Canada where it is being tested the first of May. LSL expects to receive the final corner blocks in June to begin assembling houses. The test is complete and the mold is ready for future orders as we go forward to commercialize in 2022.

Architectural, Engineering and Electrical design drawings of high-performance home (100% complete)

Architectural design drawings are 100% complete. Engineering drawings are 100% complete. Electrical drawings are 100% complete. Structural engineering drawings are 100% complete.

Detailed shop drawings with all specifications for manufacturing

All shop drawings are complete except SIPS panels which are under development and review for efficiency and affordability.

Published Builder’s Manual

The initial outline, chapters, content, and design layout are in process. The photography and drafting illustrations have been ongoing. Photographs are still ongoing of the actual construction that has not yet been completed.

Energy audit and documentation of energy performance goals

TBD (due in final quarter of project)

Manufacturing-ready, affordable, energy-efficient Kit Home

TBD (due at completion of project)
## Expenditures

**EXPENDITURES FOR THIS REPORTING PERIOD ONLY**

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