# **EXECUTIVE SUMMARY**

This feasibility report analyzes a recent study conducted on a 2,4550 ft2 residential home (referred to as SH or Standard Home) built in Ann Arbor, Michigan. The goal of the study was to determine the effectiveness of employing energy-efficient building strategies to minimize energy consumption and costs in a residential home.

The home was modeled using Energy-10, a software package capable of calculating the energy consumed during the use of the home over a 50-year period. While keeping the basic functional units (such as floor plan, occupancy, type and number of appliances, and internal volume) of the home consistent, SH was then modeled to reduce the energy consumption by employing various energy-efficient strategies (referred to as EEH or energy efficient home).

The total life-cycle consumption of SH was found to be 15,455 GJ, which consisted of space and water heating and cooling, lighting, ventilation, and appliances. The total life-cycle energy consumption of EEH was reduced to 5,653 GJ. The purchase price of SH was $240,000 (actual market value) and was determined to be $22,801 more for EEH. The cost analysis performed found that despite the 9.5% increase in the purchase price of an energy-efficient home, lower annual energy expenditures make the present value nearly equal to the more energy-consuming version. The accumulated life cycle costs are higher in EEH until year 48 and are $1,054 (or 0.1%) less at year 50.

It was found that the most effective strategy for reducing overall annual energy costs is installation of a high-efficiency HVAC system. However, for reducing overall energy consumption, insulation was the most effective strategy followed by high-efficiency HVAC and air leakage control.