

# Section 1: Project Progress Report

## Project Introduction

### Project Summary

The traditional model of a public school is under significant pressure for change. Tax dollars are being siphoned away by proponents of school choice through vouchers, online education, and charter schools. With a comprehensive plan for improving student learning, saving energy, and reducing operating costs, this project at James Cole Elementary (JCE) will demonstrate that public schools can continue to achieve exceptional outcomes for their students. A school's greatest resource will always be its teachers and staff, but we will show that a school building can help create the best possible learning environment.



Figure 0.1: JCE's earth-berm and daylighting features

Our goal is to convert JCE in Stockwell, Indiana into a net zero energy facility, incorporating innovative and sustainable systems into the design that can be interactive, holistic, and evoke the inner consciousness of children towards creating a sustainable future. The school was built in 1988 with energy efficiency at its core, integrating an innovative earth berm design, daylighting, and geothermal heating/cooling shown in Figure 0.1. With time, the focus on sustainability has faded and our goal is to realign the building with its original concept. JCE will be the first in its school corporation to pursue net zero energy, making it a model for other renovations and future school designs to follow in this rapidly growing school district.

The design tasks for JCE NetZero include (1) completing a comprehensive analysis of the school's performance, (2) identifying cost-effective and sustainable improvements, and (3) improving the school design to enhance education, mindfulness, and active learning. The school has sufficient space for a ground mount solar array that will make JCE net zero energy on an annual basis. The solar panels and other innovative features of the renovation will be used in an interactive learning platform for the staff, students, and surrounding community

The concept behind the JCE project is achieving a natural balance between people and their environment. The earth provides energy and natural resources, while JCE provides the next generation of environmentally conscious citizens. This is part of a broader strategy for overall sustainability that will have a positive impact on public education in Indiana and the U.S. This re-design will help the Tippecanoe School Corporation continue its tradition of educational excellence.

### Project Data

- Location: Stockwell, IN | Climate Zone 5A
- Building Size: 47,250 SF, 1-story
- Site (renovation scope): 13 acres
- Classrooms: 16 | Occupancy: 300 Students and 35 Staff
- Current EUI: 94 – Target EUI: < 30
- Utility cost: Reduced from \$4,500 per month to < \$500 per month (primarily for propane)

### Technical Specifications

- Roof: Sheet Metal – Improve R-value from 16 to 45 | Windows: Improve U-value from 0.58 to 0.30
- Air Delivery: One central AHU with integrated heat recovery rated at approximately 8,000 cfm
- Temperature Control: Zoned control of heating & cooling using 38 heat pumps
- Heating & Cooling: Closed loop geothermal system with a back-up propane-fired boiler
- Water Heating: Tankless propane-fired hot water heater eliminates standby losses
- Energy Mix: 95% electric and 5% propane after improvements
- Proposed renewable option: ~300kW ground mount solar array



Figure 0.2: JCE classrooms are designed for 25 students