Net-Zero is a state of being. It is not a technology or a design; it’s a measure of an occupant’s interaction with the built environment over time. While design decisions contribute to performance after occupancy, they cannot account for the unpredictable and variable nature of human interaction with an autonomous system.

The process that this project pioneered offers the Army a solution to this familiar design paradigm. While cumulatively it is an exercise in planning and design, its true value is as an investigation of the synergies between soldier-to-environment interactions within the military. Just as the inclusion of the soldier equates to total compounded efficiency, so too does the amalgamation of multiple technologies. The strategic layering of systems does not yield a 1 + 1 + 1 = 3 effect. Rather, the synergistic relationships respond to one another (resulting in an exponential efficiency and capital savings) where 1 + 1 + 1 = 5.

This project explores the value of those interactions and prioritizes opportunities that will catalyze the Army toward a net-zero future. The success of our military (and society in turn) does not inherently lie in the design of infrastructure or facilities. It lies in its soldiers. Military construction must be treated as components in a larger system and soldiers as the sustaining force that will yield an integrated, sustainable and resilient future.

The Illustrative Plan above provides an alternative for the AIT Complex that employs sustainable design principles. From this plan, a Form Based Code was developed to establish a planning language carrying the project vision forward. The standard design Barracks buildings (4) on the East were to be replicated on the West boundary. By reprogramming the buildings for optimal orientation and function (shown below), the team was able to consolidate the footprint to the equivalent of two buildings. The smaller site area was then restricted to existing grayfields leaving 27 acres of land to the South as green space. Additional efforts were made to site the buildings adjacent to the existing track saving the project approximately $500M. Exercises in infill development located an additional 75,000+ sq. ft. of buildable area.

Through compounded application, the total summation of systems results in exponentially greater savings and reduced cost. After Net-Zero is achieved, continued implementation of synergy results in increased sustainability and/or supplemental income through energy provided by the installation to the surrounding communities.

Energy, Water and Waste Efficient Military Installation, Fort Leonard Wood, MO, United States