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## EXECUTIVE SUMMARY

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This report examines energy use and emissions production of the Landscape Building at Janelia Farm Research Campus using ASHRAE Standard 90.1-2004 Energy Standard for Buildings at design conditions.

The Landscape Building is a 546,436 square foot world-class biomedical research facility owned by Howard Hughes Medical Institute. The facility is built into the side of a large hill overlooking the Potomac River. It is currently beginning its third year of construction in Ashburn, Virginia located 45 minutes outside of Washington, D.C. The building is divided into Zones A through G on three different levels.

The building is supplied air by 15 air handling units which feed into one plenum that serves the entire building. There are 2-50,512 MBH and 2-20,125 MBH (one future) boilers. The majority of the load is used for the air handling unit's steam coils. The remaining steam is used at various shell and tube heat exchangers. The chiller plant has seven chillers and seven cooling towers (one back-up) each rated at 1200 tons. The portion of the load that does not go to the air handling units serves various equipment within the building. For example, the data center has air conditioning units that require chilled water.

The Landscape Building is able to achieve a Gold LEED™ rating, but the owner is not applying to be rated. HHMI wanted to be rated Platinum or not at all.

HHMI has asked to keep the mechanical space completely separate from the rest of the building. As a result, almost 50% of the building is dedicated to mechanical systems. All of this space is located in the back of the building buried up to 60ft underground.

The building was modeled using Carrier's Hourly Analysis Program 4.20a (HAP) to compare a calculated design load with the actual design load performed by Burt Hill Kosar Rittelmann. In addition to this, HAP's building simulation provides data on energy usage and emissions production. The emissions data was compared to a series of spreadsheets created by the Energy Information Administration, United States Department of Energy.

The HAP calculations did not come up with numbers similar to those of the original design. This can be attributed to crucial information not being known and assumptions made during calculation.