



EXECUTIVE SUMMARY

1050 K Street is an office building located in downtown Washington, D.C. The mechanical system currently provides energy efficient cooling and heating to the occupants through one central outdoor air unit and variable air volume units located on each floor. The outdoor air unit utilizes an energy recovery wheel to preheat and cool the incoming air. Cooling coils are provided in both the ERU and each AHU to provide further cooling. All of the coils are fed by three 115 ton rotary screw chillers and when whether permits, a water side economizer heat exchanger between the cooling towers and the chilled water loop. All space heating is provided by the energy recovery unit and electric reheat at the perimeter terminal units.

The DOE-2 software eQuest was used to perform energy simulations to determine the efficiency of the system. The VAV system described above was compared to a chilled beam system which will also use the energy recovery unit for its outdoor air. The most critical differences between the systems is that the VAV system requires an air handling unit on each floor to mix the return air and outdoor air while the chilled beams provide mixing directly in the space. The chilled beam system also provides the cooling coil in the space while the VAV system has one in each of the AHUs. Although the chilled beam system can provide the cooling more efficiently than the VAV system, the high initial costs make it less feasible to implement. In this case there is a 61 year payback period between the energy savings and the initial costs of the VAVs and AHUs and the chilled beams. Given such a long payback period it is not economical to implement the chilled beam system over the VAV system currently installed.