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Project Profile

Washington Athletic Club

The Washington Athletic Club is a private athletic facility located in the heart of the city. Originally built in 1930, the building comprised 200,000 square feet on 26 floors. In 1954, addition was completed adding another 30,000 square feet on four floors. The last major addition was completed in 1970 when eight more floors, totaling 70,000 square feet were added. The facility offers 116 hotel rooms for members and guests, along with athletic club facilities, banquet facilities, meeting rooms, restaurants, lounges, a gym, handball and racquetball courts, saunas and a swimming pool. Current membership of the WAC numbers close to 11,000.

The original 1930's building was not air conditioned. Ventilation air was supplied by two central fans and heat was provided by steam radiators and coils, with steam purchased from Seattle Steam. The 1954 addition was the first that included mechanical cooling. In 1957, air conditioning, utilizing D/X cooling, was added to the pre-1954 banquet rooms. The 1970 addition was a major project that included a central chilled water plant and heating water plant. An energy management system was installed in 1988 to provide basic on/off scheduling for the 1970's multi-zone units as well as the 1957 A/C units.

In 1993, as part of the Energy Smart Design program sponsored by Seattle City Light, an energy audit was conducted on the facility. The audit revealed several energy conservation measures (ECMs) that made sense to incorporate. Due to budget constraints, however, it was decided to spread these improvements out over two years. The first phase of the project was started in January of 1994, and included the installation of a new Teletrol DDC system to replace the existing pneumatic controls on seven air handling units, and provide supervisory control over 25 other air handling units. The chilled water and hot water plants were retrofitted for total DDC control, and eight Variable Frequency Drives (VFDs) were installed on various pumps and fans. In addition, the D/X units were converted to chilled water and the swimming pool controls were converted to DDC.

The intent of the first phase of the project was to lay the foundation of a system that

would be capable of eventually being expanded to take control of all the Club's mechanical systems. A computer using Teletrol's PINNACLE graphical user interface was provided to make the system easy to use for operators who had no previous exposure to DDC systems. Phase 1 was completed in April of 1994 and extensive auditing was performed by Seattle City Light's engineers to verify that actual savings were comparable to the original projections.

The second phase commenced in April of 1995 and included the conversion of all 22 remaining air handlers to full DDC, and the addition of VFDs on all AHUs. The desired control sequence required modifying the zone dampers to provide separate modulation of the heating and cooling dampers, and control of the economizer and hot and cold deck control valves. The control sequence polls all of the zones supplied by a unit and resets the hot and cold deck temperatures based on the greatest zone differential from setpoint. If any zone exceeds an adjustable threshold from setpoint, the VFD is allowed to start increasing fan speed to satisfy the zone load. The system currently features 20 controllers spread out over 23 floors and serving approximately 15,000 points of control.

The system is aggressively scheduled by the operating engineers to insure that units only run when needed. According to the lead Facilities Engineer, Dennis Williams, "Without a control system like Teletrol's, we wouldn't be able to be as aggressive about the scheduling of the meeting rooms and other systems serving the multitude of areas we have with different operating schedules. In addition, the ability to remotely monitor and change setpoints has been a tremendous advantage over the older system."

Final system verification of Phase 2 was completed in November of 1995. The energy audit conducted in 1993 showed a potential energy savings of 1,240,716 kWH/yr or roughly 103,000 kWH per month. Through the first four months of monitoring (while the second phase was still being fine tuned), the average monthly savings has been approximately 100,000 kWH per month. Seattle City Light awarded the WAC a total of $306,237 to offset the total cost to implement the ECMs which had a total cost of $511,025. The savings on their electric bill, coupled with the savings on the steam bill, will provide a project with a simple payback of under four years. According to building superintendent Andy Voogd, a 25-year employee with the WAC, "It is a rare opportunity for a maintenance department to contribute in a positive way to the bottom line for the building ownership. Dennis and his staff have wrapped their arms around this control system and are wringing every dollar of savings possible from it".

Funding is anticipated in the coming year to expand the control system to include zone occupancy sensors to provide individual zone setbacks and local lighting control.

The real benefits: reduced energy and operating costs, better comfort, streamlined operations, and a good financial return.

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