

Holiday Energy Curtailment Program to Reduce Energy Costs

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ABSTRACT

During the Fall of 2001 a program was designed, developed, and implemented to reduce energy consumption, and ultimately utility costs. The energy curtailment period was from December 15, 2001 to January 14, 2002. The program was a partnership between Baylor Facility Services staff and the Baylor community. A program manual was developed which categorized the type of building and the space to be curtailed, scheduled, and monitored during the program period. Occupants of the building were informed of schedules and both technological (EMS) and human intervention was used day and night to ensure the buildings were operated within proper parameters.

Using the previous year utility bills for gas and electric to compare, consumption was reduced by approximately 35,000 MMBTU. The ultimate savings to Baylor were approximately \$150,000. The success of the program has created strong community support for a similar program for the 2002-2003 holiday period.

INTRODUCTION OF THE ORGANIZATION

Chartered in 1845 by the Republic of Texas and affiliated with the Baptist General Convention of Texas, Baylor is the oldest institution of higher learning in the state and the largest Baptist university in the world. The beautiful 432-plus acre campus is located on the banks of the Brazos River in Waco, Texas, a metropolitan area of 215,000 people. While remaining true to its heritage, Baylor has grown to more than 13,000 students, who originate from all 50 states and some 85 countries. The high quality of the student body allows Baylor to be ranked among the nations top 1 percent in the number of freshmen National Merit Scholars enrolled. Students may choose from 162-baccalaureate degree programs, 73 masters programs and 19 doctoral programs. Baylor is a nationally acclaimed teaching institution and an emerging research community where both the dissemination and discovery of knowledge are important. With a student/faculty ratio of 18:1, Baylor maintains small classes averaging 29 students, and faculty rather than graduate students teach approximately 92 percent of all classes.

STATEMENT OF THE PROBLEM/INITIATIVE

Initiate and institute for the campus buildings, an energy curtailment program, during the 2001-2002 holiday winter recess, to reduce energy consumption and energy costs. Normally the buildings were operated to not take advantage of the opportunity. During this process essential activities of the University were supported to operate normally, as

well as planned maintenance on critical mechanical and electrical was accomplished.

DESIGN

An energy curtailment committee was established consisting of facility personnel that included people of diverse talents. A Holiday curtailment manual was written to both communicate to the University the objectives and methods, as well as guide the facilities personnel to implement the process. As the date approached to begin the curtailment period, a luncheon attended by Senior Management University personnel received a presentation explaining the Holiday Curtailment Process. The event allowed a clearer understanding of the program. A sitemap was used to identify and classify all the buildings on campus, into a specific category. The three categories are "continuous use", "partial use", and "not in use". Using these categorizations it was determined how to schedule the heating, cooling, and lighting for the particular buildings. Of course a building in continuous use has less energy opportunities than one that is not in use during this period.

A cost savings projection was established to identify to the University the range of funds saved during the curtailment period. By using recent electric and gas bills a unit cost of energy was established, which was used in an equation along with consumption reduction estimates. Policy direction was devised to establish direction and instructions to essential staff. From the first day the curtailment began through the last day, each was described to follow general operational guidelines. Monitors with specific instructions and daily forms to fill out status performed their job function on a shift basis. Operational instructions to transcribe temperatures were established before

the curtailment program began. By using a map of the campus, monitor routes were established to equally divide job functions as equally as possible. Forms were developed to identify campus buildings with the "time", "outdoor air temperature", and monitors name. Also, emergency call lists were developed with "shop names", and appropriate persons to call in case of a problem. Also Baylor University staff associated with the specific buildings were listed along with their phone numbers. The names and phone numbers of the curtailment committee are listed and called in an event of any problem. Each person on the main committee was appointed to a specific date range to the "on duty Foreman" during those dates.

Through the facilities automatic temperature control system many buildings on campus can be scheduled on/off. A schedule was developed to identify all the buildings on this system and the specific equipment that can be controlled. By using the "building category" the equipment on the automatic system, along with dates and times, was combined to complete a detailed schedule. Buildings and equipment not on the automatic temperature control system were manually turned on and off.

By contacting appropriate University personnel a document and schedule was developed to identify events taking place on campus. This included both holidays and sporting events.

IMPLEMENTATION

The holiday curtailment period began on December 15, 2001 and was completed on January 14, 2002. Using the building categorizations and dates, equipment on the

automatic temperature control system was programmed to turn on/off at the appropriate times. This also included establishing temperature changes in the buildings to lower energy consumption. Therefore instead of operating the building at 74 degrees it was operated at 55 degrees. Due to these scheduled cutbacks in equipment operations and temperature reductions allowed the Central Plant to reduce their operation of large chillers and boilers. By cutting back the load on chillers and boilers substantially reduces the energy consumption for the facility.

The one operating chiller actually was able to use "free cooling" due to its internal design, and the required reduced loads. This boiler operated at less capacity to supply heat, as the buildings did not have to warm up to their original setpoint temperature.

The monitors walked the facility and inspected the buildings during their appropriate shift. The appropriate form was completed and at the end of the shift was turned into the "service response center" The on duty person in the center insured the form was appropriately completed and filed. Each day passed and personnel on the committee insured proper communication between members.

On the last day of the curtailment period the automatic temperature control system was returned to its normal operation schedule. Any buildings operated in a manual mode were returned to operation. All forms were taken for review. A detailed list of any complaints or problems was completed which was identified through the service response center.

BENEFITS

Baylor University Management was very excited about the savings achieved during this period. After a few weeks all the utility bills were accounted and tabulated to identify the savings. A total saving of \$137, 982 was realized.

The Baylor campus community worked hand in hand with the facility to complete the effort, and allowed for relationships in other fields to advance.

RETROSPECT

Overall the total program, during the curtailment period was a success. There were a few opportunities that can be improved upon for the future. Monitor routes are required to be divided so the walk through are more evenly distributed. The routes need to be divided based on categorization of buildings, to distribute the scope of work between work groups.

A separate section is required to be added to the Holiday Curtailment Manual, for procedures and duties for operation of the BEC. The operation of free cooling needs to be outlined, and the associated operating procedures require to be outlined.