

2023 ENERGIZING EFFICIENCY CASE STUDY

City of Alexandria's Chinquapin Recreation Center Commissioning

THE CHALLENGE

Chinquapin Recreation Center in Alexandria, Virginia is a 35,000 square foot facility that serves a variety of community activities including racquetball, events, weight-lifting, and an indoor pool. Indoor pools are notorious for their high energy use due to the need for heating pool water, high indoor air temperatures, dehumidification, and high shower use. For the City of Alexandria, its **energy use was the highest per square foot of any facility**, which in 2020 reached 350 kBtu/square foot/year.



THE SOLUTION

City of Alexandria's Department of General Services **re-evaluated system operations** and took advantage of a **major replacement** to generate energy savings. One of the main findings was that certain system operations were not re-adjusted after a 1990s renovation. The initial 1980s design included a concessions stand that needed high temperature domestic hot water (DHW) for sanitation requiring two DHW recirculating loops. However, after the concession stand was renovated into office space, no one turned off the high temperature recirculating pump. Through experimentation, the high temperature recirculating pump was turned off, which resulted in no tenant and customer complaints, while also reducing the DHW pipe losses by 50%.

The success of these energy savings took coordination, ideas, and effort from no less than eight different city employees in various capacities. It also required perseverance in the face of some set-backs and patience on behalf of the building engineers and managers who occasionally responded to temporary negative comments prior to resolution.

Persistence paid-off!

The **Virginia Energy Efficiency Council**, a member-based 501c3, launched the Energizing Efficiency Campaign in 2023 to further the mission of advancing EE across the state by showcasing incredible work being done in our communities and inspiring others to act. Learn more at [VAECC.org/Energizing-Efficiency-Campaign](https://www.vaeec.org/Energizing-Efficiency-Campaign).

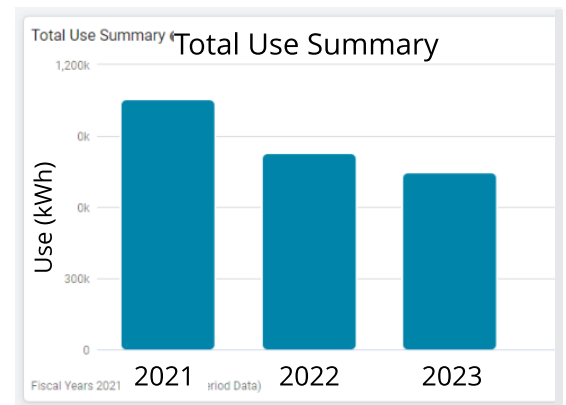


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Another key energy conservation measure was the **re-evaluation of the initial mechanical engineering specification through experimentation**. The design engineer specified that the boiler should be kept at 180 degrees to meet all heating demands (pool + DHW + space conditioning). However, the City experimented with lowering the boiler temperature by 5 degrees each week while simultaneously graphing space temperatures in the building management system. Counter-intuitively, as the boiler temperature was lowered over the course of two months, some of the spaces became easier to maintain temperature setpoint. It was found that in the coldest days, the building was able to meet setpoints with a maximum hot water temperature of 160 degrees, and as the outdoor air temperature climbed, the hot water temperature could be lowered to 140 degrees. Therefore, an **outside air reset sensor** was added.

Additional energy conservation measures included:

- Replacement of 40-year-old **windows** with new, high performance ones
- Addition of non-pool **HVAC schedules**
- Installation of **low flow shower fixtures**
- Replacement **DHW back-flow preventer**, and
- Installation **DHW pump timer**



THE RESULTS

All together, **these measures saved** the City **250,000 kWh of electricity** per year, **20,000 Therms of gas** per year, and **held the cost of the facility constant** even in the face of approximately 20% utility rate increase (as evaluated in post-bill analysis using EnergyCAP). The energy use per square foot is currently 226 kBtuh/square foot/ year and is expected to fall to 200 by the end of the year without any further alteration.

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