



CASE STUDY: CITY OF VIRGINIA BEACH

Virginia Beach, Virginia:

Energy Manager's determined pursuit of energy efficiency savings earned the city tens of thousands of dollars in rebates in just a few short years.

THE CUSTOMER: THE CITY OF VIRGINIA BEACH

Located where the Chesapeake Bay meets the Atlantic Ocean, the City of Virginia Beach is anything but a sleepy resort town. It is the most populous city in the Commonwealth of Virginia, and boasts an economy comprising tourism, national and international corporate headquarters, advanced manufacturing, military bases, and agribusiness.

Besides the beach (the longest pleasure beach in the world, according to the Guinness Book of Records), visitors are drawn year-round to Virginia Beach's many renowned attractions, including:

- **The Virginia Beach Convention Center** the nation's first convention center to earn LEED® Gold certification as an existing building from the U.S. Green Building Council;
- **The Virginia Aquarium & Marine Science Center**, which attracts 650,000 visitors a year and hosts more than 10,000 fish, mammals, birds, and reptiles representing more than 300 species from around the world; and
- **The Virginia Beach Boardwalk**, three miles of oceanfront access, bike paths, live entertainment, restaurants, shops, and a 12-ton bronze statue of King Neptune.

Keeping the Convention Center, the Aquarium, and 350+ city buildings running in top shape uses a great deal of energy. That means, Virginia Beach is a city that understands the value of world-class demand-side energy management in municipal operations.

THE CHALLENGE: PERMANENT ENERGY (AND COST) REDUCTION

Virginia Beach's city government serves its citizens and visitors from more than 350 facilities citywide. By 2010, constant increases in energy costs incurred at these facilities had risen to \$20 million a year, a total plagued with "lost" buildings and meter reading errors in the hundreds of thousands of dollars.

To address this and other issues, including utility billing, Virginia Beach created the position of Energy Manager and hired Lori Herrick, MBA, LEED Accredited Professional, to lead its energy initiatives and manage municipal energy expenditures. With \$5 million from the city, an unexpected \$4 million windfall from the U.S. Dept. of Energy, and a mandate to conquer the city's energy challenges—Ms. Herrick went to work.



Virginia Beach Convention Center

THE CPOWERED STRATEGY: FINDING READY KILOWATTS

Energy efficiency (EE) projects result in permanent energy reductions, which the city recognizes as arguably the cheapest, most abundant, and most underutilized resource available to local government. With this in mind, Ms. Herrick sought to find out more about an energy program being offered through DMME, the state's Division of Mines, Minerals and Energy. The program in question promoted energy performance contracts (EPC) to significantly reduce energy costs through energy efficiency measures that meet a guaranteed level of energy savings.

Ms. Herrick began the process of enrolling city facilities in DMME's EPC programs, but was soon faced with the complex challenges of identifying what facilities, and how many kilowatts, to enroll. Fortunately, she received another windfall. She was introduced to CPower's champion of Virginia demand-side energy management, Leigh Anne Ratliff.

Ms. Ratliff has worked with DMME since 2007 to offer integrated demand response services on a performance basis with no set up costs to the state. Demand response programs pay organizations such as government agencies for curtailing, or reducing, their electricity usage during times of high demand. Government entities who participate in demand response both save costs on reduced electricity use and earn revenue for their trouble.

As Ms. Herrick soon found out, CPower has an additional strength: the ability to provide complete measurement & verification (M&V) services for energy efficiency projects, necessary to receive utility rebates and credits. More importantly, CPower has unmatched experience in finding additional kilowatts (kW) all too easily overlooked in already completed energy efficiency projects—and successfully submitting those kW for even greater returns on the city's investments.

CPOWERED SOLUTION: FOLLOW THE DATA (AND FIND THE MONEY)

Because the permanent energy reductions resulting from energy efficiency projects can pay dividends for up to four years after completion, Ms. Herrick and Ms. Ratliff set about the task of unearthing four years' worth of city files to find buried EE gold - kilowatts that others missed. Looking back, Ms. Herrick says, "We were determined... it was kind of a no-brainer, to go through the files of projects we've done and submit the information. We were analyzing these projects to make sure the payback was there... They gave us a lot of data that Leigh Anne could use to calculate our benefit to the grid and then give us a check for it."

From the outset, Ms. Herrick considered no project too big to tackle, working to help the Virginia Beach Convention Center earn its LEED® Gold certification (see below). She also considered no project too small to enroll, at one point submitting a 7kW project. As Ms. Ratliff explains, "If she had it, she sent it. One building got a credit for \$52 in 2017. We're learning on the cost-benefit element of this, but Lori is always looking further, to get every bit out of it that she can. In that way, she's revolutionized what people put into energy efficiency."

SPOTLIGHT: VIRGINIA BEACH CONVENTION CENTER

The Virginia Beach Convention Center (VBCC) is the crown jewel among the city's facilities. It was the first convention center in the state to receive certification from Virginia Green, the Commonwealth's voluntary campaign to promote environmentally friendly practices in Virginia's tourism and hospitality industries. As noted above, it is also the nation's first convention center to earn LEED® Gold certification as an existing building from the U.S. Green Building Council. These certifications are increasingly important in the competitive convention planning industry, where the VBCC competes nationally. Customer awareness of, and insistence on, "sustainable destinations" plays a greater and greater role in siting conventions.

The VBCC is also a shining example of how state-of-the-art EE projects can enhance a city's energy budget as well as its national reputation. Nearly all lighting in the convention center is LED lighting, and the HVAC is controlled through a state-of-the-art Direct Digital Control (DDC) system that incorporates an automated demand response program to control spikes in peak electricity demand. The automation limits any impact to convention-goers and still saves energy dollars.

It's also a shining example of how the city and CPower Engineering worked together to successfully address one of the biggest challenges facing active convention centers: controlling peak demand electricity and total kilowatt usage. Event load-ins and load-outs at VBCC can be particularly problematic because the bay doors open directly from the loading dock into conditioned exhibit space.

"The Convention Center was a very cool energy project, because people in that space change every day," Ms. Ratliff explains. "Bay doors are open for hours at a time, a lot of bodies and boxes moving in and out. The open bay doors are a significant source of heating and cooling loss. So how do we control that without disrupting load-ins and other convention-goers already onsite?"

The first step was to analyze the status of the bay doors during times of peak demand. The Center's zoned DDC system, which controls the Center's HVAC, was programmed to prevent the air conditioning from

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– Leigh Anne Ratliff

running in the exhibit halls if the bay doors were open. In addition, the DDC system receives power pulses from the electricity switch gears throughout the day. In the next phase, an automated demand response program was integrated into the DDC system. When the system reads that the Center's demand is getting ready to peak, it automatically implements one of three phases. Phase 1 changes back-of-house temperatures by one degree. If demand continues to peak, it implements Phase 2, which changes back-of-house temperatures by two degrees, all the way to three degrees at Phase 3. This automated program reduces the demand on VBCC's chillers, which in turn reduces peak electricity demand.

"Our CPower engineers worked with VBCC's staff to understand how the bay doors and events taking place in the building impact peak demand and usage," Ms. Ratliff says. "Together, we developed a process to systematically go through the building to reduce demand with the least impact on customer events."

With its DDC system program finalized and firmly in place, the Convention Center was able to ease demand on the grid, with near-zero disruption to its customers' activities. In fact, the Center saved an astonishing 15 percent off their peak during its first year. And since the price of electricity peaks along with demand, this translated into significant cost savings that they otherwise would not have been able to attain.

THE RESULTS: \$87,000 AND COUNTING

CPower is instrumental in helping the City of Virginia Beach navigate the complexities of PJM energy efficiency credits and paybacks. CPower submitted the uncovered EE data to PJM and earned the city both savings and revenue. For the delivery years 2017

through 2022, earnings from PJM for the city will reach just over \$87,000 (see chart), with the VBCC earning \$40,000 alone. And the city's just getting started. "We just got another big round of funding," Ms. Herrick says, "so Leigh Anne's going to be hearing a lot from us."

LOOKING AHEAD: DEMAND RESPONSE

In November, 2017, the Commonwealth of Virginia retained CPower through 2020 to continue to offer integrated demand response (DR) services to state agencies and departments through DMME. Ms. Herrick worked with Ms. Ratliff to identify five city sites they believe could be the most eligible for DR: Judicial and correctional facilities, the Convention Center, the Aquarium, and the central plant. The Convention Center currently participates in CPower's DR program and earns revenue. The remaining facilities are undergoing audits to better understand their suitability. "DR involves curtailment, and we have to be careful when and how we curtail," Ms. Herrick says. "That's especially true of the aquarium. I want to earn revenue for the city, but we also don't want to be responsible for a fish fry." There's no doubt, though, that Ms. Herrick will find a way to make it work. Above all else, she and the city are determined. CPower will support their energy goals at every turn, with an energy strategy custom-made to meet their unique requirements.

SAVINGS AND EARNINGS:

CITY OF VIRGINIA BEACH/VIRGINIA BEACH CONVENTION CENTER

Projects include lighting and green building. Sites include Aquarium, Boardwalk, Convention Center, library, maintenance garages, recreation centers, fire stations, police stations, EMS administrative and training center, and arts center.

City of Virginia Beach

	PROJECTS	ESTIMATED DR	FORECASTED GROSS \$
2017/2018	14	185.67	\$14,820.89
2018/2019	13	173.24	\$17,869.86
2019/2020	11	170.24	\$9,283.28
2020/2021	7	87.17	\$2,434.65
2021/2022	2	38.36	\$1,865.51
TOTAL	47	654.68	\$46,274.19

Virginia Beach Convention Center

	PROJECTS	ESTIMATED DR	FORECASTED GROSS \$
2017/2018	2	172.52	\$13,781.49
2018/2019	2	172.52	\$16,374.31
2019/2020	2	172.52	\$9,497.01
2020/2021	1	40.95	\$1,143.73
TOTAL	7	558.51	\$40,796.54

Combined Totals

	PROJECTS	ESTIMATED DR	FORECASTED GROSS \$
TOTAL	54	1,213.19	\$87,069.73

CPower, Demand-Side Energy Management Solutions.

CPower is a demand-side energy management company. We create optimized energy solutions that help organizations reduce energy costs, generate revenue, increase grid reliability, and help achieve sustainability goals.

For more information on how CPower can help you, call 844.276.9371 or visit CPowerEnergyManagement.com.

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