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Green Scene
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GREENING THE BIG HOUSE

Sustainability in Corrections

Data Delivery

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Spotlight

Bryna Cosgriff Dunn, vice president at Moseley Architects, offers her perspective on the greening of corrections, as she suggests a step-by-step strategy for incorporating environmental sustainability measures into detention facilities. **Page 24**

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Facility of the Month

Oregon's Deer Ridge Correctional Institution embraces the challenges, pressures and opportunities presented by shifting landscapes and new horizons in correctional programming, inmate populations and environmental sustainability. **Page 28**

Greening Corrections: How to Get Started

By Bryna Cosgriff Dunn, LEED AP, Moseley Architects

While green building and sustainable design are becoming more common in the design and construction worlds, designing and building with the environment in mind has been slow to spread to correctional facilities.

As the continued growth of inmate populations and the need for more correctional facilities creates a sense of urgency surrounding the construction of new facilities, the inherent benefits of green building are frequently overlooked in the rush to create additional bed space with new facilities and expansion projects.

However, building green correctional facilities is not impossible, and it does not have to be a terribly expensive endeavor. Incorporating green principles and features into correctional facility design makes sense, both environmentally and economically. The trick is knowing where to begin.

Where to Start

For those who have never been involved in a green building project or who are undertaking the design of a green correctional facility for the first time, going green can seem like a daunting task, and knowing where to begin greening a project can be difficult.

An excellent way to begin is by first focusing on the things that can be measured: energy and water use.

In order to completely understand the impacts of reducing energy and water use of a facility and how to achieve optimal savings, it is necessary to compare that facility to a baseline case — a comparable building without energy and water efficiency strategies.

Energy modeling can be an accurate way to estimate projected savings, and if completed during schematic design and design development, it can guide decisions that affect the building's energy efficiency. Similarly, performing simple calculations to predict a facility's water use as compared to a baseline case allows a design team to select plumbing fixtures that maximize water efficiency.

Long-Term Costs and Benefits

Maximizing energy and water efficiency not only helps to conserve natural resources, it can also result in significant cost savings over the life of a building. Even within the first several years in the life of a building, water and energy efficiency strategies have the shortest payback periods of any green design feature.

As the number of correctional facilities increases in response to growing inmate populations, so does the amount of resources consumed by correctional facilities. Securing, lighting, heating and cooling correctional facilities require a great amount of energy — energy that is typically derived from nonrenewable resources.

During the design phase of a project, the design team should conduct comparative analyses, predicting the energy savings and water savings that could be expected by different design decisions.

The LEED rating system provides guidance on determining a baseline prediction, and how to model improvements over that theoretical baseline in the actual design. But remember, this comparison is between two theoretical conditions and is intended to show the relative importance of different design options in the overall efficiency of the building; results should not be interpreted as a predictor of actual costs or performance.

For projects that are already built and are striving to improve efficiencies, the previous year's energy performance and water consumption can serve as a good baseline for evaluating potential upgrades.

Once a facility is operating — either as a new or upgraded facility — water and energy consumption can be measured to determine the actual savings accrued by a facility. Those actual savings can be compared to the savings modeled or measured at the beginning of the project, to determine if the energy and water efficiency measures are performing as predicted.

Design Strategies: A Case Study

Federal Correctional Institution #3 in Butner, N.C., the first federal prison project to earn LEED certification, shows how simple energy and water efficiency strategies can have a big impact on a building's resource consumption.

The energy model completed during the design phase for the facility predicted energy efficiency strategies would result in a 31 percent decrease in energy costs as compared to the ASHRAE 90.1-1999 baseline. For the approximately 530,000-square-foot facility, that is an annual savings of $137,000.

Energy-efficiency measures included increasing insulation above the roof deck, high-efficiency lighting to reduce the overall lighting energy budget, and variable air volume (VAV) and multi-zone HVAC systems.

In order to make the building more water-efficient, the project team installed low-flow and ultra low-flow plumbing fixtures in lieu of standard fixtures. The low-flow urinals in the facility use only a half-gallon of water per flush, and the lavatories have a flow rate of a half-gallon per minute. Ultra low-flow showers and sinks have a flow rate of 1.5 gallons per minute. As a result, the calculated reduction in water use is more than 5 million gallons, or 34 percent as compared to the Energy Policy Act of 1992.

As the Butner Federal Correctional Institution #3 demonstrates, energy and water efficiency are key aspects of green building, which can justify the greening of any correctional facility through quantifiable results.

What's next: Just do it!

Whether you're embarking on an entirely new project or trying to improve the performance of an aging facility, start with determining your baseline energy and water performance and then develop strategies to improve the actual performance over that baseline.

After implementing those strategies, measuring the actual performance of your facility will provide you with the information you need to determine your environmental and financial savings.

Bryna Cosgriff Dunn is a vice president at Moseley Architects, serving as the director of environmental research and planning.

Moseley Architects

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