Fleet Management, GIS and Telework Power Green Government Efforts

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State and local governments are climbing aboard the green bandwagon, although "green building" innovations such as energy-efficient light bulbs dominate the ride.

Emphasis on lighting is understandable given that light bulbs devour 22 percent of all electricity produced nationwide, according to the U.S. Department of Energy (DOE). But green government involves more than the usual suspects. Emerging projects in state and local government show that IT workers have a role to play via data center consolidations, GIS, inventory databases and telework.

Consolidations typically get the most attention from CIOs because data centers account for 1.5 percent of all electricity consumption in the country, according to the U.S. Environmental Protection Agency (EPA). Data center consolidation slashes power consumption by eliminating redundant processing and unnecessary cooling, as well as by conserving floor space.

It may seem lofty to implement green projects for environmental concerns alone. However, the trick of a successful green IT project may be pursuing something the government needs to accomplish anyway.

For example, agencies typically consolidate data centers to reduce costs, simplify IT management and improve business continuity. But these initiatives also lower electricity bills, which automatically reduces carbon emissions. An inventory management system cuts costs by eliminating unnecessary purchases; it obviously reduces consumption, which ultimately lowers emissions. GIS and mobile applications eliminate unnecessary driving, which improves productivity and reduces fuel costs - once again, a carbon emissions reduction comes built in to that investment.

Green Fleet

California law requires state government agencies to cut energy consumption by 20 percent by 2015. The California Department of General Services (DGS) intends to meet the mandate by collecting information that gives the department new insight into state operations. That insight will be used boost efficiency and conserve resources, said Will Semmes, chief deputy director of the DGS.

For example, the department - which negotiates all statewide vehicle procurement contracts - is implementing fleet management changes that will provide better data about the use of state vehicles.

The 119 California agencies that own at least one state vehicle will upload fleet information into a

centralized DGS database. The solution will offer the DGS an unprecedented breadth of information for calculating carbon emissions and other factors, said Semmes.

"If you multiply by 50,000 vehicles, we're going to get information that we've never had before about the use of our fleet in different aspects: the actual disposition of the vehicle, whether it was used appropriately and whether it was used enough to warrant having that vehicle," Semmes said. "How are the emissions? How much fuel did we use? Are we buying the right fuel? Where did we buy it from, and therefore what kind of alternative fuel infrastructure can we get in those places where we seem to be buying the most?"

Semmes said the database will give the DGS a comprehensive view of all state vehicles, making it easier to see if unused vehicles could be shared among agencies. The project could potentially reduce the number of cars the state owns and maintains, thereby cutting costs and reducing consumption.

The DGS also aims to reduce carbon emissions by purchasing more alternative fuel. The agency has many vehicles that can operate on traditional or alternative fuel, but state workers often don't fill them with alternative fuel because it's usually unavailable on their routes.

"I think it's unconscionable for us to demand of a child support worker, who just happened to get the E85 car [that is fueled by a mixture of ethanol and gasoline] that day, to drive 20 miles out of her way to fill it up with E85 when her job, and the only thing she's being judged by, is whether she picked up this foster kid and took him to the right place on time," Semmes said.

State employees who work out of the office pay for fuel with government credit cards. The DGS is considering using government purchase card data to determine where employees buy fuel for state vehicles. The agency could then work with the California Air Resources Board (ARB) - which recently received legislative funding to establish alternative energy infrastructure in the state - to suggest appropriate locations for alternative fuel sites.

"You're going to see the adoption of these alternative fuels at a much greater rate than you would if you were to force employees to do all this other stuff. It would cost you money. It would slow things down. It would interrupt that child support services worker, and if you multiply that by 215,000 employees, you've got yourself a productivity problem," Semmes said.

The state also could track vehicle usage efficiency by installing GPS systems in them. However, state leaders have resisted GPS vehicle trackers.

"It's not part of this project, but it's something we'd like to try. A lot of folks have wanted to go down this road over the years, but when they found out that either the modules cost $800 a car or whatever the issue was, everybody got cold feet," Semmes said. He said collaboration between the California Department of Transportation and the EPA to secure funding for GPS trackers is a possibility. If the DGS can't find enough money to install them in every car, it could install them in some, but in a way drivers couldn't detect which vehicles had them, said Semmes.

Even with that compromise, GPS systems would be a tough sell with many state employees.

He said the best way to implement GPS systems would be with the intent to use the data for overall analysis of all vehicle activity - not individual vehicle travel.

"You can look at the driving habits over a period of time and say, 'Look at that. This department is

driving with a sedan with one person in it from this location to that location. At the same time, another department is driving with a sedan with one person in it from the same location to the same location. Let's combine the trips and ditch one of those cars,'" Semmes said.

Benchmark It

California state government must track exactly how much energy it uses - and where it uses that energy the most - in order to achieve the mandated 20 percent cut in energy consumption. Rather than collecting massive stores of data on energy usage and building a new database to establish benchmarks, Semmes is taking advantage of existing resources outside state government. The federal Energy Star program already has a database built for analyzing power consumption. And the power utilities already have information on where and how much electricity agencies use because electricity is metered. Instead of asking agencies to assemble the data, Semmes will have utilities download the information directly into the Energy Star database.

"We can use that benchmarking data to determine what makes sense economically and which green things we should be doing," Semmes said.

But there are limits on the level of detail those benchmarks would provide at various facilities. In many cases, just one meter measures electricity for an entire campus. Semmes said the limited benchmarks would at least give the DGS a head start as it prioritizes energy efficiency efforts.

Mapping the Wind

Property tax revenue is pouring into a once-anemic government budget in Cascade County, Mont., thanks to a wind speed GIS tool the county provides to wind power developers.

Normally when a new business moves to Cascade County, it relocates to the city of Great Falls for access to sewer and water infrastructure. Consequently outlying county areas often get no additional tax revenue from new businesses. Wind turbines, though, are ideally suited for rural land, said Peggy Beltrone, Cascade County commissioner.

Strong, predictable wind patterns that are attractive to wind power providers can be found in many parts of Montana. Cascade is competing for attention by removing some of the preliminary work that providers would typically do before constructing turbines. Providers can attain maps of the area's prevailing winds from the EPA, but the Cascade wind power GIS tool offers additional information the EPA doesn't include.

"We stick the topography layer in so they know if the wind source is sitting on top of a mountain - that wouldn't be as good [a location to build] because you need roads to get up to it," Beltrone said. "We have the land database, so if they're interested, they can know exactly who owns the property. You can't get that on a federal map. We've also plotted the power lines on the map."

The county started the project in 2002, and two years later successfully attracted Horseshoe Bend, the first wind farm facility Cascade County brought in by using the GIS tool. That facility began generating power in 2006. The facility features six 1.5-megawatt turbines, with a combined value of $10 million.

"The taxes off a project like that are considerable. It goes directly to the funds that desperately need money to serve the rural parts of the county. Per turbine, the project brings in about $25,000 per year in tax revenue. A project of six turbines might be $150,000 in taxes, although it's going to decrease every

year because of depreciation," Beltrone said. "That's real money, and it's going to schools, libraries, health departments and road departments."

That revenue came from a GIS tool that cost almost no extra money, because the county already had an active GIS team in place.

The Horseshoe Bend facility is locally owned, but most wind providers will lease land from farmers for the turbines, said Beltrone. That will bring extra income to landowners.

"The large industrial-size wind projects are owned by multinational corporations that lease the land. A farmer who puts a turbine on his property might have a lease that would pay between $3,500 and $4,500 per year, per machine," Beltrone said.

Four other wind power companies are exploring Cascade County as a potential site, she said, and they were attracted to Cascade through the GIS tool. Beltrone said a private Cascade County citizen even used the GIS tool to build a wind turbine to produce his own onsite generation.

The project also made Beltrone a national player in the wind energy industry. She now holds a seat on the DOE's Wind Powering America Committee, which promotes wind energy nationwide.

"Now I'm really at a point where I can talk about Cascade County because I'm at national meetings and making speeches on behalf of what the federal government's been doing," Beltrone said.

The Telework Option
Many vendors pitch telework products as a way for governments to attract and retain a skilled IT work force. Telework also offers green benefits - fewer polluting cars in the fleet and fewer cubicles in the office mean less consumption.

Virginia already utilizes telework for IT workers. Roughly 40 percent of the Virginia Information Technologies Agency's (VITA) work force telecommutes at least one day per week, said Aneesh Chopra, VITA's secretary of technology.

"It's a priority for our governor, and the security issues can be addressed if you pay for the appropriate security standards and you have the right tools in place," Chopra said.

He said adjusting management styles to accommodate telework is more challenging than solving security issues. Chopra contends agency managers must learn to manage based on workers' production rather than the duration they see them at their desks.

Chopra said he thinks part of the reason the VITA's telework participation is so high is that Virginia moved all of its IT workers last year to a facility 20 miles south of the old Richmond, Va., building. The move created a longer commute for many workers, which made telework more attractive.

Chopra said the process hasn't required dramatic changes to employee and manager interactions. Some telework advocates recommend equipping remote employees with Web cameras and other communication devices. But Virginia's current IT workers adjusted well to telework using BlackBerrys and e-mail, Chopra said.

Beyond the green benefits, telework and flexible work hours will play a critical role in attracting young IT workers, according to Mitzi Higashidani, chief deputy director of the California Department of Technology Services.

"They may work at 3 a.m. because that's when they're awake. Perhaps their highest performance and creativity peak is at that time," Higashidani said.

She said California's purchasing habits are already reflecting the move to telework.

"We're retooling. We are no longer buying desktops. Everybody who shows up to work is going to get a laptop and a phone. Work is going to happen through Web conferencing. Some managers expect you to show up to meetings, but you don't have to see the person for it to be a personal experience," Higashidani said. "When the work force moves out and becomes mobile and flexible, you have to stay in touch more through phones and other tools. Blogs, wikis and similar technologies will be the way this work force works. Baby boomers are slow in adopting that."

She added that California is developing a security strategy to make telework possible. Currently telework happens on a limited basis, said Semmes.

"There is no overall telework policy. It's done department by department, which is common sense because it gives managers flexibility," Semmes said.

Almighty Data Center
Government data center consolidation is now commonplace across the country. For instance, Texas is midway through a massive outsourced consolidation effort, reducing 5,500 physical servers down to 1,300. The project also will cut 15 mainframes to six. Much of the consolidation is powered by virtualization technology, which has become increasingly popular.

Texas pursued consolidation to cut costs and reduce the staff it needed to maintain IT. The resultant green benefit was not a primary motivation, but it came in handy when selling the project to the Texas Legislature, said Lara Coffer, technology center operations division director for the Texas Department of Information Resources (DIR).

IBM won the outsourcing contract. The consolidation will centralize IT management and eliminate redundant functions.

"We have duplicate systems. For example, everybody's running their own e-mail systems. Everybody's running their own domain name systems," Coffer said.

Coffer said she prefers to advocate those green initiatives that are side benefits to projects that serve other state needs. The DIR used the green component of its consolidation to sell it to the Legislature.

"There are so many people who think of green as building out of materials that are recyclable. What I've really seen that can give you the most cost-effective benefits are simple green initiatives, like energy-efficient equipment and consolidation," Coffer said.

Servers in the new data center use direct current (DC) technology, which is about 12 percent more efficient than the more common alternating current (AC) server technology, according to DC Power for Improved Data Center Efficiency, a report from the Lawrence Berkeley National Laboratory.

The new data center also uses sophisticated cooling technology that enables the facility to cool servers while using less power, said Coffer.