Green Mandates

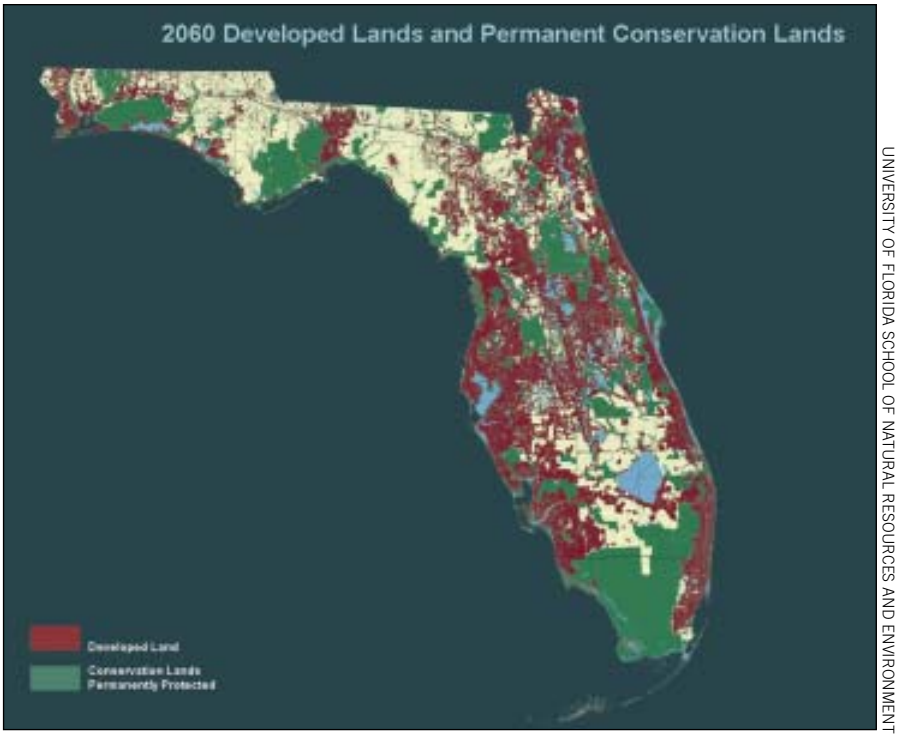
Sustainable building moves from concept to code

With governors and municipal leaders promoting green building from California to Florida to New York, some in the industry are worrying about added construction costs boosting home prices during an already pronounced slump.

"Right now, the one thing that we don't need and are very concerned about are significant spikes to our costs," says Douglas Buck, director of governmental affairs for the Florida Home Builders Association.

Green building, often defined as increasing energy efficiency while reducing negative impacts on the environment, has long been an option for environmentally minded home buyers and builders. But with California Governor Arnold Schwarzenegger, Florida Governor Charlie Crist, New York City Mayor Michael Bloomberg, and others publicly embracing the concept in recent months, policymakers are steadily writing important elements of the concept into state and municipal policies and building codes.

As of this fall, at least 24 states and 90 municipalities had green building initiatives in place, says Jason Hartke, manager for state and local advocacy with the U.S. Green Building Council. Those numbers will likely grow: more than 500 U.S. cities have signed on to the U.S. Conference of Mayors Climate Protection Agreement, which encourages green building. Meanwhile, Minnesota Governor Tim Pawlenty announced in July that he would make "securing a clean energy future" his top priority for his term as chairman of the National Governors Association — a move met with wide support from his peers.



UNIVERSITY OF FLORIDA SCHOOL OF NATURAL RESOURCES AND ENVIRONMENT

Developed land vs. conservation land. The future is at stake, says Florida Governor Crist, New York City Mayor Bloomberg, and other policymakers who have passed environmental initiatives aimed at balancing the impact of developed lands on natural lands and waterways.

"There are a lot of really interesting policies being put in place whether you are in Seattle or Florida," Hartke notes.

Today, buildings account for 71% of electricity use and 40% of carbon emissions nationwide. Stemming largely from coal- and gas-burning power plants, emissions tied to buildings eclipse even the 33% from transportation, Hartke explains.

Policymakers clearly hope to reduce those numbers. Today's most common green building initiative among states and municipalities requires new publicly owned buildings to be green, often as dictated by the Green Building Council's Leadership in Energy and Environmental Design (LEED) certification program, Hartke says. These policies are hardly confined to government office buildings: New Jersey, for example, requires developers of affordable housing units to meet minimum green building standards.

Offering builders incentives to adopt green building techniques is almost as common as mandating public green buildings, Hartke adds. Cities and states have extended the majority of incentives, from tax relief, expedited permit review, and density rule exceptions or exemptions to commercial projects. But

they are rapidly expanding into residential construction. New Mexico, for example, recently passed a tax credit for residential structures, with the credit amount pegged to the efficiency level of the home, notes Hartke.

Less common but also on the increase are new or strengthened state or municipal green building codes. Some new codes are tied to incentives. Maryland's Howard County, for instance, recently coupled stepped-up green building codes with property tax abatements. Other codes stand alone. This spring in Florida, for example, Governor Crist issued an executive order seeking to require all newly constructed homes and buildings to be at least 15% more efficient by 2009. The order, which is now being considered by the Florida Building Commission, got a tepid reception from the industry and some builders.

The main objection: that the added cost of efficiency improvements would turn away already scarce home buyers unless they result in clear and rapid energy savings — savings that could be directly marketed to home buyers. "Unless the homeowner sees a payback period of time — hopefully it's not 55 years, it's seven years, which is the length of time I might own a home — the homes are at a price disadvantage to existing construction," explains Buck, of the Florida Home Builders Association.

Energy-efficiency advocates insist builders can achieve the 15% reduction easily and cheaply. Danny Parker, principal research scientist for buildings at the Florida Solar Energy Center, says doing so would likely require only three steps: using compact fluorescent bulbs, sealing ductwork, and choosing light colors for roofing and exterior walls. "No problem; easy to do," he says of the 2009 deadline outlined in Crist's order.

Buck isn't so sure. Home construction codes and standards have become so numerous that each new one increases potential conflicts, he explains. One cheap way to make homes more efficient is to use fewer windows, for example, but that may violate fire codes. "We are so finely tuned in our homes that you can't have a ying without a yang," he comments.

Hartke says it's key to involve builders and other stakeholders in discussions leading up to new green building codes or rules. Nevertheless, it seems likely more objections will flare up as green building transitions from concept to code nationwide. — *Aaron Hoover*

Mapping Disaster

Ongoing research

George Fernandez remembers sitting beside his father, a soldier in the U.S. Army Reserve, as he drove around South Florida handing out food and bottled water in the days following Hurricane Andrew.

He was just a young boy in 1992. But 15 years later, Fernandez has returned to hurricane recovery, this time as undergraduate civil engineering student and member of a team of University of Florida wind researchers.

"I think our research is vital to helping people survive the aftermath of a hurricane," he says. "Considering we can't stop hurricanes, we might as well learn how to prevent the most damage that we can."

Fernandez was among over a half-dozen students and two faculty members at the ready this hurricane season to travel anyplace where a hurricane landfall was expected, to gather data on its wind speeds and forces.

The team planned to make the trips as part of the Florida Coastal Monitoring Program, a nine-year-old UF-led effort to learn more about low-altitude hurricane winds and the forces they impart on homes and businesses.

Heading out from Gainesville in a small fleet of white Ford F250 trucks, researchers tow four trailer-based towers equipped with devices that measure wind speeds, barometric pressure, and rainfall to projected landfall locations. They also keep tabs on 30 homes around coastal Florida modified to include roof-mounted pressure monitors and other devices aimed at monitoring their performance during storms.

The goal: to correlate the low-altitude wind speeds measured by the towers with wind forces on the homes, establishing relationships needed to understand, predict and — with luck — help prevent onshore hurricane damage.

"When you define Category 1, 2, or 3

hurricanes, that's based on what's happening over water," says Kurt Gurley, a UF associate professor of civil and coastal engineering and the lead researcher on the project. "The missing piece is, how do you take that and translate it into what's happening over the land?"

With partner Clemson University, UF has collected data from the towers, modified houses, or both during least 18 tropical storms hurricanes dating as far back Hurricane Georges in 1998. While that sounds like a lot, the amount and variety of data is only now reaching the level required to draw potentially new conclusions about low-altitude hurricane winds and determine precisely how they stress homes.

"The important thing," Gurley explains, "is to get a critical mass of different storms hitting different parts of the state at different intensities."

He and several students are currently working on analyzing the data bank, a project that could lead to reexamining the American Society of Civil Engineers Wind Load Provisions — guidelines used by engineers nationwide in assessing potential wind loading on homes and other structures. It's unclear at this point whether the research will suggest that the provisions should be revised, but it will have value even if it serves only to confirm the accuracy of existing provisions, Gurley says.

> The goal: to correlate the low-altitude wind speeds measured by the towers with wind forces on the homes, establishing relationships needed to understand, predict and — with luck — help prevent onshore hurricane damage.

More immediately, the towers since 2003 have provided real-time wind data, via cell phone and now a satellite connection, to the National Oceanic and Atmospheric Administration. NOAA plugs the data — the only such information gathered from low altitudes over land — into a computer model of hurricane wind speeds called HWIND.

The Federal Emergency Management Agency uses a portion of HWIND in another model, HAZUS, that projects anticipated hurricane damage. That model in turn helps FEMA decide where to prioritize its response and recovery activities, notes Gurley.

The UF researchers are also working with utility companies seeking to find ways to reduce hurricane-caused outages and repair jobs. "They are investigating a number of different options," he says, "and they want to work with the scientists to make sure their approach is going to be cost effective." — *A.H.*

UNIVERSITY OF FLORIDA CIVIL AND COASTAL ENGINEERING

Down-to-earth data. The Florida Coastal Monitoring Program erects towers as close to the path of Hurricane Wilma as possible. Wind-speed data from the towers, along with wind-pressure data from houses wired with instruments, is part of a growing body of real-world data used to establish hurricane-resistant building techniques. Most of the data prior to this has been from buoys that measure hurricane winds over open water or from airplanes gathering it high above the sites where the damage actually takes place.