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The Emergence of Zero Net Energy

By Joanna R. Turpin
Of *The NEWS* Staff

According to the U.S. Department of Energy (DOE), commercial buildings, including offices, schools, hospitals, restaurants, hotels, and stores, consume nearly 20 percent of all energy used in the U.S. That translates into more than \$200 billion spent each year to power millions of square feet of space that is often designed or operated inefficiently, according to DOE

research, which results in 20 percent or more of that energy and money being wasted.

Given these statistics, it is no wonder building owners and operators are frequently investing in energy-saving solutions, such as improved lighting, occupancy sensors, and better building controls. But a growing number are going a step further and looking to design buildings that produce as much energy as they consume each year. These so-called zero-net-energy (ZNE) buildings may sound like a pipe dream, but they've already

become a reality in many parts of the U.S. and around the world.

Growing Popularity

One of the groups behind the ZNE movement is the New Building Institute (NBI), Vancouver, Washington, a nonprofit organization whose mission is to advance commercial building energy efficiency. "Our focus on ZNE has been in the works for the last three to five years, and we published our first "Getting to Zero" report in 2012," said Ralph

DiNola, CEO, NBI. "Our most recent report, which was released in 2014, showed the ZNE trend is happening in more than 38 states, in every climate zone, and in a whole variety of building types, including private, public, new, and existing."

In fact, that latest Getting to Zero update reported that since the first update was released in 2012, the number of ZNE buildings has increased by 52 percent, and projects on the path to ZNE have increased by

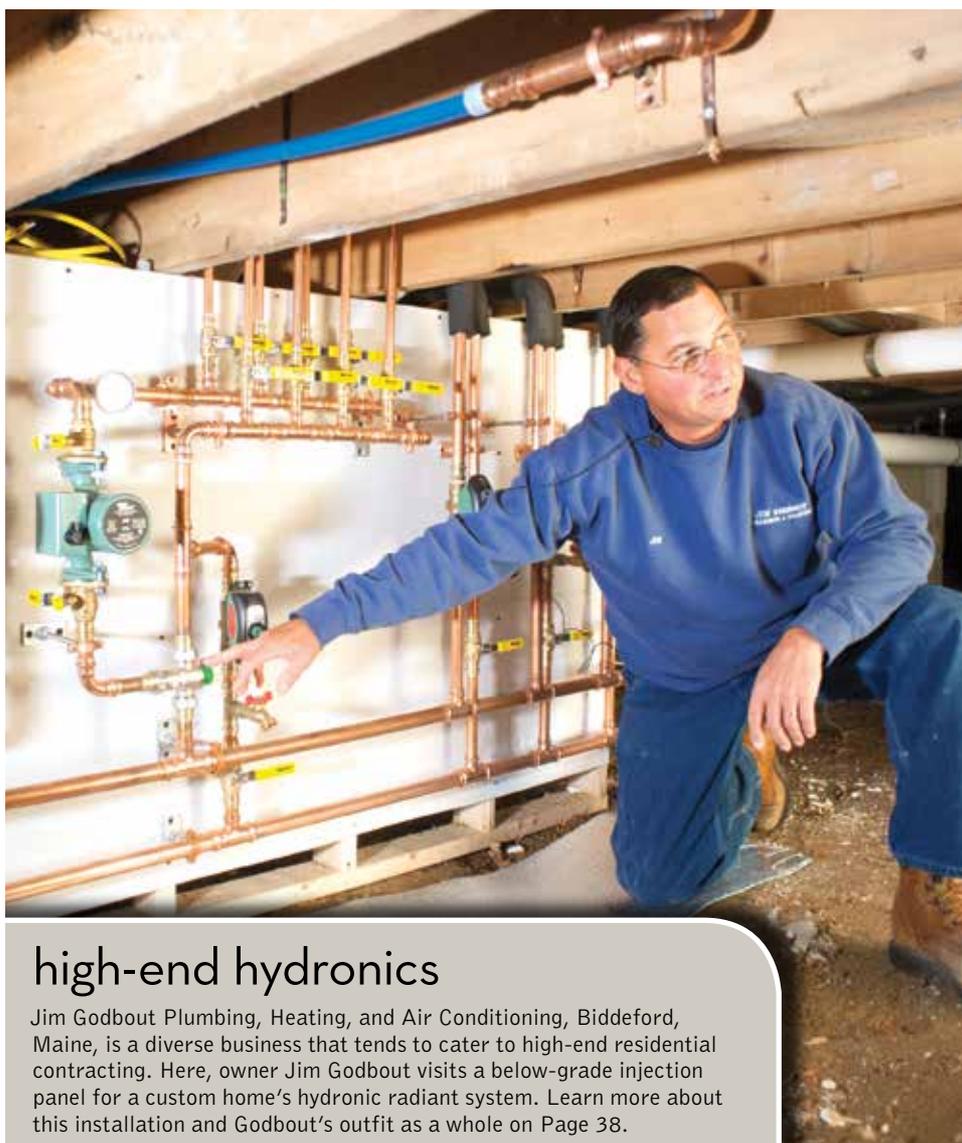
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Demand for US HVAC Equipment to Increase Through 2019

CLEVELAND — The demand for HVAC equipment in the U.S. is forecast to increase 6.8 percent annually through 2019 to \$20.4 billion, recording gains at about twice the rate of the 2009-2014 period, according to a new study released in March by The Freedonia Group. The study presents historical demand data from 2004, 2009, and 2014, plus forecasts 2019 and 2024 by fuel type, equipment type, and market. The study also considers market environment factors, examines the industry structure, evaluates company market share, and profiles 32 U.S. HVAC manufacturers.

According to the study, a large part of advances will be the result of robust gains in building construction spending, especially growth in improvement and repair expenditures. The market will also be propelled by

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high-end hydronics

Jim Godbout Plumbing, Heating, and Air Conditioning, Biddeford, Maine, is a diverse business that tends to cater to high-end residential contracting. Here, owner Jim Godbout visits a below-grade injection panel for a custom home's hydronic radiant system. Learn more about this installation and Godbout's outfit as a whole on Page 38.

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Residential Contractors

- **Gold Medal Service** (East Brunswick, New Jersey) received **Lennox Intl. Inc.'s** (Richardson, Texas) Dave Lennox Award.
- **IAQ Technologies Inc.'s** (Syracuse, New York) president, **Bob Krell**, was inducted into the **National Air Duct Cleaners Association (NADCA)** Hall of Fame.

Organizations

- **Northern California Mechanical Contractors Association (MCA)** contributed \$10,000 to **The Mechanical Contracting Education & Research Foundation (MCERF)**.
- **Air Conditioning Contractors of America — Arizona (ACCA-AZ)** will hold a Clay Shoot Fundraiser May 29 at the Ben Avery Shooting Facility and Clay Target Center in Peoria, Arizona.
- The **Alliance to Save Energy** (Washington, District of Columbia) will host its Energy Efficiency Global Forum, May 12-13, in Washington, District of Columbia.

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Contractor Builds Expertise and Relationships through Hydronics

In Biddeford, Maine, winter and comfort do coexist. There's a pro in the area whose specialty is, quite literally, house-warming. In fact, his many employees pride themselves on their ability to craft the business of home comfort as an art form.

The town of Biddeford, which dates back to 1616, and is about 80 miles north of Boston and 15 miles south of Portland, Maine, is home to Jim Godbout Plumbing, Heating, and Air Conditioning, a diverse enterprise that tends to cater to high-end residential contracting.

Crafting Solutions

On a visit to a residential job site, owner Jim Godbout jockeyed for a parking space next to a lift device used to move shingles to a team of roofers. At least a dozen trucks and twice as many craftsmen were at work on the home, framing, siding, trenching, and painting.

On his way through the large three-bay garage, he was stopped by a woman in her early 30s carrying a large binder and blueprints. They spoke for a minute and it was readily apparent to several workers nearby that she was very pleased

with the work his guys had done earlier that day.

As he entered the home's main living spaces, he turned to say, "She's the project manager, and she's as sharp as a tack."

Godbout deftly swung through an access port in the floor, hidden within a closet, and into a 4-foot crawl space below the home's great room. A work light illuminated a remote injection panel, neatly fabricated by his guys — the source of the project manager's happiness. Shiny copper, soon to be insulated, connected two three-speed hydronic circulators and several zone valves. This panel and its several components would serve the great room's radiant heat zone and some smaller low-temp zones, as well.

"We differentiate ourselves through the work we do and the way we solve problems," said Godbout while crouched inside a 4-foot crawl space below the great room, raising his voice to overcome the volume of nearby circular saws and job site radios.

He explained it was too early in the construction process to place and connect equipment in the mechanical room, "But, we can easily do work like this because it's in no one's way."

Godbout added that the original home, built 80 years earlier, was pretty much taken down to the foundation. "It's common in this area to expand homes significantly. Heating and cooling equipment is usually removed to make way for new systems. We do a lot of hydronic work on projects like this one."

Earlier years

Godbout's affinity for the trade began at the age of 8. He was a "lead-melting boy," helping his grandfather solder cast-iron pipe. With each year, his responsibilities and skills grew. In high school, he opted for the co-op program, so he could learn carpentry. By this time, his parents had separated, so he was an early breadwinner for his mother and two young brothers.

Carpentry work put Jim in close proximity to plumbing and mechanical subcontractors. In their work, he saw a niche that he liked. By 1985 and 1986, in his mid-20s, Godbout helped found the Mechanical Trades Association (MTA) of York County, Maine, and served as the group's president for seven years, and he was also



Back at the shop, Godbout oversees a tightly-run ship; there's plenty of well-organized stock for jobs in progress at any time.



Jim Godbout Plumbing, Heating, and Air Conditioning, Biddeford, Maine, is a diverse enterprise that tends to cater to high-end residential contracting.

Built to Last

Godbout's 20-person firm serves customers within a 50-mile radius of the shop. The business is about 80 percent residential, and, of that, it's 10 percent service and 90 percent new and remodel construction. The remaining 20 percent of overall revenue is attributed to commercial work. Two employees do plumbing/heating service work almost exclusively.

Godbout says hydronic system work remains a mainstay for the firm's installation and service crews, even with new construction.

For new homes, often constructed where an older home stood, Godbout's hydronic recipe includes tried-and-true components.

"We typically install a multi-zone radiant heat or radiant panel heating system with a Viessmann boiler and indirect Taco Zone Sentry zone valves, a Viridian electronically commutated motor (ECM) pump, Taco i-Valves, autofill, and 4900 air

involved with Plumbing-Heating-Cooling Contractors Association (PHCC) and served as the state association's president.

During his first years as an independent trade pro, Godbout was employed as a subcontractor. In 1987, he opened his own firm. He paid close attention to the work of tradesmen dedicated to the craft — among them, good friend Rich Trethewey, best known from his work with "This Old House."

Success also stemmed from a lesson he learned quickly — to install the best products and technology. "If I were to do my very best work for clients, why would I settle for anything less from manufacturers?"

Six years after starting his firm, Godbout hired Todd DeMeule and, the following year, Jeff Tardif, both of whom are still with him and whose roles and responsibilities with the company have grown steadily and considerably.

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Jeff Tardif, project manager, Jim Godbout Plumbing, Heating, and Air Conditioning, sets a new Taco Viridian VT2218 ECM, variable-speed circulator as a key component to completing a residential hydronic system in Kennebunk, Maine — very near the site of George Bush Sr.'s recent birthday skydive.

separator. We also install a lot of Uponor products,” said Godbout.

For air conditioning, they’ve come to appreciate split-system heat pumps and air conditioners.

“No job follows a formula. We’re always attentive to difficult challenges that others may not want to do. And, we hang our reputation on products and technology that work each and every time,” said Godbout. “We also watch for the latest advancements offered by manufacturers. That attentiveness is what introduced us to the new, ECM-driven Viridian circulators, and the Zone Sentries. Now, we carry them in every truck and stock them in inventory.”

General Contracting

One rather unusual business decision allows Godbout to stretch the company’s influence within the territory it serves. Because of his early initiation into the trades through carpentry, he decided 20 years ago to broaden the scope of his crew’s work to include the role of general contractor for projects large and small. “We’re glad to be diversified that way, but we’re careful not to cross the line with the general contractors we work for,” said Godbout.

One project that points to the breadth of this expanded responsibility for the firm was its general contracting of expansion work at FunTown USA’s amusement park, just a mile or so from the shop’s location in Biddeford.

The \$6 million project began in 2011 and completed eight months later in 2012. The project aimed to develop a 4-acre parcel within the 35-acre park; the task: to add several water ride attractions, includ-

ing two water slides and a 60-foot tower, multiple restrooms, and food venues including a beer garden. Understandably, the rides required substantial water pumping of up to 8,460 gallons per minute (gpm). The plans also called for three rebuilt swimming pools.

“Essentially, we built the amusement park’s water slide addition around the mechanical system,” said Godbout.

Godbout supervised the efforts of up to 150 trade pros at a time, from high steel workers and welders to carpenters and civil engineers. He explained that the park’s owner, who he’s known and worked with for more than three decades, wanted Godbout to handle the general contracting role from start to finish.

“Our guys learned a lot through their involvement with that very large job,” said Godbout. “They were exposed to new things and expanded into new and different roles.

“Each day is a new day, and jobs like that one give you an entirely new perspective about how to grow professionally,” he continued. “We’re in it for the long haul and – hey [with a Yankee chuckle] – if it was easy, everybody’d do it. It seems like the tougher the challenge, the more we take to it.”

Hydronic Recipe

A typical Godbout job begins with a “for sale” sign at a 30- or 40-year-old beachfront home. It’s quickly purchased for \$500,000 and demolished, making way for a 5,000- to 7,000-square-foot, \$3 million to \$5 million custom vacation home.

“No job follows a formula, but the common denominators are quality and comfort. Those are the

essentials; everything is built from the start.”

“We hang our reputation on products and technology that work each and every time,” continued Godbout.

The last job of the day landed Godbout at a canary-yellow-sided home built on a low bluff above the bay in Kennebunk port. Godbout was there to check on the hydronic system’s final work; a new ECM circulator was added as the last component.

The home’s many windows looked out over a small inlet, about a half mile from the Bush family compound. The magnificent house was, before substantial renovations, a simple 1½-story cottage built in the early 1900s.

Godbout explained the owner avoided a host of travails and scrutiny by adhering to the cottage’s old footprint. “They went up, adding a new floor and redesigning the entire space.”

Previously, the home had a meager forced-air system and no a/c. The project’s general contractor asked Godbout to do all of the plumbing and mechanical systems work as a design-build project. Inside, the space was an elegant architectural masterpiece. The old forced-air heat? Out with the tide.

Now, Runtal panels discreetly provide warmth in many of the home’s common areas. They also provided warmth with close to 1,000 square feet of in-floor radiant, using Uponor’s QuikTrak.

Down in a spacious basement is where Godbout installers placed the Vitodens 200 and an indirect for domestic hot water. Each of the system’s many heat zones was governed by Taco’s Zone Sentry zone valve.

Taco iValves were used to temper liquid heat for floor warming. A new Taco ECM circulator, the Viridian VT2218, served as the

main system pump, which held the focus of their work that day. A Taco 5120 Series mix valve was also installed above the indirect to temper domestic hot water, allowing the tank to keep water in the 140°F bacterial kill zone, and two Taco ZVC zone controls governed circulation to the home’s seven thermostatically-controlled comfort zones.

As evening arrived with a striking sunset, Godbout awaited his wife’s arrival. He ordered a glass of Cabernet and scrolled through iPhone messages. With a smile, he said, “Tomorrow’s stacking up to have some new challenges, too. We’ll be ready for it.”

Editor’s note: Interested in learning more about Jim Godbout Plumbing, Heating, and Air Conditioning? Check out the feature video on our website, <http://www.achrnews.com/videos>.

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