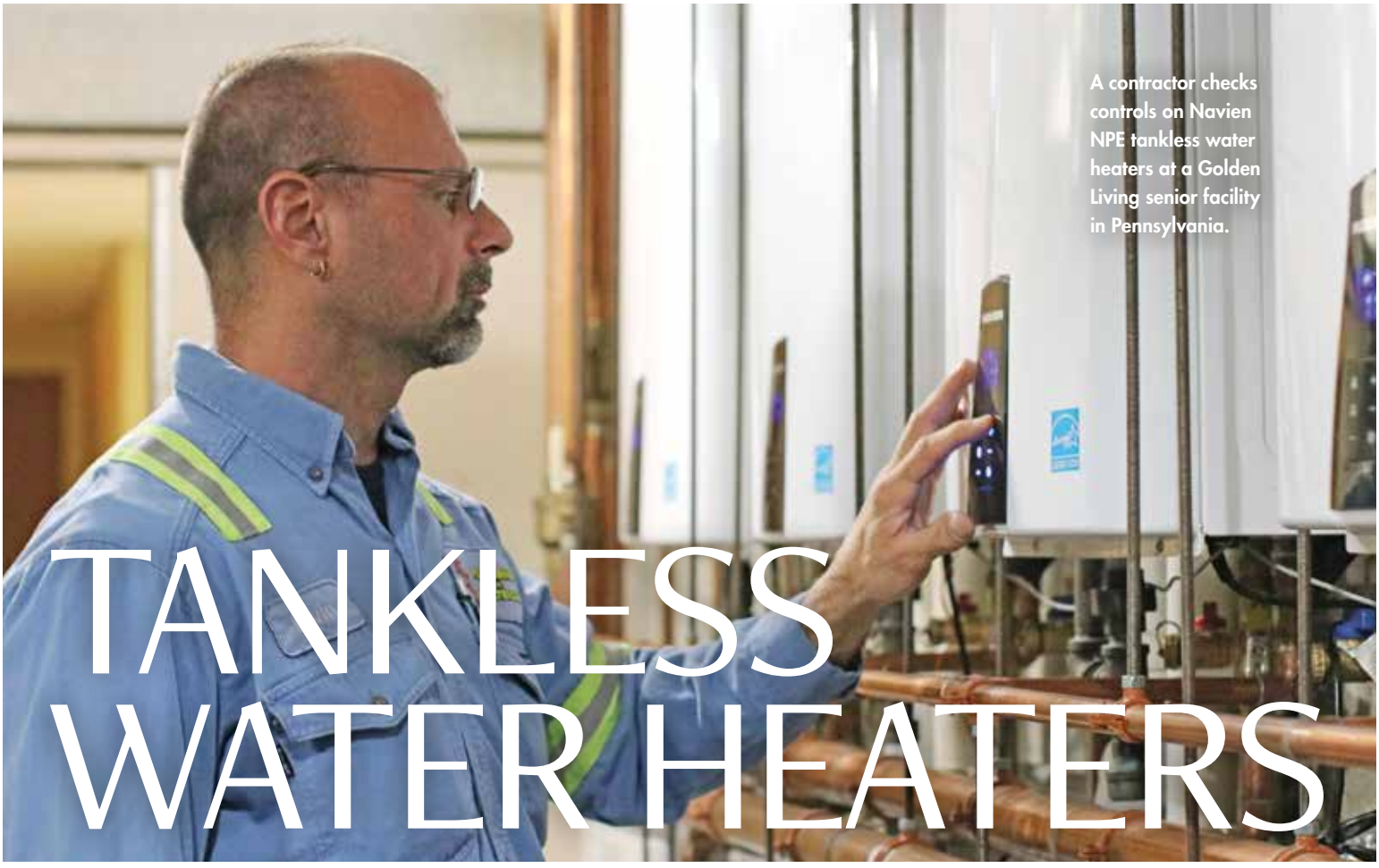

A contractor checks controls on Navien NPE tankless water heaters at a Golden Living senior facility in Pennsylvania.

TANKLESS WATER HEATERS

A dozen things you should know about these energy-saving systems.

BY PETER FABRIS, CONTRIBUTING EDITOR

Tankless water heaters have come a long way in the last 10 years or so. One-third of respondents (33.2%) to our exclusive 2019 *Multifamily Design+Construction* Amenities Survey (https://bit.ly/3d7lB4y) said they had installed tankless water heaters in an apartment or condominium community in the previous 12-18 months.

Sales of tankless water heaters in the overall residential market—multifamily plus single-family—have jumped from 7-9% in recent memory to "14 or 15% this year," according to Brian Fenske, Director of Commercial Sales for Navien, a tankless water heater and boiler manufacturer.

One particularly robust component of the multifamily market—new urban luxury high-rise properties—may already have swung over to tankless systems, according to Steve Straus, LEED AP BD+C, President of engineering firm Glumac. Five years ago, the tank-to-tankless ratio on Glumac-engineered luxury high-rises was about 80/20; today, it's 50/50, Straus said. The pace of adoption in this sector could portend greater acceptance in the broader multifamily market.

Despite these positive signs, many developers hold fast to the notion that tankless units can't produce enough hot water to meet the needs of hundreds of apartment or condo dwellers. Having used tank models for years, they see no reason to switch to tankless. "Investors can be risk-adverse," said Straus.

LEARNING OBJECTIVES

After studying this article, you should be able to:

+ COMPARE the energy savings of tankless water heaters vs. tank water heaters in multifamily construction.
+ LIST several additional benefits beyond energy savings of employing tankless water heaters in apartment/condominium projects.
+ DEFINE "UEF," the U.S. Department of Energy standard for measuring energy efficiency in similar types of water heaters.
+ DISCUSS the financial aspects—initial cost, potential rebates, life expectancy, and payback period—of deploying tankless water heaters in large-scale multifamily communities.

PHOTO: NAVIEN INC

Sixteen Navien NPE tankless water heaters in two back-to-back banks of eight serve 170 residences in the West End Asteria Apartments, Boston.

PHOTOS: NAVIEN INC

According to Navien's Fenske, however, "those days are over." Today's tankless units can supply a steady stream of hot water indefinitely. Manufacturers have markedly improved tankless units, overcoming the perceived drawbacks and improving performance to the point where developers, operators, builders, and engineers should consider using them in multifamily projects.

The choice of water heaters should be preceded by a comprehensive analysis of all the options: tank vs. tankless, gas vs. electric, brand vs. brand, model vs. model. Let's look at 12 factors to consider in evaluating tankless water heaters for your next multifamily project.

1 **Tankless water heaters supply plenty of hot water.** The most important advantage of tankless systems, said Fenske, is that they provide an uninterrupted supply of hot water to your tenants and condominium owners. That's because tankless systems instantaneously heat the water based on immediate need, whereas tank systems can temporarily run out of hot water after heavy use.

One thing you don't need is angry building occupants complaining about cold showers.

2 **Tankless water heaters score high on energy efficiency.** The U.S. Department of Energy standard for measuring energy efficiency in similar types of water heaters is the *uniform energy factor*, or UEF. The higher the UEF, the more energy efficient the water heater.

According to Energy Star, gas tankless water heaters have a UEF of at least 0.87 to as high 0.97 for the most efficient gas units, known as condensing gas models, which use a second heat exchanger to heat water with the exhaust gas. Electric tankless water heaters have a UEF of 0.96 to 0.99, while the UEF of commercial tank water heaters can range from 0.80 to 0.90, according to Energy Star. (Note: The UEF rating does not take into account the cost of producing and delivering natural gas or electricity.)

3 **Tankless water heaters save space.** Tankless units typically occupy 40–60% less space than comparable tank units, according to Fenske, who also conducts training, design, and product development for Navien. This is especially noteworthy since the latest energy code standards require beefier insulation jackets for new tank units, adding several inches to their girth and taking up more room.

Reducing the space needed for water heaters by about one-half can be a big plus for multifamily developers, particularly in large high-rise projects, said Glumac's Straus. Ganging tankless water heaters in the basement could open up space for, say, a dog washing room.

4 **Tankless water heaters can be installed in "ganged" assemblies.** Tankless units can be ordered in preassembled racks that simplify installation. Centralized or zoned systems provide redundancy and reliability, and are often preferred for large multifamily buildings. "Our clients almost always want centralized systems," said Straus. "When the units are arranged in parallel, if one fails, others can take its place." He said his multifamily clients avoid using "dispersed systems," where each apartment has its own tankless unit. "They don't want the maintenance associated with servicing individual tankless water heaters in every living unit," said Straus.

5 **Tankless heaters have a reasonable payback period.** Tankless water heaters cost anywhere from 30-40% more up front vs. tank systems, although this premium comes down significantly—and can even disappear—when multiple ("ganged") tankless installations are compared to multiple commercial tank and boiler combinations.

Tankless systems can save 15-25% on energy costs compared to tank systems, depending on the type (gas or electric), the brand, and specific product features. If your project is located in a service area with high utility rates, the payback period will be quicker. Your estimator, preconstruction expert, or MEP engineer can weigh all these variables to determine the anticipated payback period for each of the various systems you may be considering.

"If you're going to hold the property and you're looking at cost of ownership over a longer payback period, tankless is going to be a better value for you in almost every situation," said Ansley Houston, Senior Director of Commercial Business for Rinnai America Corporation, manufacturer of gas tankless water heaters.

6 **Tankless water heaters have a long lifespan**. According to the DOE (https://bit.ly/3b0jqO6), most tankless water heaters will last more than 20 years; comparable tank units average 10-15 years. That's because tankless units don't have the most common point of failure in tank units—the tank itself. Check the warranty for coverage of labor, parts, and the heat exchanger.

7 **Tankless water heaters may soon be required by code.** Tankless units may become a necessity, not a choice, as energy-efficiency codes get tougher and tougher. Glumac's Straus

Indoor installation of a Rheem "Prestige" High Efficiency tankless unit serves a single apartment.

Freestanding tankless racks from Rinnai come in outdoor and indoor configurations.

Up to six Noritz NCC199CDV tankless water heaters can be common-vented using two- or three-inch PVC, CPVC, or polypropylene pipe.

noted that tank units with a low UEF (0.80 or less) may fail to meet more restrictive state or local energy codes in the near future.

8 **Tankless systems are relatively easy to maintain.** The maintenance needs of tankless water heaters depend largely on the quality of the water being fed into them. Hard water can leave mineral deposits on heat exchange elements. When hard water is the only alternative, install a water softening system. Tank water heaters, which store large volumes of water, are more susceptible to mineral buildup than tankless models.

One manufacturer, Navien, uses stainless steel heat exchangers that are more resistant to corrosion from minerals in the water than the more commonly used copper tubing.

Contaminated combustion air can also be of concern in gas units, as air drawn in for combustion can leave deposits in the heat exchange chambers. Proper installation steps should be taken to assure clean combustion air for gas-fired models. Here, too, gas models with stainless steel heat exchangers will resist corrosion more effectively.

For maximum operation combustion elements should be cleaned during scheduled annual maintenance.

9 **Tankless water heaters can contribute to your "green" marketing.** If you're seeking green certification, such as LEED, or promoting your use of Energy Star appliances, you'll want to mention your use of tankless water heaters in your sales campaign.

"Developers in parts of the country where conservation is either mandated or valued by consumers can show what they're doing to save energy and water," said Julius Goodman, Head of Marketing with Stiebel Eltron, a manufacturer of electric tankless models.

10 **Gas tankless water heaters may earn utility rebates.** Some gas utilities offer rebates for gas tankless units. Utility rebates for electric tankless water heaters are generally less available. Check with your local utility for current rebates.

11 **Today's tankless units are getting smarter and smarter.** The latest tankless models have sensors that detect when demand fluctuates. The sensors send a signal to smart electronic controls, which automatically "cascade" the number of units in operation, so that hot water supply keeps pace with demand, saving energy.

Manufacturers are adding Wi-Fi capability to many models so that your operations staff can monitor and adjust the units remotely. Check with your supplier, as the technology is getting more sophisticated day by day.

12 **Tankless water heater suppliers are eager to help.** If you're new to tankless systems—or just have a question—consult with the manufacturer or dealer in the early stages of your project, when crucial design, engineering, and construction decisions are being made. |M|

EDITOR'S NOTE

This completes the reading for this course. To earn 1.0 AIA CES learning units, study the article carefully and take the 10-question exam posted at BDCnetwork.com/TanklessWaterHeaters2020

PHOTOS: (TOP LEFT) RHEEM; (TOP RIGHT) RINNAI AMERICA CORP.; (BOTTOM RIGHT) NORITZ