



CASE STUDY

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Plumber-Turned-Laundromat Owner Chooses High-Efficiency Tankless Water Heating to Modernize his New Business

Seeking to turn an “ugly duckling into a golden goose,” contractor J.R. Nunez upgrades an aging boiler-storage tank system with four, condensing tankless units. Rated 94%-efficient, they are projected to cut his fuel costs by thousands annually.

BY SCOTT ISAKSEN

WHITTIER, CA — Why would a career plumbing contractor – a 20-year industry veteran with a thriving service business that already absorbs nearly all his waking hours – suddenly decide to try his hand at running a Laundromat?

“I’m just not comfortable having all my eggs in one basket,” explains J.R. Nunez, owner of Imperial Highway Plumbing, Heating & Air in Brea, Calif.; and Lambert Laundry, in nearby Whittier. “When the economy began to slow a couple of years ago, I began exploring new ventures. I had worked on a few Laundromat renovations over the years, so I figured now might be a good time to own one myself.”

Thus, in May 2011, Nunez became the proud owner of what he brightly describes as the “worst-looking Laundromat in town.” His first move, not surprisingly, was to shutter the place for 90 days and commence extensive renovations.

Now, you might expect that one of the first projects Contractor Nunez would tackle on behalf of Owner Nunez would be to upgrade the facility’s aging, low-performing, hot-water system: a decades-old, 480,000 Btu/hour boiler and a 275-gallon storage tank that fed Lambert Laundry’s 31 commercial-grade clothes washers. Made in the early 1980s by Ace Buehler, the boiler had a thermal efficiency rating of 70 percent, but was part of a terribly inefficient domestic hot water system that routinely dumped substantial amounts of heat into the cold-water supply.



J.R. Nunez of Imperial Highway Plumbing, Heating & Air: “I had worked on a few Laundromat renovations over the years, so I figured now might be a good time to own one myself.”

“The actual amount of hot water delivered to the washers was only a small fraction of what the boiler generated, and the storage tank also suffered from serious heat loss,” says Nunez, who was, indeed, inclined to rip out the old setup almost as soon as he laid eyes on it. But his realtor advised against the move. Replacing the boiler and its tank companion would entail a major outlay, “so my realtor thought I should use them as bargaining chips when it came time to sell the place,” Nunez says.

It was a decision that Nunez “immediately and consistently regretted” over the next several months, as he busied himself with the other renovation work. For one, the old boiler ran all-out, all day, every day – whether all 31 washers were operating or none at all. “I was constantly cooking 275 gallons of 130°F water, a total waste that drove me nuts.”

But there was another, even bigger problem: Lambert was operating without a “safety net”; that is, a backup boiler to take over if ever the main unit went down. Losing his one-and-only heat source for any length of time would have meant closing the Laundromat without delay to avoid heavy fines. “The Los Angeles County Department of Public Health doesn’t mess around in that situation,” says Nunez. “You have no choice but to suspend operations immediately.”

Time for a change: By the time Nunez had completed the other renovation work last spring, he figured enough was enough. The energy-squandering, boiler-tank combo had to go in favor of a new tankless system that would fire only when the washers were actually running, delivering only as much 130°F water as they needed.

Nunez was well acquainted with the benefits of tankless technology, having installed his first unit in the mid-1990s as a young plumber’s apprentice. “I was always open to the idea of tankless because I could see how popular it was outside the United States,” says Nunez. “I felt the technology would change the industry in this country, and it certainly has in California. Tankless is commonplace here today.”

PROJECT PROFILE

Project: Lambert Laundry, Whittier, Calif.

Application: Hot water for (1) 31 commercial-grade washing machines with a total capacity of 1,100 gallons; and (2) one restroom sink. Full capacity at Lambert is defined as three turns per day for each washer, or a potential maximum of 3,300 gallons of 130°F water.

Problem: Built during the 1950s, Lambert Laundromat used a 480,000 Btu/hour boiler to generate hot water for its washers. The 130°F water was stored — and kept warm during hours of operation — in a 275-gallon storage tank, also located in the facility’s cramped mechanical room. The always-on system routinely lost much of its heat to the building’s cold-water supply, while the 9-foot x 6-foot storage tank also suffered heat loss.

Solution: Four Noritz gas-fired, condensing tankless water heaters work together in stages, firing in response to fluctuating demand. The primary tankless unit activates when a clothes washer is in use. As other washers are turned on, the flow rate through this first unit increases in response. When the unit reaches 50 percent capacity, a second unit activates, and when the second unit reaches 50 percent capacity, a third unit activates, and so forth — until all four are running at full capacity if necessary. A separate controller provides real-time diagnostics of all four units simultaneously, and it will keep the entire system operational even if multiple units are down

Venting was done through the roof with Schedule 40 PVC.

Payoff: In a before-and-after test conducted by Noritz applications and tech engineer Chris Sellers, the tankless system used 40 percent less energy than the boiler-storage tank combination it replaced. This translates into a projected annual savings of just under \$1,100. Installer and Laundromat owner J.R. Nunez saved half that amount on his first month’s gas bill, so he anticipates even greater savings and a faster payback over time.

Models: Four NCC1991-DV-NG condensing tankless water heaters and an SC-301-6M system controller, all manufactured by Noritz.

Time Frame: April and May 2012

Installer: Imperial Plumbing, Heating & Air, Whittier, Calif.

Although Nunez has installed his share of tankless units in residential applications over the past decade and a half, a high-demand laundry application was a step up in complexity. So he approached Noritz Southern California district sales manager Ryan Simmerman for technical support. Simmerman, in turn, recruited Noritz project manager Javier Pacheco and applications and technical service supervisor Chris Sellers to determine the right mix of water heaters to meet peak demand and provide ample redundancy, all the while maximizing efficiency.

After a careful analysis of the floor plan and operation, Sellers specified four Noritz NCC1991-DV-NG gas-fired condensing tankless water heaters, with a thermal efficiency of 94 percent and maximum gas inputs of 199,900 Btu/h. That is, if all four tankless water heaters were fully operational, the total input would be 799,600 Btu/h.

All four are equipped with low-NOx burners with emission levels of less than 21 parts per million, meeting the new standards of the [South Coast Air Quality Management District](#). Linked together and to a Noritz SC-301-6M system controller, the quartet operates in stages, continuously adjusting to fluctuating demand. When the first-firing primary unit reaches 50 percent operational capacity, the second unit kicks in; and when the latter reaches 50 percent capacity, a third unit activates, etc. The role of primary unit automatically rotates among the four to limit wear-and-tear and prolong service life.

The SC-301-6M, which allows all four heaters to be monitored quickly and simultaneously, draws its power from the primary unit. However, if the latter should lose power, another unit will immediately furnish backup power to maintain operations.

Head-to-head comparison: The unusual circumstance of the licensed installer and the end user being one and the same person led Noritz to propose a before-and-after test at Lambert. Chris Sellers would use a special meter to calculate the Btu flow rate and total gas usage of the old boiler-storage tank combo for a week. Then, after Nunez and his two colleagues installed the new tankless system, Sellers would develop the same metrics for it, on his way to doing a head-to-head comparison.

**SIDEBAR: UNDERSIZING
THE SYSTEM...ON PURPOSE!**

One of the most important outcomes of the head-to-head testing of energy usage, tank vs. tankless, at Lambert Laundry was a more precise understanding of the application's true hot-water needs. "Most of our sizing for this type of application has been based on historical precedent, rather than on actual usage data," says Noritz applications and technical service supervisor Chris Sellers.

While the peak demand at Lambert demanded a flow rate of 40 gallons per minute, Sellers chose to design the system for only 26 gpm. But wouldn't that cause problems for J.R. Nunez's customers at peak periods of activity? Not at all, insists Sellers.

"Twenty-six gpm is the max flow rate needed 96 percent of the time, based on our measurements," he says. "So, yes, this means demand would exceed the flow rate four percent of the time. However, that period of imbalance is so short – maybe 10 seconds on average – the customer will hardly notice, and the system will be largely unaffected."

It's not as if the water heaters will shut down during these peak periods, according to Sellers. Their flow rates will simply slow, and the washers will take a little longer to fill. But as soon as one unit fills, the flow rate will rise at all the others.

"By undersizing the operation for those rare instances," says Noritz project manager Javier Pacheco, "Chris was able to design a smaller, less expensive system for J.R. that still meets his needs."

The comparison test had unavoidable limitations, because Sellers had no control over activity levels at Lambert from one week to the next. As it turned out, the tank-testing period was a busier week than that for the tankless tests, which occurred two weeks later. (The delay itself was the result of a tougher-than-usual installation – more on this in a bit.) For example, approximately 8,600 gallons of hot water were consumed during the tank week; 5,900, during the tankless week.

So Sellers sought to achieve apples-to-apples parity by ignoring activity levels and calculating “how many Btu’s were needed to produce a one gallon of 130°F water” by each system. For the tank week, that figure came in at 754.1 Btu; for the tankless only 455.4, a 39.6 percent savings.

Sellers then extrapolated his measurements over the course of a full year, calculating that the tank system would ultimately use an estimated 3,380 therms, for a yearly gas cost of \$2,741.69. The tankless system, however, would consume only 2,041 therms, for a total cost of \$1,655.56 – again, a savings of nearly 40%. The estimated total cost of the complete tankless system, including all gas and vent piping plus accessories, was \$9,838.60. The annual savings in fuel costs of \$1,086.13 (\$2741.69 - \$1655.56) yields an estimated payback of roughly nine years.

While that’s a respectable number, Nunez believes that the final payback will be considerably shorter. We will discuss the basis for his belief toward the close of this article.

Challenging installation: The decision to go tankless was the easy part of Lambert Laundry project. And, with the support of Sellers and Pacheco, Nunez and his two-man crew had no serious issues installing the four commercial tankless units, either.

But extricating the old boiler and the storage tank, which measured nine feet high and six feet in diameter, from Lambert Laundry’s 12-foot x 6-foot mechanical room: That was a formidable challenge. According to Nunez, the storage tank was so big, the walls of the mechanical room had to be built around it after the equipment was already in place.

“Our going-in plan was simply to demo the old system and install the new, tankless units in its place,” Nunez says. “But as soon as we saw the space and the setup, we realized the situation was more complicated and had to be done in phases.”

Step 1 was to erect a temporary installation in another part of the building, consisting of two tankless units and a controller, so that the facility could continue to operate as the installation proceeded. Step 2, the really tough part, involved dismantling the old system one chunk at a time: Nunez and his two colleagues, Sonny Gomez and Bill Spartyly, sat there for two full days, cutting the units into pieces with acetylene torches,” Nunez



J.R. Nunez (left) with Chris Sellers of Noritz: After a careful analysis of the operation, Sellers specified four Noritz NCC1991-DV-NG gas-fired condensing tankless water heaters (above), with a thermal efficiency of 94 percent.

continues. “We went through two large bottles of oxygen acetylene, but piecemeal was the only way to fit the old equipment through the door and out the building.”

Steps 3 and 4 entailed assembling all four tankless water heaters and the controller in their proper positions. First came the installation of tankless units 3 and 4 in the mechanical room. Then, while that pair kept the washers in hot water, Team Nunez relocated 1 and 2 from their temporary spot into the mechanical room as well.

Nunez followed Noritz’s recommendation to use condensing units for their higher thermal efficiency. This, in turn, allowed him to vent with three-inch Schedule 40 PVC pipe instead of stainless steel. The exhaust run through the roof is approximately 12 feet, while makeup air is fed to the system through a sidewall with a 12-foot run of PVC.



Front entrance of the Lambert Laundry (“Lavanderia”) in Whittier, Calif.: The gain in energy efficiency with the tankless water heaters has helped Nunez “turn a nice profit, while easing the pricing pressures of the plumbing business and allowing me to hold my margins. Plumbing is so competitive. But thanks to this business, I don’t need to give in.”

“We hung the four tankless units and the controller high on the wall near the ceiling, leaving plenty of room for storage of cleaning equipment and supplies underneath,” says Nunez, stressing another critical advantage in going tankless: space savings. When the boiler and storage tank dominated the mechanical room, Lambert Laundry had to store supplies in a remote location across town. “That was a bummer,” he continues, “because I was always finding myself missing something. Now I keep all those materials on premises.”

Nunez has even closed one of his plumbing company’s offices and relocated administrative operations to a remodeled section of the mechanical room. In short, the space savings with tankless helps lower Nunez’s operating costs in both businesses, while “making our professional lives a little easier.”

From start to finish, the installation required a longer-than-usual week and a half, Nunez reports. “That’s because we still had to handle our normal plumbing workloads during the day, so the Laundromat job was confined to evenings, weekends and lulls between service calls. The important thing was, the Laundromat never shut down. I would attribute that to the fact that the tankless part of the install went so smoothly.”

“Pretty amazing” savings: None of the installation challenges has left Nunez doubting the wisdom of his decision to buck the realtor’s friendly counsel – certainly not after getting his gas bill in June, the first full month post-installation. That initial invoice was approximately \$450, or half what it was a year ago with the boiler-storage tank combo.

The 31 commercial washers at Lambert Laundry have a combined capacity of 1,100 gallons. Full operation would mean that each would “turn” three times daily, for a potential maximum load of 3,300 gallons of hot water each day.

Lambert can occasionally approach that level of activity during the eight “winter” months (September to April), when the weather is somewhat cooler, the kids are in school full-time, and there are more clothes to wash. But in summer, business is slower, according to Nunez. “One customer does 50 pairs of school uniform pants weekly during the winter; but come summer, her wash load is cut in half.”

Fewer loads means less hot water needs to be generated, of course. And the longer the tankless units sit idle, the greater the savings over the old boiler system that fired constantly. That is why Nunez expects the 50 percent cut in his first month’s gas bill to hold for the four warm-weather months; however, the monthly savings will likely drop to around 35 percent the rest of the year.

Even so, that calculates to a total annual savings of between \$4,000 and \$5,000. These are necessarily rough estimates, Nunez admits, and only time will tell for certain. But he expects his annual savings will be significantly greater and his payback faster than what the head-to-head test figures cited earlier in this story indicated.

“The savings generated by those four tankless water heaters have been pretty amazing,” he says. “Their efficiency is helping me turn a nice profit, while easing the pricing pressures of the plumbing business and allowing me to hold my margins. Plumbing is so competitive: A lot of people are taking jobs for 5 percent just to make a decent day’s wages. But thanks to this business, I don’t need to give in.”

In fact, Nunez is thinking of expanding his involvement in the Laundromat business – “turning ugly ducklings into golden geese,” to further extend his business holdings. He has even fielded a serious outside offer to buy Lambert Laundry, he says. Not that Nunez plans to say “yes,” but the exquisite irony is: The new tankless system is one of the major selling points for this would-be buyer.

“In retrospect, replacing the old boiler with tankless should have been one of the first renovations I did, rather than the last,” he comments. “Today, even my realtor can see it was a very good idea.”

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Hi-res versions of photographs to accompany this case study are available for immediate download in .tif format by using this link: <http://www.noritz.oreilly-depalma.com/2012/cs-lambert-laundry.shtml>

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