

MULTIFAMILY

*Journal of*  
**Utility**  
management

THE LATEST RESEARCH AND MODELS FOR  
OPTIMIZING UTILITY USAGE IN MULTIFAMILY  
VOL. 10, ISSUE 1 • WINTER 2020

**MUST READS**

THE SECOND LIFE  
OF RECYCLING

GREENING OF  
THE PARKING LOT

COOL ROI  
THROUGH PROPERTY  
MAINTENANCE

REALPAGE

**ENERGYSUMMIT2020**

SPECIAL EDITION

Emerging sustainability practices  
in utility management





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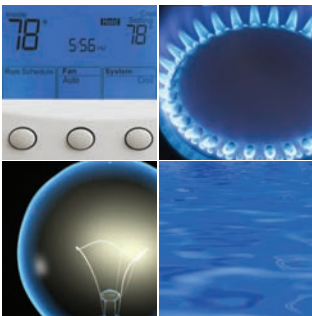
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## Backyard treasure

I grew up in unincorporated Fresno, California (the part of Fresno that Fresno didn't want). It was rural. We were on well water and grew crops. The barn was built in 1912 and the house in 1913. We modernized the house and eventually added a pool.

We didn't have a lot of money so the pool was an above-ground Doughboy. Because we were classy, we dug a hole and partially buried the pool.

Digging that hole was magnificent to 6-year-old me because in the process of digging we discovered buried treasure. I should be clear—buried treasure consisted of old bottles, cans and other items that the original owners had buried as trash.

In our quest for the perfect pool we excavated their landfill. I still love thinking about the magnificent blue glass bottles (for some sort of elusive tonic) and the rusted tin cans that I was certain were worth a fortune. One man's trash was now my treasure. With

such treasure I collected knowledge and potential from the past.

I look at our industry and see how far we have come with respect to utility management, where we stand in this moment, and sense what is to come. I experience the same wonderment that I did as a child. There is so much potential NOI in an expense category that has historically been discarded and deemed uncontrollable.

We have gone from a view that you can't impact utility cost or consumption, to wide adoption of LED lighting retrofits and ENERGY STAR appliances, to net zero and passive house. Some of this shift in perspective comes from resident demand. Some catalysts of change are mandated from new investment partners from outside our industry: lenders and (let's call it what it is) regulators.

Despite these influencers, our shift also derives from common business sense. We

have learned (and continue to understand) that utility spend is controllable, that there is value in managing it, and that to future-proof our communities not only better positions our assets for tomorrow, but improves our bottom line today.

When we ask, "Is it sustainable?" we seek to preserve NOI and improve it within the course of our actions. We welcome the opportunity to do better, drive revenue, reduce costs. That's not to say it's easy. Sustainability requires knowledge and experience—both of which we gain through the "new normal" of utility management.

We all know the problem. The question, is how do we acquire knowledge more quickly? Where do we dig to find opportunity?

You are a great treasure hunter. You know that value exists—but wouldn't it be nice to have a map where a big "X" marks the spot?

It is my privilege to bring you this *Journal of Utility Management* to help on your mission to control a top expense category. "Is it sus-

tainable" is the map to efficiency, accuracy and to reduce costs—all buried treasure found in your own backyard.

**Mary Nitschke**  
Publisher



## Sustainability and our universe of utility management

As we work within our universe of utility management, our job descriptions often require us to be at least some part asset manager, regional supervisor, property manager, service manager, project manager, financial analyst, auditor, accountant, sales, marketing, IT, and (increasingly) environmentalist. The cool kids' word of the day is "sustainability," and though we know the definition, we struggle with its exact meaning.

Think of the word "red." We all know what red is, right? We've known what red is before kindergarten. And yet, how do you describe red to someone who doesn't know what red is? We point to a red car. We point to a red apple. Perhaps we point to a red marker, and say, "those things are red." And yet, the shade of a red car, an apple, a red marker, are all slightly different.

Some might argue that certain shades of red are more orange and not really red at all. How do you even begin to describe red to those who cannot see red and instead see



what we would consider grey/green?

In the same vein, sustainability means different things to different organizations. Even within an organization, sustainability within the portfolio may look different from one region to another, from one asset to another. Recycling is sustainability—would anyone disagree? Benchmarking is sustainability—would anyone argue that more data is use-

less? Herein we point to things within our universe of utility management and say "these things are related to sustainability." We may disagree about the execution of sustainability, but we're already talking and acting on it... it's all some kind of red, maybe a bit of orange. And it's all progress.

Many organizations now consider utilities a controllable expense, in some measure, through systems, people, and processes. It's an exciting time when the historically-contrarian objectives of NOI and rate of return begin to align with those of residents, sustainability, and environmentalism.

Many of us have the power to impact a large portion of an asset's financial performance with decisions we make and programs we manage. As Uncle Ben said to Peter Parker: With great power, comes great responsibility. Now go out there, be a utility management hero, and save the world.

Oh great. One more thing to add to the job description.

**Peter Chan**  
Fairfield Residential, Director of Ancillary Services and  
*Journal* Guest Editor





## Cool ROI through property maintenance



**Fieldpiece SMAN refrigerant manifold with micro gauge** is just one of the newest tool-related innovations on today's multifamily properties. As wireless becomes a standard, this equipment documents and generates reports from a smartphone or tablet.

One of the most overlooked aspects of property management is maintenance. The maintenance team is on the front lines of the community, interacting with and satisfying residents, and saving money by extending the life of appliances and equipment. It's a mistake to underestimate their value.

"The service team is the heartbeat of return on investment, and selection is paramount to success of the bottom line," said Mark Cukro, founder and owner of Harrisburg, N.C.-based Serviceteam Training that has been providing certification training to multifamily technicians nationwide for 15 years.

According to Cukro, companies that rate highly for both customer service and performance almost always have a good service team and enough techs to care properly for the community.

The general rule in the multifamily industry for the number of technicians per property is one per 100 units, which Cukro says is the absolute bare minimum for mediocre to average service.

"For instance, if you have a 30-year-old property with 200 units and two maintenance techs, there's no way your property can provide amazing service. But if you have 200 units and four technicians and the property is 40 years old, you are probably going

to have really good service. Residents don't mind living in old buildings. What they do mind is someone taking too long to respond to service requests," he said.

### Team building

The first step toward building a quality maintenance team is hiring the right people. The next is retaining them. But in today's tight job market, it has become increasingly difficult to find qualified technicians. One reason is the shift in the education system that has pushed high school graduates toward a four-year college degree while nearly eliminating trades as an educational option.

According to Cukro, baby boomers seem to have the most proficient level of trade skills of the two largest generations, but as thousands retire every day, those trained in the trades are exiting the work force.

As millennials and the smaller Gen X cohort enter, they are less proficient in trade skills but bring to the workforce greater

understanding about mobile and cloud-based systems and software. This has created a technical trade skills gap. For this reason, Cukro stresses that managers change the way they advertise for, hire, recruit and train service techs.

"Every tech I've met wants to work for a great company that respects and appreciates them and pays them fairly. That's a reasonable expectation. They want to understand that they contribute to the team. Provide that environment and you will have a low turnover, wonderful company culture and technicians who will work for you as long as you want them to," he said.

In recent years, the process of advertising for maintenance technicians hasn't changed. Ads that hype the company and not what the company has to offer the employee are still the rule.

Cukro suggests highlighting what the company has to offer potential candidates rather than how many communities are in the portfolio.

Verbiage might include, "Do you want to work for a company where people take care of each other? We will help you build your career and excel in every area possible. We'll invest in you as a human being and an employee. We offer a career path."

"That's a completely different advertisement than, 'You're fortunate to work for us.' I think that's an important shift in approach that needs to take place," said Cukro.



Next, he said, pinpoint the skill and experience level of the candidate you seek. Identify those traits that will best enable them to engage with residents, and fit in with your team and company culture. Interview questions that focus on knowledge, skills, attitude, integrity, maturity and competence can help ascertain if the candidate is a fit.

"If you want good techs to stay, the pay scale has to be appropriate. Remember, if you call an electrician to replace a circuit breaker, it's going to cost between \$100 and \$150, maybe more, so every time a service technician makes a repair, the community is saving a tremendous amount of money and the job is completed in a shorter amount of time, he said. "Be prepared to offer fair pay."

Besides compensation that signals that maintenance team members are appreciated, a company culture that gives them a voice and empowers them to make important decisions is critical.

### Training—how much is enough?

Once the team is assembled, a consistent training program is necessary. Most industries recommend one week a year of tech training, but multifamily typically provides less than half of that, said Cukro.

He says this needs to change and recommends a minimum of 40 hours, or one full work week per year of training for a tech position and twice that amount of training for tech supervisory roles.

Some managers and supervisors think that if techs receive training they can be lured away by the promise of more money. "What if you never train them and they stay? What will that cost you?" The lack of training will cost you much more than the training itself," Cukro said.

Cukro sees a direct correlation between great training programs and great retention.

"People don't leave companies where they are respected and treated well, or they are trained too much. They leave because they are mistreated," he said.

As technicians move up in a company they need business acumen to handle administrative responsibilities and a level of social maturity to deal with people. Office managers should provide technicians with both technical and soft skills training and

attend at least one training session themselves, so they understand what goes in to fixing things, said Cukro.

When managers understand why maintenance techs do things in a certain order, they gain a greater connection to the work and a deeper understanding of how service is delivered. If they only know how to read a report and a budget, they may not have needed insight and might try to micromanage the technician, he said.

"Interrupting the technician during a job wastes time causing stress and frustration. Every time you interrupt a tech it takes, on average, an extra 20 or 30 minutes out of the work day, so if you interrupt a technician three times a day, you've taken an hour from their productivity."

"The less you interrupt techs in their tasks or the flow of their routine, the more productive they will be. Managers who micromanage have tremendous team turnover rates. I'm pretty sure the service tech doesn't tell the office team how to market the property," said Cukro.

### The value of organization

A clean and organized shop is key to cost savings. Every property should have a shop that is so clean it could be part of a tour. The entire staff should be required to clean the shop once a week.

"Once everything is color-coded, put away and easy to find, then you can work on inventory control. Once that's done, it's easy to eliminate unnecessary expenses and increase efficiency," said Cukro.

Some of the greatest unnecessary expenses result from a lack of understanding owners' needs and expectations when it comes to repairs versus replacements.

"Appliances today are designed to last 12 years, plus or minus two. My rule is if an appliance is at 50 percent of its life and the part is 50 percent of the replacement cost,

replace it. Below that in any category, repair it. Once a company rule is established and communicated, your field people have a basic compass of judgement," said Cukro.

### The right stuff

Never forget that field techs are the lifeblood of the multifamily community, said Cukro. "They're knocking on doors, shaking hands, making problems go away, making people smile and building relationships. Don't respond to them appropriately, or fail to get them the tools, resources and training they need, and they can't do as good a job," he said.

While hammer, pliers and wrenches don't change much, some tools, especially those used for diagnostics, should be updated or replaced every several years, said Cukro.

Manual gauges and meters should be replaced with digital ones that communicate wirelessly to smartphones or through Bluetooth, enabling techs to upload data and troubleshoot systems.

And, if technicians are required to use their phones as part of their job, they should be provided a phone, because now their phone is a piece of equipment necessary to do their job.

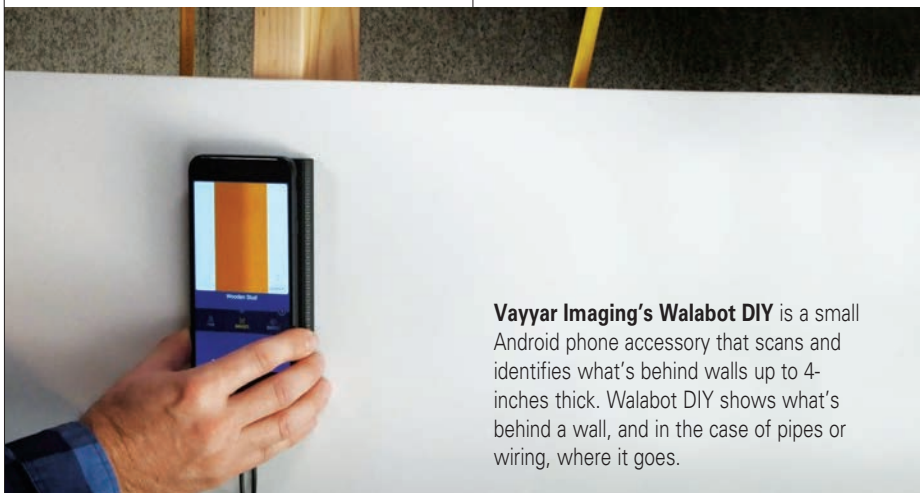
Trade shows, seminars and workshops can help service managers stay up to date on the latest tools and technology, as can talking to industry experts and tradespeople outside of the industry and then bringing their specialty equipment into the multifamily industry.

If you listen to the people in the field and get them what they need, they stay and residents get what they need. When the residents get what they need, they stay and the company performs.

"When you own an apartment property, it should be your highest priority to make sure everyone looks forward to coming to work and to home where they live. If you believe you can do that, that's when the magic of service happens," said Cukro. ☀



**Mark Cukro** is founder and owner of Harrisburg, N.C.-based Serviceteam Training. Cukro is the keynote speaker at the RealPage Energy Summit in Dallas in February.



**Vayyar Imaging's Walabot DIY** is a small Android phone accessory that scans and identifies what's behind walls up to 4-inches thick. Walabot DIY shows what's behind a wall, and in the case of pipes or wiring, where it goes.

# When net zero is not net zero

With increasing frequency, the term net zero is entering conversations around the design and operation of the built environment. This is an important goal, but what if what we are designing and calling net zero will not be net zero for decades?

The impact of the built environment is well documented and accounts for 39 percent of annual global greenhouse gas emissions. Looking deeper at that 39 percent we find that 28 percent is from building operations while the remaining 11 percent is from building materials and construction, according to the *Global Alliance for Buildings and Construction 2018 Global Status Report*.

That 11 percent is the focus of the conversation around embodied carbon and is also the reason why that net zero building may not really be net zero for decades, despite being designed to operate at zero emissions. In fact, fundamental to actually designing a net zero building is to understand the materials being specified and their impact.

This is particularly important in new construction, as 90 percent of the carbon released from buildings constructed between 2015 and 2050 represent embodied carbon associated with building materials, according to *Architecture2030*.

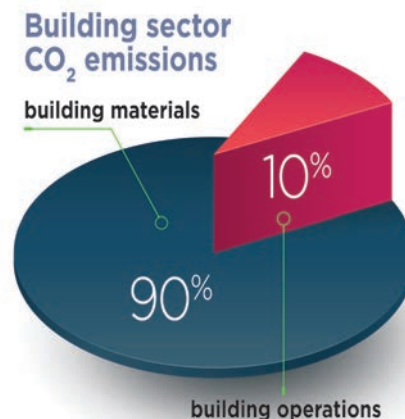
Just as in energy management, the foundation is data and understanding the level of carbon

intensity of the products specified. Once we understand which materials contribute the most to a building's embodied greenhouse gases, we can begin to evaluate those materials to determine if less carbon intense materials are available.

There are free databases, which can be a good starting point. One such database is the ICE Database at Circular Ecology and the Quartz Database, as well as the recently released EC3 Carbon Calculator Tool. These resources provide a better understanding the amount of carbon in materials.

Another tool is the Environmental Product Declaration (EPDs), which provides a product-specific look into the impact of the materials in a product. The EPD contains life cycle assessment information summarized into an easy to read format. The format also lends itself to allow for comparisons between products. The EPD is a valuable tool in comparing like products against like products.

The gold standard in understanding the Embodied Carbon in a project is to conduct a whole building life cycle assessment. From cradle



SOURCE: EIA 2001, RICHARD STEIN CBEC'S 2003, MCKINSEY GLOBAL INSTITUTE

dle to grave, this assessment examines the impact over the entire life cycle of the project.

The drawback of this approach, however, is cost, as not every project has the budget for a full-scale, whole-building life cycle assessment. But there is a valuable takeaway from whole-building life cycle assessment, which is the realization that structural systems almost always comprise the largest source of embodied carbon in a project, up to 80 percent. This means that targeting the structural system and material choices in the concrete, steel and wood can make a major impact on the overall embodied carbon in a project.

Take concrete. Concrete is one of the biggest carbon emissions culprits with a significant presence in nearly every structural system. While largely rock, sand and water, about 11 percent of the typical concrete mix includes portland cement, a substance that, alone, is estimated to be responsible for 5 percent of total global carbon emissions.

Made of calcium carbonate, silicon, aluminum, and iron, about 1.6 tons of raw materials are required to make 1 ton of cement. The elements are placed in a rotary kiln and heated to about 2,700 degrees Fahrenheit, largely through the burning of fossil fuels. Yet, the inclusion of fly-ash or blast-furnace sludge can reduce the embodied carbon in the concrete mixes.

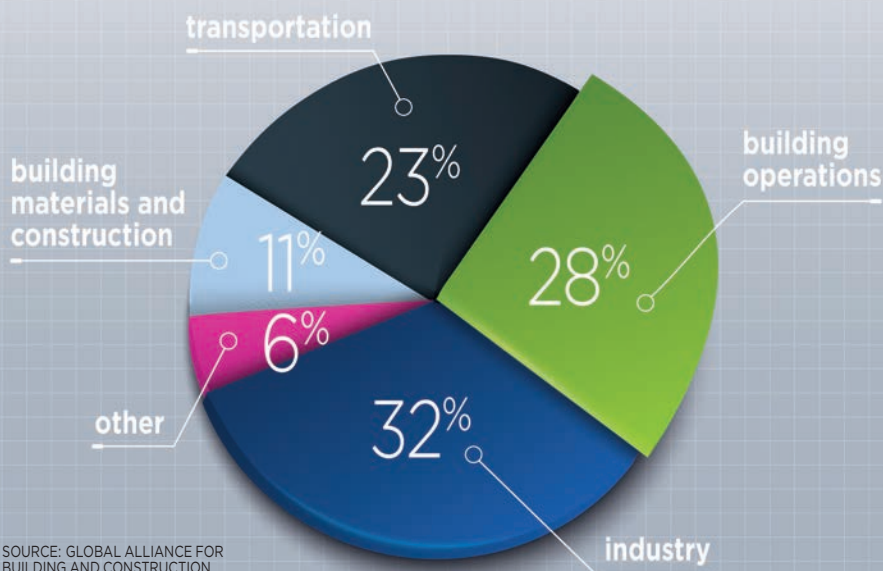
From structural elements to interior design components, taking the extra step to investigate what is in the materials you specify, then investigating whether alternative, less intense options are available, can make a big difference in the embodied carbon in your project. Only



when we consider the full impact of our design can we truly design and deliver a net zero building. ⚙️

**Chris Laughman** is Director of Sustainability for Greystar.

## Global CO<sub>2</sub> emissions by sector



SOURCE: GLOBAL ALLIANCE FOR BUILDING AND CONSTRUCTION, 2018 GLOBAL STATUS REPORT



# Building energy efficiency

WHEN SAVING ENERGY IS CHEAPER THAN MAKING ENERGY

## U.S. ENERGY USE VERSUS U.S. GDP



U.S. ENERGY INTENSITY  
DECREASED BY  
(1980 TO 2014)

**50%**

## What is energy intensity?

From 1980 to 2014, U.S. energy consumption increased by 26 percent and U.S. gross domestic product (GDP) increased 149 percent. Energy intensity is energy use per real dollar of GDP. Energy intensity declined from 12.1 thousand Btu per dollar in 1980 to 6.1 in 2014.

Here are some reasons why:

New car fuel economy  
**▲ 25%**

Industrial energy use per unit value of product  
**▼ 40%**

Electrical transmission loss  
**▼ 25%**

Energy use of new clothes washers  
**▼ 70%**

New home energy use meeting new building codes  
**▼ 40%**

**\$6.1**  
BILLION

energy  
efficiency  
spend in 2017

**\$8.6**  
BILLION

projected U.S.  
spend on energy  
efficiency by 2030  
(Lawrence Berkeley  
National Lab)

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HOW THIS TRANSLATES  
TO THE U.S. ECONOMY

**\$800**  
BILLION

TOTAL SAVINGS TO  
BUSINESS AND  
CONSUMERS ANNUALLY

**\$2,500**

PER CAPITA SAVED  
THROUGH ENERGY  
EFFICIENCY

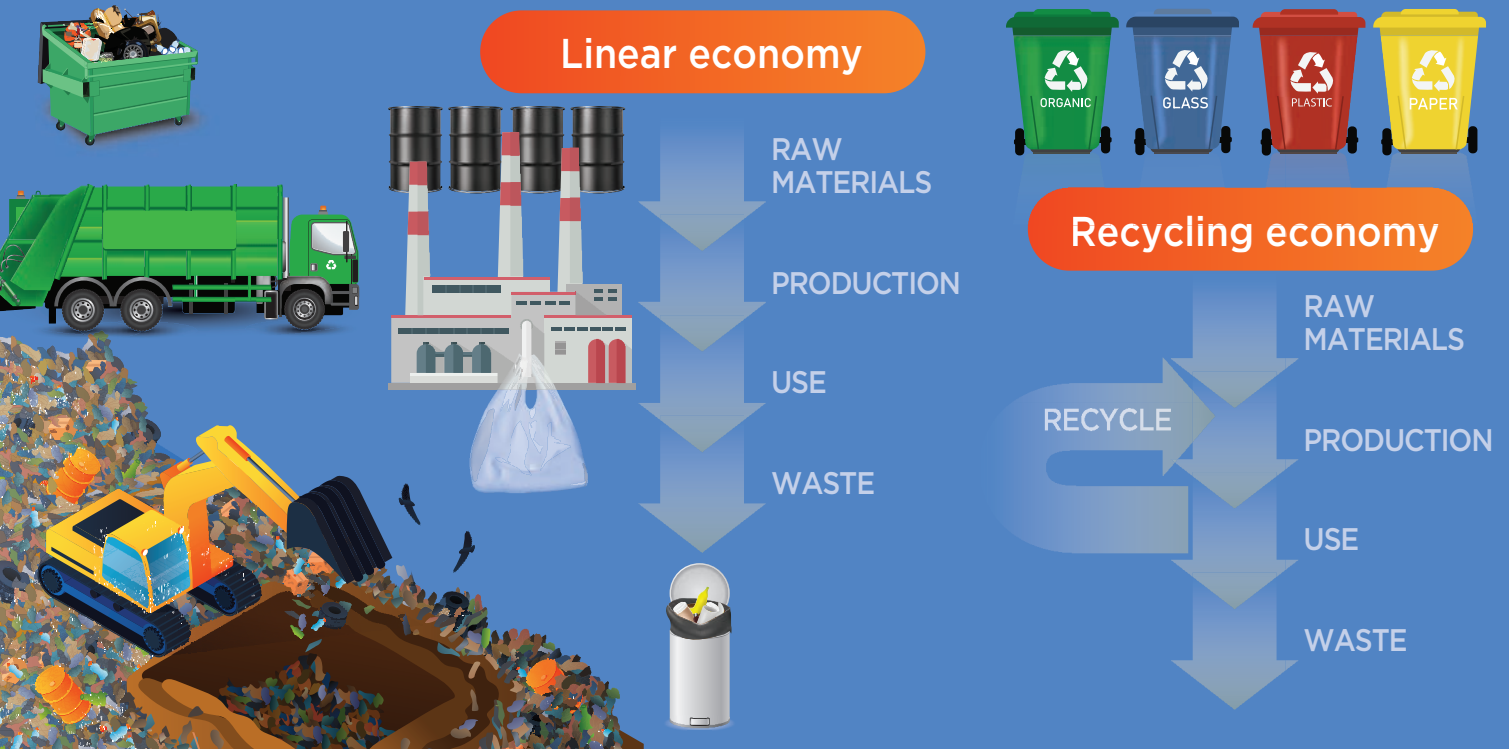
**\$423**  
BILLION

of building and  
construction  
costs were spent on  
energy efficiency

**\$5**  
TRILLION

was spent on building  
construction and  
renovation globally  
(2017)

# What is zero waste? .....



## The second life of recycling

Have you ever watched a Godzilla movie? Just when you think Godzilla is on the ropes and going down, dying, he gets up stronger and more powerful and angrier. Recycling is kind of like that. For those of you who thought recycling was going down, it was going to die when China closed its doors to contaminated recycling, get ready for the recycling comeback stronger than you imagined as we move into the era of zero waste.

Zero waste is an objective (typically made by an agency, city, or business) to achieve 90 percent diversion of waste. This means that only 10 percent or less goes to the landfill or incinerator. 90 percent must be recovered or diverted in some way. Diversion can include upcycling (reuse), recycling materials to manufacture other things or composting. Major cities, like Dallas, Boulder, Detroit, Boston, Austin, San Francisco, and New York are targeting zero waste objectives.

Multifamily owners and managers should note trends toward zero waste as these goals often turn into ordinances and hefty fines for violations.

As of January 1, 2020, the City of Dallas

has mandated recycling at all multifamily complexes with eight units or more. Multifamily housing comprises 50 percent of all housing in Dallas so this ordinance is significant both in its requirements and its penalties. Key components of the ordinance:

- If your building has 8 units or more residents, you must offer recycling.
- Provide 11 gallons of recycling per unit at minimum.
- Submit annual recycling plan and affidavit of compliance with the City's multifamily code compliance division.

I recently spoke with two trash experts who are fluent in this ordinance and multifamily: Richard Bates, commercial property strategic account manager for Waste Management, and Richard Merrill, partner, Field Operations for TrashLogic.

"I believe Dallas wants to be relevant and competitive when attracting new companies to do business," said Bates. "When a Fortune 100 company like Amazon is deciding where to establish a new corporate office, sustainability is going to be considered. How well do the cities goals and initiatives align with their own? Corporate social responsibility is a key pillar in almost every Fortune 100 company."

"There is more to mandating recycling than just doing the right thing, there are economic drivers behind it as well," he said.

Merrill agrees. "There is also growing demand from residents," said Merrill. "We are seeing a trend in new residents who previously lived in single-family homes and are moving back into multifamily dwellings. It is resident-driven because that's what they are used to. As people move (to Dallas) from other metropolitan areas, they expect to see recycling services offered because it has been the standard in so many other places."

The city's new recycling requirements are



## Circular economy

RAW  
MATERIALS

RECYCLE

PRODUCTION

USE

In a circular economy materials are reused. Waste glass is used to make new glass. Waste paper is used to make new paper.

The zero waste strategy prevents new waste by making products and materials more efficiently by reusing them. When raw materials are needed, they are obtained sustainably.



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not without implementation challenges. Multifamily operations are solving these in a number of ways.

“Many multifamily housing communities in the mandated area were never really designed with recycling in mind. The mandate requires adding volume and service to sites that may not have room for an additional dumpster or adding a recycling bin near the current trash container,” said Bates.

Since many properties are not physically designed for such an expansion of service, there’s often a construction challenge to overcome. Most properties simply weren’t designed for recycling. Adding the containers needed for the volume required can be a challenge. And recycling services must be available within a line of sight of trash containers, amplifying the logistical challenge.

“If the customer is space-constrained for dumpsters, I recommend tote services for door to door recycling,” said Bates. “Owners can use a recycling hauler. The goal is the diversion, but the city is willing to work with owners that have challenges.”

“Absolutely,” said Merrill. “Space constraint is a top issue. Many properties were designed without waste processing in mind—even in new construction projects.”

Creating an effective plan to add recycling to a property is often challenging, fur-

ther complicated by moving it off the property cleanly.

“Most people think the hurdle is education, but it is space constraints,” said Merrill. “What Dallas is doing well is allowing properties to develop their own programs and use innovative options. They have some freedom to do it differently rather than just mandating that the local or franchised hauler do everything.”

Merrill said that doorstep programs combined with recycling sorting and processing are a simple solution. Such programs allow doorstep providers to haul recycling off-site directly to the appropriate processing site rather than storing the recycle material on-site for a weekly pickup from the franchise hauler. This not only solves the space constraint, it moves trash off-site in a timely and efficient manner. But what are the costs associated with such programs?

There are three points to consider with regard to cost. “The first is that recycling is, on average, twice as expensive as trash service in the Dallas market,” said Bates. “The second is the risk for contamination charges if residents do not put the proper material in the recycling containers.” Different providers handle costs differently. Some do not charge contamination fees, but will not pick up bins with a large amount of contam-

ination leaving the property team responsible for removing the noncompliant bins.

“The third consideration is time and resource drain on your maintenance teams,” said Bates. Maintenance staff will need to manage recycling bins to assure that bulk items, plastic bags, and non-recyclable materials are not placed in recycling bins. Minimizing contamination charges is an important part of the recycling process.

Eventually there will be penalties of up to \$500 for complexes that do not comply with the ordinance. Currently no fines have been assessed as the city works with owners to sort through the challenges of getting a recycling program up and running in a market where none previously existed.

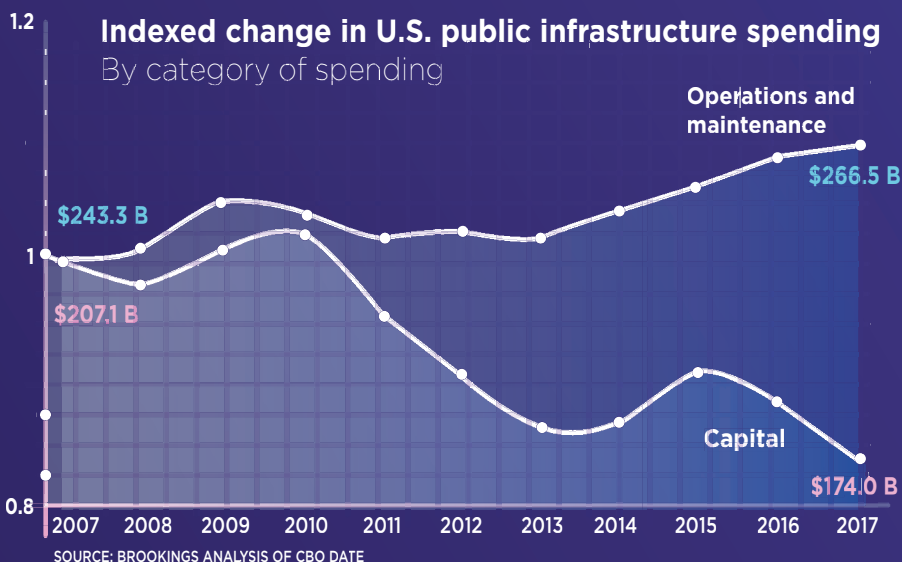
That said, owners should look ahead and start to consider ways to future-proof their buildings. Although recycling may increase costs, not recycling could cost even more.

Recycling is only the beginning as cities and businesses continue to forward their zero waste goals.



Godzilla isn’t dead. He’s rising, stronger than ever. Don’t forget, Godzilla has friends. Mothra may be coming.

**Mary Nitschke**  
Publisher



## Building a utility management program for the future

Nationally, apartment starts in 2019 were 116 percent of the 2018 level. Analysts expect a 1 percent increase in new apartment projects in 2020, followed by a 4 percent increase in 2021. Even with continued rent growth in many areas, as well as 22 percent of young adults (ages 25 to 34) delaying household formation, rental owners justifiably remain uneasy about the future. There remain unknowns like rent control, water quotas and rolling blackouts—all threats to operations, controlling expense—and profitability.

Last year marked the 10th straight year of growth for the U.S. economy. The multi-family housing industry is expected to perform, even expand as renters from all demographics continue to fill its units.

Times are good. Yet, the industry's rising utility spend, local and national regulations around benchmarking and conservation, and the growing optics of sustainability are good reasons to plan ahead.

Aging gas, water and power infrastructure, and changing global markets for trash exporting are just some of the hard and fast realities in the world of utilities—even before adding in evolving social attitudes on climate change, its potential and timing.

### Powerful economy, aging grid

The U.S. power grid delivers more than

\$400 billion of electricity each year across 7 million miles of line. While it keeps the world's largest economy humming, it's also an aging infrastructure in serious need of more than \$1 trillion of repair and upgrades. These improvements would make the grid more reliable, resilient and efficient, while also cutting carbon emissions.

On the profitability side of the model, electricity is a business under pressure. The U.S. power grid loses 5 percent of its transmitted electricity. Electricity consumption has flatlined as users and their appliances have become more energy-efficient. In California, the state's largest utility filed for bankruptcy and now cuts power to customers on high fire-risk days adding a large measure of unreliability to its service, driving customers to seek other sources includ-

ing back-up fossil-fuel operated generators.

While the world of energy has changed, the nation's 3,000 utilities haven't altered their operational model in over 100 years. The argument for large, centralized utility companies that deliver electricity over long distances is now up against micro grids, and other emerging technologies like energy storage and net metering.

### Half-century-old gas mains

The nation's average gas mains—gas pipes running under city streets—were, on average, 33.8 years old in 2018. A quarter of active gas mains are more than 50 years old.

Last year a report found that six major U.S. cities—Washington, D.C.; Baltimore; Philadelphia; New York City; Providence; and Boston—had methane leaks totaling more than twice EPA estimates. High-profile gas explosions have driven utilities to replace older pipes, as in Massachusetts where 45 miles of pipe were rapidly replaced in 2018 following a series of explosions.

New and abundant supplies have kept gas prices low, and concealed the costs of an aging infrastructure. But gas utility customers typically pay for infrastructure investments, as in Illinois.

The state recently approved Peoples Gas' massive infrastructure replacement plan to replace all gas pipes running under the city of Chicago. When finished in 2040, hundreds of thousands of customers could be paying \$750 a year for the replacement effort, a report found. The total cost will be between \$11,000 and \$16,000 per customer served by Peoples Gas.

### Taking water for granted

It's said that the industrial revolution was marked by three points of innovation. First the steam engine, mechanized cotton spinning, and railroads. The second, indoor plumbing, electricity and the internal combustion engine. The third, the computer and internet revolution.

While most inventions have subsequent, newer models, once those that require substantial infrastructure, such as the railroad tracks and water pipes, are built, the emphasis becomes expansion, not upgrades—until the system's level of disrepair exceeds the point of tolerance.

As many of the nation's underground water pipes reach or exceed their end of life, the average 240,000 water main breaks cost an estimated \$2.6 billion annually. The American Society of Civil Engineers estimated the cost of degrading water/wastewater





# \$2trillion

## IN REPAIR COSTS

of the U.S. infrastructure just to maintain reliability (2030)

# 90million

## smart meters

in the field (2019)  
show how utilities can  
operate in a  
decentralized future



## AMERICA'S INFRASTRUCTURE CHALLENGE:

- patchwork of modern and antiquated technologies
- centralized, large generating facilities push power, linearly to the meter

- non-wire alternatives
- smart grid network
- utility management

## REAL-TIME INFORMATION

allows better response time to issues and opportunities

## SOLUTION: LET TECHNOLOGY RESHAPE THE GRID AND REDUCE INVESTMENT BURDEN

Deploy grid management tools on a wide scale to create resilience and security without big costs. The way Uber transformed transportation: distributed, connected computing power.

SOURCE: DAVID BLACKMON, THE AMERICAN SOCIETY OF CIVIL ENGINEERS, STEPHEN CHASKO

infrastructure at \$59 billion (2013 to 2020) to households and \$147 billion to businesses.

Most American consumers and businesses get water from one of approximately 51,000 community water systems. Fifty-five percent of those systems serve populations of 500 or less. Less than 1 percent of systems serve communities over 10,000. These large water systems are located in the country's 100 largest metropolitan areas, but serve 82 percent of the population.

The American Water Works Association estimates the cost of restoring underground pipes at \$1 trillion over the next 25 years, not including building or repairing treatment plants.

Water utilities are selling less water due to a fall in usage since 2000 and a slowing of new customers.

### The era of repair

Repair and maintenance costs of the nation's aging utility infrastructure have risen. Unfortunately this has also meant that a decrease in spending on capital projects. According to a Brookings study, the U.S. is spending far more money to keep infrastructure systems working (water, electricity, gas) and much less on building new systems or making significant upgrades.

As this trend in spending on repairs versus new projects continues, its financial pressure creates capital shortfalls in geographic areas also experiencing dwindling populations and shrinking economies.

And while state and local spending have declined over the past decade, they represents over three-quarters of all U.S. infrastructure spending—largely operations and maintenance. States and local government have increased operation and maintenance spending by \$23.9 billion (+11.1 percent) and decreased their capital spending by \$31.1 billion (-23.3 percent) over the last decade.

### Importance of utility management

As governments at all levels work to strike a balance on infrastructure maintenance while managing its associated costs, apartment owners are best served protecting their investment from the impact of rising costs, tiered and other changing utility pricing structures, consumption caps and other methods of cost recovery by utility companies.

While policies, political posturing and public opinion evolve around conservation and sustainability, the impact of an aging infrastructure is as tangible as that of deferred maintenance on a property. It requires attention and funds to repair and maintain, and

costs will be recovered, at least in part, from the consumer. This makes conservation as much a good business practice as it does a social responsibility.

The good news is that utility management has been around for decades. Commercial buildings of all types have perfected facility management, including benchmarking, and predicting and managing utility costs.

Technologies such as predictive analytics (to identify potential asset failures and accelerate repairs) are effective ways to deliver customer service to residents, while managing utility costs, now and into the future.

Resident engagement efforts to increase conservation are also an impactful way to control expense and partner with residents to achieve sustainability goals. Management companies Greystar, The Bozzuto Companies, Alliance Residential Company and MAA are just a few of those who have set annual sustainability goals for their properties and companies.

A solid utility management program will not only contribute to a property's conservation, but save on expenses. Apartment operations also conserve through utility billing programs, submetering, expense and energy management, and utility benchmarking.

SOURCES: BROOKINGS; DELOTTE; ACEEE; EDISON ELECTRIC INST.



# ELECTRIC VEHICLE PARKING



## Greening of the parking lot

Website EVAdoption reports that in 2018, plug-in electrical vehicles (EVs) made up about 2 percent of total light vehicle sales nationally. In California, it was nearly 8 percent. Indeed, the 153,000 plug-in electric vehicles sold in California represent almost half of national electric vehicle sales. New York, Florida, Washington and Texas all saw plug-in electric vehicles sales exceed 10,000 units in 2018.

Apartment owners in states with high rates of adoption of electric vehicles will find themselves at a significant disadvantage in competing for the relatively affluent cohort of renters who own EVs if they do not accommodate their need to recharge those cars.

### It's all about power

There are several types of EV chargers on the market. Level 1 EV chargers plug into a standard 120 VAC, 15 or 20 Amp wall outlet. These chargers operate at a relatively low power level and are suitable for overnight recharging of an EV. A Level 1 charger is often included with the purchase of an EV.

Level 2 EV chargers plug into a 230 VAC, 30 Amp or higher wall outlet. These outlets

are similar to what would be used for an electric clothes dryer. Since they provide both twice the voltage and twice the current of a 120 V wall outlet, Level 2 chargers can recharge an EV much more quickly than can Level 1 chargers.

The fastest EV chargers, such as the Tesla Supercharger, deliver high direct current power to the EV. Because they operate at very high power levels, these chargers may require specialized wiring to connect them to the AC supply. However, Tesla says that their Supercharger can recharge a Tesla car in 30 minutes.

### Meeting the need

The simplest way to deliver charging capability to residents with EVs is to provide park-

ing spaces with wall outlets. Because this solution would require overnight connection to recharge the vehicle, each parking space would likely be assigned to a particular resident. Residents could be charged a premium for these spaces in order to recover the cost of installing the wiring. Submeters could be used to track the power used and the cost of this power could be billed to the resident along with his other utility charges.

An issue with this approach is that it does not include load balancing. When an EV with a depleted battery is first plugged into a charging system, the amount of current drawn from the power system is very high. As the batteries in the EV approach full charge, the charging current is reduced in order to prevent overcharging, which can damage the batteries. Therefore, if many EV drivers get home from work at nearly the same time and plug in their EVs in order to charge them up for the next day, the total initial charging current drawn by all of the EVs may strain the capacity of the electrical system to support it.

An alternative approach is to install Level 2 chargers in the parking area. Level 2 chargers intended for the multifamily/commercial market have networking capabilities and will coordinate with each other to balance the load on the system. That is, they will seek to provide power to all of the EVs being charged without overburdening the power system. This allows the property to support charging more EVs at a time for a given wiring infrastructure.

A property with Level 2 chargers installed could use them with dedicated parking spaces assigned to individual residents as in the first scenario. However, because Level 2 chargers can recharge an EV more rapidly than Level 1 chargers, Level 2 chargers can also be used as a shared resource.

Providing EV chargers as a shared resource can reduce the capital expense to the property owner since fewer charging stations would be necessary to service a given number of EVs.

Sharing, however, introduces complications. Suppliers of Level 2 chargers for multifamily properties address these complications through their supplied apps and through their supported pricing models.

For example, the charging system app can be used to find out if a charger is currently available and to sign up on a waiting list if one is not. A notice is sent to a resident on the waiting list when a charger becomes available. Pricing can be set up to charge for both charging time and for time the EV is connected to the charger after it is fully charged. The latter charge is imposed to



encourage residents to remove their vehicle from the charger once it is charged so that others may take their turn.

### Pricing it out

Of course, there is a cost to the flexibility provided by Level 2 chargers. While a Level 2 charger intended for the home market may sell for around \$500, commercial grade Level 2 chargers with networking capability may cost between \$1,000 and \$1,500 each. Their cost is in addition to the cost of running new electrical wiring to the parking area, which may be in the same range as the cost of the chargers.

The cost of the electrical changes depends on the distance of the parking spaces from the power panel, whether trenching or other costly construction methods are required to install the new wiring and whether electrical service upgrades are necessary. Therefore, it can vary significantly.

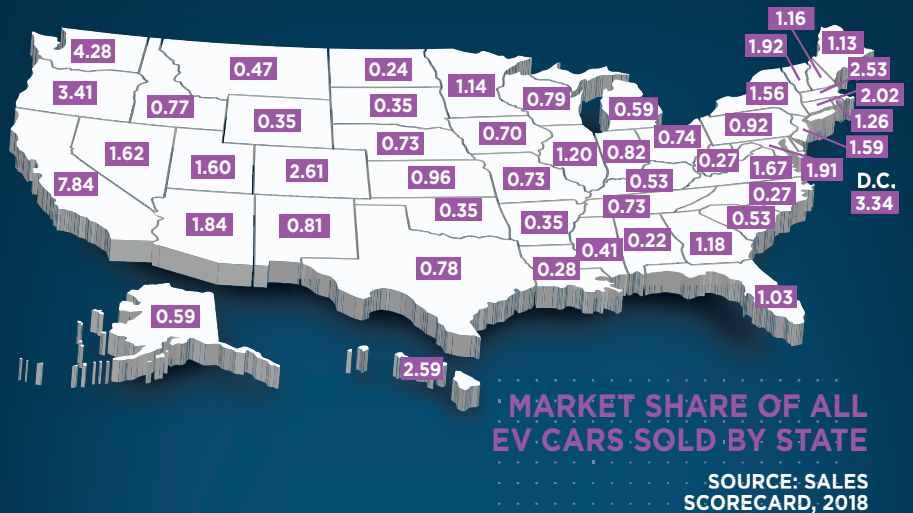
In addition to the cost of the equipment, electrical system changes and electricity costs, the suppliers of the charging equipment charge periodic service fees for managing the residents' accounts and for maintaining the charging equipment. Residents with dedicated chargers may pay a fee directly to the equipment supplier while properties using the shared charger business model may be responsible for payment of service fee. The property manager would recover the service fee from the residents using the system by charging an access fee.

### A final consideration

The Holy Grail of EV charging is to get the recharge time down to 15 minutes. If this happens, recharging an EV may become more like filling up a gasoline powered vehicle and "filling stations" may come to dominate the recharging landscape.

Currently, suppliers of high-speed EV charging stations are focusing on installing them at shopping centers or other venues where the driver will be otherwise occupied while his car is being charged, making the wait time less onerous.

While it would be hard to beat the convenience of plugging your car in when you get home and never having to worry about finding a charging station when you need it, as the availability of high speed chargers improves, the premium residents are willing to pay for that convenience is likely to decrease. Property managers should keep that in mind when deciding whether to introduce EV charging as an amenity at their properties and when deciding how to price it. ⚙️



## COMING SOON TO YOUR PARKING LOT: ALTERNATIVE ENERGY VEHICLES

### Conventional HYBRID

- Both gas engine and electric motor
- Can't be plugged in and recharged
- Batteries are charged from captured energy from braking, regenerative braking converts kinetic energy into electricity
- Such energy is wasted in conventional vehicles

### Plug-in hybrid HYBRID ELECTRIC VEHICLE

- Both gas engine and electric motor
- Can be plugged in and recharged

### Battery ELECTRIC VEHICLE

- BEV
- Solely electric motor
- Must be plugged in and recharged

### Fuel cell ELECTRIC VEHICLE

- FCEV
- Solely electric motor
- Combines hydrogen with oxygen from the air to produce electricity
- The only exhaust is water
- Refueled with hydrogen

## TESLA SURPASSES 2018 PRODUCTION BY 50%



**367,500**  
TESLA ALL-ELECTRIC VEHICLES DELIVERED, 2019

Journal of  
**Utility**  
management









**RealPage was the first** multifamily advisor to EPA, and Service and Product Provider (SPP) on ENERGY STAR Portfolio Manager.



that collecting the building characteristics would be fairly easy, yet questions about a property's gross square footage or even the number of available parking spots can be challenging to accurately answer.

Whole building energy data is not readily available for residential properties due to residents having direct accounts with serving electric and/or natural gas utilities. Such consumption data is protected by privacy laws. Access to resident data is harder absent a mandate placing pressure on utilities to offer whole building data.

Without a mandate, resident authorization forms open access to monthly data, but are cumbersome. The number of residents, occupancy turnover and utility data transfer challenges are just a few of the issues apartment operators face.

Once building characteristics, whole build-

ing energy and water usage data are gathered, there remain other required specifications such as building size requirements, data input formats, data auditing and filing date deadlines, which differ by location.

Benchmarking season begins in April in Seattle, Washington, D.C., and St. Louis. Boston, Cambridge, New York City, San Francisco, San Jose and for the first time in Des Moines beginning in May. June launches benchmarking requirements in California, Atlanta, Chicago and Denver. The list continues through the end of the year.

In addition to benchmarking mandates, several municipalities have moved to stage two of their sustainability plans with mandated energy audits and retro-commissioning activities.

New York City, Seattle, Chicago, Boston, to name a few, have enacted energy audit require-

ments following ASHRAE Level I or II standard requirements. This is in addition to retro-commissioning services including air balancing services, boiler efficiency checks, and building management system operational checks.

Los Angeles recently postponed their energy audit and retro-commissioning requirements for one year starting in 2021.

We expect benchmarking authorities to decrease their threshold square footage requirements, increase the number of benchmarked properties, and for authorities to start using the

resulting scores for resident disclosure driving of conservation targets. ⚙️



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