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MULTI-
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OPTIMIZING UTILITY USAGE IN MULTIFAMILY

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the future
made simple

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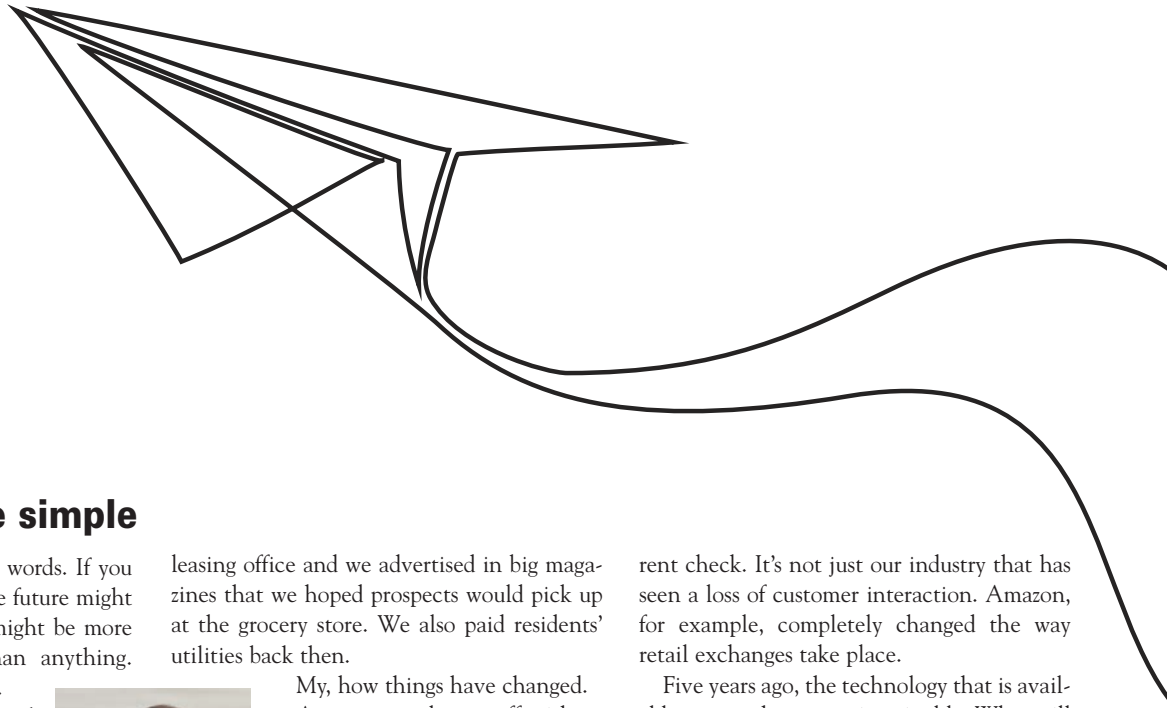

The future made simple

I found a bit of irony in these words. If you are like me, the prospect of the future might not seem so simple at all. It might be more intimidating or confusing than anything. Maybe more scary than simple.

We are constantly presented with another innovation, new technology, or cutting-edge product to make us more efficient and successful. While often helpful, they can also be overwhelming and cumbersome. That's not the goal, but it's often a reality that can make the future seem complicated.

Those of us with more than a few years in multifamily have seen a complete revolution within our industry. Without dating myself too badly, we were using fax machines to communicate (no email) when I began my career. We generated leases by hand, on 3-ply paper. We had one shared computer in our leasing office and we advertised in big magazines that we hoped prospects would pick up at the grocery store. We also paid residents' utilities back then.

My, how things have changed.

Are we now better off with so many new technologies? On one hand, yes. We get information quickly and decisions are made faster. Prospective residents have already researched our communities before they come to visit, making the leasing process targeted.

And most residents pay their own utilities, which encourages them to conserve. Technology has also cramped our style a bit. In an industry built on resident relationships, tech has dramatically changed the face-to-face opportunities we once had with residents. Long gone are those friendly chats we once had when a resident dropped off their rent check. It's not just our industry that has seen a loss of customer interaction. Amazon, for example, completely changed the way retail exchanges take place.

Five years ago, the technology that is available to us today was unimaginable. What will things look like in another 5 years?

In this issue, we will be exploring a glimpse of what the future may hold.

I hope you enjoy the exploration and insight that this issue of the journal provides. It's an exciting time to be part of our industry and working in utility management. I look forward to exploring the future with you all!

Lori Hanson
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The power business and the digital grid

You may have noticed we're in the midst of a digital transformation. As both residents and owners align on a common future, the importance of energy to virtually everything continues to transform mainstream operations and permeate the lives and expectations of those residents we serve.

Energy is the heartbeat of civilization. As goes the energy market, so goes, well, everything. Certainly the most remarkable thing to happen is the piercing of the owner/resident veil. Residents are becoming active stakeholders in energy with real time engagement. Owners are sharing once-behind-the-curtain data though consumption reporting, real-time alerts and dynamic responses to irregular consumption patterns.

Next-generation grid architecture continues to unfold as more applications and data move to the cloud, enabling real-time communications, as well as the steady drumbeat of distributed energy (your rooftop solar panels).

In a world of pay-off and ROI analyses, the best news is that the digitization of energy is mostly low barrier. It transcends every type of asset, in every part of the country, to virtually every demographic.

Energy is dynamic and firmly coupled with behavior. As such, we are presented with one of the biggest opportunities in the history of energy. In essence, we've gained new partners in our residents. Like any new partnership, there will likely be moments of discomfort, but some of us have been given the answers in advance to breeze through.

It's called data.

Jason Lindwall
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Predictive analytics uses different techniques and algorithms including statistics and data mining to analyze current and historic data to predict the outcome of future events and interactions.

Inspiring residents to greatness

Predictive analytics is about to meet the apartment business—and residents—in a meaningful way.

BILL MELENDEZ

Submeters measure, monitor and collect data. They identify electricity, water and gas usage down to the individual apartment unit. Most are non-intelligent measuring devices that track usage and provide data back to a server. While the data tells the story, the software interface managing the data is also a key part of energy management automation.

As analytics and AI move into the apartment operations consciousness, submeters provide an obvious entry point. The energy management automation they enable has the potential of influencing human behavior in areas where individual habits create what's known in the energy field as rejected energy consumption.

Research from Lawrence Livermore Lab suggests that as much as two-thirds of all energy produced in the U.S. is "rejected" or wasted, a number that has increased from half in 1970. Waste is about personal behavior and inefficiency—such as leaving on the lights—and waste is also about system design.

What this means to apartment operations is that there is potential for enormous savings with better-designed systems. Theoretically, we could double energy use with no increase in production simply by halving our energy waste.

The art of persuasion

Humans do the darndest things. My teenagers would turn on the lights, TV, and computer, crank up the stereo—then leave the house. Our electric bill was the subject of heated discussions at the dinner table. Anyone who has kids knows the challenge of training young people to flip off the switch. What if things simply turned off when a room was vacant? Systems that do this already exist in many hotels and offices.

Many apartment buildings have the infrastructure in place for a basic energy management system without incurring added cost. Today, electricity meters, for example, provide large quantities of data that, when used ethically, can profile resident behavior.

Does the resident make coffee every morning? Does he watch the morning news before heading to work? Electricity consumption can be charted by signal patterns created within the unit's internal electrical grid. Certain patterns can then be programmed to trigger automated responses that avert energy consumption that has no useful purpose: i.e. turning off lights and adjusting climate control in an empty room.

Then there are human behaviors that responsive automation can't cure. Running a half empty dishwasher is an individual choice and can only be dissuaded by the consequences of a utility bill. It's also an opportunity for management to partner with residents, helping them curb consumption in known areas of waste.

Utility billing + data = revenue

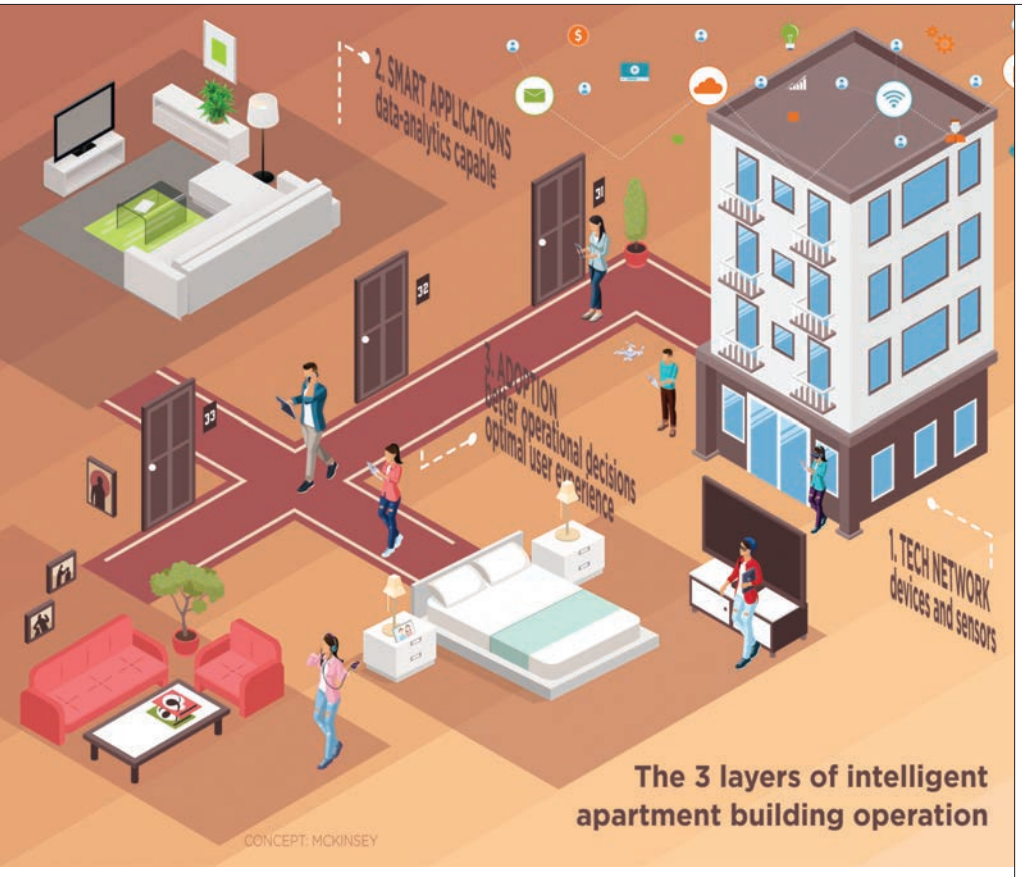
Integrative utility billing provides detail on energy waste and potential targets for increasing efficiency. This is a direct benefit of analytics and AI, and provides dynamic guidance that saves energy and money for both the resident and the community. The impact of such energy management tools is so compelling that simply billing for services is no longer a viable business model.

The inclusion of an "energy guide" designation, be it LEED or other standard, associates utility billing with higher purpose. This type of focus on energy savings and carbon footprint reduction is equally strategic and marketable.

An analytical engine can track and flag waste created by aging or inefficient equipment, resident behavior and some other inefficiencies occurring within the community ecosystem. Adding sensors to equipment through intelligent AC outlets provides further visibility, such the status and electrical draw of anything plugged in. It can also provide defense against electrical fires through auto on/off decisions as well as other services and alarms paired with common resident energy consumption.

Such services expand the resident experience beyond a monthly bill and connect occupants to the energy environment in which they live. As a result, residents become knowing and vested partners in their own energy efficiency.

Making the user experience enjoyable and intuitive translates intelligent processes into energy savings. The industry can simply refer to the home automation industry for live case studies on how technology platforms can maximize customer service, generate revenue and improve resident experience. Apartment companies seeking to add retrofits and other upgrades to reduce energy consumption and cost need only look at their existing processes to find cost savings and improved resident retention.



The power of platform

Today's apartment owners are tasked with finding digital solutions for more livable communities. It's a new day and a new experience for resident and owner, alike.

As apartment communities become more intelligent, operations must become more efficient and communities more responsive. From utility billing to maintenance requests to predictive analytics, we're beginning to see what technology can *really* do in the rental environment.

Because of its major impact, attractive pay-off and gateway to green financing, energy management is an easy-to-justify point of entry into this brave new world of smart living. In the bigger picture, this gateway to sensors and automation not only opens up a new world of holistic facilities management, but also drives new points of engagement with residents through their smartphones and other personal devices.

Almost miraculously, the historic resident-owner barrier has been breached by the smartphone. This portal to the other side affords apartment operators more points of resident engagement, but its real power is far more world-changing.

Operating from a unified platform, apartment owners can use apps to nudge residents toward desired behaviors, like power conservation on peak consumption days, to digitize management functions for an improved resident experience and to track aggregated behavior snapshots to identify patterns and appropriate responses for improved and streamlined property operations. Smart operations let owners get more from any asset, no matter the type, age or renter profile.

With the promise of strategically-positioned automated processes and predictive analytics on the horizon, this may be the pivotal moment to evaluate your operational platform.

Designing the future

Management software should be poised for break-out functions that seamlessly transition into smart functions. There are big promises on the horizon, but big data is merely undeveloped land. What and how you build, whom you've partnered with in collecting and holding the data and the ultimate system vision will determine the result. Authentically smart platforms create room for partnerships to build out the multiple technologies and services required for a whole property ecosystem with the resident experience at the center.

Sensors, software and infrastructure exist here and now, not tomorrow and whenever. For apartment operators, making the most of their potential means measuring innovation and strategy by results and performance. Getting past the promises and focusing on the results not only leads to a shared vision and aligned business priorities, but also identifies those with the understanding and foresight to build the infrastructure for more liveable apartment communities.

Smart is an ecosystem

As business owners and operators, we've developed the ability to identify real-world dynamics. With this clarity of vision comes a keen skepticism as we sort through what's hype and what's real, especially in the sometimes-intentionally-jargon-filled world of technology.

In the tight-margin world of property management, it all comes down to results.

After a decade of big promises and bigger expenses, smart is now about installing digital interfaces in traditional infrastructure to streamline apartment operations. This includes using technology and data to systematically enable better decisions. Real-time data lets apartment operators watch events unfold versus being stuck reviewing history after a problem has occurred. Such a vantage point lets apartment operators recognize patterns and respond faster with lower-cost solutions.

Smart technology can also deploy scarce resources and personnel more effectively. Applications such as building automation systems and dynamic electricity pricing are just a couple of tools that are already lowering operations costs in the industry.

Providing immediate feedback messaging on power consumption is already nudging residents toward conservation and reducing consumption by up to 15 percent in some cities. Why not in apartments? Using sensors and analytics to know, in real time, when a water leak has occurred is already deployed in many properties, cutting losses by a quarter or more. Pay-as-you-throw digital tracking of trash has reduced solid waste by as much as 20 percent.

Intelligent apartment communities must harness this data to develop new insights as well as new products and services. Smart communities that integrate smart technologies, can enable the rapid delivery of new applications, and create connected ecosystems that truly transform their property's efficiency and resident experience.

Analytics is about empowering good decisions.
Performance begins with both good data and the expertise to put it into action.

The autonomous apartment building

You would think that operationalizing apartment buildings would be simplier than designing driverless cars to navigate roads and traffic—not so. The apartment business is fragmented. Buildings come in all classes, sizes and locations. Their operational dynamic is determined by construction, resident demographic, local legislation, type of equipment and more.

Today's operations must be analytics driven, location strategic and most of all, scalable.

Know your analytics
Understanding the difference between traditional analytics (business intelligence and reporting) and advanced analytics (powerful predictive and prescriptive tools such as machine learning) is the first step in setting expectations and goals.

The great **automation** migration

Highly efficient operations and elevated resident experiences is the ultimate focus. Facilities and energy management teams are expected to extend their roles as smart solution providers.

Property owners see facility managers as stakeholders in business growth.

Our changing business model

Aggragated solutions that funnel massive amounts of whole-data into single line-of-sight property functions have paved the way for better asset performance, predictive analytics and multiple points of automation.

Great strides have been made to help apartment operations reduce energy consumption, monitor and manage equipment health and performance, while improving built environments for residents.

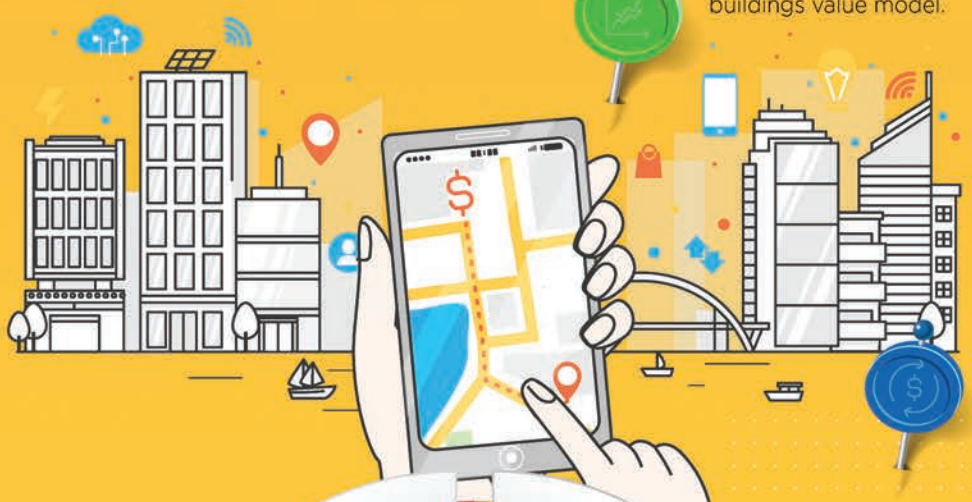
With any automation, the greatest impact comes from a unification of systems and data to provide a holistic and clear picture of operations.

Finding the value model for intelligent buildings

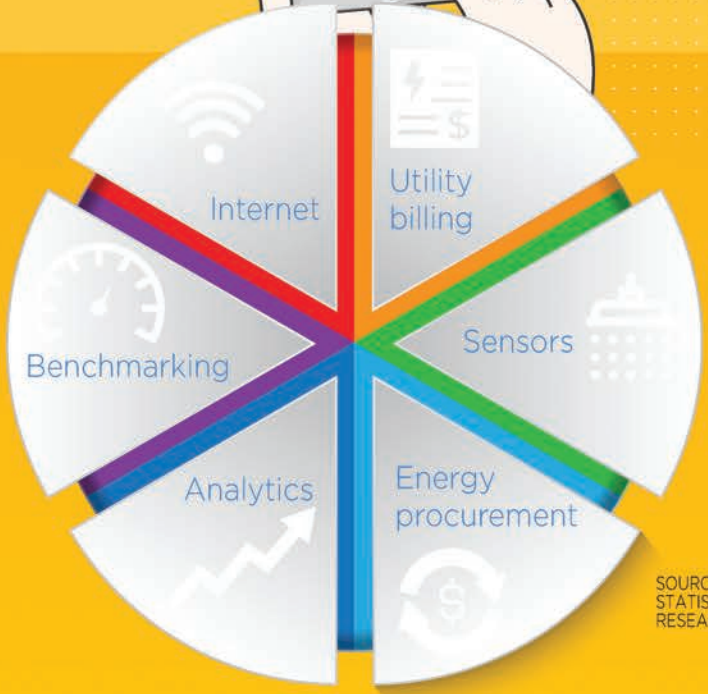
Intelligent building technologies have improved the operations of equipment and created value through energy efficiency.

IoT is important for apartment owners because it delivers the ability to unify and process data at the enterprise level—a key point to the intelligent buildings value model.

IoT enables more cost-effective data acquisition, aggregation, communication, analysis, and ultimately, better asset performance.



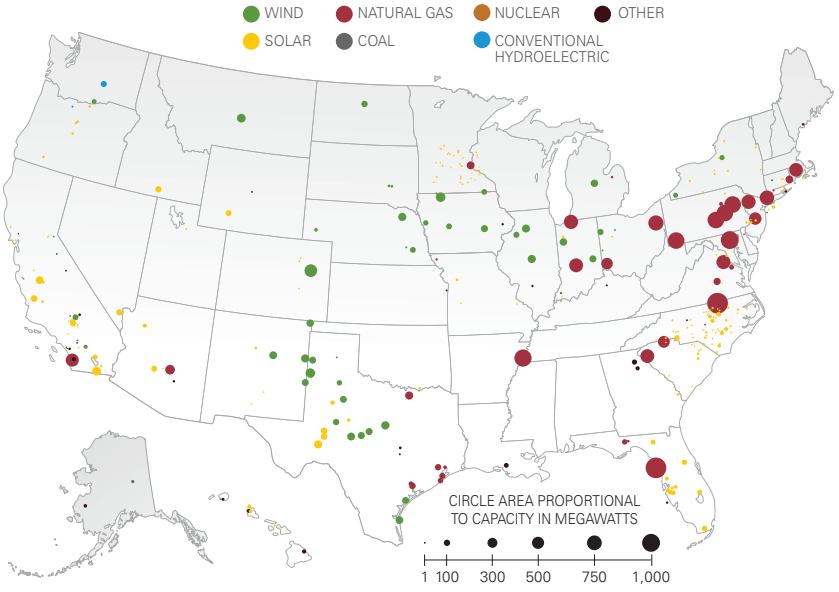
6 must-have technologies for today's intelligent apartment operation



SOURCE: IDG RESEARCH, U.S. BUREAU OF LABOR STATISTICS, EPA, MCKINSEY, NAVIGANT RESEARCH

New power plants

Below is a snapshot of power plants scheduled to open between April 2018 to March 2019.



SOURCE: EIA

Utilities heat up

Summer is expected to bring warmer than normal temperatures, some grid vulnerability—and higher prices.

BOB RICOBENE

Electricity is unlike any other utility. It cannot be stored and the supply must be exactly matched to the highly variable demand at all times. In 2016, there were 8,084 power plants delivering a total of 4,137.1 terawatt-hours of power across the U.S. These power plants spanned three operational types.

Base load power plants operate at maximum capacity day and night, stopping only for maintenance or repair.

Load following power plants have the ability to increase or decrease their production to match the constantly varying system demands.

Peaking (peaker) power plants operate specifically during periods of highest demand. These facilities produce more expensive energy as they use the most expensive fuel sources, are the least efficient, designed to only operate over short periods of time and must amortize down-time over limited production. They are a superior alternative to a power outage, but their power comes at a significant cost compared to base load and load following power production.

Those utilities adopting consumer-level variable pricing models—such as time-of-use cost scales inside their pricing models—tie consumption directly with market prices. The optics on such models converts the consumer to stakeholder with a choice in how they consume, and provides knowledge that enables conservation.

At a higher view, the nation's regional power markets operate like an auction to meet electricity demand. The auction pricing process considers the daily energy demand at hourly increments, available generation resources, power grid capacity and regulations. While the process varies, the power markets generally base their price on production cost and dispatch the lowest-cost power available. The fuel used to generate the electricity is a large part of its cost.

Nuclear plants typically provide the lowest bid options. However, natural-gas-fired power plants have managed to lower costs considerably, allowing gas to usurp some of the coal market space.

Fossil fuel facilities, like natural gas and coal can ramp generation levels up and down more quickly than other types of power generation which means they can respond more efficiently (and more cheaply) to changing market demands.

Supply, demand and weather

The cost of electricity is mainly driven by supply and demand. Weather is a big factor in predicting future consumption and also drives consumers' use of energy. Local regulation has some influence, but not as much as other fundamentals.

Innovations in energy efficiency have caused the nation's electricity consumption to level off, beginning in 2007, even though the GDP, number of electronic devices and population have all grown significantly. Residential electricity consumption fell 9 percent between 2010 and 2016.

Between 1990 and 2017, U.S. energy intensity (energy required per unit of GDP) decreased by a third as manufacturing made notable strides in efficiency. The Energy Information Administration predicts the trend will continue through 2050 when energy intensity will be 42 percent of that in 2017.

Even as demand stagnates, the U.S. continues to increase its power generating capacity. Electricity providers will add 25 gigawatts of generating capacity this summer, far more than the 14 gigawatts that were retired since May 2017, according to FERC's (Federal Energy Regulatory Commission) summer 2018 reliability report.

From an asset management perspective, apartment owners, the nation's largest collective of utility distributors, know the unpredictability and heartburn of summer power spikes. Multifamily profitability hinges on having the highest efficiency in all-things-built-environment. Utilities are not just another budget line item, but one of the largest variable expenses for an apartment property.

Add to that the optics of conservation and social responsibility and you have a value model trifecta.

Ahead in the market

Even as the National Oceanic and Atmospheric Administration predicts warmer than usual summer temperatures, FERC says that most regions of the country are prepared to meet power demand with the exception of California and Texas.

A warm summer could mean near-record power and natural gas consumption across the U.S., but FERC expects the addition of home solar panels and consumer-demand-response programs to keep usage at last year's level.

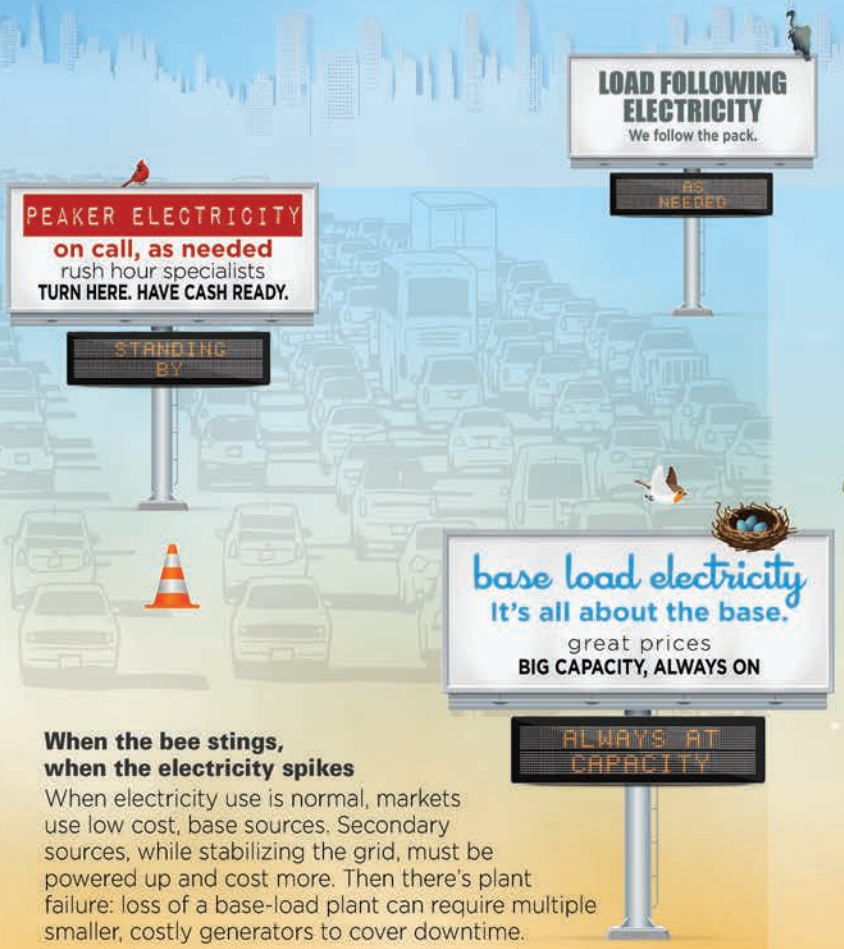
If forecasts are correct, FERC predicts that gas burned to produce electricity could top 2016's record high due to the addition of over 16,000 megawatts of new gas-fired generating capacity and low gas prices. Natural gas is now cheaper than coal in many parts of the country.

Natural gas reserves are above target except in California, which is below target by nearly 3 percent, and Texas, which FERC does not regulate.

California's projected power shortfall is due to low hydropower and gas supply. Concern over electricity supply in Texas is due to the fact that the state has retired several of its coal fired plants.

The road most traveled: signs of the dreaded **summer spikes**

We're in for a hot one. Electricity prices rise with demand. What does that mean for apartment owners? It's never too late to take steps to get your systems in good working order and educate residents on best practices to optimize air flow in their units and conserve where possible.



When the bee stings, when the electricity spikes

When electricity use is normal, markets use low cost, base sources. Secondary sources, while stabilizing the grid, must be powered up and cost more. Then there's plant failure: loss of a base-load plant can require multiple smaller, costly generators to cover downtime.

The cost of fuel to produce electricity

Prices below per kilowatt hour Including fuel, operation and maintenance of major U.S. investor-owned electric utilities.

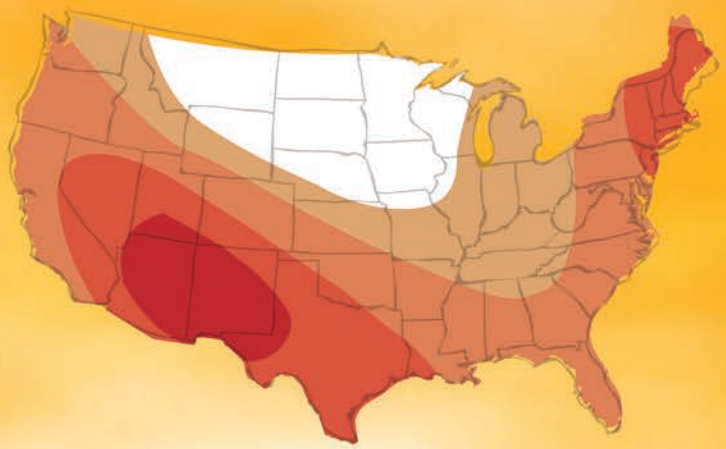
1.0¢
Hydro-electric
CONVENTIONAL, PUMPED STORAGE
8% OF ELECTRICITY PRODUCTION, 153 U.S. PLANTS

2.5¢
Nuclear
NUCLEAR REACTION ROTATE TURBINES
20% OF ELECTRICITY PRODUCTION, 99 U.S. PLANTS

3.0¢
Gas turbine
INTERNAL COMBUSTION, SOLAR AND WIND
9% OF ELECTRICITY PRODUCTION, 3,433 U.S. PLANTS

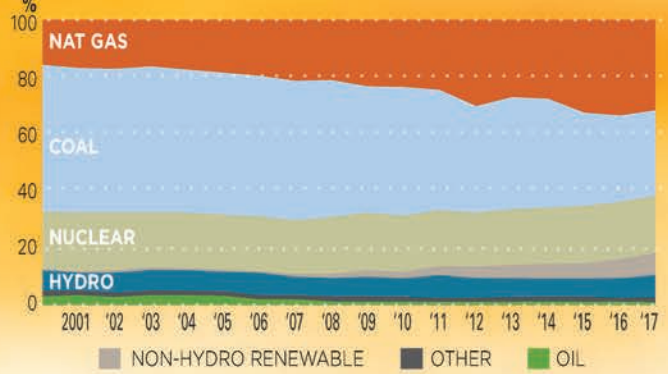
3.6¢
Fossil fuels
COAL, NATURAL GAS, PETROLEUM
63% OF ELECTRICITY PRODUCTION, 10,218 U.S. PLANTS

Probability (% chance) COOLER THAN NORMAL | EQUAL CHANCE | WARMER THAN NORMAL

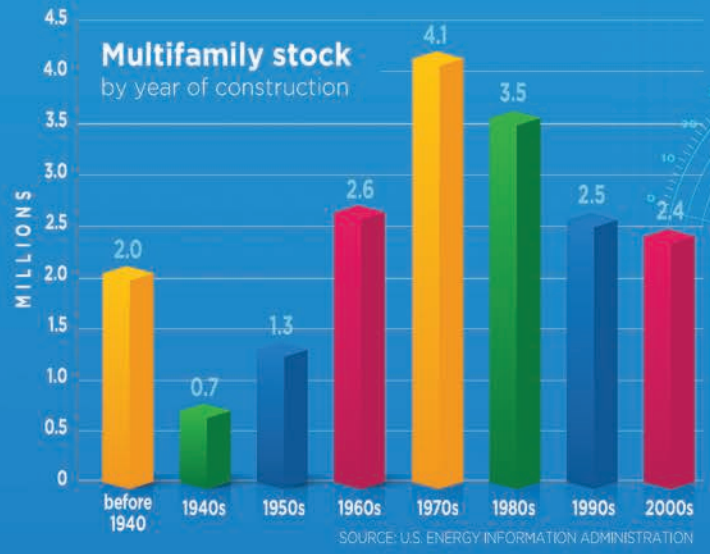


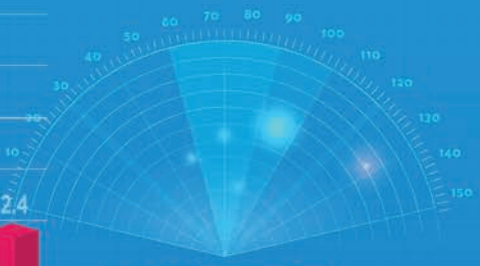
Top sources of U.S. electricity

Natural gas continues to gain ground in the production of the nation's electricity due to lower production cost.



SOURCE: NOAA TEMPERATURE OUTLOOK FOR MAY 2018 TO JULY 2018, EIA, TOP SOURCES OF ELECTRICITY: NON-HYDRO RENEWABLE ENCOMPASSES WIND, SOLAR AND GEOTHERMAL ENERGY. PERCENTAGES ARE ROUNDED. ELECTRICITY PRODUCTION PERCENTAGES ARE FOR 2017.





Buildings constructed between 2000 and 2009 use **15 percent less energy** per sq. ft. than those built in the 1980s, and **40 percent less energy** than structures built before 1950.

RetroFit Fun Fact: The Empire State Building's $13 million energy-efficiency retrofit was completed in 2013. Upgrades cut energy consumption by 40 percent saving $4+ million annually. Retrofits included new exterior LED lights. The color range of the lights increased from nine to millions—at a quarter of the electricity use of the original floodlights.

Building occupants regularly complained about the poor A/C in the summer. Convention called for more powerful chillers at a cost of $17 million. Instead, management invested in improvements that reduced energy use—and boosted the bottom line.

Sixty-plus energy-saving ideas were computer-modeled. Eight were chosen. Upgrades ranged from heating and cooling components to lights that auto-dim during the day to simple barriers that prevent radiator heat from escaping through walls.

Instead of replacing the Depression-era structure's 6,500 double-pane windows—they were removed, refurbished on-site and reinstalled after-hours. A gas-filled film, acting as an insulating third pane was added. The super windows now reduce summer heat gain and winter loss by over half.

Removing the **bottleneck** to energy savings

$27B

FANNIE MAE'S 2017 TOTAL ISSUE OF GREEN LOANS MADE TO FINANCE ENERGY AND WATER EFFICIENCY IN APARTMENT BUILDINGS

56% OF U.S. APARTMENT BUILDINGS WERE BUILT BEFORE 1980

OF ANNUAL U.S. ENERGY CONSUMPTION, HOW MUCH IS RESIDENTIAL? **22%**

$229B

spent in energy efficiency retrofits on U.S. residential buildings would yield $395 billion in savings by 2020 according to a popular McKinsey study. The ensuing 28 percent reduction in energy would translate into an internal return on investment (IRR) of over 19 percent.

Three paths to building asset value and cash flow

Whether you want retrofits for the fast and furious or long-range game changers, there's something for everyone.

Quick wins

COMMUNITY CAMPAIGNS
ENERGY PROCUREMENT
ENVELOPE WEATHERIZATION
LIGHTING
MAINTENANCE REVIEW
SUBMETERING
THERMOSTAT AUTOMATION
UTILITY BILLING

Long view

BOILERS
EQUIPMENT UPGRADE AND REPLACEMENT
HVAC
INSULATION
SOLAR/THERMAL GEN
SYSTEMS AUTOMATION

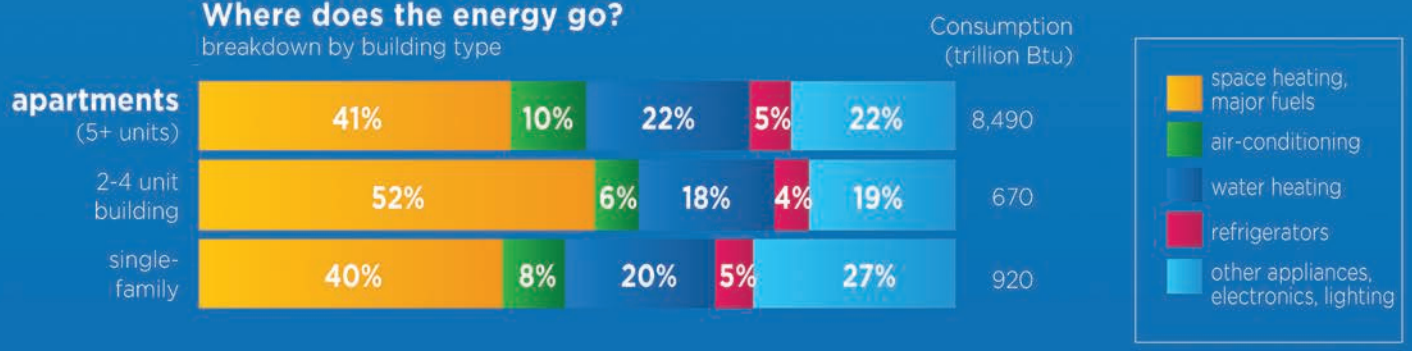
Big game

AC/FURNACE UPGRADE
APPLIANCES*
FACILITIES MONITORING AND AUTOMATION
FLOOR, WALL, CEILING INSULTATION
WATER HEATERS*
WINDOWS/DOORS

*89% OF EXISTING STOCK DATES 1960-1980

Where does the energy go?

breakdown by building type



Renters v. owners

energy burden

Household type	Annual income	Unit size (sq. ft.)	MEDIAN ANNUAL Utility spend	MEDIAN ANNUAL Utility $ (sq. ft.)	Energy burden
Renters	$34,972	1,000	$1,404	$1.40	4.0%
Owners	68,000	1,850	2,172	1.17	3.3
Multifamily low-income	21,996	800	1,032	1.29	5.0
Multifamily market-rate	71,982	950	1,104	1.16	1.5
All households	$53,988	1,573	$1,932	$1.23	3.5

SOURCE: AMERICAN COUNCIL FOR AN ENERGY EFFICIENT ECONOMY

Energy burden is the percentage of household income that is spent on energy. Renters have a lower annual median income and higher median annual utility cost, and thus, higher energy burden versus owners. Low-income multifamily households, in particular, have a higher energy burden compared to market-rate multifamily and average households.

SOURCE: ROCKEFELLER FOUNDATION, 2012. EIA 2003 CBECS; OHCP/INC/COWS. MULTIFAMILY ENERGY EFFICIENCY RETROFITS: BARRIERS AND OPPORTUNITIES FOR DEEP ENERGY SAVINGS REGIONAL BY ENERGY EFFICIENCY ORGANIZATIONS 2016; EPA, DOE.

THE ENERGY MANAGEMENT BUSINESS CASE

Future-proofing your property

As IoT devices continue to gain traction with apartment residents, there is a new and growing expectation among renters.

The internet of things (IoT) is defined as an internet where everyday objects have network connectivity that allows them to send and receive data. Connected devices afford residents with lifestyle benefits and convenience, and make managing vacant units easier for managers. The data that connected things generate, directed toward analytic engines, also enable owners to derive valuable business insights. These perceptions can be used to reduce operating costs, increase security and give properties a competitive edge in their respective markets.

But which emerging smart technologies are suitable for multifamily, especially since the newest tech tends are also the most expensive?

Tim Haddon, director of strategic business services for PK Management, headquartered in Richmond Heights, Ohio, thinks keyless locks and remotely activated light switches and thermostats make sense because they provide benefits to both residents and owner-managers. But he's not a fan of spending hundreds of thousands of dollars on the next cool widget, knowing that as soon as the check for the tech is written, a new device will take its place.

Marty Hollingsworth, CEO of managed WiFi and internet service provider Epproach, believes it's important for owners to develop a smart solution that provides a platform allowing a choice of different smart device manufacturers, makes, or models. Seamless integration of residents' own smart devices into the existing IoT infrastructure is also important.

Haddon agrees. "The resident can bring in their own Google Home or Amazon Echo as those are personal devices. Owners will need to provide the backbone—the internet connection—so that when the next cool thing comes out, the resident can add or update to the next device," he said.

Providing the needed infrastructure for IoT poses other challenges for multifamily operators who must invest to meet resident demand for high-speed internet and prepare for the connected needs of the future.

Finding the right architecture

IoT requires high-speed internet service that can't be provided by the traditional twisted-pair cable wire/coaxial lines or DSL that currently makes up 90 percent of the nation's telecommunication infrastructure.

New construction offers the best opportunity to plan and implement solid communications infrastructure, while existing communities are hamstrung by the type of wiring inside the buildings. But even older properties that weren't designed for today's internet needs can implement cutting-edge connections by upgrading to the latest wiring technologies, or fiber, during remodeling and a retrofit.

Haddon believes the best way to future-proof an apartment property and create a solid connection backbone is with an open conduit to each unit. "If you have an empty pipe that runs to every unit, you have a pathway. If a technology comes down the pike, you have a way of getting it to every resident," he said.

The more devices that are on a network at one time, the more bandwidth is required. Too many devices equals data overload. But an open conduit gives owners the ability to increase the bandwidth and speed needed to sufficiently operate more connected devices as they come online.

According to Hollingsworth, the key to success—for an IoT network especially—is more than bringing the wire to the property

for an internet backhaul. It's being able to manage the delivery of service and its bandwidth in a secure streamlined fashion.

Developers can choose between a wireless or wired infrastructure. Haddon favors the latter. "Having started in IT in the late 1990s, I lived through the whole wireless launch. It's been said that wireless isn't truly wireless. There's a wire to backbone that takes you to the access point. It's just the last step—the step that touches the resident—that's wireless. But providing WiFi to every resident across an entire building is still complex because there is always going to be that pocket where they can't get the service. That pocket is going to get most of your attention," he said.

Owners also have a choice of Internet Service Providers (ISPs), from big box companies to full-service and managed service internet providers that specialize in fiber and WiFi integration for multifamily.

Big box ISPs, many with antiquated business models, wiring and poor customer service, still dominate a number of apartment communities. Haddon advocates partnering with smaller ISPs over big box incumbents that have bought their way into communities with revenue sharing promises and upfront door fees.

The evolving market of connectivity

While many residents prefer bundled communications and entertainment services that allow them a single point of contact versus multiple vendors, there is evidence that some, especially millennials, are opting out of structured video packages.

Last year, 22.2 million Americans cut the cable and satellite TV cord, according to data research firm eMarketer, that forecasts 30 percent will no longer have traditional pay TV by 2021.

While many residents are eliminating traditional cable, no one is going without internet. It has become a utility, almost like water or AC.

"Residents don't want someone else choosing their channels for them. Bulk internet packages are of little use when they can get their own Netflix or Hulu," said Haddon.

"If an owner is looking for the best investment for the property, delivering the highest quality internet provides an on-demand amenity. In tandem and becoming nearly as valuable is a network to deploy a sophisticated multifamily IoT infrastructure," said Hollingsworth.

While price is always a concern regarding network infrastructure, owners have options on getting the best return on that network, he points out.

Marty Hollinsworth is CEO of Epproach

One owner-side solution is to use their bulk buying power, leverage the existing community network as an asset and then monetize that network infrastructure. This creates a profit center by offering supported services as an upgrade or tiered package to residents.

Haddon's thoughts about the multifamily industry: "We keep trying to treat apartments like single-family homes, but we really need to take our cue from the hotel industry. Each hotel room doesn't have an individual provider—there is only one provider for internet and video service and that simplifies that tech component. When we try and be everything to everyone—it gets complex." Haddon will speak on the subject at NAA's *Apartmentalize* conference in June.

Hollingsworth agrees that it is a best practice for property owners to have their own campus-wide network and provide their own internet services. "It means the ability to control the quality of service and deliver a better user experience for all residents, versus residents choosing whatever service happens to be available. A single, property-wide internet service can also deliver infrastructure that serves multiple purposes, such as staff or common-area networks for pool or clubhouse," he said.

This is especially important as IoT becomes a reality. From a practical standpoint, if each resident has their own internet connection, when he or she moves out, the internet would be switched off and connectivity to that unit, lost. The owner then has to reestablish connectivity or lose control over the unit's utilities and appliances.

There are concerns with providing campus-wide networks, such as how to manage those networks and effectively onboard new residents as they move in, or how to respond to technical issues.

Hollingsworth believes that the value proposition of any multifamily IoT provider with a WiFi onboarding platform is the ability to use that same platform for smart devices. This makes it both seamless and easy for property owners and residents.

Who owns the wires?

The question of who owns the building's wires remains in the spotlight.

Timothy Haddon is director of strategic business services with PK Management.

The FCC has included a provision for property owners to take back ownership of their internal infrastructure once an ISP stops serving the subscriber. They must then abandon the wires to the property owner or remove them. The latter is costly to the point of being prohibitive.

But there's also an access upheaval taking place. About 20 states allow franchised ISPs to access multifamily residents over property owners' objections.

"Here's where the benefit of open conduit comes into play," said Haddon. "If your building has an existing provider and a new provider doesn't have a path into the unit, an open conduit or existing fiber or coax in the walls gives other providers a path to the subscriber."

If the existing provider already has exclusive use of the only existing wire in the building, there may not be a way to comply with allowing the new provider in. But San Francisco's Article 52, enacted last year, addresses that issue by allowing new providers to use existing inside wiring owned by the property owner, as long as the owner is compensated. A petition to preempt Article 52, filed by the Multifamily Broadband Council, is expected to be settled this summer.

"The passage of Article 52 is directly driven by Google attempting to make an individual mandate on competition. Competition isn't necessarily a bad thing. But the government telling owners what to do with their property gets a little sticky," said Haddon.

Looking to the future, the smart technology wave is only going to increase with automated flow sensors, water heater controls, and more.

Haddon's suggestion for creating that solid information backbone? "Run lots of fiber and multiple paths and own it so you can control it."

Hollingsworth notes that with 5G cellular networks around the corner, "Owning your own network allows you to take advantage of even faster WiFi networks that will ultimately merge with cellular services. In dozens of different ways, it truly future-proofs your property."

Viewing property operations through a single-pane-of-glass

If you aren't collecting, learning and getting prescriptive guidance from your data, your system is not working.

The race is on.

Hundreds of buildings have already become integral players in the emergence of smart cities. Then there's the national march toward aggregating and analyzing all of the country's building data through EPA's Portfolio Manager tool. Finally, Fannie Mae's financing program for green retrofits topped $28 billion last year alone—a number that has risen every year the program has existed.

Let's not forget the explosion of sensors: Of the 25.2 billion internet-connected devices predicted by 2025 (6.3 billion more than 2016), over half will be deployed by businesses, mostly in the residential market.

The road is paved for apartment owners to collect and analyze data as they transition from instinct-based decision making to data driven intelligence and automation.

There's already a body of field knowledge from commercial real estate sectors already down the road of data-driven buildings.

Smart office buildings save an average 18 percent in energy costs, according to the American Council for an Energy Efficient Economy. Occupancy sensors, smart thermostats, and HVAC and lighting controls reduce energy usage in unoccupied offices, conference rooms, and other spaces. Smart systems have been shown to improve worker productivity and increase property value.

Smart hotels save an average 8 percent in energy costs through guest management systems and environment controls, which integrate with guest room HVAC systems and window shading. Smart hotels use apps and other tech to provide a customized experience and bolster revenue and loyalty.

Even with performance data, the cost of retrofitting has historically been a high hurdle for the apartment industry.

Energy-efficiency-as-a-service

Centuries before cloud-based software firms coined as-a-service for what is essentially leased software, landlords were providing housing-as-a-service. Only today it's a bit more complicated. Apartments are selected for floor plan and location—but also for resident experience, energy efficiency, connectivity and more. What used to be harder-to-quantify features, are now nearly as important to residents as the floor plan.

Energy efficiency has seen a particular rise in importance to both owners and renters as utility prices continue to rise, more lease agreements assign responsibility for utility payments to the resident, and some utilities and legislators begin to penalize and increase rates for certain thresholds of consumption.

Remaining competitive is a game of strategy, but also of cash flow. While it's easy to understand importance of energy efficiency retrofits, including smart controls, the real hurdle is more often cost and term of pay-off.

Within the sometimes cash-strapped world of apartment operations, leasing retrofit devices, rather than purchasing them outright, has become an attractive option. It is often the quickest way to lower a property's utility costs, effectively increase its cap rate, raise its asset value, keep the asset competitive and potentially qualify for green incentives.

Under energy-efficiency-as-a-service, a building retrofit is directly funded by the future reductions in energy costs.

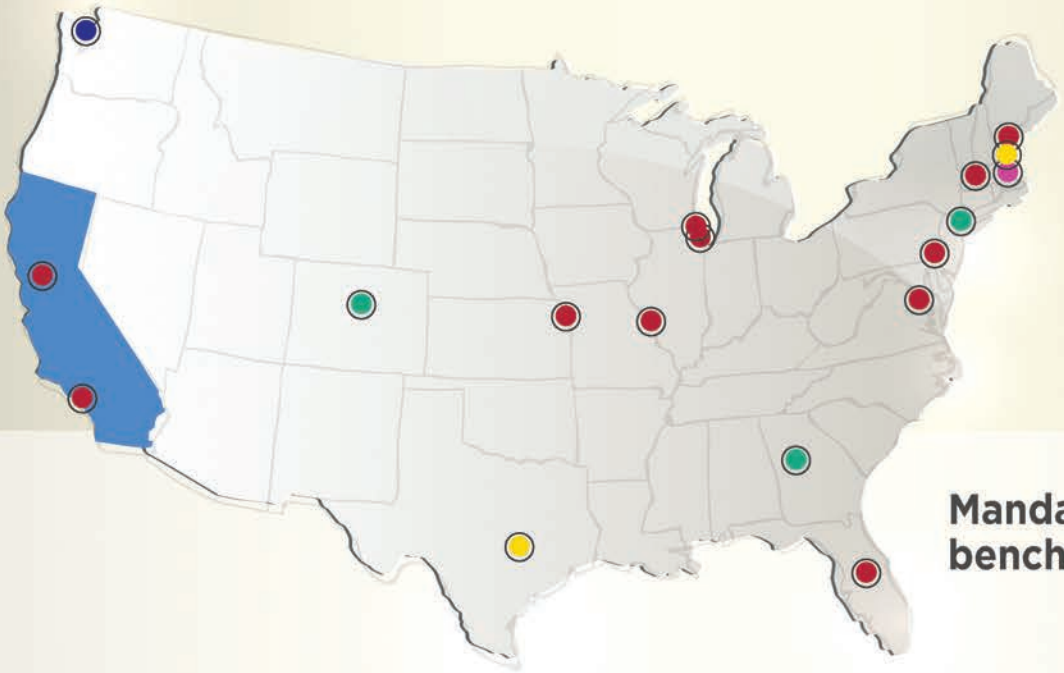
Converting big data to intelligence

Whether through internal capitalization, green loans or energy-efficiency-as-a-service, the faster a property takes steps to improve efficiency, the quicker the return.

There is a massive amount of energy—and so, money—to be saved across the nation's built environment and the advancement of analytics is accelerating the change. In fact, the intelligent buildings sector is expected to grow from $15.1 billion in 2018 to $67.5 billion in 2027, according to a report from Navigant Research.

Operationally, this means two things: increased transparency (visibility of building metrics and costs) and service automation (growing intelligent building operation through data-driven analytics).

Building data, encompassing energy, assets and people, is amassing by the day. As AI and predictive analytics mature, drawing upon this data for analysis, actionable insight and automation will be the path to the future for apartment operations.



Mandatory benchmarking

Multifamily energy disclosure requirements by locale

For detail such as to whom to report, penalties and government links: realpage.com/utility-benchmark/

20,000+ sq. ft.
Seattle

25,000+ sq. ft.
Atlanta
Denver
New York City

35,000+ sq. ft.
Boston *35,000+ sq. ft. or 35+ units*

50,000+ sq. ft.
Berkeley, Calif.
Chicago
Evanston, Ill.
Kansas City, Mo.
Los Angeles
Orlando
Philadelphia
Portland, Me.
St. Louis, Mo.
Washington, D.C.

other
Austin *5+ units*
Cambridge *50+ units*

In 2019, California will impose a benchmarking mandate on multifamily buildings of more than 50,000 sq. ft. Berkeley will reduce its minimum size building for mandated reporting to 25,000 sq. ft., and Evanston, Ill. and Los Angeles will reduce the minimum size building for mandatory reporting to 20,000 sq. ft.

Are you at risk of losing your certification?

At the end of August, the Energy Star metric will experience a sweeping reset that is certain to push some properties out of the range of qualification. The recalculation will affect all building types and the average scores of nearly all categories, including multifamily housing, are expected to drop—many by double digits.

The updated building performance baselines are derived from the Commercial Building Energy Consumption Survey (CBECS) conducted by the Energy Information Administration. The national survey collects energy consumption and expenditures of all commercial buildings.

Published every four years, there was a problem with the CBECS data in 2007, and the 2011 survey was delayed by funding until 2013. This means that Energy Star scores are based on 2003 building performance leaving the present scores extremely inflated. It's safe to assume that building energy efficiency has improved significantly from 2003 to 2012.

"We anticipate an average drop of 15 points in our customer's Energy Star scores," said Mike Semko, legal counsel for RealPage. "The confluence of events mean that the current scores are skewed and need to be adjusted—a lot. We recommend getting on the gameboard before the re-calculation."

Those buildings that have never applied for Energy Star but precalculate a score of 75 or higher, and those who earned the Energy Star certification in 2017, can reapply before the July 26 deadline.

EPA is making an exception to its 11-month wait period between applications so that apartment owners and operators can take advantage of the legacy baseline.

"We recommend applying as soon as your March-April energy bill is entered into Portfolio Manager," said Semko. Year-end for 2018 is April 30 for those applying before the July 26 cut-off.

Properties on Portfolio Manager should also download their score before and after the data update. Once the August 26 update occurs, prior history will no longer be available. If a property does lose its certification through the re-set, they are not precluded from advertising that their property was Energy Star certified in past years.

Unfortunately, the Energy Star reset may also affect a property's other standings such as LEED certification. The window for getting in front of the reset is closing fast. For regular updates and next steps for your portfolio, go to realpage.com/utility-benchmark.

Use Less Energy and Water While Spending Less for Them

RealPage® in-house energy experts use industry-leading data analytics to find opportunities for you to reduce energy consumption and expense. We help multifamily companies like yours take advantage of competitive energy rates, tax exemption savings and conservation project opportunities. And we can help you stay compliant with the latest energy benchmarking reporting requirements.

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