Highlights from our spring tech roundup: Four trends to keep an eye on

By Luke Beckett, Michael Hartnack, Bryan Jungers, Jay Stein
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Our biannual tech roundup webinars keep you updated on the latest developments in energy-efficiency, load management, and decarbonization technologies. During these online events, we discuss the technologies and trends our researchers have been following over recent months that offer great potential for your pilots and programs. We recently discussed 11 technology trends we see on the horizon as part of our Tech roundup: Spring 2021 webinar. Here's an exclusive look at four of the hot tech trends we covered.

Want more tech trends?

Check out Tech roundup spring 2021: The report for all 11 trends.

HFC refrigerant update for residential markets: 2021

Jay Stein

The US Environmental Protection Agency (EPA) is about to regulate hydrofluorocarbon (HFC) refrigerants to reduce the chemicals' contribution to climate change. These new regulations will affect almost all electric utility loads, including space cooling, space heating, water heating, refrigeration, and food processing. The EPA will likely restrict refrigerants for heating and cooling in the residential and light commercial sectors depending on their global warming potential (GWP). However, these regulations will only affect newly manufactured equipment, not existing equipment.

These new, mildly flammable refrigerants can ignite, but not easily, and the HVAC industry is developing systems that will enable them to be used safely.

For the residential and light commercial sectors, the EPA is likely to adopt standards already in place in California, limiting refrigerants to less than 750 GWP starting January 1, 2025. A major concern for utilities is that most of the refrigerants that will be approved for use in these sectors are mildly

flammable. For the last century in the US, residential applications have used only nonflammable refrigerants. These new, mildly flammable refrigerants can ignite, but not easily, and the HVAC industry is developing systems that will enable them to be used safely.

Once the industry addresses those safety concerns, the biggest challenge is that mildly flammable refrigerants aren't allowed in many residential building codes. New codes that will enable the residential sector to widely use mildly flammable refrigerants are on the way, but, for most building departments, they won't be in place until 2025 at the earliest. Some might not be ready until 2035 or later. Keep in mind that it can take years for building departments to get ready to enforce new codes, and updating building codes just in time for the new refrigerant regulations will likely lead to confusion. You can help reduce any potential confusion by supporting new code adoption and training for building code officials and contractors.

In the meantime, HVAC manufacturers are deciding which of three refrigerants with a GWP less than 750 to choose for their new equipment. We expect that all the refrigerants will be more efficient than the current industry standard. However, only one is nonflammable, and its GWP is so close to 750 that it's not clear how many manufacturers, if any, will choose to use it. It's time for utility program managers to prepare to update their incentives for refrigerant-charged equipment based on the latest manufacturer announcements with performance and specifications of their new products.

Multifamily EV charging

Bryan Jungers

Electric vehicle (EV) charging in multifamily residences is more complicated than in single-family homes, but it's a key factor in growing the EV market. Our market research consistently shows that customers charge their EVs at home 75% of the time. But deploying, operating, and maintaining EV charging infrastructure at multifamily facilities is expensive and has limited revenue potential. Because of the weak business case for multifamily charging, it's rarely available. That means that owning an EV may not be an option for multifamily residents unless their workplace offers convenient charging. So, the success of multifamily EV charging will rely on strong utility programs and incentives.

It's helpful to not be tied to one vendor because it gives EV drivers multiple options to manage and pay for charging.

New technologies aim to help multifamily customers reserve and pay for EV charging sessions. The technologies we're most excited about are those that are vendor agnostic, which means the technology allows for coordination between EV drivers, property owners, utilities, and any charging station vendor. It's helpful to not be tied to one vendor because it gives EV drivers multiple options to manage and pay for charging.

We're tracking two emerging commercial offerings that could make EV charging more accessible to multifamily customers. Neither of these technologies has been independently evaluated, but some of the pilots are promising:

- *EVmatch*. Hailed as the "Airbnb of EV charging" when the company first launched, EVmatch is now actively targeting the multifamily market with several utility pilots underway. The company designed the product to allow EV users to share their home charging stations with other drivers. But, so far, the vendor has found that there are more drivers looking for a place to charge than

people who are willing to share their garage or car port with others. This led EVmatch to consider the multifamily market, where a shared-use model for parking and charging is a more natural fit. EVmatch partners with Enel X—the maker of the Juicebox charger—but the company hopes to expand to be vendor agnostic in the future.
- *AmpUp.* This company has a similar technology to EVmatch, but it's also serving the commercial fleet market and it works with multiple charging equipment vendors. AmpUp also just launched a program for disadvantaged communities. The company is currently partnering with a few utilities to pilot its technology for multifamily and commercial customers. As with EVmatch, we haven't seen any results yet from independent evaluations of this technology.

Creating competitive markets for RNG credits

Michael Hartnack

Renewable natural gas (RNG) is a pipeline-compatible gas derived from waste or other renewable sources. This carbon-neutral (sometimes carbon-negative) fuel source can help gas utilities that are trying to reduce emissions while using existing infrastructure. RNG commonly replaces diesel as a low-carbon transportation fuel, while using it in stationary applications is usually not cost-effective. However, developments in renewable-energy credit (REC) markets may help make many stationary RNG projects more cost-effective by allowing developers to generate and sell RECs to offset project costs.

There are many RNG project types and fuel sources—including ruminants, manure, wastewater, and landfills—but few work for stationary applications because of their high cost compared to conventional gas infrastructure. To offset high RNG project costs, developers heavily rely on selling credits that comply with regulated fuel-standards like the low-carbon fuel standard. Because of the high market value for transportation-related credits, RECs for stationary applications are less appealing for developers. However, incentives for RNG as a transportation fuel are tapering off as the natural gas transportation market gets saturated and as the sector shifts its focus to electric vehicles.

The decrease in transportation projects could make REC markets for stationary projects more cost-effective.

The decrease in transportation projects could make REC markets for stationary projects more cost-effective as large, stationary gas end-users build projects and develop innovative approaches. This may result in a new and competitive REC market for stationary RNG applications.

Competitive REC markets are critical to RNG project feasibility. To help spur the market for stationary RNG projects and grow the overall RNG REC market, gas utilities should:

- Design incentives specifically tailored to the project and financing needs of stationary RNG consumers.
- Collaboratively develop and finance stationary RNG projects with developers, while placing these capital projects on the utility's own balance sheets to facilitate investor interest.
- Geographically concentrate RNG project development into clusters to reduce the cost of research and development, land management interconnection, and treatment.

Induction cooktops for residential efficiency and electrification

Luke Beckett

For utilities pursuing whole-home electrification initiatives, cooking equipment will be one the hardest technologies to convert to electric. It's one of the few energy end-uses that customers directly interact with, and many people have a strong emotional attachment to gas ranges because they consider them to be superior.

Learn more about induction-cooking programs

Our report Promoting induction cooking to support residential efficiency and decarbonization has tips on how to design and market induction-cooktop programs as part of your beneficial electrification strategy.

However, induction cooktops and ranges are an appealing alternative to electric resistance and gas units because of their energy and non-energy benefits. Studies like Residential Cooktop Performance and Energy Comparison Study (DOCX) suggest induction cooking can save energy because it's 5% to 10% more efficient than traditional electric cooktops and more than 65% more efficient than gas cooktops. They also have better cooking performance, are safer to use, and reduce indoor pollution.

Despite the technology's benefits, ENERGY STAR estimates that only 0.64% to 1.7% of residential cooktops are induction cooktops. That's not surprising because many customers simply don't know that the technology exists or they don't understand the benefits of it. That's why it's important to focus your program strategy on the non-energy benefits that could help address customers' hesitations. These include:

- *Better cooking performance.* Compared to electric resistance and gas ranges, induction cooktops offer a wider range of power settings, along with precise and nearly instant temperature control. They can also cook food and boil water faster than gas burners can.
- *Increased safety.* An induction cooktop's surface stays much cooler compared to traditional gas or electric cooktops. The equipment also automatically shuts off elements after the user takes a pan off for an extended period.
- *Reduced indoor air pollution.* Unlike cooking with direct combustion, cooking with induction doesn't emit any indoor air pollutants, which are associated with health concerns like asthma or cardiovascular illness.

Besides a lack of product awareness, high up-front and installation costs are a crucial market barrier to consider, especially if a retrofit requires an upgrade in electrical panel capacity. Utility rebates and thoughtful program design could help lower the cost for customers, but few utility programs exist outside of California. Fortunately, ENERGY STAR's new Emerging Technology Award product category, 2021–2022 Residential Induction Cooking Tops, will likely make it easier for utilities to claim savings for these products and incorporate them into their demand-side management portfolios.

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