

Meet the People Preparing to Amp Up Building Electrification

[Energy Efficiency The Big Picture](#)

Three organizations focused on building electrification share their message for the AEC industry.

by [Candace Pearson](#)

Advocacy groups have been popping up, urging people to use more electricity, not less. It's sometimes a confusing message for people to hear.

WHAT IS BUILDING ELECTRIFICATION?

Building electrification refers to using electric technologies instead of combustion-fueled technologies to supply the comforts of a modern building. An electrified building typically uses electric heat pumps for space heating and domestic hot water, as well as electric or induction stoves for cooking.

The transportation sector can also be electrified, and such policies sometimes overlap with building electrification. Therefore, installing the infrastructure to charge electric vehicles within a building or garage is also sometimes included in building electrification.

“For so long, we have focused on efficiency,” says Keith Dennis, co-chair of the Beneficial Electrification League. “Things have moved so fast that most people don’t realize that [in most places] you can make something a lot greener just by switching to an electric model and plugging it in.”

The concept is also a huge shift for the design and construction industry, which is now being asked—or in places with [gas bans](#), forced—to deliver all-electric buildings. BuildingGreen spoke with leaders of three organizations championing electrification efforts, all of whom emphasized that the pace of change will be staggering and that the building industry is far from prepared.

First, the basics

It helps to understand why there’s such a push for electrification all of a sudden.

Especially following the U.S. withdrawal from the Paris Climate agreement, many states implemented their own statewide greenhouse gas targets—one of the strictest being New York’s mandate to cut greenhouse gas emissions by 85% below 1990 levels by 2050. Meanwhile, the carbon intensity of the U.S. electrical grid has gradually become lighter. On average, pounds of CO₂ per MWh dropped 25% from 2007 to 2017

(largely due to the shift from coal to natural gas but also helped along by growing amounts of wind and solar).

It became clear that the more customers ran heating systems, hot water heaters, and cars off electricity, the more states could put their lowest-carbon energy to work. Today, in all but the most coal-intensive grids, all-electric homes are responsible for [lower carbon emissions](#) than those consuming natural gas, according to the Rocky Mountain Institute. And energy experts expect carbon intensity to continue to drop as more renewable energy is added. Once the grid is fully decarbonized, so too will be every appliance plugged into it—a decarbonization plan that is straightforward and relatively affordable (See “[Changing Building Design for a Changing Electrical Grid](#)”).

That’s the concept behind electrification. In fact, by some indications, it’s the only way some states can possibly meet the climate targets they have set for themselves. A [Rocky Mountain Institute study](#) recently looked at the ten U.S. states and territories with the greatest proportion of energy-sector carbon emissions from fossil-fuel use in buildings. The authors found that none—including New York, Massachusetts, and Washington D.C.—could meet their climate targets without full building electrification.

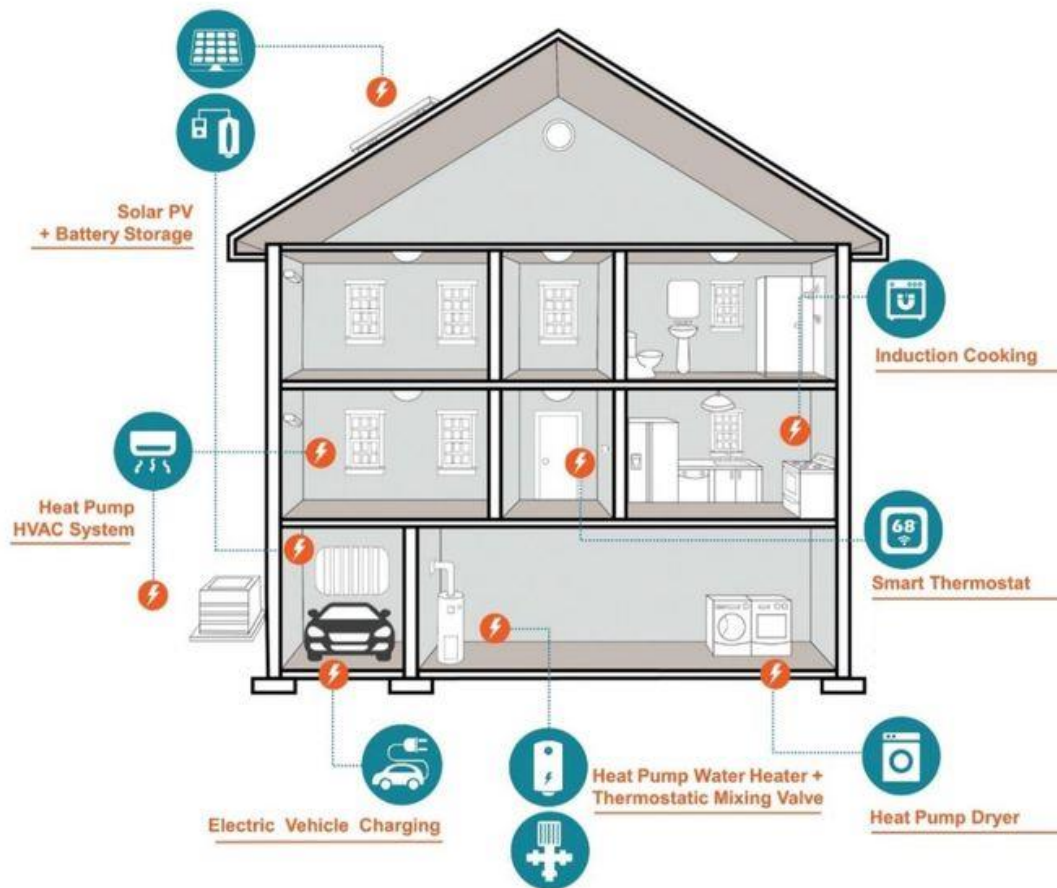
That brings us to where we are today, with multiple states and localities needing to ramp up building electrification, but not without significant obstacles to overcome, including added cost, consumer education, and supply chain support. The different groups profiled below were founded to address those barriers and pave the way for a speedy transition.

Building Electrification Initiative

[The Building Electrification Initiative](#) (BEI) got its start as cities began organically coordinating their electrification efforts and sharing resources. The Initiative helps solidify that knowledge sharing and brings in experts to complement what cities are already doing, according to Jenna Tatum, director of the BEI.

Washington, D.C. is concerned about heat waves, and because heat pumps provide both heating and cooling, electrification furthers its resilience efforts. Salt Lake City has invested in electric vehicle charging infrastructure and solar installations, seeing electrification as a solution to its air-quality problems. Boston has noticed wages for HVAC professionals haven’t been high enough to attract new people to the field and is identifying electrification opportunities that will keep that needed workforce strong.

Tatum and her colleagues also work with cities to address specific obstacles. For some, the trick is transitioning away from gas infrastructure in an equitable way, says Tatum. With fewer customers paying to maintain the infrastructure, gas could become more expensive. Without subsidies to switch to electric equipment, the poorest people will be left vulnerable to spiking gas prices.



This diagram from the Building Decarbonization Coalition shows the technologies that are typically specified for an all-electric home.

Credit: Building Decarbonization Coalition

Another issue, especially in California, has been concern over more electric infrastructure increasing already urgent wildfire risks. Tatum is helping cities work through that, but at an intuitive level, she says, yes—electrical infrastructure will have to be hardened. “But so would the gas network. If we are going to have to harden entire networks, it might be easier to focus on just one.” And if so, better to focus on the one that might mitigate climate change, not deepen it, she says. When asked whether she has a message for the building industry, Tatum said, “Even if the building you build uses energy efficiently, it is still a problem if the energy is dirty.” The systems that we put in place today may be in place in 2050, and if they aren’t electric, they can’t currently be decarbonized economically. “Electrification is basically like an electric vehicle for your building,” she says. “Suddenly you are able to tap into the renewable energy supply.” And if you don’t care about that, Tatum says she can’t envision a future where policies don’t push us towards electrification anyway. “Architects and contractors are going to be in the best position if they start experimenting with this now.”

Beneficial Electrification League

Whereas BEI was started by city governments, the [Beneficial Electrification League](#) (BEL) was founded by nonprofits and cooperative electric utilities. Its primary focus is educating the consumer. “The idea is that there are a lot of trends that make electricity a really good option,” says Keith Dennis of the National Rural Electric Cooperative Association. BEL talks about reduced greenhouse gas emissions, but also the potential for internet connectivity and fun products like electric scooters. “For utilities, this is a new opportunity to re-engage with consumers and talk about these benefits.”

BEL takes a softer approach to other energy sources, and its members may have different opinions about how electricity should be generated, says Dennis. But it focuses on finding opportunities where all stakeholders agree that electrification is “beneficial,” which it defines as doing one of the following without adversely impacting the others:

- Saving consumers money
- Benefiting the environment and saving greenhouse gases
- Improving product quality or consumer quality of life, and
- Fostering a more resilient grid

Thus, BEL might not advocate for switching out a brand-new gas furnace for an electric heat pump, Dennis says, because the savings might not pencil out for the consumer. But switching over to electric forklifts or agricultural pumps from diesel and installing electric space and water heating in most new buildings is a “no brainer.”

What architects should understand, according to Dennis, is that “electricity gives you the ability to meet a huge range of consumer needs.” Soon, *when* you use energy will become just as important as how much you use, he says, and clients will be very interested in whether a building’s systems position them to “get the most out of their buildings.”

Distinguishing the Electrification Organizations

Organization	Building Electrification Initiative	Beneficial Electrification League	Building Decarbonization Coalition
Primary Audience	Cities and municipal governments	End-use consumers	Building industry stakeholders, energy providers, environmental organizations, and local governments in California
Supporters/ Founders	Incubated by the Innovation Network for Communities; supported by the Urban Sustainability Directors' Network and the Carbon Neutral Cities Alliance	Sponsored by nonprofits including The Natural Resources Defense Council (NRDC) and by electric cooperatives like the National Rural Electric Cooperative Association (NRECA)	Coalition members include City of Palo Alto Utilities, PG&E, Sierra Club, Stop Waste, and Clean Coalition among others
Sample Projects	Evaluating the cost-effectiveness of heat pump installations in Washington, D.C. (link in caption)	Dual Fuel Evaluation Tool Video: What is Beneficial Electrification (links in caption)	A Roadmap to Decarbonize California's Buildings (link in caption)
Stance on Gas Bans	"All-electric new construction codes are exciting because we know that type of construction is cheaper to build, and we shouldn't be investing in new gas infrastructure anyway. That is not to say that existing buildings should be mandated to go all-electric." - Jenna Tatum	"Those policies can be quite divisive. We try to stay focused on the benefits of electrification. Since we work on consumer education, we're not out there supporting policies anyway." - Keith Dennis	"We try to focus on building the alternatives to natural gas. But at this point, I have not seen anyone who has been able to show how we can meet our climate goals and still have combustion in buildings." - Panama Bartholomy

[Evaluating the cost-effectiveness of heat pump installations in Washington, D.C.](#)

[Dual Fuel Evaluation Tool](#)

[Video: What is Beneficial Electrification](#)

[A Roadmap to Decarbonize California's Buildings](#)

Source: BuildingGreen, Inc.

Dennis also has full faith that electrification will continue to grow. Referring to the pollution emitted from building chimneys and car tailpipes, Dennis said, "When my kids grow up, if they see smoke coming out of something, they are going to want to call the fire department."

Building Decarbonization Coalition

The [Building Decarbonization Coalition](#) (BDC) is a group of energy providers, manufacturers, and non-profits, currently geared towards electrification efforts underway in California. BDC doesn't denigrate natural gas, but its work is definitely motivated and driven by the fact that many California municipalities have chosen to restrict gas.

“Californians are becoming more aware that we can’t solve climate change while we continue to burn gas in our buildings,” says Panama Bartholomy, director of BDC. In total, 29 municipalities have adopted some type of code that restricts or bans new natural gas hookups, according to Bartholomy. “We expect that very soon 40% of Californians will live in a jurisdiction that has adopted some kind of restriction.”

But such polices could cause bottlenecks. Many buildings on the California coast do not have air conditioning, says Bartholomy, so the typical electric panel is quickly maxed out as an electric stove, washer/dryers, and heat-pump water heaters are added. Then, it costs a lot to do a panel upgrade and is virtually impossible to schedule all the needed people to arrive at the same time when a system breaks and you want it fixed within 24 hours, he says. Solving those supply-chain issues is crucial.

And then there’s the equipment itself. Californians alone replace 400,000 water heaters a year, according to Bartholomy. But last year, only 60,000 heat-pump water heaters were even available nationally, due to relatively small demand. Lack of demand is partially a cost issue and partially an awareness issue. Yet, we’ll soon need “manufacturing capacity to match our climate priorities,” said Bartholomy. Policies incentivizing heat-pump water heaters will be needed “so that manufacturers can trust that there will be a solid and sustainable market should they increase supply.”

But one of the most serious bottlenecks of all is in design and construction. In one [survey](#) conducted by BDC, only 36% of builders had built an all-electric home, and unfamiliarity with induction stoves was identified as the primary barrier. In [another survey](#) commissioned by BDC, contractors had relatively positive associations with the term “electrification.” However, plumbers had negative associations, and half of the electricians interviewed weren’t even familiar with the term.

“My message to the building industry is that this is happening. It is starting to become a situation of not if, but when, and who pays,” says Bartholomy. “If the design and construction community doesn’t get ahead of this, they are going to be pinning their customers with stranded assets”—equipment that only runs on gas, which will become very expensive. “The best way to future-proof for gas costs is to build an all-electric building.”

<https://www.buildinggreen.com/news-analysis/meet-people-preparing-amp-building-electrification>