

What Is Building Electrification?

Building electrification is the shift away from burning fossil fuels—like natural gas—to using clean electricity for space heating and cooling, water heating, and other uses in residential, commercial, and industrial buildings. As defined by the Environmental and Energy Study Institute (EESI), strategic or beneficial electrification refers to replacing direct fossil fuel use (e.g., methane, propane, heating oil, gasoline) with clean electricity in a way that reduces overall emissions and energy costs, improves quality of life, and/or strengthens the grid. This can include switching to an electric vehicle or an electric heating system—as long as the end-user and the environment both benefit. A key component of beneficial electrification is electricity generation from carbon-free, renewable sources.

Beneficial electrification is a term for replacing direct fossil fuel use with electricity in a way that reduces overall emissions and energy costs, improves quality of life, and/or strengthens the grid. This can include switching to an electric vehicle or an electric heating system – as long as the end-user and the environment both benefit.

In residential buildings, ubiquitous gas appliances can be replaced with electric alternatives:

- Heat pump space heating and cooling
- Heat pump water heater
- Heat pump clothes dryer
- Induction stove and cooktop

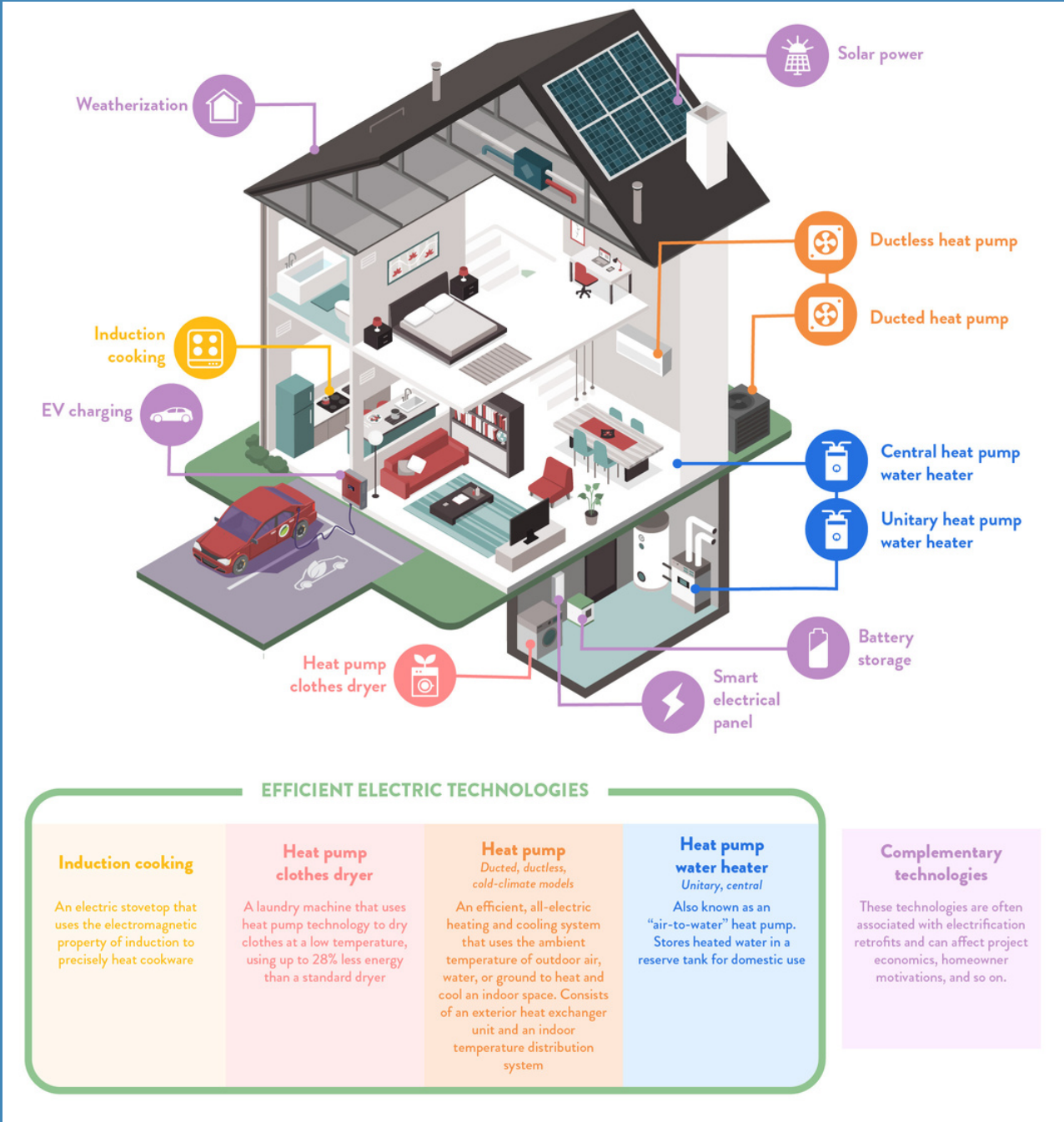


An all-electric cafeteria in Microsoft's One Esterra Food Hall that opened in March 2022. Photo courtesy of Microsoft.

In commercial and industrial buildings, key equipment and processes that can be electrified include:

- Space heating and cooling
- Water heating
- Food preparation and service equipment
- Wastewater treatment
- Heat generation for industrial processes (boiler or furnace replacement)
- Pipeline compression
- Heat recovery in industrial chillers

What does an all-electric home look like?



EFFICIENT ELECTRIC TECHNOLOGIES

<p>Induction cooking</p> <p>An electric stovetop that uses the electromagnetic property of induction to precisely heat cookware</p>	<p>Heat pump clothes dryer</p> <p>A laundry machine that uses heat pump technology to dry clothes at a low temperature, using up to 28% less energy than a standard dryer</p>	<p>Heat pump <i>Ducted, ductless, cold-climate models</i></p> <p>An efficient, all-electric heating and cooling system that uses the ambient temperature of outdoor air, water, or ground to heat and cool an indoor space. Consists of an exterior heat exchanger unit and an indoor temperature distribution system</p>	<p>Heat pump water heater <i>Unitary, central</i></p> <p>Also known as an “air-to-water” heat pump. Stores heated water in a reserve tank for domestic use</p>	<p>Complementary technologies</p> <p>These technologies are often associated with electrification retrofits and can affect project economics, homeowner motivations, and so on.</p>
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Graphic: American Council for an Energy-Efficient Economy (ACEEE)