

Using Building Performance Standards to Advance Electrification



Exploring
Building Performance Standards

Electrification is a key component of a comprehensive city decarbonization strategy. At the grid level, replacing fossil fuel power plants with renewable energy generation provides cleaner electricity; at the building level, replacing equipment that uses fossil fuels with electric alternatives allows the buildings to take advantage of this cleaner electricity. As the grid gets cleaner and buildings electrify, cities move closer to achieving their decarbonization goals. While cities can have some influence on decisions about the grid by participating in utility regulatory processes, they have direct authority to affect changes in buildings. Building Performance Standards (BPS) can be a powerful tool for achieving electrification in buildings.



BPS Options for Electrification

Commercial buildings use natural gas, oil, and propane mainly for space and water heating; restaurants use significant amounts of natural gas for cooking. Proven, widely used electric alternatives include high-efficiency heat pumps for space and water heating and induction stove tops for cooking. A BPS that ties compliance to reducing carbon emissions will incentivize electrification and the increased adoption of these technologies. However, cities should be careful to craft at least one of their BPS metrics so that it focuses directly on reducing the carbon emissions created inside buildings rather than those associated with electricity production on the grid. The reason for this is that building owners have no control over changes to the grid whereas they have full control over emissions created by their buildings. They will justifiably argue that a city ordinance cannot require them to take responsibility for actions over which they have no control.

Cities have multiple options with regard to encouraging electrification in buildings but none are without challenges. The most obvious solution is to simply ban fossil fuel equipment, requiring that electric alternatives be used when equipment reaches the end of its useful life and is replaced. This approach has been adopted for new construction in several cities, but it has never been applied in existing buildings and the legality of such a requirement is uncertain.

In general, the BPS should simultaneously encourage electrification and reduced energy use. To achieve this, a city should establish separate standards for electric use and on-site fossil fuels, or create a single standard, such as an EUI, which is calculated in such a way as to incentivize electric use and discourage gas use. A more aggressive approach is to directly penalize the continued use of gas systems by applying a fee if they are not electrified. The city could use the collected fees for electrification projects in other buildings.

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The Importance of Long-Lived Energy Systems

A priority for cities should be the electrification of space heating systems because of their long lives: at its installation, a new system locks in associated emissions for up to 25 years. Plus the distribution and control technology associated with a new system may not be adaptable later to an electric alternative.

In all cases, a city will have to know when systems are replaced so it can intervene at the appropriate time. This will require a coordinated effort with the city building department so that it can provide information to BPS requirements owners at the time a permit is obtained. For the large number of equipment replacements that occur without a permit, the city will need an aggressive outreach campaign to reach equipment installers who will need education on the BPS policy requirements. Ideally, the BPS ordinance would impose penalties on the installers if inappropriate equipment is used.

An action cities can take to reduce building emissions before equipment is replaced is to require whole-system tune-ups. Poorly operated and maintained equipment and, especially, leaky

duct systems, can waste a third or more of all the energy consumed. Fixing these systems can significantly reduce carbon emissions without requiring extraordinary efforts on the part of owners. A BPS policy should require whole-system tune-ups for any system that is not scheduled for replacement in the next three years.

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Electrical Efficiency is Key

Another area related to electrification that a BPS ordinance should address is ensuring that any electrical systems that replace gas systems are high efficiency. Using minimum efficiency equipment can increase overall carbon emissions if the grid is dirty and will require unnecessary distribution and transmission infrastructure even if the grid is clean. In addition, electrification can also cause a building to exceed its electric system capacity, so high-efficiency equipment should be

used to avoid the need for building electric system upgrades. If it is not possible to mandate higher equipment efficiency because of state or federal laws, incentives should be provided either by the city or in coordination with the utility. In all cases, it should be a priority of the building department to verify that all distribution systems (e.g. air handlers, ducts, etc.) are installed and functioning correctly. It is difficult to overstate the potential benefit that can occur from this single action.

Equity and Electrification

A final, critical topic to consider in any electrification policy is its impact on economically at-risk populations, including both tenants and small business owners. Because current gas prices are so low, in many areas it will cost more to heat with electricity than with gas. (Though higher efficiency electric systems will reduce this discrepancy.) A BPS policy should support and protect these populations by ensuring that

their out-of-pocket costs for energy bills do not increase. This will require a mechanism for determining how much bills have increased and a process for delivering financial compensation to affected parties. Ideally, a BPS policy should not exempt at-risk populations because there may be important benefits, such as improved indoor air quality, that are linked to electrification.

In summary, electrification is critical to cities' decarbonization goals, and a BPS can be a powerful tool for achieving electrification. Cities will want to carefully investigate the options that make the most sense in the context of their political climates and their resource capabilities. IMT is here to help. For more information, visit imt.org/BPS.