A report titled “Buildings and Climate Change,” completed by the United Nations Environment Programme (UNEP), revealed that “over 80 percent of greenhouse gas emissions take place during the operational phase of buildings, when energy is used for heating, cooling, ventilation, lighting, appliances, and other applications” (UNEP, 2009, p.6). Because buildings overall are one of the largest contributors to climate change, it would be wise to utilize and promote the tools we currently have to drastically cut their energy consumption. A few companies have recently proved successful in cutting home energy use by using the tool we are now all familiar with—the smartphone—to leverage the power of energy disaggregation.

Disaggregating a home or building’s energy use allows occupants to see how much energy each major appliance is consuming. This appliance-specific information enables companies like Bidgely and Chai Energy to supply homeowners with automated personalized recommendations through smart gateway devices that connect to a home’s smart meter. These consumer-based smart energy management platforms can identify all the major appliances in a home (i.e. HVAC, pool heater, refrigerator, entertainment systems), and then give the user prompts and recommendations throughout the day via a smartphone about what appliances are being inefficient, which to unplug at certain times, and when to upgrade to a more energy-efficient device (Gupta & Chakravarty, 2016). This applied project leverages these new smart disaggregation and remote energy management platforms by drafting up a new credit for U.S. Green Building Council’s (USGBC) LEED rating system for potential adoption.

USGBC’s LEED certification, the most widely used green building rating system in the country, allows building project teams to acquire points in certain credits that USGBC has created for each rating system (there is a platform for each building type—i.e. residential, hospital, commercial, etc.)—all of which are aimed to contribute to sustainable design (USGBC, n.d.). In order for a credit to first become adopted by the system, it must be tested out as a Pilot Credit for at least a year, where project teams may acquire a point in it and must supply USGBC with feedback throughout the process. If a Pilot Credit makes it past the testing phase, it is typically adopted into USGBC’s Innovation Catalog—a list of successful Pilot Credits that project teams may continue to receive points in. Once the next LEED version is due (we are now at LEED v4), USGBC may decide to fully adopt some or all Innovation Catalog credits into the next complete version. A literature review of USGBC’s credit creation process, and a telephone interview with Batya Metalitz, the Technical Director at USGBC, allowed a roadmap to be created for this project, which shows the intended path the energy disaggregation credit would take through USGBC’s system, from birth of concept, all the way to complete adoption into LEED v5. Various USGBC committees and stakeholders are tied to each step in the roadmap.

Through insight gained from Metalitz, I have created a Pilot Credit proposal for a new credit, titled “Real-time Disaggregation Data and Remote Energy Management.” In order for outside third-party USGBC members to submit an idea for a new credit, they must create a Pilot
Credit proposal application, which includes: sufficient research to back the feasibility and importance of such a credit; an “Intent” and “Requirements” portion (what the credit language will look like to a project team); and which LEED rating systems it will apply to. Mrs. Metalitz recommended, among a list of things, to narrow down the research and focus the credit on energy disaggregation, and to include this term in the title. A “guest expert” is also required in order to submit the Pilot Credit application, who may be contacted by the USGBC after submitting the proposal. Julie Castro, Director of Strategic Partnerships at Chai Energy, confirmed that she would be the guest expert for this Pilot Credit proposal. Ms. Castro, who works at an energy disaggregation smartphone application company, and also has experience in LEED for Homes certification, made recommendations for this project’s Pilot Credit proposal as well. Ms. Castro (along with Metalitz) confirmed my decision to include LEED for Building Design and Construction (BD+C) and LEED for Building Operations and Maintenance (O+M) rating systems in the proposal, which will allow new and existing larger multifamily residential building projects to obtain this credit point. While research that backs energy disaggregation for multifamily buildings is sparse, the building stock that represents condominiums (where units are individually owned) is too large and holds too much potential to ignore, especially considering this is a Pilot Credit; it should be tested in new areas and push project teams to lead the way in being the first to adopt these technologies. LEED for Homes is the other rating system that is included—this sector is very promising, as much of the energy disaggregation research that has been conducted focuses on single-family homes.

The overall goal of this applied project, to put energy disaggregation tools in the hands of building occupants, will more likely be met if I actually submit the Pilot Credit proposal. Because only USGBC-member organizations may submit proposals, the current green building consulting firm I am interning at, Verdical Group, LLC, will have to submit the application. After Verdical Group submits this energy disaggregation Pilot Credit proposal, the first step in the roadmap created for this applied project can be checked off, and (perhaps) for the first time, key stakeholders at the USGBC will consider this very important energy management strategy as a credit of its own.

References:


