

Metering Heat Pumps for Multifamily Buildings

Metering issues are important for heat pumps. For all-electric heating and cooling systems (typically heat pumps), which replace what is commonly a fossil-fuel heating system that is landlord-paid and resident-paid electric window air conditioners, questions arise as to who will pay for the heat pump heating and cooling.

The answers to these questions for any specific project depend on the type of building, the type of heat pump chosen, and other factors. This FAQ is intended to lay out options to help with decisions about which metering strategy to choose and, conversely, how various options for metering might impact the decision of which type of heat pump to use.

This FAQ was developed for the HPD-NYSERDA Electrification Pilot that began in 2021 and will likely run for 2-3 years. But the issues discussed can be applied more broadly to any multifamily building.

The focus of this FAQ is heating and cooling. Simpler discussions typically apply to the cost of energy for domestic hot water because these costs are most frequently landlord-paid both for pre-retrofit fossil fuel systems and post-retrofit heat pump systems. If this is not the case, in other words if the pre-retrofit and post-retrofit domestic hot water energy costs are not both landlord-paid, metering decisions then merit discussion. This FAQ also does not address in-unit cooking stoves, for which decisions are also generally simpler, but which should nonetheless not be overlooked in electrification discussions.

Figures 1-4 show how metering can be accomplished for various options, with a focus on various options of how cooling energy costs could be allocated to residents in a variety of ways. For reference and comparison, Figure 1 shows a simple direct-metered building where the resident pays for all heating and cooling costs. What should be noted in Figures 2-4 is that in order to separate out cooling energy costs, the energy use of heat pumps themselves needs to be measured. Each approach has pros and cons.

Figure 1

DIRECT METERED

This graphic is for reference/ comparison purposes. Resident/tenant pays all heating and cooling costs.

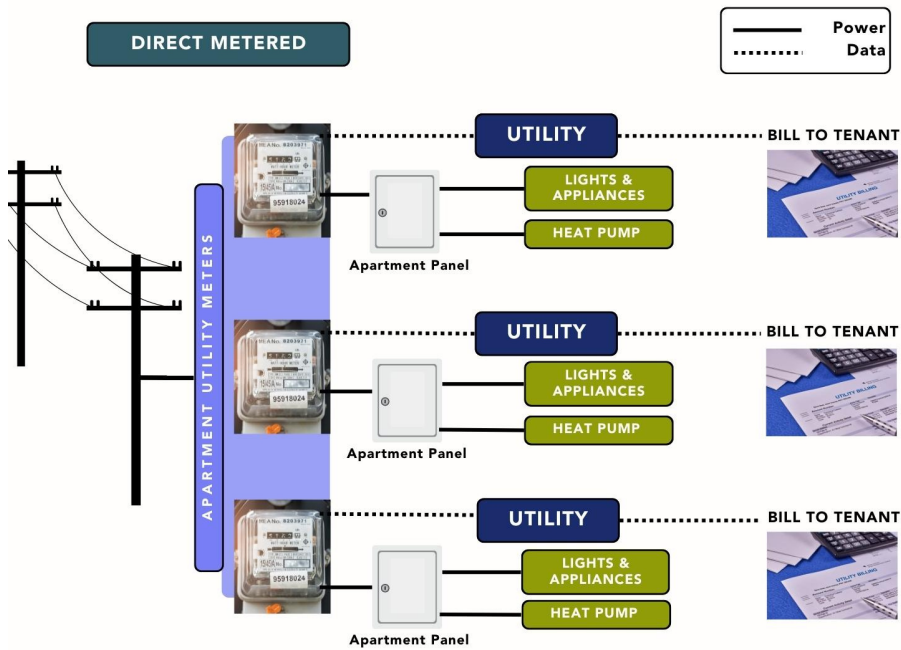


Figure 2

CONVENTIONAL SUBMETERED

A single master electric meter (at left) serves the whole building. Landlord-owned submeters measure energy use by the heat pumps. The landlord or a third party metering consultant reads the heat pump submeters and bills the tenant for cooling in summer months, presumably May-August. The measurements are reasonably accurate, but minor cooling energy costs in September-April are ignored (paid for by landlord) and minor heating energy costs in May-August are also ignored (paid for by resident/tenant). Installation cost is moderate (one meter for each apartment). Submetering costs are moderate.

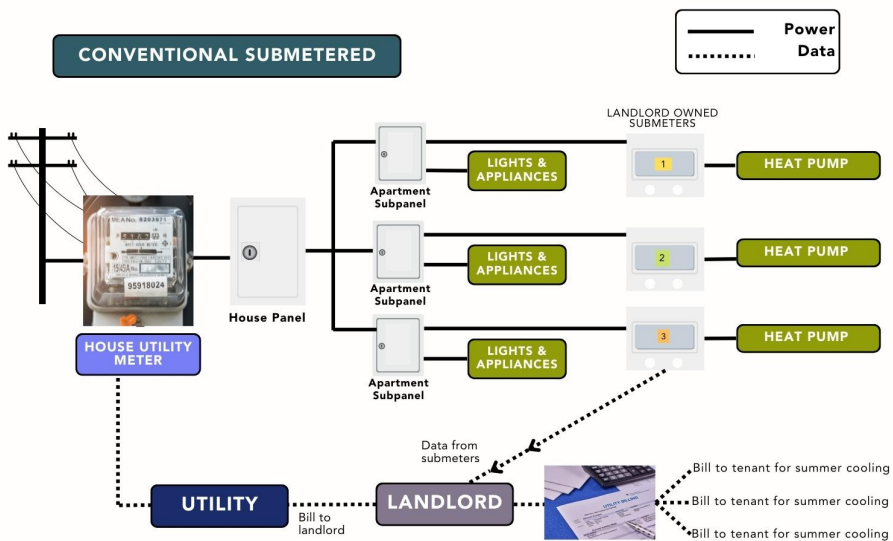


Figure 3

HEAT PUMP CONTROL-ASSISTED SUBMETERING

Like Figure 2, a single master electric meter (at left) serves the whole building. A single submeter serves all of the heat pumps. Data from the heat pump controls is used to allocate cooling usage in summer, as a fraction of energy use for each apartment relative to total building heat pump energy use as measured at the one submeter. Installation cost is low (only one submeter, plus the cost of the controls). Submetering costs are moderate. Accuracy is slightly lower than Conventional Submetering (Figure 2), because the allocation is based on indirect per-apartment estimates of energy use from the controls, not actual energy measurement. Some manufacturers offer this service at no cost on an ongoing basis (e.g. after installation), but some charge for it on a monthly basis.

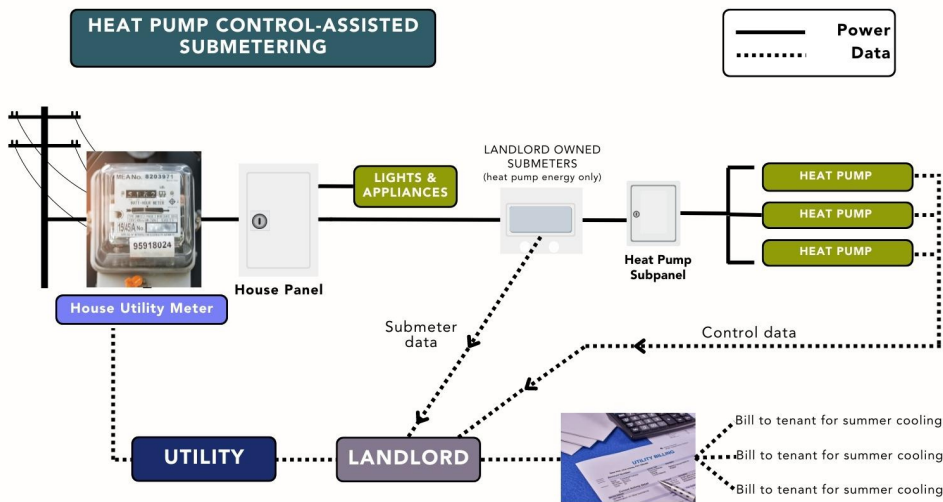
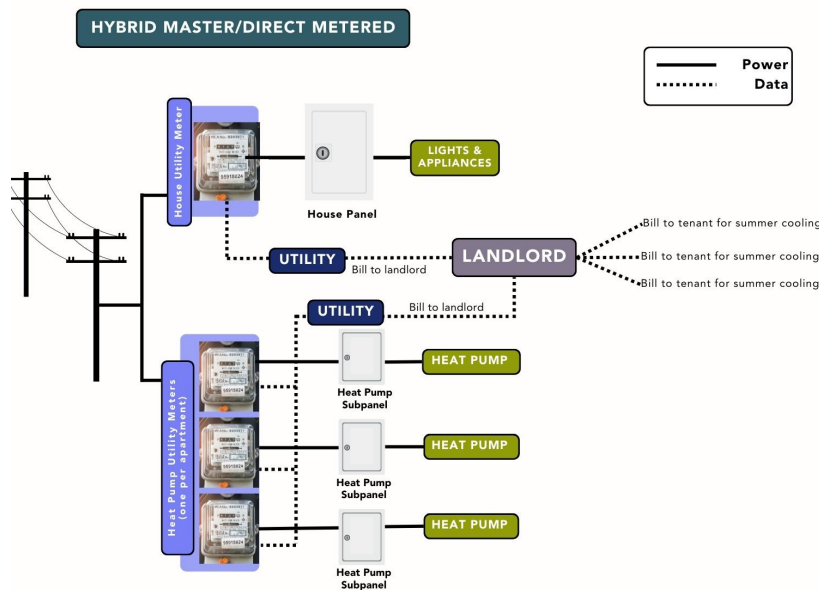


Figure 4

HYBRID MASTER/DIRECT METERED. A master utility meter (at top left) serves all non-heat-pump loads. Individual utility meters for each apartment measure heat pump energy use. Installation costs are high (although are likely borne by the utility). Metering costs are high (come from the utility, typically \$15-20/month per apartment, rather than \$4-8/month per apartment for a third party submetering service). Accuracy is high. Convenience is high because all metering is done by the utility. Note that the metering costs likely outweigh the cost of the summertime cooling, so this option should be carefully analyzed for cost-effectiveness, even though it is convenient.



If you want to learn more, contact electrificationpilot@hpd.nyc.gov