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SUB-METERING FOR ELECTRICITY

Description:

There are two different methods by which multifamily buildings are metered for electricity: direct metering and master metering. Single-family buildings are direct metered.

Direct metering: In a direct-metered building (also known as individually metered), the utility owns the meter and supplies electricity to each living unit (single-family home; individual apartment). Each householder receives his living unit's electric bill from the utility at the residential retail rate; in a multiunit building, the building owner receives an electric bill for electric usage in the common areas, typically at a commercial retail rate.

Master metering: In a master-metered building, the utility supplies electricity to the entire building, and one utility-owned meter serves the building. The building owner receives one electric bill, often at a rate that results in a bill significantly lower than the retail residential rate. Individual apartments are not metered, and actual apartment consumption cannot be determined or used as the basis for billing electric charges.

In a direct-metered building, residents pay for the amount of electricity they consume. In a master-metered building, the cost of the total electric consumption for the building is divided among apartments, not taking into account actual consumption per household. Billing for each apartment can be handled in various ways; for example, divided evenly among all apartments, or based on the size of the apartment or where it is located in the building, or based on the numer of residents in an apartment. Submetering combines the best of both direct- and master-metering systems.

Submetering: Submetering is used with master-metered buildings. It permits the measurement of electric use in individual apartments via a building-owned meter installed for each apartment (these are submeters and are owned by the building and not the utility). The building continues to purchase its electricity on the less expensive commercial or bulk residential rate basis, but the owner is able to bill electric-use to individual apartments on an actual-consumption basis. The building owner continues to receive one bill from the utility; the owner allocates the utility costs across apartments based on the usage recorded by the apartment submeters; residents pay the building owner, not the utility; and the building owner continues to be responsible for the portion of the utility bill that covers the building's common areas.

There are many benefits to electrical submetering in master-metered buildings—both the owner and the residents reap the benefits of lower energy costs, current technology facilitates the reading of submeters without entry into individual apartments (preserving residents' privacy), and available software systems enable automated billing procedures. In addition, electrical submetering is a successful energy-conservation strategy, reducing energy use among residents. Often, property owners do not bill residents separately for utilities, but incorporate those charges into the rental charge. When property owners do not charge for utilities separately, residents have little reason or incentive to conserve energy; and they are unable to compare how much energy they are saving when they do decide to take energy-saving steps. When a building undergoes a typical energy-conservation measure (installation of a new boiler, etc.), consideration should be given to including submetering as a beneficial component of the new installation.

Benefits:

- *Energy savings*—a change from traditional master-metering to submetering has been shown to reduce residents' consumption of electricity in apartments by 10-26 per cent.[1]

- *Lower utility costs*—building owners continue to reap the benefits of less expensive commercial or bulk-buying electric rates, which are passed on to apartment dwellers.

- *Fairer allocation of energy costs*— Submetering restores the "pay for what you use" concept. Data reveals that 20-25 per cent of total apartment usage is consumed by only 10 per cent of the residents;[2] yet, under traditional master-metering, these excessive users pay the same as other residents. Sub-metering restores fairness. Approximately 60-70 per cent of residents benefit from submetering. The only residents who fare worse under submetering are those who use excessive amounts of electricity; however residents who find that their electric bills are excessive have the ability to reduce cost by reducing consumption.

- *Benefits to owners*— Submetering largely eliminates a volatile, variable, and difficult-to-control factor from a building's operating budget—apartment electric usage costs. Whether the building is a rental, cooperative, or condominium, owners can better predict costs when the only electric usage to be considered is for common areas, which are under management control.

- *Benefits to utilities and society*— Submetering benefits utilities and society in the same way: by reducing the waste of energy and deferring the need to site, build, or otherwise acquire electric generating capacity, as well as by reducing the use of fossil fuels (e.g., oil), which are still the primary source of power-generation in New York State. Reducing the use of fossil fuels is a giant step toward enhancing the environment by improving air quality.

References:

[1, 2] "Sub-metering," *Energy Conservation Services Corporation,* New York City: http://enconcorp.com/index.php?option=com_content&task=view&id=38&Itemid=77.

Impediments or barriers to development or implementation:

- Inplementing submetering involves an investment of about $500 per submeter point (tenant space), and the owner is responsible for all maintenance and billing to the tenants.

- Some residents may refuse to pay any additional charges related to the implementation of the sub-metering syistem.

- Some residents may object to a change in billing procedures, or may object to any increase in charges due to their higher individual consumption patterns. The owner is responsible for any dispute-resolution process to resolve such issues. Such a process is designed to establish procedures in the event a resident does not agree with the meter reading, billing, or other aspects of the electric charges.

- Some tenants may lobby others in the building to convince them that submetering is bad for everyone; it is usually the tenants who use the most energy who become most vocal.

Resource—examples :

- *Aguilar Gardens*, Flushing, New York—conversion of a master-metered system to a master-metered/advanced-submeter system for 256 apartments in two buildings just outside of Manhattan. The cost of the advanced-submetering system was $104,560; projected annual electric savings was $25,011; and annual electric-consumption savings was projected to be 264,800 kWh. http://www.getenergysmart.org/Files/aguilargardens.pdf.

- *Southern Connecticut State University*, New Haven, Connecticut - U. S. Environmental Protection Agency—New England (January, 2007), "Sub-Metering Campus Buildings," *Energy.* http://www.epa.gov/region1/assistance/univ/pdfs/bmps/SCSUSubmetering1-8-07.pdf.

Resource—written and web:

- Herbert Hirschfeld, Joseph Lopes, Howard Schechter, and Ruth Lerner (1997; revised 2001), *Residential Electric Submetering Manual,* a report prepared by the Project Team of Applied Energy Group, Inc., in the course of performing work sponsored by the New York State Energy Research and Development

Authority (NYSERDA), Albany, New York. Contracts #4483-IABR-BR-97 and #5037, Project Manager: Mary Ann Bowers. http://www.submeteronline.com/pdf/subman2001.pdf.

- Lou Mane (Summer, 2005), "Submetering—A Practical Approach," *GE ESL Magazine*: http://www.geindustrial.com/Newsletter/fall05_submetering.pdf.

- Daryl Cowie (December, 2009), "The Business Case for Sub-Metering," *Sub-Metering 101,* AutomatedBuildings.com: http://www.automatedbuildings.com/news/dec09/articles/wescon/091127105404wescon.htm.

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