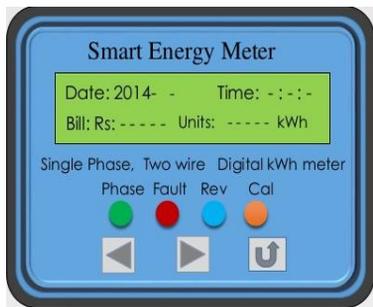
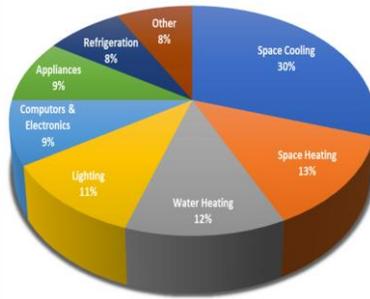


Electrical Sub-metering System

Sub-metering offers the ability to monitor separate circuits for example: individual electric circuits (lights, plugs, AC), large loads, individual tenants and can be tailored for the building type. This additional metering data will enable better understanding of the performance and usage of different building systems, to calculate savings and detect faults over the lifetime of the building. Modern metering technology offers a range of meters and data loggers (for temporary tracking), with the option of wireless connectivity and excellent data visualization tools.



(D. Patil, 2014.)



Environmental Improvement	High
Awareness Impact	Medium
Capital	Medium
Payback	< 2 years

Recommendations

Understanding your building's energy usage and performance is the first step to energy sustainable operation. Basic metering is recommended for all buildings even if the data is not actively used from the start. The availability of accurate data is vital. A greater extent of sub-metering will open more of the benefits and savings.

- Plan an energy management strategy for the building.
- Reduce metering equipment requirement for new buildings by grouping different electrical circuits types (lights, plugs, AC, etc.) together so that they the whole circuit can be metered at one point.
- Small buildings using basic metering will be simple and cost effective to set up. Consider submetering mains, lights and hot water. Do-it-yourself or an electrician can assist.
- Large buildings with specific metering objectives will require a metering design for strategic energy management, possibly integrated with BMS. Initial capital costs may be significant, but with a low pay-back-period. An experienced consultant / engineer is recommended.
- For advance engineering guidance on measurement and verification refer to ASHRAE Guideline 14.
- Contact [Ecolution](http://www.ecolution.co.za) for more details

Savings and Benefits

- Energy management capability.
- Track equipment performance (efficiency).
- Equipment energy usage analysis (hours per day per system).
- Fault detection of building systems.
- Identify greatest inefficiencies - inform retrofit decision-making.
- Savings calculation of new interventions.
- Peak demand reduction.
- Graphical data display for building occupant awareness and behavioural change.
- Easily expand metering using modular wireless technology.

Electrical Sub-metering System – GREEN STAR

An *effective monitoring system* is installed to monitor all sub-meters and an automated metering strategy is prepared:

There must be an 'effective system' for collecting, recording and monitoring data from all submeters, and for alerting the facility management of any change in electrical / thermal energy consumption trends during the building's operation. In most cases, the requirement for an effective system will lead to the design of automated monitoring systems, such as Building Management Systems (BMS). Manual monitoring of sub-meters is not acceptable to meet the Credit Criteria. Wherever such systems are present to monitor the energy consumption data, the electrical and thermal energy sub-meters must be linked to them. If there is a monitoring system / BMS that can provide a breakdown of the energy use by building system and location, this will also comply with the Credit Criteria. However, relevant details of the monitoring system and data must be provided to confirm the energy metering monitoring capability of the system.

Energy Meters (Credit ENE-2):

Up to 3 points are awarded as follows:

1 point is awarded where:

Electrical sub-metering is provided for:

1. – All *substantive electrical energy uses* within the building;
 - Car park ventilation and lights;
 - Chillers;
 - Hot water plants for space heating;
 - Air handling fans;
 - Lifts/escalators;
 - Domestic hot water plants with a combined storage of 1000 litres or more;
 - All tenancies individually; and
 - Any additional item that carries an energy use greater than 100kVA.
2. Sub-metering must measure energy in kWh and need not measure kVA or other electrical parameters.

1 point is awarded where:

Thermal sub-metering is provided for:

- All *substantive thermal energy uses* within the building;
 1. all spaces where thermal energy is provided (these can be grouped into one meter if practically possible, but can also be in the form of multiple meters)

1 additional point is awarded where:

1. • The first point above is achieved; AND
2. • Electrical sub-metering is provided separately for *lighting and separately for power* for 95% of the building; AND