CURRENT NEWS

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SMART METERS: REVOLUTIONISING ENERGY UTILISATION AND ADMINISTRATION

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In the rapidly evolving field of technology, Smart Meters have become an indispensable instrument for the energy industry. By modernizing the methods of measuring, monitoring, and managing electricity usage, these devices benefit consumers, energy providers, and the environment in a number of ways.

TABLE OF CONTENTS

What is a Smart Meter?

A Smart Meter is an electronic device that tracks energy use in real time and gives the data straight to energy suppliers. Smart Meters provide precise and timely data, in contrast to traditional Analogue Meters, which often result in estimated billing and require manual readings. This eliminates the uncertainty associated with estimated billing practices and guarantees that consumers are billed for the precise amount of energy they use. The cost of a Smart Meter is in the range of ₹ 18,000/- ₹20,000/-.

An in-home display (IHD), a user-friendly interface that enables users to monitor their energy usage in real time, is a standard feature of Smart Meters. By understanding their consumption patterns and identifying high-energy appliances, homes and businesses can use this real-time data to make more informed decisions that will lower usage and save energy costs.

Data Collection	Tracks energy consumption at regular intervals throughout the day
Data Transmission	The meter uses a secure wireless network to send the data it has collected to the energy supplier. Usually, mobile networks, power line communication (PLC), or specialized radio frequency (RF) networks are used for this kind of communication
In Home display screen	Provides customers with the ability to track their energy usage patterns and make changes to minimize it
Service Provider Analysis	Once the data is received, the energy provider uses it to create accurate bills, provide insights into customer consumption, and provide customized energy-saving advice. Enhancing energy distribution and optimizing grid management are further uses for this data

Table 1: Processes involved in Smart Meter

Merits of Smart Meters

Beyond precise billing, Smart Meters provide many other advantages. Energy suppliers, customers, and the larger energy system are all impacted by these advantages.

Precise Billing	Customers can feel more confident about their energy bills because Smart Meters make sure that bills are based on actual usage.
Energy Conservation	Real-time feedback on energy consumption from Smart Meters enables users to spot trends and modify their behavior for more energy-efficient use.
Environmental impact	Smart Meters help lower overall energy demand by promoting more economical energy use, this can reduce greenhouse gas emissions. Smart Meters also facilitate the integration of renewable energy sources by supplying data that helps balance supply and demand on the grid.

Grid Management	It makes it possible to more accurately forecast energy consumption, respond to power cuts more quickly, and distribute energy more efficiently.
End user Empowerment	With the ability to regulate their energy use, Smart Meters empower users.

Table 2: Advantages of adopting a Smart Meter

Challenges

Though Smart Meters offer a wide range of advantages, yet some challenges and considerations need to be taken into account.

Privacy	Current Smart Meters have some privacy vulnerabilities. Addressing these issues will preserve customer trust. This requires implementing strong data encryption and stringent privacy regulations.
Cost	Some households, especially those with lower incomes might find the cost of a Smart Meter prohibitive.
Technical Challenges	Issues with software or connectivity can render a Smart Meter ineffective. Concerns such as these need to be quickly addressed by energy suppliers through dependable customer service and maintenance programs.
Capacity building	Consumers need to be educated about the advantages of Smart Meters and how to use them efficiently.

Table 3: Disadvantages of Smart Meters

Future perspectives on Smart Meters

It is anticipated that Smart Meters will become a key component of energy management as the world transitions to a more interconnected and sustainable future. The future of Smart Meters is expected to be shaped by a number of developments and trends.

- **Smart homes**
  - With the help of Smart Meter integration, consumers can automate energy-saving measures based on real-time data, enabling more thorough energy management. A smart home system might, for instance, automatically modify the temperature or humidity levels in response to changes in energy costs or anticipated demand.
- **Renewable energy**
  - Smart Meters can assist in balancing the grid and ensuring that renewable energy is used as efficiently as possible by providing real-time data on energy generation and usage.
- **Data Analytics**
  - Deeper insights into patterns of energy consumption can be obtained through machine learning algorithms. Energy providers can use these insights to create more individualized services, like customized energy-saving recommendations or dynamic pricing schemes that offer incentives to customers who move their energy use to off-peak hours.
- **Standardization**
  - Creation of global guidelines for data security, interoperability, and smart meter design will facilitate the widespread installation of Smart Meters by energy companies.

UNI-DIRECTIONAL METERS OR BI-DIRECTIONAL METERS : WHICH IS PREFERRED FOR NEW SERVICE CONNECTIONS?

KIRUBAKARAN.B

In recent years, the rise of rooftop solar installations has introduced households to a new concept in energy metering: bi-directional meters. These meters are designed to measure not only the electricity consumed from the grid but also any surplus energy generated by rooftop solar panels and exported back to the grid. Traditionally, residential homes are equipped with uni-directional meters. These devices measure how much electricity is consumed from the grid in kilowatt-hours (kWh) and help utility companies (DISCOMs) bill consumers accordingly. However, with the advent of grid-connected solar rooftop systems, households began to generate their own electricity. During times when solar generation exceeds consumption, the surplus electricity is exported back to the grid. Here lies the need for a bi-directional meter, which tracks both the inflow and outflow of electricity, ensuring that consumers are credited for the energy they send back to the grid.

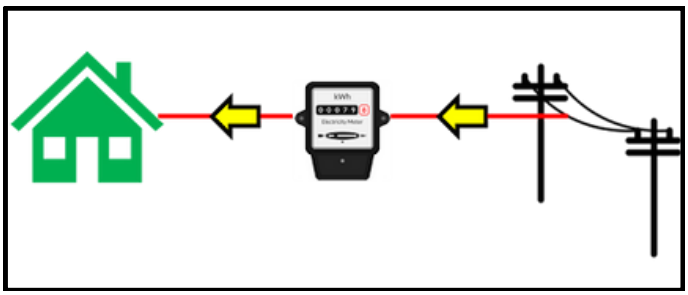


Fig 1 : Uni-directional meter : Working

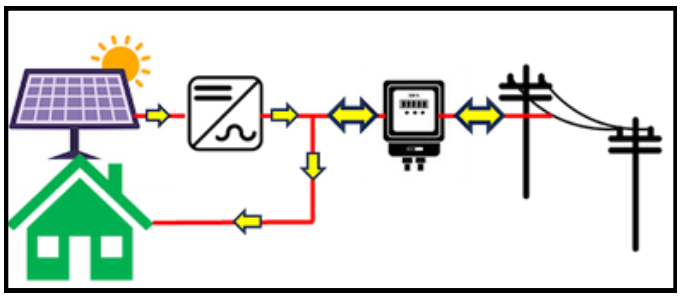


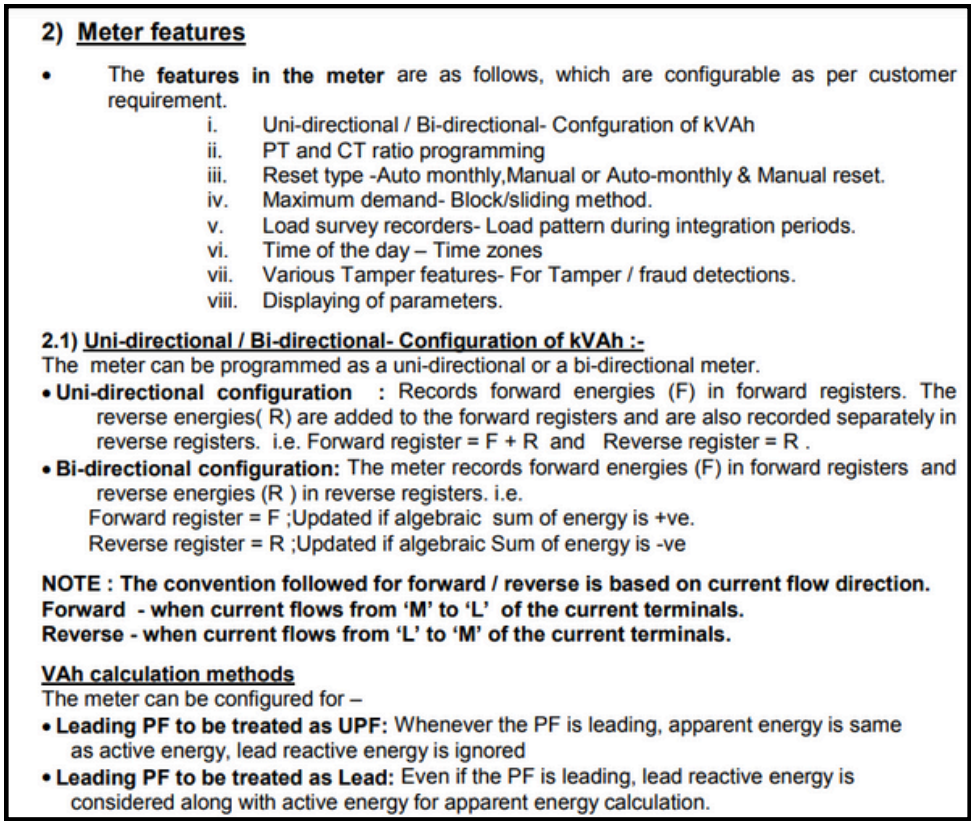
Fig 2 : Bi-directional meter : Working

Without a bi-directional meter, any energy exported to the grid is not recognized as an export; instead, it is mistakenly counted as energy imported from the grid. This leads to consumers paying for the energy they themselves generated—a clear and significant disadvantage. As a result, solar customers are advised to replace their existing uni-directional meters with bi-directional ones, which, in India, can cost around ₹10,000 to ₹ 12,000 compared to the uni-directional ones, which costs around ₹4000 to ₹7000.

Energy consumption in a residence	250 kWh/month
Excess solar power generation exported to grid	100 kWh/month
Electricity tariff	₹ 8/kWh
Energy bill (with bi directional meter)	(250 - 100) kWh x ₹ 8/kWh : ₹ 1200/month
Energy bill (with uni directional meter)	(250 + 100) kWh x ₹ 8/kWh : ₹ 2800/month

Hence if we install grid connected rooftop solar photovoltaic systems, a bi-directional meter is essential.

The difference between unidirectional and bi-directional meters is in the software. Both meters are typically built using the same electronic chips capable of measuring voltage, current, and power in both directions. The key difference is that uni-directional meters are programmed to only display the energy consumed, whereas bi-directional meters are programmed to display both consumption and export. Most of the electronic digital meters are known as "Trivector four quadrant meters" and they are able to measure and register both import and export parameters. But they are configured for displaying only the limited parameters that are essential for the customers.



2) Meter features

- The **features in the meter** are as follows, which are configurable as per customer requirement.
  - i. Uni-directional / Bi-directional- Confguration of kVAh
  - ii. PT and CT ratio programming
  - iii. Reset type -Auto monthly,Manual or Auto-monthly & Manual reset.
  - iv. Maximum demand- Block/sliding method.
  - v. Load survey recorders- Load pattern during integration periods.
  - vi. Time of the day – Time zones
  - vii. Various Tamper features- For Tamper / fraud detections.
  - viii. Displaying of parameters.

2.1) Uni-directional / Bi-directional- Configuration of kVAh :-

The meter can be programmed as a uni-directional or a bi-directional meter.

- **Uni-directional configuration** : Records forward energies (F) in forward registers. The reverse energies(R) are added to the forward registers and are also recorded separately in reverse registers. i.e. Forward register = F + R and Reverse register = R .
- **Bi-directional configuration:** The meter records forward energies (F) in forward registers and reverse energies (R) in reverse registers. i.e.
  Forward register = F ;Updated if algebraic sum of energy is +ve.
  Reverse register = R ;Updated if algebraic Sum of energy is -ve

NOTE : The convention followed for forward / reverse is based on current flow direction.
Forward - when current flows from 'M' to 'L' of the current terminals.
Reverse - when current flows from 'L' to 'M' of the current terminals.

VAh calculation methods

The meter can be configured for –

- **Leading PF to be treated as UPF:** Whenever the PF is leading, apparent energy is same as active energy, lead reactive energy is ignored
- **Leading PF to be treated as Lead:** Even if the PF is leading, lead reactive energy is considered along with active energy for apparent energy calculation.

(Source : L & T User Manual : ER300P Electric Meter)

Fig 3: Specification sheet of the digital meter mentioning possible Uni-directional / Bi-directional configurations

In the "Best practice manual for implementation of state-level rooftop solar photovoltaic programmes in India" released by the MNRE, it recommended DISCOMs to consider installing service connection meters that are configured for bidirectional energy recording as their standard meter for all new service connections and for all meter replacements of existing service connections so that these service connections are solar net metering ready.

This proactive measure ensures that households are equipped to harness the benefits of solar net metering, even if they do not have solar panels installed immediately. By investing in bi-directional meters upfront, consumers can avoid costly retrofits later and position themselves for future energy savings and environmental benefits.

CONSUMER FOCUS

The petitioner lives in a 35-year-old apartment building with a ground floor and three additional floors but no lift. The building shares common amenities like lighting and a water supply motor, which are metered under Tariff 1D. According to the announcement made by Tamil Nadu's Chief Minister in October 2023, common areas in small apartment buildings without a lift (three floors or less containing 10 dwelling units or less), shall be metered under tariff 1E.

Tariff Order No.9 of 2023, dated 31.10.2023, says "Energy charges to be collected at the reduced rate as per Government directive effective form 01.11.2023, category 1E-Common facilities in multi tenements/residential flats of small apartments without lift facility (3 and less than 3 floors with 10 and less than 10 dwelling units), the energy charges in paise per kWh (unit) is 550 i.e Rs.5.50/unit"

To utilise this tariff provision, the petitioner submitted an application to TANGEDCO requesting a tariff change for the common service connection from tariff 1D to tariff 1E. Furthermore, the petitioner has stated that the reduced tariff rate should be applied to the common meter from the date of the announcement, and the excess amount should be refunded.

According to the petitioner's request, TANGEDCO conducted an inspection of the apartment and discovered the following:

- The apartment comprises a ground floor + 3 floors, with each floor containing 4 houses, totalling 16 dwelling units (a dwelling unit is a living space used for domestic purposes). Out of these 16 dwelling units, 4 units were converted into a duplex house. Therefore, the apartment now consists of 12 dwelling units with an additional 2 service connections used for motor and lighting purposes, bringing the total service connections to 14.
- The block has two common service connections, both billed under Tariff 1D, with one connection for lights and the other for motor pumps.

After conducting the site inspection, it was determined that the common meter is being used only for essential services, including lights and water motor pumps. According to the tariff 1E provisions, it is not feasible to change the tariff for the apartment as it has more than 10 service connections, which places it outside the eligible category. Therefore, the request to change the tariff was closed.

Upon receiving an unsatisfactory response from the respondent, the petitioner sought the intervention of the Consumer Grievance Redressal Forum (CGRF) to address the issue. Following a thorough review of the case, the CGRF referenced the provision mentioned in Tariff Order No. 9 of 2023 and ruled that the respondent's inspection report was valid, and thus, the petitioner could not be granted tariff conversion.

The petitioner sought the intervention of the Electricity Ombudsman to address the issue. During the hearing, the petitioner argued that denying the reduced tariff rate based solely on the number of dwelling units was unrealistic. The petitioner contended that apartment dwellers, categorized in the middle-class income group, were unfairly burdened with higher tariff rates despite having fewer common facilities compared to larger apartments. The higher tariff rate in 1D significantly impacted individual expenses when compared to the more favourable tariff 1E.

The Electricity Ombudsman thoroughly investigated the issue and raised the following questions:

Can the petitioner be eligible for the separate tariff category (1E) if the electricity used is for basic amenities such as lighting and motor pumps? Despite the usage of essential amenities like lights and motors for residential purposes, the petitioner's request cannot be granted as the apartment exceeds the limits of the Tariff 1E category. Therefore, the tariff cannot be revised to 1E, and the current tariff classification for the common meter at the petitioner's apartments is deemed appropriate. The Electricity Ombudsman ordered that the petitioner's petition be rejected.

SOURCE: OMBUDSMAN CASE

NEWS FROM TAMIL NADU

Power tariff revised in Tamil Nadu

According to the revised tariff, the increase for domestic consumers is between Rs 5 and Rs 40 for different categories, the release from Tamil Nadu Generation and Distribution Corporation (TANGEDCO) said. Power tariff for different sections of consumers was revised in Tamil Nadu on Monday and this was part of the measures to offset the mounting financial losses incurred over the years, the state-run discom TANGEDCO said. The Tamil Nadu Electricity Regulatory Commission (TNERC) has effected a "small" revision, TANGEDCO said in a release.

According to the revised tariff, the increase for domestic consumers is between Rs 5 and Rs 40 for different categories, the release from Tamil Nadu Generation and Distribution Corporation (TANGEDCO) said.

For 63 lakh domestic consumers using up to 200 units for two months, the increase will be a maximum of Rs five per month, it said. The new tariff for 35 lakh domestic users consuming up to 300 units for two months will be a maximum of Rs 15 per month.

The revised tariff for domestic consumers consuming 400 units and 500 units for two months will be Rs 25 and Rs 40 per month, respectively. For low and high transmission industries, the tariff was being revised to 35 paise per unit, it said.

SOURCE: ENERGYWORLD.COM, 16 JULY2024

NEWS FROM ACROSS THE COUNTRY

Interest subvention likely to push energy efficiency among MSMEs

India could offer support to businesses, including micro, small, and medium enterprises (MSMEs), to deploy energy efficient technologies, people familiar with the development. The power ministry has begun discussions on offering interest subvention under the Assistance in Deploying Energy Efficient Technologies in Industries & Establishment (ADEETIE) Scheme for adoption of energy efficient technologies, people aware of the developement said.

The Bureau of Energy Efficiency's ADEETIE scheme is an online facilitation centre for encouraging and up-scaling energy efficiency financing. "To make India energy efficient and for sustainable development, it is important that the MSME sector adopt the green and efficient manufacturing processes," the Bureau of Energy Efficiency had said earlier. The government is keen to bring down this cost to help the sector adopt more new technologies, which may be expensive.

The scheme is likely to be designed in a manner that gives higher interest subvention for more efficiency and energy saving. Some of such technologies could be automation and control systems for better resource utilization and loss reduction, combustion control systems for boilers, pocket ventilation systems, air-dyeing technology, methane capture technology, among many others. The allocation for interest subvention is likely to be to the tune of ₹2,000 crore, said an official.

"The scheme could be in phases and in the first phase it could be ₹1,000 crore. Based on the response there could be another tranche. It is being discussed," one of the people said. MSMEs need support to adopt new technologies and once those technologies have got scale, the financial support can be withdrawn, another person said. The energy efficient technologies may be linked with certain threshold energy savings. Energy efficiency has been at the forefront of the power as well as renewa .

SOURCE: ECONOIMCTIMES 05 JULY 2024

WORLD NEWS

China building two-thirds of world's wind and solar projects

The amount of wind and solar power under construction in China is now nearly twice as much as the rest of the world combined, a report has found.

Research published on Thursday by Global Energy Monitor (GEM), an NGO, found that China has 180 gigawatts (GW) of utility-scale solar power under construction and 159GW of wind power. That brings the total of wind and solar power under construction to 339GW, well ahead of the 40GW under construction in the US.

The researchers only looked at solar farms with a capacity of 20MW or more, which feed directly into the grid. That means that the total volume of solar power in China could be much higher, as small scale solar farms account for about 40% of China's solar capacity.

The findings underscore China's leading position in global renewable energy production at a time when the US is increasingly worried about Chinese overcapacity and dumping, particularly in the solar industry.The Chinese government is aware of this challenge, naming lithium-ion batteries as one of the "new three" technologies important for creating high-quality growth, along with electric vehicles and solar panels. Last year, $11bn was invested in grid-connected batteries, an increase of 364% on 2022.

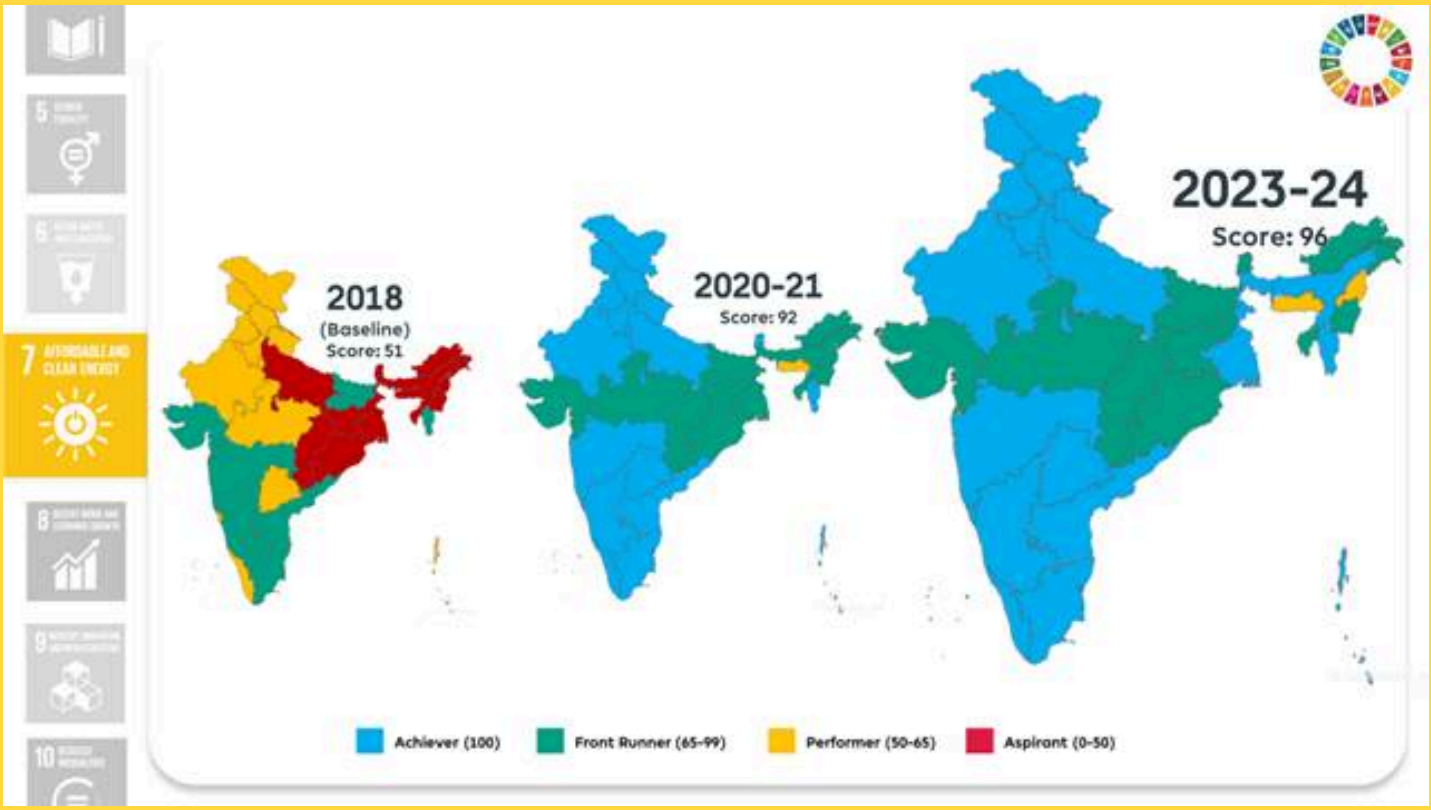
The GEM report also highlighted China's lead in actually building planned renewable energy infrastructure. The 339GW of wind and solar that has reached the construction stage represents one-third of proposed projects, far surpassing the global construction rate of 7%.

SOURCE: THEGUARDIAN, 11 JULY 2024

PUBLICATIONS

- Operational Guidelines for Implementation of Component 'Awareness and Outreach' under PM-Surya Ghar: Muft Bijli Yojana, MNRE, July 2024
- Renewable energy statistics 2024, IRENA, July 2024
- Carbon Accounting for Sustainable Biofuels, IEA, July 2024
- The water, energy, and food security nexus in Asia and the Pacific : The Pacific, UNESCO, July 2024

GOAL 7 - AFFORDABLE AND CLEAN ENERGY



SOURCE: PIB

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