**Solar net meters data Report**

The solar net metering system allows consumers to generate electricity using solar panels and feed surplus energy back to the grid. This report analyzes Southern part of Telangana net metering data to assess regional performance and distribution.

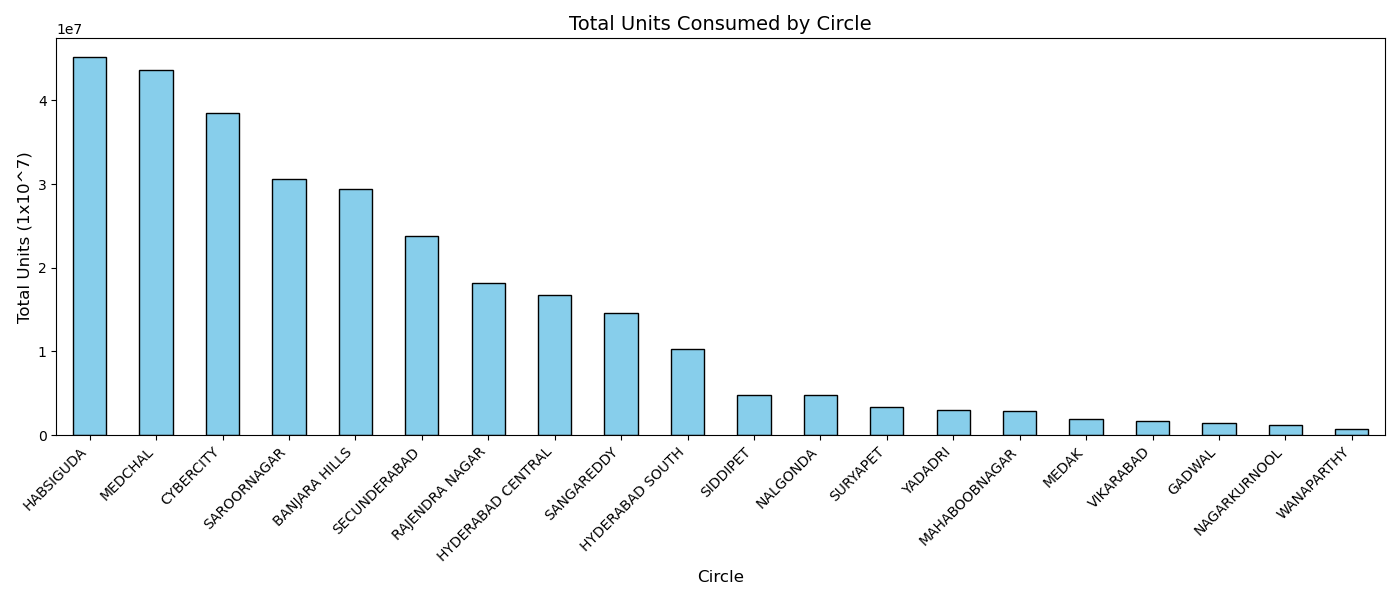
1. **Data Description:**

The dataset consists **records** with the following key columns:

* **Location Information:**
  + circle, division, subdivision, section, area
* **Category Information:**
  + catcode and catdesc (e.g., Domestic, Non-Domestic)
* **Services Data:**
  + totservices (total services), billdservices (billed services)
* **Energy Metrics:**
  + units (energy units consumed/generated)
  + load (in kW; converted from HP for categories 3, 4, and 5)

1. **Analysis & Results:**
   1. **Total Units Consumed by Circle:**

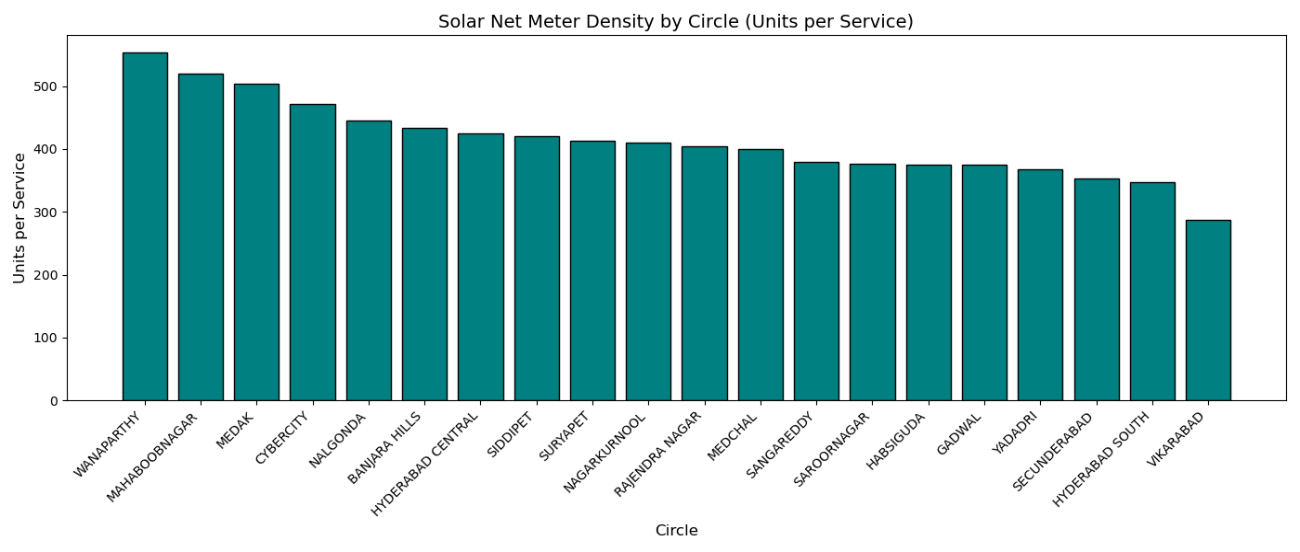
This visualization highlights which circles have the highest (**Habsiguda**) and lowest (**Wanaparthy**) net metering activity, allowing for easy comparison across regions.



* 1. **Units per Service (Density):**

This helps identify regions with more efficient or concentrated solar usage. High values may indicate better adoption or larger installations per connection.

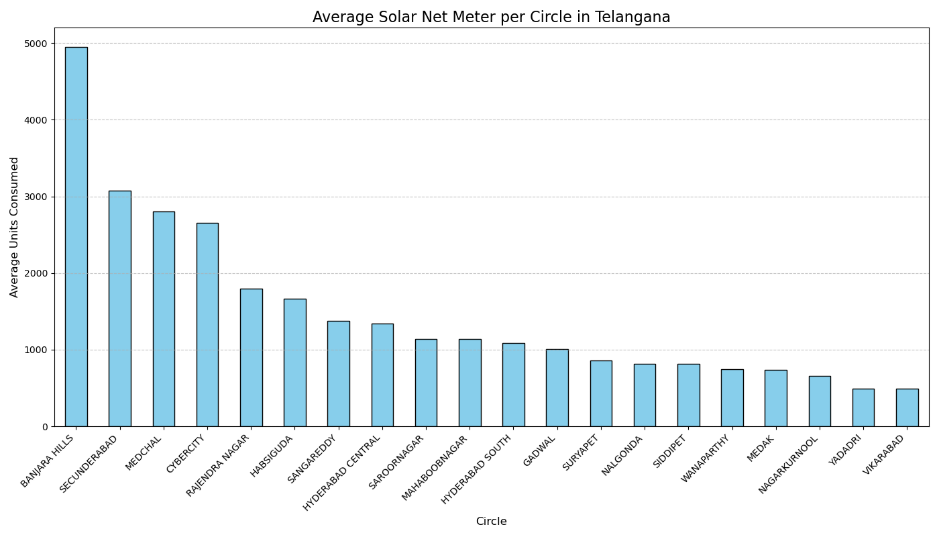
**Wanaparthy** has the **highest units per service**, indicating highly efficient or concentrated solar usage per connection.

**Warangal** shows the **lowest units per service**, suggesting either smaller-scale installations per connection or lower solar adoption in that circle.

**#** From the data on unit consumption per circle and units per service, we observe that while **Habsiguda** has the highest total energy consumption, **Wanaparthy** leads in terms of **units consumed per service**. This suggests that although Wanaparthy consumes less total energy overall, each individual service there tends to use more energy on average.

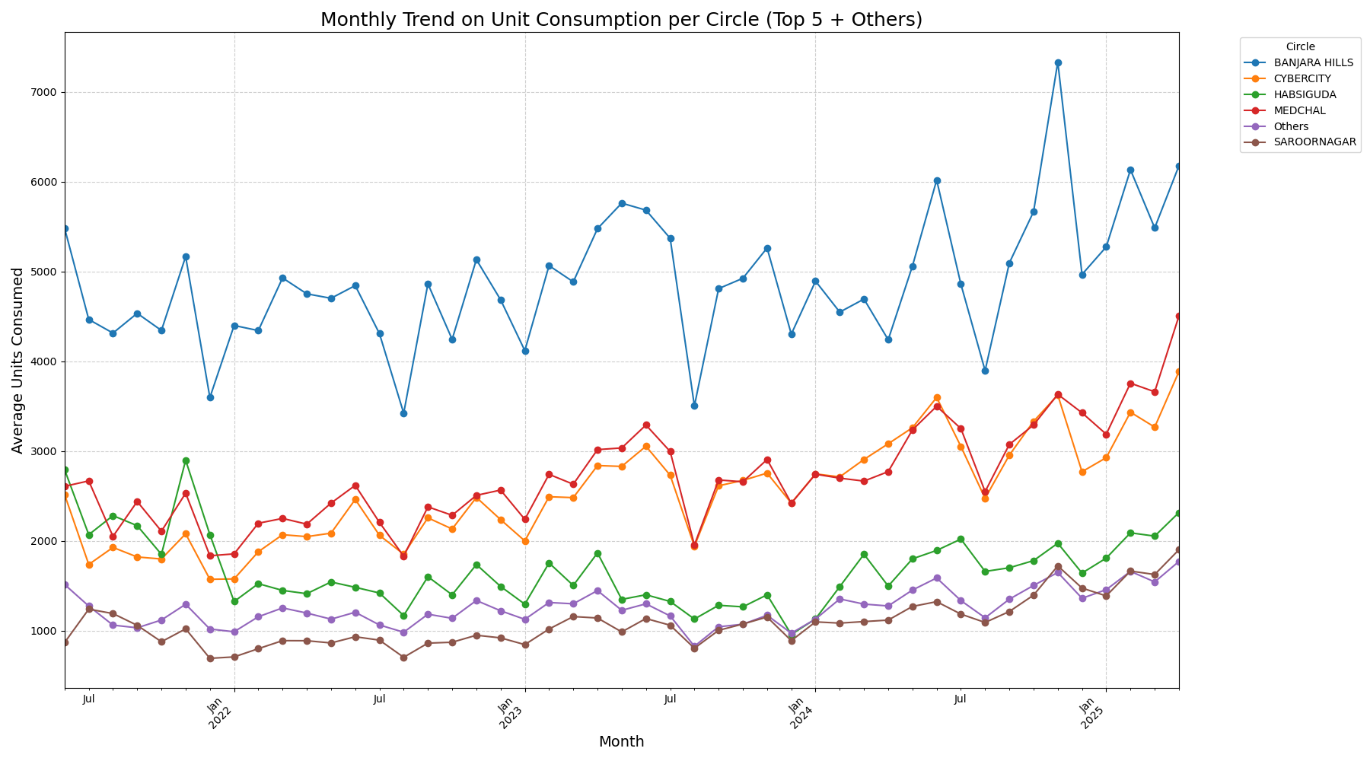
* 1. **Average solar net meter usage** **per Circle:**

The average solar net meter usage per circle provides insight into how effectively solar energy is being utilized across different regions. By calculating this within each circle, we can identify areas with higher solar penetration or more efficient usage patterns. Notably, some circles with lower total consumption still exhibit high average usage per service, indicating focused adoption or larger-scale individual installations. This metric helps highlight regions where solar net metering is having a stronger impact at the consumer level.



* 1. **Monthly Trend on Unit Consumption per Circle:**

The monthly trend of unit consumption across different circles reveals how solar energy usage changes over time. By tracking these patterns, we can identify seasonal fluctuations, growth in adoption, or irregularities in usage. Some circles show a steady increase in consumption, suggesting rising awareness and solar capacity, while others may have more variable trends influenced by weather, policy changes, or local infrastructure. Understanding these monthly patterns helps in forecasting demand and planning future solar investments more effectively.

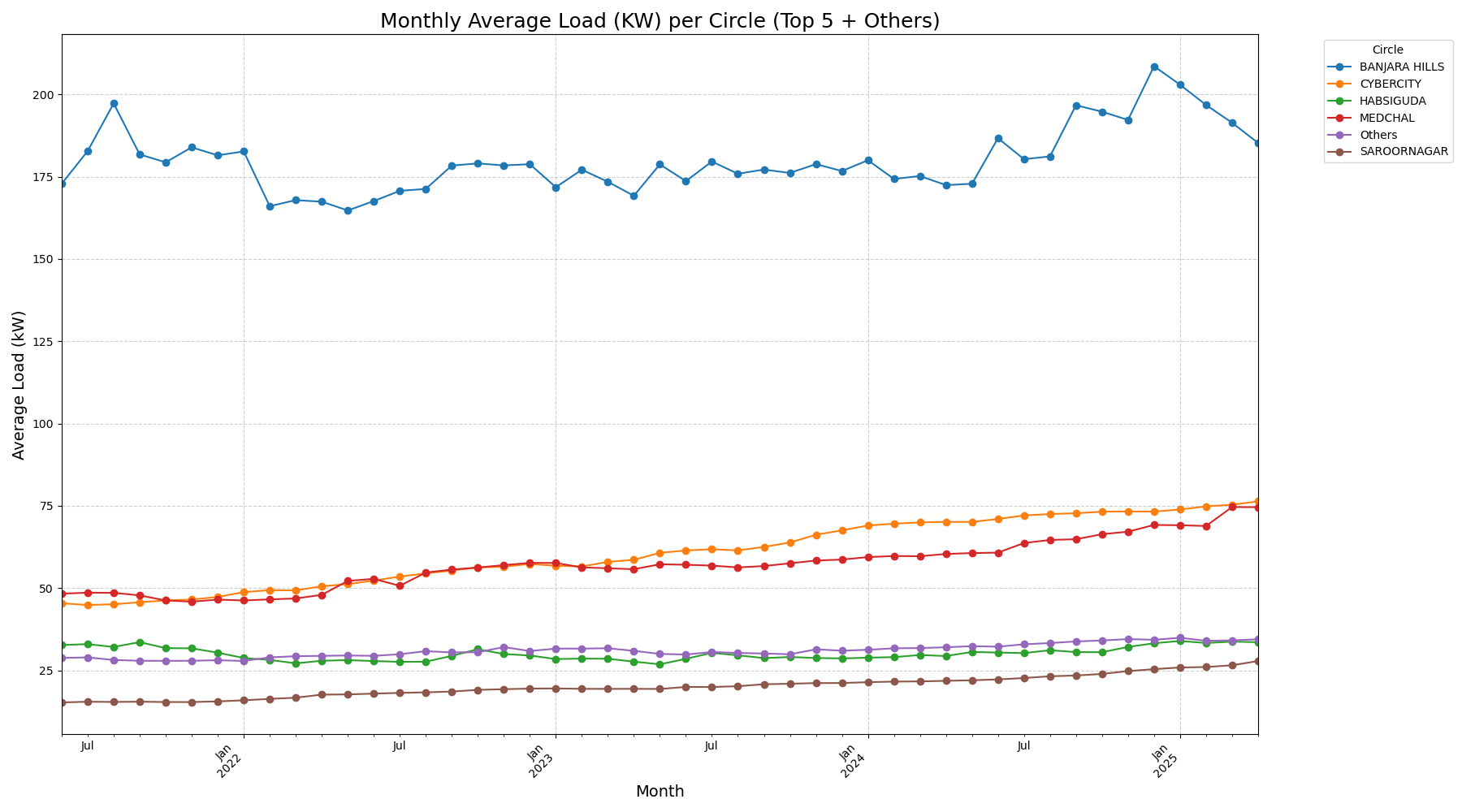


* 1. **Monthly Average Load per Circle:**

The analysis of monthly average load per circle highlights how much electrical load is being supported in different regions.

Among all the circles, **Banjara Hills consistently shows a significantly higher average load**, indicating either a higher number of large-scale solar installations or consumers with greater energy demands. This could be due to a concentration of commercial or high-usage residential services in the area.

Comparing this with other circles helps identify regions with more developed solar infrastructure or greater energy consumption needs.



# 3 How This Data Can Be Used:

* **Policy Planning**: Identify high- and low-performing regions to develop targeted policies that encourage solar adoption where it's lagging.
* **Infrastructure Development**: Support planning for grid upgrades or additional solar infrastructure in areas with high load or rapid growth in usage like Banjara Hills.
* **Subsidy and Incentive Allocation**: Direct government subsidies and incentives toward circles with low solar penetration but high potential based on average service usage.
* **Forecasting and Demand Management**: Use monthly trends to predict future demand, helping utilities manage load and energy supply more efficiently.
* **Performance Benchmarking**: Compare circles to establish benchmarks for efficient solar net meter usage and set realistic targets for others to follow.
* **Outreach and Awareness Campaigns**: Focus awareness programs in circles where units per service are low, indicating under-utilization of solar net metering.
* **Energy Equity Analysis**: Evaluate how equitably solar energy benefits are being distributed among urban and rural circles, guiding inclusive energy access efforts.

# 4 Conclusion:

* The analysis reveals significant regional variation in solar net meter performance across southern Telangana, highlighting differences in energy consumption, service density, and load distribution.
* **Habsiguda** stands out for having the highest total energy consumption, indicating extensive adoption or larger installations, while **Wanaparthy**, despite lower total units, shows the highest **units per service**, suggesting more intensive usage per connection.
* **Banjara Hills** consistently shows a higher average load, likely due to the presence of commercial establishments or high-demand residential areas, pointing to a need for targeted infrastructure support.
* The **monthly trends** in unit consumption across circles suggest steady growth in some areas and seasonal or policy-related fluctuations in others, underscoring the importance of continuous monitoring.
* The **average solar net meter usage per circle** offers a valuable metric for understanding efficiency and potential. Regions with high average usage but low total consumption may benefit from broader outreach and infrastructure expansion.
* Overall, the data-driven insights from this analysis can support more informed decisions around solar policy, investment priorities, and regional planning for sustainable energy growth.

# Links:

**https://github.com/gt-rio/Solar-Net-Meter-Data.git**