SMART METERING INFRASTRUCTURE

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Abstract

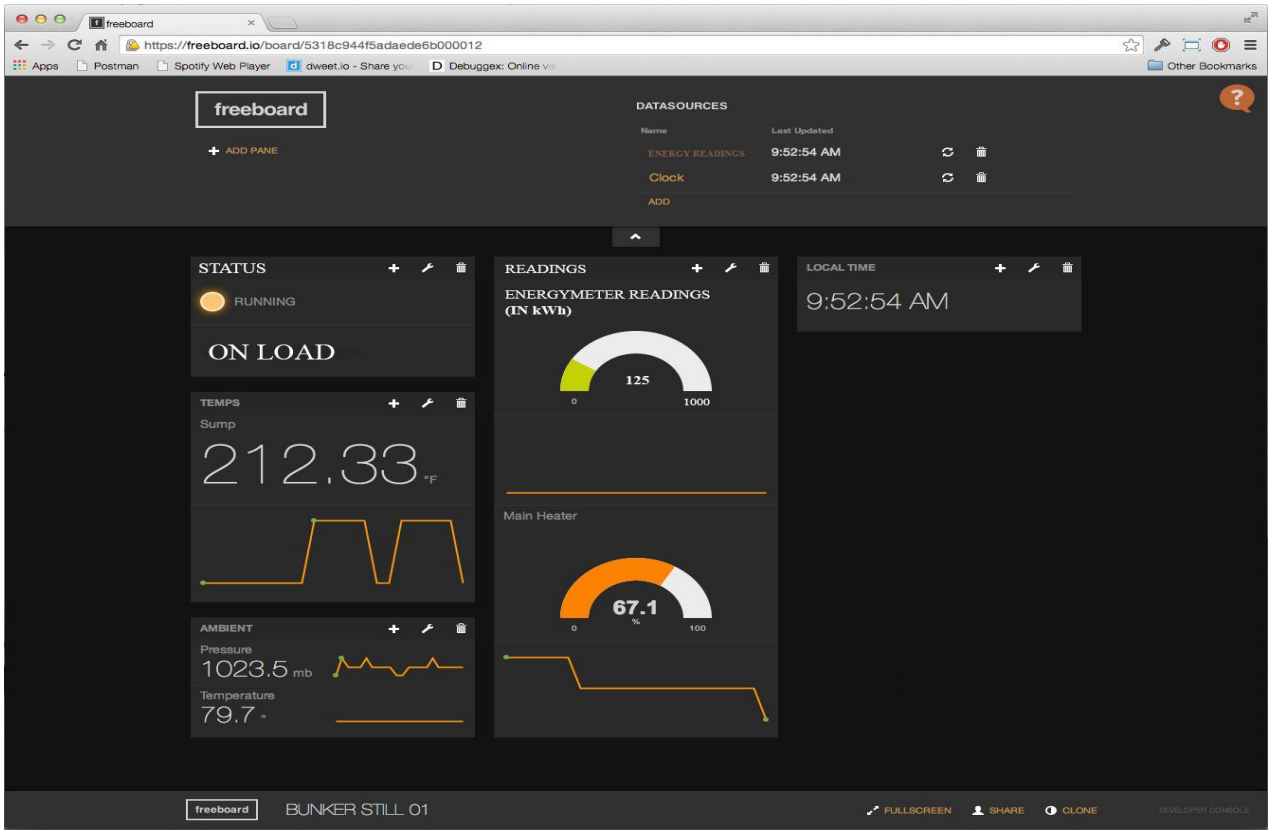
The Smart Metering Infrastructure (SMI) is an integrated system of smart meters, communication networks and data management systems that enables two way communications between utilities and customers. SMI is a replacement for traditional analog devices with computerized smart meters which improves energy management. By this implementation the user receives constantly the usage readings via their smart phones and has consumer friendly load functionality via wireless controllabity. The project introduces an automatic meter reading mechanism which can be implemented by means of Broadband network over a secured 128 bit encrypted channel and control of loads via android application and through websites.

Objective

In our project we would like to facilitate in improved cash flow management in energy utilities and can reduce the problem associated with billing consumer living in isolated area and the deployment of manpower for taking meter readings by implementing various ways using microcontrollers and wireless (Wifi) Modules. SMI creates transparency about energy consumption and incentivise consumers to adjust their behaviour in order to lower their energy consumption and energy costs. By this the user receives the usage, which eliminate the difficulty of approaching the meter constantly. Our project aims to improve energy management and to provide an accurate and economical computerized metering system.

Result

SMI measures the energy (in kWh) using the STPM01 IC and displays in the LED display through the PIC efficiently. The Raspberry Pi displays the energy values and the other sensed values like the temperature remotely in Ethernet and Internet using the open-source servers like openhab and displays in website widgets using dweet.io and freeboard.io. The values are displayed in the smart phones through android application installed in it using the open-source applications of arduino openhab. The loads connected to the supply are controlled via the localhost as well as from the android application successfully by sending signals to the relays connected via RF module . The loads are controlled manually using a touch switch with a feedback which enhances the energy management effectively and the load control using WiFi module were successful and efficient.



Scope

Electricity usage can be monitored directly by K.S.E.B using broadband functionality and the connections can be tamper proof by additional sensors installations. Consumer friendly load functionality can be enhanced via smart phone interfacing by introducing individual rooms controls and complete Home Automation with improves the energy usage most efficient and conservative. Better load forecasting and management can be done in the advancements of SMI for both customers as well as suppliers. Energy Suppliers will be able to improve the accuracy of forecasting their total customer energy demand at different seasons and at various times of day and be able to purchase energy contracts more efficiently.

Conclusion

In the present situation all customers are using manual communication. To reduce the manual efforts, human errors and for increasing the load controllabity wireless also, we need to have some kind of automated system monitoring all the parameters and functioning of the connections between the customer and electricity board. Also by implementing this system we can control the usage of electricity on consumer side to avoid wastage of power. Since there is need to utilize energy in better and efficient way this SMI proves to be a boon in the power sector. In this system to save time of consumer, the consumed energy corresponding price is displayed in their phones and also websites for the consumer benefits. By the implementation of this system overall efficiency in operations of the electric board will improve. An attempt is made in this work to develop a system, which when interfaced with static electronic energy meter is avoided where in complexity of the circuit is reduced and cost also gets reduced of the meter. The consumers and the suppliers can be benefited by using the Smart Metering Infrastructure (SMI). This system is of great advantage for the electricity department as this unit can be utilized effectively for improving the energy management to a very large extent.