# Cloud-based smart metering system

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***Abstract*- The smart grid is the growing energy system wherein the application of information technology, tools and techniques that make the normal electrical grid a E-energy system and it make grid run more efficiently. Cloud based energy system allows the cosumers to control there consumption. The challenges and opportunities of emerging and future smart grids can be addressed by cloud computing. This paper is to relate the smart meters with cloud based technology.**

## 1. INTRODUCTION

Electrical power has become an indispensable part of modern day life. Hebra [1]and NIST [2] styled today's electric power system as a multifaceted system of power generation, transmission, and distribution. With the global economy more reliant on sustainable development of energy, a series of problems, such as energy shortage, electricity blackout and global warming are gaining attention. ABB [3] pointed out that there are tenacious economic as well as environmental urgings for the refurbishment of the conventional power systems, and its replacement with a Smart Electrical Power Grid or simply Smart Grid. A smart grid is an electricity network that uses digital and other advanced technologies to monitor and manage the transport of electricity from all generation sources to meet the varying electricity demands of end-users [4].

Cloud-based energy management solutions require standardized communication between the meter and the server. The open M-Bus standard can produce reliable solution for local communication, and a gateway or data collector can send the information to the web application through the Internet.

## 2. SMART GRID

Smart Grid monitors power use, adapts consumption to match power costs and system load, and integrates new kinds of renewable energy sources with conventional power generating systems. It associates every distributed electricity producer (independent power producer) in the energy market from conventional thermal, hydroelectric and atomic power plants to new kinds of renewable energy systems with each electricity consumer, from industries to residences, and to every load plugged into the electric network. The digitally controlled, self-monitoring and self-healing

Smart Grid provides two-way communication for energy production, transmission and distribution, control and monitoring, supply and demand balancing, etc. with more customer choices.

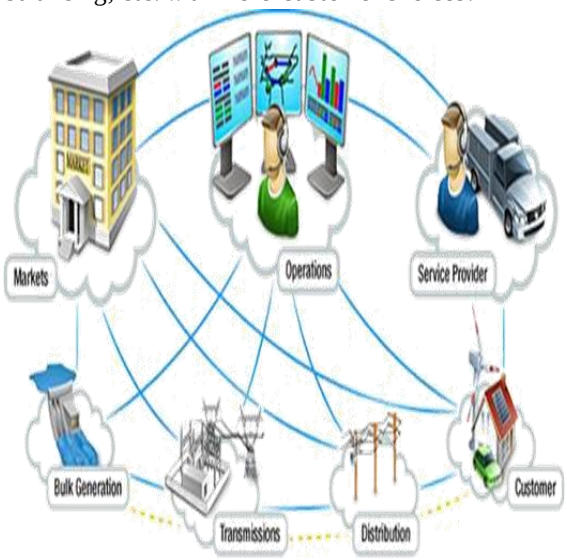


Figure 1. NIST Smart Grid Framework.

## 3. CLOUD COMPUTING

Cloud computing - a model that enables convenient, ubiquitous, on-demand access to a pool of computing resources (e.g. servers, networks, applications, storage, and services) that are configurable. With minimal management effort, resources can be provisioned and released seamlessly [5]. NIST's

visual model of cloud computing definition is shown in figure 2. It delivers infrastructure, platform, and software to customers as subscription-based services in a pay-as-you-go model.

The following main functions are required for cloud-based energy management service implementations:

- collecting, storing, displaying real-time data of the smart meters;
- ensuring adaptability of newly developed smart meters to the system;
- determining consumption and costs for different periods;
- near real-time energy management, and control of energy using devices;
- simple and rapid addition of smart meters, users, built-in functions;
- the manual remote control of energy consumption devices;
- safe and reliable realization of the above functions.

## 4. CLOUD-BASED ENERGY MANAGEMENT SERVICES IN THE WORLD

In the United Kingdom the number of smart electricand gas meters both in households and smaller companieswas raised to more than 52 million, according to agovernment regulation in 2011. The so-called "UK Smart Energy Cloud" platform was developed by IBM and Cable&Wireless Worldwide, which is an intelligent solution to realize the smart meter program. Energy consumption of the consumers can be monitored by the system, while at the same time, the collected and stored data is forwarded to energy companies, which makes exact billing possible [6]. In Hungary the implementation of an experimental smart metering program was initiated by an information system also developed by IBM .

## 5. ADVANTAGES

(A).create a safere facility

Does your facility have critical heating or cooling needs? Would an unplanned outage or fluctuation in energy use be costly or even hazardous? Would a gas leak or power surge be dangerous?With cloud-based monitoring, you'd be notified immediately in any of these scenarios. Not only will you be able to detect and prevent common dangers, but you'll also be notified immediately if your usage deviates from the norm in any way. Subtle deviations can be used to predict device failure, which can save thousands of dollars in maintenance costs. When a device begins to use more energy, perhaps an internal failure is requiring this increased draw. As a result, predictive maintenance becomes possible.

(B).Protect our product

In the case of hospitals, food storage and agricultural facilities, or pharmaceutical warehouses, keeping products within specific temperature ranges is vital to their preservation. In instances of tissue storage in hospitals, for example, unplanned deviation from specified temperatures can literally cost lives. In other cases, such as food storage, temperature deviations can lead to massive waste and crippling costs.Tracking temperature and other variables, like pressure, airflow, and moisture, from moment to moment, can prevent these dangers and potential waste.

(C).Track usage data and work smarter.

When you're able to track the energy usage of specific subsystems, you can gain real insight into your usage patterns. You see where the drains are and where the inefficiencies are. For instance, with monitoring, you'll be able to closely align your output to your usage and build smarter automation systems for devices like lights, climate control systems, and more. Devices or systems that are creating energy drains can be identified and, if necessary, altered. Collecting and analyzing usage data over time is what will allow you to create streamlined, ultra-efficient systems.

(D).Boost your bottom line.

When you have the ability to do predictive maintenance, decrease waste, enhance efficiency and eliminate safety hazards, you'll see substantial gains in profit over time.

(E). Easy reporting to regulatory agencies.

Because you have electronic logs of energy usage and system data, making reports to regulatory agencies is as easy as clicking a button.Greater connectivity offers benefits across every aspect of facility management. Is ensuring compliance crucial

to your organization's functioning? Are you interested in learning more about how cloud monitoring can help you maintain compliance, efficiency, and safety in your facility.

## 6. CONCLUSION

In this survey, we provided an overview of existing works integrating cloud computing in the existing smart grid architecture, in order to have a reliable and efficient energy distribution. Different aspects of energy management in the smart grid were discussed. We identified some important technical issues and proposed several future research directions on cloud-based smart grid. Using cloud computing applications, energy management techniques in smart grid can be evaluated within the cloud, instead of between the end user's devices. This architecture gives more memory and storage to evaluate computing mechanism for energy management, and cost-optimization. We proposed a new highlight on cost-effective cloud based power dispatching for smart grid applications. From this surveyed work, we can see the integration of cloud computing in smart grid is envisioned to be useful for evolving the smart grid architecture further in terms of considerationds such as monitoring cost, computing, and power management.

## REFERENCES

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