classmate
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SMART METER

example of a smart meter based on open smart grid protocol (OSGP) in use in europe that has the ability to reduce load, disconnect-reconnect remotely, and interface to gas and water meters.

newer retrofitted u.s. domestic digital electricity meter Elster REX with 900MHz mesh network topology for automatic meter reading and energy/time of use metering.

each local mesh networked smart meter has a hub such as this elster a3 type a30, which interfaces 900MHz smart meters to the metering automation server via landline.

a very old rusted box housing a smart meter as found near a circle k supermarket along the main road in south Bali near Gianyar.

a smart meter is an electronic device that records consumption of electric energy and communicates the information to the electricity supplier for monitoring and billing. Smart meters typically record energy hourly or more frequently, and report at least twice daily. Smart meters typically record energy hourly or more frequently, and report at least Smart meters enable two-way communication between the meter and the central system. Such an advanced metering infrastructure (AMI) differes from automatic meter reading (AMR) in that it enables two-way communication between the meter

and the supplier. communications from the meter to the network may be wireless, or via fixed wired connections such as power line carrier (PLC). wireless communication options in common use include cellular communications (which can be expensive), WiFi (readily available), wireless ad hoc networks over WiFi, wireless mesh networks, low power long range wireless (LoRa), ZigBee (low power, low datarate wireless), and Wi-SUN (smart utility networks).

the term Smart Meter often refers to an electricity meter, but it may also mean a device measuring natural gas or water consumption.

similar meters, usually referred to as interval or time-of-use meters, have existed for years, but "smart meters" usually involve real-time or near real-time sensors, power outage notification, power quality monitoring, these additional features are more than simple automated meter reading (AMR). they are similar in many respects to advanced metering infrastructure (AMI) meters. interval and time-of-use meters historically have been installed to measure commercial and industrial customers, but may not have automatic reading.

research by the UK consumer group, showed that as many as one in three confuse smart meters with energy monitors, also known as in-home display monitors. the roll-out of

smart meters is claimed to be one strategy of saving energy. while energy suppliers in the UK could save around £300 million a year from their introduction, benefit to users of electricity depends on their using the information to change their pattern of energy use. for example, smart meters may facilitate taking advantage of lower off-peak tariffs, and selling electricity back to the grid with net metering.

the installed base of smart meters in Europe at the end of 2008 was about 39 million units, according to analyst firm Berg insight. Globally, Pike Research found that smart meters shipments were 17.4 million units for the first quarter of 2011. visiongain determined that the value of the global smart meter market would reach us$7 billion in 2012.

smart meters may be part of a smart grid, but do not themselves constitute a smart grid.

> BRIEF HISTORY

in 1972 theodore paraskevakos, while working with boeing in huntsville, alabama, developed a sensor monitoring system that used digital transmission for security, fire and medical alarm systems, as well as meter reading capabilities. this technology was a spin-off from the automatic telephone line identification system, known as Caller ID.

in 1974, paraskevakos was awarded a us patent for this technology. in 1977, he launched metretek, inc which developed and produced the first fully automated, commercially available remote meter reading and load management system. since this system was developed pre-internet, Metretek utilized the IBM series 1 mini-computer. for this approach paraskevakos and Metretek were awarded multiple patents.

PURPOSE

since the inception of electricity deregulation and market-driven pricing throughout the world, utilities have been looking for a means to match consumption with generation. non-smart electrical and gas meters only measure total consumption, providing no information of when the energy was consumed. smart meters provide away of measuring this site-specific information, allowing utility companies to charge different prices for consumption according to the time of day and the season.

Utility companies say that smart metering offers potential benefits to householders. these include a) an end to estimated bills, which are a major source of complaints for many customers. b) a tool to help consumers better manage their energy purchases - stating that smart meters with a display outside their homes could provide up-to-date information on gas and electricity consumption, and in

doing so help people to manage their energy use and reduce their energy bills. electricity pricing usually peaks at certain predictable times of the days and the season. in particular, if generation is constrained, prices can rise, if power from other jurisdictions or more costly generation is brought online. proponents assert that billing customers at a higher rate for peak time encourages customers to adjust their consumption habits to be more responsive to market prices and assert further, that regulatory and market design agencies hope these "price signals" could delay the construction of additional generation or atleast the purchase of energy from higher priced sources, thereby controlling the steady and rapid increase of electricity prices there are some concerns, however, that low-income and vulnerable consumers may not benefit from intraday time-of-use tariffs.

an academic study based on existing trials showed that homeowners' electricity consumption on average is reduced by approximately 3-5%.

the ability to connect/disconnect service and read meter consumption remotely are major labor savings for the utility and can cause large layoffs of meter readers.

CRITICISM