What exactly should North American utilities look for and what questions should they ask when comparing smart meter choices? It’s all in the details, which are outlined for you here.

SAFETY FIRST

1. Can the service switch be left in an indeterminate state?
   Look for a meter with a service switch that cannot be left in an indeterminate state — a system that identifies the status of the switch and a sensor that can report whether load-side voltage is present. If a customer uses a backup generator during a major power outage and the switch suddenly closes in the independently energized circuit, the result may be irreparable physical damage.

2. Does it have a surface-mounted load break switch?
   Smart meters that come equipped with a surface-mounted button for operating the load break switch may seem like a great idea. It’s best, however, if your meters don’t have them. Why? Meters are often located in hard-to-access places, and requiring your customers to interact with the meter is unnecessary and potentially unsafe.

3. Do the blades adjust?
   Some meters incorporate blades that are capable of slightly adjusting their alignment. This is a useful, but not always standard feature that makes them better able to make a solid connection with a less-than-perfect socket. Meters that fail to make a strong connection could generate excess heat.

4. Are the connections secure?
   Secure connections are essential to safe operation over an extended period of time. Open the meters and compare the way in which its components are secured, especially the strength of the connections in the primary current path.

ACCURACY AND RELIABILITY

5. What is the failure rate?
   Most smart meters have a failure rate of approximately 0.5%. Some — subject to a more rigorous verification strategy — have surpassed this, achieving a failure rate of 0.2% and, in some cases, as low as 0.2%. Though the difference may seem small, the fewer failures the better.

6. Is the resolution precise?
   Resolution also varies, from as low as 8 bits to as much as 21. Resolution is important to measurement precision, which is the ability to very accurately measure over and over again — to achieve accuracy reliably. With utility automation (especially self-healing), precision is vital to the ongoing health of the electric system.

7. Does it have a supercapacitor?
   Some smart meters use batteries to keep time across a power outage. The use of a supercapacitor can either prolong battery life or reduce the need for a battery in a meter. Some smart meter designs don’t require a battery. Find out what your chosen meter uses and why.

8. Does it store data in the meter, not the communications module?
   The meter is still the cash register. Your meter shouldn’t sacrifice any measurement accuracy or precision for the sake of achieving convenience. Choose one that performs all functions and stores the data in the meter itself, not in the communications module. Meters that conduct these functions internally are more accurate and much easier to audit.

9. Does it identify and report anomalies?
   Unfortunately, anomalies sometimes occur in intervals, due to power outages and clock adjustments, for example. Choose a meter that is able to identify and report these anomalies so that the data can be correctly interpreted. Accuracy and billing verification will both be enhanced.

DEPENDABLE PERFORMANCE

10. Is the cover opaque?
    Opaque plastic covers or housings significantly reduce thermal gain and internal heating, improving accuracy and extending the life of the meter. This is an important design feature you don’t want to be without.

11. Does it exceed ANSI standards?
    While all meters used in the U.S. must meet the ANSI standard, only some exceed it. Look for a meter that’s been subject to additional engineering and manufacturing tests designed to guarantee greater accuracy and reliability.

12. What are the warranties and return rates?
    Meter failure rates tend to follow a “bathtub” curve — that is, they’re highest immediately following deployment and as the end of their normal life expectancy approaches. Ask about a meter’s longevity, and for added assurance, check the manufacturer’s warranty and return rates.

13. What is the technology lifecycle and firmware field upgradable?
    Choose a meter provider that won’t force obsolescence. Technology is changing rapidly, you want a meter that can be readily and remotely modified or upgraded. Look for a vendor whose newer firmware for metrology and communications is downloadable to current hardware.

14. How many openings does it have in the base (and how small are they)?
    Look for a meter that has fewer or smaller openings in the base. Openings can let in water or insects that may cause damage to the meter.

MINIMAL ENVIRONMENTAL IMPACT

15. Does it snap together and have the recycling symbol?
    For minimal environmental impact, choose meters that snap together.

They’re easier to disassemble and therefore easier to recycle or repurpose.

16. Does the manufacturer use sustainable manufacturing?
    By using common components across the product line, some meter manufacturers exhaust surplus materials from one product by employing them in another, different product. Besides reducing waste, this eliminates the need to invest in additional designs and materials, thus diminishing the cost of production and the price of the meter.

17. How much energy does it use?
    Some manufacturers have also managed to decrease the amount of energy their meters need to function properly. Thus, they’ve also lowered the meter’s internal temperature (improving safety and reliability), reduced parasitic load (lowering operating costs) and helped slash the number of power plants required to fuel the smart grid.

BEYOND TRADITIONAL METERING

The uses and associated value of smart meters are growing, including applications extending beyond traditional revenue billing. To support these emerging applications, the following features are important.

18. Does it have accurate and flexible voltage monitoring?
    Meters must measure voltage accurately and need to be able to detect changes using programmable thresholds with event logging and notification. Voltage profiling stored in the meter’s non-volatile memory is also essential for post-event analysis.

19. Does it have flexible communications?
    Meters need communication flexibility to allow transport of appropriate messages based on the application. They should also offer the ability to be remotely and securely reprogrammed, especially for communications capabilities and protocols.

Does it have robust security?

Meters and metering communications modules must support robust data security capabilities, including encryption and as well as segregation of differing types of data traffic. This is increasingly important as distribution applications more tightly converge with traditional revenue metering.

ALL METERS ARE NOT CREATED EQUAL

As the source of most of the data, the measurement interface with your customer and the part of the system where you’ll realize the biggest financial investment, meters are the most critical component of your AMI deployment. Buyer beware. And be smart.

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