Center for Government Innovation

Office of the Washington State Auditor
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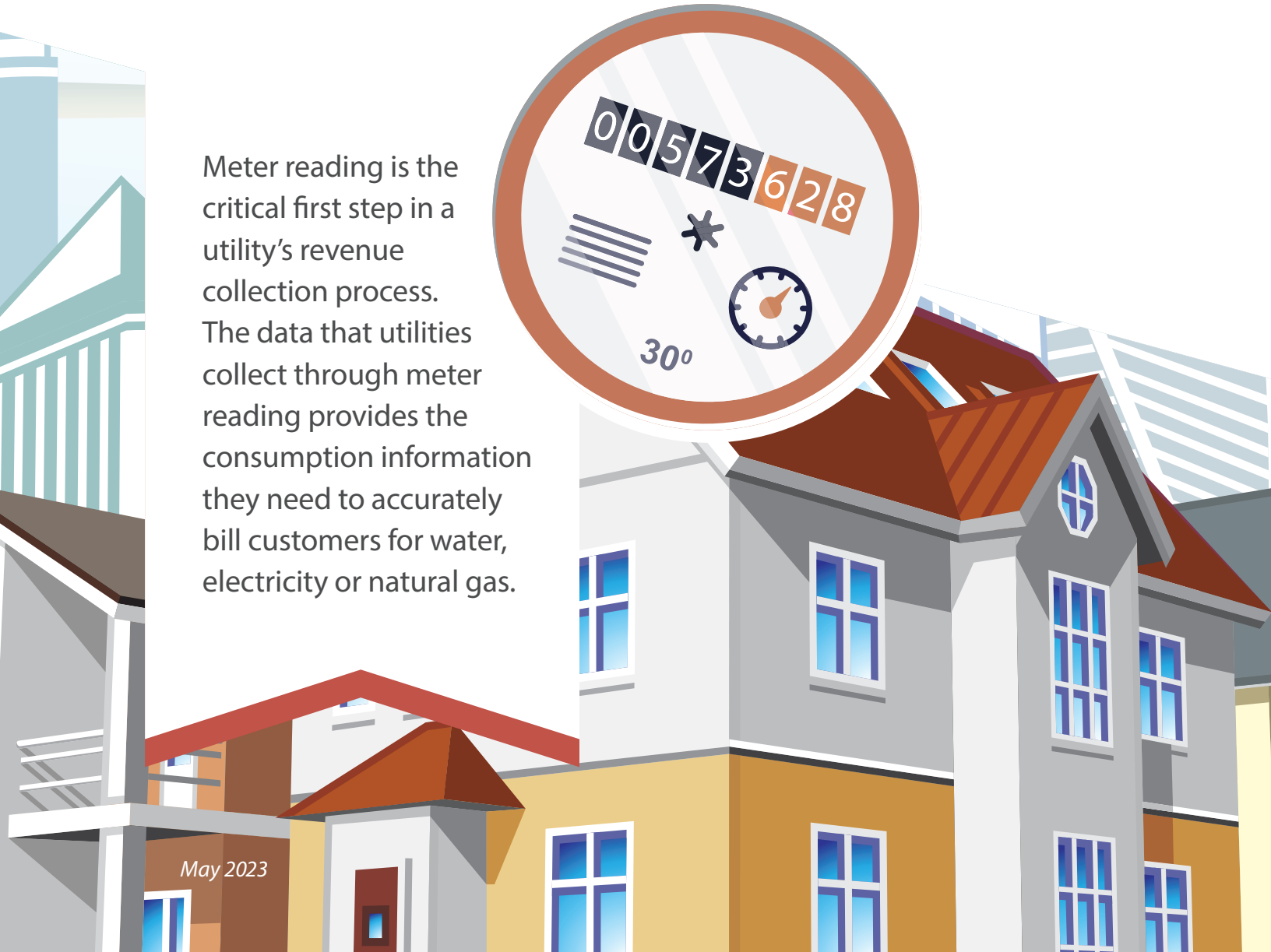
Best practices to ensure accurate billing from meter-read data



Meter reading is the critical first step in a utility's revenue collection process. The data that utilities collect through meter reading provides the consumption information they need to accurately bill customers for water, electricity or natural gas.

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Gathering accurate, complete meter data is essential not only for collecting the appropriate amount of revenue to operate the utility, but also for ensuring a positive customer experience and public image. Customers are more likely to pay on time, without complaint, if they have confidence in the accuracy of meter-read data and trust your data collection process.

Utilities use different methods to collect this data, and each has its unique risks and benefits. The most common methods for collecting meter-read data are:

- **Manual** – Utility meter readers visit property addresses and collect data by inspecting the meter and recording the information in a written log or a hand-held device.
- **Touch reading** – Meter readers touch a wand to a sensor on the meter, which automatically transfers the read to the hand-held device.
- **Automated meter reading (AMR)** – Meter readers walk or drive by each property address to collect the reads using a data receiver, which receives the reads from the meter's built-in radio transmitter.
- **Advanced metering infrastructure (AMI)** – Meter-read data is communicated wirelessly to a central data collection point, eliminating the need for meter readers to visit the property address. AMI uses a combination of radio and wireless technology to transmit meter reads at predefined intervals (e.g., hourly).

More and more utilities are looking at meter automation so they can collect accurate, real-time meter reads with minimal resources, as well as provide continuous usage information to their customers. While AMR and AMI have many benefits, not every utility is ready for this transition and will continue to rely on manual meter reading for the foreseeable future. And for those utilities that have transitioned to automation, manual meter reading may still be necessary to satisfy customers who opt out of receiving an automated meter.

If full automation is not feasible, consider strategically automating certain meters with AMR or AMI. You might choose to automate high-cost meters or those where real-time data is needed to accommodate a certain pricing structure. High-cost meters are those that are difficult to access, in unsafe locations, or associated with high-turnover properties.

Regardless of the type of meters your utility has deployed, this guidance will help you understand and apply best practices over meter-read data, as well as improve your policies and internal controls. Some best practices will apply to any of the four meter-read data collection methods, while others may be specific to only one method.

Best practices for collecting data

If you are using hand-held devices to collect data:

- **Optimize hand-held device technology.** Hand-held devices typically come with built-in controls, such as alerts to prevent reads outside of an expected range of consumption (as long as you have established reasonable and seasonally adjusted usage parameters). You should understand the control options your devices have and how to use them and ensure staff cannot circumvent controls.

- **Restrict meter readers' access to customers' usage history.** Meter readers should not be able to see a customer's past usage. This helps ensure that a dishonest meter reader does not fabricate a reading based on a customer's usage history.

- **Electronically import meter-read data into your billing system from hand-held devices.** This practice reduces the risk of manual keying errors, and it is a more efficient way to transfer the data into your billing system.

If your meter readers follow prescribed routes:

- **Rotate routes periodically.** This reduces the risk that a dishonest meter reader can falsify readings by remembering a customer's usage patterns. However, this is more of a risk with manual systems than AMR. If you rotate routes, you also collect better data for performance metrics that may alert you to potential problems. If you only have one meter reader, then you should ensure adequate monitoring.

- **Reassess routes:** Continuously assess the design of routes to reduce your costs and gain efficiencies, especially if you have undergone periods of growth.

- **Review the daily route results.** Supervisors should review daily route reports for red flags, such as excessive skipped reads or other unusual trends or gaps in customer usage, and sign off on results. If using automated data collection methods, the daily route report should show the method used to collect the reading so supervisors can monitor for manual reads.

No matter your collection method, meter-read data must be complete, accurate, and safeguarded from unauthorized changes or manipulation.

- **Limit access to meter-read data.** Restrict employee access to input or edit meter-read data to only those who need it to perform their job duties.
- **Configure your billing system to expect reads for all accounts, including inactive ones or those on the no-bill list.** You need this data so you can detect if the property's status changes (e.g., the building is no longer vacant), if a leak begins, or unauthorized use occurs.
- **Add newly installed meters to billing software promptly.** Staff should add new meters promptly to the billing system so that it expects a read, and the system can alert staff if there are issues.
- **Periodically review your high- and low-usage parameters to ensure they are effective.** You should use effective parameters so you can identify accounts with possible meter-read data issues that require investigation. Consider using a percentage (of usage) so all types of accounts have an equal opportunity of being flagged and investigated. Also, adjust parameters to reflect seasonal changes in usage patterns. You should be able to demonstrate that the parameters selected are effective and appropriate, and you should resist adjusting them to accommodate a certain workload.
- **Identify and promptly address any data issues.** Someone should review meter-read data for unexpected or unusual activity and follow up before you bill the account. For example, someone should visit the property to verify zero consumption before the billings are generated. Take time to explore your system to learn the types of exception reporting available to monitor meter-read data. Management should establish a frequency for the initial review, as well as the timeline for revisiting certain types of exceptions. Staff should document the results for any cleared exceptions in the customer's account history.

Look for missed reads, high or low usage, repeating usage, duplicate readings, readings for vacant or inactive accounts, zero-consumption reads (the meter could have stopped working or the property may just be vacant), as well as negative consumption (the meter could have an equipment problem, but there are other causes).

- **Keep an audit trail of changes.** Ensure your billing system (and potentially other meter-read databases) is keeping an ongoing record of any subsequent changes made to the initial meter reads.

Ensure you charge customers for all services rendered

- **Segregate duties for the customer set-up process.** One staff member should set up new customers, and a second employee should audit the set-up process. This can detect errors in customer rate class or the multipliers used, which can later affect billing.

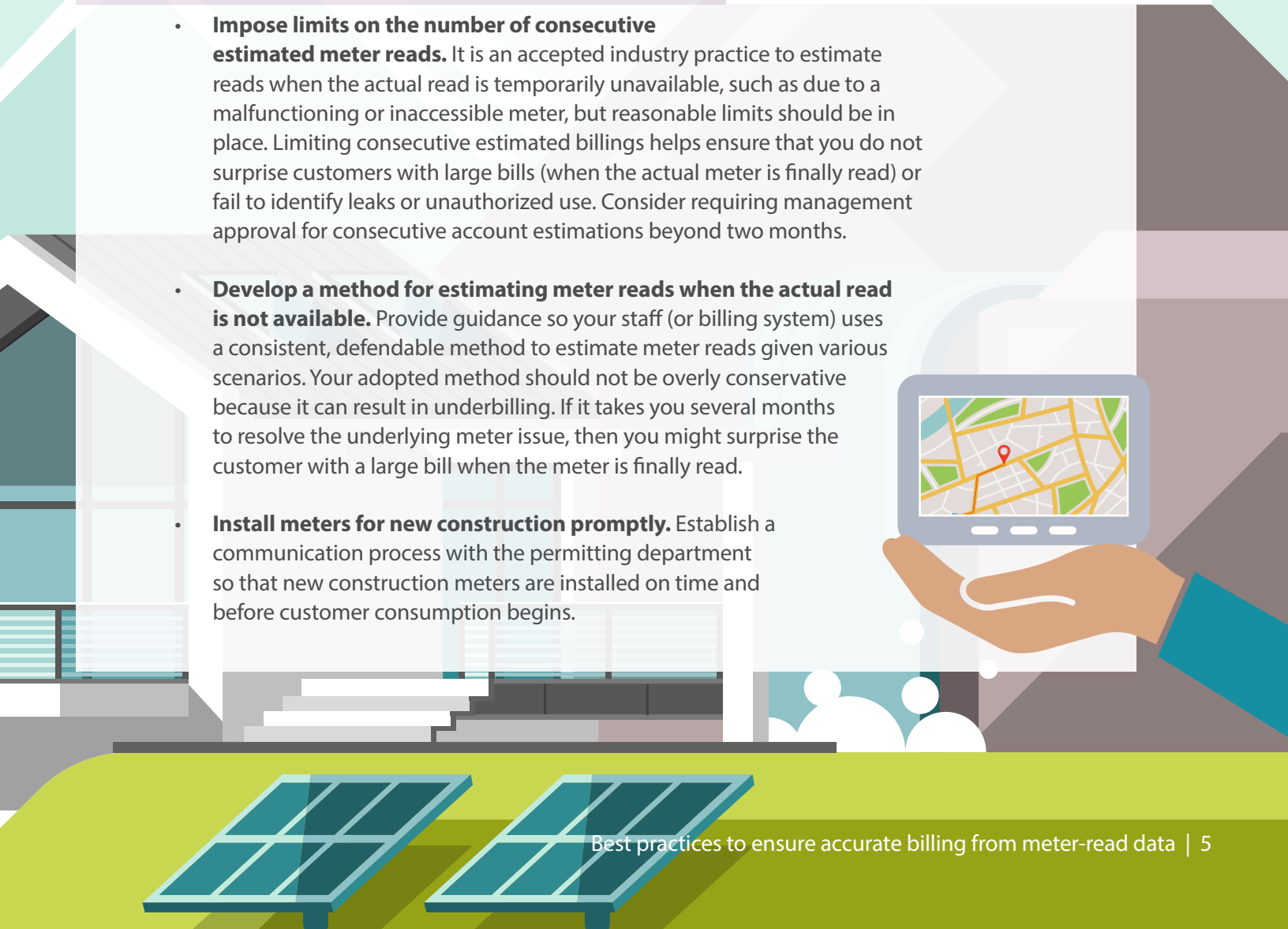
- **Implement a mapping process to identify unmetered properties.** All properties should map to a meter, including multi-residential properties, properties with more than one street address, and severed properties (a property that has been divided). Compare utility accounts to a separate property address database that is complete and accurate. Follow up on differences because even one unmetered property can result in significant revenue loss.

Your organization may have a separate property database (e.g., for garbage service) that you can use to identify unmetered properties. Alternatively, you might work with another government that maintains property databases, like the county assessor.

- **Impose limits on the number of consecutive estimated meter reads.** It is an accepted industry practice to estimate reads when the actual read is temporarily unavailable, such as due to a malfunctioning or inaccessible meter, but reasonable limits should be in place. Limiting consecutive estimated billings helps ensure that you do not surprise customers with large bills (when the actual meter is finally read) or fail to identify leaks or unauthorized use. Consider requiring management approval for consecutive account estimations beyond two months.

- **Develop a method for estimating meter reads when the actual read is not available.** Provide guidance so your staff (or billing system) uses a consistent, defendable method to estimate meter reads given various scenarios. Your adopted method should not be overly conservative because it can result in underbilling. If it takes you several months to resolve the underlying meter issue, then you might surprise the customer with a large bill when the meter is finally read.

- **Install meters for new construction promptly.** Establish a communication process with the permitting department so that new construction meters are installed on time and before customer consumption begins.



- **Review the no-bill list.** Verify all accounts on the no-bill list at least quarterly to ensure this designation continues to be appropriate. If your government owns the property, make sure that other (non-utility) departmental users or private lessees are charged for their consumption. For example, a city water utility should be billing parks and recreation for its water use.

- **Impose consequences for customers who block meter access.** Some customers may refuse to cooperate with the utility's staff who require access to install, inspect or repair a meter. Utilities should have escalating consequences—from administrative fees to a disconnect notice—for customers who prevent their staff from accessing meters.

- **Be prepared if you allow net metering.** If you allow customers to generate some or all of their own electricity and connect to the grid, make sure that your billing system is configured to do this accurately, or assign someone to watch the billing closely throughout the year.

Washington state law prohibits resources restricted for specific uses, such as utilities, from benefitting other funds without true and full value in return (RCW 43.09.210). This means that the utility is prohibited from providing free services to other funds or departments within a local government.

Manage and track the meter-reading equipment

- **Track meters from cradle to grave.** You need to account for every meter the utility purchases. Your records should accurately reflect whether the meter is in inventory, has been installed, has been transferred or moved from its original installation site, or retired.

- **Reconcile operational meter records to those maintained in the billing system.** If your system is not integrated, periodically reconcile the meter listings—as per operational records—to the those reflected in the billing system. Follow up on differences.

- **Use a work order system, preferably an electronic one, for a complete and accurate view of the meter maintenance process.** A work order system enables communication among departments, including those that inspect meters, repair meters, and rely on meter-read data to bill customers. The system should track repair requests and provide a well-documented maintenance

An electronic work order system offers increased transparency and communication so that all affected departments can view and monitor open repair tickets, and so that customer service can communicate with customers. Management can also quickly identify a repair backlog and assign additional resources to resolve it.

history for each meter. Make sure you have a procedure for creating, reviewing and closing work orders.

- **Set expectations for documenting meter maintenance.** Utility management should ensure that maintenance staff clearly and consistently document their work. That way, the utility will have adequate records detailing each meter's maintenance history that anyone can understand.

- **Adopt a formal testing program using best practices.** A formal testing program can help a utility assess its meters' accuracy and maintenance needs. You should include residential meters in your program, and plan on more frequent testing of high-consumption meters. Staff should document all test results so the utility can track each meter's history and useful life cycle. The American Water Works Association and the American National Standards Institute establish meter reading testing standards for water and electric, respectively.

- **Plan for physical inspections if using drive-by AMR or AMI.** If you use AMR or AMI, staff will not physically observe your meters on a regular basis, so you need to plan for periodic inspections. That way, you can assess maintenance needs, protect meters from becoming inaccessible, identify environmental hazards, and detect tampering (data analytics could also be used to detect tampering).

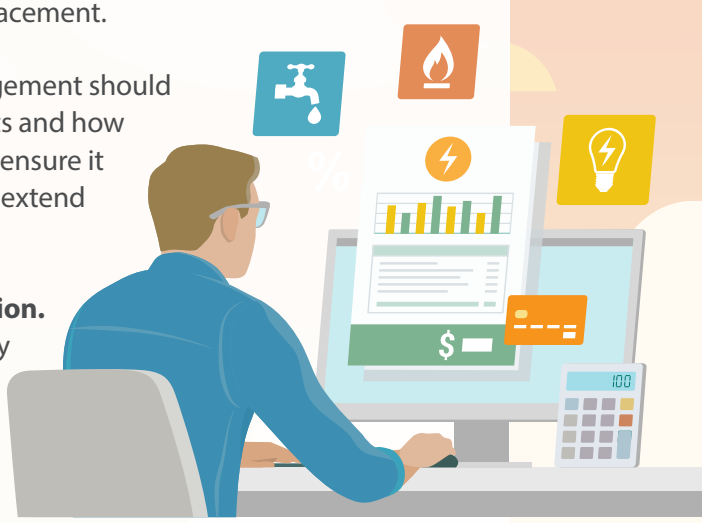
- **Upgrade/replace meter-reading equipment when it is time.** Prioritize replacement when equipment is not performing as expected or nearing the end of its lifecycle. Some meters slow down as they age and become less accurate. New equipment can increase accuracy, prevent lost revenue, and provide other benefits with new technology and features.

Actively monitor and manage the meter-reading system

- **Examine subsequent changes made to meter reads.** Management should monitor changes to the initial meter-read data to ensure they are valid and appropriate.

- **Assess meter maintenance and testing.** Management should monitor the maintenance backlog, as maintenance delays can lead to prolonged

estimated billing practices. Management should also monitor that meter testing is performed appropriately and consistently, and use the results to inform decisions about meter performance and replacement.



- **Monitor estimated meter reads.** Every month, management should review an exception report that lists estimated accounts and how long they have been estimated. Monitor the activity to ensure it meets expectations and does not suddenly increase or extend beyond reasonable timeframes.

- **Monitor no-reads or manual reads if using automation.** Determine if the no-read or manual read is due to faulty equipment or other issues, and promptly address the problems.

- **Evaluate underlying causes of billing errors.** Take the time to understand what occurred to cause a billing error. Then, review your internal controls and processes to determine if adjustments should be made to prevent it from happening again.

- **Evaluate an aging report of meters.** Management should periodically monitor the age and type of meters installed to assess if replacements are needed.

- **Use metrics to measure system performance.** Management should design and review performance-based metrics per route, by meter reader, and for the utility as a whole. Develop thresholds and goals for the metrics used so management can evaluate the results effectively. Potential measures include:

  - Completion rate (number of meters read per route)
  - Percent of errors (such as the number of implausible meter reads created and changed)
  - Number of skipped reads, estimated reads, and/or rereads
  - Read time per route, excluding breaks and lunches
  - Cost per read
  - Meter reads per full-time employee

- No-read rate (especially after implementing AMR or AMI)
- Number of customer complaints, disputed billings, and revised billings (due to a reading error or customer-initiated meter investigation)
- Number of account adjustments due to leaks or billing errors
- Average number of days to process a service/work order (for meter maintenance or repair)
- Number of service/work orders outstanding (for meter maintenance or repair)

Additional resources

- Accounts receivable internal controls checklist – This detailed checklist can help you assess your government's internal controls over billing and collections processes.
- Accounts receivable guide – This comprehensive resource can help you develop policies and identify best practices and other ways to improve your billing and collections process.

For assistance

This resource was developed by the Center for Government Innovation at the Office of the Washington State Auditor.

Please send questions, comments, or suggestions to Center@sao.wa.gov.

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