



ADVANCED METERING INFRASTRUCTURE 2.0: THE NEXT STEP FORWARD FOR ENERGY AND UTILITIES

Abstract

The next generation of advanced metering infrastructure (AMI) has arrived, making it possible for energy and utility companies to transform their operations utilizing broader communication to edge devices, real-time data processing, robust integration, cybersecurity protocols, and more.

This paper looks at the value proposition of AMI 2.0 for the energy and utility industry. It outlines the expected efficiency improvements from AMI 2.0 and explains why utility companies must consider upgrading their metering systems.

A woman and a man are shown in profile, looking intently at a computer monitor. The woman is in the foreground, wearing glasses and a red top. The man is behind her, also wearing glasses. The monitor displays a complex interface with various colored bars and data points. The background is dark, suggesting a control room or office environment.

Introduction

Converging pressures are driving significant change across the utility industry. The accelerated adoption of electric vehicles and distributed energy resources (DERs) coupled with increasing customer expectations and a growing need for reliable clean energy require greater visibility and better data at the grid edge.

The first waves of advanced metering have proved to be indispensable in eliminating a significant amount of manual work around energy usage and meter reading through automation.

Today, advanced metering infrastructure (AMI) has further evolved considerably on the back of emerging technologies. AMI 2.0 represents the next generation of advanced metering systems that improve upon the capabilities of the previous AMI deployment. It encompasses a comprehensive network of smart meters, communication networks, and data management systems that facilitate two-way communication as well as edge intelligence. These enable the advanced insights required to manage an increasingly dynamic electric grid.

Evolution of AMI 1.0 to 2.0

Advanced metering infrastructure has undergone significant evolution from its initial iteration – AMI 1.0 – to its current form, i.e., AMI 2.0. The new generation of AMI incorporates advancements in technology and a deeper understanding of utility needs.

AMI 1.0 was introduced in the early 2000s. At the time, it was a groundbreaking development that replaced traditional meter reading with automated systems. It enabled communication so utility companies could remotely collect data from meters. This innovation reduced the need for manual readings, thereby improving efficiency and accuracy. However, AMI 1.0 had limitations in terms of data granularity and real-time monitoring capabilities.

In contrast, AMI 2.0 is a leap forward in functionality and performance. It incorporates two-way communication and computing capabilities that enable data collection as well

as real-time interaction between utility organizations and customers. This bidirectional communication supports advanced features such as demand response, load management, outage prediction, load disaggregation, and advanced analytics.

AMI 2.0 leverages advancements in data analytics and integrates with other smart grid components. This gives utility companies deeper insights into energy consumption patterns so they can optimize their operations more effectively. Additionally, AMI 2.0 meters are more sophisticated and can support other value-adding services such as prepaid metering, energy efficiency, and integration with home automation systems.

While AMI 1.0 was a foundational step in modernizing the utility industry, AMI 2.0 represents a more mature and capable technology that offers enhanced functionality and benefits for both utility companies and their consumers.



Why Should Utility Companies Implement AMI 2.0?

AMI 2.0 offers a compelling value proposition. It provides utility companies with a range of innovative features that are vital to cater to customer demand for transparency as well as the business need to make operations more effective and responsive. Some of the cutting-edge features enabled through AMI 2.0 are:



Data accuracy and granularity

AMI 2.0 enhances the precision and granularity of data collection, allowing utilities to gather more accurate information about energy consumption patterns. This data can be leveraged for better load forecasting, asset management, and grid optimization.



Renewable energy integration

Utility companies are increasingly adding renewable energy sources to their grid. AMI 2.0 supports the monitoring and management of distributed energy resources. It aids in the efficient integration of solar panels, wind turbines, and other renewable technologies into the grid.



Advanced communication capabilities

The upgrade in AMI 2.0 enhances communication by enabling real-time interactions between utilities and end-users. It facilitates quicker response to outages, improves demand response programs, and increases customer engagement.



Cybersecurity mechanisms

AMI 2.0 incorporates enhanced cybersecurity measures to protect the integrity and confidentiality of data transmitted within the smart grid. Robust security protocols are crucial in safeguarding against potential cyber threats.



Integration with innovative technologies

AMI 2.0 integrates with emerging technologies such as the Internet of Things (IoT) and advanced analytics. This enables sophisticated data processing to identify patterns, anomalies, and optimization opportunities, contributing to higher operational efficiency.



Regulatory compliance and reporting

AMI 2.0 helps utility companies meet regulatory requirements by providing detailed and accurate data for compliance reporting. This transparency also aids in demonstrating the environmental and efficiency improvements achieved through smart grid initiatives.



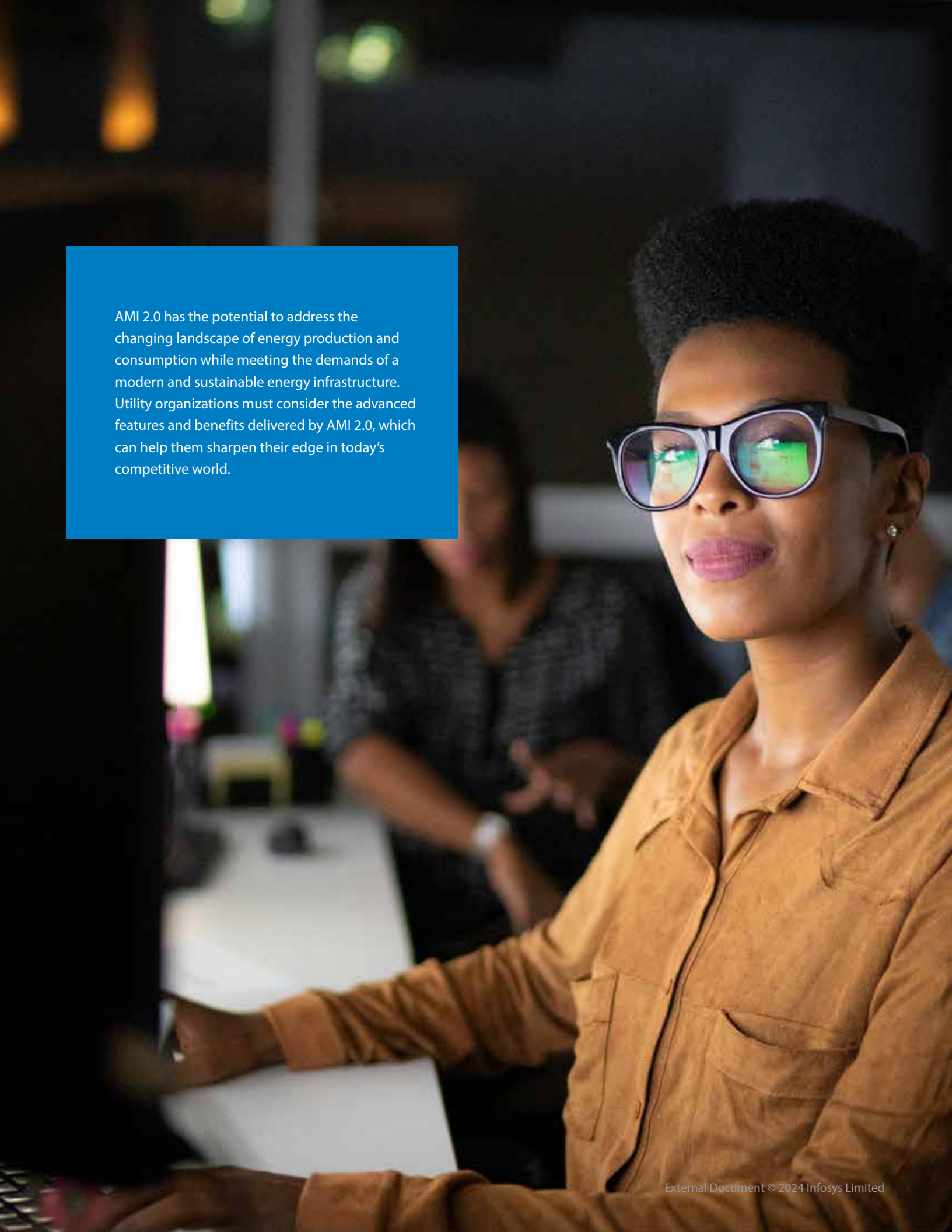
Visibility into asset performance

AMI 2.0 increases the resilience of the electrical grid by providing utility organizations with better visibility into the performance of their assets. This enables proactive maintenance, rapid response to faults, and overall improved grid reliability.



Transparency for customers

By providing consumers with real-time data about their energy usage, AMI 2.0 empowers customers to make informed decisions regarding their energy consumption. This can lead to increased energy efficiency and reduced costs for end-users.

A woman with short dark hair, wearing glasses and a brown jacket, is looking at a computer monitor. The background is a blurred office environment with other people and warm lighting. A blue text box is overlaid on the left side of the image.

AMI 2.0 has the potential to address the changing landscape of energy production and consumption while meeting the demands of a modern and sustainable energy infrastructure. Utility organizations must consider the advanced features and benefits delivered by AMI 2.0, which can help them sharpen their edge in today's competitive world.

Benefits of AMI 2.0

Utility organizations that invest in AMI 2.0 can be assured of the following benefits:



Improved operational efficiency

AMI 2.0 provides more granular data, allowing utilities to better understand usage patterns, detect leaks and outages faster, and optimize energy distribution, leading to operational cost savings.



Support for distributed energy sources

AMI 2.0 can facilitate the integration of renewable energy sources and provide real-time data on energy production and consumption, helping utilities balance supply and demand more effectively.



Enhanced customer experience

With AMI 2.0, utilities can offer real-time usage data to customers, enabling them to make more informed decisions about their energy consumption, leading to potential energy savings, new offerings, and improved customer satisfaction.



Improved infrastructure planning

The rich data provided by AMI 2.0 can be leveraged for advanced analytics such as predictive maintenance and load forecasting, helping utilities optimize their operations, infrastructure planning, and capital investment strategies.



Increased grid resilience

AMI 2.0 can enable utilities to quickly identify and respond to grid issues such as overloads or equipment failures, improving overall grid resilience and reliability.



Enhanced regulatory compliance

AMI 2.0 can help utilities comply with regulatory requirements such as providing accurate billing and usage information, which can lead to fewer disputes and penalties.

Investing in AMI 2.0 can help energy and utility companies modernize their infrastructure, improve operational efficiency, and enhance the overall customer experience, positioning them for future growth and sustainability.

Conclusion

AMI 2.0 incorporates advanced technologies and enhancements to address evolving challenges and opportunities in the utility industry. It plays a pivotal role in the evolution of the utility sector by enabling advanced two-way communication, accurate and high-resolution data collection, visibility into asset performance, and integration with new technologies and renewable energy sources. By leveraging advanced technologies such as IoT, automation, and data analytics, AMI 2.0 helps energy and utility organizations get better insights, optimize their assets, empower their customers, and improve operational efficiency.



About the Authors

Matthew Lenzini

Senior Principal - Business Consulting | Infosys Limited

Matt Lenzini is an experienced leader, with a 25+ year career bringing solutions to market and leading cutting-edge technology initiatives for Fortune 500 and mid-market utility companies. Matt has been a trusted advisor, helping organizations navigate change and has managed large scale, cross functional transformation programs across the industry.

Marc Kane

Principal - Business Consulting | Infosys Limited

Mr. Kane is a Principal at Infosys Consulting. With 19 years of experience serving as a Digital Strategy & Transformation Leader to Energy & Utility clients across the North and South America, Marc provides Domain knowledge across the E&U Value Chain ranging from Performance Improvement and Technology Optimization to Value Realization and Regulatory Affairs.

For more information, contact askus@infosys.com



© 2024 Infosys Limited, Bengaluru, India. All Rights Reserved. Infosys believes the information in this document is accurate as of its publication date; such information is subject to change without notice. Infosys acknowledges the proprietary rights of other companies to the trademarks, product names and such other intellectual property rights mentioned in this document. Except as expressly permitted, neither this documentation nor any part of it may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, printing, photocopying, recording or otherwise, without the prior permission of Infosys Limited and/ or any named intellectual property rights holders under this document.