AMPOTECH
Intelligence Driven Energy Solutions

# Energy Efficiency in the AI Age

How AI is Reshaping Energy Management, Sustainability, and Business Operations




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# Executive Summary

Artificial Intelligence is rapidly transforming industries, changing how software is built, how businesses operate, and how energy is consumed. While AI creates unprecedented opportunities for automation and optimization, it also introduces a new challenge: rising energy demand from data centers, computing infrastructure, and digital services.

For organizations focused on sustainability and operational efficiency, the question is no longer whether AI will impact energy consumption but how to leverage AI to reduce energy costs while managing its growing energy footprint.

This whitepaper explores how AI is disrupting traditional software models, why integrated hardware-software-service solutions are becoming essential, and how organizations can use AI-powered energy management to achieve measurable business outcomes.

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# 01 The AI Revolution is Disrupting SaaS

## The End of Traditional SaaS Advantages

For more than a decade, SaaS companies created value through software workflows and user interfaces.

Today, generative AI is rapidly commoditizing many software functions. Tasks such as reporting, analytics, workflow creation, and customer support can increasingly be performed directly by AI models. As a result, attention and investment are shifting from pure software businesses toward companies that combine software with proprietary data, hardware, operational expertise, and real-world deployment capabilities.

## Key Trends from Market Research



### AI Agents Replacing Manual Workflows

Generative AI is transforming enterprise operations.

**88%**
of organizations use generative AI in at least one business function, up from 78% in early 2024.
**Source: McKinsey**

**75%**
of knowledge workers already us AI at work, with 46% adopting AI tools within the past six months.
**Source: Microsoft**



### Faster Software Development Cycles

AI is accelerating software development and reducing repetitive work.

**56% faster**
Developers using GitHub Copilot complete coding tasks up to 56% faster
**Source: GitHub Copilot**

**30-40%**
reduce repetitive work, including coding, testing, debugging, and documentation,




### Lower Barriers to Entry for SaaS Competitors

AI-powered platforms are enabling fasster and easier software development.

**92%**
of companies plan to increase AI investment over the next three years.
**Source: McKinsey**



### Growing Importance of Proprietary Operational Data

Competitive advantage is increasingly driven by proprietary data, workflows, and domain expertise




### Increasing Investment in Physical AI & Infrastructure

Investment in AI infrastructure, chips, robotics, and data centers is accelerating globally.

**US$100 billion**
Global AI venture investment surpassed US$100 billion in 2024
**Source: PitchBook & CB Insights**

**US$3 trillion**
NVIDIA's market valuation reached US$3 trillion, reflecting growing investor confidence in AI infra.
**Source: NVIDIA**

## Implications for Energy Management

AI is creating new opportunities for energy efficiency while increasing global electricity demand. The IEA estimates that scaling existing AI-enabled interventions could save around **300 TWh of electricity in buildings globally**, while NREL research estimates that advanced sensors and controls could deliver approximately **29% energy savings across the commercial building sector.**

**300 TWH**
of electricity in buildings globally (IEA)

**29%**
energy savings across the commercial building sector (NREL)

However, AI software alone cannot deliver these outcomes. Effective energy optimization depends on continuous access to real-world data, connected equipment, and the ability to translate intelligence into operational action



## Ampotech's Approach and Vision

At Ampotech, we believe the future of energy management lies in connecting physical infrastructure with intelligent software, AmpoCloud, and services, we aim to bridge the gap between AI capabilities and real-world energy performance.




Our vision is to move energy management beyond monitoring toward intelligent, connected, and increasingly autonomous operations, enabling businesses to optimize energy use, improve operational efficiency, and decarbonisation

# 02 The Integrated Advantage

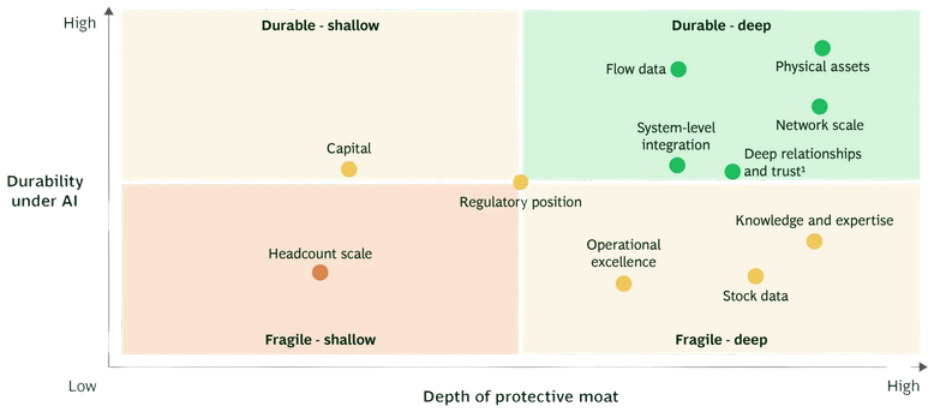
## Why Hardware, Software, and Services Drive Real Energy Impact

### The Changing Nature of Competitive Advantage

As AI becomes increasingly accessible, technology alone is no longer a sustainable source of competitive advantage. The real differentiators are shifting toward assets and capabilities that are harder to replicate: physical infrastructure, continuous operational data, system-level integration, and trusted customer relationships.

### What Creates a Durable Advantage?

Research by **BCG** highlights several sources of competitive advantage that remain resilient in the AI era:




Source: BCG analysis.
¹Including brand trust.

### The New Technology Stack

Organizations increasingly realize that AI models alone cannot deliver energy saving Successful energy optimization requires three integrated layers:




### Why Integration Matters

- Without hardware, AI lacks reliable real-world data.
- Without software, operational data lacks intelligence.
- Without services, insights rarely translate into action.

By integrating all three layers, organizations can move beyond isolated AI applications toward measurable energy performance improvements and stronger operational outcomes.

> The competitive advantage is not simply adopting AI. It is building an integrated system that connects physical assets, operational intelligence, and real-world execution.

# 03 Practical Applications and Real-World Impact

The value of AI in energy management is realized when digital intelligence is connected to physical assets and supported by the expertise required to deploy and optimize them. The following examples illustrate how hardware, software, and services work together across building energy efficiency and distributed energy resources.

## 3.1 AI-Enabled Building Energy Management



## 3.2 Solar, Battery Storage, and Distributed Energy Resources



# 3.1 AI-Enabled Building Energy Management

Many commercial buildings in Southeast Asia either lack a building management system (BMS) or operate with systems offering limited functionality. AI-powered energy management solutions can help bridge this gap by enabling smarter building operations, optimizing HVAC performance, and improving energy efficiency across existing infrastructure.

These solutions demonstrate the potential of AI to move beyond energy monitoring toward predictive and automated control.

### Verified Impact from Industry Examples

**15.8%**
HVAC electricity reduction

**Up to 35%**
Verified energy savings

However, AI software alone cannot optimize a physical building. Effective deployment still requires sensors, meters, HVAC equipment, controls, connectivity, and high-quality operational data. It also requires engineering expertise to integrate these components with each building's existing infrastructure and operating conditions.

This creates an opportunity in markets where BMS infrastructure is limited. Ampotech combines metering and connectivity hardware with cloud-based software and engineering expertise to deploy AI-enabled energy management even in facilities without an existing BMS.




By connecting physical assets to a continuous stream of operational data, Ampotech can provide visibility into energy consumption and enable applications such as waste identification, anomaly detection, and HVAC optimization. The combination of hardware, software, and domain expertise creates a scalable foundation for delivering measurable energy and operational improvements.

# 3.2 Solar, Battery Storage, and Distributed Energy Resources

The rapid deployment of solar PV, battery energy storage systems (BESS), EVs, and other distributed energy resources is creating increasingly complex energy environments. Managing these assets effectively requires more than standalone software for individual devices.

Modern distributed energy systems must coordinate multiple assets, including generation, storage, metering, and loads. AI can improve forecasting, anomaly detection, dispatch optimization, and automated control, but these capabilities depend on reliable real-time data and connectivity to the underlying equipment.

As distributed energy resources become more interconnected, integrated energy management platforms are increasingly important. They enable coordinated monitoring, data analysis, and control across multiple energy assets, helping organizations manage system performance more efficiently.

The challenge is that AI models cannot operate effectively without access to the physical systems they are intended to optimize. Deployments require edge gateways and controllers, power meters, sensors, and integration with solar and storage equipment. They also require expertise in system design, commissioning, and ongoing optimization.

Ampotech applies this integrated approach to solar and energy storage systems through edge gateways, controllers, power metering, and sensors connected to its software platform. These technologies create high-quality, real-time data streams that support monitoring, forecasting, condition detection, and control.




As AI capabilities become increasingly accessible, competitive advantage is shifting beyond algorithms alone. Proprietary operational data, hardware connectivity, interoperability, energy expertise, and the ability to deploy and continuously optimize solutions across real-world assets are becoming increasingly important.
For Ampotech, this combination of hardware, software, AI, and domain expertise provides the foundation for scalable energy-management solutions across both energy efficiency and distributed energy resources.

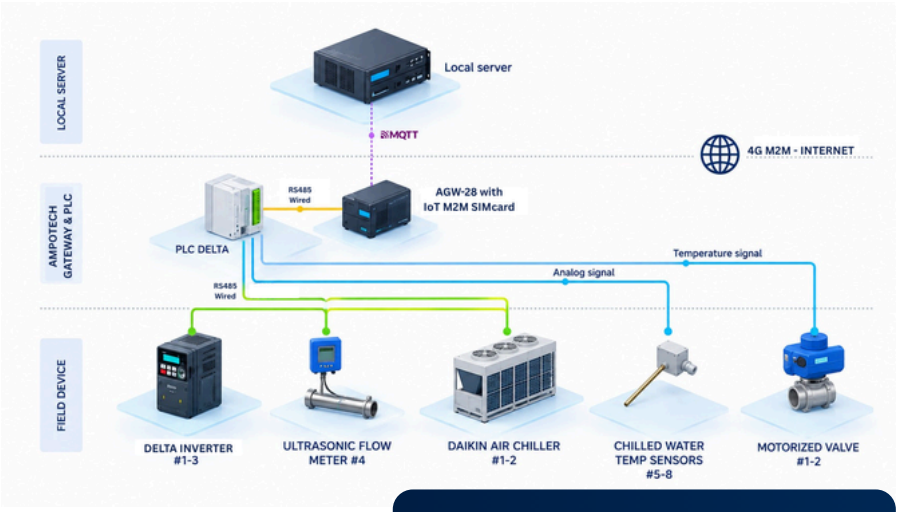
CASE STUDY

# 04 Therm X

## Why Hardware, Software, and Services Drive Real Energy

### Overview

Therm X, a US based electronics manufacturer, partnered with Ampotech to improve energy visibility and automate its cooling systems at its ISO-certified facility in Vietnam




### Key Outcomes

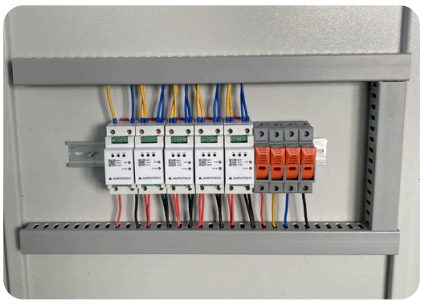
**12 - 18%** reduction in electricity consumption

**Real-time** monitoring across multiple facilities

**Improved** operational efficiency and reliability

> “Professional with dashboard, data to monitor and report, and alerts to control EMS and control the facility system
>
> **Therm X**

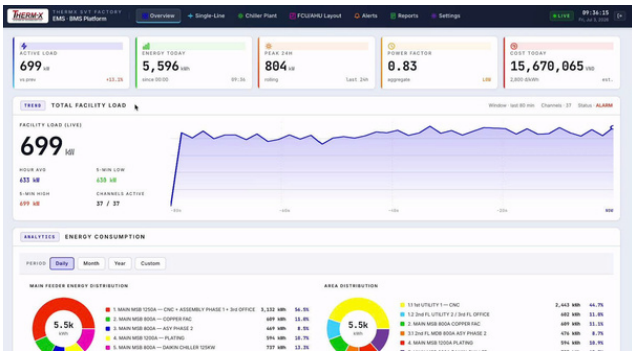
### Project Photos

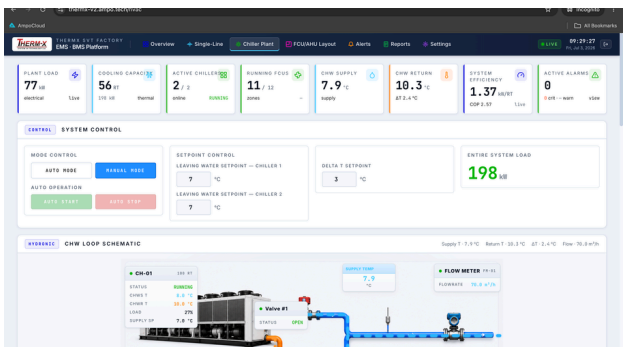







### AmpoCloud EMS Platform



CASE STUDY

# 05 Xurya

## Enhancing Solar and Battery Asset Performance

## Overview

Xurya, a leading Indonesian renewable energy company, partnered with Ampotech to integrate and manage solar PV and battery energy storage assets at Sudamala Resort Seraya.




## Key Outcomes

**Higher energy yield** through real-time monitoring

**Improved asset performance** and reduced downtime

**Greater operational efficiency** and renewable energy impact

> "Ampotech's real-time monitoring and insights help us optimize our solar and battery assets, ensuring maximum performance and reliability"
>
> **Xurya**

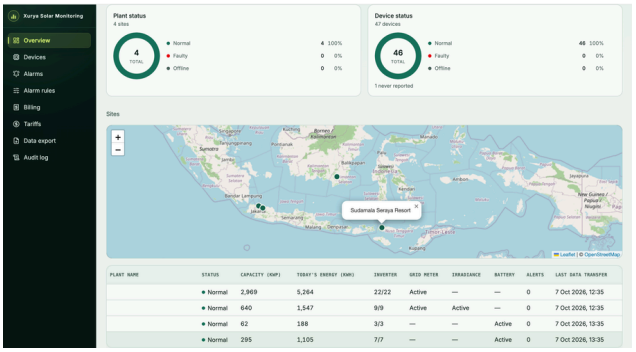
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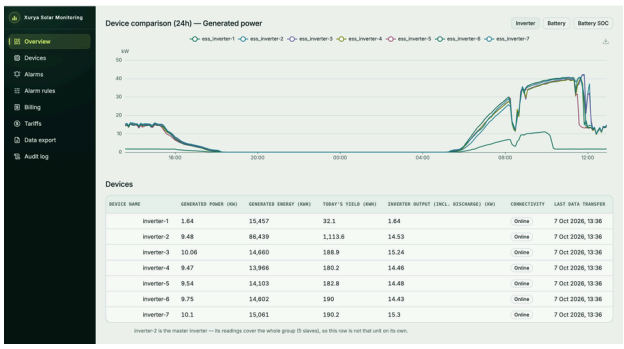






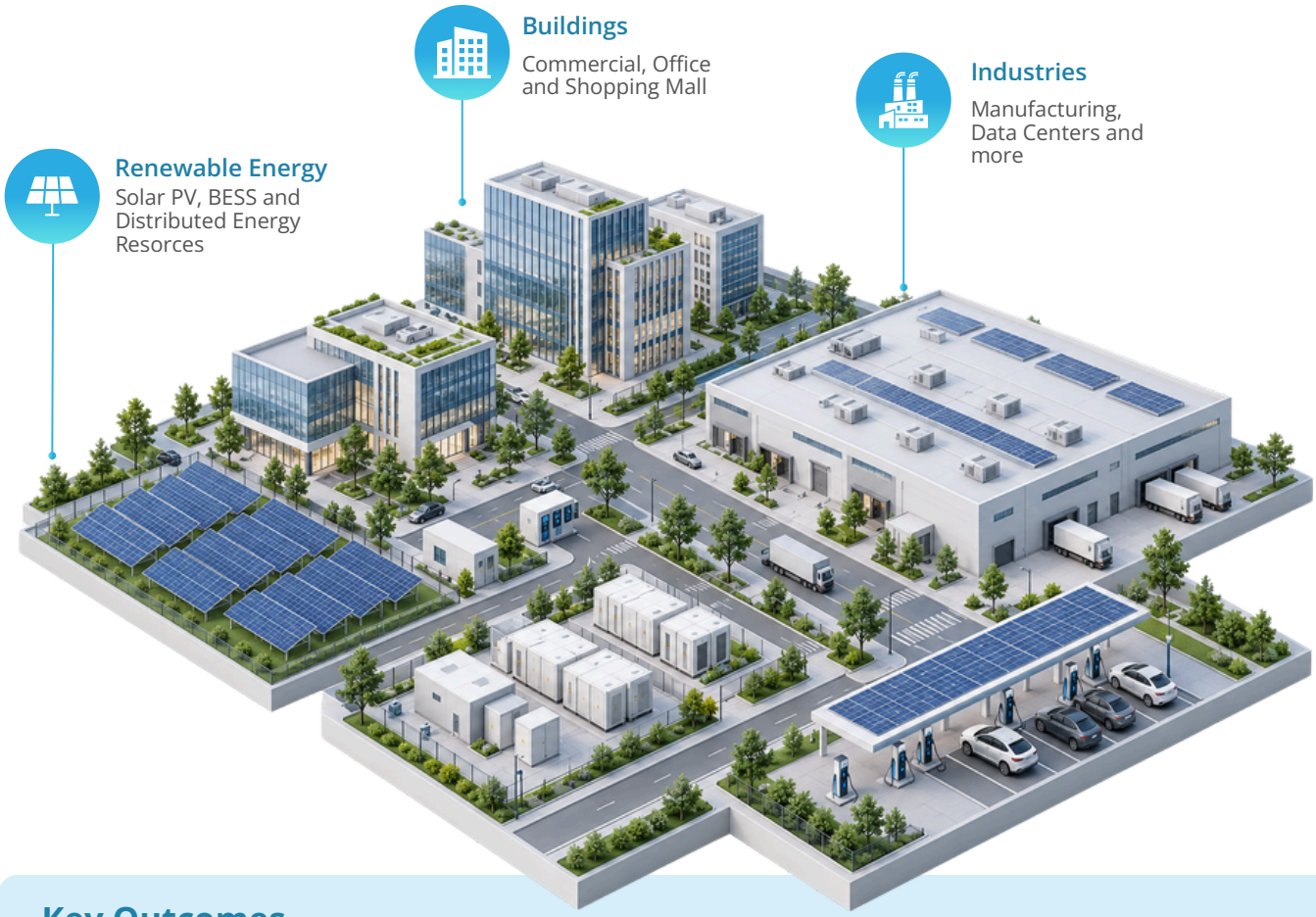

## AmpoCloud EMS Platform



# 06 Conclusion

The rapid growth of AI means success is no longer driven by the product or technology. It will be driven by the understanding of industries and use cases, the availability of unique data and insights into how to operationalize AI-enabled software, and the ability to offer hardware/software systems at scale.




## Key Outcomes

**Industry Knowledge**
Deep understanding of industry needs and real-world use cases.

**Unique Data**
Access to proprietary operational data and actionable insights.

**Operational Expertise**
Ability to deploy, operate, and optimize at scale.

**Integrated Solutions**
Hardware, softwware, and services working as one system.

AI will create unprecedented opportunities for energy efficiency, lower costs, and greater sustainability when combined with real-world assets, data, and expertise.



# 07 About Ampotech

Ampotech provides intelligence driven energy solutions for commercial and industrial clients in Asia Pacific. With over 10 years of experience developing, deploying, and maintaining AI-enabled internet of things and energy asset solutions in the real estate and renewable energy sector, Ampotech is at the forefront of the transition to an AI-native energy sector. For more information visit our website at [www.ampotech.com](http://www.ampotech.com)

**End-to-end solution**

**AI-genered platform**

**Proven real world impact**

**Scalable across industries**




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