# TEIA trust model: building confidence across energy systems

Why interoperability needs trust to succeed

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# Why interoperability needs trust to succeed

**Distributed energy resources (DERs) continue proliferating while AI-driven systems become the standard and cybersecurity threats intensify.**

The result is an ever-growing fragmented puzzle of proprietary vendor silos with disparate systems, forcing operators to stitch together custom integrations, driving up costs, and exposing critical vulnerabilities.

Traditional OT stacks and perimeter-based security models simply can't scale in today's interconnected grid. A single breach or weak legacy device can compromise entire systems.

That's why global leaders including E.ON, JERA, Origin Energy, GS Energy, GivEnergy, and Intertrust founded the Trusted Energy Interoperability Alliance (TEIA) to deliver universal zero-trust interoperability.

TEIA doesn't replace existing standards—it serves as "the glue that binds" them, creating one secure, interoperable, decentralized energy ecosystem. Its design is:

- **Vendor-neutral.** Works across any vendor, device, or service

- **Evolutionary, not revolutionary.** Operates seamlessly with standards like Matter, OpenADR, and OCPP

- **Fully integrated.** Evolves with industry best practices while ensuring backward compatibility.

TEIA delivers the foundation the industry needs to scale securely into the future. This unified trust layer transforms fragmented energy infrastructure into a cohesive, secure ecosystem ready for tomorrow's challenges.

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# TEIA's four layers of trust

**TEIA provides a comprehensive model that applies zero-trust principles across four interlocking layers.**

### Identity
Cryptographic identity for devices, services, and platforms ensures only authenticated actors participate.

### Secure messaging
Application-layer protocols deliver trusted, interoperable communication, independent of underlying networks.

### Protection
Cryptographically secure packets in transit and at rest enable data integrity across vendors and clouds.

### Key management
Interoperable key provisioning and management supports PKI, blockchain, and quantum-safe cryptography.

TEIA's layered approach ensures no single point of failure while maintaining interoperability across vendors and clouds.

**trusted-energy.org**

# How the trust model maps to energy environments

**The TEIA trust framework addresses security challenges across all layers of the modern energy ecosystem, from grid infrastructure to connected devices, cloud platforms, and intelligent systems.**

### Grid (TSO, DSO, market operators)

Ensures trust in commands and data for operators, TSOs, DSOs, and flexibility markets.
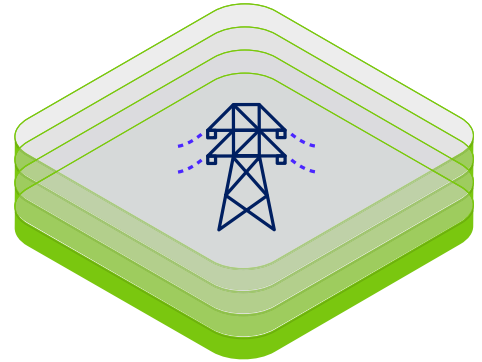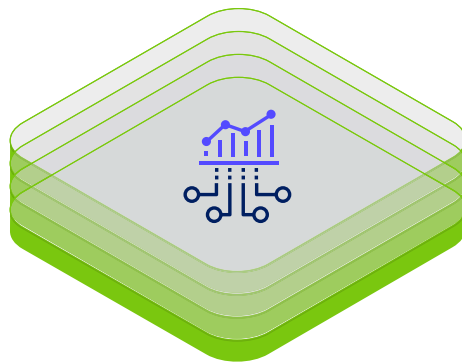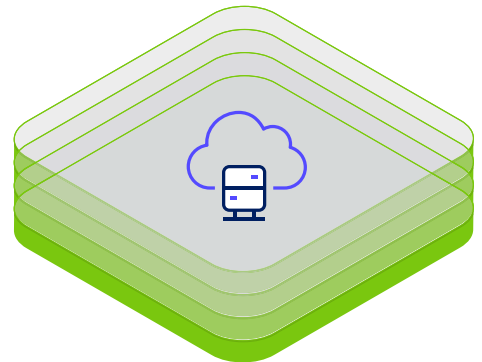
### Device (IoT, DERs, smart meters, EVs, etc)

Protects IoT and DERs (legacy and modern), guaranteeing data authenticity and safe control.

### Cloud (multi-cloud infrastructure, SaaS, energy trading)

Extends trust across hybrid and multi-cloud environments, avoiding lock-in while ensuring compliance.

### Platform (AI, orchestration, analytics, forecasting)

Supports AI-driven orchestration and analytics with cryptographic integrity at scale.

# Where TEIA provides immediate value

**TEIA's cryptographic trust infrastructure addresses critical security and interoperability challenges across the energy sector's most rapidly evolving domains. From distributed energy resources to AI-powered grid operations, TEIA addresses the modern energy ecosystem.**

## Smart grids & VPPs

The modern grid depends on orchestrating thousands of DERs—from rooftop solar to home batteries—into flexible, reliable capacity. But fragmented vendors and inconsistent security make it hard to trust the data or the commands that drive markets. With cryptographic identity and secure messaging, every DER command and data packet is authentic and verifiable. This enables secure VPP aggregation, trusted flexibility markets, and protection against manipulation or false signals.

## EV charging networks

EV charging is one of the fastest-growing energy sectors, but fragmented authentication and weak roaming agreements create billing disputes, security risks, and poor user experience. TEIA enables cross-operator authentication and interoperability with cryptographic trust, ensuring secure payments, seamless roaming, and reliable grid integration.

## Cross-border energy trading

As energy markets integrate, TSOs and DSOs need real-time trust in cross-border data and transactions. Today's fragmented standards and bilateral agreements slow trading, raise costs, and expose operators to fraud. TEIA delivers a shared trust framework with cryptographic verification, enabling seamless, auditable, and regulatory-grade cross-border transactions while accelerating market integration.

## AI in energy

AI is set to become the brain of the modern grid, bringing accurate forecasting, predictive maintenance, and real-time optimization. But without trusted data, even the smartest models fail. TEIA ensures data provenance and integrity so AI runs on verifiable, tamper-proof inputs. This creates the foundation for confident, large-scale adoption of AI in mission-critical grid operations, delivering energy systems that are not only automated but intelligent and secure by design.
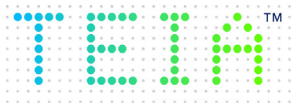
# The time is now

**The global energy sector faces an unprecedented challenge as digital transformation accelerates without adequate security foundations. The industry must choose between fragmented, vulnerable systems or a unified approach to digital trust that can secure our energy future.**

Today's energy infrastructure stands at a crossroads. Interoperability without trust leads to fragmentation, inefficiency, and systemic risk. TEIA provides the trust layer for digital energy, combining identity, secure messaging, protection, and key management into a flexible, zero-trust model.

Backed by global leaders, TEIA offers a future-proof roadmap for secure, connected, and intelligent energy systems. The choice for operators, vendors, and policymakers is clear: lead the transformation with TEIA, or risk being left behind.

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Trusted Energy
Interoperability Alliance