

SMART METER OF THE FUTURE



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Executive Context and Core Problem

Germany's energy transition depends on widespread deployment of low-cost, regulation-compliant smart meters. The MsbG and recent 2025/2026 regulatory updates mandate large-scale rollout, 15-minute reporting, and increased controllability requirements, creating an urgent need for affordable, certifiable devices that can scale quickly.

Unlike in India, smart meters in Germany are not primarily revenue-protection tools; they function as high-security gateways enabling flexible integration of EVs, heat pumps, rooftop solar, and home batteries. The core challenge is therefore threefold: meeting strict technical and regulatory requirements, achieving mass-market affordability and scalability, and driving customer acceptance.

Customer acceptance remains a major barrier. Many consumers perceive smart meters as intrusive, overly technical, expensive, or lacking clear personal value. Concerns around privacy, granular energy monitoring, and complex app experiences reduce adoption and engagement. Successful solutions must therefore combine compliance and low cost with a simple, trustworthy, and genuinely delightful customer experience that encourages active participation in energy management and flexibility services

Problem Statement

Cluster 8 — Smart Meter of the Future

We invite innovators in India to propose concepts for the "Smart Meter of the Future": a hardware+software concept for a smart meter that is as low-cost as feasible for mass roll-out, yet fully compliant with German/European regulatory, security and interoperability requirements (BSI TR-03109 family, MsbG requirements including 15-minute data and MaBiS compatibility), and that provides clear, privacy-respecting, delightful user experiences that increase customer acceptance and active use. The solution must be suitable for a fragmented market structure, support a secure, scalable path to compliance, avoid vendor lock-in, and be realistic for mass deployment by utilities and metering operators.



Problem Space

Regulatory Compliance and Interoperability

Smart meters and gateway components must comply with German and European regulatory requirements, including:

- BSI technical guidelines (TR-03109 family), including cryptographic specifications and gateway administration requirements.
- MsbG rollout obligations, 15-minute measurement/reporting requirements, and evolving market communication structures such as MaBiS-Hub.
- New 2025/2026 requirements related to controllability, rollout quotas, and contractual standards.

These requirements impose strict expectations around security, cryptography, administration, interoperability, lifecycle management, and certification timelines.

Customer Acceptance and Data Privacy

German consumers are highly sensitive to data use and energy monitoring. Existing smart meters are often perceived as intrusive or lacking clear customer value.

Solutions should therefore:

- Provide open and local smart home integration options. There is an ever growing community of „Smart Homies“ who are not willing to step into a closed and/or cloud-based smart home ecosystem. The solution should provide open but secure APIs for „real-time“ data readings.
- Demonstrate privacy protection clearly and transparently.
- Minimise unnecessary data collection.
- Reduce friction for users with varying digital literacy.
- Avoid dependence on complex app-based interactions.
- Provide intuitive, trustworthy, and delightful customer experiences that increase engagement, encourage regular active use, and create clear ongoing value for households.

Cost and Scalability

Solutions must be commercially realistic for large-scale deployment in Germany

Proposals should prioritise:

- Low Bill of Materials (BOM) and production costs.
- Manufacturability at scale.
- Straightforward maintenance and secure update pathways.
- Avoidance of vendor lock-in.

Challenge Statement

Design a hardware + software concept for a smart meter that is:

- As low-cost as feasible for mass deployment.
- Fully compliant with German and European regulatory, security, and interoperability requirements.
- Compatible with BSI TR-03109 requirements, MsbG obligations, 15-minute reporting, and relevant German market communication interfaces.
- Privacy-preserving, customer-friendly, and designed to create high levels of sustained customer engagement and satisfaction.
- Suitable for scalable manufacturing and deployment in Germany.

Submissions should explain how the solution would support use cases such as:

- Dynamic tariffs
- Demand response
- EV charging
- Heat pumps
- Rooftop solar
- Home energy storage

while maintaining strong privacy and security.



Guardrails

Mandatory Compliance

The design must include a realistic path toward compliance with:

- BSI TR-03109 requirements, including cryptographic modules and gateway administration rules.
- MsbG obligations in force as of June 2026.
- Relevant interoperability and market communication requirements.

Privacy and Security

Solutions must:

- Use privacy-preserving default settings.
- Provide transparent user controls and auditability.
- Include secure update mechanisms, firmware signing, secure boot, and appropriate key management approaches.
- Provision of a local customer interface to smart meter data

Interoperability and Vendor Neutrality

Solutions should:

- Support standard interfaces and market integration.
- Avoid proprietary vendor lock-in.
- Support 15-minute interval data handling and compatible export formats.

Cost Realism and Scalability

Proposals must demonstrate:

- Realistic BOM and production assumptions.
- Scalability toward multi-100k deployments, such that every energy customer gets a smart meter.
- Practical maintenance and lifecycle support strategies.

Stage-1 Submission Criteria

Stage-1 solutions should be at approximately TRL 1–2 and must include:

Technical Sketch

- Hardware and software architecture.
- Secure gateway and communication stack overview.
- Integration points with German market roles.

Cost Model

- BOM estimates at 10k / 100k / 1M production volumes.
- Installation and deployment assumptions.

Feasibility and Certification Note

- Proposed certification pathway.
- Security and cryptographic approach.
- Market interface and interoperability strategy.

User Experience Concept

- Mockups, workflows, or interaction concepts.
- Explanation of customer value, engagement strategy, delight factors, and privacy transparency.

Prototype or Proof-of-Concept Evidence

- Prototype images, simulations, or component validation evidence.

Technical Parameters and Success Metrics

- Support for 15-minute interval measurements and secure transmission.
- Metering accuracy consistent with German legal requirements.
- BOM and production cost targets that materially undercut current mainstream iMSys solutions while remaining certifiable.
- Projected customer engagement, usability, or customer satisfaction metrics (e.g. active usage, retention, Net Promoter Score uplift, or engagement frequency).
- Manufacturing scale-up pathway

Criteria for All Challenges

Transferability and Scalability in Europe and Globally

The proposal must be transferable and scaleable to Europe and globally. Scalability within India is nice-to-have but not mandatory.

• **Explicit transferability to Europe (mandatory)**

- Clear explanation of how the solution can be adapted to European regulatory, market, and customer contexts
- Identification of required modifications (e.g. standards, cost structure, integration)

• **Global scalability potential (mandatory)**

- Core concept is not India-specific in its fundamentals
- Demonstrates relevance to other markets facing similar constraints

• **Scalable within India (good to have)**

- Clear pathway from pilot to large-scale deployment
- Addressable market size and adoption drivers identified
- Key customer(s)/segments identified

Leverages Strengths of the Indian Innovation Landscape

Proposals must demonstrate a strong alignment with India's proven innovation strengths:

- **Cost efficient engineering:** The idea leverages engineering approaches that minimize cost without compromising essential functionality.
- **Frugal innovation mindset:** The solution delivers high value with limited resources and avoids unnecessary complexity.
- **Constraint-driven creativity:** The proposal explicitly shows how constraints related to cost, infrastructure, skills, or system complexity have informed the design.

Practicality and Rapid Deployability

The idea must be suitable for rapid validation and deployment in the coming 12 to 18 months in a large, diverse markets in the EU and globally, and as a good-to-have, India:

- Addresses a clearly identifiable real-world problem.
- Demonstrates usability in environments with varying levels of infrastructure maturity.
- Shows evidence that the solution can be tested, piloted, or scaled without long development cycles.

Solution Quality Requirements

All submitted solutions must meet the following non-negotiable design principles:

1. Simple

- Clear core functionality
- Minimal dependencies
- Easy to understand, use, and maintain

2. Robust

- Reliable under variable operating conditions
- Tolerant to imperfect infrastructure or user behavior
- Low maintenance requirements

3. Affordable

- Cost structure suitable for price-sensitive markets for EU and global markets and optionally, Indian markets
- Transparent assumptions on production, deployment, and operating costs, presented in the form of estimates for Total Cost of Ownership (TCOs) or techno-economic assessments

Overall proposed ideas will be measured on how they fare on three "I's"

- **Innovation:** novelty, competitive differentiation, translation across markets (EU, global, India)
- **Implementation:** adoption risks, co-innovation risks, regulatory hurdles, time to deploy, time to mature market
- **Impact:**
 - how much you can make - serviceable addressable market size (% of TAM)
 - how much you can save – resilience, robustness, reliability





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