ENERGY INFRASTRUCTURE

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AUCOTEC

IEC 61850 and Engineering Base

THE KEY TO DIGITAL ENERGY NETWORKS

THE AI REVOLUTION IN PLANT ENGINEERING
Engineering Advisor

40 YEARS OF AUCOTEC
From software pioneer to the digital nervous system of industry

INTERVIEW WITH RENATA FERNANDES FROM SM ENERGY
"AI is not a product for us – it is a learning journey"

> Dr. Pouria Bigvand

THE AI REVOLUTION IN PLANT ENGINEERING
ENGINEERING ADVISOR

In the world of modern engineering, knowledge – and therefore data – is the decisive raw material. With Engineering Base, AUCOTEC has long since structured this knowledge – and is now going one step further with the AI-powered Engineering Advisor.

In today's dynamic and increasingly complex world of plant engineering, staying on top of information is critical. This is exactly where AUCOTEC's new Engineering Advisor comes in. It knows every project down to the smallest detail and provides answers in seconds. Its intelligence builds entirely on AUCOTEC's Engineering Base platform and its digital twin – the central and reliable Single Source of Truth for the entire plant.

THE TECHNOLOGY BEHIND THE "MAGIC"

What exactly does the Engineering Advisor do – and how does it work? Put simply, it acts like a tireless, highly technical partner who supports users around the clock. At its core is Engineering Base itself: all structured engineering data and complementary unstructured information from external sources are unified in a single, consistent data model. The Advisor merges data depth, contextual understanding, and AI-powered analytics – fundamentally changing the engineering workflow:

> #### Semantic search instead of data hunting
The Engineering Advisor understands the plant model, the functional logic, and the relationships between all elements. Endless searches through files, objects, and links become a thing of the past. It analyzes context, delivers highly accurate results, and presents answers either as a chat response or a structured result list.

> #### Projects with a single click
Search results can be turned directly into new projects or integrated into existing ones. This creates a seamless connection between knowledge and execution.

> #### Detailed system analysis
Whether PAAG rules, safety assessments, or component evaluations: the Engineering Advisor provides a robust foundation for technical analyses, calculates missing properties, and evaluates existing data – all the way through to a complete plant assessment.

> #### Quality assurance and standards compliance
The AI checks the data model for inconsistencies and evaluates compliance with IEC and ISO standards. It identifies discrepancies and provides immediate improvement suggestions – ensuring transparency and compliance.

> #### Understanding, explaining, visualizing
The Advisor can explain Engineering Base functions in natural language, process speech-to-text inputs, analyze technical images (PNG, PDF), and automatically generate visualizations from them.

A MILESTONE FOR ENGINEERING

"The Engineering Advisor is a highly comprehensive technical consultant," explains Dr. Pouria Bigvand, Director Products at AUCOTEC. "Our goal is not to replace people, but to empower them to make better decisions – faster, more confidently, and with greater insight."

The Advisor collects, links, and analyzes information at a speed previously unimaginable in engineering. Users gain valuable time for conceptual and creative work.

WHY IT IS UNLIKE ANYTHING BEFORE

AUCOTEC's solution goes far beyond previous approaches. "By combining AI directly with our established Engineering Base platform, we have created a solution that is not only intelligent but understands the language and logic of plant engineering," emphasizes Bigvand. Engineering Base is, by design, perfectly suited for the application of artificial intelligence.

Open for integrations, data-centric across all disciplines, and uncompromisingly consistent – the AUCOTEC platform forms the foundation on which the Engineering Advisor can fully unfold its strengths. With the Engineering Advisor, AUCOTEC is setting a new benchmark for AI in engineering and continuing its own innovation story.

AI
inside
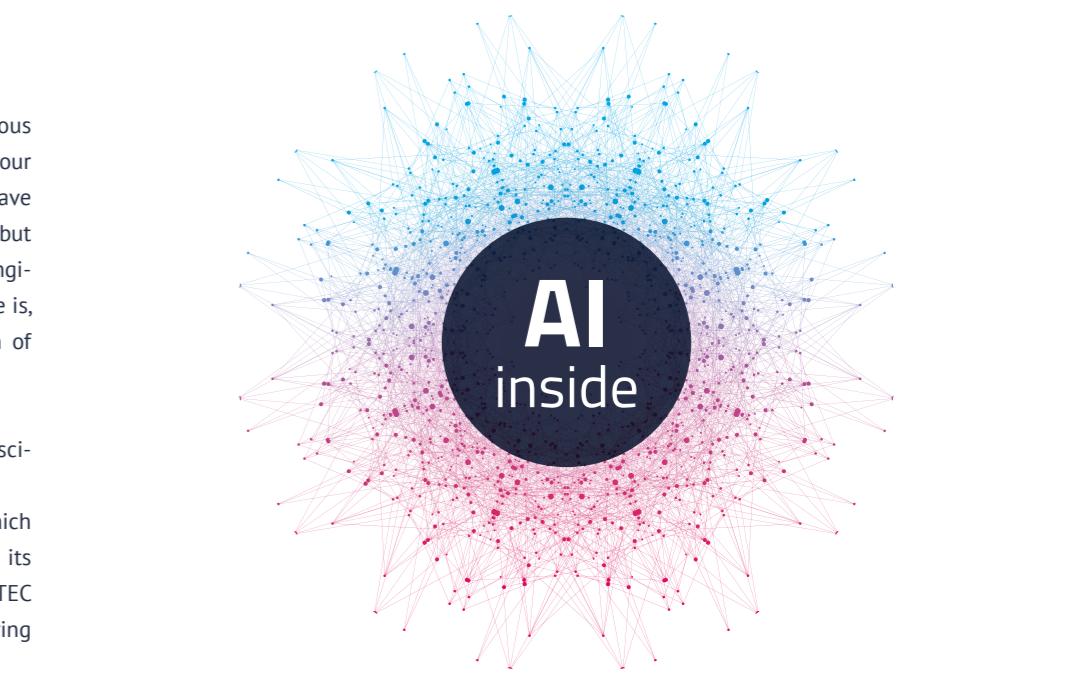
IEC 61850 and Engineering Base

THE KEY TO DIGITAL ENERGY NETWORKS

Wind turbines and solar parks are delivering strongly – yet the energy transition is faltering. Green generation alone is not enough. With increasingly decentralized energy production, the system is becoming more complex. What is missing are intelligent grids that consolidate distributed energy and deliver it where it's needed. Quickly, reliably, and efficiently.

Digitalized substations stand at the heart of this transformation. They are the backbone of a decentralized energy infrastructure and the key to integrating renewable sources. But while demand is exploding – hundreds of thousands of new facilities are needed worldwide – outdated planning processes, missing interfaces, and a shortage of skilled specialists are slowing progress.

AUCOTEC's Engineering Base brings new momentum to grid expansion. With full integration of IEC 61850 and a consistently digital approach, the planning, execution, maintenance, and operation of modern switchgear becomes radically simpler – future-proof, interoperable, and ready for AI.

FULLY INTEGRATED: IEC 61850 ON ONE PLATFORM

"With the world's first full integration of IEC 61850 into a cooperative engineering platform, we are setting a milestone: For the first time, standard-compliant protection and control models can be created, validated, and linked to real hardware without external tools," says Klaus Naumann, Global Sales Director Electrical Plants & Mobility at AUCOTEC. "Users work in a unified system, with one license and one data model that operates seamlessly and is fully future-proof."

As the Single Source of Truth, Engineering Base unifies all disciplines – from primary technology to control systems – on a single data foundation. Standardized data objects (DOs) are connected directly to IEDs and hardware, enabling real-time analyses, variant management, and clear change tracking.

"AI READY" FROM DAY ONE

The world is talking about AI – and for good reason. AI is triggering paradigm shifts in industry, business, and society. In engineering, however, the decisive factor is this: only those who have structured, centrally maintained engineering data can truly benefit from AI. Engineering Base provides exactly that – cross-disciplinary, consistent, machine-readable data, even for existing plants. Open interfaces allow external sources to be connected so AI solutions can operate directly on a unified model of the entire plant.
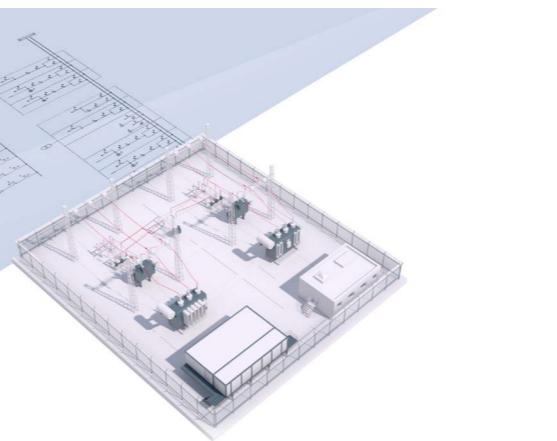
INTELLIGENT AUTOMATION

Together with its Brazilian partner SM Energy (see the interview on page 8), AUCOTEC is taking yet another significant step forward: The AI DB Builder, developed by SM Energy, automatically generates IEC 61850-compliant models, protection functions, and signal mappings directly from documents.

This transforms what used to be a manual process into a standardized and significantly accelerated workflow. The AI-powered application extracts technical information directly from engineering documents and automatically transfers it into structured, object-oriented models within Engineering Base.

"Thanks to Engineering Base's open architecture, the AI DB Builder integrates seamlessly into existing processes. Automatic hardware linking, IED structure validation, and interlocking logic generation all happen quickly, consistently, and error-free," explains Michaela Imbusch, Product Manager at AUCOTEC. "Users achieve dramatically shorter engineering cycles, maximum consistency, and a decisive step toward intelligent grid planning."

LESS EFFORT, MORE SPEED

Network operators and engineering firms using Engineering Base report up to 20% shorter project durations, reduced system landscapes, and significant savings in training and IT resources.

The platform not only fully supports IEC 61850, but also IEC 81346 and 81355 – while remaining open for custom requirements and future developments. In short: Engineering Base is a key enabler of digital grid transformation – delivering greater efficiency, interoperability, and climate impact. And it is fully ready for the next generation of AI.

> **Klaus Naumann**

> **Michaela Imbusch**

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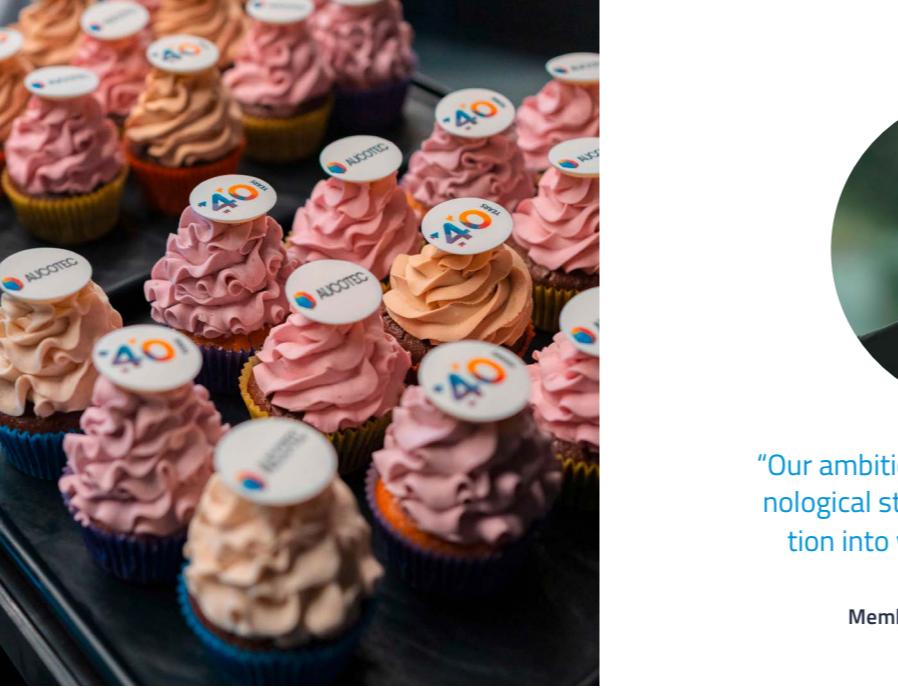
40 years of AUCOTEC

FROM SOFTWARE PIONEER TO THE DIGITAL NERVOUS SYSTEM OF INDUSTRY

Forty years of innovation, partnership, and passion for engineering: AUCOTEC celebrates its 40th anniversary in this fiscal year – and looks back on a success story that stretches from the pioneering 1980s to the digital present. What began as a vision has become a globally recognized provider of engineering software.

40 years of AUCOTEC

ENGINEERING BASE – THE BACKBONE OF MODERN INDUSTRIAL PLANTS

Whether in machinery, power distribution, or the process industry – complexity is increas-ing everywhere. Efficient plant design now requires cross-disciplinary collaboration, con-tinuous data models, and a platform that con-nects everything. "Networking and parallel processing are essential today," says Uwe Vogt, Member of the Executive Board of AUCOTEC. "Our platform Engineering Base provides the flexibility and future-readiness needed to meet these demands."

FROM ELCAD TO ENGINEERING BASE – A JOURNEY THROUGH FOUR DECADES

The story began in 1985 with the first products ELCAD and RUPLAN, laying the foundation for digital engineering.

In the 1990s and 2000s, AUCOPLAN and other spe-cialized tools followed. Then, with Engineering Base, a completely new platform emerged — uniting all core engineering disciplines in a central data model since 2018. "Over the years, Engineering Base has become the true heart of plant engineering – for us and for our customers," says Horst Beran, CEO and co-founder of AUCOTEC.

GLOBALLY CONNECTED – CLOSE TO MARKETS AND PEOPLE

AUCOTEC's success is also a story of proximity: to partners, markets, and people. The company contin-ues to grow internationally with new locations in Poland, Sweden, South Korea, Norway, India, and Malaysia. Long-term collaborations with leading industry players and new partnerships, including Aker BP and Westfalen AG, underscore AUCOTEC's role as a reliable technology partner on the path to Industry 4.0 and AI-driven engineering.

LOOKING AHEAD – ARTIFICIAL INTELLIGENCE AND DIGITAL TWINS

AUCOTEC has always looked to the future. The com-pany is investing in AI-enabled applications and further expanding Engineering Base as an intelli-gent cooperation platform for more efficient and sustainable processes.

"Our ambition is to always stay a technological step ahead and turn innovation into value for our cus-tomers," says Vogt. Co-founder Beran adds: "This is how we shape the future of engineering – efficient, digital, and sustainable."

FOUR DECADES OF FORWARD-THINKING INNOVATION

What once began as a software pioneer has evolved into a global driver of innovation. Yet despite all technological excellence, AUCOTEC remains, above all, one thing: a company that sees progress as a collective achievement – shaped by people, ideas, and data working together.

AUCOTEC's 40-year journey is not just an anniver-sary – it marks the beginning of a new era in engi-neering.
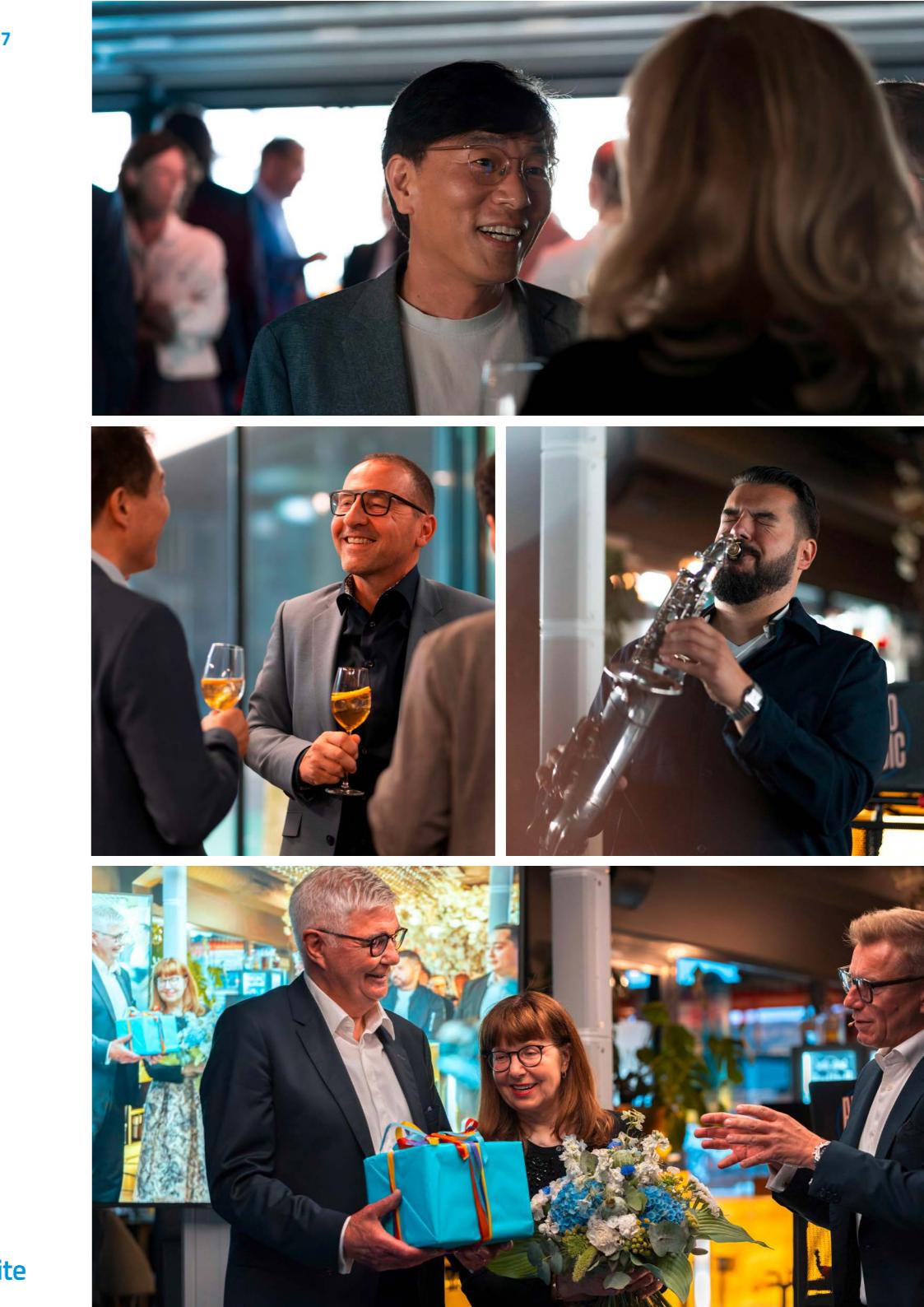
> Renata Fernandes

"AI IS NOT A PRODUCT FOR US – IT IS A LEARNING JOURNEY"

We spoke with Renata Fernandes, CTO of SM Energy – an innovative company in the Brazilian energy sector. Since its founding in 2020, SM Energy has been developing solutions for key challenges across the lifecycle of energy installations. In this interview, Fernandes discusses Engineering Base, artificial intelligence, the partnership with AUCOTEC, and their in-house AI DB Builder.

How does Engineering Base transform classic workflows in plant and grid engineering?

"With IEC 61850 as an example: traditionally, implementing the standard is extremely time-consuming and error-prone, because many steps must be done manually. Engineering Base marks a real breakthrough here. Instead of manually transferring information, users work directly with intelligently linked data objects.

The system automatically ensures consistency between circuit diagrams, device data, and communication models – enabling more efficient, error-free, and standardized processes."

Why is Engineering Base the ideal platform for AI-driven approaches?

"Engineering Base provides the perfect foundation for AI. Because all engineering data exists in structured, object-based form, the AI can interact directly with it. This creates an intelligent interplay of automation, traceability, and integration."

Was this also a key driver behind developing the AI DB Builder at SM Energy?

"Absolutely. Many utilities still struggle with scattered, unstructured legacy data – old drawings, PDFs, spreadsheets. Valuable knowledge often gets lost in the process. With the AI DB Builder, we wanted to close exactly this gap. Our AI extracts, classifies, and structures information automatically and transfers it into the Engineering Base data model. Static documents become living, reliable engineering data."

What do you value most about collaborating with AUCOTEC?

"AUCOTEC is open to innovation and true partnership – something we deeply appreciate. Technically, we benefit from one of the most advanced engineering platforms on the market; strategically, from AUCOTEC's global reach.

Together, we combine deep industry expertise with engineering excellence to accelerate the digital transformation of the energy sector."

Where is the industry heading – and what role will AI play?

"The greatest potential lies in standardization and data governance. The combination of AI and Engineering Base creates a unified, trustworthy data foundation – essential for informed decisions, efficient operations, and new AI applications. Especially in maintenance and lifecycle management, I see huge opportunities: when real-time operational data is linked to engineering data, AI can predict maintenance, optimize systems, and continuously improve performance."

Finally – what is your vision for the future?

"For us, AI is not simply a product to sell. It is a learning journey – for ourselves, for our customers, and for the entire industry. Together with AUCOTEC, we want to continue this journey consistently: technologically, internationally, and in genuine partnership – to make the energy infrastructure of the future more efficient, more interconnected, and more sustainable."