



# **The faster, easier route to an all-electric society**

With RiLineX for smooth energy distribution

ENCLOSURES

POWER DISTRIBUTION

CLIMATE CONTROL

IT INFRASTRUCTURE

SOFTWARE & SERVICE

FRIEDHELM LOH GROUP



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# 1 | Executive summary

The energy transition poses huge challenges, both for industry and for society as a whole. The transition to a sustainable energy supply calls for a new mindset, as well as technological innovations to boost efficiency, integrate renewables, and transform existing infrastructures.

Smart power distribution is a key consideration. Modern system platforms like RiLineX help to eliminate implementation barriers and adapt rapidly to specific requirements. They allow efficient, flexible distribution of electrical power and support the integration of renewables into the energy mix. These types of platforms can help companies to design future-proof energy systems and make an active contribution to the all-electric society.

This trend paper was written in collaboration with various market research organisations and academic institutions. The results have been audited, peer-reviewed and approved for publication. The publicly accessible sources are shown beneath the relevant diagrams and provide a comprehensive summary of the topic.

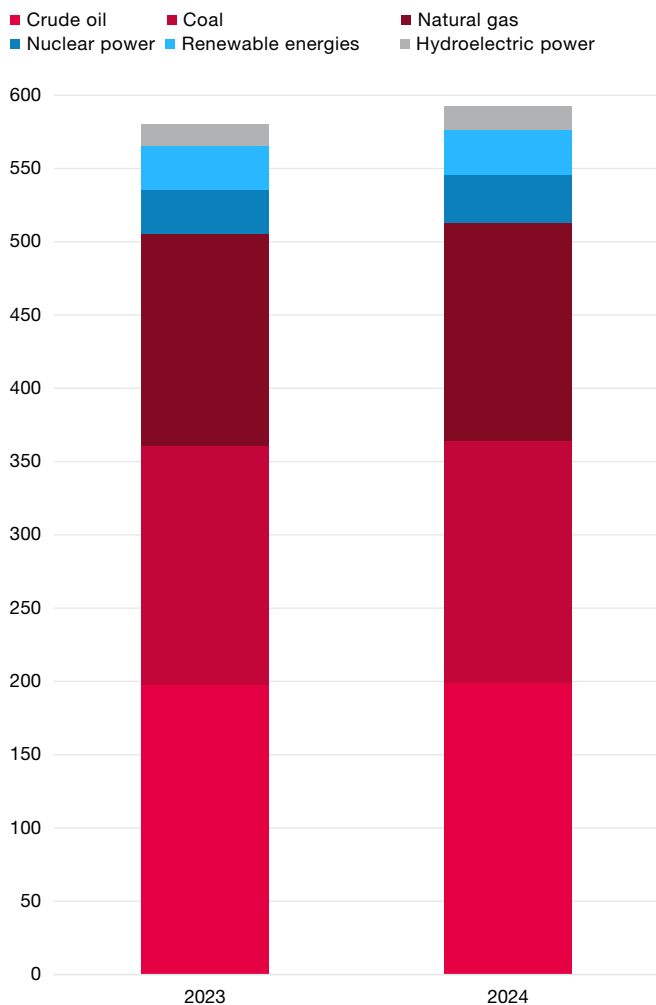


# 2 | The energy transition: Slower than anticipated

## Vision of a sustainable energy future

The energy transition – the global transition to renewable energies – is one of the core challenges facing us in the 21st century. As well as drastically reducing carbon emissions, it also promises more efficient energy use in a fully electrified society. The all-electric society, in which electricity is the principal source of energy, is the long-term goal of many countries and corporations.

### Primary energy consumption by energy carrier (in exajoules (EJ))



Source: Energy Institute; KPMG; Kearney

However, when it comes to distributing renewable energies efficiently and in the required quantities, today's systems have almost reached their limitations.

Integrating renewables into existing grids will necessitate substantial investment in the latest technologies and an expansion of the infrastructure.

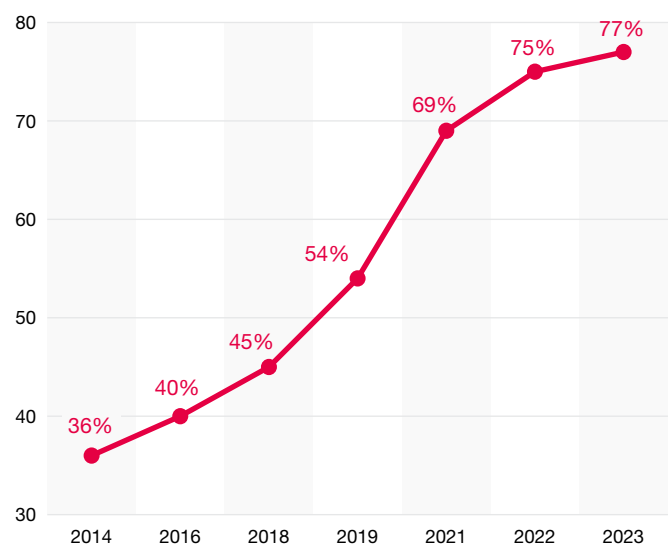
## From goal to reality: Transformation to the all-electric society

Ambitious sustainability targets and investments in climate-friendly technologies are being hampered by external factors such as a weakening global economy, spiralling energy costs, geopolitical uncertainty and supply chain problems.

A lack of qualified personnel exacerbates the pressure. The ManpowerGroup study "Global Talent Shortage 2024" revealed that 77% of employers worldwide find it difficult to fill vacancies.



### Global shortage of qualified personnel



Source: ManpowerGroup

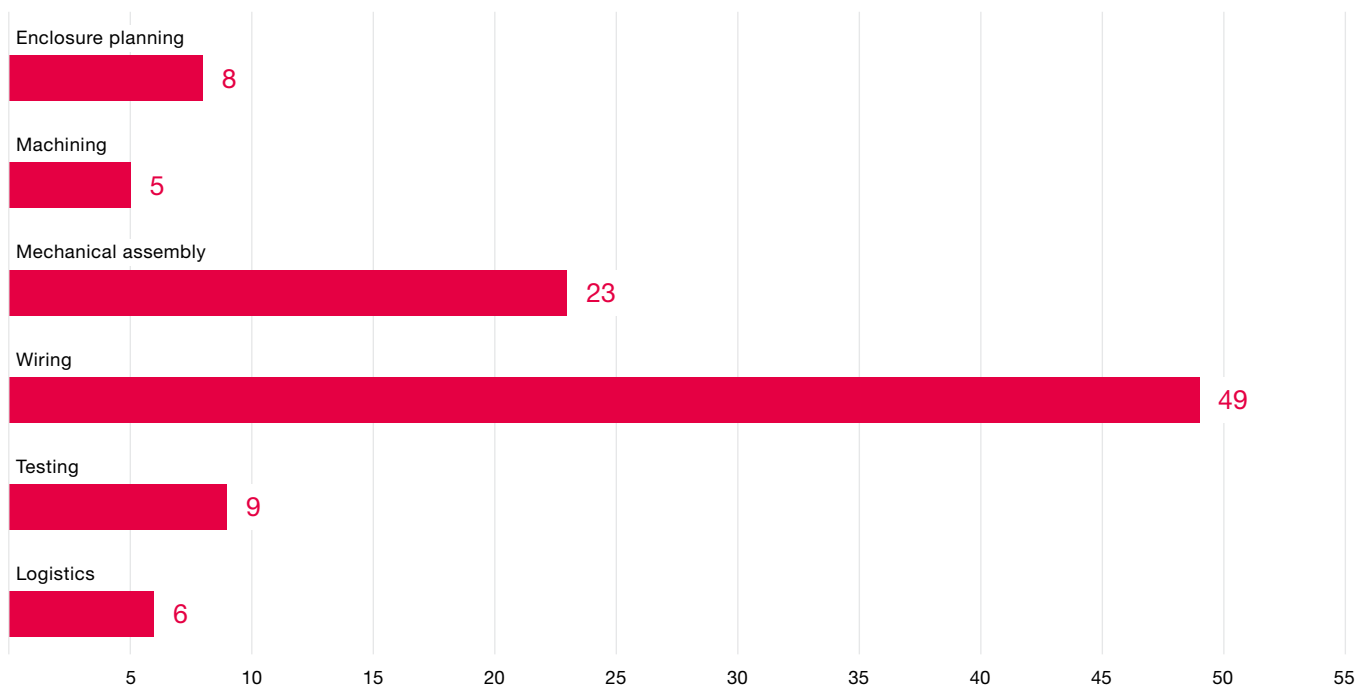
## Decentralised energy systems could accelerate the transformation

We need to step up the rate of expansion of the entire infrastructure if we are to meet our sustainability targets. Decentralised energy systems are a key lever on our journey to the all-electric society. This includes solutions for energy generation, transmission, storage and consumption. Efficient implementation calls for cleverly engineered system

platforms that can minimise complexity, facilitate rapid implementation and ensure long-term usability and scalability.

However, planning and building enclosures and power distribution technology for decentralised energy systems is both complex and time-consuming.

### **Assembly stages of an enclosure** Work attributable to each stage (%)



Source: Institute for Control Engineering of Machine Tools and Manufacturing Units (ISW) at the University of Stuttgart



To drive the energy transition forward, we will need to establish new processes and solutions and mine untapped efficiency potential. Standardisation is the key here. Planning and assembly processes can be speeded up significantly with standardised components and digital integration in engineering. As well as efficiency gains, standardisation also helps to reduce complexity and minimise error ratios, leading to consistently better results.



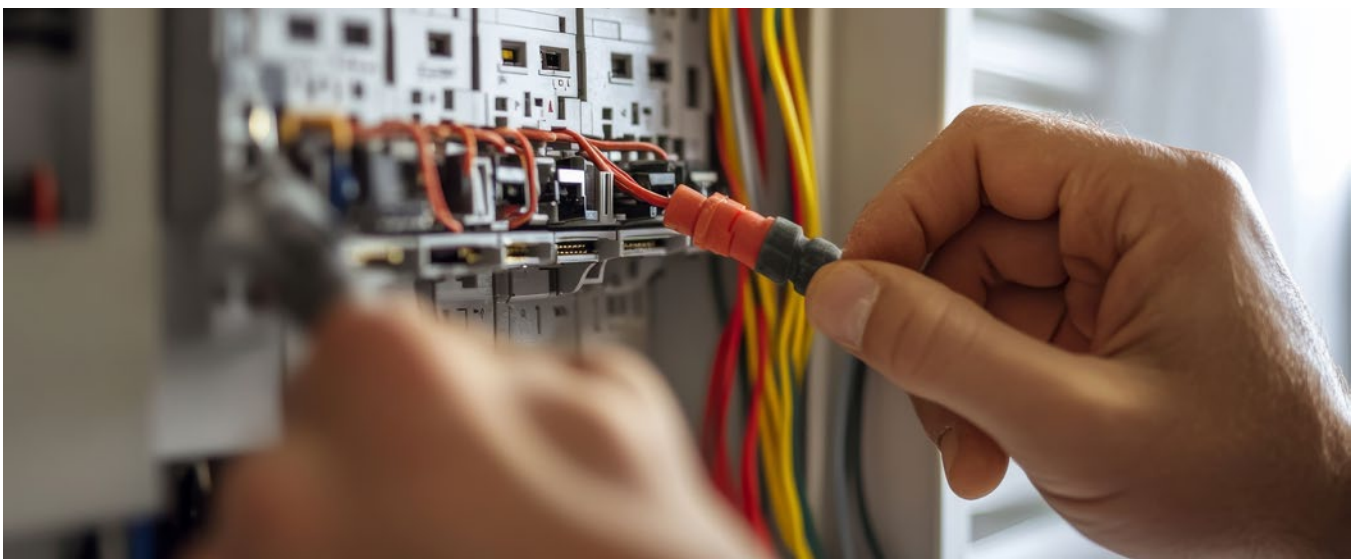
# 3 | Enclosure manufacturing is evolving: Smart platform solutions have replaced tangled cables

## In the beginning: Conventional cabling

For many years, manual wiring was standard practice in enclosure manufacturing. The very first enclosures were hand-built masterpieces. Each cable was individually cut, stripped of insulation, marked and connected.

Although flexible, this technique was also very time-consuming. The process entailed multiple steps, from planning to testing, and was susceptible to errors.

- Intricate planning**  
Every connection had to be planned individually. The precise cable length, the position of the cable trunking and the junctions had to be documented in detail.
- Susceptibility to errors**  
The large number of manual work steps meant an increased risk of errors. Loose connections, incorrect wiring and poorly insulated points were fairly commonplace.
- Space requirements**  
Cable harnesses took up a lot of space, necessitating larger enclosures, which in turn increased the overall cost.
- Upgrades**  
Modifications and extensions to the system were extremely complex, because existing cable trunking had to be modified and new connections pulled in.
- Heat generation**  
The densely bundled cables often caused problems with heat dissipation, which in turn impaired efficiency.



## A breakthrough: Busbar systems

The introduction of busbar systems, particularly the 60 mm variant, marked a milestone in switchgear manufacturing and heralded a new era in power distribution. These systems deliver a highly organised, efficient alternative to manual wiring, by streamlining the design and integration of control technology and switchgear and reducing the overall cost.

International certifications support global use and market access across multiple regions.

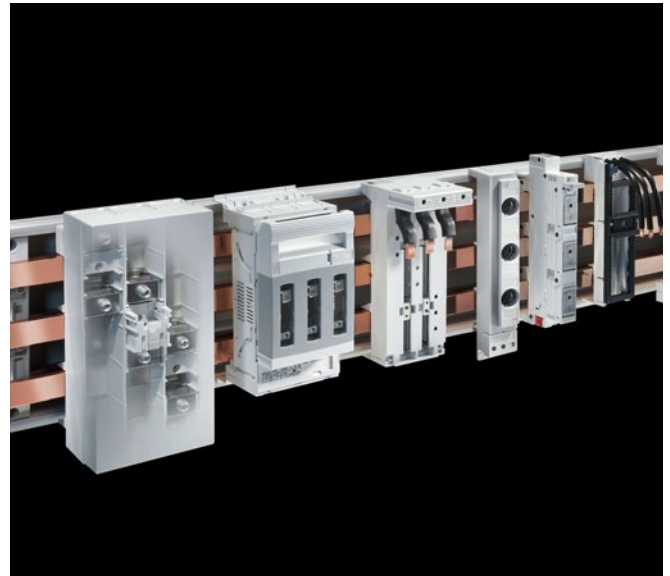
The power distribution block and endless cables in a typical enclosure were replaced by a busbar system, leading to more efficient layouts, smaller enclosure sizes and shorter project throughput times.

Busbar systems boast innovative features and significant improvements over conventional enclosure wiring techniques. Key system properties included tested short-circuit resistance and a rated operating current at defined ambient temperatures, thereby significantly reducing the engineering input and time needed to commission the plant.

## The present day: The platform concept

Busbar system platforms are the latest innovation in enclosure manufacturing. This is about more than just physical power distribution; it is a holistic system that unites mechanics, electronics and digital technologies.

These platform solutions are centred around modularity and connectivity between all project participants, taking enclosure manufacturing to the next level. As well as greater efficiency, platform solutions promise a future-proof basis for increasingly complex requirements.



- + Compact, space-saving design
- + Tested short-circuit resistance with type-tested components
- + Less calculation work for certifications
- + Fewer contact points, which minimises susceptibility to errors
- + Less assembly work, reduced heat loss
- + A clear layout for easier troubleshooting
- + Easy integration of large cable outlets
- + Comprehensive range of accessories for almost any application
- + Type-tested system components for effortless upgrades

# 4 | Open standards can accelerate the energy transition

## Open system platforms help to eliminate barriers and drive innovations

The energy transition is more than just a technological challenge; it also requires a well-developed infrastructure and close coordination between numerous players.

Open system platforms promote collaboration between different technology partners and facilitate the seamless integration of new solutions into existing systems. They offer a promising opportunity to accelerate our transition to sustainable energy, thanks to their combination of reconceptualised mechanical engineering and digital integration which transforms processes even at the planning stage.

As well as offering mechanical benefits, this innovative platform approach takes openness and versatility to the next level. Collaboration with technology partners encourages the creation of platform ecosystems even during the development process. Manufacturers of devices and components benefit from open interface data.

## New industry standard for efficient power distribution

Many sectors recognise the urgent need to establish a new industry standard in power distribution. As well as traditional panel builders and switchgear manufacturers (e.g. for machine controllers), this also applies to the energy storage industry, power grid operators, local energy producers and the IT sector. They all face similar challenges: Escalating cost pressure, rising complexity and a lack of specialist staff.

Even in different industries and their varied application areas, approaches for optimising power distribution follow similar principles: Standardisation and digital integration. These two solutions help to streamline planning, assembly and operation, minimise defects, and boost total runtime. The more component manufacturers reinforce it, the more powerful the platform approach becomes.



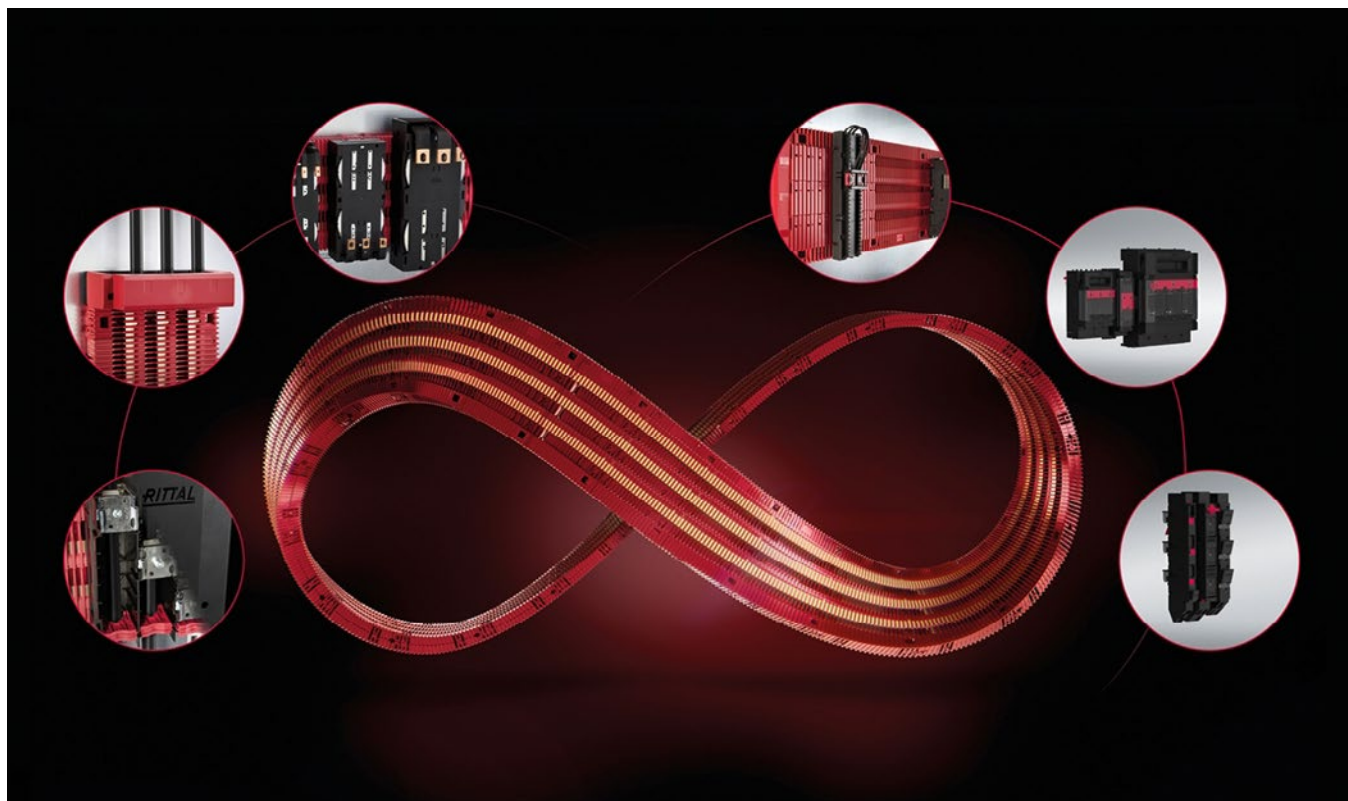




## Benefits of open system platforms

- 1 Speed**  
Clear standards and digital data continuity at every stage of the process translate into accelerated planning and implementation.
- 2 Less pressure on personnel**  
Automation and simplified processes reduce staff requirements and ease the pressure on existing resources.
- 3 Reliability**  
Uniform processes and reduced error sources help to safeguard operational reliability.
- 4 Collaboration**  
Standardised platforms promote integration and collaboration between different partners when building power distribution systems.
- 5 Cost-effectiveness**  
Optimised operations and minimal complexity help to cut costs and boost output with the same level of resources.

**With their combined benefits, system platforms offer a future-safe approach capable of meeting both current requirements and future challenges.**



## RiLineX: The new pacesetter for reliable, efficient power distribution

When developing RiLineX, Rittal was determined to reimagine both mechanical and conceptual aspects. The brief was to devise an innovative approach which would provide an open platform for technology partners.



### No more time-consuming busbar support planning

The new platform frees engineers from the planning work involved in busbar supports and eliminates space losses associated with assembly distances. Exposed contacts are covered and safe from finger contact, without having to painstakingly cut plastic covers to size. This reduces the time required, minimises error sources and cuts plastic waste by an average of 1.9 kilograms per system.



### Flexibility for every application

RiLineX is available as a quick-assemble complete board and also as a modular system. It can also be supplied without flat copper busbars. The open modular design supports individual system assemblies of up to 2.4 metres and is also bayable across multiple enclosures.



### Short-circuit protection as standard

With the integrated assembly of busbars, the new platform supports a full range of planning and assembly options. At a tested short-circuit resistance of up to 65 kA, it delivers maximum protection and reliability for applications up to 1000 V AC and 1500 V DC.



### Future-proof power distribution

With DC current compatibility and digital integration, RiLineX provides the ideal basis for the rapid assembly of smart infrastructures and decentralised energy systems. It is perfect for DC applications which play a central role in IT infrastructure and renewable energies.



### 75 percent faster assembly

The RiLineX platform significantly reduces the work involved in planning, assembly and maintenance, with savings of up to 30% with engineering and 75% with assembly. An innovative click-and-work system makes installing boards and device components easy, allowing you to achieve modular solutions with minimal effort, even with little prior knowledge or experience. At the same time, the modular concept ensures that the systems are exceptionally maintenance-friendly, which also keeps operating costs down.

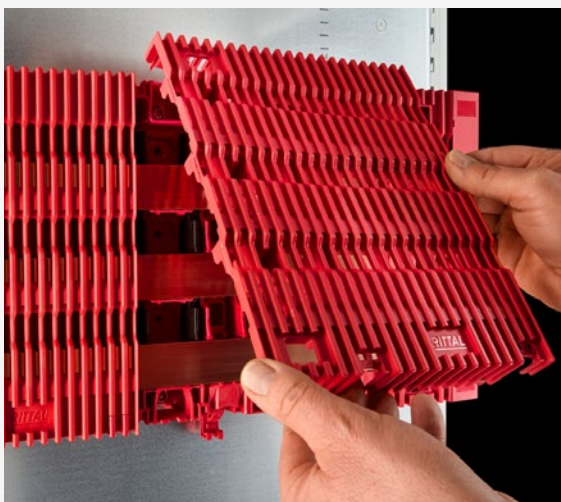


### All components from a single source

Alongside the basic system, RiLineX is also available with a full range of device components. The connection adaptors, component adaptors, CB adaptors, NH technology and fuse holders can all be installed without the use of tools and are both downward-compatible and extendible. Smaller busbar formats from 15 x 5 millimetres may also be used, thanks to automatic width adjustment and integral busbar thickness compensation. What's more, no special copper busbars are required, because the standard flat copper busbars that are freely available worldwide are either included in a complete set or may be added separately.

# 5 | RiLineX: Revolutionising power distribution

## The board



Standardised, globally available flat copper busbars



Complete contact hazard protection to IP 2XB, upgradable to IP 3X



Simple, tool-free system assembly



Patented system that supports open standards



Available as a complete or modular board

## Functions

Simple configuration using the RiPower cloud configurator



Vertical, horizontal and overhead installation



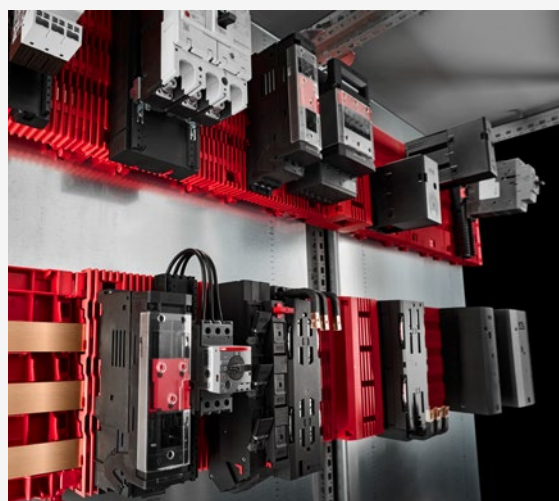
Easily installed in the enclosure using self-tapping screws



Integral cable duct at the rear



“Click and work” installation of device components



## Flexibility inside the enclosure



Flexibly extendible and bayable, thanks to the modular structure



Adapts perfectly to Rittal enclosures



Unrestricted top-mounting of the busbar supports



Downward-compatible to RiLine60 components

## Simple baying



### Sealing cap

Removal of the sealing caps, with standard bar length



### Base plate

Simply slide the insulating plate in from above or below, with contact hazard protection from all sides



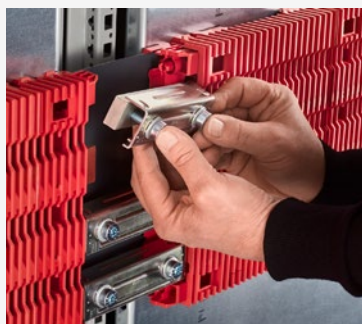
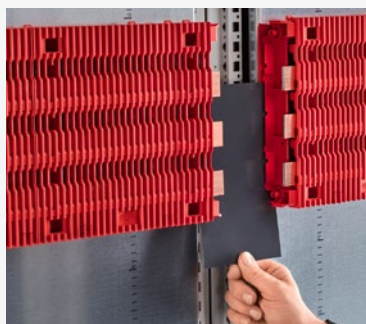
### Baying connector

Slide the baying connector in from above and screw-fasten; one connector covers 15x5 mm -30x10 mm



### Cover

Mount the front cover from the front

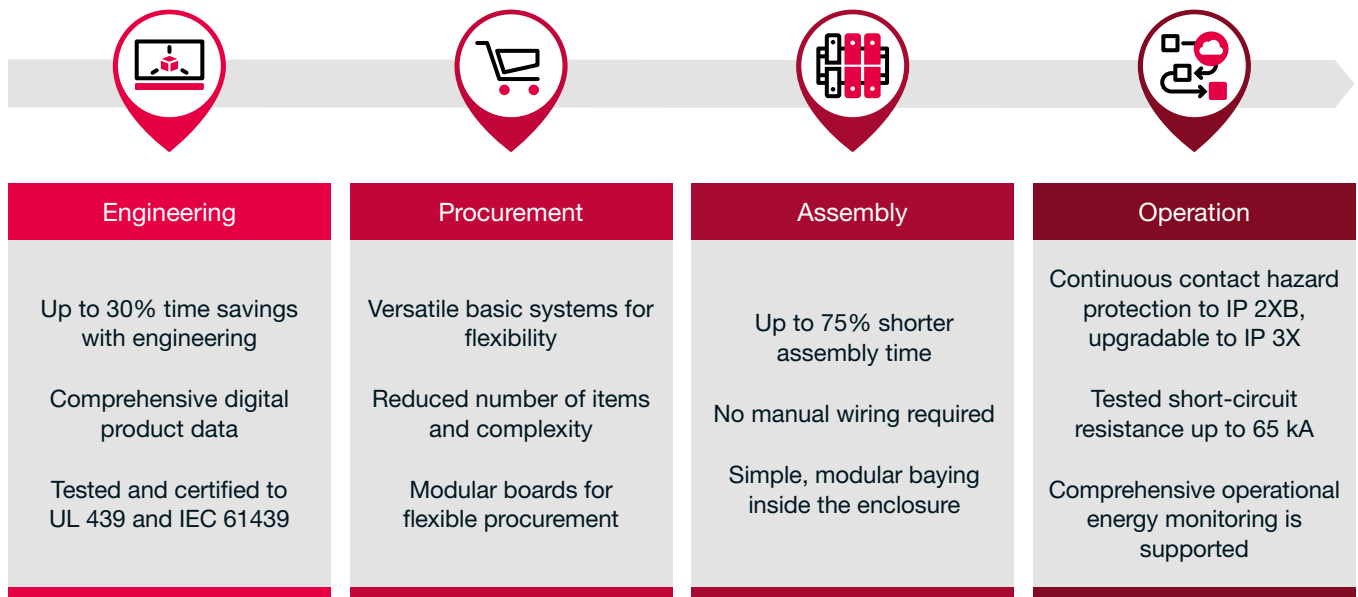


# 6 | Smart power distribution – Systematic, fast and visionary



The **RiLineX** platform boasts decisive advantages for accelerating the energy transition and our journey to an **all-electric society**.

## Benefits at a glance



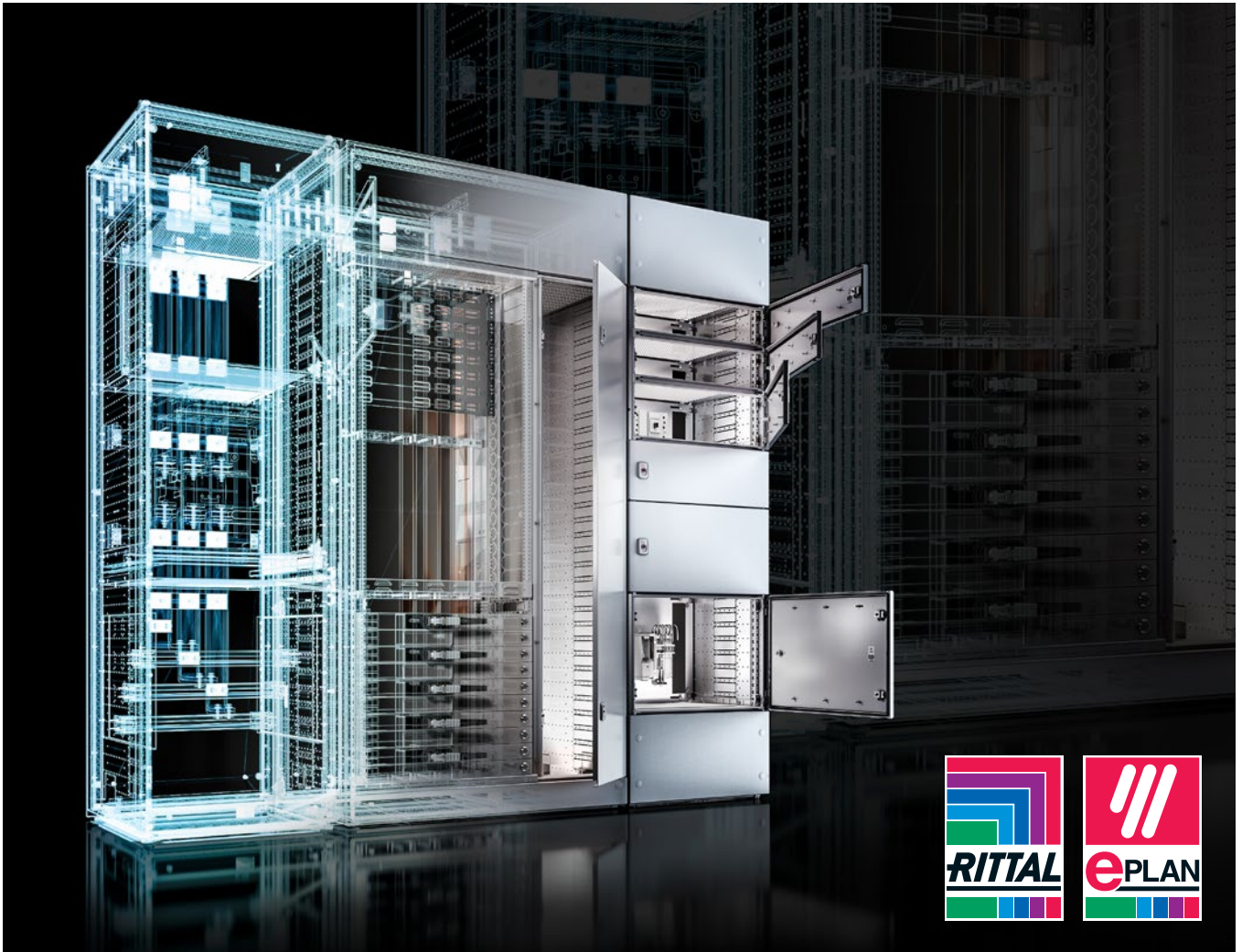
RiLineX is a seamless system solution and supports all power distribution phases, from advance planning through to energy-efficient operation. When the pressure is on to find a faster, more cost-effective way of converting our

energy systems, digital solutions can help create additional transparency and facilitate implementation.

# RiLineX

## THE POWER PLATFORM





## Engineering: Digital planning with Eplan and RiPower

The planning phase is a critical lever for optimising projects. Rittal is setting new standards with the Eplan platform and its cloud-based planning tool, RiPower. Users benefit from a streamlined, rule-based configuration which allows entire switchgear to be designed in just a few logically structured steps.

The central element is the digital twin created in Eplan. It accompanies the project throughout every phase, from engineering, to production, through to maintenance. Integrating RiPower into the Eplan cloud allows data to be integrated into other Eplan tools as well. Because planning data is reusable, this accelerates processes, reduces potential sources of error and makes the entire project process more transparent.

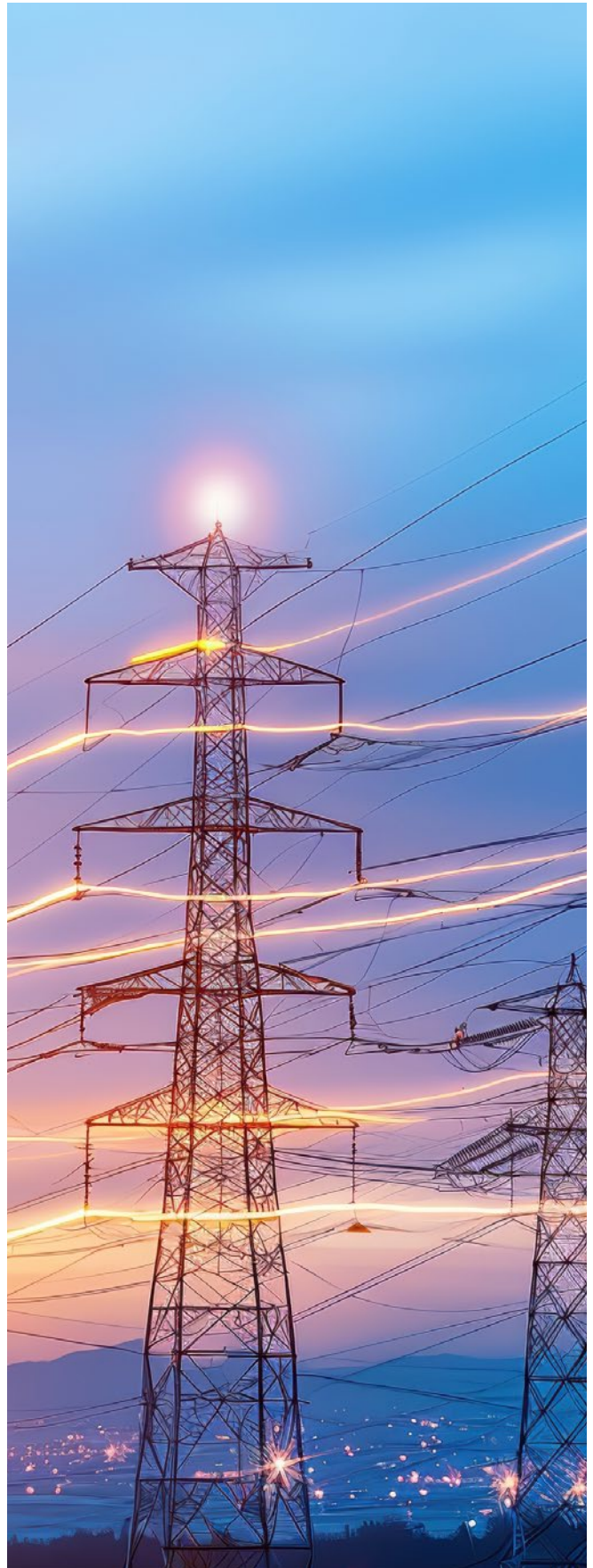
- Availability of all planning data saves up to 30% engineering time.
- Digital product data allows straightforward creation of a digital twin.
- Design verifications, parts lists and documented configurations are automatically generated.
- Cloud-based and collaborative: Project participants can access planning statuses in the cloud from anywhere in the world

## Operation: Understand energy flows with energy monitoring

There is a growing emphasis on operational energy efficiency. With integral energy monitoring solutions that include both hardware and software components, Rittal helps you to log and analyse the energy consumption of your enclosures and systems in detail.

By combining measurement technology (such as current converters) with the monitoring and analysis tool RiZone, companies can benefit from complete transparency about their energy flows, making it possible to pinpoint consumption patterns, identify peak loads and derive targeted measures to reduce carbon emissions and cut costs.

- Simple, intuitive configuration for real-time monitoring and evaluation
- Individually adaptable solutions for a wide range of application areas
- Potential energy savings are easily identified
- Contributes to sustainability and helps reduce the carbon footprint
- All components, including RiLineX, are available from Rittal





# 7 | Summary

The energy transition is one of the greatest challenges of our time. Sadly, progress towards this goal has been slow. The path to a sustainable energy supply is being hampered by regulatory hurdles, technical limitations and complex infrastructure requirements.

At the same time, it also offers an opportunity: Technological innovations can accelerate the change process and create the basis for a green, adaptable future. The development of modern platform solutions for power distribution is a prime example of such ingenuity. From time-consuming manual wiring, to standardised busbar systems, through to modular, state-of-the-art platform concepts like RiLineX, every innovation brought with it significant advantages in terms of efficiency, reliability and sustainability. These days, controlgear and switchgear are far more than simple metal boxes; they are smart, interconnected systems capable of meeting the requirements of modern technologies and Industry 4.0.

Progress is being made and leading to sustainable, scalable power distribution systems that are perfectly poised to meet the challenges of the energy transition. They boost energy efficiency, promote the integration of renewable energies and facilitate an adaptable infrastructure.

**Innovation remains the key to driving the energy transition and creating a sustainable energy future.**





# | Electrify Your System!

**Get ready for the all-electric society**

**Future-proof your systems through standardisation in the energy sector**

2025

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