Unlock Sustainability Success

brainboxes

Introduction

In an era where resource management and environmental impact reduction are critical worldwide concerns, companies are looking for innovative approaches to reduce their carbon footprint. As an essential part of this revolutionary journey, industrial automation devices have demonstrated unparalleled potential for increasing operating efficiency, reducing waste, and optimising energy usage.

Brainboxes is strongly committed to sustainability, incorporating eco-friendly practices across its operations. We have achieved ISO 14001 certification and have been awarded a bronze medal for our sustainability achievements. Our smart IIoT technology assists businesses in optimising their energy usage by providing real-time insights into energy use and equipment efficiency. By improving energy management and efficiency, our cutting-edge technology helps to reduce the environmental impact across sectors and lowers operating costs.

This eBook will provide you with a comprehensive overview of the various ways that industrial automation devices can be used to optimise energy consumption and pave the way for a more sustainable future.

Our Commitment

As part of our commitment to society, our people, and the environment, Brainboxes completes a thorough assessment of its business sustainability practices every year through **EcoVadis**, the global standard for business sustainability ratings. The EcoVadis assessment includes 21 sustainability criteria across four core themes: Environment, Labour & Human Rights, Ethics and Sustainable Procurement.

In our latest rating, completed in May 2024, we earned a bronze medal for our sustainability achievements. This rating places us in the **top 35%** globally, which demonstrates our progress towards sustainability!

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Driving Sustainability with Brainboxes

Empowering Eco-Friendly Solutions through Intelligent Technology

Our mission is to realise the 4th Industrial Revolution for all businesses, regardless of size. Brainboxes are committed to creating a sustainable future. That's why we provide the smart hardware to enable machine monitoring, connect industrial IoT projects, innovate factory automation, and make the remote feel right on site.

Watch Now

The Right Fit for your IIoT Journey

Integrating IIoT Solutions in Industrial Environments

Drive sustainability with the Industrial Internet of Things (IIoT) and Brainboxes by using cutting-edge technology to maximise resource use, reduce waste, and boost industry operating effectiveness. IIoT enables connectivity between industrial equipment, sensors, and systems, while Brainboxes provides the essential hardware solutions to support this transformation.

Apply for your Free Evaluation Program Now!

Have you got an upcoming project that might benefit from Brainboxes trusted industrial connectivity products?

Tell us more and you could qualify for a **FREE** 14 day evaluation of any product in our catalogue. Our team will review your submission and see if we could be the right fit for your IIoT journey.

Apply Now

How IIoT and Brainboxes Support Sustainability in an Industrial Setting

IIoT and Brainboxes devices work together to promote sustainability by facilitating smarter, more sustainable industrial processes, lowering resource consumption, increasing equipment longevity, and enabling optimal energy utilisation. Their combined power allows industries to reduce their environmental impact while simultaneously improving their bottom line.

Energy Efficiency

- Energy usage across various assets and processes may be continually monitored by IIoT-enabled sensors and smart devices. Businesses may find inefficient equipment or procedures and optimise them to use less energy by collecting data in real time.

- For continuous monitoring and analysis, **Brainboxes Industrial Ethernet switches** and **serial converters** facilitate smooth connections between various devices and guarantee dependable data flow. This reduces wasteful energy use, leading to lower carbon footprints.

Predictive Maintenance

- By gathering data on equipment performance, IIoT systems allow manufacturers to carry out predictive maintenance to avert malfunctions before they occur. Industries can cut down on waste and unnecessary resource consumption by prolonging the life of machinery and decreasing downtime.

- Older equipment can be upgraded into IIoT-enabled systems by using Brainboxes serial data acquisition modules, which can gather data from legacy systems. This reduces e-waste by allowing businesses to prolong the life of current machinery rather than replacing it too soon.

Water and Resource Conservation

- IIoT sensors can optimise irrigation systems and track water use in industries like manufacturing and agriculture. To cut down on waste, sensors can measure the moisture content of the soil and adjust water usage accordingly.

- These procedures can be automated with Brainboxes IO devices, which gather environmental data and trigger control systems to save resources in response to urgent demands.

Smart Manufacturing

- IIoT technologies enable the creation of smart factories, where everything from production lines to material supply is optimised for minimal waste. Data-driven choices reduce wasteful raw material utilisation and overproduction.

- The connectivity solutions offered by Brainboxes provide dependable data transfer between various equipment and systems within these factories, facilitating automation and accurate control.

Carbon Footprint Reduction

- Businesses can monitor and reduce their greenhouse gas emissions by using IIoT platforms to measure emissions from industrial operations.

- Brainboxes assist businesses in reducing the carbon emissions that come with creating and setting up completely new equipment by enabling older systems to connect to modern IIoT platforms.

Remote Monitoring and Control

- IIoT allows for remote monitoring of equipment and facilities, eliminating the need for physical inspections and travel. This is especially crucial in sectors like oil and gas, where field activities are dispersed across wide distances.

- **Brainboxes Remote IO devices** allow businesses to monitor activities from centralised control rooms, reducing emissions associated with travel and increasing operational efficiency.

Minimising Downtime and Waste

- Industries can minimise the waste that comes with halted production lines or malfunctioning equipment by leveraging real-time IIoT data to optimise operations and eliminate unscheduled downtime.

- The reliable connectivity offered by Brainboxes solutions guarantees that real-time data from every device is constantly available, reducing the possibility of communication breakdowns.

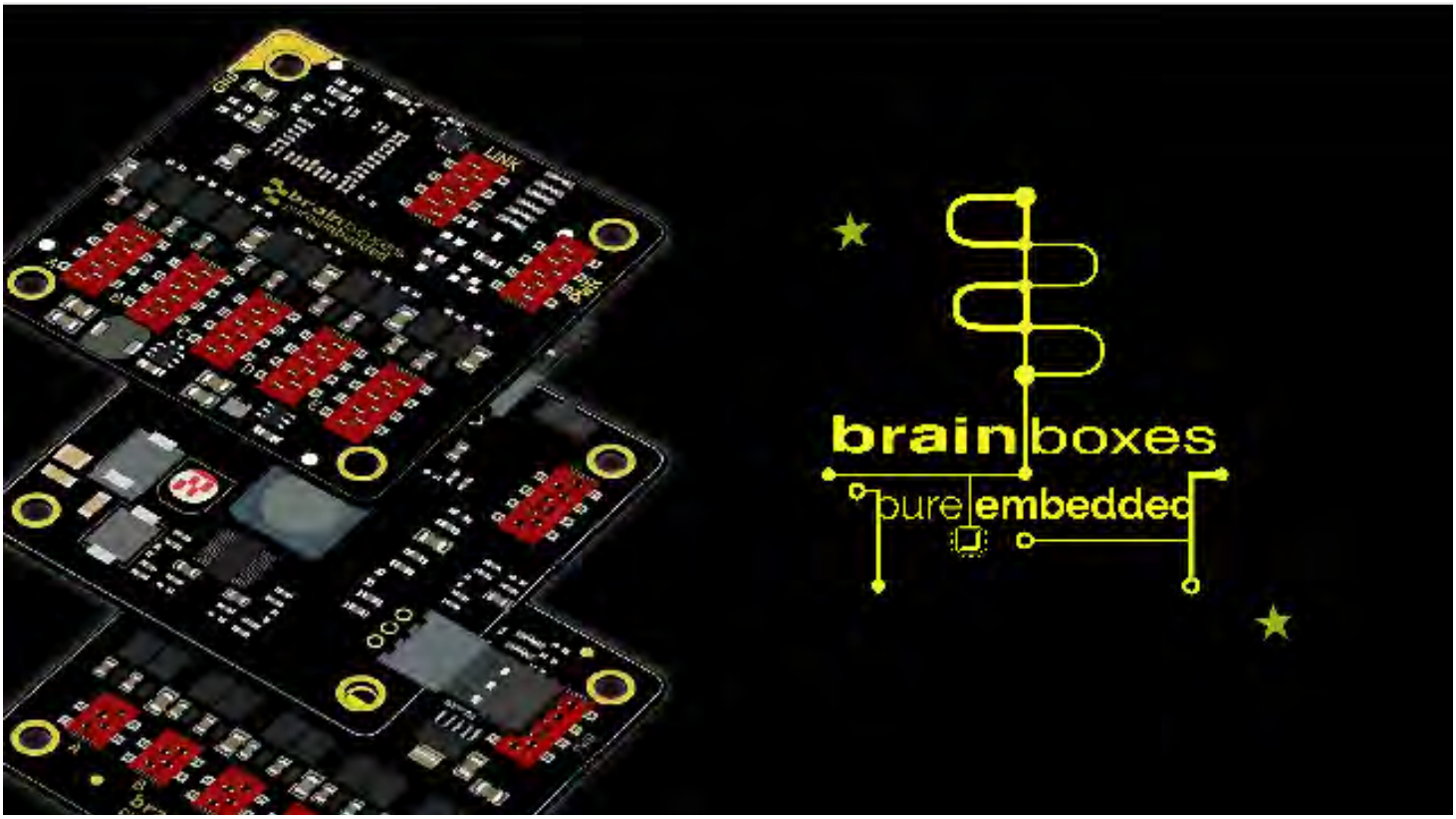
DID YOU KNOW?

Brainboxes products come with a **free lifetime warranty**, reflecting their durability and long-lasting quality. Not only does this ensure a prolonged lifespan, but it also helps conserve resources and reduce waste sent to landfills.

Register for Free

Reliable Support for Embedded Systems

Pure Compatibility, Pure Stability, Pure Design: Pure Embedded Range

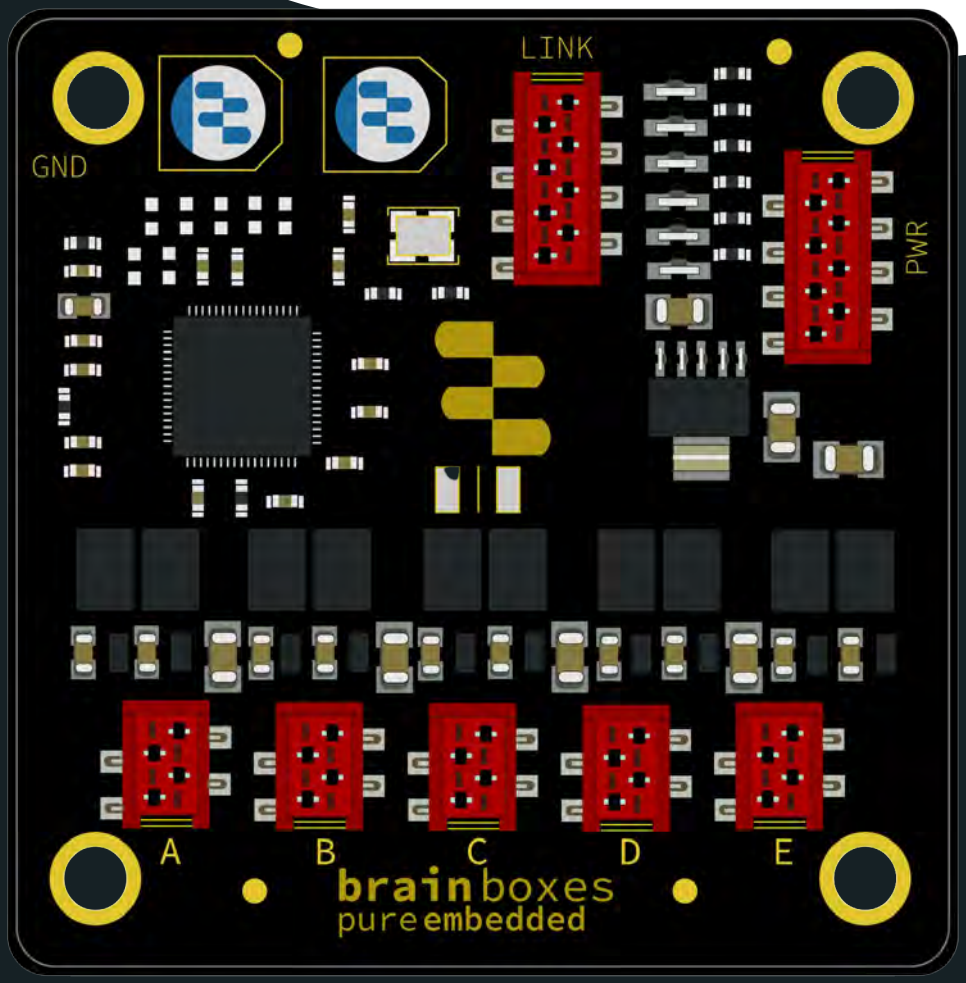


Find your perfect fit with the Pure Embedded: the next generation of embedded Ethernet! Our Embedded products are integral to your system; the last thing you need is a product that changes unexpectedly. That's why we promise availability, stability and reliability for a minimum of 10 years from product launch.

Watch Now

Pure Embedded Ethernet Switch

Low Power Consumption Reduces Energy Usage and Electricity Costs



- ✔ Mega compact form: 55x55x10mm
- ✔ Seamless integration with design software
- ✔ Board to board and board to cable connection
- ✔ 3D CAD files and PCB footprints

Shop Now

Brainboxes Pure Embedded Ethernet Switch is a versatile and energy-efficient networking solution that promotes sustainable practices throughout industrial and building automation. Using this solution can help businesses meet regulatory standards while promoting eco-friendly operations.

Pure Embedded Sustainable Benefits

Equipment Idle Times

The Pure Embedded Ethernet Switch helps to reduce downtime and stops equipment from operating needlessly by connecting and integrating IoT devices and machines. This further saves energy and reduces related emissions.

Energy Management

The Switch's dependable sensor and controller connections allow for real-time power usage monitoring. This supports low-latency communication across multiple devices, enabling better control and management of energy-intensive processes.

Monitoring and Maintenance

The remote monitoring feature makes preventive maintenance possible for monitoring renewable energy equipment It promotes the sustainable generation of renewable energy by reducing system failures and preserving peak performance.

Real-Time Process Monitoring

Real-time production line monitoring is made possible by the switch's seamless data flow capabilities, which help in identifying inefficiencies and reducing waste in manufacturing processes.

Beyond the Horizon with Pure Embedded

Smart Solution for High-Altitude Applications

Recent technological advancements have led to smart, long-duration weather balloons capable of flying hundreds of times longer compared to traditional weather balloons to circumnavigate the globe, collecting critical weather data from areas previously under-sampled or missed altogether **Brainboxes Pure Embedded Ethernet switches**, available in both 10/100 and Gigabit versions, allow optimised data transmission in weather balloon applications in several key ways.

Withstanding Extreme Weather Conditions

To address the impact of climate change, weather balloon missions have taken on unprecedented importance in gathering critical meteorological data at various altitudes within Earth's atmosphere.

Pure Embedded switches are engineered to withstand extreme conditions, operating reliably in temperatures ranging from -40°C to +85°C. This durability is essential for weather balloon missions, which expose equipment to harsh environmental conditions including rapid temperature changes and high-altitude pressures.

Collecting Real-Time Data

Advanced telemetry systems can save over 500 megatons of carbon emissions by improving ship and plane routing and accelerating the transition to renewable energy. Innovative designs, such as automatic valves, increase measurement quality and enable data collection from the same air column twice.

The high data throughput of Brainboxes Pure Embedded Gigabit switches ensures real-time transmission of this increased data volume, preserving all valuable information.

Industrial Edge Controller: BB-400

Identify Unnecessary Power Use by Monitoring Data in Real-time

- ✔ Hardware built for industry
- ✔ 8 digital IO lines & Serial
- ✔ Bluetooth for wireless sensors
- ✔ UPS power managment prevents corruption

Shop Now

Brainboxes Industrial Edge Controller (BB-400) offers flexible, remote monitoring and control. Its capacity to maximise energy utilisation, boost productivity, and improve the operation of resource-intensive processes makes it useful for a range of sustainable applications.

BB-400 Sustainable Benefits

Remote Monitoring

Using the BB-400's remote monitoring features, engineers can monitor equipment performance without needing to be on-site, which reduces travel-related emissions. Remote monitoring also ensures that machinery is running effectively, avoiding unnecessary energy use.

Grid Management

Smart grids and renewable energy sources can be effectively managed thanks to the BB-400's capability for IoT integration. It can be connected to energy storage devices, wind turbines, and solar panels, enabling smooth integration and management of energy sources.

Real-Time Monitoring

To optimise energy use, the BB-400 offers real-time monitoring of environmental and equipment data. By keeping an eye on trends of energy use, companies can cut back on wasteful use, which lowers operating expenses and carbon emissions.

Predictive Maintenance

The BB-400 can determine when maintenance is required by collecting data from sensors connected to the machinery, preventing unnecessary downtime and reducing the frequency of complete equipment replacements.

Smart Energy Monitoring

Green Revolution in Automotive Manufacturing

In an era marked by unprecedented surges in global electricity demand and energy market volatility, it's essential to understand energy costs. The first step is to monitor power consumption. For one leading Tier 1 automotive lighting manufacturer, this was achieved by retrofitting energy monitoring devices into their existing production environment.

With **Brainboxes Industrial Edge Controller (BB-400)** added to the distribution panel, they were able to monitor the power consumption of individual areas, machines, and processes, capture timestamps, and record historical usage data.

Aggregating and Visualising Plant-Wide Energy Data

By installing Brainboxes Remote IO devices to monitor additional sub -meters across their facility, data on every area, every breaker in the distribution panel, and every single Kwh of energy usage is linked and sent over the network to the BB-400 Edge Controller.

This plant-wide energy monitoring data is then aggregated by the BB-400 and can either be sent into the cloud or integrated into the existing factory monitoring system.

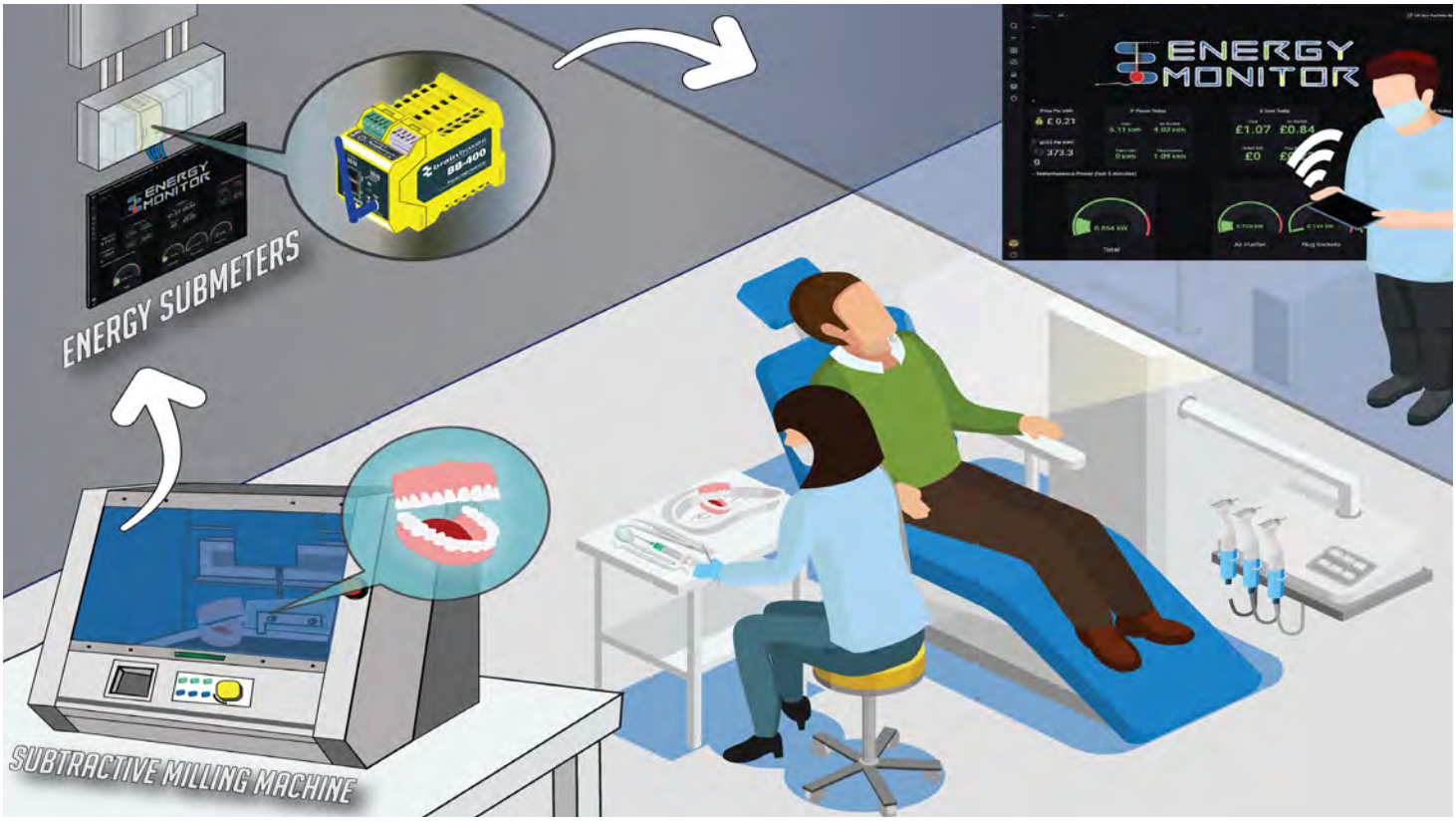
Transforming Operations with Energy Monitoring

Evolving ESG regulations, reducing carbon emissions, and accelerating sustainability drives have become not just a mandate but also an invaluable opportunity to enhance brand equity. The automotive manufacturer has transformed their operations through the capture and analysis of accurate energy data enabled by Brainboxes hardware and open-source software tools.

By embracing IIoT solutions, businesses can position themselves as pioneers in the green revolution.

Sustaining Smiles with Smart Energy Monitoring

Providing a Low-Cost, Reliable Solution



Restorative dentistry typically involves repairing or replacing damaged and missing teeth to manage diseases of the oral cavity. **Rose Lane Dental Practice (RLDP)** provides custom-made teeth that must be moulded perfectly to the patients' mouth.

Brainboxes Smart Edge Controller (BB-400) provides an industrial solution for sub-metering the process, efficiently capturing and aggregating power data from across your entire facility.

Monitoring Energy Usage with Electrical Signals

RLDP found it difficult to see how much energy their new subtractive milling machine was consuming, both historically and in real-time.

Brainboxes worked alongside Liverpool City Region Holistic to create a bespoke energy monitoring system for the dental practice. Within the system, the BB-400 is connected to sub-meters, which send an electrical signal to the BB-400 via its IO lines for every thousandth of a kilowatt hour of energy consumed.

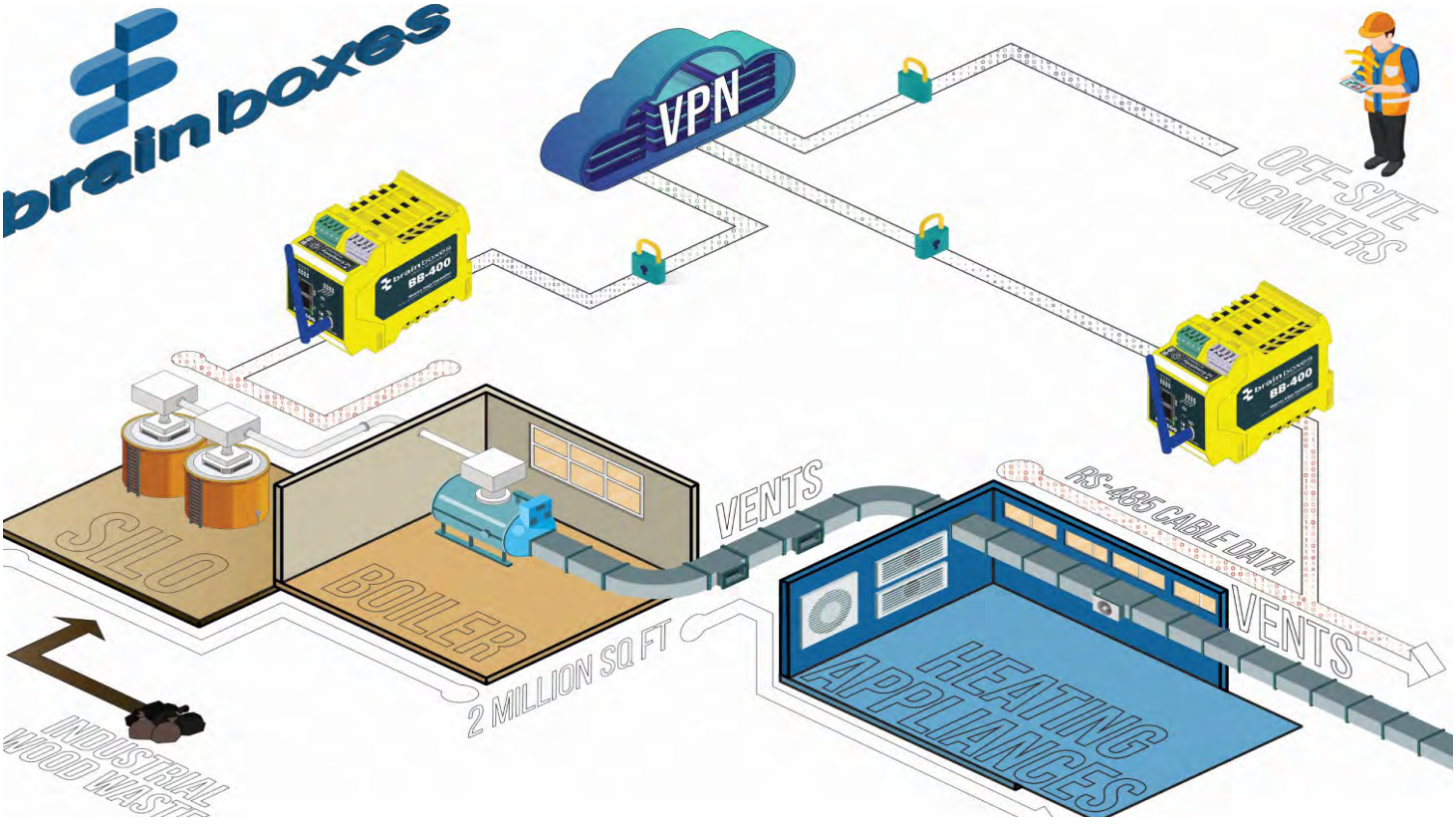
Saving Energy Costs and Reducing Carbon Footprint

Utilising the BB-400's integrated open-source software tools, the dental practice can capture and store the data from the machine. This allows the user to monitor both historical and live data.

The energy monitoring system provided the practice with the ability to log into the system to see what their energy consumption is. They could also monitor how much the machine is costing them in terms of energy usage and carbon footprint.

From Industrial Waste to Clean Energy

Fueling Smart Heating Systems



The costs associated with industrial heating and the disposal of industrial biomass can be significant, both to businesses and to the environment.

Ranheat, a leading provider of biomass energy management equipment, designs and manufactures wood waste boilers and warm air heaters that generate heat from the by-products of industrial processes rather than sending the waste to costly landfill sites.

Efficiently Accessing Complex Networks

The smart biomass heating system utilises **Brainboxes BB-400 Industrial Edge Controllers** to circumvent the need to setup expensive, complex networks with each individual company's IT department.

For the end user, it's important to be able to access their network as quickly and as efficiently as possible, and with a secure VPN client on the BB-400, Ranheat is able to offer a full solution that avoids wasting time fighting infrastructure.

Enabling Remote Monitoring of PLCs and HMIs

As the BB-400s VPN connection to the cloud is secure, Ranheat has full engineering access from offices off-site, enabling remote monitoring of the PLCs and HMIs, and allowing engineers to reconfigure processes as necessary.

For energy managers, often responsible for the planning, regulation, and monitoring of energy use in multiple facilities, the BB -400's encrypted connection to the cloud also allows off-site access to the data required to build a unified usage picture.

Ethernet to Serial: DB9 Connector

Remotely Monitor and Configure Systems to Reduce Haphazard Service Visits

- ✔ Retain existing software applications
- ✔ 1, 2, 4 or 8 ports
- ✔ Connect to remote devices as if they were attached locally
- ✔ Serial Port Tunnelling allows serial cable replacement over any distance

Shop Now

Brainboxes Ethernet to Serial (DB9 Connector) devices allow traditional equipment with RS232/422/485 serial interfaces to integrate into modern networked systems. This process is useful for sustainable applications since it increases energy efficiency and encourages resource-efficient practices.

Ethernet to Serial: Industrial

Securely Communicate Serial Data from Anywhere in the World

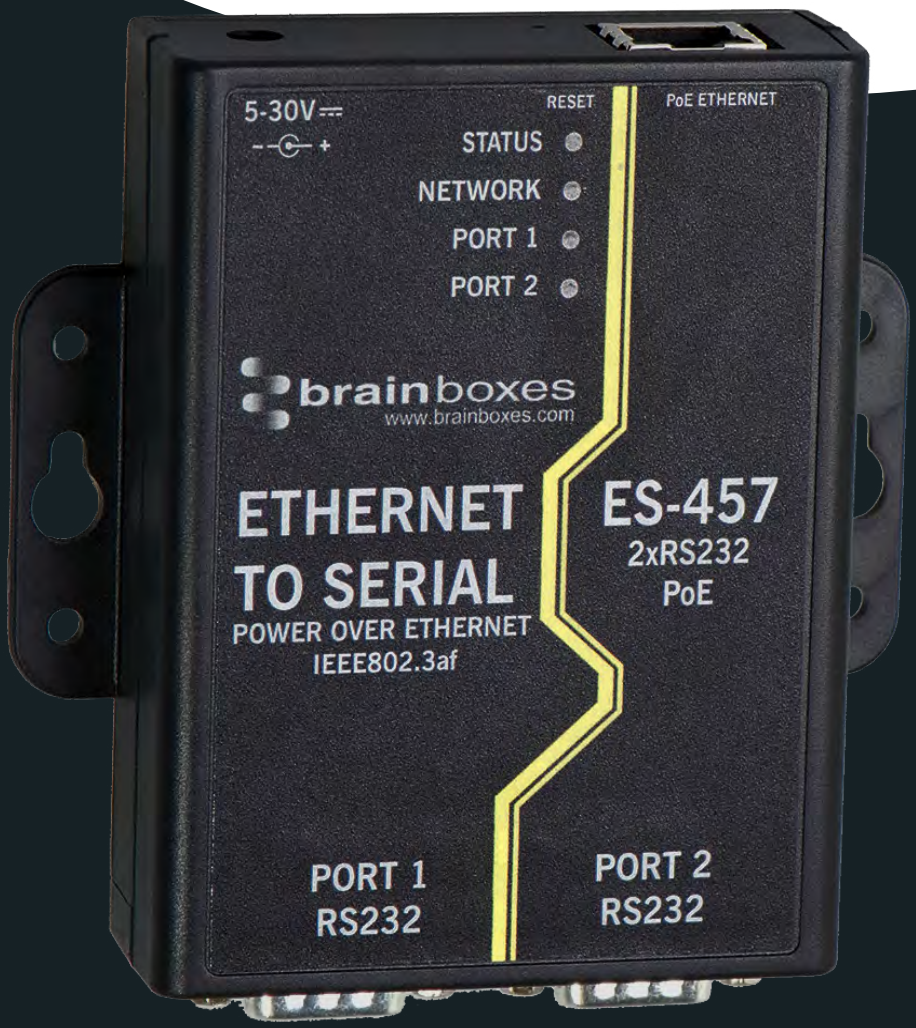
- ✔ Wide range input power supply
- ✔ Redundant dual power input
- ✔ Extended operating temperature range
- ✔ Quick and easy installation with removable screw terminal blocks

Shop Now

Brainboxes Ethernet to Serial (Industrial) devices increase the effectiveness, longevity, and adaptability of industrial systems. They facilitate the smooth transition between modern Ethernet networks and legacy Serial devices, supporting sustainability initiatives. This connection promotes remote management and waste reduction.

Ethernet to Serial: PoE

Connect to Power and a Network Through a Single Cable



- ✔ Use existing network cable
- ✔ Quick, safe and simple to install
- ✔ Convenience of multiple power options
- ✔ Convert your RS232 or RS422/485 port into a network PoE Ethernet port

Shop Now

Brainboxes Ethernet to Serial (Power over Ethernet to Serial) modules allow devices that depend on serial communications to be powered and connected through a single Ethernet cable. This technology contributes to a more sustainable and resource effective operation by supporting optimal energy consumption.

Ethernet to Serial Sustainable Benefits

Cost-Effective Retrofitting

Businesses can connect to central control systems by retrofitting existing legacy equipment with Ethernet to Serial devices rather than purchasing brand-new systems. This enables more economical and sustainable resource allocation for facilities.

Water Management

A lot of older water monitoring devices use serial ports for communication. Ethernet to Serial devices allow these systems to connect to centralised control to enable real-time monitoring, early leak detection, and optimisation of water usage.

Fleet Management Emissions

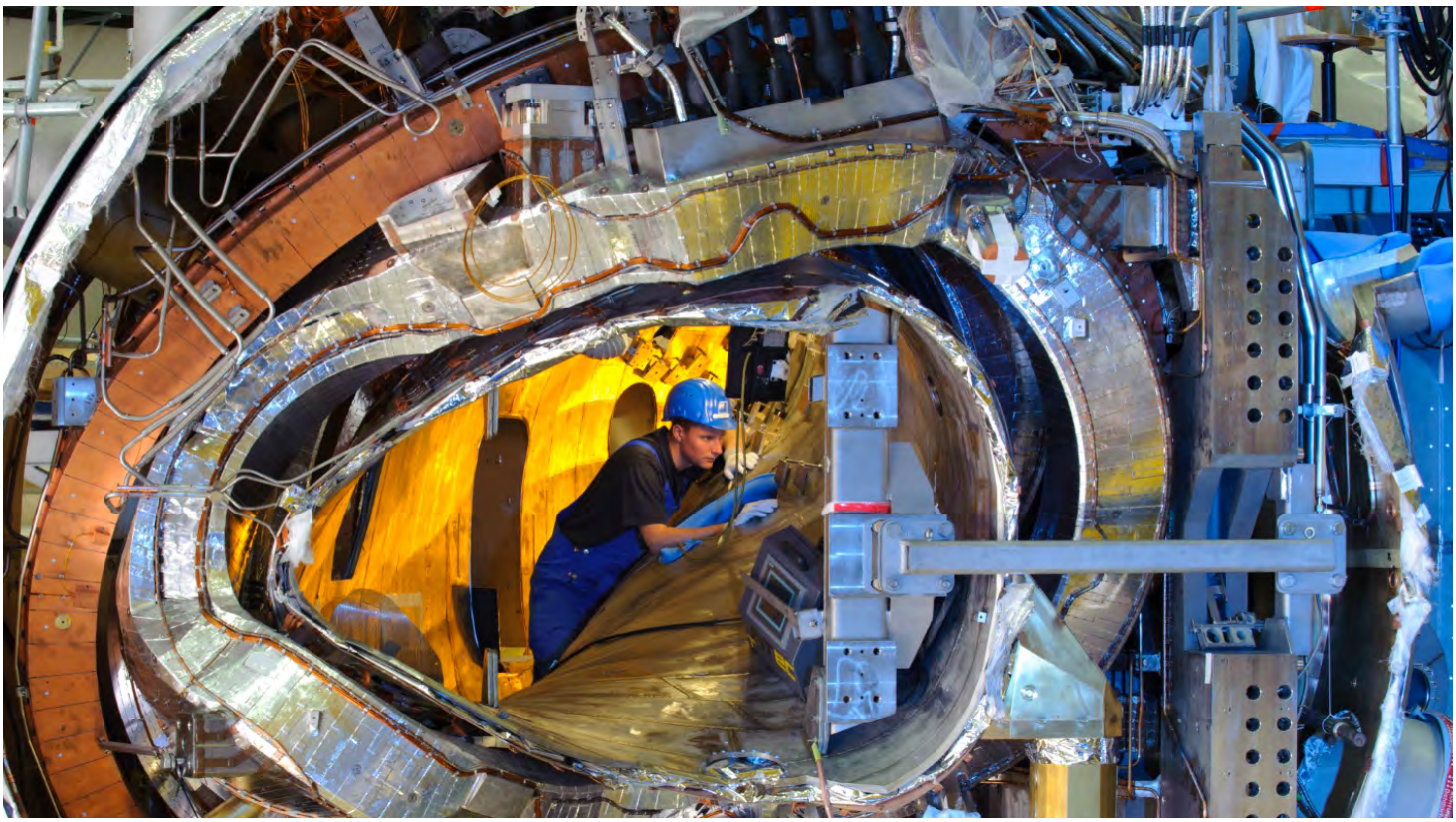
By connecting older, serial-based fleet management equipment to modern tracking systems, Ethernet to Serial devices optimise fuel use and route planning, leading to reduced emissions.

Real-Time Tracking in Warehousing and Logistics

Ethernet to Serial devices allow legacy systems, such as industrial scales and barcode scanners, to link to centralised tracking systems in warehouses and logistics centres. This increases logistical efficiency and reduces material waste.

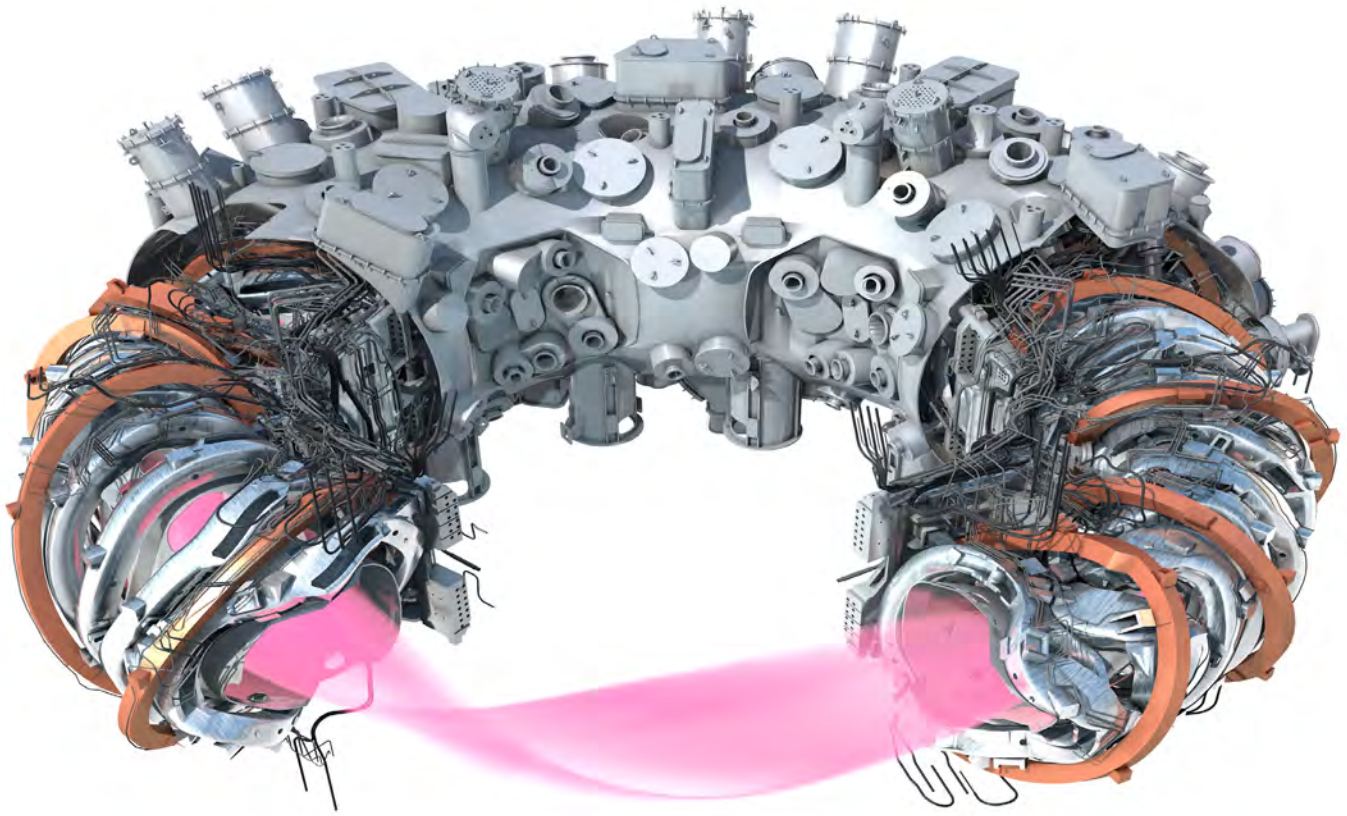
Harnessing the Power of the Sun

Is Nuclear Fusion The Energy Fuel of the Future?



Research into nuclear fusion aims to develop power plants that can generate vast amounts of climate-friendly energy: 1 gram of fusion fuel could generate 90,000 kWh, the equivalent combustion heat of 11 tonnes of coal.

The Max-Planck-Institute for Plasma Physics (IPP) focuses its research on Wendelstein 7-X based in Griefswald in Germany, the world's largest Stellerator. Its objective is to investigate the suitability of the design for a working power plant.



Remotely Monitoring Critical Data

Whilst much of the measurement hardware utilised by IPP is designed for direct readout, strict access restrictions during operation make it impossible for scientists to view HMIs or screens, so all of the diagnostics must be remotely monitored.

Brainboxes Ethernet to Serial (ES devices are used to send critical data from sensors installed in the diagnostic ports and the connected serial-bus-only controllers over the network to be remotely monitored on the PC stationed a safe distance away.

Developing Sustainable Sources of Energy

Using Brainboxes ES devices saved time and allowed IPP engineers to build the diagnostic quickly and with fewer requirements.

With the time-sensitive need to establish environmentally-sound, sustainable sources of energy, and the fact that questions about nuclear fusion can't be answered by theoretical means; clarifying it experimentally with functioning sites like IPP at Griefswald means that fusion power plants could start supplying real-world electricity as early as the second half of this century.

DID YOU KNOW?

Brainboxes automation solutions facilitate the adoption of sustainable practices by businesses. These practices include integrating renewable energy systems, automating the shutdown of idle equipment, and lowering energy use during off-peak hours.

Industrial Network Switches: SFP

Fibre Optic Uplinks Extend Network Reach and Reliability

- ✔ Higher data transfer speeds
- ✔ Immunity to EMI
- ✔ Greater bandwidth capacity
- ✔ Longer transmission distances

Shop Now

Brainboxes SFP (small form-factor pluggable) devices provide fast, dependable, and energy-efficient networking in demanding settings, making them ideal for sustainable applications. This includes supporting applications such as data centres and smart buildings for renewable energy optimisation.

Enhancing Efficiency with SFP Fibre

SFP and Sustainable Energy Management

A leading hospitality company aimed to establish an eco-resort in a remote location, operating efficiently while embracing sustainable energy practices. The challenge was integrating diverse renewable energy sources into a smart microgrid and ensuring reliable data communication.

Brainboxes SFP Industrial Gigabit Ethernet Switch offered versatile connectivity options, high-speed data transmission, long-distance communication capabilities, and network security.

Network Resilience, Security and Scalability

With Brainboxes SFP enabling the fibre-optic connections, the microgrid is less susceptible to electromagentic interference and electrical noise, reducing the risk of communication disruptions. This ensures continuous data exchange between components, even in the most remote locations.

The SFP industrial Gigabit Ethernet Switch offers scalability, allowing seamless integration of additional energy sources or loads as energy requirements evolve.

Centralised Monitoring and Control

Data from different renewable energy sources and loads is gathered and transmitted through the switch to a central control panel. This real-time data access enables operators to make impactful and informed decisions, optimise energy distribution, and respond quickly to changing energy demands.

With industrial Gigabit Ethernet, the smart microgrid can efficiently handle the vast amounts of data generated; this improved control can contribute to the eco-resort's energy efficiency goals.

Green Tech

Driving Sustainable Innovation

Smart Grids

Smart grids are electrical systems that effectively monitor and control energy flow via the use of digital communication technologies. By streamlining the flow of power from suppliers to customers, they increase dependability and cut down on energy waste.

Smart networks minimise any energy waste and reduce carbon emissions by adjusting the supply of electricity in response to current demand.

Contributions to Sustainability

Smart grids make it a lot easier to incorporate renewable energy sources like wind and solar power into the system, which lowers the carbon footprint of producing electricity.

They enable lower power generation and lower transmission losses by allowing dispersed energy resources, such as rooftop solar panels, to contribute energy back into the grid.

Energy Storage Systems

Energy storage systems allow energy to be captured and stored for later use, particularly from renewable sources.

By storing excess energy produced during periods of peak production and releasing it during periods of high demand, energy storage helps balance the unpredictable nature of renewable energy sources like solar and wind.

Establishing Renewable Energy

Stored renewable energy can be used when output is low, decreasing the need to rely on fossil fuel-based power plants as backup sources.

Large-scale energy storage systems can collaborate with electric vehicles (EVS) to control grid demand and store renewable energy for use in transportation.

DID YOU KNOW?

Brainboxes devices are frequently utilised in infrastructure that supports energy-efficient manufacturing, renewable energy management, and smart grids. Our devices assist in controlling power distribution and consumption in ways that support sustainability objectives.

Remote IO: Ethernet to Analog

Instantly Network Analog Sensors for Relevant and Real-Time Data Monitoring

- ✔ Connect any analog industry standard sensor to your network
- ✔ Monitor inputs and control outputs from any web-browser
- ✔ Interact with real-world data and applications

Shop Now

Brainboxes Remote IO Analog devices offer real-time data monitoring and control to enhance resource management, increase productivity, and reduce environmental impact. By increasing energy efficiency and optimising resource consumption, these devices play a vital role in businesses looking to adopt greener practices.

Remote IO: Ethernet to Digital

Factory Floor Process Control and Automation

- ✔ Connect digital sensors & transducers to bring data onto the network
- ✔ Monitor inputs and control outputs of your factory floor machinery from anywhere
- ✔ Know the status of your mission critical processes at any time

Shop Now

Brainboxes Remote IO Digital devices support sustainability by automating control systems, optimising resource usage, and enhancing energy efficiency. By utilising real-time data and remote access capabilities, these devices enable smarter, more sustainable decision-making in a variety of industrial applications.

Remote IO: Temperature

Thermocouple and RTD Inputs for Industrial Applications

- ✔ Monitor inputs and control outputs instantly from any web browser
- ✔ Supports simple ASCII TCP Protocol or ASCII over virtual COM port
- ✔ Deliver industrial data exacly where you need it

Shop Now

Brainboxes Remote IO Temperature devices accurately monitor temperature in real-time to help businesses maintain optimal temperatures. Using these devices can help organisations reduce unnecessary heating or cooling, leading to significant energy savings.

Remote IO Sustainable Benefits

Real-Time Monitoring

Brainboxes Remote IO devices continuously monitor important variables, including temperature, current, and voltage. Businesses can use this real-time data to identify inefficiencies and implement energy-saving measures.

Reducing Downtime and Maintenance Needs

Remote IO monitors key performance indicators, including temperature, pressure, and vibration. This can help businesses detect equipment failure. Predictive maintenance prolongs equipment life and reduces unplanned breakdowns.

Enabling Smart and Remote Monitoring

Due to their integrated Ethernet connectivity, Brainboxes Remote IO devices enable remote monitoring and control of processes and systems. As a result, fewer site visits are required, which reduces travel emissions and lowers operational costs.

Energy-Efficient Production Lines

Businesses can use Brainboxes Remote IO to automate and regulate various production stages. This will ensure that machines only operate when required, reducing idle time and energy consumption.

From Grid Dependence to Energy Autonomy

IoT Solutions for On-Site Sustainability

On-Site Energy, a leading provider of low-carbon and renewable energy centres for manufacturers, build combined heat and power (CHP) systems on-site to help their clients reduce energy costs, lower carbon footprints, and take control of their own energy supplies.

They looked to **Intelligent Industries**, a leading end-to-end industrial IoT provider, to create a bespoke solution to enable remote monitoring and control of their CHP systems across sites.

Ensuring Energy Generation Remains Compliant

Using **Brainboxes Remote IO** and **Industrial Ethernet Switches**, Intelligent Industries built a standardised industrial control panel for the On-Site energy centres with a cloud-based platform providing dashboards, reporting, and alerting.

Designed for extremely demanding environments, the Brainboxes devices within the smart system enabled Intelligent Industries to monitor signals from a variety of sources, including electricity meters, gas meters, and G100 devices.

Capturing Signals and Tracking Energy Consumption

Ethernet to Digital IO Brainboxes capture pulse signals from gas meters, enabling consumption to be further measured and tracked. Using digital signals, Remote IO devices detect faults in external equipment and monitor the status of the pump room.

Addressing the challenges of production demand, Brainboxes modules integrated with Azure IoT Hub to create a cost-effective smart system for optimising energy generation on-site.

Monitoring Machine Data in Die-Casting

Increasing Sustainability and Productivity

Manufacturers can reduce emissions using automotive die-casting. **CastAlum**, a global supplier for aluminium die-casting and machining, produces steering gear housing, transmission cases, and safety-critical suspension knuckles.

They have used **Brainboxes Remote IO modules** to develop a factory management system and remotely collect real-time data. This has helped them to maintain high productivity levels with no delay.

Capturing and Visualising Real-Time Production Events

Brainboxes Industrial Ethernet to 16 Digital Input devices are capable of monitoring any input from the machines, from TTL to high-voltage, high-current industrial devices. This provides CastAlum with a simple interface to capture and visualise production events in real-time with zero latency.

CastAlum have also been able to implement the tracking of shots as they are happening. This provides engineers with information about parts produced, cycle times, shift efficiency, and tooling life.

Saving Time and Costs for Manufacturers and Customers

By using Brainboxes Remote IO devices, CastAlum is continuing to achieve their goal of attaining the highest levels of productivity and quality.

Supervisors and engineers are freed from the administrative requirement to update systems manually and can instead rely on receiving real-time information from the machines themselves. Using devices from Brainboxes such as the ED-516 provides them with a wealth of information about the machines, including their status and shot counts.

Measuring Energy in Precision Engineering

Reducing Energy Consumption

Beverston Engineering are a manufacturer specialising in safety-critical, precision parts for aerospace, oil and gas, and pharmaceutical industries They aimed to implement quality 4.0 practices through their digital improvement project.

Brainboxes Remote IO devices make the digitisation process easier by automating the collection of data. Brainboxes were chosen to assist with the digital improvement project due to the scalability of the products.

Tracking and Reducing Energy Costs

Using Brainboxes **ED-549** combined with DataHone provided them with a system where they could track the power status to see if they are at risk of quality failures.

This provides the factory floor with an instant view of live and historical data. This helped Beverston to recognise when the machines were running. Then the engineers could switch individual machines off from the electrical distribution board to save on energy costs.

Measuring Temperature Usage

The ED-549 provided Beverston with a system where they could track the temperature to see if they are at risk of quality failures. For instance, they could see if the factory floor needed additional ventilation.

Available data also helped them to recognise the money that they could save if they invested in a cooling system. If the quality of the products was affected by the temperature, they could justify the investment ofa cooling system with hard data.

DID YOU KNOW?

Brainboxes solutions help in the early detection of possible equipment failures, resulting in fewer malfunctions, reduced downtime, and less waste from unnecessary replacement of damaged components.

Climate Change

The Urgent Call for Global Action

Impact on the Industrial Automation Industry

The need for robust, adaptable, and sustainable solutions is growing as a result of climate change.

The automation industry plays an important role in developing smart solutions for reducing and preparing for any challenges that are a direct result of climate change.

The industrial automation sector is under pressure to increase energy efficiency and lower emissions as stakeholders demand more environmentally friendly practices.

Industrial automation is crucial in enabling businesses to increase operational effectiveness, adjust to changing regulations, reduce their negative environmental impact, and promote adaptability within an increasingly unpredictable environment.

Impact

Extreme weather and rising global temperatures increase the need for energy, particularly for industrial buildings' refrigeration, ventilation and cooling systems.

The adoption of the circular economy strategy, which emphasises material and recycling reuse, is being accelerated by climate concerns

The Role of Automation

Industrial automation optimises energy use, allowing manufacturers to operate more efficiently. Energy waste can be reduced and energy efficiency objectives can be met with technology.

Automation supports the circular economy by enabling accurate material sorting, recycling and reuse within industrial systems. Robotics and machine vision are particularly useful in recycling facilities.

Impact

Natural disasters become more frequent and severe due to climate change. They disrupt infrastructure and supply systems, which effects production and delivery schedules.

Governments are tightening regulations, and consumers are becoming more eco-conscious. This encourages companies to be more accountable and transparent about their environmental impact.

The Role of Automation

Automated and digitalised supply chain solutions improve flexibility and visibility, allowing businesses to see realtime data from automated systems and respond faster to disruptions.

Automation supports industries in meeting customer and regulatory needs through transparent reporting systems, sustainable product lifecycle management, and compliance monitoring.

Mitigation and Adaptation Strategies

Mitigation (reducing emissions) and adaptation (preparing for the effects) techniques are needed to combat climate change:

Mitigation

Invest in energy-efficient systems

Change to electric transportation alternatives

Use carbon capture, utilisation, and storage technologies

Embrace a circular economy approach (recycling and reusing materials)

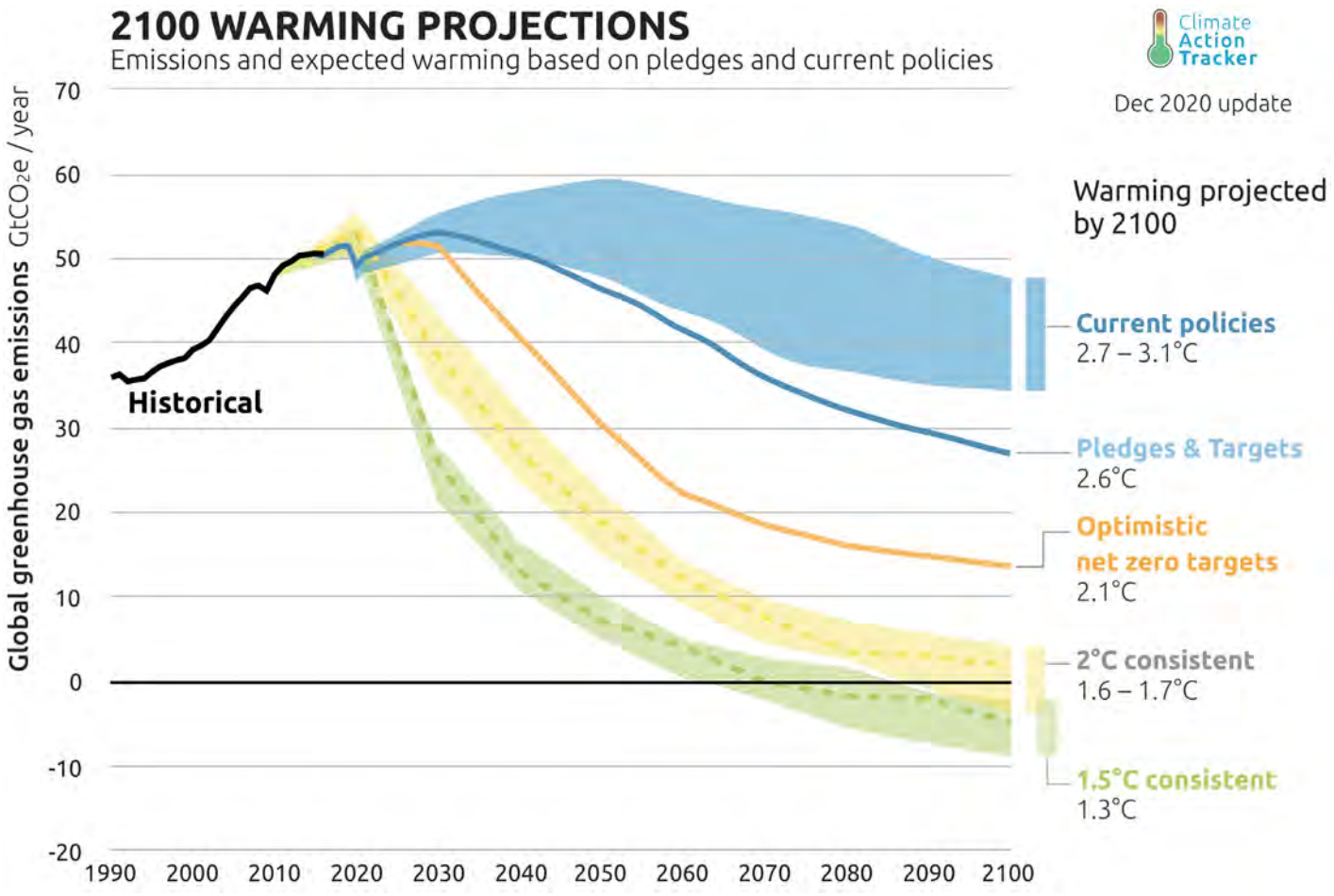
Adaptation

Design infrastructure to withstand extreme weather events

Use real-time climate data and predictive analytics

Get climate risk insurance to protect assets affected by climate change

Automate supply chain monitoring



Source: Climate Action Tracker

International Action

Adopted in 2015, the Paris Agreement seeks to keep global warming relative to pre-industrial levels to far below 2˚C, ideally 1.5˚C. However, present policies and commitments won't be enough to achieve this target, with projections suggesting warming of 2.4–3˚C by 2100 under current trajectories.

Sustainability Regulations and Policies

Governments throughout the world are putting more pressure on businesses to address climate change by enacting strict sustainability laws and policies. Crucial areas to consider involve Net Zero goals, supply chain transparency, and brand reputation. It's anticipated that as climate change accelerates and laws tighten, these government regulations will intensify.

Net Zero Targets

Regulations: Businesses must reach net-zero carbon emissions by the mid century, with many governments imposing intermediate targets around 2030. This aligns with the Paris Agreement which aims to keep global warming well below 2˚C above pre-industrial levels.

Corporate responsibility: Businesses must disclose their emissions and frequently show that their greenhouse gas emissions have decreased from year to year. For instance, organisations must decarbonise across scopes 1, 2, and 3 emissions (direct, indirect, and supply-chain related) in order to meet the UK's legislative obligation to Net Zero by 2050.

Transparency in Supply Chains

Regulations: To guarantee sustainable behaviour across supply chains, transparency is becoming more and more important. Companies are required to report their environmental impacts and practices along the supply chain, from material procurement to end-of-life disposal, under the UK's Supply Chain Transparency Act and The European Union's Corporate Sustainability Reporting Directive (CSRD).

Market Expectations: Investors and consumers increasingly demand thorough environmental disclosures, and noncompliance may result in financial fines and reputational damage. These specifications promote resource efficiency, ethical sourcing, and a decrease in supply chain environmental effects.

Brand Reputation

Regulations: Strict anti-greenwashing laws have been put in place by several countries, requiring businesses to make verifiable statements reagrding their environmental effect. This includes transparency regarding sustainable practices and honest marketing.

Public Relations: Companies that are caught greenwashing risk fines from the government as well as damage to their reputation. True accountability becomes more and more of a question of public trust as consumers, investors, and regulators want clear evidence of sustainable practices.

Future Outlook: Growing Accountability

As governments continue to tighten regulations to combat climate change the significance of these laws will only grow. Proactively implementing sustainable practices will provide businesses with a competitive advantage in meeting regulatory standards and establishing a strong reputation.

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Corporate Sustainability Practices

Building a Resilient Future

Businesses are making sustainability top priority as environmental, social, and governance (ESG) issues gain traction. Using sustainable methods lowers long-term operating costs, enhances brand reputation, and benefits the environment.

Companies can embrace sustainability through a number of important tactics, with a particular focus on supply chain management, corporate social responsibility (CSR), and sustainability reporting.

Supply Chain Management

A sustainable supply chain aims to reduce waste, protect the environment, and ensure ethical conduct throughout the production and distribution process.

Companies can collaborate with suppliers who adopt sustainable practices, such as recycling materials and using renewable energy. Businesses may also choose to use raw materials that are ethically sourced. For instance, purchasing Fair-Trade certified products or materials from companies that support biodiversity and avoid deforestation.

Sustainable Technology and Transportation

Technology such as IoT, AI and blockchain can monitor resources and ensure transparency and accountability across the supply chain. This increases productivity, reduces environmental impact and builds trust with consumers.

Businesses can reduce their transportation emissions by replacing traditional vehicles with electric or hybrid options to significantly reduce carbon emissions. They can also optimise vehicle loads to reduce the number of trips required, decreasing overall fuel usage and emissions.

Corporate Social Responsibility (CSR)

Corporate Social Responsibility (CSR) focuses on social, ethical, and environmental issues. CSR involves recognising the positive impact that companies can have on society.

Key strategies include:

- **Participating in environmental initiatives** - companies can engage in activities including water conservation, reforestation, and carbon footprint reduction. These activities can appeal to environmentally concerned customers while also reducing environmental damage.

- **Encouraging ethical decision-making** - buisnesses can improve CSR by promoting ethical decision-making, making their operations more transparent, and involving stakeholders in reaching long-term sustainability objectives.

- **Establishing fair labour practices** - a critical component of CSR involves treating employees ethically. This focuses on maintaining a safe working environment, preventing child labour, and promoting human rights within the organisation and throughout the supply chain.

- **Seeking global sustainability accreditations** - selecting suppliers that have sustainability accreditations, such as **EcoVadis**, enables businesses to comply with global standards and demonstrates a dedication to tackling global issues. This includes cutting carbon emissions, supporting fair trade and fostering sustainable development.

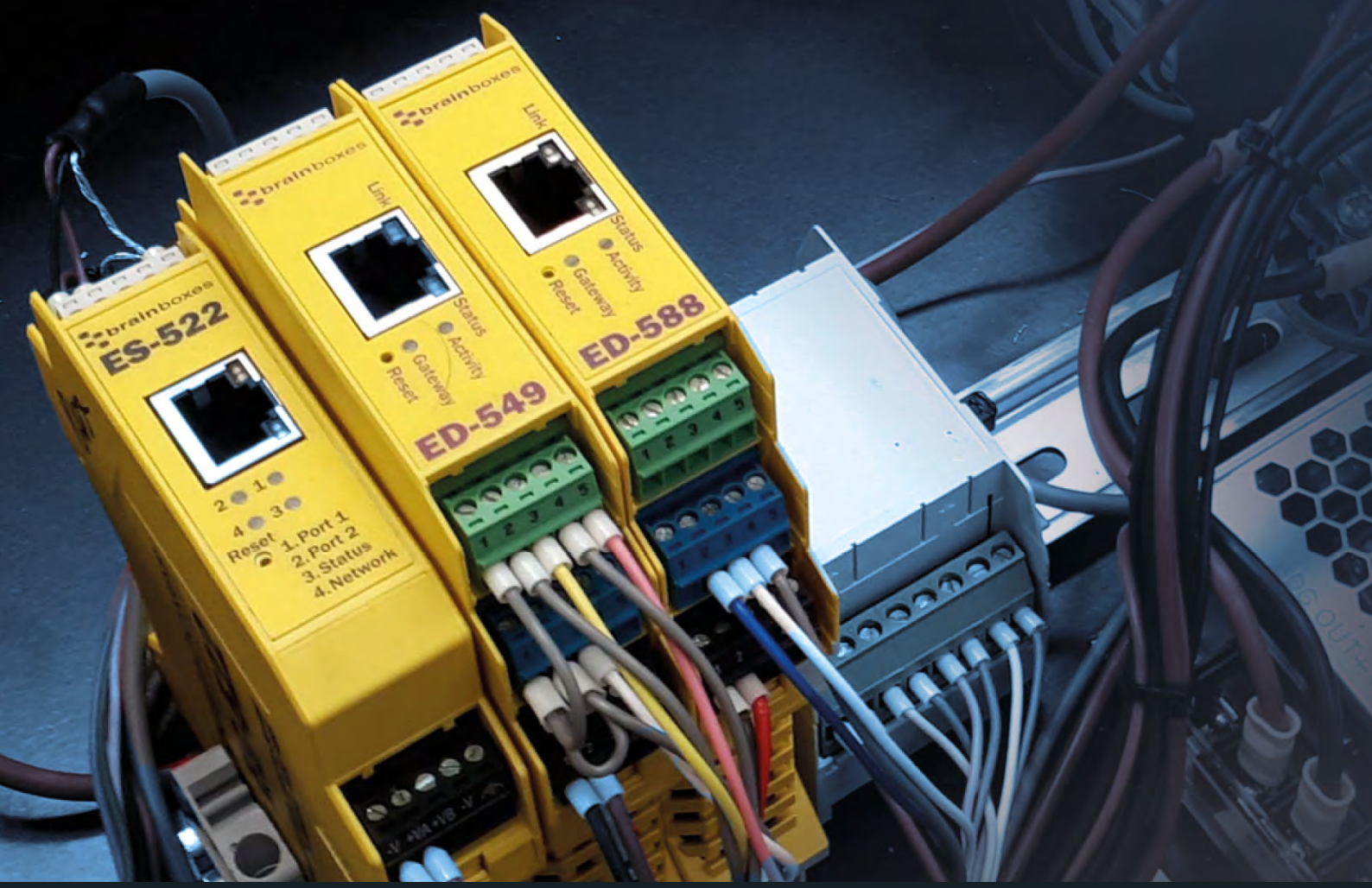
Sustainability Reporting

Businesses can track and report their impact on the environment and society through sustainability reporting. Crucial factors of successful sustainability reporting are:

- **KPIs and ESG metrics** - companies should track and report specific environmental, social, and governance metrics. This includes carbon emissions, water and energy usage, diversity in leadership, and community impact.

- **Integrated reporting** - combining financial and non-financial data in integrated reporting will highlight the connection between sustainability success and financial performance, giving stakeholders a comprehensive view of the company's long-term value.

- **Third-party verification** - third-party verification of sustainability reports can ensure that the reported data is accurate and reflects the company's true environmental and social impact.



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