100 energy saving applications using variable speed drives and low voltage motors
No.1
Customer: Aberthaw Power Station
Application: Fans
Industry: Power generation
Challenge: Aberthaw is a coal-fired power station with a capacity of 1,600 MW. To light the three boilers, the power station uses 36 oil-injecting lances on each boiler. Oil from the lances is blown into the boiler by fans at two rates – a high flow rate to light the coal and a low flow rate to sustain and support the burn. Previously, the fans were driven by direct-on-line motors, which made it difficult to get the correct oil flow rate required – too much air and the flame will blow out, while too little air risks too much oil entering the boiler, causing potentially dangerous combustion conditions. ABB authorised value provider APDS was asked to supply a solution.
Solution: 32 x 7.5 kW ABB variable speed drives were installed on selected oil-injecting lances.
Benefits: • Air flow rate can be adjusted to suit – high speed for ignition, low speed for sustaining the combustion • Savings of £350,000 on oil costs • Drives offer high heat resistance, allowing them to operate in temperatures up to 30°C
No.2

Customer: ABN
Application: Fans, grinders, compressors
Industry: Animal feed production
Challenge: ABN produces 1.7 million tonnes of feed per annum from ten mills located throughout the UK. It wanted to improve the energy efficiency of key processes such as cooler fans, grinders, grinder extractor fans and air compressors and asked ABB authorised value provider Inverter Drive Systems to investigate.

Solution: 33 ABB industrial variable speed drives, rated from 7.5 to 200 kW, to replace direct-on-line starting.

Benefits:
• Average 30 percent energy saving
• Better product size control on the grinders
• Quieter working environment

“Grinding machines produce different sized stock depending on the speed, so using variable speed drives allows us to vary the size of the feed to suit customers’ needs. Using the ABB solution allowed us to retrofit the drives onto our existing grinders rather than buy new variable speed grinders.”
Supply chain director, ABN

No.3

Customer: Acrivarn
Application: Industrial ovens
Industry: Original equipment manufacturer (OEM)
Challenge: The manufacturer’s ovens have turntables to rotate racks of food during the baking process. Rapid acceleration of the direct-on-line motors powering the turntables jolted the racks. This caused ingredients to splash, resulting in an unsightly product and creating a mess that then took time to clean. Acrivarn turned to ABB authorised value provider Halcyon Drives to provide a solution.

Solution: A 0.55 kW ABB general machinery variable speed drive controls the turntable motor. The drive’s soft start function eliminates the jolt when the racks rotate.

Benefits:
• Improved end product quality
• Reduced cleaning time
• Drives’ safe torque-off function has made the ovens safer, enabling Acrivarn to achieve EN ISO13849 accreditation

Project managed by ABB authorised value provider Inverter Drive Systems Ltd
Ilkeston: 0115 944 1036
www.inverterdrivesystems.com

Project managed by ABB authorised value provider Halcyon Drives Ltd
Leeds: 0113 236 1509
www.halcyondrives.com
No.4

Customer: Amtico
Application: Pumps, cooling towers
Industry: Flooring
Challenge: Specialist flooring manufacturer Amtico conducted a major programme of energy saving. This included controlling cooling tower and recirculation pumps more efficiently. Originally, the cooling tower pump, controlled by a star-delta start-up technique, ran constantly at 120 bar, when only 80 bar was needed. ABB authorised value provider Sentridge Control made suggestions of how the pumps could be run more efficiently.

Solution: A 55 kW ABB variable speed drive on the main cooling tower pump, and 22 kW and 30 kW ABB drives on the recirculation pumps, run the pump motors to match actual demand.

Benefits:
- £15,000 reduction in energy costs
- 220 tonnes of CO$_2$ saved each year
- Reduced maintenance costs, as motors no longer operate at constant full speed

“In reality, our energy consumption is constant, but we are producing over 45 per cent more flooring. We are managing our energy consumption far more wisely that we did in the past.”
R&D director, Amtico

Project managed by ABB authorised value provider
Sentridge Control Ltd
Coventry: 024 7655 3303
www.sentridge.com

No.5

Customer: Anglian Water, Blackhouse Lane
Application: Pumps
Industry: Water & wastewater treatment
Challenge: The borehole at Blackhouse Lane is one of two that feed a reservoir. Both pumps ran at fixed speed all of the time but had to be turned off frequently as the reservoir had reached capacity. This was inefficient as it was pumping more water than needed. The frequent stopping and starting of the pumps was also causing excess turbidity. Anglian Water asked Gibbons Engineering Group, an ABB authorised value provider, to perform an energy assessment.

Solution: A 132 kW ABB variable speed drive at Blackhouse Lane controls the speed of the pump motor to match demand. The other borehole pump, without a VSD, runs at full speed to provide most of the demand.

Benefits:
- Saved £2,000 in energy costs
- Reduced turbidity

“Previously, running both pumps at full speed meant that the borehole pump at Blackhouse Lane could not take up the slack if the other failed – now if the pump fails it can ramp up the pumping rate to compensate.”
Works technician, Blackhouse Lane

Project managed by ABB authorised value provider
Gibbons Engineering Group Ltd
Maldon: 01621 868138
www.gibbonsgroup.co.uk
No.6

Customer: At-Bristol
Application: Air conditioning units
Industry: Buildings
Challenge: At-Bristol, a science centre and Millennium Project based at Bristol harbourside, was experiencing excessive noise from air conditioning units in a conference room and auditorium. Turning the air conditioning off solved the noise problem, but the air quality rapidly deteriorated. Solutions involving extensive ducting were prohibitively expensive.

Solution: Four ABB 2.2 kW variable speed drives were installed, one for the incoming and one for the outgoing airflow in each room. A potentiometer on the wall allows the speed of the drives to be varied from 30 to 50 Hz.

Benefits:
- Noise from the air conditioning units is reduced
- The centre is now seeing an increase in hiring rates

“The speed control makes all the difference. People using the rooms can adjust it to their own requirements - at half speed we can hardly hear the air conditioning yet it still provides plenty of fresh air.”

Technical services director, At-Bristol

No.7

Customer: Atlantic Plastics
Application: Injection moulding machine
Industry: Plastics
Challenge: Atlantic Plastics of Bridgend, South Wales, makes fittings for water utilities and the distribution market. The company wanted to cut energy use and had identified its two 400 tonne injection moulding machines as energy intensive. An investigation by ABB authorised value provider APDS showed that the existing direct-on-line installation used 25.3 kW.

Solution: A 10.5 kW ABB variable speed drive switches the machine's motor to a lower speed during the off-load part of the pressurising cycle.

Benefits:
- 20 percent reduction in energy costs
- Avoids alterations to hydraulic system needed by alternative method
- Payback in 12 months, beating customer goal of two years

“We are very pleased with the results of the project. We intend to put similar solutions on our remaining 35 injection moulding machines.”

Engineering manager, Atlantic Plastics

Project managed by ABB authorised value provider APDS Ltd
Bristol: 01179 822 049
www.apds.co.uk
No.8

Customer: Bairds Malt
Application: Germination vessel
Industry: Food & beverage
Challenge: Bairds Malt supplies 250,000 tonnes of malt annually to brewers and distillers. Bairds uses a 15-tonne trolley, known as a turner, to constantly agitate the barley during the germination process. Powered by a single motor operating at a fixed speed, the turner was unable to slow down to negotiate blockages. Trying to drive through would cause a spike in current, causing it to break down. Bairds designed a new system and asked Gibbons Engineering Group, an ABB authorised value provider, to design and supply the control package.

Solution: An ABB industrial drive controls four gear motors on the corners of the turner. If a spike in current is detected, signaling a blockage, the drive reduces the speed of the motors, giving the turner time to work through the obstruction.

Benefits:
- Stoppages reduced to zero
- Improved safety for staff as the turner no longer moves out of place
- Energy use cut by reducing the amount of work the gear motors have to do

Project managed by ABB authorised value provider
Gibbons Engineering Group Ltd
Maldon: 01621 868138
www.gibbonsgroup.co.uk

No.9

Customer: Bedford Hospital
Application: Air handling units
Industry: Healthcare
Challenge: Bedford Hospital is a 370-bed acute district general hospital serving patients in North and Mid Bedfordshire. Inverter Drive Systems (IDS), an ABB authorised value provider, approached the hospital with a proposal to investigate its motor-driven fan applications with a view to using variable speed drives to cut energy use. The air handling units in the hospital’s maternity and pathology departments were connected direct-on-line, with no form of speed control. IDS identified four units that could be quickly and easily retrofitted, with minimal disruption.

Solution: Four 11 kW ABB variable speed drives and one each of 7.5 kW, 15 kW and 3 kW.

Benefits:
- Drives run fan motors to match demand, saving energy costs of £15,000 a year
- Payback in only 11 months
- Motors run quieter
- Less wear and tear, reducing maintenance

Project managed by ABB authorised value provider
Inverter Drive Systems Ltd
Ilkeston: 0115 944 1036
www.inverterdrivesystems.com
No.10

Customer: Belton Park Golf Club
Application: Pumps
Industry: Sports ground / stadia
Challenge: Belton Park is a 27-hole, 250-acre course in Grantham, Lincolnshire. Three pumps feed up to 500 individual sprinklers on the fairway, greens and tees from a 12 million gallon reservoir. The control panel for the pumps failed and couldn’t be repaired, requiring staff to operate the system manually. ABB authorised value provider Inverter Drive Systems proposed three variable speed drives to replace the control panel.

Solution: Three ABB variable speed drives controlling the three pumps.

Benefits:
• Drives communicate with each to maintain required pressure automatically
• Enhanced pump life through lower wear and tear
• Easier diagnostics to locate faults

No.11

Customer: Birmingham Hippodrome
Application: Pumps, fans
Industry: Buildings
Challenge: Birmingham Hippodrome is a 1850-seat theatre in the Chinese quarter of Birmingham. It wanted to reduce its costs by improving the energy efficiency of the pumps and fans in its HVAC system. In preparation, it upgraded its Building Management System to use BACnet, a communications standard specially developed for building services. ABB supplied HVAC variable speed drives designed to communicate over BACnet.

Solution: 29 ABB HVAC variable speed drives ranging from 2.2 kW to 30 kW control the motors on the pumps and fans.

Benefits:
• Pump motors use between 25 percent and 30 percent less electricity
• Energy costs for ventilation system cut by between 28 percent and 30 percent
• Easier monitoring of HVAC plant performance

Project managed by ABB authorised value provider Inverter Drive Systems Ltd Ilkeston: 0115 944 1036 www.inverterdrivesystems.com
No.12

Customer: Blackburn Hospital
Application: Pumps, air handling units
Industry: Healthcare
Challenge: Blackburn Hospital has 668 beds and 14 operating theatres. It was the first major building in the UK to use the BACnet communications protocol to control its building services. This required BACnet capable variable speed drives to control the motors driving the hospital’s air handling units and water pumps.

Solution: 100 ABB HVAC variable speed drives with native BACnet capability.
Benefits: • Rapid commissioning in 15 minutes compared to three hours for non-BACnet drives
• Improved energy efficiency due to running motors to match demand

No.13

Customer: Bourne Leisure
Application: Pumps
Industry: Swimming pools
Challenge: Bourne Leisure, which owns brands such as Haven, Butlins and Warner Leisure hotels, has swimming pools at a number of its properties. ABB authorised value provider APDS was asked to investigate the energy saving potential for the swimming pools and a trial was conducted on two of the three filtration pumps at Bourne Leisure’s Devon Cliffs site.

Solution: Monitoring the pumps with a temporary variable speed drive fitted demonstrated that considerable energy savings could be made. The direct-on-line pumps were working at 50Hz drawing an average of 30 A. When the drive was introduced, this figure was reduced to 23 A during the day and 15 A at night, with no effect on water quality. ABB drives ranging from 3.3 to 30 kW were eventually installed in 36 Bourne Leisure owned pools around the country.

Benefits: • Cost savings of £77,000 a year by running filtration pumps to meet actual demand
• Total project payback time of one year

Project managed by ABB authorised value provider
APDS Ltd
Bristol: 01179 822 049
www.apds.co.uk
No.14

Customer: BPI Films
Application: Winders
Industry: Plastics
Challenge: BPI Films of Sevenoaks in Kent produces 13,000 tons of plastic film a year for customers in the food and medical packaging industries. The company has a slitter-rewinder, which it uses to rewind film produced by other machines. The machine was operated using old hydraulic gears, with ABB motors but without encoders and drives. The hydraulic gears proved inefficient and unreliable and were subject to breakdown and therefore needed a lot of maintenance.

Solution: Two 7.5 kW drives - one as the main drive to regulate the speed of the machine by driving a rubber covered roller, while the other drives the winder core shaft.

Benefits: • The main drive reduced the demand of the principal motor from 22 A per phase to 7 A per phase, a saving of 66 percent
• Overall energy saving of 33 percent
• More reliable than hydraulic system

No.15

Customer: Bradford Royal Infirmary
Application: Air handling units
Industry: Healthcare
Challenge: Bradford Teaching Hospitals NHS Foundation Trust provides acute hospital care services for the people of Bradford and neighbouring communities. The Trust wanted to save energy as part of introducing the CRC Energy Efficiency Scheme. This included a policy to conserve energy and minimise investment costs by optimising the phased replacement of older motors and specifying variable speed drives on all future motors. The drives for this project were supplied and commissioned by ABB authorised value provider Halcyon Drives. Installation and commissioning had to be carried out without disrupting critical air handling operations.

Solution: 28 ABB HVAC variable speed drives rated from 0.75 kW to 30 kW were installed on air handling units across sites at Bradford Royal Infirmary and St Luke’s Hospital.

Benefits: • Expected cost savings of more than £26,000 per year
• 110 tonne annual reduction in CO₂ emissions

Project managed by ABB authorised value provider Halcyon Drives Ltd
Leeds: 0113 236 1509
www.halcyondrives.com
No.16

Customer: **Brintons Carpets**

Application: Spinning frames

Industry: Textiles

Challenge: Brintons Carpets is the UK’s leading premier carpet maker. The company wanted to increase the production capacity of spun yarn, while eliminating motor spare parts, lowering maintenance costs and saving energy. All of the spinning frames for the yarn were DC controlled. As the existing DC motors were obsolete, spares were not readily available. The 75 kW motors needed regular maintenance, with each one requiring 12 carbon brushes to be exchanged every year at a total cost of about £5,000. Brintons worked with ABB authorised value provider Sentridge Control and asked about the feasibility of a DC to AC conversion.

Solution: 12 AC motors and 12 ABB variable speed drives.

Benefits: • Improved power factor avoided need to replace transformers and substation equipment
• Easy to maintain
• Simple programming of drives
• 504,000 kWh saved, a reduction of 25 percent

Project managed by ABB authorised value provider Sentridge Control Ltd
Coventry: 024 7655 3303
www.sentridge.com

No.17

Customer: **Bristol Water**

Application: Pumps

Industry: Water & wastewater treatment

Challenge: Bristol Water wanted to improve the energy efficiency of pumping equipment at its Purton pumping station. The pumping station, which has a capacity of 70 mega litres per day, takes water from a canal and pumps it to a water treatment works downstream. The original installation used direct–on–line starters, which were unable to match flow to demand. Bristol Water asked APDS, an ABB authorised value provider, to improve the installation.

Solution: Two transformers, three new pump ends with ABB Eff1 high efficiency motors and three 400 kW ABB industrial variable speed drives.

Benefits: • Energy consumed by the site’s 40 mega litre pumps reduced from 560 kW to 240 kW, an improvement in efficiency from 68 percent to 87 percent
• Better flow control, with flow matched to demand
• New drives and pumps are low voltage so operators do not need high voltage experience

Project managed by ABB authorised value provider APDS Ltd
Bristol: 01179 822 049
www.apds.co.uk
No.18

**Customer:** British Ceramic Tile  
**Application:** Grinder  
**Industry:** Ceramics  
**Challenge:** The fluid coupling at British Ceramic Tile (BCT)’s production facility in Devon connected a motor to a gearbox, and regulated the speed of a drum which grinds the frit used in the glazing of tiles. The fluid coupling suffered failures resulting in oil leakage from temperature hot spots. Plastic coated coupling pins also needed regular replacement, adding to maintenance costs. BCT invited ABB authorised value provider APDS to investigate replacing the fluid coupling with a variable speed drive.

**Solution:** A 45 kW ABB general purpose drive replaced the fluid coupling, providing greater reliability than the mechanical solution.

**Benefits:**  
- Energy saving of 30 percent compared with fluid coupling – equal to £4,800 per year  
- Improved speed regulation  
- Protection to IP54 allows the drive to resist water sprays when the mixer is being cleaned

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No.19

**Customer:** British Telecom  
**Application:** Air handling units  
**Industry:** Buildings  
**Challenge:** Castle Wharf, a large BT site housing offices together with a 24-hour call centre, is staffed by approximately 900 people. The HVAC system needed to be refurbished and BT also wanted to install variable speed drives for energy saving. Fans were not speed controlled, leading to a large waste of energy. Car park ventilation was not needed at night and needed to be controlled. BT also wanted a BACnet based Building Management System (BMS), allowing it to zone the building and introduce time controls to take account of occupancy patterns.

**Solution:** 18 ABB HVAC drives, ranging in size from 5.5 to 30 kW, run air handling unit supply and extract air fans at the site.

**Benefits:**  
- Electricity costs reduced by 23 percent  
- Reduction in gas usage to 12 percent due to better control of the HVAC system  
- ABB BACnet native drives can be easily connected to the new BMS

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Project managed by ABB authorised value provider APDS Ltd  
Bristol: 01179 822 049  
www.apds.co.uk
**No.20**

**Customer:** Byworth Boilers  
**Application:** Boilers  
**Industry:** Original equipment manufacturer (OEM)  
**Challenge:** Byworth Boilers manufactures steam, hot water and waste heat boilers, with capacities ranging from 250 to 18,000 kg/hr. A boiler needs to provide a constant flow of feed water to its heat exchanger. However, demand for process steam causes the temperature, pressure and flow rates of water and steam to constantly change. Working with ABB authorised value provider Halcyon Drives, Byworth identified the proportional integral derivative (PID) loop control within ABB variable speed drives as a way of stabilising water and steam flow.  
**Solution:** Each boiler is fitted with an ABB machinery drive, ranging from 1.1 kW to 20 kW, dependent on the boiler flow rate.  
**Benefits:**  
- PID control ensures the boiler uses the correct amount of energy to heat the water to meet the actual steam demand of the process  
- Boilers now produce a more consistent steam supply  
- Better control makes the customer’s plant safer by maintaining correct operating temperatures and pressures  

Project managed by ABB authorised value provider Halcyon Drives Ltd  
Leeds: 0113 236 1509  
www.halcyondrives.com

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**No.21**

**Customer:** Capital Valley Plastics  
**Application:** Extruders  
**Industry:** Plastics  
**Challenge:** Capital Valley Plastics produces gas barriers, damp proof membrane and damp proof course at its plant near Pontypool in South Wales. The company uses several blown film extruders, which it was keen to make more efficient and productive. The extruders use bespoke DC motors, which were becoming increasingly expensive and difficult to replace and maintain. ABB authorised value provider APDS visited the site to assess what was needed.  
**Solution:** ABB 200 kW IE3 AC motor together with an ABB variable speed drive.  
**Benefits:**  
- Savings of between 10 and 15 percent on power use per tonne on the refurbished machine  
- Power usage and costs are easy to see, allowing more accurate quotes for products  

“Because we’re getting live readings of our power usage from the drive, we can see how this changes with different products. This helps us quote a more accurate selling price for our products because we have better information on what it costs to produce them.”  
Project manager, Capital Valley

Project managed by ABB authorised value provider APDS Ltd  
Bristol: 01179 822 049  
www.apds.co.uk
No.22

Customer: Castlegate Business Park
Application: Air handling unit
Industry: Buildings
Challenge: The Castlegate Business Park provides a range of accommodation for offices and light industry. Originally, the fans in the air handling unit (AHU) were driven directly by the motor via a pulley system. The speed of the motor could not be altered and offered no potential for saving energy. An activity that generated large amounts of heat had ceased, leaving the AHU with more capacity than required. ABB authorised value provider APDS was asked for a solution.

Solution: Two ABB variable speed drives, a 22 kW drive on the supply fan and a 15 kW drive on the air extract fan, control the speed of the fan motors to match actual demand.

Benefits: • Energy costs reduced 70 percent
• Annual saving of over £6,000
• Payback time of 16 months

Project managed by ABB authorised value provider APDS Ltd
Bristol: 01179 822 049
www.apds.co.uk

No.23

Customer: CBRE
Application: Pumps, fans
Industry: Buildings
Challenge: Harbour Exchange Tower is a 46,500 square metre office development near Canary Wharf in London. When the building was completed, in 1989, only the most energy intensive applications were speed controlled. Maintenance contractor CBRE asked Inverter Drive Systems, an ABB authorised value provider, to identify applications that could be made more efficient.

Solution: 18 ABB HVAC variable speed drives, rated from 5.5 kW to 37 kW, were installed on the motors controlling hot water pumps, chilled water pumps and toilet supply and extraction fans.

Benefits: • £15,000 reduction in electricity costs in six months
• Drives display energy use in kWh, CO₂ reduction and money saved, helping CBRE to monitor and fine-tune processes to ensure optimal energy use

“The fact the drives display CO₂ savings was particularly important to us. At the same time their compact size made installation very easy.”
Technical supervisor, CBRE

Project managed by ABB authorised value provider Inverter Drive Systems Ltd
Ilkeston: 0115 944 1036
www.inverterdrivesystems.com
No.24

Customer: Celsa Manufacturing  
Application: Roller table  
Industry: Steel  
Challenge: Celsa Manufacturing’s plant in Cardiff has a roller table with 80 rollers to transport finished steel billets. There are four variable speed drives each controlling four banks of 20 roller motors. Celsa’s existing roller table drives were obsolete. The existing drives could not be interrogated to discover what they are doing or what condition they were in. It was also becoming difficult to source spares for them. ABB authorised value provider APDS was asked to provide a solution.

Solution: A 125 A ABB general purpose drive sized to control 20 motors via scalar control. A further three drives will be installed in due course, with installation taking place during scheduled plant shutdowns to avoid unnecessary downtime.

Benefits:  
• Easy interrogation via ABB’s DriveWindow Light  
• Predicted 30 percent energy saving  
• More compact than previous solution, with fewer components

Project managed by ABB authorised value provider  
APDS Ltd  
Bristol: 01179 822 049  
www.apds.co.uk

No.25

Customer: Celtic Anglian Water  
Application: Pumps  
Industry: Water & wastewater treatment  
Challenge: Celtic Anglian Water (CAW) operates the Ringsend wastewater treatment works. This has three 90 kW pumps to transfer accumulated water from six storm tanks back to the plant for treatment. The pumps were prone to ragging, caused by debris fouling the pump inlet and preventing the pump from operating normally. Pumps had to be removed, and cleaned, entailing 16 hours labour costs for each blocked pump. ACS Drives and Control Systems, an ABB authorised value provider, was asked to provide a solution.

Solution: Each pump motor is controlled with an ABB variable speed drive for water and wastewater treatment applications. This features an anti-ragging technique to clean pumps of debris.

Benefits:  
• Pumps no longer need to be lifted for cleaning  
• Maintenance costs and out of service hours cut  
• Reliability of storm drain system improved

Project managed by ABB authorised value provider  
ACS Drives and Control Systems Ltd  
Mullingar: 00 353(0)44 934 0242  
www.acsdrives.ie
No.26

Customer: Cherry Valley Farms
Application: Chillers, fans
Industry: Food & beverage
Challenge: Cherry Valley Farms of Lincolnshire rears eight million ducks every year and processes 45,000 birds a day. Ten blast chiller bays each have two 4 kW motors turning fans that blow air over coils of ammonia to produce a blast of very cold air. The fans need to operate 24 hours a day, as switching them off would cause them to ice up. Cherry Valley Farms asked Inverter Drive System, an ABB authorised value provider, to investigate ways it could reduce energy use.

Solution: 20 ABB HVAC variable speed drives, two for each blast chill bay. In production, the drives run the motors at 45 Hz, giving a 25 percent energy saving. Outside production hours, the motors are slowed further to 30 Hz, producing a 60-70 percent saving.

Benefits: • Saving of £30,000 a year on energy costs
• Less damage to the fans

"As well as the energy saving, we expect that the slower start up achievable by the drives could lead to fewer fans breaking up, which we sometimes experienced with direct-on-line control.”

Factory engineering manager, Cherry Valley

No.27

Customer: Claridges
Application: Fans
Industry: Buildings
Challenge: Luxury hotel Claridges in London wanted to lower energy costs and reduce CO2 output as part of a kitchen refit. Previously the cooker hood system was consuming over 450 kWh per day, with the fans running at 100 percent at all times. Ventilation control system specialist Food Industry Technical (FIT) was asked to install a new system to cut energy use.

Solution: FIT installed its Cheetah™ cooker hood extraction system into the kitchen. This incorporates two 11 kW ABB HVAC variable speed drives to control the extraction and supply fans. The system has sensors measuring temperature, smoke, steam and airflow in the extract and supply ducts to determine the fans’ optimum flow rates, enabling conditions in the kitchen to remain constant at all times.

Benefits: • Total energy savings of over £10,000 a year
• Energy consumption down to 315 kWh per day
• 50 tonnes of CO2 per year saved
**No.28**

**Customer:** Corus Strip Products, Port Talbot  
**Application:** Pumps, fans  
**Industry:** Steel  
**Challenge:** The Corus site at Port Talbot in Wales is one of the biggest steelmaking plants in the UK with an annual output of five million tonnes. The challenge involved pumps on the hot strip and cold mills, plus three fans on the coke ovens - pumps recirculate cooling water in the mills, while the fans are used for dust extraction at the coke ovens. The motors on these applications were oversized and running longer hours than necessary, wasting energy.

**Solution:** 24 ABB industrial drives, ranging from 140 to 400 kW, now run the pump and fan motors to match actual demand, saving energy.

**Benefits:**  
- Saving of £1 million in energy costs  
- Running to demand improves control, potentially resulting in better product quality  
- Low voltage drives used to save space

"With the ABB drives we are now installing, we can fine-tune the applications to a degree that just wasn’t possible previously.”

Energy optimisation team leader, Port Talbot

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**No.29**

**Customer:** Coutts and Co.  
**Application:** Pumps  
**Industry:** Buildings  
**Challenge:** Coutts & Co, the international private banking arm of Natwest Group, was keen to improve the efficiency of the HVAC system at its main office in London. Pumps for chilled, hot and condenser water, as well as medium pressure water for the boiler room, were running at 100 percent continuously. It asked ABB to look at providing a more efficient method of control.

**Solution:** One 4 kW, one 22 kW and two 75 kW drives are now driving the pump motors, running them at 40 percent speed to meet actual demand.

**Benefits:**  
- Cost savings of £7,000 a year  
- Lower pump speed reduces wear, cutting maintenance

“The hot water is used more efficiently, saving gas. Before, we would pump water out at 40°C at get it back at 40°C. Now, the return water is at 32°C.”

Facilities manager, Coutts & Co.
No.30

Customer: **D&D Engineering**

Application: Conveyors

Industry: Original equipment manufacturer (OEM) / food & beverage

Challenge: D&D Engineering (Hull) makes conveyors and product handling equipment, mainly for customers in the food industry. It had an order for a tomato handling machine for grower John Baarda. The tomato handling conveyors needed to match the speed of the packing machine and ensure that the tomatoes are packed quickly and accurately. D&D Engineering asked ABB to provide a solution to control the conveyors.

Solution: The two feeder conveyors are each driven by an ABB machinery drive in master-slave configuration, with the master receiving an encoder signal from the wrapper. This drive knows where the wrapper is in its cycle and can control the speed of the conveyor precisely to ensure the tomatoes arrive at the wrapper at the correct time.

Benefits:
- Processes 70 to 80 packs per minute compared to mechanical method of 60 packs a minute
- Product menus on the drives allow different products to be run on the conveyor with quick changeovers

No.31

Customer: **Dyson**

Application: Fans

Industry: Buildings

Challenge: Dyson vacuum cleaner prototypes are put through their paces with a battery of tests that include their ability to remove dust from surfaces. The dust produced for these tests needs to eventually be extracted to maintain a safe and healthy atmosphere. It is extracted from several test points by a motor-driven fan. Originally controlled direct-on-line via a star-delta arrangement, this motor drew a large starting current that was causing fuses to blow regularly, causing significant downtime. Dyson asked ABB authorised value provider APDS to provide a solution.

Solution: A 55 kW ABB variable speed drive. A pressure sensor is used to determine the flow rate needed and the drive changes the fan speed instantaneously to match this demand.

Benefits:
- Annual energy cost saving of over £6,000
- Reduced noise in the test area

“We got good support from ABB and APDS from the beginning. They also helped us setting up the pressure sensor and finding the correct set point to give the best operation.”

Integration team leader, Dyson test facility

Project managed by ABB authorised value provider APDS Ltd
Bristol: 01179 822 049
www.apds.co.uk
No.32

Customer: **East of Scotland Water**
Application: Pumps
Industry: Water and wastewater treatment
Challenge: Howden Water Treatment Works near Selkirk is run by Scottish Water. The site also comprises a borehole pumping station. Four pumps at the boreholes serve a common contact tank. Scottish Water wanted to match the rate of filling of the main storage tanks to demand. This would limit the number of stops and starts required and reduce the damaging effects of surging, known as water hammer. Over time, this can result in burst pipes, causing possible injury to operators. Scottish Water asked ABB authorised value provider EDC (Scotland) to develop a solution.

Solution: Eight ABB variable speed drives are used on the two applications – four on the pumping station and four at the treatment works. The drives allow demand to be smoothed out, reducing the sudden stops and starts that lead to water hammer.

Benefits:
- Avoids damaging water hammer
- Matches pump speed to demand, saving energy
- Active harmonic filters limit the distortion to the supply at the point of common coupling

Project managed by ABB authorised value provider **EDC (Scotland) Ltd**
Erskine: 0141 812 3222
Gateshead (NE office): 0191 917 0200
www.edcscotland.co.uk

No.33

Customer: **Edinburgh Design Limited**
Application: Testing facility
Industry: Off-shore
Challenge: The world’s first circular wave and tidal current test facility is located at the University of Edinburgh’s King’s Buildings campus. Using paddles to generate waves, the facility allows realistic testing of off shore installations such as wind farms. Main contractor Edinburgh Designs asked ABB to provide the motors and drives to control the motion of the paddles.

Solution: The velocity, position and force feedback of each of the 168 paddles is controlled by its own ABB MotiFlex e100 servo drive, used to generate long-crested straight waves and fast currents. In addition, 28 submerged flow-drive units drive current across the tank, driven by a permanent magnet synchronous motor, speed controlled by an ABB variable speed drive rated at 46 kW.

Benefits:
- Drives give precise control of simulated sea states
- Active front ends mitigate the impact of harmonics on the mains supply
### No.34

**Customer:** Edinburgh Royal Infirmary  
**Application:** Air handling units  
**Industry:** Healthcare  
**Challenge:** Edinburgh Royal Infirmary is one of the UK’s largest acute teaching hospitals. A vital aspect of its operations is to maintain a clean air supply in its wards and operating theatres. The air handling units have been divided into critical and non-critical applications. All of the 20 operating theatres are classed as critical applications. The operating theatres need a filtered airflow with a maintained air volume. As static pressure builds up over the air filters, variable speed drives need to compensate for the reduction in flow rate in order to maintain the air volume.

**Solution:** Over 100 ABB variable speed drives, of varying sizes, are used for the hospital’s air handling applications. The Building Management System monitors the system for any reduction in performance, signalling the drive to increase the airflow accordingly, or maintaining a reduced airflow to save energy.

**Benefits:**  
- Maintains correct air flow in all areas  
- Minimises energy use  
- RFI filters ensure drives do not interfere with medical equipment

### No.35

**Customer:** Emirates Stadium  
**Application:** Aerator  
**Industry:** Sports ground / stadia  
**Challenge:** Arsenal Football Club’s Emirates Stadium has an advanced heating and drainage system designed to maintain the health of the pitch. An extremely large fan in the plant room provides air to the turf or can aid drainage. A control method was needed that could ensure the fan was run at the correct speed to maintain the pitch, while preventing damaging harmonics that could interfere with TV transmissions. The solution was provided by ABB authorised value provider Central Group (formerly Central Electrical).

**Solution:** ABB motor and a 160 kW ABB low harmonic drive.

**Benefits:**  
- The ABB drive adjusts air movements at ground level according to pre-set variables or the ground staff’s requirements  
- When no air is required, the ABB drive powers down the system to save energy  
- Low harmonic drive avoids interference with TV cameras

Project managed by ABB authorised value provider Central Group  
Liverpool: 0151 546 6000  
www.gocentral.co.uk
No.36

Customer: Experian
Application: Air conditioning units
Industry: Data centres
Challenge: Experian’s Fairham House data centre in Nottingham has a 2,000 square metre production floor with over 2,000 servers. 26 air conditioning units blow cooled air under the floor through grills to cool the servers. Previously, motors running the air conditioning units were used direct-on-line, with no form of speed control. ABB authorised value provider Inverter Drive Systems (IDS) was contacted for advice on variable speed drives.

Solution: 26 air conditioning units were each fitted with a 15 kW ABB drive for HVAC. They save energy by matching the speed of the air conditioning fans to actual demand.

Benefits:
• Energy cost saving of £140,000 a year
• Annual CO₂ emissions reduced by 1300 tonnes
• No need to install extra air conditioning as the site grows

“We are very pleased with the drives project, as it contributed to an overall saving of eight percent on our energy bill for the units, some £144,000, with a payback time of 15 months.”

Technical facilities manager, Fairham House data centre

Project managed by ABB authorised value provider Inverter Drive Systems Ltd
Ilkeston: 0115 944 1036
www.inverterdrivesystems.com

No.37

Customer: Express Asphalt
Application: Fans
Industry: Aggregates
Challenge: Express Asphalt produces 40,000 tonnes of asphalt a year. A dryer in the form of a rotating drum dries the aggregate at a temperature of 150 degrees centigrade, creating steam and dust. These are extracted by an exhaust fan. Because the 90 kW fan was run at full speed with its output damped, it was wasting a lot of energy. The company asked Invertech Solutions to look at ways of controlling the exhaust fan with a variable speed drive. ABB authorised value provider Beta Power supplied the drives.

Solution: A 110 kW ABB standard variable speed drive installed on the fan motor. The fan has its damper set fully open and the dryer pressure is controlled via a pressure transmitter feeding a signal back to the drive.

Benefits:
• With drives on other parts of the dryer, the plant is saving £25,200 a year in energy costs
• Reduced noise in drying area
• Fewer breakdowns

Project managed by ABB authorised value provider Beta Power Engineering Ltd
Stockport: 0161 432 9995
www.beta-power.co.uk
No.38
Customer: Firth Rixson
Application: Fans
Industry: Metals
Challenge: Firth Rixson manufactures 1,500 tonnes a year of rings, forgings and special metals for a range of engineering uses. Dust extraction in the fettling and de-scaling plant is provided by a 75 kW extraction fan. Previously the fan motor was connected direct-on-line and run constantly. However, because not all machines run simultaneously, there was often more extraction capacity than needed, wasting energy. ABB authorised value provider Halcyon Drives was asked to find a solution.

Solution: A 75kW ABB industrial drive was installed to control the extraction fan motor. The drive saves energy by reducing the speed of the fan to meet actual demand.

Benefits:
• 20 percent reduction in energy costs
• Saving of 44 tonnes of CO₂
• Lower air flow cuts abrasion of the ducting by metal dust

Project managed by ABB authorised value provider Halcyon Drives Ltd
Leeds: 0113 236 1509
www.halcyondrives.com

No.39
Customer: Flowserve
Application: Pumps
Industry: Original equipment manufacturer (OEM)
Challenge: Flowserve, a leading provider of fluid motion and control products and services, needed a method for quick and easy testing of its new pump variants at different speeds. ABB authorised value provider Inverter Drive Systems was asked to design a solution.

Solution: Five ABB IP54 wall-mounted variable speed drives ranging from 11 kW to 132 kW to match the five ABB motors on two test benches. The drives allow motor speeds to be varied without the need to put a different motor on the test rig.

Benefits:
• Pumps can be tested at various speeds as required by customers
• Data acquisition system gives instant access to the measurement data of the pump under test

“We also have calibrated torque meters permanently installed on the motor shafts to accurately output the motor power absorbed. With the torque reading and the accurate speed of the drive we can determine the power absorbed and use this to accurately determine the efficiency of the pump.”

Engineering manager, Flowserve

Project managed by ABB authorised value provider Inverter Drive Systems Ltd
Ilkeston: 0115 944 1036
www.inverterdrivesystems.com
No.40

Customer: Fox’s Biscuits
Application: Mixers
Industry: Food & Beverage
Challenge: Fox’s Biscuits of Batley, West Yorkshire, is well known for its high quality biscuits. The company was interested in saving energy on its ten Baker Perkins dough mixers, each of which is driven by an 18.5 kW slip-ring motor. ABB authorised value provider Halcyon Drives was asked to investigate how the energy use of the mixers could be improved.

Solution: An ABB induction motor driven by an ABB standard variable speed drive. This achieves energy savings by driving the mixer at the appropriate speed for the product.

Benefits:
• 30 percent energy saving
• Ability to run at best speeds for product avoids crushing delicate ingredients
• Motor has greater torque enabling easy turning of harder doughs

“With the drive-controlled mixer, we can experiment by using different speeds throughout the mix, from as low as two rpm to 50 or 60 rpm, depending on the recipe.”

Area engineering manager, Fox’s Biscuits

Project managed by ABB authorised value provider Halcyon Drives Ltd
Leeds: 0113 236 1509
www.halcyondrives.com

No.41

Customer: Freightliner Limited
Application: Cranes
Industry: Freight
Challenge: Freightliner is the largest intermodal rail freight company in the UK. On its crane at Garston, Liverpool, the existing DC drives and relay-based control system were becoming unreliable, causing increasing downtime. With no spares available and fault finding becoming difficult, the system was becoming expensive to maintain. Freightliner asked Drives and Automation, an ABB systems integrator, to modernise the drive and control system and make it more reliable.

Solution: Four ABB DC variable drives – one for the hoist, two for the long travel and one for the cross travel. The drives include software to ensure accurate control of the hoist movement is maintained at all times.

Benefits:
• Reduced downtime
• Increased production

“We are extremely pleased with the way the project was handled by Drives and Automation. From project conception through to commissioning, Drives and Automation showed great professionalism and would be highly recommended on future projects.”

Crane engineer, Freightliner
No.42

Customer: General Domestic Appliances Limited
Application: Fans
Industry: Manufacturing
Challenge: General Domestic Appliances manufactures 12,000 cooking products a week for its Creda, Hotpoint and Cannon brands. The company decided to look at the energy consumption of its wet fume extraction plant, which extracts waste vitreous enamel from four paint booths. Some of the booths were not in constant use and were closed off by a mechanical shutter, yet the 132kW extraction fan was run at a constant speed, wasting energy and money. ABB authorised value provider Central Group was asked to assess energy use and come up with a solution.

Solution: An ABB variable speed drive reduces the speed of the fan motor by 20 percent to meet actual demand.

Benefits:
- Saving of £17,000 in energy costs
- Payback in only four months
- Extraction rate remains unchanged

Project managed by ABB authorised value provider Central Group
Liverpool: 0151 546 6000
www.gocentral.co.uk

No.43

Customer: Ginsters Bakery
Application: Pumps
Industry: Food & beverage
Challenge: The bakery, which produces over three and a half million pastry products a week, was keen to investigate its energy use to improve efficiency and cut costs at the plant. ABB and authorised value provider APDS carried out an energy survey at the plant. The survey focused on the refrigeration system, in which chilled water pumps provide chilled water to the cold storage and production areas of the plant. These ran constantly with a full unrestricted flow, a clear waste of energy.

Solution: A trial installation of an ABB drive improved stability of the system and reduced power consumption. Following this, permanent ABB drives were installed on all pumps.

Benefits:
- Operational costs cut by 17 percent
- Improved stability of chilled water pumping process

“Reduced power consumption has been realised on site and we know from the pre- and post-installation surveys that we are using less electricity to drive the pumps.”
Projects manager, Ginsters

Project managed by ABB authorised value provider APDS Ltd
Bristol: 01179 822 049
www.apds.co.uk
**No.44**

**Customer:** GKN AutoStructures Limited  
**Application:** Fans  
**Industry:** Automotive  
**Challenge:** GKN AutoStructures produces components for many leading vehicle manufacturers. The welding process on two chassis production lines uses an extraction system to remove fumes. Each line has an air intake and air extraction fan, driven by motors. These were oversized and were not drawing their rated power. ABB proposed to investigate energy usage and determine if low voltage AC drives could make a difference.

**Solution:** ABB installed two temporary drives of 55 kW and 30 kW, adjusting motor speed until they were extracting a sufficient air volume to maintain the desired air quality.

**Benefits:**  
- £20,000 reduction in energy costs  
- Payback in six to nine months  
- Reduced noise level

“"We are in the process of rolling out ABB low voltage AC drives to other areas of the plant and we have recently installed five ABB drives on the Land Rover Defender line and are looking to install another in our compressor house.”

Energy champion, GKN AutoStructures

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**No.45**

**Customer:** Greenwich University  
**Application:** Fans  
**Industry:** Buildings  
**Challenge:** The University of Greenwich wanted to reduce its energy bill while also cutting its CO₂ emissions. ABB authorised value provider Mid Kent Electrical Engineering examined the air handling units (AHUs) across three campuses. It found that many of the AHUs had rated speeds and powers less than that of the motors. These were either being run too fast or the motor speed was being reduced by pulley ratios on the belts driving the fans.

**Solution:** MKE installed an ABB HVAC drive on a single AHU for a two-day trial. From this it was able to produce estimated savings for the AHUs across all three campuses, a total of 44 installations with a combined installed power of 127 kW.

**Benefits:**  
- Saving of £10,000 across three campuses  
- CO₂ emissions reduced by 57 tonnes

“We were looking for payback times on the projects of around five years, yet most were much quicker than that.”

Building services engineer, University of Greenwich

Project managed by ABB authorised value provider  
Mid Kent Electrical Engineering Co Ltd  
Sittingbourne: 01795 471089  
www.mke.co.uk
No.46

Customer: **Haddonstone**

Application: Wood chipping machine

Industry: Manufacturing

Challenge: Haddonstone produces garden ornaments and architectural stonework. The company uses large amounts of plywood to produce moulds for forming the stone products. Once the moulds have been used, a wood chipping machine, known as a hogger, grinds them up. These are then fed into a furnace which is used to provide space heating. Using the hogger added 70 A to the load, exceeding the available supply capacity. Improving the supply to account for the higher power demand would be very expensive. Haddonstone asked ABB authorised value provider Inverter Drive Systems for a solution.

Solution: A 45 kW ABB general purpose drive to control the speed of the hogger’s motor. The drive’s improved power factor and peak torque limit function allows the hogger to be run at a slower speed meaning it now only draws around 45 A.

Benefits:
- £50,000 upgrade to the electrical supply is avoided
- Slowing the hogger down enables it to grip the plywood boards better and stops them from slipping, increasing productivity

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No.47

Customer: **Halton Hospital**

Application: Air handling units, fans

Industry: Healthcare

Challenge: A Cheshire and Merseyside NHS Treatment Centre based at Halton Hospital needed variable speed drives to run its air handling units (AHUs) and fans. These had to be BACnet compatible to integrate with its Building Management System, which was installed by controls specialists Open Building Systems.

Solution: 18 ABB HVAC drives, rated from 4 to 15 kW, are being used to control AHUs and fans, in facilities such as operating theatres and MRI scanner rooms.

Benefits:
- Easy to integrate with BMS
- BACnet communications protocol is native to the ABB HVAC drive, with no requirement for additional gateways

“...The ABB drives are very easy to integrate with the BMS. We simply connect them to the communications network, enter their addresses in the system and it is virtually done. It’s all very easy.”

Owner, Open Building Systems

Project managed by ABB authorised value provider

*Inverter Drive Systems Ltd*

Ilkeston: 0115 944 1036

www.inverterdrivesystems.com
No.48

**Customer:**  Haystack Dryers  
**Application:**  Dryers, fans  
**Industry:**  Original equipment manufacturer (OEM)  
**Challenge:**  The Valhalla ride at Blackpool Pleasure Beach plunges visitors into a series of water pools. An innovative dryer, installed by Haystack Dryers, uses four cross-flow fans to create a vortex of warm air around the riders, drying up to two adults and three children at once. To avoid blasting customers with a high-speed jet of hot air, Haystack decided to use a variable speed drive, choosing ABB to provide the drive and motors for the application.

**Solution:**  The four 80W fans are powered by ABB motors, driven by ABB 1.1 kW variable speed drives. The drives are used in two modes. Idle mode is used when the dryer is unoccupied. Fans turn at a low speed to recycle the air. In operational mode, fans are driven to full speed to remove moisture.

**Benefits:**  
- Idle mode saves energy when dryer is unoccupied
- The drive allows the use of frequencies above 50 Hz, providing up to 20 percent more drying capacity
- Drives can be interrogated for fault finding

No.49

**Customer:**  Heinz  
**Application:**  Fans  
**Industry:**  Food & beverage  
**Challenge:**  The Heinz factory in Wigan produces over 1.3 billion cans of food per year. This requires 100 tonnes of steam every hour, used for both space heating and sterilisation of canned foods. The plant's energy centre has four boilers. Each has two gas-fired burners supplied by Hamworthy Combustion, fitted with fans to push air into the flame. Demand for steam ramps up and slowly over several days and also varies seasonally. Heinz specified variable speed drives for use on the plant to take account of the varying demand.

**Solution:**  Eight ABB standard drives, rated 55 kW, vary the speed of the fans to control the amount of air injected, altering the flame level to match steam demand.

**Benefits:**  
- Energy centre is 14 percent more efficient than previous boiler house
- Drives more responsive than mechanical dampers, which introduce a time lag
- Reducing the energy used also cut Nitrous Oxide emissions
**No.50**

**Customer:** Hendra Holiday Park  
**Application:** Air conditioning unit  
**Industry:** Swimming pools  
**Challenge:** Hendra Holiday Park in Cornwall employs a Calorex air conditioning system to maintain correct air temperature and humidity in its pool. As well as the summer, the unit also needs to run in winter to maintain the fabric of the building. The fan was driven at full speed constantly, with air flow reduced by 40 percent by a damper. The park asked ABB’s authorised value provider APDS to look at improving the situation.

**Solution:** APDS installed an ABB variable speed drive on the unit, producing energy savings by matching air flow to actual demand.

**Benefits:**  
- Normal constant energy use reduced from 31 kW to 17 kW for nine hours in the day and 7 kW for 12 hours at night and three hours in the day  
- Cost saving of £4,797  
- Reduced noise in pool hall

“*I am very pleased with what APDS has achieved for us. They came and installed a drive at their own expense and demonstrated beyond doubt that these savings are real.*”  
**Finance director, Hendra Holiday Park**

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**No.51**

**Customer:** Heron Brothers  
**Application:** Fans  
**Industry:** Manufacturing  
**Challenge:** Heron Brothers of Northern Ireland manufactures timber doors and windows and uses an extraction fan system to remove potentially harmful wood dust from the machinery. There are three 37 kW extraction fans, an 18.5 kW extraction fan and a 15 kW transfer fan. The extraction fans were left running all day as the control panel for them is situated some distance from the machines they serve. The fans also had to be started in a set sequence to avoid overloading the supply on start-up. ABB authorised value provider Advantage Control was asked to improve the system’s efficiency.

**Solution:** Five ABB general purpose drives mounted beside the main control panel match the fan speeds to the demands of the process.

**Benefits:**  
- Energy savings of £13,000 a year  
- Reduction of 59.79 tonnes of CO₂ per year  
- Remote control stations allow operators to switch off the fans serving their machines

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**Project managed by ABB authorised value provider**  
**APDS Ltd**  
Bristol: 01179 822 049  
www.apds.co.uk

**Project managed by ABB authorised value provider**  
**Advantage Control**  
Downpatrick: 02844 613782  
www.advantagecontrol.co.uk
No.52

Customer:  Jackson House
Application:  Pumps, fans
Industry:  Buildings
Challenge:  Jackson House, an office block in Manchester, had air flow problems throughout the tenanted areas. One was that the main ventilation plant’s fans were running constantly at full speed. The block also has a heating system comprising four pumps, also running at full speed. Another problem was the high noise level of the fans, which affected letting potential. Building Environment Control (BEC) was asked to install variable speed drives to improve the management of the building’s ventilation.

Solution:  ABB HVAC drives were installed on each of the four fans, as well as each of the heating pumps. The variable speed drives control the fans’ and pumps’ motors to match air and water demand.

Benefits:  • £29,000 energy cost saving
           • Accurate air and water balance achieved reducing noise, drafts and improving temperature control
           • Payback in 11 months

No.53

Customer:  James Chadburn
Application:  Milling machine
Industry:  Restoration
Challenge:  James Chadburn repairs and restores timepieces at his workshop in Bedfordshire. To add to the capabilities of his workshop, Chadburn bought a highly accurate Swiss-made milling machine. The three-phase machine needed to be run from the single-phase supply in the workshop. Chadburn chose ABB authorised value provider Inverter Drive Systems to provide a solution.

Solution:  A panel containing two 0.37 kW ABB machinery drives, a new fascia with forward and reverse operator controls and an emergency stop. One of the drives supplies the three-phase power for the milling machine as well as providing speed control, while the other powers the coolant pump. The main drive is also used to drive the milling head at different speeds to match the work being done.

Benefits:  • Power input converted from single-phase to three-phase
           • Accurate speed control allows replication of wear on a component to match the age of the timepiece
No.54

Customer: James Cropper Paper Mill
Application: Pumps
Industry: Paper
Challenge: The James Cropper Paper Mill makes a wide range of speciality papers and technical fibres for use in products such as insulation and fire retardant materials. Two 55 kW pumps supplied medium-pressure water to various processes throughout the mill. The rate of delivery from each pump was controlled by a valve positioned downstream. This meant that the pumps were constantly running at full speed, whatever the demand for water. Furthermore, the valves placed a significant restriction on the flow of water through the pipes, even when fully open.

Solution: Two ABB 55 kW variable speed drives automatically vary the speed of the pump motors to match the changing demand for water.

Benefits:
- Energy costs reduced £20,000 a year
- The plant can now meet maximum demand with only one pump, using other as a standby
- Reduction in the standby pressure in the water system when there is no demand from the mill

No.55

Customer: Kemira Chemicals
Application: Re-reeler
Industry: Chemicals
Challenge: Kemira Chemicals of Bradford makes special polymers, which go through a chemical reaction on a continuously moving conveyor belt. This is covered by polythene sheeting so that the polymers do not come into contact with it, allowing continuous reaction of the polymers. The polythene sheet is recovered using a re-reeler driven by a motor and a variable speed drive. With the old drive, it was difficult to set the torque correctly. This caused the polythene to split, leading to a potential loss of production. Kemira asked ABB authorised value provider Halcyon Drives to provide a solution.

Solution: ABB industrial drive set up in torque control mode. This prevents the polythene tearing when it is being wound onto the reel.

Benefits:
- Avoids potential £1,500 per hour of lost production
- Adaptive programming detects when the reel is over speeding and switches back into speed control to control it

Project managed by ABB authorised value provider Halcyon Drives Ltd
Leeds: 0113 236 1509
www.halcyondrives.com
No.56

Customer: KnaufAlcopor Limited
Application: Fans
Industry: Manufacturing
Challenge: KnaufAlcopor produces slab or roll formed mineral fibre insulation products. The process starts with molten glass running through an electrically heated brushing, flowing into a fiberising machine spinner. The spinner rotates at 2,000 rpm and glass fibre strands are formed through holes on the outer wall. The fibres are then sucked onto a conveyor with suction provided by forming fans, controlled by three variable speed drives. These had reached the end of their lives and the company asked ABB authorised value provider Central Group to provide a solution.

Solution: Central Group supplied three ABB variable speed drives and overhauled the existing motors to increase their lifespan.

Benefits:
- Energy cost saving of £50,000 a year
- Improved reliability of the forming section
- Less downtime, increased production

“The equipment has improved process reliability with the added benefit of 20 percent saved energy and running costs.”

Maintenance leader, KnaufAlcopor Ltd

No.57

Customer: Lafarge Cement
Application: Fans, kiln
Industry: Cement
Challenge: Lafarge Cement’s plant in Derbyshire produces 1.2 million tonnes of cement a year. The plant was suffering reliability problems with its cement kiln pre-heaters due to the obsolete slip-ring motors and control system used to drive the fans. Unscheduled stoppages were affecting the company’s ability to meet its production targets. Many of these problems were caused by dust ingress. Additionally, the fans needed 1.8 MW to reach the required output but the slip-ring motors could only supply 1.6 MW, resulting in the process failing to reach its designed airflow.

Solution: The slip-ring motors were replaced with two ABB HXR high voltage motors, which include seals to prevent the ingress of dust. Each motor is controlled by an ABB 1.8 MW medium voltage drive, giving better speed control of the pre-heater fans.

Benefits:
- Drives have achieved 100 percent reliability
- Low speed ability means fans can be started and checked before they are needed
- Medium voltage drives suffer less volt drop and have smaller diameter cabling

Project managed by ABB authorised value provider Central Group
Liverpool: 0151 546 6000
www.gocentral.co.uk
No. 58

Customer: Laois County Council
Application: Pumps
Industry: Water and wastewater treatment
Challenge: The water services department of Laois County Council in the Republic of Ireland had problems with the sewage pump at its Connolly Street pumping station. The pump was prone to ragging, which is caused when rags foul the pump inlet and prevent the pump from operating normally. The pump therefore needed to be lifted and cleared three to four times a week. Each lift cost €270 and took around six man hours to complete. It also meant that the town was relying on one standby pump while the main pump was being cleaned. Laois County Council contacted ACS Drives and Control Systems, an ABB authorised value provider, for a solution.

Solution: A 15 kW ABB industrial drive for water and wastewater was installed on the motor driving the pump. This has an anti-jam module, which runs the pump at high speed and reverses or stops it to prevent congestion.

Benefits: • Pump maintenance costs cut by €1,000 a week • Payback in just two and a half weeks

Project managed by ABB authorised value provider ACS Drives and Control Systems Ltd
Mullingar: 00 353(0)44 934 0242
www.acsdrives.ie

No. 59

Customer: Leeds University
Application: Fans, pumps
Industry: Buildings
Challenge: Leeds University had formed a Carbon Management Plan, in which it identified ways to save energy and cut its carbon emissions. This included installing variable speed drives on existing motors powering fans in air handling units and fume extraction equipment and water pumps. Most of the assessed motors had no speed control, being connected direct-on-line. ABB authorised value provider Halcyon Drives was chosen to supply the drives.

Solution: 94 ABB variable speed drives ranging from 5.5 to 55 kW run the motors at speeds that match demand.

Benefits: • Annual saving of £194,000 in energy costs • CO₂ emissions cut by 809 tonnes per year • Swinging choke technology ensures the drives deliver up to 25 percent fewer harmonics at partial loads compared to a conventional choke of equal size

Project managed by ABB authorised value provider Halcyon Drives Ltd
Leeds: 0113 236 1509
www.halcyondrives.com
No. 60

Customer: Leixlip Water Treatment Works  
Application: Pumps  
Industry: Water and wastewater treatment  
Challenge: The Leixlip Water Treatment Works in Co. Kildare has six pumps in two sets of three, one used for duty and the other on standby. In each set of three motors, two were controlled by soft starts and one was controlled by a variable speed drive. The speed of one pump would be varied with the drive with the others brought in as needed. All three motors were running constantly to keep up with demand. The pumps have butterfly valves which were throttled to maintain the required head. Contractor AECOM and ABB were asked to investigate the pumps’ energy use and come up with a solution to reduce it.

Solution: Four 710 kW ABB cabinet built drives were installed in place of the existing soft starts and now work in conjunction with the two drives previously installed. All three motors now run at the same speed.

Benefits:  
- Saving of over €500,000 a year on pumping costs  
- Reduced wear and tear on the discharge valve  
- Payback time in less than a year

No. 61

Customer: Llechwedd Slate Caverns  
Application: Cable railway  
Industry: Tourist attraction  
Challenge: Llechwedd Slate Caverns in Blaenau Ffestiniog, North Wales, operates the Victorian Mine Tour, which carries visitors deep into the slate mine on the steepest cable railway in Britain. The old thyristor-based control system was prone to failures due to excessive heat. It was also possible for the driver to perform incorrect commands, causing the ride to stall. Faults could take several days to diagnose. There was also a constant danger that guests could be stranded in the tunnel.

Solution: An ABB regenerative drive, set up to control the relays already being used on the ride. A larger motor was also installed, allowing the ride to carry 23 people as opposed to 18 previously.

Benefits:  
- No downtime since installation  
- Easier diagnostics  
- Simpler controls means larger pool of potential drivers

“We are very pleased with the new system. It costs less to run and needs very little maintenance.”  
Chief engineer, Llechwedd Slate Caverns
**No.62**

Customer: **Lubrizol Limited**  
Application: **Blenders**  
Industry: **Chemicals**  
Challenge: Lubrizol of Derbyshire produces additives for fuels such as diesel. Additives are blended using an impeller that mixes the chemicals to the right consistency. Due to limited speed control of the impeller, the operators would run motors at full speed to get the right viscosity. The company wanted to save energy and get more consistency. Lubrizol approached ABB authorised value provider Inverter Drive Systems to supply and install variable speed drives.

Solution: 33 ABB machinery drives, each rated at 0.55 kW. The drives allow Lubrizol to accurately control the speed of each agitator.

Benefits:  
- Achieves greater consistency of blends  
- Allows the operators to run tests for predetermined times at particular speeds  
- Translates operator experience into actual speed settings, giving more repeatability and making it easier to train new operators

Project managed by ABB authorised value provider  
**Inverter Drive Systems Ltd**  
Ilkeston: 0115 944 1036  
www.inverterdrivesystems.com

**No.63**

Customer: **Magma Mouldings**  
Application: **Injection moulding machine**  
Industry: **Plastics**  
Challenge: Magma Moulding produces up to 23,000 Trunki suitcases each month at its Plymouth facility. The two halves of the cases are made on two identical moulding machines. The newer machine already had a speed-controlled hydraulic pump and Magma Moulding wanted to see if similar savings could be achieved by retrofitting a variable speed drive to the older machine. The moulding machine has a 65-second cycle time. Around 30 percent of the cycle time is spent off load, during which the hydraulic system is not in operation but the pump motor is still running at maximum speed. Magma Moulding wanted to save the energy that was wasted here while avoiding affecting the cycle time. ABB’s authorised value provider APDS conducted a week-long trial with an ABB drive to see how much energy could be saved.

Solution: A 55 kW ABB general machinery drive measures the torque in the motor to decide if the machine is on or off load and reduces the speed of the motor when off load.

Benefits:  
- Energy costs reduced by £7,800 a year  
- Cycle time unaffected

Project managed by ABB authorised value provider  
**APDS Ltd**  
Bristol: 01179 822 049  
www.apds.co.uk
No.64

Customer: **McDonald’s**

Application: Fans

Industry: Buildings

Challenge: McDonald’s was updating old equipment and realised it could reduce the carbon footprint of its restaurants by making large fans run more slowly, using variable speed drives. The company wanted a branded drive that had proven reliability, as well as easy, trouble free setup. McDonald’s was hoping to see a 40 percent energy saving and less wear and tear on the fans. It asked ABB authorised value provider Inverter Drive Systems to look at the application and provide the correct drive.

Solution: 5.5 kW ABB HVAC drives were installed. Using the drive’s real-time clock, the fans are run at full speed at busy periods and at 80 percent speed at other times.

Benefits: • 50 percent reduction in energy use  
• Lower fan noise  
• Improved temperature control in kitchen areas

“As well as reduced utility costs, we now have fewer operational difficulties with the kitchen equipment as a result of being able to balance the extract volume.”

Project manager, Restaurant Services, McDonald’s

Project managed by ABB authorised value provider  
**Inverter Drive Systems Ltd**  
Ilkeston: 0115 944 1036  
www.inverterdrivesystems.com

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No.65

Customer: **McKechnie Automotive and Engineered Plastics**

Application: Injection moulding machine

Industry: Plastics

Challenge: McKechnie is one of Europe’s leading manufacturers of engineered plastic assemblies. The company was looking to improve the efficiency of an injection moulding machine. Most injection moulders are hydraulically operated and often waste up to 50 percent of the electrical power they consume. This is because the hydraulic systems typically pump a constant amount of oil around and dump any excess back to the sump. McKechnie asked ABB authorised value provider Halcyon Drives to develop a solution.

Solution: A control panel that combines an ABB industrial drive with an interface to link the new drive and the existing injection moulding machine motor. The drive controls the speed of the pump motor to deliver the precise amount of oil needed for each sequence in the injection moulding cycle.

Benefits: • 33 percent reduction in energy costs  
• Payback in less than two years

Project managed by ABB authorised value provider  
**Halcyon Drives Ltd**  
Leeds: 0113 236 1509  
www.halcyondrives.com
**No.66**

**Customer:** Medway Galvanising Company Limited  
**Application:** Fans  
**Industry:** Metals  
**Challenge:** Medway Galvanising Company provides galvanising, powder coating, stripping and shot blasting services for all types of architectural and structural steel. Galvanising is carried out in the company’s zinc dipping bath. An extraction system over the bath extracts the harmful fumes given off in the process. The fan on this extraction system was initially run at full speed for 24 hours a day, even when not needed. The company asked ABB authorised value provider Mid Kent Electrical Engineering for an energy saving solution.

**Solution:** An ABB standard drive and a high efficiency 37 kW ABB motor. For most of the time, the ABB motor runs at half speed, or 25 Hz. A limit switch detects when the crane carrying the components to be dipped is over the zinc bath, signalling the drive to ramp up the motor to full speed to achieve the maximum extraction rate.

**Benefits:**  
- £10,000 annual energy saving  
- CO₂ emissions cut by 60 tonnes a year  
- Motor life extended by no longer running at full speed constantly

Project managed by ABB authorised value provider Mid Kent Electrical Engineering Co Ltd  
Sittingbourne: 01795 471089  
www.mke.co.uk

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**No.67**

**Customer:** Medway Maritime Hospital  
**Application:** Air handling units  
**Industry:** Healthcare  
**Challenge:** Medway Maritime Hospital in Gillingham, Kent, is an acute and general hospital primarily serving the needs of people in Medway, Swale and North Kent. It was increasingly concerned by the energy consumption of the air handling units in the three plant rooms serving the hospital’s Block A. Each plant room has one supply and three extract fans. The hospital asked ABB authorised value provider Inverter Drive Systems to recommend a more energy efficient solution. The project was carried out with a loan from Salix Finance, a not-for-profit agency that provides interest-free loans to public bodies such as NHS trusts.

**Solution:** 12 ABB variable speed drives for HVAC, rated between 1 kW and 11 kW. At night, the speed of the fans is set back to 80 percent, while in the daytime they are set to 90 percent.

**Benefits:**  
- £9,000 reduction in annual energy costs  
- Set-points can be adjusted to suit the occupancy of the building  
- Payback in 2.5 years

Project managed by ABB authorised value provider Inverter Drive Systems Ltd  
Ilkeston: 0115 944 1036  
www.inverterdrivesystems.com
No.69

Customer: National Marine Aquarium
Application: Pumps
Industry: Tourist attraction
Challenge: The National Marine Aquarium in Plymouth features a 2.5 million litre seawater tank. Keeping the inhabitants of the tank healthy involves constant pumping of water at the correct temperature, resulting in a substantial energy bill. The Aquarium needed to save energy. However, it has nine pumps that must be on all the time, with varying flow and pressure. The pumps were running at 100 percent speed, with flow and pressure control provided by a manual throttle valve. ABB authorised value provider APDS was asked to supply the variable speed drives.

Solution: Nine ABB variable speed drives were installed, ranging from 7.5 to 18.5 kW. Pressure transducers in the pump output provide a feedback signal to the drives, allowing the throttle valves to be kept fully open, allowing the VSD to determine the correct pump speed for the desired flow rate.

Benefits:
• £15,000 annual energy saving
• Minimised downtime to protect tank inhabitants

Project managed by ABB authorised value provider
APDS Ltd
Bristol: 01179 822 049
www.apds.co.uk
**No.70**

**Customer:** NCP Drury Lane car park  
**Application:** Fans  
**Industry:** Car parks  
**Challenge:** NCP wanted to modernise its Drury Lane car park’s ventilation system to meet current demand while achieving significant energy savings. The car park is used at predictable times, by commuters during the day and theatre goers during the evening. NCP wanted a system which would control the ventilation to match actual vehicle movements while maintaining adequate statutory environmental conditions.

**Solution:** Two 37 kW drives are installed on the motors running the fume extract fans, while two 22 kW drives control the motors running the supply fans. Carbon monoxide (CO) sensors set the speed of the drives proportional to the CO level.

**Benefits:**  
- Significant energy savings  
- Maintains statutory air quality while using minimum energy  
- Reduced wear and tear

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**No.71**

**Customer:** Newtown Plastics  
**Application:** Injection moulding machine  
**Industry:** Plastics  
**Challenge:** Newtown Plastics makes a wide variety of moulded plastic components, both its own ranges and bespoke designs. The company was interested in using variable speed drives to control its energy use. Of its 14 injection machines, one with an 18.5kW motor was identified as suitable because it had such a long cycle time. It operates for 40 weeks a year making a perfume display case and requires a long cooling time. During this time, the hydraulic motor is not doing any work but is still running at top speed.

**Solution:** An ABB variable speed drive uses its internal load measurements to decide when the pump is doing useful work or recycling back to the tank. When the pump is recirculating fluid back to the tank, while the plastic part is being cooled, the speed of the motor is dropped to 50 percent.

**Benefits:**  
- Saved £2,000 a year in energy costs  
- 18 month payback  
- Off load power reduced from 7 kW to 3.7 kW
No.72

Customer: Northern Foods
Application: Pumps
Industry: Food & beverage
Challenge: Northern Foods produces chilled pre-prepared foods for customers such as Marks & Spencer and Sainsbury’s. It uses large refrigeration units to store both the ingredients and the finished products. These are fed by cooling water pumped by three 75 kW motors. Northern Foods was keen to find a way to improve the energy efficiency of the pumping system. It asked ABB authorised value provider Inverter Drive Systems to supply a solution.

Solution: Three 55 kW ABB industrial variable speed drives. Also supplied was a 4-20mA analogue temperature sensor connected to the drives’ integral PID controllers. This uses the return temperature of the chilled water as its feedback signal, adjusting the speed of the pumps to maintain the correct temperature.

Benefits:
- £30,000 reduction in energy costs
- Payback time of only 10 months
- More accurate control of water temperature

Project managed by ABB authorised value provider Inverter Drive Systems Ltd
Ilkeston: 0115 944 1036
www.inverterdrivesystems.com

No.73

Customer: Northumbrian Water
Application: Pumps
Industry: Water and wastewater treatment
Challenge: Northumbrian Water operates an anaerobic digester at its Bran Sands sewage treatment works on Teesside. An anaerobic digester uses micro-organisms to break down biodegradable material such as sewage waste. Each digester tank had two 90 kW star-delta controlled pumps with no speed control. When run at full speed, the pumps caused a foaming of the liquid in the tanks, making it difficult to control the digestion. The digesters also produce methane, producing power for the site. However, the foaming also interfered with the volume of methane produced.

Solution: Two ABB variable speed drives were installed on the pump motors in one of the digesters for a trial period. These reduce the motor speeds, from 1500 rpm to 900 rpm, allowing them to pump without causing excess foaming.

Benefits:
- Total energy savings for completed system of £107,000
- Payback in just over three months
- CO₂ footprint reduced by more than 700 tonnes per annum
No.74

Customer: Omnibus Building
Application: Pumps
Industry: Buildings
Challenge: The Omnibus building in Reigate, Surrey is a multi-tenant facility offering over 65,000 sq. ft. of office space. The motors driving the HVAC system pumps were all running at full speed, with flow control achieved by mechanical throttling. The building management company was approached by Econowise Drives and Controls with a proposal to investigate the HVAC system and look at the scope for using variable speed drives to cut its running costs.

Solution: Twelve ABB standard drives for HVAC, six on the chiller pumps rated at 15 kW, four on the LPHW secondary heating pumps rated at 15 kW and two on the LPHW Primary pumps rated at 7.5 kW. Econowise opened all the valves and set the drives to maximum speed, reducing the speed until the water flow rate met the exact requirements of the building.

Benefits: • £20,000 annual energy saving
• Payback in under nine months
• Reduced wear and tear on motors

No.75

Customer: Park Laundry
Application: Ironing machine
Industry: Laundry
Challenge: Park Laundry is Scarborough’s largest commercial laundry. A critical process is the calender ironing machine, which is usually in operation for nine hours a day. The machine was originally operated using an old slip-ring motor, with speed control provided by an auxiliary servo motor. With spares becoming harder to source, the company was considering replacing this motor when it suffered a sudden failure. Eclipse Electrical Engineers offered a new induction motor and contacted Halcyon Drives, an ABB authorised value provider, for a speed control solution.

Solution: The drive solution supplied by Halcyon Drives incorporates a 15 kW ABB general purpose variable speed drive together with sensors on the feeder and folder that feedback to the drive to synchronise the roller speed.

Benefits: • Drive is integrated with the existing controls, making it easy for the machine operators
• Improved reliability and availability
• Cooler running and lower noise

Project managed by ABB authorised value provider
Halcyon Drives Ltd
Leeds: 0113 236 1509
www.halcyondrives.com
No.76

**Customer:** Patersons Quarries  
**Application:** Generators  
**Industry:** Power generation  
**Challenge:** Patersons Quarries’ landfill site at Mount Vernon near Glasgow produces methane gas and burns it to produce heat to convert into electricity. The site produces 40,000 MW of green electricity a year, enough to power up to 4,000 homes. This is sold to Scottish Power Distribution, producing a significant income. The gas management compound has four motors to boost gas pressure to ensure correct combustion in the site’s five generators. Two of these motors are used at any one time and were running at 100 percent speed constantly, whether they needed to or not, wasting energy that could be sold. The company approached ABB authorised value provider EDC (Scotland) for a solution.

**Solution:** Two 45kW ABB general purpose drives provide constant gas pressure to the generators. The drives use pressure transducers to feed back the gas pressure to the drives and allow them to control the speed of the motors to maintain the pressure at the correct level.

**Benefits:**  
- An extra 200,000 kWh per year can now be exported back on to the grid  
- Extra revenue of £17,000

Project managed by ABB authorised value provider  
**EDC (Scotland) Ltd**  
Erskine: 0141 812 3222  
Gateshead (NE office): 0191 917 0200  
www.edcscotland.co.uk

No.77

**Customer:** Pfizer  
**Application:** Chillers, pumps  
**Industry:** Chemicals  
**Challenge:** The Pfizer plant located in County Cork, Ireland, produces a wide range of bulk pharmaceutical products for shipping to other Pfizer facilities worldwide. The plant chillers use circulation pumps to pump heat transfer fluid to and from the cold storage tank. The application included three 45 kW motors and one 37 kW motor, all run with soft starters. For best efficiency, the pumps needed to maintain a constant flow rate of 185 m3/hr, but the pumps were actually rated for 240 m3/hr. To achieve the optimum flow rate, gate valves were used to throttle the pumps.

**Solution:** With the gate valves opened fully, ABB variable speed drives were installed to maintain the optimum flow and energy saving by running the motors at 35Hz rather than 50Hz

**Benefits:**  
- Energy cost saving of €28,000 per year  
- Reduction in CO₂ emissions
No.78
Customer: Pizza Hut
Application: Fans
Industry: Buildings
Challenge: Pizza Hut’s Watford Dome branch wanted to control energy costs on the cooker hood fans in its kitchen. The supply and extract fans were running for 13 hours a day at full speed and consumed between 35 kWh and 45 kWh. Food Industry Technical was approached to provide a system that would improve energy efficiency in the kitchen.
Solution: A 1.5 kW ABB component drive on the extractor fan motor and a 3 kW ABB component drive on the supply fan save energy by altering fan speeds to match actual demand. For added safety, the system accurately measures CO₂ levels within the kitchen space and initiates air extraction when levels increase.
Benefits: • 85 percent energy saving
         • Payback of only 18 months
         • Rapid installation avoided disruption to restaurant’s operations

No.79
Customer: Poole’s Pies
Application: Compressor, condenser, fan
Industry: Food and beverage
Challenge: Poole’s Pies of Wigan produces 200,000 meat pies a day. The company had installed a new production line, complete with spiral freezer, prompting it to look at ways of improving its energy efficiency. For many companies in the food manufacturing sector, refrigeration can account for 70-80 percent of the electricity bill, so any savings made in this area are likely to be significant. The refrigeration system was installed by Seward Refrigeration, which chose ABB drives to run two of its major components.
Solution: The condenser is an evaporative type with the fan controlled by an ABB standard drive. A single 315 kW screw compressor is used to provide refrigerant for the spiral freezer, also controlled by an ABB variable speed drive. The drives run the fan and compressor motors at speeds to match actual demand, giving a significant reduction in power.
Benefits: • Energy costs cut by £6,200
         • Payback in 2.3 years
         • ABB industrial drive on the screw compressor minimises harmonic interference
No.81

Customer: Q-Parks
Application: Fans
Industry: Car parks
Challenge: The Q-Park car park in Sheffield has space for 531 cars over six floors. To ventilate the car park and ensure that smoke can be vented during a fire, four fans are installed on the main car park ground floor, two for air movement and two for extraction. PSB UK installed the fans complete with variable speed drives to control them.

Solution: The air movement and extraction fans are driven by two 1.5 kW and two 4.8 kW ABB standard drives for HVAC respectively. These save energy by running at different speeds depending on the air changes needed.

Benefits:
- Fans run at most efficient speed to meet demand
- Soft start ensures fan motors do not draw a large current on start up
- Built-in ‘run to destruct’ function runs the extraction at full speed in the event of fire

“The Modbus facility of the drive is far better than using communications based on laying wires and relays. Installation is much easier and there is less to go wrong.”

Operations manager, PSB
**No.82**

**Customer:** Radius Systems  
**Application:** Extruder  
**Industry:** Plastics  
**Challenge:** Radius Systems’ plant in Derbyshire, houses 14 extrusion lines, each of which produces polyethylene pipes from 16 mm to 1200 mm, together with an injection moulding facility making associated fittings for gas and water transfer. Line 12 had a high utilisation rate and yet the 182 kW DC motor was regularly failing, leading to an increase in downtime and rising maintenance costs. The company estimated that the annual static and dynamic checks, brush changes and outsourced labour costs alone was about £2,000 per motor. It asked ABB authorised value provider Inverter Drive Systems to investigate the viability of upgrading to an AC system.

**Solution:** An ABB 200 kW IE4 synchronous reluctance motor and variable speed drive package.

**Benefits:**  
- Up to 15 percent energy saving  
- Saving of £2,000 on maintenance costs

“Would we consider a SynRM package again? Most definitely; IE4 and higher efficiencies are the way forward.”

Engineering manager, Radius Systems

Project managed by ABB authorised value provider  
Inverter Drive Systems Ltd  
Ilkeston: 0115 944 1036  
www.inverterdrivesystems.com

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**No.83**

**Customer:** Ricoh  
**Application:** Air handling units, pumps, compressors, granulators  
**Industry:** Plastics  
**Challenge:** The 52 acre site of office equipment supplier Ricoh has a large number of air handling units (AHUs), as well as water circulation pumps and compressors, contributing to an annual utility spend of £1.25 million. Ricoh was keen to reduce energy consumption and initially trialled two ABB drives, one on a pump and one on an AHU. These were provided on a hire drive basis by ABB authorised value provider Central Group.

**Solution:** 90 percent of the originally identified applications are now fitted with ABB drives.

**Benefits:**  
- Saved energy costs of £100,000 a year  
- Average payback time of around six months  
- Drives synchronise machinery to allow granulators to run on demand, cutting run time by 95 percent

“We try to purchase equipment that can benefit from VSD control. Having previously proved the extensive savings that can be realised, we don’t want to miss out on further opportunities to save even more energy.”

Energy specialist, Ricoh

Project managed by ABB authorised value provider  
Central Group  
Liverpool: 0151 546 6000  
www.gocentral.co.uk
No.84

Customer: Royal National Lifeboat Institution
Application: Crane
Industry: Marine
Challenge: The Royal National Lifeboat Institution (RNLI) operates a number of inflatable lifeboats of the Atlantic class, each weighing around 1.5 tonnes. The small dockside cranes used to launch the boats, known as davits, are traditionally operated by a shore support crew winching the boats off a trolley and into the water. Following a rescue operation, the boat is recovered and winched back on shore in preparation for the next call out. Retrieval of the boats can be slow, potentially dangerous and can cause damage to the boat. Winding the winch down to retrieve it is also time-consuming. The RNLI asked Hunter Gears of Tyneside to upgrade two of its lifeboat stations’ davits to all electric operation, starting with its Harwich facility.

Solution: An 11 kW motor for the hoist and a 0.37 kW motor and drive, together with a control panel, for turning the davit.

Benefits: • Provides power and precise control to turn the davit and bring the boat safely back
  • Hoist starts smoothly, avoids jerking the boats and risking damage

No.85

Customer: Samuel Taylor
Application: Recoiler, bonder
Industry: Metals
Challenge: Samuel Taylor produces precision metallic components for the aerospace and automotive industries at its plant near Birmingham. One of the products it makes is bimetallic strips. The production line consists of a leveler, grooving and inlay machines, a bonder and a recoiler. The recoiler originally used a 20 year old DC motor that was often in for repair. The bonder was also experiencing regular problems, as its direct-on-line motor was prone to blowing fuses because of the high initial mechanical resistance. Adford CNC and Sentridge Control, an ABB authorised value provider, supplied the solution.

Solution: The motor on the recoiler was changed for a 5.5 kW AC force fan-vented motor, controlled by a 7.5 kW ABB general purpose drive. A second ABB general purpose drive was installed on the bonder, and its existing 11 kW motor was replaced by a 15 kW version.

Benefits: • Improved reliability of the production line
  • Better control of current and acceleration and deceleration
  • Less maintenance

Project managed by ABB authorised value provider Sentridge Control Ltd
Coventry: 024 7655 3303
www.sentridge.com
**No.86**

**Customer:** Severn Trent Water  
**Application:** Pumps  
**Industry:** Water and wastewater treatment  
**Challenge:** Severn Trent’s Stoke Bardolph facility uses wash water to clean the screens at the inlet works. The six pumps controlling the wash water are usually controlled by a PLC, but this has suffered a number of failures. When this happens, no wash water is available to clean the inlet screens and sewage arriving needs to be stored in an emergency tank until the system is working. Failure to cure the PLC problem within eight hours risks the sewage overflowing, potentially inundating local homes with raw sewage.

**Solution:** An ABB machinery drive acts as a PID controller. When the PLC has gone offline due to a failure, the drive controls two wash water feed pumps that pump water into a buffer tank. The pressure of the water leaving the tank is maintained at five bar by four booster pumps, controlled by four ABB general purpose drives.

**Benefits:**  
- Prevents risk of flooding homes with sewage  
- Avoids need for possibly expensive compensation  
- Avoided the cost of installing and programming a complete standby PLC system

**No.87**

**Customer:** Simon Dryers  
**Application:** Dryers  
**Industry:** Original equipment manufacturer (OEM)  
**Challenge:** Simon Dryers manufactures bespoke drying machinery for industries including chemicals, pharmaceuticals and waste processing. Many dryer users specify an oversized dryer, as they may be uncertain of the initial market size for their finished products. Also, because many materials are natural products, their moisture content can vary. Simon Dryers specified variable speed drives to control its products, sourced from ABB authorised value provider Halcyon Drives.

**Solution:** ABB variable speed drive are installed in all Simon Dryers, rated between 0.75 kW and 90 kW.

**Benefits:**  
- Flexibility to start at 50 percent capacity and then increase as demand grows, without having to buy another machine  
- Dryer rotation speeds can be changed easily, matching drying time to moisture content

“Electrical energy efficiency is playing an ever more important role. The fact that we can minimise the operational costs of the dryers through using VSDs is a good selling point for us.”

Managing director, Simon Dryers

Project managed by ABB authorised value provider Halcyon Drives Ltd  
Leeds: 0113 236 1509  
www.halcyondrives.com
No.88

Customer: South Staffordshire Water
Application: Pumps
Industry: Water and wastewater treatment
Challenge: At Somerford Pumping Station, South Staffordshire Water needed to replace a 20-year old, 115 kW induction motor used to control a single vertical shaft driven borehole pump which abstracts 2.5 million litres of water each day. The IE2 motor was already using an ABB variable speed drive, and had has already saved a lot of energy using the drive's flux optimisation function. The company was interested in trialling an ABB synchronous reluctance motor (SynRM) to harness its many benefits including higher efficiency, greater reliability, lower heat loss, less noise and reduced maintenance costs. Sentridge Control, an ABB authorised value provider, was asked to provide the solution.

Solution: IE4 SynRM and drive package.
Benefits: • Six percent increase in efficiency
• 75 percent reduction in audible noise

“We're running this pump as our duty pump because it's the most efficient system and it's been 100 percent reliable.”
Field performance manager, South Staffordshire Water

Project managed by ABB authorised value provider
Sentridge Control Ltd
Coventry: 024 7655 3303
www.sentridge.com

No.89

Customer: Southern Water
Application: Pumps
Industry: Water and wastewater treatment
Challenge: Southern Water's Hardham Water Supply Works provides water to more than 450,000 customers in the north of West Sussex. Southern Water needed to replace the pump motor and control system, which were becoming obsolete and increasingly unreliable. The existing 75 kW DC motor required maintenance to its brushes every three months and a recent failure had made it critical to find a more reliable solution. Southern Water contacted ABB authorised value provider MKE for a solution.

Solution: A 75 kW synchronous reluctance motor (SynRM) with an IE4 efficiency rating, together with an ABB variable speed drive for water and wastewater applications.

Benefits: • Improved reliability
• Four percent more efficiency
• Reduced risk of harmonic currents and voltages

“We're running this pump as our duty pump because it’s the most efficient system and it’s been 100 percent reliable.”
Field performance manager, Southern Water

Project managed by ABB authorised value provider
Mid Kent Electrical Engineering Co Ltd
Sittingbourne: 01795 471089
www.mke.co.uk
No.90

Customer: Tamar Foods
Application: Air handling units
Industry: Food and beverage
Challenge: Tamar Foods produces five million pastry based products a week, including sausage rolls, pasties and pies. As part of its push to improve the energy efficiency of its processes, Tamar Foods was keen to see how variable speed drives could help. Inverter Drive Systems (IDS), an ABB authorised value provider, looked at the potential for savings on the plant’s HVAC system. This accounted for around 15 percent of the total electricity use of Tamar Foods.

Solution: IDS retrofitted the HVAC system with 11 ABB standard drives for HVAC with ratings ranging from 15 to 45 kW.

Benefits: • Saving of around 23 per cent on energy costs
• Typical payback time less than 12 months
• Increased motor life and reduced maintenance and labour costs.

“These are fantastic savings for us. This puts us ahead of our rivals and improves our standing with the major supermarkets, which are all keen to source products from suppliers who can demonstrate a more sustainable production process.”
— Health, safety and environmental manager, Tamar Foods

Project managed by ABB authorised value provider
Inverter Drive Systems Ltd
Ilkeston: 0115 944 1036
www.inverterdrivesystems.com

No.91

Customer: Tata Steel
Application: Slitting line
Industry: Metals
Challenge: The slitting line at Tata Steel’s plant in Shotton divides a coiled sheet of metal into smaller widths, before recoiling the sheets at the end of the production line. The line uses a multidrive to control it but the previous solution, from another supplier, proved unreliable and some control boards were suffering failures. The line had suffered four major failures, costing two to three days production every time. A new solution needed to ensure accurate tension control at all diameters to ensure a good quality coil. Radway Control Systems was asked by Tata to produce the new solution.

Solution: An Allen Bradley ControlLogix PLC and an ABB multidrive adjusts the speed of the uncoiler, slitter, tension unit and recoiler, ensuring correct speed and tension is maintained across the slitting line.

Benefits: • No major failures since installation
• PLC provides information such as line metering and coil diameters
• In an emergency, the machine stops in the shortest possible time and is then left in a safe condition
No.92

Customer: **TI Automotive**
Application: Compressor, pumps, granulator
Industry: Plastics
Challenge: TI Automotive of Flint in North Wales makes 180,000 high density polyethylene plastic fuel tanks a year. The company identified three applications – air compressors, chilled water pumps and granulators – that were particularly energy intensive. It asked ABB authorised value provider Central Group to recommend ways in which energy use could be reduced.

Solution: A 75 kW ABB standard drive on the site's air compressor, which had previously been a fixed speed unit, together with 11 kW ABB standard drives on three chilled water pumps. Running these applications at the best speed for the process saves energy. A 132 kW ABB industrial drive was installed on one of the granulators. The drive detects the torque demand, ramping up torque when the machine is chopping material.

Benefits: • Saving of £2,000 a month on energy costs
• The drive on the air compressor provides more consistent air pressure
• Consistent chilled water pressure means production can be started or stopped without upsetting neighbouring production lines

Project managed by ABB authorised value provider Central Group
Liverpool: 0151 546 6000
www.gocentral.co.uk

No.93

Customer: **voestalpine Metsec**
Application: Pumps
Industry: Metals
Challenge: Component manufacturer voestalpine Metsec wanted to improve the energy efficiency of one of its metal bending machines. ABB authorised value provider AAR Powerdrives identified an Addison metal bending machine that would be suitable for a drive application. This was because of the high idle times the machine has in its cycle. For a component that takes 20 seconds to form, there can be 30-40 seconds of idle time, accounting for some 60 percent of the total cycle time.

Solution: A 22 kW ABB variable speed drive controls the speed of the motor used by the hydraulic pump on the machine, saving energy during non-active times in the cycle. The full load speed was slowed by 17 percent to 1,185 rpm and the no load speed was slowed by 42 percent to 830 rpm.

Benefits: • Machine's energy use cut by 28 percent
• Lower pressure on the hydraulic system means less heat build-up, giving longer lifetime and less noise
• Longer motor life as they are no longer running at full speed constantly

Project managed by ABB authorised value provider AAR Powerdrives
Kingswinford: 01384 400 800
www.aarpowerdrives.co.uk
**No.95**

**Customer:** Wastecycle

**Application:** Waste sorter

**Industry:** Recycling

**Challenge:**
Wastecycle is a waste reclamation and recycling company. The company collects and processes 450,000 tonnes of waste each year. A sorting machine called a trommel spins the waste to separate recyclable material from less usable small particles, called fines. The trommel is driven through a shaft turned by two motors. The two motors must run at exactly the same speed, or the shaft will twist. Previously there was no speed control for the trommel, as the motors were run direct on line. Wastecycle approached ABB authorised value provider Inverter Drive Systems for a solution that would improve productivity and remove even more of the fines.

**Solution:**
Two 22 kW ABB general purpose drives, one on each of the trommel’s motors.

**Benefits:**
- Motor speed can now be increased to 55 Hz when processing commercial waste, improving throughput from 23 to 25 tonnes per hour
- Increase in the proportion of fines removed when using the higher speed

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**No.94**

**Customer:** Wabtec Rail Limited

**Application:** Test rig

**Industry:** Rail

**Challenge:**
Wabtec Rail, of Doncaster, refurbishes the dampers used on railway engines and rolling stock. The railway damper test facility subjects each damper to compression testing at set frequencies. A motor connected through a gearbox to a cam compresses the damper at the selected speed. The original set-up used a 15 kW DC motor controlled by a frequency converter. Both the drive and motor were around 35 years old and were nearing the end of their lives. The company asked ABB authorised value provider Inverter Drive Systems to examine the application and suggest a replacement solution.

**Solution:**
An 18.5 kW AC motor and an ABB variable speed drive. The rating of 18.5 kW ensures the motor can be used to test the most demanding dampers. The drive was programmed and installed so that the existing controls were integrated with it, with the speed setting of the motor selected via an input to the drive.

**Benefits:**
- More accurate speed control
- Ability to reach set point speed instantly
- Higher reliability and lower maintenance

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Project managed by ABB authorised value provider Inverter Drive Systems Ltd
Ilkeston: 0115 944 1036
www.inverterdrivesystems.com

Project managed by ABB authorised value provider Inverter Drive Systems Ltd
Ilkeston: 0115 944 1036
www.inverterdrivesystems.com
**No. 97**

**Customer:** Welsh Water  
**Application:** Pumps  
**Industry:** Water and wastewater treatment  
**Challenge:** Welsh Water needed to pump water to, and sewage away from, roads on new housing estates. The existing solution consisted of motor control centres (MCCs) with their own PLC and human-machine interface. They were costly and complex as they needed to be customised for each scheme and had to be sourced from three specialised manufacturers. With customised software required for each one, there was also an extended lead time needed for the deployment of each MCC. Welsh Water specified its requirements for new kiosks to ABB, which worked with authorised value provider APDS.

**Solution:** Each kiosk contains two pumps, operating in duty/standby mode, each controlled by an ABB drive for water and wastewater applications, housed in IP54 enclosures.

**Benefits:**  
- User’s own pressure and flow parameters are incorporated into the drive software, enabling pumping regimes to be easily changed as estates expand  
- Customised control panel displays with error messages familiar to the company’s engineers

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**No. 96**

**Customer:** Weetabix Food Company  
**Application:** Extruders  
**Industry:** Food and beverage  
**Challenge:** The Weetabix Food Company makes a variety of foods, among them the Weetos brand of breakfast cereal. Product is fed into a hopper and is measured into the extruder screw. The extruder mixer then transfers the product forward through the barrel under a controlled temperature and pressure through a faceplate. From here it is extruded into a long hollow tube before being cut into short lengths prior to cooking. The extruders use up to 30 percent of the site’s energy consumption. Sentridge Control, an ABB authorised value provider, carried out an energy assessment to make the process more efficient.

**Solution:** Eight ABB industrial drives, five ABB general purpose drives and low voltage ABB motors, rated from 0.75 kW to 250 kW.

**Benefits:**  
- Energy saving of £28,000 a year  
- Maintenance and downtime costs reduced by £20,000 a year  
- More consistent product and lower noise and heat levels in the production area

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Project managed by ABB authorised value provider  
**Sentridge Control Ltd**  
Coventry: 024 7655 3303  
www.sentridge.com

Project managed by ABB authorised value provider  
**APDS Ltd**  
Bristol: 01179 822 049  
www.apds.co.uk


No.98

Customer: Wiggenhall St Germans pumping station
Application: Pumps
Industry: Water and wastewater treatment
Challenge: The pumping station at Wiggenhall St Germans in Cambridgeshire provides water management for the Middle Level District, an area of the Cambridgeshire Fens. Aging equipment and a need for a higher capacity meant that a new station was needed. Six pumps were chosen instead of the previous four. Each of the six new pump sets can raise 16.66 m³/sec to a static head of 4.25 m, giving a total capacity of 100 m³/sec. The Middle Level Commissioners, operators of the station, engaged Atkins to design an electrical system for the new station, including variable speed drives to control the pumps.

Solution: Six, 1.2 MW ABB industrial drives, fitted in three Motor Control Centre cabinets. The drives are controlled via a SCADA system that is fed data from level meters, giving accurate control and adjustment of the flow.

Benefits: • Helps protect 20,000 homes as well as farmland
• Avoids over pumping to maintain drain level and allow navigation by boats

No.99

Customer: WSP Textiles
Application: Spinning machines
Industry: Textiles
Challenge: WSP Textiles manufactures cloth for sports equipment. A critical part of the process is the spinning machines, which had an inadequate speed control system. The motor ran at full power constantly, with the speed of the machines controlled via a system of variable diameter pulleys. As well as being inefficient, the system suffered a high number of mechanical failures, resulting in lost production time. WSP asked ABB authorised value provider APDS to provide a solution.

Solution: An ABB high efficiency motor and variable speed drive. The speed control provided by the drive enables WSP to adjust the tension of the yarn, avoiding the tangling that was a problem with the previous method.

Benefits: • Annual energy saving of £18,000
• Better production quality

“There have been some energy savings but the biggest benefit for us is that there has been no down time since the VSD was installed.”

Technical manager, WSP Textiles

Project managed by ABB authorised value provider APDS Ltd
Bristol: 01179 822 049
www.apds.co.uk
No.100

Customer: Yorkshire Water
Application: Pumps
Industry: Water and wastewater treatment
Challenge: Yorkshire Water’s Esholt Wastewater Treatment Works uses filter recirculation pumps to pump final effluent to the filter distribution chamber. There are three 180 kW fixed-speed recirculation pumps on site, which were operating in a duty, duty, standby configuration. Normal operation was for two pumps to be operated continuously providing a recirculation flow of approximately 1,000 litres per second. Recent operational changes at the site meant that the load to the filters was substantially reduced. Yorkshire Water worked with ABB authorised value provider, Halcyon Drives, to review the flow rates of these pumps to determine if there was any scope for savings.

Solution: 200 kW ABB low harmonic variable speed drives were installed on the three recirculation pump motors. Investigations showed that maximum energy savings were achieved by running the motors at 45 Hz.

Benefits:
• Saving of over £61,000 on energy costs
• Flexibility to account for varying flows
• Payback period beat customer’s expectations

Project managed by ABB authorised value provider Halcyon Drives Ltd
Leeds: 0113 236 1509
www.halcyondrives.com

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