

# EHS REPORT 2014



# MORGAN ADVANCED MATERIALS



MORGAN ADVANCED MATERIALS IS COMMITTED TO BUILDING A SUSTAINABLE COMPETITIVE ADVANTAGE IN ATTRACTIVE MARKETS WITH TRULY DIFFERENTIATED PRODUCTS AND SERVICES UNDERPINNED BY WORLD-LEADING TECHNOLOGY.

The Group produces a wide range of specialist, high-specification materials that have extraordinary attributes and properties.

Engineered into products, they deliver enhanced performance, often under extreme conditions.

The Group's dynamic, highly skilled people are continuously engaged in finding solutions for complex and technologically demanding applications, which are used all over the world.

In short, the Group supplies innovative, differentiated products made from highly technical advanced materials which enable its customers' products and processes to perform more efficiently, more reliably and for longer.

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# GROUP STRATEGY



THE GROUP'S STRATEGY IS BASED ON BUILDING A SUSTAINABLE BUSINESS FOR THE LONG TERM, BY FOCUSING ON ITS FIVE STRATEGIC PRIORITIES AND REMAINING COMMITTED TO DELIVERING STRONG FINANCIAL RETURNS.

## STRATEGIC PRIORITIES

## IMPLEMENTATION

**1 Be innovative, differentiated and high value-added to our customers**

By helping to solve technically demanding challenges for its discerning customers, the Group is able to secure the value that these skills and efforts justify, allowing it to build long-term relationships with customers who regard Morgan as a solutions provider rather than just another supplier.

**2 To focus on higher growth, higher margin, non-economically cyclical markets**

Over time Morgan actively manages its portfolio and makes capital and people investments to maximise exposure to its chosen geographies and markets.

**3 Be number one or number two in our chosen market segments**

A significant majority of revenue comes from markets where the Group has successfully established a leading position. Through detailed 'share of wallet' assessments Morgan understands its position and actively targets where this can be improved. The Group nurtures and maintains relationships with key customers at multiple levels in the organisation. From these strong positions the Group is able to invest in long-term relationships with customers, providing technology leadership and delivering good, sustainable returns.

**4 Have a culture of operational excellence and cost efficiency**

Providing the Group's customers with product and service excellence secures Morgan's revenue stream, and a focus on all elements of its cost base maximises the profits generated from that revenue. The Group is focused on managing its operational footprint, using its low-cost operations as much as possible, sourcing decisions, manufacturing and back office efficiency and on minimising scrap and any other inefficiencies throughout its processes.

**5 Find, keep and develop the right people**

The 'people process' begins with a robust recruitment process, considering internal and external candidates, utilising a suite of assessment tools and interviews. There is a growing graduate recruitment programme, targeting the world's best universities and providing a pipeline of talent. Training and development is targeted to develop job-specific and wider management skills and a flexible remuneration package considers the external market and individual contribution. Site, regional and global communication is regular and environmental, health and safety is a key focus at all levels of the business.

The Group uses its strategic priorities to test new investment opportunities, to screen its existing businesses for fit with the Group and to identify areas requiring strategic attention and action.

# AT A GLANCE



## WHAT DIFFERENTIATES US?

- Advanced material science and processing capabilities
- Our applications engineering experience
- A strong history of innovation and reinvention
- Consistent and reliable performance
- A truly global footprint
- We find and invest in the best people

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## OUR MARKETS



### HEALTHCARE

Morgan Advanced Materials produces components used in medical monitoring and diagnostic instrumentation and tools for treatment and surgery.



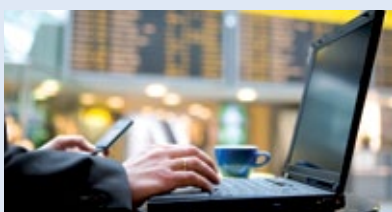
### PETROCHEMICAL

Morgan Advanced Materials makes critical components for tough assignments in the global petrochemical industry.



### TRANSPORTATION

Morgan Advanced Materials makes high-performance products to exacting standards for aerospace, automotive, marine and rail applications.



### ELECTRONICS

Morgan Advanced Materials makes components that help the electronics industry in its drive towards higher performance and reliability in smaller, lighter, more robust products.



### ENERGY

Morgan Advanced Materials develops products for power distribution and generation from renewable and traditional sources and insulation materials for heat management.



### SECURITY AND DEFENCE

Morgan Advanced Materials supplies precision-engineered materials, components and assemblies to meet the exacting standards of the international defence and security markets.



### INDUSTRIAL

Morgan Advanced Materials designs and manufactures products for use in a broad range of challenging process and manufacturing environments.

OUR GLOBAL FOOTPRINT



SALES BY REGION (£MILLION)

North America	£353.1
Europe	£325.7
Asia/Rest of World	£242.9

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PRINCIPAL PRODUCTS

**1 INSULATING FIBRE, BRICK AND MONOLITHICS**

Extensive range of high-temperature insulation products used to reduce energy consumption in industrial processes.

**2 ELECTRICAL CARBON, LINEAR AND ROTARY TRANSFER SYSTEMS**

Used to transfer current and data between stationary and rotating or linear moving parts, in motor, generator, current collector and rotary signal applications within mining, power, transportation and industrial markets.

**3 SEALS AND BEARINGS**

Providing improved performance, reliability and extended life to pumps and similar equipment used in petrochemical, aerospace and water applications.

**4 CERAMIC CORES FOR INVESTMENT CASTING**

Consumable products used to create intricate internal cooling cavities in aero engine and industrial gas turbine blades.

**5 PIEZOELECTRIC SENSORS AND TRANSDUCERS**

Products for measurement duties including level, flow, vibration and pressure in aerospace, medical, industrial and defence applications.

**6 CRUCIBLES FOR METALS PROCESSING**

Comprehensive range for optimum performance in non-ferrous metal and alloy melting in foundries, die-casters and metal processing facilities.

**7 PERSONNEL BALLISTIC PROTECTION**

Lightweight armour systems combining advanced ceramics with high-technology composites to create high-performance products.



# INTRODUCTION



“EHS IS A KEY PART OF OUR AIM TO CREATE LONG-TERM SUSTAINABLE VALUE, INTEGRAL TO MORGAN AND ALIGNED WITH OUR CORE VALUES STATEMENT AND STRATEGIC PRIORITIES.”



**KEVIN DANGERFIELD**  
INTERIM CHIEF EXECUTIVE  
OFFICER & CHIEF FINANCIAL  
OFFICER

The major re-organisation of the Group in 2013 to the One Morgan model with a management structure organised on a regional basis: North America, Europe and Asia/Rest of World, has provided continuing improvement for Morgan in 2014. The benefits have driven an improving profit and margin profile through 2014 in trading conditions that have remained mixed across the world.

With the new structure in place in 2014, the One Morgan model has enabled the Group to benefit from the close alignment of the Group's global management structure with the regional EHS management structure that we had developed over the past few years. This has facilitated the development and implementation of a standardised system of monthly EHS reporting within the regions that enables the key EHS metrics to be tracked against local performance targets. The system also provides for improved EHS reporting to the Group Executive and Board on a quarterly basis.

This alignment is particularly important as we begin to fully implement the Group's thinkSAFE behavioural safety programme worldwide. The training element of the programme was successfully piloted in the UK and launched in Asia in 2014 and is currently being rolled out throughout the Group. The thinkSAFE programme is designed to develop and maintain a high level of behavioural safety awareness at all levels. It involves a number of elements including top to bottom training of all Group employees in behavioural safety and the installation of 'safety corners' at every facility to enable the intranet based introduction of safety topics and training.

2014 also saw the successful development of the Group-wide intranet based accident reporting system, which not only enables the Group to track accidents and incidents on a real-time basis, but also to share the information and implement measures to help prevent similar incidents occurring at other facilities.

I want to take this opportunity to reaffirm the commitment at every level of the Group, from the Board downwards, to conducting all the Group's activities in a manner which achieves high standards of health and safety for employees and others affected by its operations. This commitment is continuous and ongoing and involves significant investment in safety systems and training as well as capital projects to improve the safety of the workplace. To reinforce this, when visiting Group facilities, senior executives are encouraged to review the health and safety practices at the site.

This is the eleventh year in which we have published an EHS Report and we believe that it is important to ensure that good financial performance is not achieved at the expense of our programme of continuous improvement in EHS performance. We see this as a key part of our aim to create long-term sustainable value and our EHS programmes continue to be integral to our business and are aligned with our Core Values Statement and our strategic priorities.

In terms of environmental performance against our two year stretch targets, 2014 was a challenging year, with the Group failing to meet most of its improvement targets. These intensity targets and KPIs relate environmental impacts to revenues and although revenues at constant currency in 2014 were up on the prior year, they were down compared to 2012, the baseline year. We believe that a number of environmental initiatives in place or planned will improve future environmental performance.

Although the Group's overall health and safety performance in 2014 deteriorated, this was confined to a small number of facilities and we are confident that specific action at those sites, combined with the implementation of the thinkSAFE programme, will lead to improved health and safety performance in the future.

I was also pleased when, for the third year running, Morgan was noted in the 2014 CDP FTSE 350 Report as one of the companies featured in the Carbon Disclosure Leadership Index. This reflects the continuing emphasis that the Group places on accurate and informative reporting of energy usage and resulting CO<sub>2</sub>e emissions. The Group also participated in the CDP water reporting programme for the first time.

During 2014 we continued to work with PricewaterhouseCoopers LLP (PwC) in order to provide independent assurance of the energy, CO<sub>2</sub> emissions, water, waste and recycling and lost time accident frequency KPI data that we include in this report and the Annual Report. Their assurance report is included on page 18 of this report.

I look forward to reporting on our progress next year, but in the meantime if you have any comments or suggestions, please let us know at [ehs@morganplc.com](mailto:ehs@morganplc.com)

**KEVIN DANGERFIELD**  
INTERIM CHIEF EXECUTIVE OFFICER  
& CHIEF FINANCIAL OFFICER  
MAY 2015



# WHAT MORGAN DOES

## GROUP ACTIVITIES

Morgan Advanced Materials is a world-leader in advanced materials, focused on specialist ceramics, carbon and composites. Working at the forefront of materials science, the Group supplies differentiated products to a range of attractive growth markets, helping to make the world more efficient, better protected and healthier.

Morgan's 2014 revenues of £921.7m were down 3.8% on 2013 at reported rates but were up by 1.8% at constant currency. Compared to 2012, the baseline year for the Group's environmental intensity targets, 2014 revenues were down 8.5% at reported rates and down 3.8% at constant currency.

Group underlying operating profit was £112.4m in 2014 up from £108.5 million in 2013 and from £107.7m in 2012.

## BUSINESS STRUCTURE

Operating from approximately 100 manufacturing sites, supported by a network of sales offices, and employing circa 9,000 people, Morgan Advanced Materials has a significant operational presence in all the world's major regions, serving customers in over 100 countries.

The Group reports through three geographical Regions, North America, Europe and Asia/Rest of World, and each of those regions offers the full range of Morgan's product and services. The regional management teams work effectively together in terms of product and market development and providing service excellence to the customer base. The One Morgan model integrates the Group under a cohesive brand identity which better reflects the business as a whole.

Morgan has a wide portfolio of products which help make the world safer, healthier and more efficient, helping to improve the environmental sustainability performance of the Group's customer's products and operations. Although Morgan has not sought to quantify this benefit, it is a key part of the Group's contribution to sustainability.

## PRODUCTS

The principal product ranges are:

- Insulating fibre, brick and monolithics – 35% of Group revenue in 2014 – an extensive range of high-temperature insulation products used to reduce energy consumption in industrial processes. A Morgan design team will often work with the customer to ensure an optimum solution.
- Electrical carbon, linear and rotary transfer systems – 15% of Group revenue in 2014 – primarily used for transferring electrical energy in motor and generator applications within mining, transportation and power generation markets.
- Seals and bearings – 8% of Group revenue in 2014 – carbon/graphite and silicon carbide components that provide improved performance, reliability and extended life to pumps and similar equipment used in petrochemical, aerospace and water applications.
- Ceramic cores for investment casting – 4% of Group revenue in 2014 – consumable products used to create intricate internal cooling cavities in aero engine and industrial gas turbine blades.
- Piezoelectric sensors and transducers – 4% of Group revenue in 2014 – products for measurement duties including level, flow, vibration and pressure in aerospace, medical, industrial and defence applications.
- Crucibles for metals processing – 4% of Group revenue in 2014 – comprehensive range for optimum performance in non-ferrous metal and alloy melting in foundries, die-casters and metal processing facilities.
- High-technology composites – 2% of Group revenue in 2014 – which are combined with the Group's advanced ceramics for lightweight armour systems, providing ballistic protection in the form of personnel body armour or vehicle armour.

In addition to these principal product ranges, there are also a high number of application specific products made to customer requirements using a wide range of structural ceramics, electro-ceramics and precious metals that are sold into the seven markets listed on page 3.

Additional information on all areas of Morgan Advanced Materials' CSR-related activities and performance can be found on pages 22-33 of the Group's 2014 Annual Report.

Further information about Morgan Advanced Materials is available on the Group's website at [www.morganadvancedmaterials.com](http://www.morganadvancedmaterials.com)

# ABOUT THIS REPORT



MORGAN ADVANCED MATERIALS' 2014 EHS REPORT SUMMARISES THE GROUP'S ENVIRONMENTAL, HEALTH AND SAFETY PERFORMANCE IN THE YEAR ENDED 31 DECEMBER 2014.

This, the Group's eleventh annual EHS Report, covers the available data for the whole business.

Morgan's Environment, Health and Safety (EHS) Policy and implementation programmes support its five strategic priorities and Core Values Statement. EHS performance has a direct and significant effect on operating performance and is therefore a key focus for risk assessment and operational management across the Group.

Morgan Advanced Materials is committed to conducting all its activities in a manner which achieves high standards of health and safety for employees and others affected by its operations. This commitment is continuous and ongoing.

The Group is also committed to minimising the impact of its business on the environment and maximising the positive environmental benefits of its products. Examples of Morgan's products which help enhance the environment-related performance and efficiency of the products and operations of the Group's customers are included in pages 19 to 22 of this Report.

The health and safety data in this report covers 100% of Morgan's employees and the environmental data covers 100% of its production sites.

The Group engaged PricewaterhouseCoopers LLP ('PwC') to provide independent external assurance on its 2014 energy, CO<sub>2</sub>e<sup>></sup>, waste, recycling and water related environmental data and on its lost time accident frequency. PwC's independent assurance report is set out on page 18.

As required by The Companies Act 2004 (Strategic Report and Directors' Report) Regulations 2013, the Group reports its Greenhouse Gas emissions in its Directors' Report. This information is included on page 87 of the Group's 2014 Annual Report and is reproduced in the Appendix on page 24 of this report.

<sup>></sup> CO<sub>2</sub>e. Carbon Dioxide Equivalent – the amount of Carbon Dioxide or the amount of non-CO<sub>2</sub> Greenhouse Gas with the equivalent global warming potential.



# EHS POLICY



MORGAN ADVANCED MATERIALS' EHS POLICY APPLIES TO ALL GROUP BUSINESSES WORLDWIDE. IT FORMS THE BASIS FOR EXECUTIVE AND MANAGEMENT OVERSIGHT, REQUIRING HIGH STANDARDS OF EHS MANAGEMENT AT ALL MORGAN FACILITIES.

Morgan's EHS Policy seeks to provide continuous improvement in environmental, health and safety performance in support of the Group's strategic priorities.

The Policy sets out our commitment to the environment and the health and safety of our employees, contractors and visitors across all Morgan companies worldwide.

As summarised below, the Policy is made available to all employees and published on the Group's website and intranet.

All employees have responsibility for EHS policy and related matters:

- The Chief Executive Officer has overall accountability for corporate responsibility matters.
- The Chief Financial Officer is responsible for EHS policy, strategic direction and performance monitoring.
- The Chief Operating Officer and the operational management teams have responsibility for EHS performance and reporting across the businesses for which they are responsible and for implementing this Policy and ensuring compliance.
- The manager of each operation has operational responsibility for EHS.
- Employees at all levels are responsible for implementing EHS rules and guidance, avoiding potential and actual hazards, warning others accordingly and identifying opportunities for improvement.

It is the Group's EHS policy that all Morgan businesses:

- Have an objective of zero harm by implementing the thinkSAFE programme.
- Comply with EHS legislation, regulations and other applicable legal requirements as a minimum standard.
- Conduct operations so as to minimise the impact on human health, prevent pollution and reduce hazards.
- Include EHS and climate change related considerations in our business decisions, promote resource and efficiency programmes across the Group and minimise the environmental impact of historic, current and future operations.
- Supply products that, when used in compliance with product safety communications and common safety practices, will not present an unacceptable risk to human health and safety.
- Set objectives and targets for the continuous improvement of EHS performance and monitor and report progress internally and externally as appropriate.
- Ensure competence in EHS matters through training and education at all levels of the organisation.
- Conduct periodic reviews of the Group's Environmental, Health and Safety management systems.
- Maintain communications with stakeholders on EHS matters to help ensure alignment with their needs and expectations.

The Group's commitment to this Policy is considered as fundamental to its business success and this Policy must be implemented by all Morgan operations worldwide.

This Policy applies to all Morgan operations, including all legal entities and business area units, and to Morgan joint ventures over which Morgan is able to exercise control over policies and procedures.

In addition to the Group Policy, Morgan businesses are required to ensure that they are aware of and take account of national, regional and local EHS laws and regulations and best practice, including that set out in the Group's EHS Good Management Practice Manual.

Where appropriate the Group's operations have supplementary environmental and health and safety policies, key performance indicators and targets according to the risks, opportunities and needs of each particular business.

# EHS POLICY IMPLEMENTATION

Morgan's EHS governance procedures are centred on its EHS Policy which forms the basis of its environment, health and safety management systems and processes. The core objectives of these systems are to identify risks and opportunities, legal and other requirements and to monitor and continuously improve performance in support of the Group's strategic objectives.

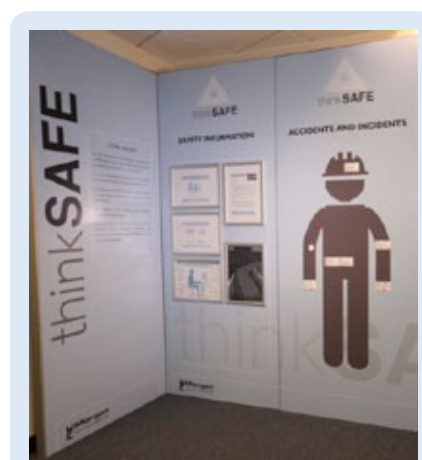
The Group's operations involve the normal environmental and health and safety risks associated with manufacturing and other activities in the countries in which Morgan operates. EHS management processes are designed to be forward-looking in the identification, management and mitigation of EHS risks and opportunities that could impact the Group's short- and long-term performance and value.

The governance structure for EHS places responsibility for EHS performance with the Chief Operating Officer and the operational management team, with each site having a point of accountability. EHS performance is reported regularly to the Board by the Chief Financial Officer who has specific responsibility for EHS policy, strategic direction and performance monitoring. He is supported by the Group's Director, Environment, Health and Safety, who provides Group direction and oversight of the Group's EHS programmes, the review of standards and procedures, and the review of the adequacy of EHS resources across the Group, for performance reporting and all assurance processes.

During 2014 the Group

- Launched Morgan thinkSAFE, the Group's safety performance improvement programme. This is a top down behaviour-based safety programme led by the Chief Executive Officer and the Executive team.
- Adopted a new set of health and safety core values which have been communicated and adopted Group-wide.
- Participated in the Carbon Disclosure Project 2014 and, for the third consecutive year, was awarded a position in the Carbon Disclosure Leadership Index, recognising the depth and quality of the climate change data disclosed by the Group.
- Developed a Group-wide online incident tracking system to cover health and safety incidents.

In addition, as described on page 18, the Group commissioned external assurance on selected EHS data from PricewaterhouseCoopers LLP (PwC).



## MORGAN thinkSAFE LAUNCHED

Morgan thinkSAFE, the Group's behaviour-based safety programme, was launched in Asia in the final quarter of 2014 and during 2015 thinkSAFE is being implemented throughout the Group.

A key component of thinkSAFE is the installation of a 'safety corner' at each Group facility, with the first one installed at the Group's head office in Windsor, as pictured above. The safety corners are used to build a greater awareness of health and safety, to provide an interactive focus for safety information and for promoting local initiatives.

The thinkSAFE programme also includes an online reporting system for health and safety incidents.

# EHS POLICY IMPLEMENTATION

## continued

Morgan Advanced Materials' EHS management processes include the EHS Compliance Audit Programme. The audits cover the EHS management systems and the EHS KPIs reported by each site and also help to identify how sites can anticipate and respond to developing and impending regulations and improve their EHS performance to meet internationally accepted good practice. The programme helps ensure compliance with national and other regulatory requirements, with the Group's EHS reporting criteria and with good management practice as set out in the Group's Environmental, Health and Safety Good Management Practice Manual.

The programme is conducted by external EHS auditors and the audit reports are reviewed by the Director, Environment, Health and Safety and by regional management. Sites are required to develop a corrective action plan following the audit. These actions are regularly tracked by the audit teams and regional management. Manufacturing sites are audited on a three year rolling cycle. During 2014 26 sites were audited (2013: 30 sites).

In 2014 environmental management systems were in place at 94 sites worldwide, including 42 major sites certified to ISO 14001. Additional certifications were achieved at sites in China and Canada in 2014. These new certifications are in addition to the ongoing programme of re-certifications. Worldwide, 99 sites have health and safety management systems in place, with 17 sites certified to or working towards OHSAS 18001.



Abner Gica, based at Technical Ceramics, Melbourne, was in the top 5 in the Most Miles March initiative

### QUARTERLY EHS THEMES IN ASIA

During Q1, the theme was employee wellbeing – 'Better You, Better Life' – encouraging employees to be healthier and safer at work and at home. The initiative included:

- Employee medicals;
- Diet and nutrition;
- Fitness;
- Managing stress;
- Ergonomics; and
- Community wellbeing activities.

Sites participated in 'Most Miles March', a region-wide competition to clock the most miles walked or run during the month of March. Across all the sites in the region, over 168,000km were covered, the equivalent of over four times round the world!

In Q3 the theme was 'Bright, Clean and Safe'. This focussed on the 5s programme:

- Sorting: making work easier and safer by removing unnecessary obstacles
- Setting to order: organising to make the work flow smoother
- Shining: cleaning the work environment, and making it easier and safer to work in
- Standardise: create a standardised workflow

→ Sustain: ensure that 5s is a long-term goal.

Audits and competitions were organised on several aspects of 5S that highlighted the best practices on the shop floor, in warehousing, material and pedestrian movements, and amenities. A clear link between 5S and safety was brought out through these events. All the sites conducted contests for slogans, posters and campaigns to draw maximum response to suggestion schemes.

In Q4, activity was based on the environmental theme 'Reduce, Reuse, Recycle'. This included regional initiatives such as common audit templates and best practice contests in the areas of energy, water and waste.

For example, the energy category winner was the Thermal Ceramics' Ranipet, India site. With strong practices of energy consumption mapping, daily measurement through metering and regular auditing, Ranipet has been the most efficient spun high temperature fibre line in Asia for three consecutive years. Energy saving initiatives include annealing oven fuel reduction, implementation of energy efficient motors and installation of LED lighting.

# EHS PERFORMANCE



EHS PERFORMANCE IS REPORTED MONTHLY BY ALL SITES AND IS REPORTED TO THE EXECUTIVE COMMITTEE AND THE BOARD TWICE PER YEAR.

In addition to the EHS Compliance Audit Programme, the Group monitors the effectiveness of its EHS Policy through a series of EHS key performance indicators (KPIs). These are reported monthly by all sites and are subject to twice-annual review and challenge at Group level with reporting of performance to the Executive Committee and the Board by the Chief Financial Officer.

The charts in this report summarise the Group's EHS performance in real terms, covering 100% of production sites and 100% of employees during the year. Environmental intensity KPIs are reported at constant currency and, where necessary, historic data has been restated to reflect changes to the business, in reporting methodology and to ensure year-on-year consistency.

### Environmental performance

Wherever possible the Group works to minimise the impact of its business on the environment. The Group monitors the effectiveness of its environmental policy through a series of environmental key performance indicators (KPIs) reported by all sites on a monthly basis with the Executive Committee and the Board receiving regular reports. The Group also sets targets for key aspects of its environmental performance. These are summarised in the table on page 23 with performance against target reviewed for each KPI below.



## ENERGY MANAGEMENT IN NORTH AMERICA

Sites across the North America region have worked on energy efficiency throughout their operations for many years, but recently progress has stalled.

During 2014 the Bedford, OH site, which is part of the Technical Ceramics business, started a more structured approach to energy management by appointing an energy champion supported by a cross-functional team. Using metering and live data management systems to track usage by the minute, the team took an in-depth review of electricity use at the site.

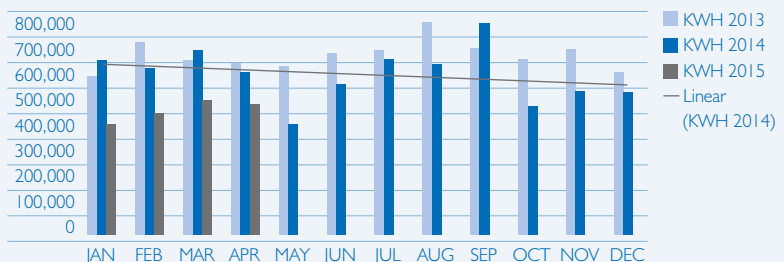
As they built a profile of the site's base load and energy consumption it emerged that the largest use was in the site's HVAC systems rather than in the furnaces and

other production equipment. They also found that one of their key pieces of equipment which is used to monitor electricity had been installed incorrectly which meant that previously some of the data that was being collected was inaccurate.

The additional metering, data systems and awareness have driven a more structured and energy-centred approach to business and production decisions and this has delivered a reduction of 18% in electricity use in 2014 compared with 2013, as highlighted in the chart below.

The Bedford team are now working with other sites to share lessons and to roll-out and accelerate the energy management programme across the North America region.

### ELECTRICITY USE



# EHS PERFORMANCE

## continued

### Key environmental impacts

Morgan Advanced Materials' key environmental impacts include the Scope 1 and Scope 2 CO<sub>2</sub>e emissions due to the use of energy in the Group's processes and facilities, the consumption of raw materials, water use and discharge, the recycling and disposal of waste and the impact of products on the Group's customers' environmental performance.

Morgan sets two-year targets for the reduction of the impact of its operations on the environment, as measured by CO<sub>2</sub>e emissions, energy, waste and water intensity. The Group's 2014 environmental performance is reported against the targets for the two-year period 2012-14.

The Group did not achieve its environmental targets for the period 2012-14. These intensity targets and KPIs relate environmental impacts to revenue and although revenues at constant currency were up 1.8% on 2013, they were down 3.8% compared to 2012, the baseline year for the Group's intensity targets. Whilst many sites worldwide achieved or exceeded their individual environmental targets this was not sufficient for the Group as a whole to meet its targets. Various factors contributed to this during 2014, including a number of production transfer, technology change and commissioning projects, which led to a reduction in production and environmental efficiency over the target period.

### Energy use and emissions

Much of Morgan's production involves the use of high-temperature processes. The Group reports the environmental impact of the energy used in these process and elsewhere in its facilities as CO<sub>2</sub>e emissions, indexed to turnover. This takes into account the use of all sources of energy. Business performance is assessed on the basis of energy and emissions intensity i.e. energy use and emissions relative to turnover. In absolute terms total CO<sub>2</sub>e emissions due to energy use in 2014 were

some 400,300 tonnes, up by 4% from 386,500 tonnes in 2013 and 1% higher than the 394,500 tonnes reported for 2012. Energy use was some 1,333 GWh, up by 3% from 1,295 GWh in 2013 and 1% up against the 1,319 GWh reported for 2012.

Taking into account the decline in the Group's sales at constant currency since the baseline year of 2012, CO<sub>2</sub>e intensity<sup>^</sup> was up by 2% compared with 2013 and by 5% compared with 2012. Thus the Group did not achieve its target to reduce the CO<sub>2</sub>e emissions intensity due to energy use by 5% over the two-year period 2012-14. 2014 energy intensity<sup>^</sup> was up by 1% compared with 2013 and by 4% compared with 2012.

Energy and CO<sub>2</sub>e intensity have been reduced since 2010 and the Group continues to have a number of production improvement projects which include energy efficiency programmes. These are planned to help reduce energy intensity in 2015 and beyond and include plans to increase kiln efficiencies, to install high-efficiency variable speed drives on compressors, dust collectors and other equipment and the replacement of lighting systems which will both save energy and improve the working environment,

In addition to improving energy consumption and emissions performance through increased efficiency, changes in Morgan's business and product mix influence the Group's energy and emissions when indexed to turnover. Emissions are also affected by changes in national electricity-CO<sub>2</sub> conversion factors. More details on Morgan Advanced Materials' carbon management can be found in the Group's submissions to the Carbon Disclosure Project. See [www.cdp.net](http://www.cdp.net) for further details.

### Energy use and emissions intensity

CO <sub>2</sub> e <sup>&gt;</sup> DUE TO ENERGY USE <sup>^*</sup> Tonnes <sup>†</sup>	
2014	400,300
2013	386,500
2012	394,500
2011	436,700
2010	426,600

CO <sub>2</sub> e <sup>&gt;</sup> INTENSITY DUE TO ENERGY USE <sup>^*</sup> Tonnes CO <sub>2</sub> e/£m revenue <sup>†</sup>	
2014	434
2013	427
2012	414
2011	427
2010	456

ENERGY USE <sup>^‡</sup> GWh <sup>†</sup>	
2014	1,333
2013	1,295
2012	1,319
2011	1,439
2010	1,397

ENERGY INTENSITY <sup>^‡</sup> MWh/£m revenue <sup>†</sup>	
2014	1,446
2013	1,430
2012	1,386
2011	1,406
2010	1,492

<sup>^</sup> The 2011-2014 CO<sub>2</sub>e intensity, energy intensity, water intensity and the 2012-2014 waste intensity and waste recycling rate information has been subject to assurance by PwC. For further details of the assurance provided see the Independent Assurance Report on page 18. Further details of the 2013, 2012 and 2011 assurance provided are included in the Independent Assurance Reports on page 31 of the 2013 Annual Report, page 25 of the 2012 Annual Report and page 41 of the 2011 Annual Report.

<sup>\*</sup> Scope 1 CO<sub>2</sub>e emissions from fossil fuel usage and Scope 2 CO<sub>2</sub> using country-specific electricity factors as CO<sub>2</sub>e factors are not consistently available for electricity use in all countries.

<sup>†</sup> Constant currency basis and updated to reflect changes in reporting methodology.

<sup>‡</sup> Energy from all sources.

<sup>></sup> CO<sub>2</sub>e. Carbon Dioxide Equivalent – the amount of Carbon Dioxide or the amount of non-CO<sub>2</sub> Greenhouse Gas with the equivalent global warming potential.

# EHS PERFORMANCE

## continued

WASTE <sup>^</sup> Tonnes <sup>†</sup>	
2014	49,400
2013	44,600
2012	48,700
2011	48,400
2010	46,200

WASTE INTENSITY <sup>^</sup> Tonnes waste/£m revenue <sup>†</sup>	
2014	54
2013	49
2012	51
2011	47
2010	49

RECYCLING <sup>^</sup> % of total waste <sup>§</sup> recycled	
2014	28
2013	31
2012	34
2011	28
2010	26

RECYCLED WASTE <sup>^</sup> Tonnes <sup>†</sup>	
2014	13,600
2013	13,800
2012	16,400
2011	13,600
2010	11,800

### Waste and Recycling

Waste management is a key area of focus for the Group with opportunities to reduce the use of raw materials, packaging and other consumables. As well as saving money through waste reduction, by recycling certain waste streams including scrap metal, cardboard and other materials, the Group can turn costs into revenue.

Hazardous and non-hazardous waste is monitored according to waste stream and disposal route, with performance assessed on the basis of waste intensity (i.e. waste quantities indexed to turnover) and the proportion of total waste which is recycled.

Total waste reported in 2014 was 49,400 tonnes, up by 11% from 44,600 tonnes in 2013 and 1% higher than the 48,700 tonnes reported for 2012. Waste intensity<sup>^</sup> was up by 9% compared with 2013 and by 5% compared with 2012. Thus the Group did not achieve its target to reduce waste intensity by 5% over the two-year period 2012-14. The increased level of waste reported in 2014 includes the impact of the production and technology change projects mentioned above and the one-off disposal of historic waste at sites in Italy, India and elsewhere.

The proportion of total waste which was recycled<sup>^</sup> was 28% in 2014, down by 3 percentage points from 31% in 2013 and down by 6 percentage points from the 34% reported for 2012. The recycling rate achieved in 2012, and to a lesser extent in 2013, was enhanced by a number of one-off disposals of recyclable material, including surplus materials and equipment across a number of sites worldwide, much of which was recycled. Thus the Group did not achieve its target to increase the proportion of total waste which is recycled over the two years 2012-14.

Consistent attention to waste management has helped to drive improved underlying rates of recycling through increased site-level awareness of recycling opportunities. As a result over 13,600 tonnes of waste material was recycled during the year. This included some 1,060 tonnes of paper and cardboard, 290 tonnes of plastic, 1,400 tonnes of wood and 1,170 tonnes of metal. The remainder of the recycled material included scrap, dust, slag and other process by-products which were used by others as raw materials for their processes and for other purposes.

<sup>^</sup> The waste intensity and waste recycling rate information has been subject to assurance by PwC. For further details of the assurance provided see the Independent Assurance Report on page 18. Further details of the 2013, 2012 and 2011 assurance provided are included in the Independent Assurance Reports on page 31 of the 2013 Annual Report, page 25 of the 2012 Annual Report and page 41 of the 2011 Annual Report.

<sup>†</sup> Constant currency basis and updated to reflect changes in reporting methodology.

<sup>§</sup> Hazardous and non-hazardous waste, including recycled material.



# EHS PERFORMANCE

## continued

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### RECYCLING IN EUROPE: WASTE STREAMS TO REVENUE STREAMS

Across Europe the Electrical Carbon and Seals and Bearings businesses have taken a long-term approach to managing waste and maximising recycling. This has driven waste to landfill down from 24% to 11% of total waste over the period 2009-2014. A number of recycled waste streams have also been switched from cost to revenue generators. These include solid carbon, metallic powder, graphite off-cuts and oils.

Historically waste materials from different production stages and processes were combined prior to disposal. This general waste stream included potentially valuable recyclable and reusable materials so the Morgan team used chemical analysis and

other techniques, working with regulators where necessary, to classify the individual materials and to identify markets for them.

Once the markets and opportunities were identified the team worked to separate the waste streams. They employed a number of techniques, including material-specific dust extraction and vacuum cleaners, line-side segregation, waste handling area segregation and above all employee awareness.

As well as reducing waste to landfill, of eight of the main waste streams identified for segregation and recycling, seven of them are now revenue generators and the eighth is disposed of at no cost to Morgan.

# EHS PERFORMANCE

## continued

### Water Use and Intensity

The Group reports water use for potable, sanitary, irrigation and process purposes. A significant proportion of the Group's water usage is in production processes, approximately 60% of which is subsequently discharged. The Group monitors use of water from both on-site extraction and from local authority and similar sources and assesses performance on the basis of water intensity.

Total water use in 2014 was 2.50 million m<sup>3</sup>, up 10% from 2.27 million m<sup>3</sup> in 2013 but down 1% from 2.52 million m<sup>3</sup> in 2012. Water use intensity<sup>^</sup> increased by 8% compared with 2013 and by 3% compared with 2012. This was behind the target to reduce water intensity by 5% over the two years 2012-14. Despite a significant reduction in the water intensity at key sites in the Asian region, where water is a limited resource, this improvement was not sufficient to offset the increased intensity at a number of sites which were not operating at optimum efficiency and by other sites as new processes were commissioned and optimised. Water use and intensity has been reduced significantly since 2010 and the Group will seek to achieve further improvements in 2015-16.

### Environmental Regulatory Compliance

Morgan Advanced Materials received no fines or penalties in relation to environmental compliance matters during 2014. However, a site in France received an enforcement notice in relation to dust levels within the plant and a site in the USA received a notice of violation in relation to local statutory reporting and an overdue report. Both issues have been addressed and rectified where appropriate.

The Group has a small number of ongoing remediation programmes to address historical soil and groundwater contamination issues.

### WATER USE<sup>^></sup> million m<sup>3</sup><sup>†</sup>

2014	2.50
2013	2.27
2012	2.52
2011	2.77
2010	2.92

### WATER INTENSITY<sup>^></sup> m<sup>3</sup>/£m revenue<sup>†</sup>

2014	2,713
2013	2,509
2012	2,642
2011	2,711
2010	3,119



Secondary Reverse Osmosis plant

### BEST PRACTICE WATER MANAGEMENT – INDIA

The Morgan site in Gujarat, India is part of the Thermal Ceramics business and produces insulating fibre and paper products. The Gujarat area suffers from extreme water stress and recognising this, the plant set up a water management team to help reduce fresh water use from 116m<sup>3</sup> per day to a maximum of 40m<sup>3</sup> per day, in accordance with conditions set by the local authorities. An additional restriction of maximum discharge of 16 m<sup>3</sup> per day was imposed.

The team constructed a water balance map and conducted a consumption audit to help engage employees through a motivational programme named 'Koshish'. This resulted in projects to re-use grey water and to recycle the plant's cooling water. This cut water use to 73 m<sup>3</sup> per day.

The next step was to reduce water use in the sites' insulating paper plant. The team, supported by an expert consultant, designed and implemented a system consisting of filtration, chemical treatment and reverse osmosis technologies. This helped to reduce water use to less than the target of 40m<sup>3</sup> per day on average for the whole of 2014 and also contained the discharge to the stipulated limits.

<sup>^</sup> The 2011-2014 water intensity has been subject to assurance by PwC. For further details of the assurance provided see the Independent Assurance Report on page 18. Further details of the 2013, 2012 and 2011 assurance provided are included in the Independent Assurance Reports on page 31 of the 2013 Annual Report, page 25 of the 2012 Annual Report and page 41 of the 2011 Annual Report.

<sup>†</sup> Constant currency basis and updated to reflect changes in reporting methodology.

<sup>></sup> Water from all sources, including process, irrigation and sanitary use.

# EHS PERFORMANCE

## continued



THE GROUP'S LONG-TERM OBJECTIVE IS 'ZERO HARM' AND IT SEEKS TO ACHIEVE YEAR-ON-YEAR IMPROVEMENTS IN PERFORMANCE AS IT PROGRESSES TOWARDS THIS OBJECTIVE.

### Health and safety performance

Morgan Advanced Materials is committed to implementing its health and safety core values with the long-term aim of an injury-free workplace and to conducting all its activities in a manner which achieves high standards of health and safety for all employees and others affected by its operations.

The Group's health and safety policy statements are clear and communicated throughout the Group and health and safety metrics receive a high degree of focus at all levels of the business. The policy statements are supported by site-level assessment and monitoring of risks.

In 2014 the Group's accident prevention and training programmes were ongoing, with the objective of reducing accident numbers and the time lost per lost time accident. Particular focus is placed on those sites with below-average performance, as measured by their health and safety KPIs and through the EHS Compliance Audit Programme.

During 2014, the Group's health and safety initiatives included:

- Launch of Morgan thinkSAFE, the Group's safety performance improvement programme. This is a top down behaviour-based safety programme led by the Chief Executive Officer and the Executive team designed to reduce work related accidents, illness and lost time. The programme was formally launched in Asia in the final quarter of 2014 and will be implemented throughout the Group during 2015.
- Introduction of quarterly EHS 'themes' in Asia: Better You Better Life; Bright, Clean and Safe Initiative; and Reduce, Reuse and Recycle.
- Adoption of a new set of Health and Safety core values which have been communicated and adopted Group-wide:
  - We are committed to creating a culture and environment that is 'zero harm' with no related accidents or illness due to our activities.

- We will encourage and expect our employees and contractors to be passionate about safety.
- We are dedicated to creating a positive safety culture based on openness, transparency and responsibility.
- We support a safe working culture through investment and training.
- We will engage with our people to continuously improve safety knowledge, reporting and performance through our commitment to our thinkSAFE programme.

These values have been adopted Group-wide and are available in 17 of the working languages used across the Group.

The roll-out of Morgan thinkSAFE includes the installation of a 'safety corner' at each Group facility. These safety corners are used to build a greater awareness of health and safety and provide an interactive focus for safety information. (See case study on page 9).

As part of the development of the thinkSAFE programme, the Group created and trialled an internal online reporting system for the capture of health and safety incident data on a global basis. The system captures incidents in real-time and notifies individuals by email when an incident is logged. The system also drives a detailed incident investigation process that will help further increase understanding of accident root causes thereby helping the Group to reduce accidents and the resulting lost time. The first phase of the system, covering lost time accidents, went live on 1 January 2015.

The inquest into the employee fatality which occurred in December 2012 at the Group's site in Ruabon, UK returned a formal verdict of 'accidental death'. The Company was informed in 2014 that Morgan Technical Ceramics Ltd would be subject to a prosecution by the UK Health and Safety Executive in relation to this incident and proceedings were initiated in early 2015.



### HAYWARD, CA SAFETY PROGRAMME: HEADING FOR ZERO

During 2013 and 2014 the Metals and Ceramics operations in Hayward implemented a new safety programme focussed on eliminating safety incidents through employee engagement.

The programme engaged the whole team at Hayward and used leading indicators to monitor implementation and to drive activities which will help improve future performance. These included:

- Weekly safety training for all employees by the Production Management team.
- Safety walks to identify potential hazards and risks. During 2014, 200 safety walks took place and all team members participated.
- Some 217 'find and fix' projects were implemented to address potential issues.
- One-on-one safety 'chats' with each team member twice per year to reinforce the programme.
- Use of Process Hazard Analysis and a six-step scientific problem solving methodology.

The programme is a key step for the Hayward site on its journey towards zero safety incidents.

# EHS PERFORMANCE

## continued

### Health and Safety KPIs

The Group's health and safety KPIs include accident frequencies, causes and related lost working time. These are reported monthly by all sites to monitor the effectiveness of the Group's Health and Safety Policies and related systems. The Executive Committee and the Board receive reports and review health and safety matters on a regular basis.

The health and safety KPIs in this report cover 100% of employees (2013: 100%) and in 2014 the independent external assurance performed by PwC covered the Group's Lost Time Accident ('LTA') frequency rate.

The Group's 2014 health and safety performance was behind that achieved in 2013 and so the Group did not achieve its objective of improving on the performance achieved in the prior year. The Group has over 130 sites worldwide and overall the majority performed well with no LTAs reported during the year. However, a small number of sites reported a disproportionate number of LTAs, resulting in the overall decline in performance. The Group is taking action to address performance issues at these sites.

In 2014 the Group's LTA frequency<sup>^</sup> was up 16% at 0.53 per 100,000 hours worked (2013: 0.46). The number of lost time accidents reported was 110 (2013: 97).

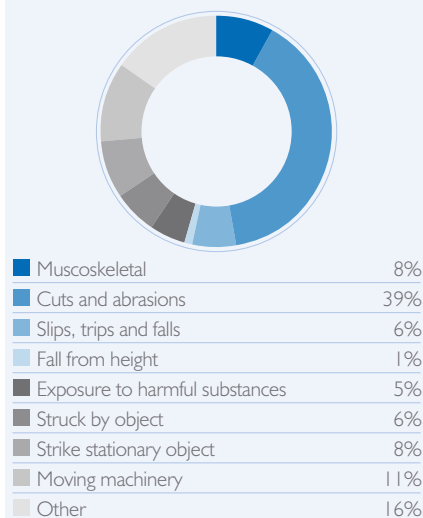
Reported lost time due to accidents and work-related illnesses as a percentage of working time increased from 0.10% in 2013 to 0.12% in 2014. The number of days lost during 2014 was up by 19% and the number of hours worked decreased by 2%.

The reported average number of days lost per LTA reported in the year increased by 5%. This reflected a small number of longer term cases at certain sites whilst the majority of sites improved performance through an increased focus on the management of LTAs and lost time.

Accidents are reported in the year in which the accident actually occurs with the lost time reported in the year in which the individual is away from work. Thus accidents which occur

in a prior year which result in lost time the following year can impact the lost time as a percentage of total working time and the lost time per LTA key performance indicators.

### 2014 ACCIDENT CAUSES (ALL ACCIDENTS)



Manual handling related cuts and abrasions remain the most common causes of accidents and the Group continues to address this, with attention being focussed through the regional EHS management team on targeting the main causes of accidents in each region.

### Health and Safety Regulatory Compliance

As reported on page 16 there was notice of one health and safety related prosecution received during the year. This related to the employee fatality which occurred in December 2012 at the Group's site in Ruabon, UK.

In addition, two sites in the USA received a health and safety related Notice of Violations. One was in relation to machine guarding issues. These were rectified and a fine of \$7,200 was imposed. The second site received a notice in relation to personal protective equipment. This was also complied with and no fine was imposed.

### LOST TIME ACCIDENTS<sup>^</sup> Number of LTAs\*

2014	110
2013	97
2012	114
2011	132
2010	124

### LOST TIME ACCIDENT FREQUENCY<sup>^\*</sup> LTAs/100K hours worked\*

2014	0.53
2013	0.46
2012	0.52
2011	0.58
2010	0.58

### HEALTH AND SAFETY RELATED LOST TIME % of total working time

2014	0.12%
2013	0.10%
2012	0.12%
2011	0.10%
2010	0.11%

### LOST TIME PER LTA<sup>†</sup> Days per LTA\*

2014	28.6
2013	27.3
2012	27.8
2011	21.0
2010	23.7

\* Lost Time Accident ('LTA'): accident or work-related illness which results in one or more days' lost time.

<sup>^</sup> The 2013 and 2014 Lost Time Accident Frequency information has been subject to assurance by PwC. For further details of the assurance provided see the Independent Assurance Report on page 18. Further details of the 2013 assurance provided are included in the Independent Assurance Report on page 31 of the 2013 Annual Report.

<sup>†</sup> Total time lost due to health and safety in the year divided by the number of lost time accidents reported in the year.

# INDEPENDENT ASSURANCE REPORT

## Independent Limited Assurance Report to the Directors of Morgan Advanced Materials plc.

The Directors of Morgan Advanced Materials plc ('Morgan') engaged us to provide limited assurance on the information described below and set out in Morgan's Annual Report for the year ended 31 December 2014.

### Our conclusion

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the Selected Information for the year ended 31 December 2014 has not been prepared, in all material respects, in accordance with the Reporting Criteria.

This conclusion is to be read in the context of what we say in the remainder of our report.

### Selected Information

The scope of our work was limited to assurance over the selected environment, health and safety ('EHS') data (the "Selected Information") marked with the symbol ^ in the Morgan Annual Report for the year ended 31 December 2014.

The Selected Information and the Reporting Criteria against which it was assessed are summarised below. Our assurance does not extend to information in respect of earlier periods or to any other information included in the Morgan Annual Report for the year ended 31 December 2014.

- CO<sub>2</sub>e and CO<sub>2</sub>e intensity (scope 1 and scope 2 emissions due to energy use);
- Energy use and energy intensity;
- Water use and water intensity;
- Waste and waste intensity;
- Recycling rate; and
- Number of lost time accidents and lost time accident frequency rate.

We assessed the Selected Information using Morgan's Reporting Criteria as set out at: <http://www.morganadvancedmaterials.com/responsible-business/environment-health-safety>

### Professional standards applied<sup>2</sup> and level of assurance<sup>3</sup>

We performed a limited assurance engagement in accordance with ISAE 3000 and, in respect of greenhouse gas emissions information, ISAE 3410.

### Our Independence and Quality Control

We applied the Institute of Chartered Accountants in England and Wales (ICAEW) Code of Ethics and the International Standard on Quality Control (UK & Ireland) <sup>1</sup>.

Our work was carried out by an independent team with experience in sustainability reporting and assurance.

### Understanding reporting and measurement methodologies

The Selected Information needs to be read and understood together with the Reporting Criteria, which Morgan is solely responsible for selecting and applying. The absence of a significant body of established practice on which to draw to evaluate and measure non-financial information allows for different, but acceptable, measurement techniques and can affect comparability between entities and over time. The Reporting Criteria used for the reporting of the Selected Information are as at 31 December 2014.

### Work done

- We are required to plan and perform our work in order to consider the risk of material misstatement of the Selected Information. In doing so, we:
- Made enquiries of Morgan's management, including those with responsibility for EHS management and Group EHS reporting;
  - Evaluated the design of the key structures, systems, processes and controls for managing, recording and reporting the Selected Information. This included analysing 13 sites and visiting six sites of these, selected on the basis of their inherent risk and materiality to the Group, to understand the key processes and controls for reporting site performance data to the Group EHS team;
  - Performed limited substantive testing on a selective basis of the Selected Information at corporate Head Office and in relation to the same 13 sites noted above to assure that data had been appropriately measured, recorded, collated and reported; and
  - Considered the disclosure and presentation of the Selected Information.

### Morgan responsibilities

- The Directors of Morgan are responsible for:
- The identification and reporting of Morgan's material environmental and health and safety impacts which are included in the Selected Information;
  - Designing, implementing and maintaining internal controls over information relevant to the preparation of the Selected Information that is free from material misstatement, whether due to fraud or error;
  - Establishing objective Reporting Criteria for preparing the Selected Information;
  - Measuring and reporting the Selected Information based on the Reporting Criteria; and
  - The content of the Annual Report 2014.

### Our responsibilities

We are responsible for:

- Planning and performing the engagement to obtain limited assurance about whether the Selected Information is free from material misstatement, whether due to fraud or error;
- Forming an independent conclusion, based on the procedures we have performed and the evidence we have obtained; and
- Reporting our conclusion to the Directors of Morgan.

This report, including our conclusions, has been prepared solely for the Directors of Morgan as a body in accordance with the agreement between us, to assist the Directors in reporting Morgan's EHS performance and activities. We permit this report to be disclosed in the Annual Report for the year ended 31 December 2014, to enable the Directors to show they have addressed their governance responsibilities by obtaining an independent assurance report in connection with the Selected Information. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the Directors as a body and Morgan for our work or this report except where terms are expressly agreed between us in writing.

 **PricewaterhouseCoopers LLP**  
Chartered Accountants  
London  
12 February 2015

- 1 The maintenance and integrity of Morgan's website is the responsibility of the Directors; the work carried out by us does not involve consideration of these matters and, accordingly, we accept no responsibility for any changes that may have occurred to the reported Selected Information or Reporting Criteria when presented on Morgan's website.
- 2 We have complied with International Standard on Assurance Engagements 3000 'Assurance Engagements Other than Audits or Reviews of Historical Financial Information' and, in respect of the greenhouse gas emissions, in accordance with International Standard on Assurance Engagements 3410 'Assurance Engagements on Greenhouse Gas Statements', issued by the International Auditing and Assurance Standards Board.
- 3 A limited assurance engagement is substantially less in scope than a reasonable assurance engagement in relation to both the risk assessment procedures, including an understanding of internal control, and the procedures performed in response to the assessed risks.
- 4 We applied the Institute of Chartered Accountants in England and Wales (ICAEW) Code of Ethics which includes independence and other requirements founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour. We apply International Standard on Quality Control (UK & Ireland) 1 and accordingly maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.



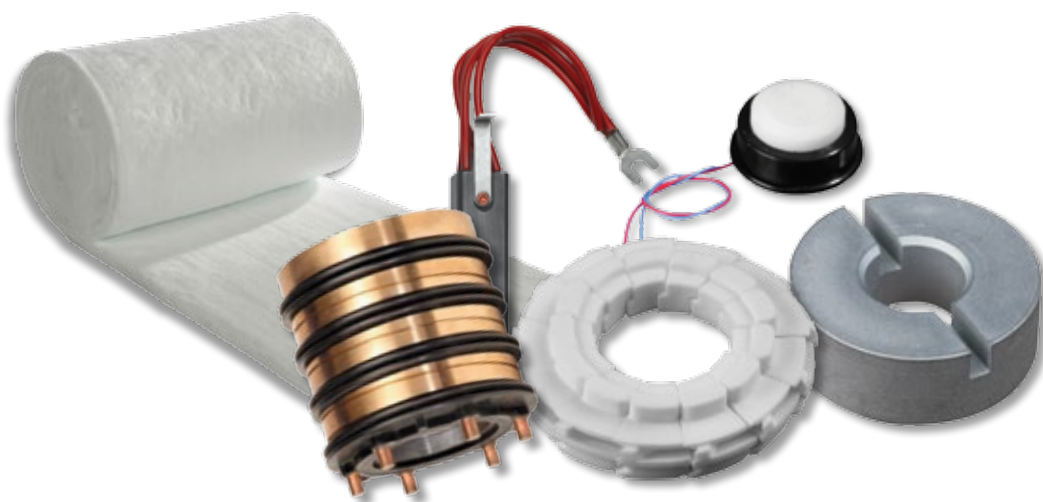
# MORGAN ADVANCED MATERIALS IS HELPING TO ENHANCE GLOBAL SUSTAINABILITY



## STRATEGY IN ACTION

Morgan identifies major opportunities in sectors driven by megatrends where its materials science and applications engineering skills can solve technically demanding challenges. The Company chooses its markets carefully, focussing on those in which it can achieve leadership quickly and then continue to refine its output to increase the proportion of high-margin, technically complex products.

## HOW ENERGY EFFICIENCY ISSUES ARE CREATING OPPORTUNITIES ACROSS MORGAN ADVANCED MATERIALS' SECTORS AND MARKETS



The development of advanced materials science and engineering has a major role to play in the global drive towards energy efficiency.

In implementing its strategic priorities, Morgan is ideally placed to provide the technical support that its customers need to plan their own approach to improving energy management.



# HOW ENERGY EFFICIENCY ISSUES ARE CREATING OPPORTUNITIES ACROSS MORGAN'S SECTORS AND MARKETS



ENERGY DEMAND IS A CRUCIAL GLOBAL ISSUE. ADVANCED MATERIALS ARE INCREASINGLY PLAYING A SIGNIFICANT ROLE IN HELPING TO DEVELOP GREATER ENERGY EFFICIENCIES FOR A SUSTAINABLE FUTURE.

As Global energy demand continues to rise, the solutions to the world's energy problems will include optimisation of a range of traditional and renewable energy sources.

The dilemma of how to deal with rising energy demand will not be met by a single solution. The way to make a difference and to start to reverse the global trend is through a combination of efforts. Energy efficiency improvements, clean energy initiatives and education to reduce consumption will all play a part. And in all these, materials science and developments in ceramics and carbon technology in particular have a major role to play.

Morgan Advanced Materials is working with leading players in energy generation, distribution and usage on a wide range of significant projects, where incremental advances in the performance of critical components can facilitate step changes in commercial advancement and application.

The Company works with customers in energy and related industrial sectors all over the world, but particularly in the high growth expanding industrial economies in China, India and Latin America.

In well-developed markets and dynamic growth economies, innovation in carbon and ceramics is helping to improve efficiencies in fossil fuel energy generation and distribution systems, and is a key enabler in the new clean energy infrastructures including wind, solar and electric vehicle technology.

In the drive to reduce energy consumption, ceramic materials are being used to make energy efficiency improvements in a wide variety of existing industrial and transportation systems, for example by reducing friction and increasing reliability. Ceramic and carbon materials are also used to provide high performance insulation for use in buildings and in industrial processes.

Central to Morgan's strategy, culture and vision are the first-class people that make it happen. The company strives to attract, retain and develop the very best for every aspect of the business from engineering excellence and technical innovation to business management and customer service. This fundamental recognition of the contribution of the individual is apparent throughout the company's activities from its outstanding graduate and apprenticeship schemes to its acquisition strategy and lean management team.

In the energy sectors there are many examples of how Morgan's expert teams, advanced materials science and engineering are making a contribution to the cumulative global effort to manage climate change now and into the future.

Carbon and ceramic components play a critical role in traditional and renewable power generation and throughout the electricity supply chain.

World-renowned for performance and reliability, Morgan's carbon brush technology is used in coal, gas, nuclear and wind power plants all over the world and is at the heart of electricity storage and distribution systems for applications from rail transport to electric vehicles.

Ceramic technology is contributing to the development of solar energy systems in the production of photovoltaic cells using silicon wafers and by thin film deposition.

For example, alumina/silica rollers are used to move the wafers through the high temperature (900°C) deposition furnaces without damage, and fully stabilised zirconia is used for high reliability thermocouples. Similarly, high purity aluminium oxide bars and locator pins are used for wafer lifting, stacking and transporting between furnaces. They provide greater strength at high temperatures and eliminate the buckling associated with metal equipment.

A specialist ceramic, Pyrolytic Boron Nitride (PBn) has been developed by Morgan for use in crucibles and boats used to hold materials for thin film deposition. It is chemically inert at high temperatures, has low wetting to alloys and is resistant to chemical shock. As a result, the crucibles remain dimensionally stable and do not react with the molten material.

# ENHANCING SUSTAINABILITY

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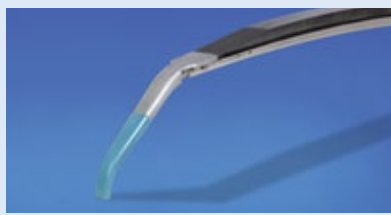
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## SMART METERING

Piezoelectric ceramic sensors are helping make accurate, in-home smart metering a reality.



## RAIL

Morgan materials ensure reliable and efficient operation of electric trains.



## ELECTRIC AND HYBRID VEHICLES

The development of new carbon materials holds the key to better performing electric and hybrid vehicles.

## SMART METERING

Morgan is developing ultrasonic piezoceramic sensors which provide utility companies and OEMs with high reliability, high accuracy, cost effective gas measurement, making high volume manufacture of smart domestic gas meters a reality.

## RAIL

Rail is on average four times more energy efficient than road transport. It has huge potential to make a difference to fuel consumption globally. Carbon technology is at the heart of rail transportation with brushes, collectors and rotary current transfer products used in overground and underground rail and tram systems all over the world.

Railway applications are exceptionally demanding on these components; they have to be able to cope with large current peaks, weak load operation, intermittent usage and aggressive environments and, especially in long distance networks, perform in high ambient temperature differentials and humidity.

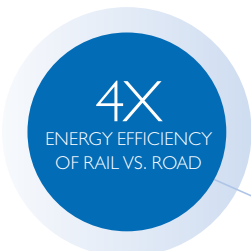
Morgan's advanced technology components perform optimally over a wide range of environments from sub zero to >40°C ambient temperatures and at up to 2km above sea level. They are designed for high reliability on all types of rolling stock from high-speed trains to long haul trains covering varying terrain, changeable loads, impact and vibration.

## ELECTRIC AND HYBRID VEHICLES

Advances in electric and hybrid vehicle battery technologies are driving the demand for increasingly tough thermal management solutions.

The exceptional properties of Morgan's carbon and ceramic materials are helping enable the manufacture of pump components robust enough to circulate the aggressive coolants used through Lithium-Ion batteries.

Components produced by Morgan are also offering additional benefits. Being up to 60% lighter than steel, their weight saving contributes to low noise running and the increased energy efficiency of modern electric and hybrid vehicles.



# INCREASING EFFICIENCY

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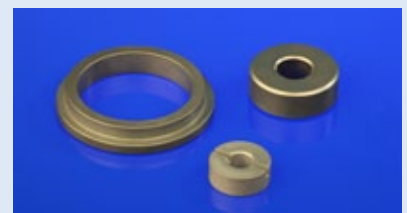
## LED TECHNOLOGY

Carbon and ceramic materials are key enablers for LED technology.



## INSULATION

Advances in ceramic insulation materials help industrial installations to reduce energy consumption.



## PUMPING SYSTEMS

Pumping systems account for nearly 20% of the world's energy demand.

## LED TECHNOLOGY

Morgan makes graphite felt which is used in LED sapphire production to provide a uniform thermal environment to support crystal growth. This highly stabilised, long-life insulation enables long process cycles and the high chemical inertness of the insulation minimises contamination of the sapphire ingot.

## INSULATION

Morgan's new low bio-persistent Superwool® Plus fibre, designed for use in duct and chimney insulation, process heater linings, pipe wrap and automotive exhaust heat shields is 17% more energy efficient than traditional insulation products such as Refractory Ceramic Fibre (RCF).

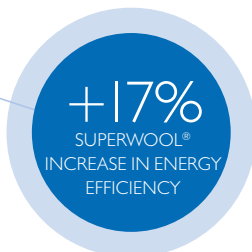
High-temperature insulating fibre, bricks and monolithics are used to help optimise thermal efficiency in industrial applications from 500°C to 1,600°C.

## PUMPING SYSTEMS

Improvement in the efficiency of pumps and pump systems has the potential to impact global energy consumption significantly.

Morgan has developed a family of graphite-loaded silicon carbide materials based on the patented PGS100 for hardwearing seals in long-life pumps for demanding processing applications such as those with extremely caustic environments, abrasive process fluids or high pressures and operating temperatures.

The material contains a free-graphite, which improves lubricity, for greater dry run survivability and better thermal shock resistance than conventional sintered materials. The graphite also gives it better pressure-velocity capability between hard-face mating pairs. As a result, it lasts twice as long as other materials in harsh field conditions.



# GROUP EHS TARGETS



THE GROUP SETS ANNUAL TARGETS FOR HEALTH AND SAFETY PERFORMANCE AND TWO YEAR TARGETS FOR ENVIRONMENTAL PERFORMANCE.

In addition to Group targets, Morgan Advanced Materials' businesses set targets and undertake initiatives appropriate to their specific opportunities for improvement, as is highlighted in a number of the case studies in this report.

AREA	2014 OBJECTIVE	2014 PROGRESS	FUTURE OBJECTIVE
<b>Environmental and Health and Safety data reporting</b>	→ Maintain standards of reporting, supported by external assurance where appropriate.	<b>Achieved:</b> Independent external assurance was achieved for lost time accident frequency, CO <sub>2</sub> e, energy, water, waste and recycling data.	→ Review scope of assurance programme to ensure added value
<b>Environmental management systems</b>	→ Maintain and where appropriate extend ISO 14001 coverage.	<b>Achieved:</b> Additional certifications were achieved at sites in China and Canada in 2014.	→ Maintain and where appropriate extend ISO 14001 coverage.
<b>Reduction in emissions intensity</b>	→ A 5% reduction in emissions intensity due to energy use over the two years 2012-14.	<b>Not achieved:</b> Emissions intensity due to energy use increased by 5% in 2014 compared to 2012.	→ A 5% reduction in emissions intensity due to energy use over the two years 2014-16.
<b>Reduction in waste intensity</b>	→ A 5% reduction in waste intensity over the two years 2012-14.	<b>Not achieved:</b> Waste intensity increased by 5% in 2014 against 2012.	→ A 5% reduction in waste intensity over the two years 2014-16.
<b>Increase in recycling</b>	→ Increase the proportion of total waste which is recycled over the two years 2012-14.	<b>Not achieved:</b> The proportion of total waste recycled decreased by six percentage points in 2014 compared to 2012.	→ Increase the proportion of total waste which is recycled by five percentage points over the two years 2014-16.
<b>Reduction in water use intensity</b>	→ A 5% reduction in water use intensity over the two years 2012-14.	<b>Not achieved:</b> Water use intensity increased by 3% in 2014 compared to 2012.	→ A 5% reduction in water use intensity over the two years 2014-16.
<b>Health and safety management systems</b>	→ Work to introduce and roll-out the Morgan thinkSAFE programme Group-wide.	<b>Ongoing:</b> Morgan thinkSAFE was launched in Asia in Q4 2014.	→ Complete the roll-out of Morgan thinkSAFE Group-wide. Consider the introduction of leading indicators to measure input to safety activities.
<b>Reduction in lost time accident frequency</b>	→ Reduce accident frequencies to make progress towards the long-term goal of zero accidents.	<b>Not achieved:</b> Lost time accident frequency was 16% higher in 2014 than 2013 at 0.53 LTAs per 100,000 hours worked.	→ Reduce accident frequencies to make progress towards the long-term goal of zero accidents.
<b>Reduction in lost time</b>	→ Reduce the average time lost per LTA and implement additional monitoring systems to further manage lost time.	<b>Not achieved:</b> Average number of days lost per LTA increased by 5% in 2014 compared to 2013.	→ Reduce the average time lost per LTA and further embed the additional monitoring to further manage lost time.
<b>EHS compliance audit programme</b>	→ Continue to audit all manufacturing sites on a three-year rolling cycle.	<b>Ongoing:</b> Sites are audited on a three-year cycle with 26 EHS audits completed during 2014.	→ Continue to audit all manufacturing sites on a three-year rolling cycle. Review scope of audit to ensure that other key EHS criteria are audited besides compliance.

# APPENDIX: GREENHOUSE GAS EMISSIONS DISCLOSURES

The Companies Act 2006 (Strategic Report and Directors' Reports) Regulations 2013 ('the Regulations') require UK listed companies to disclose their Greenhouse Gas emissions in tonnes of carbon dioxide equivalent (CO<sub>2</sub>e) in their Directors' Report within their Annual Report. This information is on page 87 of the Group's Annual Report 2014 and the Information is reproduced here for completeness.

Morgan has published information on its emissions due to the combustion of fossil fuels and the electricity purchased by the Company for its own use in its annual EHS Report since 2004 and in its Annual Report since 2005. Since 2011 the Group's CO<sub>2</sub>e emissions due to energy consumption have been externally assured by PwC (see PwC's 2014 Assurance report on page 18). The Group has participated in the Carbon Disclosure Project since 2006 and in 2014, for the third consecutive year, was included in the Carbon Disclosure Leadership Index. This reflects the depth and quality of climate change data Morgan has disclosed to investors and the global marketplace through CDP.

The Regulations require the Group to disclose its emissions due to the combustion of biomass and due to process and fugitive emissions which are in addition to the emissions due to energy use reported on page 12 in the Environmental performance section of this Report.

	2014 Tonnes CO <sub>2</sub> e	2013 Tonnes CO <sub>2</sub> e
<b>Emissions from combustion of fuels and operation of facilities<sup>^</sup></b>		
Combustion of fossil fuels <sup>^</sup>	<b>153,100</b>	150,800
Operation of facilities, including process emissions <sup>†</sup>	<b>35,900</b>	32,700
<b>Electricity, heat, steam and cooling purchased for own consumption<sup>‡</sup></b>		
Purchased electricity <sup>^†</sup>	<b>247,200</b>	235,700
<b>Intensity measurement<sup>§</sup></b>		
Tonnes CO <sub>2</sub> e due to fossil fuels and purchased electricity per £m revenue <sup>^</sup>	<b>434</b>	427
Tonnes GHGs per £m revenue	<b>477</b>	466

CO<sub>2</sub>e is the amount of CO<sub>2</sub> and the amount of non-CO<sub>2</sub> Greenhouse Gas with the equivalent global warming potential.

Data is rounded to the nearest 100 tonnes of CO<sub>2</sub>e.

\* Excludes emissions from Company-owned and leased vehicles estimated at approx. 2,300 tonnes CO<sub>2</sub>e in 2014. (2013: 2,100)

<sup>^</sup> The 2014 and 2013 information regarding CO<sub>2</sub>e due to energy use has been subject to assurance by PwC. See the Independent Assurance Report on page 18 of this Report and on page 30 of the 2013 Annual Report for further details.

<sup>†</sup> Electricity from renewable sources at zero tonnes CO<sub>2</sub> per kWh. Emissions increase by 3,400 tonnes at grid-average rates (2013: 3,000 tonnes).

<sup>‡</sup> Excludes steam supplied by third parties to two sites in China and one in Europe.

<sup>§</sup> Constant currency basis and updated to reflect changes in reporting methodology.

As required under the Regulations, the above report includes the material emission sources from the operations and activities covered by the Group's financial statements. As noted, the reports exclude emissions from Company-owned and leased vehicles and emissions relating to steam supplied by third parties to two sites in China and one in Europe, which are in total estimated to account for less than 1% of total emissions. The Directors consider that these sources of emissions are not material to the total of the emissions.

The Group's reporting methodology is based on the Greenhouse Gas Protocol with emission factors for standard grid electricity by country and year from the International Energy Agency together with other factors as published by the UK Department of Environment, Food and Rural Affairs in order to calculate the CO<sub>2</sub>e emissions included in this Report.

# NOTES

## 1. Data gathering and comparisons

Morgan Advanced Materials' EHS reporting processes are focussed on data that is of EHS and commercial value and are increasingly accurate. Thus improvements in environmental and health and safety performance reporting and measurement may increase or decrease some reported figures and require historic data to be restated. Where possible, the Group ensures meaningful comparisons between annual performance indicators are available.

## 2. Verification

In 2014 the Group engaged PwC to provide independent external assurance on the Group's CO<sub>2</sub>e emissions and intensity; energy use and intensity; water use and intensity; waste generation and intensity; recycling and the proportion of total waste recycled; and the number of lost time accidents and the lost time accident frequency rate using international assurance standards. The report from PwC is set out on page 18.

In addition, all Morgan Advanced Materials manufacturing facilities are regularly reviewed under the Group's EHS Compliance Audit Programme. Those sites certified to ISO 9001, ISO 14001, OHSAS 18001 and other standards have regular external audits. The Group's Director, Environment, Health and Safety and the Divisional EHS teams also work with independent external consultants to review and where appropriate verify the Group's environmental and health and safety related key performance indicators.

The Board considers that these procedures provide a reasonable level of assurance that the Group's EHS disclosures are free from material misstatement whether caused by fraud or other irregularity or error.

## 3. Guidelines

A variety of guidelines, reports, standards and other authorities have been consulted and utilised in the compilation of this report. These include the Greenhouse Gas Protocol, the UK Government's Department for Environment, Food and Rural Affairs environmental reporting guidelines, the Global Reporting Initiative's G4 Sustainability Reporting Guidelines and relevant ISO standards.

## 4. External Assistance

Morgan Advanced Materials utilised the assistance of CSR Consulting Ltd. in the compilation and production of this report.

## 5. Feedback

The Group welcomes feedback on this EHS Report and comments on ways reporting could be further developed at Morgan Advanced Materials. You can contact the Group by e-mail at [ehs@morganplc.com](mailto:ehs@morganplc.com) or write to Morgan Advanced Materials plc, Quadrant, 55-57 High Street, Windsor, Berkshire SL4 1LP, United Kingdom.

Employees and others who have concerns regarding EHS or other matters which cannot be satisfactorily resolved locally may also use the Morgan Advanced Materials Ethics Hotline. Further details are available on the Morgan Advanced Materials website and on the Group's intranet.