



# Driving businesses forward

An introduction to the use and benefits of  
standards in the energy sector

**bsi.**

...making excellence a habit.™

## Foreword

“BSI is dedicated to promoting excellence throughout the energy sector. Working with organizations of all sizes in 172 countries worldwide, we improve performance, reduce risk and increase resilience right the way through the supply chain.”

Howard Kerr, Chief Executive, BSI

## Disclaimer

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## Introduction

# The benefits of standards in oil, gas and renewable energy

As David Fatscher, Head of Market Development in Sustainability & Energy at BSI, says in his article on page 16, "...the UK's energy generation mix is changing fast," and it is not just in the UK. The energy sector is diversifying across the globe and there are exciting opportunities as well as challenges in this rapidly changing marketplace.

Standardization plays a vital role in the energy industry. Technical standards have long been essential for defining specifications in oil and gas refining, as well as ensuring interoperability in electricity generation, storage and distribution. According to our 2014 CEBR commissioned report, over three quarters of all companies in the energy sector are using health and safety, environmental and quality management standards.

New trends are seeing more businesses looking to ensure organizational resilience and minimize risk in the supply chain. And with reputation becoming an ever-increasing factor in a company's success, standards that look to improve organizational governance are becoming increasingly important.

In this report, we have gathered together energy experts and key leaders in the field to discuss why standards continue to be essential to the on-going health and development of the energy sector. And why, with so many new technologies, standardization remains a key factor in engaging all stakeholders and de-risking investment.

**Shirley Bailey-Wood** Director Information Solutions, BSI



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# Looking back to drive forward...

Dr Scott Steedman CBE, Director of Standards at BSI, reflects on the history of BSI and shows how standards have become an integral component in running a successful and accountable business...

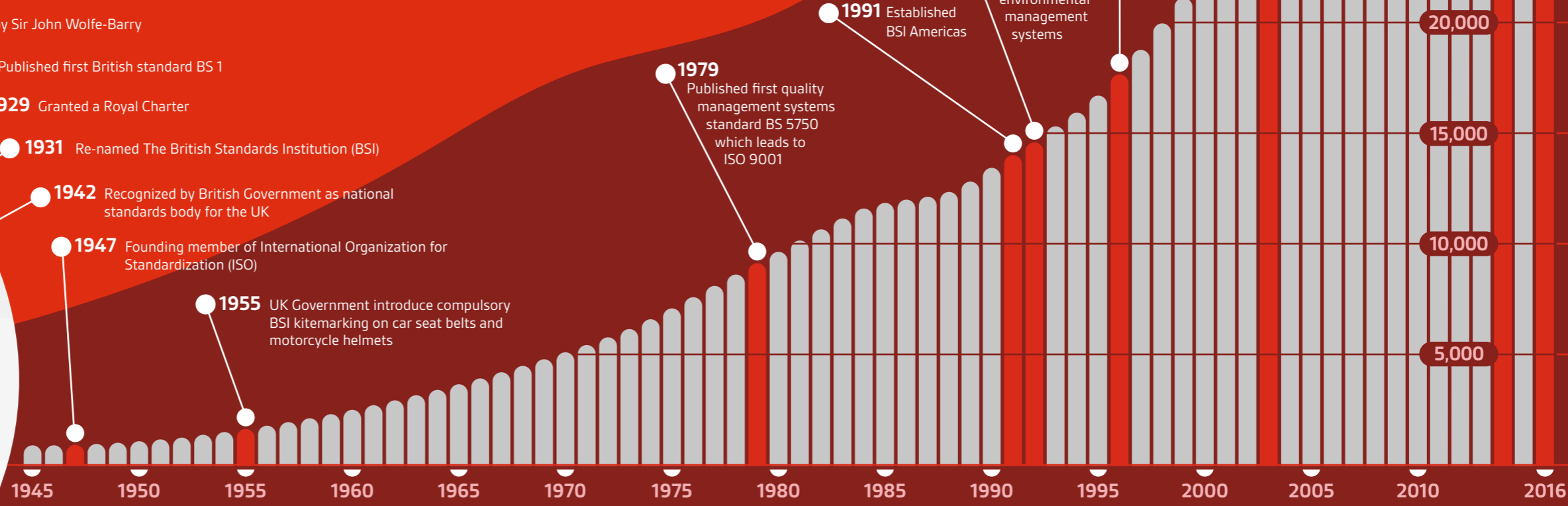
“ Before the twentieth century there were no standards. ”

This may seem like a counter intuitive statement. After all, society has always been awash with morals and ethics, rules on how to behave and what to do. However, we only need to think of passengers and goods having to be transferred between trains running on different gauges in the UK to be reminded that there was often little consensus in the industrial process.

A growing recognition soon developed, that producing materials and components to a standard specification would lead to efficiencies that could increase competition and open up new markets. This resulted in the very first meeting of the Engineering Standards Committee in 1901.

Convened by Sir John Wolfe-Barry, designer of London's Tower Bridge, the committee published the first British Standard (BS1) in 1903. BS 1 tabulated the standard dimensions of steel angle sections, essential for structural engineers in sourcing from different manufacturers.

This was soon followed by standards for the specification of sections and gauges of tramways, copper conductors, telegraph materials and cement. By 1931 the Engineering Standards Committee had been granted a Royal Charter and finally changed its name to The British Standards Institution (BSI).



During this time, the practice of standardization was starting to spread globally and nowhere was the need for it more apparent than in the rapidly expanding energy sector. With oil and gas fields opening up across the world, there was an immediate need for standardized methods and procedures and this led to the establishment of several industry specific standards organizations.

After the end of World War II there was renewed focus on the need for global standards and in 1946 the first Commonwealth Standards Conference took place. This led to the International Organization for Standardization (ISO) of which BSI is a founding member.

The latter half of the twentieth century saw the emergence of business process standards, as it became increasingly apparent that the quality of a product produced was also a result of the process that made it. Once again, BSI was at the forefront of development and many of the world's most widely used ISO standards, such as the Quality and Environment Management series (ISO 9001 and ISO 14001), started out as original British Standards.

From less than 100 in 1920, the BSI catalogue now has over 35,000 publications, covering everything from technical product and management process standards to those covering health and safety, environmental impact, leadership, governance and risk. We continue to play a leading role in developing a new generation of standards that ensure organizational resilience. We also continue to invest in new areas and new partnerships and now have 58 offices worldwide.

Everyone operating in today's global market place is governed by accountability – accountability to their customers, their shareholders and their employees. Standards no longer just provide a guarantee of technical quality and specification, they are integral in demonstrating that a company is doing everything it can to operate in the best way possible. Or to put it another way, okay is no longer an option - excellence is expected.

# Ensuring fire resilience in energy facilities

Peter Wilkinson, trustee at the Institution of Fire Engineers (IFE) and director at Pyrology, looks at how using Business Impact Analysis ensures resilience from fire in energy facilities.

British and International Standards, European Norms, Codes, ACOPs, Approved Documents and Guides. There's a wealth of information available on fire safety for those responsible for designing, constructing, approving, insuring and operating energy facilities.

Fire safety information will consider everything from the provision of facilities for life safety, to minimizing the impact and disruption to operations should the worst happen. Experience tells me that the energy industry no longer sees value simply as the driving down of costs to the absolute minimum. One of the key trends in today's energy sector is delivering 'robust' facilities to ensure continuity of supply and minimize potential environmental impacts.

Robust facilities are those that provide an infrastructure appropriate to the end users' needs over the life span of the plant. Their value comes from meeting those needs. They will need to have an in-built resilience to the many potential disruptions and disasters that could affect the facility's performance, including fire and explosion.

The challenge is to define what is 'appropriate' and how this will influence the facility's design - there are some recommended steps in the BS report PD 7974-8:2012 ("Application of fire safety engineering principles to the design of buildings", specifically the section covering property protection, business and mission continuity, and resilience). These include embedding the use of a Business Impact Analysis (BIA) as an integral part of the fire safety engineering qualitative design review (QDR).

A BIA enables the collection and analysis of an organization's activities, and their tolerance for disruption. It then identifies the resources and systems necessary for these activities to be accomplished. Although BIA is an established process in business continuity management (see standard BS 25999), its use within the design process is relatively new.

Using it in design is fundamental to ensuring a successful facility design that fully meets the needs of the client. It is also essential for ensuring the continued viability and success of the client's organization.

The effects of fire and explosion are only some of the causes of disruptions that would be identified and managed within a holistic business continuity plan. However, by identifying these fire-related disruptions and potential consequences at the design stage of a plant, it is possible to incorporate design features to reduce property loss. This will help to ensure business continuity and provide resilience against the effects of fire.

For the fire safety engineer, the BIA process will help identify those activities critical to the end user. It will also find the resources needed to support the activities and the fire safety objectives necessary to protect the resources. This information could also contain specific quantitative requirements, such as ensuring that fire must be detected and extinguished before reaching a defined size, as well as determining the timescales for returning to an operational business stream.

By including the information derived from a BIA, within the traditional QDR process, the fire safety objectives can be developed to ensure operational resilience. It will also allow architects, building designers and fire safety engineers to provide clients with energy facilities that are resilient from fire.

After all, based on research from the Association of British Insurers, 80% of businesses that suffer a major incident fail within 18 months. And BSI has developed techniques for architects and engineers to better advise their clients, enabling them to create resilient buildings and facilities.



Dr Peter Wilkinson EngD CEng FIFireE, is a practicing Fire Engineer, and Director at Pyrology Limited. He is also Chairman of FSH/24, the BSI technical committee responsible for fire safety engineering; and a Trustee at the Institution of Fire Engineers, the international organization for fire professionals.

## Fire related standards

|                         |   |
|-------------------------|---|
| <b>BS 9999</b>          | Code of practice for fire safety in the design, management and use of buildings.  |
| <b>BS EN ISO 13702</b>  | Petroleum and natural gas industries. Control and mitigation of fires and explosions on offshore production installations. Requirements and guidelines. |
| <b>BS 5306-0</b>        | Fire protection installations and equipment on premises. Guide for selection of installed systems and other fire equipment.                             |
| <b>BS 7974 (series)</b> | Application of fire safety engineering principles to the design of buildings.   |

|                     |  |
|---------------------|--|
| <b>BS EN 12845</b>  | Fixed firefighting systems. Automatic sprinkler systems. Design, installation and maintenance. |
| <b>BS ISO 16732</b> | Fire safety engineering. Fire risk assessment. General.  |
| <b>BS 7273</b>      | Code of practice for the operation of fire protection methods.                                 |

You can find out more about dealing with resilience in your organization on the BSI site: [www.bsigroup.com/en-GB/our-services/organizational-resilience](http://www.bsigroup.com/en-GB/our-services/organizational-resilience)  
 For specific fire-related help, please visit: [www.bsigroup.com/en-GB/industries-and-sectors/fire](http://www.bsigroup.com/en-GB/industries-and-sectors/fire)

## Case study

# Trading on the **global stage**

Applus+ RTD's Head of Health Safety Environment and Quality (HSEQ), **Leonard Collins**, discusses the importance of British standards and the benefits of working with BSI when trading on the global stage.

“ Applus+ RTD works globally. We provide non-destructive testing (NTD) to the energy, utility and infrastructure industries, ensuring the integrity of highly valuable assets such as pipelines, storage tanks and refineries. We use British standards because they are recognized as a guarantee of quality worldwide. When we tell our customers that BSI has certified our management systems, we are giving them a great deal of confidence in the integrity of our work.

Working in so many different countries means we use many international standards, all of which we get through BSI. A large percentage of ISO standards are of British origin, with the International Standards Organization adopting the original British standard as a benchmark and this heritage is recognized in every territory where we operate.

By using BSI to provide all of our standards, we can ensure that whenever we are speaking to colleagues around the world, we are all using the same common language. The system has a user friendly and inclusive way of storing the various standards we require (through BSOL) and they are all readily accessible for us to utilize.

One of the challenges in operating globally is that we occasionally find differences in the way standards are interpreted. BSI provides us with an external audit of our systems that we also supplement internally. By continually auditing, we can spot any issues and deal with them before they become a problem. As for access to standards for our work practices, we are alerted to any changes, revisions or updates via our BSOL account.

The use of standards is essential to our business, from prolonging the life of machinery to providing customer confidence, they have a direct link to increased revenue. There are also many hidden benefits and I'm often struck by how important they are for internal pride and morale. A happy workforce is a productive workforce and standards give our employees confidence in the quality of our operations. This has a tangible benefit on recruitment and retention, and means we can source the very best people.

It's very difficult to put a direct financial figure on the benefits of standards to our business. Although, when I reflect on all of the advantages they give us, trading on the global stage, it feels entirely credible to suggest that around 15% of our revenue could be attributed the use of BSI standards and certification.

However, the main word that always comes to mind is reassurance. Working with BSI means that our customers and employees feel safe and that we have their best interests at heart. After all, that's why we have standards in the first place and being certified by BSI is something that we are extremely proud of.

“ ...around 15% of our revenue could be attributed to the use of BSI standards and certification. ”

Applus+ RTD is part of the Applus+ group, one of the world's leading testing, inspection and certification companies. The company has more than 20,000 employees and 350 offices worldwide, with the group headquartered in Spain and UK Head Office in Grangemouth, Scotland.

**bsi.** **BSOL**  
Standards Online

**British Standards Online (BSOL)** is the online standards database that makes using standards easier and more cost effective. You can access a comprehensive library of over 90,000 internationally recognized standards.

Case study

# Scottish and Southern Energy (SSE)

Richard Walton, Scottish and Southern Energy's Lead Pressure Parts and Materials Engineer, talked to us about the importance of British standards.

### Q Tell us about SSE.

SSE has a heritage of energy production and played an important role in Scotland's hydroelectric revolution. Based in Pontefract, West Yorkshire, with offices in Glasgow and Perth in Scotland, we provide engineering support to SSE's power generation fleet across the UK.

### Q What are the main British standards with which you comply currently and why did you choose them?

We regularly refer to a lot of materials standards (such as EN 10216 and EN 10222), as well as welding, NDT (non-destructive testing), assessment and design standards.

We also refer a lot to the old British Standard documents (such as BS 1113 and BS 5500). A lot of the boilers in our power stations were built to old specifications and it's important to have access to the standards they were designed to.

They are also a very useful introduction for new staff, helping them build up their knowledge. For example an older version of BS 1113 is now covered by a 14-section EN standard that runs to over 450 pages, so it's easier to start understanding the equipment by referring to older standards.

### Q What other benefits do standards bring to your business?

Standards are essential for us to be able to utilize the full life of our boilers with confidence. This helps us make lump sum savings of between £1.5 to 2.5 million over the life of each boiler.

The standards provide additional financial benefits as they impact the number of pipework inspections required and improve the effectiveness of each plant item - all of which leads to an efficient plant and less costly downtime.

We have also been able to construct a number of internal operating models using readily available standards. This has helped us operate more efficiently and cost effectively by displacing the need for some expensive third parties.

Standards are essential for us to be able to utilize the full life of our boilers with confidence. This helps us make lump sum savings of between £1.5 to 2.5 million over the life of each boiler.

### Q To your business, what is the one most important benefit of using standards?

Operating as efficiently as possible is a driving factor in our industry. The standards we have from BSI give us a guiding principle from which to ensure that we are operating both efficiently and, most importantly, safely.

### Q How do you effectively manage your standards?

The BSI website gives us everything we need and we can login and access it anywhere. We get access to the latest standards, as well as previous versions and old standards (unlike other organizations), meaning we can cross-reference between codes and see what has been superseded or replaced.

SSE was formed in 1998 following the merger of Scottish Hydro Electric and Southern Electric. SSE produce, distribute and supply electricity and gas to residential and commercial customers across the UK, as well as providing other energy-related services.

From seven sites across the UK, SSE accessed over 4,000 documents on standards via BSI's online BSOL platform in the last year, nearly double the usage from the previous year.

## Case study

# Sulzer Pumps (UK)

We spoke to Management Systems and Audit Officer **Ian Battersby** about how they use standards.

## Q Tell us about your company.

“ Sulzer Pumps (UK) Ltd is 170 years old and employs over 500 people at its site in Leeds. We build the world's biggest, most high pressured, high-powered, complex pumps. ”

85% of our business is in the oil and gas sector, providing solutions for extraction, refining and distribution. But we also supply pumps for the utilities industries and we run a spare parts and service business. ”

## Q Why do you use British standards?

“ We use standards because we have to use them. It would be impossible for us to operate in our marketplace without them. Our customers have always demanded a very high specification from our products and safety concerns in recent years have increased the focus on standards. ”

They need to be assured that everything is produced to the highest possible quality and every element - the type of metal we use, the welds, the fasteners, pipework, the engineers' drawings, even the way we test things - all has to be highly specified. ”

## Q Do you use any international standards?

“ We have a requirement to provide a number of different standards worldwide. ”

We have to use NORSOK, EN, and ISO as well as thousands of American standards, plus some individual ones relevant to specific regional markets. We have just bought into a new BSI offering called ASTM, which provides us with 2,500 American standards. ”

## Q What are the benefits of buying standards through BSI?

“ We have 90 people regularly using our service from BSI and I have a full analysis of who uses what and when. Last year, for example, we had 2,597 logins to the system to access over 1200 different standards. If we were not on BSI, sourcing these individually would be a huge administrative burden. ”

The BSI subscription service is also invaluable for ensuring that the standards we are accessing are completely up to date. In the past we have had to re-buy standards, because standards have been updated just after we purchased them – this added significant extra cost and effort. ”

The other big benefit for us of using the BSI subscription service is having instant access to such a huge library of standards. This enables us to respond instantly to our clients' demands and build and test complex pieces of kit without any disruption to the flow of operations. ”

## Q What advice would you offer to other businesses that are considering using standards for the first time?

“ You need to conduct an internal assessment, to specify exactly what you need. There are 81 different modules and knowing which ones you need to focus on is important. Then keep monitoring your usage to ensure that you are getting the best out of your subscription. ”

Talk to your BSI account manager and use all parts of the service, we have recently had some training from BSI and realized we are still not using the service to its full potential. ”

“ Last year... we had 2,597 logins to the system [BSOL] to access over 1200 different standards. If we were not on BSI, sourcing these individually would be a huge administrative burden. ”



Sulzer Pumps (UK) Ltd is part of Sulzer, a Swiss owned industrial engineering and manufacturing company employing around 15,000 people worldwide.

They are one of the world's leading manufacturers of custom engineered, high-energy pumps for the oil, gas, water and hydrocarbon processing industries and power generation markets.

Case study  
**Talisman Sinopec Energy UK**

Data Co-ordinator Mark Boyle spoke to us about the importance of British Standards.

**Q Why did you select and use British standards?**

“ Selecting and using British standards demonstrates that we are operating in-line with current industry best practice. This also ensures that the design and build of our platforms comply with legislative requirements and provides a fully auditable process back and forth. ”

**Q What are the main British standards you currently use at your business?**

“ Fortunately, the BSI has made keeping up to date with all of the relevant standards easy and breaks them down into sector specific modules. We buy into the oil and gas module, which covers mechanical, electrical, process and metallurgical, as well as environmental and quality assurance. ”

We are constantly reviewing the standards we use and BSI provides us with a top up account as part of our package – this allows us to add up to 100 additional standards to those we have selected. ”

**Talisman Sinopec Energy UK** was created in 2012 as a joint venture between Talisman Energy Inc. and Addax Petroleum UK Ltd., a wholly owned subsidiary of China Petrochemical Corporation (Sinopec Group). In 2015 Talisman Energy Inc. (including its 51% equity interest in the joint venture) was acquired by Repsol.

An oil and gas explorer and producer operating in the North Sea, they employ a workforce of around 3,000 in the UK. They also have interests in 49 fields (operating 38) on the UK Continental Shelf, with 12 offshore installations and one onshore terminal.

“ BSI’s online offering is extremely useful. There is no requirement to take content offline, which means that we can be confident that we are always using the most up-to-date standard... ”

**Q Do you use any international standards?**

“ We use a number of international standards, most of which we get via BSI. The oil and gas industry is comprehensively covered by the American Petroleum Institute (API), which has become a standard, and we use many of their standards as well as those provided by NACE and ASME. ”

We also occasionally (though rarely) refer to European standards such as Norwegian, French or German. ”

**Q How do you effectively manage your standards?**

“ BSI’s online offering is extremely useful. There is no requirement to take content offline, which means that we can be confident that we are always using the most up-to-date standard and not worrying that people have obsolete information squirreled away on their hard drives. ”

The alert service is also extremely useful for ensuring we have access to all of the latest knowledge. ”



Opinion

# New standards for energy generation

David Fatscher, Head of Market Development for Sustainability and Energy at BSI, discusses the importance of standardization in the rapidly evolving market for renewable energy.



“With so many new technologies evolving quickly, standards have an extremely important role to play in developing and maintaining interoperability in the supply chain.”

The UK's energy generation mix is changing fast and there is ever-increasing diversification. Driven by many factors, including a strong desire to minimize risk and increase resilience in the supply chain, the UK domestic market now generates electricity from conventional sources including gas and coal, as well as unconventional and renewable sources such as wind, solar, hydro, biomass, waste and nuclear.

With the need to continue reducing carbon emissions in the face of climate change, renewable energy has seen a particular surge and is now second only to gas when it comes to energy generation in the UK. All of this has happened extremely quickly. In 2010 renewables made up just 7% of the energy generated, but just five years later in 2015, they exceeded coal for first time, being responsible for 25% of the UK's energy. More recently, on April 9 2016, solar alone exceeded coal in terms of total gigawatt hours (GWh) produced (29 GWh for solar compared to 21 GWh for coal)\*.

Following earlier and widely successful government encouragement and investment in solar energy, there has also been massive investment in offshore renewable energy. With over 700 wind turbines already installed, five of the world's ten largest offshore wind farms are to be found in British seas (including the top two) and more growth is forecast with a further £50bn estimated to be invested before 2020.

With so many new technologies evolving quickly, standards have an extremely important role to play in developing and maintaining interoperability in the supply chain.

Determining specifications and codifying good practice leads to greater operational efficiency across the industry, which in turn leads to reduced costs and increased commercial viability.

Standards also help to de-risk investment in the sector and in a time when the government is withdrawing many incentives and asking the industry to stand on its own two feet, the ability to reassure potential investors is likely to become more important for continued growth.

However, perhaps the greatest value that standards can offer to the development of the renewable sector is in the standardization process itself. This brings together all of the stakeholders invested in the sector and ensures that the industry is developing together.

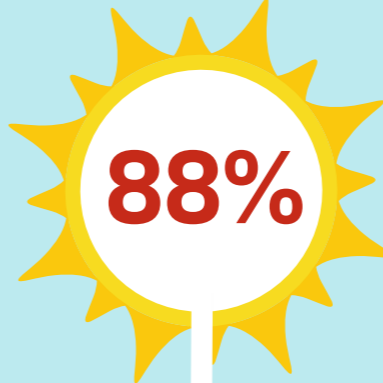
Companies who are actively involved in establishing standardization will be able to demonstrate their commitment to quality, as well as having an opportunity to promote the industry's interests at a national level. They will be at an advantage commercially as they also will be best placed to anticipate future market rules and emerging themes in the sector.

New industries require new standards and renewables is a relatively new industry with huge potential for growth. Standardization allows consensus to agree on what 'good' looks like, embedding excellence, and creating resilience and value for both stakeholders and customers.

\* According to analysis by Carbon Brief

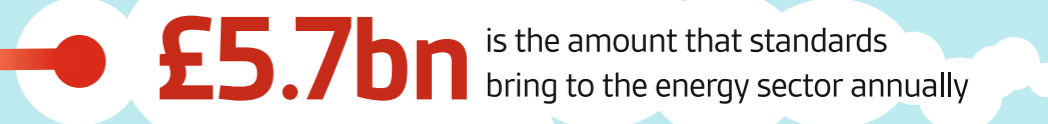
# BSI Standards in NUMBERS

“ Standards boost UK productivity and improve performance, kick-start innovation, and support UK and domestic trade. ”



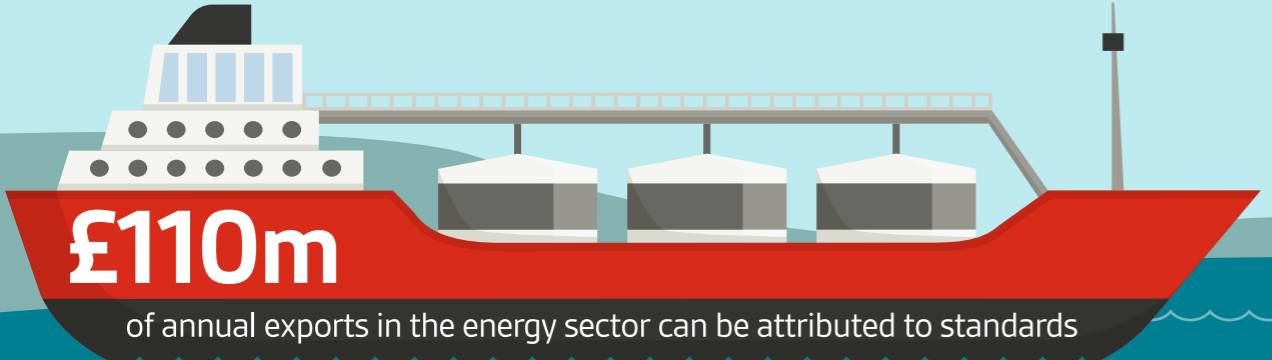
**88%**

of all firms involved in the standardization process say participation has facilitated anticipation of future markets.



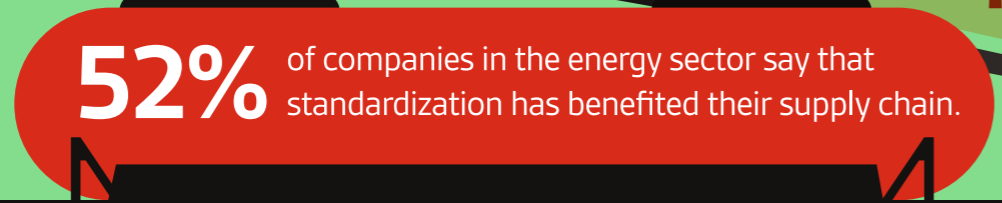
**£5.7bn**

is the amount that standards bring to the energy sector annually



**£110m**

of annual exports in the energy sector can be attributed to standards



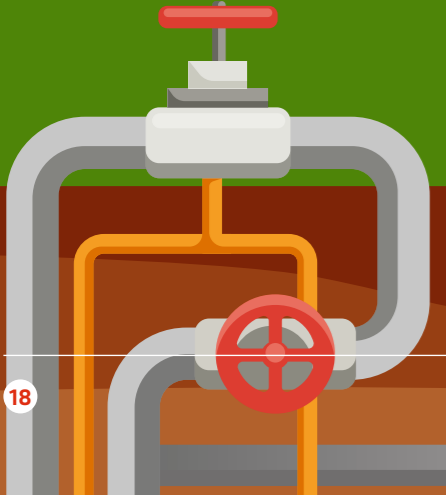
**52%**

of companies in the energy sector say that standardization has benefited their supply chain.



**48%**

of companies in the energy sector say that their organisation experiences net benefits from the process of standardization.



**£970m**

Estimated contribution of standards to Gross Value Added (GVA)



If you would like to find out more about  
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via BSOL please get in touch:

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