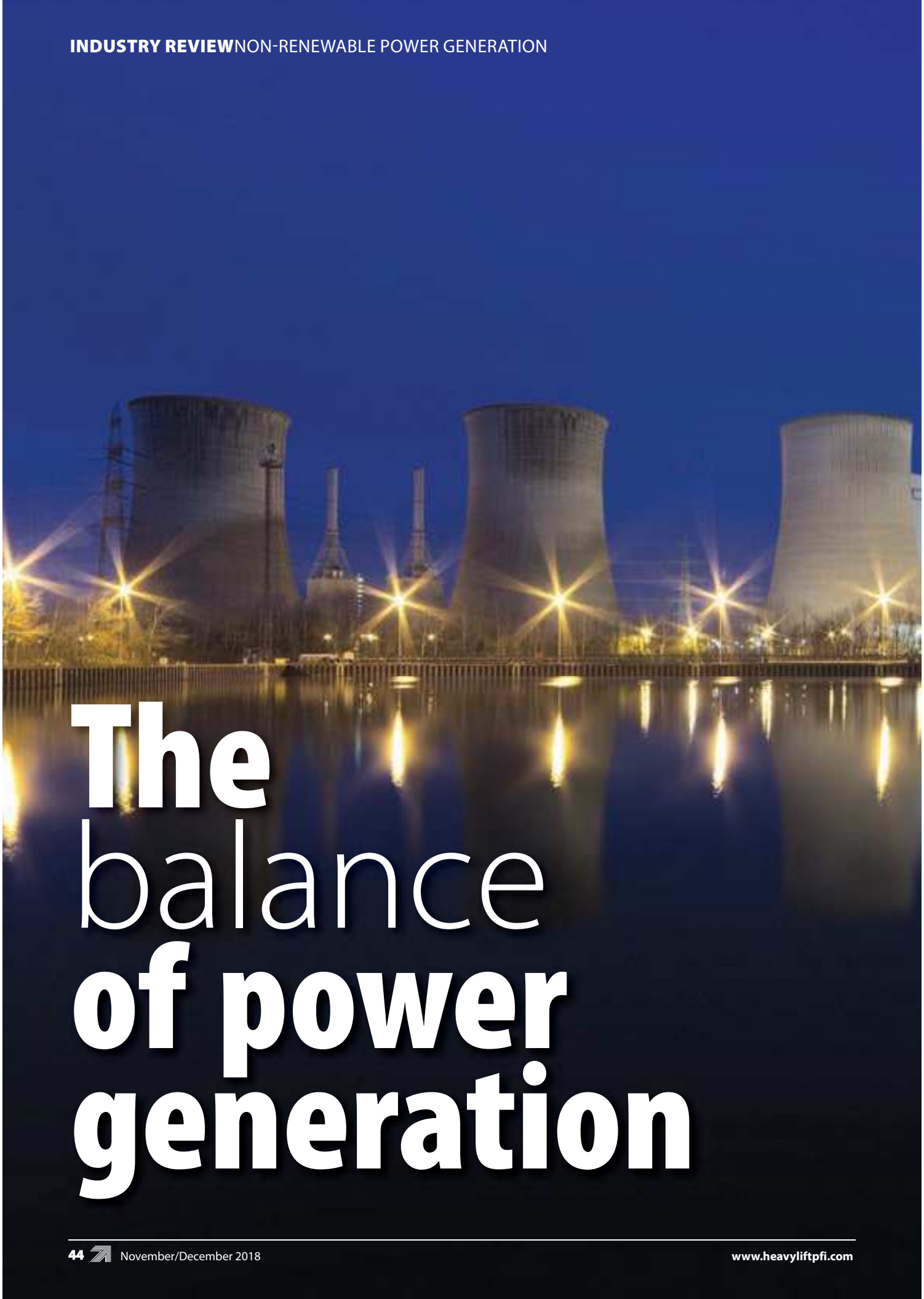
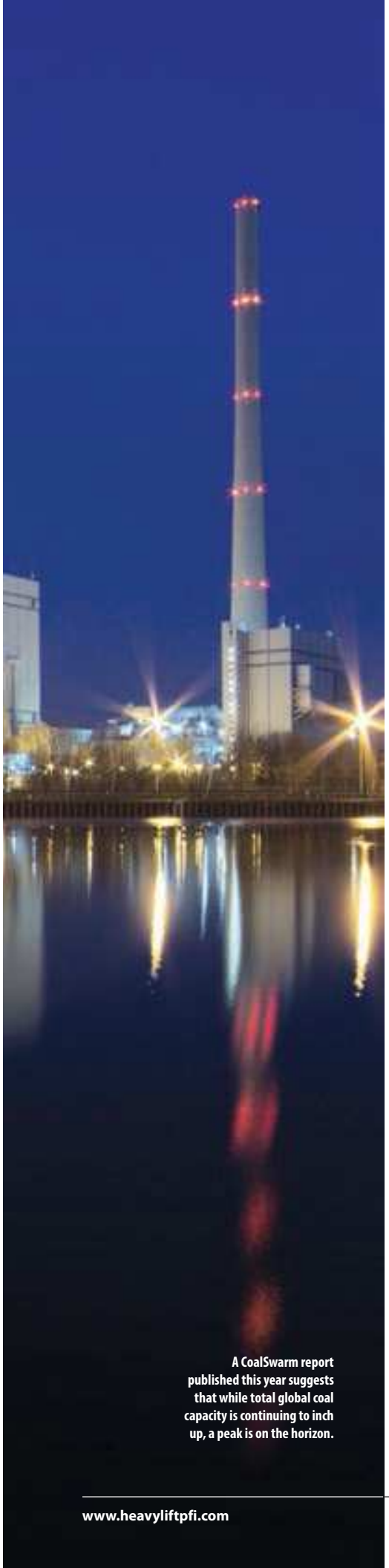


The balance of power generation



A CoalSwarm report published this year suggests that while total global coal capacity is continuing to inch up, a peak is on the horizon.

Reports that China is resuming large-scale construction of coal-fired power plants, and confirmation that the rate of worldwide nuclear plant development has stalled, highlight the unpredictability of the non-renewable power generation sector. *Phil Hastings* discusses some of the recent trends and developments.

Overall, despite the steady advance of renewable resource alternatives like wind and solar, the non-renewables sector of the global power generation project market is continuing to create substantial heavy lift and project forwarding business opportunities as it strives to meet ever-growing demand for more capacity.

That trend was confirmed in a recent statement issued by the International Energy Agency (IEA), which noted: "The share of fossil fuels in energy supply investment rose last year [2017] for the first time since 2014, as spending in oil and gas increased modestly."

However, when it comes to assessing which particular non-renewable resources will be most favoured for new power plant construction over the next few years and beyond, the picture is far from clear.

One of the key questions facing governments and power utilities is a need to balance the conflicting issues of cost and environmental impact.

Significance

From a logistics industry perspective, the significance of those issues was summarised by Holger Hinrichs, managing director of Germany-headquartered heavy lift shipping line Combi Lift.

"As long as the world's population continues to grow, so will demand for energy but it will be interesting to see if governments and energy providers continue to look for the most cost-effective solution or tend towards renewable sources in order to reduce overall CO_2 emissions," he commented.

Michael Goodisman, business development director, at oversize cargo specialist Antonov Airlines, made similar points. "As the world's population grows and modernises, there will be increased power generation needs, but it is very difficult to judge what the balance [between the various options] will be," he stated, noting that renewable power sources are in direct competition with an increasingly efficient non-renewable sector.

As long as the world's population continues to grow, so will demand for energy, but it will be interesting to see if governments and energy providers continue to look for the most cost-effective solution or tend towards renewable sources in order to reduce overall CO_2 emissions.

– Holger Hinrichs, Combi Lift

Those conflicting influences are currently particularly apparent in China, where a drive to massively increase the amount of power generated by renewables appears to be running in tandem with a recently renewed focus on the construction of coal-fired power plants.

The latter move was highlighted in a report published by USA-based energy research group CoalSwarm in late September that claimed, "a massive cohort of hundreds of new coal-fired power plants is on course to be added to the already overbuilt Chinese coal plant fleet." Specifically, it stated, 259 GW of new

Sarens has won the contract for heavy lift operations at the Hinkley Point C nuclear reactor newbuild in the UK.

capacity is under development, representing a 25 percent increase in China's coal-fired power fleet.

On a global level, though, the construction of coal-fired plants is continuing to slow. A separate CoalSwarm report published earlier this year suggested that while total global coal capacity is continuing to inch up, a peak is on the horizon. "In the first half of 2018, retired capacity nearly matched newly operating plants and the global pipeline for proposed coal is quickly eroding," it claimed.

Decline of coal

Putting figures to those claims, the report said the amount of coal power capacity in pre-construction stages has declined every year since 2015. "So far, 2018 has been no exception, with proposed capacity dropping 20 percent in the first half, from 447 GW at the end of 2017 to 364 GW by July 1, a decline of 83 GW. Overall, the pre-construction pipeline has fallen two-thirds since 2015, when it was 1,090 GW."

Stijn Sarens, key account manager power plant business at heavy lift and transport engineering specialist Sarens, confirmed the general slowdown in the construction of new coal-fired power plants.

"We are currently finishing a coal-fired power plant in Greece [Ptolemaida] but I think that will be the last one for Europe. There are a couple being built in South Africa but I do not see many other countries building any new ones right now," he said.

However, he added, Sarens does expect to see further work in relation to the upgrading of some existing coal-fired power plants with new technology to reduce their harmful emissions.

"Around 2010 we completed approximately 15 DeNOx installations (an emissions filter to reduce nitrogen oxide emissions) in a row for one particular customer and we are still doing some of that type of work," he stated.

The stagnation of the global nuclear power market was highlighted in the recently published World Nuclear Industry Status Report 2018; it revealed that while worldwide power generation using the fuel grew by 1 percent in 2017 due to an 18 percent increase in China, "global nuclear power generation excluding China declined for the third year in a row".

... It is very difficult to judge what the balance [between the various power generation options] will be.

– Michael Goodisman, Antonov Airlines

Of the new nuclear power plant projects, four reactors started up in 2017, three in China and one in Pakistan. Plus: "Five units started up in the first half of 2018, of which three were in China and two in Russia."

New nuclear plants

There were five construction starts in the world in 2017, continued the report, while the number of units already under construction globally has declined for the fifth year in a row from 68 reactors at the end of 2013 to 50 by mid-2018, of which 16 were in China. "At least 33 of the 50 units under construction are behind schedule, mostly by several years," it added.

Even so, the nuclear power plant market continues to offer business opportunities for providers of specialised heavy lift and forwarding services – coupled with major challenges generated by the complexity and often long gestation period for such projects.

Stijn Sarens highlighted both aspects of that market. On the positive side, he said that of the power plants fuelled by non-renewable resources, the nuclear sector now offers the best opportunities for the specialised heavy lift services offered by the Sarens group.

"There are fewer companies around

Antonov Airlines delivered 12 heat recovery steam generator modules, each weighing 140 tonnes,to Bolivia using the world's largest aircraft – the Antonov AN-225 Mriya – on behalf of Hansa Meyer Global.

which can provide the top-end heavy lift equipment required for the construction of the larger nuclear power plants," he commented.

Sarens has worked on nuclear projects in several parts of the world, including Finland, France, the USA, China and Japan. It is currently involved with the development of further new plants, including in China, Turkey, Hungary and India, although no actual work has been awarded yet.

UK's nuclear focus

"Right now, the UK is a particular focus market for us as there are plans to build up to six new nuclear power plants there," Stijn Sarens went on. "In fact, the biggest new nuclear power project business we have been awarded recently is in the UK, for the Hinkley Point C plant in England.

"The contract we have secured for Hinkley Point C covers heavy lift operations for which we are now building an entirely new Sarens Giant Crane (SGC). It will have 5,000 tonnes lifting capacity and be capable of being relocated on site while it is completely rigged, something we believe is unique in the world," said Stijn Sarens.

"We are expecting to be on-site early next year, with our work due to start somewhere between February and April, and continue for about four years." (For more information on Sarens' SGC 250, see page 24).

However, he also confirmed that the complexities, financing issues and major political influences associated with nuclear power plant developments frequently result in project delays and cancellations.

As an example, he pointed to recent developments in South Africa where, according to local media reports in late August, the government has decided to cancel any further nuclear projects in favour of stepping up investment in renewable energy.

"Nuclear is controversial and when it comes to new power plant construction it is always the national government in the country concerned that makes the major decisions. However, because it takes such a long time to move from any decision to build, to the actual execution of the project, the government might change two or three times in that period, with each having different policies when it comes to nuclear power," he explained.

"We can follow nuclear power plant projects for years and see many ups and downs, with contracts being awarded and then withdrawn, companies going bankrupt or being sold, and the technology being changed. Financing is also often an issue – because of the time lags, projects can end up costing a lot more than originally budgeted for."

There are fewer companies around which can provide the top-end heavy lift equipment required for the construction of the larger nuclear power plants.

– Stijn Sarens, Sarens

Popular option

Meanwhile, gas is continuing to prove a popular option when it comes to fuelling power generation plants in many parts of the world, particularly developing countries with a need for cheap energy to support their industrial and economic growth.

"Most developing countries have a high demand for energy, for example South Sudan, Eritrea, Ethiopia, India, Pakistan and Bangladesh," said Combi Lift's Hinrichs.

"In general, they are looking for a quick and easy solution to this problem which ideally is also cost effective. This is where gas-fired plants have the advantage over other energy sources such as renewables, which require a higher initial investment."

Javier Martinez, executive director for heavy lifting, transport and installation specialist ALE, confirmed that gas is a particularly active sector at present.

However, he continued, challenges

Nearly 1,400 coal power plants in development

Approximately 1,400 coal-fired power projects are planned or under development in 59 countries. If built, these plants would increase coal-fired power capacity by 33 percent, adding more than 670 GW to the global coal-fired fleet.

The information was provided by German non-governmental organisation urgewald and its partners; together they have released a new database – coalexit.org – detailing the world's top 120 coal-fired power plant developers.

The top 120 have been culled from a larger list of 700 companies with significant coal-related business activities. The top 120 currently account for 68 percent of the global coal-fired power plant pipeline.

The list was created primarily for the finance industry, which has taken a growing interest in the risks of the sector.

urgewald said that the financial risk of investing in the coal supply chain is intensifying, particularly for coal plant developers. Risk factors include expensive construction and operating costs and shifting demand forecasts. The costs of alternative energy sources, especially renewables, continue to decline.

Meanwhile, some of Europe's most prominent institutional investors, including Allianz, AXA, and Generali, have adopted policies barring coal plant developers from their investment activities, said urgewald.

Some of the world's largest international banks and investors are now using urgewald's research to inform their coal-related investment decisions.

However, it is important to note that coal-fired power plants are going to play a key role in meeting the developing world's burgeoning electricity requirements.

The database is free to view and provides a welcome insight into which firms continue to see potential in coal-fired projects.

associated with the actual delivery of the gas required to fuel such generating capacity mean that in some instances where relatively small plants are required, marine diesel engines are being installed instead.

Politics of gas

"Delivery of gas can involve using pipelines that cross different countries, and that sometimes results in political problems arising. In Chile, for example, some gas-fired plant projects have been put on hold because political issues have led to gas not being delivered," reported Martinez.

"In some situations where there are problems securing gas supplies, marine diesel engines can become an alternative option for power generation because there is often more flexibility in terms of how that fuel is delivered."

Marine diesel-fired power generation systems remain a viable option for smaller power plants up to 100 MW, or for projects located on islands or at remote locations. Demand is still seen in the Caribbean, Central America, South America and the Far East. "We are even seeing diesel engines being used to power some smaller plants in Canada and the USA," he added. Efforts are under way to boost the efficiency and reduce the environmental footprint of such installations.

In some situations where there are problems securing gas supplies, marine diesel engines can become an alternative option for power generation because there is often more flexibility in terms of how that fuel is delivered.

– Javier Martinez, ALE

However, it is combined-cycle gas-fired power generation projects that continue to be the most prominent type of power project approved at present. These systems use a gas and a steam turbine together to produce up to 50 percent more electricity than a traditional simple-cycle plant. "The waste heat from the gas turbine is routed to the nearby steam turbine, which generates extra power," explained global power generation group GE Power.

Patchy outlook

Overall, though, the worldwide market for heavy lift projects involving the modernisation and refurbishment of existing plants remains patchy and unpredictable.

"The decision to further invest in an old facility depends on many factors such as age, maintenance, performance, efficiency and newly developed technology," explained Combi Lift's Hinrichs. "There is no general rule as to when it is deemed necessary to upgrade an existing facility. Each case has to be considered individually, including whether a newbuild might be a better choice."

HLPFI