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On January 31, 2013, Wärtsilä received an order from Portland General Electric Company (PGE) to supply a 220 MW power plant being built near Clatskanie in the state of Oregon, USA with 12 Wärtsilä 50SG natural-gas-fuelled engines and related auxiliary equipment. We asked Rick Tetzloff, Senior Project Manager at PGE, to share the business logic behind their selection of Wärtsilä technology.
Just to set the scene, PGE could be described as a fairly typical investor-owned utility in the Pacific Northwest. We have residential, commercial and industrial customer segments, and our main priority is to achieve the best combination of cost and risk for these customers.

In 2009, we submitted an Integrated Resource Plan to the Oregon Public Utility Commission (OPUC) which established the need to seek approximately 200 megawatts of flexible peaking capacity. We then initiated an RFP process in 2011, into which we ourselves made two entries, one of which employed Wärtsilä technology.

Managed by a separate, impartial team at PGE, the RFP and bidding process was overseen by an independent evaluator reporting to OPUC. Port Westward Unit 2 in its current form, using Wärtsilä 50SG engines, was the successful proposal. That’s the long, complex process that gave rise to this selection of technology and supplier.

In terms of our annual energy needs in the Portland area, we are becoming a dual-peaking utility, with nearly equal summer and winter peaking loads. On a daily basis, we also have a fairly standard loading profile, with morning and afternoon peaks.

Traditionally we’ve relied on hydro resources to provide flexibility, but the share of our generation provided by hydro is declining over time. Where before we depended on mid-Columbia hydro contracts for load-following functions in our generation system, more and more of those resources are now switching to a short-term market basis or serving their native loads.

Our Integrated Resource Plan showed that we needed products that would provide ancillary services, including load following, regulating margin, spinning reserve and non-spinning reserve.

Wärtsilä’s engines cover all of these needs. The plan they proposed for the Port Westward Unit 2 plant complements our portfolio very well. The power generation we have currently is more traditional, and wasn’t designed to be ramped up and down...
throughout its load range at a fast rate. This capability was something we needed to add to our system to maintain flexibility as more wind energy is integrated into our system.

**Gas on hand**

Fuel storage was critical to the success of this project because traditional pipelines need to have the gas scheduled a day in advance. You need to predict how much gas you are going to use the next day and be responsible for balancing it if you deviate from that.

Having access to an underground reservoir close to our facility was a key driver for this location and for this kind of technology to be added to our system. There is very limited available capacity in the existing pipelines so we will need to use what capacity we have to inject gas into the storage reservoir during off-peak periods in order to have it available when needed for this plant. When fully constructed, we'll end up with an underground natural gas storage reservoir and pipeline that we can draw from at any time of day, at any load, to match our needs on the generation side.

So, with natural gas the fuel of choice, it became about selecting a technology. The Wärtsilä system we decided on provides three critical services that we were looking for to develop our portfolio:

- **Peaking service during the winter and summer periods**
- **Load following throughout the year**
- **Wind integration service throughout the year**

The biggest benefit the Wärtsilä 50SG engines provide for our system is in helping us to maintain compliance with our commitments to renewable energy, and as those commitments increase over time, they also allow our customers to benefit from a more renewable-focused electricity portfolio.

**The load**

The modelling we've done to date, looking at our entire portfolio, shows that these engines will be operated throughout the year when integrating wind.

Though it's difficult to predict the capacity factor for the plant, we expect that some portion of the plant will be used every month if not every week, when integrating wind. There may be days when only two or three units are run, and others when all units will be operated at minimum load and have that spinning reserve available as the day progresses.

As the wind energy penetration in the Northwest increases to meet state renewable portfolio standard requirements, we expect this plant to be used on a more regular basis.
Garnering support
One area we needed to work on was the education about this new technology, as the use of reciprocating engines as a prime mover for generation is a new development within PGE. There was a bit of a learning curve internally and with our stakeholders, which necessitated informing people and getting them more familiar with using this technology in a major power plant.

Looking forward
During the decision-making process we also developed an internal model that simulates overall system costs to show the savings to our customers that are realised by having flexible capacity. We can plug different resources into this simulation and model the constraints and the flexibility of those resources, and then see how these results are reflected as lower overall OPEX in the system.

This included some modelling of things like pumped-storage hydroelectricity and compressed air energy storage. In the context of our integrated resource plan, we look at all the options, but those technologies are very risky right now. They take a long time to develop, and there are also a lot of permitting risks.

With the future addition of more wind energy to our system to meet our renewable portfolio standard requirements, the need for flexibility is only going to increase. This was one of the driving reasons why the flexibility of Wärtsilä’s technology made them a good fit for this project.

Wärtsilä has a long history. We see them as a company that tries to work fairly and reasonably with their partners, and we’re happy to pass on the benefits of this relationship to our own customers and stakeholders.
In 2013, a number of coinciding developments signalled that the tipping point for liquefied natural gas (LNG) is approaching. Wärtsilä, as an early backer of LNG for both marine and land-based applications, is seizing the moment to expand its own offering into a new area: infrastructure.

LNG has been labelled a fuel of the future for years now. Offering global availability and significant environmental benefits, the reasoning has always been sound, but with commitment from industrial and political decision makers required for its widespread adoption, along with significant investments into infrastructure, LNG’s time has been a while coming.

Today, with North American shale gas on everyone’s lips, we are in the midst of what some have termed the “gas revolution”. LNG has begun to appear in the headlines of the world’s media, and commentators are elaborating publicly more and more about what these three letters could mean for the geopolitical status quo. Fuel prices may have dropped as a consequence of the newly available shale resources, but transportation is still seen as a challenge. Liquefaction of gas is a key enabler: pipeline transportation is not an option, for example, when considering the North American potential to supply global markets. Nor is it a valid approach for island nations showing demand for gas (Japan is a major importer operating under these circumstances).

By this stage, observers of the industries poised to take advantage of LNG are fully aware of the chicken and egg dilemma which has delayed the area’s development. Key decision makers have been slow to make the necessary commitment to infrastructure that would enable the world’s harbours and power hubs to reap the benefits of liquefied gas. However, Wärtsilä’s acquisition of Hamworthy in 2012, as well as substantially increasing its offering of environmental solutions, put the company in a unique position to help break the deadlock.
Wärtsilä’s businesses converge on Tornio

The key enabler was Hamworthy’s expertise in small-scale liquefaction and regasification plants, their long experience in gas-handling solutions, and their many references for both offshore and land-based applications using similar and related technologies.

For Wärtsilä, this provided the opportunity to plug a vital gap in the LNG supply chain, and the first case came from a surprising direction: the power plants business.

The energy demands on Wärtsilä’s doorstep – in Tornio, northern Finland – provide a textbook example of how certain usages such as industrial applications can provide a valid, cost-effective basis for installing LNG infrastructure which can then potentially serve other customer segments.

The deal entails a turnkey contract to supply an LNG receiving terminal in Tornio. Worth around EUR 100 million, the contract was made with Manga LNG Oy, a joint venture between the Finnish companies Outokumpu Group, Ruukki Metals Oy, Gasum Oy and EPV Energy Ltd.

Flexibility is a great advantage here. The main user of the natural gas supplied by this terminal will be the Outokumpu Tornio steel mill, but industries, mines, and other potential gas consumers in the region will also be served. The terminal may also eventually supply LNG to ships, such as the new icebreaker planned to operate in the Tornio and Bay of Bothnia region.

Vesa Riihimäki, President, Power Plants, elaborates: “We’ve been waiting for the development of LNG infrastructure to supply power plant applications,” he explains, “but the industry isn’t quite there yet. For one thing, players who can provide the overall EPC solution have not been available. Based on this need, we looked at our own competences and saw we can actually provide a one-stop shop to offer these solutions and serve the demand.”

And while the involvement of Wärtsilä’s Power Plants business in the LNG race may seem unexpected, Riihimäki makes the business logic crystal clear. “Power plant delivery and terminal
delivery aren’t hugely different. After acquiring Hamworthy, we have gained strength in LNG-handling: liquefaction, regasification, and the core technology know-how.”

“When you put this together with our competences in turnkey construction, project management and systems integration in the power plants business, overall you have a very compelling package.”

The harbour is the hub

It’s becoming evident that the harbour is the meeting ground for marine and land-based power generation. Typically close to large consumer centres, such sites could provide Wärtsilä with the opportunity to supply power plant technology later. “This gives us the chance to deploy Smart Power Generation in areas where it makes sense,” Riihimäki continues, “where the load pockets are, and where the introduction of infrastructure can influence power system development, enabling more renewables in the power system, for example.”

Exciting news from elsewhere in Europe supports this thinking. The Netherlands’ port city of Rotterdam, already the site of multiple LNG terminals, looks set to become the focal point of Europe’s first true LNG logistics chain.

In 2013, two LNG-related European subsidy applications were granted, a strong indication that the EU supports the development of a Rotterdam LNG hub. These included a subsidy of EUR 40 million for LNG infrastructure for the Rhine-Main-Danube area and a EUR 34 million subsidy for LNG breakbulk terminals in Gothenburg and Rotterdam.

The port shares Wärtsilä’s ambition to fully develop the market for LNG as a fuel, and the opening of an LNG hub in Rotterdam before the end of 2015 will represent a huge step in this direction. The subsidy for breakbulk terminals relates to a joint venture between the ports of Gothenburg and Rotterdam, and will also enable the supply of LNG to the bunker market in northwest Europe.

Making inroads

Developments in infrastructure are not only necessary on the marine side, however. For LNG to fulfil its potential, adoption of LNG solutions is required on land too. This is why the media buzz surrounding Shell’s Canadian green corridor in the past year is of such significance for the industry at large.

The road from Calgary to Edmonton became the focus of international attention during 2013 and came to represent the most high profile discussion yet of LNG in the world’s media. By planning a number of LNG-equipped fuelling stations along the 300 km Calgary-Edmonton trucking route, Shell hopes to establish a working benchmark for LNG refuelling stations.
Jean-Marc Morin, Shell Canada General Manager Commercial Fuels, spells out the opportunities opened up by the green corridor approach, “For heavy-duty truck operators facing a challenging economic climate, LNG could be a cost competitive fuel option, particularly for those looking to invest in new vehicle fleets.”

**Taking the green corridor global**

In publicising a series of further investments, Shell also laid out plans for similar projects in Australia and the U.S. Two small-scale liquefaction units were announced in key locations, the first of which is to be placed in the Gulf Coast Corridor to serve the Mississippi River and the Intra-Coastal Waterway as well as the onshore oil and gas exploration areas of Texas and Louisiana. The second will be installed in Sarnia, Ontario, and will develop LNG availability to the Great Lakes, their bordering states and provinces on both sides of the border, and the St. Lawrence Seaway.

Aided on the marine side by Wärtsilä, whose technology underpins, for example, Shell’s offshore support vessels in the Gulf of Mexico, this concentration of effort on the North American market could help to set a standard for global fuel trends in the near future.

With LNG infrastructure now in a phase of development both in Europe and the Americas, Asian markets are also demonstrating considerable interest. This is most ably demonstrated by the bilateral cooperation pact to stimulate trade and investment opportunities in oil and LNG signed between Canada and Japan in October. The tone has been set, and announcements of further initiatives look set to appear with increasing frequency. By all appearances, the future has arrived.
Q&A

Lauran Wetemans
Shell, General Manager, Downstream LNG Business Development

Pilot projects like the Calgary-Edmonton corridor represent the first stage of the LNG market opening up. What could the next phases be?

As confidence in the technology grows, the reliability and the economic case will trigger a tipping point where LNG infrastructure will evolve quickly from these initial trials to become a commonly-used fuel.

What are the coming challenges?
These are manifold: firstly, driving for critical mass of demand leveraging both supply and demand for LNG as a fuel, and driving down cost in the value chain to provide a sustainable competitive offering. Then, of course, we need further optimisation of engine performance and infrastructure. Finally, maturing operating standards and adequate regulation for the sector are of great importance. It is key to keep high safety standards which are fit for purpose.

How does the land-based “green corridor” approach dovetail with the future of LNG as a marine fuel?
Today marine demand is developing around the known emissions control areas. By doing so and focusing on key ports, we start to see the development of a network of bunkering options that will grow with demand to offer a compelling proposition for LNG as a marine fuel.

This, of course, requires collaborative partnerships between leading global OEMs, such as Wärtsilä shipowners, ports and end customers to embrace a vision for LNG as a credible fuel for the future.

How do Shell’s marine partnerships fit in?
A variety of collaborative partnerships between different players along the value chain are required to enable the market to develop. For Shell it is not feasible to simply make LNG available, build the infrastructure, and wait for the demand to develop. Credible and reliable technology partners, concentrating and aggregating demand in key hubs, local legislative support, and a strong will to make it happen need to come together to create the conditions for market development. In that context, Shell is proud to work with Wärtsilä and others to lead and innovate in the marine sector.
We understand that there is a lot of information out there sometimes. That’s why when it comes to our LNG service contracts, we want to explain things in a way that will make the most important points sing out.
Discover what’s distinct about the way we serve our customers, why LNG is so important today to the shipping and power industries we serve, and how Wärtsilä is uniquely placed to capitalise on the biggest trend in this area for many years to come.

We put expertise into action.
The importance of being environmental.
It’s a changing world.
Viking Grace is the first passenger cruise ship in the world to run on LNG. This makes it the most environmentally-sound cruise ferry in the world, the stunning result of top-notch engineering and state-of-the-art design. The vessel operates between Turku and Stockholm – her large windows command a view of thousands of small islands scattered across the sea between Finland and Sweden. Wärtsilä’s service agreement covers the four Wärtsilä 50DF dual-fuel main engines, as well as the Wärtsilä LNGPac. The Viking Grace maintenance contract is a model example of the broad range of services Wärtsilä brings to the LNG value chain:
- Engine maintenance planning
- Maintenance work
- Condition monitoring
- Spare parts supply, technical support
- Workshop services
The overall service target is to extend the intervals between maintenance, optimise the logistics for spare part deliveries, and ensure optimal operating efficiency and fuel consumption, thereby lowering operating costs.
Gas is also clean. Viking Line will make savings here too, as the decreased need for cleaning machinery will cut the cost of maintenance.

“Our highest priority is the maintenance of safety measures on both short- and long-term bases. It is a great privilege indeed to be working with industrious and safety-oriented colleagues, all of whom have risen to the challenge of keeping a visionary approach to shaping M/S Viking Grace. The logistics of the liquefied natural gas (LNG) supply started working well in April, since the bunkering supply vessel Seagas has started operation.
We’re very glad about the decision to be the first to use LNG as source of fuel for this kind of traffic. Eco-friendly traffic solutions such as those incorporated in M/S Viking Grace garner great interest on both a domestic and an international level. This becomes very apparent on a daily basis when meeting people and personally addressing questions specific to the technology and design behind M/S Viking Grace.”

Henrik Grönvik, Captain, Senior Master, M/S Viking Grace
THE IMPORTANCE OF BEING ENVIRONMENTAL—EIDESVIK

Wärtsilä has enjoyed a long-term services relationship with Eidesvik Offshore ASA, covering multiple vessels, since 2010.

- “In 2003 we launched the first LNG fuel supply vessel, Viking Energy.”
- “This was motivated by the challenges we had when it comes to the emission of NOx, sulphur and particles.”
- “If we look at coastal areas in Norway, Sweden, Denmark and in the Baltic states, ships represent approximately 40% of NOx emissions.”
- “I’m convinced that one single land-based industry representing emissions of this magnitude would never exist today unless they made dramatic changes. This is where our industry is today.”
- “We strongly believe that the use of dual-fuel engines combined with other hybrid solutions can help to avoid unnecessary burning of heavy fuel and therefore a great deal of pollution.”
- “Like ourselves, Wärtsilä definitely has the scope to be a bigger contributor in terms of technologies and solutions in order to supply and service these problem areas as part of the company’s core business.”

“Today Eidesvik operates a fleet of 28 modern offshore support vessels within supply, seismic and subsea, with a further large vessel in construction. We are based on the west coast of Norway, employ approximately 800 people, and have been quoted on the offshore stock exchange Dax since 2005.”

“We see ourselves, justifiably I believe, as a real powerhouse when it comes to innovative solutions. This means both in terms of technology and the way we operate our fleets.”

Jan Fredrik Meling, CEO, Eidesvik Offshore ASA
IT’S A CHANGING WORLD - THE MARKET, THE MAP, AND THE FUTURE

World Energy Outlook 2012 by OECD/IEA: Major global trade flows 2035

- Let's take a look at the world energy outlook.
- It should be evident that gas transportation in liquid form is an area of huge potential.
- Decision makers, governments and energy providers are waking up to this.
- Gas consumption expected to increase >30% by 2035
- Long-term growth mainly driven by power production
- CO₂ emissions reduced by 60% compared to coal
- Highest demand growth in emerging economies / non-OECD countries
- Mismatch between location of resources and consumers
NOW KEEP THAT WORLD MAP IN MIND AND LET’S OVERLAY WÄRTSILÄ’S EXPERTISE IN THE GAS VALUE CHAIN

3 THINGS WE’D LIKE YOU TO UNDERSTAND ABOUT WÄRTSILÄ’S LNG SERVICE CONTRACTS

- Now take a look at Wärtsilä’s service network:
  - 70 countries
  - 160 locations
  - 11,000 service professionals

- We hope it’s clear by now that:
- The growth of gas as a fuel in shipping and power generation is a key market driver.
- Wärtsilä is superbly placed to capitalise on this opportunity.
- When it comes to LNG, the service possibilities are impossible to measure: right now, people just don’t fully appreciate how big this will get.

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In January 2013, M/S Viking Grace’s maiden voyage marked a major step in extending the use of natural gas in shipping. It is the first large passenger cruise ferry ever to run on liquefied natural gas (LNG), and includes several unique features making it inherently safe and environmentally sound. Since the launch, engineers around the world have been pouring in to witness first hand how the age of safe gas in shipping will look.
The Baltic Sea, located between Central and Northern Europe, is one of the busiest maritime areas in the world, and is especially vulnerable to environmental pollution. Because of this, the Baltic Sea will be among the first areas in the world to see stricter regulations imposed regarding sulphur and nitrogen oxides (SOx and NOx). Stricter SOx limits are due to come into force in 2015 and NOx limits will follow soon after.

For M/S Viking Grace these dates are of no significance: it makes the grade already, years in advance of the coming changes. From an emissions perspective, it is the world’s most environmentally sound large ferry. Compared to traditional diesel-powered ferries, its SOx emissions are close to zero when running on LNG. Particulate emissions are almost non-existent, and NOx and CO2 emissions are reduced by 80% and 20% respectively compared to its diesel-powered equivalents.

"We hope and feel that this ship has been a strong signal for the whole industry," says Kari Granberg, the Project Manager from Viking Line, the ship’s owner. “A year after the launch we still have regular tours so people can see the LNG systems and the bunkering.”

Environmental solutions beyond the choice of fuel
Opting for gas was not the only environmental choice Viking Line made when commissioning this ship. For example, during the warm summer months the liquefied gas’s extremely cold temperature is utilised in the air conditioning system. To minimise disturbance to the residents of the abundant summer cottages along the ship’s route and maximise passenger comfort, the ship is equipped with Wärtsilä’s Compact Silencer System (CSS). This solution reduces engine noise, particularly in the unpleasant lower frequencies. Thanks to its advanced five-blade propellers the ship is practically without vibration.

“As it became clear Viking Line was not just choosing gas as fuel, but also looking for all sorts of other ways to decrease the environmental..."
load, we got very excited. From the beginning this felt like a very attractive project,” says Sören Karlsson, who worked on the LNGPac™, Wärtsilä’s patented storage and supply system for gas.

Safety comes first
Assuring the safety of the gas technology employed was a key concern in the Viking Grace project. This is a busy ferry line, so the ship needs to be bunkered within a single hour. At the same time, thousands of passengers and hundreds of vehicles are being loaded and unloaded. To ensure safety, everything from the double-walled pipes and engine room arrangements to the location of the LNG tanks had to be carefully planned.

“I remember the first time Viking Line came to discuss the project and introduced the idea of bunkering a passenger ship with LNG, which at the time was still illegal for example in Norway. Though we could not give them a guarantee immediately, there was a strong understanding that we would make this work safely together. And we did,” says Sten Sundberg of the Finnish Transport Safety Agency (Trafi).

Scope of Wärtsilä supply
- Four 8-cylinder in-line Wärtsilä 50DF dual-fuel main engines
- Two 2,300 kW bow thrusters and a 1,500 kW stern thruster
- Two stainless steel fixed-pitch built-up-type main propellers
- Complete propeller shaft lines with shaft-line seal systems
- LNGPac™ storage and supply system
- Gas Valve Unit – Enclosed Design (GVU-ED™)
Thousands of people and hundreds of companies worked on this ship. For many, it was a once-in-a-lifetime experience. What made this project so special for them?

“We hope and feel that this ship has been a strong signal for the whole industry. A year after the launch we still have regular tours so people can see the LNG systems and the bunkering. All in all, there has been a huge amount of interest towards the vessel and we’ve received a lot of feedback.”

Kari Granberg, Viking Line
“I’ve built many ships in my time, several of them much bigger than this one but none quite as complex in regards to new features. There is a lot of new technology which meant a whole lot of adjustment was involved. You couldn’t just pick and choose parts. Anyhow, the ferry was delivered successfully and on time. Viking Line made a courageous decision when they commissioned a gas-fuelled vessel and it was a great experience to see this project through before retiring.”

Vesa Airaksinen, STX Finland

“I think it was important that we all shared a common vision. We were building a ship which would not only be top of its class environmentally but also offer an unforeseen level of safety and comfort for everyone on board. We just had to believe we could pin down any problem and solve it. Together we showed the world that gas can be applied to any ship.”

Sören Karlsson, Wärtsilä

“The knowledge requirements in this project were extensive, which made this very interesting, professionally speaking. We had our top experts flown in from London to visit the yard. There was a lot of new technology, so we paid extra attention to the processes and how the installations were done, not just the technology as such.”

Timo Hakala, Lloyd’s Register

“The role of feedback was absolutely critical in this project. Especially with problematic issues, you have to be very open and precise. The calculations had to be in place to see what’s really happening and why. Only then could you agree on the necessary changes together.”

Timo Mäki, Viafin
“Apart from strengthening the important connection between Stockholm and Turku, this new generation vessel is helping us meet our own environmental goals. It has also enabled us to invest seven million euros in the overall harbour infrastructure. Environmental concerns are especially topical in this region and critical for our license to operate as a port.”

Christian Ramberg, Port of Turku

“Early on, we could sense that everyone involved was determined to make this work. I’ve sometimes said that Viking Line were wearing both a belt and double suspenders. There couldn’t be any compromises with safety as this project was crucial for their business and for all of us involved. This made our work much easier and ensured good cooperation.”

Sten Sundberg, Trafi
“Together we showed the world that gas can be applied to any ship,”
Sören Karlsson

Commitment built this ship

It was a cold winter day in the sleepy period between Christmas and New Year. While his friends and family were celebrating the holidays, Sören Karlsson from Trafi was busy keeping his eyes on the road.

“It was dark and I was tired. The snow just kept falling and falling. But I had to be in Turku shipyard on time as the Viking Grace sea trial was about to start,” he recalls. Two weeks later – after what proved to be a successful trial – the vessel would carry excited passengers from Turku to Stockholm on its maiden voyage.

Stories of dedication like these pop up regularly when talking to the crew that built M/S Viking Grace. Thousands of committed people like Sten worked tirelessly on the ship, many of them giving a year or more to the project. Everyone was ready to go the extra mile when needed.

What made them such a good team? One answer, it seems, is a clear vision. To build a new generation vessel such as this, a tightly-knit team of committed experts was needed. During hundreds of project meetings, tough decisions were made together to keep the project moving. From the very beginning there was a strong feeling that together, this team was truly building something new.

“I think it was important that we all shared a common vision. We were building a ship which would not only be top of its class environmentally, but also offer an unforeseen level of safety and comfort for everyone on board. We just had to believe we could pin down any problem and solve it. Together we showed the world that gas can be applied to any ship,” says Sören Karlsson from Wärtsilä.
Wärtsilä turns 180°

Wärtsilä has grown tremendously from its modest beginnings in the Karelian village from which we took our name. Today we employ approximately 18,700 people in over 200 locations in nearly 70 countries.

In 2014, Wärtsilä celebrates its 180th anniversary. To commemorate this auspicious event, and provide a comprehensive overview of the company’s current activities, global presence, and varied personnel, we have launched the W180° online radio station, which can be found at www.wartsila180.com
Opening up the Russian utilities market

Russia is one of the markets targeted for development under Wärtsilä’s strategy to grow in the utilities sector in large gas power plants. In April 2013, an important step towards this goal was taken in the form of an order from independent power producer Transmashenergo, an ICT Group company, for a 110 MW power plant located in Tikhvin, 100 km east of St. Petersburg.

The new power plant, the first of its kind in Russia, will run on natural gas using six Wärtsilä 50SG engines. “Wärtsilä was able to demonstrate the technical and economic benefits of its combustion engine technology through its global references,” commented Vladimir Zhadan, Transmashenergo’s General Director.

The plant will provide a reliable and efficient electricity supply for large industrial consumers, including ICT’s railcar manufacturing complex, while meeting the highly variable load requirements with extreme flexibility and swift responsiveness. Construction of the facility will be completed by the end of 2014.

The 110 MW unit will be by far the largest power plant running on Wärtsilä engines in Russia. It is also the first time that combustion engine technology has been selected to power a plant of this size anywhere in the country.

Though already a large project, the scale looks set to increase even further: the next phase of site development assumes extension of the plant by an additional 110 MW, resulting in a plant capable of providing local industry with up to 220 MW of electricity.

As Wärtsilä’s power plant contracts in the region have previously served the distributed power sector in the range of 25-30 MW, this order represents a successful first foray into the larger and potentially more lucrative utilities segment, with a market demand estimated at tens of gigawatts over the next 7 years. With Tikhvin as a benchmark case for Wärtsilä’s combustion engine technology, further market development on a wider footing seems assured.
Year of the Dragons

Despite the global economic situation, Evergas, a Danish transporter of petrochemical gases and natural gas liquids, is actively expanding its fleet. Wärtsilä is delivering engine and propulsion packages, LNG fuel systems and cargo handling plants for their new series of four 27,500 cbm LNG-fuelled LNG/ethane carriers.

The Evergas fleet is being given a comprehensive facelift. At the beginning of 2013, the company signed a 15-year shipping agreement with INEOS Europe to transport ethane from the US Mariner East project to Europe. This long-term charter involves the construction and operation of a series of purpose-built LNG carriers that will transport ethane from Marcus Hook in the US to Rafnes in Norway.

The new state-of-the-art vessels are being designed and constructed by Sinopacific Offshore & Engineering Co Ltd in Qidong, China, a privately-owned global operator in the gas and oil sector with which Evergas has enjoyed a long-term relationship.
Acquisition in action

Delivery of the new LNG carriers, code-named Dragons after the Chinese calendar year in which they were ordered, is scheduled for 2015. “The Dragons will be the world’s largest ethane carries in their class,” says Göran Österdahl, General Manager, Wärtsilä Ship Power Sales, Europe & Africa. “In addition to ethane, they will be suitable for transporting other liquefied gases such as LNG and LPG.”

“SOE’s cooperation with Wärtsilä involves the supply and installation of dual-fuel engines, LNG fuel systems and gas plants on these vessels,” says Österdahl. “This contract marks the first case in which Wärtsilä Oil & Gas (formerly Hamworthy) is collaborating with Wärtsilä’s other business units under the Wärtsilä name.”

The Hamworthy group, whose specialities included designing cargo tanks for liquefied pressurised gases, on-board cargo handling systems, compressors, pumps, inert gas system valves, pump systems and water systems, was acquired by Wärtsilä in 2012. “This project is a strong example of how we are utilising the combined expertise of Wärtsilä Ship Power, Wärtsilä Power Plants and Wärtsilä Oil & Gas in our offering to the oil and gas markets,” adds Kjell Ove Ulstein, Business Development Manager, Wärtsilä Oil & Gas, who joined Wärtsilä from Hamworthy.

New horizons

With their large carrying capacity, the king-size Dragons provide Wärtsilä with an excellent reference demonstrating the company’s ability to deliver integrated solutions to the oil and gas sector.

Demand for LNG-fuelled gas carriers is growing in parallel with the development of port-based LNG bunkering and distribution infrastructure. The first facilities for serving LNG-powered vessels are expected to be constructed at the largest ports along the US coastline, in northern Europe, and in China.

“We have enjoyed a lengthy and trusted relationship with Wärtsilä,” comments Martin Ackermann, Evergas CEO. “This, together with their relentless efforts in understanding and adapting to our demands, has enabled us to successfully achieve a total integrated solution. I am convinced that our DRAGON 27500 series will become a benchmark in the LNG carrier markets.”
**Spotlight on GasReformer**

Associated gas from oil production is normally treated as waste and flared into the atmosphere. Around 140 billion cubic metres of gas are disposed of in this way each year*, causing emissions of some 400 million tons of carbon dioxide – equivalent to 30% of the gas consumption of the entire EU.

Launched in early 2013, the Wärtsilä GasReformer solution treats this gas and converts it into a stable composition that can be used as fuel for Wärtsilä engines. This means that oil platforms and FPSOs, which demand high levels of power, can utilise a new, previously untapped energy source. Furthermore, since in the past this power demand was met using marine diesel oil (MDO), the bunkering of this fuel can be eliminated almost entirely when using the GasReformer. Sustainable practices thereby also result in direct and measurable cost savings.

“Wärtsilä has considerable experience in the treatment of gaseous fuels for fuel cells, and this patented product is a result of this development work,” explains Tore Lunde, Director, Wärtsilä Oil & Gas Systems. “It’s a strong example of the company’s ability to develop solutions that combine both economic and environmental benefits. By turning waste gas into fuel, the GasReformer significantly lowers operating costs while enhancing environmental sustainability. In locations where flaring is prohibited, this is especially important.”

Enthusiasm for the GasReformer as a noteworthy initiative also extends beyond Wärtsilä and its customers. The solution was presented with the Spotlight on New Technology Award at the Offshore Technology Conference (OTC) 2013. This award recognises innovative new products that produce a significant impact for offshore exploration and production.

The award criteria were such that the product must be new (less than two years old), innovative, proven, have broad interest and appeal for the offshore industry, and provide significant benefits beyond existing technologies. With its accompanying economic and environmental benefits, GasReformer fit the bill precisely.

* Figure: Global Gas Flaring Reduction Partnership, led by the World Bank.

For more information on Wärtsilä’s GasReformer solution, please visit www.wartsila.com/en/gas-systems/gas-recovery/gas-reformer

**Oil platforms and FPSOs, which demand high levels of power, can now utilise a new, previously untapped energy source.**
Wärtsilä Brazil: investing in customer focus

2013 was a landmark year for Wärtsilä Brazil, where the offshore business remains active, all stand-by power plants under the company’s operations and maintenance agreements were dispatched by the National Energy Operator, and the record for Wärtsilä-generated MWh in a single year was broken along the way.

But these successes do not see the region resting on its laurels. Far from it: the way is being prepared for further successes, as services and manufacturing capabilities are being expanded in a series of exciting new developments.

New service workshop for improved support

The first of these was the opening of a new service workshop in Niterói in February. The new facilities, the largest of their kind in the state of Rio de Janeiro, will feature a laboratory for automation and electronic fuel injection, as well as a dedicated marine thruster facility. Replacing the company’s current premises in São Cristóvão, the new workshop is designed to provide logistical advantages for Wärtsilä and its customers, who will be supported by a wide range of workshop services with rapid response times.

Robson Campos, Managing Director of Wärtsilä Brazil, highlights the strategic advantages of the location: “It’s ideal both for receiving components as well as for our deliveries, as Niterói is a hub for offshore services in Brazil. This upgraded facility enables us to support our customers even better and service the increased number of installations both our customers and the entire oil exploration industry of Brazil expect to see commissioned.”

In Niterói, the company will be able to provide services on a 24/7 basis, thus doubling its operational capability status. The scope of services will also be expanded to include repairs to large engines, and the maintenance of propulsion sys-
tems for ships. “Propellers can weigh up to 80 tons. We have invested in the equipment needed to service such very large components in the most efficient and safe way,” Campos goes on to explain.

Manufacturing success

As if this were not adequate testament to the region’s potential, in March 2013 it was announced that Wärtsilä would also invest approximately EUR 20 million into a new fully-owned manufacturing facility.

The new plant will be located some 300 kilometres north of Rio de Janeiro in the Açu Superport Industrial Complex. Construction of the 4,000 square meter plant, with its own waterfront and quay, began in April 2013 and it is scheduled to be fully operational by mid 2014. The new delivery centre, expected to employ close to 100 people, is intended to meet increasing market demand, particularly in the offshore market.

Björn Rosengren, President & CEO of Wärtsilä Corporation, made it clear that these ambitious, carefully-planned moves in Brazil are firmly in line with the company’s global approach: “Wärtsilä’s global strategy is to be close to its customers. Our presence in Brazil is now further strengthened to respond to the on-going demand for Wärtsilä power solutions, and to meet the set local content requirements.”

The manufacturing premises themselves will be based on a multi-product factory concept for the assembly and testing of Wärtsilä’s generating sets and propulsion products. In the initial phase, activities will focus on medium-sized, medium-speed generating sets and steerable thrusters, with the possibility to flexibly expand the product range to respond to market needs.

The way is being prepared for further successes, as services and manufacturing capabilities are being expanded in a series of exciting new developments.
Safety webcasting loud and clear

In April 2013, Wärtsilä gave its first ever safety webinar on the topic of managers’ responsibility over safety at work.

Approximately 150 participants from around the world took part in the live broadcast, in which a number of speakers and interviewees opened up the topic and shared their own perspectives and experiences. From Wärtsilä, those present included managers of the company’s local subsidiaries, business leaders from each of its business areas, and representatives of the Quality, Environmental, Health & Safety (QEHS) organisation on the local unit level.

With adverse circumstances affecting several planned appearances at the live streaming event, a number of Wärtsilä personnel demonstrated their dedication to the topic and determination to create an event of value. For example, Sveinung Hansen, President, Wärtsilä Norway, let down by Nordic air travel conditions, pre-recorded his own contribution at the airport.

Mr Hansen gave a very personal dimension to the discussion by sharing a tragic story from his own time as a manager in the field, before pointing out Wärtsilä Norway’s remarkable safety achievements in the recent years. The company’s lost time injury frequency (LTIF) has been reduced by 82% from 2007 to 2013. His observations demonstrated the very real human dimension behind such numbers, which can, of course, easily become lost amongst the statistics.

Other speakers included Kari Hietanen, EVP, Corporate Relations & Legal Affairs; Juha Kytölä, VP, Environmental Solutions; and Tiziano Zorba, MD of the Wärtsilä-affiliated Saipem Group.

Participants’ questions, submitted in advance, were discussed as a conclusion. The event was considered of great practical use, according to feedback from stakeholders present, and showed one way forward for the use of live broadcasting as a helpful response to customer issues.

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Sharing a logistics innovation

Contributing to sustainability can be seen more broadly than just the admittedly important environmental factors. By sharing ideas and intellectual property, companies like Wärtsilä can also contribute to the business landscape and ultimately, society as a whole.

Tekes, the Finnish Funding Agency for Technology and Innovation, sponsors a program known as the Innovation Mill, which is operated by an Espoo-based consultancy named Spinverse Open Innovation. The program’s aim is to enable small companies to commercialise unused innovative ideas and more developed intellectual property from major Finnish corporations, converting them into new products and services.

In 2013, one such idea, donated by Wärtsilä, was put into action by an Oulu-based company named Haltian. The concept is a development in the field of logistics, and promises to deliver “the most polished shipment tracking device to date”.

The device is attached to shipments and can measure shocks, vibration, temperature, humidity and other local conditions according to need. This data is uploaded to an intelligent cloud-based service named Thingsee, which collates all the sensor data from multiple devices and uses it to ascertain meaningful events. The system then uses complex algorithms to create meaning and priority for the events, devices, and people in the network. Notifications can be sent when necessary, and both web and mobile user interfaces are available, presenting the network’s devices, people, and events in an intuitive way.
Off the shelf

This idea was initially conceived by a Wärtsilä employee as a way to resolve potential supply chain issues. However, it was decided that the application, which does not lie within the company’s core business areas, might be better developed elsewhere. There is no financial or ownership connection between Wärtsilä and Haltian or its new service, nor does the originating corporation retain the intellectual property rights. However, before Haltian’s new service is launched, Wärtsilä, as a potential customer, plans to pilot its use as part of a Ship Power project delivery.

As well as connecting ideas with parties more suited to carrying them out, the Innovation Mill also offers financial support from Tekes. Funding can be used, for example, to integrate new intellectual property into existing technologies, or for marketing research, pilot projects and the development of business operations.

“It’s a win-win situation,” enthuses Tero Hottilainen, General Manager, Innovation & Intrapreneurship, Wärtsilä Ship Power. “Ideas that would be left undeveloped are given new life under the Innovation Mill program. In this case, the logistics idea we shelved will become a real service in the outside world. Wärtsilä gets the chance to contribute to the business ecosystem with a strong idea, and then we can all benefit from its execution.”
Education drives South Sudan forward

The primary school of the Karika community, located in the Republic of South Sudan, was founded in 1946. Classes first took place under the shelter of a tree, until a small grass-thatched hut was built in 1947.

Unbelievably, this structure lasted for decades. The traditional mud-walled and grass-roof building methods, however, were vulnerable to the elements: and to rain in particular. Once in a while, the walls would be washed away and the floor would flood. Better than nothing, you might say, but hardly a secure learning environment for the village’s children.

In August 2013, a new 8-classroom primary school was opened – the first permanent school built in the community – with funding contributed by Wärtsilä Corporation.

“The new school is the first of its kind in the region,” says Finn Church Aid coordinator Alexia Billies. “It was built with a raised floor to prevent flooding. Bricks and a tin roof mean that the school will serve the community for a long time.”

As well as providing a structure that can be relied upon to weather the elements, the building’s construction also answers social needs practically, even to an extent readers in Europe may find surprising. The separation of toilet facilities for girls and boys is one such example: “Earlier they had to share the same toilet, making girls uncomfortable and causing them not to come to the school,” explains Alexia.

The recent conflict in South Sudan has not affected this area, but though classes are held regularly, school attendance is still an issue in Karika. By the end of 2013, there were 320 students enrolled (of whom 150 are girls), but an estimated 50 percent of the community’s children are still absent from the roster.

Given the interest generated by the school’s renewal, more children are expected to enroll during 2014 and further volunteer teachers may also be recruited. Additional plans include the construction of an additional hall, as well as fundraising to add computers and other IT-based teaching materials to the school’s resources, which may be wholly new to both students and teachers.

Building on the reputation of Finnish excellence in education, the Karika community sees itself as an example of how cooperation and partnership can develop the general level of education in South Sudan. Finn Church Aid hopes that the new school will show how local people can benefit from an education, and serve as a strong example for other communities.

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