

# Rising star

## Russian gas engine oil market looks set to expand

Russia, a major producer and exporter of natural gas, has the largest combined heat and power system in the world. Here, gas engine plants are becoming the power plant of choice as Russia works to upgrade its power generation infrastructure. Ahmad Zareh, Infineum EMEA Specialities Market Manager, explains how this trend impacts the region's gas engine oil market for reciprocating gas engines.

While the difficult economic climate slowed global electricity demand, data from the US Energy Information Agency (EIA), suggest the market will return to pre-recession rates by 2015. To meet this demand the EIA says world net electricity generation could increase by 87% from 18.8 trillion kilowatt-hours (tkwh) in 2007 to almost 35 tkwh in 2035.

Coal fired plants provide the largest share of world electricity generation. However, total energy derived from natural gas accounts for around 20%, and its use for electricity generation is gaining popularity because:

- Natural gas fired power generating plants are less capital intensive than plants that use coal, nuclear, or most renewable energy sources.
- Natural gas is a lower cost per unit energy than gasoline or diesel fuel.
- Natural gas has the lowest carbon footprint of all fossil fuels.

EIA's data suggest Russia produced over 23 trillion cubic feet (tcf) of natural gas in 2008. While production fell in 2009, owing to the economic downturn and the decline in natural gas demand, forecasts expect Russia's natural gas production to recover by 2015.

Construction of the first 1224 km Nord Stream export pipeline has been completed and when the system is fully operational the twin pipeline will supply over 1.9 tcf of Russian gas a year to the EU. However, with Russian pipeline exports to Europe down in 2009, many question the need for the additional export capacity. Despite this uncertainty Russia must invest in new fields because its three largest fields are in decline.

In the near term, as world economies begin to recover from the downturn, global demand for natural gas is expected to rebound, with supplies from a variety of sources keeping markets well supplied and prices relatively low.

### Infrastructure replacement

Currently, gas engine technology is experiencing a rebirth in Russia as gas engines are increasingly used in local low capacity power or combined heat and power (CHP) generation systems to resolve remote power supply problems. Isolated power generating units are built near energy consuming facilities (e.g. shopping centres and hospitals), which means there is no need to use expensive transmission lines and transformers. Gas engines are simple, fail-safe and effective, with an electrical efficiency of around 42% when using Russian natural gas.

With increased gas production, the replacement of aging infrastructure and the addition of new power generation systems the market for reciprocating gas engines in Russia is growing. Some analysts expect the number of operating gas engines to increase by more than 40% over the next five years.



Currently over half of the gas engines in Russia work on installed gas transmission compressors and most are supplied by the leading Russian gas engine manufacturer RUMO. The power generation and CHP segment is totally dominated by imported high performance reciprocating gas engines. Foreign suppliers are represented by a number of companies, among which GE Jenbacher and Caterpillar are the leaders. RUMO and these two foreign manufacturers currently hold a large proportion of the market.

### Gas engine oil market

Today the total market for gas engine oils (GEO) for reciprocating gas engines in Russia is estimated at 25,000 tons. The demand for GOST quality GEO is expected to decrease by 9% per year but this decline will be compensated by the strong growth of high quality GEO, where the compound annual growth rate is estimated at 16%.

Over 60% of the market is for gas transmission and this is currently served by domestic lubricant producers including TNK Lubricants and LUKOIL. The oils of choice in this market are relatively inexpensive Russian GOST quality oils. This is owing to the operators' desire to keep running costs down since a high level of oil is consumed during operation. However, many of these units are getting old and the current trend is to replace them with new imported equipment supplied by leading international OEMs, which require high quality lubricants. This is expected to lead to a dramatic decrease in consumption of GOST lubricants and a fast increase in consumption of more advanced, specialised gas engine oils.

Leading Russian oil marketers are focusing on developing higher quality and more profitable gas engine oils required by the modern high performance gas engines used in the power generation segment. A large proportion of imported GEO is supplied by ExxonMobil, Shell and Petro-Canada, and it is in these high quality imported oils that the growth is expected. Currently just over 60% of Russia's GEO is produced locally and almost 40% is imported. By 2015 this picture is expected to change dramatically, to just over 30% and well over 60% respectively.

### GEO formulation

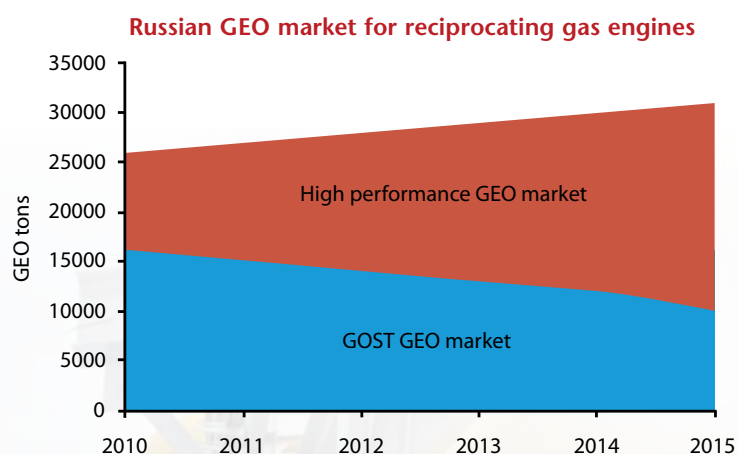
The performance of today's gas engine oils is predominantly dictated by the requirements of the engine manufacturers, based on engine operation and gas type, and their customers. The key OEMs supplying the Russian markets are GE Jenbacher, Caterpillar, Cummins, Perkins and Waukesha. These OEMs need to be able to offer long service intervals, reduced fuel consumption, prolonged engine life (even under extreme conditions) and trouble free operation to their customers.

There is no incentive in Russia to use alternative sources of gas, such as landfill

or biogas. However, Russian natural gas contains a higher level of sulphur, effectively classifying it as sour natural gas. Operating with this type of natural gas requires oils with higher base numbers (BN) and many major OEMs limit the amount of sulphated ash in GEO to maximum of 0.5 mass%, making the formulation of gas engine oils even more challenging.

Gas engine oils must be able to handle the high oxidation and nitration stresses of gaseous fuel while maintaining engine durability and reliability. They must be carefully formulated to make sure the ash content is correctly balanced so that valve seats are adequately lubricated whilst avoiding excess ash-based deposits forming on valve seats and in the combustion chamber, which can lead to valve torching and pre-ignition respectively.

We can be fairly sure that as gas engines become more powerful, hardware becomes more complex, emissions limits tighten, and specific lube oil consumption decreases, the stress on the lubricant will increase. Infineum has developed products using its unique salicylate chemistry to deliver the right level of protection so that gas engines running on Russia's natural gas can keep doing their job reliably for longer.



*The decline in demand for GOST quality oil will be compensated by the strong growth of high quality GEO*