Understanding sustainability

Sustainable development – human, social, economic and environmental – is integral to the Qatar National Vision 2030. Demonstrating its commitment to the strategy’s principles and policies, RasGas has become the first Qatari energy company to produce a sustainability report. This article, focusing on the environment, is an edited extract from the report.
RasGas is committed to the Qatar National Vision 2030 and long-term stewardship of Qatar’s natural resources. It has set a goal of zero incidents that affect the environment. As an LNG producer, RasGas contributes to sustainable development. To control the environmental, health and safety risks inherent in its business, RasGas has implemented policies, procedures and continuous improvement measures in areas such as flaring and waste management. RasGas is also involved in environmental and climate change debates in Qatar and catalyses developments through issuing papers, conducting conferences, providing expertise to government authorities, and working with regulators at the policy-making level.

Managing environmental performance
RasGas is proud to have developed a corporate environmental culture whereby environmental stewardship practices are integrated into all policy.

The principles of its environmental policies and systems cover:

- engagement with employees and the public on matters that may affect their safety, health and environment, planning, design, operations and the work ethics of all employees and contractors
- reduction of emissions/waste
- management of the efficient use of energy/ natural resources
- engagement with the government to foster timely development of effective safety, health and environment laws, regulations and standards based on sound science with consideration for risks, costs and benefits

RasGas’ management systems ensure its compliance with all relevant environmental laws and regulations, while the company is assiduous in complying with international standards and adopting best practices.

Mitigating climate change
In Qatar, gas production contributes to an increase in greenhouse gas (GHG) emissions. In line with Qatar’s commitment to minimise the impact of climate change, several ambitious GHG emission reduction programmes are being studied or have already been implemented.

It is a key priority for RasGas to do everything it can to mitigate climate change. It has a management approach to this effect and has implemented several initiatives and best practices. The company is addressing the impacts of its facilities and has already taken mitigation actions to reduce its carbon footprint, particularly through flare minimisation, waste recycling and carbon capture and storage.

Reducing greenhouse gas emissions
In 2009, although its operations expanded significantly, RasGas reduced its total GHG emissions as a percentage of weight on intake for the fourth consecutive year: 2009 emissions were 21 per cent, a 1.7 per cent improvement on 2008. It achieved this through reductions in flaring emissions and carbon capture and storage (CCS) developments. RasGas was judged best in class for GHG emissions (relative to total hydrocarbon production) in the 2009 PTAI benchmark.

In 2010 RasGas plans to continue implementing best practices for GHG emissions and developing a corporate GHG policy and strategy.

Flare reduction
Acknowledging that gas flaring is one of the main contributors to national GHG emissions, Qatar became the first GCC country to join the World Bank’s Global Gas Flaring Reduction project.

RasGas has developed a comprehensive flare minimisation plan that contributes to meeting Qatar’s objective of zero flaring. The plan optimises natural gas resource utilisation and reduces carbon dioxide (CO₂) emissions from flaring. It uses synergies between existing and new LNG operating units, innovative planning and the start-up of new facilities, and maximises the reuse of excess fuel gas streams.

RasGas is the first company in Qatar to use infrared cameras to spot leaks of volatile organic compounds

Carbon capture and storage
Unique in Qatar, a carbon dioxide capture and storage (CCS) facility has been operated by RasGas since 2005 as part of an acid gas injection scheme that also reduces emissions of sulphur dioxide, another key pollutant emitted by the natural gas industry.

About 1.1 million tonnes per year of carbon dioxide are captured by this facility, and the receiving geological reservoir is monitored through yearly campaigns using state-of-the-art microgravity sampling.

The injection of acid gases through AGI (acid gas injection) facility eliminates the emission of about 11,000 tonnes of sulphur dioxide each year.

Protecting air quality
To protect air quality, RasGas monitors all emission sources at least twice every quarter, double the operating permit requirement. Information from the monitoring is used to optimise equipment efficiency, while minimising emission concentrations.

RasGas’ Emissions Reduction Steering Committee has eight programmes to identify and define feasible air emission control initiatives. Teams are formed to address all emissions, using expertise from across the organisation.

In 2005, regulatory concerns regarding increasing ozone ground level concentrations prompted the need to develop refined air pollution modelling applications that would predict those levels, and advanced air pollution control technologies to limit emissions at source.

Continuous emissions monitoring systems (CEMS) are installed in Trains 1 to 5 and the Al Khaleej Gas phase 1 plant. RasGas has implemented quality assurance procedures for its CEMS which are aligned with United States Environmental Protection Agency guidance.

Retrofit of RasGas NOx control units
Nitrogen oxides and volatile organic compounds are precursors for ozone. In 2007, protection of air quality in the area of Ras Laffan and compliance with latest Ministry of Environment regulations led RasGas to retrofit its existing turbines and boilers with dry low NOx technology. The programme, a first of its kind in the region, demonstrates RasGas’ continuous efforts towards environmental protection. It is also an example of successful cooperation between industry and the regulators in Qatar. RasGas demonstrated its commitment to the environment by undertaking significant retrofitting activities for its older existing sources to meet or exceed the new nitrogen
RasGas has acted to reduce its carbon footprint, particularly through flare minimisation, waste recycling and carbon capture and storage.

oxide limit set by the Ministry of Environment for facilities built before 2005.

Figure 2 shows how the NOx regulatory limit for emissions sources has been reduced over the past decade as improved technologies have become available for new projects.

Leak detection and repair, and volatile organic compounds RasGas has implemented a plant-wide leak detection and repair (LDAR) programme that uses technologically advanced hand-held infrared cameras for leak identification of volatile organic compounds (VOCs – an ozone precursor).

RasGas is the first company in Qatar to use this technology, and is able to monitor piping and process equipment for leaks of volatile organic compounds at a significantly higher rate than using conventional methods and equipment. In 2009, RasGas monitored approximately 15,000 components.

In addition, RasGas and Qatargas are jointly developing a treatment facility to capture and dispose of VOC emissions from their common condensate loading berths.

Waste management RasGas is spearheading the effort to implement a waste management system in Ras Laffan Industrial City that meets residents’ needs as well as satisfying government regulations.

Massive volumes of waste must be dealt with at peak times (during equipment deliveries and shutdowns) and on a continuous basis.

RasGas is required by the terms of its environmental permits to establish waste reuse, recycling and minimisation programmes, and to report to the Ministry of Environment on the quantity and types of waste recycled.

The waste management and recycling programmes have been established to address the challenges resulting from a lack of markets in the Middle East in which to sell recyclables, and to put in place the appropriate waste collection infrastructure and dedicated personnel to develop and implement the programmes.

RasGas has taken a lead role in setting up Ras Laffan Industrial City’s (RLIC) Waste Management Facility and, together with RLIC and Qatargas, it has established the Ras Laffan Environmental Association.

Waste management programmes and recycling While waste recycling infrastructures and public awareness about recycling are still largely lacking in the region, numerous recycling and reuse opportunities are already available to minimise today’s resource consumption and prepare for tomorrow’s challenges. RasGas has stepped forward with the development and implementation of a comprehensive waste minimisation and recycling programme aimed at reducing or reusing industrial and domestic wastes generated at Ras Laffan and Doha facilities. This Corporate Waste Management Programme was initiated in 2009.

The Ministry of Environment has praised the success of this programme, and RasGas has been at the leading edge of waste recycling for LNG companies according to the PTAI benchmarking survey.

Use of resources
Energy consumption RasGas sources its energy from the national grid and generates its own power through fuel created in its plants. Its overall energy use has increased because of the recent expansion of its operations, but compared to similar sized plants in the oil and gas sector, RasGas has improved its energy efficiency for the third straight year since 2006. RasGas’ energy index of 93 in 2009 was lower than the industry average of 102 and puts RasGas’ performance in the top half of its peer group.

Water consumption RasGas’ primary process water source is seawater, which is used for cooling process equipment via a once-through cooling water system. The water is returned to a common cooling water channel that subsequently discharges into the sea.

The seawater channel outfall is monitored to satisfy Ministry of Environment requirements for a maximum 3°C differential from the average seawater temperature and residual chlorine of no more than 0.05 mg/litre. These standards have been promulgated by the Ministry of Environment to protect marine ecosystems for the Ras Laffan Port area.

In addition, RasGas has installed a network of 25 groundwater monitoring wells throughout its facility, analysing a large suite of chemicals to maintain continual vigilance on the transport of potential contaminants.

Protecting biodiversity and preserving Qatar’s national heritage
A significant proportion of the country’s energy deposits lie in the shallow waters near the coastline, and development of these offshore reserves is the foundation for the state’s economic future.

RasGas has therefore formed an alliance with Qatar University to develop special conservation measures to ensure that all coastal disturbances are temporary and minimal. Complete restoration and rejuvenation of any disturbed areas is a critical aspect of development projects.

Scientists from the Scientific and Applied Research Centre at the university have studied the Ras Laffan coastline for several years, providing essential information for the careful pre- and post-construction management of pipelines and other construction projects.

Turtle monitoring programme Recognising the importance of protecting endangered turtle species, RasGas is actively supporting the Ministry of Environment and Ras Laffan Industrial City’s annual monitoring effort at Ras Laffan’s northern beaches. Acknowledging a drop in the number of successful turtle nests, further efforts will be needed in the future to ensure nests are protected, light impact is minimised, and development of long-term turtle management plans is incorporated.

Archaeological findings While conducting an environmental baseline survey at Ras Laffan, RasGas discovered potential archaeological sites. For the first time in Ras Laffan, RasGas led a detailed archaeological survey with support from the Qatar Museum Authority and Ras Laffan Industrial City.

A total of 32 sites, mostly tent sites, were recorded and one temporary mosque structure was excavated and transferred to the museum. Identification and study of such sites provide valuable information on the tradition and spatial organisation of Arabic camp sites during the past 300 to 400 years.