



COUNTRY SUSTAINABILITY REPORT

UNITED ARAB EMIRATES - ABU DHABI



ABOUT THIS COUNTRY REPORT

This Report is part of a series of Local Sustainability Reports that Saipem began publishing in 2003 as 'Sustainability Case Studies' with the purpose of underlining the importance the Company ascribes to local business sustainability.

These Reports are also submitted to the relevant stakeholders, so they can assess the sustainability approach Saipem adopts in their respective areas.

A Country Report describes the principles, activities and performance of Saipem in relation to sustainable development in the country. It is designed to provide easy access to key indicators and information and is divided into two parts: the first provides an overview of Saipem and its business around the world, while the second introduces the country, and discusses Saipem's presence, sustainability approach and sustainability performance within it.

Along with the annual Sustainability Reports and the Project Sustainability Reports, the Country Sustainability Reports represent the main tools adopted by Saipem to communicate to all stakeholders the Company's commitment and performance with regard to sustainability.

This Report has been drafted in line with the principles of materiality, stakeholder inclusiveness, sustainability context and completeness as defined in the Global Reporting Initiative (GRI) version G3.0.

The document aims to describe Saipem's performance and its engagement with stakeholders in the Abu Dhabi Emirate of UAE. A set of Key Performance Indicators (KPIs) was selected to bolster the information provided to stakeholders.

The consolidation perimeter is based on the principles adopted for financial reporting and annual sustainability reporting and refers to all projects conducted by Saipem SpA and its Operating Companies in Abu Dhabi.

Data are calculated according to the operational criterion, meaning that operations in which Saipem SpA or one of its Operating Companies in Abu Dhabi Emirate exercises operational control are reported 100%. Data for the Company's performance reported in the document have been drawn from the management and reporting systems used by the various Company functions involved in the reporting process. Data are reported for the 2013 financial year and, when appropriate, also for previous financial years.

Published in 2014

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MESSAGE FROM THE CEO



Umberto Vergine

Saipem is an international Oil&Gas contractor with approximately 52,000 employees and operations in more than 60 countries.

Saipem plays a significant role in its market sector and contributes substantially to the economic development of the countries in which it operates. We consider business sustainability to be an integral part of our strategy.

Our commitment is to create long-term value for all our stakeholders, especially locally, by identifying common goals and agreeing on specific initiatives. Given

the wide range and complexity of our activities, our engagement with local stakeholders requires a comprehensive approach to sustainability. Furthermore, the variety of projects undertaken and the differences between countries where these activities are performed demand that a distinctive local approach be developed.

We publish these Reports on our Local Business Sustainability in order to favour open dialogue and enhance the development of local relationships, helping us to ensure that we operate at all times in an increasingly sustainable manner.

MISSION

Pursuing the satisfaction of our clients in the energy industry, we tackle each challenge with safe, reliable and innovative solutions. We entrust our competent and multi-local teams to provide sustainable development for our company and the communities in which we operate.



LETTER FROM THE MANAGEMENT



CONTRIBUTING TO SUSTAINABLE DEVELOPMENT IN ABU DHABI

Once a quiet pearling and fishing community in the heart of the Arabian Gulf, Abu Dhabi is now an Emirate, capital of the UAE and one of the world's major oil producers. It offers extraordinary business opportunities to Oil&Gas contractors as part of its pursuit of sustainable social and long-term economic growth.

This Report goes back over Saipem's presence in the Emirate since the 1970s,

weighing up some of the most challenging projects carried out by the Company and describing the culture and values it applies when designing, optimising and executing its activities.

This durable and stable presence in the country can be explained by the distinctive approach to sustainability typical of Saipem, which is that of integrating into local areas and communities and benefiting from the trust of its stakeholders.

With its Customer centred attitude, Saipem has succeeded in building long-lasting relationships based on transparency, trust and cooperation. Proof of this can be seen in the list of projects carried out by Saipem for National (ADNOC and its subsidiaries) and International Oil Companies in Abu Dhabi.

Saipem's Partners, Suppliers and Subcontractors are also fundamental to its success. The Company is committed to nurturing and improving mutual long-term understanding and trust with the enterprises who work with and for it. Saipem strongly believes in acting as an integrated team with its Partners, Suppliers and Subcontractors. To this end, it organises regular meetings and events to align efforts, share difficulties and experiences and invest in training and continuous improvement.

As regards its People, a highly qualified international team, these are the Company's most valuable asset. Saipem endeavours at all times to motivate its personnel, so that everyone can do their best, gain from experience and grow together within the Company. It does this by offering staff a challenging working environment as well as proper and valuable training, in such a way that they can perform their duties in safety while developing their skills and competences on a daily basis.

Saipem also strives to ensure that for no reason whatsoever will the health and wellbeing of its workers be compromised, regardless of the extremely harsh circumstances or high pressure to which they may be exposed. While, to be sure, all of this requires considerable commitment and effort, the Company is convinced that this is the only way forward.

Last but not least, there is Saipem's respect for the environment and for local communities. The Company is fully pledged to reducing its footprint by containing consumption, in particular by reusing water, one of the most vital resources in a desert environment.

These and many other subjects are discussed in this Country Sustainability Report, which shows Saipem's strong undertaking to maintain and reinforce its presence in Abu Dhabi while at the same time contributing to the country's massive but sustainable growth.

Stefano Grandino

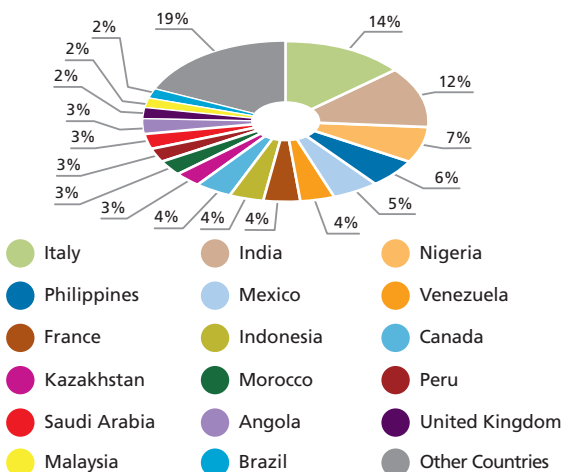
Saipem Abu Dhabi Branch Manager, Shah Gas Development Project Director

INTRODUCTION TO SAIPEM

Saipem is an international group with a strong inclination towards Oil&Gas related activities in remote and deepwater areas. The Company began operations in the 1950s and is now a

leader in the provision of engineering, procurement, project management and construction services with distinctive capabilities in the design and execution of large-scale offshore and onshore projects.

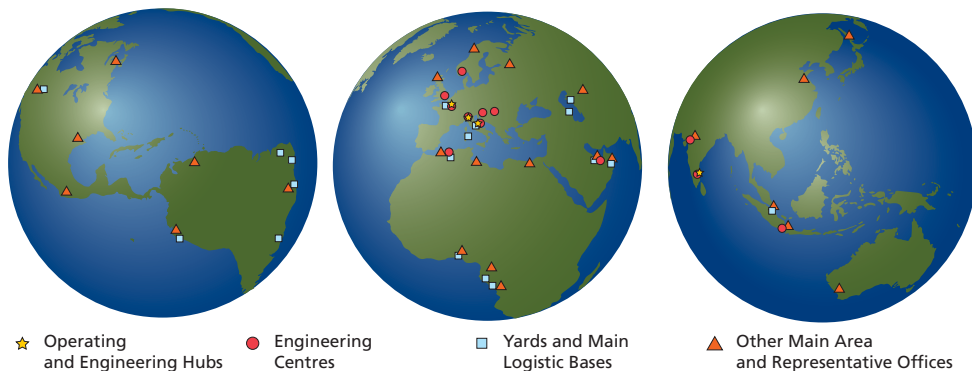
Saipem workforce distribution by nationality (2013)



Saipem operates in the Engineering & Construction and Drilling businesses.

It enjoys a significant competitive position in the provision of EPCI/EPC services to the oil industry both onshore and offshore, with a particular focus on the toughest and most technologically challenging projects, namely, activities in remote areas, deep waters and difficult oil fields. The Group is a truly global contractor, with a strong local presence in strategic and emerging areas such as West Africa, the Americas, Central Asia, the Middle East, North Africa and Southeast Asia.

Saipem is an international company employing over 52,000 people from approximately 126 nationalities (2013). The majority of the Group's human resources (77% in 2013) are locally employed.



SAIPEM SUSTAINABILITY APPROACH

Saipem believes that a correct, open and cooperative relationship with all stakeholders is vital for the success of each project. Saipem is present in many locations around the world and operates with a decentralised organisation in order to respond to local needs and sustainability requirements.

Wherever it works, the Company plays an active role in local communities by offering employment opportunities and personnel training, working effectively with local suppliers and subcontractors, creating economic and social value and, finally, contributing to infrastructures such as access roads, and construction

camps with facilities such as hospitals, power generators, and so forth.

The breadth of Saipem's international workforce is another facet of sustainability: all personnel are treated with dignity, and their rights, cultural values, local customs and traditions, diversity and identity are at all times respected.

For each project, social, economic and environmental impacts are evaluated and continuously monitored in conjunction with the pursuit of customer satisfaction.



SAIPEM AT A GLANCE

Saipem has world class engineering and project management expertise together with a strong, technologically advanced and highly versatile fleet. The Company operates in the Engineering & Construction and Drilling businesses.

Onshore, Saipem mainly serves the Oil&Gas segments, the refining and petrochemical markets, as well as a number of diversified industrial markets such as infrastructures (i.e. high speed railways, port facilities and marine terminals) and environment (especially remediation of soil, ground water and contaminated sites).

Saipem offers a complete range of services, from feasibility and front-end studies to design, engineering, procurement and field construction, most often on an EPC (Engineering, Procurement and Construction) and LSTK (Lump Sum Turn Key) contractual basis, for complex Oil&Gas facilities, including production, treatment, liquefaction, refining and petrochemical plants, as well as for Oil&Gas transportation systems, such as pipelines, pumping and compression stations and terminals.

Saipem's expertise focuses on the design and execution of large projects with a high degree of complexity in terms of engineering, technology and project management, with a strong bias towards challenging projects in the most difficult

environments and remote areas.

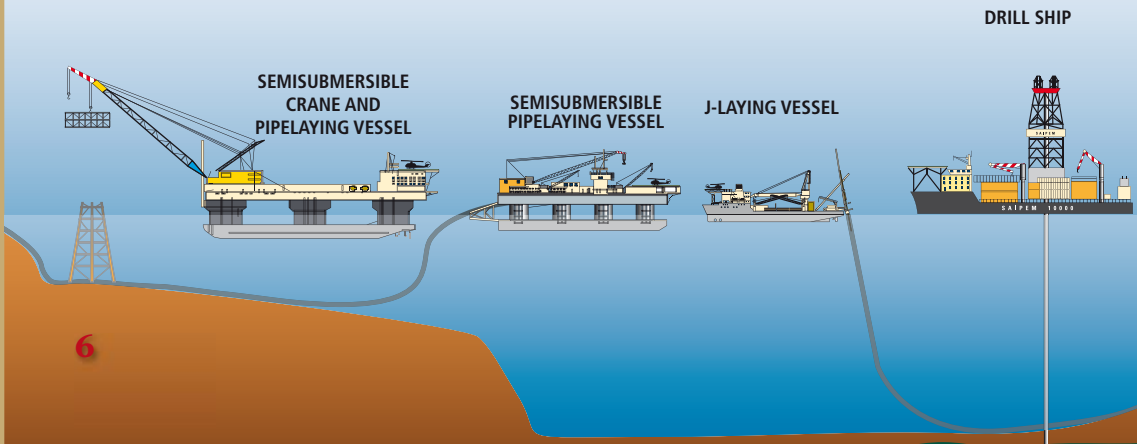
Saipem has designed and built numerous 'mega' Oil&Gas production facilities, 36 grass-roots refineries and more than 500 individual refining process units, as well as more than 400 plants worldwide to produce chemicals from natural gas, including the world's largest ammonia/urea complexes.

In particular, land pipeline design and construction has historically been one of the mainstays of Saipem's business. The Company has laid a record of over 60,000 km of gas pipelines, 30,000 km of oil & product pipelines and 1,400 km of water pipelines on five continents.

In recent years, the Company has designed and constructed more than 40 power plants (over 10,000 MW) and four Integrated Gasification Combined Cycle plants, two of which are the world's largest (power output of about 550 MW each).

Offshore activities include platforms, marine terminals, pipelines and the development of deepwater fields.

Experience in EPCI (Engineering, Procurement, Construction and Installation) projects hinges on trunklines, export pipelines, infield flowlines, pipe-in-pipe systems, bundles, tie-ins and riser systems for the transportation of oil, gas and multi-phase products from depths in excess of 2,000 metres.



With a fleet of over 40 construction vessels, the Company is a leader in deepwater and shallow water pipelaying and platform installation with more than 30,000 km of sealines and more than 2.5 million tonnes of offshore structures installed. The Company has completed more than 100 major EPCI projects, including several challenging large-scale integrated complexes.

Saipem is also involved in the construction of marine terminals, mooring systems with conventional buoys, wharfs and jetties. All of this is bolstered by significant fabrication capabilities based in the heart of major Oil&Gas provinces such as Angola, Canada, Republic of the Congo, Kazakhstan, Nigeria, United Arab Emirates, the Mediterranean Sea, Indonesia and Brazil (under construction), with an aggregate in-house fabrication capacity of over 250,000 tonnes per year.

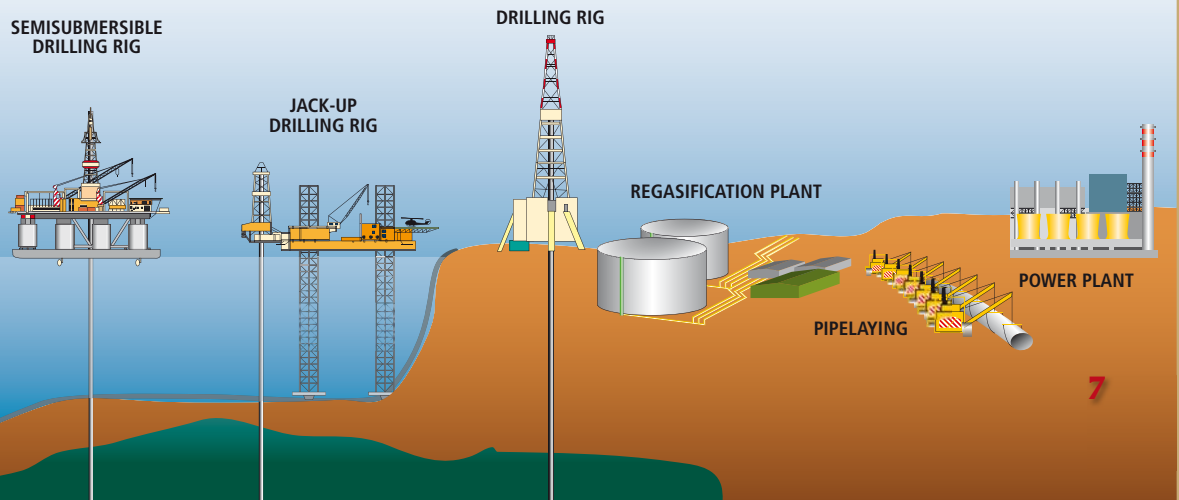
In addition to that, the design, construction or conversion of floating production units have become one of Saipem's main business since the early nineties. Thanks to the development of competitive technical solutions, relationships with key players and presence in strategic markets, together with its unique EPCI experience and track record of four new-builds and

seven conversion projects, Saipem has become a reliable general contractor to provide floating solutions worldwide. As an international drilling contractor operating in some of the harshest onshore and offshore environments, Saipem is presently contracted to major oil companies in many of the Oil&Gas industry's 'hotspots', carrying out important drilling programmes in Europe, the Commonwealth of Independent States (CIS), North and West Africa, the Middle and Far East and the Americas.

Saipem's vast experience in managing drilling activities with an adequate technological and operational level has allowed the Company's capabilities to develop.

In offshore drilling, the Company in fact boasts a rich fleet with six jack-ups, a Tender Assisted Drilling Barge, seven semisubmersible drilling rigs and two drillships (the Saipem 10000 and the Saipem 12000) which can operate at depths of up to 10,000 and 12,000 feet, respectively. In the onshore sector, Saipem owns about 100 drill and workover rigs.

Over many decades, Saipem has drilled more than 7,300 wells, 1,800 of which offshore, totalling an overall depth of about 18.5 million metres, and has been involved in the workover of hundreds of wells.



SAIPEM IN THE WORLD

EUROPE		2011	2012	2013
Revenues	(€ million)	1,938	1,781	1,593
Investments	(€ million)	78	31	34
Workforce	(units)	10,410	11,133	10,364
Local Workforce	(% of total)	81	75	84
Energy consumption	(ktoe)	72	98	74
HSE Training	(hours)	86,465	129,309	55,655

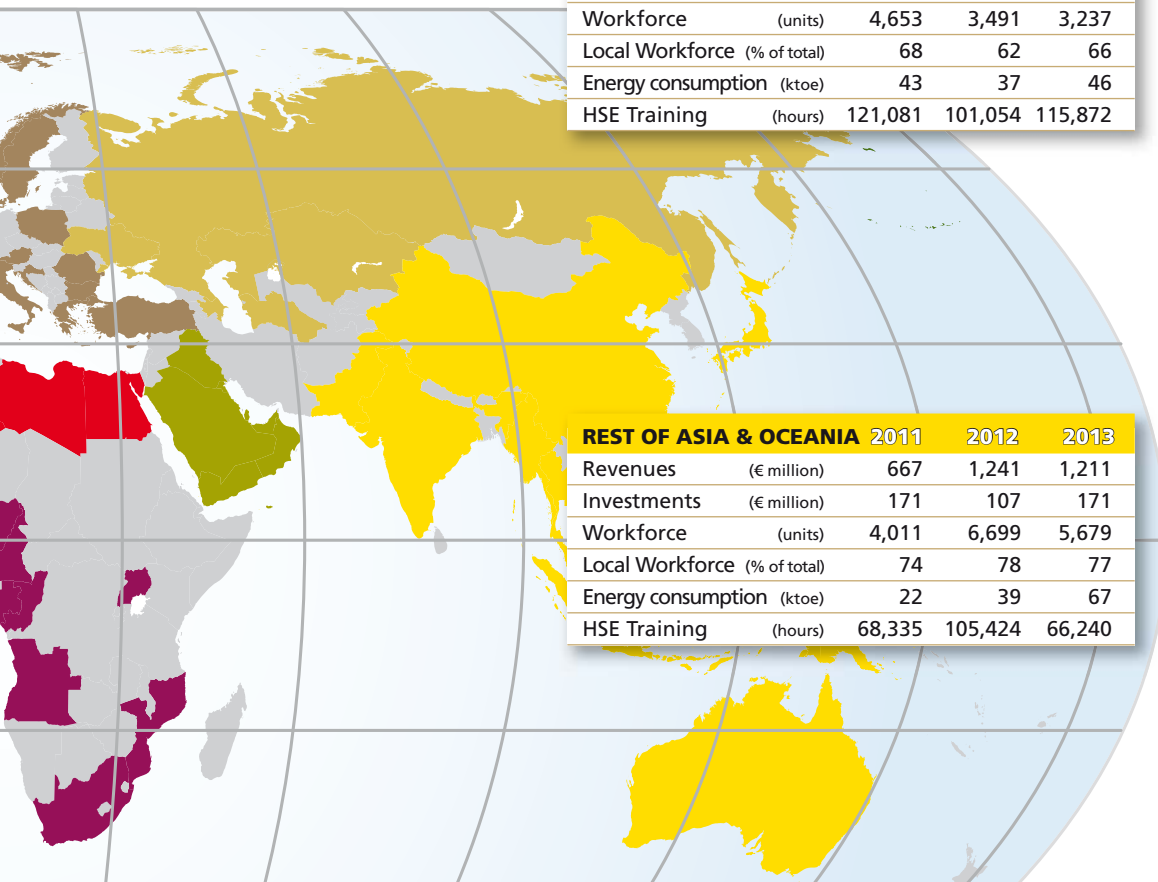
AMERICAS		2011	2012	2013
Revenues	(€ million)	1,009	1,808	2,371
Investments	(€ million)	158	136	256
Workforce	(units)	6,665	7,825	12,168
Local Workforce	(% of total)	87	88	84
Energy consumption	(ktoe)	82	101	115
HSE Training	(hours)	204,199	225,351	241,955

CENTRAL & SOUTH AFRICA		2011	2012	2013
Revenues	(€ million)	2,692	2,482	2,392
Investments	(€ million)	16	8	19
Workforce	(units)	8,462	7,586	8,563
Local Workforce	(% of total)	62	64	58
Energy consumption	(ktoe)	107	84	112
HSE Training	(hours)	170,316	146,551	104,332

NORTH AFRICA		2011	2012	2013
Revenues	(€ million)			
Investments	(€ million)			
Workforce	(units)			
Local Workforce	(% of total)			
Energy consumption	(ktoe)			
HSE Training	(hours)			

Additional data for investments

Further investments not allocated to a specific area amounted to (in € million) 738 in 2011, 717 in 2012 and 400 in 2013.



CIS		2011	2012	2013
Revenues	(€ million)	1,709	1,352	1,267
Investments	(€ million)	27	13	17
Workforce	(units)	4,653	3,491	3,237
Local Workforce	(% of total)	68	62	66
Energy consumption	(ktoe)	43	37	46
HSE Training	(hours)	121,081	101,054	115,872

REST OF ASIA & OCEANIA		2011	2012	2013
Revenues	(€ million)	667	1,241	1,211
Investments	(€ million)	171	107	171
Workforce	(units)	4,011	6,699	5,679
Local Workforce	(% of total)	74	78	77
Energy consumption	(ktoe)	22	39	67
HSE Training	(hours)	68,335	105,424	66,240

2011	2012	2013
2,531	1,494	701
11	3	11
4,523	4,379	3,113
83	85	83
73	66	27
155,568	123,113	34,825

MIDDLE EAST		2011	2012	2013
Revenues	(€ million)	2,047	3,211	2,721
Investments	(€ million)	-	-	-
Workforce	(units)	5,508	7,342	9,033
Local Workforce	(% of total)	78	82	82
Energy consumption	(ktoe)	129	168	180
HSE Training	(hours)	383,856	856,456	904,532

ABU DHABI EMIRATE



COUNTRY OVERVIEW

Abu Dhabi is the largest of the seven Emirates and is federal capital of the United Arab Emirates. The Emirate comprises 200 islands and has a 700 kilometre coastline. Abu Dhabi is the seat of

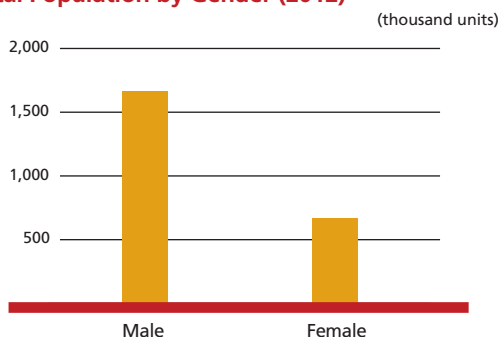
the United Arab Emirates Government. Its rapid development and urbanisation, coupled with the relatively high average income of its population, has transformed it into a large and advanced cosmopolitan metropolis.

One of the world's largest producers of oil, Abu Dhabi alone generated 57% of the GDP of the United Arab Emirates in 2008. It has actively attempted to diversify its economy in recent years through investments in financial services and tourism.

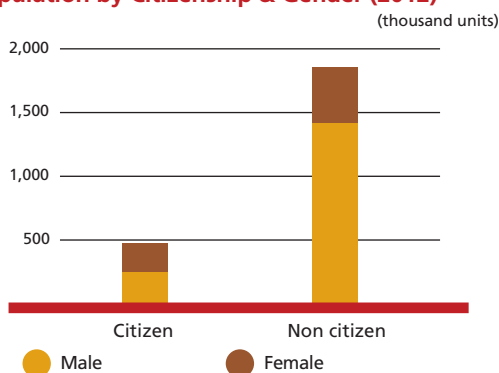
SOCIAL OVERVIEW

For the Emirate of Abu Dhabi in particular, and the United Arab

Total Population by Gender (2012)



Population by Citizenship & Gender (2012)



Emirates in general, the population issue undoubtedly presents a daunting challenge from a social, cultural and security point of view.

According to the 1975 Census, the total population of the Abu Dhabi Emirate was 211,812. In Mid 2012 it was estimated to be 2,334,563, with an average annual growth rate of 7.7%, considered one the highest population growth rates in the world.

The evolution taking place in the size and composition of the Emirate's population has been largely influenced by the increasing waves of immigration over the past five decades, especially with regard to males of working age.

More than 71% of the population are males, due to an influx of migrant workers.

Of the total population of the Emirate of Abu Dhabi, only 476,722 people (20%) are Emirati citizens.

Over the past decades, the government of Abu Dhabi has adopted plans and strategies designed to bring education into line with international standards and boost related policies and future objectives. By way of implementation of its educational strategy, and in order to achieve its goals of building the nation's future generations, the government has established schools and universities and provided them with teaching and administrative staff and advanced teaching aids. Thanks to this focus on education, the illiteracy rate declined



The Sheikh Zayed Grand Mosque

from 23% in 1995 to 21% in 2001, 13% in 2005 and 7.5% in 2011. Health services in Abu Dhabi have experienced remarkable expansion and transformation over the past 20 years. This is most evident in the significant rise in the number of hospitals and other health facilities over this period, all of which goes to show that the Emirate is still striving for world standards in health care.

Due to the ongoing economic growth of Abu Dhabi, the Emirate has seen a significant increase in the labour force, which grew from 297,406 in 1985 to 815,311 in 2005 (according to the population censuses taken in those years). In 2011, it was estimated at over 1.4 million people, of whom 132,000 were Emirate citizens (94,500 male, 37,500 female), while the figure for non-citizens was 1,311,800 (1,131,800 male, 180,000 female). Of the total labour force (68% of the

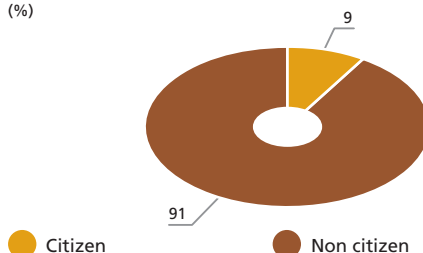
total population), only 9% are citizens, whereas 15% are female.

ECONOMY OVERVIEW

Economic reform in the Emirate of Abu Dhabi has been of crucial concern to political leaders aiming to achieve progress and development. Over the past few years, the Emirate of Abu

Labour Force Structure (2011)

(%)



Social indicators (2011)

Literacy level	(%)	92.5
Number of pupils per school (2011-2012)	(No.)	689
Number of hospitals	(No.)	35
Number of physicians per 1,000 inhabitants	(No.)	2.3

Economic indicators (2013)

GDP at current prices	(million AED*)	911,591
Gross fixed capital formation	(% of GDP)	18.9
Oil's share in GDP	(%)	56.5
Inflation rate	(%)	1.1

* United Arab Emirates Dirham.

Dhabi has accounted for approximately 60% of the GDP of the United Arab Emirates, while its inhabitants constitute only 34% of the total UAE population. Given the strong political commitment to success, coupled with economic advancement in all directions, wise economic policies, the business environment, the financial surpluses, the advanced infrastructure, and the political stability and security the Emirate enjoys, the economy of the Emirate of Abu Dhabi has come to occupy a unique position in the region. Indeed, the Emirate is moving confidently towards the goal of bringing about a radical transformation in the structure of the local economy. Oil was first discovered in the Emirate in 1958. Since then Abu Dhabi has become one of the world's major oil producers. The Emirate's annual production of crude oil was 948,200 thousand barrels in 2012, while the annual production of natural gas rose by 21% to 2,791,815 million cubic feet that same year. The annual production of refined petroleum products totalled

20,658 thousand metric tons in the same period. Over the last few years, Abu Dhabi's economy has transformed from one mostly dependent on public sector spending (directly affected by fluctuating oil revenues) to a diversified economy comprising a variety of key activities. In light of the extensive efforts of the Emirate of Abu Dhabi, nonoil sectors have emerged as a significant part of economic development, playing an important role in the structure of GDP. The industrial sector in the Emirate of Abu Dhabi has witnessed major growth, as seen in the increasing number of industrial establishments and the expansion of their investments into various other fields. In addition, the Emirate has become actively involved with several multinationals in major industrial joint ventures, and has established large-scale state-of-the-art industrial zones to attract more investments to the industrial sector. In the field of tourism, Abu Dhabi is witnessing a broad and highly significant boom which should put

The Abu Dhabi Economic Vision 2030

The year 2030 represents an important milestone for the Emirate of Abu Dhabi. In its endeavour to ensure the continued success of the Emirate's development, the government's Policy Agenda has set guidelines and priorities for socio-economic progress. With these as its parameters, the Abu Dhabi Economic Vision 2030 has been developed by the government, in consultation with the private sector, as a long-term strategy to ensure that all stakeholders in the economy are moving in concert, with a clear view of future goals.

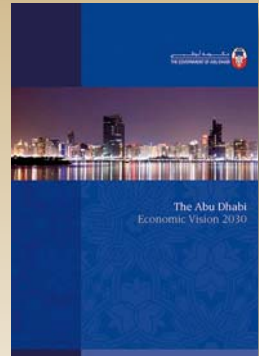
The Abu Dhabi Economic Vision 2030 aims to achieve effective economic transformation of the Emirate's economic base and to bring about global integration and enduring benefits for all. This will be

achieved by broadening the sectors of economic activity, enlarging the enterprise base and expanding into external markets.

Abu Dhabi will continue to enhance competitiveness and improve productivity. Moreover, to ensure that social and regional development reaches the whole of society equitably, the Emirate will equip its youth in such a way that they can enter the workforce, maximising the participation of women, particularly nationals, from across the Emirate. Abu Dhabi will also seek to attract a skilled workforce from abroad and stimulate faster economic growth in regional areas.

To achieve the Emirate's ambitious economic aspirations, the regulatory and legislative environment must be

optimised, importing best practices from around the world and applying them to the local context. Various resources, from infrastructure to human and financial capital, must also be provided to support the future economy and the climate in which it can thrive.





Desert environment

the Emirate on the world tourist map. The importance of this sector in supporting and diversifying the economy, driving growth, and boosting development in other activities, cannot be overestimated.

ENVIRONMENT

The Emirate of Abu Dhabi constitutes about 87% of the total area of the UAE (excluding the islands) and contains different geographic provinces, including coastal areas, inner desert areas and highlands, each enjoying varying temperatures.

The Tropic of Cancer runs through the southern part of the country, giving the Emirate a tropical desert climate with hot summers and moderate winters.

In 2012, average temperatures ranged between 18° C in January and 37° C in July, with an average humidity of 53 per cent.

Due to the characteristics of the territory, main environmental issues are related to water scarcity (the Emirate suffers from a lack of rain throughout the year), high soil salinity, elevated

temperatures and high humidity.

The Emirate of Abu Dhabi is concerned to achieve notable developments in the fields of environmental protection and conservation of natural resources. Indeed, government policies and programmes reflect the increasing awareness of the need for a better and cleaner environment.

The demand for electricity, and hence the consumption of fuel, is increasing due to population and economic growth. Power plants use different types of fuel to generate electricity, such as natural gas, crude oil, gas oil (diesel) and fuel oil. Due to economic and environmental considerations, natural gas is the main fuel used in power generation in the Emirate of Abu Dhabi, constituting 99.7% of the total fuel types used.

Water consumption in the Emirate, constantly on the increase, and one of the highest in the world due to high temperatures and continuous irrigation to maintain greenery, reflects the growth in the Emirate's population. Consumption of desalinated water has increased by 59% since 2005. However, there is a pressing need to

Environmental indicators (2012)

Average temperature	(°C)	28.2
Average rainfall	(mm)	9.6
Electrical consumption per capita	(MWh)	20.18
Desalinated water consumption - daily per capita average	(cubic metres)	1.24

disseminate a culture of conservation among consumers so as to prevent the depletion of this valuable resource.

According to a survey conducted by the Environmental Agency in 2009, the area covered by mangrove forests in the Emirate of Abu Dhabi (coasts and islands) amounted to 74,305 km².

There are three officially declared protected areas covering a total of 6,306 km², in addition to other proposed locations awaiting a declaration. These three protected areas account for about 5% of the total area of the Emirate of Abu Dhabi.

One of the three protected areas is the 592 km² Baynounah Forest (also known

as the Houbara Protected Area), located 15 km east of Ruwais. The primary purpose of this area is the protection and conservation of the Macqueens Houbara Bustard, a vulnerable and captive bred species. It also serves to house captive bred gazelles. Finally the area supports a wide array of flora and fauna, several of high value. The Railway Project led by Saipem in the Emirate passes through it from the western to the north-eastern boundary (see page 36).

*Source: Statistics Centre Abu Dhabi
<http://www.scad.ae/en/Pages/default.aspx>*

Baynounah Forest



SAIPEM'S PRESENCE IN ABU DHABI

Saipem has a long-term history in the Middle East and, in particular, in the Emirate of Abu Dhabi, where its well-established presence dates back to 1970s.

Saipem has carried out numerous large-scale engineering, EPC and drilling projects, both onshore and offshore, providing engineering, procurement, construction and installation services. That is why Saipem is today one of the main Oil&Gas contractors in the Emirate.

The Saipem subsidiary, Saipem SpA Abu Dhabi Branch, located in Abu Dhabi, supports local projects with a variety of in-house competences: Operations, HR, Procurement, Quality, HSE, Administration, and Finance & Control. At present, Saipem is leading several of the most important and large-scale EPC projects in the country, such as the Shah Gas Development Programme and the first UAE Railway.

MAIN PROJECTS IN THE COUNTRY

Some examples of the most important past and present Engineering and EPC Projects are reported below.

Onshore

Over the past 40 years, Saipem has designed and built several projects at the cutting edge of technology and execution complexity. These have mainly been for the National Oil Co, but also for the government, and include the Abu Dhabi Acid Gas Removal Plant developed between 1967 and 1969 for the Public Works Department and the Taweelah Water Transmission Scheme (Pumping Stations and Reception Complex) developed

between 1994 and 1998 for the Water Electricity Department.

As regards engineering services, Saipem (previously Snamprogetti SpA) has executed several projects for the Abu Dhabi National Oil Co (ADNOC), such as the Grass Roots Refinery (1977-1982 and Vacuum Unit Revamp 'Phase 2' 1995-1997), the Hydrocracking Project (1982-1985 and subsequent modification in 1990-1991) and the Sulphur Granulation Plant in the Ruwais area, the Gas Injection Pilot Plant in the Bu Hasa Oilfield (1985-1989), the Umm Al Nar Refinery Expansion Project (1990-1993) and the Jarn Yaphour Field development (1991-1993).

For the ADNOC, Saipem has carried out engineering, procurement and construction of the Gas Pipelines Bab-Maqta-Taweelah (1994-1997) and Jabel Dhannah-Mirfa (1995-1996) and Asab Gas Development Plant (1997-2001) and Ruwais Refinery Expansion Project - Condensate Processing (1997-2000).

In 2001, Saipem did the Front End Engineering Design for the upgrade of Bu Hasa Production Facilities on behalf of the Abu Dhabi Co for Onshore Oil Operations (ADCO). Again for ADCO, between 1998 and 2001 Saipem realised EPC Projects such as the Sahil Field Development 'Phase 1' (1996-1998) and OGD (Onshore Gas Development) 'Phase 2' - Gas Gathering System (130 km) and trunklines (95 km).

The most recent engineering and EPC Projects, both ongoing and completed, are reported in the table below.

Offshore

In the offshore field, Saipem has worked both for National Oil Companies such as Abu Dhabi Gas Industries (GASCO), ADMA-OPCO (Abu

MAIN PROJECTS IN THE COUNTRY (2010-2013)

Name	Years	Client	Project description
Ongoing FEED & EPC Projects			
BeATT Expansion Project	2013	Takreer	Front End Engineering Design (FEED) for the expansion of the BeATT (Central Environmental Protection Facilities) for the safe treatment and disposal of hazardous industrial waste generated by the various operating companies in the Ruwais Area.
Shah-Habshan -Ruwais Railway	2011-2014	Etiihad Rail Co	Engineering, Procurement Construction and T&C of a railway line linking the natural gas production fields of Shah and Habshan to the Port of Ruwais, covering a distance of over 260 kilometres. At full capacity, the railway will transport over 7 million tonnes per year of sulphur from the gas treatment processes. (see page 36)
Shah Gas Development Programme	2010-2014	Abu Dhabi Gas Development Co Ltd	Engineering, Procurement and Construction of a gas process plant, a sulphur recovery unit and 250-kilometre long pipelines for transporting gas, condensate and NGL from the Shah Gas plant to Habshan. The Plant will treat and export 1 billion cubic feet a day of sour gas from the Shah field and produce 5,300 tonnes a day of NGL. (see page 19)
Completed EPC Projects			
Ruwais 3 rd NGL Train Project	2005-2009	Gasco - Abu Dhabi Gas Industries Ltd	Engineering, Procurement and Construction of a single treatment train with a processing capacity of 24,400 t/d of NGL. NGL feedstock is supplied from OGD III Plant in Habshan fields and AGD II from Asab Area.
BU HASA Facilities Development Project - Gosp (730,000 bopd)	2003-2008	Abu Dhabi Co for Onshore Oil Operations (ADCO)	Engineering, Procurement and Construction of: <ul style="list-style-type: none"> • Wellhead facilities (13 gas injectors, 8 water injectors and 10 Water Alternating Gas); • Flowlines and injection headers lines from 3' to 10'; • 6 water clusters (1.5 MW injection pump each); • 5 Oil Production Train (150,000 b/d each); • Gas Injection (400 bar; 25 MW variable speed electric motor driven compressor); • Telecommunication and SCADA facilities.
Ongoing Drilling Projects			
Perro Negro 2	2010-2013	NDC/Total	Offshore drilling
Perro Negro 3	2013-2014	NDC	Offshore drilling

Dhabi Marine Operating Co), NPCC (National Petroleum Construction Co) and International Service Providers such as ABB.

Saipem started in 1974 with the installation of a 210 kilometre sealine in Umm Shaif, in the El Banduk Fields, on behalf of ABB.

In 1975, Saipem installed 7 kilometre

flare lines on Das Island for ADMA, and in 1976, 69 kilometre flow lines, with diameters ranging from 6' to 48' and 24 risers in water depth 20 metres (1976).

Both projects were realised using the Castoro 5 Pipelay Barge.

In 1994, Saipem worked for NPCC at the Umm Shaif Gas Development, providing installation of decks.



Project Plot Plan

The biggest offshore project ever carried out in Abu Dhabi was for GASCO between 1978 and 1981. On that occasion, Saipem was in charge of Project Management, Material Procurement, Steel Fabrication, Steel Erection and Piling Marine Works for LNG Products Marine Loading Facilities, comprising a 2,800-metre long jetty for berthing LNG carriers of up to 125,000 deadweight tonnage (DWT) and 18,000 tonnes of steel structures and piping.

Sea water intake facilities include two 10 m diameter and 8 m high mushroom shaped submerged intake heads to an 8 x 40 m onshore underground concrete basin and 2,000-metre long concrete culvert, carrying the outgoing water to an outfall concrete structure.

The offshore projects ongoing in Abu Dhabi pertain to Drilling.

Drilling

Thanks to its state-of-the-art drilling fleet and excellent technological and operational level, Saipem has been awarded several onshore and offshore drilling contracts in Abu Dhabi. Between 1973 and 1983 Saipem drilled 18 wells onshore totalling 59,740 metres. Saipem works for both National Oil Companies, such as the Abu Dhabi Company for Onshore Oil Operations (ADCO) and the National Drilling

Co (NDC), but also for International Oil Companies such as Total and ConocoPhillips.

At present, Saipem's drilling jack-ups Perro Negro 2 and Perro Negro 3 are involved in the Persian Gulf on two offshore drilling contracts for NDC and Total.

RELATIONS WITH CLIENTS

The Customer Satisfaction (CS) system is vital for supporting Customer relationship management and continuous improvement of the organisation.

Saipem defined a Customer Satisfaction methodology in 2004, and this has been applied in different ways by projects and operating companies within the Group. The process is based on three steps:

1. Measure, from the perspective of CS, the operative and management performances of a project, from the time of contract award up to handover.
2. Identify existing gaps between the Client's expectations and perceptions regarding the quality of products and services.
3. Specify the reasons for dissatisfaction which constitute the basic information required to activate continuous improvement.



View of the Shah Gas Plant

To monitor information and collect feedback from Clients, Saipem has developed a questionnaire to evaluate its reliability, analyse strong and weak areas and evaluate technical competences through representation of a degree of satisfaction for each single technical discipline.

Information is then shared with the Commercial department and with each single discipline to facilitate adoption of remedial action that will lead to improvements in Saipem's performance.

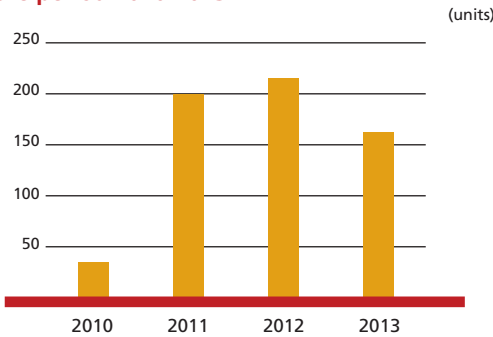
At present, data available for Abu Dhabi comes from ADCO, GASCO, Takreer and Total.

The results of the questionnaires show a good general level of satisfaction, especially for Engineering, Operations, Project Management and Commissioning processes.

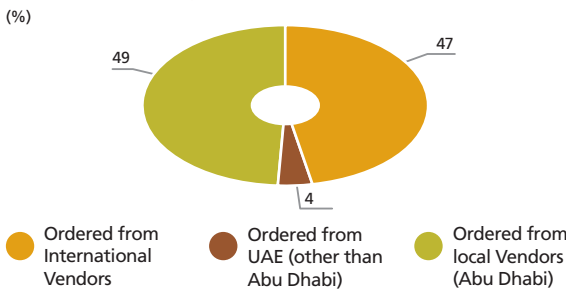
The main strengths identified by Customers are in relation to Project Management capabilities, QA/QC management and implementation of HSE practices during Project Execution, adequacy of vessels, fleets, rigs and equipment and a positive attitude for interaction and communication, teamwork and collaboration.

Main improvement areas refer to observance of contractual milestones in terms of timing, subcontractor related activities (selection, and monitoring of quality of services), the adequacy of project documentation and document traceability, and management of maintenance work.

New qualified local vendors in Abu Dhabi in the period 2010-2013



Total ordered from local and international vendors for Abu Dhabi projects in the period 2010-2013



SUPPLY CHAIN MANAGEMENT

Working on large-scale projects requires a qualified, competent and reliable supply chain.

Suppliers and subcontractors are key 'partners' in Saipem's success. Saipem is committed to building and maintaining a long-term, fair and trustworthy relationship with its vendors and to endorsing local procurement.

Vendors are selected from around the world, according to the principles of equal business opportunities and open competitiveness. The selection criteria not only include the ability to meet economic, financial, technical and organisational requirements, but also compliance with Saipem's HSE & Sustainability Policies and Management System.

Between 2010 and 2013, Saipem qualified 612 new vendors from the Abu Dhabi Emirate (local vendors).



SHAH GAS DEVELOPMENT PROGRAMME - THE MEGA PROJECT

PROJECT DESCRIPTION

As part of ADNOC Group, Abu Dhabi Gas Development Co Ltd (Al Hosn Gas) is undertaking a project to develop the Shah Arab sour gas reservoir. This has been designated the Shah Gas Development (SGD) Programme, designed to treat 1 billion cubic feet a day of sour gas from the Shah Field, before separating the sulphur from the natural gas and transporting both to processing facilities at the Habshan area and, from there, to Ruwais, located in the northern part of the Emirate.

Saipem has been awarded three EPC contracts as part of the Shah Gas Development Programme. The first two encompass the engineering, procurement, and construction of the gas process plant and of the sulphur recovery unit. The third covers the engineering, procurement, and construction of nearly 260 kilometres of pipeline for transporting gas, condensate and NGL from the Shah Gas Plant to Thammama C (Habshan) and the ASAB tie-in point.

The Shah Field is located in the centre of Shah Region, which is part of the Rub al Khali (called Empty Quarter), one of the largest sand deserts in the world. It is 180 km south-west of Abu Dhabi City, near the Liwa Crescent in the Emirate of Abu Dhabi.

The Shah Field is approximately 70 x 10 km and has been continuously developed over the past 25 years. Currently, the Abu Dhabi Co for Onshore Oil Operations (ADCO) produces oil and associated gas from

approximately 48 wells drilled in the Simsima reservoir.

There are three degassing stations located in the Shah Field, referred to as Shah 1, 2 and 3. The Shah Gas Plant, which is the heart of the SGD project, is located about 10 km to the east of the nearest proposed well cluster. Shah Station is located approximately 5 km from the Shah Gas Plant.

The three product pipelines run parallel for approximately 66 km in a south to north direction, starting from the Shah Gas Plant to the ASAB tie-in points, where both NGL and Condensate pipelines are connected to the existing network.

At this point, only the sales gas pipeline continues north-west for another 62 km up to Thammama C (Habshan network).

The main facilities of the SGD Project are the Gas Gathering System, the Shah Gas Plant, the Product Pipeline, and the Sulphur Granulation Plant & Railcar Loading Facility (Shah Station). Temporary facilities are also installed during construction.

A few Project numbers:

15 km²

Dimension

190

No. of Heavy Lifts

7,000 km

Cables

42,000 tonnes

Piping

80,000 tonnes

Structures

over 23,000

Total Workforce

A new era in Gas Development

**Luca Pretari - Operations Manager
- Saipem Abu Dhabi Branch**

Would you like to summarise the significance of the challenge for Abu Dhabi and Saipem represented by the Shah Gas Development Project?

The Shah Gas Development Project represents a new era in gas development in Abu Dhabi. The development programme is designed to treat 1 billion cubic feet a day of sour gas from the Shah Field, before separating the sulphur from the natural gas and transporting both to processing facilities in the Habshan Area, and then to Ruwais, located in the northern part of the Emirate.

It is one of the biggest onshore projects ever carried out by Saipem anywhere in the world, in terms of both size and the number of personnel involved.

Saipem has been awarded 3 contracts in relation to SGD.

The first two encompass the Engineering, Procurement, and Construction of the gas process plant and of the sulphur recovery unit. The third covers the Engineering, Procurement and Construction of nearly 250 kilometres of pipeline for transporting gas, condensate and NGL from the Shah Gas Plant to Habshan and the ASAB tie-in point.

SGD is also linked to another project. Saipem is leading a partnership in Abu Dhabi with Technimont and Dodsia to build a 264 km railway from Shah and Habshan to Ruwais. This will transport up to 11,000 tonnes per day of solid sulphur produced from the Shah Sulphur Recovery Plant.

The project is located in the Shah Field, one of the largest sand deserts in the world.

How have you managed to work in such a remote area?

The project is in the central part of Shah Region, 180 km south-west of Abu Dhabi City and near the Liwa Crescent in the Emirate of Abu Dhabi.

When we first arrived at the site,

at the end of 2010, there weren't many facilities: no water, no electricity, no infrastructures for telecommunications and inadequate roads for heavy and light transport. Almost nothing except sand dunes. We worked hard to build temporary facilities and infrastructures capable of accommodating a large number of people; we built an electricity substation from Liwa town to the camp, created an internet connection via satellite and set up an optical fibre. The area will benefit from these improvements even after the project has been completed. This is our sustainable contribution to local development.



What about inconveniences and disadvantages caused to local nomad camel farmers and communities close to the area (e.g. Liwa and Madinat Zayed)?

Actually, we have tried as much as possible not to disturb communities. For example, instead of digging up water from wells, we have preferred to buy potable water in Liwa, because we know how important wells are for the local communities and we don't want to impinge on their infrastructures.

Another big potential inconvenience for Liwa and Madinat Zayed, which are both small villages, was crowding due to the mass transfer of workers to town on Friday (day-off at site). We have mitigated this impact by organising a booking system for bus transfers to town, in this way ensuring that only a limited group of people can move on the same day to these towns for shopping and leisure.

At the peak of activities, the project employed about 25,000 people, including subcontractor employees and workers directly hired by Saipem. How did you manage safety hazards in this challenging and intercultural context?

There are two crucial aspects to be considered in this context.

First, recruiting a huge number of personnel in such a short period of time increases the likelihood of having young people on site working for the first time in the Oil&Gas market and not adequately aware of what that means in terms of safety risks.

We believe that training has a crucial impact on this project, and this is why we have created a dedicated Project Training Centre.

In the first year we trained all personnel extensively on processing techniques. We also trained subcontractor trainers. Using a highly skilled provider, we organised a specific Working at Height training and tutorship programme, with scaffolding exercises and rescue drill, and we rented a simulator for lifting operations to evaluate the ability of our crane operators.

The second crucial aspect is intercultural diversity, especially in the camp. We have tried to mitigate potential conflicts by respecting origins, cultures, religions and traditions as much as possible.

In doing so, we have received a lot of support from local authorities both in terms of security services and advice with regard to the prevention of interracial conflict.

For example, we built different sport facilities, set up various types of canteen, each with a different menu, and we created various places of religious worship.

In conclusion, we can state that we are doing our utmost to protect our people and make them feel proud to work on the SGD Project. And the figures and statistics in our possession can confirm this safety orientation!

PEOPLE

Total Workforce

The workforce for EPC 2, 3 and 5 has gradually increased over the duration of the project, peaking at over 3,500 people directly hired by Saipem and over 23,000 outsourced or working for subcontractors.

This huge international team of over 32 nationalities has been a huge challenge for the project, from the point of view of human resources recruitment and diversity management, competence assessment, training and health & safety. A significant number of personnel has been hired locally through employment agencies and have regular work permits in compliance with UAE labour law.

Welfare and Camp Management

Ensuring good living standards for all people in the camp is a priority for

Project Management. The camp was designed, built and developed with great care for comfort in both private and common areas and with due regard for visual impact.

The site has indoor gyms, recreation rooms with electrical musical instruments, a slot car circuit, billiards, football and table tennis. Outdoors, there is five-a-side football, tennis, basketball and beach volleyball courts. Sports and amusement events are organised frequently to help people feel better about themselves and to facilitate social interactions and team building. Other facilities within the camp include a supermarket, Mosques, a foreign exchange counter money, ATMs and a pizza & BBQ area.

Furthermore, the camp is alcohol free and is organised in respect of the cultures, religions and traditions of the different ethnic groups who live there. A monthly Welfare Meeting is held with Project Management to discuss all topics related to camp conditions, such



Shah workers

The biggest challenges of the Shah Project

Alessandro Cursio - Project Manager Shah Project EPC 2 & 3

Which are the main challenges of Shah Gas Development Project?

The SGD programme is of paramount importance for the UAE area: the gas processed by the Shah Gas Plant will satisfy the growing demand for natural gas of newly built and future domestic industrial plants.

The Shah Arab sour gas reservoir was well known as early as the 1940s. Despite that, the technology for safely extracting and treating the highly sour gas (23% H₂S) was immature at the time. Moreover, the high costs and risks associated with the erection and operation of the Gas Treatment and Sulphur Recovery Complex have until today delayed approval for project implementation.

We are now getting ready to face the most critical phase of the project: Commissioning. During this phase, accidental gas leakage can occur and we need to ensure an adequate and widespread preparation of all personnel directly or indirectly involved in the operations.

Saipem has been working for the ADNOC Group since 1970s on several projects in Abu Dhabi. In your opinion, what is the main reason for such a long-lasting and satisfactory relationship?

I think that ADNOC appreciates Saipem's proactive and result-oriented approach, especially when overcoming difficulties.

For example, when the transportation subcontractor applied to the Abu Dhabi Department of Transport (DoT) for a permit to shift heavy lift equipment of over 400 tonnes to the construction site across the Abu Dhabi road infrastructure, this was denied, because several culverts along the way needed major strengthening

and protection works. Saipem opted for a very proactive and costly resolution: we intervened directly and secured the implementation of the unexpected but necessary strengthening measure.

Clearance for transportation was eventually issued by the Abu Dhabi DoT, thus mitigating the impact to downstream erection activities caused by the delayed receipt of the heavy lift equipment.



Can you tell us something about relations with other project stakeholders?

This is a very sensitive area in the region and is the reason why the level of attention to all issues concerned has been very high. There are many restrictions we need to be aware of and respect.

From the very first phase of the project, we established good relations with the local council, the Chamber of Commerce and the Police.

In addition, we had to satisfy very demanding requests from the ministries, in terms of health, welfare, labour and environment. This, too, was a huge challenge.

Coming now to environment: there has been a big cultural change on the project, from the mere management of waste to its reuse and even commercialisation, thereby reducing environmental impact while at the same time generating profit.

Could you give us some details?

Since December 2012, Saipem has produced 5,385 tonnes of solid non-hazardous waste (metal, wood, paper, cardboard, plastic, cooking waste oil) and hazardous waste (oil drums, waste oil, contaminated oil filters, batteries/accumulators), of which we have recycled 2,042 tonnes (38%).

This good practice has not only allowed the project to save money on waste transportation and disposal services, but has also contributed to our gaining approximately €300,000 from selling the waste and scrap materials.

This is not our only environmental achievement through the reuse of resources. Between 2012 and 2013 more than €500,000 were saved by reusing treated sewage water for irrigation and by dust control activities at site and in camps.

This also means reducing the environmental impact by protecting one of the most important natural resources in the desert: underground water.

These good practices have allowed us to return the water used for project support activities (washing, cooking, flushing, etc.) to its natural circuit. Our subcontractors do the same. Indeed the presence of a sewage treatment plant is now common practice for all major subcontractors.

This result is a major behavioural change, one which starts from our people. To train large amounts of workers from different cultural and educational backgrounds is not an easy job. Our Project Environmental Coordinator has achieved outstanding results in getting people to become aware of the importance of proper separation and segregation of waste and saving and reuse of resources. All this leads to a win-win situation: our people are more conscious, we reduce wastefulness, the environment is protected and the project benefits from the savings.

as room comfort, health & hygiene inspections in the canteens, food quality, laundry services, transportation services to Abu Dhabi and other towns on Friday, and maintenance of common facilities.

Health & Safety Commitment

Project Top Management has recognised the importance of health and safety, especially considering the huge number of people on the site, the criticality of operations and the extremely remote location.

The first step for Saipem Project Top Management was to involve the five major subcontractors and persuade them to develop a common HSE Agenda. The CEOs of all organisations signed a shared HSE Policy. Similarly, a HSE Organisation has been developed jointly by Saipem and subcontractor professionals, synchronising HSE disciplines such as training, firefighting, environment and health.



Project HSE Policy

Project Management is truly committed to HSE and gave evidence of this by providing a safe and healthy work



Heavy lift

environment, with a goal of zero accidents.

Management's attitude and awareness serve as an example to the project, and the workforce acts accordingly.

An HSE Steering Committee (HSE SC) meeting is held monthly, involving both Saipem and subcontractor management. Typically, the Project HSE SC is composed of the Project Director as Chairman, the Project Manager, the Operations Manager, the Deputy Project Manager, the Project Management Engineer, and the Field HSE Manager and/or

Operational HSE Coordinator acting as Facilitator.

In addition to Project Management, Branch Management Representatives and the Branch HSE Manager take part in the meeting, together with client and subcontractor Project Management representatives.

Typical topics on the agenda include follow-up actions from previous HSE SC meetings, Project HSE objectives and organisation, HSE leadership and commitment (e.g. LiHS workshop implementation, safety walkthroughs),

Transporting gas through 260 km pipelines in the 'Empty Quarter'

**Roberto Lanni - Project Manager
Shah Project EPC 5**

What are the main challenges of laying a pipeline in the desert?

The Product Pipeline Project, popularly named Package 5, unfolds in a very remote area referred to as the 'Empty Quarter'. The camp site was strategically built in the barycentre of the pipeline corridor to facilitate the construction mobilisation crew.

Having said that, the location was hard to reach for material delivery, handling and transportation, as well as for resource mobilisation.

It was very challenging to keep the resources focused on project objectives and to respect project schedules.

The remote area posed another challenge, namely, monitoring a car's location in the event of an emergency, and limits to access to unauthorised off-road excursions.

Particular precautions and a special storage, maintenance and preservation procedure have been implemented to protect workers first and foremost and then also construction materials, equipment and consumables against the extreme temperatures experienced during the summer period.

These can exceed 50° C. Special attention was placed on

heat stress management for all job types, with a dedicated training programme put in place and precautionary measures monitored constantly.



Could you mention a few strategies and practical actions inspired by management leadership to integrate sustainability across the project life cycle?

Saipem has worked with all of its stakeholders to focus on implementation of its sustainability philosophy during project design and execution phases, with the objective of meeting all targets, including the minimisation of environmental impacts across operation life cycles. To implement Saipem's sustainability goals and objectives, two types

of treatment plant were installed: 2 Reverse Osmosis (RO) plants, for desalination of bore well water with capacities to treat 150 m³/day and 75 m³/day respectively, and a Sewage Treatment Plant (STP), with a capacity to treat 250 m³/day of sewage water generated from the camp. The plants are manned by a qualified vendor and periodically monitored by Saipem's environmental coordinator to ensure efficiency and operational optimisation.

The treated brackish water from the RO plant meets Client standards for domestic consumption, while the effluent is used for dust abatement along the project right of way. Similarly, the STP treated effluent is used for dust abatement that meets the recommended criteria, confirmed by independent laboratory analysis. The sludge produced from the ST plants is managed using third party accredited waste management vendors.

In addition, training of personnel on simple everyday practices such as turning off taps while brushing their teeth, cutting back on shower time and periodic checks on plumbing systems to avoid leakages, is also a good practice to reduce water wastefulness.

HSE training (training matrix and monthly plan and forecast), emergency response, HSE communications, initiatives and campaigns, monitoring (inspections, audits and action tracking), risk management (risk assessment, job hazard analysis and method statement), safety performance, incident and accident trend analysis, with particular attention to root causes, environmental performance, employee consultation and participation (e.g. safety observation cards, incentive scheme), and HSE concerns and actions for continual improvement.

Incentive Scheme

Several initiatives are in place to reward those Saipem or subcontractor workers who make a special effort to improve Safety performances, who work safely and who consolidate a health and safety culture. The Field HSE Manager, supported by Project Management, chooses the best 'Safety Performers' and defines the type and quantity of prizes to be awarded. For example, during the monthly HSE Steering Committee, an award called 'Man of the Month' is given on the basis

These water recovery facilities and all related awareness initiatives have helped significantly reduce the impact of the project's waste and wastewater production and management system. Evaluating this green initiative in monetary terms, water cost savings of €1,103,342 have been achieved over the project period. As regards waste management, the practice of waste reduction and segregation by everyone, as well as proper handling and engagement of competent external and government licensed waste vendors, have been crucial in achieving compliance and have resulted in excellent individual engagement in waste management habits. About 49% of the total solid non-hazardous waste (metal scraps, wood, paper, cardboard, tetra packs, plastic, cooking waste oil) and hazardous waste (oil drums, waste oil, contaminated clothes, oil filters and batteries) was recycled. This resulted in a cost saving of approximately €119,266. Waste management is carried out by a subcontractor and supervised by Saipem to ensure continuous good practice and compliance with stringent local laws and regulations. The active participation of the project team, spearheaded by management, coupled with the focus on sustainable actions, have become impactful as business opportunities are generated for local economies in the areas of scraps, used oil and paper recycling.

Have you spread Saipem's sustainability culture and philosophy outside the Project?

We have managed to identify numerous opportunities to spread our culture to external stakeholders. Our approach has been to choose initiatives associated with global or national environmental campaigns, with the objective of sharing our key values not only with the project personnel but also with local communities. We do this by using our project team expertise to create awareness about the earth's natural resources, facilitating stakeholder participation in decisions and activities that affect their living environment, and encouraging them to engage in environmentally responsible behaviour in Abu Dhabi and inculcate an ethic of sustainable resource management. For example, for World Environment Day (WED) 2012, our Environmental Coordinator initiated a community outreach programme for students of the Asian International School in Madinat Zayed, in line with the WED global theme, 'Green Economy: Does it include you?'. The event further cemented the relationship between the project team and the Madinat Zayed - Western Region Ministry of Youth, Sport, Culture and Community Development and their representatives, who participated overwhelmingly in the event. The project also used the 2013 WED Global Food Footprint event to visit local food stores, restaurants

and camel farms to raise the food footprint awareness.

Have you implemented any sustainable technology within the project?

The protection of workers' health and respect for the environment were taken into account when selecting the Automated Ultrasonic Testing (AUT), as the main Non Destructive Testing (NDT) method for pipelines. Over the last several years, AUT has begun to overtake traditional Radiographic Testing (RT) as the pipeline weld inspection method of choice throughout the world. The AUT method offers several advantages: in terms of safety, the absence of radiation hazards and RT crawler unit; for the environment, the absence of chemical products; in terms of timing, the speed of inspection; in terms of quality, the precise measurement of defect depth; then there is the applicability of fracture mechanics acceptance criteria instead of workmanship; the Probability of Detection (POD) of defects is better than radiography, as is the ability to size defects accurately; finally, weld repairs are more justified with AUT than with RT. This decision has had a positive impact from various perspectives, including health and safety, environment, quality and the meeting of schedules. RT is limited to short piping sections where AUT is not technically possible.

of the best safety action undertaken during routine work (e.g. best SHOC card, near miss report, Tool Box Talk on

HSE topics, safety intervention, etc.). Furthermore, in order to establish an injury-free workplace by identifying

Leading Indicators

	2011	2012	2013
Shah EPC 2, 3^(*)			
Safety Hazard Observation Cards	4,366	61,383	109,834
Tool Box Talks	12,612	192,226	364,239
HSE Meetings	685	3,167	5,198
Job Safety Analyses	570	8,705	10,449
HSE Inspections	4,862	72,159	95,946
Shah EPC 5			
Safety Hazard Observation Cards	1,042	6,779	4,936
Tool Box Talks	2,423	7,268	5,798
HSE Meetings	120	627	760
Job Safety Analyses	40	39	27
HSE Inspections	1,024	5,214	4,076

(*) The Shah Gas Development Projects EPC 2 and EPC 3 have been managed as one, and data have therefore been collected jointly.

Safety Indicators

	2011	2012	2013
Shah EPC 2, 3			
Worked Man-hours	6,388,438	42,067,500	62,353,731
Fatalities	0	1 ^(*)	0
Lost Time Injuries	1	0	0
Days Lost	55	0	0
Total Recordable Incidents	1	3	15
LTI Frequency Rate	0.16	0.02	0.00
TRI Frequency Rate	0.16	0.07	0.24
Shah EPC 5			
Worked Man-hours	1,146,098	3,003,350	2,110,518
Fatalities	0	0	0
Lost Time Injuries	0	0	1
Days Lost	0	0	94
Total Recordable Incidents	0	2	1
LTI Frequency Rate	0.00	0.00	0.47
TRI Frequency Rate	0.00	0.67	0.47

(*) On June 7, 2012, a subcontractor employee lost his life after being crushed by the excavator bucket. An investigation was immediately conducted to identify and analyse the causes of the accident and several short- and long-term corrective actions were implemented to avoid the reoccurrence of similar events. One of the most important interventions was the development of a dedicated training package for heavy equipment operators regarding the risks associated with the presence of personnel in the vicinity of equipment. Simulators have been used to assess the operators' capabilities and to fill potential training gaps (see HSE Training).

hidden hazards and correcting them promptly, a trophy for the Best Unit has been established. Construction managers from different units use the simple tool of a monthly walkthrough, during which observations are recorded. The Best Unit is the one that achieves the highest score and has made most progress in terms of corrective actions implemented.

HSE Training

HSE Training has played a fundamental role in the Shah Project, due to the huge number of personnel at site and the complexity of operations. For this reason, Saipem has developed an on-site Training Centre consisting of ten training rooms, each with a capacity of twenty, and all equipped with projector and screen. In addition,

LiHS Programme

The Leadership in Health and Safety Programme is an important and original initiative unique to Saipem. This multi-phase programme for cultural change begins with a highly interactive and emotional workshop experience, where managers and supervisors are challenged to think differently about health and safety using practical tools to develop personally as effective health and safety leaders. An integral part of workshops is the internationally awarded film 'The Safer The Better', which dramatizes the chain of events leading to a fatal accident at work.

The LiHS Programme is divided into four phases:

Phase 1

LiHS workshops for management and supervision staff. This phase aims to produce and consolidate a major change in the health and safety culture of the Company.

Phase 2

Managers present LiHS to the workforce with a highly charged speech as evidence of their commitment to health and safety. Phase 2 provides an opportunity for senior leaders to bring

leadership in health and safety to every employee by designing high impact events. This also promotes the organisation's priorities and intentions regarding health and safety throughout the entire workforce, disseminating the Saipem Safety Vision and sustaining the LiHS focus beyond the workshop, while also building interest in the workforce and preparing them for Phase 3.

Phase 3

Delivery of the Five Stars Intervention training tool throughout the organisation. This is implemented in order to provide a simple structured way to intervene in the event of unsafe acts and to reinforce safe behaviour by standardising intervention on the project.

Phase 4

The process continues with the launch of the new campaign called Leading Behaviours, which injects five simple and transferable non-negotiable behaviours into the organisation.

The LiHS Programme provides participants with a clear

understanding of the importance of health and safety both for the organisation and for their own lives. In this way, everyone can be absolutely clear as to their responsibility and has a real opportunity to contribute in an efficient way with their knowledge, experience and personal motivation. Project Management recognised the importance of introducing LiHS at the very early stages of the Shah Gas Development Project by sponsoring workshops. The programme is also the ideal platform for aligning the HSE expectations of both Saipem and its subcontractors.

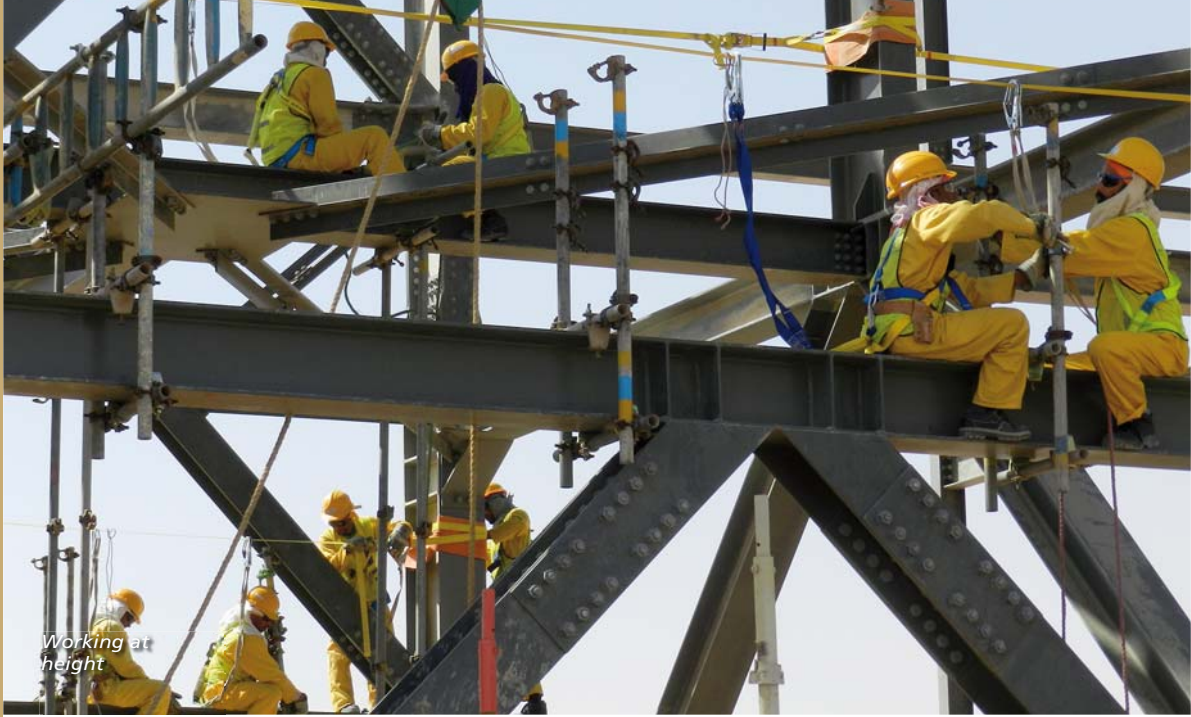
Due to the large number of people in need of training, the project is supported from Corporate Offices in the organisation and management of additional LiHS training sessions.

The following targets have been set:

- Train five more Five Stars trainers;
- Start the Five Stars Training programme;
- Start the cascading programme;
- Perform LiHS workshops.

Thanks to this huge effort, all construction supervisors have attended Five Stars Training.

	Workshop	Cascading	Five Stars	Train the Trainer
Shah 2, 3 and 5				
Session	14	15	91	2
Attendees	137	173	775	5



Working at height

specific rooms for trainers and dedicated welfare facilities are available.

The Saipem HSE Training Manager has organised a job specific training programme and coordinated an integrated training team composed of 13 HSE trainers (both from Saipem and the main subcontractors) to attain the maximum benefit in a reasonably practical time, while ensuring that all employees, including subcontractor personnel, attend the same training programme.

Training courses have been carried out both in-house and by third party providers, all approved by the Client, on a variety of HSE subjects. Some examples of job specific training courses provided in-house are: On Site Practical Hazard Identification, Confined Space Entry, Control of Substances Hazardous to Health, Safe Welding, Grinding and Cutting, Portable Power Tools, Manual Handling, Personal Protective Equipment, Heat Stress,

Health & Hygiene, House Keeping and Environmental Aspects Management. A short HSE induction is in place for all visitors to the site, while a more detailed HSE training programmes is targeted at drivers, equipment operators, and white and blue collar workers.

An area for practical training has been arranged outside the training centre, with firefighting, rigging, lifting and scaffolding training grounds.

Road Safety

The project has adopted a specific Safe Driving Policy, considering that road transport hazards present some of the most significant risks to personnel.

The Project Management team has introduced several measures to promote safe driving behaviour, such as forbidding the use of mobile phones, requiring all passengers to wear seat belts in the front and rear seats, observing speed limits and avoiding

HSE Training Hours

	2011	2012	2013
Shah EPC 2, 3	134,851	625,472	602,687
Shah EPC 5	17,466	24,723	20,497

Special Training

Working at height and lifting operations are among the most critical site activities.

Reflecting the commitment of Shah Gas Top Management, special training programmes focusing on these topics have been implemented jointly with qualified external providers.

Working at Height Training has the general aim of mitigating the risks associated with falls from the countless structures of the process units, vessels, columns and buildings.

Training introduces a new methodology, involving a highly specialised third party, which takes advantage of mountain and spelean guides of the highest level, veritable experts in the field of rescue and health and safety.



The programme starts with an assessment of Saipem's procedures and practices on site and is followed by training based on theory, practice and tutorship activities. It involves



work related and rescue activities and sees workers performing activities at height and at different levels of other strategic roles, such as supervisor, scaffolder and rescuer.

Lifting activities on the Shah Project involve more than 300 cranes, with a specialist subcontractor in charge of performing 190 heavy lifts. After the fatal accident, and in order to ensure that only competent persons are involved in these critical activities, a specific assessment was performed on operators using a certified simulator applicable to different types of machine, such as excavator, mobile crane and dumper.

When the operator performs an exercise, the simulator software 'records' the precision of the operation and the time spent, and proceeds to an automatic calculation of the score based on the operator's skill level. The Simulator programme has several control modules specific to the type of machine, such as managing hidden targets and different types of obstacle, wet concrete, bucket positioning, carrying the frame ahead and behind, trajectory, trench earthwork & truck loading, driving forward & in reverse in a corridor, manoeuvring

and parking, speed control on humps, driving in real conditions, loading, unloading and flatbed.

Each operator must pass an exam in order to obtain the certificate. In the event of failure, a recovery plan is in place to allow everyone to succeed.

In all, 265 mobile crane operators, 104 excavator operators and 41 dumper operators have been assessed using the Simulator. Alongside training, special workshops are conducted to increase the level of risk awareness of operators, using 10 'shocking' videos where possible types of serious accident involving heavy equipment and personnel are shown. These workshops have proven particularly beneficial for operators, who can share their knowledge and experience.



Working at Height Training	Saipem	Subcontractors	Total
Total Workers Trained	158	3,209	3,367
Total Scaffolders Trained	89	416	505
Total Supervisors Trained	54	169	223
Total Workers (Medical Staff) Trained	7	18	25
Total number of Rescuers Trained	13	58	71
Total	321	3,870	4,191

Shah Gas: laying the pipeline



extra-urban business related trips after sunset. All Saipem vehicles are fit for purpose and in excellent operating condition. In addition, an IVMS (In Vehicle Monitoring System) and a Roll-Bar have been installed. The former is used to track the vehicle's location (through GPS technology) and to monitor speed. The latter, a specially engineered and constructed frame built in the passenger compartment of the vehicle, is designed to protect passengers from injury in the event of an accident, particularly a roll-over. Moreover, special attention is dedicated to the selection and qualification of drivers who, besides possessing a driver's license, must also complete an authorised defensive training course.

Heat stress prevention

Heat stress (HS) is a serious threat for the project, especially considering the huge number of people deployed on

site, managed by several subcontractors. One can add to this the fact that a part of the labour force has no previous experience in harsh work environments and that construction and commissioning activities are carried out simultaneously. To protect workers against injuries and the effects of heat stress, Saipem and its subcontractors have agreed several preventive measures related to the identification of high risk jobs, the accountability of supervisors for allowing sufficiently long breaks and recognising heat stress signs early, the proper understanding and effective application of the heat stress prevention systems put in place (such as the Flag Systems) and the availability of water at all times. In 2013, 73 rest shelters were installed on site, with due regard for several important aspects, such as the number of people working under direct sunlight and underneath pipe racks, the distance between the working area and the closest rest shelter (which should be no

Heat Stress 2013

Campaigns	113
Tool Box Talks	1,395
Workers trained on heat stress precautions	35,111
Posters and banners spread all over the site	1,569
Urine tests	1,972
Inspections performed by subcontractors in summer	208
Audits performed by Saipem in summer	380
Drills conducted in all site areas by medical personnel, ERT, HS Focal Points and HSE Representatives	119

more than 100 metres) and accessibility (they must not be located near trenches or chemical storage areas). Each rest shelter is provided with a horn, a flag (which reminds workers of the importance of drinking and respecting the rest cycle), a flashing light, man coolers and fans, emergency call out procedure and the name of the HS supervisor. The HS supervisor appointed for each rest shelter has the main task of implementing the flag system, ensuring the availability of water, inspecting the conformity of the shelter and guaranteeing first aid in the event of heat stress. Multi-language posters and leaflets are distributed in prominent locations or directly to the workforce, and a considerable number of awareness campaigns and training courses have been conducted on site. These include *'Know your focal point for Heat stress'*, *'No water - no work'*, *'Precautions during a hot summer'*, *'Summer and Ramadan'*, etc. Thanks to all these efforts, the project target of 0 heat stress related incidents and 0 administrations of first aid has been achieved.

Emergency response

Several types of emergencies can occur during project execution and the nearest medical facilities are available in Liwa city, 60 km from the Shah Field, and in Medinat Zayed, 110 km from the Shah Field.

Considering the long distances from the site to local hospitals, the project has invested much in a prompt site emergency organisation in order to manage any critical health or occupational injuries effectively. Firstly, an integrated Emergency Response Management System involving Saipem and subcontractors has been developed and implemented. This has been well synchronised among all players in order to manage emergency issues and for purposes of mutual aid. An Emergency Team Coordinator has been appointed with responsibility for activating the respective Emergency Response Team (Saipem or subcontractor), depending on the level of emergency and the resources required. Mutual aid between Saipem and subcontractors has been established using a unique emergency contact number and three dedicated radio channels in order to capitalise on all available resources. Weekly drills are conducted to test the effectiveness of the emergency procedure and the synergy between the various teams.

Working in confined space

Working in a confined space is a very critical activity, since the risks for health and safety could be compromised by asphyxiation or suffocation and by the falling of people or materials. A dedicated team has therefore been deployed to deal with any emergency



Construction activities

situation and performing tutoring duties.

Furthermore, due to the increased number of confined space activities, an additional 8 people have been appointed from Saipem and its subcontractors as part of additional team available 24/24 7/7.

If a person becomes trapped in a confined space, properly trained rescuers will carry out the rescue.

In addition, several preventive actions have been put in place to mitigate this kind of risk, such as the regular inspections of all confined spaces to highlight the need to ensure a prompt response in the event of emergency, and daily assessment carried out by the team to monitor the effectiveness of rescue plans.

In the event of real emergency, the dedicated emergency response team is responsible for managing all confined space incidents and assisting Saipem and subcontractor rescuers.

As for all other types of emergency, regular drills are planned and executed to verify the capacity and promptness of the emergency team.

ENVIRONMENT


The Project Environmental Management System is based on Saipem internal standards, ISO 14001 international standard, local regulations and Client requirements.

The most significant environmental impacts were identified during project construction phase. Risks are related to aspects such as terrestrial ecology, soil and groundwater, air quality, stress on public infrastructures, water consumption and nuisance to communities.

Several environmental controls, mitigation measures and monitoring activities have been planned and

Environmental Performance

		2011	2012	2013
Shah EPC 2, 3				
Energy	(toe)	4,269	32,876	39,277
GHG Emissions	(tonnes)	12,020	102,083	121,958
Water	(m ³)	186,737	1,650,857	2,488,220
Hazardous Waste	(tonnes)	9	1,883	570
Non-Hazardous Waste	(tonnes)	3,059	67,992	181,271
Recycled Waste	(tonnes)	223	1,962	3,638
Spills				
Number	(No.)	10	11	4
Volume	(m ³)	0.052	0.231	0.215
Shah EPC 5				
Energy	(toe)	3,036	5,188	3,929
GHG Emissions	(tonnes)	9,322	16,016	12,038
Water	(m ³)	27,762	326,843	494,596
Hazardous Waste	(tonnes)	179	1,123	376
Non-Hazardous Waste	(tonnes)	229	772	1,570
Recycled Waste	(tonnes)	93	1,127	423
Spills				
Number	(No.)	0	3	0
Volume	(m ³)	0	0.017	0



Pipeline of
Shah EPC 5

documented in the Project Construction Environmental Management Plan (CEMP) and Waste Management Plan (WMP).

Project targets are set in order to ensure continuous improvement of management of environmental issues, with regard to minimising the impact on air quality, water and wastewater management, resource conservation, recycling and reuse.

Air quality

Noise surveys and ambient air quality monitoring are regularly performed on site and include both indoor and outdoor microclimatic assessment, lighting level, indoor and outdoor noise, and inhalable and respirable dust. More than 2,000 trees have been planted in the accommodation camp and office areas. These act as wind and dust barriers, oxygen providers and, not least, have a positive landscape impact and provide a more familiar 'natural'

view for camp habitants and site office employees.

Water management

Given the extremely remote location of the Shah Field and the harsh natural environment, the consumption of water is a critical environmental factor.

Fresh and potable water must be supplied continuously and, considering the complexity and low profitability of supplies to the site, this is not easy. The importance of decreasing water consumption levels therefore becomes vital, at least for diverse non-drinking purposes.

At packages 2 and 3 and at package 5, adequate water storage, including domestic and industrial water, and an appropriate wastewater disposal mechanism for purification of wastewater from organic and other pollutants, have been installed in order to reuse treated water without causing pollution.

The treatment of wastewater secures a sustainable supply of water for irrigation of accommodation camp green areas and for dust abatement. This also facilitated the saving of over €500,000 between 2012 and 2013, while reducing the environmental impact on resource consumption and protecting one of the most important natural resources in country – groundwater.

This best practice is also common among subcontractors, who manage to return water used for project support activities back to its natural cycle.

Energy saving

Several initiatives have been organised both on site and in the accommodation camp to increase awareness of the need to protect natural resources.

Energy saving was the subject of one of the most important environmental awareness campaigns.

Energy consumption increases

emissions into the atmosphere as well as air pollution, and a considerable part of it is due to the use of air conditioners present in site offices and accommodation camps.

The awareness campaign alerted the entire workforce to the correct use of air coolers, providing some intelligent tips to reduce consumption. Instructions for programming thermostats have been given to all accommodation camp habitans to discourage them from leaving air conditioners turned on all day long.

Recycling and reuse

One of the most successful environmental initiatives implemented on site had the aim of reducing the volume of waste by maximising opportunities for recycling and reusing scrap materials.

Hazardous material (such as used oil, empty drums, batteries, used oil filters)

World Environmental Day

World Environment Day (WED) is an annual event which aims to become the biggest and most widely celebrated global day for positive environmental action. World Environment Day activities take place all year round, culminating every year on June 5. The Shah Gas Development Project has celebrated WED since the project commenced. It does this to raise awareness on environmental issues and enable everyone to realise not only their responsibility, but also their power to become agents for change in support of sustainable and equitable development.

Several initiatives have been organised over the years, such as clean-up and housekeeping campaigns in the desert, reduction in the use of plastic bottles and promotion of recycling activities.

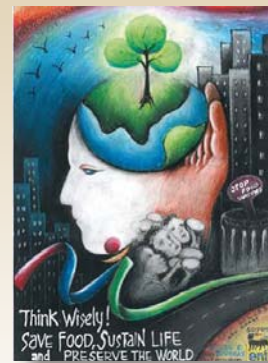
Furthermore, subcontractors have played an active part in the organisation of environmental celebrations and awareness

campaigns and the results have been truly remarkable. Initiatives have included the distribution of prizes for best environmental practices, environmental communications through banners and posters displayed on site, tree planting at the camp and motivation speeches and tool box talks by contractor management to the workforce on environmental topics.

In 2013, following the launch of the Saipem Corporate Environmental Campaign targeted at minimisation of the ecological footprint, and in line with the theme proposed by the Food and Agriculture Organisation (FAO), the celebration of WED spread the message of 'Think, Eat, Save'. The campaign encouraged everybody to reduce their 'foodprint' by reducing food waste and food loss.

Brochures in the canteen encouraged people to think about food quantities desired and needed before having their meal.

This approach has several benefits both for the wellbeing of people, who become accustomed to a well-balanced diet, and for the environment, in the sense that food waste is reduced, the environmental impact of food production is minimised and, last but not least, money is saved.





*Working in a
challenging
environment*

and non-hazardous material (such as metal scrap, empty paint containers, PVC pipes, plastic products, used cables and empty cable metallic drums) are recyclable scraps, left over from site activities.

The Project Environmental Team has realised that, unlike waste, these types of scrap have a significant monetary value and can have a second life, all to the good of the environment. Using recycled scraps means saving energy, saving raw materials, reducing air and water pollution and reducing water use.

For this reason, the project has entered into several agreements with local

buyers to assign a proper destination for all scraps resulting from site activities. These agreements support the local waste recycling market by providing valuable project waste to authorised waste collectors. The project also benefits, since it has gained about €300,000 from selling scraps and from savings in waste transportation. In addition, other best practices for recycling and reusing surplus materials have been adopted by the project, such as the reuse of concrete waste to make pavement or border slabs for internal roads and the recycling of wood to build waste bins or flower decanters.

SHAH-HABSHAN-RUWAIS RAILWAY PROJECT

PROJECT DESCRIPTION

The Etihad Railway Project forms part of the proposed Gulf Cooperation Council (GCC) railway network linking the six countries of the GCC, namely the State of Kuwait, the Kingdom of Saudi Arabia, the Kingdom of Bahrain, the State of Qatar, the UAE, and

the Sultanate of Oman. The scope of the UAE Railway Network, which will be built in various phases, is to link the main population centres and industries of the UAE. As leader of the joint venture including Dodsal and Tecnimont, Saipem was awarded the contract by the Etihad Rail Company for the development of

Playing a role in the historic change of transportation in the UAE

Giuseppe Iocco - STD JV Railway Project Director

How would you summarise the ongoing project and the future developments of the first UAE Railway?

The Etihad Rail Co has a mandate to manage the development, construction and operation of the UAE's first national freight and passenger railway network. The UAE Railway Network will link the main population and industrial centres in the UAE and forms a part of the planned Gulf Cooperation Council (GCC) Railway Network. It will run as part of the interoperability corridor linking the six countries of the Gulf Area (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE).

Etihad Rail's 1,200 km network will extend across the United Arab Emirates, from the border of Saudi Arabia to the border of Oman. The network will run from Ghweifat to Abu Dhabi, Dubai and the Northern Emirates with major connecting points in between, including Al Ain and Madinat Zayed.

Saipem is playing a pioneering role in developing the first stage of this network, a 264 km freight railway line to transport the sulphur produced by the gas refinery from the new gas facilities in the Abu Dhabi desert in Shah and Habshan to the port facility of Ruwais. All trains will depart from the operational freight maintenance depot in Mirfa, where the railway Operational Control Centre will

be located. The line will also have 124 km of double track along the coastal stretch as part of the future development of the UAE passenger railway.

Etihad Rail's first trains will carry granulated sulphur for the Abu Dhabi National Oil Co. The Railway is



expected to haul over 7 million tonnes of granulated sulphur a year from the oil and gas fields at Shah and Habshan for export through the port of Ruwais.

This is the equivalent of two 11,000 tonne trainloads per day. The train will be operated using seven SD70 ACS diesel locomotives provided by the US supplier EMD and 240 covered hopper wagons supplied by the Chinese CSR. Operation of the Railway will be managed by a joint venture between Etihad Rail and DB Schenker Rail. Key project data concern 80 million m³ of earthworks, 9 huge crossings of existing utilities from the main local

stakeholders, 2 railway bridges crossing 2 important highways, 16 overbridges, 37 underpasses, 200 minor concrete structures, 400 km of track, 14 buildings and related infrastructure area, full telecommunication and signalling systems, 2 railheads as yards dedicated to facilities for the track laying, and 3 main project camps.

What are the main challenges of the Project?

Challenges and technicalities must be faced on any rail network anywhere in the world. In the UAE these challenges mainly involve operating in a desert environment, topographic and climate challenges such as sand dunes, wind-blown sand, high temperatures and humidity.

The Project schedule is extremely challenging: 34 months to develop 264 km of railway and facilities. We succeed in performing the Section 1 civil and track works in 18 months of construction, laying 70 km of track in only 1 month, which is a huge achievement.

Moreover, some of the main challenges were from managing relations with local authorities and stakeholders (not always familiar with railway works), especially for obtaining building and environmental permits. One of the most important stakeholders is the Abu Dhabi Department of Transport (DoT). The national highway and other secondary roads have been

the first stage of the Etihad Railway. This is an EPC contract for the design and execution of the railway line from Shah to Ruwais via Habshan. It includes engineering, procurement, construction, testing and commissioning of civil works, bridges and structures, systems facilities and the track works necessary for the new 264-kilometer long railway line for freight and commercial traffic connecting Shah to the port of Ruwais. The railway will serve both the Habshan and Shah sour gas fields, and specifically will allow the transportation of granulated sulphur from these fields to the port of Ruwais.

The Shah-Ruwais line is functionally split into two sections:

- Between the Shah gas field and the gas processing and distribution facilities in Habshan City.
- Between Habshan City and the Port of Ruwais, crossing the urban areas of Al Mirfa, where the line's main facility will be built, consisting of an operational depot, including maintenance structure. It will also pass through the cities of Mezaira'a, Madinat Zayed and Tarif where future passenger stations will be built.

The project encompasses the development of a railway tract, partly

closed or are subject to deviations due to construction works of bridges, culverts and other types of structures needed for transit of the railway.

This has caused some temporary inconveniences to local communities managed by local authorities.

Another sensitive stakeholder is the Western Region Municipality (WRM), responsible for raising the level of services throughout the region's six main areas: Madinat Zayed, Mirfa, Liwa, Sila, Ghayathi and Delma. We started a consultation process with WRM mainly to obtain building and work permits for depot buildings and facilities, accommodation camps and pits. We also got approval from the Environment Agency of Abu Dhabi (EAD) for the Environmental and Terrestrial Ecological Management Plans, which require several mitigation measures in order to safeguard habitat, flora and fauna and minimise environmental impacts, especially on the 35 km section passing through the Baynounah Forest Protected Area.

Another challenge is that we are working in joint venture with our partners Tecnimont and Dodsal and it took time, especially at the beginning of the Project, to find the most incisive way to cooperate and communicate as an integrated team. Finally, Etihad Rail was established in 2009 and is relatively new in the infrastructure business. As such, it is expecting a high value contribution from Saipem and wishes to promote the best conditions possible to develop technical specifications for future projects.

Considering the desert surroundings, management of environmental requirements is rather demanding, isn't it?

It really is. To obtain environmental permits has been really challenging and subject to several environmental activities. For this reason we considered it necessary to appoint a Project Environmental Manager and a dedicated team to supervise site activities regularly, report to Environmental Authorities and manage the several audits received from environmental agencies and third parties. The Project environmental requirements were so demanding that, in some cases, in order to be able to perform very particular activities, such as tree tagging and transplantation within the Baynounah Forest Protected Area and relocation of several species of reptiles living in the construction area, we had to rely on specialist environmental professionals.

What are the expectations of local communities with regard to the Project?

This Project will transform the country, changing the habits of people and offering them a new freedom to move from one place to another. Of course, this arouses great attention and curiosity, first and foremost from communities living close to the railway passage and subsequently from the entire national population. The Project brings with it several benefits, including freight cost and business travel time savings, which will support

businesses, commuters and other travellers across the region.

There will be also huge environmental benefit. A single freight train can carry the load of up to 300 trucks, thus reducing road congestion and accidents. Based on the forecasted traffic volumes, the rail network will reduce greenhouse gases by more than 2.2 million tonnes annually, the equivalent of removing 375,000 vehicles off the road or planting 52 million trees.

The rail network will ultimately provide services for both freight and passengers, with social benefits including low-cost transportation, faster journeys than highway alternatives and reduced levels of highway traffic.

As the railway line connects more areas within the UAE and GCC, various industries and communities will expand as a result. The region will experience more economic, social and cultural growth in the form of new job opportunities, industrial diversification, and much more.

By enhancing accessibility, the Western Region will grow in terms of population, tourism and industrial activity.

With an attractive link between Abu Dhabi and Dubai, as well as to the northern Emirates, tourism should expand, in particular the range of opportunities available to international tourists and domestic holiday makers. The railway will bring massive change to the transportation landscape of the UAE and we are proud to be part of this historic moment.

Main Project Features

Future provision of commercial operations for a speed of 200 km/h

Sulphur transport capacity of 22,000 tonnes

European Train Control System (ETCS) 2 signalling system

1 operational depot, including maintenance facilities

on a single and partly on a double track, which covers a distance of 264 kilometres. At full capacity, the railway will transport over 7 million tonnes per year of sulphur from the gas treatment processes.

The UAE network will operate a full fleet of more than 100 locomotives and 5,000 freight wagons.

SUSTAINABILITY IN DESIGN

Estidama: Sustainable Buildings

Estidama, which means 'sustainability' in Arabic, is a sustainability programme which will transform Abu Dhabi into a model of sustainable

urbanisation. Its aim is to create more sustainable communities, cities and global enterprises and to balance the four pillars of Estidama: environmental, economic, cultural and social.

Estidama is focused on the rapidly changing built-up environment and tries to influence projects under design, development or construction.

Estidama is based on the Pearl Rating System, which provides design guidance and detailed requirements for rating a project's potential performance in relation to the four pillars of Estidama.

The Pearl Rating System is organised into seven categories that are fundamental to more sustainable development. These form the heart of the Pearl Rating System:



The first railway in UAE





- **Integrated Development Process:** Encouraging cross-disciplinary teamwork to deliver environmental and quality management throughout the life of the project.
- **Natural Systems:** Conserving, preserving and restoring the region's critical natural environments and habitats.
- **Liveable Buildings:** Improving the quality and connectivity of outdoor and indoor spaces.
- **Precious Water:** Reducing the demand for water and encouraging efficient distribution and alternative water sources.
- **Resourceful Energy:** Targeting energy conservation through passive design measures, reduced demand, energy efficiency and renewable sources.
- **Stewarding Materials:** Ensuring consideration of the 'whole-of-life' cycle when selecting and specifying materials.
- **Innovating Practice:** Encouraging innovation in building design and construction to facilitate market and industry transformation.

The programme aims to guide and rate the sustainability performance of a given development throughout its lifecycle from design to operation via construction. It consists of a suite of

rating systems specific to the design and construction of communities, buildings and villas, as well as the ongoing operation of existing buildings.

Buildings that apply Estidama guidelines will:

- Save natural resources.
- Reduce environmental impact.
- Increase the quality of life of residents.
- Conserve energy and water.
- Enhance reputation and marketability.

In order to meet the project's commitment to the Environment Agency and to execute the project on the basis of best practices, Saipem supports the Estidama sustainability programme, implementing some of its guidelines for the design and construction of the operational depot located in Mirfa. A Project Environmental Management System (EMS), based on ISO 14001 Standard, has been developed as the best tool to oversee implementation of Estidama requirements and achieve project environmental targets and objectives.

The EMS serves as a tool to manage environmental issues in a comprehensive, systematic, planned and documented manner, ensuring compliance with local environmental legislation, minimisation of

environmental impacts, and control and proper management of environmental aspects, while at the same time demonstrating to all stakeholders a commitment to protecting the environment and a constant focus on improving the system.

The STD JV has issued a Project HSE Policy signed by the Project Top Management, developed a Construction Environmental Management Plan (CEMP) which has been approved by Environment Agency, delivered environmental awareness training and dedicated tool box talks to the whole workforce regarding air pollution, chemical handling, spill management, waste management and working in environmental protected area.

As for the depot, compliance with Estidama guidelines has been fulfilled mainly by operating a waste management segregation and recycling system at construction sites. This entails segregating several types of hazardous and non-hazardous waste (vegetation, tyres,

packing and packaging material, timber, steel, wooden planks, paper, scrap metal, scrap cable, organic and food waste, plastic, cut material, concrete, general and sanitary waste) into dedicated skips and containers, with labelling in different languages, in a temporary storage area within construction site perimeters. In the first instance, all re-usable materials (i.e. timber for temporary works and steel rebar for barriers and fence posts) have been reused at the project site. The other waste has been transported to the selected disposal/treatment facilities through certified recycling and waste management contractors.

Audits have been performed on waste management and, extensively, on CEMP Compliance, by the SDT JV on a regular basis.

Source: The Pearl Rating System for Estidama - Building Rating System - Design & Construction - Version 1.0.

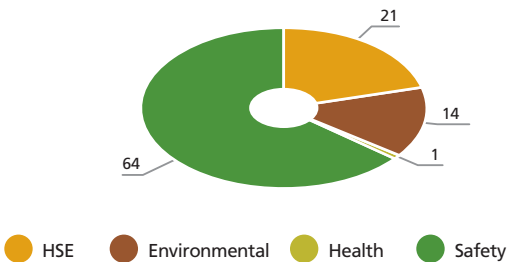
Eco Design

Project environmental requirements were implemented in design phase in close thanks to the coordination among Engineering Team and Environmental Department in order to consider and address various important environmental factors and to ensure the highest quality facilities while maintaining the smooth flow of traffic and protecting wildlife. A series of workshops were organised to reach agreement on mitigation measures and fulfil stakeholder expectations. The environmental mitigation measures needed during railway design and construction phases were submitted to stakeholders and, upon their approval, were duly implemented during design phase, especially along protected and other environmentally sensitive sections.

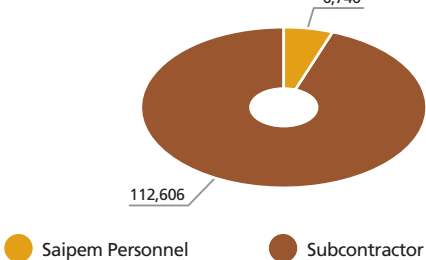
Cooperation with the Engineering Team was especially fruitful during design phase, since it helped obtain the necessary environmental permits from local authorities and reduce the overall environmental impact of the project.

One of the requirements of the Environmental Impact Assessment (EIA) and of the Terrestrial Ecology Management Plan was to carry out a pre-construction survey in

HSE Training Hours by Type in 2013
(%)



HSE Training Hours by Personnel Category
(No.)



order to identify and tag the trees to be translocated as part of the Pre-construction Flora Survey Procedure. Before construction started, every healthy, mature, native tree within the construction corridor in the areas specified within the EIA were watered on a daily basis to encourage root growth and increase the likelihood of successful translocation. The same trees were then demarcated using a metal tag and recorded in the Flora and Native Tree Register. Finally, they were translocated in the new location agreed upon with EAD, with special care taken during transportation and replanting phases so as to prevent damage to the root ball before replanting. Since replanting, the trees have been regularly watered and their condition will be monitored for the time necessary.

During final design phase, Saipem slightly modified the railway route so that its trajectory was as far away as possible from particularly sensitive and valuable habitat type areas such as rock hills, which can provide valuable shelter and nesting spots for birds, bats, mammals and reptiles. The original railway corridor was significantly reduced in width

inside the forestry area resulting in approximately 6,500 trees being saved. The largest impact associated with the railway was identified as the linear nature of the project, which created a permanent new ecological barrier that risked fragmenting habitats and dividing fauna populations in the Protected Area. Within this section of the railway, culverts were designed at intervals of 1-5 km. Three types of animal crossings were planned and realised: 10 camel underpasses, 22 gazelle underpasses and 78 reptile underpasses. These efforts reduce the impact of the ecological barrier and minimise the disruption of natural habitats.

ENVIRONMENT AND COMMUNITIES

Protection of Biodiversity

A preliminary pre-construction habitat and fauna survey was conducted to identify reptiles, mammals and birds living in the construction corridor and minimise the risks for their survival in the area.

Safety Indicators

Lagging Indicators	2012	2013
Worked Man-hours	4,984,751	14,421,909
Fatalities	0	0
Lost Time Injuries	0	3
Days Lost	0	249
Total Recordable Incidents	0	3
LTI Frequency Rate	0.00	0.21
TRI Frequency Rate	0.00	0.21
Leading Indicators	2012	2013
Safety Hazard Observation Cards	1,443	2,789
Tool Box Talks	3,055	20,254
HSE Meetings	339	633
Job Safety Analyses	239	366
HSE Training Hours	48,200	121,554
HSE Inspections	832	7,699



Local desert species



One of the main actions provided for in the Terrestrial Ecological Management Plan is the removal of a high valued reptile species, the Spiny-tailed Lizard, from the construction corridor. A reptile proof fence was installed around the construction corridor, where appropriate, in order to capture the reptiles, prior to commencement of construction activities. After capture, reptiles were brought to the new translocation area, identified by EAD, to acclimatise before release. The acclimatisation within a designated shelter took two to three months.

Working in a Protected Area

Approximately 49 km of the railway will run through the 592 km² Baynounah Forest Protected Area (also known as the Houbara Protected Area) found

approximately 15 km east of Ruwais along the proposed Al Gharbia Mainline of the railway.

The primary purpose of the area is the protection and conservation of the Macqueens Houbara Bustard, a bird which is captive bred in the area. This species is very significant to Arabian heritage and culture and is currently listed as vulnerable on the International Union for Conservation of Nature (IUCN) Red List. The area was also recorded as important for several species of animals and plants and for habitat types, including jebels, saline coastal plains, as well as sand sheets, low dunes and alluvial gravel plains.

Environmental induction training is delivered to all personnel before they enter the Baynounah Forest. This illustrates the peculiarities of the

Environmental Performance

		2012	2013
Energy	(toe)	11,934	25,479
GHG Emissions	(tonnes)	34,206	72,239
Water	(m ³)	61,996	544,051
Hazardous Waste	(tonnes)	109	1,529
Non-Hazardous Waste	(tonnes)	1,389	24,200
Recycled Waste	(tonnes)	975	10,942
Spills			
Number	(No.)	6	3
Volume	(m ³)	0.140	0.055

Waste recycling			
Waste type		Quantity (up to Nov. '13)	Recycled
Wood scrap	(m ³)	170	-
Metal scrap	(m ³)	306	296
Paper waste	(m ³)	320	215
Plastic waste	(m ³)	39	7
Concrete waste	(m ³)	1,332	1,265
Total	(m ³)	2,167	1,783

Actual recycling is about 79% of total waste produced in Depot, whereas the minimum target required by Estidama to achieve 2 pearls is 70%.

area and the preventive measures to be adopted in order to avoid disturbing or endangering local flora and fauna.

Snake Handling Training

A project Snake Response Procedure was drafted to safeguard site personnel and ensure the survival of the animal recovered.

Following issue of the procedure, a dedicated training course was delivered by an expert ecologist with a view to setting up a team of qualified snake handlers capable of intervening promptly and effectively in order to remove reptiles.

The course examined all types of dangerous animals in the UAE, and in particular taught attendees how to minimise interactions with snakes and how to intervene in the event of a snake bite.

It also gave instructions in

snake-catching techniques using appropriate handling tools.

A snake response drill is organised on a monthly basis to verify the responsiveness of security personnel, snake handlers and first aiders. Once captured, animals are released and relocated in a safe area.

Interaction with local communities

The project represents massive change for neighbouring communities and great attention and curiosity has been shown by people living close by.

In order to prevent the risks associated with pedestrian and car crossings, the project HSE department has organised several public meetings and awareness campaigns using posters and brochures to explain the hazards people are exposed to when approaching level crossings and the meaning of warning signs.



Drawing a line in the sand



ACRONYMS

ADCO
Abu Dhabi Co for Onshore Oil Operations

ADNOC
Abu Dhabi National Oil Co

EAD
Environment Agency of Abu Dhabi

EPC
Engineering, Procurement, Construction

EPIC
Engineering, Procurement, Installation and Construction

ERT
Emergency Response Team

FEED
Front End Engineering Design

GASCO
Abu Dhabi Gas Industries Ltd

GCC
Gulf Cooperation Council

HSE
Health, Safety, Environment

LiHS
Leadership in Health and Safety

LTI
Lost Time Injury

NDC
National Drilling Co

NGL
Natural Gas Liquids

OGD
Onshore Gas Development

QA/QC
Quality Assurance/Quality Control

RT
Radiographic Testing

SCADA
Supervisory Control and Data Acquisition

SGD
Shah Gas Development

SHOC
Safety Hazard Observation Card

TRI
Total Recordable Incidents

UAE
United Arab Emirates

WED
World Environment Day

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SAIPEM Società per Azioni

Capital stock: €441,410,900 fully paid

Tax identification number and Milan Companies' Register

No. 00825790157

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What you think of this Country Report matters to us.

As we are constantly striving to improve our reporting, we would very much welcome your feedback. We will also be pleased to answer any questions you may have.

Contact us at: sustainability@saipem.com

Special thanks to all those who contributed to the drafting of this report.

Website: www.saipem.com

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Translation and Proofreading: TRAD Dept. - Saipem SpA

Design, layout and supervision: Studio Joly Srl - Rome - Italy

Printing: Impronta Grafica - Cantù (Como) - Italy

This document is printed on pure Fedrigoni Group FSC certified Elemental Chlorine Free (ECF) cellulose paper, with a high content of selected recycled material. The paper has the European mark of ecological quality Ecolabel (Ref. No. IT/011/04), is produced at an ISO 14001 certified facility and is fully recyclable.





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