



PNG LNG Environmental and Social Report – Annual 2016

Energy lives here™

ExxonMobil

About this Report

This Papua New Guinea Liquefied Natural Gas (PNG LNG) Environmental and Social Report – Annual 2016 provides information about ExxonMobil PNG Limited's safety, health, environment and social management progress during production.

It forms part of PNG LNG's commitment to ensuring the Government and citizens of Papua New Guinea, interested non-government organisations and other stakeholders are kept well informed of production activities.

This Report is available on the PNG LNG website, www.pnglng.com. Printed copies are also available.

ExxonMobil

PNG LNG is operated by a subsidiary of ExxonMobil in co-venture with:



Contents

Executive summary	i	6 Environmental management	41
Production	i	6.1 Air	41
Safety and health	i	6.2 Noise	41
Environment	ii	6.3 Water	42
Workforce development	iii	6.4 Materials management	45
Supporting Papua New Guinean businesses	iii	6.5 Spill prevention and response	45
Social development	iv	6.6 Waste management	45
Stakeholder and community engagement	v	6.7 Reinstatement, erosion and sediment control	47
1 Overview	1	Case study: Preserving air quality	49
1.1 Production update	1		
Case study: It's a bird's life at the LNG Plant site	5	7 Biodiversity	51
		7.1 Biodiversity management	51
2 Environmental and social framework	7	7.2 Monitoring programs	51
2.1 Approach	7	7.3 Ecological management	56
2.2 Management of Change	7	7.4 Quarantine management	57
		7.5 Invasive species, pests and plant pathogens	57
3 Procurement and supply	9	7.6 Access control	59
3.1 Supplier development	9	Case study: Safeguarding biodiversity	60
3.2 Enterprise Centre	9		
4 Communities	13	8 Performance	65
4.1 Community investment	13	8.1 Incidents	65
4.2 Community grievance management	24	8.2 Monitoring and evaluation	65
4.3 Resettlement	25	8.3 External monitoring	66
4.4 Compensation	25	Case study: Regulatory team manages compliance	67
Case study: Supporting Papua New Guinea's teachers	26		
		9 Stakeholder engagement	69
5 Workforce	29	9.1 Communities	69
5.1 Workforce composition	29	9.2 Government	70
5.2 Workforce training	29	9.3 Media	72
5.3 Workforce health	32	10 Acronyms	75
5.4 Workforce safety	33		
5.5 Security	36		
5.6 Worker welfare and conditions	36		
Case study: Global recognition for EMPNG health programs	39		



Executive summary

“As we reflect on EMPNG’s achievements over the past year it is important to remember the stakeholder partnerships that have made our success possible.”

Andrew Barry, Managing Director, ExxonMobil PNG Limited

ExxonMobil Papua New Guinea (EMPNG) has safely produced more than 19 million tonnes of Liquefied Natural Gas (LNG) and delivered 264 LNG cargoes since production began. Of this, 7.9 million tonnes of LNG was produced and 108 cargoes delivered during 2016, which is approximately 14 percent above the original design specification of 6.9 million tonnes per annum.

EMPNG, a subsidiary of Exxon Mobil Corporation, manages and operates the Papua New Guinea Liquefied Natural Gas (PNG LNG) production facilities on behalf of co-venture partners: Oil Search Limited, Kumul Petroleum Holdings Limited, Santos Limited, JX Nippon Oil and Gas Exploration Corporation, Mineral Resources Development Company Limited, and their affiliates. This Annual – Social and Environmental Report provides a progress update on EMPNG’s social and environmental commitments from 1 January – 31 December 2016.

Production

Two production milestones were celebrated during 2016 with the loading of the 200th LNG cargo in June and loading of the first cargo on the second custom-built PNG LNG vessel, the *Kumul*.

On 24 February, Papua New Guinean Prime Minister, the Honourable Peter O’Neill, also officially opened EMPNG’s new Port Moresby office.

Safety and health

EMPNG has completed another year without a Lost Time Incident and continued its record of zero Lost Time Incidents since production began, bringing the record to 1295 days.



Loading of the first cargo on the second custom-built PNG LNG vessel, the *Kumul*

As well as strong safety performance, EMPNG has demonstrated innovative community health initiatives and achieved recognition from two global industry associations.

IPIECA, the global oil and gas industry association for environmental and social issues, featured EMPNG’s Community Health Impact Management Program as an example of industry best practice in its *Health impact assessment* guide, while EMPNG’s community health partnerships were highlighted at the Society of Petroleum Engineers International Conference and Exhibition on Health, Safety, Security, Environment, and Social Responsibility held in Norway in April 2016.

During 2016, EMPNG and the PNG Tribal Foundation helped local hospitals with donations of medical equipment and supplies.

In November, four shipping containers of medical supplies were delivered, with two donated to the Port Moresby General Hospital and the other two delivered to Angau Memorial Hospital.

264

LNG cargoes delivered to customers

Opposite:

Lower Kikori Delta, Gulf Province

A fifth container of medical supplies was delivered to Daru Hospital in December. The containers were donated from the United States with assistance from Project C.U.R.E.

A five-day workshop was held in Tari in July to train local healthcare workers to correctly identify and treat acute malnutrition in children.

The workshop, conducted by the National Department of Health in collaboration with the University of Papua New Guinea School of Medicine and Health Sciences, involved 20 health care workers from Tari Hospital and other health centres throughout the Hela Province. Funding for the workshop was provided by UNICEF and through EMPNG's partnership with the Texas Children's Hospital and Baylor College of Medicine.

Since 2014, nearly 2000 children have been treated for malnutrition through the program. Texas Children's Hospital physicians are also supervising 19 research programs in paediatric care and public health in Papua New Guinea.

To commemorate World Tuberculosis Day on 24 March, EMPNG delivered tuberculosis awareness, free testing and prevention programs to workers and local communities. Tuberculosis awareness talks were also conducted with local schools.

Environment

A significant environmental milestone was achieved during 2016 with the completion of a revised Biodiversity Strategy, a supporting Biodiversity Implementation and Monitoring Program, and four biodiversity protocols. These revisions captured lessons learned during early implementation of the Biodiversity Strategy, feedback from stakeholders, and the results of biodiversity surveys conducted as part of the Biodiversity Implementation and Monitoring Program.

EMPNG's biodiversity activities during 2016 also included progressing the biodiversity offset program. In March and September, workshops were conducted with 125 conservation researchers and practitioners to address topics such as biodiversity and conservation research, best practices, policies, and partnerships in Papua New Guinea.

In April, November and December, EMPNG's Biodiversity team visited seven villages in the Lower Kikori Delta to conduct community resource use mapping, provide information about the biodiversity offset program and raise awareness about invasive species.

Community resource use mapping enables community members to identify important resource areas, and determine the status of these areas, so they can implement strategies to protect their resources. The communities were highly receptive to participating in the biodiversity offset program.

New programs to deliver Postgraduate Diploma and Masters in Conservation Management degrees focusing on biodiversity conservation were developed during 2016. These courses will be introduced in 2017 in partnership with the Mama Graun Conservation Trust Fund and the University of Papua New Guinea. Masters degree scholarships will also be offered from 2017.

A detailed freshwater ecology program examines the health of aquatic species in rivers surrounding Upstream area facilities.

Post-construction freshwater ecology monitoring conducted in September indicated that river systems had recovered from any short-term impacts caused by the construction of PNG LNG facilities. The most pronounced recovery was observed at Akara Creek downstream of the Hides Gas Conditioning Plant (HGCP).

At this site, the macro-invertebrate community composition and diversity had shown strong recovery, exceeding previous post-construction survey predictions.



A plant in the genus *Psychotria* discovered for the first time during biodiversity surveys. The flowers of this shrub are among the largest known for the genus. This new species is only found in one location on Hides Ridge

Air dispersion models, using actual emissions data collected between June 2015 and June 2016 for PNG LNG facilities, were completed during the second half of the year. This post-construction modelling confirmed predictions of no off-site impacts for normal operating emissions as presented in the PNG LNG Environmental Impact Statement.

Workforce development

More than 2500 workers, including EMPNG employees and contractors, were employed in production-related roles in 2016. Over 2000 of these were Papua New Guinean citizens, who comprised 82 percent of the workforce.

Employment of workers from areas surrounding EMPNG facilities is a priority for EMPNG. Of the total Papua New Guinean workforce, 37 percent are employed at worksites in their local area. Another 36 percent are employed from the broader regional areas in which the company operates. Other Papua New Guinean workers are employed from elsewhere in the country.

During 2016, the equivalent of 96,800 hours of training were delivered through 2180 courses. Ninety-five percent of all training hours were delivered to Papua New Guinean citizens.



EMPNG's first Production Engineer, Gerard Schulze at Hides

Thirty-nine Operations and Maintenance trainees completed the Advanced Skills training component of the Operations and Maintenance training program at the LNG Plant and HGCP in December. This is the first group of Operations and Maintenance trainees to complete Advanced Skills training in Papua New Guinea. The training was previously conducted in production facilities in Canada and Malaysia for the first and second intakes respectively.

EMPNG has funded scholarships for two intakes of 16 trainees to attend the Kumul Petroleum Academy in Port Moresby, which is the former Port Moresby Construction Training Facility that was handed over to the Papua New Guinean Government in 2014. The first intake of scholarship recipients began their 15-month training program in August.

Toward the end of 2016, nine wastewater treatment plant operators completed professional accreditation at the HGCP.



Kumul Petroleum Academy scholarship recipients Kwalimu Hiri and Micah Aluy learn how to work on flanges at the Academy in Port Moresby

These operators are among the first in Papua New Guinea to receive this accreditation, which is nationally recognised in Australia.

Supporting Papua New Guinean businesses

EMPNG uses the services of nine landowner companies (Lancos) and some 150 non-Lanco Papua New Guinean businesses for production-related activities. Lancos provide services such as labour hire, maintenance, transportation, fuel distribution, freighting and vegetable supplies.

Non-Lanco Papua New Guinean businesses are used for services including security, freight and logistics, transportation of personnel, food supply, customs clearance, surveying, maintenance supplies, medical services and construction material testing.

In 2016, EMPNG's total in-country spend on third party services was more than PGK337 million (US\$106 million). More than PGK150 million (US\$47 million) of this was spent on Lanco services.

Since the start of production, EMPNG has spent more than PGK1.2 billion (US\$378 million) on Papua New Guinean services. This includes almost PGK514 million (US\$162 million) spent with Lancos.

In March 2016, EMPNG and the Papua New Guinea Institute of Banking and Business Management announced a 12-month continuation of their long-standing partnership to develop the capacity and skills of Papua New Guinean businesses through the Enterprise Centre.

82%
of the production
workforce is
Papua New
Guinean

96,800
hours of training
delivered

In October, the Enterprise Centre hosted a Local Supplier Engagement forum with more than 200 local business owners. The forum aimed to educate business owners about topics such as: governance and leadership; safety, health and environment; compliance; and business ethics.

The equivalent of 6000 days of training were completed at the Enterprise Centre during 2016, with support from EMPNG and other organisations.

Social development

EMPNG's community livelihood improvement project, which was launched in August 2015, continues to help develop the capacity of community groups in the Upstream area.

The project is designed to educate and encourage community groups to improve the livelihoods and standards of living of their members, and to generate household and group income from small enterprise development.

By the end of December, the project had supported 17 women's groups with the development of skills such as land preparation, crop planting and poultry production. To date, more than 500 women and almost 130 men have benefitted from the program and gained skills in distributing planting materials and seeds, improved land management techniques, good crop management practices, poultry distribution, and improved food and health literacy and hygiene.

The Agricultural Livelihood Project, which builds on the food and agricultural program introduced to LNG Plant site communities in 2013, is supporting local farmers with agricultural training and materials to help them achieve sustained income to benefit their own household and the wider community. During 2016, 107 households in LNG Plant communities received agricultural training, while another 80 farmers received ongoing mentoring support. More than 4400 one-on-one mentoring and advisory support sessions were conducted during the year.

In August, EMPNG provided new teachers' houses for Papa Elementary School and Porebada, Boera, and Lea Lea primary schools in LNG Plant site communities. In addition to teacher housing, EMPNG is supporting the PNG Teaching Excellence Awards that were launched in late 2016 as part of the Prime Ministers' Excellence Award program.

In November, EMPNG completed the construction of a new clinic building and staff house for Para Clinic in the Hela Province.

EMPNG, in partnership with the Hides Special Purposes Authority Inc. and local Lanco the Hides Gas Development Company Limited, invested PGK1 million (US\$315,000) in the new infrastructure to improve healthcare for local communities.



From left: ExxonMobil Production Company Regional Vice President, Asia Pacific Region, Raymond Jones, Hides Special Purpose Authority Inc. Chairman, Lemson Mabiria and EMPNG Managing Director, Andrew Barry at the Para Clinic handover

More than 1200 students from 18 schools participated in the ExxonMobil Science Ambassador Program in 2016. Fifty-five EMPNG representatives delivered 45 sessions of the Program to eight schools in Hides, four schools in LNG Plant site communities and six schools in Port Moresby. For the first time, the Program was delivered to Gerehu and Carr Memorial and Coronation primary schools in Port Moresby.



Mananda Primary School students participating in the Science Ambassador Program in Hides

EMPNG sponsored nine Papua New Guinean women to attend the Centre for Development and Population Activities Global Women in Management (GWIM) program held in Jakarta, Indonesia from 18 April to 13 May 2016. These are among 62 Papua New Guinean women who EMPNG have supported to participate in the GWIM program since 2006.



EMPNG volunteers helping Buk bilong Pikinini during National Book Week

During 2016, the GWIM program celebrated its 10th anniversary in Papua New Guinea. In March, the inaugural Advancing PNG: Women Leaders Network Inc. annual general meeting was held in Port Moresby. The Network was established to ensure GWIM participants continued to support each other and share ideas to influence positive change in Papua New Guinea.

Forty women from Porebada, Boera, Papa, and Lea Lea villages have completed financial literacy training conducted by Nationwide Micro Bank (MiBank) with support from EMPNG. The training has helped these women understand how to make, manage and invest money. The women are transferring their new financial literacy skills to their respective communities.

During 2016, EMPNG and the Australian Government jointly launched scholarships through the Australia Awards Pacific Scholarships program. The Australia Awards – PNG LNG Scholarships program focuses on supporting students who are living in rural and remote provinces where EMPNG has its operations. Seven students are currently in the Scholarships program.

EMPNG has also provided a PGK350,000 (US\$110,250) *Pidu* or 'dolphins and dugongs' research scholarship to support three postgraduate students with their research into protecting the unique Australian snubfin dolphin (*Orcaella heinsohni*). In the Pacific Islands, this species is only found in the Kikori River Delta making it a unique species for Papua New Guinea.

EMPNG has committed an additional PGK282,000 (US\$89,100) to the Port Moresby Nature Park for its educational programs and the *Piku* Project. This contribution is part of EMPNG's ongoing sponsorship of the Park, which commenced in 2013 and has enabled the Park to develop a structured school excursion program.

Close to 60,000 students have participated in the excursion program.

EMPNG also contributed to World Wildlife Day activities held at the Nature Park in March 2016, with more than 2000 people participating in the day. To date, EMPNG's total contribution to Port Moresby Nature Park has reached more than PGK2.3 million (US\$724,500).

More than 1400 volunteer hours were recorded with over 360 EMPNG employees engaged in 17 volunteer activities during 2016.

Stakeholder and community engagement

EMPNG conducted 1795 formal community engagements in 136 communities and 9269 informal engagements in 176 communities, during 2016. These engagements involved more than 41,000 attendees.

During 2016, EMPNG started community tours of the HGCP, with a group of 11 women and six men from the Belopa Community Group being the first to participate and learn about Hides operations.

As part of the tour, the group visited the Hides medical clinic for a health talk about breast cancer awareness. By the end of 2016, four community groups had completed HGCP site tours.

At the LNG Plant site, Boera and Porebada primary school students were among eight school and community groups to tour the LNG Plant facilities in 2016.

EMPNG's site tours are intended to help communities better understand what life is like for workers at the LNG Plant and HGCP. In addition to community groups the tours are open to school students, church groups, youth groups and women's groups.

By the end of 2016, more than 250 dignitaries had participated in EMPNG's advocacy program and facility site tours.

"Now that EMPNG has settled into production operations, we continue to work together with communities, governments and other stakeholders on a single focused goal to create lasting social, environmental and economic opportunities for Papua New Guinea."



Andrew Barry
Managing Director,
ExxonMobil PNG Limited

41,000+
attendees at
community
engagements



1 Overview

This PNG LNG Environmental and Social Report – Annual 2016 provides a progress update on production activities from 1 January to 31 December 2016.

ExxonMobil PNG Limited (EMPNG) is the operator of the US\$19 billion Papua New Guinea Liquefied Natural Gas (PNG LNG) gas production and processing facilities located in the Southern Highlands, Hela, Western, Gulf and Central provinces of Papua New Guinea. EMPNG's production operations began on 23 April 2014.

More than 700 kilometres of pipeline connect the facilities, which include a gas conditioning plant in Hides and liquefaction and storage facilities near Port Moresby. These facilities have the capacity to produce around 7.9 million tonnes of LNG per year, which is approximately 14 percent above the original design specification of 6.9 million tonnes per annum.

The location and elements of EMPNG's facilities are shown in Figure 1.1.

Over the 30-year life of the facilities, approximately 325 billion cubic metres of LNG are anticipated to be produced to provide a long-term supply to Asia Pacific region customers including: China Petroleum and Chemical Corporation (Sinopec); Osaka Gas Company Limited; JERA Company Inc.; and CPC Corporation, Taiwan.

This Report, along with previous Environmental and Social Reports can be found on the PNG LNG website.



Visit the website at www.pnglng.com

Printed copies and translated summaries are made available to Papua New Guinean citizens who may have limited access to the internet.

1.1 Production update

EMPNG has safely produced more than 19 million tonnes of LNG and delivered 264 LNG cargoes since production began. Of this, 7.9 million tonnes of LNG was produced and 108 cargoes delivered during 2016.



Plate 1.2 – From left: Asia Pacific Vice President for Production, Raymond Jones; Asia Pacific Vice President for Geoscience Exploration, Kim Bates; EMPNG Managing Director, Andrew Barry; Papua New Guinean Prime Minister, the Honourable Peter O'Neill; Minister for Petroleum and Energy, Ben Micah; and Asia Pacific Vice President for Development, Jon Gibbs, at EMPNG's Port Moresby office opening

Hides Gas Conditioning Plant

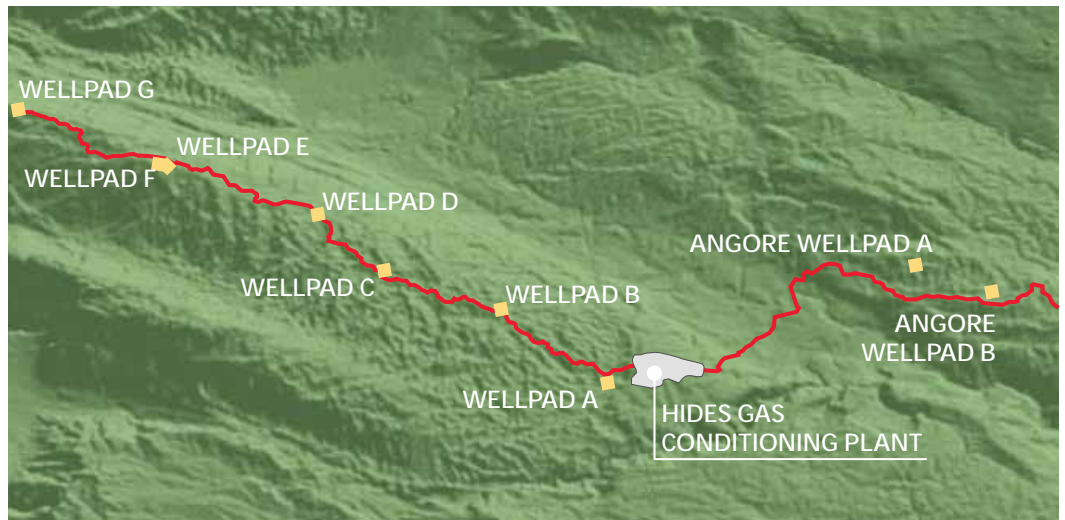
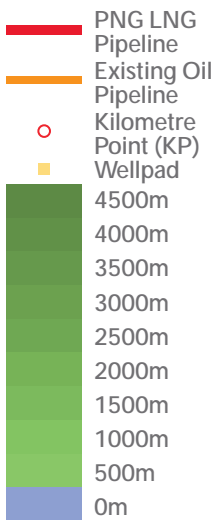
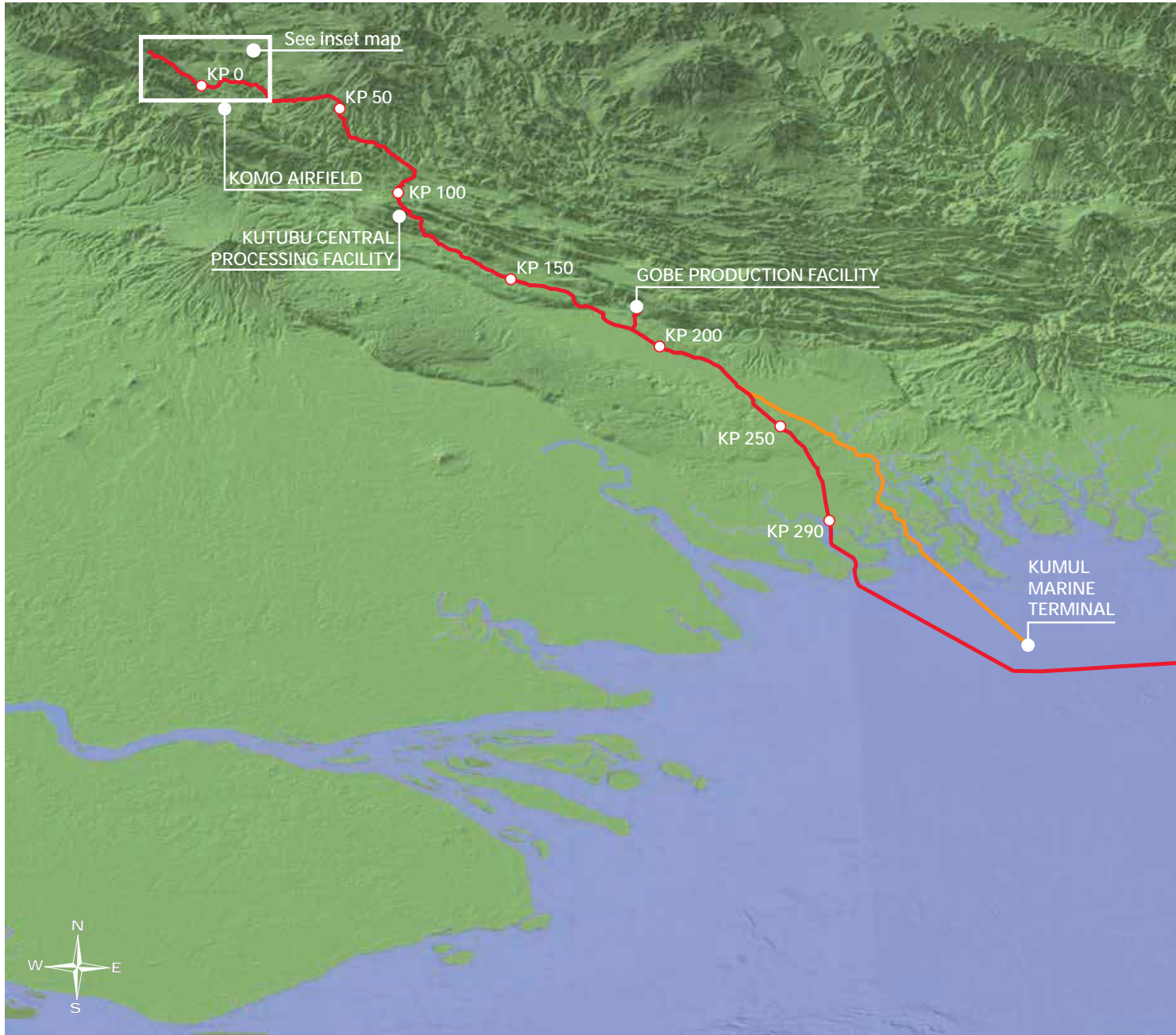
The eight Hides production wells are online and continue to supply the Hides Gas Conditioning Plant (HGCP), which is meeting supply requirements of the LNG Plant. Condensate production remains steady.

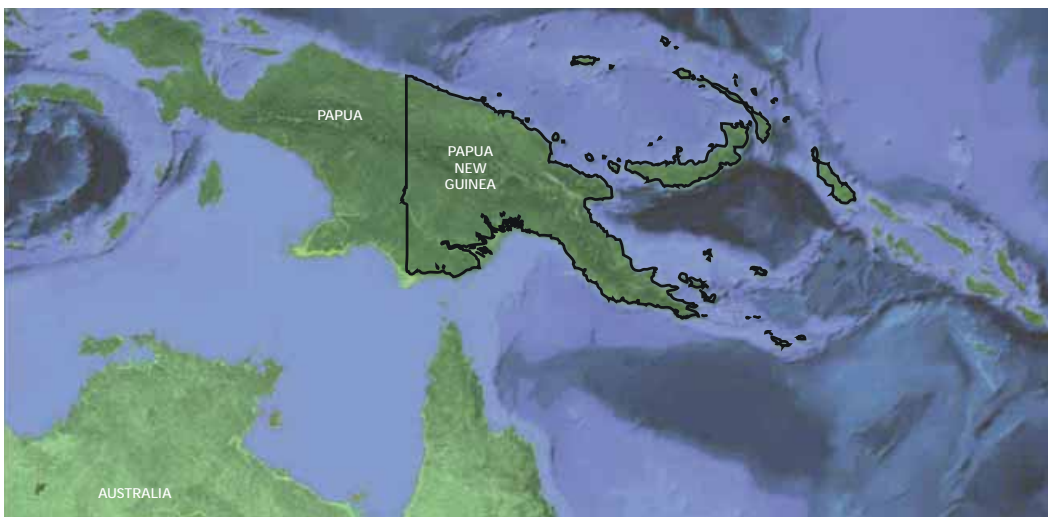
Opposite:

Plate 1.1 – Loading the second custom-built PNG LNG vessel, the *Kumul*, with its first cargo

EMPNG facilities

Figure 1.1





Drilling

Following the completion of drilling activities at the end of 2015, the demobilisation of drilling equipment was completed in early 2016.

LNG Plant

LNG production is steady, with process optimisation at both the LNG Plant site and HGCP resulting in the LNG Plant operating above design capacity during 2016.

Compressor servicing was conducted in April and October.

During 2016, monitoring found that species diversity had increased at the LNG Plant site, especially in local and migrating water birds, as discussed in *Case study: It's a bird's life at the LNG Plant site*.

Marine facilities

All five PNG LNG vessels were in service by the end of 2016. Since PNG LNG's production facilities have been safely operating above their design capacity, additional charter vessels have been engaged to transport extra LNG cargoes to customers in Asia.

Port Moresby office

On 24 February, Papua New Guinean Prime Minister, the Honourable Peter O'Neill, officially opened EMPNG's new Port Moresby office.



Plate 1.3 – EMPNG Managing Director, Andrew Barry, Papua New Guinean Prime Minister, the Honourable Peter O'Neill and Minister for Petroleum and Energy, Ben Micah, unveil the plaque at the official office opening

Pre-construction surveys

The pre-construction survey process has been completed for Phase 2 of PNG LNG, also known as the Angore Gathering System. The Angore Gathering System involves the construction of an 11-kilometre pipeline to connect the production wells at Angore Wellpad A to the HGCP.

Up Close: EMPNG celebrates two production milestones

During 2016, EMPNG celebrated two production milestones with the loading of its 200th LNG cargo in June and the loading of the first cargo on the second custom-built PNG LNG vessel, the *Kumul*.

The *Kumul* is the sister vessel to the *Papua*, which was also custom-built for PNG LNG and began its service in February 2015. Both the *Kumul* and the *Papua*, each with a capacity of 169,000 cubic metres, are the largest LNG carriers ever to be built in China. At 290 metres long, these vessels are almost as long as three football fields.

The *Kumul* and *Papua* are among five LNG vessels currently in service with EMPNG. Two others, the *Spirit of Hela* and *Gigira Laitebo*, have a capacity of 174,000 cubic metres and the fifth vessel, *Velikiy Novgorod*, has a capacity of 168,000 cubic metres.

EMPNG Managing Director, Andrew Barry, said he appreciated the hard work and dedication of everyone who had been involved in production activities during the past two years.

"PNG LNG has grown into one of the most efficient and reliable LNG production operations in the world. Most importantly, we have achieved these outstanding results while maintaining our commitment to safety."

Andrew Barry
Managing Director, ExxonMobil PNG Limited



First loading of the *Kumul* at the LNG Plant Marine Terminal

Some social sensitivities were identified during the surveys. As a result, EMPNG's Production Environmental and Social Management Plan (ESMP) has been updated to include these social considerations.

Case study

It's a bird's life at the LNG Plant site



Collared sparrowhawk, brahmyn kite, little egret, rainbow bee-eater, Australian pelican, little pied cormorant, masked lapwing and whimbrel

Habitats in and near the LNG Plant site are attracting many animals, particularly native birds.

The grassland, open woodland, savannah, mangrove and sub-coastal wetland habitats in and around the LNG Plant site have attracted an abundance of birdlife and other animals native to Papua New Guinea. Prior to construction, these habitats were exposed to frequent fires, hunting of wildlife, wood collection, use by vehicles and agricultural use. Since EMPNG fenced the site and controlled access, local wildlife has been able to flourish.

In particular, the nationally protected little egret (*Egretta garzetta*) has been frequently observed at the site. This species, and other egrets such as the cattle egret (*Bubulcus ibis*), find rich food sources during regular mowing of grassland areas at the site. Raptors, such as the brahmyn kite (*Haliastur indus*), whistling kite (*Haliastur sphenurus*), collared sparrowhawk (*Accipiter cirrocephalus*) and Australian kestrel (*Falco cenchroides*) use the site's trees, light posts and fences to search for prey.

For some species of resident breeding birds, populations are augmented by non-breeding seasonal migrants from Australia.

For example, the population of the brilliantly coloured rainbow bee-eater (*Merops ornatus*) expands from March/April to October. Wetland birds that have both resident and migratory populations include the wandering whistling duck (*Dendrocygna arcuata*), intermediate egret (*Mesophoyx intermedia*), Australian white ibis (*Threskiornis molucca*), Pacific black duck (*Anas superciliosa*), grey teal (*Anas gracilis*), little pied cormorant (*Phalacrocorax melanoleucos*) and masked lapwing (*Vanellus miles*). The site also provides a valuable stopover for migratory birds such as the whimbrel (*Numenius phaeopus*), plumed whistling duck (*Dendrocygna eytoni*), royal spoonbill (*Platalea regia*), black-winged stilt (*Himantopus himantopus*) and gull-billed tern (*Gelochelidon nilotica*).

Newly formed permanent ponds at the LNG Plant site attract ducks, Australian white ibis and little pied cormorants. From early 2016, Australian pelicans (*Pelecanus conspicillatus*) were seen at the ponds for the first time.



2 Environmental and social framework

To protect the wellbeing of workers, communities and the environment in and around production facilities, EMPNG operates in accordance with requirements of the Production ESMP.

2.1 Approach

The Production ESMP applies lessons learned from the construction phase, along with ExxonMobil's Operations Integrity Management System requirements and the International Finance Corporation Performance Standards.

The ESMP is comprised of two Environmental Management Plans and seven Social Management Plans, as shown in Figure 2.1. The Environmental Management Plans align geographically to production facilities, while the Social Management Plans are based on key social themes.

The ESMP's requirements, and those of its supporting management plans, apply during normal operating conditions and in reasonably foreseeable abnormal operating conditions or emergency situations. The ESMP can be viewed on the PNG LNG website.



Visit the website at www.pnglng.com

In consultation with key stakeholders, EMPNG periodically updates the ESMP to meet ongoing operational, environmental and social needs.

2.2 Management of Change

Temporary or permanent modifications to facilities and changes to previously approved documents are managed through EMPNG's Management of Change process. Before any proposed change can be made, requirements such as health, safety, security, environmental and social management, operability and maintenance, regulatory compliance, cost and scheduling are considered.

EMPNG classifies changes according to how they need to be managed. Class I changes require Lender Group review before implementation, while Class II changes involve Lender Group notification in the PNG LNG Environmental and Social Report.

No Class I or II changes were raised during 2016.

Opposite:

Plate 2.1 – A tube-flowered rhododendron (*Rhododendron* sp.) unique to Papua New Guinea where it is only found on the Hides Ridge and at one other location near the Hindenburg Wall

Production Environmental and Social Management Plan structure

Figure 2.1





3 Procurement and supply

EMPNG procures goods and services for production activities from local suppliers wherever possible. The Enterprise Centre helps develop the capacity of Papua New Guinean businesses.

3.1 Supplier development

EMPNG uses the services of nine landowner companies (Lancos) and some 150 non-Lanco Papua New Guinean businesses for production-related activities. Lancos provide services such as labour hire, maintenance, transportation, fuel distribution, container freighting and vegetable supplies. Non-Lanco Papua New Guinean businesses are used for services including security, freight and logistics, transportation of personnel, food supply, customs clearance, surveying, maintenance supplies, medical services and construction material testing.

In 2016, EMPNG's total in-country spend on third party services was more than PGK337 million (US\$106 million). More than PGK150 million (US\$47 million) of this was spent on Lanco services.

Since the start of production, EMPNG has spent more than PGK1.2 billion (US\$378 million) on Papua New Guinean services. This includes almost PGK514 million (US\$162 million) spent with Lancos.

3.2 Enterprise Centre

In March 2016, EMPNG and the Papua New Guinea Institute of Banking and Business Management announced a 12-month continuation of their long-standing partnership to develop the capacity and skills of Papua New Guinean businesses through the Enterprise Centre.

In May, the Institute officially opened a new 250-seat auditorium to support training for Papua New Guinean businesses.

The Institute also honoured former EMPNG General Manager – Procurement, Mike Skillington, for his service to the Enterprise Centre.



Plate 3.2 – EMPNG General Manager – National Content, Susil Nelson-Kongoi accepts an Institute of Banking and Business Management Honorary Fellow award on behalf of former EMPNG General Manager – Procurement, Mike Skillington, from EMPNG Managing Director, Andrew Barry

In October, the Enterprise Centre hosted a Local Supplier Engagement forum with more than 200 local business owners. The forum aimed to educate business owners about topics such as: governance and leadership; safety, health and environment; compliance; and business ethics.

The equivalent of 6000 days of training were completed at the Enterprise Centre during 2016, with support from EMPNG and other organisations. Capacity building services were provided to Papua New Guinean Government departments including the Department of Defence and Department of Justice.

Opposite:

Plate 3.1 – Representatives from the Lea Lea Village women's group attending Director's training at the Enterprise Centre



Plate 3.3 – Business owners attending the Local Supplier Engagement forum in the new Institute of Banking and Business Management auditorium

The Centre also provided advice and assistance with projects such as the Wafi-Golpu Gold Project and the #GameChanger initiative of the United Nations Development Programme.

The equivalent of 600 days of training were delivered to Lancos and businesses owned by women as a result of increased demand from these businesses during 2016. For example, Lancos such as Hides Gas Development Company Limited received training on topics including essential skills for directors, introduction to supervision, safety in the workplace, customer service and sales fundamentals.

A senior executive from Hides Gas Development Company Limited was also sponsored by EMPNG to participate in the Torrens University Australia Master of Business Administration program. The sponsorship was arranged with assistance from the Enterprise Centre.

EMPNG sponsored 38 business assessments conducted by the Enterprise Centre during 2016, including six Lanco assessments. Business assessments help suppliers to identify gaps in their business processes and develop business improvement plans to strengthen their management and operational capabilities.

Since the Centre's establishment in 2010, 433 business assessments have been completed and approximately 26,000 training days delivered.



Plate 3.4 – EMPNG General Manager – Safety, Health and Environment, Dennis Vidmar presenting at the Local Supplier Engagement forum

Demand for business advisory and mentoring services also increased in 2016, with more businesses seeking assistance from the Centre in the areas of business and financial management, corporate governance and business improvement plans. Almost 280 advisory and mentoring hours were delivered over 35 days during 2016.



Plate 3.5 – Trainees from Hides Gas Development Company Limited with their Certificates of Participation for the introduction to supervision course

To date, more than 1230 advisory and mentoring days have been provided for Papua New Guinean businesses.

Some 500 entrepreneurs were assisted through information workshops and the use of workstations and business meeting facilities during 2016. The Enterprise Centre has supported more than 18,200 Papua New Guinean entrepreneurs to date.

By the end of December, more than 550 job vacancies were entered into the PNG Employment and Supplier Database and 40 approved suppliers were registered.

The Database was developed to connect job seekers with job opportunities, and businesses with business opportunities, from projects outside of PNG LNG.



4 Communities

Working together with communities, non-government organisations and government agencies, EMPNG aims to deliver programs that build the capacity of local communities and community-based organisations.

4.1 Community investment

EMPNG supports economic empowerment and sustainable community development in Papua New Guinea through implementing its Community Development Support Management Plan and community investment programs.

The Plan focuses on education, health, women's economic opportunities, environmental initiatives and agriculture. Activities are conducted as appropriate to their relevant geographical areas. These include:

- local area programs such as planned activities conducted near production facilities
- national programs encompassing EMPNG's support for national initiatives and Port Moresby projects.

EMPNG and relevant partner organisations work together to deliver social development programs at both the local and national level in: education; health; law and justice; and livelihood support such as agriculture, cultural promotion and the environment.

4.1.1 Local area programs

EMPNG's local area programs are designed to build sustainable capacity for communities surrounding production facilities. These programs include supporting the development of infrastructure and education initiatives in schools and local communities.

During 2016, local area programs focused on delivering infrastructure and other support to schools and health care providers in villages near production facilities.

Upstream area and pipeline Right of Way

EMPNG's community livelihood improvement project, which was launched in August 2015, continues to help develop the capacity of community groups in the Upstream area. The project is designed to educate and encourage community groups to improve the livelihoods and standards of living of their members, and to generate household and group income from small enterprise development.



Plate 4.2 – HGCP Senior Field Superintendent, Ken Rhyason, viewing gardens grown by the Mbelopa Women's group as part of the community livelihood improvement project

By the end of December, the project had supported 17 women's groups with the development of skills such as land preparation, crop planting and poultry production. To date, more than 500 women and almost 130 men have benefitted from the program and gained skills in distributing planting materials and seeds, improved land management techniques, good crop management practices, poultry distribution, and improved food and health literacy and hygiene.

Opposite:

Plate 4.1 – Seri Heagi Lohia, from Porebada, with a recently planted coconut seedling in his family food garden

EMPNG continues to support the annual Kutubu Kundu and Digaso Festival with a PGK50,000 (US\$15,750) sponsorship provided during 2016. The Festival was held in September and this year's theme was *"Tingim Gut Bihain Bilong Yumi"* or "Our actions today will determine our future" to reinforce the importance of preserving local traditional cultures.

EMPNG also celebrated Papua New Guinea's 41st Independence Day in September with lunch-and-learn sessions and information booths about traditional cultures at the Port Moresby office.



Plate 4.3 – EMPNG Independence Day celebrations

In November, EMPNG completed the construction of a new clinic building and staff house for Para Clinic in the Hela Province. EMPNG, in partnership with the Hides Special Purposes Authority Inc. and local Lanco Hides Gas Development Company Limited, invested PGK1 million (US\$315,000) in the new infrastructure to improve healthcare for local communities. The clinic includes solar power to cater for equipment such as large vaccine refrigerators. Office equipment was also donated for the clinic office. The clinic serves more than 5000 residents from Hides, Para and Laite villages. In addition to the new clinic infrastructure, an ambulance was donated to the Para community.



Plate 4.4 – The new ambulance for the Para community

Kikori Rural Hospital also received a new ambulance from EMPNG during 2016. The ambulance will ease the Hospital's challenge with mobilising patients during emergency situations. Kikori Rural Hospital serves more than 20,000 people in Kikori and surrounding communities, including Gobe and Samberigi in the Southern Highlands Province. Much of the Kikori Rural Hospital's service is focused on the prevention and treatment of tuberculosis.



Plate 4.5 – Upstream Community Development Support Analyst, Debbie Maraki, gives Kikori Rural Hospital Administrator, Larry Kaipu, the key to the donated ambulance

EMPNG provided support with installing a VHF radio at the Benaria Clinic during 2016 to improve the clinic's communications system. This follows support that was provided in late 2015 with maintenance work, which comprised plumbing to ensure running water and refurbishment of the clinic's dispensary. The plumbing and refurbishment work was the first such maintenance that had been completed at the clinic since it was built in the 1960s. The Benaria Clinic serves more than 17,000 people from Benaria Village and surrounding communities.



Plate 4.6 – Celebrating the completion of maintenance works at the Benaria Clinic



Plate 4.7 – Juni Primary School students participate in the pilot sports for development program

Solar panels were installed at both the Paua and Inu clinics during 2016 to provide lighting for after-hours services. Pimaga Rural Hospital and Tari Hospital both received new water tanks, with Tari Hospital also receiving water and wastewater treatment facilities.

Water tanks, mattresses, linen and office equipment were donated to various education centres in the Hela Province during the year, including Dauli Teachers College, Kikori Secondary School and numerous primary schools in Komo, Angore and Hides.

Maintenance work was conducted on a double classroom at Paua Primary School and 40 desks were provided for the upgraded classroom during 2016, as well as two new toilets. At Koroba Secondary School, a new water pump was provided to give students access to clean drinking water. A donation of new school desks was also made to Tiute Primary School in the Hela Province.

In late 2016, a pilot sports for development program focusing on basketball was introduced to Juni Primary School students in partnership with the Basketball Federation of Papua New Guinea and the Papua New Guinea Olympic Committee. The program provided lessons on basketball skills and the importance of the Olympic values of respect, friendship and excellence. As part of this program, EMPNG is funding an upgrade of Juni Primary School's basketball court.

Sporting merchandise such as balls, whistles and trophies was delivered to Kopi Village in September to support the local community's Independence Day games.

At the end of the 2016 school year, EMPNG donated graduation awards for six primary schools in the Upstream area and provided academic achievement awards to another 13 schools.

Surplus office stationery was donated for teachers and students at Tubo, Kantobo and Inu primary schools and to Tubage Elementary School.

A baseline needs assessment was conducted on 10 primary schools in the Upstream area during 2016 to assess School Board of Management structures and capacities and identify education goals for the next three to five years. The assessment was completed with funding support from EMPNG.

LNG Plant site

EMPNG's Agricultural Livelihood Project, which builds on the food and agricultural program introduced in 2013, is supporting local farmers in LNG Plant site communities with agricultural training and materials. The Project aims to provide farmers with an avenue for sustained income generation to benefit their own household and the wider community.

During 2016, 107 households in LNG Plant communities received agricultural training, while another 80 farmers received ongoing mentoring support. More than 4400 one-on-one mentoring and advisory support sessions were conducted during 2016.



Plate 4.8 – Pak choi seedlings ready for distribution through the Agricultural Livelihood Project

By the end of December, 84 mango seedlings, 535 coconut seeds, 535 banana suckers, 214 guava seedlings, 1200 sweet potato cuttings, 107 African yam tubers and 5097 drought tolerant cassava cuttings were provided to farmers involved in the Project. In addition, 92 seed starter packs of vegetable crops, such as pak choi, watermelon and pumpkin, were introduced to farming households along with more than 26 kilograms of corn seed. These open pollinated seed varieties allow farmers to save and maintain seed supplies. Since 2013, 496 farming households have participated in the Agricultural Livelihood Project.



Plate 4.9 – Australian National University Enterprise Livelihood Specialist, Michael Atuai, meeting with landowner, Hane Kohu, at her pak choi nursery in Boera Village

Forty women from Porebada, Boera, Papa, and Lea Lea villages have completed financial literacy training conducted by Nationwide Micro Bank (MiBank) with support from EMPNG. The training has helped these women understand how to make, manage and invest money. The women are transferring their new financial literacy skills to their respective communities.

Another 40 women from LNG Plant site villages have completed one week of mentoring conducted by the Young Women's Christian Association with support from EMPNG.

The program was conducted as part of the RiseUp! Young Women's Leadership Program, which aims to educate and empower young women to lead change in their society.

These women will become mentors for young women participating in the RiseUp! Program.

Approximately 40 local-level government representatives and Ward councillors from LNG Plant site communities participated in a three-day budget tracking and governance workshop held in Boera Village in October. EMPNG sponsored this workshop.

Food and drink supplies were donated to the Hiri District Sports Council to support 200 athletes from Hiri, Koiari and Vanapa during the Provincial Games, which were held in April. Trophies and sporting shields were also donated to the Papa Koita and Buria Lea Lea Rugby League Associations for their end of season presentations.

EMPNG has provided new teachers' houses for Papa Elementary School and Porebada, Boera, and Lea Lea primary schools. After the delivery of School Board of Management training at the end of 2015, the schools identified the need for teacher housing so that teachers could more effectively prepare lessons for their students. The teachers' houses were handed over to the schools in August as detailed in *Case study: Supporting Papua New Guinea's teachers.*

For the second consecutive year, more than 500 t-shirts were donated to students at Papa, Lea Lea, Boera and Porebada primary schools and Redscar High School as part of the 2016 Trukai Fun Run, which was held in June.

The Trukai Fun Run is an annual major fundraiser to support sporting events organised by the Papua New Guinea Sports Federation. Proceeds from EMPNG's purchase of Trukai Fun Run t-shirts went towards sending TEAM PNG to the 2016 Olympic Games in Rio.



Plate 4.10 – Trukai Fun Run t-shirts donated to Boera Primary School



Plate 4.11 – EMPNG and MiBank representatives with financial literacy graduates from Porebada, Boera, Papa and Lea Lea villages

Sporting equipment, stationery and end-of-year trophies and vouchers were also donated to Redscar High School, Boera and Papa primary and elementary schools, and Porebada and Lea Lea primary schools during 2016.

Pre-school teachers from Papa and Porebada Salvation Army pre-schools have completed early childhood educator training with funding support from EMPNG. Buk bilong Komuniti Program training provided teachers with skills in early childhood development including the Buk bilong Pikinini phonics routine, lesson planning, classroom management, positive behaviour management strategies, book reading strategies and managing a standard book lending register. The teachers were also introduced to the Buk bilong Pikinini Early Childhood Literacy and Awareness Program and related teaching resources.

Six containers consisting of 120 bedframes and mattresses, 80 air-conditioning units, 46 televisions and 80 fridges were among items donated to LNG Plant site communities from the demobilisation of PNG LNG construction camps in 2016. Donations also included storage racks, mirrors, lockers, printers, chairs, bins and LCD displays. These were all distributed to schools and health centres in the LNG Plant site communities of Papa, Lea Lea, Boera and Porebada.

In addition, building materials from demobilised PNG LNG camps were repurposed for use by the Daru tuberculosis and isolation ward, the Royal Papua New Guinea Constabulary (RPNGC) in Port Moresby, the Goroka community, and the Ministry of Communications and Information. EMPNG provided logistical support with the transportation of the donated building materials.

EMPNG is sponsoring the Papua New Guinea Cancer Foundation's free screening and cancer awareness program. The sponsorship has enabled cancer awareness raising workshops to be conducted in Papa and Lea Lea villages for the first time.

In September, the Wantok Musik Foundation consulted with Papa, Lea Lea, Boera and Porebada community leaders to discuss cultural heritage and music to preserve local cultures. The visit included recording traditional music and cultural dances and ceremonies of the Motu-Koita society.

The Wantok Musik Foundation is a not-for-profit music label representing indigenous and world music groups of Australia and Melanesia. Its cultural heritage community recording projects involve filming and recording audio of local cultural practices, traditions, oral history and music from indigenous societies and producing a CD/DVD to preserve and promote the culture and traditions from each target area.

4.1.2 National programs

EMPNG sponsored nine Papua New Guinean women to attend the Centre for Development and Population Activities Global Women in Management (GWIM) program held in Jakarta, Indonesia from 18 April to 13 May 2016.

The nine women: Kore Tau; Elizabeth Taurega; Margaret Aila; Miriam Gai; Ruth Kissam; Theresa Gizoria; Miriam Layton; Shirley Iragali and Rita Paru, are among 62 Papua New Guinean women who have been supported by EMPNG to participate in the GWIM program since 2006. During 2016, the GWIM program celebrated its 10th anniversary in Papua New Guinea.



Plate 4.12 – Participants at the GWIM program in Jakarta, Indonesia

Plan International USA coordinates the program and brings together women from diverse cultures and countries to share, examine and adapt best practices for expanding women's economic opportunities to meet the needs of individual communities and countries. Participants gain competencies in areas such as project and financial management, proposal writing, leadership and advocacy.

In March 2016, the inaugural Advancing PNG: Women Leaders Network Inc. annual general meeting was held in Port Moresby. The Network was established to ensure GWIM participants continued to support each other and share ideas to influence positive change in Papua New Guinea.

EMPNG has provided PGK427,000 (US\$134,505) to help establish the Network's secretariat, which supports the participation of women in events including the PNG Women in Business Expo, The Flower Cut Expo and the PNG Women's Forum. The secretariat currently has 62 members.



Plate 4.13 – Advancing PNG: Women Leaders Network interim President, Cathy Alex, and EMPNG Executive General Manager – External Relations, Daniel Worrall, welcome the appointment of Mary Michael as President of the Network at their first annual general meeting

Up Close: Celebrating a decade of Global Women in Management

In October, more than 300 people joined a group of GWIM alumnae to celebrate 10 years of the GWIM program in Papua New Guinea.

A masquerade ball was held to commemorate the milestone and raise funds for the Advancing PNG: Women Leaders Network, an organisation formed by GWIM alumni following the GWIM conference in Port Moresby in July 2014.

EMPNG has provided funding and support for Papua New Guinean women to attend GWIM training workshops conducted by Plan International USA in Jakarta, Indonesia, Washington DC and Port Moresby since 2006. There are currently 62 GWIM alumni members from 22 communities in 15 provinces in Papua New Guinea.



2016 GWIM participants in Indonesia, including nine women from Papua New Guinea

On 22 May 2016, EMPNG supported the Nipa-Kutubu District Council of Women with commemorating the annual *Haus Krai* at Pimaga Government Station in the Southern Highlands Province. The National *Haus Krai* calls for an end to violence against women and girls in Papua New Guinea. EMPNG provided awareness-raising materials and refreshments for more than 100 participants at the event.



Plate 4.14 – Nipa-Kutubu District Council of Women representatives at the National *Haus Krai*

EMPNG also supported the inaugural Men of Honour awards, which were presented in April 2016, to acknowledge the positive contributions of Papua New Guinean men in society. The awards covered five categories of education, leadership, ingenuity, sports and entrepreneurship. EMPNG Community Affairs Officer, Tuem Narewec, was announced runner-up for the Ingenuity Award for his work in founding the Bawii Community Learning and Development Centre in Jiwaka Province. The Centre provides programs such as early childhood education, elementary education, flexible open and distance learning, skills empowerment training for mothers and girls, an adult literacy program, early childhood teacher training, and basic safety training.



Plate 4.15 – Bawii Community Learning and Development Centre students perform traditional dances to welcome the Men of Honour awards

To commemorate National Literacy Week activities during September, EMPNG provided support for a Buk bilong Pikinini book fair that raised PGK14,000 (US\$4410) toward providing books for underprivileged children. EMPNG also sponsored a Buk bilong Pikinini television commercial to raise awareness about literacy for children, and EMPNG Managing Director, Andrew Barry, participated in the first Dads Read Event that involved some 100 fathers reading books with their children.



Plate 4.16 – EMPNG Managing Director, Andrew Barry (seated second from left) joins in the inaugural Buk bilong Pikinini Dads Read Event in September

EMPNG has donated PGK161,000 (US\$50,715) to support the work of Transparency International Papua New Guinea Inc. (TIPNG) in raising anti-corruption awareness.



Plate 4.17 – Author Iriani Wanma reads her book *Oa the Grasshopper and Kaipua the Caterpillar* to children during the Buk bilong Pikinini book fair

The donation will go towards supporting three of TIPNG's major activities: The Mike Manning Youth Democracy Camp; Know Your Basic Land Rights campaign; and the Sir Anthony Siaguru Walk Against Corruption. The Mike Manning Youth Democracy Camp teaches high school students basic principles of good governance and democracy. Participants also learn skills in advocacy and media.

The Know Your Basic Land Rights campaign educates people about the Papua New Guinea *Land Act 1996* and what they can do to protect their customary land from being exploited.

The Sir Anthony Siaguru Walk Against Corruption is TIPNG's major annual awareness-raising and fundraising event. EMPNG has supported TIPNG's activities since 2011.

EMPNG also donated PGK20,000 (US\$6300) to support the Coalition for Change PNG Inc. 2016 White Ribbon campaign, which focused on the elimination of violence against women and girls. The campaign is intended to raise awareness about family violence against women and girls in Papua New Guinea. EMPNG has supported White Ribbon Day since 2012.

The Salvation Army Red Shield Appeal received PGK47,619 (US\$15,000) to support its fundraising activities during 2016. This is the fourth consecutive year that EMPNG has provided support to the Salvation Army's social services programs in Papua New Guinean communities.

Education and training

During 2016, EMPNG and the Australian Government jointly launched scholarships through the Australia Awards Pacific Scholarships program. The Australia Awards – PNG LNG Scholarships program focuses on supporting students who are living in rural and remote provinces where EMPNG has its operations.

The Scholarships program aims to provide opportunities for students to complete tertiary studies in the fields of health and education.

Scholarships are offered at select institutions in Papua New Guinea, with successful applicants receiving full tuition fees, airfares and living allowances throughout the duration of their studies.

The selection of awardees is merit-based, with academic performance and the ability of applicants to contribute to their communities taken into consideration. The program aims to continue to build the foundation for a highly competent and capable professional Papua New Guinean workforce. Seven students are currently in the Scholarships program.

EMPNG has contributed PGK282,000 (US\$89,100) to the 2016 Papua New Guinea Olympic Committee's Olympic Values Education Program. The Program was launched in 2015 with support from EMPNG.

It integrates sporting values and physical activity into a cultural and educational framework, promoting the three Olympic Values of respect, friendship and excellence. The Program encourages students to realise ways in which these values are displayed in everyday life and how they can display the Olympic Values in their own behaviour and actions.

EMPNG has also provided a PGK350,000 (US\$110,250) *Pidu* or 'dolphins and dugongs' research scholarship to support three postgraduate students with their research into protecting the unique Australian snubfin dolphin (*Orcaella heinsohni*). In the Pacific Islands, this species is only found in the Kikori River Delta making it a unique species for Papua New Guinea.



Plate 4.18 – Australian snubfin dolphin (*Orcaella heinsohni*)

Through the scholarship, student Elizah Nagombi started his Masters coursework at James Cook University, Australia, in February. Wilma Maveria and Monica Kolkia commenced Honours programs with the University of Papua New Guinea in early 2016.



Plate 4.19 – Research scholarship recipients Monica Kolkia, Elizah Nagombi and Wilma Maveria

The scholarship, which is a collaboration between James Cook University and the University of Papua New Guinea, aims to protect the snubfin dolphin species and also seeks to establish what other marine mammals occur in the Kikori River Delta.

It involves working with Papua New Guinean communities to develop a community-based management plan that enables the long-term conservation of marine mammals in the Kikori region.

In July, EMPNG supported training for 13 of its community partner organisations to help them build skills in communications and media. The three-day training program was facilitated by the Divine Word University's Department of Communication Arts.

Fifteen training participants from the Advancing PNG: Women Leaders Network; Esmie Sinapa Development Consultants and Services; the PNG Tribal Foundation; the United Church; the Young Women Christian Association; the Evangelical Church of Papua New Guinea; the Business Council of PNG; Leadership PNG Inc.; the Papua New Guinea Olympic Committee; The Coalition for Change Inc.; the Salvation Army; Life PNG Care; and WeCARE! Papua New Guinea attended the program.

The training covered: the development of strategic communications and advocacy plans; newswriting; the use of mainstream media; interviews; photography; and online communications and social media. It involved both theoretical and practical sessions.

Life PNG Care has partnered with EMPNG to bring mobile education services to disadvantaged children in Port Moresby communities. Through the partnership, EMPNG has provided PGK32,200 (US\$10,140) to support fundraising activities for the mobile education program.

In addition to educational support, EMPNG has contributed PGK20,000 (US\$6300) to support the Business and Professional Women's Club with activities such as the International Women's Day fundraising breakfast held in March 2016. More than 400 people attended the breakfast, which helped raise awareness about women's issues in Papua New Guinea and promoted the Club's scholarship programs for girls and women. Since 2014, the Business and Professional Women's Club has provided 591 scholarships for girls in 24 educational institutions with a total scholarship value of approximately PGK595,000 (US\$187,425). All funds raised by the Club are used solely for the scholarships program.

Up Close: Scholarships grow community capacity

In partnership with local and international tertiary education providers, non-government organisations and government agencies, EMPNG is providing opportunities for Papua New Guinean students to further their education through scholarships such as:

- The Australia Awards – PNG LNG Scholarship program: These scholarships are provided in partnership with the Australian Government through the Australia Awards Pacific Scholarships program to help address the rural workforce gap in PNG LNG areas. The PNG LNG Scholarships encourage students to complete tertiary studies in health and education.
- James Cook University and University of Papua New Guinea scholarship: This collaborative scholarship supports tertiary students with researching and conserving dolphin species in Papua New Guinea.
- University of Canberra scholarship: Contributes to scientific research into the *Piku* Project, which aims to protect Papua New Guinea's pig-nosed turtle (*Carettochelys insculpta*) species and raise community awareness around community conservation.
- Business and Professional Women's Club scholarships: Available for financially disadvantaged women to undertake tertiary education studies.
- Baylor College of Medicine International Pediatric Acquired Immunodeficiency Syndrome (AIDS) Initiative scholarship: Supports community health care by funding tertiary students to complete a Masters in Public Health at the University of Texas School of Public Health in Houston.



EMPNG and Australian Government representatives announce the launch of new PNG LNG scholarships through the Australia Awards Pacific Scholarships program



Plate 4.20 – Smart Economics alumni students at the Lae workshop

EMPNG was also the major sponsor of the 2016 PNG Women's Forum held in March. The theme for this year's Forum was "Women Empowering Women: Her Success is Your Success". It aimed to share information and experiences, and demonstrate influence and change at a local-level. The Forum consisted of 10 panel sessions and four workshops on topics such as leadership, social entrepreneurship, health, safety, security, economic empowerment and effective communication.

Since its inception in 2014, more than 2000 women have attended the Forum. The 2016 event attracted more than 350 women, including Papua New Guinea's First Lady, Lynda Babao-O'Neill.

Following the PNG Women's Forum, a group of 40 Smart Economics alumni students from Lae attended a workshop to network and share their experiences. Smart Economics provides small business start-up grants and training for women and young girls who are survivors of gender-based violence or who are at risk of violence from male family members. EMPNG is the principal sponsor of this program.

To support the development of young leaders, EMPNG contributed PGK280,000 (US\$100,000) to The Voice Inc. Leadership Development Program during 2016.

The Voice Inc. is a non-government organisation that provides leadership programs for university students. It was established in 2007 at the University of Papua New Guinea and has since expanded its programs to the Papua New Guinea University of Technology in Lae and the University of Goroka.

The Leadership Development Program aims to build the leadership capacity of young people by influencing their values, attitudes and ethics. Some 200 students are enrolled in the Program.

Twenty-seven students from the Leadership Development Program, and six young leaders from Australia's largest youth organisation, Oaktree, participated in The Voice Inc.'s inaugural Nation Builders Conference held in Port Moresby in January. EMPNG Managing Director, Andrew Barry, presented at the conference, which focused on the theme of "Building a Sustainable Future".

Through its donation to TIPNG, EMPNG continues to support the annual Mike Manning Youth Democracy Camp, with the 2016 camp held in Port Moresby in September.



Plate 4.21 – Papua New Guinea University of Technology mechanical engineering student, Alexander Opop, with EMPNG Managing Director, Andrew Barry at the Nation Builders Conference

Fifty young people from 15 secondary schools, five community-based organisations and a Poly Technical College participated in the Camp.

Participants had the opportunity to meet with dignitaries including National Capital District Governor, the Honourable Powes Parkop, United States Ambassador, Catherine Ebert-Gray, and Member for Rabaul Open, the Honourable Allan Marat. Since its inception in 2008, more than 400 students have participated in the Camp.

EMPNG has committed an additional PGK282,000 (US\$89,100) to the Port Moresby Nature Park for its educational programs and the *Piku* Project. This contribution is part of EMPNG's ongoing sponsorship of the Park, which commenced in 2013 and has enabled the Park to develop a structured school excursion program. Close to 60,000 students have participated in the excursion program.

EMPNG also contributed PGK36,700 (US\$11,560) to World Wildlife Day activities held at the Nature Park in March 2016, with more than 2000 people participating in the day.

To date, EMPNG's total contribution to Port Moresby Nature Park has reached more than PGK2.3 million (US\$724,500).

In December, EMPNG supported 24 schools throughout the PNG LNG area with donations of stationery and vouchers for their end of year graduation ceremonies. The donations were provided to preschools, primary, elementary and high schools throughout the Upstream area and LNG Plant site villages. EMPNG has provided annual graduation prizes to schools in PNG LNG areas since 2010.

Science Ambassador Program

More than 1200 students from 18 schools participated in the ExxonMobil Science Ambassador Program in 2016.



Plate 4.22 – Mananda Primary School students participating in the Science Ambassador Program in Hides

Fifty-five EMPNG representatives delivered 45 sessions of the Program to eight schools in Hides, four schools in LNG Plant site communities and six schools in Port Moresby. For the first time, the Program was delivered to Gerehu and Carr Memorial and Coronation primary schools in Port Moresby. The Science Ambassador Program enables students to participate in practical experiments and lessons about topics such as rocks and geology, and the origins of oil and gas.

The Program was introduced to Papua New Guinea in 2013 and more than 2600 students from 20 schools have participated to date.

Community health

The Texas Children's Hospital, with its partner the Baylor College of Medicine, continues paediatric care in Papua New Guinea through funding provided by EMPNG. Under this partnership, a comprehensive program has been developed to diagnose, manage and document acute malnutrition in children in Papua New Guinea.

Since 2014, nearly 2000 children have been treated for malnutrition through the program.

Training has also been provided to healthcare workers in Tari, Wabag, Bougainville and Daru villages.

A five-day workshop was held in Tari in July to train local healthcare workers to correctly identify and treat acute malnutrition in children.

Up Close: Medical donations support four hospitals

EMPNG, in partnership with the PNG Tribal Foundation, has helped four hospitals with donations of medical equipment and supplies.

In November, four shipping containers of medical supplies were delivered, with two donated to the Port Moresby General Hospital and the other two delivered to Angau Memorial Hospital. A fifth container of medical supplies was delivered to Daru Hospital in December. The containers were donated from the USA with assistance from Project C.U.R.E.

The supplies donated to Port Moresby General Hospital were primarily used for the children's ward and included incubators for premature babies.

Funding for the medical containers was raised during Project C.U.R.E.'s First Ladies Luncheon held in Denver, Colorado in 2014. The event, patroned by Papua New Guinea's First Lady, Lynda Babao O'Neill, attracted 1200 business and community leaders and resulted in PGK4 million (US\$1.26 million) being raised for medical equipment and supplies for Papua New Guinea. The first medical container donated by EMPNG was delivered to Tari Hospital in 2015.

The workshop, conducted by the National Department of Health in collaboration with the University of Papua New Guinea School of Medicine and Health Sciences, involved 20 health care workers from Tari Hospital and other health centres throughout the Hela Province. Funding for the workshop was provided by UNICEF and through EMPNG's partnership with the Texas Children's Hospital and Baylor College of Medicine. The 2016 workshop followed a previous training workshop conducted in Tari in 2015.

Training in paediatric care was also delivered to 84 nurses and health professionals at the Port Moresby General Hospital and 75 lectures were presented to more than 1000 undergraduate students from the University of Papua New Guinea School of Medicine and Health Sciences.

Texas Children's Hospital physicians are currently supervising 19 research programs in paediatric care and public health in Papua New Guinea.

In October, one of the research students presented at the International Union Against Tuberculosis and Lung Disease conference held in the United Kingdom.

In November, EMPNG donated PGK79,365 (US\$25,000) to Rotary Against Malaria for the provision of more than 3900 bed nets for distribution to households in the Hela, Gulf and Central provinces.

Volunteers

More than 1400 volunteer hours were recorded with over 360 EMPNG employees engaged in 17 volunteer activities during 2016. Among the many volunteer activities, a team of 34 EMPNG workers donated their time to support the World Wildlife Day event at Port Moresby Nature Park in March. Another team of more than 60 volunteers dedicated their time, in partnership with local Lancos and schools, to World Environment Day activities in early June.



Plate 4.23 – Toea teaches children how to care for the environment at Port Moresby Nature Park

A team of more than 50 volunteers also helped to cover and distribute some 6000 books to support Buk bilong Pikinini library donations to schools in PNG LNG areas.

In July, 30 volunteers helped with painting a classroom at Redscar High School and, in October, another team of 25 EMPNG volunteers was involved in a beach clean-up with Lea Lea villagers as part of the Papua New Guinea Olympic Committee's Love Your Coast program.

EMPNG workers even brought Christmas cheer to sick children when a team of 27 volunteers visited the Three Mile Clinic and the children's outpatient Six Mile Clinic in Port Moresby to serenade children with Christmas carols and provide them with gifts donated by EMPNG.

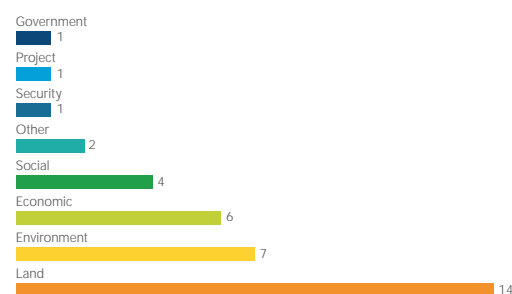
In December, EMPNG hosted a special thank you event to recognise all the EMPNG volunteers who had donated their time to support local communities during 2016.

4.2 Community grievance management

EMPNG registered and categorised 36 grievances during 2016. This compares to 60 grievances registered during 2015. Figure 4.1 shows the number of grievances by category registered in 2016.

Grievances

Figure 4.1 – Number of active grievances by category for 2016



Of grievances registered during 2016, 14 were land-related concerns. Five of these were in relation to Clan Agency Agreements and the distribution of payments within the clans. One regarded a compensation claim for an access road that was completed during the construction phase, one regarded payment for land use for wellheads in Juha and two were in relation to resettlement compensation. All of these grievances were investigated and addressed appropriately. The remaining five land-related grievances were found to be non-genuine.

Environmental concerns accounted for seven of the total grievances registered during 2016. Three regarded general concerns about vegetation, one related to a waterlog and soil erosion issue, one regarded a general concern about the rise in water levels during the rainy season along the pipeline Right of Way (ROW), and another related to a landslip causing a blockage to a river stream, resulting in damage to a food garden. All of these were investigated by the Environment team and found to be naturally caused by heavy rainfall events.

The remaining claim regarded air emissions from flaring at the HGCP potentially damaging the environment outside the HGCP fence. This claim was investigated and found to be non-genuine.

Economic grievances account for six of the total grievances recorded, with three regarding employment concerns. These were forwarded to the appropriate agencies to resolve. The other two grievances regarded payment for grass cutting and storage services. There was one economic grievance regarding the Barging Route Waterways Memorandum of Understanding, which was signed between EMPNG and waterways communities in 2010. The claim related to incomplete commitments that were agreed in the Memorandum of Understanding. This claim was investigated and found to be non-genuine.

Of the four social grievances recorded two were from existing Village Liaison Officers expressing their dissatisfaction at the recruitment of additional Village Liaison Officers in the Angore area. One grievant was seeking payment for work conducted during the construction phase, however there was no evidence to support the claim. One grievance regarded better representation of local community initiatives in the *PNG LNG TIES* newsletter. This grievant was informed that the newsletter did include this coverage.

By the end of December, all of the grievances registered during 2016 were addressed and closed, with none carried over to 2017.

4.3 Resettlement

EMPNG aims to avoid resettlement as a result of construction activities wherever possible. In situations where resettlement is unavoidable, the company aims to improve or at least restore the standard of living and livelihoods of displaced persons.

Works associated with the Angore Gathering System have been engineered to avoid existing community structures erected around the boundaries of the worksite and the Angore Wellpad Access Road. Seven households have been identified through pre-construction surveys as being economically displaced by land acquisition for some works, with one of these households being physically displaced. During 2016, EMPNG undertook the resettlement process for these households, which will all receive compensation.

In May 2016, consultation began with clan members who had erected speculative structures in areas they incorrectly thought to be the route of the Angore pipeline. Engagements focused on advising them about how legitimate compensation claims were managed and that no compensation would be paid for structures outside of the construction footprint. Broader clan consultation started in late May along brownfield areas, while specific construction meetings were held with clan leaders for greenfield areas.

EMPNG also worked with local community members to move speculative structures from a potential landslip area outside of the construction footprint to ensure the safety of the community.

4.4 Compensation

During 2016, nine Clan Agency Agreements were signed and 24 compensation payments made to landowning clans for land access along 11 kilometres of the pipeline ROW, for an access road between Tubage Junction and the HGCP, for the Gobe Main Line Valve, Main Line Valve 2 and Gobe access roads. This equates to 97 percent of statutory compensation payments completed for the pipeline ROW.

By the end of the year, 83 percent of 2016 annual deprivation payments were completed, with 55 awaiting payment once clan disputes are resolved. EMPNG has changed the compensation payment method to clans from cash to electronic funds transfer. During 2016, EMPNG assisted clans with opening bank accounts with Bank South Pacific to facilitate electronic payments. This access is intended to make payment processing faster, provide flexibility for the clans to access their money at their convenience and eliminate the need to carry large amounts of cash if not needed. As part of this process, EMPNG is paying account keeping and withdrawal fees for the clans. By the end of 2016, some 250 clan payments were made electronically.

Case study

Supporting Papua New Guinea's teachers



Students from Boera Primary School thanked representatives from EMPNG for the school desks donated in December

EMPNG has provided support to schools in the PNG LNG area since 2010 through funding various infrastructure projects and providing capacity building resources and programs for teachers.

During 2016, support was provided for new teacher housing, a new national award to recognise outstanding teachers, and a new Board of Management Training Manual for primary and elementary schools in Papua New Guinea.

In August, EMPNG handed over four new teachers houses constructed for Papa Elementary School and Porebada, Boera, and Lea Lea primary schools.

Each house has four bedrooms, a 3000-litre water tank, a water pump and power supply. EMPNG Managing Director, Andrew Barry said teachers were fundamental to developing and inspiring Papua New Guinea's future leaders.

"Providing a conducive environment for our dedicated teachers is important as it enables successful teaching and in turn promotes children's chances of achieving better learning outcomes."



Papa Elementary School Head Teacher, Puro Bisia and EMPNG Managing Director, Andrew Barry cutting the ribbon to open the new house that Puro and his family will occupy



Andrew Barry
Managing Director,
ExxonMobil PNG Limited

In addition to teacher housing, EMPNG is supporting the PNG Teaching Excellence Awards to recognise and honour the contribution of teachers in Papua New Guinea. The awards were launched in late 2016 as part of the Prime Ministers' Excellence Award program.

Nominations were received in October for teachers who inspired students and fostered intellectually challenging and supportive learning environments. Head teachers who provided exemplary leadership and management in schools also qualified for nomination.

Case study

Supporting Papua New Guinea's teachers

"We know that great teachers can change the direction of your life. Across this country, in rural and urban communities, we have many great teachers who are seldom recognised or appreciated for the work they do. Through these awards we want to acknowledge their selfless efforts to set the highest of standards for our children, helping to grow our country."

"Providing a conducive environment for our dedicated teachers is important as it enables successful teaching and in turn promotes children's chances of achieving better learning outcomes."



Hon. Nick Kuman
Minister for Education

Award recipients will be announced during 2017.

EMPNG has also supported the Central Provincial Government Education Division with the development of a new Board of Management Training Manual for schools.



Central Provincial Government Deputy Administrator, Edward Kila (left); Manager – LNG Plant, Murray Bell (centre); and Esmie Sinapa Development Consultants and Services Managing Director, Esmie Sinapa (right) with the new Board of Management Training Manual for schools

EMPNG contracted local company, Esmie Sinapa Development Consultants and Services, to develop the manual following a series of capacity building workshops with School Board of Management members from Porebada, Boera, Papa and Lea Lea schools. The Manual will be used to support the skills development of education providers in schools throughout the Central Province.

It covers five modules: influential leadership; effective communications; Science, Technology, Engineering and Mathematics education emphasis; good governance; and understanding and application of the *Department of Education*

Up Close: EMPNG volunteers support schools

In 2016, more than 50 EMPNG volunteers helped deliver some 6000 books to 25 schools in the Hela, Southern Highlands and Central provinces.

EMPNG volunteers helped pack and deliver the books provided by Buk bilong Pikinini. The volunteers also enjoyed spending time with students while helping them with their reading lessons.

EMPNG's maintenance team volunteered their time in September to build school desks from spare materials for children from Tiute Primary School in the Hela Province. The team decided to build and donate the desks after seeing students sitting on the ground for their end-of-year presentations. Jim Marai, Teacher In-Charge at Tiute Primary School said the newly built desks would positively improve the students' engagement and their ability to learn.

"Prior to the desks' construction students sat on compacted dirt and mud, making it very hard for them to take notes and undertake exercises. From now on, students in elementary school will sit at newly constructed desks thanks to EMPNG."

Jim Marai
Teacher In-Charge, Tiute Primary School



EMPNG Public and Government Affairs Upstream Community Affairs Field Administration Support Officer, Dele Magando-Jenjet, reads to primary school students in Moro

Board of Management Handbook for elementary, primary and community schools.

At the end of 2016, EMPNG donated some 500 school desks and chairs to Porebada, Boera, Papa and Lea Lea primary schools and Redscar High School so that the students would have new desks and chairs in time for the start of the 2017 school year.



5 Workforce

Ongoing training and accreditation opportunities are provided to develop the skills and technical capacity of Papua New Guinean citizens working in production roles.

5.1 Workforce composition

More than 2500 workers, including EMPNG employees and contractors, were employed in production-related roles in 2016. Over 2000 of these were Papua New Guinean citizens, who comprised 82 percent of the workforce.

Third party contractors represent more than 70 percent of the production workforce. More than 90 percent of contract workers are Papua New Guinean.

Thirty-three percent of the EMPNG workforce is based in the Upstream area, with another 36 percent based at the LNG Plant site. The remainder of the workforce is based in other areas of Papua New Guinea, such as at the Port Moresby office, or internationally at other ExxonMobil office locations.

Employment of workers from areas surrounding EMPNG facilities is a priority for EMPNG. Of the total Papua New Guinean workforce, 37 percent are employed at worksites in their local area. Another 36 percent are employed from the broader regional areas in which the company operates. Other Papua New Guinean workers are employed from elsewhere in the country.

5.2 Workforce training

EMPNG provides both in-house training and externally delivered courses for employees. The company provides specific training for its workforce, while contractors deliver training relevant to their scopes of work.

In 2016, the equivalent of 96,800 hours of training were delivered through 2180 courses to approximately 9600 employees and contractors. Ninety-five percent of all training hours were delivered to Papua New Guinean citizens.

5.2.1 Employee training

More than 65,500 hours of training were provided to almost 2200 EMPNG employees across 1950 courses in 2016. This compares to just over 40,000 hours of training delivered to almost 3000 employees during 2015. Since the start of production, the equivalent of almost 132,000 hours of training has been delivered to over 5000 EMPNG employees. Most of the training delivered during 2016 was conducted at the LNG Plant (43 percent) and HGCP (32 percent).



Plate 5.2 – Mechanical technician trainee, Michelle Samai, at work with a grinder

Training focused primarily on developing the production workforce's technical skills, including building the capacity of Operations and Maintenance trainees and graduate engineers. Other non-technical courses included:

- Business Practices Review 2016 – This training re-familiarises participants with the standards of business conduct, including mechanisms to seek guidance and support to avoid non-compliance.

Opposite:

Plate 5.1 – Operations Technicians Appollonia Nabo, Haggai Aluy, Ben Keith and Vagi Hekwa during maintenance of the Mixed Refrigerant Hydraulic Turbine for Train 1 at the LNG Plant

- **Work Management eJSA Rollout Training** – This course teaches participants to apply the JSA process using the electronic Permit to Work system and also provides an understanding of the roles and responsibilities, JSA lifecycles and JSA management processes.
- **Cyber Security Awareness** – This enables course participants to understand the risks of cyber-attacks, including identifying and reporting phishing and suspicious emails and protecting both their private and company assets online.
- **Benzene Awareness** – This training educates participants about the health effects of benzene, occupational exposure limits and workplace systems and controls, including personal protective equipment requirements.
- **Emergency Response Drills** – These practical drills prepare employees to respond to emergency situations in accordance with the Emergency Response Plan. Drills include medical emergencies, a gas or condensate pipeline release and fire response.

Approximately 60 percent of EMPNG employees trained during 2016 were Papua New Guinean citizens. Of these, 35 percent were women.

EMPNG continues to provide cultural awareness training to all workers, with 130 sessions delivered during 2016 through site inductions and supervisor training. This includes specialised training delivered to 12 supervisors at the LNG Plant and four supervisors at the HGCP.

Engineering and technical professionals

A group of engineering graduates who were appointed to full-time roles with EMPNG in late 2015 settled into their new jobs during 2016. Ginisegana Solien was appointed as a Civil-Geotechnical Engineer, Christine Sahuburua as a Facilities Surveillance Engineer, Immaculate Wanjik as an Electrical Engineer and Kenny Hampalekie as a Facilities Surveillance Engineer. An additional three engineers were appointed to full-time EMPNG roles during 2016. Nathan Manup joined the company as an Integrity Engineer in early 2016, while Derek Narara was employed as a Machinery Engineer and Cedrick Moi as a Civil Engineer in December. Technical professionals Anita Mosby and Rebekah Ilave were employed as EMPNG Environmental Advisors during 2016, while Peter Moses was appointed as a Safety Advisor for the company's health programs. In December, Wesley Spinder joined EMPNG as a Safety Advisor for the HGCP.

Up Close: Construction training facility becomes permanent training academy

The former Port Moresby Construction Training Facility, which was developed to train national workers for the construction of PNG LNG infrastructure, has become a permanent training facility called the Kumul Petroleum Academy.

The facility, which was handed over from EMPNG to the Papua New Guinean Government in May 2014, has become a pioneering training facility that focuses on providing Papua New Guinean citizens with international accreditation so they can contribute to oil and gas, mining and shipping projects within the country.

In addition to providing teaching resources and training materials, the Academy offers a Safe Live Process Plant to give trainee technicians hands on experience with a live plant before gaining in field experience. The Safe Live Process Plant is the first of its kind in the Pacific Islands. It is a small, fully functioning processing plant with live process systems, a centralised control room, emergency protection systems and an electrical distribution centre to provide real life scenario training and assessment in a safe and controlled environment.

EMPNG has signed a PGK9 million (US\$2.84 million) technician development agreement with the Academy to sponsor two intakes of 16 trainees. Their training will cover the production, instrumentation, electrical and mechanical disciplines in the oil and gas industry.

EMPNG Managing Director, Andrew Barry, said he was pleased to see a former construction facility being permanently used as a training institution for Papua New Guinea citizens.

“We are pleased to continue to support this facility by sponsoring trainees to attend the Academy to develop workplace skills.”

Andrew Barry
Managing Director, ExxonMobil PNG Limited



EMPNG-sponsored trainees at the Kumul Petroleum Academy in Port Moresby

Operations and maintenance

Thirty-nine Operations and Maintenance trainees, including 12 women, completed the Advanced Skills training component of the Operations and Maintenance training program at the LNG Plant and HGCP in December.

This is the first group of Operations and Maintenance trainees to complete Advanced Skills training in Papua New Guinea. The training was conducted in production facilities in Canada and Malaysia for the first and second intakes respectively.

Advanced Skills training provides trainees with trade and site-specific knowledge and skills. Twenty-six trainees from the current intake are now completing on-the-job training at the LNG Plant, while 13 trainees are based at the HGCP.

EMPNG has funded scholarships for two intakes of 16 trainees to attend the Kumul Petroleum Academy in Port Moresby. The first intake of scholarship recipients began their 15-month training program in August.

All trainees from the first two intakes of the Operations and Maintenance training program have settled into full-time roles with EMPNG and most have met Technician Level 1 requirements.

To achieve Technician Level 1, trainees must demonstrate a high quality of work, as well as initiative and the ability to self-monitor. They must also show teamwork and competency at the worksite, strong planning and organisational skills and high levels of safety, health and environmental awareness.

5.2.2 Contractor training

During 2016, contractors provided more than 31,200 hours of training relevant to their scopes of work.

This training was delivered to some 7400 Papua New Guinean workers who attended more than 230 courses. Women comprised 24 percent of all Papua New Guinean contractors trained.

Up Close: Engineering graduate builds career

One of the first PNG LNG graduate engineers, Gerard Schulze, continues to build his career with EMPNG. Gerard, who was also PNG LNG's first Gas Management Systems Engineer, moved to Melbourne, Australia in December 2015 to become EMPNG's first Production Engineer. In this role he works alongside experienced reservoir engineers, subsurface engineers and geoscientists to help prioritise future phase investment needs for the company.

"The PNG LNG graduate program was an extremely rewarding experience and has set the solid foundation upon which my career is being built. It has opened up many doors of opportunity, which continue to develop me as both a professional and an individual. Without it, I wouldn't be where I am today."

Gerard Schulze
Production Engineer, ExxonMobil PNG Limited



EMPNG's first Production Engineer, Gerard Schulze at Hides



Plate 5.3 – The third intake of Operations and Maintenance trainees

Forty-eight percent of training programs were delivered in the Upstream area, while 38 percent were provided at the LNG Plant.

Training topics included firefighting, hazard identification, loss prevention, manual handling, working at heights, and food and personal hygiene.

5.3 Workforce health

EMPNG is maintaining high-quality clinical operations across medical, public health and industrial hygiene programs at all worksites.

Medical

EMPNG clinicians completed more than 6200 patient consultations at camp clinics in the Upstream area and some 5550 patient consultations at the LNG Plant site clinic during 2016.

The number of clinical consultations declined compared to the previous year because many workers had completed their medical screening in 2015.

Clinical consultations during 2016 included pre-employment examinations, general medical reviews, follow-up vaccinations, medical screening, malaria prevention and occupational health examinations. Ongoing training provided to clinical staff is enabling improved efficiencies with patient diagnosis and management.

EMPNG is maintaining vaccine-preventable disease management, with clinicians providing health awareness sessions and completing almost 1500 vaccinations during 2016 across all clinics. To date, more than 95 percent of the EMPNG workforce has received vaccinations. Clinicians also conducted over 2800 tuberculosis screening tests as part of EMPNG's tuberculosis awareness and prevention program. Five active tuberculosis cases were identified and managed during 2016, with no transmission of the illness in the workplace. Another 400 latent tuberculosis cases were identified and registered in the tuberculosis surveillance program.

In addition to EMPNG workers, all EMPNG contractors are provided with access to site clinics for medical diagnosis and care. This access has enabled the early detection and management of infectious and vector-borne illnesses. The clinical service provider continues to deliver weekly health awareness toolbox talks to workers on topics such as healthy living, women's health, foodborne illnesses, snakebite treatment, infectious disease control and sexually transmitted infections.

During 2016, more than 50 health topics were covered in some 1100 toolbox talks, with around 500 workers attending each session.

Toward the end of 2016, EMPNG implemented a new electronic global medical records management system to enable clinicians to more efficiently share and manage employee medical records.

Public health

EMPNG conducts monthly health assessments to monitor camp hygiene and sanitation, food and potable water safety, vector surveillance and control, and infectious disease management. Assessments conducted during 2016 showed that EMPNG and its contractors were maintaining high camp health standards and effectively implementing program improvements. For example, EMPNG's infectious disease management procedures enabled the company to quickly contain norovirus gastroenteritis at the LNG Plant site, which affected six workers. There was no impact to other workers on-site or to operations at the LNG Plant.

EMPNG is maintaining its support for the 'Partnership in Health' agreement with the Papua New Guinea Institute of Medical Research. A key component of the agreement is the integrated Health Demographic Surveillance System (iHDSS), which has been used to monitor the impact of PNG LNG on the health of communities within key areas. IPECA, the global oil and gas industry association for environmental and social issues, showcased EMPNG's Community Health Impact Management Program in its *Health impact assessment* guide released in early 2016 as described in *Case study: Global recognition for EMPNG health programs*. EMPNG commenced a review of the iHDSS during 2016 in partnership with the Papua New Guinea Institute of Medical Research. The review will be completed in early 2017.

Industrial hygiene

During 2016, the Industrial Hygiene team reviewed health hazards for workers by conducting interviews, inspections, exposure assessments and monitoring. Health hazards reviewed included heat stress, hydrocarbon safety, noise and hearing conservation, chemical management and respiratory protection. By the end of the year, 40 health inspections, 58 exposure assessments and 61 monitoring samples were completed.

The exposure assessment and monitoring data is used to evaluate risks for a specific health hazard. Where higher risk tasks are identified, appropriate controls are applied to protect workers. As part of a program of continuous improvement, EMPNG has adopted a focused risk reduction initiative to: reduce chemical exposure through engineering controls; reduce personal noise exposure through the use of quieter handheld tools; and minimise the reliance on personal protective equipment. EMPNG also continues to keep third party contractors informed about the company's industrial hygiene programs.

As part of ongoing workforce training, EMPNG sponsored two industrial hygiene technicians to attend international conferences during 2016.

Other strategic initiatives

To commemorate World Tuberculosis Day on 24 March, EMPNG delivered tuberculosis awareness and prevention programs to workers and local communities. Tuberculosis awareness talks were also conducted with local schools.



Plate 5.4 – Dr Cain Kapiri, Medicine and Occupational Health Physician, presents a World Tuberculosis Day lunch-and-learn session



Plate 5.5 – EMPNG Production Operator, Albert Bowman, educating Baguale Primary School students about World Tuberculosis Day

Following a dengue outbreak in Papua New Guinean communities in early 2016, 23 dengue cases were recorded in the EMPNG workforce but these all involved workers who became sick shortly after returning to work from vacation with their families in local communities. EMPNG conducted awareness-raising sessions with production workers about dengue prevention.

EMPNG continues to support the Corporate Blood Drive organised by the Port Moresby General Hospital Blood Service. The program targets the corporate community to donate much needed blood to replenish blood supplies, which are used in hospitals throughout Papua New Guinea.

During 2016, EMPNG volunteers donated 319 bags of blood. EMPNG was officially recognised by the Port Moresby General Hospital Blood Service for providing the most blood donations.

EMPNG commemorated World AIDS Day on 1 December by raising awareness about the importance of Human Immunodeficiency Virus (HIV) testing. Dr Henry Welch from the Texas Children's Hospital shared his experience of working with AIDS patients during a lunch-and-learn session held with workers in Port Moresby.



Plate 5.6 – Dr Henry Welch (back row, third from left) from the Texas Children's Hospital with EMPNG's Medicine and Occupational Health team at the World AIDS Day lunch-and-learn session

5.4 Workforce safety

EMPNG has completed another year without a Lost Time Incident and continued its record of zero Lost Time Incidents since production began, bringing the record to 1295 days.

Key activities conducted during 2016 to help maintain safety in the workplace included:

- The 'Safe Start' campaign – This campaign started off the new production year with nine sessions of presentations conducted over a two-month period by EMPNG's senior management who reinforced to workers and contractors that safety is a core value in EMPNG. Each session involved multiple presentations that showed EMPNG's 2015 safety results and emphasised the company's 2016 safety focus themes: Follow Work Management; Manage Major Risks and Barriers; Learn from Incidents; and Actively Care. The presentations also outlined what was expected from management and workers to maintain the company's vision of '*Nobody Gets Hurt*'.
- The Circle of Safety program – This program aimed to enhance driver awareness and reduce vehicular accidents at EMPNG worksites. The program involved specific training for drivers and awareness-raising regarding the need to walk around vehicles to identify potential hazards prior to reversing. It included a steering wheel cover and a magnetic flag for drivers to place on their vehicles to remind them to walk the Circle of Safety prior to reversing. The Circle of Safety program reduced vehicular accidents at worksites by half during 2016 compared to 2015.



Plate 5.7 – Logistics driver Eric Gebi is reminded by his steering wheel cover to complete the Circle of Safety walk prior to starting his trip

Up Close: Heavy duty maintenance

Maintenance at the LNG Plant is no small feat. In August, a team of more than 30 workers were involved in maintenance of the Plant's mixed refrigerant hydraulic turbine. The turbine, which measures approximately 2.8 metres and weighs 10.6 tonnes, is used to generate electricity to increase the plant's efficiency. Excess energy generated by the turbine is directed to the LNG Plant site energy grid. Any further excess of power is directed for domestic use under an agreement between EMPNG and the Papua New Guinean Government.

To conduct the maintenance, an 80 tonne crane and a second 30 tonne crane were used to lift the turbine from its housing – this was the first dual crane lift conducted since production began. Safety was paramount during the lift, with workers effectively implementing EMPNG's safe lift procedures to ensure nobody was hurt. To allow the turbine to be removed and replaced in the same day, pre-work such as staging tools at the site and removing pipework above the turbine was conducted prior to the lift.

The maintenance process was conducted by a team consisting of: Operations Technicians – who prepared the equipment for removal by isolating and hydrocarbon freeing; Mechanical Technicians – who removed the turbine; Electrical Technicians – who removed the high voltage cable; Instrument Technicians – who replaced some damaged cables on the turbine; and scaffolding, insulation and crane crews.



The turbine maintenance operation at the LNG Plant

- Learning from Incident Safety session – This session was held with 200 participants from EMPNG's Port Moresby office. Senior EMPNG managers shared their experiences about when safety became an important part of their management style. Stories ranged from witnessing significant workplace incidents to near miss events with their own families.



Plate 5.8 – Papua New Guinea Hunters football team players Enock Maki and Justine Olam after the Safe Start lunch-and-learn session at the Port Moresby office

- Contractor Safety, Security, Health and Environment Leadership – Two workshops, each involving more than 100 people from 16 EMPNG contractor companies, were held in May and November respectively. The May workshop focused on work management, while the November workshop theme covered “Safety in the Moment”. The workshops aimed to reinforce with participants the need for flawless planning and execution to achieve successful working days with nobody getting hurt. Several contractors shared their safety experiences and appreciation of how much they had learned from EMPNG.
- ExxonMobil Fundamentals of Safety training – Three sessions were held with 30 participants at each session. The sessions involved both EMPNG workers and contractor supervisors and provided insights and tools to effectively manage a world-class safety program.
- The Strong Finish campaign – This campaign started in October with worksites reviewing their safety goals and commitments for the remainder of 2016. Four sessions of

presentations from senior managers were delivered to workers and contractors over a six-week period. The campaign emphasised EMPNG’s Safety Focus Areas and what was expected from management and workers toward the end of the year to maintain the company’s vision of ‘*Nobody Gets Hurt*’.

5.4.1 Core safety processes

EMPNG’s core safety processes involve the use of indicators to determine overall safety performance. Leading indicators measure the effectiveness of EMPNG’s safety systems, while lagging indicators measure actual incidents and their consequences.

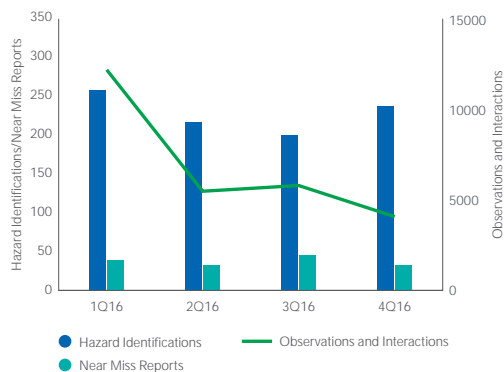
Key leading indicators include Observations and Interactions, Hazard Identification and Near Miss Reporting.

During 2016, the focus of the Observation and Interaction Program shifted from a high quantity of reports to higher quality Observations and Interactions between team members.

More than 80 percent of workers submitted Observation and Interaction reports, with 27,300 recorded during 2016 as shown in Figure 5.1.

Core safety processes

Figure 5.1 – Number reported by quarter



The number of Observations and Interactions, Near Miss Reporting and Hazard Identifications has decreased since demobilisation of drilling field operations at the beginning of 2016, but has remained at expected levels.

Through its ongoing commitment to safety, EMPNG is maintaining a Total Recordable Incident Rate of 0.14, with three minor recordable events recorded in 2016.

5.5 Security

During 2016, EMPNG worked closely with the RPNGC and the National Maritime Safety Authority to address thefts of offshore navigational aids in waters near the LNG Plant. In August and September, protests by local landowner groups regarding the non-payment of government-administered benefits caused some disruption near EMPNG operations in Hides. Increased security was implemented at the HGCP and other EMPNG facilities in Hides to minimise disruption to operations.

To support the work of the RPNGC in maintaining law and order in Papua New Guinea, EMPNG donated 12 patrol vehicles to the RPNGC in December.

EMPNG and the RPNGC are maintaining a Memorandum of Understanding that enables the provision of security in areas around production facilities.

Both government and contracted security personnel continue to undertake regular training in the Voluntary Principles on Security and Human Rights.

Up Close: HGCP housekeeping cleans up safety award

The HGCP's Housekeeping team has become the first to receive a new Observation and Interaction award at the HGCP.

The award, which was introduced in early 2016, recognises individuals and teams who participate in the Observation and Interaction program. The program involves observing worker behaviour and providing positive reinforcement and corrective feedback to ensure safe behaviour in the workplace.

The HGCP Housekeeping team was recognised for correctly submitting Observation and Interaction reports for proper lifting techniques, the use of personal protective equipment for chemical handling, and to address talking on mobile phones while walking.

EMPNG Contractor Safety Advisor, Kelly Sandel, encouraged contractors to continue to use Observation and Interaction reports to identify both positive and negative work behaviours and to share key learnings with their work teams.



The HGCP Housekeeping team with their Observation and Interaction award

5.6 Worker welfare and conditions

High standards of worker welfare and conditions are maintained during production through the ongoing implementation of EMPNG's Labour and Working Conditions Management Plan.

5.6.1 Camps

During 2016, camp refurbishment works were completed on a new recreational space at the LNG camp for employee meetings, social gatherings and sports.

Significant room upgrades, improved kitchen facilities, the addition of carpark spaces, new gardens and an upgraded public address system were also completed.



Plate 5.9 – EMPNG workers in the new Port Moresby office

At the HGCP Camp, refurbishment of the Camp's dining facility was completed and a previous construction dining hall space was converted into a multi-use recreational facility for employee meetings and social gatherings. An upgrade of the HGCP Camp barbecue area included new flooring, new paint and a stage for small gatherings and a karaoke system.

As part of a program of healthy eating and portion control for production workers, dining stewards were introduced in early 2016 to assist diners with portion sizes at dessert bars. To support local communities, the HGCP Camp began purchasing produce direct from local suppliers, such as women's groups, for the camp kitchen. A review was undertaken at the end of 2016 to improve the range and quality of food items at worker camps.

All camp residents continue to rely on regular camp newsletters for updates and general information about production activities. A dedicated television information channel at the HGCP Camp is proving successful in delivering timely communications to residents. Camp committees at both the HGCP and LNG Plant camps are supporting ongoing communication and feedback from camp residents, which is enabling EMPNG to maintain high standards at the camps.

5.6.2 Labour and working conditions

EMPNG maintains Standards of Business Conduct that outline the company's workplace policies regarding ethics, conflicts of interest, corporate assets, anti-corruption, health, safety, environment, alcohol and drug use, equal employment opportunity, harassment and other topics relevant to the production working environment. The Standards also explain EMPNG's procedures including open door communication, which encourages employees to ask questions, voice concerns, escalate issues to senior levels of management when needed, and make appropriate suggestions regarding the company's business practices.

All new EMPNG employees receive the Standards of Business Conduct during their induction process and existing workers are provided with periodic refresher training. Every four years, managers lead a Business Practices Review with their employees to reinforce expectations of the Standards of Business Conduct, share case studies and respond to any questions. During 2016, 26 Business Practices Review sessions were conducted with more than 870 EMPNG employees and contractors.

A Fair Play protocol, which promotes a consistent and appropriate approach to workplace behaviour, was also launched during 2016.

Fair Play aims to enhance the company's core values of Safety, Security, Excellence, Teamwork, Integrity and Environment. It provides a set of guidelines that recommend: management recognition for positive behaviour; coaching or counselling opportunities for unintentional undesired behaviour; and disciplinary action for violations of the protocol.

EMPNG introduced a home ownership program in 2016 to support eligible employees with raising the equity required to purchase a home, or the materials to build a home. The assistance program was launched in response to employee feedback about the high cost of housing, particularly in Port Moresby. By the end of December, PGK2.9 million (USD\$913,500) was provided for 37 EMPNG employees.

Ongoing open communication is being maintained between EMPNG's employees and senior management through bi-monthly lunch-and-learn sessions with Managing Director, Andrew Barry. The sessions cover topics relevant to employees and enable them to ask Mr Barry questions. Regular site management and Human Resources sessions are also held to provide workers with updates and give them the opportunity to ask questions and provide feedback.

During 2016, the Social Club organised numerous activities for workers such as soccer, softball, touch rugby, canoeing, family fun days and a celebratory year-end dinner. These activities help to build good relationships among *wanwoks* or 'fellow workers' and foster a productive work environment in Papua New Guinea.

Case study

Global recognition for EMPNG health programs



EMPNG General Manager – Medicine and Occupational Health, Dr Nirven Kumar (back left) and Dr Bang Pham from the Papua New Guinea Institute of Medical Research (right) visiting the iHDSS community of Asaro Valley



Papua New Guinea Institute of Medical Research representative educating communities on healthy living

Two global industry associations have recognised EMPNG for its innovative community health initiatives.

The global oil and gas industry association IPIECA featured EMPNG's Community Health Impact Management Program as an example of industry best practice in its *Health impact assessment* guide, while EMPNG's community health partnerships were highlighted at the Society of Petroleum Engineers International Conference and Exhibition on Health, Safety, Security, Environment, and Social Responsibility held in Norway in April.

EMPNG's Community Health Impact Management Program was developed in partnership with the Papua New Guinea Institute of Medical Research to improve the country's data collection and health diagnostics.

The partnership included working with the University of Papua New Guinea's School of Medicine and Health Services to finance, build and fit out the National Infectious Disease Diagnostic and Research Laboratory, and to train laboratory staff to World Health Organization gold standards. The Laboratory is used to advance biomedical research in tropical medicine, and research for infectious diseases such as cholera and tuberculosis.

A key component of EMPNG's health program was the iHDSS, which was used to monitor the

impact of PNG LNG on the health of the Hiri and Hides communities within the PNG LNG area, compared with two control sites at KarKar Island and Asaro Valley. The iHDSS was a first for the oil and gas industry worldwide.

Data collected through the iHDSS has helped to improve the accurate diagnosis of disease at the village level and enabled provincial and national health authorities to more effectively plan and implement health services.

EMPNG Managing Director, Andrew Barry, said the importance of establishing effective partnerships with government, universities and non-government organisations to support sustainable health sector improvements was realised early during the construction phase.

"Our partnership with communities, government and non-government organisations continues to be a priority for EMPNG in production."



Andrew Barry
Managing Director,
ExxonMobil PNG Limited



6 Environmental management

EMPNG implements environmental management and monitoring procedures to reduce the potential impact of production activities on the surrounding environment.

6.1 Air

Ambient air quality monitoring was completed at the LNG Plant, HGCP and Hides Waste Management Facility (HWMF) during 2016. Third party consultants analysed a full year of data and found all parameters to be below guidelines outlined in the relevant Environmental Management Plan, with the exception of ozone. Additional monitoring was conducted to provide further data on actual ozone emissions, with results available in early 2017.

Air dispersion models, using actual emissions data collected between June 2015 and June 2016 for PNG LNG facilities, were also completed. This post-construction modelling confirmed predictions of no off-site impacts for normal operating emissions as presented in the PNG LNG Environmental Impact Statement (EIS).

Stack testing recorded no air criteria exceedances at the HGCP or HWMF during 2016. Stack testing at the LNG Plant recorded dioxin/furan readings above Environment Permit criteria from the general waste incinerator in March. For further information about EMPNG's stack testing process, refer to *Case study: Preserving air quality*.

Following the dioxin/furan detection, further compliance and performance testing was conducted in June on the general waste incinerator at the LNG Plant. The compliance testing indicated that dioxin/furan remained above criteria. Rigorous operational testing was undertaken to assess the relationship between the type and volume of waste materials incinerated and the resulting impact on emission concentrations.

Lessons learned from the compliance and performance testing were applied in a revision of the incinerator waste loading and operating guidelines. Further follow-up stack testing was conducted on the LNG Plant waste incinerator, regeneration furnaces and hot oil heater in October. The regeneration furnaces and hot oil heater were compliant with Environment Permit criteria. While dioxin/furan emissions from the general waste incinerator had reduced, they remained slightly above criteria. EMPNG is implementing measures, such as increased waste segregation and the installation of liquid food composter units, to reduce the amount of waste processed through the incinerator.

Total greenhouse gas emissions, including fuel gas use, are calculated and reported on an annual basis. During 2016, EMPNG generated approximately 2104 kilotonnes of carbon dioxide equivalent, with gas turbine fuel consumption the primary contributor, as expected during normal operations. Gas turbine fuel consumption accounted for 88 percent of annual greenhouse gas emissions at the HGCP and 84 percent at the LNG Plant. Fuel gas consumption is closely monitored.

Annual flaring volumes continued to decrease compared to 2015, with a 13 percent decline at the HGCP and 6 percent reduction at the LNG Plant. These reductions were achieved as steady state operations were reached.

6.2 Noise

No noise-related incidents or near misses were reported at any PNG LNG facility during 2016.

Opposite:

Plate 6.1 – The attractively coloured rainbow tree frog, (*Litoria iris*), is found only in the mountains of central New Guinea

EMPNG conducted two biannual noise monitoring events at PNG LNG facilities in 2016.

The first biannual monitoring event, held in May 2016, recorded no noise exceedances at the LNG Plant site.

A potential non-conformance was observed at the HWMF when noise levels at the security fence-line exceeded Environment Permit requirements during incinerator operations. Additional noise monitoring, and the second biannual noise monitoring event, were conducted at the HWMF in July and September respectively, with results showing that noise levels complied with the Environment Permit criteria. Incinerator operations, which are generally conducted between the hours of 10 am and 2pm, continue to be monitored as part of EMPNG's noise monitoring program.

The second biannual noise monitoring event for the LNG Plant site was conducted in December and found that noise levels complied with the Environment Permit noise criteria. The second monitoring event for the HGCP was not completed during 2016 but monitoring will continue in 2017.

6.3 Water

EMPNG extracts water from sources such as groundwater, seawater and streams for production use. The amount of water extracted is monitored to ensure conformance with permitted extraction volumes.

Regular testing is conducted to confirm the quality of extracted water, and processed wastewater is checked to ensure it conforms to Environment Permit requirements and meets the guidelines for its intended use.

6.3.1 Consumption

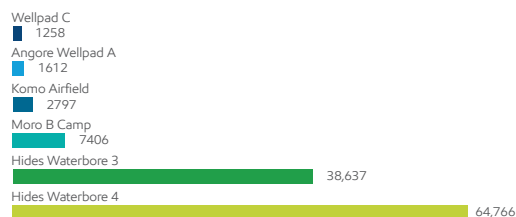
EMPNG uses extracted water for worker camps, safety showers, dust suppression, fire water systems and cleaning of utilities.

For Upstream area operations, freshwater is extracted from groundwater sources and streams, while seawater is used for LNG Plant operations.

During 2016, approximately 116,000 kilolitres of groundwater was extracted for use in the Upstream area. Analysis of water quality showed the extracted groundwater complied with EMPNG's raw water quality criteria. Freshwater volumes taken from each groundwater extraction source during 2016 are shown in Figure 6.1.

Groundwater extraction

Figure 6.1 – Volume (kilolitres) by extraction source for 2016



An additional 104 kilolitres of surface water was extracted from a stream near Homa Ridge in early 2016 to support geotechnical-drilling works in the area at the time.

Freshwater usage has decreased compared to volumes extracted in 2015 due to the completion of drilling activities at the end of January. For example, no water was consumed at Hides Wellpad C and Angore Wellpad A from the start of February. HGCP-supplied water to the Drilling organisation's camps also ceased at the end of January.

The Port Moresby office draws water from the Port Moresby municipal water supply. During 2016 water restrictions were imposed after the prolonged drought in 2015. Water consumption at the site was reduced by initiating workforce campaigns to ensure water was used wisely. During 2016, the Port Moresby office used 18,557 kilolitres of water.

At the LNG Plant, 537,369 kilolitres of seawater was extracted during 2016 to supply the desalination plant, which generated 54,175 kilolitres of potable water for production use. In March, technical issues with the potable water generation system resulted in a reduction of potable water able to be generated by the plant. During this time, bottled water was provided to LNG Plant workers. The potable water generation system was repaired and resumed operations in April.

6.3.2 Water quality monitoring

Regular monitoring is conducted to confirm the quality of wastewater, process water and the health of receiving water bodies. Monitoring includes semi-annual groundwater sampling at the LNG Plant, HGCP and HWMF.



Plate 6.2 – Surface water monitoring of a receiving environment near the HWMF

A detailed freshwater ecology program examines the health of aquatic species in rivers surrounding Upstream facilities. The program aims to determine the degree of recovery of these ecosystems given the residual impacts identified in the construction and post-construction freshwater ecology surveys.

Monitoring in September showed that the Upstream area ecosystems were recovering well, as predicted by previous surveys, with the most pronounced recovery at Akara Creek downstream of the HGCP.

At this site, the macro invertebrate community composition and diversity had shown strong recovery, exceeding previous survey predictions. Freshwater ecology monitoring will continue in 2017.

At the LNG Plant site, a low-level incident involving a cobalt parameter exceedance was recorded for a wastewater discharge from the retention pond in early 2016. Follow-up sampling showed cobalt parameters to be below criteria with no further exceedances reported, suggesting that the cobalt exceedance was an anomaly.

A second low-level incident was recorded at the LNG Plant site later in February when amines were detected in the inlet section of the retention pond after equipment cleaning was completed in the process area. The retention pond discharge was stopped immediately and an incident investigation was conducted. Deep-water diffusion was undertaken, with approval from the Papua New Guinea Conservation and Environment Protection Authority (CEPA), to empty the pond and dispose of the low concentration amine water to reduce any impact on the surrounding environment.

The discharge of amine-impacted water through the deep-water diffuser began in October and was completed by mid-December. Baseline sampling of surface waters above the diffuser and more widely in Caution Bay were completed prior to the start of discharge operations. Additional sampling was conducted throughout the discharge process.



Plate 6.3 – LNG Plant site retention pond

Post-discharge sampling of surface water above the diffuser and more widely in Caution Bay indicated no detectable amine concentrations.

The quality of wastewater discharge in the Upstream area improved in 2016 due to the commissioning of a new wastewater treatment plant at Moro B Camp in February, as well as steady performance from other wastewater treatment plants in operation. Before the introduction of the new wastewater treatment plant, a non-conformance involving exceedances of the wastewater management criteria at the discharge point was recorded at Moro B Camp. Monitoring continued throughout commissioning and into the operations phase of the new plant. In June, a non-conformance was raised for an exceedance of ammonia and oil and grease recorded at the discharge point during routine monitoring of the new treatment plant. Sampling of the receiving environment showed water parameters to be within EMPNG's water quality criteria. However, chemical dosing procedures were reviewed and adjusted to avoid a recurrence.

Toward the end of 2016, nine wastewater treatment plant operators completed professional accreditation. Three of the operators achieved Certificate III certification and the other six achieved Certificate II. These certifications are nationally recognised in Australia and these operators are among the first in Papua New Guinea to receive this professional training. The training involved in-depth technical calculations, equipment testing and an analysis of various water treatment methods.



Plate 6.4 – Wastewater treatment plant at the LNG Plant site

At the HWMF, two low-level incidents were recorded during 2016 when an uncontrolled discharge of wastewater into the environment from a retention pond resulted in potassium levels above criteria in the receiving environment.

The incidents were the result of a mechanical failure with the retention pond water outlet valve. This was rectified and the equipment was replaced. Subsequent monitoring showed potassium levels to be within EMPNG's water quality criteria.

Sampling of discharge from the wastewater treatment plant at the HGCP detected one exceedance of biological oxygen demand and one total suspended solids, exceedance which resulted in two non-conformances being recorded during the year. Follow-up sampling showed these parameters to be below criteria.

Monitoring of stormwater runoff from the HGCP in 2016 detected turbidity and associated suspended solids levels to be above criteria resulting in two non-conformances. Erosion and sediment control measures continue to be monitored and maintained as vegetation reinstatement progresses.

As agreed with CEPA, wastewater discharge from the Port Moresby office continued through the Eda Ranu wastewater main until the site wastewater treatment plant was commissioned in April.

Groundwater monitoring is conducted at the LNG Plant, HGCP and HWMF, with the timing of monitoring coinciding with seasonal variations.



Plate 6.5 – Purging a groundwater sampling bore at the HWMF to allow for more representative sampling of groundwater conditions

Laboratory results from groundwater samples collected at the LNG Plant and HGCP during 2016 were found to be below baseline conditions or within natural background variations. Groundwater samples collected at the HWMF were found to be consistent with baseline conditions, with the exception of iron, cobalt and manganese. These dissolved metals have been shown through previous monitoring events to be characteristic of the natural groundwater environment and not associated with activities undertaken at the site.

6.4 Materials management

EMPNG aims to avoid significant impacts from the use of raw materials wherever possible. Aggregate is occasionally sourced from quarries when required for general maintenance, repair works or special projects.

During 2016, approximately 8770 cubic metres of limestone was sourced from Wellpad C for works at Wellpad F and Wellpad E. An additional 8530 cubic metres of limestone was obtained from Para Quarry for maintenance works at the HGCP.

EMPNG purchased just over 370 cubic metres of concrete from a Lanco during 2016 for: re-establishment of the Angore camp; construction works at Hides Wellpad F and Wellpad E; and upgrade works at the HGCP wastewater treatment plant and heliport. Approximately 12 cubic metres of timber was purchased from third party suppliers for wastewater treatment plant upgrade works at the HGCP.

At the LNG Plant, just over 380 cubic metres of concrete, 28 cubic metres of gravel, 460 cubic metres of sand and 848 cubic metres of crushed rock for use as road base, were sourced from third party quarries for upgrades to camp facilities, as well as maintenance works across the site. An additional 2 cubic metres of timber was purchased from third party suppliers for camp upgrade works.

6.5 Spill prevention and response

To reduce the likelihood and consequences of emergency situations, EMPNG maintains dedicated plans, personnel, equipment, and workforce training. This also applies to the company's hydrocarbon spill prevention and response.

During 2016, EMPNG recorded 45 low-level spill incidents involving 36 hydrocarbon spills, eight chemical spills and one wastewater spill.

One Severity Level 0 incident was recorded in February when approximately 2700 litres of diesel fuel was spilled from an unknown third party illegally entering the Komo Camp and attempting to steal fuel from an above ground storage tank.

In November, one chemical spill was recorded as a Severity Level 0 incident when 260 litres of methyl-ethyl-glycol was released at Hides Wellpad G from a leaking fitting. Upon discovery, the leaking line was immediately shut down and repaired.

All spills recorded during 2016 were responded to appropriately and in a timely manner and had no significant environmental impact. EMPNG and its contractors continue to conduct dedicated spill prevention toolbox talks with their relevant work teams.

Nineteen spill near misses were recorded during 2016. These involved spills to impermeable surfaces.



Plate 6.6 – Deploying a shoreline protection boom and skimmers during an emergency response exercise

Twenty-one practical spill response drills and eight desktop drills were conducted during 2016. Scenarios included tank farm diesel fuel spill; piping leak at a wellpad; jet fuel release at Komo Airfield; oil spill from a cargo ship collision in Caution Bay; condensate release into a river; and bunker spill from an LNG carrier.

Practical drills included field discussions, full equipment deployment and clean-up strategies.

6.6 Waste management

EMPNG implements waste reuse initiatives and uses approved third party facilities to recycle production waste wherever practicable to reduce the amount of waste sent to landfill.

A waste register is maintained by an approved contractor to record all waste received at PNG LNG waste processing facilities.



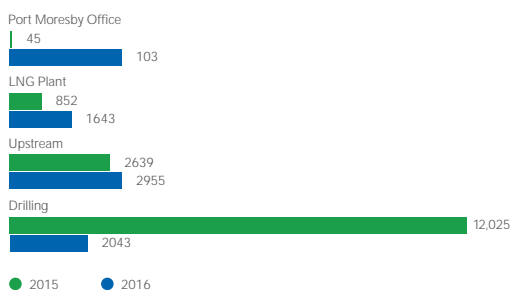
Plate 6.7 – EMPNG’s Emergency Response team practicing shallow water boom deployment

The register includes information on waste transfer numbers, waste classifications, quantities and treatment or disposal methods.

EMPNG’s waste volumes decreased during 2016 compared to 2015 as shown in Figure 6.2, primarily due to the demobilisation of drilling activities.

Generated waste

Figure 6.2 – Weight (tonnes) by source



At the LNG Plant site, waste increased because of maintenance works including: an activated carbon change out; a molecular sieve change out; and retention pond and lift station clean outs.

A slight increase in waste in the Upstream area resulted from bio-remediation of soil that had been contaminated by a spill at Komo Camp.

At the LNG Plant, 165 tonnes of molecular sieve material was replaced in 2016 during maintenance of the dehydration units, which removes water from the feed gas. An assessment to determine the appropriate disposal method of the material was undertaken, with laboratory results showing that the waste material contained no hazardous substances and could be used as landfill cover.

Ninety-six tonnes of waste oil, scrap metal and spent car batteries from the LNG Plant site were sent to approved third party waste recycling facilities during 2016. Two hundred tonnes of drilling mud and 128 tonnes of waste drilling chemicals that were stored at the HWMF were sent to an approved third party facility in Australia for disposal.

In February, following the introduction of an excavator with a cutting shear to process waste tyres at the HWMF, more than 70 percent of waste tyres were processed and reused as base

material for the Facility's landfill cells. At the LNG Plant, 35 used dump truck tyres were donated to PNG Ports Corporation Limited for reuse as wharf fenders.

Waste recycling and reuse initiatives continued in the Upstream area. During 2016, more than 214 tonnes of recyclable waste generated at the HGCP was reused on-site or sent to approved third party recycling facilities.



Plate 6.8 – Dump truck tyres donated to PNG Ports Corporation Limited being reused as wharf fenders

Recycled materials included waste oil, scrap metals, spent car batteries and wood waste.

Improvements were made to waste fuel and oil storage during 2016 by replacing metal drums and plastic tote tanks with double walled tanks for storage.

Liquid food composters are being installed at permanent worker camps, with one composter installed at the HGCP Camp in November and additional units being provided at the LNG Plant site Camp. The composters will improve waste management for food waste, resulting in less waste being incinerated and a subsequent reduction in air emissions. At the HGCP Camp, 3 tonnes of food waste was processed through the composter during November and December, with the effluent treated at the site's wastewater treatment plant.

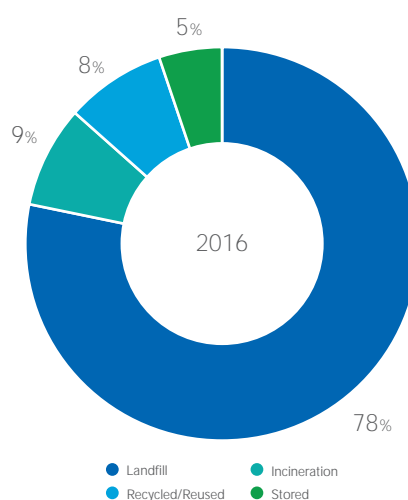
Two Severity Level < 0 non-conformances relating to waste management were recorded in August. The first non-conformance was due to sanitary sludge being disposed of through an unapproved wastewater treatment plant because approved Upstream area disposal facilities were inaccessible during community protests in Hides. The second non-conformance, involved the disposal of sanitary waste at the LNG Plant site landfill, a practice not aligned with methods defined under the Environmental Management Plan for the site.

In addition to EMPNG waste, 38 cubic metres of medical waste from Tari Hospital was processed through the HWMF incinerator during 2016 to assist the Hospital with disposing of a large batch of expired medicine.

The predominant waste type during 2016 was general office or accommodation refuse followed by food waste. Solid waste by disposal method is shown in Figure 6.3.

Waste disposal

Figure 6.3 – Percentage by disposal method



6.7 Reinstatement, erosion and sediment control

Aerial and ground inspections are used to monitor the effectiveness of EMPNG's erosion and sediment controls in areas near production facilities. Information is also gathered from clans involved in Clan ROW Maintenance Agreements. Specialist teams manage the repair and maintenance of erosion and sediment control measures.

During 2016, ground surveys were conducted between the HGCP and Angore Wellpad B, and between Kilometre Points 94 and 108. Maintenance and repair works undertaken included: identifying and sealing ground surface tension cracks; clearing vegetation and silt out of berms and drainage outlets; constructing additional berms; and re-contouring existing berms. Maintenance and the installation of sediment control measures were also conducted on drainage lines around the HGCP, while drainage improvements were undertaken along the Hides Wellpad Access Road at Kilometre Point 4.

Erosion repair works were completed along the pipeline ROW between Kilometre Points 96 and 98, at Kilometre Points 41, 61 and 100, and between Kilometre Points 102 and 104. Repair works were also conducted at Kilometre Point 9 where a small landslip had occurred following heavy rainfall.

Due to vandalism, repairs to drainage channels and erosion control structures were required on the northwest side of Komo Airfield during 2016. Repair works were also conducted on the northeast drainage channels at the Airfield.

One grievance was recorded regarding a landslip that occurred at Kilometre Point 41. An investigation by EMPNG's Geotechnical Engineering team found that the landslip was the result of natural environmental causes unrelated to EMPNG's activities. Repair works were conducted and the grievance was closed.

EMPNG continues to monitor and record rainfall at the Port Moresby office to determine any impact on Saraga Creek, which runs through the site. During 2016, upgraded erosion mitigation measures such as concrete stone pitching, reshaping and reseeding slopes and jute matting proved effective in reducing erosion during rainfall at the site.

Case study

Preserving air quality



LNG Plant site generators

As part of EMPNG's environmental management commitments, an air emissions monitoring program is conducted at production facilities to ensure ambient air quality is within criteria.

A key component of the air monitoring program is stack testing, which involves a team of third party specialists who use purpose-built equipment to measure emissions from production facility stacks. Air emissions must comply with specific stack emissions criteria as set out in EMPNG's Environmental Management Plans.

EMPNG's stack testing program covers generators, compressors, furnaces and waste incinerators at the LNG Plant, HGCP and HWMF. There are 23 stacks at the LNG Plant, eight at the HGCP and one at the HWMF. The types of emissions monitored during stack testing include nitrogen oxides, sulphur oxides, carbon monoxide, particulate matter and various metals, which are key parameters used to measure air quality.

Testing is performed while equipment is operating and is taken over several hours. Specially designed air sampling ports and stack probes are used during testing to route flue gas to gas analysers and data recorders, which collect live readings. For incinerators, additional samples are collected directly from the stacks and sent for analysis to accredited laboratories in Australia. This approach is taken to monitor for certain materials, such as metals, that can only be accurately identified and analysed in a laboratory.

Third party specialists are all trained in working-at-heights because most stacks are located well above ground level. Safety is managed by conducting a thorough Job Safety Analysis to assess risks, including weather-related risks, before starting the monitoring.



Third party specialists perform stack testing on the generator stack from a mechanical lift, to which they are harnessed



7 Biodiversity

Biodiversity management and monitoring programs are conducted by EMPNG to preserve Papua New Guinea's unique biodiversity.

7.1 Biodiversity management

During 2016, EMPNG achieved a significant milestone with the completion of a revised Biodiversity Strategy, a supporting Biodiversity Implementation and Monitoring Program, and four biodiversity protocols. These revisions captured lessons learned during early implementation of the Biodiversity Strategy feedback from stakeholders, and the results of biodiversity surveys conducted as part of the Biodiversity Implementation and Monitoring Program.

The Biodiversity Strategy and Biodiversity Implementation and Monitoring Program are available on the PNG LNG website.



Visit the website at www.pnglng.com

The Biodiversity Strategy is also outlined in *Case study: Safeguarding biodiversity*.

In February, a workshop was held in Cairns, Australia with key contractors responsible for implementation of the Biodiversity Strategy. The workshop's purpose was to re-affirm goals and objectives, refine the approach across the Programmed Monitoring Activities (PMAs), align field monitoring programs with performance objectives, and discuss requirements for data management, analysis and reporting to achieve efficient, effective, and integrated execution. The results of the workshop were used to refine aspects of the Biodiversity Strategy and add detail to the Biodiversity Implementation and Monitoring Program, and the associated biodiversity protocols.



Plate 7.2 – Participants at the workshop in Cairns, Australia

7.2 Monitoring programs

EMPNG's biodiversity activities during 2016 focused on progressing the biodiversity offset program and assessing the progress of each of the PMAs.

PMA1 – Remote Sensing of Broadscale Land Cover

As part of PMA1, an analysis of Landsat and high-resolution Rapid Eye imagery captured during 2015 was undertaken. The results of the assessment, which was conducted in 2016, concluded that there was no evidence of broadscale forest loss or degradation attributable to PNG LNG activities.

PMA2 – Condition Surveys of Focal Habitats and Significant Ecological Features

PMA2 monitoring activities provide the necessary data to assess the condition and ecological functionality of focal habitats and significant ecological features located near PNG LNG facilities and infrastructure.

Opposite:

Plate 7.1 – Lake Kutubu, Southern Highlands Province

This involves monitoring of 32 pre-defined focal habitats and significant ecological features. Monitoring conducted during 2016 indicates that recovering focal habitats and sensitive ecological features have not sustained any further impact as a result of PNG LNG activities.

PMA3 – Biodiversity Surveys

Detailed biodiversity surveys were conducted in the Upstream area in June and July as part of PMA3. These terrestrial biodiversity surveys are designed to collect and analyse data relating to trends in flora and fauna species diversity and abundance in the Upstream area, as well as protected areas enhanced and/or established as part of EMPNG's offset program.

Eight national and international scientists documented 577 animal and plant species, including at least 35 species that were previously unknown to science (new species) or that were known but were yet to be scientifically named (undescribed), and 14 species listed in a category higher than Least Concern in the International Union for Conservation of Nature (IUCN) Red List of Threatened Species.

Monitoring results have been outlined in a report, which indicates that biodiversity values of the Upstream area remain intact, with only minor impacts detected in close proximity to PNG LNG facilities. Given the scientific significance and high stakeholder interest in the survey and its conclusions, EMPNG has supported printing and distribution of 500 copies of the report. The report can also be viewed on the PNG LNG website.



Visit the website at
www.pnglng.com



Plate 7.3 – Biodiversity consultants, Giles Totona and Dr Iain Woxvold setting a camera trap for use in PMA3 monitoring

In late 2016, preparations were made for the next round of PMA3 surveys. In 2017, EMPNG will conduct surveys in the Lower Kikori area as well as around Moro and Hides Ridge. Preparations for the Lower Kikori area surveys included trial sampling of biodiversity in three locations in the Kikori region: Wau Creek, Goaribari Island, and within the Neiru (Aird Hills) Wildlife Management Area (WMA). Camera traps were set to capture images of animals in these areas. The cameras captured species such as the red-bellied pitta (*Erythropitta erythrogaster*) in both Wau Creek and the Neiru (Aird Hills) WMA. While these birds are common in lowland areas, they are secretive, so this is the first time they have been recorded in the Lower Kikori area.

In Wau Creek, camera trapping confirmed the existence of two different species of monitor lizards. Camera images captured at Goaribari Island showed a rich diversity of marsupials and birds on the small island.

PMA4 – Efficacy of Biodiversity Offsets

Biodiversity field activities conducted during 2016 also focused on the five components of PMA4:

- Component 1: Protected area planning
- Component 2: Support the national biodiversity strategy
- Component 3: Build conservation capacity
- Component 4: Enhance existing protected areas
- Component 5: Establish new protected areas.

Through Component 1, EMPNG is supporting CEPA with developing a Protected Area System Plan for the Kikori River Basin. EMPNG has engaged the Wildlife Conservation Society to lead the delivery of this component because of its expertise in regional conservation planning.

In early 2016, the Wildlife Conservation Society completed biodiversity data collection and mapping of the Kikori River Basin.

In April, EMPNG and the Wildlife Conservation Society held a meeting with conservation planning experts to review preliminary outputs from the mapping exercise. Meeting participants helped to identify gaps in the data and provided scenarios for conservation planning.



Plate 7.4 – EMPNG and Wildlife Conservation Society representatives with conservation planning experts

Another meeting was held in July to review mapping outputs from a Marxan analysis conducted by the Wildlife Conservation Society with support from the Queensland University of Technology, Australia. Feedback from the meeting is being incorporated into a technical report of the Marxan analysis being prepared by the Wildlife Conservation Society.



Plate 7.5 – Conservation planning specialists complete Marxan analysis exercises supervised by Kendall Jones from the Queensland University of Technology (third from the left)

Component 2 of the offset program involves supporting CEPA with its implementation of the National Biodiversity Strategy and Action Plan (NBSAP), which was launched in 2007. The NBSAP helps Papua New Guinea meet its obligations under the *Convention on Biological Diversity* and other multilateral agreements.

Up Close: Early signs of success

The Communicating Conservation Practice in Papua New Guinea workshops have provided participants with the opportunity to share some successful community-based conservation efforts.

For example, Tenkile Conservation Alliance, in the Torricelli Mountains of the West Sepik, focuses on protecting the tree kangaroo (*Dendrolagus scottae*), which is listed on the IUCN Red List of Threatened Species as Critically Endangered. The Alliance aims to protect the tree kangaroo through community capacity building and the provision of alternative protein sources. At the March workshop, Patrick Akon, from Tenkile Conservation Alliance, spoke of the challenges of restricting communities from hunting the species, which has traditionally been their major source of protein.

Cornwall Nukara from Dadakul community in Oro Province, which is a part of the wider Managalas Conservation Area, has been working with local communities to protect the Critically Endangered Queen Alexandra's birdwing (*Ornithoptera alexandrae*) – the largest butterfly in the world.

“Presentations from community-based organisations at the workshops has highlighted the diversity of conservation strategies that different groups have adopted to protect endangered species in Papua New Guinea.”

Dr Jane Mogina
Biodiversity Advisor ExxonMobil PNG Limited

To progress the implementation of NBSAP, EMPNG and some 50 conservation representatives involved in the NBSAPs delivery participated in a three-day Communicating Conservation Practice in Papua New Guinea workshop held in March 2016. The meeting brought together conservation researchers and practitioners from organisations including EMPNG, CEPA and the Mama Graun Conservation Trust Fund to provide updates on the status of their activities pertaining to NBSAP.

Workshop topics included biodiversity and conservation research, best practices, policies, and partnerships in Papua New Guinea.



Plate 7.6 – Participants at the Communicating Conservation Practice in Papua New Guinea workshop

Among case studies presented were: the pig-nosed turtle (*Carettochelys insculpta*) conservation project – the *Piku* Project; the YUS Conservation Area – named for its three main rivers, Yopno, Uruwa and Som; and the Tenkile Conservation Alliance's tree kangaroo conservation programs.

Outcomes of the workshop included the identification of gaps in NBSAP implementation and actions to address these, as well as an agreed list of communications tools to promote a more coordinated approach to progressing the NBSAP.

Following the event, the Mama Graun Conservation Trust Fund published the first issue of Biodiversity Digest. This newsletter aims to communicate conservation news to practitioners. It is produced with support from The Nature Conservancy and SeaWeb.

In September, a second Communicating Conservation Practice in Papua New Guinea workshop was held with some 75 conservation representatives.

The second meeting aimed to provide updates on the status of activities pertaining to the NBSAP and covered topics including: the first draft of the Protected Area Bill; the draft Protected Area Policy Action Plan; conservation best practices; and community conservation programs. Case studies included: the Hogave conservation area's community focus on the protection of the forest around Mount Michael in the Eastern Highlands Province; and the Sepik Wetland Management Initiative – a conservation initiative that protects endangered salt water crocodiles listed under the *Convention on International Trade in Endangered Species of Wild Fauna and Flora*.

From the workshop, a final draft of the Protected Area Policy Action Plan was completed, along with extensive analysis of the draft Protected Area Bill, and numerous actions were identified to support community conservation efforts. The second issue of Biodiversity Digest was also published.

To meet the Component 3 requirement, new programs to deliver Postgraduate Diploma and Masters in Conservation Management degrees focusing on biodiversity conservation were developed during 2016. These courses will be introduced in 2017 in partnership with the Mama Graun Conservation Trust Fund and the University of Papua New Guinea.

Masters degree scholarships will also be offered from 2017. Doctorates and Certificate courses in Conservation Management were approved by the University Academic Senate in September.

Work on Component 4, which aims to enhance the Lake Kutubu WMA, included community-based training coordinated by Enoch Kale from EMPNG's program partner, the PNG Institute of Biological Research.

The training was held in February and focused on the ecosystems services analysis for the Lake Kutubu WMA.

It reviewed ecosystems services as expressed in the *Millennium Ecosystems Assessment Report* and discussed how these ecosystems services categories applied to the local context in Lake Kutubu. Lake Kutubu WMA Committee members worked in small groups to define the types of ecosystems goods and services that are important to Lake Kutubu communities. Progress was also made on the Lake Kutubu WMA Enhancement Plan.



Plate 7.7 – Members of the Lake Kutubu WMA Committee participating in the community-based training workshop

To support World Environment Day, Lake Kutubu WMA Committee members from Gesege, Yo'obo, Tugiri, Old Tugiri, Kei Point and Wasemi villages organised with their respective communities a clean-up of rubbish from within and around the Lake.



Plate 7.8 – Chairman of the Lake Kutubu WMA Committee, Lawrence Kage, with Hunabi Alfred collecting rubbish at the Kaimari River outlet of Lake Kutubu

In September, the Lake Kutubu WMA Committee held a promotional booth at the Kutubu Kundu and Digaso Festival to raise funds and educate local communities about their activities.

Component 5 of the offset program aims to establish new community-based protected areas in the Upstream area that are representative of the biodiversity values recognised by EMPNG. During April, November and December, EMPNG's Biodiversity team visited seven villages in the Lower Kikori Delta to conduct community resource use mapping, provide information about EMPNG's offset program and raise awareness about invasive species.



Plate 7.9 – EMPNG Biodiversity Advisor, Rebekah Ilave, conducting community resource use mapping with Goare villagers

Community resource use mapping enables community members to identify important resource areas, and determine the status of these areas, so they can implement strategies to protect their resources.

In November, EMPNG donated a boat to the Neiru (Aird Hills) WMA Committee to support its conservation activities.

The Neiru (Aird Hills) WMA was initially established in December 1987 and is managed by members from the Ero and Wowou villages belonging to the Porome tribe in the Lower Kikori area. EMPNG has been providing support to the Neiru (Aird Hills) WMA Committee since 2012 with helping the committee to re-establish activities and develop targeted programs for the WMA. Most activities focus on the protection of forests and waterways within tribal lands, managing solid waste in the villages, and raising conservation awareness within Ero and Wowou villages.



Plate 7.10 – EMPNG General Manager – Environment and Regulatory Affairs, Laura Ann Dresser, and Neiru (Aird Hills) WMA Committee Chairman, Koumi Komo cut the ribbon at the boat hand-over ceremony

The new boat will make it faster and easier for Neiru (Aird Hills) WMA Committee members to inspect the WMA and to reach out to communities outside their own villages.



Plate 7.11 – EMPNG Biodiversity Advisor, Rebekah Ilave, reviews a map of Wau Creek Conservation Area with principal landowner Frank John

7.3 Ecological management

Wildlife monitoring during 2016 identified increases in some populations of existing species in the LNG Plant site area, particularly the agile wallaby (*Macropus agilis*). Monitoring results also reported an increase in species diversity, especially in local and migrating water birds, as well as an increase in the number of snakes observed. This is likely the result of the sediment ponds and increased vegetation in reinstated areas of the LNG Plant site providing ideal habitats and food sources. The increasing wildlife diversity at the LNG Plant site has prompted the development of an internal Wildlife Management Plan for the site. This Plan aims to maintain and enhance the ecological value of the site while ensuring the safety of site workers. A Safety, Security, Health and Environment Alert was issued to EMPNG employees to re-emphasise the company's commitment to protecting wildlife.

Approximately 456 hectares of mangrove forest is located adjacent to the LNG Plant site, through which the offshore pipeline passes. Monitoring of the pipeline ROW indicates stilted mangroves (*Rhizophora stylosa*) are the most common species growing on the low tide mark near the LNG Plant, and the species also continues to grow at the high tide mark through natural regeneration.

The orange mangrove (*Bruguiera* sp.) and red mangrove (*Rhizophora* sp.) species dominate the middle area behind the stilted mangrove stands. The grey mangrove (*Avicennia marina*), and yellow mangrove (*Ceriops tagal*) are predominant at the high tide mark. The grey mangrove became established along the ROW in 2014 and was found to be thriving during 2016. Local communities have been observed harvesting mangroves close to the pipeline ROW to provide wood for building. EMPNG is engaging with communities about the ecological importance of mangroves and the need to protect them.



Plate 7.12 – A Torresian imperial pigeon (*Ducula spilorrhoa*) at the LNG Plant site



Plate 7.13 – Grey mangroves at the mid tide mark on the pipeline ROW

In September, the prevalence of low tides enabled the EMPNG monitoring team to inspect the seaward side of existing mangroves as well as new mangroves on the pipeline ROW.

Mud flats under the LNG Plant Marine Terminal jetty were observed to have large populations of sea slugs, sea stars, sea cucumbers, sponges



Plate 7.14 – Spoonbills and ducks in the sediment pond at the LNG Plant site

and other species during 2016. Six species of sea grass in the intertidal zone adjacent to the LNG Plant also appeared to be in good health.

EMPNG continues to monitor the health of two sandalwood (*Santalum macgregorii*) trees at the LNG Plant site. Both trees were bearing fruit and flowers and appeared to be in good health during 2016.



Plate 7.15 – Flowering sandalwood at the LNG Plant site

7.4 Quarantine management

Papua New Guinea's National Agriculture Quarantine and Inspection Authority requires EMPNG and its contractors to comply with regulations and procedures for all freight imported into the country.

During 2016, EMPNG received 690 shipments into Papua New Guinea. Of these, 111 shipments (16 percent) were inspected and 23 of the inspected shipments (21 percent) required re-fumigation to comply with National Agriculture Quarantine and Inspection Authority standards.

7.5 Invasive species, pests and plant pathogens

EMPNG's ninth and tenth weed audits were conducted during 2016. The ninth weed audit, conducted in May, recorded no new weed species and found the abundance of recorded weeds to be low at most sites. The only recorded increase was grader grass (*Themeda quadrivalvis*), a Priority 1 weed located at the LNG Plant site.

In the Upstream area, the weed audit indicated that Priority 1 weed diversity was lower in the majority of weed management zones compared to pre-construction survey levels. The exception was the Gobe to Kaiam zone, in which two additional species were recorded compared to the pre-construction survey level, as noted in the previous weed audit.

The tenth weed audit, conducted in October, included 37 permanent monitoring sites. The audit recorded no new weed species and weed abundance was low at most sites. A review of weed species was conducted during this audit to take into account the latest information about weed status and distribution in Papua New Guinea. The review resulted in seven Priority 1 weed species being downgraded to Priority 2. The species were: buffel grass (*Cenchrus ciliaris*), orange desmodium (*Desmodium repandum*), silver-leaf desmodium (*Desmodium uncinatum*), molasses grass (*Melinis minutiflora*), guava (*Psidium guajava*), woolly senna (*Senna hirsuta*), and Singapore daisy (*Sphagneticola trilobata*).

EMPNG continues to implement measures to control Priority 1 and Priority 2 weeds in and around production facilities. Targeted species include spiked pepper (*Piper aduncum*), anglestem willow primrose (*Ludwigia leptocarpa*), kudzu (*Pueraria phaseoloides*), bitter vine (*Mikania micrantha*), giant cane (*Arundo donax*), greenleaf desmodium (*Desmodium intortum*), silverleaf desmodium, highlands trefoil (*Desmodium sequax*), giant sensitive plant (*Mimosa diplotricha* var. *diploctricha*) and candlestick senna (*Senna alata*). Weed management was conducted in areas including: Hides Ridge, the HWMF, Gobe and Moro in the Lake Kutubu area. The weed management contractor also revisited all invasive species monitoring control sites to monitor and manage weed regrowth.



Plate 7.16 – Manual removal of weeds near Ai'io Village

The weed management contractor uses selective spraying to control Priority 1 weeds. This method focuses on enabling native species to grow and, once established, shade out Priority 1 weeds. Priority 3 weeds are not controlled as they provide ground cover, which prevents Priority 1

and Priority 2 weeds from establishing in exposed ground. In addition to the use of environmentally sound herbicides, weed species are manually removed from waterways and from areas close to village communities.



Plate 7.17 – Selective spraying of spiked pepper (*Piper aduncum*)

During 2016 cane toads (*Rhinella marina*), were recorded at Moro B Camp. This is an invasive species in Papua New Guinea and is of concern because the toxin contained within their skin has the potential to cause harm to humans and native animals.

EMPNG has implemented a cane toad management plan, which includes investigating the presence of cane toads within, or near, other PNG LNG facilities and raising awareness with workers about cane toad management.

EMPNG also continues to raise awareness about other invasive animal and weed species with workers and local communities. In April 2016, invasive species awareness sessions were conducted in four villages in the Kikori River Delta. The sessions provided general awareness about invasive species that affect river communities and ways to reduce and prevent the spread of these species.



Plate 7.18 – EMPNG Biodiversity Advisor, Anita Mosby, conducts an invasive species awareness raising session at Omati Village in the Kikori River Delta

As part of an ongoing invasive species awareness program, toolbox talks and training were provided to workers at the HGCP and the HWMF during 2016. Production workers also received comprehensive invasive species monitoring and control training to assist Upstream area operations with new work fronts.

In response to community requests, EMPNG trained Upstream area villagers in identifying weed species so that communities could develop their own invasive species management strategies. The Lake Kutubu WMA Committee also presented invasive species awareness sessions to schools in the Lake Kutubu area.



Plate 7.19 – Grade 8 students from Tubo Primary School in the Lake Kutubu area reading invasive species awareness materials



Plate 7.20 – Surveying the ROW



Plate 7.21 – After control of Priority 1 weed anglestem willow primrose (*Ludwigia leptocarpa*) on the banks of a creek in the Mubi area

7.6 Access control

EMPNG collects data on the number and types of vehicles using EMPNG-controlled roads through an access control system at security checkpoints. The system also collects data about reasons for the road use.

During 2016, 1774 vehicles were recorded using EMPNG's access roads for purposes such as work, business/trade or visiting family and friends, as shown in Figure 7.1. Figure 7.2 shows the types of vehicles that entered EMPNG-controlled roads.

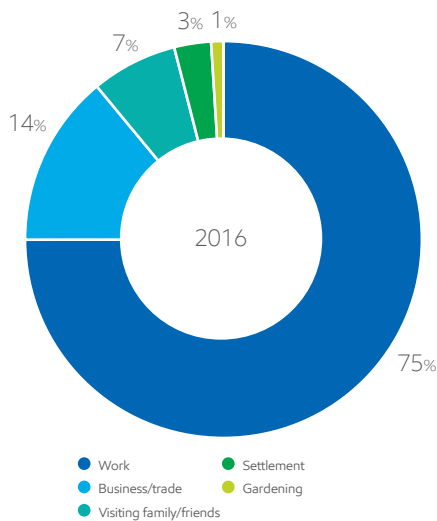
Compared to access control data collected since early 2015, there have been no significant changes in the volume or composition of traffic using EMPNG's access roads. This shows that access control measures are effectively managing traffic on EMPNG-controlled roads.

Access control checkpoints and worker site identification cards are also maintaining access control at the Hides Wellpad Access Road.

One non-conformance was reported early in the year when an unknown third party vehicle accessed the pipeline ROW at the LNG Plant. Investigations confirmed that the vehicle did not cause damage to the ROW or to the adjacent mangrove environment. Additional security measures, including increased surveillance and community education, were implemented in response to the non-conformance.

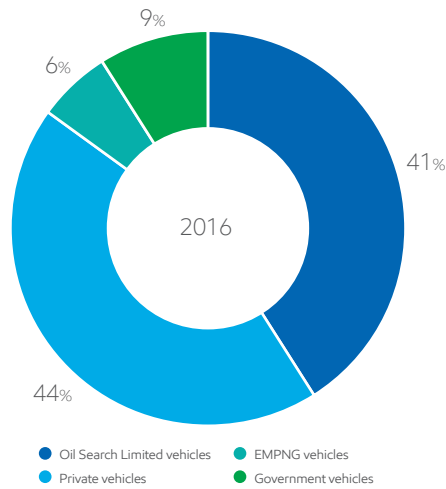
Purpose of access

Figure 7.1 – Percentage of traffic using EMPNG controlled roads by purpose



Vehicle types

Figure 7.2 – Percentage using EMPNG access points



Aerial monitoring identified tyre tracks on the pipeline ROW in the vicinity of the Hides to Komo Road crossing in October. EMPNG conducted awareness-raising engagements with local communities to reinforce that vehicles were not permitted to drive along the ROW.

Papua New Guinea's Department of Works completed and opened the Benaria River bridge and the access road to Benaria Village for public use during 2016. As a result, the community no longer uses the temporary Benaria River bridge EMPNG installed, so monitoring of public vehicles using this bridge is no longer required. The Kopi Scraper Station Access Road was also handed over to the Papua New Guinean Government during 2016.

Case study

Safeguarding biodiversity



Interior of lower montane forest at the highest elevations on Hides Ridge

EMPNG is committed to safeguarding biodiversity in areas where the company operates and, in particular, the biodiversity values in the Upstream area of PNG LNG. To achieve this, EMPNG has developed a Biodiversity Strategy that outlines how impacts on biodiversity will be assessed and managed for the long-term.

PNG LNG's facilities in the Upstream area include: production wells; the HGCP; Komo Airfield; Oil Search Limited's pre-existing facilities; and the 290-kilometre onshore pipeline. An offshore pipeline links the Upstream area with the LNG Plant and Marine Facilities area.

A biodiversity impact assessment of the PNG LNG development area was conducted as part of the PNG LNG EIS. Approximately 120 technical consultants from 30 organisations guided this analysis, many of which had experience in Papua New Guinea.

Management of potential impacts to biodiversity across the Upstream area and the LNG Plant and Marine Facilities area is through implementation of EMPNG's ESMP. While the ESMP applies to a broad range of land and aquatic environments in which PNG LNG is operating, the largely undisturbed tropical forest in the Upstream area was identified as having the highest biodiversity value. This area is also where most of the biodiversity-related impacts from the construction phase were predicted to occur in the PNG

LNG EIS. This was confirmed in the Initial Post Construction Biodiversity Assessment Report. As such, the Upstream area requires additional biodiversity-related management processes to supplement the measures outlined in the ESMP. The Biodiversity Strategy addresses this need. The PNG LNG EIS, ESMP and Biodiversity Strategy can be found on the PNG LNG website.



Visit the website at
www.pnglng.com

Upstream biodiversity

The Upstream ranges from sea level to 3650 metres in altitude and covers 2,265,099 hectares (22,651 square kilometres). Of this, the actual land take for construction of the PNG LNG pipeline and facilities, as defined in the Initial Post Construction Biodiversity Assessment Report, is 2373 hectares, which is 380 hectares less than predicted in the PNG LNG EIS.

Case study

Safeguarding biodiversity

The Upstream area is ecologically significant not only due to its high species richness, but also because it supports large numbers of endemic species. Therefore, the entire Upstream area has been defined as critical habitat, pursuant to the International Finance Corporation's Performance Standards on Social and Environmental Sustainability; specifically Performance Standard 6: Biodiversity Conservation and Sustainable Natural Resource Management.

Vegetation types in the Upstream area include montane forests, grasslands, rocky scrubs, open lowland forests, swamp woodlands and mangroves. Within this area, the PNG LNG EIS identified 78 species considered by the IUCN to be threatened, an additional 30 regulated under the *Fauna (Protection and Control) Act 1966* and 15 more regulated by the *International Trade (Fauna and Flora) Act 1979*.

Of the species named on the IUCN Red List of Threatened Species, seven were also listed as Critically Endangered or Endangered, including the Critically Endangered species Bulmer's fruit-bat (*Aproteles bulmerae*), the long-beaked echidna (*Zaglossus bartoni*), the Endangered tree kangaroos *Dendrolagus notatus* and *Dendrolagus goodfellowi* and tree species *Halfordia papuana*, *Bleasdalea papuana* and *Flindersia pimentelliana*. These species are among the important biodiversity values addressed by the Biodiversity Strategy.



A giant White-tailed rat (*Uromys cf. caudimaculatus*) observed during PMA3 surveys

In Papua New Guinea, and the Upstream area in particular, many inhabitants rely on subsistence cultivation and a wide range of forest resources to meet their physical, cultural and spiritual needs. The relationship of people with the land was also a key factor in the development of the Biodiversity Strategy.

Since 2010, stakeholders such as CEPA, national and international non-government organisations, Papua New Guinean universities, and relevant communities have informed the development of the Biodiversity Strategy.

Biodiversity values

Biodiversity values of the Upstream area have been identified through surveys conducted over the past 20 years, as well as pre-construction surveys undertaken as part of PNG LNG, along with other research. These values are categorised at the large scale, medium scale and small scale. Large scale values encompass biodiversity features of the Upstream area as a whole. This includes faunal and floral species diversity and species of conservation concern. Medium scale values focus on priority ecosystems such as the Lake Kutubu area, forest in the Hides Ridge area, high altitude forest in the Homa area and forest in the Juha area. Small scale values cover habitats and significant ecological features such as caves, swamps, mangroves and streams.

Biodiversity Strategy goal and objectives

The Biodiversity Strategy goal is to retain the biodiversity values of the Upstream area for the long-term. This is consistent with International Finance Corporation Performance Standard 6 that states:

- there are no measurable adverse impacts on the ability of the critical habitat to support the established population of Critically Endangered or Endangered species or the functions of the critical habitat.
- there is no reduction in the population of any recognised Critically Endangered or Endangered species.
- any lesser impacts are mitigated to achieve no net loss of biodiversity where feasible.

To achieve the Biodiversity Strategy goal, objectives were needed at large, medium and small scales. An objective was also required to offset residual biodiversity impacts from the construction of PNG LNG facilities.

Case study

Safeguarding biodiversity

Therefore, the Biodiversity Strategy objectives are:

1. At the large scale, maintain the intactness of the Upstream area as a whole.
2. At the medium scale, conserve priority ecosystems.
3. At the small scale, protect focal habitats.
4. To identify, measure and offset significant residual impacts.

The first step to achieving the Biodiversity Strategy goal is the application of a risk management hierarchy, which involves, in order of application, the following approach:

- Avoidance of impacts to identified biodiversity values – Avoiding impacts on the biodiversity of the Upstream area was factored into project feasibility, planning and design studies and the timing and/or performance of construction works.
- Reduction of impacts involves implementing management measures in situations where avoidance is not feasible – Management measures to reduce the severity of an impact were established in the PNG LNG EIS and actioned through the Construction and Production ESMPs.
- Remedy significant impacts that cannot be avoided or reduced – EMPNG has conducted reinstatement works on construction sites and worked with stakeholders to develop an offset program for significant residual biodiversity-related impacts.

Biodiversity offset

The PNG LNG EIS identified seven types of potential residual impacts with moderate or major potential, and of relevance to the biodiversity of the Upstream area. These were: habitat loss in priority ecosystems; edge effects in high altitude karst; barrier and erosion impacts; steep cuttings in karst; fire; the introduction of weeds and pathogens; and enhanced access. EMPNG has developed an offset program with the objective of compensating for the residual impacts of PNG LNG. This forms the basis of Objective 4 of the Biodiversity Strategy.

The offset program is based on a set of guiding principles that were developed in consultation with stakeholders. Also central to the offset program is the concept of offset debt, which was calculated to be 6586 habitat-hectares. This debt would need to be accounted for by protecting 13,108 hectares of old growth forest over 30 years (the offset target). The guiding principles have been combined with lessons learned from studies of the Upstream area and the offset target to develop five components of the offset program:

- Component 1: Protected area planning – Support CEPA in the development of a Protected Area System Plan for the Kikori River Basin.
- Component 2: Support the national biodiversity strategy – Support CEPA in enhancing implementation of the NBSAP.
- Component 3: Build conservation capacity – Build technical capacity by contributing to the expansion of a training system aimed at developing qualified professionals across a range of disciplines that relate to the offset program.
- Component 4: Enhance existing protected areas – Enhance and strengthen the operation of existing WMAs in the Upstream area.
- Component 5: Establish new protected areas – Establish new community-based protected areas in the Upstream area that are representative of the biodiversity values recognised by EMPNG.



Anamiatoi's frog (*Oreophryne anamiatoi*) observed at Hides Ridge during PMA3 surveys. The frog is unique to Papua New Guinea where it is known only from a small area of the central mountain ranges

Components 1, 2 and 3 provide the foundation for capacity building to support the sustainability of protected areas (Components 4 and 5). Components 1, 2 and 3 are, by their nature, discrete programs that cease when their endpoints have been reached. Components 4 and 5 form the core of the offset program as they define the sites where the averted losses or conservation gains are planned, where the management effectiveness and ecological integrity will be monitored, and hence the objective of achieving the offset target.

It is through Components 4 and 5 that EMPNG's offset target of 13,108 hectares will be met. The company has elected to meet this target within an offset framework that comprises a notional area of 50,000 hectares in three elevation zones, giving a combined area of 150,000 hectares.

Case study

Safeguarding biodiversity

Monitoring progress

EMPNG has developed a Biodiversity Implementation and Monitoring Program to outline the methods used to monitor and measure residual impacts over time, deliver the components of the offset program, and track EMPNG's progress toward demonstrating the achievement of its offset target, and hence, no net loss of biodiversity in the Upstream area.

The Plan involves four PMAs that are used to collect data, which is then compared against a set of Key Performance Indicators that align with the Biodiversity Strategy objectives. The four PMAs are as follows:

- PMA1 – Remote Sensing of Broadscale Land Cover: PMA1 involves using remote sensing imagery to determine the extent to which broadscale direct and indirect residual impacts eventuate as a result of PNG LNG.
- PMA2 – Condition Surveys of Focal Habitats and Significant Ecological Features: PMA2 involves field surveys to collect data, adjacent to and in the vicinity of the pipeline ROW and other PNG LNG facilities and infrastructure that relates to the condition of focal habitats and significant ecological features.
- PMA3 – Biodiversity Surveys: PMA3 involves biodiversity field surveys providing flora and fauna data in and around the areas affected as part of PNG LNG, and protected areas enhanced and/or established as part of the offset program.



PMA3 survey team scientists. From left to right: Dopo Uriye, Kyle Armstrong, Muse Opiang, Amos Ona, Stephen Richards, Fanie Venter, Iain Woxvold, Ken Aplin and Leo Legra

- PMA4 – Efficacy of Biodiversity Offsets: PMA4 monitors progress of the five components of the offset program to enable EMPNG to evaluate whether Objective 4 of the Biodiversity Strategy is being achieved.

Up Close: Frank has turtle's back

Wau Creek's principal landowner, Frank John, has been working with the University of Canberra since 2007 to protect the Piku – pig-nosed turtle (*Carettochelys insculpta*), which nest in large numbers on his land.

The Piku is the main source of food and income for people along the Kikori River. Because of overharvesting, it is now considered vulnerable on the IUCN Red List of Threatened Species.

Frank has been at the forefront of protecting the turtle's habitat in the Wau Creek area, which is located in the headwaters of the Kikori River system in the Gulf Province. He participates in the monitoring of local nesting sites and educating local people about the plight of the Piku, Frank has built a research facility at Wau Creek for Piku and other biodiversity researchers to be based while working on his property.

Frank is in the process of developing Wau Creek as a protected area under CEPA's Protected Area Policy. With support from EMPNG and Canberra University, he had the boundary of the area surveyed and mapped. A number of researchers from several Australian Universities are currently doing biodiversity surveys of the area. Boundary and biodiversity surveys are part of CEPA's protected area establishment process.

"I think it's important that we all work together to protect our local animal species for future generations of Papua New Guineans. I feel privileged to be involved in protecting our Piku species."

Frank John

Wau Creek Conservation Area - principal landowner

The Biodiversity Implementation and Monitoring Program is designed to be adaptive so that Key Performance Indicators, PMAs and other elements of the Plan can be modified in response to findings, changing circumstances and lessons learned, recognising that the overall goal is to sustainably retain the biodiversity values of the Upstream area. Monitoring, evaluation and reporting on biodiversity values and the offset program components is an ongoing process.

EMPNG also continues its collaborative approach to the delivery of the Biodiversity Strategy, based on partnerships with specialist organisations, consultancy firms, government departments, not-for-profit organisations, communities and other stakeholders.

This approach promotes a higher probability for sustainable outcomes for Papua New Guinea.



8 Performance

Monitoring and evaluation tools such as system assessments, site inspections, surveys, sampling and measurement enable EMPNG to assess the effectiveness of the ESMP. These tools also enable the company to identify whether mitigation measures designed to manage production risks are achieving their intended outcomes.

8.1 Incidents

EMPNG's approach to managing incidents is outlined in the company's incident management system. A situation that has an unintended impact on a person's health, safety, security or livelihood, or has an impact on property, legal or regulatory compliance or the environment is classed as an incident. These are classified by Severity Levels of <0, 0, 1, 2, or 3.

Severity Level <0 has no significant impact, while Severity Level 2 or 3 require notification to the Lender Group's Independent Environmental and Social Consultant, or relevant government authority.

Figure 8.1 shows incidents and near misses recorded during 2016 according to Severity Level.

Incidents

Figure 8.1 - Number by Severity Level for 2016



Fifty-two low-level environmental incidents classified Severity Level <0 and 20 near misses were recorded during 2016.

Two Severity Level 0 incidents were recorded, with the first involving a hydrocarbon spill of approximately 2700 litres and the second involving a methyl-ethyl-glycol chemical spill of 260 litres (as described in *Section 6.5 Spill prevention and response*).

EMPNG and its contractors investigated the causes of all incidents and undertook corrective actions to reduce the likelihood of reoccurrence. None of the incidents resulted in a significant impact to the environment.

There were no Severity Level 1, 2 or 3 incidents during 2016.

8.2 Monitoring and evaluation

EMPNG uses ExxonMobil's Operations Integrity Management System to monitor, verify and evaluate its conformance with the ESMP. This enables the company to confirm its mitigation of recognised risks so that intended outcomes can be achieved.

Compliance with company and regulatory requirements is the responsibility of all EMPNG workers and contractors and is managed by the Regulatory team – see *Case study: Regulatory team manages compliance*.

Site-based Environmental Specialists implement the company's verification program by inspecting worksites, conducting field observations and monitoring air, noise and water discharge in accordance with EMPNG's environmental protocols.

Opposite:

Plate 8.1 – EMPNG Instrumentation Technician Trainee, Hilda Wagia at the HGCP

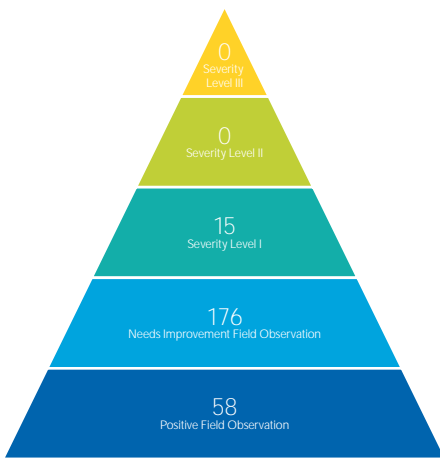
8.2.1 Results

Situations that do not meet ESMP requirements are identified as non-conformances. Three Severity Levels are used to classify non-conformances, with Severity Level I involving no damage or reasonable expectation of damage, to Severity Level III requiring corrective action. These Severity Levels align with the incident Severity Levels of <0, 0, 1, 2 and 3.

Field observations and non-conformances identified during 2016 are shown in Figure 8.2.

Non-conformances and field observations

Figure 8.2 - Number by Severity Level for 2016



Fifteen Severity Level I environmental non-conformances were recorded during 2016. One of the non-conformances related to uncontrolled access to the ROW. Six non-conformances related to wastewater discharge effluent quality. Four non-conformances related to exceedances of EMPNG's wastewater management criteria. The remaining non-conformances included one exceedance of air emissions criteria, one chemical spill and two related to waste management issues. Where required these were also recorded as Severity Level <0 incidents. Corrective actions were implemented to prevent a reoccurrence. There was no damage to the environment caused by any of the non-conformances.

'Needs improvement' field observations are used to detect potential non-conformance situations. They identify an intervention and/or corrective action that is required to prevent a non-conformance.

Refresher field observation training was conducted with EMPNG's Environmental Specialists during 2016. As a result of the training, the number of field observations significantly increased throughout the year.

Positive field observations record examples of good environmental practices. Fifty-eight positive field observations were recorded in 2016, with four of these for erosion and sediment control; one for good housekeeping; one related to reinstatement and regeneration; one related to invasive species, pests and plant pathogen management; eight related to materials management; 27 regarding spill prevention and response; 14 for waste management; and two related to water discharges.

Of the 176 needs improvement field observations recorded, four were for air emissions; 11 related to invasive species, pests and plant pathogen management; 23 related to materials management; 12 related to erosion and sediment control; 54 were for waste management; nine regarded water discharges; and 63 were for spill prevention and response management.

By the end of December, most needs improvement field observations were addressed and closed, with only three remaining open in the Upstream area (two at Komo, one at Moro) while teams continued working on corrective actions to close them.

8.3 External monitoring

The Lender Group's Independent Technical Consultant conducted a monitoring visit of EMPNG facilities in February 2016, and the Lender Group's Independent Environmental and Social Consultant completed a monitoring visit in November.



Plate 8.2 – Regeneration of the pipeline ROW near the Hides Gas Conditioning Plant during an Independent Environmental and Social Consultant monitoring visit

The final Independent Environmental and Social Consultant report is available on the PNG LNG website.



Visit the website at www.pnglng.com

Case study

Regulatory team manages compliance



EMPNG's Regulatory team with Papua New Guinean Department of Petroleum and Energy representatives

ExxonMobil has internal policies and procedures to manage compliance with applicable laws and regulations in countries where the company operates.

In Papua New Guinea, EMPNG complies with all applicable national laws and regulations, as well as international environmental and social principles and standards, such as the International Finance Corporation Performance Standards on Social and Environmental Sustainability. In addition, EMPNG applies the ExxonMobil Operations Integrity Management System to safeguard compliance.

Regulatory compliance is the responsibility of all EMPNG workers and contractors and is managed by the Regulatory team. In 2016, the Regulatory team was supported by 85 regulatory representatives from different groups within the company who helped steward compliance responsibilities and ensured all license and permit requirements, as well as any additional EMPNG requirements, were effectively communicated and actioned in the field. The Regulatory team captures all requirements, allocated responsibilities and actions to achieve compliance in EMPNG's regulatory compliance

database, RegFrame. The database includes information about the requirements of more than 700 Papua New Guinean Acts, Regulations, Laws, Rules, Agreements and Approvals, as well as Lender Group requirements and international guidelines, where appropriate. It also enables the Regulatory team to monitor more than 350 company and contractor licenses and permits issued by the government to ensure timely reporting, applications and submissions, and payments and renewals of licenses and permits to the appropriate regulatory agencies. Additionally, RegFrame manages more than 1875 regulatory obligations, including many that are commitments outlined in the ESMP.

During 2016, the Regulatory team's assessments of EMPNG facilities found regulatory compliance to be robust and performing well. The team also prepared EMPNG's compliance outlook for new construction projects, such as Phase 2 of PNG LNG, the Angore Gathering System, ahead of 2017.



9 Stakeholder engagement

EMPNG maintains ongoing engagement and collaboration with communities to keep stakeholders informed about production activities.

9.1 Communities

EMPNG conducted 1795 formal community engagements in 136 communities and 9269 informal engagements in 176 communities, during 2016. These engagements involved more than 41,000 attendees. This compares to 7473 formal and informal community engagements conducted in 104 communities with 34,500 participants in 2015.

The number of stakeholder engagements significantly increased in 2016 compared to 2015 because of engagements for the Angore Gathering System, engagements with clans regarding the introduction of eBanking for compensation payments, and road safety engagements with communities and schools.

In Angore, community engagements during 2016 primarily related to the Angore Gathering System. Land access is required for 1 kilometre of the 11-kilometre Angore pipeline, with the other 10 kilometres located within the existing pipeline ROW. Construction of the Angore pipeline is anticipated to begin in 2017, once land access arrangements for the 1 kilometre section have been completed.

In the Upstream area, engagements continued with clans involved in Clan ROW Maintenance Agreements. EMPNG also engaged with local communities regarding community development support programs.

Road safety awareness programs continue to be delivered to schools and communities in the LNG Plant site villages, with the focus on the safety of children near roads. During 2016, more than 90 road safety engagements were conducted with approximately 4000 participants, of whom most were primary school children.

Mangrove use awareness sessions were also conducted with the Papa Women's Group and primary, elementary and high schools in LNG Plant site communities.

Navigational aid awareness sessions were conducted with LNG Plant communities to raise awareness about the importance of navigational aids to marine safety, with the aim of reducing thefts of navigational aids in Caution Bay.

EMPNG also conducted bushfire awareness with LNG Plant communities ahead of the dry season.

Numerous engagements were held in Upstream area and LNG Plant site communities during 2016 to raise awareness about the Australia Awards – PNG LNG Scholarship program, which is being provided in partnership with the Australian Government through the Australia Awards Pacific Scholarship program.

9.1.1 Issues identification

As shown in Figure 9.1, economic issues accounted for 28 percent of all issues raised during 2016 and mainly regarded requests for community development support and questions about clan caretaking activities and employment with EMPNG.

Land-related concerns accounted for 21 percent of issues and mainly related to compensation payments and clan compensation agreements for land access. The number of land issues have increased mainly due to enquiries raised about the introduction of eBanking for clans receiving compensation payments.

Social issues accounted for 17 percent of the total, with most regarding requests for support with community development programs and financial assistance.

Opposite:

Plate 9.1 – Stakeholder consultations undertaken during 2016 included remote locations such as Omati Village in the Lower Kikori Conservation Area

There were also expressions of appreciation from community members for community support projects delivered and comments about EMPNG's road safety awareness program.

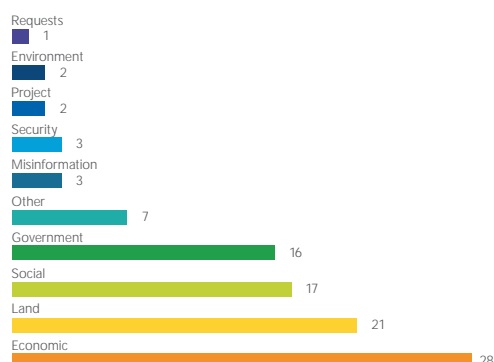
Some concerns were raised about the delay of fortnightly employee payments by a contractor and these were passed onto the respective agency.

Government issues comprised 16 percent of the total and mainly related to the Government's distribution of royalties from LNG production.

Toward the end of 2016 a new Requests category was added to the Information Management System. The new category captures requests from communities for assistance such as donations, sponsorship or infrastructure improvements.

Issues

Figure 9.1 - Percentage received by category for 2016



9.2 Government

EMPNG engages with all levels of government to keep government representatives informed about production activities.

9.2.1 Infrastructure and government support

During 2016, the Central Province Government-appointed contractor completed feeder road Infrastructure Development Grant projects for Papa, Lea Lea, Boera and Porebada villages.

Funding for these projects is a national government commitment under the PNG LNG Umbrella Benefit Sharing Agreement between the State and PNG LNG area landowners.

EMPNG is providing financial support to the Papua New Guinean Department of Works for remedial repairs along a section of the Highlands Highway that traverses the PNG LNG Upstream area.

During 2016, remedial works were conducted along the Komo, Hides and Angore sections of the highway in the Hela Province.

9.2.2 Advocacy

In April 2016, ExxonMobil Executives, including President of the ExxonMobil Production Company, Neil Duffin and PNG LNG co-venture partners, met with Papua New Guinea's new Department of Petroleum and Energy (DPE) Minister, the Honourable Ben Micah, at the naming ceremony for the second custom-built vessel for PNG LNG, the *Kumul*.



Plate 9.2 – EMPNG Operations Technician, Edna Maniot, explaining the functions of the LNG Plant facilities to Grade 8 students of Lea Lea Primary School



Plate 9.3 – DPE Minister, the Honourable Ben Micah and ExxonMobil Production Company President, Neil Duffin with his wife Maryanne Duffin, at the ship naming ceremony for *Kumul*

In July, EMPNG hosted Chairman and President of the Export-Import Bank of the United States, Fred Hochberg and, in September, the Australian High Commissioner to Papua New Guinea, His Excellency Bruce Davis visited EMPNG facilities.



Plate 9.4 – His Excellency Mr Bruce Davis, Australian High Commissioner to Papua New Guinea receives a briefing on the liquefaction process from LNG operations technicians, Lamech Alu and Samantha Amos

More than 95 students and five teachers from Papa and Lea Lea primary schools visited the LNG Plant site during 2016. The students and teachers were given a detailed tour of the liquefaction plant by Plant Superintendent, Al Sandoval and members of the Operations team.

Representatives of the Papua New Guinean DPE were also hosted at the LNG Plant and participated in a site tour.

In addition to LNG Plant site visits, EMPNG's senior management hosted 15 Australian Defence Force Academy delegates and provided them with an update on PNG LNG activities. The HGCP site hosted a delegation of CEPA representatives in April.

By the end of 2016, more than 250 dignitaries had participated in EMPNG's advocacy program.

Up Close: Communities visit EMPNG facilities

EMPNG is giving communities first-hand experience of LNG operations with community tours of the HGCP and LNG Plant site.

During 2016, the company started community tours of the HGCP, with a group of 11 women and six men from the Belopa Community Group being the first to participate and learn about Hides operations. As part of the tour, the group visited the Hides medical clinic for a health talk about breast cancer awareness. By the end of 2016, four community groups had completed HGCP site tours.

At the LNG Plant site, Boera and Porebada primary school students were among eight school and community groups to tour the LNG Plant facilities in 2016.

EMPNG's site tours are intended to help communities better understand what life is like for workers at the LNG Plant and HGCP. In addition to community groups the tours are open to school students, church groups, youth groups and women's groups.



Community visit to the HGCP

9.2.3 Benefits assurance delivery

Papua New Guinea's DPE has completed Phase 2 of the Clan Vetting Process for LNG Plant site villages. The first phase involved identifying new clans in greenfield areas and verifying existing clans in brownfield areas. The clan lists, the Department compiled, were approved through a ministerial determination and gazettal process. The list of approved clans was published in Papua New Guinean newspapers for public record.

During Phase 2 of the clan vetting process, the Department determined how landowner royalties would be split between the approved clans. This process continues for communities in Hela, the Southern Highlands and Gulf provinces, which are involved in mediation through Papua New Guinea's National Court regarding the distribution of benefits from oil and gas production.

The Papua New Guinea Government is funding the mediation process.

In accordance with requirements of the *Oil and Gas Act 1998*, EMPNG made its second Development Levy payment to the Government of Papua New Guinea during 2016.

The Development Levy is held in the DPE trust account to be paid to provincial and local-level governments for infrastructure development in Papua New Guinean communities.

EMPNG is paying monthly royalties from LNG production into the appointed Bank of Papua New Guinea trust account for distribution to landowners. The Department of Finance and the DPE are custodians of the account.

9.2.4 Revenue management

The Papua New Guinea Extractive Industries Transparency Initiative (EITI) reached a significant milestone with the publication of its first EITI report in 2016.

The report, covering activities in 2013, was announced by Papua New Guinea's Treasurer, the Honourable Patrick Pruaitch, at the Global EITI Conference held in Lima, Peru in February 2016. Papua New Guinean Prime Minister, the Honourable Peter O'Neill, officially launched the EITI report in March 2016.

Since the launch, Papua New Guinea's EITI National Secretariat has reviewed the country's work plan to include the critical path tasks needed to develop Papua New Guinea's second EITI report, which will cover activities conducted in 2014 and be used as the basis for validation of EITI compliance. In collaboration with Papua New Guinea's EITI multi-stakeholder group, the National Secretariat appointed Independent Administrator, Ernst and Young, to draft the second report, which will be published in early 2017. The EITI International Secretariat has advised that the validation process for the second report will occur in 2018.

During 2016, workshops were held with industry and government participants in Papua New Guinea's provinces to raise awareness about the EITI.

EITI is a voluntary initiative that aims to improve governance in resource-rich countries through the disclosure and verification of company payments and government revenues from oil, gas and mining projects. EMPNG is among 21 members of the EITI multi-stakeholder group. ExxonMobil has served continuously on the EITI board as either a full or an alternate member since its inception in 2002.

9.3 Media

During 2016, EMPNG Managing Director, Andrew Barry presented at The Voice Inc.'s inaugural Nation Builders Conference in Port Moresby, the Australia Papua New Guinea Business Forum and Trade Expo in Cairns, Australia and the Papua New Guinea Trade and Investment Forum in Paris, France. He also addressed the Chamber of Mines and Petroleum Conference in Sydney, Australia along with EMPNG's Executive Director of External Affairs, Robert Aisi and ExxonMobil's Asia Pacific Exploration Manager, Andrew Elliott.

Mr Barry gave keynote addresses at the Enterprise Centre's graduation ceremony and at the Centre's inaugural Local Supplier Engagement forum, as well as participated in a panel discussion at the Asia Pacific Economic Cooperation Australia Business Advisory Council forum in Port Moresby.



Plate 9.5 – PNG LNG display booth at the Chamber of Mines and Petroleum Conference



Plate 9.6 – The Voice Inc. Executive Director, Barbra Thomas with EMPNG Managing Director, Andrew Barry at The Voice Inc. Nation Builders Conference

EMPNG General Manager – Community Development Support, Sisa Kini, delivered a keynote address on the importance of investing in women as significant stakeholders in Papua New Guinea during the Australia Business Advisory Council forum.



Plate 9.7 – EMPNG General Manager – Community Development Support, Sisa Kini delivering a keynote address at the Australia Business Advisory Council forum

This was the final semi-annual Report for PNG LNG. PNG LNG has now moved to annual environmental and social reporting. The *PNG LNG Environmental and Social Report – Second Half 2015*, along with previous Environmental and Social Reports can be found on the PNG LNG website.

The PNG LNG website was relaunched in November with improved digital capacity, simplified navigation and new content. This upgrade enables users to better access the website across multiple platforms, including smartphones and tablets.

Three editions of *PNG LNG TokTok* were published in Papua New Guinea's daily newspapers during 2016. *PNG LNG TokTok* is a newspaper column from EMPNG Managing Director, Andrew Barry, which provides updates about EMPNG activities and national content initiatives.

EMPNG's advertising campaign *Stori Bilong mi* or 'My story', which was launched in August 2015, continued to be promoted in business publications during 2016. The campaign features real-life stories of people who have been involved in PNG LNG and the benefits it has provided to their families and communities.

Three editions of *PNG LNG TIES* were published during 2016. This eight-page pictorial broadsheet-sized newsletter covers production and business updates as well as stories about EMPNG's interactions with local communities. It is distributed to 7000 stakeholders including EMPNG workers, government, media and local communities. *PNG LNG TIES* is also published on the PNG LNG website.



Visit the website at www.pnglng.com

The *PNG LNG Environmental and Social Report – Second Half 2015* was distributed in early 2016. The Report's Executive Summary was published in Tok Pisin and printed copies of the Report were made available to stakeholders with limited access to the internet.



10 Acronyms

Acronym	Definition
AIDS	Acquired Immunodeficiency Syndrome
CEPA	Papua New Guinea Conservation and Environment Protection Authority
DPE	Department of Petroleum and Energy
EIS	Environmental Impact Statement
EITI	Extractive Industries Transparency Initiative
EMPNG	ExxonMobil PNG Limited
ESMP	Environmental and Social Management Plan
GWIM	Global Women in Management
HGCP	Hides Gas Conditioning Plant
HWMF	Hides Waste Management Facility
iHDSS	integrated Health Demographic Surveillance System
IUCN	International Union for Conservation of Nature
Lanco(s)	Landowner company (companies)
LNG	Liquefied Natural Gas
NBSAP	National Biodiversity Strategy and Action Plan
PMA	Programmed Monitoring Activity
PNG	Papua New Guinea
ROW	Right of Way
RPNGC	Royal Papua New Guinea Constabulary
TIPNG	Transparency International Papua New Guinea Inc.
WMA	Wildlife Management Area

Opposite:

Plate 10.1 – A Melpa woman in traditional dress from Mount Hagen in the Western Highlands Province of Papua New Guinea

Port Moresby – Project headquarters

ExxonMobil PNG Limited
Jacksons Parade
Port Moresby
National Capital District
Papua New Guinea

GPO Box 118
Port Moresby
National Capital District
Papua New Guinea

Email pnglngproject@exxonmobil.com | Web www.pnglng.com

© ExxonMobil PNG Limited 2017

Corporate Separateness Notice: Nothing in this material is intended to override the corporate separateness of local entities. Working relationships discussed in this material do not necessarily represent a reporting connection, but may reflect a functional guidance, stewardship, or service relationship. Where shareholder consideration of a local entity matter is contemplated by this material, responsibility for action remains with the local entity. The terms corporation, company, affiliate, ExxonMobil, Exxon, Mobil, Esso, our, we and its, as used in this material may refer to Exxon Mobil Corporation, to one of its divisions, to the companies affiliated with Exxon Mobil Corporation, or to any one or more of the foregoing. The shorter terms are used merely for convenience and simplicity.

Data adjustments may occur after publication and as such, data may be revised in future Reports.

For the purposes of this Report, the currency conversion rate used, between Papua New Guinea Kina (PGK) and United States Dollars (US\$) is 0.3150 [PGK1 = US\$0.3150]. This rate is as published by the Bank of Papua New Guinea at 31 December 2016.



Printed on 55% recycled FSC® Mix Certified paper.



Prepared by IDP Consulting Pty. Ltd.



*Energy for the World. Opportunity for Papua New Guinea.
Eneji Bilong Wol. Luksave Bilong Papua Niugini.*