

ExxonMobil

PNG LNG Environmental and Social Report – **Annual 2018**





About this Report

This *PNG LNG Environmental and Social Report – Annual 2018* 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.

Printed copies are available.

ExxonMobil

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



Santos



To our stakeholders

I am pleased to share with you the PNG LNG Environmental and Social Report – Annual 2018.

We started the year on a sombre note. The devastation and loss of life from the earthquake in the Highlands of Papua New Guinea on 26 February 2018 was on an unimaginable scale and is etched in the minds of many of us for the rest of our lives. Following the initial event, our focus was to ensure the safety of our people and assist in community relief efforts. I was impressed with how the operating partners and international communities worked together to do what we could to assist those in most need. By the end of the year there was still much work to be done for communities to recover. Our focus has now turned to the long term where we are supporting communities and the Papua New Guinean Government with rebuilding and repairing roads, bridges and other critical infrastructure that was so severely damaged by the earthquake.

I am most proud of how our Papua New Guinean workforce met the challenge head on and demonstrated exceptional levels of resilience, professionalism and teamwork throughout the recovery process. I believe we have become a stronger organisation as a result.

As an organisation, our most important achievement in 2018 was our outstanding safety performance. In August, the LNG Plant recorded five years worked without a Lost Time Injury. This clearly demonstrates the actions of our employees and business partners to maintain their focus on safety every single day. As well as our safety achievements, ExxonMobil PNG Limited had a record production day in August and a record production month in September. This shows our ability to get on with the job of driving positive economic outcomes for Papua New Guinea.

Our commitment to the environment also remains strong and we continue to work extensively to reduce environmental impacts associated with our operations, while preserving Papua New Guinea's unique biodiversity.

ExxonMobil PNG Limited had the opportunity to showcase our work and our people later in the year at the Asia Pacific Economic Cooperation. Our company was involved in many Asia Pacific Economic Cooperation programs including the Women and the Economy Forum, The Micro, Small and Medium Enterprise and Innovation Summit and the CEO Summit.

What 2018 has shown us is, despite the significant challenges the earthquake presented, Papua New Guinea continues to rapidly move forward on a path of sustainable national growth. This country is showing to the world what ExxonMobil has known for some time – that it is a great place to invest and do business.

I hope you find this report helpful in understanding more about how we work in Papua New Guinea.



**Andrew Barry, Managing Director,
ExxonMobil PNG Limited**



Cover image: Operations Technician, Ramona Terence, from the third intake (2015) of the Operations and Maintenance training program at the LNG Plant

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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 0.3095 [PGK1 = US\$0.3095]. This rate is as published by the Bank of Papua New Guinea at 31 December 2018.

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472 LNG cargoes delivered to customers

89,080 training hours delivered

34,500 engagements in 289 communities

PGK 3 billion+ spent on Papua New Guinean services

PGK 80 million invested in communities in 2018

CAUTION: HEIGHT CLEARANCE 7 M

Executive summary

Papua New Guinea is rapidly moving forward on a path of sustainable national growth. It is showing to the world what ExxonMobil has known for some time – that it is a great place to invest and do business.

A subsidiary of Exxon Mobil Corporation, ExxonMobil PNG Limited (EMPNG) manages the operation of 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 Environmental and Social Report provides a progress update on EMPNG's social and environmental performance from 1 January to 31 December 2018.

Production

EMPNG produced almost 7.4 million tonnes of Liquefied Natural Gas (LNG) and delivered 98 LNG cargoes in 2018. This brings EMPNG's total production to 35 million tonnes of LNG and 472 LNG cargoes.

Production activities were significantly impacted by the 7.5 magnitude earthquake that occurred near the Hides Gas Conditioning Plant (HGCP) on 26 February 2018. Immediately following the earthquake, EMPNG's Production team safely shut down HGCP processing facilities to assess and repair damages. The LNG Plant was also shut down while repairs were completed at the HGCP. Production facilities were restored and restarted within eight weeks of the earthquake. This included the second warm start in the LNG Plant's history and the first import of LNG into the LNG Plant to keep key storage and loading systems cool. The restart of the LNG Plant was conducted safely by a predominantly Papua New Guinean team of operations and maintenance technicians and engineers.

New production records were achieved in the second half of the year due to greater efficiencies achieved through maintenance activities undertaken during the shutdown period. This included a record production day of 9.2 million tonnes per year equivalent produced on 16 August and a record production month of 9.0 million tonnes per year equivalent produced in September at the LNG Plant.

| Image opposite: LNG Plant



| An LNG vessel moored for loading at the LNG Plant Marine Terminal

Safety and health

EMPNG achieved its strongest year for safety performance since production began with a Total Recordable Incident Rate of 0.11 for the year. No Lost Time Incidents occurred in 2018 despite the challenging activities required in response to the earthquake. The LNG Plant was recognised at the Papua New Guinea Chamber of Mines and Petroleum's inaugural Chamber Awards for achieving five years and more than 13 million hours worked without a Lost Time Incident.

For the fifth consecutive year, EMPNG's Supply Chain and Warehousing team was awarded ExxonMobil's Procurement Global Supply Chain Gold Star Award for outstanding safety performance.

During 2018, EMPNG's Medicine and Occupational Health team was recognised with an ExxonMobil Global Health and Safety Award for their contribution to raising mental health awareness in the workplace.

Environment

EMPNG has published the first book that provides comprehensive biodiversity information for the Hela and Southern Highlands provinces in the Upstream area. The book *Biodiversity Assessment of the PNG LNG Upstream Project Area* includes long term high biodiversity data sets for Papua New Guinea obtained through a 2015 study in the Upstream area, as well as methods used to undertake biodiversity surveys. At least 579 animal and plant species were documented during the surveys. This includes several dozen species that were previously unknown to science.



| Doria's tree kangaroo (*Dendrolagus dorianus*)

EMPNG's Biodiversity team shared results of biodiversity monitoring in Papua New Guinea with participants at the Society of Petroleum Engineers International Conference and Exhibition on Health, Safety, Security, Environment and Social Responsibility held in Abu Dhabi, United Arab Emirates in April 2018. The EMPNG presentation was selected as a 'paper of particular interest' by Conference organisers.

Some 225 conservation representatives from Papua New Guinea participated in Communicating Conservation workshops during 2018.

In August, a meeting was conducted that brought together 300 community members and community leaders of 10 villages from the lower Kikori River region. In addition to the meeting, more than 1000 people from nine villages participated in resource mapping exercises as part of the Biodiversity Offset Program.

The first recipients of the Masters in Conservation Science scholarship commenced their studies in 2018.

More than 20 EMPNG employees participated in a complex major spill response exercise that spanned both Lea Lea and Papa villages, during 2018. The exercise included the first deployment of a Rigid Inflatable Boat in a river and open sea environment, deployment of a shoreline collection boom at Kahiru Beach in Papa Village, and deployment of an Exclusion Boom along Lea Lea River in Lea Lea Village.

During 2018, EMPNG assessed four third party waste contractors in Lae and three in Port Moresby, with four of the seven companies approved to process production waste. The approved companies are being used to recycle scrap metal and restricted waste such as used batteries. In the Upstream area, operational waste volumes increased slightly during 2018 compared to 2017. The increase was due to waste resulting from earthquake damage.

Eighteen environmental non-conformances were raised for exceedances of operating criteria at the LNG Plant in 2018, with a further 13 in the Upstream area. Most of the non-conformances relate to exceedances of water quality criteria. Water management and treatment systems continue to be monitored and adjusted to meet varied operating conditions.

The New Guinea Binatang Research Centre has been engaged to revise the company's weed monitoring method and conduct field surveys in the Upstream area along the pipeline Right of Way. The revised monitoring method involves field teams walking 100-metre transects to identify weed species on the pipeline Right of Way. Data gathered using this transect approach is intended to improve data analysis and trending of the diversity and distribution of weed species within PNG LNG's footprint.

Workforce development

By the end of 2018, 3236 employees and contractors were working in production-related roles with EMPNG. More than 2770 of these are Papua New Guinean citizens, who comprise 86 percent of the workforce.

Forty-eight new Papua New Guinean employees were recruited during 2018 in the areas of operations, maintenance, engineering, technical, human resources, procurement, information technology, law and safety, health and environment.

Seven Papua New Guinean employees were promoted to supervisory or managerial roles during the year.

Since 2011, more than 160 Papua New Guinean employees have been given an overseas assignment as part of the Operations and Maintenance training program, Early Career Graduate interchange program or through international opportunities.

Eleven new university graduates were employed by EMPNG in 2018. They had completed degrees in disciplines such as civil, mining, electrical and industrial engineering.

Throughout 2018, EMPNG engineers had the opportunity to further develop their skills through overseas training. This included: witnessing a gas turbine engine teardown in Massa, Italy; materials and corrosion training in Houston, United States; regional response training in Hong Kong; and process controls training in Houston, Kuala Lumpur and Brisbane.

Since the first intake in 2010, more than 200 Papua New Guineans have been recruited through EMPNG's Operations and Maintenance training program. The fourth intake of 16 Operations and Maintenance trainees, who joined the program in August 2016, completed their training in December 2017 and started work as Junior Technicians at the HGCP and LNG Plant in January 2018. This was the first intake of EMPNG sponsored trainees to undertake their training through the Kumul Petroleum Academy in Port Moresby rather than at EMPNG-provided training facilities. Twenty-nine trainees were selected for the fifth intake of the training program, with training commencing at the Kumul Petroleum Academy in January 2019.

In June, Control Room Technician, Noah Pingin, became the first trainee from the Operations and Maintenance training program to be promoted as a supervisor, replacing an expatriate worker. By the end of December, 16 out of 22 Control Room Technician positions and all three Maintenance Scheduler positions were filled by Papua New Guinean citizens, with women occupying eight of these positions.

During 2018, the equivalent of more than 89,000 hours of training were delivered to more than 9600 participants through some 2400 courses. Ninety-two percent of all training hours were delivered to Papua New Guinean citizens.

Supporting Papua New Guinean businesses

Four Papua New Guinean businesses were recognised for their contribution to digital innovation at the Enterprise Centre's inaugural Micro, Small and Medium Enterprise Digital Innovation Awards held in September.

The Enterprise Centre assessed some 100 companies from Port Moresby, Lae and Madang for their use of innovative digital technologies. The four winning businesses were chosen because they had either developed applications or used digital technology platforms for their business operations.

In 2018, EMPNG engaged 16 landowner companies (Lancos) and some 250 non-Lanco Papua New Guinean businesses for production-related activities. This is an increase compared to 12 Lancos and 200 non-Lanco businesses in 2017 due to goods and services needed for the Asia Pacific Economic Cooperation (APEC) and earthquake recovery efforts.

EMPNG's total in-country spend with Papua New Guinean businesses in 2018 was more than PGK567.3 million (US\$175.6 million) compared to PGK477.5 million (US\$138.5 million) in 2017. Of this, almost PGK184.3 million (US\$57 million) was spent on Lanco services compared to PGK129.3 million (US\$40 million) spent on Lanco services in 2017.

Since the start of production, EMPNG has spent more than PGK3 billion (US\$928.5 million) on Papua New Guinean services, with PGK866.5 million (US\$268.2 million) spent with Lancos.



| Operations Integrity Management System Technician, Wesley Spinder (left) and Field Operations Technician, Petrus Paul, at the HGCP

Social development

EMPNG spent PGK80 million (US\$24.8 million) on community investment programs in 2018 involving education, health, community infrastructure and environmental projects. This included PGK324,730 (US\$100,500) donated to the Port Moresby Nature Park for projects such as the pig-nosed turtle (*Carettochelys insculpta*) 'Head Start' conservation program, a new 'Plumes of Paradise' precinct, which opened in October and the school excursion program that involved some 20,000 students during the year.



EMPNG Senior Field Superintendent, Jazz Peters, reads to students from Porebada Elementary School as part of National Literacy Week activities

In collaboration with the Australian National University Enterprise, EMPNG is providing the community livelihood improvement project for another three years. The community livelihood improvement project provides education about seeds and planting techniques, crop management, poultry production and food and health hygiene. It helps community members improve their livelihoods and standards of living through generating household and group income from small enterprise development. Some 500,000 vegetable cuttings, 490 kilograms of quick growing corn seeds and 5000 garden tools were distributed through the project to help long term recovery efforts following the earthquake. This reached more than 3500 households in communities along the pipeline Right of Way at Benaria and in Hides. As this Report was being published, Para Primary School was reopened in the Upstream area following earthquake repairs conducted with support from EMPNG.

A partnership between EMPNG and Lanco Laba Holdings Limited has resulted in three new classrooms for more than 180 Boera Elementary School students.

The classrooms are located in a new building that also includes office space for teachers. The classroom project was agreed in collaboration with Gas Resources PNG LNG Limited, a subsidiary trust company of Mineral Resources Development Company that distributes royalty and equity payments for landowner communities in the LNG Plant site villages.

Together with Pacific Sports Media Marketing, EMPNG supported National Literacy Week activities at schools from Papa and Lea Lea, Boera and Porebada villages leading up to International Literacy Day on 8 September.

The Advancing PNG: Women Leaders Network hosted its first women's empowerment workshop in September with 19 women who are recognised as strong leaders within their communities. The theme of the workshop was 'personal and professional leadership'. Workshop participants were provided with information about leadership and gained skills in promoting strong institutional systems, management practices and programs. The workshop, supported by EMPNG, coincided with the APEC Women and the Economy Forum.

EMPNG has donated PGK161,550 (US\$50,000) to the Pacifica Women Network Trade Centre initiative, which provides a platform to bring entrepreneurial women together from across the Pacific and give them access to trade. The Network officially opened a trade centre in Port Moresby in July and attracted a large number of enquiries from women in micro and small businesses. The trade centre currently has 45 stalls. EMPNG's funding will enable the addition of another 110 stalls, including an outdoor market place. This will help generate greater networking opportunities for women in business and improve regional trade.



EMPNG Science Ambassador, Nathaniel Tuba, describing rock types to students at Port Moresby International School during a rocks and geology session

More than 600 students from nine schools participated in the ExxonMobil Science Ambassador Program during 2018.

A new energy topic was introduced in collaboration with the Kokoda Track Foundation to teach students about oil, gas, wind, hydro and solar energy. During these sessions students had the chance to build solar lights in the classroom.

Through its partnership with the Texas Children's Hospital and Baylor College of Medicine, EMPNG continues to support the improvement of maternal and child health outcomes in Papua New Guinea. Since the partnership began in 2014, more than 1200 mentoring hours have been given to Papua New Guinean healthcare professionals by Texas Children's Hospital doctors, and more than 870 undergraduate and 105 postgraduate students have received specialist paediatric education.



| APEC Voices of the Future participants at the LNG Plant

The Texas Children's Hospital doctors have also treated some 3000 children for malnutrition in Papua New Guinea.

Some 470 EMPNG employees volunteered 1870 hours for 18 Papua New Guinean organisations during 2018.

A group of EMPNG volunteers was among nearly 2000 people who joined the inaugural Bel isi PNG Elimination of Violence Against Women Walk in November. The walk aimed to raise funds to help keep safe houses open so they could continue to provide essential services for women and their families who have experienced violence.

Stakeholder and community engagement

A public private partnership has been announced to develop a large-scale commercial agricultural venture in the Hela Province. EMPNG is providing support to the project, which will be led by Innovative Agro Industry in partnership with the Mineral Resource Development Company; the Hela Provincial Government; and Tari-Pori, Koroba-Kopiago and Komo Margarima local level governments.

The proposed venture aims to train and equip small-holder farmers to produce stock feed and vegetables. The venture has the potential to positively impact as many as 5000 small-holder farmers in Hela Province over the next five years and beyond, as well as diversifying the economic base and encouraging the development of additional small enterprises in Hela Province. A detailed feasibility study is being developed and includes an analysis of soil and growing conditions, a detailed design of the farmer training program, the establishment of a training centre and finalisation of the commercial venture structure.

EMPNG has conducted more than 34,500 engagements with stakeholders in some 289 communities, including almost 9300 formal engagements and more than 25,000 informal engagements, since production began.

During 2018, 4885 engagements were conducted in 213 communities, comprising 2309 formal and 2576 informal engagements. These engagements involved almost 46,900 attendees.

In the Upstream area, engagements focused on disaster relief efforts following the earthquake. This included supplying clean drinking water and tarpaulins to local communities as well as providing agricultural support.

At the LNG Plant site villages, engagements covered community development support programs, marine safety and infrastructure projects with schools.

For the first time, the LNG Plant hosted consecutive days of advocacy tours to accommodate more than 1100 students from the Australia-Pacific Training Coalition in Port Moresby. The tours were held in early September and consisted of eight groups of 145 students and their teachers. The students, who were studying courses at the college in carpentry, cookery, hospitality, diesel fitting, electrical, fitting and machinery, light vehicle mechanics and metal fabrication, were able to learn how these roles applied at the LNG Plant.

EMPNG also hosted 70 APEC youth representatives from 21 countries and was involved in numerous APEC-related events including the Women and the Economy Forum and CEO Summit.

EMPNG is moving into 2019 with a continued focus on safety and ongoing collaboration with the Government, businesses and communities of Papua New Guinea.



98 LNG cargoes and **10**
naphtha cargos delivered in 2018

35 million tonnes
of LNG produced to date

~7.4 million tonnes
of LNG produced
in 2018

1 Overview

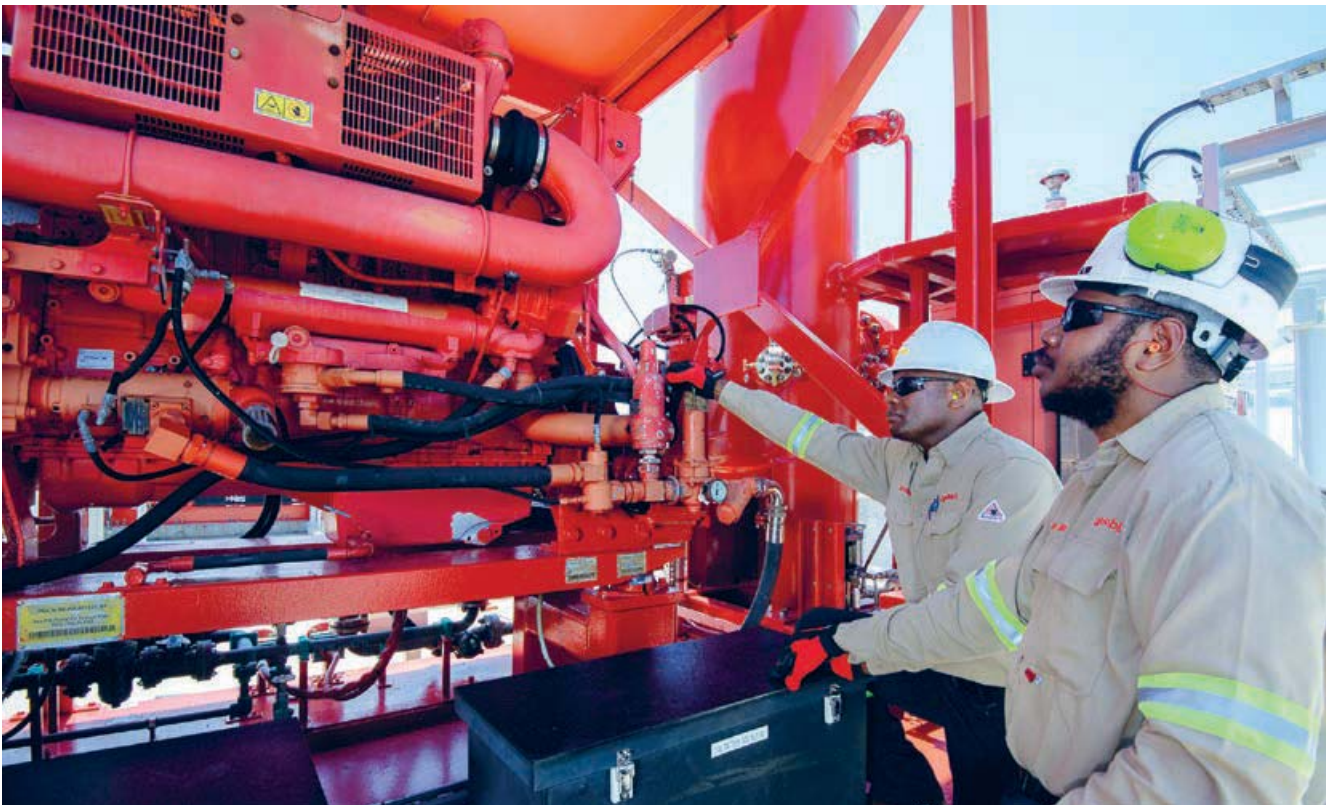
ExxonMobil PNG Limited (EMPNG) manages the operation of the US\$19 billion Papua New Guinea Liquefied Natural Gas (PNG LNG) production and processing facilities and associated gas resources.

These facilities extend from the Hela, Southern Highlands, Western and Gulf provinces to Port Moresby in the Central Province. EMPNG's facilities are involved in gathering multiphase fluids from Hides wells and transporting them through the Hides Spine to the Hides Gas Conditioning Plant (HGCP), where the fluids are stabilised and conditioned into two streams – gas and condensate. The condensate is transported through the HGCP-Kutubu Condensate Pipeline to the Kutubu Central Processing Facility, and from there, transported to the Kumul Marine Terminal in the Gulf of Papua. Dry gas is transported through more than 700 kilometres of pipeline to the LNG Plant located northwest of Port Moresby on the Gulf of Papua.

The gas is then processed and liquefied at the LNG Plant for export to customers in Asia.

EMPNG's facilities have the capacity to safely operate at approximately 20 percent above the original design specification of 6.9 million tonnes per year. The location and elements of EMPNG's facilities are shown in Figure 1.1.

More than 325 billion cubic metres of LNG are anticipated to be produced over the life of PNG LNG to provide a long-term energy supply to customers including: China Petroleum and Chemical Corporation (Sinopec), Osaka Gas Company Limited, JERA Company Inc., and CPC Corporation in Taiwan.



Mechanical Technician, Junias Warpin and Machinery Engineer, Jimmy Simatab, inspect the diesel engine that drives the firewater pump at the LNG Plant Marine Terminal

Image opposite: Blue fibre optic cables and red low voltage signal cables on a cable ladder tray at the HGCP

This Report, as well as previous Environmental and Social Reports, is published on the PNG LNG website.

Visit the website at: www.pnglng.com

Translated summaries and printed copies of the Report are made available to Papua New Guinean citizens who may have limited access to the internet.



HGCP Mechanical Lead, Jackson Michael, conducts maintenance on the HGCP hot oil monoethylene glycol regeneration pump

1.1 Production

Production activities were significantly impacted by the 7.5 magnitude earthquake that occurred near the HGCP on 26 February 2018.

Immediately following the earthquake, EMPNG's Production team safely shut down HGCP processing facilities to assess and repair damages.

The LNG Plant was also shut down while repairs were completed at the HGCP. Production facilities were restored and restarted within eight weeks of the earthquake. This included the second warm start in the LNG Plant's history and the first import of LNG into the LNG Plant to keep key storage and loading systems cool. The restart of the LNG Plant was conducted safely by a predominantly Papua New Guinean team of operations and maintenance technicians and engineers.

New production records were achieved in the second half of the year due to greater efficiencies achieved through maintenance activities undertaken during the shutdown period.

Almost 7.4 million tonnes of LNG was produced and 98 LNG cargoes delivered in 2018. EMPNG has produced 35 million tonnes of LNG and delivered 472 LNG cargoes since production began in 2014.



Celebrations were held at worksites across EMPNG's operations to commemorate the 400th LNG cargo

1.2 Hides Gas Conditioning Plant

The HGCP and wellpad facilities were shut down following the earthquake. During the shutdown, planned slug catcher modifications were brought forward and completed.

Earthquake recovery continued after the restart of production and included repairs to the gas plant, camp facilities, the pipeline Right of Way (ROW), wellpads and Komo Airfield.

Pigging operations were conducted in November, with a series of 'pigs' (devices used to perform various maintenance operations inside pipelines) launched from the HGCP to Kopi and Kutubu through the gas and condensate lines respectively. The pigging operations have confirmed that the pipeline is running smoothly.



Aerial view of the HGCP

1.3 Drilling

No drilling activities were conducted in 2018.

1.4 LNG Plant

The LNG Plant was safely shutdown following the shutdown of the HGCP due to the earthquake. Essential systems, such as power generation, were kept online for operational integrity and to continue domestic power supply to the Port Moresby grid.



Aerial view of the LNG Plant

Scheduled maintenance activities initially planned for April 2018 were conducted while the facility was shutdown. The maintenance work involved servicing and completing upgrades to refrigeration gas turbines and defrosting the Main Cryogenic Heat Exchanger (MCHE).

Since full production was restored in May 2018, the LNG Plant has performed above expectation and achieved new production records, with a record production day of 9.2 million tonnes per year equivalent produced on 16 August and a record production month of 9.0 million tonnes per year equivalent produced in September.



Mechanical Technician, Junias Warpin, Machinery Engineer, Jimmy Simatab and Operations Technician Level 1, Julian Romel, inspect a gas turbine at the LNG Plant

The LNG Plant site team also safely conducted three unplanned turbine changeouts with Papua New Guinean technicians at the forefront of the work activities.



The MCHE is PNG LNG's tallest single piece of equipment at 53 metres

Despite weighing 300 tonnes the MCHE is still not the heaviest piece of equipment at the LNG Plant

The MCHE at the LNG Plant

1.5 Marine facilities

In early April 2018, the first import of an LNG cargo occurred at the LNG Plant Marine Terminal.

The imported LNG was required to sustain critical site operations during the LNG Plant shutdown, and to keep the marine and loading facilities cold and ready for restart.

The LNG import operation involved modifications to the marine and storage facilities to ensure the safe reverse flow of LNG to the storage tanks.

The successful operation was the result of the technical expertise of EMPNG workers and contractors, including Papua New Guinean engineers, technicians and Marine Loading Masters.



Operations Technician, Abena Asi, who joined the second intake of the Operations and Maintenance training program in 2012, now working at the LNG Plant Marine Terminal

Major maintenance work on the marine loading arms continued, with minimal impact to the shipping schedule.

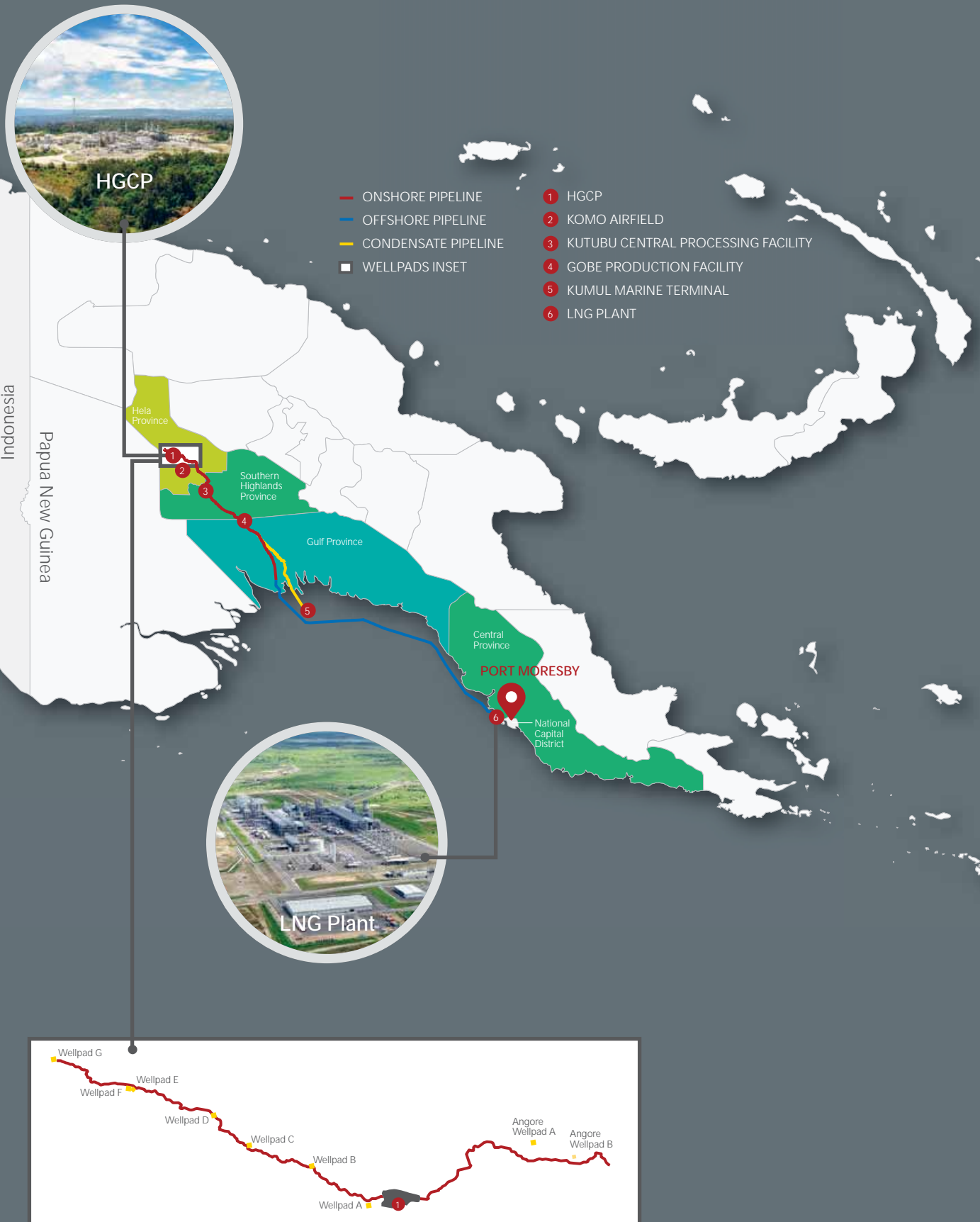
By the end of 2018, the LNG Plant Marine Terminal had loaded 98 LNG cargoes and 10 naphtha cargoes, which exceeded the amended post-earthquake outlook.

EMPNG has produced 35 million tonnes of LNG and delivered 472 LNG cargoes since production began in 2014.

1.6 Angore Gathering System

Work progressed on the Angore Gathering System during the first half of 2018. During the month of June, the Angore project experienced an incursion at both the Tagari horizontal directional drilling site and wellpads where personnel were threatened and equipment was damaged. Work was halted at both sites following the incursions, with security restrictions in place on the north side of the Tagari River. Work continued on the south side of the Tagari River through October when further threats were made to personnel. Fieldwork was subsequently suspended, with security restrictions in place until social stability is restored. No injuries to personnel occurred during these events.

| Figure 1.1 PNG LNG facilities





2000+
regulatory
obligations

7 Social Management
Plans in the Production
ESMP



3 Environmental Management
Plans based on geographical
areas of PNG LNG

992
licences, permits and
certificates monitored

2 Environmental and social framework

The Production ESMP guides operations to ensure the wellbeing of workers, communities and the environment in and around EMPNG facilities.

2.1 Approach

The Production Environmental and Social Management Plan (ESMP) was developed based on lessons learned from the construction phase, along with ExxonMobil's Operations Integrity Management System requirements and the International Finance Corporation Performance Standards. It incorporates three Environmental Management Plans, as shown in Figure 2.1, which align geographically to production facilities. The first covers the Upstream facilities and pipelines, while the second covers the LNG Plant site and the third covers the Port Moresby office. An additional seven Social Management Plans are based on key social themes. Through implementing national content commitments of the Social Management Plans, EMPNG is providing long-term career opportunities for Papua New Guinean citizens. See *Case Study: Building careers*.

Requirements of the ESMP and its supporting management plans apply during normal operating conditions and in reasonably foreseeable abnormal operating conditions or emergency situations. The ESMP, which can be viewed on the PNG LNG website, is periodically updated in consultation with stakeholders to meet ongoing environmental, social and operational needs.

Visit the website at: www.pnglng.com



2.2 Management of Change

EMPNG applies a Management of Change process to any temporary or permanent modifications to facilities or previously approved documents.

The process is intended to: manage permanent, temporary and urgent/emergency changes to procedures or process equipment; provide for a thorough evaluation of the proposed change; and consider factors for the identification and control of potential risks associated with any proposed change.

It is also used to communicate the proposed change to workers whose job tasks may be impacted by the change and who may require training prior to implementing the change. Before any proposed change can be made; health, safety, security, environmental, social management, operability, maintenance, regulatory compliance, cost and scheduling requirements are considered. Changes are classified in accordance with how they need to be managed. Class I changes require Lender Group review prior to 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 2018.

Figure 2.1 Production ESMP structure



Image opposite: Hiri Moale Festival performer showing traditional headdress

Case study

Building careers

EMPNG is dedicated to providing long-term opportunities for Papua New Guinean citizens by implementing the national content objectives of the Social Management Plans.



EMPNG Operations Technician, Grace Yandi and EMPNG Electrical Technician, Yasi Koriem, at the HGCP

In accordance with the Production Social Management Plans, EMPNG is maximising employment opportunities for Papua New Guinean citizens through recruitment, training and development. This involves providing Papua New Guinean citizens with access to positions for which they are qualified and offering appropriate training and skills development opportunities.

In 2018, Papua New Guinean citizens held 86 percent of positions within the production workforce. Forty-eight new Papua New Guinean employees joined the company during the year.

As part of providing employment opportunities for Papua New Guinean citizens, priority is given to communities most affected by PNG LNG. EMPNG and its contractors recruit in accordance with geographic priorities that are, in order of preference:

- Local – Papua New Guinean citizens from areas proximate to PNG LNG operations
- Regional – Papua New Guineans from the Southern Highlands, Hela, Western, Gulf and Central provinces and the National Capital District
- National – Papua New Guinean citizens originating from elsewhere in Papua New Guinea.

By the end of 2018, the production workforce included 1160 Papua New Guineans of local origin. This is 42 percent of all Papua New Guineans in the production workforce. Another 32.5 percent were from regional locations, while the remaining 25.5 percent were from elsewhere in Papua New Guinea.

To develop the skills of employees, EMPNG provides many corporate training and development programs.

For example, 92 percent of all training delivered during 2018 was provided to Papua New Guinean citizens.

EMPNG Production Operations Manager, Jagir Baxi said EMPNG was working to build the careers of more Papua New Guinean citizens through training programs and international opportunities.

“More than 160 of our Papua New Guinean employees have undertaken overseas assignments as part of the Early Career Graduate interchange program, the Operations and Maintenance training program or through international opportunities offered since 2011. We have also recruited more than 200 Papua New Guineans through the Operations and Maintenance training program since 2010. Most of these have completed their training and are now employed with EMPNG.

Our engineers have also had the opportunity to enhance their skills through specialised training in Italy, the United States, Malaysia and Australia. We are particularly proud to have filled 16 out of 22 Control Room Technician positions with Papua New Guinean citizens, including six women.”

Jagir Baxi
Production Operations Manager
EMPNG

Community Development Support Manager, Debbie Maraki, was promoted to her current role in March 2018 and said the company had helped fast-track her career.

“EMPNG provided me with many opportunities to rapidly increase my existing skills and gain new ones. The result of this has been a promotion to a management role just three years after joining the company.”

Debbie Maraki
Community Development Support Manager
EMPNG

Debbie is one of seven EMPNG workers who were promoted to supervisory or managerial roles during the year.

By the end of 2018, 250 Papua New Guinean citizens held management positions within EMPNG and contractor organisations.

Noah Pingin, previously a Control Room Technician from the first intake of the Operations and Maintenance training program in 2010, was promoted as Pipeline Operations Supervisor within eight years of joining the training program. Replacing an expatriate worker, Noah is the first Operations and Maintenance trainee to be promoted to a supervisor level. For most Operations and Maintenance trainees, the process to progress to a supervisory level and beyond takes approximately 11 years.

In addition to on-the-job training and structured training programs, EMPNG is sponsoring three engineering students, Kimberly Sabarei, Naomi Kenny and Jonah Tokiong, to complete their studies at the University of Technology in Lae. The company also hosts interns during their engineering studies. Twelve students who held internships with EMPNG during the 2018/19 summer holidays were offered scholarships for the 2019 university year, valued at approximately PGK23,760 (US\$7350) each.

In building a strong workplace culture, EMPNG regularly celebrates the exceptional achievements of its workforce. For example, in June, three early career Papua New Guinean engineers, Alma Gaso, Andrew Hemetsberger and Lei Banduru, were included in the company's delegation to the World Gas Conference in Washington DC, United States.

In November, Electrical Technician Yasi Koriam received four awards at the 2018 National Apprenticeship and Trade Testing Board awards, which was the first time that EMPNG had participated in the awards.

Another 10 EMPNG employees received Lead Country Manager awards in December for living the values of safety, environment, security, integrity, excellence and teamwork, which are fundamental to *Em pasin bilong ExxonMobil long PNG* or 'the way we work at ExxonMobil in PNG'.

"The growth of our Papua New Guinean workforce is integral to our operations. We are very proud to be providing local career opportunities.

Our Papua New Guinean workforce was at the forefront of showing APEC delegates our Papua New Guinea-based operations. We also had a team of local engineers take ExxonMobil Chairman and CEO, Darren Woods, through how we are using complex data analytics to optimise our production operations. The engineers took him deep into the models and explained, with confidence, how they are using the absolute latest technology.

The overwhelming praise for the quality of our amazing Papua New Guinean staff is something that I constantly hear from visitors to EMPNG. I am very confident that one day one of them will become the managing director of our Papua New Guinea operations."

Andrew Barry
Managing Director
EMPNG



2770+ Papua
New Guineans in
the production
workforce

"We are investing in world class training and career development opportunities that will help shape the future workforce of Papua New Guinea."

Darren Woods
Chairman and CEO
ExxonMobil

≡ 89,080+ hours of
training provided to the
production workforce

EMPNG workers at the Port Moresby office during a visit by ExxonMobil Chairman and CEO, Darren Woods



PGK **866.5**
million spent
with Lancos to date

16 Lancos + 250 non-Lanco
Papua New Guinean businesses
engaged in 2018

572 business
assessments
provided by the
Enterprise Centre

19,700+
entrepreneurs supported
since 2010

≡ 38,000+
training days
provided by the
Enterprise Centre

3 Procurement and supply

EMPNG works closely with the Enterprise Centre to assist in building the capacity of Papua New Guinean businesses.

3.1 Supplier development

EMPNG's local business development objectives are outlined in the company's Social Management Plans. To meet these objectives, EMPNG helps businesses build their capacity through appropriate training and business development. EMPNG also engages local suppliers wherever practicable for the supply of production-related goods and services.

Prior to the construction of PNG LNG, 10 landowner companies (Lancos) representing a geographic area within the PNG LNG area of operations were selected to support the project. The Papua New Guinean Government provided seed capital to enable Lancos to participate in PNG LNG opportunities. The key services of labour supply, catering, camp maintenance, security and the hire of light vehicles were reserved for Lanco suppliers. Lancos were also engaged for services such as timber supply, heavy equipment rental, truck hire, construction machinery and spare parts and fresh produce from local communities for camp kitchens.

Two Lancos were pivotal in the construction of PNG LNG and continue to provide essential services to EMPNG throughout production. These Lancos are Laba Holdings Limited and Hides Gas Development Company (HGDC).

Laba Holdings Limited was formed in 2009 to provide labour, security, camp management and catering for the LNG Plant site and is the umbrella representative Lanco for the four LNG Plant site villages of Papa, Lea Lea, Boera and Porebada. As such, it represents the interests of Porebada Holdings Limited, Boera Holdings Limited, Papa Resources Development Limited and BuriaRearea Caution Bay Limited. Laba Holdings Limited has also formed joint ventures to expand its services. For example, Laba Holding Limited was able to provide catering services to PNG LNG through a joint venture with The Alliance Group, known as the Laba Alliance Group.

At the peak of PNG LNG's construction, Laba Holdings Limited employed almost 2500 Papua New Guineans from the LNG Plant site villages for roles at the LNG Plant. By January 2013, Laba Holdings Limited's business development was so successful that they were no longer reliant on funding.

This meant the company was able to transition into a stand-alone business.

EMPNG worked with Laba Holdings Limited during PNG LNG's transition from construction to production to re-evaluate labour requirements and assist the company in meeting these changing needs. Laba Holdings Limited now employs approximately 350 workers, including more than 50 women, and continues to provide labour supply services in catering, camp maintenance, security, transport and civil work to EMPNG.



Lab Holdings Limited working together with EMPNG

Founded in April 2008, HGDC is the umbrella representative Lanco for 13 Lancos in the Upstream area. During construction, HGDC supplied labour for civil construction, catering and security services and employed over 3000 Papua New Guineans at the peak of construction.

With the support of EMPNG, HGDC made a smooth transition from construction to production operations and continues to develop, now employing approximately 400 Papua New Guineans. One outcome of the transition was a partnership with catering company, The Alliance Group, to form the Hides Alliance Group, which has managed HGCP Camp management and catering services since July 2014. The HGCP Camp routinely caters for more than 500 workers at any one time, with a team of 145 personnel.

In 2018, EMPNG engaged 16 Lancos and some 250 non-Lanco Papua New Guinean businesses for production-related activities.

Image opposite: The LNG Plant site's grounds are maintained by a joint venture between Pacific Rim Constructors and Lanco, Laba Holdings Limited

This is an increase compared to 12 Lancos and 200 non-Lanco businesses in 2017 due to goods and services needed for Asia Pacific Economic Cooperation (APEC) and earthquake recovery efforts.

In production, Lancos provide services including labour hire, transportation, maintenance, container freighting, fuel distribution and vegetable supplies. Non-Lanco businesses provide services such as security, transportation of personnel, freight and logistics, customs clearance, food supply, maintenance supplies, surveying, construction material testing and medical services.

During 2018, EMPNG's total in-country spend with Papua New Guinean businesses was PGK567.3 million (US\$175.6 million) compared to PGK477.5 million (US\$138.5 million) in 2017. Of this, almost PGK184.3 million (US\$57 million) was spent on Lanco services compared to PGK129.3 million (US\$40 million) spent on Lanco services in 2017.

Since the start of production, EMPNG has spent over PGK3 billion (US\$928.5 million) on Papua New Guinean services, with PGK866.5 million (almost US\$268.2 million) spent with Lancos.

3.2 Enterprise Centre

EMPNG is maintaining its long-standing partnership with the Papua New Guinea Institute of Banking and Business Management Enterprise Centre to develop the capacity and skills of Papua New Guinean businesses.

The Enterprise Centre was established in April 2010 by EMPNG and the Institute of Banking and Business Management. The Centre is an independent organisation based at the Institute's premises in Port Moresby. It provides business assessments and training to local suppliers, as well as connects local businesses with opportunities both within EMPNG and external organisations.

In 2018, four Papua New Guinean businesses were recognised for their contribution to digital innovation at the Enterprise Centre's inaugural Micro, Small and Medium Enterprise (MSME) Digital Innovation Awards held in September. The Awards, supported by EMPNG, were hosted at the APEC 2018 Papua New Guinea Business Advisory Council MSME Summit's gala dinner in Port Moresby.

The Enterprise Centre assessed some 100 MSMEs from Port Moresby, Lae and Madang for their use of innovative digital technologies. The four winning businesses were chosen because they had either developed applications or used digital technology platforms for their business operations.

The Micro Innovative Enterprise Award went to Papua New Guinea software developer Kumulsoft Limited for their online fixed asset management system and legal practice billing system.

Kumulsoft's clients include Papua New Guinea Customs, the University of Goroka and the East New Britain Provincial Administration and Western Highlands Health Authority.



"Our partnership with EMPNG helps us provide services that build the skills and capacity of Papua New Guinean businesses"

Johnson Pundari
Executive Director
Institute of Banking and
Business Management

83 business assessments
and **≡ 6700**
training days in 2018

>770 business owners and entrepreneurs assisted in 2018

The Enterprise Centre operating out of the Institute of Banking and Business Management's premises in Port Moresby



From left: Kumulsoft Limited Managing Director, Marsh Narewec; EMPNG Managing Director, Andrew Barry; Dinade Geospatial Solutions Managing Director, Florence Kuyie; Emstret Holdings Limited Administrations Officer, Jamala Anuk; ExxonMobil President Environmental and Property Solutions Linda DuCharme; and PNG Geospatial Solutions Managing Director, Mary Pati, at the MSME Digital Innovation Awards

The Small Innovative Enterprise Award recognised satellite internet service provider Emstret Holdings Limited, which helps businesses achieve connectivity in hard to reach locations. Emstret Holdings Limited also received the People’s Choice Award.



EMPNG Managing Director, Andrew Barry with Emstret Holdings Limited Administration Officer, Jamala Anuk, receiving the Nasfund People’s Choice Award at the MSME Digital Innovation Awards

PNG Geospatial Solutions received the Medium Innovative Enterprise Award in recognition of the service it provides with spatial applications and data capture, as well as processing, management and presentation technologies.

It provides services to industries including mining and petroleum, agriculture, transport, disaster and emergency, urban and regional planning, environment and conservation and education, health and research.

Dinade Geospatial Limited was recognised with the Women Owned Innovative Enterprise Award. The company is developing a nationwide database of Papua New Guinea’s information that will include both geographical and geospatial data covering areas such as health, education, population, towns and villages, roads and bridges and Papua New Guinea’s resources including agriculture, fisheries and oil and gas. The MSME Digital Innovation Award winners have received business training packages from the Enterprise Centre, as well as business equipment from the awards sponsors.

The Enterprise Centre conducted 83 business assessments, including 40 Lanco assessments in 2018, compared to 56 business assessments provided in 2017. The equivalent of some 6700 training days were delivered during 2018. The Centre has completed 572 assessments and provided the equivalent of 38,000 training days since it was established in 2010. The Centre also assisted 771 business owners and entrepreneurs with information, training, business assessment registrations and access to workstations in 2018. Over 19,700 entrepreneurs have been supported since 2010.



Earthquake relief and recovery included agricultural support to **5000** households, **PGK 2.66** million in-kind support and **14,000+** personnel hours

1870 hours volunteered for 18 Papua New Guinea organisations in 2018

600+ students participated in the Science Ambassador Program in 2018

PGK 80 million invested in communities

4 Communities

EMPNG is supporting communities, non-government organisations and government agencies to help drive sustainable development for Papua New Guinean communities.

4.1 Community investment

To support economic empowerment and sustainable community development in Papua New Guinea, EMPNG implements the Community Development Support Management Plan and community investment programs. The Plan covers education, health, women's economic opportunities, cultural promotion and environmental and agricultural initiatives.

The broad range of community development support activities within the Plan are conducted as appropriate to their relevant geographic area, which covers:

- local area programs that are conducted in communities near production facilities
- national programs that include broad scale capacity building projects and support for projects in Port Moresby.

During 2018, EMPNG spent PGK80 million (US\$24.8 million) on community investment programs involving education, health, community infrastructure and environmental projects.

4.1.1 Local area programs

EMPNG's local area programs provided agricultural opportunities, supported training for women's groups, delivered infrastructure to schools and helped to drive health initiatives in communities surrounding production facilities in 2018. These programs are intended to build the sustainable capacity of local communities.

Upstream area and pipeline Right of Way

EMPNG has extended its partnership with the Australian National University Enterprise to continue the community livelihood improvement project for another three years. Through this partnership, the University and EMPNG aim to generate sustainable economic benefits for Upstream area communities, covering rural households and community-based organisations. The community livelihood improvement project provides education about seeds and planting techniques, crop management, poultry production and food and health hygiene.

Highlight: Driving positive change

Community Development Support Manager, Debbie Maraki, plays a pivotal role in leading EMPNG's community investment program to deliver positive sustainable change for local communities. Debbie leads a team of three community development field specialists and coordinates projects across health, education, livelihood support and law and justice. In 2018, her role included facilitating support from EMPNG and humanitarian partner organisations following the February 2018 earthquake.

"This year alone we have reopened Para school, delivered new classrooms for schools in the LNG Plant site villages, implemented an agricultural program that is generating sustainable economic benefits for Upstream area communities, and supported numerous programs to improve economic empowerment and business opportunities for Papua New Guinean women," Debbie said.

From the Central Province, Debbie joined EMPNG in 2015 as a Community Development Support Analyst for the Upstream area before being promoted to her current role.

Prior to EMPNG, she was a United Nations Coordination Analyst, providing overall coordination and advisory support to help the Papua New Guinean Government achieve its national priorities set out in the United National Development Assistance Framework.



| Community Development Support Manager, Debbie Maraki

| Image opposite: Students from Mendi Elementary School in the Southern Highlands Province

Highlight: EMPNG aids earthquake recovery

EMPNG distributed 1.4 tonnes of quick growing corn seeds, some 100 kilograms of bean and pak choi seeds and almost 5000 garden tools to help long-term recovery efforts following the February 2018 earthquake.

Coordinated through the community livelihood improvement project in partnership with Australian National University Enterprise, EMPNG's support has reached some 5000 households in communities along the pipeline ROW at Benaria and in Hides. These villages are very remote and surrounded by mountains. The communities are mostly subsistence farmers, producing crops such as banana, sweet potato, pumpkin, peanuts and corn, which the earthquake destroyed.

By September, households that planted corn, pak choi and green bean seed distributed early in the year had begun harvesting, with surplus produce entering the market and helping to create household income.

As well as agricultural support, EMPNG has provided PGK 2.66 million (US\$822,066) in-kind support and more than 14,000 personnel hours on relief and recovery efforts.

This involved working closely with communities, the Papua New Guinean Government and non-government organisations on multiple projects such as supporting the recovery of 11 health centres, helping to restore 10 school facilities for about 2300 children, distributing 600 shelter kits, raising awareness about how to rebuild shelters and working with the Papua New Guinean Government to restore roads and bridges. For example, over 150 HGCP employee and contractor volunteers worked with the local community to repair earthquake damage at Para Primary School. The volunteers helped restore teacher accommodation and flower gardens, repair classroom concrete foundations and wall gaps, clean up buildings and install sporting equipment. Para Primary School was reopened as this Report was published.

As a community safety initiative, EMPNG also supported the Papua New Guinean Government with the relocation of more than 20 households in high risk landslip areas that were located near the pipeline ROW but outside of the PNG LNG area. Working closely with the Papua New Guinean Government, EMPNG provided monetary support for the impacted households to enable them to move. In addition, the company provided community messages about high risk landslip areas.



Volunteers repair foundations at Para Primary School

The community livelihood improvement project helps community members improve their livelihoods and standards of living through generating household and group income from small enterprise development.

Since 2015, EMPNG has invested PGK8 million (US\$2.4 million) in the project, which has reached 700 people from 20 community groups in Hides, Komo and Angore.



The Belopa Community Enterprise Group is among Upstream area community organisations learning how to generate sustainable income from growing crops through the community livelihood improvement project

During 2018, EMPNG spent PGK1.7 million (US\$528,000) on health facilities, including repairing and upgrading facilities at the Mananda, Para and Juni health centres in the Hela Province. The Mananda and Para clinics are managed by the Evangelical Church of Papua New Guinea, while the Juni clinic is operated by the National Department of Health through the Hela Provincial Health Authority. Repairs are being conducted on the Mananda and Para clinics and an additional staff house is being built for the Para clinic. At Juni a new health centre encompassing five wards is being built on the site of the old clinic. Located within the Komo-Magarima District it will service a population of 5000 people. This will enable the Juni clinic to expand its services to provide antenatal and postnatal care, inpatient wards, emergency and dispensary rooms, a drug storeroom, health promotions, utility and procedure rooms, volunteer counselling and testing of Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS).

EMPNG has also supported the opening of the Community Health Aid Post at Arou in Hela Province, which had previously been closed for 15 years. This project was initiated by past Global Women in Management (GWIM) trainee Julie Alo who lives in Arou Village.

Julie is well known for teaching the women in her community how to earn an income through sewing and cooking. She also teaches local women basic bookkeeping. Outside of her village, Julie delivers good governance and leadership training to the Juha and Hides Women's groups.

The annual Kutubu Kundu and Digaso Festival has received a donation of PGK49,950 (US\$15,460) from EMPNG. The 2018 theme was *Yumi mas kirapim bek yumi yet* or 'We must raise ourselves' in recognition of community resilience following the earthquake.



Some of the many traditional costumes on display at the Kutubu Kundu and Digaso Festival

LNG Plant site

Porebada Village has opened a new health centre with support from EMPNG. The centre will provide health facilities for the village's population of 10,000 people. EMPNG also provided a new community hall for Lea Lea Village in 2018, which was officially opened in April.



Students inside the newly-built Papa Community Preschool classroom with their tutor from Buk bilong Pikinini

EMPNG's commitment to education has continued with the donation of a new double classroom for Papa Community Preschool.

The Preschool, which has some 50 students, started in a teacher's home and then moved to a semi-permanent classroom in a church building. It now has a permanent classroom that includes a teacher's office. EMPNG also donated desks, chairs and a 9000-litre water tank to the Preschool. The classroom project was agreed in collaboration with Gas Resources PNG LNG Limited, a subsidiary trust company of Mineral Resources Development Company that distributes royalty and equity payments for landowner communities in the LNG Plant site villages.

A partnership between EMPNG and Lanco Laba Holdings Limited has resulted in three new classrooms for more than 180 Boera Elementary School students.



Papa Community Preschool students



Boera Elementary School students thank EMPNG and Lanco Laba Holdings Limited for their new classrooms

The classrooms are located in a new building that also includes office space for teachers. The building replaces a run-down classroom that was previously used by the students and their teachers.

During 2018, EMPNG handed over a newly renovated staffroom, as well as two laptops and nine desktop computers for teachers to use at Redscar High School. Deputy Principal, Huri Yapenare, said prior to receiving the computers, teachers had to handwrite their lessons and wait in line to provide them to the school typist, who would type the lessons out and photocopy them for students.

Since the computers were donated, teachers have been able to prepare lessons more quickly and easily.

Another six laptops and eight desktop computers were provided to Papa, Lea Lea, Boera and Porebada primary schools and Porebada Maiari and Papa preschools during the year.

For the fourth consecutive year, EMPNG has sponsored the Trukai Fun Run, which was held in June. The company donated 3000 Trukai Fun Run t-shirts to 10 participating schools from LNG Plant site villages. Proceeds from EMPNG's purchase of the t-shirts supports the Papua New Guinea Sports Federation.



Redscar High School receiving their Trukai Fun Run t-shirt donation

EMPNG also provided t-shirts, trophies, sports shields and refreshments for the 2018 inter-school carnival, which involved students from six elementary and primary schools in Papa,

Lea Lea and Boera villages. More than 200 students participated in this year's event.

In September, 34 participants from LNG Plant site villages completed an Oceania Sport Education Program Sports in Community Administration and Coaching course at Koke Hanua in Boera Village. The course aims to support coaching for Papua New Guinean youths.

Thirteen schools and three health centres in Papa, Lea Lea, Boera and Porebada villages received some 113,000 litres of water in 2018 as part of EMPNG's water cartage delivery program, which was initially introduced during the dry season in 2017.

Programs to support economic empowerment for women continued during 2018, with EMPNG providing sewing machine repair and garment tailoring training to 40 women from LNG Plant site villages. See *Case Study: Tailoring training opens opportunities*.

Another 23 women from Papa Village attended a Young Women's Christian Association Rise Up Leadership Peer Training program supported by EMPNG. The program aims to build the confidence of women aged between 15 and 35 and develop them as potential leaders in their communities. It consists of nine training sessions across five days on topics including public speaking, understanding culture and tradition, human and women's rights, gender-based violence, drug and alcohol abuse, climate change and leadership. This is the third year EMPNG has sponsored the training, with 132 women from LNG Plant site communities participating in the program since 2016.

4.1.2 National programs

Since the start of production, EMPNG has donated PGK1.8 million, (US\$561,780) to the Port Moresby Nature Park, which has helped to develop a structured schools excursion program with more than 80,000 participating students, including some 20,000 in 2018.



Children participating in the schools excursion program at Port Moresby Nature Park

EMPNG's commitment includes PGK324,730 (US\$100,500) donated during 2018, which has been used for projects such as the Park's pig-nosed turtle (*Carettochelys insculpta*) 'Head Start' conservation program.



The Raggiana bird of paradise is the national symbol of Papua New Guinea, is on the nation's flag and currency and is used in the PNG LNG project logo

31 bird of paradise species occur in Papua New Guinea, with all protected under local legislation

Raggiana bird of paradise (*Paradisaea raggiana*) at the new 'Plumes of Paradise' exhibit at the Port Moresby Nature Park

The program is a first of its kind joint initiative between the University of Canberra and Port Moresby Nature Park to reduce the disappearance of pig-nosed turtles from the wild.

The donation also supported a new 'Plumes of Paradise' precinct, which opened in October. The precinct consists of seven large walkthrough bird aviaries and an interpretation centre to showcase the bird of paradise.

EMPNG continues to provide training and development opportunities for women. In April, GWIM alumnae Margaret Harvey travelled to Washington DC for a week-long Designing and Facilitating GWIM Step-Down training program to strengthen her skills in training design and workshop facilitation. The training program is enabling Margaret to use lessons learned from her GWIM experience to strengthen the capacity of women in Papua New Guinea.

She is among 64 GWIM alumni who are part of the Advancing PNG: Women Leaders Network and is the fifth GWIM alumnae from Papua New Guinea to attend the train-the-trainer program in Washington DC.

The Advancing PNG: Women Leaders Network hosted its first Papua New Guinea Women's Leadership Workshop in September.

The Workshop involved 19 women who are recognised as strong leaders within their communities. The theme of the Workshop was 'personal and professional leadership'.

Participants were provided with information about leadership and gained skills in promoting strong institutional systems, management practices and programs. The Workshop coincided with the APEC Women and the Economy Forum.

EMPNG Public and Government Affairs Manager, Robert Aisi said women's economic empowerment was one of ExxonMobil's key focus areas for community investment because it recognised that women are strong drivers of social change.

"Each investment in a woman is also an investment in her family and her community, so the impact is broad and multidimensional."

Robert Aisi

Public and Government Affairs Manager
EMPNG

The Advancing PNG: Women Leaders Network was formed in 2014 by alumnae from ExxonMobil's GWIM program.

The GWIM program is supported by ExxonMobil Foundation's Women's Economic Opportunity Initiative, a global effort launched in 2005 to help women in more than 90 countries fulfil their economic potential and drive economic and social change in their communities.



EMPNG Public and Government Affairs Manager, Robert Aisi, with some Advancing PNG: Women Leaders Network members

Fifteen netball associations from the Kairuku-Hiri District participated in a week-long tournament in Port Moresby in June. EMPNG supported the event with a donation of sporting equipment, player uniforms and prizes.

EMPNG has donated PGK161,550 (US\$50,000) to the Pacifica Women Network Trade Centre initiative, which provides a platform to bring entrepreneurial women together from across the Pacific and give them access to trade.

The Network officially opened a trade centre in Port Moresby in July and attracted a large number of enquiries from women in micro and small businesses. The trade centre currently has 45 stalls.

EMPNG's funding will enable the addition of another 110 stalls, including an outdoor market place. This will help generate greater networking opportunities for women in business and improve regional trade.

Highlight: Training specialist joins GWIM alumni

Jill Pijui, a Senior Training Specialist with the Microfinance Expansion Project, joined GWIM alumni after completing GWIM training in Washington DC during July.

The GWIM training builds on Jill's existing 10 years of experience in managing socio-economic programs.

During the past five years she has trained 810 financial literacy trainers and mentored them to teach financial literacy to 212,000 Papua New Guineans, which resulted in the opening of more than 100,000 bank accounts.

Jill is passionate about women's economic empowerment and believes women represent a powerful source of economic growth and an opportunity for financial inclusion in Papua New Guinea.



From left: Pacifika Women Network Trade Centre Administration Manager, Joanna Stephen, with small business owner, Marietta Kawa, and Training Coordinator, Wilma Maru



Jill Pijui, a member of the GWIM alumni

Papua New Guinea's 43rd year of independence was celebrated across EMPNG's operations in September.

Upstream celebrations at the HGCP included face painting, a cultural dance by a Huli group and sporting challenges. At the LNG Plant site, dancers from the Trobriand Islands of Milne Bay and Bougainville performed for staff. A lunch-and-learn session was also held at Port Moresby, where Papua New Guinea's former Prime Minister Sir Rabbie Namaliu shared his personal experience and achievements.

Twenty participants from Komo-Magarima, Moro, Kutubu, Erave, Kikorim, Papa and Lea Lea villages attended a one-week Introduction to Agribusiness course held in October.



Dancers in traditional Huli costume performing during Independence Day celebrations at the HGCP

The rural farmer participants gained an understanding of essential business concepts, such as the difference between a business and subsistence farm, how to keep records, basic budgeting, the importance of savings and fundamental marketing techniques. The course was delivered by the University of New England and RuralBiz Training Institute with support from the Australian Government-funded Australia Awards and EMPNG.

This is the second year the Australia Awards has partnered with EMPNG to offer short courses in agribusiness with the aim of assisting the growing number of small- to medium-sized business owners in Papua New Guinea.



| Introduction to Agribusiness course participants

EMPNG supported the 2018 Hiri Moale Festival through its prestigious event, the Hiri Hanenamo Quest. The quest is open to women aged between 18 and 25 with contestants vying for the title of 2018 Hiri Hanenamo Queen or the friendship title, Miss Hetura. The PGK33,000 (US\$10,200) funding provided by EMPNG goes toward preparation for the contestants, as well as the crowning of the 2018 Hiri Hanenamo Queen and the other categories. The Hiri-Moale Festival celebrates the historical Hiri trade expedition between the people of the Gulf and Central provinces. It also celebrates the Motu-Koitabu people as the indigenous landowners of the National Capital District.



| Performers in traditional attire as part of the Hiri Moale Festival

EMPNG has donated office furniture including metal shelves, desks, chairs and a server rack to St John's Ambulance in Port Moresby. Computer equipment was also donated to the Hiri District education office at Konedobu.

Highlight: I now understand how to farm for business

My name is Kila Oumabe, I represent a group called Delta Greenfield Marketing based in Kikori, Gulf Province.

The group is made up of women from five different tribes. Women from the borders of Gulf, Western and Southern Highlands provinces.

I am glad to be a participant of this one-week agribusiness course offered by Australia Awards in partnership with PNG LNG.

I admit that my group of mothers and myself continue to struggle to grow our business because we lack the knowledge and know-how.

This one-week agribusiness course has taught me the things I need to do to run a successful business. I have learnt how to farm for business, book and record keeping skills and marketing.

I now feel that I have a clear understanding of what I need to do to make my farm a successful business.

When I return to Kikori, I will run a short training session for the women in Delta Greenfield Marketing. I will impart what I learnt with my fellow women so that we can be successful business farmers.



| Kila Oumabe, Kikori, Gulf Province

Since 2016, the company has donated more than 3000 items of furniture and other household and office items to 13 organisations in Papua New Guinea, including church groups, schools, government departments and non-government organisations.

Transparency International Papua New Guinea received PGK238,000 (US\$73,660) during 2018 to support its work in promoting transparency, honesty and accountability in public and private dealings. Transparency International conducts the annual Mike Manning Youth Democracy Camp, which teaches potential young leaders of the future about how governments should work.

In addition, Transparency International conducts school-based civic education teacher workshops and holds the annual Sir Anthony Siaguru Walk Against Corruption to raise awareness about corruption.

Education and training

In October, a School Board of Management Leadership and Governance Capacity Building Program meeting was held for the Hiri District with EMPNG and the Central Provincial Government.

From the meeting, Hiri District educators made key recommendations for an annual Board of Management workshop for schools, a train-the-trainer program and a monitoring and evaluation framework to record lessons learned. The training and evaluation program is based on the School Board of Management Training Manual developed by Esmie Sinapa Development Consultants, which was EMPNG funded in partnership with the Central Provincial Government in 2016. It aims to improve board governance and leadership capabilities in schools.

EMPNG continues to support The Voice Inc. with a PGK425,000 (US\$131,530) donation for the organisation's Centre for Leadership. This donation has enabled the Centre to provide leadership programs for students from the University of Papua New Guinea, the University of Goroka and the Papua New Guinea University of Technology.



The Voice Inc. participant and Clean Generation advocate, Maliwai Sasingian

The leadership programs aim to inspire young leaders of the national Clean Generation movement. During 2018, more than 170 students participated in The Voice Inc. and helped to influence some 2000 of their peers to join in the Clean Generation initiative.

Since the start of production, EMPNG has contributed almost PGK1.2 million (US\$371,060) to The Voice Inc. and provided mentoring support for its leadership programs.

The Kokoda Track Foundation received PGK233,100 (US\$72,140) for its 'Teach for Tomorrow' program that enabled further training of almost 670 elementary teachers in the Southern Highlands Province. The partially-trained teachers participated in a six-week course to enable them to complete their Certificate of Education and become fully certified as elementary teachers. This follows more than 110 volunteer teachers who participated in the training and received their qualification in 2017.

In partnership with Pacific Sports Media Marketing, EMPNG supported National Literacy Week activities at schools from Papa and Lea Lea, Boera and Porebada villages leading up to International Literacy Day on 8 September.

Students from Grade 6 to Grade 10 participated in a quiz and group discussions about 'making a change in the community'. The week concluded with a gala day at each school featuring activities such as health games, face painting, a reading corner and rugby league skills. Buk bilong Pikinini libraries also received support for literacy week activities, which focused on the theme 'Educate a Girl, Educate a Generation'.

EMPNG continues to be a major sponsor of the Papua New Guinea Olympic Values Education Program, with PGK266,400 (US\$82,450) donated to the program in 2018. This Program delivers interactive educational sessions that integrate sporting values and physical activity to promote the three Olympic Values of respect, friendship and excellence.

More than 7300 school-aged children from the National Capital District, Southern Highlands, East Sepik and Morobe provinces participated in the Program during 2018. A team of 30 Athlete Ambassadors was also trained for ongoing Olympic Values education through the Team PNG Hero program. For the first time, the Olympic Values Education Program held a display booth at the 2018 Goroka Show, which attracted some 2000 attendees.



Some of the thousands of elementary school students who will benefit from an education provided by the fully qualified teachers



Buk bilong Pikinini libraries' 'Wonder Women and Girls of Papua New Guinea' event held at Murray Barracks Hall in Port Moresby during National Literacy Week

Science Ambassador Program

More than 600 students from nine schools participated in the ExxonMobil Science Ambassador Program during 2018. The Program uses an interactive approach to encourage students to consider careers in science, technology, engineering and mathematics.



EMPNG Community Affairs Coordinator, Marilyn Wingi, conducting a Science Ambassador Program session with Grade 8 students from Papa Primary School

It involves practical experiments and lessons on topics such as rocks and geology and the origins of oil and gas.

A new energy topic was introduced in collaboration with the Kokoda Track Foundation to teach students about oil, gas, wind, hydro and solar energy.

During these sessions students had the chance to build solar lights in the classroom. Forty EMPNG volunteers and two SP PNG Hunters rugby league players helped deliver the Science Ambassador Program in 2018.

Papa, Lea Lea, Boera and Porebada primary schools and Redscar High School completed the Program during the year. Boroko Salvation Army Primary School and Port Moresby, Gordons and Ela Murray international schools from the National Capital District also participated. Twelve schools from the Upstream area were included in the 2018 Program but were unable to participate due to the displacement of the student population and destruction of school infrastructure caused by the earthquake.

The Science Ambassador Program was introduced to Papua New Guinea in 2013, with more than 4300 students from 45 schools participating to date.

Community health

Through its partnership with the Texas Children's Hospital and Baylor College of Medicine, EMPNG continues to support the improvement of maternal and child health outcomes in Papua New Guinea. Since the partnership began in 2014, more than 1200 mentoring hours have been given to Papua New Guinean healthcare professionals by Texas Children's Hospital doctors, and more than 870 undergraduate and 105 postgraduate students have received specialist paediatric education. The Texas Children's Hospital doctors have also treated some 3000 children for malnutrition in Papua New Guinea.

The Papua New Guinea Cancer Foundation's Healthy Teens Schools Program received a donation of PGK272,000 (US\$84,180) during the year. The Program aims to help teenagers make healthy lifestyle choices to reduce their risk of cancer. In 2018, the Program targeted 3000 Grade 6 to Grade 8 students at Tatana, Baruni, Hanuabada, Alotau, Kimbe and Lae.



The Papua New Guinea Cancer Foundation delivers the Healthy Teens Schools Program at Boera Primary School with funding support from EMPNG

To commemorate World Malaria Day, EMPNG donated more than 2000 mosquito nets to students and teachers at Boera, Papa, Lea Lea and Porebada primary schools and Redscar High School near the LNG Plant site.



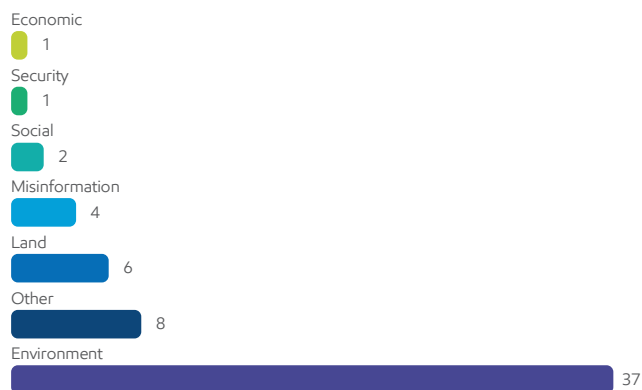
Mosquito net donation to Boera Primary School

4.2 Community grievance management

Fifty-nine grievances were registered during 2018, which is consistent with the number of grievances recorded in 2017. Grievances registered in 2018 are shown by category in Figure 4.1.

Of the 59 grievances registered, 37 related to the environment. Most were for claims regarding sediment runoff from a section of track along the Angore pipeline ROW, with some grievants claiming crop damage. All of the grievances were addressed and closed, including the completion of erosion repair works.

Figure 4.1 Grievances: Number of registered grievances by category for 2018



The remaining grievances included payments for clan caretaking activities in Hides, the removal of garden fence posts by an EMPNG contractor to support the navigation of machinery through terrain in Angore, and a concern about the impact of flaring emissions on crops in Papa Village near the LNG Plant site.

All grievances were closed except for four that were received in December. These will be addressed in 2019. Eleven outstanding grievances raised in 2017 were also addressed and closed during 2018.

4.3 Resettlement

EMPNG aims to avoid resettlement resulting from construction activities.

In situations where resettlement is unavoidable, the company aims to improve, or at least restore, the standard of living and livelihoods of displaced persons.

Following the February 2018 earthquake, several areas along the pipeline ROW were identified as requiring maintenance and repairs that necessitated additional land access. One household was resettled to allow for repairs that may require open trench construction and associated safety buffers.

The impacted household received compensation. Further assessments are underway to determine whether any other households are impacted.

4.4 Compensation

In 2018, nine Clan Agency Agreements were signed, and compensation payments made to landowning clans for land access along 3 kilometres of the pipeline ROW between Maruba to Dagia River in Homa. This allowed for an access road to Main Line Valve 4 Station at Moro and an access road to Check Valve 1 in Angore.

During the year, 295 deprivation payments were completed via electronic transfer.

Five payments remained outstanding due to internal clan disputes but will be paid once the disputes are resolved.

4.5 Volunteers

Some 470 EMPNG employees volunteered more than 1870 hours for 18 Papua New Guinea organisations during 2018.

Thirty EMPNG volunteers joined local communities in the annual Sir Anthony Siaguru Walk Against Corruption held in April.

EMPNG also sponsored teams of 12 students from 10 different schools in the National Capital District and provided t-shirts for them to wear during the walk.



EMPNG volunteers at the Walk Against Corruption

Forty-three EMPNG volunteers spent three weekends of their time during May 2018 repairing the waiting area of the Family Sexual Violence Unit located at the Boroko Police Station in Port Moresby.

The works included replacing worn floorboards, repairing the seating area and re-painting the hut.



The repaired waiting area for the Family Sexual Violence Unit at Boroko Police Station

Almost 60 EMPNG volunteers participated in clean-a-thon events for World Environment Day in June. The volunteers helped with a clean-up of grounds near Badihagwa High School in Port Moresby and a beach clean-up and tree planting with LNG Plant site communities.



Students from Boera Elementary School planting a tree for World Environment Day



World Environment Day clean-a-thon volunteers with EMPNG Managing Director, Andrew Barry (centre); Papua New Guinean Minister for Environment and Conservation, Honourable John Pundari MP (third from left); and Governor for the National Capital District, Honourable Powes Parkop MP (fourth from right); at Badihagwa High School



EMPNG volunteers (from left) Community Affairs Manager, Elly Sawa, and Community Development Support Coordinator, Cannon Ungere, spread Christmas cheer at Tari Hospital

A group of EMPNG volunteers was among nearly 2000 people who joined the inaugural Bel isi PNG Elimination of Violence Against Women Walk in November. The walk aimed to raise funds to help keep safe houses open so they could continue to provide essential services for women and their families who have experienced violence.



EMPNG volunteers participate in the inaugural Bel isi PNG Elimination of Violence Against Women Walk

HGCP volunteers joined 45 youths from the Komo Catholic Church, Evangelical Church of Papua New Guinea and the Seventh Day Adventist Church in the Yumi Klinim Komo or 'We Clean Komo' community clean-up, which included picking up rubbish and planting flowers around the Komo Government Station. In addition to providing volunteer time, EMPNG donated gardening tools and equipment to encourage the ongoing maintenance of beautification works in the Komo community.

EMPNG also donated a set of gardening tools for Juni youths to support local clean-up activities, while another clean-up program similar to the Komo initiative was held at Inu.

In December, EMPNG volunteers brought Christmas cheer to children at Tari Hospital in the Hela Province, Kiunga and Rumginai hospitals in the Western Province, and Kikori Hospital in the Gulf Province. The volunteers distributed gifts to the children and their parents.

Case study

Tailoring training opens opportunities

In July, 40 women from Papa, Boera, Lea Lea and Porebada villages attended advanced tailoring training at Boera Women's Resource Centre.



Lynda Babao-O'Neill, wife of the Prime Minister of Papua New Guinea (right) with EMPNG representatives Marilyn Wingi and Christine Yango at the advanced tailoring training course closing ceremony

The sewing machine care and maintenance and advanced tailoring training was the first formal course hosted at the new facility, which was EMPNG funded and opened in February 2018.

The Advancing PNG: Women Leaders Network organised the eight-day course. Topics covered included sewing machine care and maintenance, testing machines and reducing noise, an introduction to tailoring, the differences between basic and advanced sewing, tracing and cutting dress patterns and iron interfacing and overlocking. Sessions on financial literacy, HIV/AIDS and gender-based violence were incorporated into the course. A train-the-trainer component was also included so that participants could take their new skills back to their communities.



Participants of the machine care and maintenance and advanced tailoring training course

Women who participated had basic to intermediate knowledge in tailoring, but no knowledge of sewing machine repair and maintenance. By the end of the course, 80 garments were completed, and all sewing machines were overhauled and oiled by the training participants.

Since completing the course, 80 percent of the trainees have used their new skills to train other women in their villages.

Many of them have also developed micro sewing businesses generating income for their families. The women have kept in contact through forming support groups to connect and share lessons learned.

Trainee Edith Dairi from Porebada Village said she was so excited to participate in the course that she borrowed an old sewing machine from a relative to use in the training.

"This training motivated me to learn more about using electric sewing machines and overlockers and to learn new patterns and designs for outfits. It has given me the confidence to use an electric sewing machine to sew and create something new.

I've been working on sewing many more outfits that women from the community have been interested in buying.

I'm sharing what I've learned from the sewing training with the women in my clan and the community."

Edith Dairi

Sewing machine care and maintenance and advanced tailoring training course participant



Edith Dairi with the outfits she made during the course



86% of the workforce is Papua New Guinean

2400 training courses delivered

42% of Papua New Guinean workers from local areas

5 years and >13 million hours worked without a Lost Time Incident at the LNG Plant

"The growth of our Papua New Guinean workforce is integral to our operations."
Andrew Barry
Managing Director
EMPNG

5 Workforce

EMPNG is maximising employment and training opportunities for Papua New Guinean citizens.

5.1 Workforce composition

By the end of 2018, 3236 employees and contractors were working in production-related roles with EMPNG. This is an increase of some 700 workers compared to 2017 because of contractors appointed to assist with earthquake recovery efforts. More than 2770 of workers and contractors employed with EMPNG are Papua New Guinean citizens, who comprise 86 percent of the workforce. Nineteen percent of the Papua New Guinean workforce are female.

Forty-one percent of the production workforce is based in the Upstream area, with another 31 percent based at the LNG Plant site. The remainder of the workforce is based in other locations, such as the Port Moresby office.

Employment of workers from areas surrounding EMPNG facilities is a priority for the company. Of the total Papua New Guinean workforce, 42 percent are employed at worksites in their local area. Another 32.5 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

In-house training and externally delivered courses are provided to develop the skills of EMPNG workers. Contractors deliver training that is relevant to their scopes of work.

During 2018, the equivalent of 89,080 hours of training were delivered through some 2400 courses to over 9600 employee and contractor training participants. Ninety-six percent of all training hours were delivered to Papua New Guinean citizens, including 20 percent women.

5.2.1 EMPNG workforce training

The EMPNG workforce was provided with the equivalent of 53,000 hours of training in 2018. This was delivered to some 2500 participants through 1700 different courses. This is an increase of more than 10,000 training hours compared to 2017 primarily because of mandatory cyber security and legal compliance training completed during 2018.

Highlight: Niateng fast tracks her career

Within a few short years, Niateng Pokanau from Madang and Manus provinces has fast tracked her career from an IT support analyst to Supervisor of Customer Experience for EMPNG.

Niateng started work with EMPNG as an IT End User Support Analyst in 2012 and within four years was appointed IT Lead at the HGCP.

In late 2018, she took the opportunity for a position as Supervisor of Customer Experience, where she manages nine people who provide information technology support within the company.

"There are many opportunities available for women in EMPNG and it's good to see a lot of Papua New Guinean women taking up leadership roles with the company," Niateng said.

"What I enjoy most about my job is seeing IT customers happy and satisfied when we have provided assistance or solutions for their information technology needs.

I also love that the job provides opportunities to connect with people from different cultures. Learning about their experiences and success in ExxonMobil is very inspiring."



| Supervisor of Customer Experience, Niateng Pokanau

| Image opposite: Operations Technician, Abena Asi at the LNG Plant

Since the start of production, the equivalent of almost 228,000 hours of training has been delivered to nearly 12,000 course participants.

Training continues to focus on building the technical skills of the production workforce in areas such as emergency response, business conduct and cyber security awareness. Sixty-nine percent of training participants during 2018 were Papua New Guinean citizens. Of these, 34 percent were women.

Cultural awareness training was delivered to 85 participants during 2018 through site inductions and specific cultural awareness training sessions. An additional 11 participants undertook supervisor cultural awareness training.

Engineering and technical professionals

EMPNG's Engineering team played a key role in restoring facilities and restarting production following the February 2018 earthquake. This included the second warm start in the LNG Plant's history, which was conducted safely and on schedule by a predominantly Papua New Guinean team of engineers.

In 2018, EMPNG employed 11 new university graduates, including two women. They had completed degrees in disciplines such as civil, mining, electrical and industrial engineering.

In June, three early career Papua New Guinean engineers were included in EMPNG's delegation to the World Gas Conference in Washington DC, United States. Machinery Engineers, Alma Gaso and Andrew Hemetsberger and Electrical Engineer, Lei Banduru toured gas industry exhibits and attended sessions on technical and geopolitical developments in LNG. They were also able to network with senior ExxonMobil managers and technical professionals.

In December, EMPNG hosted a Mentoring and High Performance teaming workshop for engineers.



Instrument and Electrical Lead, Anthony Gonsalves; Electrical Engineer, Immaculate Wanjik; Graduate Electrical Engineer, Samuel Nanggore; Programmatics Supervisor, Stephen McFetridge; and Instrumentation and Controls Engineer, Naomi Kenny at the Mentoring and High Performance teaming workshop

The workshop covered topics such as mind-set shifts, skills of high-performance teams and the benefits of mentoring.

Throughout 2018, EMPNG engineers had the opportunity to further develop their skills through overseas skill specific training. This included witnessing a gas turbine engine teardown in Massa, Italy; materials and corrosion training in Houston, United States; regional response training in Hong Kong; and process controls training in Houston, Kuala Lumpur and Brisbane.

EMPNG is sponsoring three engineering students, Kimberly Sabarei, Naomi Kenny and Jonah Tokiong, to complete their studies at the University of Technology in Lae. Kimberly is studying mining engineering, Naomi is undertaking electrical engineering studies and Jonah will soon complete a mechanical engineering degree. The students had previously completed internships with EMPNG.



Engineering graduates employed by EMPNG in 2018

Highlight: Washington conference provides energy insight

Three early career engineers who had the chance to attend the World Gas Conference in Washington DC in June said the experience enabled them to learn a lot about the energy sector.

Facilities Integrity Management Systems Coordinator, Andrew Hemetsberger, said the key thing he learned at the Conference was the number of organisations and government departments that worked together to provide natural gas for energy needs.

Andrew said he also learned a lot about renewable energy and related technologies, including artificial intelligence, robotics and deep learning.

"The knowledge and observations from such an event opens your mind to the great possibilities and technologies available if a situation arises where you need to use it."

Machinery Engineer, Alma Gaso, said she learned about the use of gas for domestic energy.

"I was particularly interested in learning about the use of gas in the domestic market as Papua New Guinea does not use gas for domestic purposes," she said.

"It was empowering to see a good participation of women at the Conference. I appreciate working in an industry that supports the empowerment of women."

Electrical engineer, Lei Banduru, said he learned about the importance of developing the LNG industry to help reduce greenhouse gas emissions.

Lei said he would apply the lessons he learned about teamwork and leadership at the Conference to his daily duties at the LNG Plant.



EMPNG Managing Director, Andrew Barry (fourth from front) with Machinery Engineer, Alma Gaso (third from front), Machinery Engineer, Andrew Hemetsberger (second from front) and Electrical Engineer, Lei Banduru (front) at the World Gas Conference in Washington DC

Twelve students were hosted as interns with EMPNG during the 2018/19 summer holidays. The students are at various points of progression through engineering studies in Papua New Guinea and Australia. They were given work assignments to complement their studies and provide insight into graduate opportunities with EMPNG. All 12 students were offered scholarships for the 2019 year, valued at approximately PGK23,760 (US\$7350) each.

Operations and maintenance

Since the first intake in 2010, more than 200 Papua New Guineans have been recruited through EMPNG's Operations and Maintenance training program, which includes full-time on-the-job training in operations and maintenance trades for roles at the HGCP and LNG Plant.

The fourth intake of 16 Operations and Maintenance trainees, who joined the program in August 2016, completed their training in December 2017 and started work as Junior Technicians at the HGCP and LNG Plant in January 2018. This was the first intake of EMPNG sponsored trainees to undertake their training through the Kumul Petroleum Academy in Port Moresby rather than at EMPNG-provided training facilities.

The Kumul Petroleum Academy was formerly the Port Moresby Construction Training Facility, which was handed over to the Papua New Guinean Government in 2014. EMPNG invested PGK150 million (US\$46.4 million) to build the Facility, which was used during the construction of PNG LNG to provide internationally accredited training courses through the Australian Quality Training Framework.

More than 1660 people from Papa, Lea Lea, Boera and Porebada villages near the LNG Plant site received internationally accredited training through the Port Moresby Construction Training Facility during the construction phase. Almost all trainees who achieved their qualification were employed in construction roles at the LNG Plant.

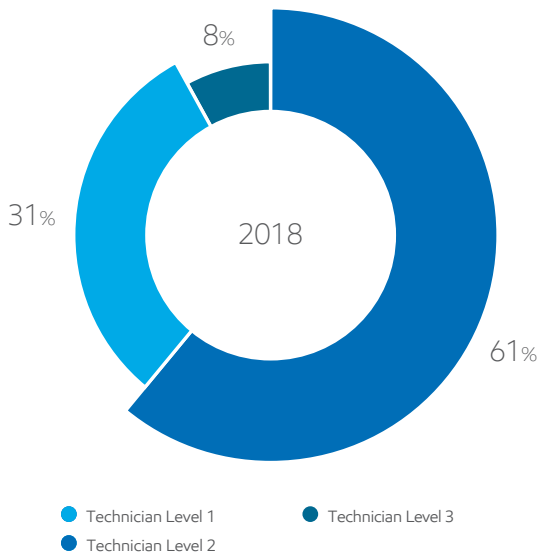
By the end of 2018, 176 of the Operations and Maintenance trainees, including 44 women, were employed as Operations and Maintenance technicians with EMPNG. Fifty-nine of the Operations Technicians are based at the LNG Plant, with the other 33 based at the HGCP. For the maintenance disciplines, 33 trainees are Mechanical Technicians, another 33 hold roles as Instrumentation Technicians and 18 are Electrical Technicians.

The Operations and Maintenance technicians have a training progression plan, starting at Junior Technician level.

Trainees have the opportunity to progress from Junior Technician level through to Technician Levels 1, 2 and 3. Some may progress to Lead Technician Level 4 and/or supervisory level and beyond. It takes approximately 11 years to progress from a Junior Technician to Lead Technician.

Almost 110 trainees have already achieved Technician Level 2. Progression levels of the Operations and Maintenance technicians is shown in Figure 5.1.

Figure 5.1 Operations and Maintenance technicians: Percentage by Technician Level



In June, Control Room Technician, Noah Pingin, became the first trainee from the Operations and Maintenance training program to be promoted as a supervisor, replacing an expatriate worker. In July, Appollonia Nabo was appointed as a LNG Train Control Room Technician, while Geua Gau and Malikah Salmang were appointed as Utilities, Storage and Loading Control Room Technicians. These women join Vickie Watch who was the first female promoted as a Control Room Technician in 2017.



Three of the five qualified Control Room Technicians from the Operations and Maintenance training program Eunice Isaac (seated front), Elsie Digwaleu (standing) and Geua Gau (seated rear) at the LNG Plant

By the end of December, 16 out of 22 Control Room Technician positions and all Maintenance Scheduler positions were filled by Papua New Guinean citizens.

Thirteen of the 18 Electrical Technicians from the first two intakes (2010 and 2012) of the Operations and Maintenance training program have fulfilled requirements of PNG Power and the National Apprenticeship and Trade Testing Board to receive their electrical licenses.

One of the Electrical Technicians received the 2018 Tradesperson of the Year award at the National Apprenticeship and Trade Testing Board awards ceremony in November.

Twenty-nine trainees, including 10 women, were selected for the fifth intake of the Operations and Maintenance training program, with training commencing at the Kumul Petroleum Academy from January 2019. Of the 29 trainees, eight are from local areas close to PNG LNG operations, nine are from the provinces in which PNG LNG operates and 12 are from other regions in Papua New Guinea.

Highlight: Fast start to a great career

Lae resident, Noah Pingin, is the first Operations and Maintenance trainee to become a supervisor. He has been appointed as the Pipeline Operations Supervisor based at Moro, replacing a non-national who was previously in the position.

Noah graduated with the first group of Operations and Maintenance trainees in 2014. He said the opportunity to train with ExxonMobil, both in Papua New Guinea and abroad, helped him to step out of his shell and gave him the ability to professionally communicate and engage as part of a team in a global organisation.

“The quality of technicians we have is testament to the world class systemic approach that ExxonMobil has with regard to training its workforce,” he said.

Noah was the Control Room Technician on duty when the earthquake struck in February 2018. He was involved in safely shutting down the HGCP, which minimised damage to the plant and helped to ensure the safety of the workforce.

In his new Pipeline Operations Supervisor role, Noah said his daily activities involved planning and coordinating the work of his team.

“It means I have to lead by example and give my team the right support and tools to perform their job effectively and safely. The greatest thing I have learned is not to compromise on EMPNG’s standards and procedures, and always strive for excellence.

“If in doubt, stop and ask. Learn to work with others so you can be efficient in what you do because ExxonMobil is a company with so many resourceful people and great leaders. Pick up their leadership traits and put it in your mental toolbox so you can use it when the need arises.”



Pipeline Operations Supervisor, Noah Pingin



The 29 trainees from the fifth intake of the Operations and Maintenance training program at the Kumul Petroleum Academy

Highlight: Yasi cleans up at national awards

An EMPNG Electrical Technician received four awards at the National Apprenticeship and Trade Testing Board awards ceremony held in November. Yasi Koriam received the 2018 National Apprenticeship and Trade Testing Board Chairman’s Award and was also named Tradesman of the Year, 2018 Best Tradesperson of the Year and the 2018 Trade Test Candidate of the Year. This was the first time EMPNG had participated in the awards.

Yasi was recognised for his work on ‘Project Friday’, a remote control dual fuel generator for use in remote sites. It provides an alternative method to generating electricity in remote areas using natural gas or diesel.

Yasi said Project Friday took seven weeks to develop and could help save money and increase the reliability of power generation in the field.

“I wanted to represent the kind of training my colleagues and I receive from EMPNG,” he said.

Yasi was among EMPNG’s first intake of Operations and Maintenance technicians in 2010. He completed his Electrical Trade Test Level 3 Certificate in early 2018.



Electrical Technician, Yasi Koriam, with his awards at the National Apprenticeship and Trade Testing Board awards ceremony

Sixteen trainees were selected to take the operations career path. From the maintenance disciplines, eight are training to be electrical technicians and four were selected for mechanical studies. One trainee was chosen to complete the Operations and Maintenance basic skills training and then join the Safety, Health and Environment department. This is the first time a trainee has taken this training path.

5.2.2 Contractor training

In 2018, contractors provided the equivalent of some 36,000 hours of training to more than 7100 Papua New Guinean course participants through some 680 different courses. Women comprised 19 percent of all Papua New Guinean contractors trained.

Fifty-one percent of contractors were trained in the Upstream area, with 33 percent trained at the LNG Plant.

Of the contractor workforce participants during 2018, 46 percent were employed from local communities, 29 percent from a province in which PNG LNG operates and the remaining 25 percent from elsewhere within Papua New Guinea. Training topics included performing lifting operations, safe driving, working at heights, business management, loss prevention system and job safety analysis training.

5.3 Workforce health

EMPNG provides high quality medical, public health and industrial hygiene programs and services to support operations at all worksites.

In 2018, EMPNG’s Medicine and Occupational Health team was recognised with an ExxonMobil Global Health and Safety Award for their contribution to raising mental health awareness in the workplace.

Medical

EMPNG replaced more than PGK215,000 (US\$66,540) of medical equipment at the HGCP clinic that was damaged in the earthquake.

Highlight: Health team gets global safety award

The EMPNG Medicine and Occupational Health team has received a Global ExxonMobil Safety and Health Award for the 'Wik bilong lukautim tingting' mental health awareness program. The award recognises exceptional contributions that demonstrate commitment, innovation, leadership and continuous improvement in safety and health performance.

Wik bilong lukautim tingting means 'the week for taking care of one's mental wellbeing'. It was launched in 2017 and is held for one week in October each year, with messages about mental health awareness reinforced throughout the year. The program was developed to engage Papua New Guinean workers and introduce important concepts in a fun, easy and relatable way. It aims to encourage open discussion about mental health issues in a supportive environment.

The program combines visual images and simple messages in Tok Pisin and English. Animals unique to Papua New Guinea are used as mascots to help guide workers through day-to-day mental health issues and solutions. The animal mascots are Cassie the cassowary, Charlie the cuscus and Alex the Queen Alexandra birdwing butterfly.

In addition to promoting open discussions about mental health, the program encourages people to exercise, reduce their alcohol intake and pay more attention to how their physical health impacts their emotions and overall mental health.



Cassie the cassowary encouraged workers to take a moment to check on their colleagues with a short Yu OK? or 'Are you OK?'

The clinic continued to operate out of the on-site emergency room immediately following the earthquake while damages to the rest of the clinic were repaired. All critical emergency equipment remained operational.

Almost 12,000 patient consultations were conducted across camp clinics during the year, with more than 6100 people treated in the Upstream area and some 5500 patient consultations at the LNG Plant site clinic.

Approximately 50 Upstream area workers were treated for minor injuries sustained during earthquake response.

Other clinic visits were for general patient consultations, tuberculosis screening, malaria chemoprophylaxis supplies, pre-employment medical screening and vaccinations, including free influenza and polio vaccinations provided to employees.

Approximately 1700 workers received tuberculosis screening during 2018. Eight active tuberculosis cases were identified and managed. All cases were community acquired with no transmission in the workplace. Another 278 latent tuberculosis cases were identified and registered in the tuberculosis surveillance program.

A tele-microscopy connection was completed between the LNG Plant and the HGCP clinics to enable laboratory technicians at both sites to conduct real-time microscopic assessments of the same malaria blood slides and promote discussions for improved malaria diagnosis.

The medical service provider continues to deliver at least two toolbox talks each day across 20 health topics such as hygiene and sanitation, food safety, first aid for snake bites and vaccine preventable illnesses. Each health topic reaches an average of 200 workers at each worksite.

Twenty-eight emergency medical evacuations were conducted during the year, with 12 requiring an air ambulance. None of the medical evacuations were work-related.

Public health

EMPNG and its contractors have maintained high camp health standards in the areas of hygiene and sanitation, food and potable water safety, vector surveillance and control and infectious disease management despite the impact on health facilities and local communities following the earthquake.

In consultation with international health experts and based on extensive research, EMPNG has revised its Malaria Control Program to better reflect the current risk profile for malaria in Port Moresby.

In February, an infectious disease outbreak management training and emergency response drill was conducted at the LNG Plant.

An outbreak of norovirus from an external source impacted 34 workers at the HGCP during the second half of the year, but it was contained due to a well-planned and practiced response plan.

During a polio outbreak in Papua New Guinea in the second half of the year, EMPNG raised awareness of the national outbreak with workers and increased vaccine availability to employees.

Industrial hygiene

EMPNG provides hazardous materials training to employees and contractors to ensure the safe management of hazardous substances at worksites.

More than 400 industrial hygiene inspections were conducted during 2018 to assess respiratory protection, benzene control, chemical storage and noise management in the workplace. Fifty-four exposure assessment reviews were also completed with field teams and 87 chemical and noise monitoring samples were collected for analysis.

A new Industrial Hygiene Technician was appointed and completed a Basic Principals in Occupational Hygiene course in Brisbane, Australia during the first half of the year. In the second half of the year, the Industrial Hygiene team evaluated exposure to health hazards and confirmed that personal protective equipment requirements were effective for the retrieval of 'pigs' in the Upstream area.



Team members associated with pigging operations from the HGCP pictured at Kopi Scrapper Station

Other strategic initiatives

In April, EMPNG's Medicine and Occupational Health team presented two papers at the Society of Petroleum Engineers International Conference and Exhibition on Health, Safety, Security, Environment and Social Responsibility held in Abu Dhabi, United Arab Emirates. The papers were titled *Preventing Workplace Transmission of Tuberculosis in a High Tuberculosis Endemic Country* and *Linking Longitudinal Morbidity and Mortality Trends in Host Communities to Workplace Disease Control Efforts in the PNG LNG Project*. Both papers were well received by Conference participants.

To commemorate World Tuberculosis Day, Port Moresby General Hospital tuberculosis specialist, Dr Rendy Moke, provided tuberculosis prevention education to Port Moresby office workers.



EMPNG workers unite in support of World Tuberculosis Day

The 2018 World Tuberculosis Day theme was 'Wanted: Leaders for a tuberculosis-free world'.

Eighty Port Moresby workers participated in a two-day tuberculosis screening program, while tuberculosis screening and toolbox talks were also provided at the LNG Plant and Upstream facilities.

Mr Buzz, the World Malaria Day mascot, provided bed nets, mosquito repellent and thermometers to EMPNG workers to commemorate World Malaria Day. The theme was 'Ready to beat malaria'.

Malaria prevention lunch-and-learn sessions were conducted at the Port Moresby office, while toolbox talks with Mr Buzz were held at Upstream and LNG Plant facilities.

In October, the Medicine and Occupational Health team conducted Mental Health Week with the theme 'Mindfulness and Resilience'. A psychologist and counsellor conducted a series of sessions about mental health topics and offered counselling support for workers.



EMPNG employees wearing odd socks to promote discussions about mental illness

In December, World AIDS Day was observed with employee awareness sessions at worksites, including the Port Moresby office. The theme of the day was 'Know Your Status'.

5.4 Workforce safety

EMPNG achieved its strongest year for safety performance since production began with a Total Recordable Incident Rate of 0.11 for the year. No Lost Time Incidents occurred despite challenges such as the February 2018 earthquake. In recognition of EMPNG's response to the earthquake, the company received a global ExxonMobil Safety, Security, Health and Environment Performance and Perseverance Award for outstanding safety performance.

The LNG Plant was recognised at the Papua New Guinea Chamber of Mines and Petroleum's inaugural Chamber Awards for achieving five years and more than 13 million hours worked without a Lost Time Incident. See *Case Study: Pride in safety award*. For the fifth consecutive year, EMPNG's Supply Chain and Warehousing team was awarded ExxonMobil's Procurement Global Supply Chain Gold Star Award for outstanding safety performance.



EMPNG Field Operations Manager, Kim Hahn, conducting a site visit at Hides

Core safety processes

EMPNG's core safety processes are defined by ExxonMobil's Operations Integrity Management System, which uses a set of indicators to determine the health of safety systems. Leading indicators measure the effectiveness of EMPNG's safety programs, while lagging indicators measure actual incidents, consequences and overall safety performance.

Key leading safety indicators include Observations and Interactions, Hazard Identifications and Near Miss Reports. During 2018, EMPNG introduced a new 'Nobody Gets Hurt' card to drive the collection of leading indicators, which enables improved analysis and feedback to the work teams.

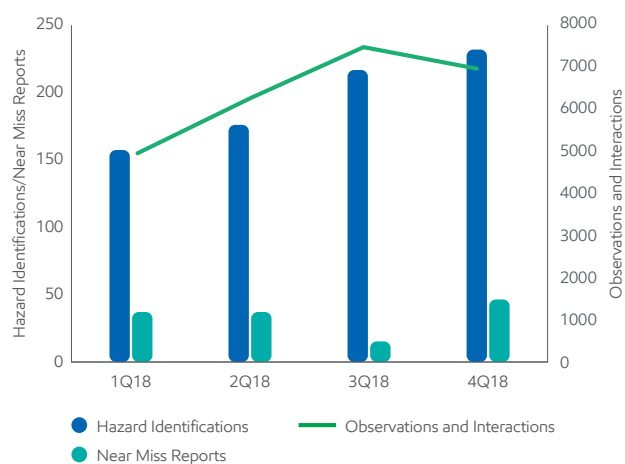
More than 25,000 Observations and Interactions were recorded for the year, as shown in Figure 5.2, a four percent increase from 2017.

The focus remains on improving the quality of peer-to-peer observations and discussions rather than the quantity of reports submitted.

More than 700 Hazard Identifications and 120 Near Miss Reports were submitted in 2018. The steady use of these programs is due to continued worker awareness of the value of reporting, as well as discussions held during monthly safety meetings and toolbox talks.

Lost Time Injury Rates, Total Recordable Incident Rates and the number of Tier 1 and Tier 2 process safety events as defined by IPIECA, the global oil and gas industry association, are key lagging indicators for EMPNG.

Figure 5.2 Core safety processes: Number reported by quarter



At the end of 2018, EMPNG had a Total Recordable Incident Rate of 0.14, which was a decrease from 0.28 in 2017. This was primarily due to applying key lessons learned from 2017 to reduce injuries resulting from security incidents. No major process safety events were recorded for EMPNG for the fourth consecutive year.

The 2018 'Safe Start' campaign included sessions by senior management who reinforced to employees and contractors that safety is a core value in EMPNG. Each session reviewed EMPNG's 2017 safety results and emphasised the company's 2018 safety focus themes: Enhancing Process Safety; Making Safe Choices; and Security.



EMPNG's Safety, Health and Environment team participating in a team-building exercise at the Port Moresby Nature Park

The sessions also outlined what was expected from managers, supervisors and workers to maintain the company's vision of 'Nobody Gets Hurt'.

EMPNG has increased its focus on first- and second-line supervisors being actively engaged with pre-job planning and field execution to ensure workers adequately address key hazards and risks in the workplace. This includes manager and supervisor safety walks to engage with the workforce regarding hazard identification, protective safeguards in place, and applying lessons learned.

In September, EMPNG held the 5th annual Contractor Safety Leadership Workshop. The focus of the Workshop was 'Making Safe Choices – Risk Tolerance'. During the Workshop, contractors shared their experiences of how risk tolerance helped them to develop ideas to improve site safety performance. A new annual awards program was introduced for contractors that best exhibited EMPNG's safety behaviours. The inaugural winners of the award were Baker Hughes, a subsidiary of General Electric, and Laba Security Services Limited, a joint venture between Lanco Laba Holdings Limited and Guard Dog Security Services Limited.

Baker Hughes supplies the HGCP with gas turbine driven pipeline gas compressors and the LNG Plant with gas turbine driven refrigeration compressors.



Baker Hughes representatives Gerard Whitcombe, David Lindsay and Loke Meng Wong receive the safety award from EMPNG Executive Director – Production, Dinesh Sivasambo

Laba Security Services Limited provides guard services at the LNG Plant.



EMPNG Executive Director – Production, Dinesh Sivasambo, presents safety awards to Laba Security Services Limited representatives Raho Kewau, Addis Bulcha and Dale Smith

To reduce the likelihood and consequences of emergency situations, EMPNG maintains dedicated plans, personnel, equipment and workforce training.

During 2018, EMPNG conducted 182 emergency response drills across all facilities.



Participants of the 5th annual Contractor Safety Leadership Workshop



| Esso Australia Production Limited Training and Design Team Lead, Heath Brew (middle back) with EMPNG operators at the LNG Plant

Scenarios included fire/explosion, muster, evacuation, aviation incidents, natural disaster and security. They were completed through both desktop and practical exercises.

EMPNG has become one of the first ExxonMobil affiliates to implement a new program to raise worker awareness about major hazard scenarios and the critical safeguards in place to prevent a major incident. The program is intended to drive positive behaviours in how EMPNG employees work within the company's facilities.

As a powerful learning opportunity that coincided with the 20th anniversary of the Longford Gas Plant explosion in Victoria, Australia, EMPNG employees received two visits from Heath Brew who was severely injured during the explosion. Heath shared "what could go wrong" and "what's the worst that could happen" to the workforce in such an event. Lessons learned from Longford have been applied globally and to EMPNG's best practice safety standards.

5.5 Security

During the first half of 2018, an uninhabited EMPNG camp and work location in Angore were damaged as a result of interclan rivalries. Due to increased security risks associated with ongoing law and order issues in this area, restrictions on movement applied to EMPNG and its contractors throughout the year. The Papua New Guinean Government provided additional security to the region while the restrictions were in place.

While EMPNG and impacted communities conducted recovery efforts following the earthquake, additional security support was provided for remote site work in the Upstream area.

The Royal Papua New Guinea Constabulary maintains a Memorandum of Understanding with EMPNG to enable the provision of security in areas around production facilities. Voluntary Principles on Security and Human Rights training is provided to both government and contracted security personnel working at EMPNG sites.

5.6 Worker welfare and conditions

EMPNG promotes fair and equitable labour practices for the treatment, non-discrimination and equal opportunity of workers.

This is achieved through implementation of the Labour and Working Conditions Management Plan, which includes the promotion of healthy management-worker relationships and safe, secure and comfortable worker accommodation that does not impact on surrounding communities.

5.6.1 Camps

A large amount of work was undertaken during 2018 to restore infrastructure at the HGCP Camp, which was damaged in the February earthquake.

Worker accommodation was quickly reinstated to support ongoing camp operations, and the dining hall, fitness centre and band room were restored to help ensure residential life returned to normal as quickly as possible.

Infrastructure works also continued throughout 2018 with upgraded basketball and volleyball courts, a second prayer room for workers, and a roofing upgrade at the HGCP Camp.

At the LNG Plant Camp, 270 accommodation rooms were refurbished, a roofing upgrade was completed at the commissary building and safety improvements were made including a redesigned pedestrian access and new bus drop-off zone. The LNG Plant observation deck was also renovated.



| The renovated LNG Plant observation deck

A water conservation education campaign conducted at the HGCP Camp during 2018 resulted in residents minimising water use and reducing the amount of wastewater generated at the Camp.



Fresh produce for sale at a local community market in the Nogoli area

EMPNG's catering contractor continues to purchase fresh fruit and vegetables for camp meals from local community markets. During 2018, the HGCP Camp catering contractor spent more than PGK83,000 (US\$25,680) on market produce from local suppliers.

Camp newsletters at all camps and a dedicated television information channel at the HGCP Camp continue to provide regular updates about camp activities and general production information to residents. Camp committees are also enabling ongoing communication and feedback from camp residents so that EMPNG can maintain high standards at worker camps.

5.6.2 Labour and working conditions

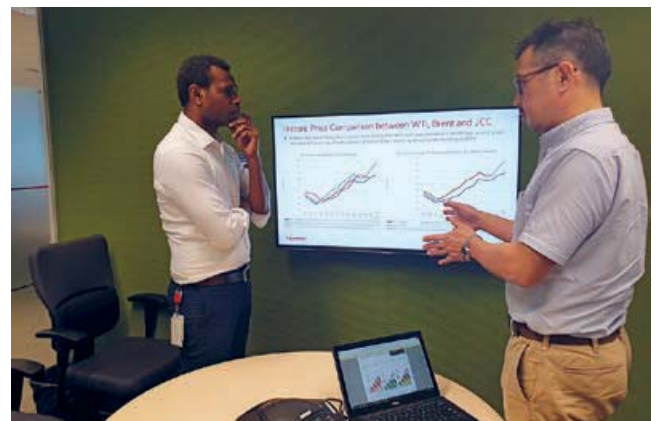
EMPNG provided financial assistance and counselling support to employees whose homes were impacted by the earthquake. This included the provision of approximately 50 disaster assistance loans totalling some PGK500,000 (US\$154,750), as well as income continuation to employees who were unable to return to work for some time after the earthquake. The company also provided employees with additional paid leave to attend to personal emergencies.

Forty-eight new Papua New Guinean employees were recruited during 2018 in the areas of operations, maintenance, engineering, technical, human resources, procurement, information technology, law and safety, health and environment. Seven Papua New Guinean employees were promoted to supervisory or managerial roles during the year. Since 2011, more than 160 Papua New Guinean employees have been given an overseas assignment as part of the Operations and Maintenance training program, Early Career Graduate interchange program or through international opportunities. These include Machinery Engineer, Stephen Marinjemi, who is on assignment in Houston, United States and Commercial Advisor, Seth Woruba, who is working with ExxonMobil Gas and Power Marketing based in Singapore.

EMPNG continues to provide Standards of Business Conduct training to new employees during their induction process, as well as periodic refresher training to the existing workforce.



Machinery Engineers Art Klink (left) and Stephen Marinjemi inspect a compressor impeller



Commercial Advisor, Seth Woruba (left) working with a colleague in the Singapore office

The Standards of Business Conduct training encompasses topics relevant to the working environment and includes ethics, conflicts of interest, corporate assets, anti-corruption, health, safety, environment, alcohol and drug use, equal employment opportunity and harassment. The Standards also explain EMPNG's open door communication procedures, which encourage 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.

As well as Standards training, bi-monthly workforce lunch-and-learn sessions are held with EMPNG Managing Director, Andrew Barry. These sessions enable workers to directly ask questions to the Managing Director.

Regular human resources and site management sessions are conducted to keep workers informed and involved in human resources and site management activities.



Employees at the HGCP helping to raise breast cancer awareness by showing their support of Pinktober

The Women in Energy Network hosted two high profile speakers at a lunch-and-learn session held in September about the role of the private sector in women’s empowerment.

Professor Linda Scott and Dr Mayra Buvinic also participated in the APEC Women and the Economy Forum and the Advancing PNG: Women Leaders Network’s Papua New Guinea Women’s Leadership Workshop.



Dr Mayra Buvinic presenting at APEC

Professor Scott is the Emeritus DP World Chair for Entrepreneurship and Innovation at Said Business School, University of Oxford. She is best known for her creation of the concept of the Double X Economy, a perspective that describes the global economy of women in both the developed and developing world, and the roles of women not only as consumers, but as investors, donors and workers.

Dr Buvinic, an internationally recognised expert on gender and social development, is a Senior Fellow both at the Center for Global Development and the United Nations Foundation.

Previously, she was Director for Gender and Development at the World Bank and was a founding member and President of the International Center for Research on Women.

Ten EMPNG employees received Lead Country Manager awards in December for living the six values and behaviours fundamental to *Em pasin bilong ExxonMobil long PNG* or ‘the way we work at ExxonMobil in PNG’. For further information, refer to *Case Study: Award winners live EMPNG values*.

Employees continue to access the home ownership program introduced in 2016. This program helps eligible employees to raise the equity needed to purchase a home, or to purchase the materials to build a home.

During the past three years, EMPNG has provided PGK8.5 million (US\$2.6 million) to 110 employees through this program.



Family fun day at the LNG Plant site

EMPNG’s 2018 employee social club events included a family fun day, corporate touch football, a netball event, Women in Energy Network functions and a Pinktober celebration.

Case study

Pride in safety award

The LNG Plant has been recognised for its outstanding safety performance at the inaugural Papua New Guinea Chamber of Mines and Petroleum's Chamber Awards.



EMPNG Marine Loading Master, Nonnie Eri, at the 15th Papua New Guinea Mining and Petroleum Investment Conference

The Awards were presented during the 15th Papua New Guinea Mining and Petroleum Investment Conference, which attracted over 1300 delegates. The LNG Plant was recognised for its achievement of five years and more than 13 million hours worked without any serious injury that prevented a person from returning to work.

LNG Plant employees Nonnie Eri, Olive Isikiel and Appollonia Nabo accepted the inaugural Award in Recognition of Outstanding Safety Performance in 2018 on behalf of the company. Olive and Appollonia started their careers in 2010 as part of the first intake of Operations and Maintenance Technician trainees.



From left: Papua New Guinea Chamber of Mines and Petroleum President, Gereia Aopi CBE with EMPNG Marine Loading Master, Nonnie Eri; Trains Control Room Technician, Appollonia Nabo; Instrument Planner, Olive Isikiel; and Managing Director, Andrew Barry, receiving the inaugural Award in Recognition of Outstanding Safety Performance in 2018

Nonnie Eri, EMPNG's first female Marine Loading Master, said she had seen the company's ongoing focus on keeping people safe as part of the global ExxonMobil vision of 'Nobody Gets Hurt'.

"We pride ourselves in the safety culture of our operations. It is because of the relentless efforts of thousands of people that we achieved five years without a Lost Time Incident at the LNG Plant. You can imagine the challenge of trying to find a common ground within a culture or language that transcends through our 800 plus different norms in Papua New Guinea and 50 or more different languages from around the world representing the global workforce supporting PNG LNG."

Nonnie Eri
Marine Loading Master
EMPNG

Olive, who started work as an Instrument Technician after completing her training, now works as the Instrument Planner at the LNG Plant.

"As a Papua New Guinean, I am very proud to be part of the team at PNG LNG right from the days of its development through commissioning and now production, I have watched the project being built, supported its progress and am now contributing to ensuring the safety of our wanwoks, our family, both on- and off-the-job."

Olive Isikiel
Instrument Planner
EMPNG

Trains Control Room Technician, Appollonia Nabo, said she was proud to build her career with EMPNG and was impressed with the company's strong safety culture.

"I can personally attest to the fact that at PNG LNG, factors such as race, age, skills and language are part of the rich tapestry of our teams, but our culture of safety remains a unifying culture and one that has enabled the LNG Plant to achieve this remarkable milestone in safety, one that we will work to continue long into the future."

Appollonia Nabo
Trains Control Room Technician
EMPNG

Case study

Award winners live EMPNG values

Ten EMPNG employees have been recognised at the annual Lead Country Manager awards.



EMPNG Managing Director, Andrew Barry (right), with some of the recipients of the 2018 Lead Country Manager awards

The annual Lead Country Manager awards are presented to EMPNG personnel who demonstrate outstanding examples of *Em pasin bilong ExxonMobil long PNG* behaviours across the values of safety, environment, security, integrity, excellence and teamwork. *Em pasin bilong ExxonMobil long PNG* translates to 'the way we work at ExxonMobil in PNG'. It has been integral to building EMPNG's workplace culture.

EMPNG Managing Director, Andrew Barry, said the awards recognised employees who were role models for EMPNG's values.

"Whenever people are asked to describe someone who lives the values and someone who doesn't and how their behaviour affects team dynamics, it is clear that negative behaviour can result in decreased motivation and performance. However, when people live the values, their teams feel inspired and engaged, which leads to a happier and more productive work environment."

Andrew Barry
Managing Director
EMPNG

This year's Lead Country Manager award winners were: Safety Specialist, Jamila Pyakalia; Utilities, Storage and Loading Control Room Technician, Lamech Alu; Environmental Advisor, Nicole Yasi; Lead Logistics Coordinator, Cordelia Seta; Surveillance Engineer, Gerard Schulze; Procurement Associate, Leilannie Mizigi; LNG Plant Surveillance Engineering Lead, Rupesh Parbhoo; Upstream Operations Integrity Management System Technician, Andrew Doonar; Human Resources Client Advisor, Fatima Hani Morgan; and Upstream Community Affairs Manager, Richard Haguai.

The winners were awarded during a ceremony at the Stanley Hotel in Port Moresby on 1 December. All EMPNG employees are eligible for the annual LCM awards, with nominations received in October and winners announced at the end of year staff function.

Each winner received a customised Lead Country Manager framed award certificate.



Nicole Yasi's passion for protecting the environment led to her award under the environment category. Nicole has worked tirelessly to inspire others to learn about the importance of protecting Papua New Guinea's unique flora and fauna. She developed the framework for the LNG Plant's highly successful Welcome to Our House initiative to reduce litter and increase environmental awareness at the site. Nicole is also a positive ambassador for EMPNG, representing the company at many external events.



Gerard Schulze also received recognition for excellence. Gerard sets positive examples for his peers through consistent actions and behaviours that help elevate the performance of the Facilities Surveillance team. He is committed to continuous development as part of the Process Safety Implementation core team and motivates his colleagues to help improve their knowledge and understanding of process safety.



Jamila Pyakalia was recognised under the value of safety for consistently demonstrating strong initiatives across EMPNG’s safety programs. During 2018 she proactively contacted employees to encourage participation in a ‘Safe Start’ video contest. Jamila is committed to continuous development and coaches and mentors others around her to ensure ‘Nobody Gets Hurt’.



Rupesh Parbhoo was recognised under the value of teamwork. Rupesh fosters an inclusive work environment to get the best out of everyone in his team. He has driven performance improvement within the LNG Plant Surveillance team by coaching and mentoring his colleagues, encouraging people to take ownership of projects, improving data analytics and applying new technologies to safely maximise production.



Lamech Alu, EMPNG’s first Papua New Guinean Utilities, Storage and Loading Control Room Technician, was recognised under the value of environment. Lamech played a critical role in optimising the boil-off gas compressor during a plant outage, which averted a potentially substantial environmental impact. He consistently demonstrates a positive attitude in his highly demanding role and proactively mentors others in his team.



Fatima Hani Morgan was also recognised for integrity because she consistently demonstrates strong interpersonal skills and contributes new ideas to improve the effectiveness of EMPNG’s operations. In 2018, Fatima drove improvements to staffing and development processes across the Pacific region.



Leilannie Mizigi was awarded for teamwork. Leilannie led the introduction and implementation of ExxonMobil Contractor Services within EMPNG and helped many teams work through contractor compensation challenges. She also established an effective interface with the broader ExxonMobil Contractor Services organisation in Singapore, Australia and Bangkok.



Andrew Doonar was awarded for integrity. Andrew is well known for treating everyone with dignity and respect. He consistently demonstrates punctuality and strictly follows workplace procedures to ensure ‘Nobody Gets Hurt’. During 2018, Andrew proactively led and contributed to numerous volunteering events to help others.



Richard Haguai has been recognised for his work in the community to ensure a safe work environment. He achieved this by remodelling fieldwork processes and driving lively discussions during job start meetings to encourage a heightened focus on safety.



Cordelia Seta was recognised for excellence because she consistently identifies ways to improve processes and focuses on delivering long-term solutions to benefit EMPNG and local communities. Cordelia played a key role in logistics arrangements over the 100 days Komo was without access following the earthquake.



83 tonnes
of scrap metal
recycled

35 Clean Green
team leaders



87,400kL
of potable water
generated from
seawater

114 tonnes of food
waste composted

6 Environmental management

Environmental monitoring and management procedures are implemented to reduce the potential impact of EMPNG's activities on the surrounding environment.

6.1 Air

Stack testing conducted at the HGCP during 2018 found all stacks to be compliant with Environmental Management Plan criteria. One of the gas turbine generators was not tested as it was offline due to damages sustained from the earthquake.

Nineteen out of 22 stacks at the LNG Plant were reported as compliant during stack testing. The three Train 2 mixed refrigerant compressors recorded non-conformances for exceeding nitrogen oxide emissions criteria due to calibration issues on the compressor fuel gas meters. The fuel gas meters were recalibrated to address the issue. These compressors will be stack tested in 2019 to ensure the recalibrations were effective.

Flaring has been generally trending downwards since the start of production due to stable operations. A short-term increase in flaring was required between March and May 2018 due to equipment shutdowns and restarts following the earthquake.

6.2 Noise

Noise monitoring originally scheduled for the first half of 2018 was postponed to the second half of the year because of a fault in the monitoring equipment.

During monitoring at the HGCP, an exceedance for night time noise was recorded at the wastewater treatment plant due to an ineffective noise barrier. A non-conformance was raised to track remediation of the issue.

A new barrier is scheduled to be installed in early 2019 with verification monitoring to be conducted once the installation is complete.

Noise monitoring was unable to be conducted at the LNG Plant and Port Moresby office in 2018 because of damage to noise monitoring equipment. Monitoring will be conducted as soon as new noise level meters arrive.

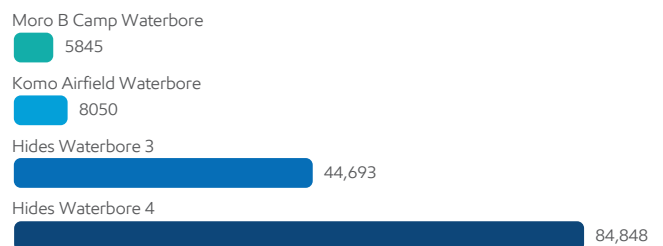
6.3 Water

Groundwater, seawater and surface streams provide water used for production purposes. EMPNG monitors the amount of water extracted from these sources to ensure conformance with permitted extraction volumes. The quality of extracted water for consumption is confirmed through regular testing. Processed wastewater is checked to ensure it complies with Environment Permit requirements before discharge.

6.3.1 Consumption

Water is used for worker camps, dust suppression, safety showers, fire water systems and maintenance activities. Freshwater is extracted from groundwater and surface streams for use in the Upstream area, while LNG Plant operations use seawater. Figure 6.1 shows freshwater volumes taken from each groundwater extraction source in 2018.

Figure 6.1 Groundwater extraction: Volume (kilolitres) by extraction source for 2018



Approximately 143,430 kilolitres of groundwater was extracted for use in the Upstream area during 2018. This was an increase compared to 116,760 kilolitres of groundwater extracted in 2017 due to the increased number of workers on-site, along with the need to extract additional water to supplement supply while one of the Hides wells was offline following the earthquake.

| Image opposite: Reinstatement work in the Upstream area



| Environmental Specialist, Anzlyyn Neil, undertaking water sampling at the tidal flats on the shore of the LNG Plant site

An analysis of water quality showed the extracted groundwater complied with EMPNG's raw water quality criteria. No water was extracted from surface streams in 2018.



| One of two 260-cubic metre potable water tanks at the LNG Plant

At the LNG Plant, some 622,800 kilolitres of seawater was extracted to supply the desalination plant. This generated almost 87,400 kilolitres of potable water for production use.

6.3.2 Water quality monitoring

In January 2018, a back-up wastewater treatment plant was brought online at the LNG Plant Camp while the main treatment plant was undergoing maintenance. During this time, two non-conformances were raised for elevated ammonia nitrogen levels. All other discharge parameters were within criteria.

Groundwater monitoring conducted at the LNG Plant in May 2018 indicated elevated faecal coliform levels at three groundwater wells.

Sampling protocols were reviewed to verify the accuracy of these results. Monitoring conducted at three wells during the second half of the year showed that they were operating within criteria. Elevated faecal coliform readings were identified at two groundwater wells near the LNG Plant landfill. Follow-up sampling of wells near the landfill and laboratory verification is scheduled for the first half of 2019.

Ten non-conformances were recorded for ammonia nitrogen, oil and grease, total suspended solids and methyl-diethanolamine exceedances at the LNG Plant's dissolved air flotation unit during 2018. This occurred following a change in the unit's operating conditions, combined with the effects of maintenance work. EMPNG continues to monitor and adjust the process system operating conditions, including during maintenance periods. The adjustments are designed to result in better separation of dissolved oil and less system fluctuations.

Two non-conformances were recorded at the LNG Plant retention pond in early 2018 for elevated pH levels, dissolved oxygen, chemical oxygen demand and faecal coliforms. These were due to algae photosynthesis, which raises pH levels. To help manage these parameters, the pond is being operated to maintain active water flow and algae has been manually removed.

Fortnightly sampling conducted since August showed that the levels had stabilised at the retention pond.

External laboratory verification of sampling results will occur in the first half of 2019.

Monitoring at the LNG Plant mixing pit during the first half of 2018 found elevated levels of pH, faecal coliforms and chemical oxygen demand, which was recorded as an incident. In the second half of the year, pH and chemical oxygen demand levels were below criteria while faecal coliforms remained elevated. To address this, algae in the mixing pit was removed manually.

The non-conformance for HGCP stormwater discharge, which was recorded in 2017, remained open in early 2018 as total suspended solids and turbidity were expected to continue to exceed criteria until the installation of sediment controls was completed. Erosion control materials such as biodegradable coconut fibre logs, silt curtains and sandbags were installed during the year, but follow-up sampling showed that total suspended solids and turbidity levels remained elevated, triggering two non-conformances during the annual stormwater sampling program. Corrective actions, such as re-evaluation of the location of the coconut fibre logs and maintenance works that could mitigate or avoid sedimentation, are being undertaken.

A non-conformance was reported for faecal coliforms at a Hides Waste Management Facility retention pond during the first half of 2018. Water was observed to be leaking from a crack caused by the earthquake. The pond contents were transferred to another contained pond while repairs were conducted. A second non-conformance was recorded at the Hides Waste Management Facility later in the year when elevated suspended solids were recorded during annual stormwater sampling.



EMPNG's Environment team inspects the Hides Waste Management Facility retention pond

One non-conformance was reported for elevated faecal coliforms at the Moro B Camp wastewater treatment plant in the first half of the year. The wastewater treatment plant operators were notified and corrective actions implemented. Follow-up sampling was within criteria.

In July, the HGCP wastewater treatment plant recorded one non-conformance for elevated faecal coliforms at the plant and one non-conformance in the receiving environment, which was also recorded as an incident.

Highlight: Graduate engineer joins Environment team

Jocelyn Narokai from the Autonomous Region of Bougainville is among the engineering graduates who joined EMPNG in 2018. Jocelyn completed a Bachelor of Civil and Environmental Engineering with the Queensland University of Technology, Australia in 2017.

She said she is enjoying her current role with EMPNG as Environment Advisor, focusing on air quality.

"I think EMPNG has made a significant commitment to environmental management. The company works hard to comply with and, in some areas, exceed expectations of government laws and regulations. They also look to push good policies like recycling and waste reduction strategies at its sites," Jocelyn said.

Prior to her new role with EMPNG, Jocelyn worked in both transport engineering and civil engineering consultancy capacities.

"I'm interested in using the opportunity of working with EMPNG to further develop my project management skills," she said.

"I also like the construction side of things so long-term I'd like to move back into that sort of role, whether it's working in an oil and gas expansion capacity, or the more traditional civil construction side of the industry."

Jocelyn said that, while oil and gas was traditionally a male-dominated industry, she could see the culture changing.

"It is becoming more welcoming of women and the industry is trending towards ensuring workplaces are safe and equal for everyone," she said.

"There are more and more female role models to look up to, and the men as well are actually very encouraging and willing to help you and look out for you. If you have an interest in the industry then work hard because this is an industry that's always changing and always has opportunities available."



Environment Advisor, Jocelyn Narokai

However, follow-up laboratory analysis that month showed all levels were within criteria. A further non-conformance for elevated faecal coliforms was recorded in October. Levels continue to be monitored to assist effective operations.

6.4 Materials management

EMPNG aims to avoid impacts from the use of raw materials wherever possible and undertakes review processes when sourcing materials. Some aggregate and timber is occasionally needed for repair works, general maintenance or special projects.

During 2018, a Lanco was engaged to supply 5748 cubic metres of limestone from the Mana/Hegero Quarry for maintenance and repair of access roads to the Main Line Valves at Kilometre Points 66 and 85. Another 400 cubic metres of limestone was sourced from Para Quarry for road maintenance and erosion repair works at the HGCP, while 840 cubic metres of limestone was purchased from the Gobe 2000 Quarry for Gobe to Kantobo road maintenance works.

The Mana/Hegero and Para quarries are operated by Lancos, and the Gobe 2000 Quarry is operated by Oil Search Limited, under their own environment permits.

EMPNG purchased 32 cubic metres of rock, 6 cubic metres of sand and 517 cubic metres of concrete from a Lanco for construction of the pipeline integrity gauge receiver and security fence upgrade works at the HGCP along with maintenance and earthquake recovery works throughout the Upstream area. An additional 156 cubic metres of concrete was purchased for the Angore Gathering System.

At the LNG Plant, 138 cubic metres of concrete, 30 cubic metres of road base, 15 cubic metres of sand and 1.8 cubic metres of timber were sourced from third party suppliers for upgrades to camp facilities and general site improvements.

Approximately 59 cubic metres of concrete, 15 cubic metres of rock, 2900 cubic metres of sand and road base and 40 cubic metres of timber were purchased from third party suppliers for the Power Plant Fuel Gas Piping project.

6.5 Waste management

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

A waste register managed by an approved third party waste contractor is used to document waste received at EMPNG processing facilities. The register includes information on waste transfer numbers, waste classifications, quantities and treatment or disposal methods.

During 2018, EMPNG assessed four third party waste contractors in Lae and three in Port Moresby, with four of the seven companies approved to process production waste. The approved companies are being used to recycle scrap metal and restricted waste such as used batteries.

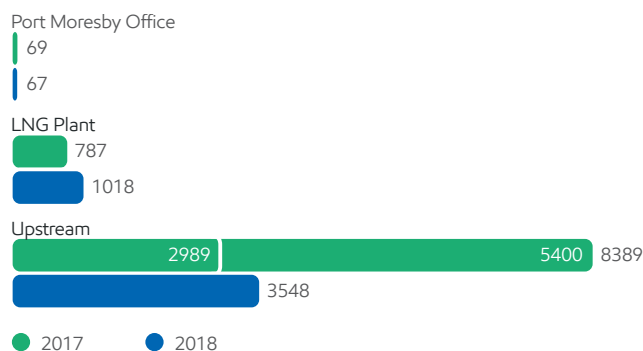


EMPNG's main waste management contractor with the members of the EMPNG Safety team

In the Upstream area, waste volumes increased slightly during 2018 compared to 2017. This comparison excludes the once-off 5400 tonnes of waste generated in 2017 from the demobilisation of the Komo Camp. The increase in 2018 was due to waste resulting from earthquake damage.

Figure 6.2 shows waste volumes produced at both the Upstream area and LNG Plant in 2018 compared to the waste volumes for 2017.

Figure 6.2 Generated waste: Weight (tonnes) by source



No waste related non-conformances were raised in 2018.

Almost 83 tonnes of scrap metal and 11 tonnes of light plastics were sent to an approved third party Papua New Guinean recycling facility during the year. Another 66 tonnes of hazardous wastes, such as solvents, chemicals and additives, were transported to Australia for appropriate disposal.

Approximately 40 tonnes of used batteries were sent to a newly-approved third party battery recycling company that operates in Lae and Port Moresby.

Almost 30 tonnes of waste oil were sent to approved third party facilities for reuse in the first half of the year.

No waste oil was sent for reuse during the second half of the year because the third party waste oil receiver based in Lae was upgrading spill prevention measures recommended by EMPNG. The facility will begin receiving waste oil once corrective actions have been completed.

The domestic waste incinerator at the LNG Plant continues to process production waste, with approximately 73 tonnes of waste from the LNG Plant and Port Moresby office processed in 2018. The incinerator was offline later in the year due to a control panel malfunction.

Approximately 700 tonnes of waste from the LNG Plant and Port Moresby office was sent to landfill.

The high temperature incinerator at the Hides Waste Management Facility remained out of operation in 2018 due to a corroded fan duct. EMPNG is replacing the unit with a new biohazardous waste incinerator and an industrial waste incinerator. The biohazardous waste incinerator was installed at the end of the year and will be commissioned in early 2019.

The industrial waste incinerator will be installed and commissioned during the first half of 2019.

While the Hides Waste Management Facility incinerator was shut down, approximately 140 tonnes of waste was disposed of using the incinerator at Oil Search Limited's Iagisu Ridge Camp and almost 3200 tonnes of waste was sent to landfill.

The Oil Search Limited incinerator was damaged during the earthquake and was unable to process waste from Moro B Camp. In May, Moro B Camp waste was sent to the Hides Waste Management Facility for processing.

By the end of 2018, 100 tonnes of non-restricted waste were transferred from Moro B Camp to the Hides Waste Management Facility.

A new domestic sludge dewatering unit was delivered to Moro B Camp in late 2018 and will be installed and commissioned in early 2019.

At the end of the year, approximately 16 tonnes of non-restricted waste and 130 tonnes of restricted waste was stored at the HGCP awaiting recycling or appropriate disposal. The main non-restricted waste is used tyres. Stored restricted waste mainly consists of waste oil and used batteries for recycling in Lae and oily rags and paint waste that will be disposed in the Hides Waste Management Facility incinerator once it becomes operational.

Highlight: Keeping a clean house



In January, the LNG Plant site launched the *Tenkyu tru long kam long haus bilong mipela* or 'Welcome to Our House' initiative to support the ongoing preservation of the local environment. The initiative included the formation of the Clean Green team consisting of 35 leaders from 17 workgroups across the site. This team of environmental champions is responsible for implementing the Welcome to Our House initiative and promoting it through regular environmental discussions during toolbox talks.

Welcome to Our House also involves the organisation of bus tours for workers to visit environmental monitoring sites such as mangrove swamps, wildlife zones and culturally important areas, as well as waste management facilities. The tours aim to promote clean green behaviours to the workforce.

Throughout the year, LNG Plant site workgroups have supported the initiative through activities such as local clean up campaigns and the reduction of single use plastic onsite.

For example, LNG Plant site teams

were involved in a community clean up and tree planting at Boera Village for World Environment Day on 5 June.

EMPNG Environmental Advisor, Nicole Yasi, said additional activities were planned for 2019 to further drive environmental efforts at the LNG Plant and with local communities.

"We're excited to see where 2019 takes us. We plan to have more clean-up days, site tours and waste collection activities in nearby villages," she said.

| Members of the Clean Green team



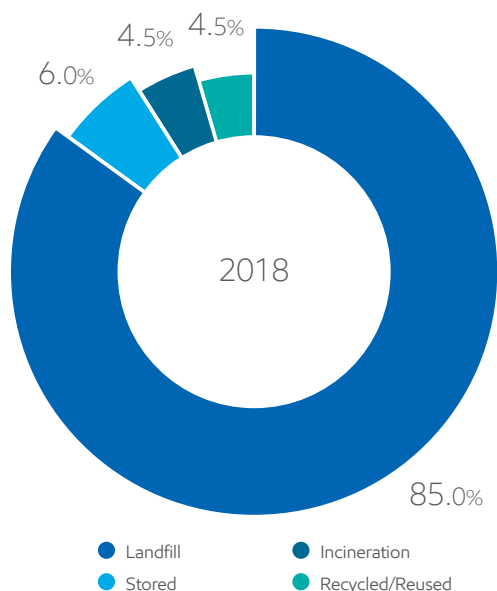
HGCP workers ready to commence a monthly clean-up of worksites and camps

Smaller quantities of other restricted waste is stored on-site until it can be transported for off-site disposal. This waste includes oil filters, toner cartridges, solvents and chemicals, aerosols, fluorescent tubes and contaminated soil.

At the LNG Plant, more than 84 percent of waste stored on-site consists of scrap metal, plastics, used batteries and waste oil for recycling.

The predominant waste type during 2018 was general office/ accommodation refuse, sanitary sludge, food waste and construction and demolition waste. Some construction and demolition waste was attributable to earthquake damage and recovery. The predominant disposal method continues to be on-site landfill. Solid waste disposal methods used during 2018 are shown in Figure 6.3.

Figure 6.3 Waste disposal: Percentage by disposal method



Liquid food composters are continuing to process food waste, with approximately 34 tonnes of waste processed at the HGCP and approximately 80 tonnes processed at the LNG Plant during 2018. Liquid food composters are fully enclosed automatic commercial bio-digesters that compost solid and liquid food waste within 24 hours into greywater that is safely released to the sewage system for further treatment.

During 2018, HGCP workers introduced a regular local clean-up campaign to reduce single-use plastic on-site. Some also participated in community litter management programs, such as the *Yumi Klinim Komo* or 'We Clean Komo' events.

6.6 Spill prevention and response

EMPNG has plans and procedures in place to reduce the likelihood and impact of spills.



Setting-up temporary waste storage for recovered oil and wastewater during a shoreline response drill

During 2018, 57 low-level spill incidents involving 43 hydrocarbon spills, nine wastewater and five chemical spills were recorded. Most of these spills were less than 5 litres and occurred at the HGCP, with four hydrocarbon and five wastewater spills at the LNG Plant. One chemical spill of 1000 litres was recorded at the Hides Waste Management Facility when condensate pump wash water containing a small amount of dissolved chemicals was accidentally discharged to the facility's reed bed. All spills were responded to quickly and appropriately, resulting in no significant environmental impact. EMPNG and its contractors continue to conduct dedicated spill prevention toolbox talks with their relevant work teams. Thirteen near misses were recorded during 2018 involving potential spills to impermeable surfaces.

No spill response drills were conducted in the first half of the year, primarily due to earthquake response activities.

Highlight: Drill aids complex spill response

More than 20 EMPNG employees participated in a complex major spill response exercise that spanned both Lea Lea and Papa villages during 2018.

The exercise included the first deployment of a Rigid Inflatable Boat in a river and open sea environment, deployment of a shoreline collection boom at Kahiru Beach in Papa Village, and deployment of an Exclusion Boom along Lea Lea River in Lea Lea Village.

Lessons learned from the spill response scenario included ensuring personnel who are assigned to oil spill response and emergency preparedness complete the Shoreline Site Supervisor Course and to conduct the same spill response exercise with another shift of workers to ensure consistency in oil spill response knowledge. These and other lessons learned will be incorporated into EMPNG's emergency response plans.



Deploying the boom during an oil spill response exercise in August

In the second half of the year, three field-based spill response drills were conducted. The scenarios covered a fuel depot spill at the HGCP, a shoreline response at Caution Bay and protection of sensitive resources along Lea Lea River located on the northern portion of the LNG Plant Marine Terminal jetty.

Oil spill tactical response plans were also developed for earthquake recovery works. These plans covered scenarios and associated emergency response information including access, sensitivities and response objectives, for various sections along the ROW where earthquake recovery works were planned.

6.7 Reinstatement, erosion and sediment control

Throughout 2018, repair works were conducted on erosion and sediment control measures at the HGCP, Hides wellpads, Hides Wellpad Access Road, Komo Airfield and Kutubu Main Line Valve Station following damage caused by the earthquake. Works included clearing landslip material, identifying and sealing ground surface cracks, clearing sediment from drains and stormwater culverts and repairing batters.

Geotechnical engineers were also engaged to survey the HGCP, pipeline ROW and associated above ground infrastructure, Hides and Angore spines and wellpads and the Kubutu Spurline and associated roads and bridges. Based on results of the surveys, a geotechnical drilling program commenced along the pipeline ROW towards the end of 2018. Information obtained during the drilling program will be used to design more extensive repair works required at specific sections of the pipeline ROW.

Maintenance works were completed on the Hides Spine at Kilometre Points 4 and 22, along the pipeline ROW between Kilometre Points 38 and 41 and at Kilometre Points 61, 64, 180, 182 and 197 during the year. Maintenance included identifying and sealing ground surface tension cracks, clearing vegetation and silt from berms and drainage outlets, reinforcing drainage outlets, installing additional erosion controls, constructing additional berms and re-contouring existing berms.

At the HGCP, sediment control measures were installed along drainage lines, with regular inspection and maintenance of these structures conducted. Monthly monitoring of temporary erosion and sediment control measures installed along the greenfield section of the pipeline ROW associated with the Angore Gathering System was suspended due to security restrictions in the Upstream area. However, aerial reviews did not identify any key areas of instability along this section of the pipeline ROW.

6.8 Invasive species, pests and plant pathogens

EMPNG has engaged tropical ecology specialists from The New Guinea Binatang Research Centre to revise the company's weed monitoring method and conduct field surveys in the Upstream area along the pipeline ROW. The revised monitoring method involves field teams walking 100-metre transects, as shown in Figure 6.4, to identify weed species on the pipeline ROW. Data gathered using this transect approach is intended to improve data analysis and trending of the diversity and distribution of weed species along PNG LNG's footprint and across the elevation zones traversed by the project.



Deputy Director, Dr Francesca Dem (right) and Botanist, Kenneth Pokam, from The New Guinea Binatang Research Centre during the 2018 weed audit

Figure 6.4 Weed monitoring transects at Kilometre Point 111 within the Mubi River to Lake Kutubu weed management zone



The 2018 survey covered 108 transects across 54 hectares and all elevation zones of the Upstream area. Some sites could not be monitored because of security restrictions in the Upstream area. Eighty-five weed species were recorded in the 2018 weed monitoring survey, with weed populations remaining stable.



A weed auditor from The New Guinea Binatang Research Centre monitoring a transect along the pipeline ROW between Mubi River and Lake Kutubu

Of the five most common weed species, Priority 1 weeds *Piper aduncum* and *Desmodium uncinatum* became less abundant, while Priority 3 weeds *Crassocephallum crepidoides*, *Paspalum conjugatum* and *Agecatum comyzoides* showed decreasing or stable abundance. Mid-altitude sites of between 1000 and 1500 metres had the highest diversity of weeds.

EMPNG's Cane Toad Management Procedure was updated during 2018 as part of the company's cane toad management program.

The program encompasses awareness raising, prevention and the control of cane toads (*Rhinella marina*) across all life cycle stages from eggs through to tadpoles and adult toads.

Education about cane toads was conducted with workers in the Upstream area in the second half of the year to enable effective cane toad management.

Educational materials and a training program have been developed in both English and Tok Pisin for EMPNG workers, contractors and local communities. These materials include cane toad sighting cards that were distributed to HGCP workers in November.

6.9 Regeneration monitoring

Monitoring conducted along the pipeline ROW and at the LNG Plant site during 2018 found ongoing slow progression of natural regeneration with further improvement of ground cover and the development of mangrove trees.

An analysis of results from the 2017 regeneration monitoring survey was completed during 2018. The analysis found that regeneration remained the same between 2015 and 2017.

A decrease in the density of seedlings and an increase in the density of saplings observed between the 2015 and 2017 surveys indicated a positive transition towards the young secondary forest benchmarks.

The next survey is scheduled to be completed by the New Guinea Binatang Research Centre in 2019.

6.10 Access control

An access control system at EMPNG security checkpoints collects data on the number and types of vehicles using EMPNG-controlled roads. The reasons for vehicles using these roads is also recorded.

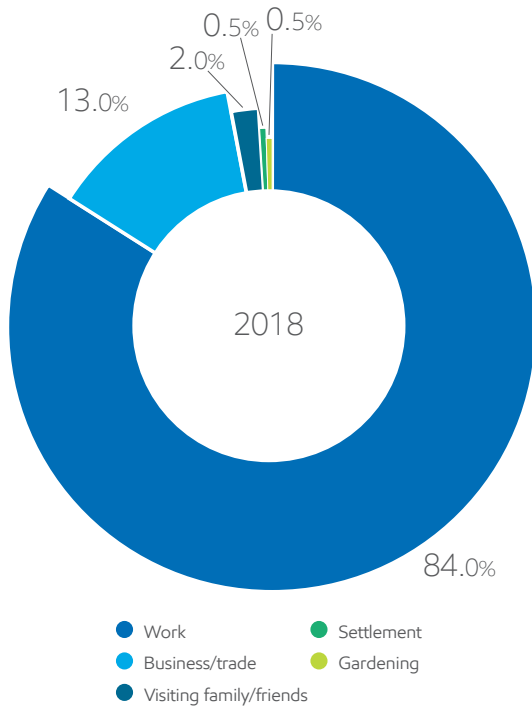


An access road between Kaiam and Gobe

During 2018, 1247 vehicles used EMPNG's roads, which is a slight increase compared to 1030 in 2017 because of access required by EMPNG, Oil Search Limited and Government vehicles for earthquake relief efforts. The number of private vehicles using EMPNG controlled roads decreased in 2018 compared to 2017.

Work, including earthquake recovery, was the primary reason for access during 2018 as shown in Figure 6.5. The type of vehicles entering EMPNG-controlled roads is shown in Figure 6.6.

Figure 6.5 Purpose of access: Percentage of traffic using EMPNG controlled roads by purpose

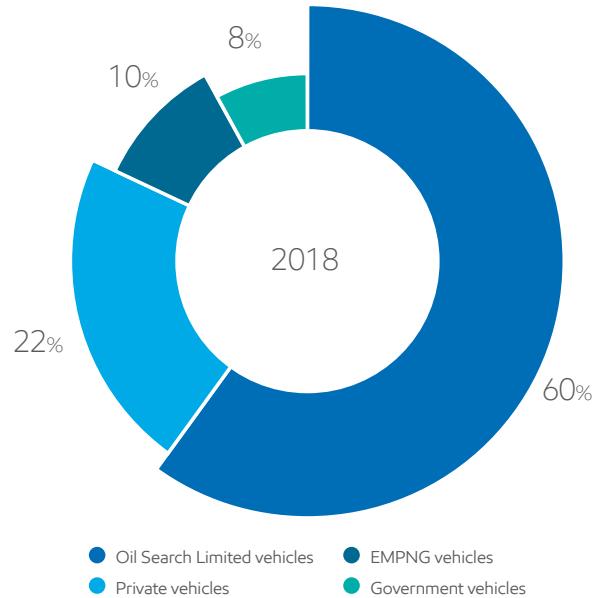


Aerial patrols were completed along the pipeline ROW in 2018, with no signs of logging occurring adjacent to ROW infrastructure. Burnt grass was observed between Kilometre Points 10 and 18. EMPNG is working with communities to reinforce the message that burning of vegetation along

the ROW is prohibited and a condition of Clan Caretaking Agreements.

A security checkpoint continues to operate at the Hides Wellpad Access Road to manage access to EMPNG's Hides facilities.

Figure 6.6 Vehicle types: Percentage using EMPNG access points



6.11 Quarantine management

For all freight imported into Papua New Guinea, EMPNG and its contractors ensure compliance with National Agriculture Quarantine and Inspection Authority procedures and regulations.

EMPNG received 935 shipments in 2018. Of these, 259 shipments (28 percent) were inspected and 44 of the inspected shipments (17 percent) required re-fumigation to comply with the Authority's standards.

There was an increase in the number of shipments received in 2018 compared to the previous two years because of materials required for earthquake relief and recovery works.

6.12 Cultural heritage

EMPNG respects the culture and history of communities located near production facilities.

During the construction of PNG LNG, measures were developed and implemented to manage known cultural heritage resources and chance finds, such as unknown archaeological sites.

Known sites were subject to either salvage activities or protection from disturbance by construction activities.

Chance finds were recorded and either monitored or artefacts were transferred to the Papua New Guinea Museum and Art Gallery, in accordance with a protocol agreed with the Papua New Guinean Government and in close consultation with local communities. An example of a chance find is Lapita pottery shards found at the LNG Plant site during construction.



| Cultural heritage is respected and celebrated throughout Papua New Guinea

Refer to *Case study: Significant archaeological find at LNG Plant* for further information.

Following construction, the protection of cultural heritage remains a priority for EMPNG. As such, cultural heritage aspects are included in employee inductions and toolbox talks and addressed through specialised training.

During 2018, ongoing cultural heritage awareness training was provided to the construction team working on the Angore Gathering System, HGCP workers and the Pipeline Operations team at Moro B.

6.12.1 Pre-construction surveys

Pre-construction surveys are undertaken prior to construction activities to identify potential cultural heritage sites that may require preservation, or mitigation measures developed in partnership with local landowners.

In November, pre-construction surveys were conducted at the LNG Plant for a project to direct gas from the LNG Plant to a neighbouring gas power plant facility referred to as the Power Plant Fuel Gas Piping project. The surveys focused on the project's temporary transmission line corridor. Within this corridor, 15 archaeological sites were recorded that contained shells, flake scatters and pottery shards but none were of high significance.

6.12.2 Chance finds

EMPNG conducts site inspections to identify the presence of chance finds before and during ground disturbance activities. No chance finds were discovered in 2018.

Case study

Significant archaeological find at LNG Plant

The LNG Plant site is home to one of the most important archaeological finds ever made in mainland New Guinea.



Lapita pottery from approximately 2500 years ago found at the LNG Plant site

Evidence of Lapita pottery, dating between 2400 and 2900 years old, was discovered at seven sites at the LNG Plant. This ancient pottery was discovered during the construction phase following 50 years of searching by archaeologists.

The pottery was made by the Lapita people who lived in the western Pacific Islands approximately 3200 years ago. These sea faring people are renowned for their extensive travels across the Pacific Islands where they conducted trade over long distances.



Lapita pottery fragments found at the LNG Plant site

EMPNG Field Environment Specialist and archaeologist, Julia Hagoria, said the Lapita pottery discovery was one of the most significant finds ever made in mainland New Guinea.

“This discovery effectively re-writes the history of the Motuan people who, up until this point, could not be linked for certain to the Lapita migrations despite having the characteristics of the Lapita people, such as being sea-going and speaking Austronesian languages,” Julia said.

Archaeological discoveries of Lapita pottery in southern Papua New Guinea are helping to provide a better understanding about the cultural history of the Torres Strait and northeast Australia. Evidence of pottery making and seafaring in this area indicates the presence of early pottery trading between these regions.

In addition to Lapita artefacts, many stone relics, shell deposits and other archaeological remains dating back to 1700 BCE have been found at some of the archaeological sites, which pre-dates the arrival of the Lapita people.

Throughout the construction phase and during production, EMPNG has implemented measures to protect and preserve cultural finds and has contributed to Papua New Guinea’s archaeological history through the discovery, salvage, preservation and documentation of relics at project sites.



An excavation site at the LNG Plant uncovered during the construction phase of PNG LNG

Including the seven Lapita archaeological sites, EMPNG has documented almost 3000 cultural heritage sites and relics across the PNG LNG area.



34 frog **12** rodent **26** bat species
recorded in biodiversity field survey

>1000 people
from 9 villages
participated in
resource mapping

4 students received
Masters in Conservation
Science scholarships

80+
camera traps
deployed

7 Biodiversity

EMPNG is committed to safeguarding the unique biodiversity in Papua New Guinea, in particular, biodiversity values in the Upstream area.

EMPNG has developed a Biodiversity Strategy, which is the over-arching document that provides guidance on how biodiversity is managed for PNG LNG. The Biodiversity Strategy includes a Biodiversity Offset Program and its five components. The Biodiversity Implementation and Monitoring Program outlines the monitoring activities EMPNG are implementing to achieve its Biodiversity Strategy objectives. Progress on the components of the Biodiversity Offset Program and the Programmed Monitoring Activities (PMAs) during 2018 follows.

7.1 Biodiversity Offset Program

The Biodiversity Offset Program consists of five components:

- 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.

Components 1, 2 and 3 provide the foundation for delivery of sustainable conservation outcomes through capacity building at the national and regional levels. Components 4 and 5 deliver on-the-ground conservation outcomes by enhancing the protection of existing conservation areas or by establishing new protected areas.

Through Component 1, EMPNG has been supporting CEPA with developing a Protected Area System Plan for the Kikori River Basin.

EMPNG engaged the Wildlife Conservation Society to lead the delivery of this Component because of its expertise in regional conservation planning. In 2017, the Wildlife Conservation Society completed the conservation priorities for the Kikori River Basin with the publication of a technical report about optimal conservation areas in Papua New Guinea. With this technical report complete, the requirements of Component 1 have been met.

Component 2 aims to support CEPA with its implementation of the National Biodiversity Strategy and Action Plan, which was launched in 2007.

The National Biodiversity Strategy and Action Plan enables Papua New Guinea to meet its obligations under the *Convention on Biological Diversity* and other multilateral agreements.

In March 2018, 75 conservation representatives from the Papua New Guinean Government, local communities and industry, and development agencies participated in a Communicating Conservation meeting. The meeting was held just prior to World Wildlife Day at the Port Moresby Nature Park.

Discussions focused on community-based marine conservation initiatives such as turtle conservation in Madang and Milne Bay, gender roles in conservation decision making, capacity building, and implementation of Papua New Guinea's protected areas policy. The key message from the meeting was that conservation efforts need to include local communities and address community aspirations.

A second Communicating Conservation meeting was held in Port Moresby in October.

The meeting attracted 150 participants who discussed topics such as breaking down cultural barriers in conservation decision making, the challenges of conservation at the community level, funding challenges and continued dialogue between community conservation practitioners and CEPA. The key message from this meeting was 'Conservation is a personal voyage for many and is also everybody's business'.

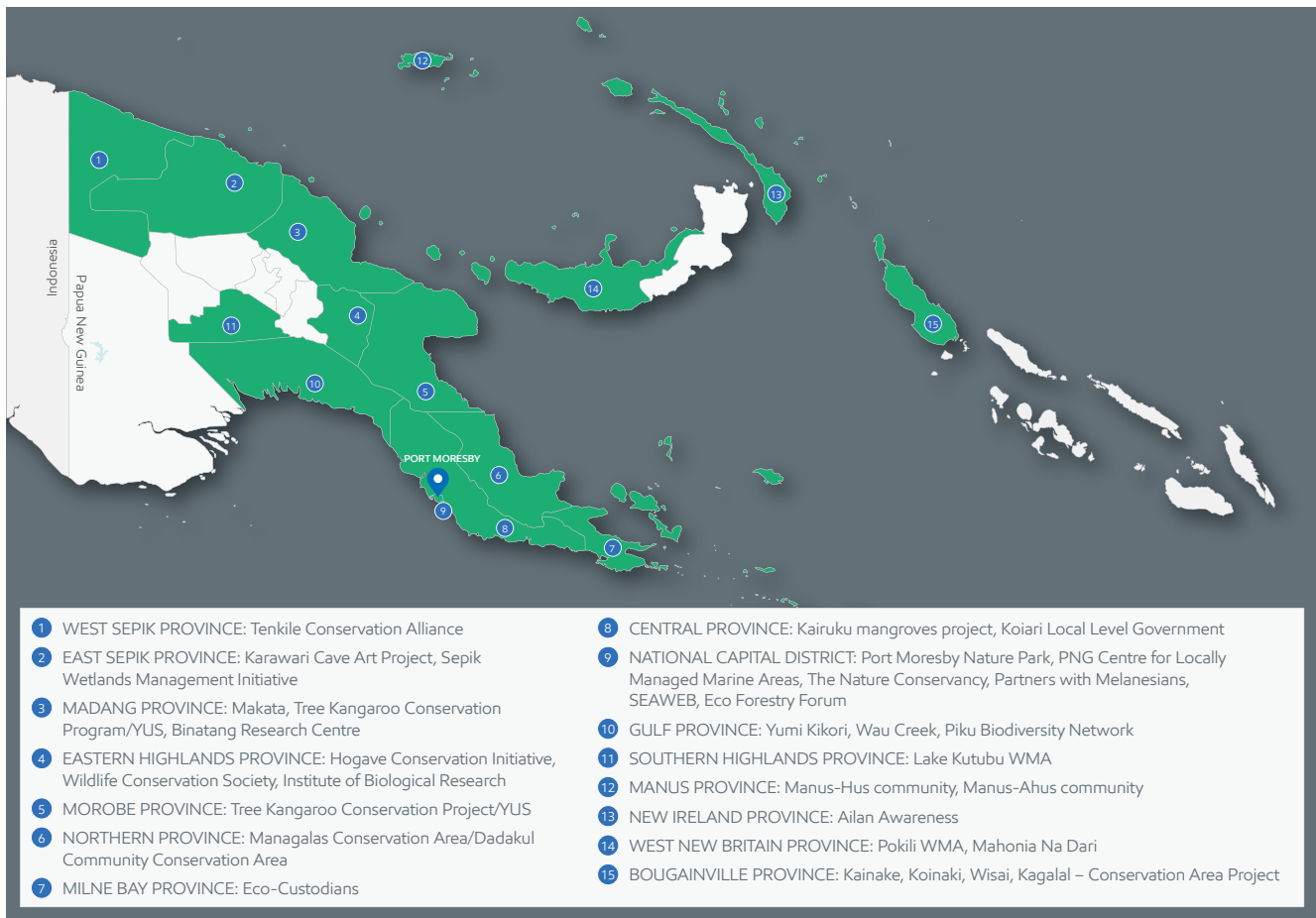
Communicating Conservation meeting participants represent conservation organisations from 15 Papua New Guinea provinces as shown in Figure 7.1.



Communicating Conservation meeting participants at Port Moresby Nature Park

Image opposite: The Papuan dwarf kingfisher (*Ceyx solitaries*) inhabits the New Guinean rainforest where it hunts for invertebrates and frogs

Figure 7.1 Geographic location of the conservation organisations participating in the Communicating Conservation meeting



These include: Makata, which is responsible for community conservation of leatherback turtles in the Bogia area of the Madang Province; Ailan Awareness, an organisation based in New Ireland that promotes community conservation; Eco-Custodians, that are based in Milne Bay and use traditional conservation methods to manage important marine resources; the Koinaki Conservation Area in Southern Bougainville; the Manus-Hus community, which is an island community actively involved in resource management as a climate change adaptation strategy; and the new Managalas Conservation Area, which focuses on the protection of the Queen Alexandra's birdwing butterfly (*Ornithoptera alexandrae*).

Meeting participants also attended a two-day biodiversity conference, which EMPNG hosted in partnership with CEPA and the Japanese International Cooperation Agency. The conference covered biodiversity research in Papua New Guinea, protected area management and conservation challenges. A key outcome from the conference was an identified need for ongoing conservation and biodiversity-focused meetings that bring together government, academia and the private sector.

Three issues of *Biodiversity Digest*, a newsletter communicating conservation practices in Papua New Guinea, were produced by the Mama Graun Conservation Trust Fund during 2018.

Under Component 3 of the Biodiversity Offset Program, the University of Papua New Guinea finalised course programs for

a Postgraduate Diploma and a Masters degree in conservation management in partnership with EMPNG and the Mama Graun Conservation Trust Fund.

The first recipients of the Masters in Conservation Science scholarship commenced their studies in 2018. Nigel Baro began his studies on the impact of urbanisation on traditional ecological knowledge, Esthel Gombo is focusing on the impact of climate change on food crop productivity, Naomi Vincent is studying environmental impacts on coral reef and adjacent ecosystems and Barbara Masike is researching the role of women in community mangrove management.



EMPNG Managing Director, Andrew Barry (centre), with scholarship recipients (from left) Nigel Baro, Esthel Gombo, Naomi Vincent and Barbara Masike at a celebratory morning tea held in February 2018

Ten Bachelor of Science Honours and Postgraduate Diploma students also began their first year of studies in 2018.

Component 4 intends to enhance the capacity of the Lake Kutubu Wildlife Management Area (WMA), which is managed by the Lake Kutubu WMA Committee, comprised of community members. Lake Kutubu WMA activities were deferred in the first half of 2018 because of extensive earthquake damage to roads and houses, and numerous landslips and cracks within the Lake Kutubu landscape.

In June, the Lake Kutubu WMA Committee spent three days working on a United Nations Development Program small grant application for a local livelihood support project. The Committee subsequently received a PGK150,000 (US\$46,425) grant in September.

As part of World Environment Day, the Lake Kutubu WMA Committee organised a community clean-up of Moro, Kaimari and the ring road around Lake Kutubu. During the clean-up they asked community members to help reduce and manage plastic litter around Lake Kutubu.

The Lake Kutubu WMA Committee participated in the annual Kutubu Kundu and Digaso Festival with an information booth for the third consecutive year. They also organised and hosted a *kenu* or 'canoe' race for the second consecutive year. The Lake Kutubu WMA Committee used the opportunity to promote their objectives for Lake Kutubu as a Ramsar site.



Members of the Lake Kutubu WMA Committee at the Kutubu Kundu and Digaso Festival



A *kenu* race at the Kutubu Kundu and Digaso Festival

Highlight: New damselfly species named after EMPNG Biodiversity Advisor

A new species of damselfly, discovered during an EMPNG biodiversity survey in the Kikori Basin, has been named after EMPNG Biodiversity Advisor, Dr Jane Mogina.

The damselfly, *Nososticta moginae*, was discovered during biodiversity surveys conducted in the Upstream area in mid-2017. It was officially named in early 2018 in recognition of Dr Jane Mogina's contribution to the preservation of biodiversity and advancement of biodiversity programs in Papua New Guinea.

Dr Jane Mogina has dedicated her career to biodiversity protection in Papua New Guinea. Prior to leading biodiversity programs for EMPNG, she was the Executive Director of the Papua New Guinea Mama Graun Conservation Trust Fund, which provides funding to support protected areas in Papua New Guinea and priority sites in the Solomon Islands.

Naming of the new damselfly species involved a rigorous process that included: a comparison of the new species with other related damselflies; the development of a detailed academic research article about *Nososticta moginae* that had to comply with international requirements outlined in the International Code of Zoological Nomenclature; a scientific peer review of the article from independent qualified researchers; and publishing of the final approved research article in an internationally recognised and relevant academic journal.

Dr Jane Mogina said the discovery of the new species was exciting for biodiversity in Papua New Guinea. "The fact that we continue to discover new species and find good numbers of known species of flora and fauna, means our biodiversity programs are working," she said.

"I feel extremely honoured to have this damselfly species named after me. It has been so rewarding to be part of the team that developed EMPNG's biodiversity program and to see that program coming to fruition."

Nososticta moginae is currently known only to inhabit the Kikori Basin, where males and females were encountered in sunny patches along small, clear and shallow streams flowing through primary lowland forest at Wau Creek.



Nososticta moginae



Women and youths were included in resource mapping discussions at villages in lower Kikori

Ramsar is a global organisation that manages the *Convention on Wetlands of International Importance Especially as Waterfowl Habitat* (Ramsar Convention). Lake Kutubu became a registered Ramsar site in 1998.

Component 5 aims to help establish new community-based protected areas in the Upstream area that are representative of the biodiversity values recognised by EMPNG.

No activities were conducted in the first half of the year due to logistics challenges following the earthquake.

In August, community engagements were conducted with 10 villages in the lower Kikori River region.

The first meeting was held in Kikori and involved community leaders from 10 villages among more than 300 attendees. This meeting addressed the CEPA process for establishing a protected area and the Kikori vision for conservation.



Some 300 people attended a community engagement in Kikori in August

Throughout the community engagements, more than 1000 people from nine villages participated in resource mapping.

Awareness on the lifecycle of barramundi, a valued food resource in the lower Kikori River region, was provided during the resource mapping sessions.



EMPNG Field Operations Manager, Kim Hahn, preparing to release a pig-nosed turtle at Uro Creek with the assistance of the community

In November, the Lower Kikori Biodiversity Survey report was delivered to the Babeio community and to local landowner Frank John, who has dedicated land at his Wau Creek property for the protection of the pig-nosed turtle (*Carettochelys insculpta*).

Resource mapping also continued with local communities and in principle land pledges for conservation purposes were obtained from five communities.

7.2 Biodiversity Implementation and Monitoring Program

The Biodiversity Implementation and Monitoring Program is supported by four PMAs.

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 involves field surveys to collect data, adjacent to and in the vicinity of the pipeline ROW and other PNG LNG facilities and infrastructure, relating to condition of focal habitats and significant ecological features.

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 Biodiversity Offset Program.

PMA4 monitors progress of the five components of the Biodiversity Offset Program to enable EMPNG to evaluate whether Objective 4 of the Biodiversity Strategy (identify, measure and offset significant residual impacts) is being achieved.

Progress was made on all four PMAs throughout 2018.

7.2.1 PMA1 – Remote Sensing of Broadscale Land Cover

An analysis of Landsat and high-resolution RapidEye satellite imagery captured during 2017 was conducted in 2018. The analysis showed no evidence of broadscale forest loss or degradation attributable to PNG LNG.

As a result of trends observed since 2009, the monitored area was adjusted to better represent the PNG LNG footprint while also including the entire Homa priority ecosystem.

New land cover classes were included in the imagery analysis and the reporting structure was changed to better reflect plans for future remote sensing monitoring.

Highlight: Papua New Guinea biodiversity results shared in Abu Dhabi



EMPNG's Biodiversity team shared results of biodiversity monitoring in Papua New Guinea with participants at the Society of Petroleum Engineers International Conference and Exhibition on Health, Safety, Security, Environment and Social Responsibility held in Abu Dhabi, United Arab Emirates in April 2018.

EMPNG's presenters, which included research scientist Stephen Richards from the South Australian Museum and ecologist and ornithologist, Dr Iain Woxvold from Museum Victoria in Australia, outlined EMPNG's Biodiversity Strategy and monitoring program.

Conference organisers selected the EMPNG presentation as a 'paper of particular interest'. They also summarised findings from biodiversity surveys that were conducted in Papua New Guinea to evaluate the impact of PNG LNG's construction and operations on the local environment.

The surveys confirmed ongoing high biodiversity values in the Upstream area. In addition to more than 500 known flora and fauna species, the surveys identified some 30 animals and plants that were previously unknown to science or known but yet to be scientifically described and named.

Fourteen species found during the surveys are listed in a category higher than Least Concern on the International Union for Conservation of Nature Red List of Threatened Species.

The EMPNG team of representatives at the International Conference and Exhibition on Health, Safety, Security, Environment and Social Responsibility

Front row (from left): EMPNG Medicine and Occupational Health Physician, Dr Cain Kapiri; EMPNG Biodiversity Advisor, Dr Jane Mogina; and EMPNG Environmental Advocacy Advisor, Isaac Jipsy Back row (from left): EMPNG Manager – Medicine and Occupational Health, Dr Nirven Kumar, Biodiversity Consultant, Steven Richards; EMPNG Environment and Regulatory Supervisor, Laura Ann Dresser; and Biodiversity Consultant, Dr Iain Woxvold

Highlight: Camera traps find rare species

A wide variety of rare and conservation-listed animals have been detected during the largest camera trap study ever to have been conducted in Papua New Guinea.

The animals were photographed on camera traps set at two sites on Hides Ridge and two sites on the Agogo Range near Moro as part of EMPNG's biodiversity monitoring program.

Eighty camera traps were used during a three-and-a-half-month survey conducted in 2017 to monitor bird and mammal diversity in the sample areas.

Animals triggered the cameras more than 21,000 times over approximately 6500 camera-days. Analysis of the camera trap images has resulted in more than 80 species documented, including the western montane tree kangaroo (*Dendrolagus notatus*) and Goodfellow's tree kangaroo (*Dendrolagus goodfellowi*), both listed as Endangered on the International Union for Conservation of Nature Red List of Threatened Species.

Other animals observed included the eastern long-beaked echidna (*Zaglossus bartoni*), the Papuan eagle (*Harpyopsis novaeguineae*), the small dorcopsis (*Dorcopsulus vanheurni*) forest wallaby, the pademelon (*Thylogale* sp.) wallaby, the New Guinea quoll (*Dasyurus albopunctatus*) and the Archbold's bowerbird (*Archboldia papuensis*).

The camera traps also confirmed the presence of animals that were not previously known to inhabit the Upstream area. For example, a population of greater ground robin (*Amalocichla sclateriana*) discovered on the upper slopes of Hides Ridge represents a range extension of more than 400 kilometres for this species.

The presence of many birds and mammals in good numbers on multiple cameras suggests that the forest remains in good health, including in areas immediately adjacent to EMPNG's production activities. The cameras will continue to be deployed to evaluate any trends in biodiversity in the Upstream area.



| Goodfellow's tree kangaroo (*Dendrolagus goodfellowi*)

The satellite imagery platforms will be changed for subsequent analysis from Landsat and RapidEye to Sentinel-2 for improved data quality and accuracy.

7.2.2 PMA2 – Condition Surveys of Focal Habitats and Significant Ecological Features

PMA2 monitors the ecological state of focal habitats and significant ecological features that had been avoided during construction.

In May 2018, 29 sites were monitored along the pipeline ROW and near other PNG LNG infrastructure.

Monitoring indicated that the condition of focal habitats and sensitive ecological features identified during pre-construction surveys remained intact with substantial vegetation regrowth.

A number of sites, including caves, streams and swamps, have become inaccessible due to dense vegetation regrowth.

Streams and caves within close proximity to settlements continue to be used by local community members. One site along the ROW near the road from Kikori to Gobe could not be assessed because of security issues in the area.

7.2.3 PMA3 – Biodiversity Surveys

An analysis of data collected from the 2017 biodiversity survey was completed at the end of 2018.

Thirty-four species of frogs were documented during the 2017 survey, of which nearly half remained undescribed. Twelve rodent species were identified, as well as 26 different species of bats.



| A male *Oreophryne flavomaculata* guards its eggs glued to a leaf in forest at Kilometre Point 107
| Photograph courtesy of Stephen J. Richards

The 2017 survey detected eight additional bat species to those recorded in 2015. This includes two species possibly new to science.

At the request of the Independent Environmental and Social Consultant, a survey of butterflies was added to the 2017 biodiversity survey.

Survey results showed that butterflies were not a reliable indicator species as trapping efforts, such as pollard walks along transects, fruit bait traps and paper lures, yielded low capture numbers. Therefore, monitoring of butterflies as an indicator species of forest status will be discontinued.

Highlight: First biodiversity book on Upstream area

EMPNG has published the first book that provides comprehensive biodiversity information for the Hela and Southern Highlands provinces in the Upstream area.

The book *Biodiversity Assessment of the PNG LNG Upstream Project Area* includes long term high biodiversity data sets for Papua New Guinea obtained through biodiversity information from a 2015 study in the Upstream area, as well as methods used to undertake biodiversity surveys.

At least 579 animal and plant species were documented during the surveys. This includes several dozen species that were previously unknown to science.

Biodiversity Assessment of the PNG LNG Upstream Project Area was presented to the Papua New Guinea Conservation and Environment Protection Authority (CEPA) during a biodiversity conference in October.

The book has also been made publicly available at www.pnglng.com/environment.



EMPNG General Manager – Safety, Health and Environment (right), Winnie Schubert, presenting a copy of *Biodiversity Assessment of the PNG LNG Upstream Project Area* to CEPA Director for Sustainable Environment Programs, Kay Kalim

The analysis also found that the forest adjacent to the pipeline ROW had retained its value for bats, and that the establishment of linear infrastructure clearings had no detectable impact on frog populations.

Data gathered through a combination of field surveys and camera traps in 2017 showed no evidence of any negative influence on the presence or behaviour of species surveyed.

7.2.4 PMA4 – Efficacy of Biodiversity Offsets

EMPNG continues to progress offset gains through work conducted within each of the Biodiversity Offset Program components.

An offset accounting methodology was developed during 2018 by an independent consultant.

The independent consultant verified PNG LNG's footprint and confirmed the accuracy of previously reported footprint information. The recommendations of the independent consultant were reviewed by the Independent Environmental and Social Consultant in November.



65
positive field
observations

“EMPNG has rigorous monitoring and evaluation tools in place to ensure that our operations comply with ESMP requirements.”

Winnie Schubert
General Manager – Safety, Health and Environment
EMPNG

7 regulatory
visits in 2018

Compliance with **>770** PNG
regulations and company
standards



8 Performance

Monitoring and evaluation tools enable EMPNG to determine the effectiveness of the ESMP and whether mitigation measures to manage production risks are achieving their intended outcomes.

8.1 Incidents

EMPNG’s incident management system outlines the company’s approach to managing incidents, which are defined as situations that have an unintended impact on a person’s health, safety, security or livelihood. A situation that impacts property, legal or regulatory compliance or the environment is also 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.

Incidents and near misses recorded during 2018 are shown according to Severity Level in Figure 8.1.

Figure 8.1 Incidents: Number by Severity Level for 2018



No Severity Level 0, 1, 2 or 3 incidents were recorded during 2018. Sixty low-level environmental incidents classified Severity Level <0 and 12 near misses were reported during the year in relation to production operations.

EMPNG and its contractors investigated the causes of all incidents and undertook corrective actions.

Image opposite: Control Room Technician – Utilities, Malikhah Salmang, from the second intake of the Operations and Maintenance training program (2012) at the LNG Plant

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.

Site-based environmental specialists inspect worksites, conduct field observations and monitor air, noise and water discharge in accordance with EMPNG’s environmental protocols to implement the company’s verification program.

Results

Non-conformances are situations that do not meet ESMP requirements and are classified according to three Severity levels. Severity Level I involves no damage or reasonable expectation of damage, progressing through to Severity Level III, which requires 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 2018 are shown in Figure 8.2.

Figure 8.2 Non-conformances and field observations: Number by Severity Level for 2018



Thirty-one Severity Level I environmental non-conformances were recorded across the LNG Plant and Upstream area during 2018.

Twenty-three were for exceedances of EMPNG's wastewater management criteria. Four related to reinstatement, three to air emissions criteria, and one to noise criteria. Three of the non-conformances were also recorded as a Severity Level <0 incident. The causes of non-conformances were investigated and corrective actions taken.

Potential non-conformance situations are reported as 'needs improvement' field observations. They identify an intervention and/or corrective action that is required to prevent a non-conformance.

Of the 148 needs improvement field observations recorded during 2018, 13 related to invasive species management, 15 were for erosion and sediment control, 64 were for waste management, 17 regarded water discharges, 29 were for spill prevention and response management, three were for materials management, two were for reinstatement and regeneration, four for ecology management and one relating to emissions to air.

By the end of December, most needs improvement field observations were addressed and closed, with approximately 13 percent remaining open while teams continued working on corrective actions to close them.

Positive field observations record examples of good environmental practices.

Sixty-five positive field observations were recorded during 2018, with eight of these for erosion and sediment control, four related to invasive species, one for materials management, 21 regarding spill prevention and response, 26 for waste management, four related to water discharges and one for emissions to air.

8.3 External monitoring

In February, CEPA technical staff visited the LNG Plant to inspect the mangroves and tidal flats next to the retention pond mixing pit outlet and the proposed pipeline route associated with the Power Plant Fuel Gas Piping project. This was followed by Department of Petroleum visits in October and November to conduct on-site inspections for the pipeline, and a visit by 15 Department of Petroleum representatives who participated in a workshop in December about licencing requirements related to the Power Plant Fuel Gas Piping project.

In April 2018, a Civil Aviation Authority inspector visited Komo Airfield to review earthquake repairs prior to the commencement of airfield operations.

Four Department of Petroleum engineers visited the LNG Plant site in September for an in-depth tour of the plant.

In November, Department of Petroleum engineers conducted an on-site rig inspection in Victoria, Australia prior to the rig being approved for import into Papua New Guinea.

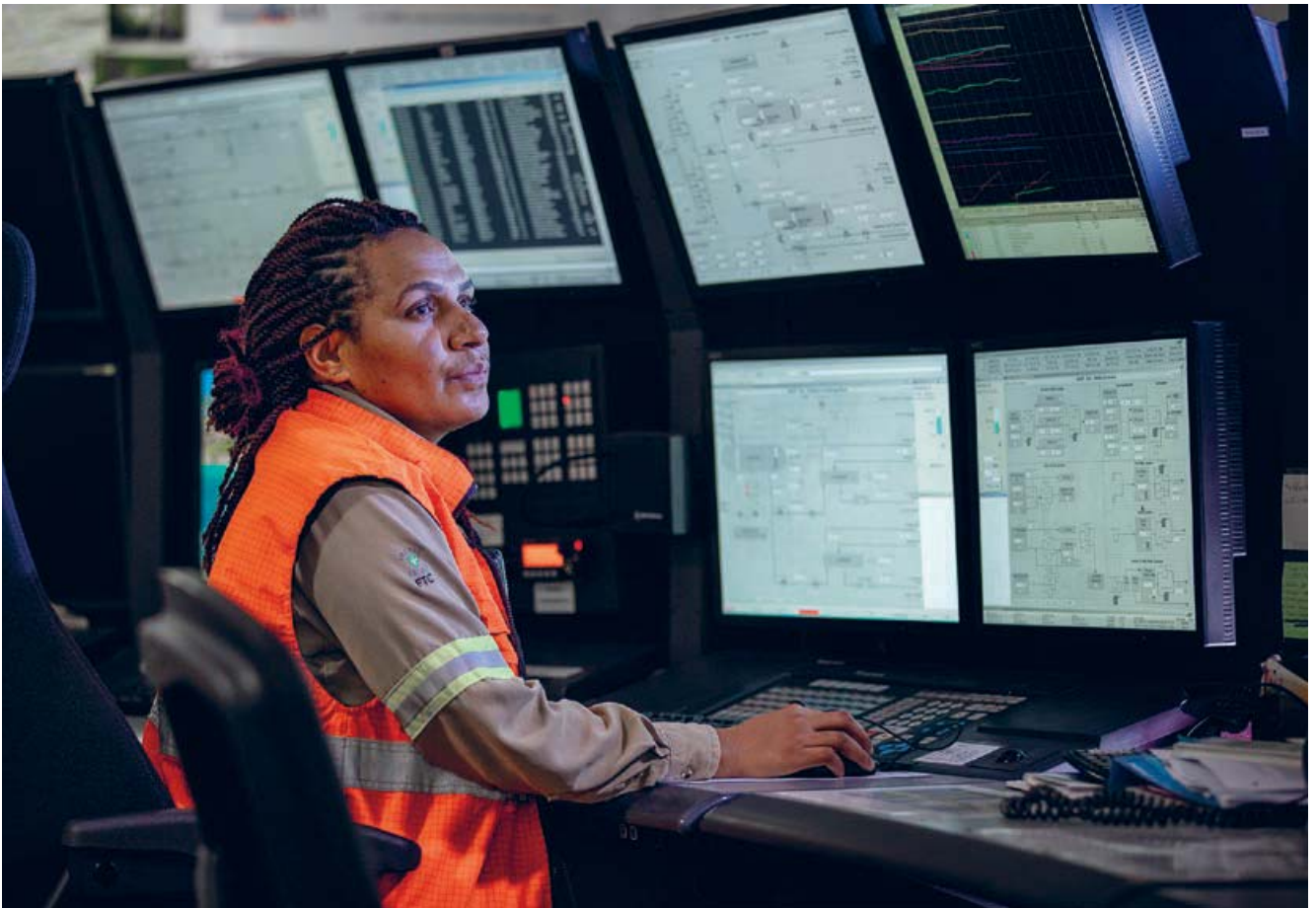


Some **37** species of mangroves are found in Papua New Guinea

Mangroves provide an important ecological link between the land and sea. Mangroves also offer shelter and feeding habitats for many fish species and marine invertebrates

3350km² of mangroves in the Gulf of Papua

Mangroves at Veraibari Island, Gulf Province



| Operations Technician, Grace Yandi, in the control room at the HGCP



| EMPNG Operations Technician, Haggai Aluy (second from left), with Department of Petroleum engineers, Kale Kiap (left), Betty Ano (third from left), Jezreel Himore (second from right) and Paul Den Atere (right)

Three valuers from the Department of Lands and Physical Planning also visited the LNG Plant in November for a 10-year land lease reappraisal inspection.

In December, three PNG Ports Corporation staff conducted a regulatory compliance inspection of the LNG Plant Marine Terminal.



40 advocacy workshops conducted

Almost **5000** community engagements in 2018

213 communities engaged in 2018

46,900 attendees at community engagements

1100 students visit LNG Plant

9 Stakeholder engagement

Engagement activities keep stakeholders informed about production operations through open, inclusive and timely communications.

9.1 Communities

EMPNG has conducted more than 34,500 engagements with stakeholders in some 289 communities, including almost 9300 formal engagements and over 25,000 informal engagements since production began.



EMPNG Community Affairs Coordinator – Moro, Marilyn Wingi

During 2018, 4885 engagements were conducted in 213 communities, comprising 2309 formal and 2576 informal engagements. These engagements involved almost 46,900 attendees.

In the Upstream area, engagements focused on disaster relief efforts following the February 2018 earthquake. This included supplying clean drinking water and tarpaulins to local communities as well as providing agricultural support. Engagements also involved Clan Caretaking Agreements and addressing landowner complaints regarding the Government's payment of royalties from LNG production.

Early in the year, engagements in Port Moresby involved working with government and non-government agencies on the earthquake response. During the second half of the year, engagements focused on APEC events.

At the LNG Plant site villages, engagements covered community development support programs, marine safety

and infrastructure projects with schools. Marine safety awareness sessions were conducted with LNG Plant site communities in partnership with agencies such as the Papua New Guinea Department of Transport, PNG Ports Corporation, National Maritime Safety Authority and Royal Papua New Guinea Constabulary Water Police Unit.



Boera Primary School students complete road safety awareness training



Community Affairs Officer, Unage Maraga, conducting a Road Safety Awareness session at Papa Primary School

Road safety awareness was conducted with Angore communities and at schools in Hides and the LNG Plant site villages during 2018.

Image opposite: Community engagement in the lower Kikori region in August

Highlight: A career in community engagement

Elly Kiany Sawa from the Autonomous Region of Bougainville has spent the past decade engaging with community stakeholders to support sustainable economic outcomes for Papua New Guinea.

In his current role as EMPNG's Community Manager for the Upstream area, Elly spends a lot of time leading field teams in community engagement and community development support.

Elly joined EMPNG in 2015 as a Community Development Support Coordinator and has quickly worked his way to a management role.

"EMPNG has provided me with some wonderful opportunities that have enabled me to progress my career," he said.

"My professional background covers community relations aspects of resource development namely; social impact monitoring and reporting, social research, community and stakeholder engagement, social projects, community development, local economic development and lease land management.

"With EMPNG I have had the opportunity to use all of these skills, while also developing new skills."

Prior to joining EMPNG, Elly was the Technical Advisor for Social Impact Monitoring for the Morobe Mining Joint Venture's Hidden Valley mine and the Social Impact Monitoring Supervisor for Newcrest Mining Limited's Lihir mine.

"The resources sector has helped me to build a strong career and at EMPNG I have been able to quickly take it to the next level," Elly said.



Public and Government Affairs Manager, Elly Kiany Sawa, supporting the Eka Dish Youth Group with their project to build the local fishing industry near the Hides Spine

Issues identification

As shown in Figure 9.1, land-related issues accounted for 24 percent of issues raised during 2018. Most were associated with claims regarding land deprivation and compensation payments.

Social issues accounted for 19 percent, with most regarding employment opportunities. Community requests were also received for in-kind support to assist with restoration works following the earthquake.

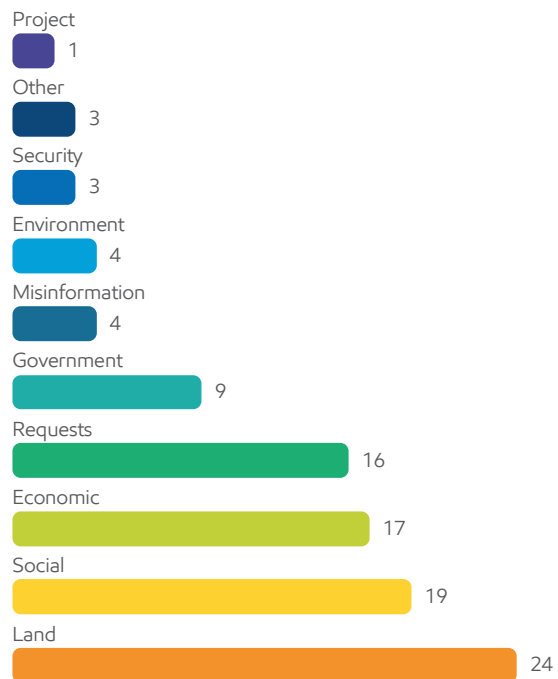
Economic issues accounted for 17 percent of issues raised, with many people seeking community and business development support after the earthquake.

Others regarded requests for community development and infrastructure projects.

Requests accounted for 16 percent of issues and were for meeting appointments to discuss scholarships, employment and business benefits and earthquake-related support.

Government-related issues accounted for nine percent and mainly regarded royalty payments from LNG production.

Figure 9.1 Issues: Percentage received by category for 2018



9.2 Government

Representatives from all levels of government are kept informed about EMPNG's production activities. During 2018, EMPNG worked closely with government agencies to support earthquake relief efforts.

9.2.1 Infrastructure and government support

A public private partnership has been announced to develop a large-scale commercial agricultural venture in the Hela Province.

EMPNG is providing support to the project, which will be led by Innovative Agro Industry in partnership with the Mineral Resource Development Company; the Hela Provincial Government; and Tari-Pori, Koroba-Kopiago and Komo Margarima local level governments.



Signing of a Memorandum of Understanding between EMPNG and Innovative Agro Industry Limited in August

The proposed venture aims to train and equip small-holder farmers to produce stock feed and vegetables. The venture has the potential to positively impact as many as 5000 small-holder farmers in Hela Province over the next five years and beyond, as well as diversifying the economic base and encouraging the development of additional small enterprises in Hela Province.

A detailed feasibility study is being developed and includes analysis of soil and growing conditions, detailed design of the farmer training program, establishment of a training centre and finalisation of the commercial venture structure.

EMPNG continues to provide support for upgrades to sections of the Highlands Highway in the Hela Province. The sections are being upgraded to a chip sealed surface, including improved drainage and road shoulders. This program of works is using materials sourced through Papua New Guinean suppliers and is providing employment opportunities for people who live nearby. During 2018, EMPNG provided substantial support to reinstate numerous sections of the highway in the Hela and Southern Highlands provinces that were damaged as a result of the earthquake.

9.2.2 Advocacy

In June, EMPNG hosted its first advocacy workshops since the earthquake. Two workshops were held with 25 Department of Provincial and Local Government Affairs representatives and 24 participants from the Central Provincial Government.

By the end of the year, 40 workshops were completed with National Government departments and agencies, as well as with the Central Provincial Government and West Hiri Local Level Government, the Gulf Provincial Government and West Kikori Local Level Government and the National Capital District Commission.

For the first time, the LNG Plant hosted consecutive days of advocacy tours to accommodate more than 1100 students from the Australia-Pacific Training Coalition in Port Moresby. The tours were held in early September and consisted of eight groups of 145 students and their teachers.



Fitting and machinery students from the Australia-Pacific Training Coalition with EMPNG LNG Plant Site Community Affairs Officer, Christine Yango (left) and Mechanical Lead, Glenn Cristodero (second from right)

The students, who were studying courses at the college in carpentry, cookery, hospitality, diesel fitting, electrical, fitting and machinery, light vehicle mechanics and metal fabrication, were able to learn how these roles applied at the LNG Plant.

Advocacy workshops provide participants with information about EMPNG operations, as well as national content and community development programs.

9.2.3 Benefits assurance delivery

Royalty payments continue to be made in accordance with the Umbrella Benefits Sharing Agreement between the State and landowners, which provides for the sharing of benefits from LNG production.

The Department of Petroleum has progressed the second phase of the clan vetting process, also referred to as Landowner Beneficiary Identification, in the Hela, Southern Highlands, Gulf and Western provinces.

During 2018, clan vetting was completed along segments of the pipeline ROW and Juha with Ministerial Determination anticipated in early 2019. The Papua New Guinean Government continues to prioritise the completion of Landowner Beneficiary Identification for all licence areas and supports the opening of clan accounts so that royalties can be distributed in 2019.

Discussions between the Government and landowners has resulted in the setting aside of a court injunction to enable the distribution of business and infrastructure development grants in the Upstream area. In 2018, PGK35 million (US\$10.8 million) was paid to clans in Hides and payments were also made to landowners in Angore.

EMPNG continues to make monthly royalty payments from LNG production for distribution to landowners. The funds are managed through a Government-appointed trust account with the Bank of Papua New Guinea. The Department of Finance is custodian of the account.

EMPNG made its fourth Development Levy payment to the Papua New Guinean Government in accordance with requirements of the *Oil and Gas Act 1998*.

The Development Levy is held in the Department of Petroleum and Energy trust account to be paid to provincial and local level governments for community-based infrastructure development projects.

9.2.4 Revenue management

During 2018, a three-day Leadership, Data Management and Transparency in the Extractives Sector workshop was jointly facilitated by the Pacific Leadership and Governance Precinct and the Papua New Guinea Extractive Industries Transparency Initiative (EITI) National Secretariat.

Participants identified the inclusion of subnational payments in EITI reporting as a key area of improvement. At the workshop, the Papua New Guinea EITI Subnational Payments Scoping Study Terms of Reference was developed and a consultant appointed to implement a reporting framework, including case study examples drawn from the Newcrest Mining Limited's Lihir gold mine in New Ireland Province; OK Tedi Mining Limited's OK Tedi Mine in the Western Province; Kula Gold Limited's Woodlark Island Gold Project in Milne Bay Province; and PNG LNG.

Papua New Guinea's EITI multi-stakeholder group, of which EMPNG is a member, continues to provide guidance to the Independent Administrator, Ernst & Young, which was appointed by the National Secretariat to draft the EITI reports. The reports have identified the need for a more robust system for managing government revenue payments to minimise vulnerability to fraud, corruption and human error.

The fifth Papua New Guinea EITI Report covering 2017 activities was published on the EITI website in December. Previous reports are published on the Papua New Guinea EITI National Secretariat website.

The Papua New Guinea EITI National Secretariat is also progressing work on the EITI legislation and policy framework, as well as activities from the Beneficial Ownership Roadmap, which was adopted in January 2016. The Roadmap aims to develop national priorities that contain a clear link between EITI principles and beneficial ownership disclosure to mitigate the risk of financial misconduct and improve Papua New Guinea's investment climate.

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

In April, EMPNG launched an earthquake relief Facebook page to provide updates about the company's earthquake response, with more than 600 people joining the group within the first two weeks. It has since transitioned to provide general news and updates on production activities. By the end of December, the EMPNG Facebook page had some 9700 followers.

Like us on Facebook at:
www.facebook.com/ExxonMobilPNG1



External and internal communications were critical during the extended earthquake response in the first half of 2018. In addition to Facebook and Twitter updates, regular media releases were issued and posted on the PNG LNG website to provide updates to external stakeholders about business impacts and humanitarian support. Traffic to the PNG LNG website increased by 40 percent in March 2018.



Gesesu and Puba villagers receive water supplies from EMPNG as part of earthquake relief efforts along pipeline ROW in the Southern Highlands Province



EMPNG Managing Director, Andrew Barry (right) and EMPNG HGCP Community Affairs Coordinator, Mohammed Paul, pack relief supplies at the Salvation Army hall in Port Moresby for delivery to Upstream area communities

EMPNG Managing Director, Andrew Barry, presented at the second Papua New Guinea Petroleum and Energy Summit held in Port Moresby in March 2018. Mr Barry also spoke at the 34th Australia Papua New Guinea Business Forum and Trade Expo in Brisbane, Australia and the PNG Investment

Summit in London, England. During his presentations, Mr Barry reinforced EMPNG's commitment to Papua New Guinea and the need for stakeholders to work together to create lasting opportunities for the country. In addition, he delivered a keynote address about the importance of integrity at the 63rd graduation ceremony for the University of Papua New Guinea early in the year.



EMPNG Managing Director, Andrew Barry, presenting at the second Papua New Guinea Petroleum and Energy Summit

Mr Barry was involved in numerous APEC-related meetings and events, including presenting the inaugural SME Digital Innovation Awards during the Papua New Guinea APEC Business Advisory Council Micro, Small and Medium Enterprises Summit's gala dinner in September. Mr Barry was also a moderator at a panel discussion at the APEC Women and the Economy Forum and a speaker at the opening ceremony of the APEC Voices of the Future program in November. ExxonMobil Senior Vice President, Neil Chapman, addressed the APEC CEO Summit.

In December, Mr Barry presented at the Chamber of Mines and Petroleum Conference in Sydney, Australia.

Communications during the second half of the year focused on raising the profile of PNG LNG's long-term benefits through EMPNG's partnerships to develop the capacity of Papua New Guinean communities. The campaign targeted local audiences and potential visitors to the country through APEC events. It included a 16-page magazine profiling EMPNG's involvement in education, healthcare, training, the environment and community support.



ExxonMobil Senior Vice President, Neil Chapman, speaking at the APEC CEO Summit in November

A new website www.pngpartnership.exxonmobil.com was also launched along with advertising in national newspapers, sponsored Facebook, Twitter and LinkedIn posts, employee newsletters, the use of infographics and face-to-face advocacy.

Visit the website at:

www.pngpartnership.exxonmobil.com

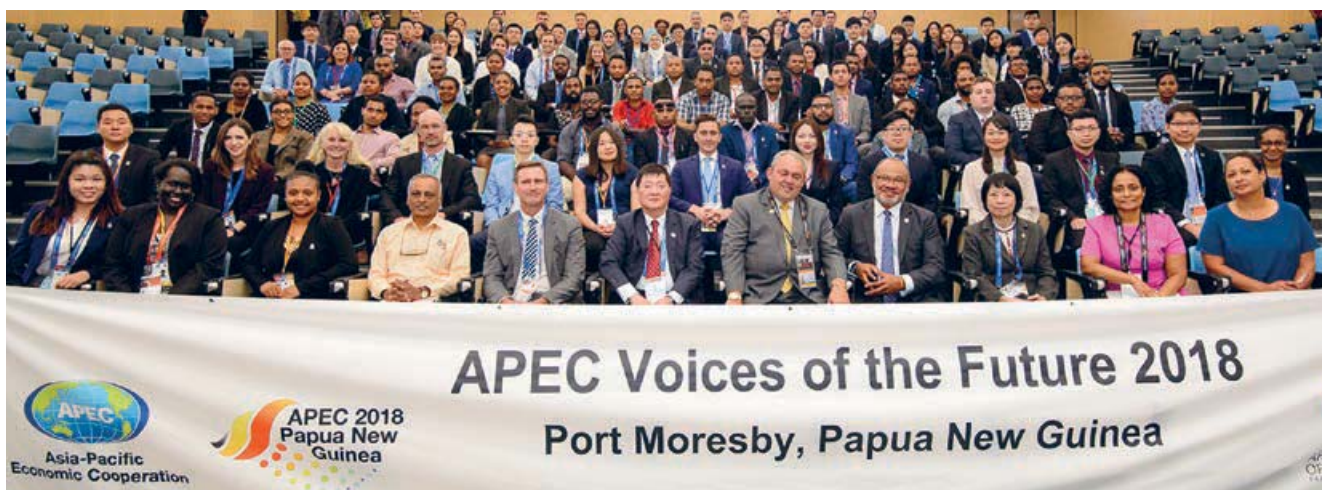


Three editions of *PNG LNG TIES* were distributed to stakeholders including EMPNG workers, government, media and local communities during 2018. This eight-page pictorial broadsheet-sized newsletter covers production and business updates as well as stories about PNG LNG's interactions with local communities. *PNG LNG TIES* is published on the PNG LNG website.

Visit the website at: www.pnglng.com



The *PNG LNG Environmental and Social Report – Annual 2017* was published in April 2018. Hard copies of the Report were distributed to almost 150 stakeholders in Papua New Guinea with limited access to the internet. A total of 120,000 printed copies of the Report's Executive Summary were published in English and Tok Pisin in national newspapers. The 2017 Report, along with previous Environmental and Social Reports can be found on the PNG LNG website.



Participants at the APEC Voices of the Future 2018 opening ceremony

Acronyms

Acronym	Definition
AIDS	Acquired Immunodeficiency Syndrome
APEC	Asia Pacific Economic Cooperation
CEPA	Papua New Guinea Conservation and Environment Protection Authority
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
HGDC	Hides Gas Development Company
HIV	Human Immunodeficiency Virus
Lanco(s)	Landowner company (companies)
LNG	Liquefied Natural Gas
MCHE	Main Cryogenic Heat Exchanger
MSME	Micro, small and medium enterprise
PMA	Programmed Monitoring Activity
PNG	Papua New Guinea
ROW	Right of Way
WMA	Wildlife Management Area

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