



PNG LNG

10
YEARS

PNG LNG Environmental and Social Report
Annual 2019

ExxonMobil



About this Report

This *PNG LNG Environmental and Social Report – Annual 2019* 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.

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



Santos



TO OUR STAKEHOLDERS

This year marks a significant milestone for PNG LNG – in 2019 we celebrated 10 years of partnership in Papua New Guinea.

During the past decade, we have worked with the people and government of Papua New Guinea to construct and deliver one of the most reliable LNG operations in the world, which has enabled Papua New Guinea to take its place as a world-class LNG supplier.

As new unprecedented global challenges emerge from the COVID-19 pandemic, including broad-scale longer term economic impacts, our company remains firmly committed to supporting the economic and social wellbeing of Papua New Guinea's citizens through the ongoing responsible operations of our business, and continued reliable supply of LNG to our customers in Asia.

Partnerships remain crucial to driving sustained development opportunities in Papua New Guinea, particularly during challenging times. In this Report we acknowledge the many partners who are contributing to the ongoing success of PNG LNG.

In 2019, PNG LNG continued to provide strong employment and training opportunities for Papua New Guinean citizens, who now comprise more than 86 percent of our 3964 production workforce.

We have achieved a world-class safety culture, with over 57 million work hours recorded since production commenced, during which there have been no Lost Time Incidents recorded for more than two years and no significant process safety events for almost six years. This is testament to our safety philosophy and the dedication of our workforce and business partners to keeping people safe.

Building the capacity of Papua New Guinean businesses has been fundamental to the PNG LNG story. We continue to support both landowner and non-landowner organisations to become competitive, which includes promoting the use of local goods and services for project-related activities.

We have also worked with government and non-government organisations to deliver many community development projects across health, education, livelihood support and the advancement of women.

While the world faces uncertainty as we enter a new decade, our achievements with PNG LNG clearly demonstrate that opportunities can be created when committed stakeholders work together to deliver a common vision for a country and its people.



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



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For the purposes of this Report, the currency conversion rate used, between Papua New Guinea Kina (PGK) and United States Dollars (US\$) is 0.2935 [PGK1 = US\$0.2935]. This rate is as published by the Bank of Papua New Guinea at 31 December 2019.

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EXECUTIVE SUMMARY

ExxonMobil PNG Limited has just completed 10 years of creating and growing a significant economic opportunity for Papua New Guinea.



The Hides Gas Conditioning Plant at dusk

In 2019, Papua New Guinea Liquefied Natural Gas (PNG LNG) reached its most significant milestone yet with the completion of 10 years in Papua New Guinea. Over the past decade, PNG LNG has partnered with many government, non-government organisations and communities to position Papua New Guinea as a world-class LNG supplier.

Since the start of production in 2014, some 43 million tonnes of LNG have been loaded and 580 LNG cargoes sold to customers in Asia.

A subsidiary of Exxon Mobil Corporation, ExxonMobil PNG Limited (EMPNG) manages the operation of PNG LNG 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 2019.

PRODUCTION

The LNG Plant achieved numerous production milestones during 2019. This included the 500th LNG cargo loaded in April, a record production week in June and a record production day in August.

The first commercial flight landed at Komo Airfield in 2019 under a user agreement between Link PNG and EMPNG. The Airfield is servicing two commercial flights a week to and from Port Moresby.

SAFETY AND HEALTH

EMPNG has achieved a world-class safety culture with over 57 million work hours recorded without a Lost Time Incident at the LNG Plant. Across all worksites, the company has recorded no Lost Time Incidents for more than two years and no significant process safety events for almost six years.

As part of its commitment to *'Nobody Gets Hurt'*, EMPNG introduced a Safe Choice program during the year to empower workers to make safer choices in the workplace. Safe Choice was also the theme of the 6th annual Contractor Safety Leadership Workshop held in September.

The EMPNG Falck Fire and Rescue team participated in their first Extractive Industries Emergency Response Challenge against other Papua New Guinea-based mining and oil and gas companies in 2019. The team achieved first place in the rope rescue event and third place in the theory session. The Papua New Guinea Chamber of Mines and Petroleum hosted the Challenge.

To help workers proactively manage their health, EMPNG has introduced a Culture of Health program. The program consists of four elements: biometric health screening; health promotion and awareness; nutritional awareness; and physical activities.

In 2019, EMPNG's Medicine and Occupational Health team was recognised with an ExxonMobil Global Health and Safety Award for the second consecutive year.



Workers celebrate the 500th LNG cargo at the LNG Plant Marine Terminal



Clinical education session at the Hides Gas Conditioning Plant clinic

In 2018, the team received the Award for their contribution to raising mental health awareness in the workplace. The 2019 award recognised the team's review of the Malaria Control Program, which involved the adoption of a fit-for-risk approach.

ENVIRONMENT

EMPNG continues to improve its environmental performance, with combined LNG Plant and Hides Gas Conditioning Plant (HGCP) regular flaring reduced to its lowest levels since the start of production. During 2019, EMPNG's environmental initiatives, capacity building efforts and publication of Papua New Guinea's biodiversity data was recognised through a Papua New Guinea Chamber of Mines and Petroleum award.

The biodiversity offset program's capacity building components have progressed and included two Communicating Conservation meetings with more than 150 conservation professionals in Port Moresby during the year. Communities that attended these meetings came from 20 Papua New Guinean provinces.

In April, 10 scholarship recipients from the Enhancing Conservation Capacity Program graduated from the University of Papua New Guinea with a Postgraduate Diploma in Biodiversity Conservation. In December, 42 community conservation practitioners graduated with certificates in Biodiversity Conservation.

Stakeholder feedback with regard to EMPNG's biodiversity offset program indicates that it is delivering value in bringing community conservation efforts to a central place for the exchange of information and helping to build capacity in areas of need at the national level and with community-based conservation organisations. For example, the Lake Kutubu Wildlife Management Area Committee continues to demonstrate improved capacity to support conservation activities, and Upstream area communities in Lower Kikori are coming together to identify areas for conservation.

Multiple field surveys were completed in 2019 and included the biennial biodiversity monitoring, regeneration monitoring and the annual weed survey. Data analysis for these survey efforts will be completed in 2020.

Fifty-two low-level environmental incidents classified Severity Level <0 were reported in 2019, along with 29 Severity Level I non-conformances for which appropriate corrective actions were taken. Most environmental incidents and non-conformances related to wastewater quality criteria exceedances.

WORKFORCE DEVELOPMENT

A total 3964 workers, including employees and third party contractors, were working for PNG LNG in 2019. This is an increase of some 700 workers compared to 2018 because of construction activities related to earthquake repair works and the restart of the Angore Gathering System project.

The PNG LNG workforce includes 3411 Papua New Guinean citizens, comprising 86 percent of the total workforce. Seventeen percent of the Papua New Guinean workforce is female.

During 2019, the equivalent of more than 96,700 hours of training were delivered through more than 2570 courses to more than 37,300 employee and contractor training participants. Ninety-eight percent of all training hours were delivered to Papua New Guinean citizens. Since the start of production, the equivalent of almost 296,000 hours of training have been delivered to more than 14,600 course participants.

EMPNG is piloting an Engineers in Operations development program for newly appointed engineers. This involves one week of orientation and six weeks of the new engineers shadowing operations and maintenance personnel to help the new employees establish working relationships and better understand work activities in the field.

Career development opportunities continue to be provided for Operations and Maintenance technicians. Some 220 Papua New Guinean citizens have been recruited through the Operations and Maintenance training program since 2010, which includes full-time on-the-job training in operations and maintenance trades for roles at the HGCP and LNG Plant. By the end of 2019, 26 out of 32 Control Room Technician positions, or more than 80 percent, were filled by Papua New Guinean citizens, including 10 women, who represent 38 percent of Papua New Guinean Control Room Technicians.

The fifth intake of Operations and Maintenance technician trainees completed their 12-month Junior Technician program at the Kumul Petroleum Academy in December. The sixth intake of Operations and Maintenance trainees attracted more than 2000 applicants, with 18 selected to begin training at the Kumul Petroleum Academy in March 2020.



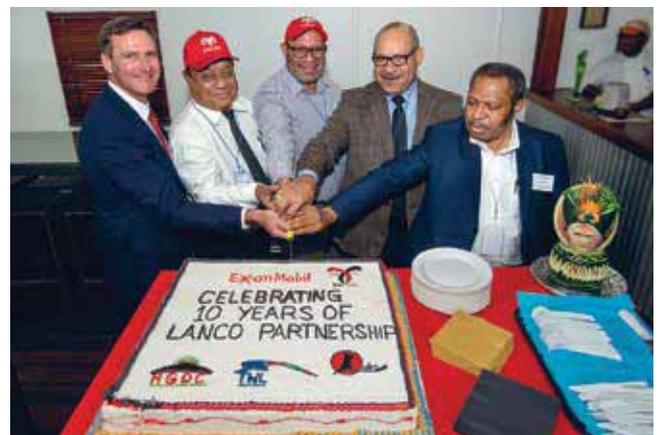
Newly recruited engineers at the LNG Plant

EMPNG participated in the 39th International Association for Impact Assessment conference in Brisbane, Australia during 2019. EMPNG workers and consultants delivered 11 presentations and chaired three sessions. EMPNG also sponsored 15 Papua New Guinean environment and conservation professionals from government, academia and non-governmental agencies to attend the conference.

SUPPORTING PAPUA NEW GUINEAN BUSINESSES

In 2019, EMPNG celebrated a decade of partnership with Papua New Guinean businesses, including landowner companies (Lancos) such as the Hides Gas Development Company Limited (HGDC), Laba Holdings Limited and Trans Wonderland Limited.

Over the past 10 years, EMPNG has engaged local suppliers for both construction and production-related activities. During 2019, 13 Lancos and some 270 non-Lanco Papua New Guinean businesses provided services such as security, catering, maintenance of light vehicles, rental of heavy equipment, vegetation management, transportation, freight and logistics, surveying, construction material testing and medical services.



EMPNG Managing Director, Andrew Barry, celebrates 10 years of partnership with Lancos HGDC, Laba Holdings Limited and Trans Wonderland Limited

EMPNG's total in-country spend with Papua New Guinean businesses in 2019 was PGK755 million (US\$221.6 million) compared to PGK567.3 million (US\$166.5 million) in 2018. Of this, almost PGK239.3 million (US\$70.2 million) was spent on Lanco services compared to PGK184.3 million (US\$54.1 million) in 2018. Since the start of production, EMPNG has spent almost PGK3.8 billion (US\$1.1 billion) on Papua New Guinean services, with PGK1.1 billion (US\$322.8 million) spent with Lancos.

The Enterprise Centre conducted 24 business assessments, including 14 Lanco assessments, and delivered the equivalent of more than 8500 training days to Papua New Guinean businesses in 2019. The Centre has completed approximately 600 business assessments, provided the equivalent of more than 46,500 training days and supported some 20,000 entrepreneurs since it began operations in 2010.

SOCIAL DEVELOPMENT

EMPNG's support for schools, in partnership with provincial government authorities, in 2019 included: two new staff houses, a double classroom and sanitation facilities for Para Primary School; a new staff house and sanitation facilities for St. Paul's Primary School in Komo; and sanitation facilities for Redscar High School and Boera, Lea Lea and Papa primary schools.



Students and teachers celebrate the handover of a new teacher's house at St. Paul's Primary School in Komo

Thirty-two Papua New Guinean businesswomen have completed a 14-week Academy for Women Entrepreneurs online business course sponsored by EMPNG and the United States Embassy in Port Moresby. The online business course is a pilot program that aims to equip women with the practical skills needed to create sustainable businesses.

The course delivers online educational resources, fosters networking that supports mentorships, and connects women to existing business support programs.

EMPNG has provided PGK230,000 (US\$67,500) to the Papua New Guinea University of Technology to help the Engineering department achieve Washington Accord accreditation. The Washington Accord is an international accreditation agreement that sets a standard for professional engineering degrees to be recognised by signatory countries. The University's Engineering department aims to have its bachelor degree internationally accredited by 2022.

Youth from four Papua New Guinean provinces now have access to a new scholarship with support from the Business and Professional Women's Association and EMPNG.

Spotlight

Hiri Moale tradition returns

EMPNG, through the Advancing PNG: Women Leaders Network, supported a traditional pottery making workshop at Porebada Village in July to revive Hiri Motu pottery that was once used in the Hiri Trade. The workshop served as a precursor to the Hiri Moale Festival, which was held at Ela Beach in Port Moresby in September.

The annual Hiri Moale Festival celebrates the traditional Hiri Trade between the Gulf and Motu Koita People. It begins with the arrival and welcoming of the *lagatoi*, a traditional double-hulled sailing watercraft, and ends with the crowning of the Hiri Queen. The 2019 Hiri Queen received a scholarship worth PGK20,000 (US\$5870) as part of her prize.

EMPNG has sponsored the Hiri Moale Festival for the sixth consecutive year with a PGK67,000 (US\$19,660) donation in 2019. The Festival included the Motu Koita Music Festival and Vanagi (canoe) race.



Performer in traditional costume at the 2019 Hiri Moale Festival

The scholarship, launched in October, supports students from the Hela, Southern Highlands, Gulf and Central provinces to further their education at vocational schools, technical colleges or universities throughout the country. A minimum of 30 scholarships will be awarded each year.

EMPNG has funded the construction of a new health centre facility at Juni in the Hela Province and refurbishments to the existing Para Health Centre, Mananda Health Centre and Benaria Health Centre. These health services were upgraded in partnership with local leaders, churches, local contractor companies, Lancos and provincial health authorities.

A new Porebada Health Centre was opened in 2019. The facility serves Porebada Village and the nearby communities of Papa, Lea Lea, Boera and Roku. The PGK1 million (US\$293,500) Health Centre was funded by landowner royalty payments derived from PNG LNG production, facilitated through the Mineral Resources Development Company Pty. Limited and administered through the Community Infrastructure Trust Fund. The Centre includes patient beds, a delivery room, an emergency procedure room, a consultation room, administration offices, a meeting room, a pharmacy and an outpatient area. It provides health services to some 30,000 people who previously had to travel to Port Moresby for treatment. EMPNG provided medical equipment for the new Health Centre.

STAKEHOLDER ENGAGEMENT

Over the past decade, more than 400,000 stakeholders have been engaged through PNG LNG.

In 2019, some 65,000 people participated in 3960 engagements with 178 communities. This included 1737 formal and 2223 informal engagements.

In the Upstream area, engagements focused on community development activities such as fresh produce market days, community events and celebrations including Independence Day. At the LNG Plant site villages, engagements included marine, road and pedestrian safety education sessions with communities and schools.



Members of the Mbelopa Women's Group preparing for a fresh produce market day

Mangrove protection education was also conducted with LNG Plant site communities.

Other engagements included community development support projects and community events across Papa, Lea Lea, Boera and Porebada villages, as well as with more remote communities.

More than 1000 people attended 63 EMPNG advocacy workshops and site tours at the LNG Plant site in 2019. EMPNG's advocacy workshops are increasingly attracting interest from international governments. During the year, government representatives from Germany, Tanzania, China and Japan participated in workshops and site tours. In addition to advocacy events at the LNG Plant site, advocacy workshops were held in the Hela and Western provinces with local and provincial level government representatives. HGCP site tours were conducted for some 250 people from schools, community and youth organisations.

PNG LNG's continued success has been built upon a strong foundation of partnership with the people of Papua New Guinea. Together, EMPNG and Papua New Guinean communities can look forward to another decade of generating even more economic growth and social development opportunities for the nation.

COMMEMORATIVE FEATURE: 10 YEARS OF SOCIAL AND ECONOMIC GROWTH IN PAPUA NEW GUINEA

PNG LNG has just completed its first 10 years of partnership in Papua New Guinea. Work began with government, non-government organisations and local communities in 2009 to develop what has since become a sustained opportunity for economic growth and social development for the country.



PNG LNG is commemorating 10 years of partnership with Papua New Guinean communities

Just some of the many outcomes that PNG LNG, together with communities, have achieved over the past decade are covered in this special commemorative feature.

FROM CONSTRUCTION TO PRODUCTION

Following completion of the Environmental Impact Statement in 2009, construction began on the US\$19 billion PNG LNG facilities in early 2010. PNG LNG spans the Southern Highlands, Hela, Western, Gulf and Central provinces of Papua New Guinea and includes over 700 kilometres of pipeline, a two-train LNG Plant, an LNG Plant Marine Terminal, the HGCP, associated infrastructure and a Port Moresby office.



From left: EMPNG Operations Technician, Ramona Terence; EMIT Asia Pacific Safety Advisor, Faridah Saibon; EMIT Security and Controls Officer, Rita Nale; EMIT Global Safety, Health and Environment Manager, Brenda Short; and Operations Technician, Moale Bae at the LNG Plant site visitors viewing platform

After commissioning of the new facilities, production began on 23 April 2014. Since then, PNG LNG has produced some 43 million tonnes of LNG, with 580 LNG cargoes delivered to customers in Asia.

Since start-up, EMPNG, which manages the operation of PNG LNG facilities, has focused on safely increasing the efficiency of its operations at the LNG Plant. By the end of 2019, PNG LNG's facilities have safely and regularly produced above 8 million tonnes per year of LNG.

DEVELOPING THE WORKFORCE

PNG LNG's achievements showcase the dedication and expertise of its workers.

During construction, PNG LNG's workforce totalled more than 55,000, peaking at 21,220 workers at the end of 2012. Of the peak workforce, nearly 8500 workers, or 40 percent, were Papua New Guinean citizens.

By the end of 2019, 3964 people were working for PNG LNG. This includes 3411 Papua New Guinean citizens, of whom almost 570 were women.

EMPNG provides a broad range of career opportunities, including supervisory roles, for workers across operations, maintenance, engineering, technical, human resources, procurement, information technology, law and safety, health and the environment. Papua New Guinean employees are also given overseas developmental assignments as part of the Operations and Maintenance training program, Early Career Graduate interchange program or through international opportunities.

The company focuses on employing workers from areas near production facilities wherever possible. Of the total Papua New Guinean workforce, 50 percent are employed at worksites in their local area.

To develop the technical skills of workers, EMPNG delivers formal classroom, in-house and on-the-job training, as well as internships and graduate programs. During construction, PNG LNG provided over 2.17 million hours of training through some 12,900 training programs. The aim was to give workers transportable skill sets that would help them develop their careers. Since the start of production, the equivalent of almost 296,000 hours of training have been delivered to more than 14,600 workers.

GROWTH OF PAPUA NEW GUINEAN BUSINESSES

"Through constant training and mentorship, local businesses are now delivering better services at a higher standard and PNG LNG has provided growth opportunities that would otherwise not have existed. These lessons of business development are now being taken back into the local communities and have contributed to transforming local economies."

Joshua Coughran, General Manager of Laba Holdings Limited, Lanco for the LNG Plant communities.

Throughout the construction and production phases, PNG LNG has been committed to the use of local goods and services, as well as building the capacity of Papua New Guinean businesses.

In 2010, PNG LNG helped establish the Enterprise Centre with the Papua New Guinea Institute of Banking and Business Management. The Enterprise Centre has since provided some 600 assessments of local businesses to improve their operations. It has also provided the equivalent of more than 46,500 training days for public and private sector organisations.

Before the construction of PNG LNG, the Papua New Guinean Government provided seed capital so that Lancos representing a geographic area within the PNG LNG area of operations could provide construction-related services and materials to PNG LNG and other customers.

The two umbrella representative Lancos, Laba Holdings Limited and HGDC were pivotal during the construction phase. Laba Holdings Limited is the umbrella representative Lanco for the four LNG Plant site villages of Papa, Lea Lea, Boera and Porebada. HGDC is the umbrella representative Lanco for the Upstream area.

In 2019, EMPNG celebrated a decade of working together with HGDC, Laba Holdings Limited and Trans Wonderland Limited.



Lancos and EMPNG workers celebrate 10 years of partnership

“Supporting local businesses is a priority for us. Building the capacity of Papua New Guinean businesses will result in more opportunities for local citizens and more sustained economic development for the country.”

EMPNG Managing Director, Andrew Barry.

During production, Lancos continue to provide goods and services to PNG LNG and expand their customer base across labour hire, maintenance, scaffolding, rigging, fabrication, transportation, fuel distribution, container freighting, catering, housekeeping, food supply and other services. Non-Lanco Papua New Guinean businesses are contracted for services including engineering, security, freight and logistics, food supply, transportation of personnel, customs clearance and medical services.

Since 2010, PNG LNG has spent nearly PGK14.8 billion (US\$4.34 billion) on Papua New Guinean services, including more than PGK3.82 billion (US\$1.1 billion) spent with Lancos.

COMMUNITY DEVELOPMENT

During the past 10 years, PNG LNG has worked with government and non-government organisations to support community development projects spanning health, education, community livelihood support and the advancement of women. For example, PNG LNG and its community development support partners have created economic opportunities for women through livelihood development programs, delivered educational projects such as teacher

training and major school infrastructure works in Upstream area and LNG Plant site communities, and invested in research and training for health care workers.

The Community Livelihood Improvement Project is an example of how PNG LNG has helped to develop the skills and capacity of local farmers through education about seeds and planting techniques, crop management, poultry production and food and health hygiene. The Project has included the supply of seedlings, planting materials, tools, livestock and poultry. It has helped more than 10,000 community members improve their livelihoods and standards of living through generating household and group income from small enterprise development.



Mbelopa Women's Group Leader, Tepele Akilo participating in poultry production as part of the Community Livelihood Improvement Project

PNG LNG continues to provide, training and development opportunities for women. The Global Women in Management (GWIM) program stems from the Women's Economic Opportunity Initiative and aims to empower women leaders across Papua New Guinea. The GWIM program has a proven record for improving the skills and networks of its participants and helps these women to continue making a real difference to their local communities. The program began with building the skills of individual women and has now expanded to provide a train-the-trainer program so that women can take their new skills back to communities more broadly. For example, in April 2019, 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 other 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.



National Literacy Week activities at the Port Moresby Nature Park

Over the past decade, PNG LNG has worked with locally based stakeholders to improve educational facilities for Papua New Guinean students, from elementary school through to university. This has included the construction of multiple school facilities, the provision of university scholarships and the development of structured school programs, such as the Science Ambassador Program that encourages primary and high school students to consider careers in science, technology, engineering and mathematics through interactive educational activities. More than 5000 students have participated in the Science Ambassador Program during almost 90 classroom visits across Upstream area, LNG Plant site villages and Port Moresby schools since it was introduced to Papua New Guinea in 2013.



EMPNG Operations Technician, Simon Koila, delivers the Science Ambassador Program at Ai'io Primary School

PNG LNG has also partnered with non-government organisations, such as the Port Moresby Nature Park, to build educational school excursion programs for students. More than 80,000 school students have benefited from the Nature Park programs.

EMPNG and Papua New Guinean community-based health organisations have led many initiatives in the past decade to improve health facilities and health outcomes for people living in the Upstream area and the LNG Plant site villages of Papa, Boera, Lea Lea and Porebada. This has included new clinic facilities in areas such as Benaria, Para, Porebada, Juni and Mananda. PNG LNG has also partnered with external organisations, such as the Texas Children's Hospital and Baylor College of Medicine, to support maternal and child health outcomes in Papua New Guinea. Through this program, 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.

SUSTAINABLE PARTNERSHIP

As operator of PNG LNG, EMPNG continues to work closely with communities, government and non-government organisations to build upon the foundations that have been set over the past 10 years. EMPNG is focused on maintaining high quality programs with all development partners and stakeholders to sustain a course of social and economic development for the future of the nation.

1 OVERVIEW

EMPNG manages the operation of PNG LNG production and processing facilities and associated gas resources to deliver affordable, reliable, sustainable and modern energy for all.



Field Operations Technician, Petrus Paul and Operations Integrity Management System Technician, Wesley Spinder, at the HGCP

2019 performance highlights

500TH
LNG
CARGO

PNG LNG loaded its 500th LNG cargo in April. Since the start of production, PNG LNG has shipped 580 LNG cargoes to customers in Asia, with 111 of these delivered in 2019.

43M
TONNES OF
LNG SOLD

PNG LNG's facilities have regularly produced above 8 million tonnes per year of LNG.

The US\$19 billion facilities extend from the Hela, Southern Highlands, Western and Gulf provinces to Port Moresby in the Central Province. They gather multiphase fluids from Hides wells and transport them through the Hides Spine to the HGCP, where the fluids are stabilised and conditioned into two streams – gas and condensate.

The condensate travels through the HGCP-Kutubu Condensate Pipeline to the Kutubu Central Processing Facility, and from there, 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 dry gas is liquefied at the LNG Plant for export to customers in Asia.

PNG LNG's facilities have regularly produced above 8 million tonnes per year of LNG.

The location and elements of PNG LNG'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.

This Report, as well as previous Environmental and Social Reports, is published on the PNG LNG website. Printed copies of the full Report and translated summaries are made available to Papua New Guinean citizens who may have limited access to the internet.

Visit the website at: www.pnglng.com



1.1 PRODUCTION

Numerous production milestones were achieved during 2019, including the 500th LNG cargo loaded in April, a record production day in August and the restart of Angore Gathering System works in December.



Celebrating the 500th LNG cargo

A total 111 LNG cargoes were loaded and delivered in 2019. Over the past five years, some 43 million tonnes of LNG have been loaded and 580 LNG cargoes shipped to customers in Asia.

In November, the first commercial flight landed at Komo Airfield, and the airfield was subsequently opened for commercial use, under a user agreement between Link PNG and EMPNG. The Airfield is servicing two commercial flights a week to and from Port Moresby.



Port Moresby

Figure 1.1 – PNG LNG facilities



1.2 DRILLING

The Hides 4 exploration well was decommissioned in May. Work began in December to plug pre-existing wells in Angore.

1.3 HIDES GAS CONDITIONING PLANT

During 2019, the HGCP completed pigging operations and gas turbine maintenance activities. Pipeline instrument gauges known as ‘pigs’ were used to clean the pipe and take pipe wall thickness measurements as they travelled through the pipeline from the HGCP to Kopi and then to the LNG Plant.

Work was also completed on earthquake repairs to the HGCP, Hides wellpads and Hides SpineLine.

In remembrance of workers and communities impacted by the February 2018 earthquake, EMPNG unveiled a memorial at the HGCP Camp on the one year anniversary of the earthquake.



The earthquake memorial at the HGCP Camp

1.4 LNG PLANT

The LNG Plant achieved a record production day of 9.25 million tonnes per year equivalent on 13 August and a record production week of 9.03 million tonnes per year equivalent in June.

Gas turbine driver maintenance was completed during the year.

For the second consecutive year, the LNG Plant Warehouse team received a global ExxonMobil Platinum STAR award for excellence in housekeeping. The Warehouse team consistently ensures outstanding performance across housekeeping, product labelling and building signage, as well as maintains a high level of teamwork that results in continued performance improvements. The team also maintains a strong safety performance.



The LNG Plant Warehouse team has received a Platinum STAR award for the second consecutive year

PNG LNG has played an important role in reliably generating around 20 percent of Port Moresby's domestic power demand since 2015. Another 40 percent of capacity was added to Port Moresby's market in 2019, with the commencement of gas supply from the LNG Plant to the new 58-megawatt NiuPower power plant.



Cutting the ribbon to commission the 58-megawatt NiuPower power plant

1.5 MARINE FACILITIES AND SHIPPING

A new rapid spill dispersant spraying system has been installed on marine tugboats as part of PNG LNG's commitment to spill prevention and response. The spraying system is intended to mitigate environmental impacts caused by any loss of containment from vessels at the LNG Plant Marine Terminal. The improved spill response capability is supported by regular spill response drills and ongoing equipment maintenance.

In accordance with the International Maritime Organization's global transition to low sulphur fuel use, EMPNG is using LNG and other compliant fuels to power its LNG cargo fleet. Effective flushing out and cleaning of the fuel tanks for storing compliant fuel, combined with training provided to crew members, is ensuring compliance with the new fuel requirements.



The LNG Plant Marine Terminal

Major maintenance work on the LNG marine loading arms was safely completed in August.

1.6 ANGORE GATHERING SYSTEM

The Mineral Resources Development Company Pty. Limited (MRDC) led a joint government effort to promote conflict resolution and peace building in Angore, which culminated in a community peace and reconciliation ceremony on 15 August. Following the ceremony, security restrictions that had been in place in Angore since August 2018 were lifted and the pipeline contractor re-mobilised, with pipeline construction work resuming in November.

Other works included the building and occupation of a worker camp and wellsite preparation works for plug and abandon activities.

2 ENVIRONMENTAL AND SOCIAL FRAMEWORK

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

Foe man in traditional dress, which includes body paint of Digaso oil from the kara'o tree

~2400
REGULATORY
OBLIGATIONS

PNG LNG monitors compliance with nearly 2400 regulatory obligations.

1496
LICENCES, PERMITS
AND CERTIFICATES

PNG LNG monitors compliance with 1496 licences, permits and certificates.

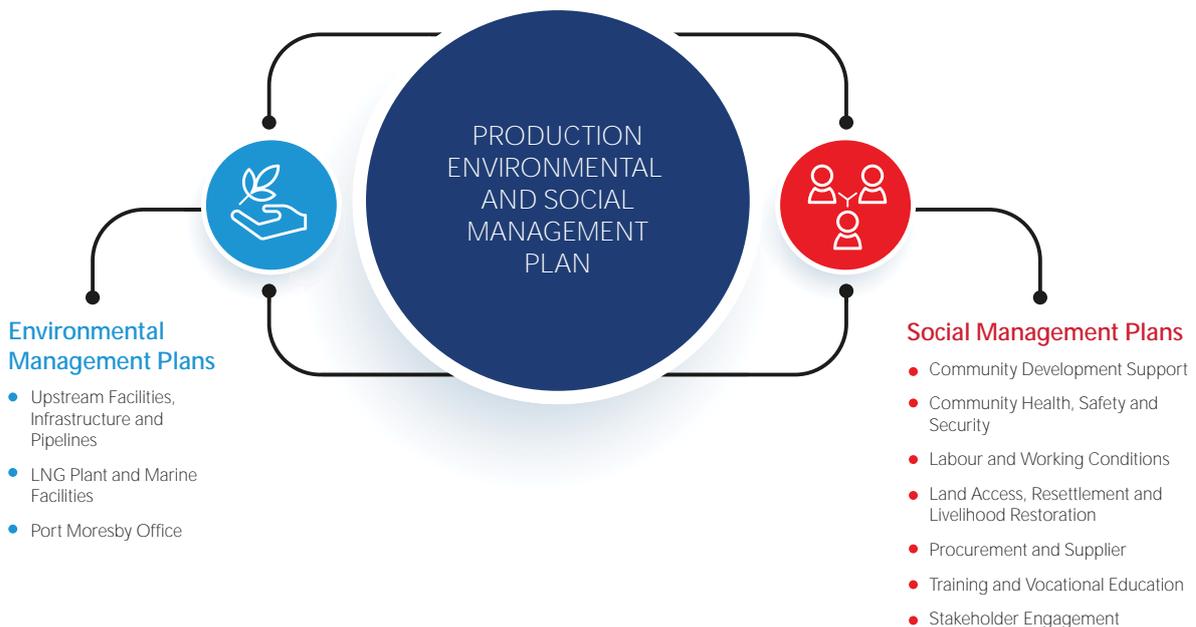
2.1 APPROACH

The Production Environmental and Social Management Plan (ESMP) is based on lessons learned from the PNG LNG construction phase, along with ExxonMobil's Operations Integrity Management System requirements and the International Finance Corporation Performance Standards. It consists of three Environmental Management Plans, as shown in red in Figure 2.1, which align to PNG LNG facilities. An additional seven Social Management Plans are based on key social themes.

EMPNG is focused on providing sustainable economic opportunities for Papua New Guinean citizens through implementing national content commitments in the Social Management Plans.

Production ESMP requirements apply during normal operating conditions and in reasonably foreseeable abnormal operating conditions or emergency situations. The ESMP is periodically updated in consultation with stakeholders to meet ongoing environmental, social and operational needs. It can be viewed on the PNG LNG website.

Figure 2.1 – Production ESMP structure



2.2 MANAGEMENT OF CHANGE

A Management of Change process is applied to any temporary or permanent modifications to facilities or integrity critical documents that impact facility operations.

The process is designed to: manage permanent, temporary and urgent or emergency changes to integrity critical procedures or process equipment and operating conditions; provide a thorough evaluation of the proposed change; and consider 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 and who may require training before the change is implemented. Safety, security, health, environmental, social management, operability, maintenance, regulatory compliance, cost and scheduling requirements are considered before any change can be made. Changes are classified according to potential impacts and consequences, which translate to how the changes need to be managed. For changes identified as having a potential impact with regard to the ESMP, the appropriate Lender Group classification will be determined. This classification will serve as the basis for determining Lender Group notification and/or review requirements.

Class I changes require Lender Group review prior to implementation, while Class II changes require Lender Group notification as part of the annual PNG LNG Environmental and Social Report, and Class III changes do not require notification to the Lender Group. During the second half of the year, one Class II notification was provided regarding the establishment of a third wellpad and replacement of two production wells for the Angore Gathering System. No Class I changes were made during the year.

3 PROCUREMENT AND SUPPLY

For the past decade, PNG LNG has worked with local suppliers to maximise their participation in construction and production related activities, and build their longer term capacity through training and business development opportunities.



Trans Wonderland Limited is one of the Lancos providing transportation services for EMPNG operations

2019 performance highlights

PGK3.8B

**SPENT ON PAPUA
NEW GUINEAN
SERVICES**

Since the start of production, EMPNG has spent almost PGK3.8 billion (US\$1.1 billion) on Papua New Guinean services, with PGK1.1 billion (US\$322.8 million) spent with Lancos.

8500

**TRAINING
DAYS**

The Enterprise Centre conducted the equivalent of more than 8500 training days and conducted 24 business assessments for Papua New Guinean businesses during 2019.

20,000

**ENTREPRENEURS
SUPPORTED**

More than 20,000 Papua New Guinean entrepreneurs have been helped through the Enterprise Centre.

>280

**LOCAL BUSINESSES
ENGAGED**

During 2019, EMPNG engaged 13 Lancos and some 270 non-Lanco Papua New Guinean businesses for PNG LNG-related activities.

3.1 SUPPLIER DEVELOPMENT

EMPNG helps businesses build their capacity through appropriate training and business development opportunities. As part of the company's commitment to supporting the growth of Papua New Guinean businesses, EMPNG engages local suppliers wherever practicable for the supply of production-related goods and services.

During 2019, EMPNG engaged 13 Lancos and some 270 non-Lanco Papua New Guinean businesses for production-related activities.



From left: Petroleum Minister, Hon. Kerenga Kua; EMPNG Managing Director, Andrew Barry; Prime Minister, Hon. James Marape; Trans Wonderland Limited Managing Director, Larry Andagali; HGDC Chairman, Libe Parindali; Laba Holdings Limited Chairman, Raho Kevau; and Trans Wonderland Limited Chairman, Mark Sakai at the event celebrating 10 years of Lanco partnership

Lancos deliver services including security, catering, maintenance of light vehicles, rental of heavy equipment, vegetation management, transportation and fuel distribution. 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.

EMPNG's total in-country spend with Papua New Guinean businesses in 2019 was PGK755 million (US\$221.6 million) compared to PGK567.3 million (US\$166.5 million) in 2018.

Of this, almost PGK239.3 million (US\$70.2 million) was spent on Lanco services compared to PGK184.3 million (US\$54.1 million) in 2018.

Since the start of production, EMPNG has spent almost PGK3.8 billion (US\$1.1 billion) on Papua New Guinean services, with PGK1.1 billion (US\$322.8 million) spent with Lancos.

3.2 CAPACITY BUILDING

EMPNG supports the Papua New Guinea Institute of Banking and Business Management's Enterprise Centre in its efforts to build the capacity of Papua New Guinean businesses. The Enterprise Centre, which was established in 2010, provides business assessments and training to local suppliers.

To help identify opportunities to improve the services provided to Papua New Guinean businesses, EMPNG is conducting a review of the Enterprise Centre's programs over the past nine years. The review aims to identify improvements that can be made to deliver greater value for Papua New Guinean businesses.

The Enterprise Centre conducted 24 business assessments, including 14 Lanco assessments, and delivered the equivalent of more than 8500 training days in 2019. This included four sessions of International Standards Organisation training, which is helping Papua New Guinean businesses with developing their own quality management systems. It also assisted 380 business owners and entrepreneurs with information, training, business assessment registrations and access to workstations during 2019.

The Centre has completed approximately 600 business assessments, provided the equivalent of more than 46,500 training days and supported some 20,000 entrepreneurs since it was established in 2010.

4 COMMUNITIES

EMPNG works with government and non-government organisations to build inclusive, resilient and sustainable Papua New Guinean communities. This is achieved through promoting the development of conditions that help strengthen communities so they can benefit from EMPNG's presence.

Community-based organisations such as women's groups are generating sustainable income through PNG LNG's community development support programs



2019 performance highlights

~PGK17M
ON LIVELIHOOD
PROJECT

Almost PGK17 million has been invested in the Community Livelihood Improvement Project since its inception in 2015.

~PGK2.5M
ON HEALTHCARE
FACILITIES

Some 40,000 patients will benefit from new health care facilities delivered in 2019.

4.1 COMMUNITY INVESTMENT

To support community and economic development in Papua New Guinea, EMPNG implements the Community Development Support Management Plan and community investment programs. The Plan covers education, health, livelihood support and law and justice.

Community development support activities within the Plan are conducted as appropriate to their relevant geographic area, which covers:

- local area programs in communities impacted by PNG LNG
- impacted provinces - programs which supports initiatives at the provincial level and includes activities aligned with provincial and local level governments and development partners
- national programs that include broader scale capacity building projects and support projects at provincial and local levels.

EMPNG spent PGK20.6 million (US\$6 million) on community investment programs in 2019 for education, health and community-based projects. This is in addition to almost PGK77 million (US\$22.6 million) spent on infrastructure enhancements, consisting primarily of roads, conducted under Infrastructure Tax Credit agreements.

Since the beginning of construction, EMPNG has invested more than PGK1 billion (US\$293.5 million) in communities and infrastructure.

4.1.1 Local area programs

Local area programs conducted in partnership with communities are intended to deliver sustainable agricultural outcomes, training and business development opportunities for women, quality education for school students and support for community-based health and wellbeing initiatives.

Upstream area and pipeline Right of Way

In May, EMPNG facilitated a visit to Komo Station in Hela Province by Papua New Guinea's stars of men's and women's rugby league, who delivered messages of determination, commitment and respect to local Komo Rugby League

Football Association players with the aim of encouraging peace in communities.

Clans are putting aside their differences and coming together in the spirit of sportsmanship through the Komo Rugby League Football Association, which has attracted 18 teams comprising 10 men's, six women's and two children's sides. EMPNG has donated players' jerseys to the Association.

More than 1000 people participated in Papua New Guinea's 44th annual Independence Day celebrations at Komo Station in September, with support from EMPNG. This was the first Independence Day to be celebrated in the area in 37 years.



Independence Day celebrations at Komo Station

In November, 80 people participated in a one-week course in rugby league knowledge in Komo. The training for rugby league administrators, coaches, referees and players was facilitated through the Southstar Sports Development Association with support from EMPNG. The Association also delivered basketball skills training to 60 participants from the Kutubu Moran Youth Development Foundation.



Basketball skills training participants from the Kutubu Moran Youth Development Foundation

National Rugby League coaches and players provided rugby league training and mentoring to Hides communities in December.

EMPNG has continued its support for the Kutubu Kundu and Digaso Festival, with a PGK50,000 (US\$14,675) donation for the 2019 event held in September. The Festival promotes Kutubu's rich socio-cultural traditions through dress, song, dance and food. The theme for this year's event was *Strongim na wok bung wantaim* or 'Strengthening and working together'. It attracted people from the Southern Highlands, Hela and the Gulf provinces. Over the past nine years, EMPNG has donated more than PGK300,000 (US\$88,050) to this important Festival.



A traditional *hausman* or 'longhouse' at the Kutubu Kundu and Digaso Festival. Longhouses are about 50 metres long and 7 metres wide, erected 1.5 metres off the ground, with the peak of the roof 5 metres from the floor. In Foe custom, the man sleeps in the longhouse while his wives and children live in smaller houses around it



EMPNG Field Operations Manager, Kim Hahn, with Foi women at the Kutubu Kundu and Digaso Festival

EMPNG also provided PGK13,000 (US\$3800) for the Digicel Foundation Men of Honour awards. The Foundation aims to break the cycle of violence through focusing on positive behaviour and affirmative action. Through the Men of Honour awards, communities are encouraged to identify male role models, not based on their achievements, but on their strength of character.

Support for Upstream area schools, in partnership with school boards and the Hela Provincial Government, in 2019 included: two new staff houses, a double classroom and sanitation facilities for Para Primary School; 15 laptop computers, a new staff house and sanitation facilities for St. Paul's Primary School in Komo; and school desks for Juni Primary School.

Solar lamps were donated to schools and community organisations throughout the Upstream area during the year.

Spotlight

Community Livelihood Improvement Project brings financial independence

Financial independence has been reported as the most significant change brought by the Community Livelihood Improvement Project, which is delivered in partnership between EMPNG and the ANU Enterprise Pty. Limited.

During 2019, a survey of 55 Project participants from the Hides area found that 80 percent of interviewees identified financial independence as the most significant change brought by the Project. This was followed by improved health, respect and education.

Since 2015, the Community Livelihood Improvement Project has helped community members improve their livelihoods and standards of living by generating household and group income from small enterprise development.

EMPNG has invested almost PGK17 million (US\$5 million) in the Project, which has reached some 20 community groups in Hides, Komo and Angore in the Hela Province. Fresh produce sales through the Project have grown from PGK9000 (US\$2641) in 2016 to more than PGK194,000 (US\$56,900) in 2019.



Members of Paija Iba Women's Agri Business Group Inc. selling produce at Mbelopa Village



Para Primary School Principal, Jeremia Naperaisa with school captains Malupe Tayape and Sandrica Timothy

Twenty-eight board members from 10 primary schools in the Komo-Magarima and Tari-Pori areas participated in leadership and governance training in September. The training is part of a continuing effort by EMPNG and the Hela Provincial Government to empower School Board of Management members in their roles and responsibilities and the positive impact they can have on school operations.

EMPNG supported the delivery of a five-day safe food handling training program for 30 participants from schools,

colleges, guest houses, hospitals, fast food shops and food stalls across Hela Province during the year.

LNG Plant site

In March, a new double classroom including office space for teachers, as well as desks, chairs and a water tank were provided to Maiari Salvation Army Preschool in Porebada Village through a partnership between EMPNG, the local community and Salvation Army.

Prior to the new classroom, the head teacher's house and a church building next to the teacher's residence served as classrooms for the Preschool's 81 students.

Papa Primary School received PGK40,000 (US\$11,740) from the Community Infrastructure Trust Fund for the addition of two double classrooms. The Fund represents a portion of landowner royalty payments derived from the production of PNG LNG, which is facilitated through the MRDC. The funds also covered the refurbishment of an existing classroom.

Redscar High School and Boera, Lea Lea and Papa primary schools have received new sanitation facilities through EMPNG's commitment to supplying clean water and sanitation for communities. Each school gained ten new student facilities, including showers, as part of the Papua New Guinea Water, Sanitation and Hygiene Policy 2015.



EMPNG Process Technician, Robert Elliot and EMPNG Senior Field Superintendent, Al Sandoval with Maiari Salvation Army Preschool students in Porebada



Redscar High School students receive new sanitation facilities through the Water, Sanitation and Hygiene program

Twenty-five teachers from six early learning centres near the LNG Plant site completed two weeks of teacher training provided by Buk bilong Pikinini in September with support from EMPNG.

Ten women from the Upstream area, five from pipeline ROW communities and five from the LNG Plant site villages completed an agribusiness short course offered through the Australia Awards PNG in 2019, in partnership with EMPNG and the University of New England. Following the course, two new tractors were donated to LNG Plant site villages to support local agricultural activities. The tractors were purchased through the Community Infrastructure Trust Fund. One will be shared between Boera and Porebada villages, while the other has been donated for the joint use of Papa and Lea Lea villages. Women's groups from these villages will charge a minimal fee to local farmers for their use.

The Advancing PNG: Women Leaders Network, in partnership with the Helaro women's group from Porebada, hosted a one-day gender-based violence education workshop at Boera Village in September. Some 40 women from LNG Plant site villages participated in the workshop.

4.1.2 National programs

The Port Moresby Nature Park, in a sister-zoo partnership with Zoos Victoria in Australia, is expanding its education program to cater for 24,000 children visiting each year on school excursions.

This program, which EMPNG supports, aims to reach 40,000 students each year by the end of 2020. In September, the Nature Park opened a long-awaited reptile house as part of its education and conservation activities. EMPNG donated nine laptop computers, two tablets, a data projector and a 54-inch flat screen television to the Nature Park in 2019.



EMPNG Production Manager, Keith Killian; Port Moresby Nature Park General Manager, Michelle McGeorge; Executive Director for Brian Bell Foundation, Ian Clough; Finance Manager for Red Sea Housing PNG, Saurabh Kaushik; and Wildlife Keeper, Ryan Reuma open the new reptile house at Port Moresby Nature Park

Founder and Chair of Mama Helpim Mama Inc. and Managing Director of Pacifica Women's Network, Ruth Undi and Papa Village Women in Agriculture President, Lucy Nunu, attended Global Women in Management (GWIM) training in Virginia, United States in July.

They are among 67 Papua New Guinean women who have participated in the GWIM program over the past decade. Since 2015, EMPNG has invested more than PGK20 million (US\$5.87 million) in women's empowerment and gender equality programs in Papua New Guinea.

Twenty-two women from the Pacifika Women's Network Trade Centre graduated from a business skills, financial freedom and Facebook management training course facilitated by *Grasruts Yuniversiti* or 'Grassroots University' in July. EMPNG supported this training as part of its commitment to the growth of Papua New Guinean businesses.

Thirty-two Papua New Guinean businesswomen have completed a 14-week Academy for Women Entrepreneurs online business course sponsored by EMPNG and the United States Embassy in Port Moresby.

The online business course is a pilot program that aims to equip women with the practical skills needed to create sustainable businesses. The course delivers online educational resources, fosters networking that supports mentorships and connects women to existing business support programs. It is provided for women who have operated a business for at least 12 months, are computer literate and have graduated from Year 12.



United States Ambassador, Erin McKee (centre front) and EMPNG Production Manager, Keith Killian (centre back), with Academy for Women Entrepreneurs course graduates

Twenty-three women from Boera, Papa and Lea Lea villages completed financial literacy training funded by EMPNG and delivered by Bank South Pacific in partnership with the Advancing Papua New Guinea: Women's Leaders Network during 2019. These women are leading capacity enhancing initiatives in their communities.

For the first time, two men completed advanced garment tailoring training funded by EMPNG and delivered through the Advancing Papua New Guinea: Women's Leaders Network in partnership with the Diari Tailoring Project. They joined 10 women from Papa Village who also completed the refresher training.

The men and women, who are now certified trainers, have provided sewing machine repair and garment tailoring training to another 30 women in their village.

Education and training

EMPNG has provided PGK230,000 (US\$67,500) to the Papua New Guinea University of Technology (UniTech) to help the Engineering department achieve Washington Accord accreditation. The Washington Accord is an international accreditation agreement that sets a standard for professional engineering degrees to be recognised by signatory countries. The University's Engineering department aims to have its bachelor degree internationally accredited by 2022.

Spotlight

New youth scholarship

Youth from communities impacted by the PNG LNG Project in four Papua New Guinean provinces now have access to a new scholarship with support from the Business and Professional Women's Association and EMPNG.

The scholarship, launched in October, supports students from the Hela, Southern Highlands, Gulf and Central provinces to further their education at vocational schools, technical colleges or universities throughout the country.

EMPNG Managing Director, Andrew Barry, said the company was committed to building human, social and economic capacity in a way that benefited Papua New Guinean people, communities and businesses for the long-term.

"We have long said education is the cornerstone to Papua New Guinea's future. It is our hope that this program will positively impact youth from the PNG LNG operational areas by providing them with the opportunity to further their education so they can return and contribute to the development of their home communities and the nation," he said.

A minimum of 30 scholarships will be awarded to students with relevant entry-level qualifications from across the PNG LNG operational area in 2020 – this is made possible by a PGK300,000 (US\$88,000) grant through EMPNG.



Gulf Province Governor, Hon. Chris Haiweta; Hela Province Governor, Hon. Philip Undialu; Business and Professional Women's Association President, Jessinta Wagambie; EMPNG Managing Director, Andrew Barry; and Central Province Governor, Hon. Robert Agarobe at the launch of the youth scholarship program



Teachers receive professional development through EMPNG and the Kokoda Track Foundation

EMPNG continues to support the Kokoda Track Foundation with the professional development of teachers in Papua New Guinea. With EMPNG's support, the Foundation has trained more than 3600 elementary school teachers across 14 provinces since 2016 through the Teach for Tomorrow program. In August, a train-the-trainer program began in the Gulf Province and was delivered by elementary school teacher trainers who had previously completed the Teach for Tomorrow program. The train-the-trainer program was extended into the Southern Highlands in September and included a 10-day professional learning exchange program in Sydney, Australia.

Science Ambassador Program

More than 770 students from 22 Papua New Guinean schools participated in the ExxonMobil Science Ambassador Program in 2019. This global ExxonMobil Program encourages high school students to consider careers in science, technology, engineering and mathematics through interactive educational activities.

It involves practical experiments and lessons on topics such as rocks and geology and the origins of oil and gas. Students also build solar lights during these classroom sessions. In 2019, some 100 EMPNG volunteers delivered the Program.

More than 5000 students have participated in the Science Ambassador Program during almost 90 classroom visits across Upstream area, LNG Plant site villages and Port Moresby schools since it was introduced to Papua New Guinea in 2013.

Community health

EMPNG's approach to community health considers the social and cultural processes through which communities experience, perceive and respond to health impacts.

As part of this approach, EMPNG has maintained its partnership with the Texas Children's Hospital and Baylor College of Medicine since 2014 to support maternal and child health outcomes in Papua New Guinea. In 2019, the national community tuberculosis health program was handed over to local healthcare providers who had received training from Texas Children's Hospital doctors.

The EMPNG and Texas Children's Hospital partnership continues to work on a children's tuberculosis program at Tari Hospital.

Over the past five years, 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.

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



Para Primary School students participating in the Science Ambassador Program

Spotlight

Supporting healthy communities

EMPNG has funded the construction of a new health centre facility at Juni in the Hela Province. The new facility includes two inpatient wards, antenatal and postnatal care facilities, emergency and dispensary rooms, a drug storeroom, procedure rooms and counselling and testing for HIV and AIDS. An existing Para Health Centre also received one new staff house, three renovated staff houses and a refurbished patient waiting area to help support its more than 6500 patients a year. The Mananda Health Centre received new outpatient services, inpatient wards, antenatal and postnatal care and counselling and testing facilities for HIV and AIDS during the year.

EMPNG has committed PGK30,000 (US\$8800) to the Benaria Health Centre for the completion of a new three-bedroom staff house with solar lighting and refurbishment of an existing staff house and clinic building that were damaged in the 2018 earthquake. The Health Centre provides: immunisation; inpatient and outpatient care; HIV/AIDS testing and counselling; antenatal and postnatal support; and community health outreach services to the local community.

A new Porebada Health Centre was opened in 2019. The facility serves Porebada Village and the nearby communities of Papa, Lea Lea, Boera and Roku. The PGK1 million (US\$293,500) Health Centre was funded by landowner royalty payments derived from PNG LNG production, facilitated through the MRDC and administered through the Community Infrastructure Trust Fund. The Centre includes patient beds, a delivery room, an emergency procedure room, a consultation room, administration offices, a meeting room, a pharmacy and an outpatient area. It provides health services to some 30,000 people who previously had to travel to Port Moresby for treatment. EMPNG provided medical equipment for the new health centre.

All of these health facilities were delivered in partnership with government, non-government organisations and communities. Their operations are managed by provincial governments and local non-government organisations.



Opening of the new health centre facility at Juni



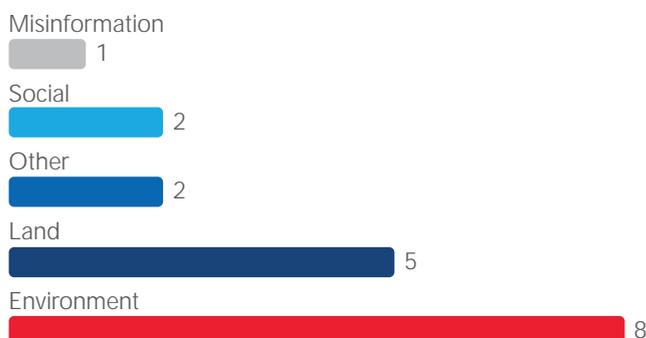
The Mananda Health Centre was upgraded in 2019 with funding support from EMPNG

4.2 COMMUNITY GRIEVANCE MANAGEMENT

Over the past decade, PNG LNG has maintained a community grievance mechanism that appropriately responds to community concerns regarding potential adverse impacts of the project.

In 2019, 18 grievances were registered and categorised compared to 59 grievances in 2018. The number of grievances registered during 2019 is shown by category in Figure 4.1.

Figure 4.1 – Grievances



Number of registered grievances by category for 2019

Of the 18 grievances recorded, eight related to environmental matters. Two were raised for impacts to gardens and a dwelling during a helicopter operation, three regarded impacts to plants and trees, one claim related to surface damage as a result of earthquake repair activity, one claim concerned a pool of water collecting in a spoil dump area and one claim was raised during an Angore construction survey exercise. Seven of these grievances were closed, leaving one, which was raised in December 2019, requiring additional work to close out.

Five land-related grievances were recorded during the year. Two of these concerned land compensation claims for gravel extraction to support the Angore Gathering System and earthquake repair works at Komo Airfield. One regarded a Clan Compensation Agreement payment claim by a clan that was not part of an existing agreement.

One related to an overdue deprivation payment and the last related to a tree felling activity conducted by a community member who wanted to be paid for his services.

All land-related grievances were addressed and closed except for the grievance relating to tree felling activity, which was reclassified as an issue.

Two social grievances were recorded with regard to a claim for a garden payment and the payment of wages for casual workers undertaking remedial works. Both were addressed and closed.

Four outstanding grievances raised during 2018 were also addressed and closed during 2019.

4.3 RESETTLEMENT

EMPNG aims to avoid resettlement resulting from construction activities. In situations where resettlement is unavoidable, the company's objective is to improve, or at least restore, the standards of living and livelihoods of displaced persons.

In 2019, a pre-construction survey conducted in Angore identified nine households and associated gardens that required resettlement due to land access required for the construction of Angore Wellpad C. Following the completion of the field surveys, a Resettlement Action Plan was prepared and approved by the Lender Group's Independent Environmental and Social Consultant (IESC) in November. Negotiation and discussion with impacted households is underway.

Following the February 2018 earthquake, several areas along the pipeline Right of Way (ROW) were identified as requiring maintenance and repairs that necessitated additional land access. While no households were resettled during 2019, work continues on assessing land requirements associated with these repairs. One household that was resettled in 2018 continues to receive livelihood restoration assistance and is monitored to ensure their standards of living are maintained or improved.

4.4 COMPENSATION

Nineteen Clan Agency Agreements were signed during 2019 and compensation payments made to landowning clans for land access along 3 kilometres of the pipeline ROW from Maruba to Dagia River in Homa. This allowed access into Main Line Valve 1 Station at Benaria.

During the year, over 300 deprivation payments were completed via electronic transfer. Three payments remain outstanding due to internal clan disputes but will be paid once the disputes are resolved.

4.5 VOLUNTEERS

More than 250 EMPNG staff contributed over 1000 volunteer hours during 2019. In March, 116 EMPNG volunteers supported World Wildlife Day activities at Port Moresby Nature Park.



World Wildlife Day activities at Port Moresby Nature Park

In June, EMPNG volunteers participated in World Environment Day activities including tree planting and lessons about 'Preserving and Protecting Today for Tomorrow' at Juni Primary School.



Juni Primary School students learn about 'Preserving and Protecting Today for Tomorrow' during World Environment Day

EMPNG volunteers supported the Komo Rugby League Football Association with up to 20 volunteers helping out at weekly games between April and September.

To support National Literacy Week in September, EMPNG volunteers helped school students build their own robots as part of activities conducted in partnership with Buk bilong Pikinini.



Children proudly show their robot creations during National Literacy Week

EMPNG has donated problem solving kits to 21 Buk bilong Pikinini's Early Childhood Development learning centres across Papua New Guinea to engage young children in science, technology, engineering and mathematics.

In October, EMPNG volunteers supported a beach clean-up activity at Papa Village and volunteers donated eight boxes of library books to Juni Primary School in November.

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.



EMPNG volunteers show their support at the inaugural Bel isi PNG Elimination of Violence Against Women Walk

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 supports and works closely with Bel isi PNG, which is a public-private partnership that provides abuse victims with access to confidential services.

EMPNG volunteers also gave the Lea Lea United Church and Boera Women's Fellowship Hall a fresh coat of paint during 2019, as well as helped the Life PNG Care Mobile Education Program build 100 lap desks for students and distributed Christmas presents to children in hospitals in December.

CASE STUDY: PIKU GOES BACK TO THE WILD

Through EMPNG's support, 15 pig-nosed turtles (*Carettochelys insculpta*), or *Piku*, raised through a conservation program at the Port Moresby Nature Park were returned to the wild in August.



Pig-nosed turtle being weighed in a laboratory at the Port Moresby Nature Park



The turtles were part of the Nature Park's 'Head Start' conservation program intended to protect the pig-nosed turtle, which is classified as endangered in the International Union for Conservation of Nature Red List of Threatened Species.

The pilot program started in March 2015, when 47 pig-nosed turtle hatchlings were relocated from their original nesting site to the Port Moresby Nature Park by the University of Canberra, Australia, with permission from Kikori River Catchment Area landowners and relevant authorities. The Head Start program is a key component of a Piku captive development research project that aims to gain insights into the turtle's growth and development.

In August 2019, once the turtles had reached a size of approximately 15 centimetres in shell length, the first 15 turtles from the program were released back into the wild.

The Head Start program is proving successful in giving Piku hatchlings the best chance of survival and growth while at the Nature Park, due to the availability of food and absence of natural predators.

During the past five years, while the turtles were kept at the Park, they were weighed weekly and measured monthly. All data recorded will be published in a research paper to document the growth rates of pig-nosed turtles from hatchling to adolescence.

Piku Biodiversity Network Inc. Director Yolarnie Amepou, said: "There is a real threat to the survival of the pig-nosed turtle as more pressure is being applied from poaching of turtle eggs and adults for food consumption, trade and traditional medicine".

After a thorough health examination and approval by the relevant authorities, permission was given to return the first 15 pig-nosed turtles from the Head Start program back to their original nesting site in Kikori on 28 August.

Accompanied by their Port Moresby Nature Park animal carer and a Conservation and Environment Protection Authority (CEPA) wildlife officer, the turtles were met by the Piku Biodiversity Network Inc. and local landowners from Babai and Apeawa villages, who are committed to protecting the turtle species. The turtles were released under one of their favourite feeding trees, close to where they were originally taken from their nest.

On their release, the turtles were observed feeding on the fallen fruit and one individual came up on to the mudflat before heading back into the water.

"It was a very good sign to see them feeding on wild food and looking comfortable in their natural surrounds," Ms Amepou said. "This is the first pig-nosed turtle program in the world that has removed turtle hatchlings and later returned the turtles to their natural habitat."

The remaining turtles from the pilot program will be returned to the wild in 2020.



Measuring turtle shell growth



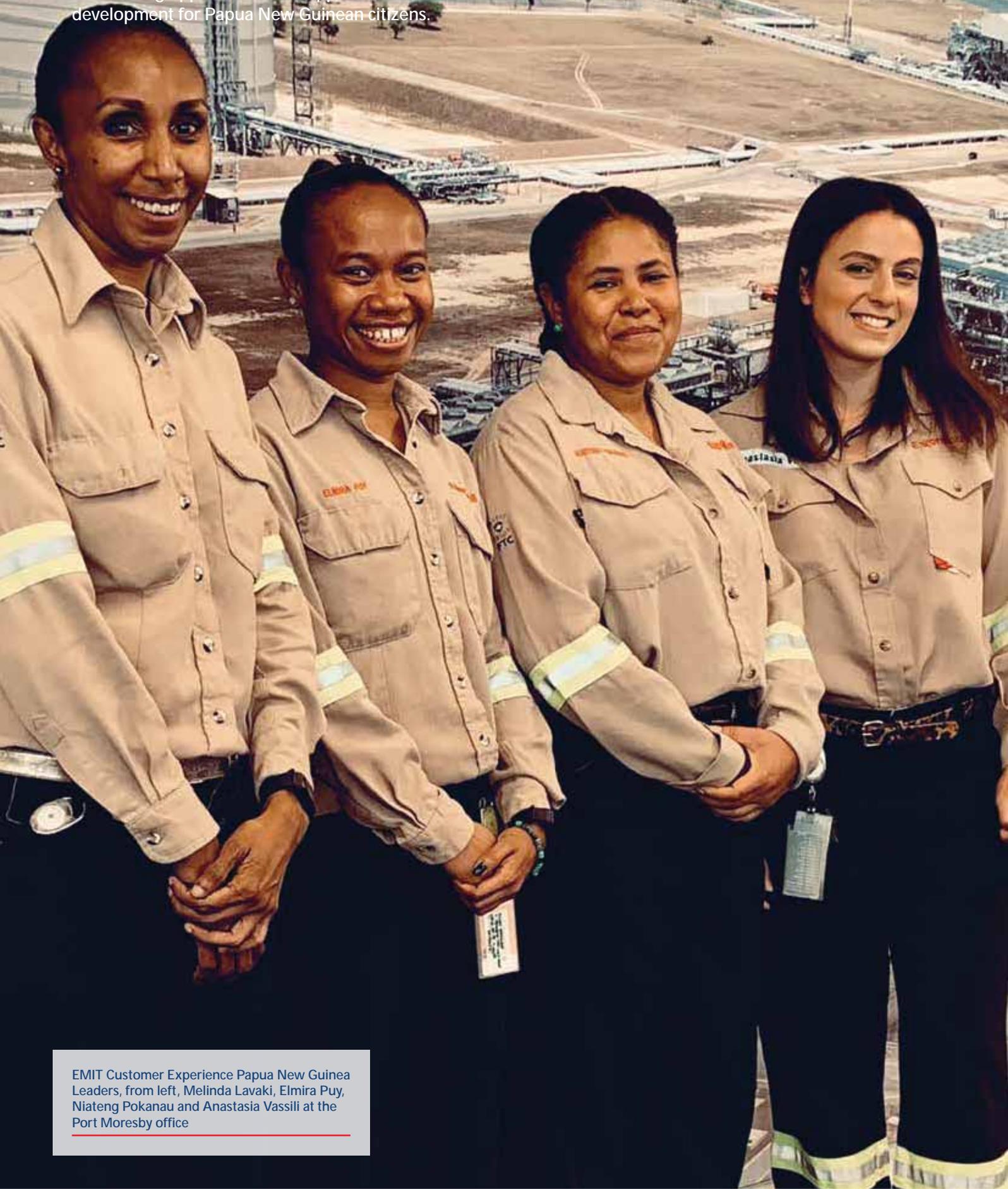
A Piku Biodiversity Network representative examines a pig-nosed turtle prior to its release



Releasing one of the 15 turtles

5 WORKFORCE

EMPNG is committed to providing employment and training opportunities to support career development for Papua New Guinean citizens.



EMIT Customer Experience Papua New Guinea Leaders, from left, Melinda Lavaki, Elmira Puy, Niateng Pokanau and Anastasia Vassili at the Port Moresby office

2019 performance highlights

3964
WORKERS

At the end of 2019, 3964 employees and contractors were working for PNG LNG.

86%
PAPUA NEW
GUINEAN WORKERS

The PNG LNG workforce includes 3411 Papua New Guinean citizens, comprising 86 percent of the total workforce.

>96,700
TRAINING HOURS

During 2019, the equivalent of more than 96,700 hours of training were delivered through more than 2570 courses to over 37,300 employee and contractor training participants.

>57M
PRODUCTION
HOURS WORKED

EMPNG has recorded no Lost Time Incidents for more than two years and no significant process safety events for almost six years.

5.1 WORKFORCE COMPOSITION

At the end of 2019, 3964 workers, including employees and contractors, were working for PNG LNG. This is an increase of nearly 730 workers compared to 2018 because of construction activities related to earthquake repair works and the restart of the Angore Gathering System project.

The PNG LNG workforce includes 3411 Papua New Guinean citizens, comprising 86 percent of the total workforce. Seventeen percent of the Papua New Guinean workforce is female.

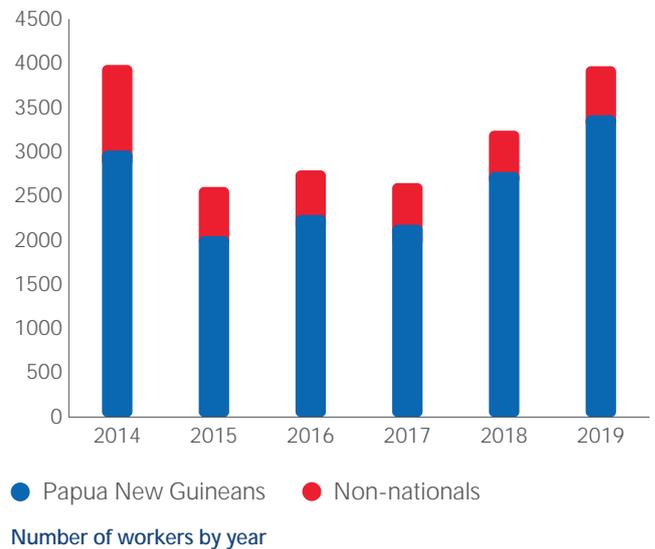
The PNG LNG workforce at the end of 2019 is similar to the workforce at the start of production; however, in 2019 the percentage of Papua New Guinean workers had grown by 10 percent, as shown in Figure 5.1, which demonstrates EMPNG's commitment to nationalising the production workforce.

Fifty-eight percent of the PNG LNG workforce is based in the Upstream area, with another 26 percent based at the LNG Plant site. The remainder of the workforce is based in other locations, such as the Port Moresby office.

EMPNG and its contractors focus on recruiting workers from areas near production facilities wherever possible.

Of the 3411 Papua New Guinean citizens in the PNG LNG workforce, 50 percent are based at worksites in their local area.

Figure 5.1 – Production workforce



EMPNG Managing Director, Andrew Barry and EMPNG former Production Manager, Dinesh Sivasambo welcome EMPNG's new employees and interns

Almost one-third of the workforce is from broader regional areas where the company operates. About 20 percent of Papua New Guinean workers are employed from other areas of the country.

EMPNG provides a broad range of career opportunities for employees. Forty-two new Papua New Guinean EMPNG employees were recruited during 2019 in the areas of operations, maintenance, engineering, technical, human resources, procurement, information technology, law and safety, health and the environment. Since 2011, more than 170 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.

5.2 WORKFORCE TRAINING

EMPNG provides access to in-house training and externally delivered courses that aim to build the technical proficiency of its workforce and give workers transportable skills to support their long term career development. This includes occupational health, safety, environmental and emergency response training. Contractors also deliver training to their personnel that is relevant to their scopes of work.

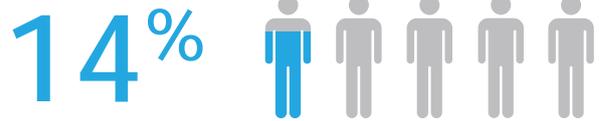
During 2019, the equivalent of more than 96,700 hours of training were delivered through more than 2570 courses to over 37,300 employee and contractor training participants. Ninety-eight percent of all training hours were delivered to Papua New Guinean citizens, of whom 30 percent were women.

2019 PNG LNG workforce summary

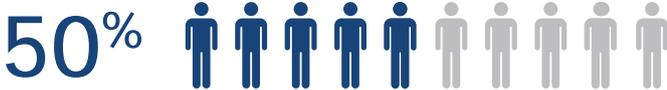
 PAPER NEW GUINEANS IN THE PNG LNG WORKFORCE



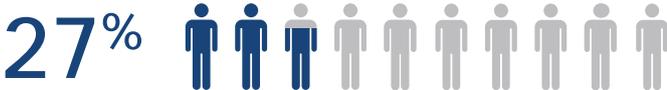
 NON-NATIONALS IN THE PNG LNG WORKFORCE



PRIORITY 1



PRIORITY 2

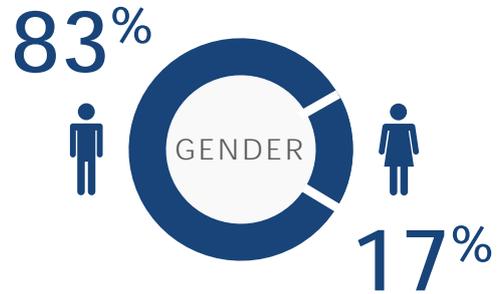


PRIORITY 3



- PRIORITY 1** Papua New Guinean citizens of local origin proximate to PNG LNG operations
- PRIORITY 2** Papua New Guinean citizens of regional origin (Southern Highlands, Hela, Western, Gulf, and Central provinces and the National Capital District)
- PRIORITY 3** Papua New Guinean citizens originating from elsewhere in Papua New Guinea

'PNG LNG workforce' includes 'workers' consisting of: 'employees' comprising direct EMPNG employees for PNG LNG and staff contractors; and 'contractors', meaning third party contractors.



 ALL WORKERS IN THE PNG LNG WORKFORCE

UPSTREAM AREA



LNG PLANT



PORT MORESBY OFFICE



Spotlight

Papua New Guinean workforce grows

The number of Papua New Guineans working on PNG LNG has grown by 10 percent since the start of production in 2014.

Papua New Guinean workers comprise 86 percent of the EMPNG workforce, a growth of 10 percent in the past five years. Conversely, EMPNG's non-national workforce has declined by 10 percent.

"The significant growth in roles occupied by Papua New Guinean citizens demonstrates the high calibre of our local workforce," said EMPNG Managing Director, Andrew Barry.

"It also shows the many career opportunities that are available to Papua New Guinean workers."

Benjamin Petrus from Hela Province is among workers who have grown their career with EMPNG. He was part of the second intake of Operations and Maintenance trainees who began their training in 2012.

After one year of basic skills training, Benjamin completed a year of advanced skills training with the Institute of Technology Petroleum Petronas in Malaysia. He returned to Papua New Guinea in 2013 as an Operations Trainee Technician under the supervision of non-national mentors. In 2015, Benjamin was promoted to Technician Level 1 for HGCP operations. By 2017, he had replaced his non-national mentor and was promoted to Technician Level 2 for the Hides Spine and wellpad operations.

"It was a personal goal of myself and several trainees, including Lape Laima, Moses Pilimbs and Manuel Dorum, to nationalise wellpad and spinline operations," Benjamin said.

"Through hard work, commitment, encouragement from EMPNG and supporting each other to step up, we all achieved this goal by early 2019.

"We now feel responsible for the whole operation and confident that management trusts the national workforce to be in charge of the Papua New Guinea hydrocarbon producing wells."

Benjamin, who left university early to join the Operations and Maintenance training program, said he had no regrets about his decision.

"This has been my dream. With the international standard training that EMPNG offers, you can work anywhere in the world."



Benjamin Petrus, Operations Technician

5.2.1 EMPNG workforce training

EMPNG employees received the equivalent of more than 68,000 hours of training in 2019. This was provided to some 2700 participants through approximately 1900 different courses. This is an increase of nearly 15,000 training hours compared to 2018, primarily due to training required for implementation of a new Work Management System during 2019. Since the start of production, the equivalent of almost 296,000 hours of training has been delivered to more than 14,600 course participants.

Training focuses on building the technical skills of the production workforce in areas such as the Work Management System, records management, emergency response, business conduct and cyber security awareness. Sixty-eight percent of EMPNG training participants during 2019 were Papua New Guinean citizens. Of these, 33 percent were women.

Cultural awareness training remains an important component of the EMPNG training program.



An Upstream area emergency response drill using a simulated fire

This was delivered to 28 participants during 2019 through site inductions and specific cultural awareness training sessions. An additional 10 participants undertook supervisor cultural awareness training.

Engineering and technical professionals

EMPNG is piloting an Engineers in Operations development program for newly appointed engineers. This involves one week of orientation and six weeks of the new engineers shadowing operations and maintenance personnel to help the new employees establish working relationships and better understand work activities in the field.

Spotlight

Welcome to our new engineers

EMPNG has employed a team of new engineering graduates who are now among some 40 Papua New Guinean engineering graduates recruited during the production phase.

Graduates Joachim Kiliu and Naomi Kenny have been hired as Instrument and Controls Engineers; Samuel Nanggore is an Electrical Engineer; Christopher Odorry is a Measurement Engineer; Kimberly Sabarei and Jovina Wallen are Surveillance Engineers; Jimmy Simatab is a Machinery Engineer; Solomon Sova and Janson Wakma are Geotechnical Engineers; and Kazieh Gaisa Tagannay is an Integrity Engineer.

Joachim Kiliu said he would use the opportunity with EMPNG to challenge himself and develop his engineering skills so that he could play a role in Papua New Guinea's growth.

Naomi Kenny said she wanted to effectively contribute and be part of a team, with the aim of preserving the local environment and achieving positive results for the company.

Jimmy Simatab said he aspired to push himself beyond his current abilities and acquire vast engineering knowledge and skills.



New engineer recruits Naomi Kenny and Joachim Kiliu

As part of EMPNG's commitment to developing Papua New Guinean engineers, 11 graduate engineers were engaged for EMPNG operations, while many of the existing Papua New Guinean engineers advanced their careers during the year. In June, Gerard Schulze became the first Papua New Guinean to hold the role of Surveillance Engineering First Line Supervisor. Immaculate Wanjik advanced to the position of Safety, Health and Environment Risk Management Advisor, and Geotechnical Engineer, Gini Solien was promoted to Joint Interest Advisor. Gini also became chair of the Women in Energy Network, while Machinery Engineer, Andrew Hemetsberger, became Deputy Chair of the Institution of Engineers Papua New Guinea's Port Moresby chapter.



EMPNG Engineer Technician, Nerolyn Verave with Machinery Engineer, Andrew Hemetsberger; Civil Engineer, Cedric Moy; and Geotechnical Engineer, Solomon Sova

EMPNG continues to provide international career development opportunities for Papua New Guinean engineers. During 2019, Project Engineers, Ronald Smare and Vili Ravusiro undertook work assignments in Melbourne, Australia; Machinery Engineers, Pete Pomeleu and Lloyd Worri participated in gas turbine engine teardown and testing in Massa, Italy; and Measurement Coordinator, Sidney Isaiah attended dry docking of an LNG cargo ship in Singapore. Machinery Engineer, Stephen Marinjemi has been providing significant support to ExxonMobil's global operations including attending conferences on behalf of the company in the United States and Middle East, and supporting major turnaround activities in Angola.

New graduate engineers attended production engineering overview sessions in Calgary, Canada and Houston, USA in 2019.

Surveillance Engineer, Christine Sahuburua co-authored a joint technical paper for the international LNG2019 event, which she attended in Shanghai, China, in April.

Machinery Engineer, Lloyd Worri and Engineering Technician, Mea Vai, presented EMPNG's engineering operations to Papua New Guinea's Minister of Petroleum, in August.

Spotlight

Training the future workforce

EMPNG engineers are helping train Papua New Guinea's future workforce through structured programs with UniTech and University of Papua New Guinea.

Through a collaboration between EMPNG and UniTech's Department of Engineering, students are learning new approaches to solving real-world problems through data insights.

A team of EMPNG engineers has established the JMP (pronounced Jump) Ahead Data Analytics Program to enhance data analytics skills among Papua New Guinean university students. During 2019, 35 UniTech students and five professors were trained through this Program.

"EMPNG is at the forefront of a lot of digital transformation initiatives so this program helps to bridge the gap from university to a production environment," said EMPNG Engineering Technician, Mea Vai.

EMPNG is also delivering a geology program for University of Papua New Guinea geology students. In September, two lecturers and 25 students participated in three days of interactive sessions where they learned about real-world challenges faced by geologists and geophysicists at energy companies. The students were shown advanced tools and techniques to evaluate and calculate results of drilling, giving the students the opportunity to complete their own analysis. This is the second year that EMPNG has hosted a geology workshop for University of Papua New Guinea's students.



Final year geology students from the University of Papua New Guinea displaying their certificate of participation at the three-day workshop facilitated by EMPNG

Some of the key operational activities that engineers were involved in during the year included:

- pipeline ROW field survey work by Geotechnical Engineers, Solomon Sova and Cedric Moy
- drone inspections led by Integrity Engineer, George Kovea and Engineering Technician, Francis Avel
- coordination of the pipeline pigging campaign by Integrity Engineer, Keiguma Oviri.

In May and June, Machinery Engineers, Lloyd Worri, Peter Pomeleu, Alma Gaso and Sam Maihua provided 24-hour coverage for major machinery maintenance at the LNG Plant and HGCP. This was the first time HGCP machines received a Level 2 service, which included turbine replacement.

In June, EMPNG engineers showcased engineering, environment and other career opportunities at the UniTech Roadshow in Lae.



EMPNG engineers and human resource advisors at the UniTech Roadshow in Lae

Engineers Mea Vai, Christopher Odorry and Naomi Kenny helped to develop EMPNG's digital roadmap for the future as part of a digital transformation workshop held in November.

Eight Papua New Guinean university students were hosted as interns with EMPNG during the 2019/20 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.

Operations and maintenance

EMPNG continues to provide opportunities for Operations and Maintenance technicians. During the past decade, some 220 Papua New Guineans have been recruited through the 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 fifth intake of Operations and Maintenance technician trainees completed their 12-month Junior Technician program at the Kumul Petroleum Academy in December. This was the second intake of EMPNG-sponsored trainees to undertake their training through the Academy in Port Moresby. The 27 Junior Technicians from the fifth intake, including 10 women, will start on-the-job training at the LNG Plant in early 2020. Of the 27 trainees, eight are from local areas close to PNG LNG operations, nine are from the provinces in which PNG LNG operates and 19 are from other regions in Papua New Guinea.



Theory training for the fifth intake of Operations and Maintenance trainees

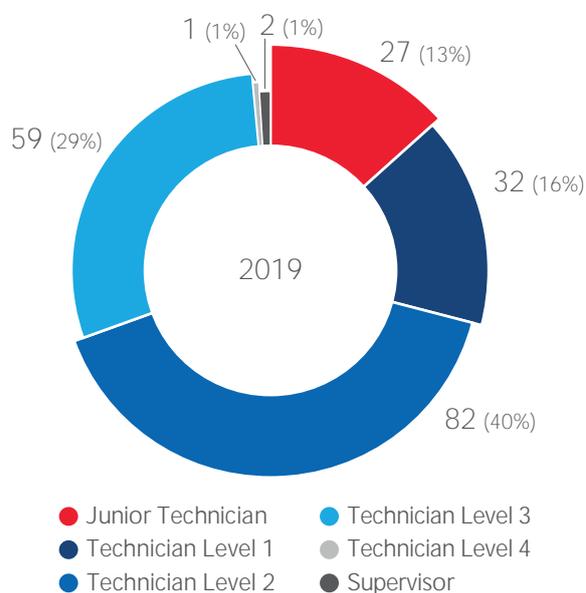
A total 203 Operations and Maintenance technicians, including 52 women, are currently employed with EMPNG. Sixty-five of the Operations Technicians are based at the LNG Plant, with the other 40 based at the HGCP. For the maintenance disciplines, 35 are Mechanical Technicians, another 33 hold roles as Instrumentation Technicians and 28 are Electrical Technicians.

By the end of 2019, 26 out of 32 Control Room Technician positions (more than 80 percent) were filled by Papua New Guinean citizens, including 10 women who represent 38 percent of Papua New Guinean Control Room Technicians. During 2019, two technicians broadened their skills as technical report writers and another four technicians as Safe Choice Trainers.

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.

Thirty-nine percent of Operations and Maintenance technicians progressed to the next Technician Level during 2019. The current levels of Operations and Maintenance technicians are shown in Figure 5.2.

Figure 5.2 – Operations and Maintenance technicians



Number and percentage by Technician Level

In August, 13 of the HGCP Operations technicians visited the Longford Gas Plant fire training ground in Australia to learn best practice emergency response procedures.



A toolbox talk being conducted at Komo Airfield

The technicians completed three days of practical firefighting and one day of practical confined space entry training followed by a tour of the Gas Plant.

The sixth intake of Operations and Maintenance trainees attracted more than 2000 applicants, with 18 selected to begin training at the Kumul Petroleum Academy in March 2020.

Operations and Maintenance technicians also participated in a Year 12 careers expo in Port Moresby during 2019 to promote training and job opportunities with EMPNG.

5.2.2 Contractor training

Contractors provided the equivalent of 28,710 hours of training in 2019 to more than 34,680 Papua New Guinean course participants through some 682 different courses. This was a significant increase compared to some 7100 course participants trained in 2018 when work stopped in the Upstream area as a result of the earthquake.

Forty-four percent of the contractors who participated in training were located in the Upstream area, with another 44 percent located at the LNG Plant and 12 percent at contractor offices and other offsite locations. More than half of the contractor workforce training participants were employed from local communities and one in five from a province in which PNG LNG operates, with approximately one in eight from elsewhere within Papua New Guinea. Training topics included Work Management System fundamentals, emergency preparedness and response, first aid, safe driving, tuberculosis awareness and working at heights.



EMPNG workers undertake first aid training

5.3 WORKFORCE HEALTH

EMPNG supports the health of its workforce through high quality medical, public health and industrial hygiene programs at all worksites.

Spotlight

Building a Culture of Health

In March, EMPNG introduced a Culture of Health program to help workers proactively manage their health. The program consists of four elements: biometric screening; health promotion and awareness; nutritional awareness; and physical activities.

The biometric screening element provides health screening such as blood pressure, body mass index and blood sugar testing at site clinics. More than 1000 workers underwent biometric screening during 2019 and 20 medical referrals were made for workers with underlying health conditions.

Health promotion and awareness involves health-related toolbox talks and the distribution of health education materials. For example, as part of World No Tobacco Day, a Quit Smoking campaign was offered to workers who wanted to quit smoking. The campaign included the provision of free nicotine gum for employees enrolled in the campaign.

The nutritional awareness element aims to raise awareness of healthy nutritional practices with the workforce. As part of this element, water infused with different fruits and boxes of fruit have been made widely available to workers. Important messages about the nutritional content of food was also advertised in dining halls at all worksites.

The fourth element helps workers maintain fitness levels through organised physical activities. During 2019, physical activities included a Walk the Pipeline challenge involving 25 teams at the HGCP and bicycle riding at the LNG Plant. Organised sports such as volleyball, basketball and touch football were conducted at both worksites.



Upstream area Safety Specialist, Natalio Liares promoting the new Culture of Health program, which is helping EMPNG workers to proactively manage their health

In 2019, EMPNG's Medicine and Occupational Health team was recognised with an ExxonMobil Global Health and Safety Award for the second consecutive year. In 2018, the team received the Award for their contribution to raising mental health awareness in the workplace. The 2019 Award recognised the team's review of the Malaria Control Program, which involved the adoption of a fit-for-risk approach that included removing the requirement for Port Moresby-based non-nationals to take malaria chemoprophylaxis.



EMPNG's Medicine and Occupational Health team was recognised with an ExxonMobil Global Health and Safety Award

Medical

More than 14,000 patient consultations were conducted across camp clinics during the year, with over 8400 people treated in the Upstream area and almost 6000 patient consultations at the LNG Plant site clinic.

In April, EMPNG Medical Advisor, Dr Valentine Kolant, attended the Society of Petroleum Engineers Asia Pacific Health, Safety, Security, Environment and Social Responsibility symposium in Kuala Lumpur, Malaysia. Dr Kolant also undertook offshore training with ExxonMobil Malaysia.

Approximately 2400 workers received tuberculosis screening during the year. Six active tuberculosis cases were identified and managed. All cases were community-acquired with no transmission in the workplace.

EMPNG conducted 10 non-work-related emergency medical evacuations. EMPNG has improved its medical evacuation capability by installing stretchers on chartered aircraft to help support the transportation of ill patients.

Public health

Infectious disease outbreak management training was delivered to workers at the LNG Plant and in Upstream area facilities during 2019. Health inspections were also conducted to ensure EMPNG was maintaining high camp health standards in the areas of: hygiene and sanitation; food and potable water safety; vector surveillance and control; and infectious disease management.

Polio, measles and influenza vaccinations continue to be offered to the workforce as part of the infectious disease management program.

One work-related gastroenteritis outbreak involving eight cases was recorded in November at an Upstream area facility. The affected workers were isolated to contain the outbreak and all fully recovered following first aid treatment.

EMPNG continues to commemorate annual health days to raise awareness with workers and local communities.

World Tuberculosis Day was commemorated in March with toolbox talks at worksites and a lunch-and-learn session at the Port Moresby office.

In April, EMPNG participated in World Malaria Day with toolbox talks and a lunch-and-learn session at the Port Moresby office featuring presenters from Rotary Against Malaria. EMPNG's malaria awareness mascot, Mr Buzz, attended the lunch-and-learn session.

In December, World AIDS Day was observed with employee awareness sessions at all worksites. The 2019 theme was 'Communities make the difference'.

Industrial hygiene

EMPNG's industrial hygiene programs are intended to protect workers through the assessment, control and communication of potential health hazards in the workplace.

Industrial hygiene inspections were conducted during 2019 to ensure that industrial health program requirements were being met and associated health control measures were in place for activity-specific tasks. The inspections covered activities such as welding, painting, abrasive blasting, laboratory operations, management of hazardous materials and the use of respiratory protection.

Health inspections were conducted on accommodation rooms designated for EMPNG-use within Oil Search Limited's Gobe Camp to identify potential health risks, assess conditions of the rooms and provide recommendations on identified gaps.

A minimum health requirements toolkit for remote work locations was distributed to Upstream area worksites during the year. The toolkit is being used as a template to address public health and industrial hygiene expectations as part of contractor mobilisation for remote camps.

Respirator storage bags have been issued across all sites to ensure workers properly store their respirators. The bags include reminders of the five key steps of respirator use and care.

Eighty-six exposure assessment interviews were completed with field teams and 100 chemical and noise monitoring samples were collected for analysis in 2019. Worker groups and tasks were reassessed to identify if there was a significant change in workplace exposure such as an increase in noise levels, or a change in work procedures impacting the control of chemical exposure.



EMPNG clinics provide health screening for workers

The Industrial Hygiene team supported maintenance activities at the LNG Plant and Upstream areas through the assessment of potential health exposures and recommendation of control measures, such as ensuring the use of appropriate personal protective equipment for respiratory, hearing and skin protection.

Industrial Hygiene Technicians supported pigging operations at the HGCP and LNG Plant, including evaluating exposures to potential health hazards and ensuring requirements were met for benzene, hazardous materials and radiation sources. Air and noise monitoring were also conducted to analyse and manage worker exposure during this activity.

An online Hazardous Materials Management Program was introduced during 2019. This enables workers and contractors to continuously update information about hazardous materials across EMPNG's worksites. The online portal is now the central repository for all approved hazardous materials used for EMPNG operations.

Other strategic initiatives

The Industrial Health team is training Environmental Health Technicians from a third party medical provider to perform basic industrial hygiene work. Their training covers air and noise monitoring, and specific industrial hygiene inspection requirements. This will allow Environmental Health teams to be better prepared to respond to urgent issues in the absence of an on-site Industrial Hygiene Technician.

In October, EMPNG Industrial Hygiene Technician, Oripa Popat, provided support for Australia's Altona Refinery during turnaround activities. This included working alongside the Altona Refinery Industrial Hygienist to ensure identified health risks in the form of benzene, noise, mercury and asbestos were evaluated, monitored and adequately controlled to safeguard worker health and safety.

A Papua New Guinea laboratory is now being used to test food samples from camp kitchens to ensure food safety for workers. Previously, food samples were tested in a laboratory in Australia.

EMPNG Medicine and Occupational Health Medical Advisor, Dr Cain Kapiri, presented an overview of EMPNG's occupational health programs at the 4th National Environmental Health and Safety Symposium in Madang in September. The theme of the Symposium, organised by Divine Word University, was 'Collaborative Partnership in Promoting Environmental Health and Workplace Health and Safety in Papua New Guinea'.

The Medicine and Occupational Health team conducted Mental Health Week activities in October, to align with the World Mental Health theme of 'Suicide Prevention'.

EMPNG activities were themed *Yu ok? Wanwok bilong yu ok?* meaning 'Are you okay? Are your work colleagues okay too?' and involved supervisors' workshops at all worksites, which focused on managing mental health in the workplace.

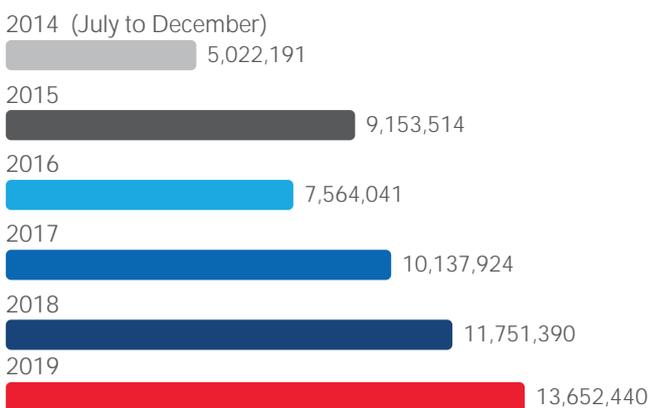
5.4 WORKFORCE SAFETY

EMPNG has achieved a world-class safety culture with over 57 million work hours recorded since the start of production, as shown in Figure 5.3.

During this time, not a single Lost Time Incident has occurred at the LNG Plant. Across all worksites, the company has recorded no Lost Time Incidents for more than two years and no significant process safety events for almost six years.

EMPNG had a Total Recordable Incident Rate of 0.10 in 2019 compared to 0.11 in 2018.

Figure 5.3 – Production work hours



Number reported by period for the total PNG LNG workforce

Core safety processes

EMPNG uses ExxonMobil's Operations Integrity Management System to define its core safety processes, which are based on indicators that 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.

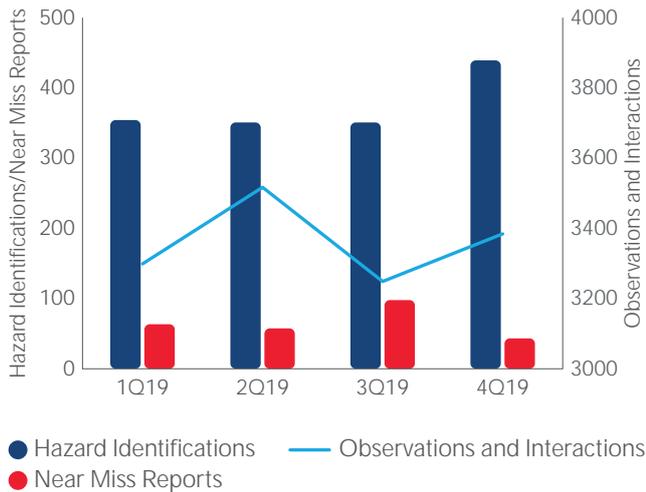
Key leading safety indicators, as shown in Figure 5.4, include Observations and Interactions, Hazard Identifications and Near Miss Reports.

The '*Nobody Gets Hurt*' cards, introduced in 2018, continue to drive the collection of leading indicators, which assists EMPNG with providing improved analysis and feedback to work teams.

A total 13,456 Observations and Interactions were recorded in 2019 compared to 25,681 in 2018. This decrease reflects an increased focus on the quality of reporting, with more supervisor input prior to submission using the new '*Nobody Gets Hurt*' tool.

There were 1495 Hazard Identifications submitted in 2019 compared to 782 reported in 2018. The number of Near Miss Reports also increased significantly with 268 reports submitted in 2019 compared to 123 in the previous year.

Figure 5.4 – Core safety processes



Number reported by quarter

These increases were achieved through a stronger focus on defining leading indicators and personalising discussions regarding process safety with the workforce.

Key lagging indicators for EMPNG are Lost Time Injury Rate, Total Recordable Incident Rate and the number of Tier 1 and

Tier 2 process safety events as defined by IPIECA, the global oil and gas industry association.

In 2019, EMPNG continued the journey to achieving its objective of *'Nobody Gets Hurt'*. Decreased injury rates can be attributed to an ongoing focus on security, competency of the workforce, change management and field leadership. To support these efforts, additional ExxonMobil Fundamentals of Safety training was provided to supervisors during the year.

Safety initiatives

ExxonMobil's former Vice President, Raymond Jones, visited Papua New Guinea in January to launch the 2019 Safe Start campaign at the HGCP, LNG Plant and Port Moresby office.

As part of its commitment, to *'Nobody Gets Hurt'*, EMPNG introduced the Safe Choice program during the year to empower workers to make safer choices in the workplace. This global ExxonMobil program was developed in partnership with Ingenium Training and Consulting and consists of six steps as shown in Figure 5.5.

Safe Choice was also the theme of the 6th annual Contractor Safety Leadership Workshop held in September.



PNG LNG launches the 2019 Safe Start campaign



EMPNG managers and contractors at the 6th annual Contractor Safety Leadership Workshop

During the workshop, contractors learned about the Safe Choice program and reviewed scenarios of how the program would apply on worksites.

As part of the workshop, EMPNG introduced a Buddy Management program. This program involves EMPNG managers partnering with a contractor manager from an area not associated with their contract scope for mutual mentoring and to work together on safety, security, health and environmental matters in the field.

Figure 5.5 – Safe Choice six steps of decision making



EMPNG contractors Total Waste Management and Hides Security Services Limited received the second contractor workshop annual award for exemplifying EMPNG's safety behaviours.

Total Waste Management provides professional waste management services for EMPNG sites and Hides Security Services Limited is responsible for security services at EMPNG's Hides and Komo operations. In 2019, Total Waste Management achieved five years of working with EMPNG without a Lost Time Incident.

Spotlight

Helping workers make safe choices

As part of its ongoing commitment to safety excellence, EMPNG has adopted a world-class safety program that empowers worker decision making and supports them to make safe choices in the workplace.

The Safe Choice program provides an insight into people's individual decision-making styles, the reasons why people make unsafe decisions and shows workers how to make safer choices. It includes training on the six steps of decision making and delivers coaching for workers to encourage them to think with their head before using their hands and to remember the four 'C's': calm, clear, committed and caring.

As well as the training, the Safe Choice program helps workers coach each other about making safe choices. HGCP Team Leader, Wally Komon, said the Safe Choice program was more than a training course.

"It integrates into the way we work every day so that activities and behaviours of our workforce achieve the Safe Choice mission.

"This helps to promote and maintain high safety performance in the workplace so that we can realise our objective of *'Nobody Gets Hurt'*."



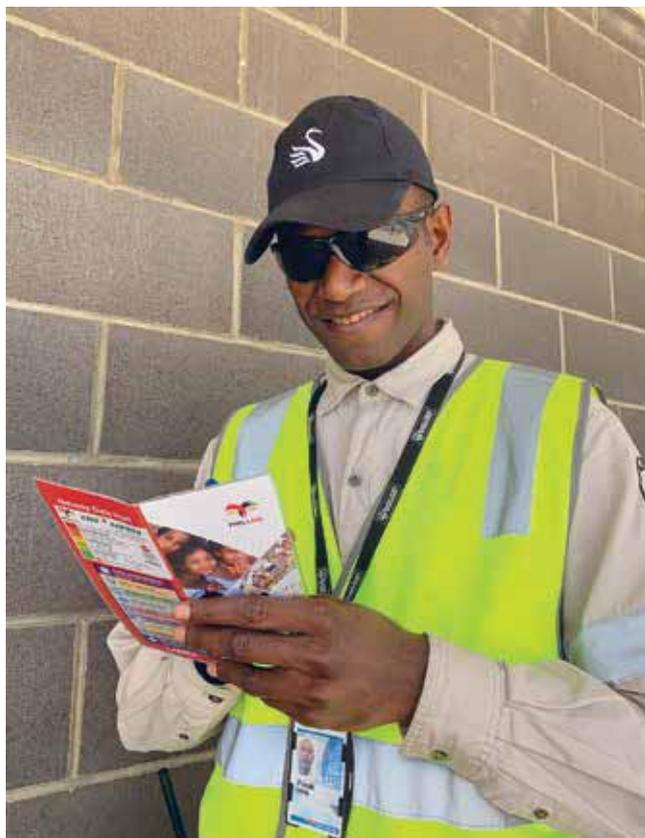
Safe Choice workplace mentors Steven Lewe, Junior Jimmy, Christine Yango, Sulaiman Salmang, Wally Komon, Brendan Gini, Mclyn Davianga and Desmond Nombon

Preparation and the ability to respond to emergencies is a critical safeguard to reduce the likelihood and consequence of an actual emergency event. During 2019, EMPNG conducted 102 emergency response drills across all facilities. Scenarios included search and rescue, fire and explosion, oil spill response, natural disaster and security. The emergency response drills were completed through both desktop and practical exercises.

5.5 SECURITY

EMPNG continues to engage with workers and communities to provide security support during operations, including earthquake recovery and EMPNG work activities in remote Upstream area locations.

In February, more than 80 people from EMPNG and emergency services agencies participated in an LNG Plant Marine Terminal International Ship and Port Facility Security drill.



Security contractor, Frank Wasi, recording an observation using the 'Nobody Gets Hurt' card

A Memorandum of Understanding was renewed during the year with the Australian Department of Foreign Affairs and Trade to progress the Justice Services and Stability for Development program in Hela Province. This program involves working with the Hela Provincial Government to appoint a Community Law and Justice Adviser for

community-based projects, such as measures to manage family and sexual violence and enhancing the Village Court system, Peace and Order Committee and associated community law and justice programs.

The Royal Papua New Guinea Constabulary maintains a Memorandum of Understanding with EMPNG to provide protection to project personnel and operations in areas near production facilities. The Constabulary, deployed under the Memorandum of Understanding, and contracted security personnel working at EMPNG sites, are required to complete Voluntary Principles on Security and Human Rights training.

5.6 WORKER WELFARE AND CONDITIONS

Through its Labour and Working Conditions Management Plan, EMPNG promotes fair and equitable labour practices for the treatment, non-discrimination and equal opportunity of workers. The Plan 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

New worker camp facilities were constructed and opened at Angore Wellpad A in December.

Refurbishment of accommodation and camp facilities at Moro B Camp continued, and construction began on additional new camp facilities in Moro. These camps will support steady-state pipeline operations and ongoing earthquake recovery works along the pipeline ROW.

Earthquake repairs were completed at the HGCP Camp and upgrades to camp facilities continued. During 2019, the replacement of ceilings in the dining hall was completed and upgrades were made to audio visual equipment for better facilitation of workforce training and Town Hall events. LED lights were installed to replace existing light fixtures throughout the Camp.

Work was also completed on the construction of sidewalks, raised garden beds and a cross-fit exercise facility for workers. The cable system in HGCP Camp worker accommodation has been updated from analogue to digital television channels, along with the installation of high-quality flat screen televisions. Wardrobes and small refrigerator units were also replaced in worker accommodation.

The Lanco, Hides Alliance Group has celebrated five years without a Lost Time Incident in providing meal preparation, laundry and housekeeping services at the HGCP Camp. The Hides Alliance Group expanded its operations during 2019 with additional staff hired from local communities.



The HGCP Camp facilities contractor celebrates five years without a Lost Time Incident

At the LNG Plant Camp, refurbishment works continued on 270 accommodation rooms, including upgrades to electronic equipment. The removal of C block in the centre of the camp has provided an open green space for workers to enjoy. Insulation and audio-visual upgrades were also completed in the main White Tent hall during the year.

Camp coordinators provide fitness activities for LNG Plant workers each week, including basketball events with Papua New Guinea's national men's and women's teams, touch football and site walks. The LNG Plant Camp also has a program for workers to borrow bicycles and its safety gear to ride around designated areas on the site.

EMPNG's catering contractor continues to purchase fresh fruit and vegetables for camp meals from local community markets.

During 2019, the HGCP Camp catering contractor spent more than PGK194,000 (US\$56,900) on market produce from local suppliers.

A dedicated television information channel at the HGCP Camp and camp newsletters across all camps provide regular updates to workers about camp activities, safety, health and environmental programs and general production information. Camp committees exist to help EMPNG maintain high standards at worker camps through continuous improvement feedback from camp residents.



Nogoli community members grow fresh produce to supply PNG LNG facility caterers

5.6.2 Labour and working conditions

Numerous initiatives were expanded during 2019 for the benefit of EMPNG employees.

Employee resource groups are providing mentoring and coaching to help employees enhance their personal and professional development. One of these groups, the Wanwok initiative, supports and encourages professional development for Papua New Guinean workers, while another group, the Women in Energy Network, supports the advancement of women. The Toastmasters and EMPNG Social Club groups empower individuals to become more effective communicators and facilitate social events, respectively.



Employee resource groups provide mentoring and coaching

Spotlight

Gini leads Women in Energy Network vision

EMPNG Joint Interest Advisor, Gini Solien, has been appointed as Chair of the Papua New Guinea Women in Energy Network (WEN) – an ExxonMobil-led initiative to support the professional advancement and personal development of women in EMPNG.

In her role as WEN Chair, Gini has encouraged women from all EMPNG worksites to establish WEN committees.

“My focus is to promote the WEN vision and mission across all levels of the workforce and ensure greater accountability for WEN as a committee,” Gini said.

“I think this network is very important for Papua New Guinean women. We live in a developing country that is facing many social issues including gender-based violence and security issues in public places for women.

“A network such as WEN that supports our personal and professional development gives us a platform to take action to address social issues in our country and our communities. This is a big win for Papua New Guinean women.”

Gini started working with EMPNG as a contractor at the LNG Plant in 2013. Through her involvement in WEN, in early 2015 Gini was selected for a Decie Autin STEM Scholarship that enabled her to complete her civil engineering degree. She joined EMPNG’s geotechnical engineering team in November 2015 and in May 2019 was appointed as a Joint Interest Advisor building relationships with Oil Search Limited.



Chair of the Women in Energy Network, Gini Solien

All of these groups are facilitating open communication with EMPNG management on issues such as employee empowerment, diversity and inclusion.

In addition to the existing Employee Health Advisory Program that offers general counselling services for personal and family problems: EMPNG has partnered with Bel isi Papua New Guinea, which is helping to provide family and sexual violence counselling and assistance to employees and local communities.

Standards of Business Conduct training is provided for new employees as a formalised part of EMPNG’s induction process, as well as during periodic refresher training for the existing workforce.

The Standards of Business Conduct training encompasses workplace topics such as ethics, conflicts of interest, corporate assets, anti-corruption, health, safety, environment, alcohol and drug use, equal employment opportunity and harassment.



EMPNG Human Resources Analyst and Bel isi program coordinator, Marsha Ikau (left), with EMPNG Occupational Health Coordinator, Louisa Sernay and EMIT Digital Specialist, Nicholas Dick, who are also family and sexual violence contacts for their departments

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 give workers the opportunity to directly ask questions to the Managing Director. The company also has regular human resources and financial planning seminars that provide employees with information about topics such as tax, superannuation, insurance and site management activities. This includes individual financial planning consultations for workers with financial experts.

CASE STUDY: BUILDING SKILLS OF ENVIRONMENTAL PROFESSIONALS

EMPNG facilitated the capacity building of Papua New Guinean environmental professionals at the the 39th International Association for Impact Assessment conference.



EMPNG Biodiversity Advisor, Kalyna Taule and
EMPNG Socioeconomic Advisor,
Anita Mosby at the IAIA conference

As part of its commitment to building capacity in Papua New Guinea, EMPNG supported the participation of its workers, as well as government and non-government environmental professionals, at the International Association for Impact Assessment (IAIA) conference held in Brisbane, Australia from 28 April to 2 May. Eight EMPNG employees and three PNG LNG consultants presented 11 papers and chaired three sessions during the conference, themed around environmental and social management. The topics covered lessons learned from the construction and operation of the PNG LNG Project, as well as the challenges and opportunities of operating in countries with high biological and cultural diversity. The implementation of biodiversity offsets were also discussed in one of the three sessions chaired by EMPNG workers.

Fifteen Papua New Guinean environment and conservation professionals from government, academia and non-government agencies attended the event with support from EMPNG and the IAIA Capacity Building Stipend. During the conference, they attended training on various aspects of environment and social management, and participated in multiple technical sessions.



EMPNG General Manager – Safety, Health and Environment, Winnie Schubert, hosting visitors to the EMPNG conference booth

Throughout the conference EMPNG hosted an interactive display booth featuring biodiversity imagery and immersive technology that took international conference guests to Papua New Guinea.



The EMPNG interactive conference booth at the IAIA conference in Brisbane, Australia

The IAIA conference attracted almost 900 delegates from 77 countries who attended 125 technical sessions in which some 480 papers were presented.

EMPNG was one of the premier sponsors of the conference.



EMPNG representatives and sponsored Papua New Guinean participants at the IAIA conference in Brisbane, Australia

CASE STUDY: MAKING A DIFFERENCE

Nine EMPNG employees were honoured at the 2019 Lead Country Manager Awards in December.



EMPNG Commercial Advisor, Larissa Solomon-Nombe receiving the Excellence Award from EMPNG Managing Director, Andrew Barry

EMPNG Commercial Advisor, Larissa Solomon-Nombe; Engineering Technician, Mea Vai; Work Management System Trainer, Pia-Marie Sitapai; Warehouse Supervisor, Kris Mea Busina; Community Affairs Officer, Christine Yango; Integrity Engineer, Oliver Launa; Industrial Hygiene Technician, Oripa Popat; Pipeline Operator, Simon Koila; and Projects Coordinator, Juliet Amos received Lead Country Manager Awards at a ceremony held at the end-of-year staff function in Port Moresby.

The Lead Country Manager Awards recognise workers who demonstrate outstanding examples of *Em pasin bilong ExxonMobil long PNG* or 'the way we work at ExxonMobil in PNG' behaviour, which reflect EMPNG's six core values of safety, security, respect for the environment, excellence, teamwork and integrity.

This year, each award winner received prizes including a customised Kundu coffee cup and an award certificate.

Safety Awards

Oripa Popat was recognised for proactively developing a new respirator protective bag for field workers who require respirators for conditions such as asthma. She also ensured global health practices were met during pigging campaigns and was identified as a top talent to work on projects in other Asia Pacific regions.

Simon Koila was awarded for demonstrating outstanding safety leadership and improving efficiencies during pigging operations throughout the year. He also effectively managed the reintroduction of night shift activity on the pipeline.

Excellence Awards

Larissa Solomon-Nombe was recognised for her work with multiple programs during 2019 including the Women in Energy Network, the Port Moresby Safety, Health and Environment Committee, the ExxonMobil Science Ambassador Program, the University of Papua New Guinea Geoscience workshop program and the American Association of Petroleum Geologists.

Mea Vai was awarded for demonstrating flexibility, teamwork and a willingness to go above and beyond in supporting the Surveillance and Operations teams. He played a key role during 2019 in driving the Papua New Guinea Analytics Community of Practice.

Pia-Marie Sitapai was recognised for her contribution to EMPNG's Permit Vision training team that involved a broad range of stakeholders. In addition to her work with the team, Pia-Marie delivered other safety training programs at the LNG Plant.

Teamwork Awards

Oliver Launa led efforts to rehabilitate the health of the local marine system while mentoring other engineers throughout the year. He also acted as an advocate for the Toastmasters program. He was presented with a Teamwork Award for his strength of leadership.

Kris Mea Busina was recognised for engaging his team in continuous operational improvements that resulted in the warehouse team achieving a Platinum Star Award in 2019, which was the first time this award was given in the Asia Pacific region. Kris also launched a safety initiative in the form of short quizzes on Job Safety Analyses to improve hazard mitigation awareness with his colleagues.

Christine Yango was honoured for her work with mentoring cross-functional teams on how best to promote safety and security for EMPNG staff and local communities. She has helped lead the Safe Choice initiative and has also been instrumental in building community partnerships through tours of Hides facilities.

Security and Integrity Award

Juliet Amos was recognised for her proactive efforts in identifying controls exposure within her team to ensure issues were quickly addressed. She also helped her team to improve efficiencies throughout the year and mentored colleagues.



EMPNG Managing Director Andrew Barry (centre) with Award winners (from left) Oliver Launa, Mea Vai, Juliet Amos, Larissa Solomon-Nombe, Christine Yango, Oripa Popat, Pia-Marie Sitapai and Kris Mea Busina

Worker engagement in the Lead Country Manager Awards has increased since they began in 2017, with 19 employees nominated by their colleagues for the inaugural awards and 34 nominated in 2019. The award winners were decided by the Country Leadership Team.

6 ENVIRONMENTAL MANAGEMENT

For the past 10 years, EMPNG has sought opportunities for continued improvement in environmental management.

Former EMPNG Environment and Regulatory Supervisor, Laura Ann Dresser; Total Waste Management Supervisor, Michael Tarua; and HGCP Environmental Specialist, Rebecca Lovi inspect the Hides Waste Management Facility retention pond

2019 performance highlights

>1300
RECEIVE INVASIVE SPECIES EDUCATION

During 2019, education about invasive species, such as weeds and cane toads, was provided to more than 1300 people including EMPNG workers, school students and community members in the Upstream area.

>300
TONNES OF WASTE REUSED OR RECYCLED

EMPNG sent over 300 tonnes of waste to approved third party facilities for reuse or recycling in 2019.

6.1 AIR

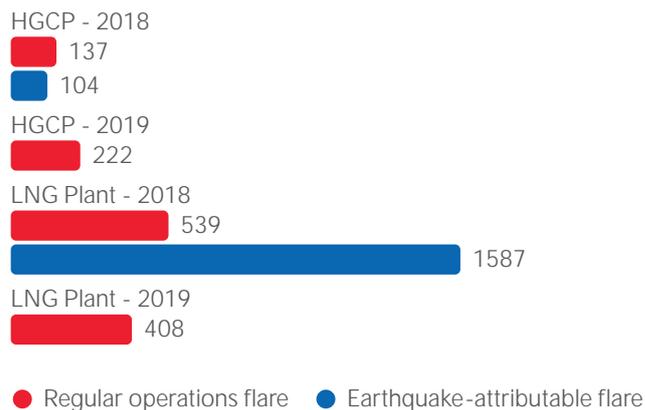
No air-related incidents or near misses were reported at any PNG LNG facility during 2019.

Overall, flaring emissions in 2019 were recorded at their lowest levels since the start of production. This is primarily due to a focus on stable operations at the LNG Plant and HGCP, and incremental reductions in flaring through the optimisation of flare headers and flare tips. While the February 2018 earthquake was a source of increased flaring at the LNG Plant; flaring related to regular operations decreased in 2019 by 131 million standard cubic feet compared to regular operational levels in 2018, as shown in Figure 6.1. At the HGCP, there was an increase of 85 million standard cubic feet in flaring emissions during 2019 compared to 2018 regular operational flaring levels due to unplanned stabiliser overhead compressor shutdowns.



The HGCP flare

Figure 6.1 – Flaring



Volume in million standard cubic feet

The 2019 stack testing program was deferred to 2020 to allow for installation to be completed on the new Hides Waste Management Facility incinerator. LNG Plant compressors that were slightly above Environment Permit criteria in 2018 were optimised during 2019 to meet the criteria.

The IESC has approved a proposed change by EMPNG to reduce the stack test program frequency from annually to every three years if monitoring results are within criteria, or annually if not within criteria until the required Environment Permit criteria are met. A representative selection of air emission sources is to be included in each stack testing program.

EMPNG is quantifying fugitive methane emissions to reduce any excessive emission sources. A fugitive emissions camera was purchased in 2019, with workers trained on the camera's use to support in-field monitoring.

Total greenhouse gas emissions, including fuel gas use, are calculated and reported on an annual basis. During 2019, EMPNG generated approximately 1985 kilotonnes of carbon dioxide equivalent, which was primarily from gas turbine fuel consumption at the LNG Plant and HGCP.

6.2 NOISE

No noise-related incidents or near misses were reported at any PNG LNG facility during 2019.

New noise monitoring equipment was purchased in May and monitoring was completed at the HGCP during May and October. An exceedance of night-time noise recorded at the HGCP wastewater treatment plant in 2018 was rectified during 2019, with the installation of noise barriers that fully enclosed the walls and roof of the treatment plant blower enclosure. Following these rectification works, noise levels recorded in 2019 were within Environment Permit criteria.



Noise barriers installed around the wastewater treatment plant at the HGCP

Noise monitoring at the LNG Plant and Port Moresby office showed all levels to be within relevant Environment Permit criteria.

Baseline noise monitoring was completed at Moro B Camp in September.

6.3 WATER

EMPNG monitors the amount of water extracted from groundwater, seawater and surface streams for production use to ensure sustainable consumption and conformance with permitted extraction volumes. Regular testing confirms the quality of extracted water for consumption, while processed wastewater is checked to ensure it complies with Environment Permit requirements before discharge.

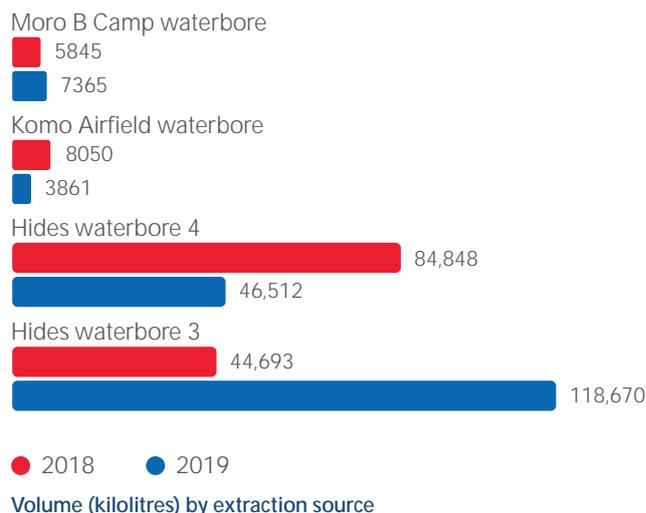
6.3.1 Consumption

EMPNG uses water for worker camps, dust suppression, safety showers, firewater systems and maintenance activities. Freshwater is extracted from groundwater for use in the Upstream area, while LNG Plant operations use seawater. Figure 6.2 shows freshwater volumes taken from each groundwater extraction source during 2019.

Approximately 176,408 kilolitres of groundwater was extracted for use in the Upstream area in 2019. This was an increase compared to 143,430 kilolitres of groundwater extracted in 2018 due to more workers being on-site as part of earthquake repair works and Angore Gathering System project activities. An analysis of water quality showed the extracted groundwater complied with EMPNG's raw water quality criteria. Approximately 120 kilolitres was extracted from surface streams in 2019.

At the LNG Plant, some 578,852 kilolitres of seawater was extracted to supply the desalination plant, a reduction from 622,800 kilolitres extracted in 2018. This generated almost 80,803 kilolitres of potable water for production use.

Figure 6.2 – Groundwater extraction



6.3.2 Water quality monitoring

Groundwater monitoring conducted at the HGCP showed all parameters to be within Environment Permit criteria. At the Hides Waste Management Facility, three sampling sites recorded elevated faecal coliform levels. Groundwater sampling at the LNG Plant included the installation of two new groundwater wells. All parameters at LNG Plant monitoring sites were within criteria, including several groundwater wells that had previously shown elevated faecal coliform levels.

Twelve non-conformances were reported for oil and grease, total suspended solids and ammonia nitrogen exceedances at the LNG Plant's dissolved flotation unit in 2019. Elevated oil and grease levels were caused by insufficient recycling during sand filter 'fluffing', low sand filter sand levels and insufficient cleaning of the unit discharge piping, as well as increased flow in the receiving tank causing agitation and inefficient skimming that impacted the removal of grease and oil from water. Updated maintenance plans, operational and procedural improvements were implemented to address these issues.

Ammonia nitrogen exceedances at the dissolved flotation unit have historically been attributed to methyl-ethanolamine carried over into the unit from processing. A trial was conducted in 2019 to re-route the stream carrying residual methyl-ethanolamine back into the processing system. The trial resulted in a significant decrease in amines and ammonia nitrogen entering the system.

Faecal coliform levels have remained elevated at the LNG Plant retention pond since the second half of 2018. Laboratory analysis confirmed that the bacteria was not human-related and therefore not attributed to operational activities.

Selenium and chemical oxygen demand levels were found to be above the discharge criteria in the retention pond, mixing pit and receiving environment tidal flats resulting in one low-level incident and one non-conformance being recorded.

This occurred after a faulty freshwater tank valve in the desalination plant was rectified, reducing brine effluent flow and increasing the concentration of metal salts in the effluent.

EMPNG is scoping a project to redirect effluent back into the retention pond during dry months when there is no dilution from retention pond water to reduce selenium concentrations. Chemical oxygen demand was recorded above Environment Permit levels due to a reduced retention pond water level, allowing stagnant water to exit the pond gate. Operations personnel were re-trained on the 'open with underflow or closed to build level' objective for retention pond management to prevent a reoccurrence.

Five non-conformances were recorded for end-of-pipe exceedances of ammonia nitrogen and total suspended solids at the LNG Plant site's wastewater treatment plant during 2019. Subsequently, one low-level incident was recorded for ammonia nitrogen levels exceeding freshwater criteria in the Vaihua River receiving environment. Total suspended solids exceedances were due to incorrect operations during the clean out and discharge of the clarifier tank. Refresher training was provided to workers about the need to recycle effluent until the clean out is complete before resuming discharge. Subsequent verification sampling of the Vaihua River showed the levels had stabilised and reduced to meet Environment Permit criteria.

The ammonia nitrogen exceedances at the LNG Plant's wastewater treatment plant were caused by unexpected equipment failures, as well as the ingress of rainwater through cracked manholes and lift stations. Rainwater ingress prevents the unit from retaining water long enough for sufficient settling and denitrification, thereby decreasing its efficiency. All repairs of camp manholes feeding the lift station were completed in 2019 and a project is underway to rectify rainwater ingress into other lift stations.

Following a spill incident at the HGCP, sampling at the retention pond showed ethylene-glycol and mercury levels above the discharge criteria, resulting in a non-conformance. While mitigation measures were put in place, an additional non-conformance and low-level incident was recorded at the retention pond for elevated mercury levels in the receiving environment at Akara Creek. Follow-up sampling showed levels had returned to below the discharge criteria.

A 2018 non-conformance for exceedances of total suspended solids and turbidity in HGCP stormwater discharge was carried over to 2019. The HGCP team implemented mitigation measures to address this issue, with verification sampling confirming that levels had reduced but further stabilisation was required to meet Environment Permit criteria.

The HGCP wastewater treatment plant reported three non-conformances for exceedances of faecal coliform and ammonia nitrogen discharge criteria in 2019. As part of end-of-pipe verification, sampling was also conducted at the downstream catchment pond, where elevated faecal coliform levels were recorded as one low-level incident. Additional filtration was installed to address this issue. The ammonia nitrogen exceedance was due to increased wastewater treatment plant loads from temporarily having additional workers on-site, resulting in less time for denitrification to occur prior to discharge. To resolve this issue, the former Angore wastewater treatment plant was commissioned to account for the increased workforce.

Four non-conformances were reported at the Moro B wastewater treatment plant for exceedances of ammonia nitrogen and biological oxygen demand.



ExxonMobil Environment and Regulatory Advisor, Geetha Kothandaraman; EMPNG Fuel and Waste Management Co-ordinator, John Douglas; and Total Waste Management Operations Supervisor, Yvette Leleca at the Hides Waste Management Facility reed bed

The ammonia nitrogen exceedances were due to the unit's inability to remove old sludge in time, resulting in the build-up of ammonia nitrogen levels. EMPNG is improving the on-site sludge management plan to avoid a reoccurrence. The biological oxygen demand exceedance resulted from improper monitoring of incoming effluent, which impacted the required adjustments to the wastewater treatment plant operations. Operational practices have improved for the Moro B wastewater treatment plant.

EMPNG has revised its water key performance indicators into a goal that addresses the causal factors behind water quality exceedances. This has been incorporated in the updated 2019 Operational Integrity Management System Management Committee scorecard, which is reviewed every month.

6.4 MATERIALS MANAGEMENT

EMPNG regularly reviews its sourcing of raw materials with the aim of ensuring sustainable consumption and to avoid impacts from the use of these materials wherever possible.

Ongoing repair works resulting from the February 2018 earthquake continued across the Upstream area in 2019, increasing the demand for raw materials.

EMPNG purchased and used a total 9009 cubic metres of aggregate and gravel, 534 cubic metres of rock product, 1512 cubic metres of sand, 2922 cubic meters of concrete and 46 cubic metres of timber during 2019.

Aggregate, rock, sand, concrete and timber were needed for earthquake repair works, general maintenance or special projects across multiple sites in the Upstream area, including: Gobe Bridge abutment reinstatement works; Gobe to Kantobo road grading works; Angore Wellpad B works; HGCP drainage and sediment control works, helipad repairs, landscaping and footpath and carpark construction; Hides Wellpad A well plug and abandonment works; Kopeanda concrete batching plant operations; and Kopeanda retention pond spillway repair works. Throughout 2019, raw materials used in the Upstream area were purchased from third party suppliers and sourced from three previously approved quarries – Timalia Quarry, Mana/Hegero Quarry and Gobe 2000 Quarry. The Timalia and Mana/Hegero quarries are operated by Lancos, while the Gobe 2000 Quarry is operated by Oil Search Limited, under their own environment permits.

Aggregate, gravel, rock, sand, concrete and timber were also used for upgrades to camp and office facilities and general site improvements at the LNG Plant site and construction of the LNG Plant support complex potable water line. All raw materials used at the LNG Plant site were purchased from third party suppliers.

The Domestic Power Plant Fuel Gas Piping project located within the LNG Plant site, purchased approximately 260 cubic metres of rock, 17 cubic metres of concrete, 185 cubic metres of aggregate and 0.5 cubic metres of timber from third party suppliers in 2019.

6.5 WASTE MANAGEMENT

EMPNG continues to work toward improving waste management at production facilities and develop long-term waste management solutions. Initiatives undertaken during 2019 include updating waste management acceptance protocols as well as training of 250 workers on requirements of the new protocols. The waste tracking register was upgraded for improved analysis of stored and offsite waste as EMPNG transitions to an online waste data management tool.

Goals were also set for target waste diversion rates and incorporated into the Operational Integrity Management System Management Committee scorecard, which is monitored and reviewed each month. As part of this approach, the company has been removing single-use items, such as disposable cutlery and cups, from worksites and providing workers with reusable items. For example, at the Port Moresby office, HGCP and LNG Plant site, reusable cups and water bottles were issued to all office staff, replacing single-use cups.

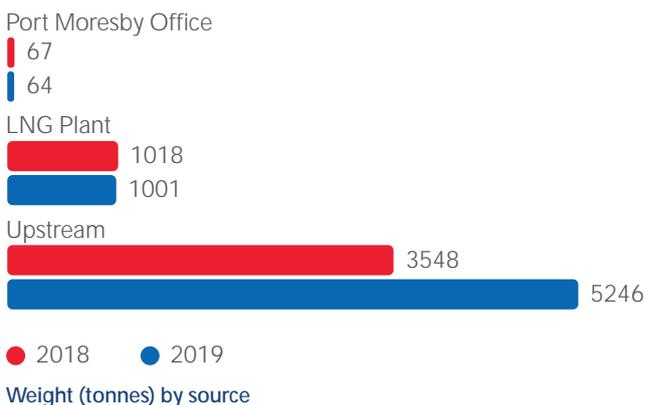
In the Upstream area, waste volumes increased during 2019 compared to 2018. The increase was due to waste resulting from earthquake repair works and increased activity on the Angore Gathering System project.

Figure 6.3 shows waste volumes produced for the Upstream area, LNG Plant and Port Moresby office in 2019 compared to the waste volumes for 2018. No waste related non-conformances were raised in 2019.

Approved third party facilities are used to recycle production waste; and waste reuse initiatives are implemented wherever practicable, to reduce the amount of operational waste sent to landfill. During 2019, EMPNG assessed one third party waste contractor in Lae and two in Port Moresby, with two of the three companies approved to process production waste. The approved companies are being used to recycle waste oils and restricted waste.

The Hides Waste Management Facility high temperature incinerator remained out-of-service in 2019. A new industrial waste incinerator was delivered to Hides and is planned to be installed in 2020.

Figure 6.3 – Waste



Some 340 tonnes of restricted waste consisting mostly of waste oil, oily rags, paint waste and spent batteries are stored at the HGCP and Hides Waste Management Facility. The oily rags and paint waste will be disposed once the new industrial waste incinerator becomes operational. A separate biohazardous incinerator was commissioned during 2019 and is used specifically for the disposal of medical waste. More than 22 percent of waste stored at the LNG Plant consists of scrap metal, plastics, spent batteries and waste oil for recycling.

The LNG Plant domestic waste incinerator processed just over 73 tonnes of combustible waste from the LNG Plant and Port Moresby office throughout the year.

A new domestic sludge dewatering unit has been installed at Moro B Camp to process sludge from the Camp's wastewater treatment plant. The dewatered sludge is transported to the Hides Waste Management Facility landfill for disposal.

A landfill capacity and 'health check' review was undertaken for both the LNG Plant and Hides Waste Management Facility and recommendations addressed.

Approximately 4100 tonnes of waste was sent to the Hides Waste Management Facility landfill during the year. Most of this waste was generated by earthquake repair works and included damaged building materials such as bricks, timber and plastic piping, as well as waste generated from increased activity on the Angore Gathering System project and Moro B Camp refurbishment activities.

Some 170 tonnes of waste oil from Hides was sent to a third party contractor in Lae for reuse during 2019.

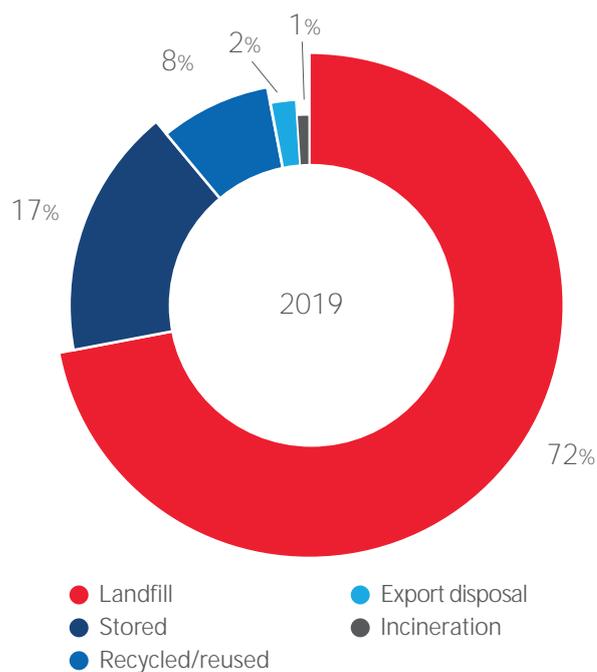
Specialist waste processing contractors continue to be used as appropriate. During 2019, 58 tonnes of synthetic lube oil and 135 tonnes of used mineral lube were sent to an approved Papua New Guinean company for recycling through their Waste Oil Processing Unit. Approximately 66 tonnes of used batteries were sent to a specialist third party contractor in Papua New Guinea for recycling.

More than 110 tonnes of waste oil and oily water from the LNG Plant was sent to an approved third party facility in Australia for disposal, while 49 tonnes of scrap metal from the LNG Plant were sent to approved recycling contractors in Papua New Guinea.

Liquid food composters continue to process food waste, with approximately 86 tonnes of waste processed at the HGCP and more than 85 tonnes processed at the LNG Plant in 2019. 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 into the wastewater system for further treatment.

Predominant waste consisted of waste oil, food waste, general office/accommodation refuse, cardboard and paper. The predominant solid waste disposal method continues to be on-site landfill, as shown in Figure 6.4.

Figure 6.4 – Waste disposal



Percentage by disposal method

6.6 SPILL PREVENTION AND RESPONSE

Forty-six low-level spill incidents consisting of 34 hydrocarbon spills, six wastewater and six chemical spills were recorded during 2019. Most of these spills were less than 5 litres. One of these spills involved the release of 1 kilolitre of chlorinated water to an earthen drain near the HGCP retention pond. Improvements were made to waste quarantine processes, and training and awareness was delivered to site personnel on wastewater, to avoid a reoccurrence. All spills were responded to quickly and appropriately, resulting in no significant environmental impact. EMPNG and its contractors continue to conduct regular spill prevention toolbox talks with their relevant work teams.

Twenty-five near misses were recorded during the year, involving potential spills to impermeable surfaces.

Five field-based education sessions were conducted to refresh worker knowledge about the use of equipment such as booms, the skimmer system, pumps, power packs and dispersant spray arms. Workers were trained across inland, shoreline and ocean spill response. This included oil spill response training sessions at the Hides Waste Management Facility and Kaimari River involving river boom deployment on a surface body of water and containment and recovery of a simulated oil spill on permeable ground. Training also covered scenarios involving a damaged pipeline in Hides, a shoreline oil spill and ocean boom deployment.

6.7 REINSTATEMENT, EROSION AND SEDIMENT CONTROL

Earthquake repair works continued to be conducted on erosion and sediment control measures at the HGCP, Hides wellpads, Hides Wellpad Access Road, Komo Airfield and the pipeline ROW in 2019. Works included clearing landslip material, identifying and sealing ground surface cracks, infrastructure repairs, preservation activities to damaged slopes, clearing sediment from drains and stormwater culverts and repairing batters.

At Komo, major works included the preservation of damaged slopes on the southern airfield runway to prevent deterioration. Field surveys, detailed design and planning activities for further restoration of the airfield were also conducted.

Along the pipeline ROW, a micro-piling field trial was conducted, along with borehole surveys, to scope detailed engineering of future ROW repair sites. Multiple repairs along the pipeline ROW were completed in 2019, which included installing drainage at Kilometre Point 6.

At the HGCP, sediment control measures were installed along drainage lines, with regular inspection and maintenance of these structures conducted.

At the Hides Waste Management Facility, sediment control devices such as silt fences were installed and silt was removed from the sedimentation pond. Sediment berms and silt fences were also installed around a temporary stockpile of soil

recovered from the Hides plug and abandonment restoration works.

Monitoring of temporary erosion and sediment control measures installed along the greenfield section of the pipeline ROW associated with the Angore Gathering System were reinstated following the lifting of security restrictions in late 2019.

6.8 INVASIVE SPECIES, PESTS AND PLANT PATHOGENS

During 2019, tropical ecology specialists from the New Guinea Binatang Research Centre conducted a weed survey across the entire length of the pipeline ROW from Hides Ridge to Kopi Scraper Station, including PNG LNG facilities and associated gas facilities. More than 360 transects spanning over 18 hectares of land were inspected in the 2019 survey. Data gathered using the transect approach is being used to improve knowledge of the diversity and distribution of weed species along PNG LNG's footprint and across elevation zones traversed by the project. An analysis of data collected will be completed in 2020.

Regular weed management continues around EMPNG's Upstream area facilities, including along the pipeline ROW, Komo, Angore, the HGCP and LNG Plant. Priority 1 weeds, which have the potential to become persistent or increase in abundance or distribution, are either manually removed or chemically treated.



A reinstated section of the pipeline ROW between Kaiam and Gobe



Vehicle washdowns at the Hides Washdown Facility are helping to minimise the spread of weeds, pests and plant pathogens

Following the identification of cane toads (*Rhinella marina*) at the HGCP in 2018, EMPNG is implementing procedures to limit the spread and proliferation of this species at worksites. This includes vehicle and cargo inspection in Hides as well as on-site management of cane toads to protect Hides Ridge priority ecosystem.

Local workers were hired in 2019 to manage cane toads at the Hides Waste Management Facility, HGCP and Komo.

During 2019, education about invasive species, such as weeds and cane toads, was provided to more than 1300 people including EMPNG workers, school students and community members in the Upstream area.



Invasive species education session in the Upstream area

In 2019, carp and tilapia were found in the HGCP sewage treatment plant effluent ponds. This resulted in one low-level incident being recorded. In accordance with the project environment permit the keeping, owning or caring for any plant, animal or bird by EMPNG employees or contractors at any worksite, accommodation or other facility is not permitted.

Appropriate mitigation action was taken to prevent a reoccurrence.

6.9 REGENERATION MONITORING

Twelve scientists from the New Guinea Binatang Research Centre conducted six weeks of regeneration monitoring covering 69 survey plots between Hides Ridge and Kopi Scrapper Station during 2019. Each survey plot was 100 metres long by 10 metres wide. Data collected from the 2019 monitoring event is being analysed.



New Guinea Binatang Research Centre scientists monitor survey plots between Hides Ridge and Kopi Scrapper Station

One non-conformance was reported when a field observation found that vegetation had been cut to the original construction width, rather than the narrower operations access requirement along the Hides Spine. To address this, EMPNG is clarifying maintenance requirements for the pipeline ROW.

At the LNG Plant site, mangrove monitoring showed continued improvement of the regenerating mangroves. One low-level incident, which was recorded as one non-conformance, was reported following an observed increase in the amount of mangrove trees being cut down by local communities along the pipeline ROW.



New Guinea Binatang Research Centre team members record tree measurements within a monitoring plot

To reduce the impact of landowner activities on mangroves, EMPNG is working with CEPA and communities to raise awareness about the importance of mangroves to the local environment. Mangrove signage has been installed in key locations along the pipeline ROW, and security camera footage is reviewed to monitor some areas along the LNG Plant site fence line. Concrete blocks have also been placed at an entry way to prevent vehicular access to the mangroves.

6.10 ACCESS CONTROL

EMPNG maintains an access control system where security checkpoints collect data on the number and types of vehicles using EMPNG-controlled roads. Reasons for the road use are also recorded.

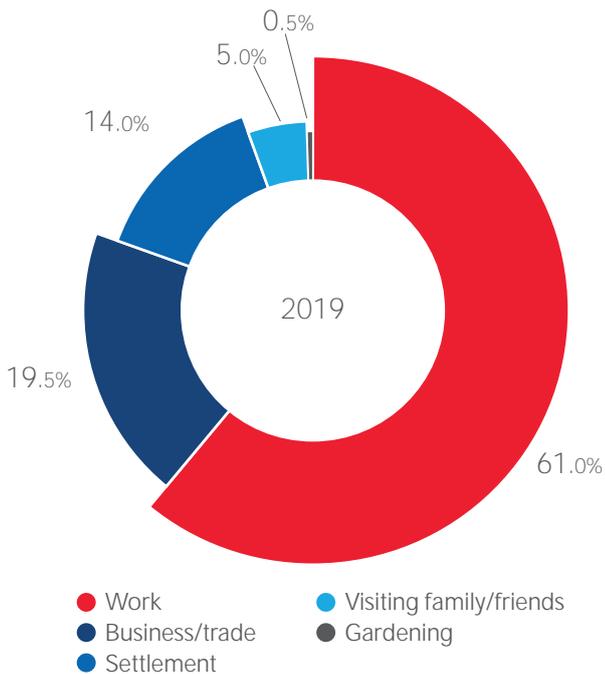
During 2019, there was an increased number of vehicles accessing EMPNG roads for ongoing earthquake recovery works in the Upstream area.

Work, predominantly related to earthquake repairs, was the primary reason for access as shown in Figure 6.5. The type of vehicles accessing EMPNG-controlled roads is shown in Figure 6.6.

Aerial patrols were completed along the pipeline ROW in 2019, with no signs of logging occurring adjacent to pipeline ROW infrastructure.

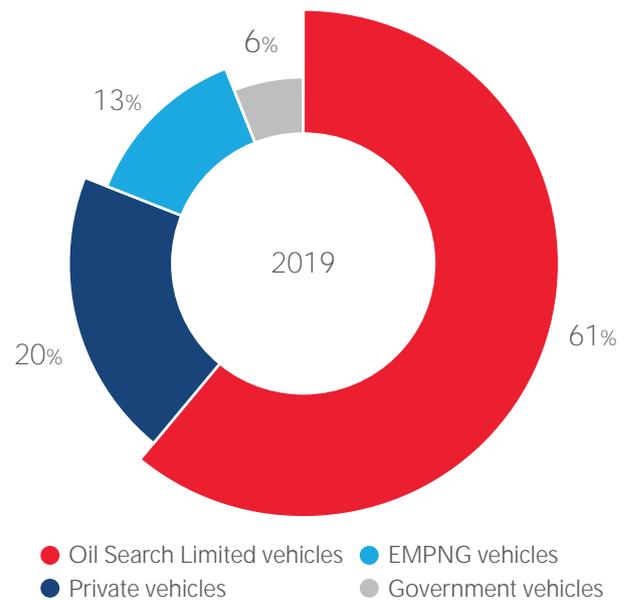
EMPNG is reviewing how access control data is captured and reported, in an effort to draw further insight on the use of EMPNG-controlled roads.

Figure 6.5 – Purpose of access



Percentage of traffic using EMPNG controlled roads by purpose

Figure 6.6 – Vehicle types



Percentage using EMPNG access points

6.11 QUARANTINE MANAGEMENT

EMPNG and its contractors comply with National Agriculture Quarantine and Inspection Authority procedures and regulations for freight imported into Papua New Guinea.

The number of EMPNG shipments continues to grow because of materials required for ongoing earthquake recovery works.

In 2019, EMPNG received 1301 shipments, with six of the shipments requiring re-fumigation to comply with the Authority's standards.

Since the start of production, EMPNG has received 6230 shipments, with 1020 of these inspected by the National Agriculture Quarantine and Inspection Authority, and 114 requiring re-fumigation.

6.12 CULTURAL HERITAGE

In Papua New Guinea, cultural identity, traditional knowledge and oral histories are connected and maintained through the use of, and relationships with, land and natural resources. These include sacred sites and other places of cultural significance. EMPNG aims to preserve the culture and history of communities located near production facilities. Measures were taken during the construction of PNG LNG to manage known cultural heritage resources, as well as chance finds such as unknown archaeological sites.

Implementation of EMPNG's Chance Finds protocol has allowed for the salvage and preservation of artefacts, many of which are kept at the Papua New Guinea National Museum and Art Gallery. There were no chance finds in 2019.

Lapita pottery fragments that had been salvaged from the LNG Plant site during construction of PNG LNG, were prominently featured at a Lapita Conference in Port Moresby in October. The Conference, hosted by the Papua New Guinea National Museum and Art Gallery, attracted 90 international archaeologists.

Lapita pottery continues to generate international interest, with the University of Otago in New Zealand conducting a study to confirm the origin of the clay material used in its production.

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.

A pre-construction survey completed in Angore during 2019 recorded 39 cultural heritage sites, including ancestral sacred sites, ceremonial sites, settlement sites and burial sites.

Of these, 13 are located in or within 5 metres of the Angore Gathering System construction footprint. Two additional sites identified during previous surveys are also located within the Angore Gathering System construction footprint.



Reconstructed Lapita Pots from the Bismarck Archipelago on display at the Papua New Guinea National Museum and Art Gallery

Of the cultural heritage sites recorded, two burial sites and one oral tradition site are considered to be of high significance in terms of their integrity, rarity and authenticity, as well as for their indigenous spiritual and historical value. One additional sacred site is associated with a water source of high community significance.

7 BIODIVERSITY

Together with local communities, EMPNG is working to conserve the unique biodiversity of Papua New Guinea.



The *Neurothemis ramburii* dragonfly is part of the unique biodiversity of Papua New Guinea

150
**CONSERVATION
SPECIALISTS
MEET**

Some 150 conservation specialists attended Communicating Conservation meetings in Port Moresby.

52
**STUDENTS
GRADUATE**

Ten University of Papua New Guinea students graduated with a Postgraduate Diploma in Biodiversity Conservation and 42 community conservation practitioners graduated with certificates in Biodiversity Conservation.

EMPNG's Biodiversity Strategy is the over-arching document that guides how biodiversity is managed for PNG LNG. The Biodiversity Strategy includes a Biodiversity Offset Program with five components. The Biodiversity Implementation and Monitoring Program outlines Programmed Monitoring Activities (PMAs) that EMPNG is undertaking to achieve the Biodiversity Strategy objectives. Progress on the components of the Biodiversity Offset Program and the PMAs during 2019 is outlined in this section.

Visit the website at: www.pnglng.com



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 and Action Plan
- Component 3: Build conservation capacity
- Component 4: Enhance existing protected areas
- Component 5: Establish new protected areas.

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

Component 1: Protected area planning

Component 1, which involved supporting CEPA with developing a Protected Area System Plan for the Kikori River Basin was completed through engagement with the Wildlife Conservation Society in 2017. A resulting report closed out the requirements for this component, with implementation to be progressed through the establishment of new protected areas under Component 5.

Component 2: Support the National Biodiversity Strategy and Action Plan

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.

From 28 February to 1 March, more than 50 conservation representatives from the Papua New Guinean Government, local communities, non-government organisations and academia participated in a Communicating Conservation meeting. The meeting was held prior to World Wildlife Day activities at the Port Moresby Nature Park on 2 March.



Participants at the February/March Communicating Conservation meeting held in Port Moresby

Discussions focused on marine and terrestrial endangered species and conservation challenges, as well as initiatives to conserve marine mammals, coral and mangroves. The key message from the meeting was that Papua New Guinea's Red Book, that contains the list of endemic and endangered species, needs to be updated to ensure all government agencies and members of the public are aligned about species needing greater protection focus.

On the World Wildlife Day event at the Port Moresby Nature Park on 2 March, local community organisations that participated in the Communicating Conservation meeting displayed their conservation initiatives across four display booths. They were supported by 116 EMPNG, University of Papua New Guinea and family volunteers.

More than 100 conservation professionals participated in a second Communicating Conservation meeting, also held in Port Moresby, in November. The first day of the meeting was attended by Papua New Guinea's Minister for Environment, Conservation and Climate Change, Honourable Wera Mori MP, the Minister for Communications and Information Technology, Honourable Timothy Masiu MP, and CEPA Managing Director, Gunther Joku. Discussions covered species and habitat protection, the link between biodiversity and tourism, the "PNG way", partnerships and capacity building, conservation success stories, the use of traditional knowledge in conservation efforts at the community level and opportunities for community conservation to participate in policy making in Papua New Guinea.



EMPNG volunteers supported conservation display booths at World Wildlife Day

Two issues of *Biodiversity Digest*, a newsletter communicating conservation practices in Papua New Guinea, were produced by the Mama Graun Conservation Trust Fund during 2019.

Component 3: Build conservation capacity

Component 3 involves building the technical capacity of conservation professionals and enhancing community capacity in conservation through implementation of the Enhancing Conservation Capacity Program, which expands on Papua New Guinea's existing Strengthening Conservation Capacity Programme.

In April, 10 Bachelor of Science Honours and Postgraduate Diploma scholarship recipients who started their studies in Biodiversity Conservation in 2018 graduated from the University of Papua New Guinea.



University of Papua New Guinea Postgraduate Diploma in Biodiversity Conservation students celebrate their graduation

In December, 42 community conservation practitioners graduated with certificates in Biodiversity Conservation. Almost 90 students have gained certification through this program since 2017.

Component 4: Enhance existing protected areas

Component 4 aims to enhance the management effectiveness of the Lake Kutubu Wildlife Management Area (WMA), which is managed by the Lake Kutubu WMA Committee, comprised of community members. This is accomplished by building the capacity of the Lake Kutubu WMA Committee.



Lake Kutubu WMA members delivering Ramsar awareness training to local schools

In January, 18 Lake Kutubu WMA Committee members received training, focusing on the Lake Kutubu Ramsar site and wetlands, provided by the University of Natural Resources and Environment. In May and June 2019, WMA Committee members delivered education sessions at local schools to raise awareness about the Lake Kutubu WMA as part of the implementation of a Ramsar funded project, for which the WMA Committee received a PGK51,108 (US\$15,000) grant. Through a PGK170,350 (US\$50,000) United Nations Development Program grant, the WMA Committee began implementing its own livelihood program in June, which included a poultry breeding project, the development of sustainable home gardens and monitoring of fish in Lake Kutubu. The project has progressed well with local community members.



Lake Kutubu WMA members participating in the poultry breeding project

The WMA Committee also received biodiversity monitoring training provided through EMPNG in June.

For the fourth consecutive year, the Lake Kutubu WMA Committee participated in the Kutubu Kundu and Digaso Festival at Pimaga Village. They also hosted the canoe race for the third year in a row. The canoe race is an initiative of the WMA Committee.

Component 5: Establish new protected areas

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

Communities in the Lower Kikori continue to meet to identify areas for conservation. During 2019, two community engagement campaigns were conducted in the Lower Kikori region to progress resource mapping.

EMPNG is committed to bringing back information to the communities that it engages with. Information is shared in various forms, including books, posters, videos and immersive technology.



Using immersive technology as an engagement tool



Lower Kikori community members reading a poster about butterflies of the Kikori River basin

The first 2019 community engagement was conducted in June. During this engagement four communities completed community resource mapping. These communities are now ready to establish conservation deeds for land they identified for conservation purposes.

EMPNG's second community engagement for 2019 in Lower Kikori was conducted in October, where eight communities progressed their resource mapping. During the October engagement, the Yumi Kikori community-based conservation organisation was formed to bring all Kikori people together under one common vision for conservation.

The first Yumi Kikori Invasive Tilapia Fishing Competition was held in October to raise awareness among local communities about invasive species.



EMPNG Environment team members join Yumi Kikori Invasive Tilapia Fishing Competition participants and organisers

7.2 BIODIVERSITY IMPLEMENTATION AND MONITORING PROGRAM

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

- PMA1 – Remote Sensing of Broad-scale Land Cover involves using remote sensing imagery to determine the extent of broad-scale direct and indirect residual impacts from PNG LNG.
- PMA2 – Condition Surveys of Focal Habitats and Significant Ecological Features uses field surveys to collect data to monitor the condition of focal habitats and significant ecological features that had been avoided during construction.
- PMA3 – Biodiversity Surveys involves biodiversity field surveys that provide flora and fauna data in and around the areas affected by PNG LNG.
- PMA4 – Efficacy of Biodiversity Offsets 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 2019.

PMA1 – Remote Sensing of Broad-scale Land Cover

In 2019, EMPNG completed ground-truthing of priority inspection zones that had been identified in the previous review period. This monitoring did not reveal any new or unexpected significant residual impact from PNG LNG. Satellite imagery was acquired in 2019 and an analysis will be conducted in 2020 to understand the evolution of the landscape around PNG LNG since the last review in 2017.

PMA2 – Condition Surveys of Focal Habitats and Significant Ecological Features

In November, 22 sites consisting of caves, streams and swamps were inspected. Monitoring indicated that the condition of focal habitats and sensitive ecological features identified during pre-construction surveys remained intact with substantial vegetation regrowth.

Streams and caves within close proximity to settlements continue to be used by local community members.

As sites become inaccessible due to dense vegetation and taller forest growth, the number of areas inspected continues to decrease.

PMA3 – Biodiversity Surveys

The biennial PMA3 monitoring survey began in August, with field work completed in early September. The survey covered six transects on Hides Ridge and four transects in the Moro area. Camera traps were also set up to collect ecological data and remained in place until early December. An analysis of the data collected will be conducted during 2020.

An environmental genomics pilot study commenced in 2019 to identify opportunities to improve ongoing biodiversity surveys. Some soil and water samples were collected from Hides Ridge and Moro to unveil potential new insights in biodiversity trends in these locations.



A biodiversity survey team in the Upstream area

Spotlight

Growing biodiversity expertise in Papua New Guinea

EMPNG is providing more opportunities for Papua New Guineans in biodiversity field surveys, with the aim of growing a national team of biodiversity experts. In 2019, six out of nine biodiversity survey team members were Papua New Guinean.

Enock Kale, from Herowana Village of Lufa district in the Eastern Highlands Province, has participated in PNG LNG biodiversity surveys since 2010 and is now recognised as a mammal expert.

Enock started trapping mammals and studying their population biology in 2004. He has built his career as a field biologist alongside some of the world's best mammalogists, and continues to learn new survey skills while working with international scientists. He has worked on previous EMPNG biodiversity surveys with the late Dr Ken Aplin, who passed away in January. Apart from participating in EMPNG's biodiversity surveys, Enock is training local communities of the Lake Kutubu WMA on biodiversity conservation and monitoring skills.



Mammal expert, Enock Kale

- Richards, S.J. & Gunther, R. (2019). Three new scansorial species of microhylid frogs (Anura: *Cophixalus*, *Oreophryne*) from Papua New Guinea. *Salamandra* 55: 55–72.
- Woxvold, I. A. & Legra, L. (2019). A population of Greater Ground Robin *Amalocichla sclateriana* (Petroicidae) from central New Guinea. *Bulletin of the British Ornithologists' Club* 139(1): 85–87.
- Woxvold, I. A., Diamond, J. M., Bishop, K. D. & Legra, L. (2019). Avifauna of the Lake Kutubu Wildlife Management Area, Papua New Guinea. *Bulletin of the British Ornithologists' Club* 139(3): 266–292.

PMA4 – Efficacy of Biodiversity Offsets

Stakeholder feedback with regard to Component 2 of the Biodiversity Offset Program indicates that it is delivering value in bringing community conservation efforts to a central place for the exchange of information; and Component 3 is helping to build capacity in areas of need at the national level and with community-based conservation organisations.

Meanwhile, the Lake Kutubu WMA Committee continues to demonstrate improved capacity to support conservation activities through Component 4, and ongoing successful community engagements and biodiversity resource mapping are occurring in Kikori under Component 5.

Five scientific papers were published during 2019. These publications described new species of frogs and birds identified during EMPNG biodiversity surveys and were titled:

- Oliver, P., Richards, S.J. & Donnellan, S.C. (2019). Two new species of treefrog (Pelodydidae: *Litoria*) from southern New Guinea elucidated by DNA barcoding. *Zootaxa* 4609: 469–484.
- Günther, R. & Richards, S.J. (2019). Three new species of *Austrochaperina* from southern Papua New Guinea (Anura, Microhylidae). *Vertebrate Zoology* 69: 327–344.

CASE STUDY: ENHANCING AN EXISTING CONSERVATION AREA

The Lake Kutubu Wildlife Management Area (WMA) Committee is leading broad conservation initiatives to protect the region.

The Lake Kutubu WMA protects wetlands and forests of global significance
[Photo by Stephen Richards]

With support from EMPNG, the Lake Kutubu WMA Committee and local communities, local capacity is being enhanced in and around the Lake Kutubu area.

Since 2012, EMPNG has worked together with Lake Kutubu communities to develop a Lake Kutubu WMA Enhancement Plan. The Plan is part of EMPNG's commitment under Component 4 of the Biodiversity Offset Program contained within the Biodiversity Strategy. Component 4 aims to enhance the Lake Kutubu WMA.

The Lake Kutubu WMA Enhancement Plan is implemented in partnership with local stakeholders, including Lake Kutubu communities and CEPA. It aims to promote and enhance conservation in the Lake Kutubu WMA by building the capacity of the Lake Kutubu WMA Committee, who are custodians of this Ramsar site.



Members of the Lake Kutubu WMA Committee wear uniforms provided by EMPNG to signify their status as conservation champions

Since implementation of the Plan, the Lake Kutubu WMA has focused on building the technical conservation capacity of its members and raising community awareness about Lake Kutubu as a Ramsar site. Some of the many achievements of the Lake Kutubu WMA Committee include:

- Fundraising success with securing a PGK170,360 (US\$50,000) grant from the United Nations Development Programme to support a local livelihood project. The project focuses on the promotion of alternative protein sources to relieve pressure on fishing of native species in Lake Kutubu. The Lake Kutubu WMA Committee also secured a Ramsar grant for PGK51,100 (US\$15,000) to support its conservation activities.
- Lake Kutubu WMA Committee members regularly lead educational sessions with communities, including school students, about the Lake Kutubu Ramsar site and how to protect biodiversity in this area.
- The Lake Kutubu WMA Committee organises successful annual World Environment Day celebrations including community cleanup events with members of surrounding communities.
- For the past four years, the Committee has participated in the annual Kutubu Kundu and Digaso Festival. As part of the Festival, the WMA Committee has organised canoe races to help raise awareness about objectives for Lake Kutubu as a Ramsar site.
- The Lake Kutubu Committee has hosted Ramsar Secretariat officials and provided information to demonstrate the Committee's leadership in protecting the Ramsar site.



The iconic ulysses butterfly (*Papilio ulysses*) male at rest [Photo by Chris Müller]



The azure kingfisher (*Ceyx azureus*) can be seen in forest around the edge of Lake Kutubu where it hunts the clean, clear waters for fish and invertebrates [Photo by Iain Woxvold]

Lake Kutubu WMA Committee Chair, Lawrence Kage, said the skills gained by WMA Committee members and the educational programs implemented in Lake Kutubu communities were having a positive impact on the people and biodiversity values in the Lake Kutubu WMA.



Dr Osia Gideon from the University of Technology in Lae examining a plant specimen in the Lake Kutubu WMA [Photo by Stephen Richards]

“We are seeing a genuine commitment from communities to preserve our valuable biodiversity resources. This will help to ensure our sustainable use of biodiversity resources for the future. This could not have been achieved without the support, guidance and environmental expertise of EMPNG,” Mr Kage said.



The bizarre facial structures of this Wollaston's leaf-nosed bat from Lake Kutubu help it to produce a unique echo-location call [Photo by Stephen Richards]

EMPNG Biodiversity Lead, Lucie N'Guessan, said the skills developed and lessons learned through the Lake Kutubu WMA Committee could be applied to other conservation sites throughout Papua New Guinea.

“The Lake Kutubu WMA Committee is a good example of how government, industry and the community can work together to protect and preserve significant cultural and biodiversity values for the benefit of many future generations,” she said.

Spotlight

Lake Kutubu Wildlife Management Area

Lake Kutubu is one of five legally protected conservation areas in the Kikori River Basin. Others are: Neiru (Aird Hills) WMA, Libano Arisai WMA, Libano Hose WMA and Sulamesi WMA.

Lake Kutubu is located in the Southern Highlands Province and lies to the east of the Kikori River, into which it eventually drains. It is the largest perched lake in Papua New Guinea, and the second largest lake behind Lake Murray in the country. At an elevation of 800 metres above sea level, Lake Kutubu is about 19 kilometres long, 4 kilometres wide at its widest point, and has a maximum depth of approximately 70 metres.

The Lake Kutubu WMA covers some 25,000 hectares that include most of the lake's catchment and an area of approximately 1000 hectares of surrounding forest. In 1998, the same area was subsequently designated as a Wetland of International Significance under the *Convention on Wetlands of International Importance especially as Waterfowl Habitat* (Ramsar Convention).

Conservation of the Lake Kutubu WMA is vital to local communities who depend on its resources to support their livelihoods. The WMA contains plant and animal species of high social, cultural and economic importance.

For example, 12 of the 18 species of fish present in Lake Kutubu are endemic, the highest level of lacustrine endemism of any lake in the New Guinea-Australia region. A small grassy island at the northern end of the lake is culturally significant because it marks the location of the original mythical tree from which the waters of the lake flowed.

The PNG LNG pipeline crosses the northern boundary of the site, north of Lake Kutubu. It involves an area, which accounts for approximately 0.2 percent of the WMA/Ramsar site. The pipeline's location is the result of extensive investigation and a review of multiple options, which aimed to avoid the WMA/Ramsar site. Pre-construction surveys were conducted within this area and mitigation measures implemented to reduce any impact on the WMA/Ramsar site.



Lake Kutubu Wildlife Management Area

8 PERFORMANCE

To determine the effectiveness of the ESMP, monitoring and evaluation tools are used to confirm whether EMPNG's mitigation measures to manage production risks are achieving their intended outcomes.



Operations technician, Eunice Isaac monitors production from the LNG Plant control room

2019 performance highlights

73
**POSITIVE FIELD
OBSERVATIONS**

EMPNG recorded 73 positive field observations as examples of good environmental practices.

3
**MONITORING
VISITS**

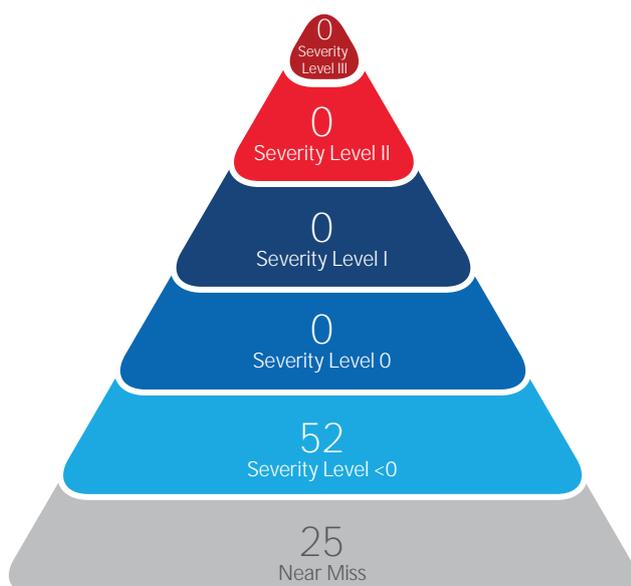
In addition to annual external monitoring, site visits during 2019 focused on the start of work for the Angore Gathering System.

8.1 INCIDENTS

EMPNG's approach to managing incidents is outlined in the company's Incident Management System. An incident is defined as a specific event or extended condition that has resulted, or could have resulted (such as near miss), in an unwanted or unintended impact on the safety or health of people, or on property, the environment, legal or regulatory compliance, or security as it relates to ExxonMobil's Operations Integrity Management System. Incidents 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 IESC, or relevant government authority.

Incidents and near misses recorded during 2019 are shown according to Severity Level in Figure 8.1.

Figure 8.1 – Incidents



Number by Severity Level for 2019

No Severity Level 0, 1, 2 or 3 incidents were recorded during 2019. Fifty-two low-level environmental incidents classified as Severity Level <0, and 25 near misses, were reported during the year in relation to production operations.

EMPNG and its contractors investigated the causes of most incidents and undertook corrective actions to address root causes and prevent reoccurrence. Investigations also resulted in the reclassification of one incident which occurred during 2018. This incident was in relation to vegetation clearing along the ROW, previously classified as a Severity Level <0 incident and now reclassified as a Severity Level 0 incident.

In addition, sighting of cane toads in the HGCP, which occurred in December 2018, was not included in the 2018 Annual Environmental and Social report and is now being included.

8.2 MONITORING AND EVALUATION

EMPNG implements a monitoring and evaluation system to determine risks and impacts of production activities in accordance with ESMP requirements. The system also monitors implementation of the management program to effectively manage identified risks.

ExxonMobil's Operations Integrity Management System is used to monitor, verify and evaluate EMPNG's conformance with the ESMP. In accordance with EMPNG's environmental protocols, site-based environmental specialists inspect worksites, conduct field observations and monitor air, noise and water discharge to implement the company's verification program.

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, typically including observed significant damage or a reasonable expectation of significant damage. These Severity Levels align with the incident Severity Levels of <0, 0, 1, 2 and 3. All non-conformances require corrective action.

Field observations and non-conformances identified during 2019 are shown in Figure 8.2.

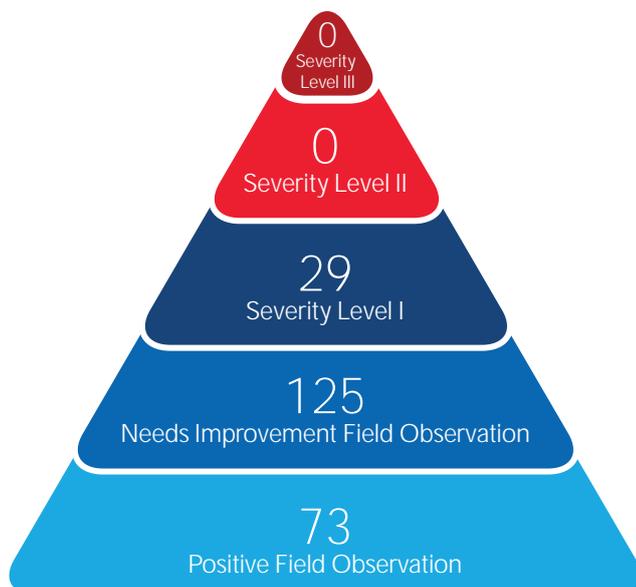
Twenty-nine Severity Level I environmental non-conformances were recorded in 2019. A Severity Level 1 non-conformance associated with the 2018 vegetation clearing incident was reclassified as a Severity Level II non-conformance for 2018, following investigations in 2019.

Six non-conformances were raised for wastewater discharge effluent quality, 21 were for exceedances of EMPNG's wastewater management criteria and two were for clearing of a revegetated area. The causes of all non-conformances were investigated and corrective actions taken.



EMPNG Environment Lead, Melanie Bok; Environmental Specialists, Rebecca Lovi and Sharon Lauatu; and former Environment and Regulatory Supervisor, Laura Ann Dresser during an IESC monitoring visit at the Hides Spine

Figure 8.2 – Non-conformances and field observations



Number by Severity Level for 2019

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 125 needs improvement field observations recorded during 2019, 15 related to invasive species management, 28 were for erosion and sediment control, 42 were for waste management, 12 regarded water discharges, 18 were for spill prevention and response management, three were for reinstatement and regeneration, three for ecology management, two for materials management, one for noise and one relating to emissions to air.

By the end of the year, most needs improvement field observations were addressed and closed, with approximately 11 percent remaining open while teams continued working on corrective actions to close them.

Positive field observations record examples of good environmental practices. Seventy-three positive field observations were recorded in 2019, with 12 of these for erosion and sediment control, four related to invasive species,

one for materials management, 18 regarding spill prevention and response, 31 for waste management and three related to water discharges, two for reinstatement and regeneration and two for positive management of emissions to air.

8.3 EXTERNAL MONITORING

The Lender Group's Independent Technical Consultant and IESC conducted monitoring visits of PNG LNG facilities in early 2019.

In June, a Civil Aviation Authority Airworthiness Manager visited Komo to conduct a Komo Supply Organisation Certificate audit.



Papua New Guinea Department of Petroleum and Energy representatives inspect the Angore Wellpad and pipeline route

In November, a Papua New Guinea Department of Petroleum and Energy representative inspected the Angore Wellpad prior to the approval of plug and abandonment program works for pre-existing Angore wells. Department of Petroleum and Energy representatives also inspected the Angore Wellpad and pipeline route in December ahead of the recommencement of the Angore Gathering System project.

9 STAKEHOLDER ENGAGEMENT

For the past decade, open and inclusive communications and engagement activities have been conducted to keep stakeholders informed about construction and production activities. Engagement involves two-way communication that allows community issues to be raised and addressed in a timely manner.



St Paul's primary School Principal, Steven Telape, during stakeholder engagement activities in Komo

2019 performance highlights

400,000+
STAKEHOLDERS
ENGAGED

More than 400,000 stakeholders have been engaged through PNG LNG in the past decade with some 65,000 people engaged in 2019 alone.

>1000
ATTEND ADVOCACY
WORKSHOPS

More than 1000 people attended 63 EMPNG advocacy workshops and site tours at the LNG Plant site in 2019.

9.1 COMMUNITIES

Over the past decade, more than 400,000 stakeholders have been engaged through PNG LNG.

During 2019, some 65,000 people participated in 3960 engagements with 178 communities. This included 1737 formal and 2223 informal engagements. Since production began, EMPNG has conducted more than 43,000 engagements with stakeholders in some 200 communities.

In the Upstream area, engagements focused on community development activities such as fresh produce market days, community events and celebrations including Independence Day. Engagements also involved Clan Caretaking Agreements, as well as ongoing earthquake recovery works.

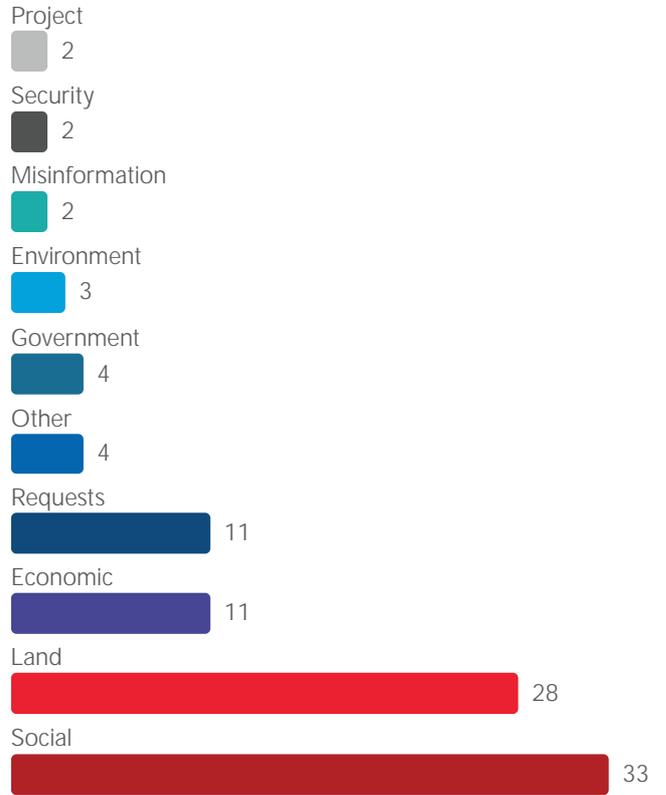
At the LNG Plant site villages, engagements included marine, road and pedestrian safety education sessions with communities and schools. Mangrove protection education was also conducted with LNG Plant site communities. Other engagements included community development support projects and community events across Papa, Lea

Lea, Boera and Porebada villages, as well as with more remote communities.

Issues identification

As shown in Figure 9.1, social issues accounted for 33 percent of issues raised during 2019. These mainly related to employment, social engagement and community health.

Figure 9.1 – Issues



Percentage received by category for 2019



Road and pedestrian safety awareness session with Porebada Elementary School students

Land issues comprised 28 percent and mostly related to land deprivation and compensation payments, as well as land compensation claims arising from internal clan disputes.

Economic-related issues accounted for 11 percent, primarily for infrastructure projects and business development and investment inquiries.

Requests also accounted for 11 percent and related to inquiries about community development projects and business development opportunities, including employment requests.

Government issues mostly regarded the local level government elections and the payment of royalties from LNG production.

9.2 GOVERNMENT

EMPNG engages with representatives from all levels of government to keep them informed about production activities and to support the development of community-based initiatives.

9.2.1 Infrastructure and government support

EMPNG supported two key United Nations Development Programme events in the Hela Province during 2019. In October, the first United Nations-sponsored Hela Peace and Development Workshop was held in Tari. The historic three-day Workshop brought together the Hela Provincial Government, national government agencies, development

partners, including the Australian and New Zealand governments, and non-government organisations. It aimed to develop strategies to support peace-building activities in the Hela Province. The Workshop led to the creation of a Road Map for Peace and Development Cooperation in Hela. The Road Map supports coordination between development partners and complements the Hela Provincial Government's efforts to promote peace building.

Building on the outcomes of the Hela Peace and Development Workshop, a two-day Komo Peace Conference was conducted in November. The Conference brought together more than 80 local leaders and community representatives from the Komo Rural Local Level Government, as well as non-government organisation and private sector representatives. Organised by the United Nations Development Programme in partnership with the Komo-Margarima Local Level Government and the Catholic Diocese of Mendi with the support of EMPNG, the conference resulted in community leaders agreeing to support peace and development efforts in Komo.

EMPNG continues to support the Papua New Guinean Government with maintenance and upgrades to sections of the Highlands Highway spanning Mendi in the Southern Highlands to Komo in Hela Province. Upgrades include a chip-sealed road surface, along with improved drainage and road shoulders. This program of works is providing employment for people living in nearby communities, as well as business opportunities for local suppliers.



EMPNG participated in an historic three-day Hela Peace and Development Workshop in Tari in October

Work has progressed on a public private partnership that was launched in 2018 to develop a large-scale commercial agricultural venture in the Hela Province. The venture, led by Innovative Agro Industry, involves a detailed feasibility study that includes an analysis of local soil and growing conditions.

9.2.2 Advocacy

More than 1000 people attended 63 EMPNG advocacy workshops and site tours at the LNG Plant site in 2019. Participants included: Extractive Industries Transparency Initiative (EITI) officials; representatives from the Papua New Guinea Department of Transport, PNG Air Services, Papua New Guinea Electoral Commission and Papua New Guinea Customs Service; Juni Health Centre staff; the 2020 Society of Petroleum Engineers President; and 25 members of the third Papua New Guinea Petroleum and Energy Summit.



2020 Society of Petroleum Engineers President, Shauna Noonan (front centre) visiting the LNG Plant site in November

The LNG Plant site also hosted more than 400 school students and teachers from Papa, Lea Lea, Boera and Porebada villages, as well as fourth year environmental science university students.

EMPNG's advocacy workshops are increasingly attracting interest from international governments. During the year, government representatives from Germany, Tanzania, China and Japan participated in workshops and site tours during official visits to Papua New Guinea.



EMPNG Operations Technician, Steven Ekeram presenting to United States Embassy delegates during a tour of the LNG Plant

In addition to advocacy events at the LNG Plant site, advocacy workshops were held in the Hela and Western provinces with local and provincial level government representatives.

HGCP site tours were conducted for some 250 people from schools, community and youth organisations.

Advocacy workshops provide participants with information about EMPNG operations, as well as national content and community development programs.

9.2.3 Benefits assurance delivery

EMPNG continues to make monthly and annual payments to the Papua New Guinean Government, in accordance with the *Oil and Gas Act 1998*, for landowner royalty and Provincial and Local Level Government Development Levy, respectively. The funds are managed through Government trust accounts with the Bank of Papua New Guinea. The Department of Finance is custodian of the accounts. These funds are distributed by the Department of Petroleum and Energy and the State-owned MRDC on behalf of the Papua New Guinean Government.

In the early stages of PNG LNG, landowners requested that the Papua New Guinean Government provide more granularity with regard to royalty apportionment than had been set out in the Licence Based Benefits Sharing Agreements.

The Government agreed to this request and undertook a detailed review of landowner identification, starting in 2011. This process is known as Landowner Beneficiary Identification. This in turn was subject to litigation by some landowners in the Hides area, which resulted in additional administrative steps for the distribution of royalties from oil and gas production, by court annexed mediations.

During 2019, Landowner Beneficiary Identification was completed for landowners in the Hides Petroleum Development Licence PDL1 and PDL7 areas. MRDC has commenced the process of opening accounts for PDL1 and PDL7 beneficiaries. Meanwhile, landowners from pipeline segments have been approved by the Government to receive their benefit entitlements in accordance with the requirements under the *Oil and Gas Act 1998*.

By the end of 2019, the MRDC had distributed funds to beneficiary clans at the LNG Plant site villages of Papa, Boera, Porebada and Lea Lea, as approved and determined by the Department of Petroleum in 2016.

EMPNG continues to support the MRDC as required.

In 2019, 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 impacted provincial and local level governments for their developmental needs.

9.2.4 Revenue management

In March, an EITI international post-validation workshop was held in Papua New Guinea where a technical working group identified areas for improvement in the country. An action plan was developed, with improvements to be implemented ahead of the second validation workshop in April 2020.

The Papua New Guinea EITI National Secretariat made significant progress with implementation of the Beneficial Ownership Roadmap, a process that commenced in July 2017. The Roadmap requires that companies who bid for, operate or invest in the extractive sector disclose their beneficial owners by January 2020 in their country reports, which is an expectation from the 2016 EITI Standard. In March, Papua New Guinea EITI representatives attended a Technical Capabilities in Beneficial Ownership Disclosure workshop held in Manila, Philippines.

Papua New Guinea EITI representatives also attended the EITI Global Conference held in Paris, France in June. During the Conference, the EITI International Board awarded Papua New Guinea for making meaningful progress in its EITI implementation. Papua New Guinea was also commended for its efforts to implement reforms that addressed weaknesses in government systems and improved the level of transparency within the country's extractive sector.

The EITI Global Conference coincided with the EITI International Board's ratification of the 2019 EITI Standard, which requires that contracts entered into or amended from 1 January 2021 should be published. The 2019 EITI Standard prescribes reporting in three new areas:

- State-owned enterprises – Countries are required to describe how funds transfer between State-owned enterprises, the State, their joint venture partners, subsidiaries and trustee companies.
- Environmental reporting – Extractive companies should disclose all material environmental payments to governments.

- Gender – A renewed focus on gender equality in which, for example, multi-stakeholder groups are required to consider gender balance in their representation and that reporting on employment figures should be disaggregated by gender.

The Papua New Guinea EITI National Secretariat continued work on its National Policy and Legislative Bill, which will assist the Papua New Guinea EITI to transition from a National Secretariat to a National Government Commission, an independent entity. The Bill was submitted to the State Solicitor's office for certification in October. Once certified, it will be taken to the National Executive Council and Parliament for final approval.

Outreach and awareness-raising programs were conducted during the year with various local stakeholder groups so that stakeholders could meaningfully and freely participate in the EITI process.

The sixth Papua New Guinea EITI Report covering 2018 activities was published on the EITI website in December. Previous reports are published on the Papua New Guinea EITI National Secretariat website.

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.



EMPNG Managing Director, Andrew Barry, with Buk bilong Pikinini staff at the Stakeholder Thank You event

Spotlight

EMPNG recognised for environmental and safety achievements

During 2019, EMPNG was recognised by the Papua New Guinea Chamber of Mines and Petroleum for outstanding environmental initiatives, including capacity building and reporting as featured in a series of biodiversity surveys. The surveys generated data on the biodiversity values of existing or potential community-based protected areas at three sites in the Kikori Basin: Wau Creek, Uro Creek and Lake Kutubu. The survey reports can be found on the PNG LNG website.

Environmental Advisor, Colman Otmar, who received the award on behalf of EMPNG, said, "I would like to thank the Chamber of Mines and Petroleum for recognising the work we are doing to protect and conserve Papua New Guinea's unique biodiversity through this award."

"As a Papua New Guinean, I am extremely proud to work for an organization like EMPNG, who supports this passion wholeheartedly and has the commitment to safeguarding this unique biodiversity," said Colman.



EMPNG Environmental Advisor, Colman Otmar (centre) receiving the Papua New Guinea Chamber of Mines and Petroleum Environmental Award

Team PNG LNG participated in their first Extractive Industries Emergency Response Challenge against other Papua New Guinea-based mining and oil and gas companies in 2019. The team achieved first place in the rope rescue event and third place in the theory session. The Papua New Guinea Chamber of Mines and Petroleum hosted the Challenge.



EMPNG Safety, OIMS and Emergency Response Supervisor, Chris Pearson (centre) with Team PNG LNG

9.3 MEDIA

Communications during 2019 highlighted EMPNG's work with stakeholders to build the capacity of Papua New Guinean communities and deliver longer term national benefits from PNG LNG.

In March, EMPNG Managing Director, Andrew Barry, addressed some 100 people from Papua New Guinea's public and private sector at the company's annual Stakeholder Thank You event. During the event, Mr Barry showed his appreciation for organisations that had worked with EMPNG to help rebuild communities affected by the 2018 earthquake.

Mr Barry also spoke at the 2019 Prime Minister's National Leaders Summit in Port Moresby, Institution of Engineers Port Moresby annual general meeting, and the Australia Papua New Guinea Investment and Business Forum. In December, Mr Barry participated in the Chamber of Mines and Petroleum Conference in Port Moresby.

During the year, EMPNG had more than 745,000 engagements on social media, with the most popular topics being workforce, skills training, women, education and the environment.



EMPNG Managing Director, Andrew Barry, at the Chamber of Mines and Petroleum Conference in Port Moresby

The *PNG LNG Environmental and Social Report – Annual 2018* was published in May. A total 104,000 printed copies of the Report's Executive Summary were published in English and Tok Pisin in national newspapers. The 2018 Report, along with previous Environmental and Social Reports are published on the PNG LNG website.

Visit the website at: www.pnglng.com



EMPNG also published eight newspaper advertorials outlining the company's achievements and support with national content initiatives.

Three editions of *PNG LNG TIES* were distributed to stakeholders during the year, including EMPNG workers, government, media and local communities. 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.

ACRONYMS

Acronym	Definition
AIDS	Acquired Immunodeficiency Syndrome
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 Limited
HIV	Human Immunodeficiency Virus
IAIA	International Association for Impact Assessment
IESC	Independent Environmental and Social Consultant
Lanco(s)	Landowner company (companies)
LNG	Liquefied Natural Gas
MRDC	Mineral Resources Development Company Pty. Limited
PDL	Petroleum Development Licence
PMA	Programmed Monitoring Activity
PNG	Papua New Guinea
ROW	Right of Way
UniTech	Papua New Guinea University of Technology
WEN	Women in Energy Network
WMA	Wildlife Management Area

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