

**PETRONAS' Environmental Focus Areas**

**» Air Emissions**

- Monitor, evaluate and address risks related to air emissions.
- Leverage on our online monitoring platform to provide early warning for increasing trends in emission load that will enable timely intervention.
- Measure Sulfur Oxides (SOx) and Nitrogen Oxides (NOx) emissions through continuous monitoring or periodic samplings.
- Ensure measurements are in accordance to host country requirements and internationally-accepted standards.

**» Oil Spill Prevention**

- Embed industry best practices on spill prevention into our facility design.
- Implement scheduled inspections and maintenance programmes.

**» Decommissioning**

- Adhere to Decommissioning Option Assessment (DOA) in disposing petroleum facilities.
- Conduct feasibility studies on transforming decommissioned oil and gas platforms into artificial reefs to maximise the lifecycle of decommissioned structures and protect marine biodiversity.

**» Water Management**

- Implement internal standards, policies and practices to optimise freshwater withdrawal.
- Focus on three pillars – conduct water accounting, understand water availability and increase water use efficiency.
- Carry out regular tracking of freshwater withdrawal in water stress areas.
- Monitor, evaluate and address risks from waste water discharge from our facilities.

**2022 Environmental Quality Performance**

**1 Water**

Freshwater Withdrawal	2021	2022
Malaysia (million cubic metres per year)	70.2	<b>76.8</b>
International (million cubic metres per year)	1.0	<b>4.8</b>
Total (million cubic metres per year)	71.2	<b>81.6</b>
Discharges to Water (tonnes of hydrocarbon)	452	<b>487</b>

In 2022, our total freshwater withdrawal was 81.6 million cubic metres as compared to 71.2 million cubic metres recorded in 2021. The increase in water withdrawal was attributed by two major new sources i.e. Pengerang Integrated Complex and new processing trains in Iraq operations.

**2 Air Emissions**

We continued to monitor air emissions from all our facilities.

	2021	2022
Total of Sulphur Oxides Emissions (tonnes)	47,954	<b>60,116</b>
Total of Nitrogen Oxides Emissions (tonnes)	133,962	62,790

In 2022, the Group's sulphur oxides emissions increased to 60,116 tonnes compared with 47,954 tonnes in 2021. The increase in emission load was attributable to higher gas production in Sarawak's Upstream asset and gas processing plant.

Total nitrogen oxides emissions for 2022 stood at 62,790 tonnes from 133,962 tonnes in 2021, mainly due to omission of emission load data from ships due to ongoing review of reporting method, and revision in calculation methodology for floating LNG and power plant.

## Safeguard the Environment

### 3 Environmental Health

#### Human Health Risk Assessments (HHRAs)

We are committed to safeguard the health of communities in areas where we operate.

We proactively conduct HHRA beyond facility fencelines to evaluate community exposure to chemicals in the ambient environment. Since 2018, we have been conducting baseline HHRAs at selected operations and continued our efforts in 2022 to establish the environmental health risk profile for our global operations. From the baseline HHRAs, we have identified areas of improvement to reduce chemical exposures in air emissions and groundwater, going beyond regulatory compliance.

### 4 Oil Spill Prevention

	2021	2022
Number of Hydrocarbon Spills into the Environment over One Barrel (Number of cases)*	2	2

\* One barrel is equivalent to 159 litres

- In 2021 and 2022, there were two cases of oil spills, compared to five in 2020.
- Several Joint Offshore Oil Spill Response (OSR) Standard Operating Procedure development workshops were conducted involving 13 government agencies in collaboration with the Department of Environment (DOE). The purpose of these workshops was to brainstorm on the effective methodology to overcome challenges during the response to oil spill incidents. This includes managing transportation from OSR service providers' bases to incident locations, chartering spotter aircrafts, mobilisation of equipment and experts from outside Malaysia.
- Document Guideline to request government assistance for oil spill response operations was approved during the National Oil Spill Operation Committee (NOSC) sitting.
- Conducted an Oil Spill Response Capability Assessment (OSRCA) for various PETRONAS OPU's
- Enhancement of OSR personnel capability via OSRL Masterclass IMO Level 3 and webinars.
- Organised 3 regional forums on Malaysia Oiled Wildlife Response (MOWReP) and developed new PETRONAS Technical Guideline (PTG) 18.41.02 Oiled Wildlife Response for Malaysia's government agencies and industry players.

### 5 Decommissioning

In 2022, we achieved the following on the decommissioning front:

- Complete the plug and abandonment of 13 wells.
- Successfully secured a preliminary agreement for the 10-year Sabah Master Reefing Plan with the Department of Fisheries (DOF), Sabah.
- Organised a Decommissioning Enhancement Workshop with Production Arrangement Contractors (PACs) and decommissioning service providers from 13 to 14 December 2022. A total of 12 papers were presented to further improve future execution of decommissioning projects. Other benefits from the workshop included clarity in future decommissioning outlook and better resource planning.
- In collaboration with DOF, the Kapal rig-to-reef site monitoring indicated a growth of fish species by ~30 per cent with an annual average fisheries' economic growth by ~5 per cent.
- Continuous active regional and international industry collaborations:
  - International Association of Oil and Gas Producers (IOGP)'s Decommissioning Committee's Expert Groups on Asset Retirement Obligations (ARO), Habitat Retention on Reefing Guidance, and Co-Chairing the IOGP Asia Pacific (APAC) Decommissioning Sub-Committee.
  - Finalised the ASEAN Council on Petroleum (ASCOPE) Decommissioning Guideline (ADG) revision draft based on inputs from the Exploration and Production Task Force (EPTF).