2024

PERTAMINA HULU ENERGI

Laporan Tahunan Kegiatan Lingkungan PHE 2024

Environmental Annual Report PHE 2024

Driving Resillience For Sustainable Future

Dalam menghadapi ancaman perubahan iklim dan volatilitas ekonomi, PHE Subholding Upstream berfokus pada penguatan infrastruktur tahan iklim, mitigasi risiko operasional, dan pengurangan dampak lingkungan. Upaya ini diwujudkan melalui investasi pada infrastruktur yang ramah lingkungan, pengelolaan risiko iklim yang berbasis data, serta peningkatan efisiensi proses operasional. PHE Subholding Upstream juga menempatkan ketahanan sebagai inti dari strategi keberlanjutannya, tidak hanya untuk melindungi aset perusahaan tetapi juga untuk menciptakan nilai bagi masyarakat dan lingkungan.

Dengan membangun kapasitas adaptasi terhadap perubahan global, PHE Subholding Upstream memastikan bahwa pertumbuhan ekonomi tidak mengorbankan keberlanjutan ekosistem. Tema ini merepresentasikan visi jangka panjang PHE Subholding Upstream untuk menjadi pelopor dalam menciptakan masa depan yang tangguh dan berkelanjutan.

In facing the threat of climate change and economic volatility, PHE Subholding Upstream focuses on strengthening climate-resilient infrastructure, mitigating operational risks, and reducing environmental impacts. These efforts are realized through investment in environmentally friendly infrastructure, data-based climate risk management, and increase of operational process efficiency. PHE Subholding Upstream also places resilience at the heart of its sustainability strategy, not only to protect the assets of the company but also to create value for the society and the environment.

By building adaptive capacity to global changes, PHE Subholding Upstream ensures that economic growth does not come at the expense of ecosystem sustainability. This topic represents PHE Subholding Upstream's long-term vision to be a pioneer in creating a resilient and sustainable future.

Tentang Laporan
About This Report

Periode dan Cakupan Laporan
Reporting Period and Scope

Laporan Tahunan Lingkungan ini mencakup periode pelaporan dari 1 Januari 2024 hingga 31 Desember 2024. Siklus pelaporan ini memberikan kesempatan bagi PHE Subholding Upstream untuk mengevaluasi pencapaian, mengidentifikasi area yang memerlukan perbaikan, serta merumuskan strategi keberlanjutan yang lebih efektif dalam mendukung visi jangka panjang.

Informasi dalam laporan tahunan lingkungan ini mencakup kinerja lingkungan dari seluruh Wilayah Kerja (WK) yang tersebar di 5 Regional, termasuk 2 AP Service yaitu PDSI dan Elnusa, serta PT Badak NGL.

This Environmental Annual Report covers the reporting period from January 1, 2024, to December 31, 2024. This reporting cycle provides an opportunity for PHE Subholding Upstream to evaluate achievements, identify areas for improvement, and formulate more effective sustainability strategies in support of its long-term vision.

The information in this Environmental Annual Report covers the environmental performance of all Working Areas (WK) spread across 5 Regions, including 2 AP Services, namely PDSI and Elnusa, as well as PT Badak NGL.

Acuan Penulisan
Writing Reference

Acuan penulisan Laporan Tahunan Lingkungan ini mengacu pada berbagai standar dan panduan yang digunakan untuk menyampaikan kinerja lingkungan PHE Subholding Upstream. Penulisan laporan ini mengikuti standar GRI, OJK, serta persyaratan lembaga pemeringkat Sustainalytics dan MSCI untuk industri minyak dan gas.

The writing reference for this Environmental Annual Report is based on various standards and guidelines used to present the environmental performance of PHE Subholding Upstream. The report follows GRI standards, OJK regulations, and the requirements of rating agencies Sustainalytics and MSCI for the oil and gas industry.

Pernyataan Kembali
Restatement

Pernyataan ulang informasi dilakukan untuk memperkuat validitas isi laporan. Apabila terdapat informasi yang diulang dari laporan sebelumnya, akan diberi tanda *restatement. Penjelasan terkait pernyataan ulang tersebut akan disampaikan dalam narasi pendukung yang mengikuti setelah tanda *restatement ditemukan.

Restatement of information is conducted to reinforce the validity of the report's content. If any information is repeated from previous reports, it will be marked with an *restatement. Explanations related to the restated information will be provided in the supporting narrative following the *restatement mark.

Daftar Isi
Table Of Content

Tentang Laporan 03
About This Report

Peristiwa Penting 05
Significant Events

Kata Pengantar 08
Foreword

10 **Laporan Manajemen**
Management Report

12 **Tinjauan Sasaran dan Kinerja Lingkungan**
Environmental Targets and Performance

14 **Komitmen Kami Untuk Keberlanjutan**
Our Commitment to Sustainability

16 **Komite Keberlanjutan**
Sustainability Committee

22 **Kinerja Lingkungan**
Environmental Performance

23 **Penghargaan dan Sertifikasi**
Awards and Certifications

23 **Penghargaan**
Awards

24 **Sertifikasi**
Certification

27 **Aspek Lingkungan**
Environmental Aspect

27 **Product Rendah Karbon**
Low Carbon Product

29 **Budaya Keberlanjutan**
Sustainable Culture

31 **Pengelolaan Sumur Lepas Pantai**
Offshore Well Management

33 **Penutupan dan Rehabilitasi Lokasi**
Site Closure and Rehabilitation

35 **Energi**
Energy

43 **Emisi Gas Rumah Kaca (GRK)**
Greenhouse Gas (GHG) Emission

53 Toxic Emission **(Non-GRK)**
Toxic Emission (Non-GHG)

61 **Emisi Fugitif**
Fugitive Emission

62 **Air**
Water

67 **Kelangkaan Air**
Water Scarcity

72 **Limbah dan Efluen**
Waste and Effluent

81 **Tumpahan Minyak**
Oil Spill

85 **Keanekaragaman Hayati**
Biodiversity

102 **Penutup**
Closing

104 **Lampiran**
Attachment

Peristiwa Penting
Significant Events

Rakor Konsolidasi Program Kerja - KPI Environment 2024
Work Program Consolidation Coordination Meeting – 2024 Environment KPIs

Flagship
Addressing Climate Change, Reducing Environmental Footprint, Protecting Biodiversity

23 - 25 Januari 2024 | January 23th - 25th, 2024

Alignment **KPI dan OTP** Environment **dengan Fungsi** Environment **SHU, Regional dan APH** Services **termasuk** cascading **target KPI Dekarbonisasi**

Alignment of Environment KPIs and OTPs with the Environment Functions of SHU, Regional, and APH Services, including the cascading of Decarbonization KPI targets

Workshop Pemaparan Hasil PROPER 2023 dan Penyusunan Roadmap PROPER 2024
Workshop on the Presentation of 2023 PROPER Results and the Preparation of the 2024 PROPER Roadmap

Flagship
Addressing Climate Change, Reducing Environmental Footprint, Protecting Biodiversity

4 - 5 Maret 2024 | March 4th - 5th, 2024

Workshop **PROPER yang melibatkan seluruh Fungsi** Environment **SHU, Regional, Zona dan WK, dengan Narasumber dari Kementerian LHK dan Pihak Eksternal Berkompeten**

PROPER Workshop involving all Environment Functions of SHU, Regional, Zones, and Working Areas (WK), featuring speakers from the Ministry of Environment and Forestry (MoEF) and other qualified external parties

Studi Water Risk
Water Risk Study

Flagship
Reducing Environmental Footprint

Mei 2024 | May 2024

Kunjungan lapangan ke PEP Pangkalan Susu untuk mengumpulkan data primer
Field visit to PEP Pangkalan Susu to collect primary data.

Penghargaan Efisiensi Energi Nasional 2024
National Energy Efficiency Award 2024

Flagship
Addressing Climate Change

25 – 26 Juni 2024 | June, 25th-26th 2024

Workshop **Pendampingan Proposal 1 dengan Direktorat EBTKE Kementerian ESDM dan Fungsi** Environment **SHU, Regional dan Zona**
Workshop on Proposal Mentoring 1 with the EBTKE Directorate of the Ministry of Energy and Mineral Resources and the Environment SHU, Regional, and Zone Functions

Penghargaan Efisiensi Energi Nasional 2024
National Energy Efficiency Award 2024

Flagship
Addressing Climate Change

24 – 26 Juli 2024 | July, 24th-26th 2024

Workshop **Pendampingan Proposal 2 dengan Direktorat EBTKE Kementerian ESDM dan Fungsi** Environment **SHU, Regional dan Zona**
Workshop on Proposal Mentoring 2 with the EBTKE Directorate of the Ministry of Energy and Mineral Resources and the Environment SHU, Regional, and Zone Functions

Biodiversity Action Plan

Flagship
Protecting Biodiversity

18 Oktober 2024 | Oktober 18th 2024
Verifikasi BAP Region **1 PEP Pendopo**
Verification of BAP Region 1 PEP Pendopo

Biodiversity Action Plan

Flagship
Protecting Biodiversity

12 November 2024 | November 12th 2024
Verifikasi BAP Region **4 PEPC JTB**
Verification of BAP Region 4 PEPC JTB

Workshop Upskilling dan FGD Pengelolaan Polychlorinated Byphenils (PCBs) Subholding Upstream Regional 1

Upskilling Workshop and FGD on Polychlorinated Biphenyls (PCBs) Management for Subholding Upstream Regional 1.

Flagship
Reducing Environmental Footprint

13-14 November 2024 | November 13th-14th 2024
Workshop **& FGD terkait pengelolaan PCBs di lingkungan SHU**
Workshop & FGD on PCB Management in the SHU Environment

Kata Pengantar
Foreword

Dear Pembaca yang Budiman,

Dengan penuh kebanggaan, kami mempersembahkan Laporan Tahunan Lingkungan dari PHE Subholding Upstream sebagai wujud nyata komitmen kami terhadap keberlanjutan dan tanggung jawab terhadap lingkungan. Laporan ini menguraikan berbagai pencapaian, program, serta langkah strategis yang telah dilaksanakan oleh PHE Subholding Upstream untuk melestarikan lingkungan, mengurangi dampak negatif terhadap ekosistem, dan memastikan bahwa seluruh aktivitas operasional kami konsisten dengan prinsip-prinsip pembangunan yang berkelanjutan.

Di tengah semakin kompleksnya tantangan lingkungan saat ini, PHE Subholding Upstream senantiasa berkomitmen untuk melakukan inovasi dan beradaptasi dengan perubahan. Kami berupaya mewujudkan visi menjadi "The World-Class Oil and Gas Company" melalui misi mengelola bisnis dan portofolio sektor hulu migas secara profesional sekaligus memberikan nilai tambah yang berkelanjutan bagi seluruh pemangku kepentingan.

Dear Readers,

We proudly present the Annual Environmental Report of PHE Subholding Upstream as a tangible demonstration of our commitment to sustainability and environmental responsibility. This report outlines various achievements, programs, and strategic steps undertaken by PHE Subholding Upstream to preserve the environment, minimize ecological impacts, and ensure that all our operational activities align with the principles of sustainable development.

Amid increasingly complex environmental challenges, PHE Subholding Upstream remains dedicated to continuous innovation and adaptation. We strive to realize our vision of becoming "The World-Class Oil and Gas Company" by professionally managing the upstream oil and gas business and portfolio while delivering sustainable value to all stakeholders.

Komitmen yang kami lakukan mulai dari pengelolaan sumber daya alam hingga implementasi strategi dekarbonisasi serta pemanfaatan teknologi ramah lingkungan seperti Carbon Capture Utilization & Storage (CCUS) dan Carbon Capture Storage (CCS).

Kami menyadari betapa pentingnya transparansi dan akuntabilitas dalam setiap tindakan yang kami lakukan. Oleh sebab itu, laporan ini tidak hanya berfungsi sebagai media untuk mengkomunikasikan berbagai pencapaian, tetapi juga sebagai bentuk pertanggungjawaban kami kepada publik, pemerintah, serta mitra bisnis dalam menjalankan komitmen perlindungan lingkungan.

Kami mengajak para pembaca untuk menelaah laporan ini dengan harapan informasi yang tersaji mampu memberikan pemahaman menyeluruh mengenai kontribusi PHE Subholding Upstream dalam menjaga kelestarian lingkungan, sekaligus menjadi pijakan untuk terus melakukan perbaikan dan memperluas dampak positif di masa yang akan datang.

Mei 2025
Hormat Kami,

VP HSSE
Gelar Winayawidhi

Our commitment spans from natural resource management to the implementation of decarbonization strategies as well as the utilization of environmentally friendly technologies such as Carbon Capture Utilization & Storage (CCUS) and Carbon Capture Storage (CCS).

We recognize the importance of transparency and accountability in every action we undertake. Therefore, this report serves not only as a medium to communicate our achievements but also as a form of accountability to the public, government, and business partners in fulfilling our commitment to environmental protection.

We invite readers to review this report with the hope that the information presented will provide a comprehensive understanding of PHE Subholding Upstream's contributions to environmental preservation and serve as a foundation for continuous improvement and expanding positive impacts in the future.

May 2025
Sincerely,

VP HSSE
Gelar Winayawidhi

Laporan Manajemen
Management Report

Pemegang saham dan pemangku kepentingan yang kami hormati,

Dunia saat ini menghadapi tantangan ganda yang signifikan yaitu memenuhi peningkatan permintaan energi global yang diproyeksikan tumbuh hingga 47% pada tahun 2050 dengan minyak tetap menjadi salah satu sumber utama serta mencapai target emisi nol bersih dalam periode yang sama. Dalam laporan World Energy Outlook terbaru yang diterbitkan oleh International Energy Agency (IEA), tercatat bahwa tingkat penggunaan energi bersih global mulai menunjukkan peningkatan signifikan pada tahun 2023. Namun, dua pertiga dari total kenaikan permintaan energi hingga saat ini masih bergantung pada bahan bakar fosil. Menyadari tantangan ini, kami berupaya untuk mengambil peran strategis dalam menjawab kebutuhan energi global yang terus meningkat, sekaligus mendorong transisi menuju masa depan yang lebih berkelanjutan.

Kami memiliki tujuan untuk menjadi perusahaan minyak dan gas bumi kelas dunia dan berfokus untuk membangun perusahaan yang berkelanjutan, berkontribusi dalam memenuhi kebutuhan energi global dengan mengutamakan keselamatan, menjaga kelestarian lingkungan, peduli terhadap aspek sosial, dan menciptakan manfaat yang maksimal. Dewan Komisaris dan Direksi kami secara aktif berperan dalam mengawasi praktik lingkungan di seluruh wilayah operasional PHE Subholding Upstream, bekerja sama dengan manajemen senior dan seluruh Perwira Subholding Upstream. Komitmen dan pelaksanaan terkait keberlanjutan serta upaya menjaga kelestarian lingkungan dituangkan secara menyeluruh dalam laporan tahunan lingkungan ini.

Shareholders and stakeholders whom we respect,

The world is currently facing a significant dual challenge: meeting the projected 47% increase in global energy demand by 2050, with oil remaining one of the primary sources, while simultaneously achieving net-zero emissions within the same timeframe. According to the latest World Energy Outlook report published by the International Energy Agency (IEA), the global adoption of clean energy has shown a significant increase starting in 2023. However, two-thirds of the total rise in energy demand to date still relies on fossil fuels. Acknowledging these challenges, we strive to take on a strategic role in addressing the growing global energy needs while driving the transition toward a more sustainable future.

We aim to become a world-class oil and gas company, focusing on building a sustainable enterprise that contributes to meeting global energy needs. Our approach prioritizes safety, environmental preservation, social responsibility, and maximizing value creation. Our Board of Commissioners and Board of Directors are actively involved in overseeing environmental practices across all operational areas of PHE Subholding Upstream, in collaboration with senior management and all Subholding Upstream personnel. All commitments and implementations related to sustainability and environmental conservation efforts are comprehensively outlined in this environmental annual report.

Minyak dan gas alam diproyeksikan akan tetap menjadi bagian penting dari pasokan energi global selama beberapa dekade mendatang. Namun, kami tetap berkomitmen untuk mendukung pencapaian target Net Zero Emissions (NZE) global. Sebagai langkah konkret dalam mengatasi tantangan ini, kami telah menerapkan beberapa program unggulan, antara lain:

1. Inisiatif efisiensi energi (optimalisasi operasi gas turbin, pengurangan penggunaan gas bahan bakar, kontrol kompresor anti surge, pemasangan lampu LED);
2. Zero Routing Flaring (pengurangan/ pemanfaatan/ monetisasi gas suar sebagai bagian dari inisiatif nol suar rutin);
3. Penggunaan Biodiesel B30/B35 sebagai bahan bakar untuk armada laut (panas rendah karbon);
4. Pemasangan panel surya sebagai bagian dari inisiatif panas rendah karbon;
5. Emisi Non-Rutin (modifikasi sistem).

PHE Subholding Upstream secara konsisten melaksanakan berbagai upaya untuk menekan emisi Gas Rumah Kaca (GRK) maupun emisi non-GRK, serta mengurangi beban pencemaran air. Upaya ini diimplementasikan melalui penerapan strategi konservasi air, pengelolaan sampah dan limbah Bahan Berbahaya dan Beracun (B3), serta pengelolaan sumber daya alam yang berpedoman pada prinsip "Reduce, Reuse, Recycle, and Recovery." Perlindungan keanekaragaman hayati juga menjadi pilar utama dalam praktik pengelolaan lingkungan Perusahaan. Selain itu, Perusahaan secara proaktif mengambil langkah-langkah pencegahan terhadap potensi tumpahan minyak yang dapat membahayakan ekosistem laut dan lingkungan sekitarnya.

Oil and natural gas are projected to remain a critical part of the global energy supply for decades to come. However, we remain committed to supporting the achievement of global Net Zero Emissions (NZE) targets. As a concrete step in addressing this challenge, we have implemented several flagship programs, including:

1. Energy efficiency initiatives (optimization of gas turbine operation, reduction of fuel gas utilization, compressor anti surge control, LED installation);
2. Zero routing flaring (flare gas reduction/ utilization/ monetization as part of zero routine flaring initiatives);
3. Biodiesel B30/B35 usage as fuel for marine fleet (low carbon heat);
4. Installation of solar panels as part of low carbon heat innitiative;
5. Non-Routine Emission (system modification).

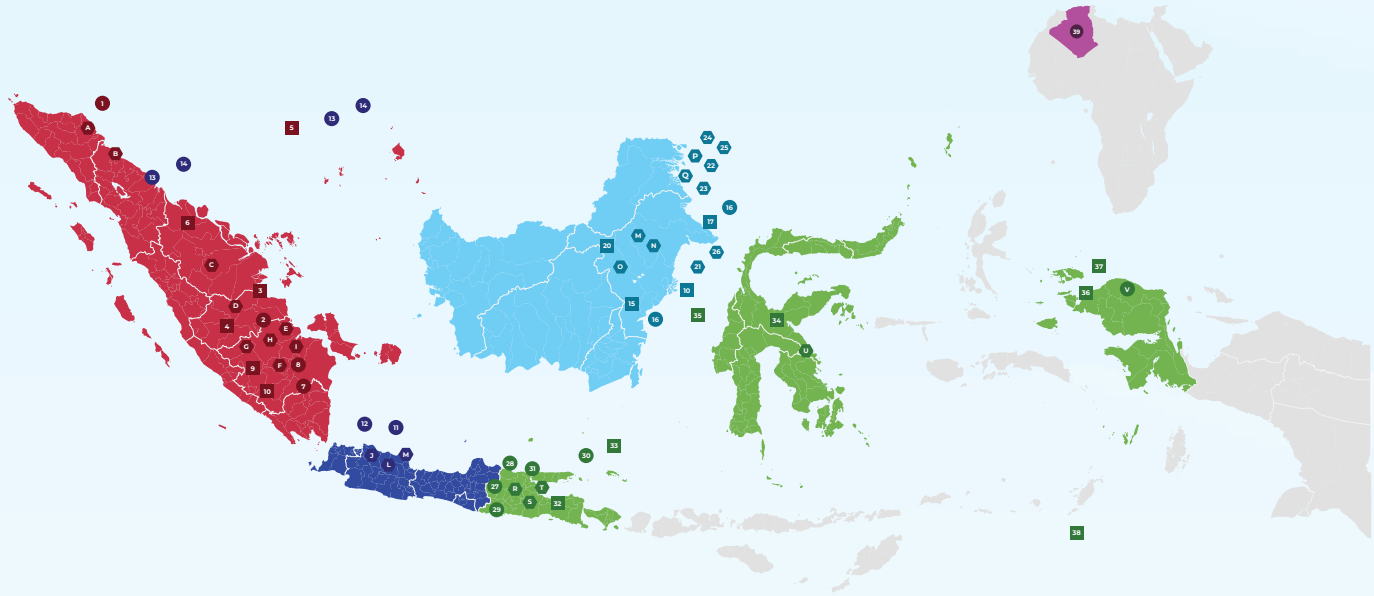
PHE Subholding Upstream consistently undertakes various efforts to reduce both Greenhouse Gas (GHG) and non-GHG emissions, as well as to lessen the burden of water pollution. These efforts are implemented through the adoption of water conservation strategies, the management of waste and hazardous and toxic materials (B3), and the management of natural resources based on the principles of "Reduce, Reuse, Recycle, and Recovery." The protection of biodiversity also serves as a key pillar in the Company's environmental management practices. In addition, the Company proactively implements preventive measures against potential oil spills that could harm marine ecosystems and surrounding environments.

Advancing Energy, Embedding Sustainability, Creating Impact

Tinjauan Sasaran dan Kinerja Lingkungan
Environmental Targets and Performance Review

PHE Subholding Upstream mengidentifikasi 11 fokus keberlanjutan yang dikembangkan untuk mendukung pencapaian tujuan jangka panjang perusahaan. Dari jumlah tersebut, lima fokus di antaranya secara khusus mengaddress aspek lingkungan yang dianggap paling material, mencerminkan prioritas strategis yang selaras dengan hasil analisis materialitas yang diterapkan oleh Pertamina Holding. Implementasi fokus keberlanjutan ini dilakukan secara holistik di seluruh Wilayah Kerja (WK) yang tersebar di lima Regional, didukung oleh dua AP Service (PDSI dan Elnusa), serta PT Badak NGL.

PHE Subholding Upstream has identified 11 sustainability focuses developed to support the achievement of the company's long-term goals. Of these, five focuses specifically address the environmental aspects deemed most material, reflecting strategic priorities aligned with the materiality analysis applied by Pertamina Holding. The implementation of these sustainability focuses is carried out holistically across all Working Areas (WK) spread across five regions, supported by two AP Services (PDSI and Elnusa), as well as PT Badak NGL.



Wilayah Kerja Domestik | Domestic Work Area — WK Pertamina EP — Operator — Non-Operator

Regional 1 — Sumatera
Area 71.590 KM²
Regional Lead: PT Pertamina Hulu Rokan

ZONA 1 | ZONE 1
- A Rantau
- B Pangkalan Susu
- C Lirik
- D Jambi
- 1 NSO
- 2 Jambi Merang
- 3 Jabung
- 4 South East Jambi
- 5 Kakap

ZONA 2-3 | ZONE 2-3
- 6 Rokan

ZONA 4 | ZONE 4
- E Ramba
- F Prabumulih
- G Pendopo
- H Limau
- I Adera
- 7 Ogan Komering
- 8 Raja Tempirai
- 9 Corridor
- 10 GMB Tanjung Enim

Regional 2 — Jawa
Area 39.613 KM²
Regional Lead: PT Pertamina EP

ZONA 5 | ZONE 5
- 11 Offshore North-West Java (ONWJ)

ZONA 6 | ZONE 6
- 12 Offshore South-East Sumatera (OSES)

ZONA 7 | ZONE 7
- J Tambun
- K Subang
- L Jatibarang
- 13 Block Natuna (Natuna Sea)
- 14 East Natuna

Regional 3 — Kalimantan
Area 57.225 KM²
Regional Lead: PT Pertamina Hulu Indonesia

ZONA 8 | ZONE 8
- 15 Peri Mahakam
- 16 Mahakam
- 17 West Ganal
- 18 East Sepinggan

ZONA 9 | ZONE 9
- 19 Sanga Sanga
- M Sanga Sanga (PEP)
- N Sangatta
- O Tanjung
- 20 GMT Sangatta

ZONA 10 | ZONE 10
- 21 East Kalimantan & Attaka
- P Bunyu
- Q Tarakan
- 22 Nunukan
- 23 Simenggaris
- 24 East Ambalat
- 25 Ambalat
- 26 Maratua

Regional 4 — Indonesia Timur
Area 62.942 Km²
Regional Lead: PT Pertamina EP Cepu

ZONA 11 | ZONE 11
- R Cepu
- S Sukowati
- T Poleng
- 27 ADK
- 28 Randugunting
- 29 Tuban East Java
- 30 West Madura Offshore (WMO)

ZONA 12 | ZONE 12
- 31 Jambaran Tiung Biru
- 32 Banyu Urip
- 33 Bunga

ZONA 13 | ZONE 13
- U Donggi Matindok
- 34 Senoro Toili
- 35 Makassar Stratit

ZONA 14 | ZONE 14
- V Papua
- 36 Salawati
- 37 Kepala Burung
- 38 Masella

Regional 5 — Internasional
Area 714 Km²
Regional Lead: PT Pertamina International EP

ZONA 15 | ZONE 15
- 39 Algeria: Block 450A

Sumber Gambar:
Internal PHE Subholding Upstream
Image Source:
Internal PHE Subholding Upstream

PHE Subholding Upstream menyajikan rangkuman berbagai inisiatif, tujuan, dan target yang telah ditetapkan sejalan dengan fokus keberlanjutan perusahaan sebagai bagian dari strategi lingkungan 2025, sekaligus menyoroti keselarasan dan kontribusinya terhadap Tujuan Pembangunan Berkelanjutan (SDGs) yang dicanangkan oleh Perserikatan Bangsa-Bangsa (PBB).

PHE Subholding Upstream presents a summary of various initiatives, goals, and targets that have been set in line with the company's sustainability focus as part of the 2025 environmental strategy, while highlighting their alignment and contribution to the Sustainable Development Goals (SDGs) established by the United Nations (UN).

Net zero GHG emissions (Scope 1 & 2) by 2060

Scope 1 & 2 Emission Reduction 32% by 2030

Scope 1, 2 & 3 GHG emissions disclosures

Net Positive Impact commitment biodiversity

10% Reduction in water intensity in 2030

50% Waste Circularity in 2030

Fokus Keberlanjutan Sustainability Focuses	**Insiatif Strategis** Strategic Initiative	**Target**	**Halaman** Pages
Mengatasi Perubahan Iklim Addressing Climate Change 	Peta jalan net zero Net zero roadmap	• Net zero emission roadmap • Net zero emission roadmap	49-51
	Dekarbonisasi (program no regret, CCS/CCUS pilot) Decarbonization (no regret) levers+CCU pilot)	• Penurunan emisi cakupan 1 dan 2 sebesar 32% hingga tahun 2030 atau lebih cepat sesuai dengan Nationally Determined Contribution (NDC) dan interim target sektor energi sebesar 12,5%di tahun 2030 • 32% reduction in emissions for Scope 1 and 2 by 2030, or sooner, in line with the Nationally Determined Contribution (NDC) and the energy sector interim target of 12.5% by 2030	
Mengurangi Jejak Lingkungan Reducing Environmental Footprint 	Meningkatkan kapasitas sumber energi terbarukan Increasing the capacity of renewable energy sources	• 2% penggunaan energi terbarukan dari total penggunaan energi di tahun 2030 • 2% use of renewable energy from total energy consumption in 2030 • Pengurangan intensitas energi 1% per tahun setelah 2025 • 1% reduction in energy intensity per year after 2025	38-40
	Meningkatkan efisiensi dan konservasi energi Enhancing energy efficiency and conservation	• Pengurangan konsumsi energi sebesar 17% pada 2025 • 17% reduction in energy consumption by 2025	41
	Pengurangan emisi Non-GHG (SOx dan Nox) Reducing Non-GHG emissions (SOx and NOx)	• Penurunan batasan emisi SO_2 dari mesin pembakaran internal <160 mg/Nm³ pada 2025 • Reduction of SO_2 emission limit from internal combustion engines to <160 mg/Nm³ by 2025.	59
Melindungi Keanekaragaman Hayati Protecting Biodiversity 	Program Keanekaragaman Hayati Biodiversity Program	• Komitmen dampak positif bersih • Commitment to net positive impact	84
	Dekarbonisasi (NBS certification) Decarbonization (NBS certification)		

Fokus Keberlanjutan Sustainability Focuses	Insiatif Strategis Strategic Initiative	Target	Halam Pages
Melakukan Pengelolaan Air dan Air Limbah Conducting Water and Effluent Management 	Inisiatif 3R (Reduce, Reuse, dan Recycle) dalam kegiatan operasi perusahaan 3R Initiatives (Reduce, Reuse, and Recycle) in the Company's operational activities	• 5% pengurangan konsumsi air bersih di area water stressed pada tahun 2025 • 5% reduction in clean water consumption in water-stressed areas by 2025 • Penurunan nilai hydrocarbon content dalam air imbah menjadi 45 mg/liter (off-shore) dan 15 mg/liter (on-shore) di tahun 2025 • Reduction of hydrocarbon content in wastewater to 45 mg/L (offshore) and 15 mg/L (onshore) by 2025	70, 79
Melakukan Pengelolaan Limbah Conducting Waste Management 	Inisiatif 4R (Reduce, Reuse, Recycle, dan Recovery) 4R Initiatives (Reduce, Reuse, Recycle, and Recovery)	• 40% waste circularity di tahun 2025 • 40% waste circularity by 2025	75-77

Komitmen Kami untuk Keberlanjutan
Our Commitment to Sustainability

Tata kelola keberlanjutan merupakan elemen krusial dalam operasional PHE Subholding Upstream. Mengacu pada Peraturan Menteri Badan Usaha Milik Negara Nomor Per-01/MBU/2011, yang mewajibkan Badan Usaha Milik Negara (BUMN) untuk mengimplementasikan prinsip-prinsip Good Corporate Governance (GCG), PHE Subholding Upstream memastikan bahwa praktik tata kelola yang baik menjadi landasan utama dalam mendukung pencapaian keberlanjutan. PHE Subholding Upstream berkomitmen terhadap seluruh aspek keberlanjutan, yang diwujudkan melalui implementasi tata kelola keberlanjutan yang terintegrasi serta penerapan berbagai kebijakan strategis. Kebijakan-kebijakan tersebut dirancang untuk menegaskan komitmen PHE Subholding Upstream dalam mengimplementasikan prinsip keberlanjutan secara konsisten, terukur, dan berkelanjutan.

Sustainability governance is a crucial element in the operations of PHE Subholding Upstream. Referring to the Ministerial Regulation of State-Owned Enterprises No. Per-01/MBU/2011, which mandates State-Owned Enterprises (BUMN) to implement Good Corporate Governance (GCG) principles, PHE Subholding Upstream ensures that good governance practices form the primary foundation for supporting sustainability achievements. PHE Subholding Upstream is committed to all aspects of sustainability, which are realized through the implementation of integrated sustainability governance and the adoption of various strategic policies. These policies are designed to emphasize PHE Subholding Upstream's commitment to consistently, measurably, and sustainably implementing sustainability principles.

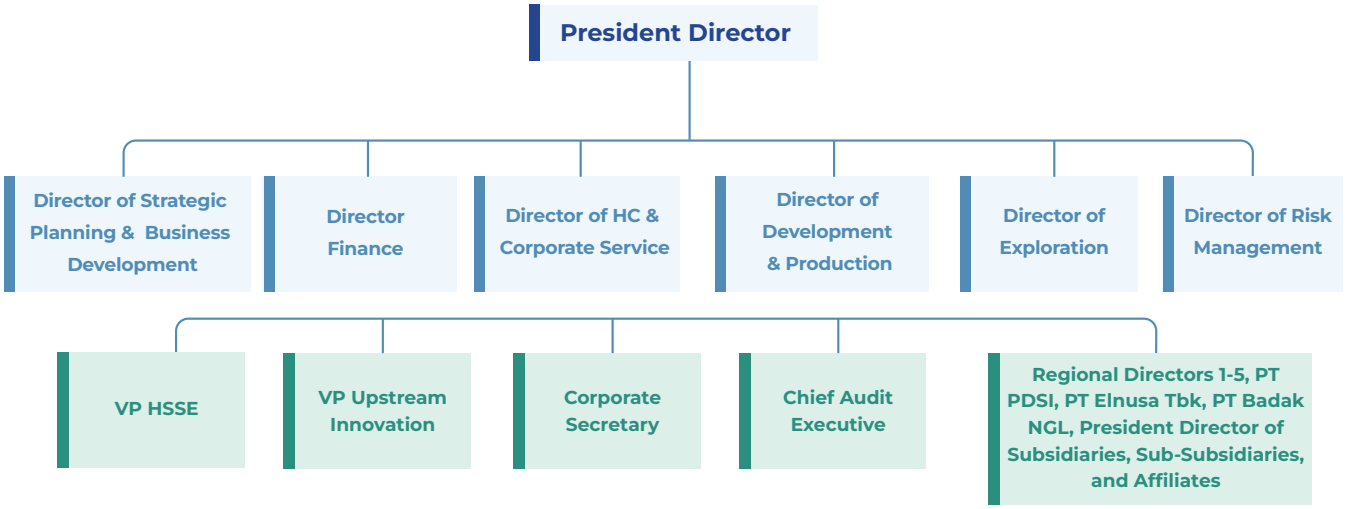
PHE Subholding Upstream memiliki Komite Keberlanjutan yang dibentuk berdasarkan Surat Keputusan Direksi No. Kpts–076/PHE00000/2022-S0, yang melibatkan seluruh anggota dewan direksi, manajemen eksekutif, serta Perwira Subholding Upstream untuk memastikan keterlibatan penuh dalam upaya mencapai tujuan keberlanjutan perusahaan. Selain itu, PHE Subholding Upstream juga telah merumuskan tujuh kebijakan strategis yang dirancang untuk mendukung implementasi prinsip-prinsip Environmental, Social, and Governance (ESG) secara terintegrasi di seluruh operasional PHE Subholding Upstream. Dalam pelaksanaannya, kebijakan-kebijakan ini diterapkan secara konsisten kepada seluruh karyawan, mitra kerja, pelanggan, dan pemangku kepentingan yang terkait.

Komitmen PHE Subholding Upstream terhadap keberlanjutan juga tercermin dalam serangkaian kebijakan yang disusun, antara lain kebijakan keberlanjutan, kebijakan HSSE, kebijakan Hak Asasi Manusia (HAM), kebijakan respectful workplace, kebijakan sosial pemasok, kebijakan pengadaan berkelanjutan, serta komitmen terhadap penerapan prinsip ESG dalam proses pengadaan barang dan jasa di lingkungan Pertamina Hulu Energi. Semua kebijakan tersebut berlaku pada 100% wilayah kerja operasional PHE Subholding Upstream. Komite Keberlanjutan dan seluruh kebijakan yang diterapkan oleh PHE Subholding Upstream dapat diakses melalui situs web resmi PHE Subholding Upstream.

PHE Subholding Upstream has a Sustainability Committee formed based on the Director's Decree No. Kpts–076/PHE00000/2022-S0, which involves all members of the board of directors, executive management, and Subholding Upstream officers to ensure full engagement in the company's sustainability efforts. Additionally, PHE Subholding Upstream has also formulated seven strategic policies designed to support the integrated implementation of Environmental, Social, and Governance (ESG) principles across all operations of PHE Subholding Upstream. In practice, these policies are consistently applied to all employees, business partners, customers, and relevant stakeholders.

PHE Subholding Upstream's commitment to sustainability is also reflected in a series of policies, including sustainability policy, HSSE policy, Human Rights (HR) policy, respectful workplace policy, supplier social policy, sustainable procurement policy, and commitment to the application of ESG principles in the procurement of goods and services within Pertamina Hulu Energi. All of these policies apply to 100% of the operational work areas of PHE Subholding Upstream. The Sustainability Committee and all policies implemented by PHE Subholding Upstream can be accessed through the official PHE Subholding Upstream website.

Komite Keberlanjutan
Sustainability Commitee



- Director of Strategic Planning & Business Development : Long-term roadmap and strategy, green merger & acquisitions
- Director of Development & Production : Decarbonization & green project, climate change, well integrity and management system, offshore well management,
- Director of HR & Business Support : Diversity, human rights, inclusivity, employee recruitment, retention & development, cybersecurity, green procurement, social supplier standards
- Director of Finance : Sustainable financing, sustainability bugdet tagging
- Director of Exploration : Minimizing environmental footprints in exploration activities
- Director of Risk Management : Climate risk management, corporate risk management
- Corporate Secretary : Community involvement & development, corporate governance, corporate ethics, stakeholder relations, communication strategy, land formalities
- VP HSSE : Climate change, environment, biodiversity, water scarcity, effluent, waste management, emergency response, land closure & rehabilitation, health & safety, prevention of major accident, security
- VP Upstream Innovation : Reorienting green innovation & research, integrated CCUS/CCS roadmap & strategy, climate change
- Chief Audit Executive : Assurance business & corporate ethics, follow up whistleblowing system
- Regional Directors 1-5, PT PDSI, PT Elnusa Tbk, PT Badak NGL, President Director of Subsidiaries, Sub-Subsidiaries, and Affiliates : Initiatives, pilot execution, implementation of ambition

Kebijakan Keberlanjutan
Sustainability Policy

PERTAMINA
HULU ENERGI

PERTAMINA HULU ENERGI
SUSTAINABILITY POLICY

In line with the values and ethical principles of Pertamina Hulu Energi (PHE) to sustain our Business, PHE places its Sustainability Policy as a core responsibility as an energy player. PHE sustainability policy aims to drive compliance towards stipulated regulation and long-term value for its stakeholders through building a sustainable practice throughout business.

This sustainability policy includes initiatives that are undertaken by the PHE aimed at integrating its strategy and activities better into the context of Environmental Social Governance (ESG), notably by contributing to human, environmental, economic, and social development. The strategy thereof can then foster continuity, transparency, and employee development within business organizations. The Sustainability Policy is an integral component for operational excellence to contribute to Sustainable Development Goals (SDGs).

PHE aspires to become a globally leading and well-reputed Energy Company, and recognized as:

1. **Environmentally Friendly Company**
   A company that provides and promotes access to energy and support green energy to support the national climate transition agenda, responsible for addressing climate change issues and exemplary in conducting environmental management systems related to its activities.
2. **Societal Responsible Company**
   A company that is committed to implementing the highest standards for Health and Safety practices, continuously respects and engages the surrounding community to stimulate sustainable social and economic development, promotes and upholds continuous employee development, diversity, and Human Rights principles.
3. **Good Governance Company**
   A company that ensures compliance to all stipulated legal requirements in its areas of operation and upholds the highest standards of good Corporate Governance practices and enforces anti-corruption and anti-fraudulent practices for all stakeholders within the company's operations.

To achieve the above, PHE commits to:

1) Ensure national security of supply and promote access to energy throughout the nation.
2) Reduce greenhouse gas emissions, non-greenhouse gas emissions, releases, waste, effluent and address the wider climate change issues through managing physical risk related to the potential for natural disasters and transition risk related to regulatory, reputational, and/or market risk of climate change by integrating it in its strategy and operations.
3) Protect and conserve the environment, water, other natural resources, and energy through an environmental management system related to its activities that will be monitored continuously.
4) Report environmental, social, and governance issues and performance periodically as an effort to maintain transparency and accountability.
5) Manage and mitigate the impacts of projects and activities to reduce the potential occurrence of water scarcity.
6) Manage and mitigate the impact of our project & activity on biodiversity with a commitment of having 'Net Positive Impact' as a goal by avoiding operation in environmental highest biodiversity value, and incorporating biodiversity requirement in project planning & operation.
7) Rehabilitate and reclaim land upon site closure to restore the ecosystem, minimize negative impacts and maximize benefits, and set aside sufficient funds to cover closure and rehabilitation.
8) Implement the highest standards of Health, Safety and Environment practices to safeguard the health, safety, and security of its employee, contractor worker, communities, and consumer, as well as preparing for and respond to emergencies and prevention to majoraccidents throughout its workplace.
9) Become the social development locomotive to stimulate social and economic development in communities.
10) Consult with stakeholders on environmental issues and with the local/surrounding community on community development & community involvement issue to improve their welfare.
11) Respect the rights of indigenous people/community where the company operates, including promoting their socio-economic development, sponsor full realization of their social, economic, and cultural rights, protect culturally sensitive areas, and avoid involuntaryresettlement of indigenous people/community.
12) Work with its partners and suppliers towards green and sustainable procurement of goods and services with an objective to ensure minimum impact on the environment.
13) Promote the delivery of sustainable products and services to its customers.
14) Promote continuous employee development program, equitable treatment, diversity within its workplace and promoting respectful workplace policy.
15) Reinforce the use of local workers and contractors to the extent compatible with operational constraints, particularly through training programs and support to Small-Micro Enterprises (SMEs) and key economic actors.
16) Ensure compliance to all stipulated legal requirements and upholds good Corporate Governance throughout its activities.
17) Enforce measures related to Anti-corruption and fraudulent practices within the Company.

PHE Management as Subholding Upstream of Pertamina group and its affiliates companies are responsible for implementing this Sustainability Policy and applying it to employees, partners, customers, and all stakeholders.

Jakarta, September 2024
Chief Executive Officer,

SIGNED
Awang Lazuardi

phe.pertamina.com

Kebijakan HSSE
HSSE Policy

PERTAMINA HULU ENERGI

HEALTH, SAFETY, SECURITY & ENVIRONMENT (HSSE) POLICY

PT PERTAMINA HULU ENERGI
SUBHOLDING UPSTREAM

PT Pertamina Hulu Energi, as the Upstream Subholding, is committed to carrying out Operations while considering the aspects of Occupational Health and Safety, Security, Environmental & Community Protection, and continuous Process Safety and Asset Integrity as the main priority of the Company following the Company's values AKHLAK (Trustworthy, Competent, Harmonious, Loyal, Adaptive, and Collaborative) to support the achievement of the Company's Objectives, Vision & Mission by:

1. Complying with all Legislation, Standards, Work Systems, and Stakeholder Requirements, while prioritizing the HSSE aspect in making all business and operational decisions which supports increases in production and sustainability of the Company's business.
2. Controlling the risk of HSSE aspects to ensure occupational health and safety, process safety, security, environment, assets, and the Company's reputation.
3. Establishing excellent and professional relationships and cooperation in managing HSSE aspects with all stakeholders.
4. Integrating the Company's strategy and activities in the context of Environmental Social Governance (ESG) to achieve operational excellence that contributes to achieving Sustainable Development Goals (SDGs).

The above commitments are realized through the implementation of an HSSE Program that includes and aims to:

1. Prevent and mitigate risks of incidents and work accidents through the application of Corporate Life Saving Rules (CLSR) and SUPREME (Sustainability Pertamina Expectations For Management Excellence), making the learning process from events (Lessons Learned) as an effort to prevent similar occurrences, implementing the Contractor Safety Management System (CSMS) as an HSSE requirement in Contract Work to be carried out, ensuring the readiness of the Emergency Response Plan and Medical Emergency Response to be an integral part of the Emergency Response and Crisis Management, as well as conducting HSSE Risk Management.
2. Preventing major accidents and achieving a superior, safe, and reliable operations by applying the Process Safety & Asset Integrity Management System (PSAIMS).
3. Preventing pollution and environmental protection by applying environmental, social, waste, and hazardous waste management through the principles of Refuse, Reduce, Reuse, Recycle, Recovery (5R) biodiversity protection to achieve Net Positive Impact, prevent oil spills, and create sustainable community development.
4. Prevent security disturbances and reduce the possibility of security incidents and detrimental impacts from each security incident throughout the Company's Operating Areas and National Vital Objects while maintaining human rights principles through applying the Voluntary Principles on Security and Human Rights (VPSHR).
5. Management and monitoring of worker's conditions through the Fit to Work program, daily health checks (Daily Check Up), Fit for Task, workplace environment monitoring, availability of health facilities, and good medical services.
6. Increasing worker awareness and competence through HSSE Mandatory Training and Technical Competencies.
7. Implementing good governance, especially in the environmental field, through applying the Environmental Management System (EMS) and Life Cycle Assessment (LCA) with energy efficiency programs, emission reduction, reduction of water pollution load, and water conservation.
8. Applying HSSE digitalization technology and a comprehensive and integrated HSSE work infrastructure to support reliable analysis and appropriate decision-making processes.

This policy is established to be implemented by every Worker, Business Partner, Contractor, and Guest present in the operating region of the Upstream Subholding while upholding Pertamina's HSSE Golden Rules: Compliance - Intervention - Care.

This policy is effective upon signing and will be reviewed periodically.

Jakarta, 13 Maret 2024

Chief Executive Officer

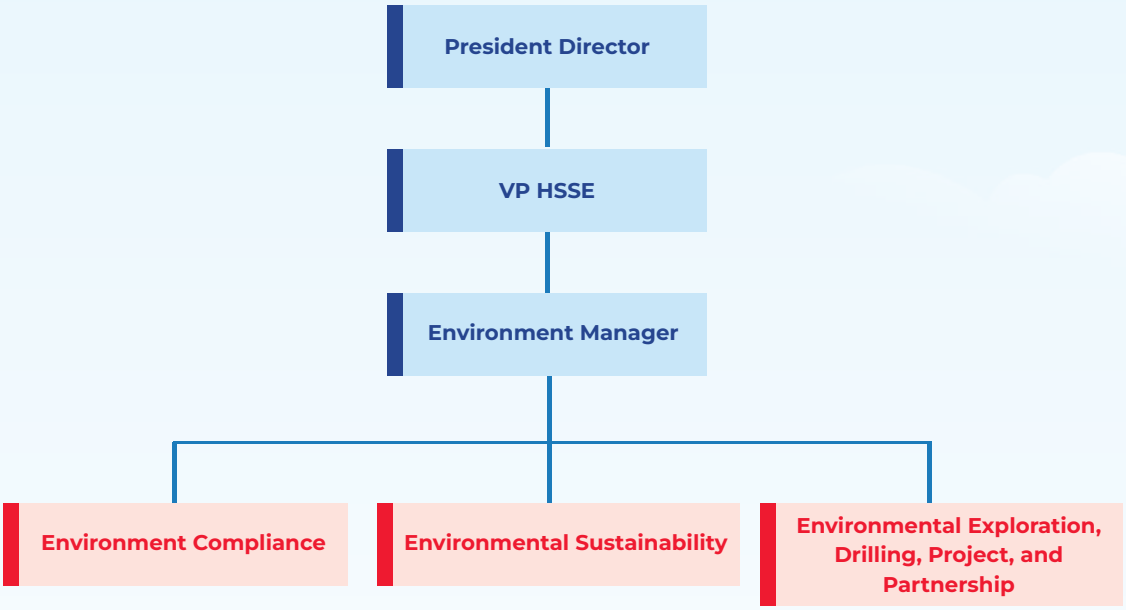
Awang Lazuardi

Mengimplementasikan fokus keberlanjutan pada aspek lingkungan, perencanaan, pemantauan, serta pengelolaan strategi dan kinerja lingkungan menjadi tanggung jawab VP HSSE, yang berperan sebagai environment manager. Environment manager bertanggung jawab atas tiga fungsi utama yang memiliki peran krusial dalam memastikan pencapaian dan keberlanjutan kinerja lingkungan PHE, yaitu fungsi kepatuhan lingkungan (environmental compliance), keberlanjutan lingkungan (environmental sustainability), serta eksplorasi, pengeboran, proyek, dan kemitraan lingkungan (environmental exploration, drilling, project, and partnership).

Implementing sustainability focuses on environmental aspects, planning, monitoring, as well as managing strategies and environmental performance is the responsibility of the VP HSSE, who acts as the environment manager. The environment manager is responsible for three main functions that play a crucial role in ensuring the achievement and sustainability of PHE's environmental performance: environmental compliance, environmental sustainability, and environmental exploration, drilling, projects, and partnerships.

Secara keseluruhan, organisasi HSSE melapor langsung kepada Direktur Utama, dan struktur fungsi lingkungan terdistribusi di setiap regional dan zona, memastikan integrasi yang efektif dari kebijakan dan praktik lingkungan di seluruh unit operasional.

Overall, the HSSE organization reports directly to the President Director, and the environmental function structure is distributed across each regional and zone, ensuring effective integration of environmental policies and practices throughout the operational units.



Sustainable Environment Management Guideline

1. Persetujuan lingkungan
   Environmental approvals
2. Pemenuhan kewajiban persetujuan lingkungan
   Fulfillment of environmental approval obligations
3. Pelaksanaan audit lingkungan
   Environmental audit implementation
4. Pengendalian pencemaran air
   Water pollution control
5. Pengendalian pencemaran udara
   Air pollution control
6. Pengelolaan limbah B3 dan kesiapsiagaan tanggap darurat
   Hazardous and toxic waste (B3) management and emergency response preparedness
7. Pengelolaan limbah non B3
   Non-hazardous waste management
8. Pemulihan lahan terkontaminasi, ekosistem terkontaminasi, dan substrat terkontaminasi
   Remediation of contaminated land, contaminated ecosystems, and contaminated substrates
9. Pelaksanaan audit energi
   Energy audit implementation
10. Pengelolaan aspek lingkungan pada kegiatan pasca operasi
    Environmental aspect management in post-operation activities

Pengelolaan melebihi ketaatan meliputi:
Beyond compliance management includes:

1. Implementasi sistem manajemen lingkungan
   Implementation of environmental management systems
2. Pengelolaan reduksi emisi
   Emission reduction management
3. Pengelolaan efisiensi energi
   Energy efficiency management
4. Pengelolaan konservasi air
   Water conservation management
5. Pelaksanaan kajian daur hidup
   Life cycle assessment implementation
6. Pengelolaan keanekaragaman hayati
   Biodiversity management
7. Pengelolaan pencapaian penghargaan pengelolaan lingkungan
   Achievement management of environmental management awards
8. Pengelolaan aspek lingkungan pada kegiatan perkantoran
   Environmental aspect management in office activities

Tata Kelola Perubahan Iklim
Climate Change Governance

1. Persetujuan:
Tindakan dan target terkait perubahan iklim ditinjau dan disetujui oleh Direktur Utama serta seluruh anggota Dewan Direksi yang tergabung dalam Komite Keberlanjutan

Approval:
Actions and targets related to climate change are reviewed and approved by the President Director and all members of the Board of Directors who are part of the Sustainability Committee

2. Pengawasan:
Evaluasi dan pemantauan terkait pencapaian target dan implementasi terkait iklim diawasi secara langsung oleh Dewan Komisaris

Oversight:
Evaluation and monitoring of progress towards climate-related targets and implementation are directly overseen by the Board of Commissioners

3. Pengelolaan:
Implementasi strategi terkait iklim dikelola oleh Environmental Manager, yang berada di bawah pengawasan VP HSSE

Management:
The implementation of climate-related strategies is managed by the Environmental Manager, under the supervision of the VP of HSSE

4. Insentif:
Kompensasi eksekutif kami terkait langsung dengan kinerja keberlanjutan tahunan. Insentif tunai tahunan ini didasarkan pada pencapaian KPI Kinerja Lingkungan. KPI Kinerja Lingkungan merupakan bagian dari KPI HSSE. Pada tahun 2023, VP HSSE mendapatkan KPI terkait implementasi ESG dan ESG Charter Environment

Incentives:
Our executive compensation is directly linked to annual sustainability performance. This annual cash incentive is based on the achievement of Environmental Performance KPIs. The Environmental Performance KPIs are part of the HSSE KPIs. In 2023, the VP of HSSE received KPIs related to the implementation of ESG and the ESG Charter for Environment

Kinerja Lingkungan
Environmental Performance

Penggunaan Energi (ribu GJ)
Energy Consumption (thousand GJ)

2022*	2023*	2024
206.548,83	199.836,49	193.043,74

*Restatement

Intensitas Air (m^3/Juta USD)
Water Intensity (m^3/Juta USD)

2022*	2023*	2024
0,0000076	0,0000082	0,0000079

*Restatement

Intensitas Emisi (Ton CO_2eq/BOE)
Emission Intensity (Ton CO_2eq/BOE)

2022	2023	2024
0,039	0,038	0,047

Limbah Padat B3 (Ton)
Hazardous Solid Waste (Ton)

2022*	2023*	2024
140.440,370	209.622,780	175.144,45

*Restatement

Pengambilan Air (m^3)
Water Withdrawal (m^3)

2022*	2023*	2024
24.585.356,51	25.307.082,39	26.840.412,46

*Restatement

Limbah Padat Non-B3 (Ton)
Non-Hazardous Solid Waste (Ton)

2022*	2023*	2024
15.856,450	13.887,490	15.569,27

*Restatement

Limbah Cair (m^3)
Effluent (m^3)

2022*	2023*	2024
12.292.566,280	13.394.430,250	15.485.439,75

*Restatement

Penghargaan dan Sertifikasi
Awards and Certifications

PHE Subholding Upstream, sebagai entitas perusahaan yang kegiatan operasionalnya memanfaatkan sumber daya alam, berkomitmen untuk memastikan kepatuhan terhadap regulasi lingkungan yang berlaku dan meminimalkan dampak negatif terhadap ekosistem. Sebagai bagian dari upaya berkelanjutan untuk mengelola lingkungan secara bertanggung jawab, perusahaan secara aktif berpartisipasi dalam Penilaian Program Penilaian Peringkat Kinerja Perusahaan dalam Pengelolaan Lingkungan (PROPER) yang diselenggarakan oleh Kementerian Lingkungan Hidup dan Kehutanan setiap tahun, serta memperoleh sertifikasi ISO terkait keberlanjutan.

PHE Subholding Upstream, as a company whose operational activities utilize natural resources, is committed to ensuring compliance with applicable environmental regulations and minimizing negative impacts on ecosystems. As part of its ongoing efforts to manage the environment responsibly, the company actively participates annually in the Public Disclosure Program for Environmental Compliance (PROPER) organized by the Ministry of Environment and Forestry, and has obtained ISO certifications related to sustainability.

Penghargaan
Awards

12 **PROPER Emas** Gold PROPER	**19** **PROPER Hijau** Green PROPER	**4** **PROPER Biru** Blue PROPER

Sumber:
Keputusan Menteri Lingkungan Hidup/ Kepala Badan Pengendalian Lingkungan Hidup Republik Indonesia Nomor 129 Tahun 2025 Tentang Hasil Penilaian Peringkat Kinerja Perusahaan Dalam Pengelolaan Lingkungan Hidup Tahun 2023 - 2024

Source:
Decree of the Minister of Environment/Head of the Environmental Management Agency of the Republic of Indonesia Number 129 of 2025 concerning the Results of the Performance Rating Assessment of Companies in Environmental Management for the Year 2023–2024

Program Penilaian Peringkat Kinerja Perusahaan dalam Pengelolaan Lingkungan Hidup (PROPER) diterapkan oleh Kementerian Lingkungan Hidup dan Kehutanan Republik Indonesia dengan kriteria penilaian PROPER terdiri dari dua kategori, yaitu kriteria penilaian ketaatan dan kriteria penilaian lebih dari yang dipersyaratkan dalam peraturan (beyond compliance).

Public Disclosure Program for Environmental Compliance (PROPER) is implemented by the Ministry of Environment and Forestry of the Republic of Indonesia, with the PROPER assessment criteria consisting of two categories: compliance criteria and beyond compliance criteria.

Penilaian PROPER dilihat terhadap kepatuhan perusahaan terhadap Nilai Baku Mutu/ambang batas dan ketentuan teknis yang ditetapkan Pemerintah mengenai Pengendalian Pencemaran Air (PPA), Pengendalian Pencemaran Udara (PPU), dan Pengelolaan Limbah Berbahaya (PLB3).

The PROPER assessment evaluates a company's compliance with the Government-established quality standards/thresholds and technical regulations regarding Water Pollution Control (PPA), Air Pollution Control (PPU), and Hazardous Waste Management (PLB3).

Sertifikasi
Certification

ISO 14001:2015
Sistem Manajemen Lingkungan
Environmental Management System

43 **Wilayah Kerja & AP Services dari 43 Wilayah Kerja & AP** Services Working Areas & AP Services out of 43 Working Areas & AP Services

100% **Persentase** Percentage

ISO 45001:2018
Sistem Kesehatan dan Keselamatan Kerja
Occupational Health and Safety System

26 **Wilayah Kerja & AP Services dari 43 Wilayah Kerja & AP** Services Working Areas & AP Services out of 43 Working Areas & AP Services

60% **Persentase** Percentage

PHE Subholding Upstream telah memperoleh sertifikasi yang mencerminkan adopsi prinsip-prinsip best practice internasional dalam operasional perusahaan, yang memastikan bahwa setiap aspek proses bisnis tidak hanya mendukung keberlanjutan ekosistem tetapi juga mengoptimalkan penggunaan energi serta menjaga standar kesehatan dan keselamatan tenaga kerja secara holistik. Seluruh area kerja operasional PHE telah tersertifikasi Sistem Manajemen Lingkungan ISO 14001:2015, mencapai cakupan 100% pada tahun 2024, meningkat 7% dari cakupan 93% pada tahun 2023. Selain itu, PHE Subholding Upstream pada beberapa wilayah kerja yang beyond compliance telah mendapatkan ISO 50001:2018 terkait manajemen energi yaitu pada PHE Offshore North West Java (ONWJ), Pertamina Hulu Mahakam (PHM), Donggi Matindok, JOB Tomori, MLN Algeria, dan PT Badak NGL. PHE Subholding Upstream berkomitmen untuk memperluas cakupan sertifikasi ini secara kontinu setiap tahunnya, dengan melakukan audit pemantauan (surveillance audit) tahunan dan melaksanakan proses re-sertifikasi ISO yang terjadwal setiap tiga tahun, untuk memastikan keberlanjutan dan akuntabilitas dalam sistem

PHE Subholding Upstream has obtained certifications that reflect the adoption of international best practice principles in the company's operations, ensuring that every aspect of the business process not only supports ecosystem sustainability but also optimizes energy use while maintaining holistic health and safety standards for workers. All operational work areas of PHE have been certified under the ISO 14001:2015 Environmental Management System, achieving 100% coverage in 2024, an increase of 7% from 93% coverage in 2023. Furthermore, PHE Subholding Upstream has received the ISO 50001:2018 certification regarding energy management in several operational areas beyond compliance, including PHE Offshore North West Java (ONWJ), Pertamina Hulu Mahakam (PHM), Donggi Matindok, JOB Tomori, MLN Algeria, and PT Badak NGL. PHE Subholding Upstream is committed to continually expanding the coverage of these certifications annually, conducting annual surveillance audits, and implementing scheduled ISO re-certification processes every three years to ensure the sustainability and accountability of these management systems.

PHE Subholding Upstream secara periodik melaksanakan audit internal SUPREME (Sustainability Pertamina Expectations for HSSE Management Excellence), yang berfungsi sebagai instrumen utama dalam menilai tingkat optimalisasi integrasi sistem manajemen HSSE di seluruh dimensi operasional. SUPREME merupakan suatu sistem manajemen pengendalian risiko yang dirancang dengan pendekatan holistik, terstruktur, dan sistematis, untuk memastikan mitigasi terhadap potensi bahaya yang dapat memengaruhi keberlanjutan operasional. Dalam rangka meminimalkan paparan terhadap risiko yang muncul di sepanjang siklus bisnis, penerapan SUPREME tidak hanya terbatas pada area atau unit tertentu, melainkan mencakup seluruh operasional PHE Subholding Upstream.

PHE Subholding Upstream periodically conducts internal audits of SUPREME (Sustainability Pertamina Expectations for HSSE Management Excellence), which serves as the primary instrument for assessing the level of optimization in the integration of the HSSE management system across all operational dimensions. SUPREME is a risk management system designed with a holistic, structured, and systematic approach to ensure the mitigation of potential hazards that could impact operational sustainability. In order to minimize exposure to risks throughout the business cycle, the implementation of SUPREME is not limited to specific areas or units, but encompasses the entire operations of PHE Subholding Upstream.

Kriteria pencapaian SUPREME

The criteria of SUPREME

Hijau Tua Dark Green — **Excellence Generative** (≥90% of the available points awarded)

Semua proses dan implementasi telah melampaui standar minimum, memastikan risiko dapat dikelola dengan aman.

All processes and implementations have exceeded minimum standards, ensuring risks are managed safely.

Hijau Muda Light Green — **Acceptable/Fully Adequate** (≥80% to <90% of the available points awarded)

Semua proses dan implementasi memenuhi standar minimum, memastikan risiko terkelola dengan aman.

All processes and implementations meet minimum standards, ensuring risks are managed safely.

Kuning Yellow — **Tolerable/Adequate** (≥70% to <80% of the available points awarded)

Sebagian besar proses memenuhi standar minimum, dan risiko masih dapat ditoleransi untuk operasi aman.

Most processes meet minimum standards, and risks remain tolerable for safe operations.

Oranye Orange — **Not Tolerable** (≥60% to <70% of the available points awarded)

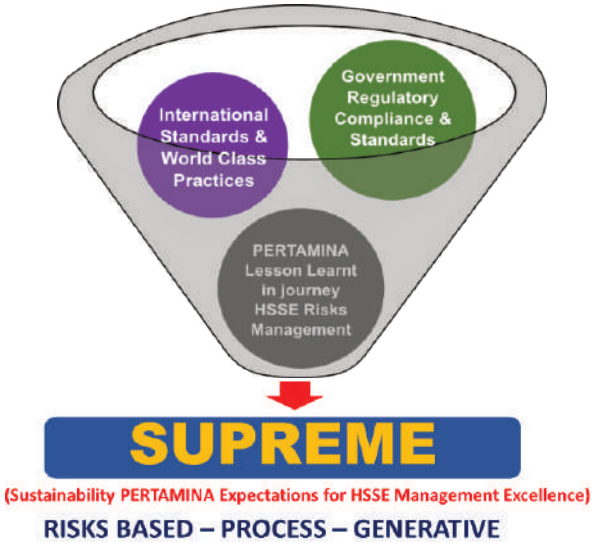
Sebagian proses tidak memenuhi syarat dan berisiko menengah hingga tinggi, sehingga tidak dapat ditoleransi.

Some processes fail to meet requirements and pose medium to high risks, making them intolerable.

Merah Red — **Not Acceptable** (<60% of the available points awarded)

Sebagian besar proses tidak memenuhi syarat dan berisiko tinggi, sehingga tidak dapat diterima.

Most processes fail to meet requirements and pose high risks, making them unacceptable.



Selain SUPREME, PHE Subholding Upstream juga melaksanakan audit internal tahunan lainnya, yaitu PERCA (Pertamina Environment Regulation Compliance Assurance). PERCA merupakan suatu audit kepatuhan terhadap regulasi lingkungan dan penilaian kinerja lingkungan yang dilaksanakan secara internal dalam ruang lingkup Pertamina Grup. PERCA merupakan tools audit lainnya selain PROPER untuk menilai kinerja pengelolaan lingkungan berdasarkan peraturan di bidang lingkungan. Pelaksanaan audit PERCA bertujuan untuk memastikan bahwa setiap entitas di bawah Pertamina Grup sepenuhnya mematuhi peraturan lingkungan yang berlaku, mengimplementasikan pengendalian terhadap pencemaran lingkungan (termasuk mitigasi emisi bahan beracun non-GRK, pengelolaan efluen, serta pengelolaan limbah), serta secara efektif mengelola potensi konflik sosial atau tuntutan masyarakat. Berdasarkan hasil proyeksi audit PERCA pada periode pelaporan terbaru, seluruh Wilayah Kerja (WK) memperoleh peringkat BIRU, yang menunjukkan bahwa evaluasi kepatuhan telah selesai dilakukan. Namun, PDSI dan ELNUSA masih berada pada tahap baselining, yang mengindikasikan bahwa proses penilaian awal sedang berlangsung dan akan diikuti dengan evaluasi lebih lanjut sebelum memasuki tahap audit lanjutan.

In addition to SUPREME, PHE Subholding Upstream also conducts another annual internal audit, namely PERCA (Pertamina Environment Regulation Compliance Assurance). PERCA is a compliance audit against environmental regulations and environmental performance assessment conducted internally within the scope of the Pertamina Group. PERCA is another auditing tool, alongside PROPER, used to assess environmental management performance based on environmental regulations. The purpose of the PERCA audit is to ensure that every entity under the Pertamina Group fully complies with applicable environmental regulations, implements controls to prevent environmental pollution (including mitigation of non-GHG toxic emissions, effluent management, and waste management), and effectively manages potential social conflicts or community claims. Based on the latest PERCA audit projections, all Working Areas (WK) received a BLUE rating, indicating that the compliance evaluation has been completed. However, PDSI and ELNUSA are still in the baselining stage, indicating that the initial assessment process is underway and will be followed by further evaluation before proceeding to the next audit stage.

Aspek Lingkungan
Environmental Aspect

PHE Subholding Upstream berkomitmen untuk memenuhi kebutuhan energi global yang terus berkembang dengan tetap berkontribusi pada keberlanjutan lingkungan di seluruh wilayah operasionalnya. Komitmen ini diimplementasikan melalui berbagai inisiatif strategis, termasuk investasi dalam teknologi ramah lingkungan, penerapan praktik efisiensi energi yang terukur, pengelolaan limbah yang berorientasi pada prinsip tanggung jawab sosial dan lingkungan, serta kebijakan internal yang terfokus pada mitigasi emisi gas rumah kaca (GRK).

Sebagai bagian dari upaya mitigasi emisi, PHE Subholding Upstream mengadopsi teknologi Carbon Capture Storage (CCS) dan Carbon Capture Utilization and Storage (CCUS) yang bertujuan untuk mengurangi jejak karbon operasionalnya, sehingga dampak lingkungan dari kegiatan industri dapat diminimalisasi secara signifikan. Selain itu, pengembangan energi terbarukan melalui optimalisasi produksi gas bumi menjadi salah satu prioritas strategis perusahaan, yang selaras dengan visi PHE Subholding Upstream untuk mendukung transisi energi yang berkelanjutan dan inklusif.

Berbagai aspek keberlanjutan yang menjadi fokus utama PHE Subholding Upstream, khususnya yang berkaitan dengan dampak lingkungan, akan diuraikan secara komprehensif dalam bagian berikut.

PHE Subholding Upstream is dedicated to meeting the growing global energy demand while contributing to environmental sustainability across all its operational areas. This dedication is implemented through various strategic initiatives, including investments in environmentally friendly technologies, the application of measurable energy efficiency practices, responsible waste management based on social and environmental responsibility principles, and internal policies focused on mitigating greenhouse gas (GHG) emissions.

As part of its emission mitigation efforts, PHE Subholding Upstream adopts Carbon Capture Storage (CCS) and Carbon Capture Utilization and Storage (CCUS) technologies, aimed at reducing its operational carbon footprint, thereby significantly minimizing the environmental impact of industrial activities. Additionally, the development of renewable energy through the optimization of natural gas production has become one of the company's strategic priorities, aligned with PHE Subholding Upstream's vision to support a sustainable and inclusive energy transition.

Various sustainability aspects that are a primary focus of PHE Subholding Upstream, particularly those related to environmental impacts, will be comprehensively outlined in the following sections.

Produk Rendah Karbon
Low Carbon Product

Menurut World Energy Outlook 2023, permintaan terhadap minyak, gas alam, dan batu bara diproyeksikan mencapai puncaknya pada tahun 2030. Permintaan gas alam diperkirakan akan tetap kuat, terutama di pasar negara berkembang, sementara penggunaan batu bara diprediksi akan mengalami penurunan secara bertahap.

According to the World Energy Outlook 2023, the demand for oil, natural gas, and coal is projected to peak by 2030. The demand for natural gas is expected to remain strong, particularly in emerging market countries, while coal usage is anticipated to gradually decline.

Meskipun gas alam tidak termasuk dalam kategori energi terbarukan, gas alam sering dipandang sebagai "jembatan" dalam transisi energi menuju sistem energi yang lebih bersih. Hal ini disebabkan oleh emisi gas rumah kaca yang dihasilkan oleh gas alam yang lebih rendah dibandingkan dengan batu bara dan minyak, menjadikannya sebagai alternatif yang lebih ramah lingkungan selama proses transisi menuju sistem energi rendah karbon.

PHE Subholding Upstream mendukung implementasi transisi energi menuju sumber energi terbarukan dengan memfasilitasi penjualan gas alam sebagai alternatif sumber energi yang lebih rendah emisi karbon. Dengan mengedepankan inovasi dan praktik berkelanjutan yang berbasis pada prinsip efisiensi sumber daya, perusahaan berkomitmen untuk menciptakan dampak positif yang signifikan bagi lingkungan, masyarakat, dan pemangku kepentingan. Selain itu, PHE Subholding Upstream juga berperan aktif dalam mendukung pencapaian tujuan pembangunan berkelanjutan global, sejalan dengan upaya transisi menuju ekonomi rendah karbon dan keberlanjutan jangka panjang.

Although natural gas is not classified as a renewable energy source, it is often referred to as a "bridge" in the energy transition towards a cleaner energy system. This is due to the fact that greenhouse gas emissions from natural gas are lower compared to coal and oil, making it a cleaner alternative during the transition towards a low-carbon energy system.

PHE Subholding Upstream supports the implementation of the energy transition towards renewable energy sources by facilitating the sale of natural gas as a lower-carbon alternative energy source. By prioritizing innovation and sustainability practices based on resource efficiency principles, the company is committed to creating a significant positive impact on the environment, society, and stakeholders. Furthermore, PHE Subholding Upstream actively contributes to achieving global sustainable development goals, aligning with efforts towards a low-carbon economy and long-term sustainability.

Produk Rendah Karbon
Low Carbon Product

	2023	2024
Total Pendapatan Gas (Juta USD) Total Gas Revenue (Million USD)	4.094,13	4.198,59
Total Pendapatan (Juta USD) Total Revenue (Million USD)	14.568,38	14.330,34
Persentase Persentage	**28,1%**	**29,3%**

Persentase penjualan gas sebagai produk rendah karbon mengalami peningkatan sebesar 4,27% dibandingkan dengan tahun 2023. Hal ini mengindikasikan bahwa PHE Subholding Upstream secara konsisten memperkuat portofolio produk berkelanjutan, dengan tujuan untuk mengurangi jejak ekologis dan dampak negatif terhadap lingkungan. Upaya ini mencerminkan komitmen jangka panjang perusahaan dalam mendukung transisi energi yang lebih bersih dan berkelanjutan di masa depan.

The percentage of natural gas sales as a low-carbon product increased by 4.27% compared to 2023. This indicates that PHE Subholding Upstream is consistently strengthening its sustainable product portfolio, aiming to reduce its ecological footprint and negative environmental impact. This effort reflects the company's long-term commitment to supporting a cleaner and more sustainable energy transition in the future.

Budaya Keberlanjutan
Sustainable Culture

PHE Subholding Upstream meyakini bahwa organisasi yang berkelanjutan adalah entitas yang tidak hanya berfokus pada penciptaan nilai ekonomi bagi pemegang saham, tetapi juga memiliki tanggung jawab terhadap perlindungan lingkungan serta berkontribusi dalam meningkatkan kesejahteraan bagi seluruh pemangku kepentingan yang terlibat atau berinteraksi dengannya. PHE Subholding Upstream berpendapat bahwa elemen kunci dalam implementasi prinsip keberlanjutan terletak pada sumber daya manusia. Oleh karena itu, PHE Subholding Upstream berkomitmen untuk membangun dan memperkuat budaya keberlanjutan yang terintegrasi dalam setiap aspek operasional dan strategi perusahaan.

PHE Subholding Upstream believes that a sustainable organization is one that not only creates economic value for shareholders but also has a responsibility towards environmental protection and contributes to improving the well-being of all stakeholders involved or interacting with it. PHE Subholding Upstream believes that the key element in implementing sustainability principles lies in human resources. Therefore, PHE Subholding Upstream is committed to building and strengthening a sustainability culture integrated into every aspect of its operations and corporate strategy.

Inisiatif PHE Subholding Upstream untuk membangun budaya keberlanjutan dimulai dengan integrasi prinsip-prinsip keberlanjutan ke dalam visi dan misi perusahaan. PHE Subholding Upstream memastikan bahwa setiap individu, dari tingkat eksekutif hingga operasional, memiliki pemahaman mendalam tentang pentingnya keberlanjutan dan implikasinya terhadap dimensi lingkungan, sosial, dan tata kelola. Melalui program pelatihan yang terstruktur dan komunikasi internal yang berkelanjutan, PHE Subholding Upstream berupaya menumbuhkan kesadaran kolektif serta membekali karyawan dengan keterampilan dan kompetensi yang dibutuhkan untuk menghadapi tantangan keberlanjutan yang semakin kompleks di masa depan.

PHE Subholding Upstream's initiatives to build a sustainability culture begin with integrating sustainability principles into the company's vision and mission. PHE Subholding Upstream ensures that every individual, from the executive to the operational level, has a deep understanding of the importance of sustainability and its implications on environmental, social, and governance dimensions. Through structured training programs and ongoing internal communication, PHE Subholding Upstream aims to foster collective awareness and equip employees with the skills and competencies needed to face the increasingly complex sustainability challenges of the future.

Training HSSE (Health, Safety, Security, and Environment)

PHE Subholding Upstream juga aktif menyelenggarakan pelatihan sebagai bagian dari upaya untuk meningkatkan kesadaran terhadap lingkungan dan K3 (Kesehatan, Keselamatan, dan Keamanan) bagi seluruh Perwira di Subholding Upstream. Materi pelatihan yang diberikan mencakup berbagai topik penting, seperti pengelolaan limbah, konservasi energi, pengurangan emisi gas rumah kaca, serta praktik ramah lingkungan lainnya.

PHE Subholding Upstream is also actively conducting training as part of its efforts to raise awareness of environmental issues and HSE (Health, Safety, and Environment) among all officers in Subholding Upstream. The training materials cover various important topics, such as waste management, energy conservation, greenhouse gas emissions reduction, and other environmentally friendly practices.

Melalui program pelatihan HSSE yang telah dilaksanakan, diharapkan para Perwira Subholding Upstream dapat secara efektif mengimplementasikan prinsip-prinsip keberlanjutan dalam setiap aspek kegiatan operasional mereka, bertransformasi menjadi agen perubahan yang proaktif dalam upaya menjaga kelestarian lingkungan, serta berperan sebagai pelopor dalam memastikan standar keselamatan dan keamanan yang optimal di seluruh operasional perusahaan. Sepanjang tahun 2024, program pelatihan ini dilaksanakan secara berkala dan melibatkan 13.138 Perwira Subholding Upstream yang tersebar di berbagai wilayah kerja dan AP Services, memastikan penyebaran pengetahuan dan keterampilan yang komprehensif di seluruh jajaran operasional perusahaan.

Through the HSSE training program that has been implemented, it is expected that the officers of Subholding Upstream will effectively implement sustainability principles in every aspect of their operational activities, transforming into proactive agents of change in efforts to preserve the environment, and serve as pioneers in ensuring optimal safety and security standards across the company's operations. Throughout 2024, this training program was conducted regularly and involved 13,138 officers of Subholding Upstream spread across various working areas and AP Services, ensuring the comprehensive dissemination of knowledge and skills throughout the company's operational ranks.

Kampanye Lingkungan

PHE Subholding Upstream secara proaktif melaksanakan kampanye keberlanjutan dengan mengusung beragam topik yang dirancang agar dapat dipahami secara efektif oleh seluruh Perwira Subholding Upstream. Kampanye ini disebarkan melalui berbagai saluran komunikasi yang terintegrasi, termasuk email broadcast, banner, dan poster, untuk memastikan penyampaian pesan yang luas dan efektif. Sepanjang tahun 2024, PHE Subholding Upstream berkomitmen untuk secara berkala mengadakan kampanye tematik yang berfokus pada isu-isu lingkungan, dengan frekuensi pelaksanaan setiap bulan

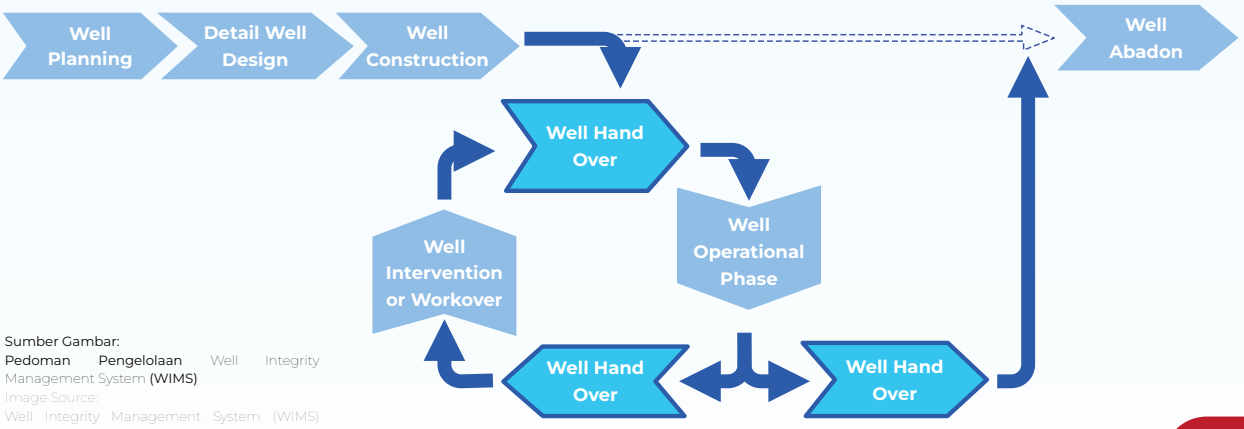
Environmental Campaign

PHE Subholding Upstream proactively conducts sustainability campaigns by presenting various topics designed to be easily understood by all officers of Subholding Upstream. These campaigns are disseminated through integrated communication channels, including email broadcasts, banners, and posters, to ensure broad and effective message delivery. Throughout 2024, PHE Subholding Upstream is committed to regularly organizing thematic campaigns focused on environmental issues, with monthly implementation frequency.

Pengelolaan Sumur Lepas Pantai
Offshore Well Management

Kegiatan eksplorasi dan produksi minyak dan gas bumi yang dilakukan oleh PHE Subholding Upstream mencakup tidak hanya operasional di daratan, tetapi juga di wilayah lepas pantai. Pada setiap tahap operasional, PHE Subholding Upstream berkomitmen untuk mencegah pelepasan minyak, gas alam, atau cairan terproduksi yang tidak terkendali ke lingkungan laut. Langkah ini merupakan bagian dari upaya perlindungan terhadap ekosistem laut, serta menjaga kesehatan dan keselamatan tenaga kerja, yang juga mendukung keberlanjutan operasional dan meminimalkan dampak negatif terhadap lingkungan. Aksi mitigasi terhadap dampak negatif yang dilaksanakan oleh PHE Subholding Upstream mencakup seluruh tahapan, mulai dari pra-operasional, operasional, hingga pasca-operasional. Seluruh proses ini mengikuti Pedoman Pengelolaan Well Integrity Management System (WIMS), yang telah diterapkan sejak Januari 2021, dengan tujuan utama untuk memastikan integritas sumur dan meminimalkan potensi dampak terhadap lingkungan serta keselamatan operasional. Pedoman WIMS ini juga berfungsi sebagai kerangka kerja yang menyederhanakan mekanisme pengendalian pada setiap Unit Operasi, sesuai dengan seluruh tahapan siklus sumur (well lifecycle), serta memastikan bahwa setiap tahapan yang berkaitan dengan integritas sumur memenuhi standar teknis yang ditetapkan, baik berdasarkan regulasi nasional maupun internasional yang berlaku. Proses manajemen sumur ini, yang dijabarkan dalam alur berikut, melibatkan kolaborasi sinergis antara Fungsi Produksi sebagai pemilik aset dan Fungsi Drilling Well Intervention dalam implementasi operasionalnya.

The exploration and production of oil and natural gas carried out by PHE Subholding Upstream includes not only operations on land but also in offshore areas. At each operational stage, PHE Subholding Upstream is committed to preventing the uncontrolled release of oil, natural gas, or produced fluids into the marine environment. This effort is part of the protection of marine ecosystems, as well as safeguarding the health and safety of the workforce, which also supports operational sustainability and minimizes negative environmental impacts. The mitigation actions for negative impacts undertaken by PHE Subholding Upstream cover all stages, from pre-operational, operational, to post-operational phases. All of these processes follow the Well Integrity Management System (WIMS) Guidelines, which have been in place since January 2021, with the primary aim of ensuring well integrity and minimizing potential impacts on the environment and operational safety. These WIMS guidelines also serve as a framework to streamline the control mechanisms within each Operational Unit, aligned with all stages of the well lifecycle, and ensure that every stage related to well integrity meets the technical standards set forth, both in accordance with national and international regulations. The well management process, outlined in the following flow, involves synergistic collaboration between the Production Function as the asset owner and the Drilling Well Intervention Function in its operational implementation.



Sumber Gambar:
Pedoman Pengelolaan Well Integrity Management System (WIMS)
Image Source:
Well Integrity Management System (WIMS) Guidelines

Pemantauan dan evaluasi terhadap integritas serta stabilitas sumur di wilayah lepas pantai dilaksanakan oleh PHE Subholding Upstream melalui sistem dashboard yang terintegrasi di setiap zona operasional. Proses ini dikelola oleh tim Produksi/Aset, dengan mengacu pada Pedoman Pengelolaan Well Integrity dan Pedoman Kerja Pasca Operasi. Di dalamnya termasuk pemantauan berkala terhadap kualitas air dan ekosistem laut di sekitar area operasi, serta penerapan teknologi ramah lingkungan untuk mengurangi emisi dan mengelola limbah dengan kualitas terstandarisasi. Hingga saat ini, digitalisasi pengelolaan well integrity telah diterapkan pada dua zona operasional, yaitu Zona 8 dan Zona 17.

Monitoring and evaluation of well integrity and stability in offshore areas are carried out by PHE Subholding Upstream through an integrated dashboard system in each operational zone. This process is managed by the Production/Asset team, referring to the Well Integrity Management Guidelines and Post-Operation Work Guidelines. It includes regular monitoring of water quality and marine ecosystems around the operational area, as well as the application of environmentally friendly technologies to reduce emissions and manage waste to standardized quality. To date, the digitalization of well integrity management has been implemented in two operational zones, Zone 8 and Zone 17.

Sebagai bagian dari upaya tambahan terhadap digitalisasi, PHE Subholding Upstream juga mengimplementasikan teknologi cathodic protection dan chemical treatment untuk mengurangi korosi sumur, serta memastikan bahwa desain sumur memenuhi persyaratan barrier yang diperlukan guna menjaga integritas sumur. Lebih jauh lagi, contingency plan disiapkan sebagai bagian dari manajemen risiko, mencakup perbaikan pada sumur atau pekerjaan well intervention yang ditargetkan pada sumur yang teridentifikasi memiliki masalah dengan integritas sumur, guna memastikan bahwa integritas sumur tetap terjaga di seluruh tahap operasional.

As part of the additional efforts towards digitalization, PHE Subholding Upstream also implements cathodic protection and chemical treatment technologies to reduce well corrosion and ensure that well designs meet the necessary barrier requirements to maintain well integrity. Furthermore, a contingency plan is prepared as part of risk management, which includes well repairs or well intervention work targeted at wells identified with integrity issues, to ensure that well integrity is maintained throughout operational stages.

Dalam rangka memastikan bahwa seluruh implementasi manajemen integritas sumur telah sesuai dengan pedoman Well Integrity Management System (WIMS), PHE Subholding Upstream secara rutin dan proaktif melakukan audit terhadap penerapan well integrity di setiap tahap siklus sumur. Audit ini dilaksanakan setiap dua tahun sekali dengan tujuan mengevaluasi efektivitas serta tingkat kepatuhan terhadap standar teknis yang ditetapkan dalam pedoman. Semua aktivitas yang terkait dengan pengelolaan sumur lepas pantai berada di bawah tanggung jawab facility owner, dengan pengawasan yang dilakukan oleh Direktur Pengembangan & Produksi PHE Subholding Upstream, guna memastikan kepatuhan terhadap prinsip-prinsip keselamatan, keberlanjutan, dan efisiensi operasional di seluruh tahapan siklus sumur.

To ensure that all well integrity management implementations comply with the Well Integrity Management System (WIMS) guidelines, PHE Subholding Upstream routinely and proactively conducts audits on the implementation of well integrity at each stage of the well lifecycle. These audits are conducted every two years with the aim of evaluating effectiveness and compliance with the technical standards set forth in the guidelines. All activities related to offshore well management are the responsibility of the facility owner, with oversight from the Director of Development & Production of PHE Subholding Upstream to ensure compliance with safety, sustainability, and operational efficiency principles throughout the well lifecycle stages.

Penutupan dan Rehabilitasi Lokasi
Site Closure and Rehabilitation

PHE Subholding Upstream beroperasi baik di onshore maupun offshore. Berdasarkan data SKK Migas pada tahun 2021, Indonesia memiliki 634 anjungan minyak lepas pantai, di mana lebih dari 85% di antaranya dikelola oleh PHE Subholding Upstream. SKK Migas juga mencatat adanya 100 aset lepas pantai yang tidak aktif, dengan 98 unit di antaranya dimiliki oleh PHE Subholding Upstream. Sementara itu, seluruh wilayah onshore yang dikelola oleh PHE Subholding Upstream tetap beroperasi dengan penuh kapasitas.

PHE Subholding Upstream operates both onshore and offshore. According to SKK Migas data from 2021, Indonesia has 634 offshore oil platforms, with more than 85% of them managed by PHE Subholding Upstream. SKK Migas also reports 100 inactive offshore assets, of which 98 are owned by PHE Subholding Upstream. Meanwhile, all onshore areas managed by PHE Subholding Upstream continue to operate at full capacity.

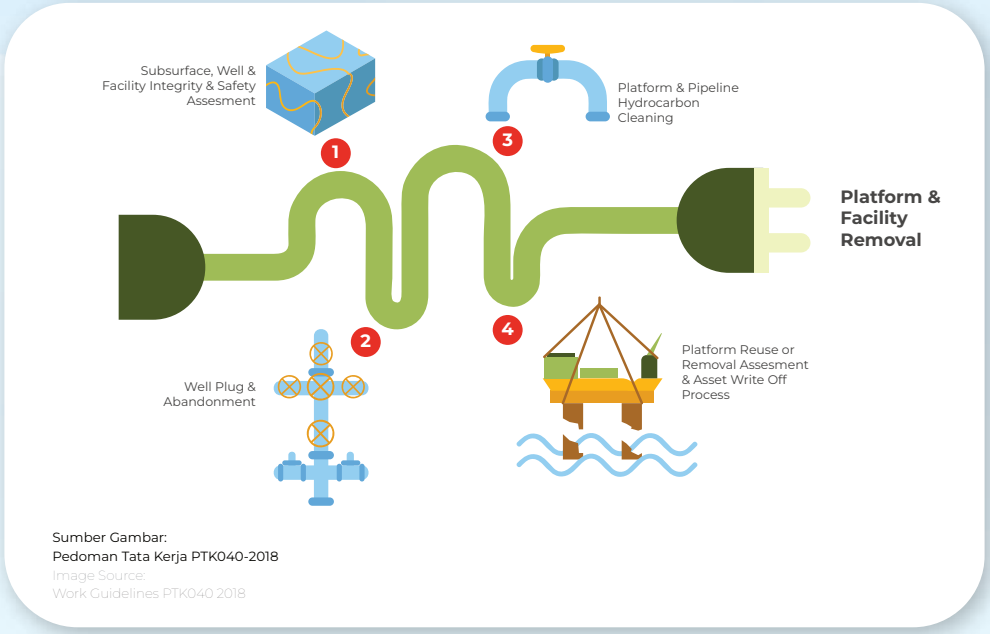
Setiap anjungan memiliki masa hidup operasional rata-rata 30 hingga 40 tahun, setelah itu, apabila produksi yang dihasilkan tidak lagi mampu menutupi biaya operasional, anjungan tersebut akan diproyeksikan untuk direstorasi. Dalam konteks ini, SKK Migas berkomitmen untuk melaksanakan proses decommissioning terhadap anjungan yang tidak lagi berfungsi, guna memulihkan kondisi lingkungan dan memastikan pemenuhan kewajiban kontrak kerja sama.

Each platform has an average operational lifespan of 30 to 40 years, after which, if the production no longer covers operational costs, the platform is projected for restoration. In this context, SKK Migas is committed to executing the decommissioning process for platforms that are no longer operational, in order to restore environmental conditions and ensure compliance with contractual obligations.

PHE Subholding Upstream mengatur kegiatan pasca-operasional dengan mengikuti kebijakan yang tercantum dalam Pedoman Tata Kerja PTK040 2018, Peraturan Menteri Energi dan Sumber Daya Mineral Nomor 15 Tahun 2018, serta Peraturan Menteri Keuangan 140/PMK.060/2020 mengenai Pengelolaan Barang Milik Negara Hulu Minyak dan Gas Bumi. Regulasi ini mengatur tentang pengelolaan dan pemulihan lingkungan pasca-operasi, serta memastikan bahwa seluruh kegiatan decommissioning dilaksanakan sesuai dengan standar yang telah ditetapkan. Perencanaan untuk Kegiatan Pasca-operasi (KPO) dilaksanakan secara kolaboratif dengan regulator terkait, seperti SKK MIGAS, Ditjen Migas, dan pihak berkepentingan yang menangani perizinan, dengan fokus utama pada aspek Environmental, Social, and Governance (ESG) guna menjamin integritas lingkungan dan keberlanjutan sosial dalam setiap tahapan proses decommissioning.

PHE Subholding Upstream manages post-operational activities by adhering to the policies outlined in the Work Guidelines PTK-040 2018, the Minister of Energy and Mineral Resources Regulation No. 15 of 2018, and the Minister of Finance Regulation 140/PMK.060/2020 on the Management of State-Owned Assets in Oil and Gas Upstream. These regulations govern the management and environmental restoration post-operation, ensuring that all decommissioning activities are conducted according to established standards. Post-Operation (KPO) planning is carried out collaboratively with relevant regulators, such as SKK MIGAS, the Directorate General of Oil and Gas, and stakeholders responsible for licensing, with a primary focus on Environmental, Social, and Governance (ESG) aspects to ensure environmental integrity and social sustainability at every stage of the decommissioning process.

Alur Proses Kegiatan Pasca Operasi (KPO)
Post-Operation Activity (KPO) Process Flow



Sumber Gambar:
Pedoman Tata Kerja PTK040-2018
Image Source:
Work Guidelines PTK040 2018

PHE Subholding Upstream telah melaksanakan serangkaian studi kelayakan untuk Kegiatan Pasca Operasi (KPO) di berbagai wilayah kerja, yang dilakukan melalui kolaborasi dengan Pusat Riset Kelautan, Kementerian Kelautan dan Perikanan, serta akademisi internasional. Studi-studi tersebut bertujuan untuk menyusun rencana decommissioning dan pemanfaatan anjungan lepas pantai nonaktif secara optimal. Beberapa opsi pemanfaatan yang dipertimbangkan dalam Kegiatan Pasca Operasi antara lain:

- Penggunaan kembali untuk pengembangan lain;
- Penggunaan kembali untuk aplikasi Rig to Reef atau budidaya ikan;
- Pelepasan total.

Seluruh aktivitas yang terkait dengan Kegiatan Pasca Operasi menjadi tanggung jawab penuh dari pemilik fasilitas (facility owner), dengan pengawasan yang dilakukan oleh VP HSSE PHE Subholding Upstream, guna memastikan mitigasi yang efektif terhadap potensi dampak lingkungan yang dapat timbul selama proses decommissioning dan pemanfaatan anjungan nonaktif tersebut.

PHE Subholding Upstream has conducted a series of feasibility studies for Post-Operation Activities (KPO) across various working areas, in collaboration with the Marine Research Center, the Ministry of Marine Affairs and Fisheries, and international academics. These studies aim to develop decommissioning plans and optimal utilization of inactive offshore platforms. Several utilization options considered for Post-Operation Activities include:

- Reuse for other development purposes;
- Reuse for Rig to Reef applications or fish farming;
- Complete decommissioning.

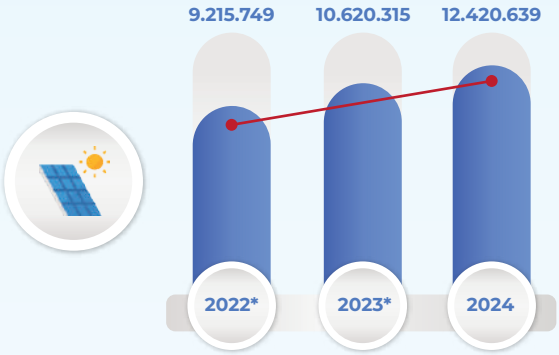
All activities related to Post-Operation Activities are the full responsibility of the facility owner, with oversight conducted by the VP HSSE of PHE Subholding Upstream, to ensure effective mitigation of potential environmental impacts that may arise during the decommissioning process and utilization of inactive platforms.

Energi
Energy

Energi merupakan salah satu tantangan global utama pada abad ke-21, yang tercermin dalam Agenda 2030 PBB melalui 17 Tujuan Pembangunan Berkelanjutan (TPB). Konsumsi energi global terus mengalami peningkatan yang signifikan seiring dengan pertumbuhan populasi dan ekspansi sektor industri. Sumber energi konvensional, seperti minyak bumi, gas alam, dan batu bara, masih mendominasi pasokan energi dunia, yang berkontribusi pada berbagai permasalahan lingkungan, termasuk emisi gas rumah kaca yang merupakan salah satu pendorong utama perubahan iklim dan polusi lingkungan. PHE Subholding Upstream berkomitmen untuk secara terus-menerus mengoptimalkan pemanfaatan energi terbarukan dan secara bertahap mengurangi ketergantungan pada sumber energi non-terbarukan.

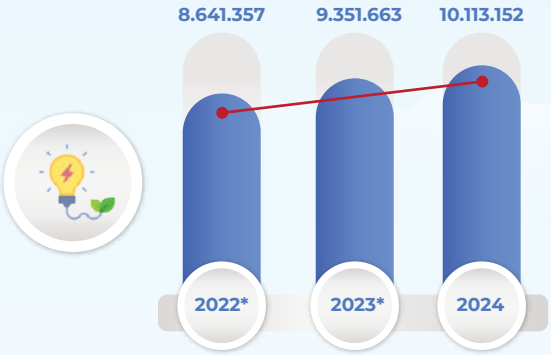
Energy is one of the major global challenges of the 21st century, reflected in the UN 2030 Agenda through the 17 Sustainable Development Goals (SDGs). Global energy consumption continues to rise significantly with the growth of population and the expansion of the industrial sector. Conventional energy sources, such as petroleum, natural gas, and coal, still dominate global energy supply, contributing to various environmental issues, including greenhouse gas emissions, which are a key driver of climate change and environmental pollution. PHE Subholding Upstream is committed to continually optimizing the use of renewable energy and gradually reducing dependence on non-renewable energy sources.

Konsumsi Energi Terbarukan (GJ)
Renewable Energy Consumption (GJ)

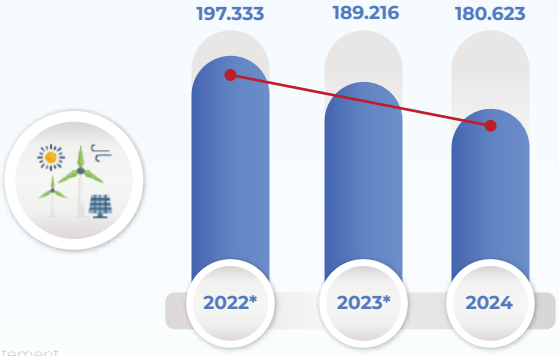


*Restatement

Konsumsi Listrik PLN (GJ)
PLN Electricity Consumption (GJ)

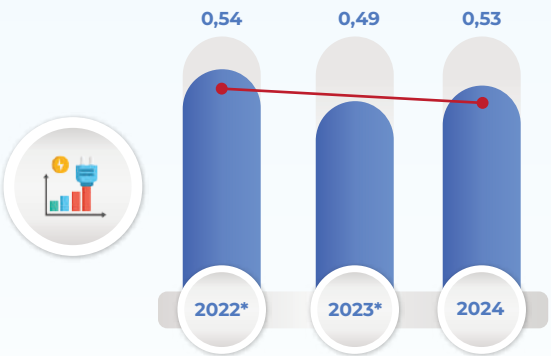


Jumlah Konsumsi Energi (GJ)
Total Energy Consumption (GJ)



*Restatement

Intensitas Energi (GJ/BOE)
Energy Intensity (GJ/BOE)



Restatement dilakukan sebagai hasil dari perbaikan metodologi yang diterapkan. Pada laporan sebelumnya, data disajikan langsung dalam satuan GJ, sementara pada laporan kali ini, PHE Subholding Upstream melakukan konversi data ke dalam satuan GJ berdasarkan volume bahan bakar yang digunakan pada setiap wilayah kerja.

The restatement was made as a result of the methodology improvements implemented. In the previous report, data was presented directly in GJ units, whereas in this report, PHE Subholding Upstream has converted the data into GJ units based on the fuel volume used in each working area.

Konsumsi Energi
Energy Consumption

Sumber Energi Energy Source	2022		2023		2024	
	GJ	MWh	GJ	MWh	GJ	MWh
Energi Terbarukan Renewable Energy						
Solar cell Solar cell	109.282,64	30.358,72	157.213,41	43.673,89	302.848,83	84.124,68
Biofuel Biofuel	9.091.638,30	2.525.657,12	10.448.320,06	2.902.543,31	12.102.936,08	3.361.926,96
Listrik yang dibeli dari sumber terbarukan Electricity purchased from renewable sources	14.829	4.119,50	14.781,84	4.106,40	14.854,26	4.126,51
Energi Tak Terbarukan Non-Renewable Energy						
Gas Gas	153.579.593,48	42.664.411,07	152.079.884,96	42.247.792,04	147.417.322,18	40.949.259,44
Oil Minyak	4.842.014,80	1.345.111,71	3.064.750,55	851.387,70	977.009,52	271.391,56
Coal* Batu Bara*	8.641.357,21	2.400.569,03	9.351.663,96	2.597.892,25	10.113.152,95	2.809.209,38
Listrik yang dijual/diberikan ke pihak ketiga Electricity sold/given to third parties	(102.212,54)	(28.394,64)	(107.270,90)	(29.799,86)	(125.275,70)	(34.801,59)
Steam Uap Panas	30.372.323	8.437.431,33	24.827.143	6.896.980,33	22.240.888	6.178.024,94

* Listrik yang dibeli dari PT PLN (Persero)
*Electricity purchased from PT PLN (Persero)

Perhitungan konsumsi energi dilakukan dengan mengacu pada volume penggunaan bahan bakar, LNG, dan listrik yang kemudian dikonversi ke dalam satuan energi GigaJoule (GJ) sesuai dengan konversi yang ditetapkan oleh International Energy Agency (IEA). Perlu dicatat bahwa perhitungan konsumsi energi yang disajikan hanya mencakup aktivitas yang terjadi dalam ruang lingkup operasional perusahaan dan belum mencakup konsumsi energi yang digunakan di luar perusahaan, seperti oleh kontraktor, vendor, atau pemasok yang terlibat dalam rantai pasokan.

Energy consumption calculation is based on the volume of fuel, LNG, and electricity used, which is then converted into energy units of GigaJoules (GJ) according to the conversion standards set by the International Energy Agency (IEA). It is important to note that the energy consumption calculated only includes activities within the company's operations and does not account for energy consumption outside the company by contractors, vendors, or suppliers involved in the supply chain.

Sektor energi berkontribusi terhadap hingga 70% dari total emisi karbon dioksida global, yang mendorong perusahaan-perusahaan untuk mengadopsi energi terbarukan sebagai strategi utama dalam upaya pengurangan emisi, sehingga meningkatkan keberlanjutan dalam penggunaan energi. Dengan memanfaatkan sumber energi terbarukan, perusahaan dapat mengurangi ketergantungan pada sumber daya terbatas yang rentan terhadap volatilitas harga pasar. PHE Subholding Upstream telah melaksanakan berbagai inisiatif untuk mengurangi ketergantungan pada energi tak terbarukan, di antaranya melalui peningkatan efisiensi energi dengan mengoptimalkan penggunaan peralatan mekanik, serta mengembangkan energi alternatif seperti biofuel dan energi surya fotovoltaik.

The energy sector accounts for up to 70% of global carbon dioxide emissions, which drives companies to adopt renewable energy as a primary strategy for emission reduction, thereby enhancing energy sustainability. By utilizing renewable energy sources, companies can reduce their reliance on finite resources that are vulnerable to market price fluctuations. PHE Subholding Upstream has implemented various initiatives to reduce dependency on non-renewable energy, including improving energy efficiency through the optimization of mechanical equipment and developing alternative energies such as biofuels and photovoltaic solar energy.

PHE Subholding Upstream juga telah mengimplementasikan penggunaan panel surya, yang mengkonversi energi matahari menjadi energi listrik. Penggunaan teknologi panel surya ini memberikan dampak yang signifikan dalam upaya perusahaan untuk mengurangi jejak karbon serta berkontribusi pada diversifikasi portofolio energi yang lebih berkelanjutan. Berdasarkan data yang ada, pemanfaatan energi terbarukan oleh PHE Subholding Upstream pada tahun 2024 tercatat sebesar 12,405,784.91 GJ, yang setara dengan 6.42% dari total konsumsi energi yang digunakan dalam seluruh kegiatan operasional perusahaan.

PHE Subholding Upstream has also implemented the use of solar panels, which convert solar energy into electricity. The use of this solar panel technology has a significant impact on the company's efforts to reduce its carbon footprint and contribute to the diversification of the energy portfolio in a more sustainable manner. According to the available data, the utilization of renewable energy by PHE Subholding Upstream in 2024 was recorded at 12,405,784.91 GJ, which represents 6.42% of the total energy consumption in the company's operational activities.

+2%

Pemanfaatan energi terbarukan dari total konsumsi energi pada tahun 2030.
Utilization of renewable energy from total energy consumption in 2030.

Kami telah merumuskan target penurunan emisi per proyek ($MtCO_2e$) yang akan dicapai setiap tahun hingga tahun 2034.
We have formulated a per project emission reduction target ($MtCO_2eq$) which will be achieved every year until 2034.

Energi yang digunakan dalam seluruh proses operasional PHE Subholding Upstream secara rutin diaudit untuk memastikan efisiensi dan pemanfaatan sumber daya yang optimal. Sesuai dengan Peraturan Menteri Energi dan Sumber Daya Mineral No. 14 Tahun 2012 yang kemudian diperbaharui dengan Peraturan Menteri Energi dan Sumber Daya Mineral No. 8 Tahun 2025 tentang Manajemen Energi, entitas industri dengan konsumsi energi tahunan ≥6.000 TOE diwajibkan untuk melakukan audit energi. PHE telah menyelesaikan audit energi untuk 100% area operasionalnya yang memenuhi ambang batas regulasi ini. Audit ini dilakukan secara berkala setiap tiga tahun oleh auditor eksternal independen, memastikan identifikasi peluang penghematan energi secara berkelanjutan dan tindak lanjut di seluruh operasi.

Proses audit energi ini bertujuan untuk mengevaluasi dan menganalisis penggunaan energi di berbagai fasilitas serta wilayah kerja, guna mengidentifikasi potensi penghematan dan area yang memerlukan peningkatan. Audit dilakukan oleh auditor eksternal yang memiliki kompetensi dan sertifikasi yang relevan, dengan dukungan dan pendampingan dari tim internal PHE Subholding Upstream, untuk memastikan keakuratan data dan kesesuaian dengan standar teknis serta regulasi yang berlaku. Hasil dari audit energi yang dilakukan setiap tiga tahun ini dijadikan sebagai dasar kajian untuk merumuskan rekomendasi program kerja terkait optimalisasi efisiensi energi, guna

PHE Subholding Upstream melaksanakan berbagai program dengan sasaran dekarbonisasi yang lebih ambisius, antara lain melalui peningkatan efisiensi energi, pemanfaatan sumber daya energi dan panas dengan emisi karbon rendah, pengurangan emisi secara rutin, serta penerapan teknologi Carbon Capture Utilization & Storage (CCUS) dan Carbon Capture Storage (CCS). Sebagai bentuk komitmen terhadap tujuan tersebut, Perseroan telah mengeluarkan kebijakan strategis untuk membentuk gugus tugas khusus yang bertugas melakukan kajian mendalam terkait potensi injeksi CO_2 (CCS/CCUS).

The energy used in all operational processes of PHE Subholding Upstream is regularly audited to ensure efficiency and optimal utilization. In accordance with the Minister of Energy and Mineral Resources Regulation No. 14 of 2012, which was later updated by the Minister of Energy and Mineral Resources Regulation No. 8 of 2025 about Energy Management, industrial entities with annual energy consumption of ≥6,000 TOE are required to conduct energy audits. PHE has completed energy audits for 100% of its operational areas that meet this regulatory threshold. These audits are carried out on a regular three-year cycle by independent external auditors, ensuring continuous identification of energy-saving opportunities and follow-up action across operations.

This energy audit aims to evaluate and analyze energy consumption across various facilities and working areas to identify potential savings and areas for improvement. The audit is conducted by external auditors with relevant qualifications and certifications, supported by internal teams from PHE Subholding Upstream to ensure data accuracy and compliance with applicable technical standards and regulations. The results of the energy audit, conducted every three years, serve as the basis for developing recommendations for work programs related to energy efficiency optimization, in support of operational sustainability and the achievement of established emissions reduction targets.

PHE Subholding Upstream is implementing various programs with more ambitious decarbonization targets, including improving energy efficiency, utilizing low-carbon energy and heat resources, regularly reducing emissions, and applying Carbon Capture Utilization & Storage (CCUS) and Carbon Capture Storage (CCS) technologies. As a commitment to these goals, the Company has issued a strategic policy to establish a dedicated task force to conduct an in-depth study on the potential for CO_2 injection (CCS/CCUS).

Inisiatif lainnya untuk mencapai dekarbonisasi antara lain:

a. Energy Intensity Efficiency

Program ini berfokus pada efisiensi intensitas energi untuk mengoptimalkan operasional turbin gas, mengurangi konsumsi bahan bakar gas, penerapan kontrol anti-surge pada kompresor, pemasangan lampu LED, serta modifikasi sistem operasional lainnya. Inisiatif efisiensi energi ini memberikan kontribusi sebesar 56% terhadap target penurunan emisi, dengan bertujuan untuk mengurangi dampak lingkungan dari konsumsi energi yang tidak efisien.

b. Zero Routine Flaring

Inisiatif pengurangan flare gas melalui pemanfaatan kembali, modifikasi, atau monetisasi flare gas yang sebelumnya dibakar dalam flaring rutin. Program ini berkontribusi sebesar 24,8% terhadap target penurunan emisi, dengan mengutamakan pengurangan pembakaran gas yang tidak terpakai dan memaksimalkan pemanfaatan energi yang terbuang.

c. Low Carbon Heat

Pemanfaatan biodiesel B30/B35 untuk armada laut, yang berkontribusi sebesar 13,6% terhadap target penurunan emisi. Inisiatif ini bertujuan untuk menggantikan bahan bakar fosil dengan sumber energi yang lebih ramah lingkungan, sekaligus mengurangi jejak karbon dalam operasional transportasi laut perusahaan.

d. Low Carbon Power

Pada tahun 2024, sebanyak 64.000 panel surya dengan kapasitas total 25,7 MWp telah dioperasikan dalam pembangkit listrik tenaga surya yang terletak di Pertamina Hulu Rokan. Inisiatif ini mendukung transisi menuju penggunaan energi terbarukan dan berperan penting dalam pengurangan emisi karbon di sektor energi perusahaan.

Other initiatives to achieve decarbonization include:

a. Energy Intensity Efficiency

This program focuses on energy intensity efficiency to optimize gas turbine operations, reduce gas fuel consumption, implement anti-surge control on compressors, install LED lights, and modify other operational systems. This energy efficiency initiative contributes 56% towards the emission reduction target, aiming to minimize the environmental impact of inefficient energy consumption.

b. Zero Routine Flaring

An initiative to reduce flare gas through reutilization, modification, or monetization of flare gas that was previously burned in routine flaring. This program contributes 24.8% towards the emission reduction target, prioritizing the reduction of unused gas combustion and maximizing the utilization of wasted energy.

c. Low Carbon Heat

Utilization of B30/B35 biodiesel for the marine fleet, contributing 13.6% towards the emission reduction target. This initiative aims to replace fossil fuels with more environmentally friendly energy sources, while also reducing the carbon footprint in the company's marine transportation operations.

d. Low Carbon Power

In 2024, 64,000 solar panels with a total capacity of 25.7 MWp were commissioned at the Pertamina Hulu Rokan solar power plant. This initiative supports the transition to renewable energy usage and plays a critical role in reducing carbon emissions in the company's energy sector.

Berikut adalah beberapa program inisiatif yang berfokus pada pemanfaatan energi baru terbarukan, dengan penekanan pada penggunaan sumber energi yang lebih bersih dan berkelanjutan.

Here are several initiative programs focused on the utilization of renewable energy, with an emphasis on the use of cleaner and more sustainable energy sources.

Inisiatif Pemanfaatan Energi Terbarukan
Initiative for Renewable Energy Utilization

Regional Region	**Lokasi** Location	**Proyek** Project	**Reduksi (CO_2eq)** Reduction (Co_2eq)
Regional 1 Region 1	WK Rokan	Pengoperasian Pembangkit Listrik Tenaga Surya PHR WK Rokan bekerjasama dengan Pertamina Power Indonesia. Lokasi PLTS: Duri, Dumai dan Rumbai - Sustain Program 2023 Operation of the Solar Power Plants (PLTS) of PHR WK Rokan in collaboration with Pertamina Power Indonesia. PLTS Locations: Duri, Dumai, and Rumbai – Sustain Program 2023	27.734,22
Regional 2 Region 2	PHE ONWJ	Installation of Solar Panels at Muara Karang ORF dan Tanjung Priok ORF	6,03
Regional 2 Region 2	PHE OSES	Application of Solar Panels (PLTS) on Gas Metering Cilegon (6 kW)	19,03
Regional 2 Region 2	PHE OSES	Application of Solar Panels (PLTS) on Pabelokan (130 kW)	461,86
Regional 4 Region 4	JOB Tomori	Instalasi PLTS pada cluster well, gudang & pos security Lapangan Gas Senoro Installation of Solar Power Systems (PLTS) at Cluster Wells, Warehouses, and Security Posts in the Senoro Gas Field	24,06
Regional 5 Region 5	MLN Algeria	Pemasangan Solar Panel untuk Power Installation of Solar Panels for Power Supply	9.444,26
PDSI	PDSI	Moveable Solar Cell Generator	420
PDSI	PDSI	Solar Cell Light Tower at Rig Site	576
Elnusa	Elnusa	Penggantian Lampu Sorot Listrik Ke Lampu Solar Panel Replacement of Electric Floodlights with Solar Panel Floodlights	5,91
		Jumlah Total	**38.691,36**

PHE Subholding Upstream telah melakukan berbagai inovasi dan inisiatif efisiensi energi, di antaranya sebagai berikut:

PHE Subholding Upstream has implemented various innovations and energy efficiency initiatives, which are as follows:

Top 10 Inisiatif Efisiensi Energi 2024
Top 10 Energy Efficiency Initiatives of 2024

Regional Region	**Lokasi** Location	**Inisiatif** Initiative	**Pengurangan (MWh/tahun)** Reduction (MWh/tahun)
Regional 2 Region 2	PHE OSES	Efisiensi penggunaan Fuel Gas dengan Optimasi Pengoperasian Gas Turbin (Pengurangan penggunaan gas fuel sebesar 6 MMSCFD dari sebelumnya 40 MMSCFD menjadi 34 MMSCFD) Fuel Gas Efficiency through Gas Turbine Operation Optimization (Reduction of fuel gas usage by 6 MMSCFD, from 40 MMSCFD to 34 MMSCFD)	792.598,13
Regional 2 Region 2	PHE OSES	Efisiensi penggunaan Fuel Gas dengan Optimasi Pengoperasian Gas Turbin (Pengurangan penggunaan gas fuel sebesar 4 MMSCFD dari sebelumnya 34 MMSCFD menjadi 30 MMSCFD) Fuel Gas Efficiency through Gas Turbine Operation Optimization (Reduction of fuel gas usage by 4 MMSCFD, from 34 MMSCFD to 30 MMSCFD)	528.398,76
Regional 2 Region 2	PHE OSES	Efisiensi penggunaan Fuel Gas dengan Optimasi Pengoperasian Gas Turbin (Pengurangan penggunaan gas fuel sebesar 2 MMSCFD dari sebelumnya 30 MMSCFD menjadi 28 MMSCFD) Fuel Gas Efficiency through Gas Turbine Operation Optimization 28 MMSCFD)	264.199,38
Regional 2 Region 2	PHE OSES	Efisiensi penggunaan Fuel Gas dengan Optimasi Pengoperasian Gas Turbin (Pengurangan penggunaan gas fuel sebesar 2 MMSCFD dari sebelumnya 28 MMSCFD menjadi 26 MMSCFD) Fuel Gas Efficiency through Gas Turbine Operation Optimization (Reduction of fuel gas usage by 2 MMSCFD, from 28 MMSCFD to 26 MMSCFD)	592.107,80
Regional 2 Region 2	PHE OSES	Naturalisasi Bahan Bakar Kapal menjadi Diesel B35 Fuel Naturalization of Vessels to Diesel B35	481.782,87
Regional 3 Region 3	PHM	Inovasi "DNA Pro" di Lapangan Senipah "DNA Pro" Innovation at the Senipah Field	187.097,54
Regional 3 Region 3	PEP Sangatta	Optimalisasi Own Used Gas EP Sangatta Optimization of Own Used Gas EP Sangatta	159.785,22
Regional 4 Region 4	PEP Sukowati	Meningkatkan Reability dan Availability pada Power Plant dengan Menciptakan alat E-PEPSI "Efektif Power Plant Sinkron" untuk mengurangi Unplanned Shutdown Improving Reliability and Availability at the Power Plant by Developing the E-PEPSI ("Effective Power Plant Synchronization") Device to Reduce Unplanned Shutdowns	156.778,48
Regional 4 Region 4	PEP Donggi Matindok	Penerapan Load Shedding di Power Generation CPP Donggi dan CPP Matindok Implementation of Load Shedding at CPP Donggi and CPP Matindok Power Generation Facilities	156.778,48
PT Badak NGL	PT Badak NGL	Otomatisasi Sistem Pengendalian Antisurge Kompresor Refrijeran Untuk Mengurangi Konsumsi Steam Pada Produksi LNG Yang Rendah Automation of the Refrigerant Compressor Antisurge Control System to Reduce Steam Consumption During Low LNG Production	226.823,14
		Jumlah Total	**3.520.801,17**

Total pengurangan energi yang dihasilkan dari semua inisiatif efisiensi energi

Total energy reduction resulting from all enabled energy efficiencies

4.433.442,25 MWh /tahun / year

Beberapa komitmen pengelolaan energi di setiap Wilayah Kerja di PHE Subholding Upstream, antara lain:

Some energy management commitments in each Working Area at PHE Subholding Upstream include:

Komitmen Pengelolaan Energi
Energy Management Commitment

Regional Region	**Lokasi** Location	**Komitmen** Commitment
Regional 1 Region 1	PEP Pendopo	Melestarikan sumber daya energi serta meningkatkan efisiensi pemakaian energi 1,2% per tahun Preserving energy resources and improving energy usage efficiency by 1,2% annually
Regional 1 Region 1	PEP Adera	Melakukan penurunan efisiensi energi sebesar 2,5% setiap tahun dari tahun sebelumnya secara konsisten. Consistently reducing energy efficiency by 2.5% each year from the previous year
Regional 2 Region 2	PEP Jatibarang	Menurunkan Intensitas energi sebesar 15% sampai dengan Tahun 2035 secara optimum dan menurunkan risiko bisnis terkait inefisiensi energi yang terkelola dengan efektif serta mutu yang terpercaya Optimally reducing energy intensity by 15% until 2035 and mitigating business risks related to effectively managed energy inefficiencies and reliable quality
Regional 2 Region 2	Pertamina Hulu Sanga Sanga	Melakukan konservasi energi sebesar 10% per tahun melalui program-program yang mendukung terlaksananya kegiatan efisiensi energi Implementing energy conservation of 10% per year through programs supporting energy efficiency activities
Regional 3 Region 3	PHM	Menjalankan program konservasi energi dengan target penghematan sebesar 776.946,87 GJ Running energy conservation programs with a savings target of 776.946,87 GJ
Regional 3 Region 3	PHKT	Mengurangi konsumsi energi sebesar 120.000 GJ per tahun melalui penerapan program-program efisiensi energi Reducing energy consumption by 120,000 GJ per year through the implementation of energy efficiency programs
Regional 4 Region 4	PEP Papua	Menurunkan energi 40.000 GJ dan program terintegrasi dengan kajian Life Cycle Assessment (LCA) Reducing energy by 40.000 GJ and implementing an integrated program with a Life Cycle Assessment (LCA) study
Regional 4 Region 4	PEP Donggi Matindok	Penghematan penggunaan energi dan substitusi peralatan hemat listrik dengan target akhir sampai tahun 2024 sebesar 8% Saving energy usage and substituting energy-efficient equipment with a final target of 8% by 2024
PT Badak NGL	PT Badak NGL	Penghematan energi sebanyak 10.500.000 GJ dalam kurun waktu 3 tahun (2022-2024) Saving energy by 10.500.000 GJ over a period of 3 years (2022-2024)

Emisi Gas Rumah Kaca (GRK)
Greenhouse Gas (GHG) Emission

Emisi Gas Rumah Kaca (GRK) merupakan salah satu isu global yang semakin mendapatkan perhatian serius. Berdasarkan data terkini, jumlah emisi GRK global terus meningkat, dengan total emisi yang tercatat pada tahun 2023 mencapai 53,82 miliar ton CO_2. Di antaranya, Indonesia menyumbang emisi sebesar 1,92 miliar ton CO_2, meningkat dari tahun sebelumnya yang tercatat sebesar 1,82 miliar ton CO_2. Emisi GRK mencakup berbagai jenis gas, seperti CO_2, CH_4, dan N_2O, serta emisi gas konvensional lainnya seperti SOx, NOx, partikulat udara (PM), dan sebagainya. Emisi-emisi ini memiliki dampak signifikan terhadap perubahan iklim global dan pencemaran udara lokal.

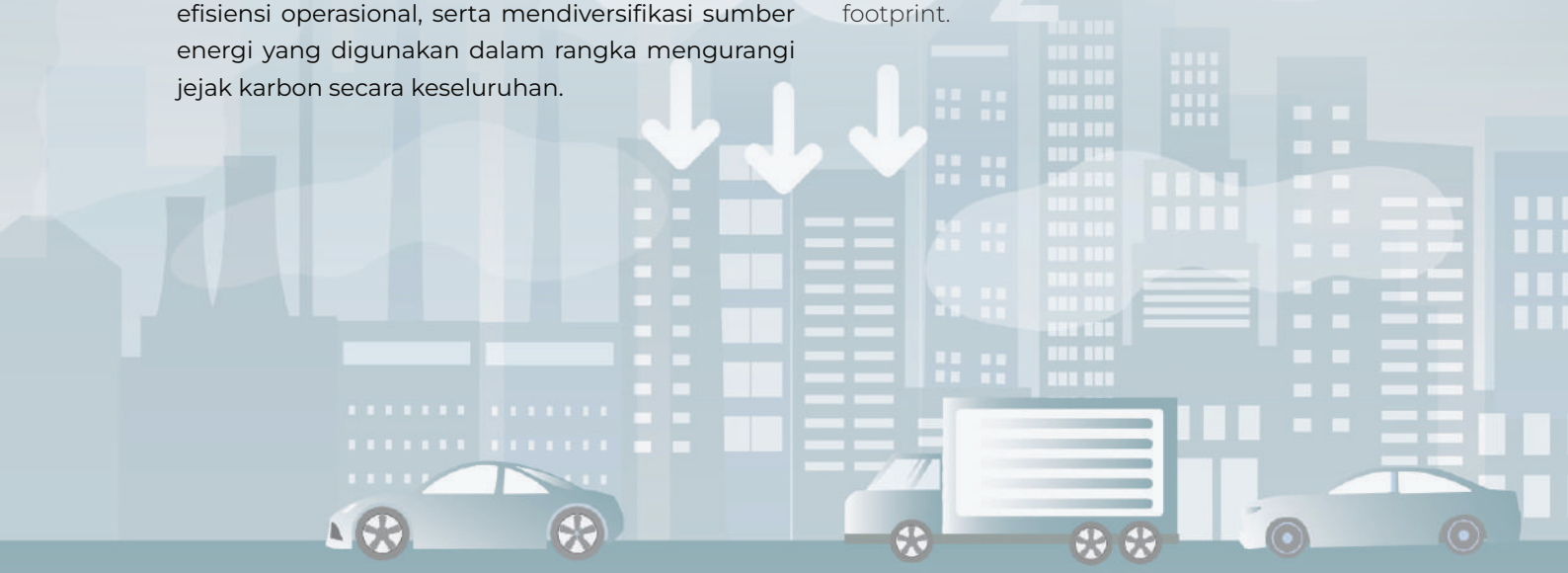
Sebagai entitas yang beroperasi di sektor hulu energi, PHE Subholding Upstream menyadari sepenuhnya kontribusinya terhadap emisi yang dihasilkan dari kegiatan operasionalnya. Perusahaan mengakui bahwa emisi ini berperan dalam memperburuk perubahan iklim dan kualitas udara. Namun, PHE Subholding Upstream berkomitmen untuk mengurangi dampak negatif tersebut dengan meminimalkan emisi yang dihasilkan dan dampaknya terhadap lingkungan sekitar.

Upaya mitigasi ini dilakukan melalui pengendalian emisi yang terintegrasi di seluruh wilayah kerja perusahaan. Langkah-langkah mitigasi yang diterapkan bertujuan untuk mendukung visi keberlanjutan perusahaan, antara lain dengan mengadopsi teknologi bersih, meningkatkan efisiensi operasional, serta mendiversifikasi sumber energi yang digunakan dalam rangka mengurangi jejak karbon secara keseluruhan.

Greenhouse Gas (GHG) emissions are one of the most pressing global issues currently being addressed. According to recent data, global GHG emissions continue to rise, with the total emissions recorded in 2023 reaching 53.82 billion tons of CO_2. Of this, Indonesia contributed 1.92 billion tons of CO_2 emissions, an increase from the previous year, which was 1.82 billion tons of CO_2. GHG emissions include various types of gases, such as CO_2, CH_4, and N_2O, as well as conventional pollutants like SOx, NOx, particulate matter (PM), and others. These emissions significantly impact climate change and air pollution.

As a company in the upstream energy sector, PHE Subholding Upstream fully acknowledges its contribution to the emissions produced by its operational activities. The company recognizes that these emissions play a role in exacerbating climate change and air quality issues. However, PHE Subholding Upstream is committed to minimizing these negative impacts on the surrounding environment.

This effort is carried out through comprehensive emission control measures across the company's operational areas. The mitigation steps implemented aim to support the company's sustainability vision, including the adoption of clean technologies, improving operational efficiency, and diversifying energy sources used to reduce the overall carbon footprint.



Emisi Gas Rumah Kaca (GRK) Cakupan 1
Greenhouse Gas (GHG) Emissions Scope 1

Regional Region	Beban Emisi Cakupan 1 Emission Load Scope 1	Beban emisi GRK Cakupan 1 Berdasarkan Aktivitas Greenhouse Gas Emission Load Scope 1 Based on Activities					
		Pembakaran Combustion	Routine Flaring	Non Routine Flaring	Safety Flaring	Venting & Process	Fugitives
	(Ton CO_2 Eq)	(Ton CO_2Eq)	(Ton CO_2Eq)	(Ton CO_2Eq)	(Ton CO_2Eq)	(Ton CO_2Eq)	(Ton CO_2Eq)
Regional 1 - Sumatera Region 1 - Sumatera	2.483.179,59	1.810.647,10	564.875,86	68.704,29	2.379,96	16.384,75	20.187,64
Regional 2 - Jawa Region 2 - Java	2.478.322,30	1.201.110,55	736.076,11	2.420,24	55.296,24	426.953,62	56.465,54
Regional 3 - Kalimantan Region 3 - Borneo	1.894.840,93	1.457.955,50	13.330,45	111.784,75	149.782,93	4.762,10	157.225,20
Regional 4 - Indonesia Timur Region 4 - Eastern Indonesia	3,048,149.20	815.753,27	371.888,20	43.805,62	89.117,01	1,688,567.25	39.017,85
Regional 5 - Internasional Region 5 - International	200.358,62	162.590,68	0	0	31.026,41	1.449,72	5.291,81
PDSI	7.279,91	7.279,91	0	0	0	0	0
Elnusa	85.386,76	85.386,76	0	0	0	0	0
PT Badak NGL	2.260.693,97	1.692.026,08	0	20.641,20	32.258,79	513.275,10	2.492,80
Jumlah Emisi Total emission	**12,458,211.29**	**7.232.749,85**	**1.686.170,62**	**247.356,10**	**359.861,34**	**2,651,392.54**	**280.680,84**

Perhitungan emisi cakupan 1 mencakup emisi yang dihasilkan dari kegiatan produksi minyak dan gas serta konsumsi bahan bakar langsung yang digunakan dalam operasional perusahaan, sementara cakupan 2 mencakup emisi yang berasal dari penggunaan listrik yang dipasok oleh pihak ketiga di seluruh anak perusahaan. Cakupan emisi Gas Rumah Kaca (GRK) yang diungkapkan mencakup seluruh unit operasional yang berada di bawah PHE Subholding Upstream, termasuk wilayah 1-5, serta entitas terkait seperti PDSI, ELNUSA, dan PT Badak NGL.

Parameter pengukuran dan perhitungan emisi didasarkan pada Pertamina Standar (PS) Perhitungan Beban Emisi tahun 2021, yang merujuk pada Peraturan Menteri Lingkungan Hidup Republik Indonesia Nomor 12 Tahun 2012 tentang Pedoman Penghitungan Beban Emisi Kegiatan Industri Minyak dan Gas Bumi, yang disajikan dalam satuan Ton CO_2eq, serta pedoman yang ditetapkan oleh International GHG Protocol Standard (IPCC).

The calculation of Scope 1 emissions includes emissions generated from oil and gas production activities as well as the direct fuel consumption used in the company's operations, while Scope 2 emissions include those derived from electricity usage supplied by third parties across all subsidiaries. The disclosed Greenhouse Gas (GHG) emissions cover all operational units under PHE Subholding Upstream, including regions 1-5, as well as associated entities such as PDSI, ELNUSA, and PT Badak NGL.

The parameters for measuring and calculating emissions are based on Pertamina Standard (PS) for Emission Load Calculation 2021, which refers to the Minister of Environment and Forestry Regulation of the Republic of Indonesia No. 12 of 2012 on the Guidelines for Emission Load Calculation of Oil and Gas Industry Activities, expressed in tons of CO2eq, as well as the guidelines set by the International GHG Protocol Standard (IPCC).

Beban Emisi Gas Rumah Kaca (GRK) Cakupan 1 Berdasarkan Parameter
Beban Emisi Gas Rumah Kaca (GRK) Cakupan 1 Berdasarkan Parameter

Regional Region	**Beban Emisi GRK Cakupan 1 Berdasarkan Parameter** Scope 1 GHG emission load based on parameters		
	CO_2 (Ton)	**CH_4 (Ton)**	**N_2O (Ton)**
Regional 1 - Sumatera Region 1 - Sumatera	2.393.702,30	42.153,18	13,81
Regional 2 - Jawa Region 2 - Java	2.296.756,26	6.553,31	14,77
Regional 3 - Kalimantan Region 3 - Borneo	1.693.469,94	7.116,60	7,95
Regional 4 - Indonesia Timur Region 4 - Eastern Indonesia	2.908.160,02	4.894,68	11,09
Regional 5 - Internasional Region 5 - International	189.775,05	370,47	0,79
PDSI	7.256,39	0,29	0,06
Elnusa	85.145,44	2,98	0,6
PT Badak NGL	2.134.824,94	4.452,85	4,49

Emisi Gas Rumah Kaca (GRK) Cakupan 2
Greenhouse Gas (GHG) Emissions Scope 2

Regional Region	**Beban Emisi Cakupan 2 (Ton CO_2Eq)** Emission Load Scope 2 (Ton CO_2 Eq)
Regional 1 - Sumatera Region 1 - Sumatera	2.139.129,12
Regional 2 - Jawa Region 2 - Java	11.443,97
Regional 3 - Kalimantan Region 3 - Borneo	105.525,46
Regional 4 - Indonesia Timur Region 4 - Eastern Indonesia	61.773,89
Regional 5 - Internasional Region 5 - International	141.609,90
PDSI	0
Elnusa	15.231,63
PT Badak NGL	9.773,02
Jumlah Emisi Total emission	**2.484.487**

Berdasarkan hasil perhitungan dan pelaporan yang telah dilakukan, PHE Subholding Upstream menghasilkan emisi pada cakupan 1 dan 2 sebesar 14.942.635,39 Ton CO_2eq.

Based on the calculations and reporting conducted, PHE Subholding Upstream generated emissions in Scope 1 and 2 amounting to 14,942,635.39 tons of CO_2eq.

PHE Subholding Upstream juga mengidentifikasi terkait dengan emisi GRK cakupan 3 yang terbagi atas beberapa kategori.

PHE Subholding Upstream also identifies Scope 3 GHG emissions, which are divided into several categories.

Emisi Gas Rumah Kaca (GRK) Cakupan 3
Greenhouse Gas (GHG) Emissions Scope 3

Kategori Category	**Emisi Karbon (Ton CO_2eq)** Carbon Category Emissions (Ton CO_2eq)	
	2023*	**2024**
Kategori 3 Category 3 Fuel and Energy-related Activities (not included in Scope 1 & 2)	578,177.15	199.341,97
Kategori 5 Category 5 Waste Generated in Operations	38,498.45	28.306,45
Kategori 10 Category 10 Processing of Sold Products	2,498,078.21	2.129.036
Kategori 11 Category 11 Use of Sold Products	637,801.91	924.229,79

*Restatement

Restatement dilakukan sebagai hasil dari perbaikan metodologi yang diterapkan dalam perhitungan, di mana kini angka kerugian transmisi dan distribusi (T&D losses) telah dimasukkan dalam perhitungan tersebut. Penyesuaian metodologi ini bertujuan untuk meningkatkan akurasi dan konsistensi data, serta mencerminkan faktor-faktor tambahan yang memengaruhi efisiensi dan distribusi energi dalam proses operasional.

The restatement was made as a result of improvements in the methodology used in the calculation, where the Transmission and Distribution (T&D) losses have now been incorporated into the calculation. This methodological adjustment aims to enhance the accuracy and consistency of the data, as well as to reflect additional factors affecting energy efficiency and distribution in operational processes.

Emisi Gas Rumah Kaca (GRK) Cakupan 3 Kategori 3
Greenhouse Gas (GHG) Emissions Scope 3 Category 3

Regional Region	**Beban Emisi Gas Rumah Kaca Cakupan 3 Kategori 3** Greenhouse Gas Emission Load Scope 3 Category 3	
	Konsumsi Listrik (MWh) Electricity Consumption (Mwh)	**Emisi Karbon (Ton CO_2eq)** Carbon Emissions (Ton CO_2eq)
Regional 1 - Sumatera Region 1 - Sumatera	2.454.474,81	170.831,60
Regional 2 - Jawa Region 2 - Java	11.992,63	827,38
Regional 3 - Kalimantan Region 3 - Borneo	85.960,64	11.161,87
Regional 4 - Indonesia Timur Region 4 - Eastern Indonesia	72.558,81	4.897,89
Regional 5 - Internasional Region 5 - International	162.769,99	9.797,45
PDSI	384,20	26,51
Elnusa	16.942,11	1.304,42
PT Badak NGL	4.126,18	494,84
Jumlah Total	**2.809.209,38**	**199.341,97**

Emisi Gas Rumah Kaca (GRK) Cakupan 3 Kategori 5
Greenhouse Gas (GHG) Emissions Scope 3 Category 5

Volume Limbah Non B3 (Ton) Volume of Non-Hazardous Waste (Ton)	**Volume Limbah B3 (Ton)** Volume of Hazardous Waste (Ton)	**Emisi Karbon (Ton CO_2eq)** Carbon emissions (Ton CO_2eq)
A. Landfill		
6.288,67	15.500,28	12.284,83
B. Insinerasi		
320,74	6.007	16.021,63
Jumlah Total		**28.306,45**

Emisi Gas Rumah Kaca (GRK) Cakupan 3 Kategori 10
Greenhouse Gas (GHG) Emissions Scope 3 Category 10

Produk & Processing Products & Processing	**Volume Produk Terjual (bbl)** Volume of sold products (bbl)	**Emisi Karbon (Ton CO_2eq)** Carbon emissions (Ton CO_2eq)
A. Crude Oil		
Refining & Petrochemical	15.349.750,88	437.314,40
Produk & Processing Products & Processing	**Volume Produk Terjual (MMBTU)** Volume of sold products (MMBTU)	**Emisi Karbon (Ton CO_2eq)** Carbon emissions (Ton CO_2eq)
B. Natural Gas		
Fertilizer Feedstock	28.551.641,32	1.690.257,17
Liquefaction	155.665.888,47	1.464.43
Jumlah Total		**2.129.036**

Emisi Gas Rumah Kaca (GRK) Cakupan 3 Kategori 11
Greenhouse Gas (GHG) Emissions Scope 3 Category 11

Wilayah Kerja Work Area	**Total Gas Terjual (MMBTU)** Total Gas Sold (MMBTU)	**Emisi Karbon (Ton CO_2eq)** Carbon emissions (Ton CO_2eq)
PHE East Sepinggan	5.596.117,67	340.301,03
PHE Corridor	1,432,487.55	87,109.85
PHE Jabung	1.015.055,85	61.725,75
PHE ONWJ	3,173,295.88	192,968.76
PHE WMO	1,520,080.13	92,436.38
PHE Jambi Merang	1.184.412,17	72.024,34
PHE OSES	408,171.56	24,820.99
PHE Salawati Basin	868.977,37	52.842,69
Jumlah Total		**924.229,79**

Emisi Gas Rumah Kaca (Ton CO_2eq)
Greenhouse Gas Emissions (Ton CO_2eq)

	2023	2024
Emisi Cakupan 1 Scope 1 Emissions	11.994.210	12,458,211.29
Emisi Cakupan 2 Scope 2 Emissions	1.971.920	2.484.487
Emisi Cakupan 3 Scope 3 Emissions	3,752,555.71	3,280,914.22

Intensitas Emisi (Ton CO_2eq/BOE)
Emission Intensity (Ton CO_2eq/BOE)

2022	2023	2024
0,039	0,038	0,047

Perhitungan intensitas emisi dalam unit Ton/BOE khusus melingkupi seluruh entitas di bawah PHE yang bergerak di sektor Oil & Gas Exploration & Production. Perusahaan di sektor pendukung (selain E&P), antara lain PDSI, Badak LNG, dan Elnusa dikecualikan dari perhitungan intensitas emisi.

The calculation of emission intensity in units of Ton/BOE specifically includes all entities under PHE operating in the Oil & Gas Exploration & Production sector. Companies in supporting sectors (other than E&P), such as PDSI, Badak LNG, and Elnusa, are excluded from the emission intensity calculation.

Pemantauan terhadap emisi Gas Rumah Kaca (GRK) di setiap wilayah kerja dilakukan secara berkala oleh PHE Subholding Upstream, dan hasilnya dituangkan dalam Dokumen Ringkasan Kinerja Pengelolaan Lingkungan (DRKPL). Selain itu, wilayah kerja PHE Subholding Upstream secara konsisten melakukan pelaporan terkait pelaksanaan Gas Flaring, sesuai dengan Peraturan Menteri Energi dan Sumber Daya Mineral Republik Indonesia No. 31 Tahun 2012 tentang Gas Flaring pada Kegiatan Usaha Minyak dan Gas Bumi. Untuk memfasilitasi pemantauan yang lebih efektif terhadap emisi yang dihasilkan dan yang berhasil direduksi, PHE Subholding Upstream mengintegrasikan penggunaan dashboard dekarbonisasi, yang datanya berasal dari masing-masing unit operasional, guna menyediakan informasi yang real-time dan akurat untuk mendukung pengelolaan emisi secara optimal.

Monitoring of Greenhouse Gas (GHG) emissions in each operational area is conducted periodically by PHE Subholding Upstream, with the results documented in the Environmental Management Performance Summary Document (DRKPL). Additionally, PHE Subholding Upstream consistently reports on the implementation of Gas Flaring in accordance with the Indonesian Ministry of Energy and Mineral Resources Regulation No. 31 of 2012 on Gas Flaring in Oil and Gas Business Activities. To facilitate more effective monitoring of emissions generated and reduced, PHE Subholding Upstream utilizes a decarbonization dashboard, with data sourced from each operational unit, providing real-time and accurate information to support optimal emissions management.

PHE menetapkan tahun 2021 sebagai tahun baseline ketika perusahaan pertama kali melakukan perhitungan emisi Scope 1 dan 2. Kemudian, PHE mengembangkan proyeksi emisi Business-as-Usual (BaU) dan mengadopsinya sebagai acuan untuk target penurunan absolut. Nilai emisi BaU tahun 2030 sebesar 20.493.169,95 ton CO_2e ditetapkan sebagai baseline untuk target interim, dengan rencana penurunan sebesar 32%, sehingga menghasilkan target emisi tahun 2030 sebesar 13.935.355,56 ton CO_2e setelah implementasi langkah-langkah dekarbonisasi. Target penurunan 32% ini selaras dengan agenda nasional, mendukung Enhanced Nationally Determined Contribution (ENDC) Indonesia serta target penurunan emisi sektor energi sebesar 12,5% pada tahun 2030.

PHE established 2021 as the baseline year when the company first conducted its Scope 1 and 2 emission calculations. From this point, PHE developed a Business-as-Usual (BaU) emission projection and adopted it as the reference for its absolute reduction target. The 2030 BaU emission value of 20,493,169.96 tons CO_2e serves as the baseline for the interim target, with a planned 32% reduction, resulting in a target emission level of 13,935,355.56 tons CO_2e after the implementation of decarbonization measures. This 32% target is aligned with the national agenda, supporting Indonesia's Enhanced Nationally Determined Contribution (ENDC) emission reduction target and the interim energy sector reduction target of 12.5% by 2030.

Dalam hal target reduksi emisi jangka panjang, PHE akan menggunakan nilai emisi BaU tahun 2060 sebagai baseline, dengan penurunan ditetapkan berdasarkan selisih antara emisi BaU dan tingkat emisi setelah dekarbonisasi. Meskipun proyeksi BaU tahun 2060 belum diselesaikan, PHE telah berkomitmen untuk mencapai net zero emisi GRK untuk Scope 1 dan 2 pada tahun 2060. Komitmen ini selaras dengan target berjenjang yang ditetapkan oleh perusahaan induk, PT Pertamina (Persero), dan akan diimplementasikan secara konsisten di seluruh anak perusahaan.

For the long-term emission reduction target, PHE will apply the 2060 BaU emission value as the baseline, with the reduction defined as the difference between BaU emissions and post-decarbonization emission levels. While the 2060 BaU projection has not yet been completed, PHE has committed to achieving net zero GHG emissions for Scope 1 and 2 by 2060. This commitment is aligned with the cascading target set by our holding company, PT Pertamina (Persero), and will be realized consistently across all subsidiaries.

Sepanjang tahun 2024, PHE Subholding Upstream melalui masing-masing Wilayah Kerja telah melakukan beberapa inovasi dan inisiatif pengurangan emisi, diantaranya sebagai berikut:

Throughout 2024, PHE Subholding Upstream, through its respective Working Areas, has implemented several innovations and emission reduction initiatives, including the following:

Top 10 Inisiatif Reduksi Emisi
Top 10 Emission Reduction Initiatives

Regional Region	**Inisiatif** Initiatives	**Cakupan penurunan emisi GRK** Scope of Greenhouse Gas Emission Reduction	**Target Pengurangan (Ton CO_2eq/ tahun)** Reduction Target (Ton CO_2eq/year)	**Realisasi Pengurangan (Ton CO_2eq/ tahun)** Actual Reduction (Ton CO_2eq/ year)
Regional 1 Region 1	Optimalisasi pemanfaatan Gas Suar untuk Bahan Bakar Turbin pada 2 Fasilitas dan Recovery Condensate (Petani GP/GS dan Pematang GS) Optimization of Flare Gas Utilization as Turbine Fuel at 2 Facilities and Condensate Recovery (Petani GP/GS and Pematang GS)	1	50.000	100.224,58

Regional Region	**Inisiatif** Initiatives	**Cakupan penurunan emisi GRK** Scope of Greenhouse Gas Emission Reduction	**Target Pengurangan (Ton CO_2eq/ tahun)** Reduction Target (Ton CO_2eq/ year)	**Realisasi Pengurangan (Ton CO_2eq/ tahun)** Actual Reduction (Ton CO_2eq/ year)
Regional 1 Region 1	Penghematan Konsumsi Bahan Bakar Gas dari 1 Unit Pembangkit Listrik PHR WK ROKAN dengan Mengoptimalkan Pembangkitan Daya Reaktif (MVAR) – New Program 2024 Fuel Gas Consumption Savings from 1 Unit of Power Generation at PHR WK ROKAN by Optimizing Reactive Power Generation (MVAR) – New Program 2024	1	65.146	81.022,80
Regional 2 Region 2	Pengurangan Gas Flare dengan Penggunaan Own Gas Compressor menggantikan menggantikan Mini Gas Compresor- SP BBS Reduction of Gas Flaring through the Use of Own Gas Compressors, Replacing the Mini Gas Compressor – SP BBS	1	64.213,20	85.887,90
Regional 2 Region 2	Efisiensi penggunaan Fuel Gas dengan Optimasi Pengoperasian Gas Turbin (Pengurangan penggunaan gas fuel sebesar 4 MMSCFD dari sebelumnya 34 MMSCFD menjadi 30 MMSCFD) Fuel Gas Efficiency through Gas Turbine Operation Optimization (Reduction of fuel gas usage by 4 MMSCFD, from 34 MMSCFD to 30 MMSCFD)	1	68.083,2	68.083,2
Regional 2 Region 2	Efisiensi penggunaan Fuel Gas dengan Optimasi Pengoperasian Gas Turbin (Pengurangan penggunaan gas fuel sebesar 6 MMSCFD dari sebelumnya 40 MMSCFD menjadi 34 MMSCFD) Fuel Gas Efficiency through Gas Turbine Operation Optimization (Reduction of fuel gas usage by 6 MMSCFD, from 40 MMSCFD to 34 MMSCFD)	1	76.788	76.788
Regional 2 Region 2	Naturalisasi Bahan Bakar Kapal menjadi Diesel B35 Naturalization of Ship Fuel to Diesel B35	1	3.385,2	38.696,12
Regional 2 Region 2	Efisiensi penggunaan Fuel Gas dengan Optimasi Pengoperasian Gas Turbin (Pengurangan penggunaan gas fuel sebesar 2 MMSCFD dari sebelumnya 30 MMSCFD menjadi 28 MMSCFD) Fuel Gas Efficiency through Gas Turbine Operation Optimization (Reduction of fuel gas usage by 2 MMSCFD, from 30 MMSCFD to 28 MMSCFD)	1	22.694,4	34.514,4
Regional 3 Region 3	Penggunaan Biosolar Sebagai Bahan Bakar untuk Marine Fleet Use of Biofuel as Fuel for Marine Fleet	1	45.661,9	64.543,99
PT Badak NGL	Otomatisasi Sistem Pengendalian Antisurge Kompresor Refrijeran Untuk Mengurangi Konsumsi Steam Pada Produksi LNG Yang Rendah Automation of the Refrigerant Compressor Antisurge Control System to Reduce Steam Consumption During Low LNG Production	1	20.196	39.593

1.186.870 Ton CO_2eq /tahun / year

Total pengurangan emisi yang dihasilkan dari semua inisiatif reduksi emisi tahun 2024

Total Emission Reduction Achieved from All Emission Reduction Initiatives in 2024

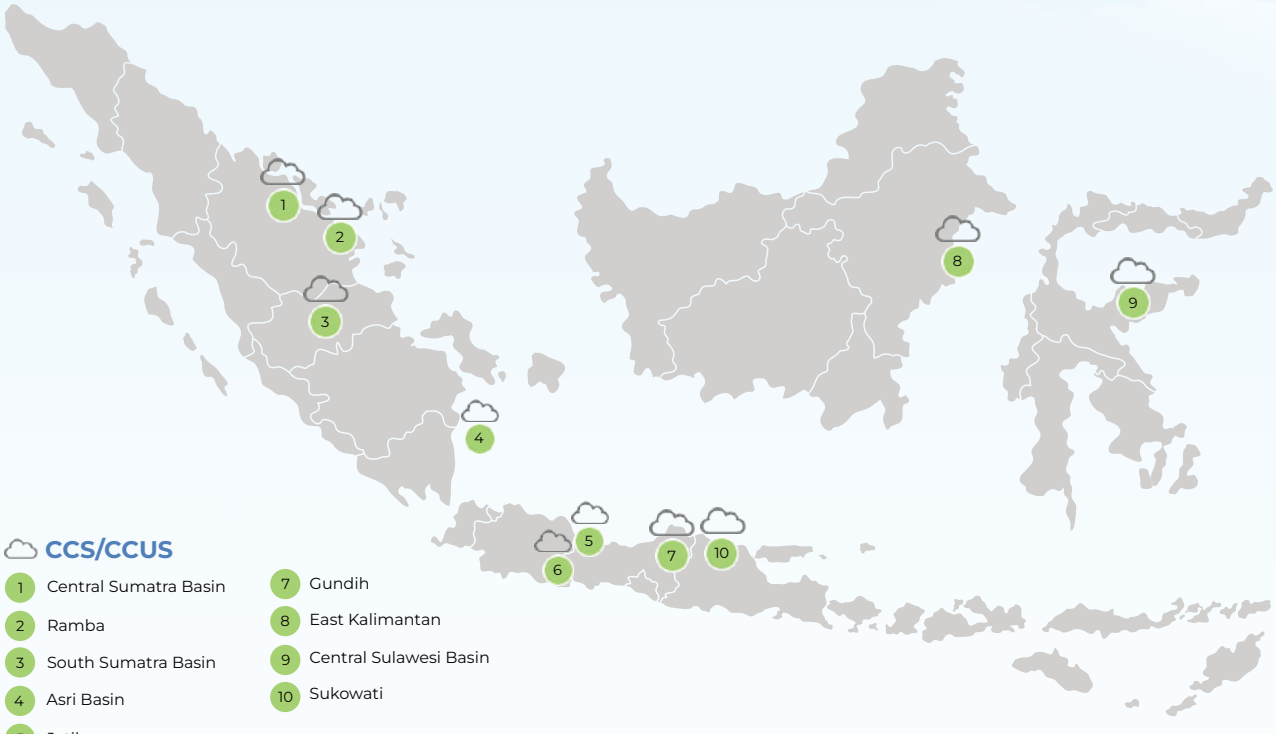
150,39%

Realisasi dari target yang ditetapkan sebesar 789.181 Ton CO_2eq

The realization of the target set at 789,181 Ton CO_2eq

Sebagai langkah untuk mempercepat implementasi program dekarbonisasi, PHE Subholding Upstream menginisiasi pengembangan teknologi Carbon Capture and Storage/Carbon Capture, Utilization, and Storage (CCS/CCUS) melalui pelaksanaan studi kelayakan dan proyek percontohan yang diterapkan di wilayah operasionalnya. Dalam pelaksanaan proyek tersebut, CO_2 injeksi yang dihasilkan oleh program CCS/CCUS tercatat mencapai 5.761 ton CO_2eq, dengan proyeksi peningkatan yang signifikan di masa mendatang. PHE Subholding Upstream menjalin kemitraan strategis dengan pihak internasional sebagai bagian dari komitmen untuk mempercepat transisi dekarbonisasi, serta membuka peluang untuk pertukaran pengetahuan, transfer teknologi, dan peningkatan kapabilitas dalam pengelolaan emisi gas rumah kaca. Berikut ini adalah sebaran dari 10 program CCS/CCUS yang sedang dikembangkan oleh PHE Subholding Upstream dalam rangka mencapai target pengurangan emisi yang lebih ambisius.

As a step to accelerate the implementation of the decarbonization program, PHE Subholding Upstream has initiated the development of Carbon Capture and Storage/Carbon Capture, Utilization, and Storage (CCS/CCUS) technology through the implementation of feasibility studies and pilot projects in its operational areas. In the implementation of these projects, the CO_2 injection achieved by the CCS/CCUS program has reached 5,761 tons of carbon equivalent (CO2eq), with significant projections for future growth. PHE Subholding Upstream has formed strategic partnerships with international parties as part of its commitment to accelerating the decarbonization transition, as well as opening opportunities for knowledge exchange, technology transfer, and capacity building in greenhouse gas emission management. Below is the distribution of 10 CCS/CCUS programs currently being developed by PHE Subholding Upstream to achieve more ambitious emission reduction targets.



Sumber Gambar:
Internal PHE Subholding Upstream
Image Source:
Internal PHE Subholding Upstream

Inovasi lainnya yang diterapkan oleh PHE Subholding Upstream dalam rangka mengurangi emisi Gas Rumah Kaca (GRK) adalah dengan mengimplementasikan inovasi dalam pengelolaan pembakaran gas suar. Inisiatif ini selaras dengan ketentuan yang diatur dalam Peraturan Menteri ESDM Nomor 17 Tahun 2021 mengenai pengelolaan gas suar dalam kegiatan usaha minyak dan gas bumi. Selain itu, perusahaan juga berkomitmen untuk mematuhi kebijakan Zero Routine Flaring 2030, yang merupakan upaya strategis untuk mengurangi pembakaran gas suar yang berkontribusi pada emisi GRK, serta meminimalkan dampak negatif terhadap lingkungan secara keseluruhan.

Another innovation implemented by PHE Subholding Upstream to reduce Greenhouse Gas (GHG) emissions is through the innovation in flare gas management. This initiative is in line with the provisions outlined in the Ministry of Energy and Mineral Resources Regulation No. 17 of 2021 regarding the management of flare gas in oil and gas business activities. Additionally, the company is committed to adhering to the Zero Routine Flaring 2030 policy, which is a strategic effort to reduce flare gas combustion that contributes to GHG emissions and minimizes its negative impact on the environment.

Inisiatif untuk mengoptimalkan efisiensi energi dan mengurangi beban emisi secara berkelanjutan terus dilaksanakan hingga tercapainya target perusahaan dalam mendukung Nationally Determined Contribution (NDC) melalui berbagai wilayah operasional PHE Subholding Upstream. Salah satu rencana kerja dan strategi jangka panjang terkait efisiensi energi serta pengurangan beban emisi yang diterapkan di wilayah kerja ONWJ PHE Subholding Upstream dapat ditemukan pada Lampiran.

Initiatives to optimize energy efficiency and sustainably reduce emissions are continuously implemented until the company achieves its targets in supporting the Nationally Determined Contribution (NDC) through various operational areas of PHE Subholding Upstream. One of the work plans and long-term strategies related to energy efficiency and emission reduction applied in the ONWJ operational area of PHE Subholding Upstream can be found in the Appendix.

Pertamina (Persero) secara proaktif melaksanakan pelaporan melalui Carbon Disclosure Project (CDP), sebuah inisiatif global yang bertujuan untuk mendorong perusahaan dan pemerintah mengungkapkan data terkait dampak lingkungan yang dihasilkan oleh aktivitas mereka. Dalam konteks pelaporan ini, data emisi yang dihasilkan oleh PHE Subholding Upstream berperan sebagai kontribusi signifikan terhadap transparansi lingkungan perusahaan.

Pertamina Holding actively reports through the Carbon Disclosure Project (CDP), a global initiative designed to encourage companies and governments to disclose data related to their environmental impact. In this reporting, the emission data generated by PHE Subholding Upstream plays a significant role as a key contribution.

Selain itu, PHE Subholding Upstream juga secara terpisah melaporkan program dekarbonisasi, tata kelola perubahan iklim, serta identifikasi risiko terkait perubahan iklim beserta metrik dan target yang relevan dalam laporan terpisah, yaitu Laporan TCFD. Penyusunan laporan ini mengacu pada pedoman yang ditetapkan oleh Task Force on Climate-related Financial Disclosures (TCFD), yang memastikan bahwa pelaporan terkait perubahan iklim dilakukan dengan transparansi tinggi dan mematuhi standar internasional yang berlaku.

Additionally, PHE Subholding Upstream separately reports its decarbonization programs, climate change governance, and identification of climate-related risks, along with relevant metrics and targets in a separate report, the TCFD Report. The preparation of this report follows the guidelines set by the Task Force on Climate-related Financial Disclosures (TCFD), ensuring that climate-related disclosures are made transparently and in compliance with applicable international standards.

Toxic Emission (Non-GRK)

Toxic Emission (Non-GHG)

Indonesia memiliki potensi besar dalam sektor energi minyak dan gas bumi, namun aktivitas industri ini juga berkontribusi terhadap peningkatan polusi udara melalui emisi non-GRK. Emisi non-GRK mencakup polutan seperti SOx, NOx, dan gas nmVOC (Non Methane Volatile Organic Compounds). PHE Subholding Upstream merupakan salah satu perusahaan yang turut menghasilkan emisi non-GRK ini, yang mendorong perusahaan untuk berkomitmen dalam pengelolaan emisi non-GRK dengan tujuan meminimalkan dampak negatif terhadap lingkungan dan mengembangkan praktik bisnis yang berfokus pada keberlanjutan serta ramah lingkungan.

PHE Subholding Upstream telah menetapkan target kualitatif yang ambisius dalam upaya pengurangan emisi beracun (toxic emissions). Target kualitatif yang dimaksud meliputi:

- Mengukur dan melaporkan toxic emission pada tingkat aset dan peralatan;
- Menentukan peralatan yang memiliki emisi tinggi untuk dilakukan peremajaan dan decomissioning;
- Meningkatkan efisiensi dan konservasi energi.

Target pengurangan emisi non-GRK di PHE Subholding Upstream ditetapkan dengan periode acuan dari tahun dasar 2024 hingga 2030. Parameter yang digunakan untuk penetapan target tersebut adalah total emisi SO_2 yang dihasilkan dari aktivitas pembakaran internal, yang diukur dalam satuan mg/Nm³. PHE Subholding Upstream berkomitmen untuk memastikan bahwa emisi SO_2 tidak melebihi ambang batas 155 mg/Nm³ pada tahun 2030. Langkah strategis ini diharapkan dapat memberikan dampak positif terhadap kualitas udara di sekitar wilayah operasional serta mendukung pencapaian Tujuan Pembangunan Berkelanjutan (TPB), khususnya dalam hal keberlanjutan lingkungan dan kesehatan masyarakat.

Indonesia has significant potential in the oil and gas energy sector, but the industrial activities also contribute to increased air pollution through non-GHG emissions. Non-GHG emissions include pollutants such as SOx, NOx, and nmVOC (Non Methane Volatile Organic Compounds) gases. PHE Subholding Upstream is one of the companies that generates these non-GHG emissions, which drives the company to commit to managing non-GHG emissions with the goal of minimizing negative environmental impacts and developing business practices that focus on sustainability and environmental friendliness.

PHE Subholding Upstream has set ambitious qualitative targets in efforts to reduce toxic emissions. These qualitative targets include:

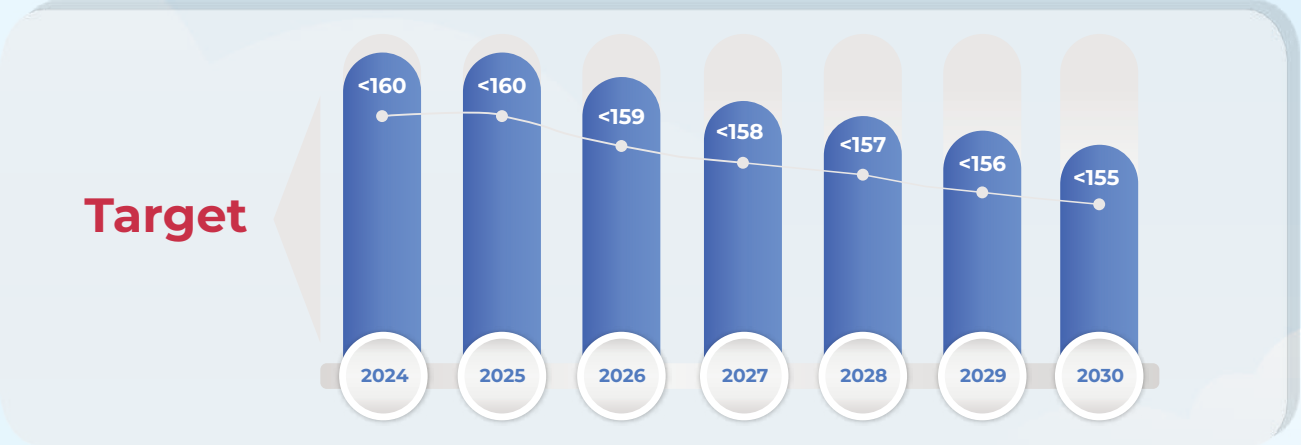
- Measuring and reporting toxic emissions at the asset and equipment levels;
- Identifying equipment with high emissions for modernization and decommissioning;
- Enhancing energy efficiency and conservation.

The target for reducing non-GHG emissions at PHE Subholding Upstream is set with a reference period from the base year of 2024 to 2030. The parameter used for setting this target is the total SO_2 emissions generated from internal combustion activities, measured in mg/Nm³. PHE Subholding Upstream is committed to ensuring that SO_2 emissions do not exceed the threshold of 155 mg/Nm³ by 2030. This strategic initiative is expected to have a positive impact on air quality in the surrounding operational areas and contribute to the achievement of the Sustainable Development Goals (SDGs), particularly in terms of environmental sustainability and public health.

Target emisi non-GRK terperinci untuk mesin pembakaran internal tercantum di bawah ini:

Detail non-GHG emission target for internal combustion engines stated below:

Target Emisi Non-GRK PHE Subholding Upstream (mg/Nm³)
PHE Upstream Subholding Emission Non-GHG Target (mg/Nm³)



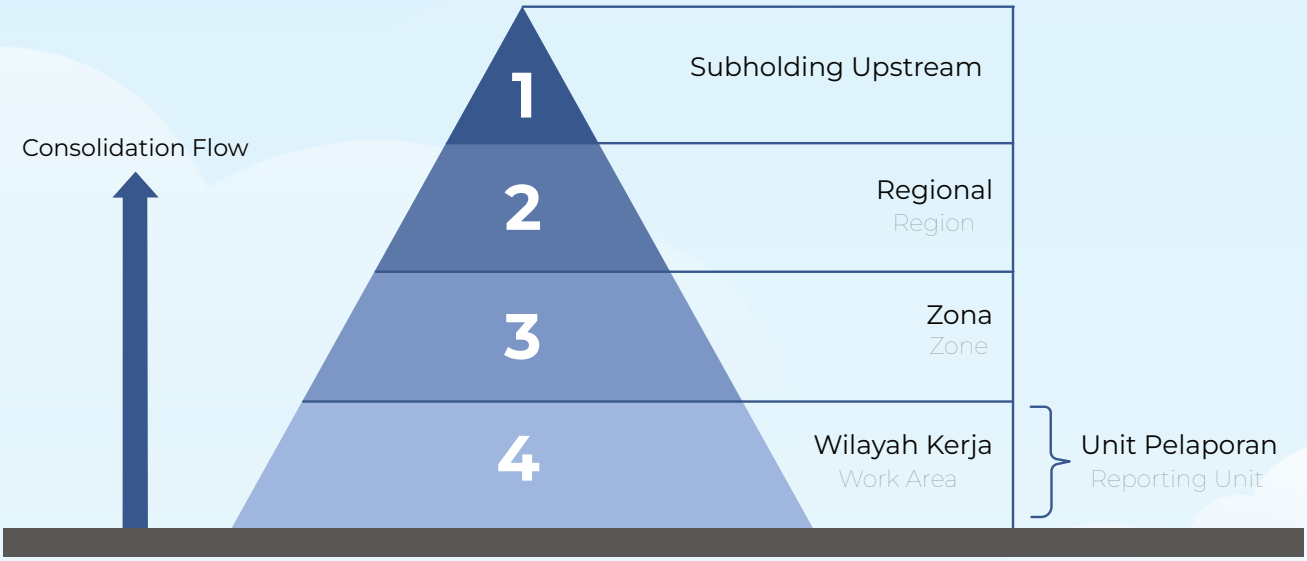
PHE Subholding Upstream mengintegrasikan manajemen kinerja lingkungan dan pemantauan secara sistematis ke dalam Indikator Kinerja Utama (KPI) yang menjadi tanggung jawab seluruh pemangku kepentingan dalam struktur organisasi HSSE. Dalam kerangka kerja HSSE, terdapat KPI Keunggulan Lingkungan yang dievaluasi berdasarkan hasil audit PROPER dan PERCA untuk seluruh entitas PHE Subholding Upstream. PROPER dan PERCA berfungsi sebagai instrumen audit eksternal dan internal untuk menilai tingkat kepatuhan dan kinerja lingkungan PHE Subholding Upstream, dengan pengendalian polusi udara sebagai salah satu dimensi yang dievaluasi. KPI yang ditetapkan dalam organisasi HSSE mensyaratkan pelaksanaan audit PROPER dan PERCA di seluruh area kerja entitas PHE Subholding Upstream secara menyeluruh (100%), dengan target minimum pencapaian kategori biru (sesuai dengan peraturan yang berlaku).

KPI ini menjadi kewajiban yang harus dipenuhi oleh VP HSSE PHE Subholding Upstream dan Pimpinan Operasi Subholding (termasuk Direktur Operasi, VP Operasi, serta General Manager/Pimpinan Tertinggi UO/AP). Tingkat pencapaian KPI ini akan menjadi salah satu faktor kunci yang dipertimbangkan dalam evaluasi kompensasi atau tunjangan yang diterima oleh para pemimpin operasional terkait.

PHE Subholding Upstream systematically integrates environmental performance management and monitoring into Key Performance Indicators (KPIs) that are the responsibility of all stakeholders within the HSSE organizational structure. Within the HSSE framework, there are Environmental Excellence KPIs that are evaluated based on the results of the PROPER and PERCA audits for all entities of PHE Subholding Upstream. PROPER and PERCA serve as external and internal audit instruments to assess the compliance and environmental performance of PHE Subholding Upstream, with air pollution control being one of the evaluated dimensions. The KPIs set within the HSSE organization require the implementation of PROPER and PERCA audits across all operational areas of PHE Subholding Upstream comprehensively (100%), with a minimum target of achieving a blue category (in accordance with applicable regulations).

These KPIs are mandatory for the VP of HSSE at PHE Subholding Upstream and the Subholding Operations Leadership (including the Operations Director, VP of Operations, and General Manager/ Highest Executive of UO/AP). The level of achievement of these KPIs will be one of the key factors considered in the evaluation of compensation or benefits received by the relevant operational leaders.

Consolidation Flow of PROPER & PERCA as tools of Toxic Emission Audit



Audit terhadap emisi non-GRK dilaksanakan oleh PHE Subholding Upstream sebagai bagian dari upaya terintegrasi dalam pengelolaan emisi non-GRK, yang juga melibatkan pemangku kepentingan eksternal yang kegiatannya terkait langsung dengan entitas PHE Subholding Upstream, termasuk vendor, kontraktor, dan pemasok. Setiap pekerjaan yang diberikan kepada pihak ketiga diawali dengan evaluasi menyeluruh melalui proses penilaian risiko (risk assessment). Tabel penilaian risiko dapat ditemukan pada Lampiran.

The audit of non-GHG emissions is carried out by PHE Subholding Upstream as part of an integrated effort in non-GHG emission management, which also involves external stakeholders whose activities are directly related to the PHE Subholding Upstream entities, including vendors, contractors, and suppliers. Each task assigned to a third party is preceded by a comprehensive evaluation through a risk assessment process. The risk assessment table can be found in the Appendix.

Sesuai dengan Pedoman Pengadaan Barang dan Jasa PHE No. A7-001/PHE5200/2021-S9, PHE Subholding Upstream menetapkan kriteria yang mengacu pada praktik pengelolaan emisi non-GRK dalam proses seleksi pihak ketiga untuk pengadaan. PHE Subholding Upstream secara berkala melakukan pemantauan dan evaluasi terhadap pengelolaan emisi non-GRK oleh pihak ketiga, termasuk menilai tingkat kepatuhan dan kinerja lingkungan mereka melalui audit rutin yang dilaksanakan dalam sistem Contractor Safety Management System (CSMS). Temuan dari audit CSMS, yang mencakup evaluasi terhadap kinerja pengelolaan lingkungan, akan segera ditindaklanjuti dan dianalisis untuk perbaikan sebelum memasuki tahapan berikutnya dalam siklus kerja. Dengan pendekatan ini, perusahaan memastikan bahwa mitra dan kontraktor yang terlibat dalam kegiatan operasional senantiasa mematuhi standar lingkungan yang telah ditetapkan.

In accordance with PHE's Goods and Services Procurement Guidelines No. A7-001/PHE5200/2021-S9, PHE Subholding Upstream establishes criteria based on non-GHG emission management practices in the third-party selection process for procurement. PHE Subholding Upstream periodically monitors and evaluates the management of non-GHG emissions by third parties, including assessing their compliance and environmental performance through routine audits conducted within the Contractor Safety Management System (CSMS). Findings from the CSMS audit, which include evaluations of environmental management performance, will be promptly followed up and analyzed for improvement before moving to the next stage in the work cycle. With this approach, the company ensures that partners and contractors involved in operational activities consistently adhere to the established environmental standards.

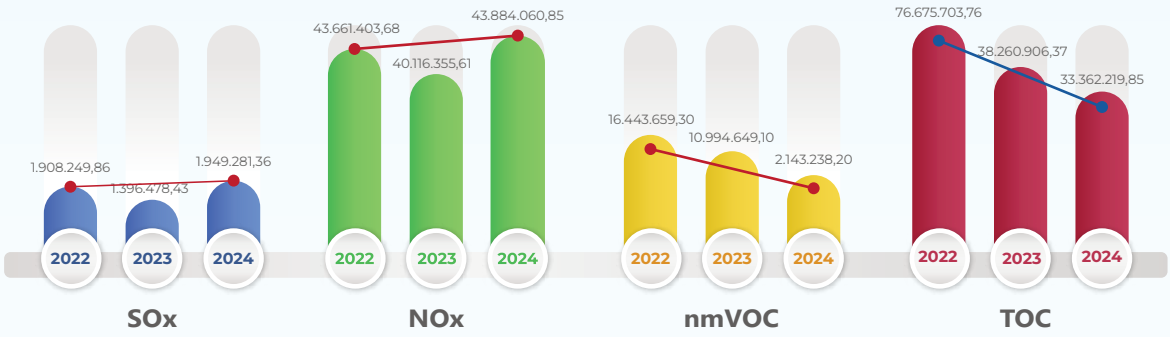
Emisi Non-GRK
Non-GHG Emission

Unit Wilayah Kerja Unit Area of Operations	Beban Emisi Non-GRK Non-GHG Emission Load				
	SO_x (Ton)	NO_x (Ton)	nmVOC (Ton)	PM (Ton)	TOC (Ton)
Regional 1 - Sumatera Region 1 - Sumatera	557,48	16.577,00	2.618,94	487,74	3.464,17
Regional 2 - Jawa Region 2 - Java	779,16	11.858,46	1.072,76	547,13	3.169,41
Regional 3 - Kalimantan Region 3 - Borneo	621,21	18.453,76	2.052,59	765,36	7.729,74
Regional 4 - Indonesia Timur Region 4 - Eastern Indonesia	3.355,91	3.421,17	826,21	111,2	2.285,76
Regional 5 - Internasional Region 5 - International	6,4	641,92	361,49	13,35	602,26
PDSI	20,56	312,62	0	21,98	0
Elnusa	218,05	3.315,80	8,6	233,08	8,6
PT Badak NGL	13,21	4.175,44	528,34	116,22	616,4
Jumlah Total	**5.571,98**	**58.756,16**	**7.468,92**	**2.296,06**	**17.876,34**

Total Emisi Non-GRK
Non-GHG Emission Total

	2022 (m^3)	2023 (m^3)	2024 (m^3)
SOx	1.908.249,86	1.396.478,43	1.949.281,36
NOx	43.661.403,68	40.116.355,61	43.884.060,85
nmVOC	16.443.659,30	10.994.649,10	2.143.238,20
TOC	76.675.703,76	38.260.906,37	33.362.219,85

Tren Emisi Non-GRK (m^3)
Trend on Non-GHG Emission (m^3)



PHE Subholding Upstream berkomitmen untuk secara konsisten mengurangi emisi non-GRK setiap tahunnya.

PHE Subholding Upstream is committed to consistently reducing non-GHG emissions every year.

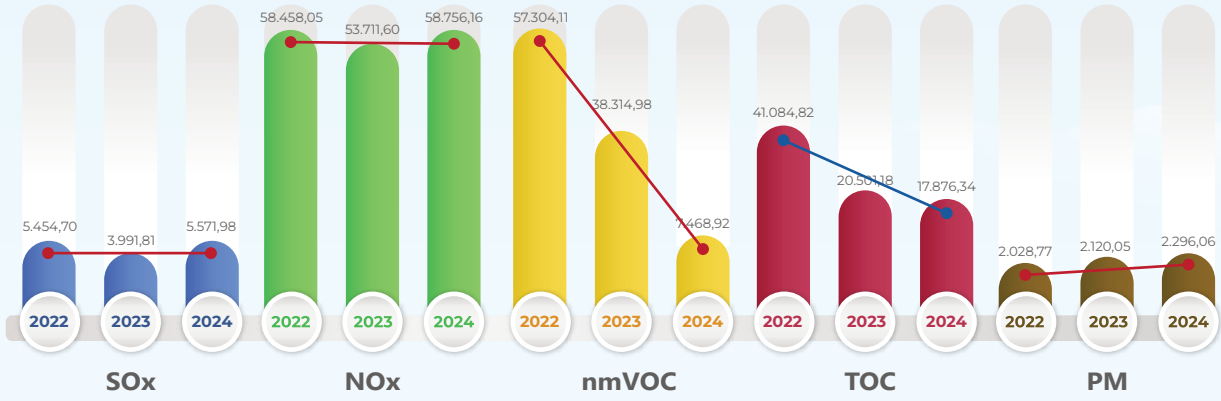
Total Emisi Non-GRK
Non-GHG Emission Total

	2022 (Ton)	2023 (Ton)	2024 (Ton)
SOx	5.454,70	3.991,81	5.571,98
NOx	58.458,05	53.711,60	58.756,16
nmVOC	57.304,11	38.314,98	7.468,92
TOC	41.084,82	20.501,18	17.876,34
PM	2.028,77	2.120,05	2.296,06

Tren emisi non-GRK selama periode 2022-2024 menunjukkan penurunan emisi nmVOC dan TOC SHU yang drastis. Tetapi di sisi lain, terdapat kenaikan emisi SOx, NOx, dan PM dari Tahun 2023 ke Tahun 2024. Hal ini dikarenakan terdapat field PEPC JTB (Jambaran Tiung Biru) yang baru beroperasi penuh di Tahun 2024.

The trend of non-GHG emissions during the 2022–2024 period shows a significant decrease in nmVOC and TOC SHU emissions. However, on the other hand, there was an increase in SOx, NOx, and PM emissions from 2023 to 2024. This is due to the PEPC JTB (Jambaran Tiung Biru) field, which began full operations in 2024.

Tren Emisi Non-GRK (Ton)
Trend on Non-GHG Emission (Ton)



Intensitas Emisi Non-GRK (Ton/BOE)
Non-GHG Emission Intensity (Ton/BOE)

	2022 (Ton/BOE)	2023 (Ton/BOE)	2024 (Ton/BOE)
SOx	0,000018	0,000013	0,00002
NOx	0,00018	0,000152	0,000191
nmVOC	0,000203	0,000133	0,000026
TOC	0,000145	0,000071	0,000065
PM	0,000006	0,000006	0,000007

Perhitungan intensitas emisi dalam unit Ton/BOE khusus melingkupi seluruh entitas di bawah PHE yang bergerak di sektor Oil & Gas Exploration & Production. Perusahaan di sektor pendukung (selain E&P), antara lain PDSI, Badak LNG, dan Elnusa dikecualikan dari perhitungan intensitas emisi.

The calculation of emission intensity in units of Ton/BOE specifically covers all entities under PHE operating in the Oil & Gas Exploration & Production sector. Companies in supporting sectors (other than E&P), such as PDSI, Badak LNG, and Elnusa, are excluded from the emission intensity calculation.

Beban emisi non-GRK PHE Subholding Upstream secara rutin dipantau melalui kegiatan Pengendalian Pencemaran Udara (PPU), yang dilaksanakan pada setiap aktivitas yang berpotensi menyebabkan pencemaran udara, baik yang berasal dari emisi konvensional (emisi non-GRK) maupun emisi GRK. Kegiatan Pengendalian Pencemaran Udara ini meliputi serangkaian tahap yang mencakup Perencanaan, Pelaksanaan, Pemantauan, dan Evaluasi, yang secara rinci diatur dalam Pedoman Pengelolaan Lingkungan Berkelanjutan PHE Subholding Upstream.

The non-GHG emissions load of PHE Subholding Upstream is routinely monitored through Air Pollution Control (APC) activities, which are conducted for every operation that has the potential to cause air pollution, both from conventional emissions (non-GHG emissions) and GHG emissions. These Air Pollution Control activities include a series of stages that encompass Planning, Implementation, Monitoring, and Evaluation, which are detailed in the Sustainable Environmental Management Guidelines of PHE Subholding Upstream.

Mekanisme Pengelolaan Pengendalian Pencemaran Udara

Mechanism for Managing Air Pollution Control

Perencanaan

1. Mengidentifikasi sumber pencemaran udara
2. Menyusun program pengendalian pencemaran udara
3. Melakukan koordinasi pelaksaan program pengendalian pencemaran udara

1. Identifying air pollution sources
2. Developing air pollution control programs
3. Coordinating the implementation of air pollution control programs

Pelaksanaan

1. Mengajukan persetujuan teknis pembuangan emisi
2. Melakukan pemenuhan terhadap sarana/prasarana sesuai persyaratan teknis pembuangan emisi

1. Submitting technical approval for emissions disposal
2. Fulfilling the facilities/infrastructure requirements according to the technical disposal emissions standards

Pemantauan

Melakukan pemantauan kualitas pengendalian pencemaran udara

Monitoring air pollution control quality

Evaluasi

Evaluasi Pengelolaan pengendalian pencemaran udara

Evaluation of air pollution control management

PHE Subholding Upstream terus melaksanakan serangkaian inisiatif dan program strategis untuk mengurangi emisi non-GRK. Inisiatif dan program ini dirancang untuk mendukung pengurangan emisi non-GRK di seluruh wilayah operasional PHE Subholding Upstream, dengan penyesuaian yang mempertimbangkan kapabilitas teknis dan karakteristik unik dari masing-masing wilayah kerja. Berikut ini adalah contoh program unggulan (flagship program) pengurangan emisi non-GRK yang direncanakan untuk dilaksanakan pada tahun 2024 di berbagai wilayah kerja.

PHE Subholding Upstream continues to implement a series of strategic initiatives and programs to reduce non-GHG emissions. These initiatives and programs are designed to support the reduction of non-GHG emissions across all operational areas of PHE Subholding Upstream, with adjustments made based on the technical capabilities and unique characteristics of each operational area. Below are examples of flagship programs for non-GHG emission reduction planned to be implemented in 2024 across various operational zones.

Inisiatif Reduksi Emisi Non-GRK
Non-GHG Emission Reduction Initiatives

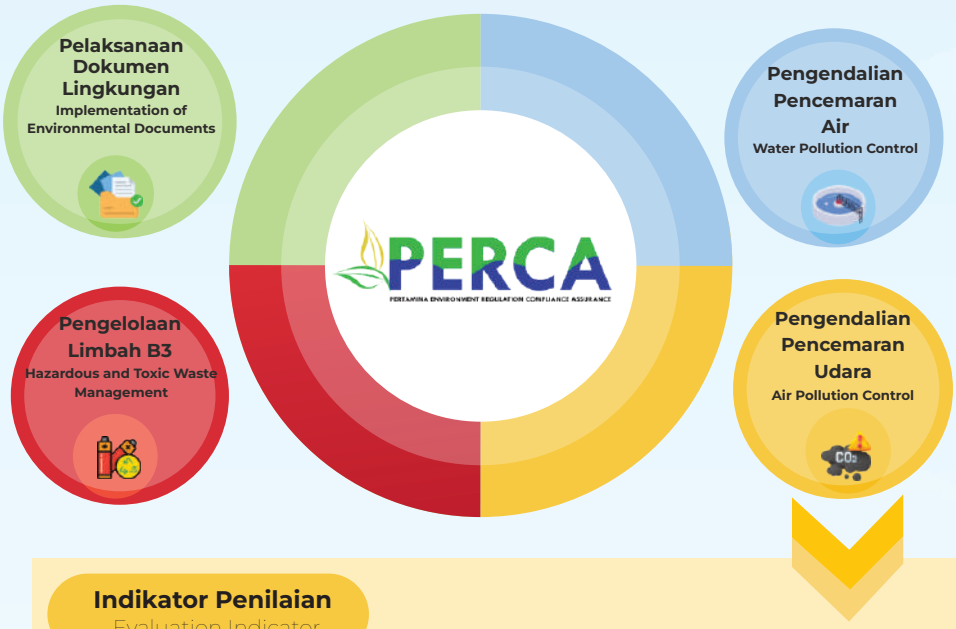
Regional Region	**Lokasi** Location	**Program**	**Zat Polutan** Pollutant Substance	**Reduksi Emisi* (Ton)** Emission Reduction* (Ton)
		Proses Produksi Production Process		
Regional 2 Region 2	PHE ONWJ	Pemanfaatan suar bakar di Zulu sebagai bahan bakar turbin generator The utilization of burn flare in Zulu as fuel for the turbine generator	SOx	0,0071
			NOx	12,973
			PM	0,1200
		Menyelamatkan produksi dengan menerapkan metode COGAN pada sistem fuel gas di PAPA/FS Saving production by applying the COGAN method to the fuel gas system in PAPA/FS	SOx	0,2358
			NOx	3,5857
			PM	0,2521
Regional 2 Region 2	PEP Subang	Exhaust Gas to Compress Fuel	SOx	0,0066
			NOx	3,4965
			VOC	1,5655
		Penggantian Engine Diesel menjadi Gas Engine di SP Tunggul Maung Replacement of Diesel Engine with Gas Engine at SP Tunggul Maung	SOx	0,0023
			NOx	1,2405
			VOC	0,5554
Regional 3 Region 3	PEP Sangatta	Hydraulic Motor Softstrater & Oil Rate Adjustment Application Sangatta (DRACOR SORE)	SOx	0,00
			NOx	0,045
			VOC	0,450
Regional 4 Region 4	PEP Sukowati	Pemanfaatan Sweat gas untuk bahan bakar Power plant Utilization of Sweat Gas as fuel for the Power Plant	SOx	0,0001
			NOx	0,1506
			PM	0,0018

*Data hingga Juni 2024

*Data as of June 2024

Inisiatif yang dilaksanakan oleh PHE Subholding Upstream melalui proses audit eksternal dan internal untuk memvalidasi bahwa pengurangan emisi non-GRK yang dilakukan telah tercapai secara terukur dan efektif. Audit internal dilakukan melalui pelaporan PERCA, sementara audit eksternal dilaksanakan melalui pelaporan PROPER, keduanya berfungsi untuk memastikan bahwa langkah-langkah mitigasi emisi yang diterapkan telah sesuai dengan standar operasional dan memenuhi kriteria keberlanjutan yang ditetapkan. Sepanjang tahun pelaporan, PHE Subholding Upstream tidak mengalami kasus pelanggaran maupun kejadian luar biasa yang terkait dengan emisi non-GRK.

The initiatives implemented by PHE Subholding Upstream undergo both external and internal audits to validate that the reduction of non-GHG emissions has been achieved in a measurable and effective manner. Internal audits are conducted through PERCA reporting, while external audits are carried out through PROPER reporting, both of which serve to ensure that the emission mitigation measures applied are in line with operational standards and meet the established sustainability criteria. Throughout the reporting year, PHE Subholding Upstream did not experience any violations or exceptional incidents related to non-GHG emissions.



Indikator Penilaian
Evaluation Indicator

1. Kompetensi personil dalam pengelolaan pencemaran udara
2. Ketaatan pemantauan dan pelaporan
3. Ketaatan memenuhi parameter baku mutu emisi, serta pelaporan beban emisi GRK (CO_2, CH_4, dan N_2O) dan non-GRK (CO, NO_2, dan Opasitas).

1. Personnel competency in air pollution management
2. Compliance with monitoring and reporting
3. Compliance with emission quality standard parameters, as well as reporting of GHG emissions load (CO_2, CH_4, and N_2O) and non-GHG emissions (CO, NO_2, and opacity)

Emisi Fugitif
Fugitive Emissions

Emisi fugitif sering kali terdiri dari metana (CH_4), karbon dioksida (CO_2), dan senyawa organik volatil non metan (nmVOC), yang dapat memberikan kontribusi signifikan terhadap pemanasan global serta degradasi kualitas udara. Pengendalian emisi fugitif menjadi salah satu fokus utama dalam pengelolaan dampak lingkungan di sektor industri, khususnya dalam industri minyak dan gas.

PHE Subholding Upstream menyadari bahwa dalam sektor ini terdapat potensi pelepasan emisi gas atau partikel ke atmosfer secara tidak sengaja dari sumber-sumber yang tidak terkontrol. Untuk menanggulangi hal ini, PHE Subholding Upstream telah merumuskan strategi jangka panjang yang lebih efektif untuk mengurangi emisi tersebut, baik melalui pengendalian langsung terhadap sumber emisi maupun dengan penerapan teknologi yang lebih bersih dan ramah lingkungan.

Salah satu strategi utama PHE Subholding Upstream dalam mengurangi pelepasan emisi fugitif adalah dengan memanfaatkan Quantitative Optical Gas Imaging (QOGI). QOGI merupakan teknologi pencitraan gas optik yang dirancang secara khusus untuk mendeteksi dan mengukur kebocoran gas hidrokarbon yang tidak tampak oleh mata telanjang. Teknologi ini mengintegrasikan sistem pencitraan gas optik dengan pendingin khusus (OGI hidrokarbon) dan algoritma canggih, yang memungkinkan pengukuran yang akurat dan real-time terhadap emisi gas yang tidak terkontrol.

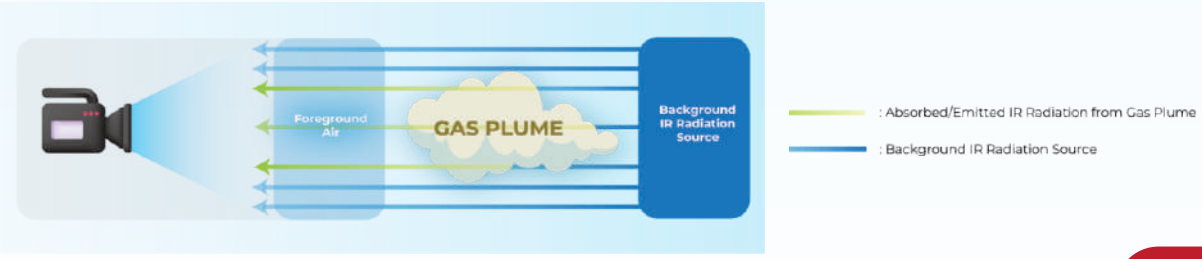
Implementasi QOGI telah menghasilkan temuan signifikan, di antaranya adalah kebutuhan untuk memperketat komponen-komponen sistem guna mencegah potensi kebocoran gas, serta perlunya pelaksanaan program Leak Detection and Repair (LDAR) secara rutin untuk meminimalkan jumlah komponen yang berpotensi menjadi sumber emisi fugitif.

Fugitive emissions often consist of methane (CH_4), carbon dioxide (CO_2), and Non Methane volatile organic compounds (VOCs), which can significantly contribute to global warming and air quality degradation. Controlling fugitive emissions has become a primary focus in environmental management within the industrial sector, particularly in the oil and gas industry.

PHE Subholding Upstream recognizes that in this sector, there is potential for the unintentional release of gas or particles into the atmosphere from uncontrolled sources. To address this, PHE Subholding Upstream has developed a long-term strategy to more effectively reduce these emissions, both through direct control of emission sources and the implementation of cleaner and more environmentally friendly technologies.

One of PHE Subholding Upstream's key strategies to reduce fugitive emissions is the utilization of Quantitative Optical Gas Imaging (QOGI). QOGI is an optical gas imaging technology specifically designed to detect and measure hydrocarbon gas leaks that are invisible to the naked eye. This technology integrates optical gas imaging with specialized coolants (hydrocarbon OGI) and advanced algorithms, enabling accurate, real-time measurements of uncontrolled gas emissions.

The implementation of QOGI has resulted in significant findings, including the need to tighten system components to prevent potential gas leaks and the necessity for the routine implementation of Leak Detection and Repair (LDAR) programs to minimize the number of components that could become sources of fugitive emissions.



Air Water

Perubahan iklim telah menjadi salah satu tantangan global yang paling mendesak, dengan dampak yang signifikan terhadap dinamika siklus hidrologi global dan keberlanjutan sumber daya air. Secara global, diperkirakan sekitar 2,7 miliar orang mengalami defisit air setidaknya selama satu bulan setiap tahunnya, sementara hampir 1,2 miliar orang tinggal di kawasan yang sangat rentan terhadap kekeringan. Fenomena ini memperburuk ketegangan yang dihadapi oleh banyak negara dalam upaya mengelola dan melestarikan sumber daya air yang semakin terbatas.

PHE Subholding Upstream memainkan peran kunci dalam mitigasi dampak negatif yang timbul akibat penggunaan air yang tidak efisien atau berlebihan. Sebagai bagian dari komitmen perusahaan terhadap prinsip keberlanjutan, pengelolaan air menjadi fokus utama dalam strategi operasional PHE Subholding Upstream. Hal ini bertujuan untuk memastikan bahwa setiap tahapan kegiatan operasional perusahaan mematuhi standar keberlanjutan yang tinggi, memperhatikan tanggung jawab ekologis, serta mendukung upaya konservasi dan optimalisasi pemanfaatan sumber daya air di seluruh wilayah operasional kami.

Operasional, produksi, dan kegiatan pendukung di seluruh wilayah kerja onshore maupun offshore secara langsung bergantung pada pasokan air dari sumber air permukaan seperti sungai, danau, dan laut. Menyadari bahwa masyarakat dan ekosistem di sekitar area operasional kami juga bergantung pada sumber daya air yang sama, PHE Subholding Upstream mengakui potensi dampak signifikan dari aktivitas operasional terhadap kelestarian sumber daya vital ini. Oleh karena itu, kami berkomitmen untuk secara aktif memitigasi dampak yang ditimbulkan terhadap sumber daya air guna memastikan keberlanjutan operasional dan kesejahteraan ekosistem serta masyarakat sekitar.

Climate change has become one of the most urgent global challenges, with significant impacts on the dynamics of the global hydrological cycle and the sustainability of water resources. Globally, it is estimated that approximately 2.7 billion people experience water scarcity for at least one month each year, while nearly 1.2 billion people live in areas highly vulnerable to drought. This phenomenon exacerbates the pressures faced by many countries in their efforts to manage and conserve increasingly limited water resources.

PHE Subholding Upstream plays a pivotal role in mitigating the negative impacts caused by inefficient or excessive water usage. As part of the company's commitment to sustainability principles, water management is a primary focus within PHE Subholding Upstream's operational strategy. This aims to ensure that every stage of the company's operational activities adheres to high sustainability standards, takes into account ecological responsibility, and supports efforts to conserve and optimize the use of water resources across all of our operational areas.

Operations, production, and supporting activities across both onshore and offshore areas are directly dependent on water supply from surface water sources such as rivers, lakes, and seas. Recognizing that communities and ecosystems surrounding our operational areas also rely on the same water resources, PHE Subholding Upstream acknowledges the potential significant impacts of our operational activities on the sustainability of this vital resource. Therefore, we are committed to actively mitigating the impacts on water resources to ensure the sustainability of our operations and the well-being of the surrounding ecosystems and communities.

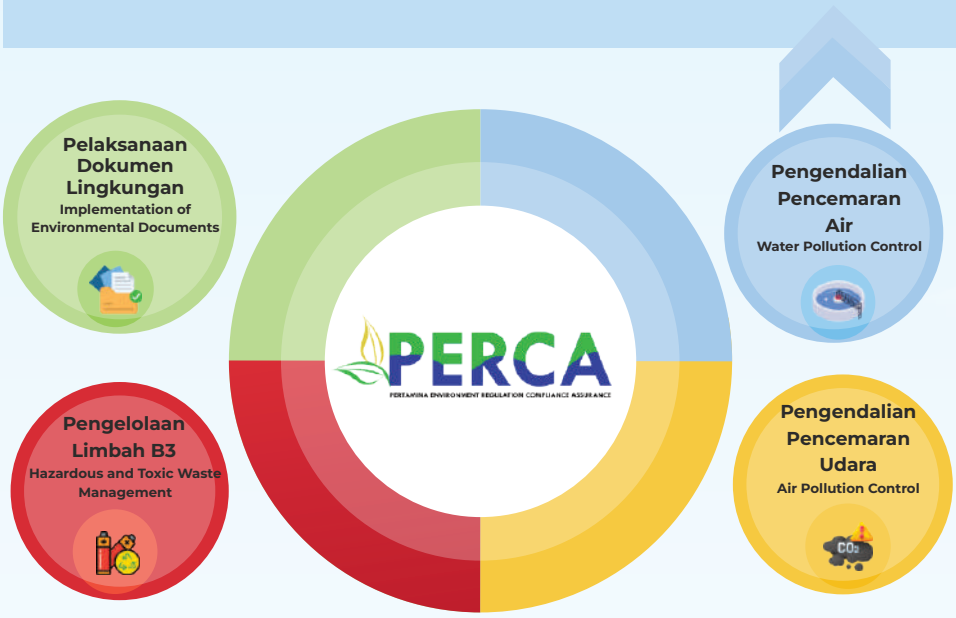
PHE Subholding Upstream secara sistematis melaksanakan pemantauan dan evaluasi berkala terhadap konsumsi air di seluruh fasilitas dan lokasi operasional, dengan mengacu pada standar internasional dan regulasi lingkungan yang berlaku. Proses pemantauan ini tercermin dalam penyusunan laporan audit air untuk setiap wilayah kerja, yang disusun sesuai dengan pedoman Pengelolaan Lingkungan Berkelanjutan yang diterapkan oleh PHE Subholding Upstream.

We routinely monitor and evaluate water consumption across various facilities and operational locations, adhering to applicable environmental standards and regulations. This monitoring is reflected in water audit reports prepared for each work area, in accordance with the Sustainable Environmental Management guidelines implemented by PHE Subholding Upstream.

Indikator Penilaian
Evaluation Indicator

1. Kompetensi personil dalam pengelolaan pencemaran air;
2. Ketaatan pemantauan dan pelaporan;
3. Ketaatan memenuhi baku mutu dan parameter pemantauan air limbah (ph, TSS, COD, NH_3-N, dan debit).

1. Personnel competence in water pollution management;
2. Compliance with monitoring and reporting;
3. Compliance with meeting water quality standards and monitoring parameters for wastewater (pH, TSS, COD, NH3-N, and flow rate).



Total penggunaan air pada tahun 2024 adalah sebanyak 11.354.972,71 m^3, yang merupakan jumlah keseluruhan penggunaan air dari seluruh wilayah kerja atau operasional PHE Subholding Upstream.

The total water consumption in 2024 amounted to 11.354.972,71 m^3, representing the cumulative water usage from all work areas and operational activities of PHE Subholding Upstream.

Penggunaan Air (m^3/tahun)
Water Consumption (m^3/year)

	2022*	2023*	2024
Jumlah Penggunaan Air Total Water Consumption	12.292.790,23	11.912.652,14	11.354.972,71
Jumlah Penggunaan Air Tawar Total Freshwater Consumption	12.218.317,28	11.829.629,34	11.269.463,55

Pengambilan Air (m³/tahun)
Water Withdrawal (m³/year)

Sumber Air Water Source	2022*	2023*	2024
Air Permukaan Surface Water	7.135.074,05	7.831.262,91	9.055.736,59
Air Tanah Renewable Renewable Groundwater	15.314.021,77	16.118.267,13	15.847.234,97
Air Tanah Non-Renewable Non-Renewable Groundwater	691.173,00	424.134,34	405.200,77
Air Hujan Rainwater	121.913,00	119.517,48	156.756,16
Air yang berasal dari pihak ketiga Water from third parties	263.139,26	267.638,49	387.296,09
Lain lain (air laut) Others (sea water)	1.060.035,42	940.561,45	988.187,89
Jumlah Pengambilan Air Tawar (Kecuali Air Laut) Total Freshwater Withdrawal (Exclude Sea Water)	**23.525.321,09**	**24.366.520,94**	**25.852.224,57**
Jumlah Pengambilan Air Total Water Withdrawal	**24.585.356,51**	**25.307.082,39**	**26.840.412,46**

*Restatement

Restatement dilakukan sebagai hasil dari perbaikan metodologi pencatatan yang diterapkan di setiap wilayah operasional, guna memastikan akurasi dan konsistensi data yang lebih tinggi dalam pelaporan.

The restatement was conducted as a result of improvements in the recording methodology applied across each operational region, ensuring higher accuracy and consistency in the reporting data.

PHE Subholding Upstream menggunakan sumber air dari air permukaan serta memanfaatkan sumber air alternatif seperti air hujan dan air laut untuk kebutuhan operasional lainnya.

PHE Subholding Upstream use surface water sources and utilize alternative water sources such as rainwater and seawater for other operational needs.

4,27% Pengambilan air alternatif dari total pengambilan air keseluruhan
Alternative water extraction from the total water withdrawal

Intensitas Air (m³/USD)
Water Intensity (m³/USD)

	2022*	2023*	2024
Intensitas Penggunaan Air Freshwater Water Intensity	0,0000076	0,0000082	0,0000079
Intensitas Pengambilan Air Freshwater Withdrawal Intensity	0,000015	0,000017	0,000019

Upaya berkelanjutan dilakukan untuk mengidentifikasi potensi pengurangan konsumsi air dan meningkatkan efisiensi dalam setiap aspek operasional. Beberapa inisiatif strategis yang telah dilaksanakan sepanjang tahun 2024 antara lain sebagai berikut:

Continuous efforts are made to identify opportunities for reducing water consumption and enhancing efficiency across all operational aspects. Some of the strategic initiatives implemented throughout 2024 include the following:

Top 10 Inisiatif Reduksi Penggunaan Air
Top 10 Water Consumption Reduction Initiatives

Regional Region	**Lokasi** Location	**Inisiatif** Initiative	**Pengurangan (m^3/tahun)** Reduction (m^3/year)
Regional 1 Region 1	PEP Pangkalan Susu	Pengurangan Waktu Operasi Pompa WTP Reduction of WTP Pump Operating Time	30.000,00
Regional 1 Region 1	PEP Pangkalan Susu	Efisiensi Air Bak Dalam Tanah (BDT) dengan Pemasangan Sistem Alarm Kontrol Pompa Di WTP Groundwater Tank (BDT) Water Efficiency through the Installation of Pump Control Alarm System at WTP	14.600,00
Regional 3 Region 3	PHM	Inovasi Optimasi Konsumsi Air untuk Proses Pengeboran Innovation in Water Consumption Optimization for Drilling Processes	63.286,96
Regional 3 Region 3	PHSS	Aplikasi Restriction Orifice pada Water Well (AROWW) Restriction Orifice Application on Water Well (AROWW)	43.687,00
Regional 3 Region 3	PEP Sangasanga	Fire Tube Boiler Sangasanga	62.211,60
Regional 3 Region 3	PEP Sangatta	Rain Water Harvesting di Lokasi Pemboran Rainwater Harvesting at Drilling Locations	15.390,00
Regional 3 Region 3	PEP Tarakan	Kampanye Hemat Air Area RDP Water Conservation Campaign in RDP Area	25.829,04
Regional 4 Region 4	PEP Donggi Matindok	Optimalisasi Pemakaian Air Tanah dengan metoda integrated speed control pump (ISCP) dengan memasang VSD di Deepwell Pump 374 P 1001 A di CPP Matindok Field Optimization of Groundwater Usage using the Integrated Speed Control Pump (ISCP) method by installing VSD on Deepwell Pump 374 P 1001 A at CPP Matindok Field	41.215,96
Regional 5 Region 5	MLN Algeria	Implementasi domestic wastewater treatment melalui proses fisika-kimia, treated water dialirkan ke sumur resapan, sludge dikumpulkan dalam septic tank Implementation of domestic wastewater treatment through a physicochemical process, treated water is discharged into a recharge well, and sludge is collected in a septic tank	148.066,19
Regional 5 Region 5	MLN Algeria	Penyiraman tanaman di BDV (Living Quarter) menggunakan air olahan IPAL Domestik Plant irrigation at BDV (Living Quarter) using treated domestic wastewater	49.355,40
Total Top 10			**493.642,14**
Jumlah Inisiatif Reduksi Penggunaan Air Total Water Consumption Reduction Initiatives			**587.737,44**

Ketercapaian TPB
Achievement of SDGs

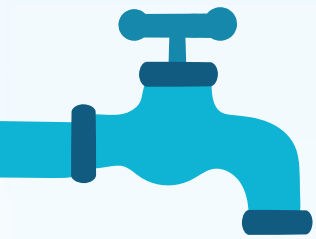
Realisasi pengurangan penggunaan air PHE Subholding Upstream
Realization of Water Consumption Reduction by PHE Subholding Upstream

587.737,44 m³/year

10% Pengurangan intensitas air pada 2030
Water Intensity Reduction by 2030

Sebagai upaya mendukung pencapaian target yang telah ditetapkan oleh PHE Subholding Upstream, setiap wilayah kerja menyusun rencana operasional dan strategi jangka panjang terkait efisiensi penggunaan air serta pengurangan beban pencemaran, yang disesuaikan dengan kebutuhan spesifik dan kapabilitas masing-masing wilayah. Sebagai ilustrasi, salah satu rencana operasional dan strategi jangka panjang dari wilayah kerja ONWJ dapat ditemukan dalam Lampiran.

As part of efforts to support the achievement of the targets set by PHE Subholding Upstream, each operational area develops operational plans and long-term strategies related to water use efficiency and pollution load reduction, tailored to the specific needs and capabilities of each region. As an example, one of the operational plans and long-term strategies from the ONWJ operational area can be found in the Appendix.



Kelangkaan Air
Water Scarcity

Kelangkaan air merupakan isu yang semakin mendesak di seluruh dunia, yang diperburuk oleh dampak perubahan iklim. Berdasarkan laporan dari World Resources Institute (WRI) pada 2021, sekitar 2,7 miliar orang di dunia menghadapi kekurangan air selama setidaknya satu bulan setiap tahunnya. Lebih dari 40% populasi global diperkirakan akan tinggal di wilayah yang mengalami stres air yang parah pada tahun 2030, jika tidak ada intervensi signifikan untuk mengelola sumber daya air secara berkelanjutan.

Sektor industri, terutama sektor minyak dan gas, juga berkontribusi terhadap krisis air ini. Industri ini sangat bergantung pada air untuk berbagai proses operasional, mulai dari eksplorasi, pengeboran, hingga pemurnian. Menurut laporan dari International Energy Agency (IEA), sektor energi mengonsumsi sekitar 15% dari total penggunaan air dunia, dengan sebagian besar digunakan untuk pendinginan pembangkit listrik dan kegiatan ekstraksi bahan bakar. Mengingat tekanan yang semakin besar terhadap pasokan air tawar, penting bagi sektor industri untuk mengimplementasikan teknologi dan strategi pengelolaan air yang lebih efisien dan berkelanjutan guna mengurangi dampak terhadap lingkungan dan mendukung keberlanjutan pasokan air global.

PHE Subholding Upstream menyadari urgensi pengelolaan sumber daya air yang berkelanjutan, khususnya di wilayah operasional yang terletak di kawasan dengan tingkat stres air yang tinggi. PHE Subholding Upstream berkomitmen untuk mengoptimalkan penggunaan sumber daya air secara efisien, meminimalkan dampak negatif terhadap komunitas lokal, serta mendukung inisiatif global dalam pelestarian dan keberlanjutan sumber daya air. Melalui pendekatan berbasis risiko, PHE Subholding Upstream memastikan bahwa setiap tahap operasional perusahaan memperhatikan prinsip keberlanjutan dan tanggung jawab ekologis, serta berkontribusi pada upaya mitigasi krisis air global yang semakin mendesak.

Water scarcity is an increasingly urgent issue worldwide, exacerbated by the impacts of climate change. According to a report by the World Resources Institute (WRI) in 2021, approximately 2.7 billion people worldwide face water shortages for at least one month every year. More than 40% of the global population is projected to live in areas experiencing severe water stress by 2030, unless significant interventions are made to sustainably manage water resources.

The industrial sector, particularly the oil and gas industry, also contributes to this water crisis. This sector heavily relies on water for various operational processes, including exploration, drilling, and refining. According to the International Energy Agency (IEA), the energy sector consumes about 15% of the world's total water usage, with the majority used for cooling power plants and fuel extraction activities. Given the increasing pressure on freshwater supplies, it is crucial for the industrial sector to implement more efficient and sustainable water management technologies and strategies to mitigate environmental impacts and support the sustainability of global water supplies.

PHE Subholding Upstream recognizes the urgency of sustainable water resource management, particularly in its operational areas located in regions with high water stress. PHE Subholding Upstream is committed to optimizing the efficient use of water resources, minimizing negative impacts on local communities, and supporting global initiatives in the conservation and sustainability of water resources. Through a risk-based approach, PHE Subholding Upstream ensures that every stage of its operational activities adheres to sustainability principles and ecological responsibility, while contributing to efforts to mitigate the global water crisis.

Upaya pengelolaan risiko air ini direalisasikan melalui serangkaian inisiatif strategis, termasuk penerapan teknologi canggih dalam pengolahan air, optimalisasi konsumsi air dalam proses operasional, serta kolaborasi lintas sektor untuk memastikan keberlanjutan pasokan air bagi masyarakat dan ekosistem. Salah satu inisiatif terdepan yang telah dilaksanakan oleh PHE Subholding Upstream adalah proyek studi kelayakan terkait implementasi Pertamina Water Risk Tools, yang dijalankan melalui kemitraan strategis dengan Institut Teknologi Bandung (ITB). Alat ini digunakan untuk menganalisis dan memetakan kawasan yang mengalami stres air (stressed areas) dan kawasan dengan kondisi air yang tidak tertekan (non-stressed areas). Seluruh wilayah operasional PHE Subholding Upstream telah melakukan water risk assessment secara menyeluruh dan secara rutin menyusun Water Resources Management Plan yang terintegrasi. Proyek ini juga mencerminkan penerapan prinsip tata kelola air yang baik (water stewardship) di Wilayah Kerja Sukowati, dengan fokus pada upaya memastikan akses yang berkelanjutan dan kualitas tinggi terhadap sumber daya air, sebagai bagian dari komitmen perusahaan terhadap pengelolaan sumber daya alam secara bertanggung jawab.

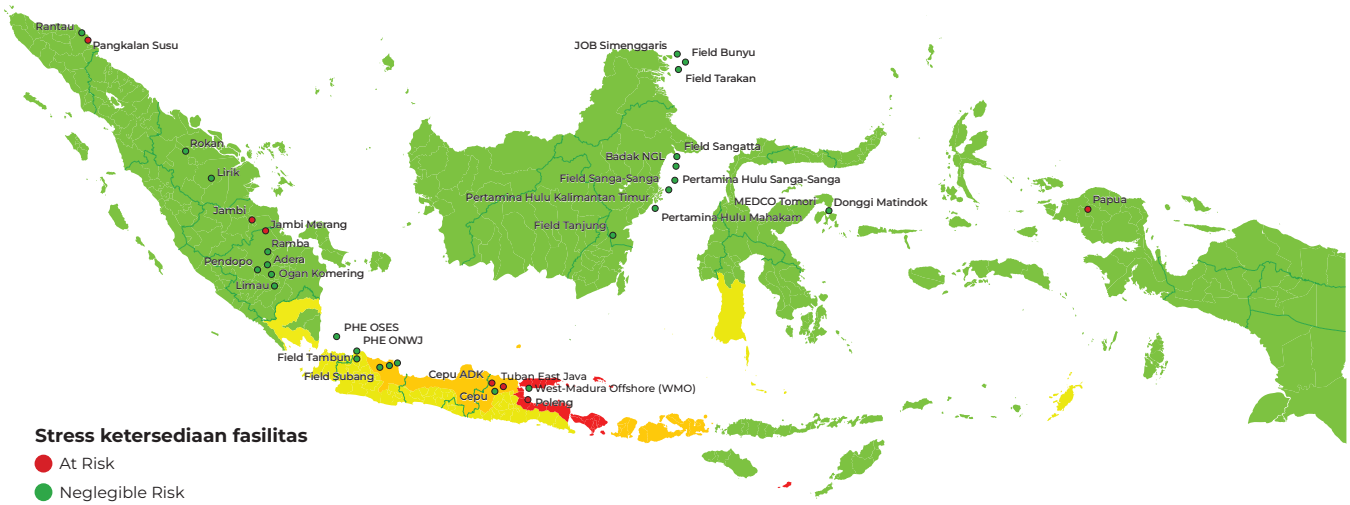
The efforts to manage water risk are realized through a series of strategic initiatives, including the implementation of advanced water treatment technologies, optimization of water consumption in operational processes, and cross-sector collaboration to ensure the sustainability of water supply for communities and ecosystems. One of the leading initiatives undertaken by PHE Subholding Upstream is the feasibility study project related to the implementation of Pertamina Water Risk Tools, carried out through a strategic partnership with the Bandung Institute of Technology (ITB). This tool is used to analyze and map areas experiencing water stress (stressed areas) and areas with untapped water resources (non-stressed areas). All operational areas of PHE Subholding Upstream have conducted comprehensive water risk assessments and routinely develop integrated Water Resources Management Plans. This project also reflects the application of good water stewardship principles in the Sukowati Working Area, focusing on efforts to ensure sustainable access to and high-quality water resources, as part of the company's commitment to responsible natural resource management.

PHE Subholding Upstream telah melakukan identifikasi menyeluruh terhadap seluruh wilayah operasional yang berada di daerah dengan potensi risiko kelangkaan air, dengan memanfaatkan Pertamina Water Tools yang mengacu pada Aqueduct Water Risk Atlas dari World Resources Institute (WRI). Inisiatif ini bertujuan untuk memastikan bahwa strategi mitigasi dan pengelolaan sumber daya air diterapkan secara tepat sasaran, terutama di wilayah dengan tingkat risiko tinggi terkait ketersediaan air. Penilaian dilakukan dengan mempertimbangkan tiga dimensi kritis, yaitu: ketersediaan (availability), aksesibilitas (accessibility), dan kualitas (quality) air. Pendekatan holistik ini memungkinkan PHE Subholding Upstream untuk merancang dan mengimplementasikan tindakan adaptif yang terukur dan berkelanjutan dalam meningkatkan ketahanan air di seluruh area operasional

PHE Subholding Upstream has conducted a comprehensive assessment of all operational areas located in regions with potential water scarcity risks, utilizing the Pertamina Water Tools based on the Aqueduct Water Risk Atlas from the World Resources Institute (WRI). This initiative aims to ensure that water resource management and mitigation strategies are implemented effectively, particularly in areas with high water-related risk. The assessment considers three critical dimensions: water availability, accessibility, and quality. This holistic approach enables PHE Subholding Upstream to design and implement measurable and sustainable adaptive actions to enhance water resilience across all operational areas.

Availability Fasilitas terhadap Ketersediaan Air Eksternal

Availability of Facilities in Relation to External Water Sources



Stress ketersediaan fasilitas

- At Risk
- Neglegible Risk

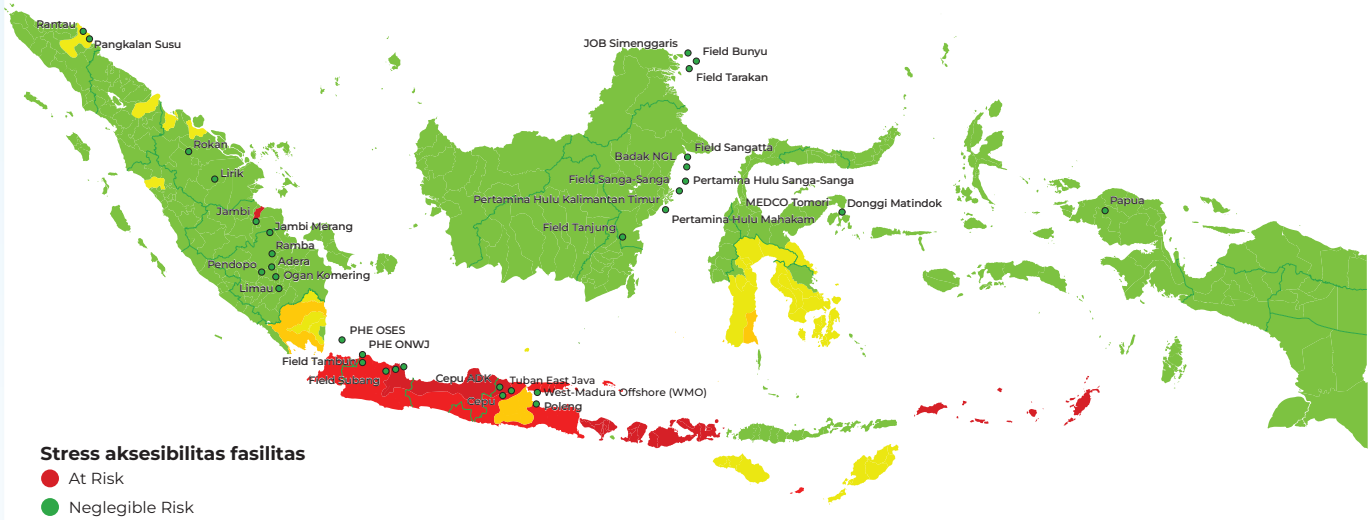
Tingkat ketersediaan air eksternal

- Low (<10%)
- Low - Medium (10 - 20%)
- Medium - High (20 - 40%)
- High (40 - 80%)
- Extremely High (>80%)

Sumber Gambar:
Studi water risk PHE Subholding Uptream
Image Source:
Water Risk Study of PHE Subholding Upstream

Accesibility Fasilitas terhadap Tingkat Kompetensi Penggunaan Air

Accessibility of Facilities in Relation to the Level of Water Usage Competence



Stress aksesibilitas fasilitas

- At Risk
- Neglegible Risk

Tingkat kompetensi Penggunaan Air

- Low (<10%)
- Low - Medium (10 - 20%)
- Medium - High (20 - 40%)
- High (40 - 80%)
- Extremely High (>80%)

Sumber Gambar:
Studi water risk PHE Subholding Uptream
Image Source:
Water Risk Study of PHE Subholding Upstream

Berdasarkan evaluasi tingkat stres air yang dilakukan oleh PHE Subholding Upstream menggunakan Pertamina Water Risk Tools, teridentifikasi tujuh wilayah kerja yang terletak di kawasan dengan potensi kelangkaan air yang signifikan. Wilayah-wilayah tersebut meliputi: PEP Pangkalan Susu, PEP Jambi, PHE Jambi Merang, PEP Poleng, PHE Tuban East Java, PEP Donggi Matindok, dan PEP Papua. Penilaian ini mengungkapkan tantangan kritis terkait ketersediaan sumber daya air di area-area tersebut, yang memerlukan perhatian dan tindakan mitigasi yang terintegrasi untuk memastikan keberlanjutan operasional dan pengelolaan sumber daya air yang bertanggung jawab.

Based on the water stress evaluation conducted by PHE Subholding Upstream using the Pertamina Water Risk Tools, seven operational areas have been identified as being located in regions with significant water scarcity potential. These areas include: PEP Pangkalan Susu, PEP Jambi, PHE Jambi Merang, PEP Poleng, PHE Tuban East Java, PEP Donggi Matindok, and PEP Papua. This assessment highlights critical challenges related to the availability of water resources in these areas, necessitating focused attention and integrated mitigation actions to ensure operational sustainability and responsible water resource management.

Penggunaan dan Pengambilan Air dari Wilayah Langka Air
Water Consumption and Withdrawal from Water Scarcity

Regional Region	**Lokasi** Location	**2023***		**2024**	
		Penggunaan Air Water Consumption	**Pengambilan Air** Water Withdrawal	**Penggunaan Air** Water Consumption	**Pengambilan Air** Water Withdrawal
		m³	**m³**	**m³**	**m³**
Regional 1 Region 1	PEP Pangkalan Susu	358.075	462.830	354.036,94	444.039,00
Regional 1 Region 1	PEP Jambi	105.344,52	140.346	120.853,33	168.663,33
Regional 1 Region 1	PHE Jambi Merang	67.784,39	82.381,60	75.332,97	92.653,00
Regional 4 Region 4	PEP Poleng	4.804,07	10.443,63	5.058,78	11.621,36
Regional 4 Region 4	PHE Tuban East Java	5.269,89	23.036,00	3.858,88	17.679,00
Regional 4 Region 4	PEP Donggi Matindok	2.902,70	171.474,03	2.725,01	181.887,74
Regional 4 Region 4	PEP Papua	13.209,51	66.047,53	12.669,72	63.348,60
Jumlah Total		**557.389,94**	**956.558,80**	**574.535,63**	**979.892,03**

*Restatement

PHE Subholding Upstream menyadari bahwa salah satu aspek esensial yang memerlukan perhatian intensif adalah pengelolaan sumber daya air di wilayah yang mengalami stres air. Stres air terjadi ketika tingkat permintaan terhadap air melampaui kapasitas ketersediaannya, atau ketika kualitas air terdegradasi akibat aktivitas antropogenik. Sebagai respon terhadap tantangan ini, perusahaan berkomitmen untuk melaksanakan serangkaian inisiatif strategis yang bertujuan untuk mengurangi intensitas penggunaan dan ekstraksi air, khususnya di kawasan yang telah teridentifikasi sebagai wilayah dengan tekanan signifikan terhadap ketersediaan dan kualitas sumber daya air.

PHE Subholding Upstream recognizes that one of the essential aspects requiring intensive attention is the management of water resources in areas experiencing water stress. Water stress occurs when the demand for water exceeds its availability, or when water quality is degraded due to anthropogenic activities. In response to this challenge, the company is committed to implementing a series of strategic initiatives aimed at reducing the intensity of water use and extraction, particularly in areas identified as having significant pressure on the availability and quality of water resources.

Inisiatif Reduksi Penggunaan dan Pengambilan Air dari Wilayah Stres Air
Water Consumption and Extraction Reduction Initiatives from Water Stress Areas

Regional Region	**Lokasi** Location	**Inisiatif** Initiative	**Pengurangan (m^3/tahun)** Reduction (m^3/year)
Regional 1 Region 1	PEP Pangkalan Susu	Pengurangan Waktu Operasi Pompa WTP Reduction of WTP Pump Operating Time	30.000,00
Regional 1 Region 1	PEP Pangkalan Susu	Efisiensi Air Bak Dalam Tanah (BDT) dengan Pemasangan Sistem Alarm Kontrol Pompa Di WTP Groundwater Tank (BDT) Water Efficiency through the Installation of Pump Control Alarm System at WTP	14.600,00
Regional 1 Region 1	Jambi Merang	KERTIS – Kran Tekan Otomatis KERTIS – Automatic Pressure Tap	160
Regional 4 Region 4	PEP Papua	Circulated Water System in BMR 001 (Penggunaan kembali air sirkulasi sisa pengeboran sehingga tidak mengambil kembali air baku dari air permukaan) Circulated Water System in BMR 001 (Reusing circulating water from drilling waste to avoid taking raw water from surface water sources)	117,6
Regional 4 Region 4	PEP Donggi Matindok	Optimalisasi Pemakaian Air Tanah dengan metoda integrated speed control pump (ISCP) dengan memasang VSD di Deepwell Pump 374 P 1001 A di CPP Matindok Field Optimization of Groundwater Usage using the Integrated Speed Control Pump (ISCP) method by installing VSD on Deepwell Pump 374 P 1001 A at CPP Matindok Field	41.215,96
		Jumlah Total	**86.093,56**

Limbah dan Efluen
Waste and Effluent

Pengelolaan limbah yang tidak memadai dan pembuangan efluen yang tidak terkontrol berkontribusi signifikan terhadap degradasi lingkungan, merusak sumber daya alam, serta mengancam kelestarian ekosistem dan kesehatan manusia. Berdasarkan data yang dilaporkan oleh Organisasi Kesehatan Dunia (WHO), lebih dari 80% limbah cair yang dihasilkan secara global dibuang tanpa pengolahan yang memadai, menyebabkan pencemaran parah pada sungai, danau, dan perairan laut.

PHE Subholding Upstream mengakui bahwa dalam setiap tahapan operasionalnya, perusahaan menghasilkan berbagai jenis limbah, termasuk limbah berbahaya dan beracun (B3) yang spesifik dari kegiatan pengeboran dan produksi. Pengelolaan limbah ini dilakukan secara sistematis di seluruh wilayah operasional melalui penerapan pedoman pengelolaan limbah yang terstandarisasi sesuai dengan prinsip-prinsip pengelolaan lingkungan berkelanjutan. Sebagai bagian dari upaya untuk melindungi kelestarian lingkungan, PHE Subholding Upstream mengambil langkah-langkah proaktif dengan mengimplementasikan strategi 4R (Reduce, Reuse, Recycle, and Recovery). Strategi ini bertujuan untuk secara signifikan mengurangi dampak limbah terhadap ekosistem, sekaligus mengoptimalkan pemanfaatan kembali sumber daya yang ada, mendukung ekonomi sirkular, dan memperkuat komitmen perusahaan terhadap keberlanjutan operasional jangka panjang.

Pengukuran kualitas pengolahan efluen dilakukan secara berkala, dengan evaluasi mendalam terhadap dampak lingkungan yang ditimbulkan. Seluruh proses ini dijalankan sesuai dengan ketentuan yang diatur dalam Peraturan Menteri Lingkungan Hidup Nomor 19 Tahun 2010 mengenai Baku Mutu Air Limbah untuk Usaha dan/atau Kegiatan Minyak dan Gas serta Panas Bumi. Hasil pemantauan terkait pengelolaan limbah dan efluen didokumentasikan secara transparan dalam Dokumen Ringkasan Kinerja Pengelolaan Lingkungan (DRKPL).

Inadequate waste management and uncontrolled effluent discharge significantly contribute to environmental degradation, damaging natural resources and threatening the sustainability of ecosystems and human health. According to data reported by the World Health Organization (WHO), more than 80% of the wastewater generated globally is discharged without adequate treatment, leading to severe pollution of rivers, lakes, and marine waters.

PHE Subholding Upstream acknowledges that during each phase of its operations, the company generates various types of waste, including hazardous and toxic waste (B3) specific to drilling and production activities. Waste management is systematically carried out across all operational areas through the implementation of standardized waste management guidelines in accordance with sustainable environmental management principles. As part of its commitment to protecting environmental sustainability, PHE Subholding Upstream takes proactive steps by implementing the 4R strategy (Reduce, Reuse, Recycle, and Recovery). This strategy aims to significantly reduce the environmental impact of waste while optimizing resource reuse, supporting a circular economy, and reinforcing the company's commitment to long-term operational sustainability.

Effluent treatment quality is measured on a regular basis, with in-depth evaluations of the environmental impacts generated. All processes are carried out in accordance with the provisions of the Minister of Environment Regulation No. 19 of 2010 on Effluent Quality Standards for Oil, Gas, and Geothermal Activities. The results of the monitoring related to waste and effluent management are transparently documented in the Environmental Management Performance Summary Document (DRKPL).

Proses pengambilan, pemanfaatan, pengolahan, dan pembuangan efluen ke badan air juga dilakukan dengan pengawasan ketat oleh Fungsi HSSE dan Operasi di setiap entitas anak perusahaan. Pemantauan dan evaluasi terhadap implementasi strategi pengelolaan sumber daya air serta kinerja pengelolaan air secara holistik menjadi tanggung jawab utama dari facility owner. Hasil evaluasi ini kemudian disampaikan secara rutin kepada VP HSSE PHE Subholding Upstream.

Memastikan keberlanjutan pengelolaan dan pemantauan kinerja lingkungan secara holistik di seluruh wilayah operasional, PHE Subholding Upstream telah mengintegrasikan aspek-aspek tersebut ke dalam Indikator Kinerja Utama (KPI) yang dikenal dengan sebutan KPI Keunggulan Lingkungan. Penilaian KPI ini didasarkan pada cakupan audit PROPER dan PERCA di seluruh entitas PHE Subholding Upstream, yang bertujuan untuk mengukur sejauh mana kepatuhan terhadap standar pengelolaan lingkungan yang diterapkan. KPI ini mengharuskan 100% wilayah kerja entitas PHE Subholding Upstream menjalani audit PROPER dan PERCA, dengan pencapaian minimum pada kategori Biru (in compliance).

Pemenuhan KPI ini menjadi tanggung jawab utama VP HSSE PHE Subholding Upstream, serta pimpinan operasional Subholding, termasuk Direktur Operasi, VP Operasi, dan General Manager/Pimpinan Tertinggi Unit Operasional (UO) atau AP. Keberhasilan pencapaian KPI ini tidak hanya berfungsi sebagai indikator kinerja pengelolaan lingkungan yang efektif, namun juga menjadi faktor kunci yang dipertimbangkan dalam penetapan kompensasi atau tunjangan yang diterima oleh para pemangku jabatan terkait, sebagai bentuk insentif yang mendorong tanggung jawab terhadap pengelolaan lingkungan yang bertanggung jawab dan berkelanjutan.

The process of water extraction, utilization, treatment, and effluent discharge into water bodies is closely monitored by the HSSE and Operations functions within each subsidiary. Monitoring and evaluation of the implementation of water resource management strategies, as well as the holistic performance of water management, are the primary responsibility of the facility owner. The results of these evaluations are regularly reported to the VP HSSE of PHE Subholding Upstream.

To ensure the sustainability of environmental performance management and monitoring across all operational areas, PHE Subholding Upstream has integrated these aspects into the Key Performance Indicators (KPIs) known as the Environmental Excellence KPI. The assessment of this KPI is based on the scope of the PROPER and PERCA audits across all entities within PHE Subholding Upstream, which aims to measure compliance with the environmental management standards in place. This KPI mandates that 100% of the operational areas of PHE Subholding Upstream undergo PROPER and PERCA audits, with a minimum achievement of the Blue category (in compliance).

Meeting this KPI is the primary responsibility of the VP HSSE of PHE Subholding Upstream, as well as the operational leaders within the Subholding, including the Director of Operations, VP of Operations, and General Manager/Senior Executive of the Operational Units (UO) or AP. The achievement of this KPI not only serves as an indicator of effective environmental management performance but also acts as a key factor in determining the compensation or allowances received by the relevant leadership, as an incentive to promote responsible and sustainable environmental management practices.

Limbah yang dihasilkan
Waste Generated

	Satuan Unit	2022*	2023*	2024
Jumlah Limbah Padat B3 Total Hazardous Solid Waste	Ton	140.440,370	209.622,780	175.144,45
Jumlah Limbah Padat Non-B3 Total Non-Hazardous Solid Waste	Ton	15.856,450	13.887,490	15.569,27
	Satuan Unit	**2022***	**2023***	**2024**
Jumlah Efluen Total Effluent	m^3	650,943,496.84	665,242,084.28	680,381,125.12

*Restatement

Restatement pada jumlah limbah padat B3 dan Non B3 dilakukan sebagai bagian integral dari proses validasi dan verifikasi data yang dikumpulkan oleh masing-masing wilayah operasional, menggunakan aplikasi yang disediakan oleh Kementerian Lingkungan Hidup, yaitu Simple dan Siraja, untuk memastikan konsistensi, akurasi, dan kesesuaian dengan standar yang telah ditetapkan. Selanjutnya, restatement jumlah efluen disesuaikan dengan jumlah air terproduksi yang relevan.

The restatement of the quantity of hazardous and non-hazardous solid waste is carried out as an integral part of the data validation and verification process collected by each operational area, using applications provided by the Ministry of Environment and Forestry, namely Simple and Siraja, to ensure consistency, accuracy, and compliance with the established standards. Furthermore, the restatement of the effluent quantity is adjusted to align with the relevant produced water volume.

Limbah B3 yang dihasilkan berdasarkan Kategori
Hazardous waste generated based on Category

Kode Limbah Waste Code	Jenis Limbah B3 Hazardous waste type	Jumlah yang dihasilkan (Ton) Waste generated (Ton)
A330-2	**Residu bekas produksi** Used production residue	80.798
B330-2	**Serbuk bor berbahan dasar oil base dan/atau synthetic oil** Boron Powder Based on Oil Base and/or Synthetic Oil	28.782
K2	**Tanah terkontaminasi (Kat. 2)** Contaminated Soil (Cat. 2)	14.253
A330-1	**Residu dasar tangki minyak bumi** Crude Oil Tank Bottom Residue	13.199
A108d	**Limbah terkontaminasi B3** Hazardous and Toxic Waste	6.057
B108d	**Sludge instalansi pengolahan air limbah (IPAL)** Sludge from Wastewater Treatment Plant (WWTP)	2.987
B330-1	**Limbah lumpur bor berbahan dasar oil base dan/atau synthetic oil** Drilling Mud Waste Based on Oil Base and/or Synthetic Oil	1.867
B104d	**Kemasan bekas B3** Used Hazardous and Toxic Waste Packaging	575
K1	**Tanah terkontaminasi (Kat. 1)** Contaminated Soil (Cat. 1)	508
B105d	**Minyak pelulmas bekas** Used Lubricating Oil	461
	Lain-lain Others	25.657

Target Pengurangan Timbulan Volume Limbah Non-B3
Target Reduction of Non-Hazardous Waste Volume

- Optimisasi proses, dan penggunaan bahan baku yang lebih ramah lingkungan
  Process optimization and the use of more environmentally friendly materials
- Meningkatkan usaha reuse and recycle
  Increasing recycling and reuse efforts
- Mempromosikan praktik reduce, reuse, dan recycle untuk limbah yang dapat didaur ulang
  Promoting the practice of reducing, reusing, and recycling for recyclable waste
- Memaksimalkan penggunaan bahan baku
  Maximizing the reuse of materials
- Memenuhi standar baku mutu yang ditetapkan pemerintah
  Comply to government quality standards

Upaya berkelanjutan terus dilaksanakan untuk mengidentifikasi potensi pengurangan limbah B3 dan Non-B3 serta meningkatkan efisiensi dalam setiap proses operasional. Beberapa inisiatif strategis yang telah diimplementasikan sepanjang tahun 2024 meliputi, namun tidak terbatas pada, sebagai berikut:

Ongoing efforts are continuously being made to identify potential reductions in hazardous (B3) and non-hazardous waste (Non-B3) and to enhance efficiency in every operational process. Several strategic initiatives implemented throughout 2024 include, but are not limited to, the following:

Inisiatif Reduksi Limbah B3 di Tahun 2024
Hazardous Waste Reduction Initiatives in 2024

Regional Region	**Lokasi** Location	**Inisiatif** Initiative	**Pengurangan Limbah (Ton)** Waste Reduction (Ton)
Regional 1 Region 1	Prabumulih	Optimasi Four Way Valve Accumulator Dual System Android (Pengurangan Timbulan Sludge Oil Dari Proses Pengeboran Dan Well Service) Optimization of Four-Way Valve Accumulator Dual System Android (Reduction of Sludge Oil Generation from Drilling and Well Service Processes)	66,35
PT Badak NGL	PT Badak NGL	Mengurangi Limbah Glycol dengan modifikasi nozzle pencucian Reducing Glycol Waste through Nozzle Washing Modification	24,81
Regional 4 Region 4	Sukowati	Pengurangan limbah terkontaminasi B3 Reduction of Hazardous and Toxic Waste (B3) Contamination	11,38
Regional 4 Region 4	Donggi Matindok	Efisiensi Penggunaan Chemical Caustic (NaOH) dengan Penggantian Caustic Cair 48% menjadi Caustic Padat 99% Efficiency in the Use of Caustic Chemicals (NaOH) by Replacing 48% Liquid Caustic with 99% Solid Caustic	11,16
Regional 1 Region 1	Rantau	Mengurangi limbah serbuk bor dengan Program Swelling Reservoir Controller dengan Adaptif KCl, penentuan konsentrasi material chemical yang optimal dan kompatibel pada pekerjaan RIG service (completion fluid) melalui modifikasi sensitivitas konsentrasi KCl 2-7% pada setiap lapisan di Field Rantau Reducing drill cuttings waste by Swelling Reservoir Controller program with Adaptive KCl involves determining the optimal and compatible chemical concentration for RIG service operations (completion fluid) by adjusting the KCl concentration sensitivity (2–7%) in each formation layer at the Rantau Field.	654.12

Inisiatif Reduksi Limbah Non-B3 di Tahun 2024
Non-Hazardous Waste Reduction Initiatives in 2024

Regional Region	**Lokasi** Location	**Inisiatif** Initiative	**Pengurangan Limbah (Ton)** Waste Reduction (Ton)
PT Badak NGL	PT Badak NGL	Pengurangan Limbah Kertas Untuk Laporan Rutin, Work Permit, Laporan Audit Waste Reduction of Paper for Routine Reports, Work Permits, and Audit Reports	3,58
Regional 2 Region 2	ONWJ	Pengurangan sampah kertas dengan penggunaan DBMS Utilization of Inorganic Waste (Reduce)	3,01
Regional 4 Region 4	WMO	Pengurangan Penggunaan Kemasan Plastik Reduction of Plastic Packaging Usage	0,76
Regional 4 Region 4	JOB Tomori	Pengurangan Sampah Kayu Bekas dengan Pemanfaatan Menjadi Pallet Reduction of Waste Wood by Repurposing into Pallets	0,29
Regional 4 Region 4	PT Badak NGL	Pengurangan Limbah Residu dengan Cara Segregasi Sampah di Area Kilang, Perkantoran, dan Fasilitas Umum Reduction of Residual Waste through Waste Segregation in Refinery Areas, Offices, and Public Facilities	112,59

*Absolute data on waste reduction up to July

Jumlah Recycle limbah yang dihasilkan dari beberapa insiatif yang dilakukan oleh wilayah kerja PHE Subholding Upstream mencapai:

The amount of recycled waste generated from several initiatives carried out by the PHE Subholding Upstream work area reached:

157.283 Ton / tahun
Ton / year

91,2%
Dari keseluruhan limbah yang dihasilkan
Of the total waste generation

Inisiatif 3R (Reuse, Recycle, Recovery) Limbah B3 di Tahun 2024
3R (Reuse, Recycle, Recovery) Hazardous Waste Initiatives in 2024

Regional Region	**Lokasi** Location	**Inisiatif** Initiative	**Pengurangan Limbah (Ton)** Waste Reduction(Ton)
Regional 2 Region 2	Subang	Pengurangan Limbah Resin (B106d) dengan Metode Pengaturan Rasio Amine Solvent Menggunakan Simulasi Software ProMax 6.0 pada Proses Pemurnian CO2 Reduction of Resin Waste (B106d) by Adjusting the Amine-to-Solvent Ratio Using ProMax 6.0 Software Simulation in the CO2 Purification Process.	5.00
Regional 1 Region 1	Limau	Penangkap pasir permukaan tegak Vertical Surface Sand Catcher	194.62
Regional 1 Region 1	Prabumulih	Scale Build Up Inhibitor dengan Rekayasa Dongkrak Hidraulik untuk Mengurangi Potensi Timbulan Limbah Sludge Oil Scale Build-Up Inhibitor with Hydraulic Jack Engineering to Reduce Potential Sludge Oil Waste	116,1
Regional 3 Region 3	Sanga Sanga	Pengurangan limbah pelumas bekas melalui program SOS (Scheduled On Sampling) Pelumas Bekas Reduction of used lubricant waste through the SOS (Scheduled On Sampling) Used Lubricant program	13,58
Regional 4 Region 4	JOB Tomori	Recovery Asam Sulfat dari Modifikasi Line Drain Sulfuric Acid Recovery from Line Drain Modification	11,04

Pengelolaan limbah melalui pendekatan reuse dan recycle dilakukan di lokasi operasional (on-site), sementara untuk lokasi di luar fasilitas (off-site), limbah disalurkan kepada pihak ketiga yang berkompeten. Pengelolaan lebih lanjut oleh pihak ketiga ini dipastikan telah memenuhi standar dan memperoleh izin yang sah dari instansi pemerintah terkait, dengan pemantauan dan pengawasan yang ketat oleh Fungsi HSSE dan Operasi di masing-masing Wilayah Kerja (WK). Adapun pengolahan limbah B3 dilakukan melalui metode seperti pemanasan (thermal treatment), stabilisasi, dan solidifikasi, yang diterapkan secara fisik, kimia, maupun biologi, dengan memanfaatkan teknologi yang ramah lingkungan dan berstandar bersih.

Waste management through reuse and recycling is conducted on-site, while for off-site locations, the waste is sent to a third-party contractor. The subsequent management by the third party is ensured to have the necessary permits from the relevant government authorities and is closely monitored and supervised by the HSSE and Operations Functions in each Work Area (WA). As for the management of hazardous waste (B3), it is processed using methods such as thermal treatment, stabilization, and solidification, applied through physical, chemical, or biological processes, employing clean and environmentally friendly technologies.

Inisiatif 3R (Reuse, Recycle, Recovery) Limbah Non-B3 di Tahun 2024
3R (Reuse, Recycle, Recovery) Non-Hazardous Waste Initiatives in 2024

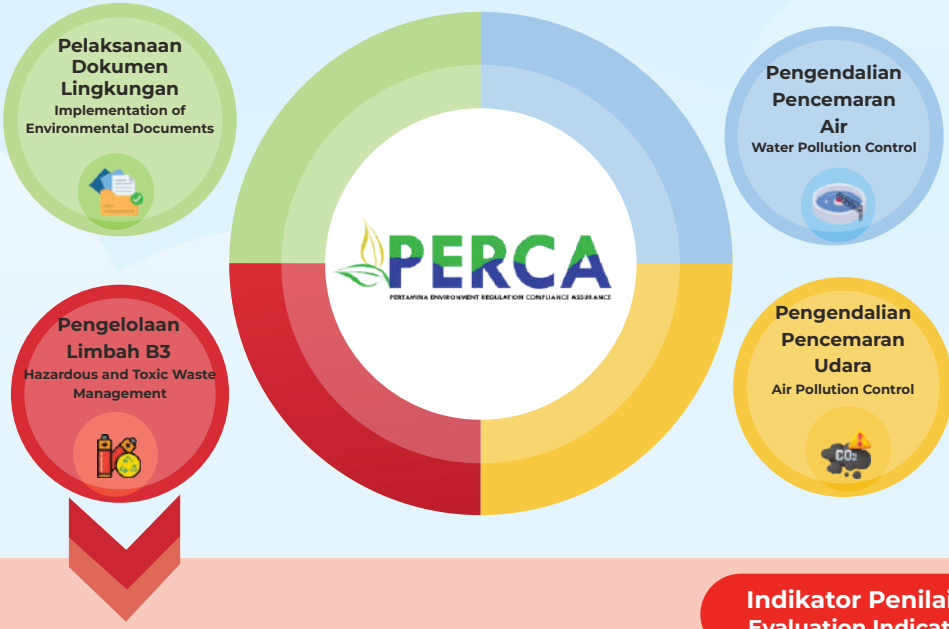
Regional Region	**Lokasi** Location	**Inisiatif** Initiative	**Pengurangan Limbah (Ton)** Waste Reduction (Ton)
Regional 4 Region 4	Sukowati	Pemanfaatan Tubing Bekas untuk Pilling Pondasi Pipe Rack Utilization of Used Tubing for Pipe Rack Foundation Piling	35,7
Regional 2 Region 2	ONWJ	Pemanfaatan Sampah Kertas, Plastik, dan Kayu di Bank Sampah Cilincing Utilization of Paper, Plastic, and Wood Waste at Cilincing Waste Bank	7,01
Regional 3 Region 3	PHM	Pemanfaatan sampah organik sebagai kompos dan pakan ternak Utilization of Organic Waste as Compost and Animal Feed	942,6
Regional 1 Region 1	Rantau	Program Pemanfaatan Scrap Waste sebagai Katapa Ambipartite Column LNB3 Pemanfaatan limbah logam bekas (LNB3 scrap) sebagai Katapa Ambipartite Column LNB3, aksesoris downhole pump yang membantu mengatasi masalah pasir pada sumur produksi	0.098
PT Badak NGL	PT Badak NGL	Pemanfaatan Limbah Organik menjadi kompos Utilization of Organic Waste into Compost	221,65

Ketercapaian TPB
Achievement of SDGs

50% Waste Circularity di tahun 2030
Waste Circularity in 2030

Inisiatif yang dilaksanakan oleh PHE Subholding Upstream melalui serangkaian audit eksternal dan internal untuk memastikan bahwa pengurangan emisi non-GRK yang dilakukan telah terukur dan tercapai secara substansial. Audit internal dilakukan melalui pelaporan PERCA, sementara audit eksternal dilaksanakan melalui pelaporan PROPER. Sepanjang tahun pelaporan, PHE Subholding Upstream tidak mengalami kasus pelanggaran maupun kejadian luar biasa yang terkait dengan pencemaran limbah dan efluen.

The initiatives implemented by PHE Subholding Upstream undergo a series of external and internal audits to ensure that the reduction of non-GHG emissions is measured and substantially achieved. Internal audits are conducted through the PERCA reporting, while external audits are carried out through the PROPER reporting. Throughout the reporting year, PHE Subholding Upstream did not experience any violations or extraordinary incidents related to waste and effluent pollution.



Indikator Penilaian
Evaluation Indicator

1. Perizinan pengelolaan limbah B3
2. Neraca limbah B3;
3. Penanganan lahan atau tanah yang terkontaminasi Limbah B3;
4. Ketaatan penyerahan penanganan limbah B3 kepada pihak ketiga;
5. Kompetensi personil dalam pengelolaan limbah B3;
6. Ketersediaan sistem tanggap darurat.

1. Hazardous Waste Management Licensing;
2. Hazardous Waste Balance Sheet;
3. Management of Land or Soil Contaminated with Hazardous Waste;
4. Compliance with Hazardous Waste Handling by Third Parties;
5. Personnel Competency in Hazardous Waste Management;
6. Availability of Emergency Response System.

Setiap wilayah kerja PHE Subholding Upstream mengembangkan dan melaksanakan inisiatif yang terstruktur untuk mengurangi konsentrasi efluen. Beberapa upaya utama yang telah diimplementasikan antara lain sebagai berikut:

Each operational area of PHE Subholding Upstream develops and implements structured initiatives aimed at reducing effluent concentrations. Some of the key efforts that have been implemented include the following:

Inisiatif Reduce Consentration Effluent
Reduce Effluent Concentration Initiative

Regional Region	Lokasi Location	Inisiatif Initiative
Regional 1 Region 1	PEP Limau	Multilayer water injection untuk enhanced oil recovery (EOR) dan pressure maintenance Multilayer water injection for enhanced oil recovery (EOR) and pressure maintenance
Regional 1 Region 1	PEP Prabumulih	Optimasi four way valve accumulator dual system android
Regional 2 Region 2	PEP Subang	Water shut off (WSO) polimer gel di sumur minyak Water shut off (WSO) polymer gel in oil wells
Regional 3 Region 3	PEP Sangasanga	PATRON completion (Produced Water Utilization as Completion Fluid)
Regional 4 Region 4	PEP Sukowati	Water injection untuk presure maintenance Water injection for pressure maintenance
Regional 4 Region 4	JOB Tomori	Modifikasi sistem netralisasi air buangan wet sulfuric acid (WSA) Water Injection for Pressure Maintenance

Selain pada aktivitas operasional sendiri, Komitmen PHE dalam melakukan pengelolaan dan pengurangan emisi non-GRK, limbah dan effluent juga merambah pemangku kepentingan yang kegiatannya berhubungan langsung dengan entitas PHE, salah satunya adalah pihak ketiga berupa vendor/kontraktor/supplier. Sebelum memilih calon vendor/ kontraktor/pemasok untuk mengikuti tender, PHE sebagai user akan melakukan kajian risiko terkait pengadaan barang/ jasa yang akan digunakan melalui mekanisme Risk Assessment yang mencakup identifikasi potensi risiko HSSE, termasuk di dalamnya risiko yang berkaitan dengan risiko lingkungan, seperti potensi emisi beracun, limbah, dan eksternalitas lingkungan lainnya. Setelah identifikasi potensi risiko pengadaan barang/jasa selesai dilakukan, PHE akan melakukan tinjauan untuk menilai vendor/ kontraktor/pemasok yang memiliki sistem manajemen yang selaras dan mumpuni untuk mengelola risiko HSSE yang telah diidentifikasi. Vendor/kontraktor/pemasok yang memiliki sistem manajemen yang memenuhi standar risiko HSSE yang ditetapkan akan diundang untuk berpartisipasi dalam proses tender, dimana dalam proses tender tersebut suplier/vendor/kontraktor akan dinilai kinerja pengelolaan aspek risiko HSSE termasuk rencana mitigasi HSSE (HSSE Plan) spesifik sesuai dengan barang/jasa yang akan digunakan atau dilakukan

In addition to its own operational activities, PHE's commitment to managing non-GHG emissions, waste and effluent extends to stakeholders directly associated with PHE entities, including third parties such as vendors, contractors, and suppliers.. Before selecting prospective vendors/contractors/suppliers to participate in a tender, PHE, as the user, conducts a risk assessment related to the procurement of goods/services to be used. This Risk Assessment mechanism includes identifying potential HSSE risks, including environmental risks such as potential toxic emissions, waste, and other environmental externalities. After the potential risks in procurement have been identified, PHE conducts a review to evaluate vendors/contractors/suppliers that have robust and aligned management systems capable of managing the identified HSSE risks. Vendors/ contractors/suppliers whose management systems meet the HSSE risk standards set by PHE will be invited to participate in the tender process, during which the performance of suppliers/vendors/ contractors in managing HSSE risks including their specific HSSE mitigation plans (HSSE Plan) tailored to the goods/services to be provided or performed will be assessed.

Vendor/kontraktor/pemasok/pihak ketiga yang terpilih akan diaudit secara berkala seiring dengan siklus pekerjaan melalui mekanisme CSMS (Contractor Safety Management System) yang mengacu pada rencana pengelolaan HSSE yang telah disetujui kontraktor.

Siklus CSMS (Contractor Safety Management System) terdiri dari:

1) Kegiatan Pra Pekerjaan;

2) Pekerjaan Dalam Proses;

3) Evaluasi Akhir.

Temuan audit CSMS yang mencakup evaluasi kinerja pengelolaan lingkungan akan ditindaklanjuti dan dianalisis untuk perbaikan sebelum memasuki tahap berikutnya dalam siklus kerja.

Selected vendors/contractors/suppliers/third parties will be audited periodically throughout the work cycle through the CSMS (Contractor Safety Management System) mechanism, which refers to the HSSE management plan approved by the contractor.

The CSMS (Contractor Safety Management System) cycle consists of:

1. Pre-Work Activities;

2. Work in Progress;

3. Final Evaluation.

Audit findings from the CSMS, which include the evaluation of environmental management performance, will be followed up and analyzed for improvements before moving on to the next phase of the work cycle.

Tumpahan Minyak
Oil Spill

Minyak dan gas alam memegang peranan penting dalam memenuhi kebutuhan energi dengan kontribusi tinggi terhadap konsumsi energi primer. Sebagai salah satu sumber energi utama, pelepasan minyak secara tidak sengaja dalam bentuk tumpahan berpotensi menimbulkan risiko bagi lingkungan dan kesehatan manusia. Ketika minyak tumpah ke lingkungan terestrial maupun perairan, minyak tersebut dapat mencemari tanah dan berdampak negatif terhadap pertumbuhan serta kelangsungan hidup biota baik yang di darat maupun perairan.

Oil and natural gas play a crucial role in meeting energy demands, with a significant contribution to primary energy consumption. As a major energy source, the accidental release of oil in the form of a spill presents potential risks to both the environment and human health. When oil spills occur in terrestrial or aquatic environments, it can contaminate the soil and have a negative impact on the growth and survival of both terrestrial and aquatic life.

Di lingkungan tersestrial, tumpahan minyak dapat meresap ke dalam air tanah dan sumber air tawar lainnya yang memungkinkan adanya penyebaran secara luas di sepanjang lanskap, sehingga menyebabkan ancaman ekologis. Kontaminasi tanah akibat tumpahan minyak menyebabkan berbagai gangguan ekologis, termasuk fragmentasi lanskap dan habitat, yang dapat mengancam keanekaragaman hayati serta ekosistem. Dampak ini menunjukkan pentingnya penerapan langkah pencegahan yang efektif, tanggap darurat yang cepat, dan strategi remediasi untuk meminimalkan konsekuensi lingkungan dari tumpahan minyak tersebut.

In terrestrial environments, oil spills can seep into groundwater and other freshwater sources, allowing for widespread distribution across the landscape, thereby posing ecological threats. Soil contamination from oil spills leads to various ecological disruptions, including landscape and habitat fragmentation, which can threaten biodiversity and ecosystems. This impact highlights the importance of implementing effective prevention measures, rapid emergency response, and remediation strategies to minimize the environmental consequences of oil spills.

Selain itu, tumpahan minyak di perairan memiliki dampak luas lainnya yang meliputi termasuk gangguan pada aktivitas perikanan, pencemaran pasokan air minum, dan polusi ekosistem tambak ikan dan udang. Dampak dari tumpahan minyak dipengaruhi oleh berbagai faktor yang meliputi fisik dan kimia. Hal tersebut akan mengakibatkan adanya penurunan kualitas tidak hanya pada perairan tetapi juga udara sekitarnya beserta kehidupan di dalamnya.

In addition, oil spills have broader impacts, including disruptions to fishing activities, contamination of drinking water supplies, and pollution of fish and shrimp pond ecosystems. The effects of an oil spill are influenced by various factors, including the physical and chemical. This results in a decline in the quality of not only the sea but also the surrounding air and marine life.

Insiden tumpahan minyak dapat terjadi di berbagai fasilitas, mulai dari sumur minyak lepas pantai hingga pipa transportasi darat yang dimiliki oleh PHE Subholding Upstream. PHE Subholding Upstream berkomitmen untuk menangani tumpahan minyak secara cepat dan efektif. Selain itu, perusahaan juga telah mengimplementasikan pedoman tanggap darurat untuk menangani situasi darurat tersebut.

Oil spill incidents are events that have a negative impact on the environment. Oil spills can occur in various facilities, ranging from offshore oil wells to onshore transportation pipelines owned by PHE Subholding Upstream. PHE Subholding Upstream is committed to addressing oil spills swiftly and efficiently. In addition, the company has established emergency response guidelines to handle such situations effectively.

Tumpahan Minyak yang Terjadi
Oil Spill Incident

Tahun Year	Unit Satuan		
	barrel	liter	m^3
2021	41,26	4.919,86	4,91
2022	127,21	15.168,58	15,17
2023	61,75	7.363,09	7,36
2024	58,21	6.940,98	6,94

*Data tahun 2020-2021 merupakan kompilasi perhitungan dari seluruh wilayah kerja PHE Subholding Upsteram.

*The data for 2020-2021 is a compilation of calculations from all operational areas of PHE Subholding Upstream.

PHE Subholding Upstream menyadari pentingnya transparansi dalam menangani insiden ini, sehingga secara rutin PHE Subholding Upstream melaporkan tumpahan minyak kepada Kementerian ESDM sesuai dengan surat edaran No. B-5408/MG.06/DMT/2021. Sejak tahun 2022, pelaporan tumpahan minyak dilakukan secara bulanan. Hingga tahun 2024, total volume tumpahan minyak yang telah dilaporkan dan dipublikasikan mencapai 58,21 barrel atau setara dengan 6.940,98 liter.

PHE Subholding Upstream recognizes the importance of transparency in handling such incidents, and as a result, the company regularly reports oil spills to the Ministry of Energy and Mineral Resources (ESDM) in accordance with Circular Letter No. B-5408/MG.06/DMT/2021. Since 2022, oil spill reports have been submitted on a monthly basis. By 2024, the total volume of oil spills reported and published amounted to 58.21 barrels, equivalent to 6,940.98 liters.

Sebagai bagian dari komitmen perusahaan terhadap praktik bisnis yang bertanggung jawab dan berkelanjutan, PHE Subholding Upstream melakukan evaluasi menyeluruh terhadap prosedur operasional dan sistem pemeliharaan untuk meningkatkan keselamatan serta mencegah terulangnya insiden serupa di masa depan.

As part of the company's commitment to responsible and sustainable business practices, PHE Subholding Upstream conducts a comprehensive evaluation of its operational procedures and maintenance systems to improve safety and prevent the recurrence of similar incidents in the future.

Begitu minyak dilepaskan ke lingkungan, minyak akan menyebar di permukaan tanah atau air. Di darat, minyak akan menyebar tergantung pada jenis permukaan, kemiringan, dan komposisi tanah. Minyak akan mengalir di atas tanah dan dapat menggenang di cekungan atau area yang lebih rendah. Setelah itu, minyak dapat meresap ke dalam tanah, terutama di tanah yang berpori atau di area dengan tanah berpasir atau longgar. Proses ini dikenal sebagai infiltrasi, di mana minyak bergerak ke bawah ke dalam bumi, yang berpotensi mencemari air tanah dan mempengaruhi akar tanaman serta ekosistem bawah tanah.

Once oil is released into the environment, it begins to spread across the surface of the land or water. On land, the oil will spread depending on the surface type, slope, and soil composition. It will flow over the ground and may pool in depressions or low-lying areas. After that, oil can seep into the soil, especially in porous ground or areas with sandy or loose soil. This is known as infiltration, where the oil moves downward into the earth, potentially contaminating groundwater and affecting plant roots and underground ecosystems.

Beberapa komponen minyak yang tumpah bersifat volatil dan akan menguap ke udara. Fraksi minyak yang lebih ringan, seperti benzena atau hidrokarbon lainnya, dapat menguap dengan cepat, meninggalkan minyak atau residu yang lebih berat. Meskipun proses ini sebagian besar alami, dalam beberapa keadaan, metode pemulihan uap atau teknik ventilasi dapat digunakan untuk menangkap zat volatil ini dan mengurangi polusi udara.

Some components of the spilled oil are volatile and will evaporate into the air. Lighter fractions of oil, such as benzene or other hydrocarbons, may evaporate quickly, leaving behind heavier oils or residues. While this process is largely natural, in certain circumstances, vapor recovery methods or ventilation techniques may be used to capture these volatile substances and minimize air pollution.

Bioremediasi adalah proses alami atau yang dipercepat di mana mikroorganisme, seperti bakteri dan jamur, menguraikan minyak menjadi zat yang kurang berbahaya seperti karbon dioksida dan air. Proses ini dapat terjadi secara alami atau dipercepat dengan menambahkan nutrisi ke area yang terkontaminasi. Jika bioremediasi diterapkan, penting untuk memantau lingkungan dan memastikan kondisi yang tepat (seperti suhu, kelembaban, dan kadar oksigen) tetap terjaga. Dalam beberapa kasus, nutrisi seperti nitrogen dan fosfor dapat ditambahkan untuk mempercepat degradasi alami minyak.

Bioremediation is a natural or enhanced process where microorganisms, such as bacteria and fungi, break down oil into less harmful substances like carbon dioxide and water. This process can occur naturally or be accelerated by adding nutrients to the affected area. If bioremediation is applied, it's important to monitor the environment and ensure that the right conditions (such as temperature, moisture, and oxygen levels) are maintained. In some cases, nutrients like nitrogen and phosphorus may be added to accelerate the natural degradation of oil.

Tindak lanjut dan Tindakan korektif
Follow Up and Corrective Action

Functional Safety Assessment	Fixed Fire Protection	Mooring Unmooring System (Penggantian Subsea hose)	Pendidikan untuk manpower dan penambahan manpower Education for manpower and additional manpower

PHE Subholding Upstream berkomitmen untuk menangani tumpahan minyak dengan serius melalui langkah-langkah tindak lanjut dan tindakan korektif yang efektif. Setelah tumpahan terdeteksi, tim tanggap darurat segera dikerahkan untuk mengendalikan dan membatasi penyebaran minyak. Penilaian dampak dilakukan oleh tim HSSE bersama ahli lingkungan untuk menentukan area terdampak. Proses pembersihan menggunakan metode ramah lingkungan dan diikuti oleh upaya pemulihan lingkungan. Investigasi mendalam mengidentifikasi akar penyebab tumpahan, diikuti oleh implementasi tindakan korektif seperti peningkatan prosedur operasional dan pelatihan karyawan. Pemantauan berkelanjutan dan pelaporan transparan memastikan tidak ada efek jangka panjang yang merugikan lingkungan.

PHE Subholding Upstream is committed to addressing oil spills seriously through effective follow-up measures and corrective actions. Upon detection of a spill, the emergency response team is immediately deployed to control and contain the spread of oil. The HSSE team, along with environmental experts, conducts impact assessments to determine the affected areas. The cleanup process uses environmentally friendly methods and is followed by environmental restoration efforts. In-depth investigations identify the root causes of the spill, followed by the implementation of corrective actions such as improving operational procedures and employee training. Continuous monitoring and transparent reporting ensure no long-term adverse environmental effects.

Insiden yang Berpotensi Mengganggu Lingkungan
Incidents with the Potential to Harm the

PHE Subholding Upstream berkomitmen untuk selalu siaga dan siap dalam menangani semua insiden yang berpotensi mengganggu lingkungan sekitar dan operasional perusahaan. Insiden dan upaya penanggulangannya secara aktif dibahas dalam rapat tinjauan manajemen di setiap Wilayah Kerja (WK). Pada tahun 2024, beberapa insiden terjadi, dan penyebabnya telah diidentifikasi serta diikuti dengan rencana aksi yang dilaksanakan oleh PHE Subholding Upstream. PHE Subholding Upstream dengan cepat dan tanggap mengambil tindakan untuk mencegah perluasan dampak negatif insiden terhadap lingkungan.

PHE Subholding Upstream is committed to always being vigilant and prepared to handle any incidents that may potentially disrupt the surrounding environment and company operations. Incidents and their mitigation efforts are actively discussed in management review meetings in each Working Area (WK). In 2024, several incidents occurred, and their causes have been identified, followed by action plans implemented by PHE Subholding Upstream. PHE Subholding Upstream promptly and responsively took action to prevent the expansion of negative impacts of incidents on the environment.

Kebocoran minyak dapat terjadi selama pengiriman melalui truk, dalam kegiatan pengeboran, saat transfer di terminal, dan juga kebocoran gas pada pipa.

Oil leaks can occur during delivery via truck, during drilling activities, during transfer at the terminal, and also gas leaks in pipes.

Keanekaragaman Hayati
Biodiversity

Menurut Global Risks Report yang diterbitkan setiap tahun oleh World Economic Forum (WEF), selain risiko iklim ekstrem, kehilangan keanekaragaman hayati juga dianggap sebagai risiko global bagi kehidupan manusia. Keanekaragaman hayati memberikan banyak manfaat, mulai dari memenuhi kebutuhan dasar manusia seperti pangan dan obat-obatan, hingga menjaga keseimbangan ekosistem dan mendukung berbagai sektor ekonomi seperti pariwisata, stabilitas iklim, pengaturan siklus air dan nutrisi, serta menyediakan bahan baku untuk industri, termasuk sumber energi dan bahan bakar.

Melindungi keanekaragaman hayati adalah salah satu dari 11 Strategi Keberlanjutan PHE Subholding Upstream. Selain itu, melindungi keanekaragaman hayati juga termasuk dalam Pilar Lingkungan dalam Strategi dan Peta Jalan Keberlanjutan pada Fase Program Keanekaragaman Hayati pada Fase Konsolidasi 2023-2025. Perlindungan keanekaragaman hayati tercakup dalam Kebijakan Pengelolaan Lingkungan PHE Subholding Upstream.

PHE Subholding Upstream menyadari bahwa operasionalnya berada di berbagai ekosistem dan berkomitmen untuk melindungi serta melestarikan keanekaragaman hayati di area tersebut. Salah satu cara perusahaan melakukannya adalah melalui program penghijauan dan konservasi. Perusahaan menanam pohon, mangrove, dan terumbu karang untuk merehabilitasi area yang terdampak oleh operasi serta mendukung inisiatif konservasi untuk melindungi spesies satwa liar dan habitat yang rentan.

Program keanekaragaman hayati yang sistematis yang digagas oleh PHE Subholding Upstream dengan berbagai inisiatif meliputi peningkatan komitmen terhadap dampak positif bersih melalui program perlindungan flora dan fauna langka serta mengurangi penggunaan lahan dan mengembangkan rencana keanekaragaman hayati untuk semua operasional. Melibatkan pemangku kepentingan dan mengembangkan solusi berbasis alam juga merupakan bagian penting dari program ini.

According to the Global Risks Report published annually by the World Economic Forum (WEF), in addition to extreme climate risks, biodiversity loss is also considered a global risk to human life. Biodiversity provides many benefits, from fulfilling basic human needs such as food and medicine to maintaining ecosystem balance and supporting various economic sectors like tourism, stabilizing the climate, regulating the water cycle, and nutrient cycles, as well as supplying raw materials for industries, including energy and fuel.

Protecting biodiversity is one of the 11 Sustainability Strategies of PHE Subholding Upstream. Furthermore, protecting biodiversity is part of the Environmental Pillar in the Sustainability Strategy and Roadmap during the Foundation Phase from 2020-2023 and the Biodiversity Program in the Consolidation Phase from 2023-2025. Biodiversity protection is incorporated into the Environmental Management Policy of PHE Subholding Upstream.

PHE Subholding Upstream recognizes that its operations are located in various ecosystems and is committed to protecting and preserving biodiversity in these areas. One of the ways the company does this is through greening and conservation programs. The company plants trees, mangroves, and corals to rehabilitate areas affected by operations and supports conservation initiatives to protect vulnerable wildlife species and habitats.

The systematic biodiversity program initiated by PHE Subholding Upstream involves various initiatives, including enhancing commitment to achieving a net positive impact through the protection of rare flora and fauna species, reducing land use and developing biodiversity plans for all operations. Stakeholder involvement and the development of nature-based solutions are also key components of this program.

Selain itu, PHE Subholding Upstream telah terlibat dalam penyusunan Biodiversity Action Plan (BAP) di beberapa wilayah kerjanya. Upaya ini dilakukan untuk memastikan bahwa dampak positif terhadap keanekaragaman hayati, baik ekosistem maupun organisme, yang disebabkan oleh proyek lebih besar dari dampak negatifnya. Hal ini diterapkan untuk wilayah kerja yang melibatkan pembukaan lahan atau yang terletak di Key Biodiversity Areas (KBA), yaitu area sensitif yang kaya akan keanekaragaman hayati. Melestarikan flora dan fauna yang dinyatakan terancam punah berdasarkan IUCN red list dan penyusunan Biodiversity Action Plan (BAP) dengan orientasi mencapai net positive impact 100% pada tahun 2030 untuk fasilitas baru yang bersinggungan/berada dengan significant impact area setelah 2022.

Additionally, PHE Subholding Upstream has been involved in preparing Biodiversity Action Plans (BAP) in several of its operational areas. This effort is aimed at ensuring that the positive impacts on biodiversity, both in terms of ecosystems and organisms, caused by the projects, are greater than any negative impacts. This is applied to operational areas that involve land clearance or are located in Key Biodiversity Areas (KBA), which are sensitive areas rich in biodiversity. Preserving flora and fauna classified as endangered according to the IUCN Red List and developing a Biodiversity Action Plan (BAP) with the goal of achieving a 100% net positive impact by 2030 for intersecting/located in significant impact areas after 2022.

Beberapa wilayah kerja PHE Subholding Upstream telah melaksanakan studi Biodiversity Action Plan, di antaranya :

Several of PHE Subholding Upstream's operational areas have implemented Biodiversity Action Plan studies, including:

PEP Pendopo | Sumatra Selatan
- Klaster Mambang, Musi, Sopa, Benakat, dan Talang Akar

PEP Jatibarang | Kab. Indramayu, Jawa Barat
- Sumur AMJ-02, AMJ-4Y, dan ROW Kecamatan Sliyeg

PHSS | Kalimantan Timur
- Sumur Draco-E, Phoenix-3 (PNX-3), Phoenix-2 (PNX-2), Helios D-2X, dan Polaris D-2X

PEP DMF | Sulawesi Tengah
- CPP Donggi; Area Green Zona CPP (DON. 1); Kebun di Barat CPP (DON. 2); Hutan di Timur CPP (DON. 3)
- CPP Matindok; Area Green Zone CPP (MAT 1); Kebun/hutan di Selatan CPP (MAT .2); Kebun/ladang di Timur CPP (MAT 3)

PEP ONWJ | Jawa Barat
- Kawasan sekitar Kabupaten karawang

PEPC JTB | Cluster 1
- Area Tapak Proyek
- Hutan Lindung Kecamatan Trucuk, Bubulan, Ngasem, dan Sekar.

PHR | Riau
- Wilayah Duri DSF dan Hutan Talang

JOB Tomori | Sulawesi Tengah
- CPP Senoro; Area Green Zone CPP (SEN.1); Hutan di tenggara CPP (SEN.2); Belakang gedung LNB3 (SEN.3); Mangrove dekat Jetty (SEN.4)
- CPP Senoro fase 2; Site CPP (SEN-2.1); SIte CPP (SEN-2.2);Estuaria (SEN-2.3)

Beberapa wilayah operasional, baik yang dimiliki, disewa, atau dikelola, terletak di dalam atau dekat kawasan yang dilindungi dan area dengan nilai keanekaragaman hayati tinggi, yang telah dilengkapi dengan dokumen perizinan dari Kementerian Lingkungan Hidup dan Kehutanan (KLHK).

Several operational areas, whether owned, leased, or managed, are located within or near protected areas and high biodiversity value areas, all of which have obtained licensing documents from the Ministry of Environment and Forestry (KLHK).

Perusahaan berkomitmen untuk meminimalkan dampak operasional pada area-area ini, dengan menerapkan praktik terbaik dalam pengelolaan lingkungan dan keanekaragaman hayati. Semua proses operasional dan produksi dilakukan dengan penuh kehati-hatian sesuai dengan regulasi yang berlaku, untuk meminimalkan dampak terhadap keanekaragaman hayati yang ada.

Dampak signifikan dari aktivitas, produk, dan layanan terhadap keanekaragaman hayati juga menjadi fokus utama dalam strategi pengelolaan lingkungan. Perusahaan secara proaktif mengevaluasi dan mengelola dampak ini, baik dalam tahap perencanaan maupun pelaksanaan operasi. Hal ini mencakup memastikan bahwa semua kegiatan operasional tidak mengganggu habitat alami, serta mengambil langkah-langkah untuk mengurangi, mengkompensasi, atau memulihkan setiap dampak negatif yang mungkin terjadi. Melalui pendekatan ini, perusahaan berusaha untuk tidak hanya mematuhi regulasi, tetapi juga menjadi pemimpin dalam pelestarian keanekaragaman hayati.

PHE Subholding Upstream dengan tegas berkomitmen untuk menjaga keanekaragaman hayati, khususnya melalui perlindungan habitat flora dan fauna di dalam dan luar wilayah operasionalnya. Hingga tahun 2024, inisiatif konservasi dan perlindungan keanekaragaman hayati yang dilakukan melalui penanaman pohon mencakup luas area 1.112,45 ha di dalam area premises, 1.225,08 ha di luar area premises, 938,39 ha pada IPPKH, dan 501,29 ha dilakukan oleh Fungsi Corporate Social Responsibility (CSR). Sementara itu, luas kawasan konservasi di area offsite mencapai 84.613,72 ha, dengan area overlap sebesar 7.146,89 ha.

Perusahaan berupaya menghindari kegiatan operasional di kawasan dengan nilai keanekaragaman hayati tertinggi, menunjukkan perhatian mendalam terhadap pelestarian lingkungan dan ekosistem yang berharga. Dalam perencanaan operasional, perusahaan menegaskan komitmennya untuk meminimalkan dampak terhadap keanekaragaman hayati. PHE Subholding Upstream juga menegaskan prinsip 'No Net Loss' dengan target 'Net Positive Impact' terhadap keanekaragaman hayati, yang menunjukkan tekadnya untuk tidak hanya menghindari dampak negatif atau kerugian tetapi juga berupaya memberikan kontribusi positif dalam pelestarian ekosistem.

The company is committed to minimizing operational impacts on these areas by implementing best practices in environmental and biodiversity management. All operational and production processes are carried out with due care, in compliance with applicable regulations, to minimize the impact on the biodiversity present.

The significant impact of activities, products, and services on biodiversity is also a key focus in the environmental management strategy. The company proactively evaluates and manages these impacts, both in the planning stage and during operations. This includes ensuring that all operational activities do not disturb natural habitats and taking steps to mitigate, compensate for, or restore any potential negative impacts. Through this approach, the company aims to not only comply with regulations but also lead in biodiversity conservation.

PHE Subholding Upstream is firmly committed to safeguarding biodiversity, particularly through the protection of flora and fauna habitats both within and outside its operational areas. By 2024, the conservation and biodiversity protection initiatives carried out through tree planting covered an area of 1,112.45 ha within the premises, 1,225.08 ha outside the premises, 938.39 ha in IPPKH, and 501.29 ha were carried out by the Corporate Social Responsibility (CSR) function. Additionally, the conservation area in offsite areas spans 84,613.72 ha, with an overlap area of 7,146.89 ha.

The company strives to avoid operational activities in areas with the highest biodiversity value, demonstrating its deep concern for preserving valuable environmental and ecosystem areas. In operational planning, the company reaffirms its commitment to minimizing impacts on biodiversity. PHE Subholding Upstream also upholds the 'No Net Loss' with 'Net Positive Impact' target on biodiversity, which demonstrating its determination not only to avoid negative impact and losses but also to contribute positively to the conservation of ecosystems.

Beberapa Wilayah Kerja (WK) PHE Subholding Upstream terletak di sekitar atau dekat dengan kawasan dilindungi dan area dengan keanekaragaman hayati tinggi. Untuk wilayah kerja di luar negeri, tidak ada yang berada dalam kawasan yang dilindungi, termasuk kawasan Arktik sesuai dengan regulasi internasional. PHE Subholding Upstream memastikan bahwa setiap kegiatan di wilayah kerja yang berada dalam atau dekat dengan kawasan dilindungi atau area dengan keanekaragaman hayati tinggi telah memperoleh dokumen perizinan dari Kementerian Lingkungan Hidup dan Kehutanan (KLHK). Semua proses operasional dan produksi dilakukan dengan penuh kehati-hatian sesuai dengan regulasi yang berlaku, dengan tujuan meminimalkan dampak terhadap keanekaragaman hayati di daerah tersebut.

Several of PHE Subholding Upstream's operational areas are located near or within protected areas and high biodiversity zones. For foreign operations, none of them are located within protected areas, including those in the Arctic, in accordance with international regulations. PHE Subholding Upstream ensures that all activities within or near protected areas or biodiversity-rich zones have obtained the necessary licensing documents from the Ministry of Environment and Forestry (KLHK). All operational and production processes are carried out with care, in compliance with applicable regulations, with the goal of minimizing impacts on the biodiversity of these areas.

Lokasi WK PHE Subholding Upstream di Indonesia yang Berada dan/atau Berdekatan dengan Kawasan Dilindungi

Locations of PHE Subholding Upstream Operating Areas in Indonesia that are Within and/or Adjacent to Protected Areas

Lokasi Location	**Wilayah Kerja Pengelola** Management Work Area	**Keterangan** Information
WK Blok Offshore Northwest Java (ONWJ)	PT PHE ONWJ	Seluas 71,5 km² dari WK di perairan Kabupaten Kepulauan Seribu berada di kawasan Taman Nasional Kepulauan Seribu, DKI Jakarta An area of 71,5 km² of the PHE Subholding Upstream's WK in the waters of the Kepulauan Seribu Regency is located within the Kepulauan Seribu National Park, DKI Jakarta
		Wilayah kerja terluar PHE ONWJ di perairan Kabupaten Indramayu, berdekatan dengan Kepulauan Biawak yang berstatus Kawasan Konservasi Laut Daerah (KKLD) Kabupaten Indramayu, dengan jarak terdekat sekitar 9 km The outermost working area of PHE ONWJ in the waters of the Indramayu Regency is adjacent to the Biawak Islands, which are designated as the Indramayu District's Marine Conservation Area (KKLD), with the closest distance being approximately 9 km
WK Blok Offshore Southeast Sumatera (OSES)	PT PHE OSES	Wilayah kerja terluar PHE OSES di perairan Laut Jawa, berbatasan dengan Taman Nasional Kepulauan Seribu di Tenggara dan Taman Nasional Way Kambas di Barat The outermost working area of PHE OSES in the waters of the Java Sea borders the Kepulauan Seribu National Park to the southeast and the Way Kambas National Park to the west
WK Jambi Merang	PT PHE Jambi Merang	Wilayah Kerja PHE Jambi Merang beririsan dengan kawasan Taman Nasional Sembilang The WK of PHE Jambi Merang intersects with the Sembilang National Park area

Lokasi Location	**Wilayah Kerja Pengelola** Management Work Area	**Keterangan** Information
WK Donggi Matindok	PT Pertamina EP	Wilayah Kerja PEP Field Donggi Matindok berbatasan dengan Taman Keanekaragaman Hayati Kokolomboi, Banggai Kepulauan, Sulawesi Tengah The WK of PEP Field Donggi Matindok borders the Kokolomboi Biodiversity Park in the Banggai Islands, Central Sulawesi
WK Sanga-sanga	PT Pertamina EP	Wilayah Kerja PEP Field Sanga Sanga area Samboja berbatasan dengan Taman Nasional Bukit Soeharto The WK of PEP Field Sanga Sanga in the Samboja area borders the Bukit Soeharto National Park
WK Rokan	PT Pertamina Hulu Rokan	Wilayah Kerja Rokan beririsan dengan Taman Hutan Raya Sultan Syarif Hasyim pada Wilayah Operasi Minas Siak dan beririsan dengan Suaka Margasatwa Balairaja pada wilayah operasi Bekasap Rokan The Rokan working area intersects with the Sultan Syarif Hasyim Grand Forest Park in the Minas Siak operation area and with the Balairaja Wildlife Sanctuary in the Bekasap Rokan operation area
WK Rantau	PT Pertamina EP Asset 1 Field Rantau	WK Rantau Field berada dalam satu kabupaten dengan Kawasan Ujung Tamiang, pada tahun 2023 Rantau Field fokus pada penanaman flora untuk menunjang habitat Tuntong Laut WK Rantau Field berada dalam satu kabupaten dengan Kawasan Ujung Tamiang, pada tahun 2023 Rantau Field fokus pada penanaman flora untuk menunjang habitat Tuntong Laut

Berdasarkan identifikasi yang dilakukan oleh PHE Subholding pada tahun 2024, terdapat beberapa spesies fauna yang dilindungi menurut Undang-Undang (UU) No. 5 Tahun 1990 mengenai Konservasi Sumber Daya Alam; Peraturan Pemerintah No. 7 Tahun 1999 tentang Pengawetan Jenis Tumbuhan dan Satwa; Peraturan Menteri Lingkungan Hidup dan Kehutanan No. 106 Tahun 2018 tentang Jenis Tumbuhan dan Satwa yang Dilindungi; serta pengategorian tingkat kepunahan dan status konservasi berdasarkan Daftar Merah The International Union for Conservation of Nature (IUCN).

Based on the identification carried out by PHE Subholding in 2024, several species of fauna are protected under Law No. 5 of 1990 on Conservation of Natural Resources; Government Regulation No. 7 of 1999 on the Conservation of Plant and Animal Species; Minister of Environment and Forestry Regulation No. 106 of 2018 on Protected Plant and Animal Species; as well as the extinction level and conservation status classification based on the International Union for Conservation of Nature (IUCN) Red List.

Daftar Merah The International Union for Conservation of Nature (IUCN)
International Union for Conservation of Nature (IUCN) Red List

Kritis atau Sangat Terancam Punah Critically Endangered (CE)	**Terancam Punah** Endangered (EN)	**Rentan** Vulnerable (VU)	**Hampir Terancam** Near Threatened (NT)	**Risiko Rendah** Least Concern (LC)
11	**19**	**18**	**9**	**163**

Terdapat peningkatan jumlah untuk setiap masing-masing kategori status konservasi IUCN dibandingkan tahun sebelumnya. Kenaikan jumlah spesies ini merupakan implikasi dari adanya spesies flora maupun fauna yang baru dijumpai saat melakukan studi eksplorasi keanekaragaman hayati flora dan fauna di WK PHE Subholding Upstream.

Pada tingkat Kritis atau Sangat Terancam Punah (CE) terdapat kenaikan menjadi 11 spesies yang tahun sebelumnya 9 spesies, pada tingkat Terancam Punah (EN) naik 1 spesies menjadi 19 jika dibandingkan tahun lalu, namun pada tingkat Rentan (VU) terdapat penurunan hingga menadi setengahnya dibanding tahun lalu yakni 9 spesies, pada tingkatan Hampir Terancam (NT) terdapat peningkatan yang cukup signifikan menjadi 18 yang mana tahun lalu hanya 7, sedangkan pada tingkat dan Risiko Rendah (LC) mengalami peningkatan yang sangat signifikan di mana pada tahun sebelumnya ada 95 spesies dan tahun ini menjadi 163 spesies.

Peningkatan jumlah spesies pada berbagai kategori status konservasi IUCN menegaskan pentingnya pemantauan dan upaya perlindungan keanekaragaman hayati secara berkelanjutan di wilayah kerja PHE Subholding Upstream. Temuan ini menunjukkan bahwa keberadaan spesies flora dan fauna baru yang teridentifikasi memerlukan kewaspadaan serta komitmen lebih besar untuk memastikan kelestariannya. Dengan memberikan perhatian terhadap status konservasi IUCN, PHE Subholding Upstream menegaskan kembali tanggung jawabnya dalam menjaga keanekaragaman hayati, meminimalkan ancaman

There has been an increase in the number of species in each conservation status category of the IUCN Red List compared to the previous year. This rise in the number of species reflects the discovery of new flora and fauna species during the biodiversity exploration study in the PHE Subholding Upstream operational areas.

At the Critically Endangered (CE) level, there was an increase to 11 species from 9 species in the previous year. The number of species classified as Endangered (EN) rose by 1 to a total of 19 species, compared to the previous year. However, the number of species categorized as Vulnerable (VU) decreased by half compared to last year, with 9 species identified this year. The Near Threatened (NT) category saw a significant increase to 18 species, up from only 7 species the previous year. Meanwhile, the Least Concern (LC) category experienced a substantial rise, with the number of species increasing from 95 last year to 163 this year.

The increase in the number of species across various IUCN conservation status categories highlights the growing importance of continuous biodiversity monitoring and protection efforts within PHE Subholding Upstream's working areas. These findings emphasize that the presence of newly identified flora and fauna species requires greater vigilance and commitment to ensure their survival. By paying close attention to the IUCN conservation status, PHE Subholding Upstream reaffirms its

PHE Subholding Upstream melaksanakan berbagai program inisiatif untuk melindungi ekosistem alami di beberapa area operasionalnya. Berikut adalah beberapa program inisiatif yang telah dijalankan:

PHE Subholding Upstream implements various initiatives to protect natural ecosystems in several of its operational areas. Below are some of the initiatives that have been implemented:

Program Pemeliharaan Keanekaragaman Hayati
Biodiversity Conservation Program

Regional Region	**Lokasi** Location	**Program**	**Hasil kegiatan keanekaragaman hayati (Dampak)** Activity Results Biodiversity (Impact)
Regional 4 Region 4	Pertamina Asset 4 Sukowati Field	Program perbaikan habitat cemara laut (Casuarina equisetifolia) Restoration of coastal she-oak (Casuarina equisetifolia)	Penanaman 4.250 pohon cemara laut dalam luas 12,37 Ha dengan penyerapan emisi karbon sebesar 7.039,40 Ton CO_2eq/tahun Planting of 4,250 coastal she-oak trees trees over an area of 12.37 Ha, with a carbon absorption capacity of 7,039.40 Ton CO_2eq per year
		Program Mangrove Perisai Jenu di Desa Jenu, Kabupaten Tuban Mangrove Perisai Jenu Program in Jenu Village, Tuban Regency	Penanaman 7.545 mangrove dalam luas 9,28 Ha Planting of 7,545 mangrove over an area of 9.28 Ha
		Program PROV Brondong (Penanaman Mangrove di Pesisir Pantai Brondong) PROV Brondong Program (Mangrove Planting at Brondong Beach)	Penanaman 5.000 bibit mangrove dalam luas 3,50 Ha Planting of 5,000 mangrove seedlings over an area of 3.50 Ha
		Program Penetapan Kawasan Konservasi The Conservation Area Designation program	Luas lahan 6,19 ha dengan total penanaman 16.203 pohon An area of 6.19 Ha with a total of 16,203 trees planted
Regional 2 Region 2	PHE Offshore North West Java (ONWJ)	Program REMAJA (Restorasi Mangrove Pantai Utara Jawa) dengan konsep OTAP (Orang Tua Asuh Pohon) REMAJA (Restoration of Mangroves in Northern Java) using the OTAP (Parenting Trees) concept.	Total 335.313 batang yang ditanam pada area seluas 38,46 Ha pada tahun 2024 di 4 Kabupaten Kabupaten Karawang, Subang, Bekasi dan Kepulauan Seribu A total of 335,313 trees planted over an area of 38.46 hectares in 2024, across 4 regencies: Karawang, Subang, Bekasi, and Kepulauan Seribu
		OTAK JAWARA (Orang Tua Asuh Karang di Laut Utara Jakarta dan Jawa Barat) OTAK JAWARA (Parenting Coral Reefs in North Jakarta and West Java)	Penerapan Inovasi Modul Honai, melalui media transplantasi sebanyak 350 buah dengan luas transplantasi 0,05 Ha, menghasilkan 1.616 fragmen karang pada tahun 2024 Implementation of the Honai Module Innovation, using 350 transplant media over a transplantation area of 0.05 hectares, resulted in 1,616 coral fragments in 2024

Regional	Lokasi Location	Inisiatif Initiative	Hasil kegiatan keanekaragaman hayati (Dampak) Activity Results Biodiversity (Impact)
Regional 2 Region 2	PHE Offshore North West Java (ONWJ)	KONSER MYUSIK (Konservasi Menyelamatkan Penyu Sisik) KONSER MYUSIK (Conservation of Hawksbill Sea Turtles)	Sepanjang tahun 2024 telah berhasil menyelamatkan 318 butir telur dan menetaskan 175 butir telur serta melepasliarkan 175 tukik In 2024, a total of 318 eggs were successfully rescued, 175 eggs were hatched, and 175 hatchlings were released into the wild.
Regional 1 Region 1	PHE Jambi Merang	Program konservasi gajah sumatera sejak tahun 2023 dengan tujuan untuk berkontribusi dalam kegiatan perlindungan satwa langka dan terancam punah The Sumatran elephant conservation program has been underway since 2023, with the aim of contributing to the protection of endangered and vulnerable wildlife.	Konservasi gajah sumatera di luar wilayah operasi yaitu di Kebun Binatang Taman Rimbo Jambi The Sumatran elephant conservation outside the operational area is located at the Taman Rimbo Zoo in Jambi.
Regional 3 Region 3	PHKT DOBS	Program Ratu Bersemi (Rawat Tumbuh dan Hijaukan Bumi) untuk pelestarian keanekaragaman hayati di Terminal Lawe-Lawe The Ratu Bersemi Program (Nurture Growth and Green the Earth) for biodiversity conservation at Terminal Lawe-Lawe.	Menetapkan kawasan konservasi di Terminal Lawe-Lawe Establishing a conservation area at Terminal Lawe-Lawe.
Regional 3 Region 3	PEP Donggi Matindok Field	Program konservasi satwa endemik gagak banggai khas Pulau Peleng Conservation program for the endemic Banggai crow native to Peleng Island.	Konservasi gagak banggai di Taman Kehati Kokolomboi melalui pengkataan pakan dengan tanaman lokal Conservation of the Banggai crow at the Kokolomboi Wildlife Sanctuary through the enrichment of food with local plants.
Regional 3 Region 3	JOB Tomori	Program konservasi burung maleo sengkawor di Kawasan Suaka Margasatwa Bangkiriang Conservation program for the maleo bird in the Bangkiriang Wildlife Sanctuary.	Inisiatif konservasi secara penetasan in situ maupun ex situ di CPP Senoro dan hanya dilakukan jika diperoleh telur sitaan di luar kawasan konservasi oleh BKSDA Conservation initiatives through in situ and ex situ hatching at CPP Senoro, which are only carried out if confiscated eggs are obtained outside the conservation area by the BKSDA.

Perlindungan dan Pemulihan Habitat di Daerah Operasi
Habitat Protection and Restoration in Operational Areas

Sepanjang tahun 2024, PHE Subholding Upstream melaksanakan berbagai upaya untuk melindungi dan memulihkan habitat diseluruh wilayah kerja operasional PHE Subholding Upstream dan anak perusahaan. Disamping itu, PHE juga melakukan program penanaman kembali pohon dengan berbagai spesies, termasuk spesies yang endemik. Kegiatan pemulihan habitat, lahan, dan konservasi tersebut dilakukan dengan melibatkan berbagai pihak, seperti akademisi atau perguruan tinggi serta Lembaga Swadaya Masyarakat (LSM) untuk studi dan penelitian, lalu masyarakat untuk kegiatan penanaman dan pemeliharaan, serta pihak terkait dari Kementerian Lingkungan Hidup dan Kehutanan (KLHK), termasuk Balai Konservasi Sumber Daya Alam (BKSDA) dan Dinas Lingkungan Hidup (DLH) setempat.

Throughout 2024, PHE Subholding Upstream carried out various efforts to protect and restore habitats across all operational work areas of PHE Subholding Upstream and its subsidiaries. In addition, PHE also initiated a reforestation program with a variety of tree species, including endemic species. These habitat restoration, land rehabilitation, and conservation activities were conducted in collaboration with various stakeholders, including academic institutions and Non-Governmental Organizations (NGOs) for studies and research, local communities for planting and maintenance activities, and relevant authorities from the Ministry of Environment and Forestry (KLHK), including the Natural Resources Conservation Agency (BKSDA) and the local Environmental Agency (DLH).

Perlindungan Keanekaragaman PT Pertamina Asset 4 Sukowati Field
Biodiversity Protection of PT Pertamina Asset 4 Sukowati Field

PT Pertamina Asset 4 Sukowati Field menyadari pentingnya pengelolaan dampak dari kegiatan operasi minyak dan gas bumi serta berkomitmen untuk melindungi keanekaragaman hayati. Oleh karena itu, untuk memastikan kelestarian keanekaragaman hayati, diperlukan upaya konservasi yang efektif. Berdasarkan pemikiran tersebut, PT Pertamina Asset 4 Sukowati Field telah mengambil inisiatif untuk mengelola lingkungan dan melestarikan tumbuhan lokal sebagai bagian dari upaya pemantauan periodik terhadap keanekaragaman hayati serta memastikan kelestarian tumbuhan tersebut.

PT Pertamina Asset 4 Sukowati Field realizes the importance of managing the environmental impacts of oil and gas operations and is committed to protecting biodiversity. Therefore, to ensure the preservation of biodiversity, effective conservation efforts are required. In line with this, PT Pertamina Asset 4 Sukowati Field has initiated environmental management and the preservation of local plant species as part of efforts to periodically monitor biodiversity and ensure the sustainability of plants.

Salah satu kegiatan konservasi yang dilaksanakan oleh PT Pertamina Asset 4 Sukowati Field adalah program perbaikan habitat cemara laut (Casuarina equisetifolia) yang bertujuan untuk mencegah erosi di sepanjang pantai Jenu, Kabupaten Tuban. Program konservasi ini dimulai pada tahun 2020 dengan penanaman 500 pohon cemara laut di kawasan pantai, dan hingga tahun 2024, jumlah pohon yang ditanam telah mencapai 4.250 pohon. Selain itu, area seluas 12,37 Ha di pesisir pantai tersebut telah berkontribusi dalam penyerapan emisi karbon sebesar 7.039,40 Ton CO_2eq/tahun.

One of the conservation activities carried out by PT Pertamina Asset 4 Sukowati Field is the restoration of coastal she-oak (Casuarina equisetifolia) aimed at preventing coastal erosion along the Jenu Beach in Tuban Regency. This conservation program began in 2020 with the planting of 500 coastal she-oak along the coastline, and by 2024, a total of 4,250 trees have been planted. Additionally, the 12.37 ha area of coastal has contributed to the absorption of 7,039.40 Ton CO_2eq/year.

Masih berkaitan dengan pesisir, PT Pertamina EP Asset 4 Sukowati Field melaksanakan Program Mangrove Perisai Jenu di Desa Jenu, Kabupaten Tuban, dengan luas lahan 9,28 ha. Program ini merupakan wujud komitmen perusahaan dalam pengelolaan lingkungan dan konservasi keanekaragaman hayati. PT Pertamina EP Asset 4 Sukowati Field bekerja sama dengan Lembaga Swadaya Masyarakat (LSM) Mangrove Centre Tuban dalam melakukan penanaman mangrove di sepanjang pesisir pantai Jenu. Selain berfungsi sebagai upaya konservasi keanekaragaman hayati, program ini juga bertujuan untuk menjadi pusat pembelajaran bagi masyarakat setempat. Penanaman mangrove ini juga diharapkan dapat mengurangi risiko abrasi di Pantai Jenu Tuban. Program ini dimulai pada tahun 2016 dan masih terus berjalan, dengan total penanaman sebanyak 7.545 pohon hingga pertengahan tahun 2024.

Still related to the coastal area, PT Pertamina EP Asset 4 Sukowati Field implemented the Mangrove Perisai Jenu Program in Jenu Village, Tuban Regency, covering an area of 9.28 ha. This program reflects the company's commitment to environmental management and biodiversity conservation. PT Pertamina EP Asset 4 Sukowati Field collaborates with the Mangrove Centre Tuban Non-Governmental Organization (NGO) to plant mangroves along the Jenu coastline. In addition to serving as a biodiversity conservation effort, this program also aims to be a learning center for the local community. The mangrove planting is also expected to help reduce the risk of coastal erosion at Jenu Beach in Tuban. The program began in 2016 and continues to this day, with a total of 7,545 trees planted by mid-2024.

Selain di Kabupaten Tuban, PT Pertamina EP Asset 4 Sukowati Field juga mengadakan inisiatif konservasi di area pesisir Pantai Brondong dengan penanaman mangrove di Desa Brondong, Kabupaten Lamongan, melalui Program bertajuk PROV Brondong (Penanaman Mangrove di Pesisir Pantai Brondong) dengan luas lahan 3,50 ha. Program ini dijalankan melalui kerja sama masih dengan Lembaga Swadaya Masyarakat (LSM) Mangrove Centre Tuban. Penanaman mangrove ini diupayakan untuk dapat mengurangi potensi abrasi di Pantai Brondong Lamongan. Program ini diinisiasi pada tahun 2023 dengan penyediaan dan penanaman sebanyak 5.000 bibit pohon mangrove pada pertengahan tahun 2024.

Besides Tuban Regency, PT Pertamina EP Asset 4 Sukowati Field has also initiated a conservation effort in the coastal area of Brondong Beach through the PROV Brondong Program (Mangrove Planting at Brondong Beach). This program covers an area of 3.50 ha in Brondong Village, Lamongan Regency. The program is being implemented in collaboration with the Mangrove Centre Tuban Non-Governmental Organization (NGO). The mangrove planting effort is aimed at reducing the potential for coastal erosion at Brondong Beach in Lamongan. The program was initiated in 2023, with the provision and planting of 5,000 mangrove seedlings by mid-2024.

Program pembuatan kebun bibit dilaksanakan di Central Processing Area (CPA) PT Pertamina EP Asset 4 Sukowati Field pada lahan seluas 0,04 ha. Program ini bertujuan untuk menyediakan tempat sebagai pusat pengawasan dan pengembangan bibit tanaman yang mendukung program konservasi keanekaragaman hayati di PT Pertamina EP Asset 4 Sukowati Field. Perusahaan memanfaatkan bibit dari tanaman yang sudah ada di area operasional, sehingga dapat mengurangi biaya pembelian bibit untuk penghijauan.

The seedling nursery program was implemented at the Central Processing Area (CPA) of PT Pertamina EP Asset 4 Sukowati Field, covering an area of 0.04 ha. The purpose of this program is to provide a facility for monitoring and developing plant seedlings to support the biodiversity conservation program at PT Pertamina EP Asset 4 Sukowati Field. The company utilizes seedlings from existing plants at the operational site, which helps reduce costs of purchasing new seedlings for revegetation.

Program ini dimulai pada tahun 2017 dan terus berlanjut, dengan total pencapaian sebanyak 1.637 total individu tanaman hingga tahun 2024 yang terdiri dari 97 bibit trembesi (Samanea saman), 69 bibit ketapang (Terminalia catappa), 78 bibit tabebuya (Tabebuya aurea), nangka 87 bibit (Artocarpus heterophyllus), 130 bibit mahoni (Swietenia mahagoni), dan 1.215 bibit telang (Clitoria ternatea).

Program Penetapan Kawasan Konservasi dilaksanakan di Wilayah Operasional PT Pertamina EP Asset 4 Sukowati Field dengan luas lahan 6,19 ha. Program ini merupakan bagian dari komitmen PT Pertamina EP Asset 4 Sukowati Field dalam mengelola lingkungan, termasuk pelaksanaan program konservasi keanekaragaman hayati. Penetapan kawasan konservasi mencakup kegiatan penanaman pohon serta pemantauan perkembangan keanekaragaman hayati di seluruh area operasional PT Pertamina EP Asset 4 Sukowati Field. Program ini dimulai pada tahun 2022 dan terus berlanjut, dengan total penanaman sebanyak 16.203 pohon yang terdiri dari 38 spesies hingga tahun 2024.

The program began in 2017 and is ongoing, with a total achievement of 1,637 individual plants until 2024 consisting of 97 Trembesi seedlings (Samanea saman), 69 Ketapang seedlings (Terminalia catappa), 78 Tabebuya seedlings (Tabebuya aurea), 87 Jackfruit seedlings (Artocarpus heterophyllus), 130 Mahogany seedlings (Swietenia mahagoni), and 1,215 Telang seedlings (Clitoria ternatea).

The Conservation Area Designation program was implemented in the operational area of PT Pertamina EP Asset 4 Sukowati Field, covering an area of 6.19 ha. This program is part of PT Pertamina EP Asset 4 Sukowati Field's commitment to environmental management, including the implementation of biodiversity conservation initiatives. The conservation area designation includes activities such as tree planting and monitoring the development of biodiversity across the entire operational area of PT Pertamina EP Asset 4 Sukowati Field. The program started in 2022 and is still going to this day, with a total of 16,203 trees planted, consisting of 38 species, by 2024.

Perlindungan Keanekaragaman PT Pertamina Hulu Energi Offshore North West Java
Biodiversity Protection of PT Pertamina Hulu Energi Offshore North West Java

PT Pertamina Hulu Energi Offshore North West Java mengadakan program perlindungan keanekaragaman hayati sepanjang tahun 2024 di wilayah konservasinya yang meliputi berbagai daerah mulai dari Kabupaten Bekasi, Karawang, Subang, Indramayu, hingga Kepulauan Seribu. Berbagai program yang telah dilaksanakan antara lain REMAJA (Restorasi Mangrove Pantai Utara Jawa), OTAK JAWARA (Orang Tua Asuh Karang di Laut Utara Jakarta dan Jawa Barat), dan KONSER MYUSIK (Konservasi Menyelamatkan Penyu Sisik).

PT Pertamina Hulu Energi Offshore North West Java implemented a biodiversity protection program throughout 2024 in its conservation areas, covering regions such as Bekasi, Karawang, Subang, Indramayu, and the Thousand Islands. Several programs have been carried out, including REMAJA (Restoration of Mangroves in Northern Java), OTAK JAWARA (Parenting Coral Reefs in North Jakarta and West Java), and KONSER MYUSIK (Conservation of Hawksbill Sea Turtles).

Program REMAJA atau Restorasi Mangrove Pantai Utara Jawa bertujuan untuk merehabilitasi ekosistem mangrove yang terdegradasi melalui penanaman berbagai spesies flora dengan konsep OTAP atau Orang Tua Asuh Pohon. Diharapkan program ini dapat meningkatkan kualitas lingkungan, mendukung upaya mitigasi perubahan iklim global, serta mengembangkan kawasan tersebut sebagai ekoeduwisata pesisir. Luaran dari program ini diantaranya terbentuknya ekosistem penyangga yang berperan mencegah erosi dan abrasi, meningkatnya luasan tutupan vegetasi, penyerapan karbon, perbaikan kualitas air, dan menjadi habitat bagi biota lainnya.

The REMAJA program, or Restoration of Mangroves in Northern Java, aims to rehabilitate degraded mangrove ecosystems through the planting of various plant species using the OTAP (Parenting Trees) concept. The program is expected to improve environmental quality, support global climate change mitigation efforts, and develop the area as coastal eco-education tourism. Outcomes of this program include the creation of buffer ecosystems that help prevent erosion and abrasion, increased vegetation coverage, carbon sequestration, water quality improvement, and providing habitats for other biota.

Program REMAJA ini memiliki cakupan wilayah yang meliputi 4 Kabupaten di Pesisir Pantai Utara Jawa Bagian Barat antara lain Kabupaten Karawang, Subang, Bekasi dan Kepulauan Seribu. Selengkapnya, lokasi spesifik dari program ini tersebar di Desa Pantai Bahagia dan Pantai Bakti (Kabupaten Bekasi), Desa Segarjaya, Pusaka Jaya Utara, Sukajaya, Tambaksari, Mekarpohaci, Sedari, Tanjung Bungin (Kabupaten Karawang), Cilamaya Girang (Kabupaten Subang), Cemara Kulon (Kabupaten Indramayu) dan Pulau Untung Jawa, Pulau Lancang, Pulau Bokor serta Pulau Rambut (Kabupaten Kepulauan Seribu).

The REMAJA program covers four districts along the western part of the northern Java coastline, including Karawang, Subang, Bekasi, and Kepulauan Seribu. Specifically, the program's locations are spread across Pantai Bahagia and Pantai Bakti villages (Bekasi Regency), Segarjaya, Pusaka Jaya Utara, Sukajaya, Tambaksari, Mekarpohaci, Sedari, Tanjung Bungin villages (Karawang Regency), Cilamaya Girang (Subang Regency), Cemara Kulon (Indramayu Regency), and Pulau Untung Jawa, Pulau Lancang, Pulau Bokor, and Pulau Rambut (Kepulauan Seribu Regency).

Pelaksanaan program REMAJA dimulai dari tahun 2020 hingga 2024 dengan fokus pada penanaman mangrove dan asosiasinya. Pada tahun 2020, sebanyak 141.290 batang ditanam pada area seluas 19,4 Ha. Angka ini meningkat signifikan pada tahun 2024, dengan total 335.313 batang yang ditanam pada area seluas 38,46 Ha. Selain itu, dilakukan pemantauan burung, sebagai upaya untuk mengevaluasi dampak positif dari program REMAJA.

The implementation of the REMAJA program began in 2020 and continues through 2024, focusing on mangrove planting and associated species. In 2020, 141,290 trees were planted in an area of 19.4 hectares. This number significantly increased by 2024, with a total of 335,313 trees planted across 38.46 hectares. In addition, bird monitoring is conducted as an effort to assess the positive impacts of the REMAJA program.

Mangrove memiliki fungsi ekologis dan memainkan peranan penting dalam ekosistem mulai dari perlindungan pesisir yang seolah berperan sebagai benteng alami yang menahan gelombang laut dan arus, melindungi garis pantai dari abrasi. Selanjutnya, akumulasi sedimen dan tanah yang ditahan oleh akar mangrove lama-kelamaan akan menimbulkan pembentukan daratan baru dan menjaga stabilisasi garis pantai.

Mangroves have ecological functions and play an important role in ecosystems, starting with coastal protection, acting as a natural barrier that absorbs ocean waves and currents, protecting the coastline from erosion. Furthermore, the accumulation of sediments and soil trapped by the mangrove roots will gradually lead to the formation of new land and help stabilize the coastline.

Lalu, mangrove merupakan habitat alami bagi berbagai organisme seperti ikan, kepiting, udang, hingga burung untuk tinggal, mencari makan, dan berkembang biak. Saat ini, mangrove terkenal dengan perannya sebagai penyerap karbon yang dapat berkontribusi dalam mengurangi dampak perubahan iklim yang dikategorikan sebagai karbon biru. Oleh karena itu, mangrove dengan perannya yang begitu vital bagi keberlangsungan ekosistem perlu dijaga kelestariannya.

Furthermore, mangroves are a natural habitat for various organisms such as fish, crabs, shrimp, and birds, providing a place for them to live, feed, and breed. Today, mangroves are well-known for their role as carbon absorbers, contributing to the reduction of climate change impacts, which is categorized as blue carbon. Therefore, mangroves, with their vital role in ecosystem sustainability, must be preserved for future generations.

Program OTAK JAWARA atau Orang Tua Asuh Karang di Laut Utara Jakarta dan Jawa Barat, adalah program perlindungan keanekaragaman hayati dari PT Pertamina Hulu Energi Offshore North West Java untuk ekosistem terumbu karang. Program ini memiliki tujuan untuk membentuk ekosistem terumbu karang di Laut Utara Jakarta dan Jawa Barat dengan luaran meningkatkan luasan terumbu karang, persentase tutupan karang, yang secara tidak langsung akan juga meningkatkan keanekaragaman ikan dan kelimpahan ikan.

The OTAK JAWARA program, or "Parenting Coral Reefs in North Jakarta and West Java," is a biodiversity protection initiative by PT Pertamina Hulu Energi Offshore North West Java focused on coral reef ecosystems. The program aims to develop coral reef ecosystems in the northern waters of Jakarta and West Java, with the goal of increasing coral reef area and coral coverage percentage, which will indirectly enhance fish diversity and abundance.

Sama halnya dengan REMAJA, program OTAK JAWARA dimulai sejak tahun 2020 dengan menerapkan dua inovasi yaitu Inovasi Modul Honai di Pulau Biawak dan Inovasi Modul Paranje di Gugusan Sendulang. Melalui penerapan Inovasi Modul Honai, menggunakan media transplantasi sebanyak 350 buah dengan luas transplantasi 0,05 Ha, pada tahun 2020 terdapat 1.496 fragmen karang dan terjadi peningkatan menjadi 1.616 fragmen karang pada tahun 2024. Kelimpahan ikan turut meningkat dari yang awalnya 571 ekor pada tahun 2020 menjadi 789 ekor pada tahun 2024.

Similar to the REMAJA program, the OTAK JAWARA program began in 2020, implementing two innovations: the Honai Module Innovation on Biawak Island and the Paranje Module Innovation in the Sendulang Cluster. Through the application of the Honai Module Innovation, 350 transplant media were used with a transplantation area of 0.05 hectares. In 2020, 1,496 coral fragments were transplanted, with an increase to 1,616 fragments in 2024. Fish abundance also increased from 571 fish in 2020 to 789 fish in 2024.

Sedangkan dalam Inovasi Modul Paranje pada tahun 2022 dengan media transplantasi 103 buah dengan luas area transplantasi sebesar 0,05 Ha, terdapat 412 fragmen karang. Pada tahun 2024, terdapat kenaikan media transplantasi menjadi 313 buah, lalu luas area transplantasi menjadi 0,17 Ha dan fragmen karang menjadi 1.372 fragmen. Terjadi pula kenaikan kelimpahan ikan karang yang pada mulanya di tahun 2022 sebesar 33 ekor menjadi 206 ekor pada tahun 2024.

For the Paranje Module Innovation, initiated in 2022, 103 transplant media were used over an area of 0.05 hectares, resulting in 412 coral fragments. By 2024, the number of transplant media increased to 313, the transplantation area expanded to 0.17 hectares, and the number of coral fragments grew to 1,372. Fish abundance in the coral area also saw a significant rise, from 33 fish in 2022 to 206 fish in 2024.

Untuk program yang berhubungan dengan satwa liar, yang dilindungi PT Pertamina Hulu Energi Offshore North West Java menggagas Program KONSER MYUSIK atau Konservasi Menyelamatkan Penyu Sisik menggunakan Sistem Deteksi Dini Berbasis CCTV dengan Energi Terbarukan di Ramsar Site, Pulau Rambut. Program ini merupakan bagian dari komitmen PT Pertamina Hulu Energi Offshore North West Java dalam melindungi dan melestarikan penyu sisik (Eretmochelys imbricata).

For wildlife-related programs, PT Pertamina Hulu Energi Offshore North West Java has initiated the KONSER MYUSIK Program, or Conservation of Hawksbill Sea Turtles, utilizing an Early Detection System based on CCTV with Renewable Energy at the Ramsar Site, Pulau Rambut. This program is part of PT Pertamina Hulu Energi Offshore North West Java's commitment to protecting and preserving the hawksbill sea turtle (Eretmochelys imbricata).

Telur-telur penyu sisik kerap kali ditemukan dalam jumlah yang banyak di sarang alaminya di pesisir pantai Suaka Marga Satwa Pulau Rambut. Diharapkan, program ini dapat meningkatkan luas area konservasi, jumlah telur penyu yang berhasil diselamatkan, jumlah telur yang menetas, serta jumlah tukik yang dilepasliarkan.

Hawksbill sea turtle eggs are often found in large numbers in their natural nests along the shores of the Pulau Rambut Wildlife Sanctuary. The program aims to expand the conservation area, increase the number of eggs successfully rescued, improve hatching rates, and increase the number of hatchlings released into the wild.

Sepanjang tahun 2024, jumlah telur yang berhasil diselamatkan sebanyak 318 butir dan jumlah telur yang menetas serta tukik yang dilepasliarkan masing-masing berjumlah sebanyak 175 ekor dari luasan area konservasi sebesar 0,05 Ha. PT Pertamina Hulu Energi Offshore North West Java akan tetap terus berkomitmen dalam menggalakan konservasi penyu sisik hingga seterusnya.

Throughout 2024, a total of 318 eggs were successfully rescued, with 175 hatchlings successfully released from a conservation area of 0.05 hectares. PT Pertamina Hulu Energi Offshore North West Java remains committed to continuing its efforts in hawksbill sea turtle conservation in the years to come.

Penyu merupakan spesies kunci dalam ekosistem lautan dikarenakan sejumlah peranan penting yang diperankan olehnya. Apabila spesies kunci hilang dari ekosistem, maka kestabilan dan kelangsungan ekosistem dapat terganggu sehingga akan memberi dampak terhadap organisme lainnya.

Sea turtles are a key species in marine ecosystems due to the important roles they play. If a key species is lost from the ecosystem, the stability and sustainability of the ecosystem can be disrupted, which will have an impact on other organisms.

Penyu merupakan predator alami dari ubur-ubur dan spons. Keberadaan penyu di lautan akan menekan laju populasi ubur-ubur dan spons. Meningkatnya populasi ubur-ubur akan menggangu kestabilan ekosistem dan spons yang tumbuh secara dominan akan dapat dapat mengganggu terumbu karang.

Sea turtles are natural predators of jellyfish and sponges. Their presence in the ocean helps control the population of jellyfish and sponges. An increase in jellyfish population can disrupt the stability of the ecosystem, and the dominant growth of sponges can interfere with coral reefs.

Penyu juga memiliki peranan penting dalam kelangsungan padang lamun dengan memakannya secara teratur sehingga membuka ruangan dan memungkinkan individu lamun lainnya tetap terpapar cahaya matahari. Di samping itu, penyu merupakan agen penyebar propagul lamun sehingga lamun dapat menyebar dan tumbuh terdistribusi pada wilayah lainnya.

Sea turtles also play an important role in the sustainability of seagrass meadows by regularly eating them, which creates space and allows other seagrass individuals to remain exposed to sunlight. Additionally, turtles serve as agents for the dispersal of seagrass propagules, enabling seagrass to spread and grow in other areas.

Inisiatif Konservasi Lahan
Land Conservation Initiative

Tindakan inisiatif konservasi lahan juga dilakukan oleh PHE Subholding Upstream sebagai bentuk kepedulian perusahaan terhadap lingkungan. Melalui berbagai program dan kegiatan terintegrasi, PHE Subholding Upstream secara aktif berkontribusi dalam menjaga kelestarian ekosistem dan mendukung keberlanjutan bisnis.

Mengacu pada data dari Kementerian Keuangan surat nomor S.39/KN/KN.2/2024 tentang kegiatan sertifikasi Barang Milik Negara (BMN) berupa tanah Kontraktor Kontrak Kerja Sama Pertamina (KKKS Pertamina), total lahan dibawah pengelolaan Subholding Hulu Pertamina Hulu Energi adalah seluas 52.716,65 Ha yang telah memperoleh legalitas berupa izin pengelolaan dari SKK Migas dan sertifikat dari Badan Pertanahan Nasional. Sebagai bentuk komitmen perusahaan terhadap pelestarian keanekaragaman hayati, PHE menetapkan kawasan konservasi yaitu kawasan yang harus dilakukan perlindungan ekosistem dan tidak boleh dilakukan kegiatan operasional yang dapat mengganggu ekosistem dengan luas 18.568,48 Ha yang tersebar di seluruh Wilayah Kerja perusahaan.

Sebagai bagian dari komitmennya dalam menjalankan praktik bisnis yang berkelanjutan dan implementasi terhadap kebijakan dalam reklamasi habitat, PHE telah melaksanakan kegiatan penanaman dalam rangka rehabilitasi daerah aliran sungai (DAS) seluas 4.508,82 Ha, dengan total pohon yang ditanam mencapai 2.616.296 pohon. Penanaman ini tidak hanya mencerminkan kepedulian terhadap lingkungan, tetapi juga merupakan wujud tanggung jawab PHE sebagai *prudent company* dan pemegang Persetujuan Penggunaan Kawasan Hutan (PPKH) seluas 3.721,69 Ha. Melalui langkah ini, PHE menunjukkan dedikasi dalam menjaga fungsi ekologis kawasan hutan sekaligus mendukung tujuan pembangunan berkelanjutan di sektor energi.

The land conservation initiative is also undertaken by PHE Subholding Upstream as a form of the company's concern for the environment. Through various integrated programs and activities, PHE Subholding Upstream actively contributes to preserving ecosystems and supporting business sustainability.

Referring to data from the Ministry of Finance, letter number S.39/KN/KN.2/2024, regarding the certification activities of State-Owned Goods (Barang Milik Negara/BMN) in the form of land under the Pertamina Contract of Work Contractors (KKKS Pertamina), the total land managed by the Subholding Upstream Pertamina Hulu Energi amounts to 52,716.65 hectares, which has obtained legal status in the form of management permits from SKK Migas and certificates from the National Land Agency.As part of the company's commitment to biodiversity conservation, PHE has designated conservation areas zones that must be protected and where operational activities that could disturb the ecosystem are strictly prohibited covering 18,568.48 hectares spread across all of the company's Working Areas.

As part of its commitment to practicing sustainable business and implementation regarding policy for reclaiming habitat, PHE has carried out planting activities to rehabilitate watershed (DAS) covering 4.508,82 hectares, with a total of 2,616,296 trees planted. This initiative not only reflects environmental concern but also demonstrates PHE's responsibility as a prudent company and holder of the Forest Area Utilization Approval (PPKH) covering 3.721,69 hectares. Through this effort, PHE shows its dedication to maintaining the ecological functions of forest areas while supporting sustainable development goals in the energy sector.

Komitmen PHE Subholding Upstream dalam upaya konservasi kenakekaragaman hayati tercermin dalam program-program konservasi dan penetapan area konservasi yang telah dilaksanakan sejak tahun 2009 sampai 2024. Penetapan area konservasi dalam wilayah kerja operasional PHE Subholding Upstream yang mencakup PEP Adera, PEP Jambi, PEP Limau, PEP Pendopo, PEP Prabumulih, PEP Pangkalan Susu, PEP Ramba, PEP Rantau, PHE Jambi Merang, PHE NSO, PHE Ogan Komering, PHE Raja Tempirai, PHR Bekasap Rokan, PHE ONWJ dengan total luas area konservasi hingga mencapai 48.839,29 Ha.

Berbagai aksi konservasi yang telah diimplementasikan antara lain Perlindungan dan Pengelolaan Tanaman Endemik di Lapangan Bajubang, Food Barrier dalam rangka Pemulihan Ekosistem dan Habitat Macan Dahan berbasis penguatan ekonomi masyarakat di KTH Sumur Jaya Mandiri, Konservasi Gajah Sumatera, Penetapan Area konservatif Keanekaragaman Hayati PT Pertamina EP Asset Tarakan Field, Pelastarian Rusa Jawa melalui Program Penangkaran Dan Peningkatan Nilai Ekonomis, hingga Pelestarian Serak Sulawesi.

PHE Subholding Upstream patuh terhadap mekanisme penggunaan lahan untuk kegiatan operasional termasuk pada tahap pengadaan lahan berdasarkan regulasi Pemerintah Indonesia. Perusahaan mengacu pada Surat Keputusan Kepala SKK Migas Nomor Kep-0015/SKKMA0000/2020/S9 tentang Mekanisme Pengadaan Tanah, yaitu melalui beberapa tahap mencakup: sosialisasi dan musyawarah dengan pemilik tanah, kesepakatan bentuk ganti rugi, pembayaran ganti rugi, dan pelaporan penyelesaian pengadaan tanah. Proses ini menunjukkan bahwa PHE Subholding Upstream selalu melindungi dan menghormati hak pihak lain yang terlibat baik masyarakat lokal maupun perusahaan lain.

Proses ini diverifikasi oleh pihak eksternal yaitu SKK Migas dan Kementerian Keuangan melalui Surat Direktur Perumusan Kebijakan Kekayaan Negara Kementerian Keuangan No. S-336/KN.2/2023 tanggal 12 Desember 2023 terkait Tanah Yang Berasal dari Kontraktor Kontrak Kerja Sama Pertamina (KKKS Pertamina) untuk seluruh area operasional.

PHE Subholding Upstream's commitment to biodiversity conservation is reflected in its conservation programs and the establishment of conservation areas that have been implemented from 2009 to 2024. The designation of conservation areas within PHE Subholding Upstream's operational working areas includes PEP Adera, PEP Jambi, PEP Limau, PEP Pendopo, PEP Prabumulih, PEP Pangkalan Susu, PEP Ramba, PEP Rantau, PHE Jambi Merang, PHE NSO, PHE Ogan Komering, PHE Raja Tempirai, PHR Bekasap Rokan, and PHE ONWJ, with a total conservation area reaching 48.839,29 hectares.

Various conservation actions that have been implemented include the Protection and Management of Endemic Plants at Bajubang Field, Food Barriers for Ecosystem and Clouded Leopard Habitat Restoration based on community economic empowerment in KTH Sumur Jaya Mandiri, Sumatran Elephant Conservation, Establishment of Biodiversity Conservation Areas at PT Pertamina EP Asset Tarakan Field, Javan Deer Conservation through Breeding Programs and Economic Value Enhancement, and the Preservation of the Sulawesi Masked Owl.

PHE Subholding Upstream complies to the land use mechanism for operational activities, including the land acquisition stage, in accordance with Indonesian Government regulations. The company refers to the Decree of the Head of SKK Migas Number Kep-0015/SKKMA0000/2020/S9 concerning the Land Acquisition Mechanism, which involves several stages: socialization and consultation with landowners, agreement on the form of compensation, compensation payment, and reporting of land acquisition completion. This process demonstrates that PHE Subholding Upstream always protects and respects the rights of other parties involved, both local communities and other companies.

This process has been verified by external parties, namely the Special Task Force for Upstream Oil and Gas Business (SKK Migas) and the Ministry of Finance through the Director of State Asset Policy Formulation of the Ministry of Finance Letter No. S-336/KN.2/2023 dated December 12, 2023 concerning Land Originating from Pertamina Production Sharing Contractors (KKKS Pertamina) for all operation areas.

Analisis Mengenai Dampak Lingkungan (AMDAL) untuk Pemenuhan Environment Impact Assessment (EIA) for Compliance

Sebelum memulai operasi di wilayah baru, PHE Subholding Upstream melakukan evaluasi terhadap dampak yang mungkin timbul bagi masyarakat dan keanekaragaman hayati di sekitarnya. Langkah ini diambil untuk memenuhi ketentuan dalam Undang-Undang Nomor 32 Tahun 2009 dan Peraturan Pemerintah Nomor 22 Tahun 2021 yang mewajibkan industri untuk melaksanakan Analisis Mengenai Dampak Lingkungan (AMDAL).

Before starting operations in a new area, PHE Subholding Upstream conducts an evaluation of the potential impacts on the surrounding communities and biodiversity. This step is taken to comply with the provisions of Law Number 32 of 2009 and Government Regulation Number 22 of 2021, which require industries to carry out an Environmental Impact Assessment (AMDAL).

Lebih lanjut, untuk setiap rencana pembangunan infrastruktur, PHE secara cermat mempertimbangkan potensi dampak lingkungan yang mungkin timbul. Penilaian dan pemantauan terhadap dampak tersebut dilakukan melalui proses Analisis Mengenai Dampak Lingkungan (AMDAL), yang telah disetujui oleh Kementerian Lingkungan Hidup dan Kehutanan (KLHK). Sebagai bagian dari proses ini, PHE juga telah melakukan kajian awal terhadap rencana tata ruang wilayah, guna memastikan kesesuaian dengan kebijakan penggunaan lahan dan perlindungan lingkungan.

Furthermore, for every planned infrastructure development, PHE carefully considers the potential environmental impacts that may arise. The assessment and monitoring of these impacts are conducted through the Environmental Impact Assessment (AMDAL) process, which has been approved by the Ministry of Environment and Forestry (KLHK). As part of this process, PHE has also conducted a preliminary review of spatial planning to ensure alignment with land use policies and environmental protection measures.

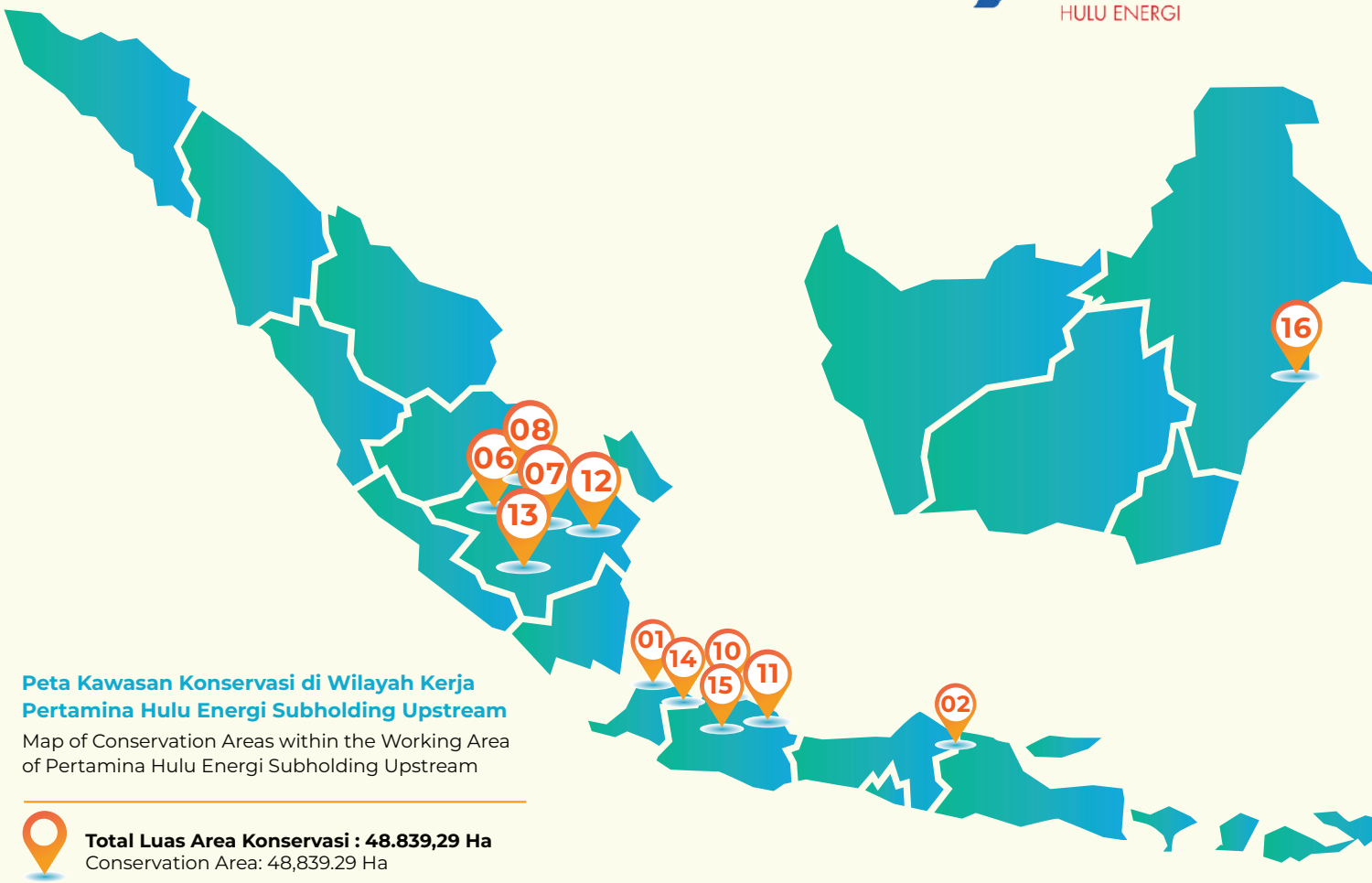
Untuk setiap rencana pengembangan baru, akan dilakukan Analisis Mengenai Dampak Lingkungan (AMDAL), termasuk penilaian keanekaragaman hayati, yang akan dituangkan dalam dokumen AMDAL. Penilaian ini akan diverifikasi oleh pihak eksternal, yaitu Kementerian Lingkungan Hidup, untuk memperoleh persetujuan. Oleh karena itu, 100% lokasi operasional telah memperoleh persetujuan AMDAL sebelum memulai kegiatan operasional sesuai dengan peraturan yang berlaku.

For each new development plan, an Environmental Impact Assessment (EIA/AMDAL) will be conducted, including biodiversity assessment, which will be outlined in an AMDAL document. The assessment will be verified by an external party, Ministry of Environment, to obtain approval. Therefore, 100% of operational locations have obtained EIA approval before commencing operations in accordance with regulations.

Upaya ini mencerminkan komitmen PHE dalam meminimalkan dampak lingkungan dan menjaga kelestarian keanekaragaman hayati. Komitmen tersebut diwujudkan melalui penetapan area konservasi di setiap wilayah kerja, yang telah ditetapkan melalui surat keputusan resmi. Selain itu, PHE juga telah menginisiasi program minimalisasi penggunaan lahan pada area pengeboran, yang diproyeksikan dapat secara signifikan mengurangi kebutuhan lahan dibandingkan dengan estimasi awal. Inisiatif ini telah dikaji melalui diskusi dalam rangka persiapan Focus Group Discussion (FGD) Site Preparation Optimization, yang membahas tantangan operasional dan mengusulkan solusi untuk mengoptimalkan efisiensi penggunaan lahan dalam kegiatan pengeboran.

These efforts reflect PHE's commitment to minimizing environmental impacts and conserving biodiversity. This commitment is demonstrated through the designation of conservation areas in each working area, which have been formally established through official decrees. In addition, PHE has initiated land-use minimization programs in drilling areas, which are projected to significantly reduce land requirements compared to initial estimates. This initiative has been reviewed through discussions held during the preparation for the Site Preparation Optimization Focus Group Discussion (FGD), which addressed operational challenges and proposed solutions to enhance land-use efficiency in drilling activities.

Peta Persebaran Daerah Keanekaragaman Hayati
Distribution of Biodiversity Area Map



Peta Kawasan Konservasi di Wilayah Kerja Pertamina Hulu Energi Subholding Upstream

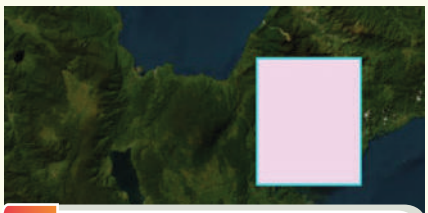
Map of Conservation Areas within the Working Area of Pertamina Hulu Energi Subholding Upstream

Total Luas Area Konservasi : 48.839,29 Ha
Conservation Area: 48,839.29 Ha

01 **SK No.M.315/EP3710/2016-S0**
Kawasan Konservasi Mangrove
Desa Pantai Mekar, Kec. Muara Gembong, Kab. Bekasi
PEP Tambun

02 **Ket-009/EP3850/2018-S0**
Area Operasi CPA dan PAD A
PEP Sukowati

03 **001A/JBT/I/2015**
Kawasan Laut Pelestarian Terumbu Karang di Lapangan Tiaka
JOB Tomori



04 **0007/TOMORI/GM/KEP/2017**
Kawasan Konservasi Maleo wilayah Cagar Alam Morowali wilayah Tanjung Peo
JOB Tomori

05 **PKS.696/VI.K-22/2018 dan 0319/TOMORI/GM/LTR/2018**
Kawasan Suaka Marga Satwa Bakiriang
JOB Tomori

06 **001/EP3640/2018-S0**
Kawasan sekitar SPU Raja II
PEP Adera

07 **392/EP3640/2019-S0**
Kawasan sekitar SPU Abab II
PEP Adera

08 **01/EP3640/2021-S0**
Kawasan sekitar SPU Dewa
PEP Adera

09 **2913/EP3830/2020-S0**
Taman Kehati Kokolomboi, Banggai Kepulauan
PEP DMF

10 **03/PEP3730/2024-SO**
Area Komperta Mundu Jatibarang
PEP Jatibarang

11 **03/PEP3730/2024-SO**
Area Komperta Cemara Jatibarang
PEP Jatibarang

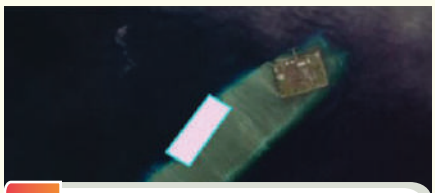
12 **001/EP3640/2018-SO**
Kawasan sekitar SPU Raja II
PEP Adera

13 **392/EP36/2019-SO**
Kawasan sekitar SPU Abab II
PEP Adera

14 **SK No.M.315/EP3710/2016-SO**
Kawasan Konservasi Mangrove
Desa Pantai Mekar, Kec. Muara Gembong, Kab. Bekasi
PEP Tambun

15 **03/PEP3730/2024-SO**
Area Komperta Mundu Jatibarang
PEP Jatibarang

16 **Kpts-16/EP3520/2015-SO**
Kawasan Tanjung Una (Kawasan Perlindungan Habitat Bekantan (Nasalis Lavartus Wurmb)
PEP Sanga-Sanga



17 **001A/JBT/1/2015**
Kawasan Laut Pelestrarian Terumbu Karang
Di Lapangan Tiaka
Job Tomori

18 **PKS.696/VI.K-22/2018 dan 0319/TOMORI/GM/LTR/2018**
Kawasan Suaka Marga Satwa Bakiriang
JOB Tomori

Penutup
Closing

Dengan penuh komitmen dan semangat keberlanjutan, penyusunan Environmental Annual Report PHE 2024 yang memuat inisiatif strategis terhadap lingkungan telah dilaksanakan di berbagai Wilayah Kerja (WK) PHE Subholding Upstream menjadi cerminan nyata dari perjalanan kami yang turut serta berpartisipasi dalam menjaga keseimbangan antara ketahanan energi dan perlindungan lingkungan. Sepanjang tahun pelaporan, PHE Subholding Upstream telah melaksanakan sejumlah inisiatif strategis yang meliputi penurunan emisi Gas Rumah Kaca (GRK) melalui program dekarbonisasi, optimalisasi pemanfaatan energi rendah karbon, konservasi air, pengelolaan limbah dan konservasi keanekaragaman hayati.

Sebagai perusahaan yang mengusung prinsip keberlanjutan, kami terus berkomitmen memperkuat ketahanan lingkungan di seluruh kegiatan operasional WK. Komitmen ini melampaui sekadar pencapaian keuntungan finansial dengan mengimplementasikan prinsip Environmental, Social, and Governance (ESG) sebagai dasar dalam pengambilan keputusan strategis. Prinsip ESG menegaskan bahwa keberhasilan bisnis harus selaras dengan tanggung jawab terhadap lingkungan.

Pendekatan ini menegaskan bahwa keberlanjutan bukan semata-mata soal keuntungan finansial, melainkan tanggung jawab menyeluruh yang mencakup pelestarian lingkungan, pemberdayaan masyarakat, serta tata kelola perusahaan yang transparan dan akuntabel. Kami membangun kapasitas internal yang tangguh agar dapat merespons berbagai tantangan lingkungan secara adaptif dan inovatif. Ketahanan lingkungan menjadi prioritas utama yang menopang pertumbuhan perusahaan secara berkelanjutan dan dalam jangka panjang.

With full commitment and the spirit of sustainability, the preparation of the Environmental Annual Report PHE 2024, which contains strategic environmental initiatives implemented across various Work Areas (WK) of PHE Subholding Upstream, reflects our tangible journey in contributing to the balance between energy resilience and environmental protection. Throughout the reporting year, PHE Subholding Upstream has carried out numerous strategic initiatives, including the reduction of Greenhouse Gas (GHG) emissions through decarbonization programs, optimization of low-carbon energy utilization, water conservation, waste management, and biodiversity conservation.

As a company that embraces sustainability principles, we remain committed to strengthening environmental resilience across all operational activities of our Work Areas (WK). This commitment goes beyond merely achieving financial gains by implementing Environmental, Social, and Governance (ESG) principles as the foundation for strategic decision-making. The ESG principles affirm that business success must align with responsibility toward the environment.

This approach emphasizes that sustainability is not solely about financial profit but a comprehensive responsibility that includes environmental preservation, community empowerment, and transparent, accountable corporate governance. We are building strong internal capacities to respond to various environmental challenges in an adaptive and innovative manner. Environmental resilience is a top priority that supports the company's sustainable and long-term growth.

Kami juga menyadari bahwa perjalanan menuju Net Zero Emission (NZE) pada 2060 bukanlah hal yang mudah dan memerlukan kolaborasi yang kuat dari seluruh jajaran perusahaan, mitra bisnis, regulator, serta komunitas sekitar. Oleh karena itu, PHE terus berinovasi dan beradaptasi dengan perkembangan teknologi serta dinamika global terkait perubahan iklim. Kami berkomitmen untuk terus meningkatkan standar kinerja keberlanjutan, memperkuat tata kelola ESG, dan memastikan bahwa setiap aktivitas operasional memberikan dampak positif bagi lingkungan dan masyarakat.

Dengan penuh keyakinan, optimisme, dan komitmen yang teguh, kami melangkah maju menuju masa depan yang lebih berkelanjutan dengan memberikan dampak positif pada lingkungan untuk kesejahteraan generasi yang akan datang. Kami percaya bahwa inovasi dan pengembangan yang dilakukan melalui inisiatif strategis untuk lingkungan dalam akan memberikan kontribusi nyata dan berkelanjutan dalam menjaga kelestarian lingkungan. Kesuksesan perjalanan ini tidak terlepas dari dukungan serta kolaborasi erat dari seluruh pemangku kepentingan, mulai dari internal, mitra bisnis, hingga komunitas setempat.

Kami menyampaikan apresiasi yang sebesar-besarnya kepada semua pihak yang telah menjadi bagian dari upaya kami dalam mewujudkan visi ini. Dengan semangat kebersamaan, kami optimis bahwa langkah-langkah yang diambil akan terus menghasilkan dampak positif yang signifikan dan menjadi inspirasi bagi perubahan yang berkelanjutan Melalui kolaborasi yang erat dan konsisten, kami optimis bahwa komitmen bersama ini akan mampu menyongsong masa depan yang lebih berkelanjutan.

We also recognize that the journey towards Net Zero Emission (NZE) by 2060 is not an easy task and requires strong collaboration across all levels of the company, business partners, regulators, and surrounding communities. Therefore, PHE continues to innovate and adapt to technological advancements and global dynamics related to climate change. We are committed to continuously improving sustainability performance standards, strengthening ESG governance, and ensuring that every operational activity delivers a positive impact on the environment and society.

With full confidence, optimism, and steadfast commitment, we move forward toward a more sustainable future by delivering positive impacts on the environment for the well-being of future generations. We believe that innovation and development carried out through strategic environmental initiatives will make a real and lasting contribution to preserving the environment. The success of this journey is inseparable from the strong support and close collaboration of all stakeholders, ranging from internal teams and business partners to the local community.

We express our profound gratitude to all stakeholders who have contributed to the realization of this vision. With a spirit of unity and collaboration, we remain optimistic that the initiatives undertaken will continue to yield substantial positive impacts and inspire sustainable transformation. Through sustained and close cooperation, we are confident that this collective commitment will pave the way toward a more sustainable future.

Lampiran
Attachment

A. Program Rehabilitasi Daerah Aliran Sungai
A. Watershed Rehabilitation Program

B. Program Area Konservasi Keanekaragaman Hayati
B. Conservation Biodiversity Area Program

C. Kriteria Penilaian Risiko untuk Aktivitas Tertentu
C. Risk Assessment Criteria for Specific Activity

D. Data Cadangan Minyak
D. Oil Reserve Data

E. Rencana Strategis dan Rencana Kerja 2020-2025
E. Strategic Plan and Work Plan 2020-2025

1. **Efisiensi Air dan Penurunan Beban Pencemar**
   Water Efficiency and Reducing Pollutant Loads
2. **Penurunan Beban Emisi**
   Emissions Load Reduction
3. **Keanekaragaman Hayati**
   Biodiversity

A. Program Rehabilitasi Daerah Aliran Sungai

A. Watershed Rehabilitation Program

Persetujuan Penggunaan Kawasan Hutan Forest Area Utilization Agreement	**Luas PPKH (Ha)** Area of Forest Area Utilization Agreement (Ha)	**Luas Rehabilitasi DAS (Ha)** Area of Watershed Rehabilitation (Ha)	**Tahun Rehabilitasi dengan penanaman** Rehabilitation Year Through Planting	**Jumlah Penanaman (Pohon)** Number of Plantings (Trees)
PPKH Kelok	4,63	6,00	2025	3.750
PPKH Handal	20,47	23,00	2025	14.375
PPKH Bangko	96,66	107,00	2025	48.300
PPKH Pudu	0,74	1,00	2025	625
PPKH Jorang	2,00	3,00	2025	1.875
PPKH Balam SE	6,06	7,00	2025	4.375
Operasi Produksi Minyak dan Gas Bumi Lapangan Jirak dan Akses Jalan Oil and Gas Production Operations at Jirak Field and Road Access	13,79	151	2020	94.375
PPKH Sumur Reaktivasi/Eksisting Ogan Komering & Muara Enim PPKH Reactivated/Existing Wells in Ogan Komering & Muara Enim	40.204	42,77	2018	26.731
Eksploitasi Sumur Minyak Bumi dan Gas Lapangan PCT - BB Exploitation of Oil and Gas Wells at PCT – BB Field	3	6,27	2023	24.690
Eksploitasi Pemboran Sumur Pengembangan Lapangan ABG-C Exploitation of the ABG Field Development Wells	2.99	6.27		
Eksploitasi Pengembangan Lapangan SP ABG dan Sarana Penunjangnya Exploitation of the SP ABG Field Development and its Supporting Facilities	14.85	17		
Eksploitasi Pengembangan Cluster ABG (ABG-G2, ABG-J,ABG-H dan ABG-E) dan sarana penunjangnya Exploitation of the ABG Cluster Development (ABG-G2, ABG-J, ABG-H, and ABG-E) and its Supporting Facilities	18.22			

Persetujuan Penggunaan Kawasan Hutan Forest Area Utilization Agreement	**Luas PPKH (Ha)** Area of Forest Area Utilization Agreement (Ha)	**Luas Rehabilitasi DAS (Ha)** Area of Watershed Rehabilitation (Ha)	**Tahun Rehabilitasi dengan penanaman** Rehabilitation Year Through Planting	**Jumlah Penanaman (Pohon)** Number of Plantings (Trees)
Kegiatan eksisting Operasi Produksi Migas dan Sarana Penunjangnya Blok Mahakam Atas Nama SKK Migas Wilayah Kerja Mahakam Existing Oil and Gas Production Operations and Supporting Facilities of the Mahakam Block under the Name of SKK Migas, Mahakam Working Area	1.925,4	2.118	2018	2397200
Operasi Produksi Sumur Pengembangan TN-X34 Dan Sumur Pengembangan TN-R69/ R70/ R71 Development Well Production Operations TN-X34 and Development Wells TN-R69/ R70/R71	62	71	2020	
Kegiatan Eksploitasi Blok Mahakam Sumur TN-G91/TN-GX473 Tie In Atas Nama SKK Migas - PT. Pertamina Hulu Mahakam Pada Kawasan Hutan Produksi Tetap di Kabupaten Kutai Kartanegara, Provinsi Kalimantan Timur Exploitation Activities of Mahakam Block Wells TN-G91/TN-GX473 Tie-In on behalf of SKK Migas – PT. Pertamina Hulu Mahakam in the Permanent Production Forest Area in Kutai Kartanegara Regency, East Kalimantan Province	0,45	360	2023	
Kegiatan Eksploitasi Minyak dan Gas Bumi Lapangan Tunu-F Inland Phase 2 beserta Sarana Penunjangnya atas nama SKK Migas - PT Pertamina Hulu Mahakam Pada Kawasan Hutan Produksi Tetap di Kabupaten Kutai Kartanegara, Provinsi Kalimantan Timur Exploitation Activities of Tunu-F Inland Phase 2 Oil and Gas Field along with Supporting Facilities on behalf of SKK Migas – PT Pertamina Hulu Mahakam in the Permanent Production Forest Area in Kutai Kartanegara Regency, East Kalimantan Province	632,5	780	2024	
Total	**3.721,69**	**4.508,82**		**2,616,296**

B. Program Area Konservasi Keanekaragaman Hayati

B. Conservation Biodiversity Area Program

Wilayah Kerja *Working Areas*	No SK	Program	Luas (Ha) *Area (Ha)*
PEP Adera	SK No. 001/EP3640/2018-S0	Kawasan sekitar SPU Raja II: Kawasan penyangga lahan terbuka di lapangan Raja *Surrounding Area of SPU Raja II:* *Buffer zone of open land at Raja Field*	12,4
	SK. No 392/EP3640/2019-S0	Kawasan sekitar SPU Abab II: Kawasan konservasi kehati pohon Ara (Ficus sp.) *Surrounding Area of SPU Abab II:* *Biodiversity conservation area for fig trees (Ficus sp.)*	
	SK No. 01/EP3640/2021-S0	Kawasan konservasi kehati lapangan Dewa *Biodiversity conservation area at Dewa Field*	
PEP Jambi	2012	Bajubang: Perlindungan dan Pengelolaan Tanaman Endemik di Lapangan Bajubang *Bajubang: Protection and management of endemic plant species at Bajubang Field*	33,69
	2017	Kenali Asam: Perlindungan dan Pengelolaan Tanaman Endemik di Lapangan Kenali Asam *Kenali Asam: Protection and management of endemic plant species at Kenali Asam Field*	
	2020	Gerai Energi (Green Edu Agrowisata Rumbai Energi): Greenhouse Hidroponik *Gerai Energi (Green Edu Agrotourism Rumbai Energi):* *Hydroponic greenhouse facility*	
PEP Limau	SK No. 032/EP3630/2018-S0	Bedegung: Penanaman pohon *Bedegung: Tree planting activities*	-
	SK No. 001/EP3630/2016-S0	Limau Hijau: Penanaman pohon *Limau Hijau: Tree planting activities*	-
	SK No. 127/EP3630/2020-S0	Konservasi Macan Dahan: Food Barrier dalam rangka Pemulihan Ekosistem dan Habitat Macan Dahan berbasis penguatan ekonomi masyarakat di KTH Sumur Jaya Mandiri *Clouded Leopard Conservation: Food Barrier initiative to support the restoration of the clouded leopard's ecosystem and habitat, based on community economic empowerment in the Sumur Jaya Mandiri Forest Farmer Group*	60.46
PEP Pendopo	SK No. 023/PHR72380/2022-S8	Komplek Pendopo: - Konservasi Flora yang Perlahan Menghilang - Pembuatan Pupuk Organik dengan Bantuan Mikroorganisme Lokal (MOL) dari Buah Maja (Aegle marmelos) untuk Kegiatan Pembibitan *Pendopo Complex:* *- Conservation of Slowly Disappearing Plant Species* *- Production of Organic Fertilizer using Local Microorganisms (MOL) derived from Maja Fruit (Aegle marmelos) for Nursery Activities*	
		Grenhouse Flora: Taman Anggrek Selangit, Ensiklopedia Flora Selangit, dan Smart Greenhouse dengan menggunakan PLC untuk sensor pengaturan kelembapan *Flora Greenhouse: Selangit Orchid Garden, Selangit Flora Encyclopedia, and a Smart Greenhouse equipped with a Programmable Logic Controller (PLC) for humidity control sensors.*	

Wilayah Kerja *Working Areas*	No SK	Program	Luas (Ha) *Area (Ha)*
PEP Prabumulih	SK No. 008/EP3610/2019-S0	Pusat Latihan Gajah Isau-isau: - Konservasi Gajah Sumatera (elephas maximus sumatranus) di Pusat Latihan Gajah Kelompok Hutan Isau-Isau bekerja sama dengan BKSDA Sumsel-SKW II Lahat - Inventarisasi dan Konservasi 43 jenis Pakan Gajah Sumatera - Pengembangan Demplot King Grass (Pennisetum purpurhoides) - Peningkatan keanekaragaman hayati jenis Petanang / Kapur guras (Dryobalanops oblongifolia) dengan metode fertilizer kotoran gajah *Isau-isau Elephant Training Center:* *- Conservation of Sumatran Elephants (Elephas maximus sumatranus) at the Isau-isau Forest Group Elephant Training Center in collaboration with the South Sumatra BKSDA - SKW II Lahat* *- Inventory and conservation of 43 species of Sumatran Elephant feed* *- Development of a King Grass (Pennisetum purpureum) demonstration plot* *- Biodiversity enhancement of Petanang / Kapur Guras (Dryobalanops oblongifolia) through the use of elephant dung fertilizer*	-
PEP Pangkalan Susu	2024	Dewa Pasar Rawa: Konservasi mangrove *Dewa Pasar Rawa: Mangrove Conservation*	176
PEP Ramba	SK No. Print-089/EP3150/2014-S0	Hutan Tanaman Endemik: Pelestarian tanaman endemik Pule, Penambahan vegetasi endmik pohon Laban, pelestarian pohon Gelam & pohon Jelutung sebagai pohon endemik di wilayah Ramba *Endemic Plant Forest:* *Conservation of endemic Pule trees, enrichment of Laban tree vegetation, and preservation of Gelam and Jelutung trees as endemic species in the Ramba area.*	-
PEP Rantau	SK No. 20/PHR62340/2022-S0	Green Nation: Sawang Langit (Saweu Riwang Elang Kita) *Green Nation: Sawang Langit*	209
PHE Jambi Merang	SK No. 0007/PHR62390/2023-S0	Konservasi flora fauna Pulai Gading, Regreening pembentukan RTH Sungai Kenawang, Konservasi di Taman Rimbo, Embung Desa Mendis, & Perhutanan Sosial *Conservation of flora and fauna in Pulai Gading, regreening for the establishment of green open space (RTH) in Sungai Kenawang, conservation in Taman Rimbo, reservoir (embung) in Mendis Village, and social forestry.*	48,35
PHE NSO	SK No. 324/PHR62330/2022-S0	Penangkaran Penyu Pantau Bantayan, Konservasi Aves-Mamalia-Insekta-Reptil, Konservasi Plankton dan Benthos, Konservasi Ikan Karang, Konservasi Pohon Cemara, Konservasi Mangrove *Turtle breeding is carried out at Pantau Bantayan, alongside the conservation efforts for various wildlife including birds, mammals, insects, and reptiles. The program also focuses on conserving plankton and benthos, as well as coral fish. Additionally, there are ongoing conservation activities for pine trees and mangroves to support ecosystem balance and biodiversity.*	110,06
PHE Ogan Komering	SK GM No. 049-12-XXI-2019	Kawasan Konservasi Flora dan Fauna PHE OK *PHE Conservation Area for Flora and Fauna*	10,00
PHE Raja Tempirai	SK No. Print 238/FM/SK/VII/2024	Kawasan Konservasi Flora dan Fauna PHE RT *PHE RT Flora and Fauna Conservation Area Balai Raja Wildlife*	2,08
PHR Bekasap Rokan	SK No. 073/PHR85416.2024-S0	Suaka Margasatwa Balai Raja & Pusat Latihan Gajah Sebanga *Sanctuary & Sebanga Elephant Training Center*	612,47
PHE ONWJ	SK No. 0574/PEP60000/2021-S0	Kawasan sekitar Kab. Karawang, Kab. Bekasi, Kep. Seribu, Cagar Alam Bokor, Suaka Margasatwa Pulau Rambut, Green Think Kab. Subang, Kab. Indramayu : Program REMAJA (Restorasi Mangrove Pantai Utara Jawa) *The areas around Karawang Regency, Bekasi Regency, Kepulauan Seribu, Bokor Nature Reserve, Pulau Rambut Wildlife Sanctuary, Green Think in Subang Regency, and Indramayu Regency are part of the REMAJA Program (Restoration of Mangroves on the North Coast of Java).*	163,22
		Kawasan Sekitar Kab. Karawang, Kab. Indramayu: PROGRAM ORANG TUA ASUH KARANG (OTAK JAWARA) *Around Karawang and Indramayu Regencies, the ORANG TUA ASUH KARANG (OTAK JAWARA) Program is implemented.*	0,05
		Kawasan Sekitar Kab. Karawang, Kab. Indramayu: PROGRAM ORANG TUA ASUH KARANG (OTAK JAWARA) *At the Ramsar Site of Pulau Rambut Wildlife Sanctuary, conservation programs include the Christmas Cikalang (Fregata andrewsi) and the Hawksbill Turtle (Eretmochelys imbricata) conservation initiatives.*	8,4

Wilayah Kerja *Working Areas*	No SK	Program	Luas (Ha) *Area (Ha)*
PEP Subang	SK No.659/EP3320/2017-S0	Hutan Kota Ranggawulung: Konservasi Hutan Kota *Ranggawulung City Forest: Urban Forest Conservation*	38,68
	SK.No. 333/PEP82600/2024-S0	Pesisir Pantai Pesona Baru: Konsevasi mangrove *Pesona Baru Coastal Area: Mangrove Conservation*	
	SK No.717/EP3320/2017-S0	Konservasi Gunung Puntang: Konservasi owa jawa *Puntang Mountain Conservation Area: Javan Gibbon Conservation*	
PEP Jatibarang	SK No.03/PEP3730/2024-S0	Area Komperta di : Mundu Jatibarang, Cemara Jatibarang, dan Konservasi Taman Nasional Gunung Ciremai *Green Nation: Sawang Langit*	1.619,03
PEP Tambun	SK No.M.315/EP3710/2016-S0	Konservasi Mangrove *Mangrove Conservation*	4,68
	SK No.M.315/EP2890/2014-S0	Kawasan Konservasi Keanekaragaman Hayati Internal "Green Tambun": Kawasan Perlindungan Keanekaragaman Hayati PT. PERTAMINA EP ZONA 7 TAMBUN FIELD *"Green Tambun" Internal Biodiversity Conservation Area: PT. PERTAMINA EP ZONE 7 TAMBUN FIELD Biodiversity Protection Area*	
	SK No.M.26/PEP82500/2021-S0	Kawasan Konservasi Surili dan Cagar Alam Gunung Burangrang *Surili Conservation Area and Mount Burangrang Nature Reserve*	
PHM	No.Kpts-1455/PHI60410/2022-S0	Kawasan Perlindungan Kehati di : Ekosistem Hutan Dataran Rendah, Hutan Kerangas dan Hutan Rawa, Ekosistem Hutan Mangrove, Ekosistem Hutan Riparian, Ekosistem Perairan Estruari Delta Mahakam. Serta Kawasan Konservasi Perairan Habitat Pesur Mahakam *Biodiversity Protection Areas include Lowland Forest Ecosystems, Kerangas and Peat Swamp Forests, Mangrove Forest Ecosystems, Riparian Forest Ecosystems, and the Estuarine Water Ecosystem of the Mahakam Delta. Additionally, there is the Conservation Area of the Mahakam Pesut (Irrawaddy Dolphin) Habitat.*	43.163,22
PHSS	SK No. 005/PHI70000/2023-S0	Kawasan Rehabilitasi Delta Mahakam dengan Penanaman Mangrove dan pohon endemik kalimantan di Lapangan Nilam, serta Pengembangan Pertanian Jagung Desa Saliki, Muara Badak *Mahakam Delta Rehabilitation Area with Mangrove and Endemic Kalimantan Tree Planting at Nilam Field, along with Corn Farming Development in Saliki Village, Muara Badak.*	1,3
	SK No.006/PHI70000/2023-S0	Kawasan Rehabilitasi Delta Mahakam dengan Penanaman Mangrove dan penghijauan serta penanaman pohon endemik kalimantan di Lapangan Semberah, Program Pengembangan Tanaman Hortikultura Bersama Masyarakat Desa Bunga Putih, Transplantasi Terumbu Karang Kawasan Pesisir Pantai Tanjung Limau Semberah, dan Penghijauan Tanaman Endemik pada Objek Wisata Pangempang *Mahakam Delta Rehabilitation Area with Mangrove Planting, Greening, and Endemic Kalimantan Tree Planting at Semberah Field; Horticultural Crop Development Program with the Community of Bunga Putih Village; Coral Reef Transplantation at the Coastal Area of Tanjung Limau Semberah; and Greening of Endemic Plants at the Pangempang Tourism Site.*	31,68
	SK No. 007/PHI70000/2023-S0	Kawasan Rehabilitasi Delta Mahakam dengan Penanaman Mangrove dan penghijauan serta penanaman pohon endemik kalimantan di Lapangan Mutiara, Pengembangan Masyarakat (Kelompok Tani) Poktan Mandiri Raya "Budidaya Jeruk dan Durian", Konservasi Taman Hutan Raya (Tahura) Bukit Soeharto Muara Jawa, dan Konservasi Mangrove Api Api (Avicennia sp) pada lokasi Mutiara 320 *Mahakam Delta Rehabilitation Area with Mangrove Planting, Greening, and Endemic Kalimantan Tree Planting at Mutiara Field; Community Development (Farmers Group) Poktan Mandiri Raya for Orange and Durian Cultivation; Conservation of Bukit Soeharto Grand Forest Park (Tahura) Muara Jawa; and Mangrove Conservation of Api-api (Avicennia sp.) at Mutiara 320 location.*	82,51

Wilayah Kerja *Working Areas*	**Nama Kawasan** *Area Name*	Lokasi *Location*	**Luas (Ha)** *Area (Ha)*
	SK No. 008/PHI70000/2023-S0	Kawasan Rehabilitasi Delta Mahakam dengan Penanaman Mangrove dan penghijauan serta penanaman pohon endemik kalimantan di Lapangan Badak, Kawasan Agrowisata Durian - Durio zibethinus (Widuri Sehati), dan Kawasan Pengembangan Budidaya Sango Sango (Rumput Laut) *Mahakam Delta Rehabilitation Area with Mangrove Planting, Greening, and Endemic Kalimantan Tree Planting at Badak Field; Durian Agrotourism Area – Durio zibethinus (Widuri Sehati); and Sango Sango (Seaweed) Cultivation Development Area.*	26,41
	SK No.197/05/KB/V/2022 SK No.354/PHI60000/2022-S0 SK No.406/PHI70000/2022-S0 SK No.191/PHI80000/2022-S0	Taman Tematik Orchidarium dan Perlindungan Keanekaragaman Hayati di Kebun Raya Balikpapan *Orchidarium Thematic Garden and Biodiversity Protection at Balikpapan Botanical Garden.*	0,50
PEP Sangatta	SK No. S.642/BTNK-1/2014 SK No.281/EP3500/2014-S0	Optimalisasi Pengelolaan Kawasan Taman Nasional Kutai Kutai National Park Optimalization Area	503.8
	SK No. S.1531/BTNK-1/2009 SK No. 965/EP1300/2009-S0	Taman Nasional Kutai Kutai National Park	
	SK No. 002/EP3550/2019-S0	Kawasan Pampang (Konservasi Burung Rangkong) Pampang Area (Hornbill Conservation)	
PEP Sanga-Sanga	Kpts-16/EP3520/2015-S0	Kawasan Tanjung Una (Kawasan Perlindungan Habitat Bekantan (Nasalis lavartus wurmb)	60
	SK No. 142/PHI12540/2022-S0	Program EKORIPARIAN SUNGAI HITAM Sungai Hitam Ecoriparian Program	-
PHKT Dobs	SK No. Prin-001/KT82330/2023-S8	Kawasan Konservasi *Conservation Area*	71.57
PHKT Dobu	No. Prin-002/KT82330/2023-S8	Kawasan Konservasi *Conservation Area*	464.05
	No. B.997/MEN-KP/X/2022 SK	Kawasan sekitar Selat Makasar *Area around the Makassar Strait*	3.89
PEP Tarakan	002/PHI82350/2021-S0	Penetapan Area konservatif Keanekaragaman Hayati di Stasiun Pompa Air(SPA)	1,37
PEP Tanjung	12/PHI72470/2024-S0	Area Konservatif Orang Utan Samboja Lestari *Orangutan Conservation Area – Samboja Lestari*	75,19
	Tidak Tercantum	TPM (Taman Pendidikan mangrove) Timur & Barat *Eastern & Western Mangrove Education Park*	53
	PHEWMO/HSES/JKT/SK/X-2013/006	Kawasan Mangrove ORF (Onshore Receiving Facility) *Mangrove Area at ORF (Onshore Receiving Facility)*	6
PEP Sukowati	Ket-009/EP3850/2018-S0	Area konservasi di : Area Operasi CPA dan PAD A, Area Operasi Sattelite Offoce Mudi Pad B, Area Operasi Sukowati A, Area Operasi Sukowati B, dan Desa Djenu Kabupaten Tuban Conservation areas in: CPA and PAD A Operational Area, Mudi Pad B Satellite Office Operational Area, Sukowati A Operational Area, Sukowati B Operational Area, and Djenu Village, Tuban Regency	141,87

Wilayah Kerja *Working Areas*	**Nama Kawasan** *Area Name*	Lokasi *Location*	**Luas (Ha)** *Area (Ha)*
PEP Papua	014/EP92310/2024/S0	Kawasan Konservatif Keanekaragaman Hayati Biodiversity conservation area	53.2
	014/EP92310/2024/S0	Peta Kawasan Rehabilitasi Terumbu Karang Di Daram No-Take-Zone (Note: 27 Media Wire Mesh; 3402 Fragment Karang) Map of Coral Reef Rehabilitation Area in Daram No-Take-Zone (Note: 27 Media Wire Mesh; 3402 Coral Fragments)	0.03
	014/EP92310/2024/S0	Peta Kawasan Rehabilitasi Terumbu Karang di pulau Kalig, Misool Selatan Papua Barat : Yayasan Misool & PT Pertamina EP Map of Coral Reef Rehabilitation Area on Kalig Island, South Misool, West Papua: Misool Foundation & PT Pertamina EP	0.1
	014/EP92310/2024/S0	Peta Kawasan Transplantasi Terumbu Karang di pulau Soop Map of Coral Reef Transplantation Areas on Soop Island	-
	014/EP92310/2024/S0	Kawasan Konservatif Keanekaragaman Hayati Biodiversity conservation area	23.3
PEP DMF	Surat Perintah : No. 1404/PPC82330/2024-S0	Zona Hijau CPP Donggi dan CPP Matindok, Bireeftek di Pantai Pandan Wangi dan Pantai Kilo 5 dan Mangrove di Pantai pandan Wangi Green Zone of Donggi CPP and Matindok CPP, Bireeftek at Pandan Wangi Beach and Kilo 5 Beach, and Mangroves at Pandan Wangi Beach	4,58
	Surat Perintah : No. 2913/EP3830/2020-S0	Taman Kehati Kepulauan Banggai Biodiversity Park, Banggai Islands	13,68
PEP Cepu	EP 3410/2022-S0 334045.4/LINGK/PRG (Berbentuk MoU Kerja Sama)	Pelastarian Rusa Jawa melalui Program Penangkaran Dan Peningkatan Nilai Ekonomis Preservation of Javanese Deer through Breeding Programs and Economic Value Enhancement Kokolomboi	--

Wilayah Kerja *Working Areas*	**No SK** *Decree Letter Number*	**Program Konservasi** *Conservation Program*	**Luas (Ha)** *Area (Ha)*
JOB Tomori	PKS.696/VI.K-22/2018 0319/TOMORI/GM/LTR/2018	Kerjasama penguatan fungsi Suaka Margasatwa Bakiringan berupa konservasi burung Maleo *Collaboration to Strengthen the Function of Bakiriang Wildlife Sanctuary through Maleo Bird Conservation*	54.09
	007/TOMORI/GM/KEP/2017	Kawasan Konservasi Maleo wilayah Cagar Alam Morowali wilayah Tanjung Peo *Maleo Conservation Area Morowali Nature Reserve area Tanjung Peo area*	150
	SK No. 001A/JBT/1/2015	Kawasan Laut Pelestarian Terumbu Karang di Lapangan Tiaka *Marine Conservation Area*	5
	SK No. 001A/JBT/1/2016	Kawasan Konservasi Mangrove di Lapangan Senoro *Mangrove conservation area at Senoro Field*	2.7
	LEMBARAN DESA SUMBERHARJO TAHUN 2018 NOMER 17	Kawasan konservasi Serak Sulawesi*Sumberharjo Village Area and Surrounding Villages*	188
	SK KUB: 141/15/DS-SIN/2021	Ekowisata Penyu Sinorang Pantai *Sinorang Village, Batui Selatan Subdistrict, Banggai Regency, Central Sulawesi Province*	0.364
	PKS. 405/BKSDAST/TU/TEK/6/2023 0019/TOMORI/GM/KEP/2023	Konservasi Maleo dan Julang Sulawesi *Batui Selatan Subdistrict, Banggai Regency, Central Sulawesi Province*	0.4
		Konservasi penyu *Sinorang Village Beach, Banggai Regency, Central Sulawesi Province*	0.5
	No 06/E/YEMINA/III.2024	Konservasi Adopsi Karang Kilo-5 Luwuk: Kegiatan edukasi dan sosialisasi tentang pentingnya konservasi terumbu karang akan dilaksanakan untuk masyarakat sekitar. *Kilo-5 Luwuk Coral Adoption Conservation: Educational and awareness activities on the importance of coral reef conservation will be carried out for the surrounding community.*	2
Total			**48.839,29 Ha**

C. Kriteria Penilaian Risiko untuk Aktivitas Tertentu

C. Risk Assessment Criteria for Specific Activity

Risk Assessment Criteria for Specific Activity

Risk Assessment ID	:
Company	:
Organization	:
Name Job	:
Job Location	:
Project Start Date	:
Duration of Work	:
Risk Level	:
Scope of Work	:

NO	Daerah Risiko *Risk Area*	Keterangan *Identification*	Konsekuensi R/S/T *Consequences of R/S/T*				Catatan *Notes*
			Manusia *Human*	Aset *Asset*	Lingkungan *Environmental*	Reputasi *Reputation*	

D. Data Cadangan Minyak

D. Oil Reserve Data

Cadangan Reserves	Sub-total		Total (MMBOE)
	Minyak (MMBBLs) Oil	Gas Alam (MMBOE)	
1P Proved Reserves	1377	985	2362
2P Proved + Probable Reserves	1741	1194	2935

PERTAMINA
PHE ONWJ

STRATEGIC PLAN FOR 2020-2025
CONSERVATION AND WATER POLLUTION REDUCTION ASPECTS OF PT. PHE ONWJ

No	Program Name	Objective	Target	PIC	Location	Success Indicators	Implementation Schedule						Budget (IDR)
							2020	2021	2022	2023	2024	2025	
1	Reduction in produced water discharge at the GG field using the SINGA method	Reducing produced water discharge	Reducing produced water discharge by 331 barrels/day	Arif Rahman (Efficiency Team Coordinator Water & PPA)	OPF Balongan	Reduction in produced water discharge by 331 barrels/day							1,624,146,000
2	Use of PDAM water to reduce groundwater extraction	Reducing groundwater extraction	Reducing the use of clean water sourced from groundwater for domestic activities by 216 tons/year	Arif Rahman (Water Efficiency & PPA Team Coordinator)	MK ORF TP ORF	Reducing the use of clean water from groundwater for domestic needs by 216 tons/year							34,803,508
3	Use of submersible pump (ESP) as feed water maker Uniform	Reducing the use of surface water from land	Reducing the use of fresh water from ships due to frequent damage to the surface mono pump currently used to supply sea water to the Uniform water maker by 140 tons/year	Arif Rahman (Water Efficiency & PPA Team Coordinator)	Uniform	Reduction in fresh water consumption from the vessel by 140 tons/year							401,957,000
4	Water conservation through Batch and/or Sequence drilling Drilling System	Water efficiency in drilling activities	The amount of water used for mud production is reduced by at least 20%	R. Najwa A. (Member of the Water Efficiency & PPA)	Drilling platform	Water consumption is reduced through the reuse of drilling mud waste							46,580,040,000
5	Application of Reverse Osmosis (RO) Technology in the Community Empowerment Program at TPI Sambung Jaya Mulya, Karangreja Village, Cirebon Regency	Replacing the clean water source used by fishermen for sailing activities from purchasing at the Drinking Water Depot to obtaining RO clean water at a more affordable price and closer access	The fishing community now has access to clean water at a more affordable price and closer proximity, with water efficiency of 289 m^3.	R. Najwa A. (Member of the Water Efficiency & PPA)	Karangreja Village, Cirebon Regency	The fishing community no longer buys water from the Water Depot							21,939,336
6	Oily Water Treatment Plant Reduction	Reduction of pollution load discharged into the water body water	Reducing the amount of pollution load by 87% per year	Arif Rahman (Coordinator of the Water Efficiency Team & PPA)	Central Plant	Reducing pollution load by 87% per year							786,043,126

Acknowledged

Chairperson of the Water & PPA Efficiency Coordination Committee

WORK PLAN 2020-2025
ASPECTS OF CONSERVATION AND REDUCTION OF WATER POLLUTION LOAD PT. PHE ONWJ

PERTAMINA PHE ONWJ

Program Name : Water conservation through Batch and/or Sequence drilling Drilling System
Objectives Targets : Water efficiency in drilling activities
Location : The amount of water used for mud production is reduced by at least 20%
: Drilling Platform

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2020											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Well operation planning sequence	R. Najwa A. (Member of the Water Efficiency & PPA Team)	Reduction in water consumption through the reuse of drilling mud waste	Rp 13,310,700,000												
	Finalization of the Sequence Well Program (Peer Review, DWOP, Pre-Spud)															
	Well Drilling Execution Sequence															

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2021											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Well operation planning sequence	R. Najwa A. (Member of the Water Efficiency & PPA Team)	Reduction in water consumption through the reuse of drilling mud waste	Rp 7,242,300,000												
	Finalization of the Sequence Well Program (Peer Review, DWOP, Pre-Spud)															
	Well Drilling Execution Sequence															

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2022											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Well operation planning sequence	R. Najwa A. (Member of the Water Efficiency & PPA Team)	Reduction in water consumption through the reuse of drilling mud waste	Rp 6,506,760,000												
	Finalization of the Sequence Well Program (Peer Review, DWOP, Pre-Spud)															
	Well Drilling Execution Sequence															

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2023											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Well operation planning sequence	R. Najwa A. (Member of the Water Efficiency & PPA Team)	Reduction in water consumption through the reuse of drilling mud waste	Rp 6,506,760,000												
	Finalization of the Well Sequence Program (Peer Review, DWOP, Pre-Spud)															
	Execution of Well Drilling Sequence															

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2024											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Well operation planning sequence	R. Najwa A. (Member of the Water Efficiency & PPA Team)	Reduction in water consumption through the reuse of drilling mud waste	Rp 6,506,760,000												
	Finalization of the Well Sequence Program (Peer Review, DWOP, Pre-Spud)															
	Well Drilling Execution Sequence															

No	Method of Implementation	PIC	Success Indicators	Budget (Rp)	Implementation Schedule for 2025											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Well operation planning sequence	R. Najwa A. (Member of the Water Efficiency & PPA Team)	Reduction in water consumption through the reuse of drilling mud waste	Rp 6,506,760,000												
	Finalization of the Well Sequence Program Sequence (Peer Review, DWOP, Pre-Spud)															

	Execution of Well Sequence Drilling																		

WORK PLAN 2020-2025
CONSERVATION ASPECTS AND REDUCTION OF WATER POLLUTION LOAD AT PT. PHE ONWJ

PERTAMINA PHE ONWJ

Program Name : Use of PDAM water to reduce groundwater extraction
Objectives Targets : Reducing groundwater extraction
: Reducing the use of clean water sourced from groundwater for domestic activities by 216 tons/year
Location : Tanjung Priok ORF & Muara Karang ORF

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2020											
					Jan	Feb	Mar	April	May	June	July	August	Septemb er	Oct	Novemb er	Dec
1	Water usage monitoring PDAM Evaluation of the implementation of of PDAM water usage Maintenance of piping utilities	Arif Rahman (Coordinator of the Water Efficiency Team & PPA)	Reduction in clean water usage volume through the use of PDAM water for domestic needs	Rp 8,332,416.00												

No	Method/Approach of Implementation	Person in Charge	Success Indicators	Budget (IDR)	Implementation Schedule for 2021											
					Jan	Feb	Mar	April	May	June	July	August	Septemb er	Oct	Novemb er	Dec
1	Water usage monitoring PDAM Evaluation of implementation of PDAM water usage Maintenance of piping utilities	Arif Rahman (Coordinator of the Water Efficiency Team & PPA)	Reduction in clean water usage through the use of PDAM water for domestic needs	Rp 3,451,732												

No	Method of Implementation	Person in Charge	Success Indicators	Budget (IDR)	Implementation Schedule for 2022											
					Jan	Feb	Mar	April	May	June	July	August	Septemb er	Oct	Novemb er	Dec
2	Water usage monitoring PDAM Evaluation of the implementation of of PDAM water usage Maintenance of piping utilities	Arif Rahman (Coordinator of the Water Efficiency Team & PPA)	Reduction in clean water usage volume through the use of PDAM water for domestic needs	Rp 4,960,000												

No	Method of Implementation	Person in Charge	Success Indicators	Budget (IDR)	Implementation Schedule for 2023											
					Jan	Feb	Mar	April	May	June	July	August	Septemb er	Okt	Nov	Dec
3	Water usage monitoring PDAM Evaluation of the implementation of of PDAM water usage Maintenance of piping utilities	Arif Rahman (Coordinator of the Water Efficiency Team & PPA)	Reduction in clean water usage volume through the use of PDAM water for domestic needs	Rp 5,456,000												

No	Method/Approach of Implementation	Person in Charge	Success Indicators	Budget (IDR)	Implementation Schedule for 2024											
					Jan	Feb	Mar	April	May	June	July	August	Septemb er	Oct	Novemb er	Dec
4	Water usage monitoring PDAM Evaluation of implementation Maintenance of piped utilities	Arif Rahman (Coordinator of the Water Efficiency Team & PPA)	Reduction in clean water usage volume through the use of PDAM water for domestic needs	Rp 6,001,600												

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2025											
					Jan	Feb	Mar	April	May	June	July	August	Septemb er	Oct	Novemb er	Dec
5	Water usage monitoring PDAM Evaluation of the implementation of of PDAM water usage Maintenance of piped utilities	Arif Rahman (Coordinator of the Water Efficiency Team & PPA)	Reduction in clean water usage volume through the use of PDAM water for domestic needs	Rp 6,601,760.00												

WORK PLAN 2020-2025
ASPECTS OF CONSERVATION AND REDUCTION OF WATER POLLUTION LOADS AT PT. PHE ONWJ

Program Name : Use of submersible pumps (ESP) as uniform feed water makers
Objectives Targets : Reducing the use of surface water from land
: Reducing freshwater usage from ships due to frequent damage to the surface mono pump currently used to supply seawater to the Uniform water maker by 140 tons/year
Location : Uniform

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2021											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Procurement of submersible pumps (ESP)	Arif Rahman (Water Efficiency Team Coordinator & PPA)	Reducing fresh water consumption from ships by 140 tons/year	Rp 135,157,000.00												

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2022											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	RO Intake Structure Survey & Data Collection	Arif Rahman (Water Efficiency Team Coordinator & PPA)	Reduced fresh water consumption from ships by 140 tons/year	Rp 56,800,000												
	TMoC submersible pump (ESP)															
	Fabrication of ESP support structure															
	Installation of ESP															
	ESP start-up															

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2023											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Monitoring of structural conditions supporting structures & ESP	Arif Rahman (Coordinator of the Water Efficiency & PPA)	Reducing fresh water consumption from ships by 140 tons/year	Rp 65,000,000												
	ESP maintenance															
	Evaluation of reduction in fresh water from Onshore															

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2024											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1		Arif Rahman (Water Efficiency Team Coordinator & PPA)	Reduced fresh water consumption from ships by 140 tons/year	Rp 70,000,000												
	ESP maintenance															
	Evaluation of reduction in fresh water from Onshore															

No	Method/Approach	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2025											
					Jan	Feb	Mar	April	May	June	July	Agust	Sept	Oct	Nov	Dec
1	Monitoring of structural conditions supporting structures & ESP	Arif Rahman (Coordinator of the Water Efficiency & PPA)	Reduced fresh water consumption from ships by 140 tons/year	Rp 75,000,000												
	ESP maintenance															
	Evaluation of reduction in fresh water from Onshore															

WORK PLAN 2020-2025
CONSERVATION AND REDUCTION OF WATER POLLUTION LOADS AT PT. PHE ONWJ

Program Name : Implementation of Reverse Osmosis (RO) Technology in the Community Empowerment Program at TPI Sambung Jaya Mulya, Karangreja Village, Cirebon Regency

Objective : Replacing the clean water source used by fishermen for sailing activities from purchasing at a drinking water depot to obtaining RO clean water at a more affordable price and with closer access

Objectives : Fishermen receive clean water at a more affordable price and with closer access, along with water efficiency of 289 m³

Location : TPI Sambung Jaya Mulya, Karangreja Village, Cirebon Regency

No	Method/Implementation Method	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2020											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Monitoring Clean Water from Reverse Osmosis Evaluation of Clean Water Implementation From Reverse Osmosis Maintenance of Clean Water from Reverse Osmosis	R. Najwa A. (Water Efficiency Team Member)	The fishing community no longer buys water from the Drinking Water Depot	Rp 2,843,500												

No	Method/Approach of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2021											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	Nov	Dec
1	Monitoring Clean Water from Reverse Osmosis Evaluation of Clean Water Implementation from Reverse Osmosis Maintenance of Clean Water from Reverse Osmosis	R. Najwa A. (Member of the Water Efficiency Team)	Fishermen no longer buy water from the Drinking Water Depot	Rp 3,127,850												

No	Method/Approach of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2022											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Monitoring Clean Water from Reverse Osmosis Evaluation of Clean Water Production from Reverse Osmosis Maintenance of Clean Water from Reverse Osmosis	R. Najwa A. (Member of the Water Efficiency Team)	Fishermen no longer buy water from the Drinking Water Depot	Rp 3,440,635.00												

No	Method/Approach of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2023											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Monitoring Clean Water from Reverse Osmosis Evaluation of Clean Water Implementation From Reverse Osmosis Maintenance of Clean Water from Reverse Osmosis	R. Najwa A. (Member of the Water Efficiency Team)	Fishermen no longer buy water from the Drinking Water Depot	Rp 3,784,698												

No	Method/Approach of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2024											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	Nov	Dec
1	Monitoring Clean Water from Reverse Osmosis Evaluation of Clean Water Implementation From Reverse Osmosis Maintenance of Clean Water from Reverse Osmosis	R. Najwa A. (Member of the Water Efficiency Team)	Fishermen no longer buy water from the Drinking Water Depot	Rp 4,163,168												

No	Method/Approach of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2025											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Monitoring Clean Water from Reverse Osmosis Evaluation of Clean Water Production from Reverse Osmosis Maintenance of Clean Water from Reverse Osmosis	R. Najwa A. (Member of the Water Efficiency Team)	Fishermen no longer buy water from the Drinking Water Depot	Rp 4,579,485.00												

WORK PLAN 2020-2025
ASPECTS OF CONSERVATION AND REDUCTION OF WATER POLLUTION LOAD PT. PHE ONWJ

PERTAMINA PHE ONWJ

Program Name : Reduction of produced water discharge using the SINGA method
Objectives Targets : Reducing the discharge of produced water
: Reduce produced water flow by 331 barrels/day
Location : OPF Balongan

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2021											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Concept & Data Collection Reliability of the GGA-2 Pipeline to OPF Balongan	Arif Rahman (Water Efficiency Team Coordinator)	Decrease in water production	Rp 204,000,000.00												
	Socialization of the GGA-2Shut-In plan															
	Execution & monitoring of the closure of the GGA-2well															
	Evaluation of pipeline reliability after closure															

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2022											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Pipeline reliability monitoring	Arif Rahman (Water Efficiency Team Coordinator)	Decrease in water production	R 306,000,000												
	Maintenance of the GGA-2well															
	Evaluation of decrease in water discharge of produced water															

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2023											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Pipeline reliability monitoring	Arif Rahman (Water Efficiency Team Coordinator)	Decrease in water production	R 336,600,000												
	Maintenance of the GGA-2well															
	Evaluation of decrease in water discharge of produced water															

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2024											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Pipeline reliability monitoring	Arif Rahman (Water Efficiency Team Coordinator)	Decrease in water production	R 370,260,000												
	Maintenance of the GGA-2well															
	Evaluation of decrease in water discharge of produced water															

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	2025 Implementation Schedule											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Pipeline reliability monitoring	Arif Rahman (Water Efficiency Team Coordinator)	Decrease in water production	R 407,286,000												
	Maintenance of the GGA-2well															
	Evaluation of decrease in water discharge of produced water															

WORK PLAN 2020-2025
CONSERVATION AND REDUCTION OF WATER POLLUTION LOADS AT PT. PHE ONWJ

PERTAMINA PHE ONWJ

Program Name : Oily Water Treatment Plant
Objectives : Reduction of pollution load discharged into water bodies
: Reduce the amount of pollution load by 87% per year
Location : Central Plant

No	Method of Implementation	PIC	Success Indicators	Budget (IDR)	Implementation Schedule for 2020											
					Jan	Feb	Mar	April	May	June	July	August	September	Oct	November	Dec
1	Water treatment produced Maintenance of wastewater treatment facilities Monitoring of wastewater quality	Arif Rahman (Water Efficiency Team Coordinator & PPA)	Reducing pollution load by 87% per year	Rp 786,043,126.00												

2020-2025 STRATEGIC PLAN ASPECTS OF
EMISSION REDUCTION
PT. PHE ONWJ

PERTAMINA
PHE ONWJ

No	Program Name	Objective	Target	PIC	Location	Success Indicators	Implementation Schedule						Budget (IDR)
							2020	2021	2022	2023	2024	2025	
1	Project Zero Routine Flaring	Installation of ejector equipment	Reducing flare gas volume by reducing GHG emissions by 11,448 tons of CO2eq and reducing conventional NOx emissions by 3.76 tons	Abdul Haris Arifiyanto	Station Bravo	Reduction in GHG emissions by 11,448 tons of CO2eq Reduction in conventional NOx emissions by 3.76 tons							2,145,000,000.00
			Reducing the volume of fuel gas with a reduction in GHG emissions of 6,703 tons CO2eq and a reduction in conventional NOx emissions of 2.18 tons		Echo Station	Reduction in GHG emissions of 6,703 tons of CO2eq Reduction in conventional NOx emissions of 2.18 tons							2,145,000,000.00
			Reducing the volume of flare gas with a reduction in GHG emissions of 5,821 tons of CO2eq and a reduction in conventional NOx emissions of 1.88 tons		Station Lima	Reduction in GHG emissions by 5,821 tons of CO2eq Reduction in conventional NOx emissions by 1.88 tons							2,145,000,000
			Reducing the volume of fuel gas with a reduction in GHG emissions of 2,721 tons CO2eq and a reduction in conventional NOx emissions of 0.95 tons		Mike-Mike Station	Reduction in GHG emissions of 2,721 tons CO2eq Reduction in conventional NOx emissions of 0.95 tons							2,145,000,000.00
2	Renewable Energy Project	Installation of Solar Panels	Reduction in GHG emissions from electricity use by 0.24 tons CO2eq	Gideon C I Lengkong	MB2 Station	Reduction in GHG emissions of 0.24 tons CO2eq							380,600,000
			Reducing emissions from electricity consumption by 58.84 tons of CO2 eq		ORF Muara Karang Station	Reduction in GHG emissions of 58.84 tons of CO2 eq							165,250,000
			Reducing emissions from electricity use by 94.65 tons of CO2 eq		Tanjung Priok OPF Station	Reduction in GHG emissions of 94.65 tons CO2 eq							165,250,000
			Reducing emissions from electricity use by 94.65 tons of CO2 eq		Cilamaya ORF Station	Reduction in GHG emissions of 94.65 tons CO2 eq							165,250,000.00
			Reducing emissions from the use of fossil fuels or electricity by 225.32 tons of CO2 eq and conventional SOx 0.02 tons, NOx 0.34 tons, and PM 0.02 tons		Balongan OPF Station	Reduction in GHG emissions of 225.32 tons of CO2eq Reduction in conventional emissions: SOx 0.02 tons, NOx 0.34 tons, and PM 0.02 tons							330,500,000
3	Implementation of PASTER (Online Monitoring System) on the AVSA Green Platform	Creating the First Green Platform in the ONWJ Region	Reducing emissions from the use of fossil fuels or electricity by GRK 190.25 tons of CO2eq and conventional SOx 0.04 tons, NOx 0.65 tons, and PM 0.05 tons	Abdul Haris Arifiyanto	AVSA Station	Reduction in GHG emissions of 190.25 tons CO2eq Reduction in conventional SOx emissions of 0.04 tons, NOx emissions of 0.65 tons, and PM emissions of 0.05 tons							455,950,000.00
4	Project Zulu Smart Platform	Installation of ZULU area online monitoring & operations system	Reducing emissions from ship use and decreasing the frequency of operator visits to NUI by 7.84 tons of CO2eq GRK and 0.02 tons of conventional SOx, 0.23 tons of NOx, and 0.02 tons of PM	Bhakti Kurniawan	Station Zulu	Reduction in GRK emissions of 7.84 tons of CO2eq Reduction in conventional SOx emissions by 0.02 tons, NOx by 0.23 tons, and PM by 0.02 tons							440,000,000.00
5	Turbine and Generator Overhaul Project	Improving the efficiency of the turbine and generator units	Reducing emissions from turbine and generator units by GRK 50.93 tons CO2eq and conventional SOx 0.1 tons, NOx 1.51 tons, and PM 0.11 tons	TM Ongko Wibisono	Arco Ardjuna Station	Reduction in GHG emissions of 50.93 tons of CO2eq Reduction in conventional emissions: SOx 0.1 tons, NOx 1.51 tons, and PM 0.11 tons							8,282,970,107.00
			Reducing emissions from turbine and generator units by GRK 2,411.32 tons of CO2eq and conventional SOx 0.09 tons, NOx 8.49 tons, and PM 0.17 tons		Mike-Mike Station	Reduction in GRK emissions of 2,411.32 tons of CO2eq Reduction in conventional SOx emissions by 0.09 tons, NOx by 8.49 tons, and PM by 0.17 tons							39,250,000,000.00
			Reducing emissions from turbine and generator units by GRK 3,481.24 tons CO2eq and conventional SOx emissions by 0.13 tons, NOx by 12.03 tons, and PM 0.25 tons		Bravo Station	Reduction in GHG emissions by 3,481.24 tons of CO2eq Reduction in conventional emissions: SOx 0.13 tons, NOx 12.03 tons, and PM 0.25 tons							96,250,000,000.00
			Reducing emissions from turbine and generator units by 738 tons of CO2eq GRK and 0.0047 tons of conventional SOx, 6.75 tons of NOx, and 0.079 tons of PM		Central Plant Station	Reduction in GRK emissions of 738 tons of CO2eq Reduction in conventional SOx emissions by 0.0047 tons, NOx by 6.75 tons, and PM by 0.079 tons							13,500,000,000.00
			Reducing emissions from turbine and generator units by GHG 424.85 tons CO2eq and conventional SOx 0.0029 tons, NOx 4.15 tons, and PM 0.048 tons		KLB Station	Reduction in GRK emissions of 424.85 tons of CO2eq Reduction in conventional SOx emissions by 0.0029 tons, NOx by 4.15 tons, and PM by 0.048 tons							13,500,000,000.00
			Reducing emissions from turbine and generator units by GHG 446.87 tons CO2eq and conventional SOx 0.0186 tons, NOx 1.75 tons, and PM 0.0362 tons		Foxtrot Station	Reduction in GHG emissions of 446.87 tons of CO2eq Reduction in conventional emissions: SOx 0.0186 tons, NOx 1.75 tons, and PM 0.0362 tons							32,500,000,000.00
6	Change in BTU type for the Turbine Generator	Increasing turbine generator efficiency by 10%	Reducing emissions from the turbine and generator by GRK 728.28 tons CO2eq and conventional SOx 0.005 tons, NOx 6.62 tons, and PM 0.08 tons	TM Ongko Wibisono	Station Zulu	Reduction in GRK emissions by 728.28 tons of CO2eq Reduction in conventional emissions by 0.005 tons of SOx, 6.62 tons of NOx, and 0.08 tons of PM							1,199,593,853.00
7	Utilization of Zulu flare gas as fuel for turbine generators (Zulu Mini Compressor/Magic Com)	Increasing turbine generator efficiency by 10%	Reducing emissions from the Turbine Generator by GRK 2,751.45 tons CO2eq and Conventional SOx 0.01 tons, NOx 11.70 tons, and PM 0.13 tons	TM Ongko Wibisono	Zulu Station	Reduction in GHG emissions of 2,751.45 tons of CO2eq Reduction in conventional emissions of SOx by 0.01 tons, NOx by 11.70 tons, and PM by 0.13 tons							28,894,190,506.00

STRATEGIC PLAN FOR 2020-2025 ASPECTS OF
EMISSION REDUCTION
PT. PHE ONWJ

PERTAMINA
PHE ONWJ

No	Program Name	Objective	Target	PIC	Location	Success Indicators	Implementation Schedule						Budget (IDR)
							2020	2021	2022	2023	2024	2025	
8	Change in the operating mode of the gas compression system at B1C from 2 to 1.5 trains	Increasing the efficiency of the generator turbine by 10%	Reducing GHG emissions by 2,591.31 tons of CO2eq and conventional SOx by 0.1 tons, NOx by 9.02 tons, and PM by 0.19 tons	Bhakti Kurniawan	Station Bravo	Reduction in GHG emissions by 2,591.31 tons of CO2eq Reduction in conventional SOx emissions by 0.1 tons, NOx by 9.02 tons, and PM by 0.19 tons							1,555,051,177.00
9	Implementation of Si Kethip OW in the electrical system at the Papa Platform	Improving the reliability of the generator turbine	Reducing GHG emissions by 14.95 tons of CO2eq and conventional SOx by 0.03 tons, NOx by 0.44 tons, and PM by 0.03 tons	TM Ongko Wibisono	Papa Station	Reduction in GHG emissions by 14.95 tons of CO2eq Reduction in conventional SOx emissions by 0.03 tons, NOx by 0.44 tons, and PM by 0.03 tons							4,790,192,863.00
10	Change in GGA Field Operation Mode (Improving Production Facility Reliability Using the "SINGA" Method at OPF Balongan PHE ONWJ)	Improving the reliability of the turbine generator	Reducing greenhouse gas emissions by 169.42 tons of CO2eq	Bhakti Kurniawan	Balongan OPF Station	Reduction in GHG emissions load of 169.92 tons CO2eq							45,496,000
11	KL Gas Lift	Reducing emissions from flare combustion	Reducing the volume of flare gas with a reduction in GHG emissions of 10,368.8 tons of CO2eq and conventional NOx of 3.68 tons	Bhakti Kurniawan	KL Station	Reduction in emissions of 10,368.8 tons CO2eq Reduction in conventional NOx emissions of 3.68 tons							6,273,613,667.00
12	Pump Monitoring & Coating	Improving energy efficiency	Reducing GHG emissions by 56.69 tons of CO2eq	TM Ongko Wibisono	Bravo Station	Reduction in GHG emissions of 56.69 tons CO2eq							330,500,000
			Reducing GHG emissions by 83.36 tons of CO2eq	TM Ongko Wibisono	Station Zulu	Reduction in GHG emissions of 83.36 tons CO2eq							330,500,000.00
13	Solar cells for the community	Reducing air emissions in the community	Reducing emissions in the community by 2.97 tons of CO2eq	Abdul Haris Arifiyanto	Sungai Buntu Village, Cemara Jaya Village, Muara Baru Village	Reduction in GHG emissions of 2.97 tons of CO2eq							355,100,000

PERTAMINA PHE ONWJ

STRATEGIC PLAN FOR BIODIVERSITY ASPECTS OF PT PERTAMINA HULU ENERGI ONWJ 2020-2025

No.	Program Name	Objective	Target	PIC	Location	Success Indicators	Implementation Schedule						Budget
							2020	2021	2022	2023	2024	2025	
A	Restoration of Mangroves on the North Coast of Java (**REMAJA**)	Improving degraded mangrove ecosystems by planting various types of flora in several locations managed by PHE ONWJ using the Tree Foster Parent (OTAP) concept, in order to improve environmental quality, support global climate change mitigation efforts, and develop the area as a coastal eco-tourism site	▪ Increasing mangrove coverage by 50 hectares by 2026 ▪ Increasing mangrove density and its associated species by 10,000 individuals per hectare per year ▪ Increasing carbon absorption and reducing CO_2 concentrations in the atmosphere. Absorption of 13 tons/ha and carbon storage in the form of plants of 4 tons/ha ▪ Increasing the biodiversity index by 5% per year ▪ Realizing the Pasirputih mangrove eco-tourism area as an integrated facility for mangrove ecosystem conservation.	▪ Indachi Purada (Coordinator of the Kehati Team) ▪ Arif Rahman (Member of the Kehati Team) ▪ Iman Teguh (Kehati Team Member)	Karawang Regency, Bekasi, and Thousand Islands	▪ Increase in mangrove ecosystem area by 50 hectares by 2026 ▪ Increase in mangrove density by 10,000 individuals/ha/year ▪ Carbon absorption of 13 tons/ha and carbon storage in the form of plants of 4 tons/ha ▪ Increase in the Biodiversity Index by 5% per year ▪ Increase in the number of mangrove species (true mangroves and associated mangroves) by 5 species/year	▪ Mangrove planting ▪ Mangrove maintenance ▪ Initiation of cooperation with the government and the community managing the white sand beach. ▪ Training/education on mangrove conservation	▪ Planting of mangroves and their associates ▪ Mangrove maintenance ▪ Monitoring and evaluation	▪ Planting of mangroves and associated species ▪ Mangrove and associated species maintenance ▪ Master plan development. ▪ Preparation of a master plan for the Pasirputih eco-tourism area ▪ Monitoring and evaluation	▪ Mangrove planting and associated activities ▪ Mangrove and associated species maintenance ▪ Construction of field laboratories and supporting facilities ▪ Enrichment of medicinal plant and horticultural species Monitoring and evaluation	▪ Mangrove planting and its associated species ▪ Maintenance of mangroves and their associated species ▪ Maintenance of medicinal plants and horticulture ▪ Operation of field laboratories ▪ Monitoring and evaluation	▪ Maintenance of mangroves and their associations ▪ Maintenance of medicinal plants and horticulture ▪ Monitoring and evaluation	**4,894,571,734**
B	Foster Parents of Coral Reefs in the North Sea of Jakarta and West Java (**OTAK JAWARA**)	Rehabilitation of the Coral Reef Ecosystem in Sukakerta Village, Karawang	▪ Increasing the area of coral reefs by 0.01 Ha/year ▪ Increasing coral fish abundance by 5%	▪ Indachi Purada (Coordinator of the Kehati Team) ▪ Arif Rahman (Kehati Team Member) ▪ Iman Teguh (Kehati Team Member)	Sukakerta Village, Karawang Regency	▪ Expansion of coral transplantation area increased by 0.01 Ha per year ▪ Increase in coral fish abundance by 5% from baseline	Initiation of replication of the OTAK Pulau Biawak program to a new location in Karawang	▪ OTAK Karawang Baseline Study ▪ Determination of transplantation locations	▪ Initiation of community group institutionalization ▪ Coral transplantation ▪ Monitoring and evaluation	▪ Coral reef transplantation ▪ Maintenance ▪ Monitoring and evaluation	▪ Coral reef transplantation ▪ Maintenance ▪ Monitoring and evaluation	▪ Maintenance. ▪ Monitoring and evaluation	**2,070,000,000**
C	**Conservation of Endangered Protected Wildlife**												

C.1	Conservation of Endangered and Protected Bird Species, **Christmas Frigatebird** (*Fregata andrewsi*) at *the Ramsar Site* of Rambut Island	Increasing the population of the Christmas Frigatebird (*Fregata andrewsi*), which is a critically endangered species (IUCN Red List) and protected by law, and is one of *the trigger species* in the Pulau Rambut IBA as an icon of *the Ramsar Site* through habitat improvement	▪ Improving the quality of the Christmas Frigatebird habitat, maintaining the existing mangrove density with enrichment plants totaling 5,000 plants per year ▪ Increasing the Christmas Frigatebird population by 5% per year	▪ Indachi Purada (Coordinator of the Kehati Team) ▪ Arif Rahman (Kehati Team Member) ▪ Iman Teguh (Kehati Team Member)	Rambut Island Wildlife Reserve, Thousand Islands	▪ Maintaining existing mangrove density with 5,000 enrichment plants per year ▪ Increase in the population of Cikalang Christmas by 5% per year from the baseline	N/A	▪ Baseline Study: Inventory of species abundance ▪ Mapping of concentrations/ main habitats	▪ Initiation of cooperation with the Jakarta Natural Resources Conservation Agency. ▪ Habitat developmen t	▪ Habitat developmen t ▪ Species abundance inventory (monitoring) and evaluation	▪ Habitat managemen t ▪ Species abundance inventory (monitoring) and evaluation	▪ Habitat managemen t ▪ Species abundance inventory (monitoring) and evaluation	**570,000,000**

No.	Program Name	Objective	Target	PIC	Location	Success Indicators	Implementation Schedule						Budget
							2020	2021	2022	2023	2024	2025	
C.2	Conservation of Endangered and Protected Sea Turtle Species, **Hawksbill Sea Turtle** (*Eretmochelys imbricate*) at the Ramsar Site of Rambut Island	Maintaining the sustainability of the hawksbill sea turtle (*Eretmochelys imbricate*) population, which is a critically endangered species (IUCN Red List) and protected by law through habitat and nesting site protection	▪ Protection of hawksbill sea turtle habitats and eggs. At least 80% of nests secured (relocated) ▪ Increasing hatchling survival rate and growth rate by at least 50%	▪ Indachi Purada (Coordinator of the Kehati Team) ▪ Arif Rahman (Kehati Team Member) ▪ Iman Teguh (Kehati Team Member)	Rambut Island Wildlife Refuge, Thousand Islands	▪ Rescue of all identified nests (nesting sites). At least 80% of nests secured (relocation) ▪ Increase in hatchability and growth rate of hatchlings by at least 50%	N/A	▪ Baseline Study: Inventory of population and number of nesting sites	▪ Initiation of cooperation with the Jakarta Natural Resources Conservation Agency ▪ Creation of semi-natural nests ▪ Relocation and hatching of turtle eggs	▪ Rearing and growing of hatchlings ▪ Release into the wild ▪ Monitoring and evaluation	▪ Rearing and nurturing of hatchlings ▪ Release into the wild ▪ Monitoring and evaluation	▪ Rearing and growth of hatchlings ▪ Release into the wild ▪ Monitoring and evaluation	**520,000,000**