

# Environment

Managing our environmental impact is a priority for Petra and, in so doing, we align our interests with those of our local communities. The rationalisation of energy usage is an operational necessity, given the benefits to the operations of optimised power planning and usage, as well as an environmental prerogative in order to combat climate change. Our operations are water-intensive and therefore Petra is committed to utilising water responsibly and efficiently to ensure the availability of water for our operations as well as local communities and downstream ecosystems.

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## Environment

“Our environmental team continued to focus on the efficient use of water and energy during the Year, as well as responsible waste management across the operations. Significant progress was made in terms of the Group’s environmental strategy in FY 2021 with the Board approval of the Group’s Climate Change Adaptation Strategy, which will assist Petra in staying on top of rapidly changing legislation and in meeting stakeholder expectations.”

**Bernard Pryor**  
Chair of the HSE Committee

**Material topics** (in order of importance to our stakeholders):

- Water management
- Environmental management (especially waste management)
- Climate change and energy usage

See a schematic of how Petra manages environmental matters here: <https://www.petradiamonds.com/sustainability/environment/>

### KPIs

**15%**  
OVERALL MORE WASTE GENERATED

**45%**  
OF WASTE IS RECYCLED

**6,981 ha**  
OF PROTECTED WILDLIFE AREAS

**47 kWh/t**  
ENERGY EFFICIENCY

**0.050 tCO<sub>2</sub>-e/t**  
CARBON INTENSITY PER TONNE

**0.56 m<sup>3</sup>/t**  
TOTAL WATER INTAKE FOR PRODUCTION

**82%**  
OF WATER USED ON MINE IS RECYCLED

### Stakeholders concerned

Employees, contractors, trade unions; financial stakeholders; local communities; host Governments, regulators, NGOs

### Company policies and guidelines

- Group HSE Policy
- Petra Climate Change Adaptation Policy
- Group Integrated Water Management Wstrategy
- Group Standard on the Optimisation of Waste Management
- Rehabilitation and Closure Policy
- Phasing out of single-use plastic

### Standards we follow

- ISO 14001:2015
- ISO 31000
- ISO 19011

## Environment continued

### **Key achievements and performance against FY 2021 objectives**

- No 'major' or 'high' environmental incidents reported for 11 consecutive years.

Commenced implementation of the Group's Climate Change Adaptation Strategy, including completion of the first set of evaluated climate change vulnerabilities at each operation and at corporate level, and the putting in place of an Energy Management Policy at each operation.

- Petra considers that it now meets the requirements of the TCFD having developed its Climate Change Adaptation Strategy in line with TCFD recommendations and having provided additional disclosures on pages 212 and 213 of its 2021 Annual Report.
- The Group's total carbon footprint (Scopes 1, 2 and 3) reduced 16%, mainly due to lower production and associated energy consumption for the Year.
- An independent verification of the Group's GHG emissions inventory has been completed.
- Petra's climate change submission to CDP achieved our highest score yet: A- ('leadership' band), which places Petra within the top 11% of companies reporting to the CDP.
- 100% of South African operations retained their certification to ISO 14001:2015.
- Improved water use efficiency by 42% and improved percentage of total water recycled.
- Improved fuel efficiency in TMMs by 22%.
- Total electricity consumption was 17% lower and electricity efficiency per tonne increased by 26%.
- Overall volume of waste generated increased by 15% due to clean-up campaigns, particularly at the Williamson mine.

### **Key challenges**

- Uncertainty around the implementation of anticipated environmental legislation.
- Identifying and implementing additional measures to improve water use efficiency where maximum efficiency has already been met.
- Unpredictable energy supply from Eskom in South Africa leads to load shedding, which hinders proper usage planning.
- South Africa produces the majority of its power from coal-fired power stations.
- Implementation of climate change adaptation measures amidst ageing infrastructure.
- Potential increase in extreme weather events as a consequence of climate change, such as drought, floods and tropical storms.

### **Objectives for FY 2022**

- Retention of ISO 14001:2015 certification.
- Continued implementation of the Group's climate change adaptation action plans.
- Maintain the Company's carbon footprint in line with FY 2019 level over a period of five years, while continuing to explore all available mitigatory options to minimise the Group's carbon footprint.
- Implementation of annual rehabilitation plans.
- Establishment and monitoring of closure sign-off criteria.
- Support efforts to find sustainable carbon sequestration methods.
- Identify and implement measures to prevent regression in water efficiency levels.
- Identify and implement measures to maximise the volumes of water reused and recycled on-mine.
- Improve management of mining waste facilities in line with internationally recognised guidelines and increase the percentage of business waste redirected to the circular economy.

# Environmental Management

## Our ambition

**Our primary focus is to embed environmental management across our operations as a value rather than a regulatory requirement. We wish to demonstrate to our employees, communities, investors and other stakeholders that taking care of our environment is built into our culture, with a value proposition of 'Let's do no harm' - more commonly referred to as 'zero harm'.**

## Our approach

We recognise that our value emanates from the natural world; therefore, protecting the environment in which we operate is fundamental to how we run our business.

The principles of pollution prevention, compliance with legal and other voluntary obligations, and continual improvement, backed up by the achievement of objectives and KPIs, are integrated into our planning, management systems and daily activities.

An Environmental Management System ("EMS") is in place for each mining licence, which sets out the detailed processes for the identification of environmental risks and implementation of action plans to mitigate the impacts of our activities. As per Clause 6.1.2 of ISO 14001:2015, the impacts of our activities, products and services are evaluated considering a life cycle perspective. This is not a life cycle analysis ("LCA") in the strict definition, as an LCA is not relevant to diamond production, but rather the analysis of a continuum of interlinked stages from service providers and suppliers through the use of resources up to final disposal of waste products/packaging material.

All our South African operations are certified to the international environmental standard ISO 14001:2015 through BSI. Williamson is not yet certified but operates with the same principles. Therefore 75% of all Petra operations are formally certified.

The Group HSE Policy, which is our guiding document for setting operational performance objectives, is covered in more detail at <https://www.petradiamonds.com/sustainability/managing-sustainability/>. Petra's Board-level HSE Committee has oversight of environmental issues and therefore these are taken into consideration in business and strategic discussions, as well as when monitoring Group performance and setting objectives.

## Risk management

Managing risk is an integral part of governance and leadership and is fundamental to how we run our business at all operational levels. It contributes to the improvement of management systems that consider the external and internal context of the risk management framework.

The potential key risks associated with our operations are as follows:

- impact on water resources, both through inefficient use and potential contamination of natural water sources;
- inappropriate waste management activities may cause water and soil contamination;
- permanent changes in topography, land use and land capability due to the final disposal of mining waste on surface;
- depletion of non-renewable sources due to inefficient consumption;
- biodiversity loss due to the spread of invasive vegetation, as well as increasing mining footprints;
- availability of water and damage to infrastructure due to climate change; and
- the continued deepening of underground operations may cause an increase in the open pit footprint, leading to the risk of damage to surface infrastructure, including sites of historic or cultural importance.

## Risk identification, analysis and management

Our approach to environmental risk management, which forms part of the new Enterprise Risk Management and Combined Assurance Plan that was operationalised in FY 2021, is based on a process of continual improvement in hazard identification, risk assessment, instilling awareness into the organisational culture and enforcing adherence to control mechanisms. Once identified and assessed, these risks are aggregated and integrated into the Group risk register. Updates to the environmental baseline risks are implemented every five years, or when processes change, after significant incidents or disasters or by instruction from regulatory bodies.

## Stakeholder engagement

Petra has processes in place to engage with its stakeholders on environmental matters, including the handling of issues raised by its local communities. Public participation processes in South Africa for obtaining environmental authorisations (legally mandated processes) also make provision for direct communication with communities where their views and needs are included into management programmes. This includes public meetings, individual interviews, advertisements and flyers containing pertinent information on changes at the operations or potential impact such as periods of increased noise and dust levels.

During FY 2021, we engaged our stakeholders on a limited number of topics due to COVID restrictions. The engagements included:

- the impact of open pit scaling at Cullinan; and
- the grave relocation project at Koffiefontein (as covered in the Report of the SED Committee on page 112 of our 2021 Annual Report).

## Environmental Management continued

### Environmental incidents

We aim to minimise environmental incidents at all our operations and have processes to manage any incidents which may occur as effectively as possible. We classify incidents according to their severity, ranging from minor to major. Incidents are recorded and managed on an ongoing basis and are only recorded as closed once all allocated actions have been addressed and the effectiveness of the corrective actions has been verified.

During FY 2021, three medium environmental incidents were reported (FY 2020: three). See page 85 for details.

For the past eleven years, no 'major' or 'high' environmental incidents were reported at any of the Group's operations.

### Spillage management

## 0

#### SIGNIFICANT SPILLAGES<sup>1</sup> AT OUR OPERATIONS IN FY 2021

Any hydrocarbon spillage on soil or tailings is either treated in situ or removed to a formal bioremediation site depending on the practicality and situational risks of the area. Approved biocides are applied according to a set procedure to ensure maximum biological digestion of the hydrocarbons. Soil samples are analysed to determine the level of digestion before the treated material is placed back on location, signed off as treated, or stored to be used as rehabilitation material.

### Waste management

Petra manages separate waste streams within the organisation:

- business waste<sup>1,2</sup>;
- hazardous waste<sup>1,2</sup>; and
- mining waste<sup>1</sup>.

#### Business and hazardous waste

We are continuously striving to improve waste management, according to the internationally recognised hierarchy of waste management, and set annual objectives and KPIs to drive continual improvement.

One of our main drivers of change is the focus on the repurposing of waste and improved recycling initiatives to reduce the overall volume of waste to landfill and maximise the percentage of business waste entering the circular economy.

The overall volume of waste generated increased by 15% to 6,335t (FY 2020: 5,483t) and the amount of combined waste (business and hazardous) sent to landfill increased by 14%. The reason for the increases was due to clean-up campaigns, particularly at Williamson which remained on care and maintenance during FY 2021, where the mine's waste generated increased by 21% and contributed 47% of Petra's total waste generated for the Year. A continuous drive to identify and remove reusable and recyclable items from the waste stream resulted in 45% of all waste being recycled (383t more than in FY 2020).

## 45%

#### PERCENTAGE OF WASTE RECYCLED IN FY 2021

There was a 41% increase in the amount of hazardous waste disposed of in FY 2021 to 198t (FY 2020: 140t) as a result of a backlog being removed in FY 2021 that was caused by COVID-19 restrictions where contractors were not allowed on-site to remove waste. In line with this trend, the amount of business (non-hazardous domestic) waste disposed of increased by 13% to 3,247t (FY 2020: 2,883t).

See page 83 for a detailed breakdown of waste disposed, recycled and incinerated.

Petra only uses reputable waste handling companies that are vetted for legal compliance prior to awarding tenders. All of the waste handling companies are ISO 14001 certified, which adds to the level of assurance provided that waste is handled, transported and disposed of in a responsible manner. This includes the management of hazardous and electronic waste. Ad hoc environmental audits are performed on hazardous waste management companies to confirm good practice and continued ISO 14001 certification.

The transport of hazardous waste is solely the responsibility of contracted waste handling companies. Petra receives waste disposal notes as confirmation that all hazardous waste was disposed of at the correct designated hazardous waste sites. We also check that the disposal sites are in possession of all required licences and permits.

All on-site waste handling areas are audited by third party independent specialists as part of the mines' ISO 14001:2015 management systems. Off-site handling and disposal sites are inspected on an ad hoc basis. All waste generated by the Company is recycled or disposed of within the country of origin.

#### Notes:

1. See Glossary for definitions.

2. Waste Classification and Management Regulations (GN R. 634 of 2013) as promulgated in terms of the National Environmental Management: Waste Act No. 59 of 2008.

## Environmental Management continued

### Case study: Waste recycling at Lime Acres

The theme of waste recycling has always been something that has been promoted and implemented at the Finsch mine. However, when employees went home, all household waste would just be thrown in a general waste bin. This seemed so contradictory that Finsch decided to do something about the situation. A campaign was launched by the Environmental and Communication sections in mid-June 2019. The initiative was met with a slow start and with the restrictions brought about by the COVID-19 pandemic in 2020, all activities seemed to come to a standstill.

However, the enthusiastic team at Finsch persevered and with a few adjustments to the pickup schedule the 'Recycling from Home' initiative survived. A local contractor was sourced to drive through the town of Lime Acres twice a month to pick up waste, separated for recycling, at homes and even some of the businesses. This waste is taken to the mine's waste facility where it is further sorted and baled for removal by reputable waste recycling companies.

This initiative proves how Petra is committed to contribute positively to its communities and to take part in the circular economy.

**Values: Let's make a difference**

## Waste management continued

### Mining waste

Petra operates a number of different mining waste facility types:

- Coarse residue deposits ("CRD"): coarse processed tailings with limited moisture content are mechanically deposited at angles of repose in continuously growing dump facilities.
- Fine residue deposits ("FRD"): fine processed tailings together with used process water are deposited on facilities where the fine material can settle and the water be returned to the processing plant to minimise total process water consumption. These are mostly upstream slimes dams or impoundment dams.
- Waste rock dumps (overburden): in very limited instances development waste is separated from ROM material and deposited in dedicated areas without it being exposed to any treatment process.

The Company's mining waste areas are planned, operated and maintained according to the country of operation's legislative framework. In addition, external professional engineers are appointed to monitor the safety and stability of these facilities, according to international best practice. Each site has a unique operating procedure that is implemented with the utmost care to reduce risk and protect the project-affected communities downstream of the facilities. See page 84 for a detailed breakdown of the sizes of Petra's mining waste facilities.

Read more about tailings residue deposit management at

<https://www.petradiamonds.com/sustainability/environment/sustainability-environment-tailings-management/>.

### Materials

The liberation of diamonds requires a process that involves mining, crushing, washing and screening of ore, followed by the recovery and sorting of concentrates, after which the raw product is shipped offsite for further classification. During this beneficiation process, the minimum raw materials are used, with the largest input being:

- energy (in the form of fuel and electricity);
- water (mostly recycled / reused water sources);
- construction steel;
- cement;
- timber;
- explosives;
- lubricating oils and grease;
- moisture sealant; and
- Dense Media Separation ("DMS") material (Ferro-Silicon).

No toxic chemicals are produced as a by-product of the diamond mining process.

Bulk chemical storage areas are built according to SANS 310:2011 and SANS 10131:2004 specifications to prevent pollution from accidental spillages and inappropriate handling.

## Environmental Management continued

### Materials continued

The Company's procurement position is such that preference is given to local suppliers and recycled products as far as practically possible.

#### Packaging material

Only reusable canisters are used for the shipment of the Company's product. Therefore, no packaging waste is generated during product transportation.

#### Transportation impacts

Petra identified the impact from various transportation activities as part of each operation's ISO 14001:2015 risk assessment process. Impacts due to the transportation of employees, ore and product were evaluated. The identified impacts include:

- consumption of non-renewable resources (fuel and electricity);
- air pollution due to exhaust gases and dust liberation; and
- nuisance noise.

The carbon footprint relating to transportation has been calculated and improvements made in terms of data management and updated emission factors to ensure a higher level of confidence in the figures; further details are available on page 63. Business travel is included in Scope 1 (Company airplane to reach mine sites: 189 tCO<sub>2</sub>-e) and Scope 3 (commercial airline travel: 72 tCO<sub>2</sub>-e; chartered airplane: 12 tCO<sub>2</sub>-e; and car rentals: 3 tCO<sub>2</sub>-e) totalling 204 tCO<sub>2</sub>-e (FY 2020: 804 tCO<sub>2</sub>-e), approximately 0.07% of Petra's total carbon footprint (FY 2020: 0.2%). The decrease of 69% is largely due to travel restrictions brought about by the COVID-19 pandemic. Employee commuting is included in Scope 3 and is calculated based on surveys and assumptions. In the reporting year, 533 tCO<sub>2</sub>-e were emitted due to employee commuting which is dominated by public transport (bus and taxi services).

### Case study: Rehabilitation at Finsch

Concurrent rehabilitation has been carried out on one of the oldest fine residue deposits at the Finsch mine. The project focused on the sustainable rehabilitation of the FRD 2 facility, including earthworks and the establishment of indigenous vegetation to support the eventual end land-use.

The rehabilitation aimed to achieve the following:

- closure of the identified areas;
- clean water runoff from the side slopes;
- the elimination of erosion on the side slopes;
- the provision of a suitable growth medium and spreading of fertilizer;
- minimum disturbance of established vegetation; and
- revegetation on the side slopes.

The project was concluded just before the January 2021 floods and proved very successful as all of the objectives were achieved. Vegetation cover has not reached 100% on all areas yet, but as with all new ecological systems, this will take some time. The dedicated environmental team at Finsch is now responsible for the aftercare and monitoring of the newly rehabilitated area of FRD 2.

**Value: Let's do it right**

### Biodiversity and land management

We recognise that our activities have the potential to significantly alter the biodiversity and topography of an area. Negative biodiversity impacts associated with mining include habitat destruction, vegetation clearance, introduction of invasive species and permanent change to the original ecological processes. Positive biodiversity impacts associated with our mining practices are the conservation of large areas of habitat that would otherwise have been over-exploited, as well as supporting conservation research.

We monitor the negative impacts at set frequencies during and after operations and implement mitigation strategies only if the impact could not be avoided.

The Company has implemented measures to integrate biodiversity in the management of its operations by:

- completion of environmental impact assessments prior to any 'greenfield' development;
- training of all employees on the importance of biodiversity;
- voluntary employee participation in biodiversity management, i.e. snake catchers and bee keeping; and
- implementation of biodiversity management guidelines.

To demonstrate our commitment to this area, Petra commenced annual participation in the CDP Forests Disclosure in 2019.

## Environmental Management continued

### Biodiversity and land management continued

None of our operations are located in or adjacent to formally protected areas.

As part of Petra's commitment to conserve biodiversity, game parks (conservation areas) are established and maintained where employees and community members can experience biomes prior to mining activities. Of the total area owned and managed by the Company, 56% is protected. See page 86 of the report for a summary of types of habitat protected.

## 6,981 ha

### PROTECTED WILDLIFE AREAS

Williamson maintains a large forest reserve of some 906 ha, thereby protecting the unique biodiversity of the Shinyanga province in Tanzania.

Ecosystem management is a process that aims to conserve major ecological services and restore natural resources while meeting the socio-economic, political and cultural needs of current and future generations. The goal of our Ecological Management Strategy is to give guidance to the implementation of specific management controls (Biodiversity Management Plans) of the operation's wilderness, vacant land or game farm areas by incorporating the international mitigation hierarchy (avoidance, minimisation, restoration, off-set and compensation). In order to ensure ecosystem service conservation, all controls must be synergistic to reach the overall objective of the ecological services area and must include the following objectives as a minimum:

- Avoidance of any ecological services system degradation as far as possible by:
  - protecting endangered and rare ecosystems within the operation's management areas.
- Mitigation of any current impacts on ecological services systems as far as practical by:
  - maintaining game populations within the ecological carrying capacity of the ecological reserve;
  - maintaining a balanced ecosystem resulting in balanced ecological services; and
  - management of controlled burning and preventing veld fires.
- Restoration of the ecosystem service by:
  - removing invasive alien vegetation from the ecological service areas;
  - restoring soil erosion occurrences; and
  - restoring bush encroachment due to veld mismanagement.
- Promotion of environmental awareness on biodiversity and general veld management.
- Promotion of tourism to the area, therefore benefitting the community with additional employment and investment through tourism in rural areas.
- Promotion of carbon sequestration through the promotion of vegetative proliferation.

## 100%

### OF OPERATIONS HAVE BIODIVERSITY MANAGEMENT PLANS

A number of protected species (four fauna and three flora species) have been identified in the areas under our care and are listed on page 87. Where appropriate, protected plants are relocated, or 'no-go' areas are established around species that cannot be relocated, such as the 'Cullinan ant colony', situated on 1 ha of undisturbed land in the middle of Cullinan's coarse tailings facility.

### Biodiversity certification

There is currently no standard available to certify biodiversity management. The BS 8583:2015 'Biodiversity – Guidance for businesses on managing the risks and opportunities' is listed as a standard by the BSI but no certification body is currently accredited for issuing such certification. Petra is considering this standard for future certification.

The Endangered Wildlife Trust of South Africa presented its Best Practice Guidelines regarding biodiversity management, as published, to the UN Secretary for Biodiversity Management in 2019. Petra has considered the nine principles laid out in the Best Practice Guidelines and is aware of the Company's upstream and downstream impacts on biodiversity in terms of chemical management, reduction of waste to landfill as well as reducing the inflow of raw water in the process. These principles have been embedded into Petra's environmental management systems and therefore the development of a standalone Biodiversity Management Standard was not considered necessary.

Our Ecological Management Strategy captures the principles of the IFC's Performance Standard 6 ("PS6"): Biodiversity Conservation and Sustainable Management of Living Natural Resources.

Petra supports the National Biodiversity and Business Network by taking part in meetings and discussion panels.

## Environmental Management continued

### Rehabilitation and closure plans

Each of Petra's operations has a rehabilitation and closure plan, as well as associated closure financial provisions. These rehabilitation and closure plans have implementation timelines in place based upon the individual operation's life of mine ("LOM"), which span through the operational phase until ten years post closure. However, it is worth noting that there is potential to extend or reduce the LOM at several of the operations and therefore these timelines are subject to change.

In order to reduce the closure liabilities and to speed up the rehabilitation of its assets, Petra has implemented a standardised Group-wide approach on concurrent rehabilitation, with the objective of generating a non-detrimental, sustainable solution for the environment and socio-economic state of our communities after mine closure. The budget assigned for concurrent rehabilitation in FY 2021 was US\$0.5 million (FY 2020: US\$2.2 million), with the decrease due to project constraints brought about by the COVID-19 pandemic, as well as due to Williamson remaining on care and maintenance.

# 100%

**OF OUR OPERATIONS HAVE CLOSURE PLANS**

The environmental impact from Petra's mining activities is not expected to last long after the cessation of operations. This is due to our strategic approach and commitment to our values at each step of the mining value chain. Each project is planned with the end of mine in mind, creating the potential to reduce double handling of mining waste and manage impacts timeously. Special measures are put in place to address residual and latent impacts. Previously, specialist studies identified a number of uncertainties, especially relating to final land use and post closure latent impact. This information gap has been reduced by updating technical rehabilitation plans and compiling closure risk assessments.

Rehabilitation budgets are allocated for concurrent rehabilitation activities to address the impacts of mining. Annual closure liability assessments are performed by external specialists to identify shortfalls in the provided funds. These funds are set aside, as per legislation, to cater for post-closure rehabilitation liability. The calculated mine closure liability for Petra during FY 2021 was US\$62.4 million (FY 2020: US\$44.3 million).

General consensus in the mine rehabilitation community is that it is not possible to reinstate the previous pristine environment after mining has taken place. However, it is possible to restore the productive potential of each site to the benefit of its local communities. Most of our current mining areas were previously used for agriculture, thus having the potential to sustain a community. Care will therefore be taken to reinstate that economic potential, with the most appropriate end land use of each area determined within ten years before mine closure. This is achieved by setting clear rehabilitation and closure objectives for all operations in line with Government-approved closure plans. This will achieve our goal of 'no net loss'.

#### Case study: Sustainable harvesting of firewood

The Williamson mine started an initiative of sustainable, controlled wood harvesting in 2005. Scheduled pruning of trees in the mining area is practised in order to protect the biodiversity and save the area from deforestation by community members looking for firewood. Firewood is still the main fuel source used for cooking and is also applied commercially by some community members that sell the wood or manufacture charcoal.

How it works: an area that is earmarked for alluvial diamond mining is first surveyed by the HSE department of the mine to determine if there are any large trees or any other rare or medicinal plants. These plants are not to be disturbed during the alluvial mining process. Local labour from the surrounding villages is then used to prune the low hanging branches of large trees that have been identified and to remove the smaller shrubs and bushes. Other areas such as the mine borders are also cleared by pruning the lower branches for security purposes.

The community and schools surrounding the mine are then invited to collect the firewood, under strict supervision of the HSE department. Company vehicles are used for the safe transport of the villagers and to deliver the collected wood to central drop-off points. During FY 2021, this initiative benefited approximately 300 people from eight local villages and a total of 700 tonnes of firewood was sustainably harvested.

**Value: Let's make a difference**

# Water Management

## Our ambition

**To provide water to tolerate current and future growth without compromising the sustainability of the environment or the communities in which we operate.**

## Our approach

Water management objectives:

- improve water use efficiency; and
- improve percentage of recycled water used in production.

Petra has identified water demand and water conservation management as its most significant environmental risks to operations. This is mainly due to water scarcity in the areas where we operate and the fact that our operations are water intensive. Two of Petra's operations are located in areas that receive less than 600 mm rainfall per annum (Finsch and Koffiefontein).

Changes in temperature, as may be expected as a result of climate change, will affect the availability of raw water for treatment processes and impact on natural water resources that sustain the communities around our operations. Scenario analysis indicates that Petra's operations may have to compete with local communities for the availability of water due to expected significant population growth in the centres that provide employment. This is expected to specifically impact Cullinan, which is situated in Gauteng (the biggest area of commerce and employment in South Africa).

Petra's short- to medium-term strategy to secure water resources is through:

- service-level arrangements and cooperative agreements with local Government and neighbouring industries;
- reduction of water losses;
- securing water from Governmental water schemes;
- expanding our own internal storage capacities; and
- maximising 'greywater harvesting'.

The long-term strategic planning for water management is based on:

1. the South African Department of Water and Sanitation's Long-term Adaptation Strategy, which includes adaptation scenarios specifically for water management; and
2. the World Resource Institute's Water Risk Atlas (WRI Aqueduct) – looking specifically at the 'business as usual' scenario for the period up to 2030 where most of the current LOM planning resides. This scenario focuses on water stress in areas due to resources supply versus development and expansion.

## 100%

### OF OPERATIONS HAVE WATER MANAGEMENT PLANS

Our Water Management Strategy, already implemented at all the South African operations, focuses on initiatives to improve water management with the below three distinct ambitions:

1. to determine current and future operational water needs by managing demand, quality and infrastructure;
2. to ensure a resource capable of not only supporting production but also improving the lives of those around us; and
3. to operate within the regulatory framework provided by international, national and local legislation.

The implementation of the Water Management Strategy in South Africa commenced in FY 2019. Implementation will commence at the Williamson mine once it resumes operations.

### Water consumption

Total clean water, which includes total raw water plus potable water consumed for mining-related activities, used by our operations decreased in FY 2021 by 78% to 2,031,934 m<sup>3</sup> (FY 2020: 9,218,119m<sup>3</sup>), mainly due to water-saving initiatives, the constrained production due to the COVID-19 pandemic and Williamson, which is the Group's largest user of water, being placed under care and maintenance.

Our total water usage per production tonne decreased by 42% to 0.56m<sup>3</sup>/t (FY 2020: 0.97 m<sup>3</sup>/t). This overall improvement in efficiency was due to restricted production under COVID-19 regulations and Williamson remaining on care and maintenance for the duration of the Year. Petra is aiming for a 1% improvement in water use efficiency in FY 2022 for each individual mine, based on their three-year average achieved over FY 2019 to FY 2021 (appropriately adjusted to take into account COVID-19 lockdown periods).

Three year average m <sup>3</sup> /t	Cullinan	Finsch	Koffiefontein
	0.119	1.158	1.810

### Water recycling

Petra prides itself on the level of water recycling achieved. All new projects are designed to be able to substitute either potable or raw water with re-used/recycled water from various sources. Besides internal recycling, most operations also utilise treated effluent from municipal wastewater treatment facilities. The percentage of recycled water used by our operations has remained above 80% for the past two years. The total volume of recycled water used during FY 2021 was 20,634,646m<sup>3</sup> (FY 2020: 51,385,297 m<sup>3</sup>), due to the overall lower amount of water used during the Year.

## 82%

### OF ALL WATER USED ON MINE IS RECYCLED

## Water Management continued

### **Our approach continued**

#### **Effluent discharge**

Petra neither treats mining effluent for discharge, nor is there any mining effluent that leaves the mining sites. We implement infrastructural changes to impound effluent water for re-use in the mining process. Both the Cullinan and Finsch operations have invested in updated stormwater management plans, with the implementation of these plans scheduled for FY 2022. The benefit of these improved structures is better separation of clean run-off from project effected process water, further eliminating the potential for effluent discharge.

#### **Co-operative agreements**

We place a high value on our working relationships with external parties such as companies operating in adjoining areas to our mines and local municipalities. These relationships aim to improve the management of shared issues such as resources consumption (water) and community involvement. We have such working agreements in place at Cullinan, Finsch and Williamson.

#### **UN Global Compact CEO Water Mandate**

Although the Company has not registered as a participant, the six elements of the mandate (direct operations, supply chain and watershed management, collective action, public policy, community engagement and transparency) are included in the daily management of our operations.

#### **CDP**

Petra completed the CDP water questionnaire for the first time in 2020, achieving a 'B-' disclosure score, and again in 2021, which further enhances the Company's disclosures in this important area.

# Climate Change and Energy Usage

## Our ambition

**We aim to be a market leader in the diamond mining industry with innovative concepts for addressing climate change, both by tackling the risks and maximising the opportunities associated with this global challenge.**

## Our approach

Diamond mining is less energy intensive than other types of mining, as evidenced by the fact that energy consumption (specifically electricity) only represented 15% of total cash on-mine costs in FY 2021 (FY 2020: 13%). However, it is recognised that non-renewable energy sources are finite and therefore likely to become increasingly scarce over time, as confirmed in the first round of our Climate Change Vulnerability Assessment in FY 2021.

Our short-term strategy is therefore to minimise overall energy usage wherever possible, while our long-term strategy is to reduce our reliance on fossil fuel energy resources. We do this by continuously evaluating opportunities to implement initiatives to reduce energy consumption, by designing all new projects to be as efficient as possible and by continuing to evaluate the strategic case for renewable power sources.

In addition, Petra recently developed an Energy Management Plan, based on the principles of the international ISO 50001 standard. Accordingly, each operation has its own specific management plan – focusing at this stage on electricity – and Energy Management Policy.

### Case study: Cullinan Energy Management Policy Statement

The Cullinan mine is committed to responsible energy management and ongoing energy improvements as part of our overall environmental strategy. Our energy management plan plays a key role in our organisation while supporting our plan to maximise profitability and strengthen our competitive position. Our efforts to reduce energy use and reduce our carbon footprint also support our commitment to our employees, the environment and the communities of which we are part.

The Cullinan mine is therefore committed to:

- having an energy management plan in place with clear and realistic targets;
- managing procuring energy efficient equipment and services;
- increasing staff awareness with regards to energy efficiency;
- investing in energy efficient plants and projects having a realistic return on investment;
- management making available necessary resources to achieve targets set in the Energy Management Plan; and
- the setup of an energy management coordination team to support the Energy Management Plan.

Cullinan will ensure compliance with all applicable legal requirements which relate to energy aspects, and other requirements to which the organisation subscribes.

**Values: Let's do it right**

We recognise the growing importance of climate change, both to our Company and to our stakeholders. By better evaluating and understanding the risks and uncertainties that climate change represents to our business, we will be able to manage our assets in the most economically and environmentally sustainable manner possible.

As driven by the unprecedented Paris Agreement and the global call to action from the UN's SDG on 'Climate Change', we are supportive of the onus on industry to be actively involved in projects and programmes to reduce the effects of global warming and climate change, as caused by human activities. We believe that amidst present policy uncertainty and future carbon constraints, the development and implementation of a comprehensive climate change adaptation framework is not only crucial to our Company's competitive position but is also an essential component of our commitment to a sustainable environment.

## Risks and opportunities

The Company follows a two-pronged approach to identify and assess climate-related risks and opportunities. The first forms part of the EMS risk assessment process that is performed annually (based on the principles of the ISO 31000 standard on risk assessment) at each of the operations. This risk assessment process includes the identification and assessment of risks and opportunities derived from internal and external issues, environmental conditions, emergency conditions, environmental legislation and significant aspects (activities, products and services) of the mining operations.

The second approach is to complete climate change vulnerability assessments at each operation and at Group level. The vulnerability assessment evaluates acute, chronic, transitional, financial, legal and reputational risks and opportunities, evaluated for two scenarios (low carbon emission future; high carbon emission future) and over three mining phases (operational, decommissioning and post-closure). The first complete set of evaluated climate change vulnerabilities was prepared in FY 2021.

# Climate Change and Energy Usage continued

## Our approach continued

### Climate change context

Our business needs to be able to adapt to the changing circumstances as can be expected from predicted climate change models. In this context, adaptation means anticipating the adverse effects of climate change and taking appropriate action to prevent or minimise the damage it can cause or taking advantage of opportunities that may arise.

According to research, Africa is likely to experience changes in climate earlier than other regions and therefore adaptation measures are urgently required on the continent. The climate across the Southern African Development Community ("SADC") region is highly diverse and driven by a range of distinct climatic systems. Evidence shows that the SADC region has already experienced an increasing frequency of hot days and decreasing frequency of extremely cold days. Rainfall trends are variable but evidence points to an increased inter-annual variability to date, with extremely wet periods and more intense droughts in different countries.

South Africa has been warming significantly over the period 1931 to date. Over the western parts of the country, including much of the Western and Northern Cape, and also in the east over Gauteng, Limpopo and the east coast of KwaZulu-Natal, the observed rate of warming has been 2°C/century or even higher – in the order of twice the global rate of temperature increase. A key feature of the projected climate change future of South Africa is that temperatures are to increase drastically under low mitigation. For the far-future period of 2080–2099, temperature increases of more than 4°C are likely over the entire South African interior, with increases of more than 6°C plausible over large parts of the western, central and northern parts. Such increases will also be associated with drastic increases in the number of heatwave days and very hot days, with potentially devastating impacts on agriculture, water security, biodiversity and human health.

It has already been observed in Tanzania that climate change is a reality. For example, a mean annual temperature increase of 0.8°C has been recorded since 1960 and rainfall decreased at an average rate of 2.8 mm per month or 3.3% per decade. It is predicted that extreme events such as drought, floods, tropical storms and cyclones are to become more frequent, intense and unpredictable.

The potential financial impacts of climate change that have been identified by Petra include:

- increased insurance costs;
- production losses;
- the loss of tailings dams due to heavy rain events;
- the cost incurred to decontaminate affected areas downstream of our operations in the event of containment facility failures;
- the need to redesign and upgrade facilities to increase freeboard levels, as well as additional holding capacity, in preparation for dry spells; and
- additional healthcare for employees as higher temperatures are linked to the spread of communicable diseases.

### Climate Change Adaptation Strategy

The Petra Climate Change Adaptation Strategy ("PCCAS") is an important step into the future as it:

- provides a position statement to our internal and external stakeholders who are concerned with climate change vulnerability and its impact on the Company;
- supports Petra in meeting international obligations and investor expectations by defining the Company's process to identify its vulnerabilities and its plans to reduce the vulnerabilities and maximise opportunities; and
- acts as a common reference point for climate change adaptation efforts within Petra, providing guidance across all levels and disciplines.

The strategic framework for Petra's Climate Change Adaptation consists of 11 steps:

1. climate change scenario analysis;
2. identification of climate change exposure (relevance);
3. identification of climate change receptors;
4. identification of potential climate change impacts;
5. vulnerability assessment;
6. identification of climate change adaptive capacity/capability;
7. prioritise adaptive needs;
8. identify appropriate action;
9. prioritise climate change adaptation action plans;
10. implementation of climate change adaptation action plans; and
11. monitor the effectiveness of adaptation action plans.

## Climate Change and Energy Usage continued

### Our approach continued

#### Climate Change Adaptation Strategy continued

The climate change scenario analysis for each operation was completed in FY 2020. The scenarios used are RCP 8.51 and RCP 2.6, which cater for both the worst-case and best-case emissions future.

Implementation of the PCCAS will span over five years with Phases 1 and 2 completed in FY 2020 and Phase 3 (completion of operational vulnerability assessments) completed in FY 2021. This will be followed by Phase 4 (implementation of adaptation action plans), scheduled to start in FY 2022, and Phase 5 (ongoing monitoring) thereafter.

The Climate Change Vulnerability Assessment of FY 2021 identified 80 potential impacts at an operational and corporate level. Of these, none were rated as 'high' vulnerabilities but 17 were rated to be of 'moderate' significance. The top ten vulnerabilities are listed below:

1. additional financial burden on operations due to changed legislation aimed at water use efficiency or the redistribution of natural resources;
2. changing legislation to regulate emissions, such as the Carbon Tax in South Africa may affect revenue;
3. the cost of energy will rise;
4. natural resources such as water will become scarcer which will impact production;
5. unreliable and expensive electricity from national providers;
6. high cost to construct additional water storage infrastructure at the South African operations or impoundments capable of holding added rain water in wetter areas at the Williamson mine;
7. changing emissions reporting obligations may increase costs due to potential fines and judgments;
8. reduced demand for our product if the market views our business as not doing enough to mitigate the risk of climate change;
9. financial implications to safeguard the community against the possibility of emergency events such as dam failure (Emergency Preparedness and Response); and
10. the clean-up and rehabilitation after storm events and the potential breach of dam walls have a direct financial implication and indirect negative impact on insurance premiums.

The Vulnerability Assessment process also identified a number of opportunities for Petra, with the most significant being:

- reduced operational cost due to more efficient machines and equipment, including modes of transport;
- increased production capacity due to effective processes;
- reduced operational cost due to increased resource effectiveness and recycling initiatives;
- reduced waste disposal due to increased recycling initiatives;
- reduced operational cost due to the use of lower emission sources of energy and more energy efficient buildings;
- reduced exposure to GHG emissions and therefore less sensitive to changes in the cost of carbon;
- return on investment in low-emission technology;
- increased consumer demand for a more responsible / ethical product.

#### Task Force on Climate-related Financial Disclosures

Petra considers that for the first time it has met all the requirements of the TCFD, which aims to develop voluntary, consistent climate-related financial risk disclosures for use by companies in providing information to the financial markets and other stakeholders. The PCCAS has been compiled with reference to the TCFD to ensure that Petra can meet these recommendations. In terms of the disclosure requirements, Petra has included the requisite information on pages 212 and 213 of its 2021 Annual Report. It should also be noted that during FY 2021 the Company completed submissions of the CDP climate change questionnaire, which has been updated to include the recommendations of the TCFD. Therefore, Petra considers that its 2020 and 2021 CDP submissions also provide all the disclosures required in relation to TCFD recommendations.

## Climate Change and Energy Usage continued

### Energy management

#### Energy consumption

Energy, particularly electricity, security in South Africa is of concern. Climate change science indicates that South Africa has the 'wrong' primary energy source – coal, which is a major source of carbon dioxide emissions. As such, there is an urgent need to diversify the country's energy sources away from the current high dependence on coal to renewable sources of power. The unprecedented load shedding of electricity experienced in Q2 FY 2020 highlighted once again why our dependence on non-renewable electricity sources needs to be re-evaluated and renewed focus should be placed on developing renewable sources of energy.

However, it is positive to note that the South African Government wants to reduce the contribution of coal to Eskom's energy generation from over 90% today to around 45% by 2030. As part of this commitment, it has established the Presidential Climate Change Coordinating Commission, whose aim will be to coordinate and oversee the transition away from fossil fuels.

Petra's total energy consumption for FY 2021 decreased by 21% to 1.5 million gigajoules (FY 2020: 1.9 million gigajoules). This reflects energy use from non-renewable resources, which include diesel consumption in TMMs, diesel consumption for electricity generation, and overall electricity consumption. The main reason for the decrease was the scaling back of operations in response to the ongoing COVID-19 pandemic and Williamson remaining on care and maintenance.

Petra's diesel consumption decreased 50% to 0.16 million gigajoules or 4,567,344 L in FY 2021 (FY 2020: 0.33 million gigajoules; 9,210,023 L), further to lower production for the Year and due to the Williamson mine (normally the biggest diesel consumer of our operations) remaining under care and maintenance. See further details in 'Supplementary Information' on page 83.

While electricity consumption was down 17% to 1.4 million gigajoules (FY 2020: 1.6 million gigajoules) predominantly due to lower production for the Year, but also due to the continued implementation of energy saving initiatives at all the mines, electricity efficiency deteriorated by 26% to 46.63 kWh/t (FY 2020: 37.02 kWh/t) due to a 34% decrease in tonnes processed for the Year. Forward-looking targets are currently on hold pending the stabilisation of the operations, post the disruption caused by the COVID-19 pandemic.

In South Africa, Petra consumes 100% of its electricity from the national grid. There are standby generators available at the South African operations, but these are only used for emergencies. The Williamson mine in Tanzania receives 95% of its electricity from the national grid and typically generates less than 5% (2.3% in FY 2021) from its own back-up resources on an annual basis due to the unreliable nature of the energy supply in that region.

Fuel efficiency in our trackless fleet improved over the last three financial years due to reduction targets that were implemented at all the operations. TMM fuel efficiency therefore improved by 22% from 0.74 L/t in FY 2020 to 0.58 L/t in FY 2021.

### Carbon emissions

#### Scope, boundaries and methodology

In 2013, Petra started tracking Scope 1, 2 and 3 (limited) emissions at all operations and used this information as the 'base year' from which to calculate the Company's carbon footprint. In FY 2016, the base year was then reset on the basis of material changes in the Company, with an intensity value of 0.20 tCO<sub>2</sub>-e/ct. Further changes in the Group structure at the end of FY 2018 necessitated a further recalculation of the base year; thus FY 2019 is now regarded as our base year.

The scope of our carbon footprint covers all of Petra's mines, as well as our offices situated in Johannesburg and London.

# Climate Change and Energy Usage continued

## Carbon emissions continued

### Scope, boundaries and methodology continued

The following activities are included into the carbon footprint calculation:

Scope 1	Scope 2	Scope 3
<ul style="list-style-type: none"> <li>Fuel consumed for electricity generation</li> <li>Fuel consumed by trackless mobile machines</li> <li>LPG</li> <li>Business travel (Company airplane)</li> <li>Fugitive emissions (R22 gas is separately reported on)</li> <li>Process emissions: water treatment (domestic effluent)</li> </ul>	<ul style="list-style-type: none"> <li>Electricity purchased from Eskom (South Africa)</li> <li>Electricity purchased from Tanesco (Tanzania)</li> <li>Electricity consumption of the London office (UK)</li> </ul>	<ul style="list-style-type: none"> <li>Waste disposal</li> <li>Water pumping (potable)</li> <li>Paper consumption</li> <li>Business travel:                             <ul style="list-style-type: none"> <li>Commercial airlines</li> <li>Chartered flights</li> <li>Car rental</li> </ul> </li> <li>Employee commute</li> <li>Scrap metal for recycling</li> </ul>

Petra uses the GHG Protocol on the reporting of greenhouse gas emissions as well as the IPCC Guidelines for National Greenhouse Gas Inventories of 2001 to calculate and report on our carbon footprint. This provides us with confidence that the correct information is portrayed to our stakeholders and enables us to be held accountable for the figures presented. An independent verification of the Group's GHG emissions inventory has been completed. The Group's GHG Emissions Report is available to view under the section 'Climate Change' on our website at <https://www.petradiamonds.com/sustainability/environment/>.

### Performance

In FY 2021, the Group's total carbon footprint (Scopes 1, 2 and 3) reduced 16% to 406,059 tCO<sub>2</sub>-e (FY 2020: 483,431 tCO<sub>2</sub>-e), mainly due to lower production and associated energy consumption for the Year.

The direct carbon emissions linked to our operations (Scope 1) decreased by 47% to 14,695 tCO<sub>2</sub>-e (FY 2020: 27,797 tCO<sub>2</sub>-e), mainly due to the aforementioned decrease in energy consumption for the Year. The Group's indirect emissions (Scope 2) decreased by 14% to 388,152 tCO<sub>2</sub>-e (FY 2020: 451,800 tCO<sub>2</sub>-e), due to the 17% decrease in electricity consumption. Further information on the different operations' performance is available on page 84.

Reporting year	Scope 1 emissions (10 <sup>3</sup> t CO <sub>2</sub> -e)	Scope 2 emissions (10 <sup>3</sup> t CO <sub>2</sub> -e)
2016	44	560
2017	53	576
2018	50	587
2019	37	438
2020	28	452
2021	15	388

Scope 3 emissions decreased by 18% to 3,213 tCO<sub>2</sub>-e (FY 2020: 3,834 tCO<sub>2</sub>-e) due to limited business travel as a consequence of the COVID-19 restrictions.

Carbon emissions from R22 gas amounting to 89 tCO<sub>2</sub>-e (FY 2020: 170 tCO<sub>2</sub>-e) are also included separately in the calculation.

Petra uses three intensity measures to express our normalised carbon footprint:

1. carbon emissions per production tonne;
2. total carbon emissions per carat recovered; and
3. total carbon emissions compared to revenue in US Dollars.

Only Scope 1 and 2 emissions are included in these calculations.

The table below provides the history of these measures.

Reporting year	tCO <sub>2</sub> -e/t (Scopes 1 & 2)	tCO <sub>2</sub> -e/ct (Scopes 1 & 2)	tCO <sub>2</sub> -e/US\$ (Scopes 1 & 2)
2017	0.032	0.154	0.0013
2018	0.028	0.133	0.0011
2019	0.032	0.124	0.0010
2020	0.039	0.135	0.0016
2021	0.050	0.125	0.0010

Petra aims to maintain the Company's carbon footprint for FY 2022 – 2026, calculated annually, below the FY 2019 base year of 0.124 tCO<sub>2</sub>e/ct (Scopes 1, 2 & 3).

## Climate Change and Energy Usage continued

### **Carbon emissions continued**

#### **Carbon sequestration**

Carbon sequestration at Petra is implemented through the maximisation of indigenous vegetated areas. According to research, each hectare of natural vegetation is responsible for the sequestration of 300kg of carbon per annum; thus, the approximate 6,981 ha of protected area under Petra's control results in the sequestration of 2,094 tonnes CO<sub>2</sub> per year.

In addition, Petra is participating in projects in collaboration with other major diamond producers and academic institutions that focus on the potential of carbon sequestration through mineralisation.

## 2,094 tonnes

OF CO<sub>2</sub> SEQUESTRATION PER YEAR

#### **Significant air emissions**

Petra has no significant sources of air emissions. Non-point sources of dust and particulates (i.e. environmental drop-out dust and particulate matter measures as pm<sub>10</sub>) as a result of surface activities are strictly regulated and annual results are submitted to the authorities for evaluation. Two of our operations (Finsch and Cullinan) reported dust levels above the allowable limit of 1,200 mg/m<sup>2</sup>/day, on 22 separate occasions (monitoring is done on a monthly basis). Samples of the collected dust were analysed to determine the origin. In all instances it was determined that the collected dust came from surrounding agricultural areas, adjacent lime mines or dirt roads. Therefore, no additional dust suppressing mitigation was initiated. See page 86 for detail on expected gases and other air emissions as they relate to the Company.

Petra does not produce, import or export any ozone-depleting substances.

#### **Reporting to the CDP**

Petra has participated in voluntary reporting to the CDP since 2013, with year-on-year improvement of disclosure scores on every report. During 2016 and 2017, Petra scored a 'C' (the 'awareness' band), which is in line with industry and region scores. In 2018 and 2019, we improved our score to 'B' (the 'management' band) and in 2020 we achieved our highest score yet: A- ('leadership' band), which places Petra within the top 11% of companies reporting to the CDP. This is above average for the industry and region alike.

As previously noted, the CDP questionnaire on Climate Change has been significantly revised to incorporate both the recommendations of the TCFD and improved alignment with other reporting frameworks such as the SDGs. Petra completed and submitted the questionnaires on Climate Change, Water Stewardship and Forestry in July 2021.

#### **Verification**

See page 87 for details of the most recent GHG Inventory Verification performed.