

# 2023 Basis of Preparation



# About this document

This document provides an overview of the approach and scope used for data consolidation and form the basis for independent assurance of our 2023 sustainability performance data, as published in Aramco's 2023 Sustainability Report.

In preparing this document, consideration has been given to following principles:

- Data Preparation: to highlight to readers of this information the primary principles of relevance and reliability of information; and
- Data Reporting: the primary principles are comparability and consistency with other data including previous years and transparency providing clarity to users.

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## 1. Flaring Intensity Basis of Preparation

<b>Definition</b>	The Flaring Intensity KPI measures flared hydrocarbon gas in standard cubic feet divided by Saudi Aramco Group’s production in barrels of oil equivalent (“BOE”).
<b>Reporting period</b>	The reporting period for this KPI is 1 January 2023 - 31 December 2023.
<b>Scope</b>	Aramco reports Flaring for facilities under Aramco’s operational control, which consists of Saudi Arabian Oil Company in-Kingdom wholly-owned operated assets, SASREF, Motiva, ARLANXEO. Based on the nature of their operations ATC, ASC, AOC, and SAAC do not have flaring.
<b>Data consolidation process</b>	Data from Saudi Arabian Oil Company in-Kingdom wholly-owned operated assets are received and verified quarterly through the Corporate Flare Monitoring System (CFMS), which is a real-time monitoring system that will capture the flaring from all Saudi Aramco operational facilities sources and is the reporting method for Flaring. Aramco’s operationally controlled assets collect and verify data through their internal control systems and then submit this quarterly to Saudi Aramco for consolidation.
<b>Formula</b>	$\text{(Flaring Intensity)} = \frac{\text{Flared gas in Standard Cubic Feet (SCF)}}{\text{Company Production (BOE)}}$ <p>Where: BOE = Barrel of Oil Equivalent</p>
<b>Units</b>	SCF per BOE
<b>Source</b>	Saudi Arabian Oil Company in-Kingdom Operational flaring sources are connected to the CFMS. The input data from all facilities are fed into the database through Flowmeters and embedded calculations. Aramco’s operationally controlled facilities use their internal system for source and flare monitoring and submit data to Saudi Aramco for consolidation.

## 2. SOx Basis of Preparation

<b>Definition</b>	Quantity of Sulphur Oxides including Sulphur Dioxide (SO <sub>2</sub> ) and Sulphur Trioxide (SO <sub>3</sub> ) expressed as SO <sub>2</sub> equivalent (KT).
<b>Reporting period</b>	The reporting period for this KPI is 1 January 2023 - 31 December 2023.
<b>Scope</b>	Aramco reports SOx for facilities under Aramco's operational control, which consists of Saudi Arabian Oil Company in-Kingdom wholly-owned operated assets, SASREF, Motiva, and ARLANXEO. Based on the nature of their operations ATC, ASC, AOC, and SAAC do not have SOx.
<b>Data consolidation process</b>	Data are received from Saudi Arabian Oil Company in-Kingdom Operational facilities and verified quarterly with Upstream Online Environmental KPI Tracking System and Downstream standardized calculation sheets. Aramco's operationally controlled Affiliates collect and verify data through their internal control systems and then submit this quarterly to Saudi Aramco for consolidation.
<b>Formula</b>	The formula is based on Sulphur mass balance over Sulphur recovery, flaring, and combustion units.
<b>Units</b>	kilotonnes
<b>Source</b>	Data from Saudi Arabian Oil Company in-Kingdom wholly-owned operated assets SOx emission sources are connected to the internal PI system which tracks activity data for SOx calculations. Sulphur contents are estimated through sampling and analysis, direct instrument readings, engineering data, or historical data. Aramco's operationally controlled assets have internal systems by facilities and report the SOx emission quantity.

### 3. Freshwater Consumption Basis of Preparation

<b>Definition</b>	The difference between freshwater withdrawn and freshwater returned to the source. The total dissolved solids (TDS) concentration of this type of water is up to 2,000 mg/l.
<b>Reporting period</b>	The reporting period for this KPI is 1 January 2023 - 31 December 2023.
<b>Scope</b>	Saudi Aramco Operational Control Covers Saudi Aramco Group’s In-Kingdom wholly owned operated assets and entities under the Saudi Aramco Group’s operational control excluding Aramco Trading Company, ASC, AOC, and SAAC.
<b>Data consolidation process</b>	EPD obtains water conservation data from proponents on a quarterly basis directly from proponents through a single point of contact (SPC). All data is validated by proponents and their BL SPCs prior to submission. EPD collects all water conservation data and revalidates the data through a high-level verification process on a quarterly basis. EPD extracts and calculates water conservation data for the reporting period based on a quarterly spreadsheet. Numbers are reviewed, revalidated, and signed off by EPD. EPD documents the validation steps and the official sign-off for future reviews before utilizing the water conservation data for annual reporting. Saudi Aramco Group’s operating facilities mostly record Freshwater data using online flowmeters that are calibrated and accurate. If freshwater is purchased from a third-party supplier (for instance in Motiva), freshwater consumption data is calculated from the monthly water bills. If the water is delivered using trucks in onshore drilling rigs, freshwater data is estimated based on the counts of tanker trucks and the amount of water in a tank. All collected data is validated by operating facilities and their Business Line representatives prior to submittal to the Corporate organization named Environmental Protection Department (EPD). EPD then consolidates and conducts a high-level verification on a quarterly basis prior to reporting the data.
<b>Formula</b>	$\text{Freshwater Consumption} = \text{TFW} - \text{TFR}$ <p>Where,</p> <ul style="list-style-type: none"> <li>• <b>TFW:</b> The total amount of freshwater withdrawn in million cubic meters to support company operations.</li> <li>• <b>TFR:</b> The total amount of freshwater returned in million cubic meters to the same water source or a different water source in the same watershed/catchment.</li> </ul>
<b>Units</b>	Million cubic meters
<b>Source</b>	Proponent organizations and OC affiliates. Freshwater Consumption data are aggregated from all In-kingdom facilities and operationally controlled affiliates’ facilities to produce the final freshwater consumption data.

## 4. HC Discharge to Water Basis of Preparation

<b>Definition</b>	Total amount of hydrocarbons in barrels (bbl), that the Company systematically releases to surface water through regulated industrial wastewater discharges.
<b>Reporting period</b>	The reporting period for this KPI is 1 January 2023 - 31 December 2023.
<b>Scope</b>	Saudi Aramco Operational Control Covers Saudi Aramco Group's In-Kingdom wholly owned operated assets and entities under the Saudi Aramco Group's operational control excluding Aramco Trading Company, ASC, AOC, and SAAC.
<b>Data consolidation process</b>	<p>Environmental Protection (EP) regularly monitors the HC2W KPI Actuals Daily submittal through the HC2W KPI dashboard to meet the planned target.</p> <p>EP requests missing data from the organization, if submittal was found incomplete in order to properly verify the data.</p> <p>EP verifies that the actual calculations follow the HC2W KPI calculation method.</p> <p>EP reviews the validity and accuracy of the variance explanation provided by the organization to observe the variance between the planned and actual data. This practice will significantly support the annual activity of target setting.</p> <p>EP will communicate to the organization any calculation error and/or comments on the variance explanation for further discussion.</p> <p>The Actuals and Variance explanations are edited upon discussion with the organization.</p>
<b>Formula</b>	$\Sigma HC2W_{Day\ i} = (Flow\ Rate_{Day\ i}) \times (Average\ O\&G_{Day\ i}) \times K$ <p>Where,</p> <p><math>\Sigma</math> = sum  <i>i</i> = Specific day  O&amp;G = Oil and Grease  K = Conversion Factor</p>
<b>Units</b>	Barrels
<b>Source</b>	HC2W Dashboard, in addition to actual data received from the facilities through email at the end of each quarter.

## 5. Industrial Waste Recycled Basis of Preparation

<b>Definition</b>	The industrial waste recycling performance of Saudi Aramco and operationally controlled affiliates generated industrial waste from Upstream (except D&WO operations) and Downstream operating facilities.
<b>Reporting period</b>	The reporting period for this KPI is 1 January 2023 - 31 December 2023.
<b>Scope</b>	This KPI will support establishing short- and long-term targets to divert the Company's generated waste from landfilling in alignment with the Kingdom's 2030 vision and to promote best waste management practices across similar Company organizations. Covers Saudi Aramco Group's In-Kingdom wholly owned operated assets and entities under the Saudi Aramco Group's operational control excluding Aramco Trading Company, ASC, AOC, and SAAC.
<b>Data consolidation process</b>	The KPI is calculated by the Environmental Protection Department using Excel sheets, based on the data extracted from the online Corporate Industrial Waste Manifesting System at SAP EHSM. The data includes the total amount of industrial waste (hazardous and nonhazardous), measured in metric tons, and recycled industrial waste (hazardous and nonhazardous), measured in metric tons. The data are extracted after 10 working days from the start of 2023.
<b>Formula</b>	$\frac{\text{Industrial waste recycled}}{\text{Industrial waste recycled} + \text{Industrial waste disposed of}} \times 100$ <p>Where,</p> <ul style="list-style-type: none"> <li>• <b>Industrial Waste recycled:</b> Include Hazardous and non-hazardous industrial waste recycled, reused, and recovered waste materials</li> <li>• <b>Industrial waste disposed:</b> Hazardous and non-hazardous industrial waste managed for proper treatment and disposal through qualified industrial waste management service providers.</li> </ul>
<b>Units</b>	Percentage (%)
<b>Source</b>	<ul style="list-style-type: none"> <li>• Corporate Industrial Waste Manifesting System,</li> <li>• Inputs from the Materials Logistics Department,</li> <li>• Inputs from Affiliates Manufacturing Excellence.</li> </ul>

## 6. Oil Spills Basis of Preparation

<b>Definition</b>	An oil spill incident is characterized as "The accidental or unplanned losses of hydrocarbon". Oil spills >1bbl are defined as any liquid hydrocarbon release of more than, or equal to, one barrel (159 litres, equivalent to 42 US gallons). This KPI measures the total volume of oil spills >1bbl into the environment, which includes both marine and land spills.
<b>Reporting period</b>	The reporting period for this KPI is 1 January 2023 - 31 December 2023.
<b>Scope</b>	Any spill > 1 BBL resulted from Saudi Aramco or operationally controlled affiliates. Saudi Aramco Operational Control. Covers Saudi Aramco Group's In-Kingdom wholly owned operated assets and entities under the Saudi Aramco Group's operational control excluding Aramco Trading Company, ASC, AOC, and SAAC.
<b>Data consolidation process</b>	Data is consolidated using Oil Spill Final Reports, Oil Spill Monthly Reports, Oil Spill Quarterly Reports, letters and emails containing oil spill information into an excel sheet for calculations.
<b>Formula</b>	$\sum \text{offshore hydrocarbon spills volume} + \text{inland hydrocarbon spills volume}$ <p>where the spill incident is &gt; 1 BBL.</p>
<b>Units</b>	Barrel (BBL) (one barrel is equivalent to 159 litres or 42 US gallons)
<b>Source</b>	Oil spill quantifications are done by the Marine Department and Loss Prevention along with facility owners, depending on spill locations (offshore or inland) and the situation. However, generally, offshore spills are quantified either by using the Bonn Agreement Oil Appearance Code or by estimating the lost hydrocarbon from the process using facility production and pipeline flow rates. As for inland spills, they are quantified by estimating the lost hydrocarbon from the process using production and pipeline flow rates or the collected/vacuumed volumes during removal activities from the environment. All the reported oil spill incidents are investigated by the company. Individual oil spill reports are prepared after investigation which consists of the findings related to the incidents including the volume of the spilled oil. The Marine Department consolidates individual offshore reports and individual inland reports from Loss Prevention to monthly reports and the Environmental Protection Department makes use of these reports for calculating the final figure of the KPI.

## 7. Recovered Hydrocarbon Basis of Preparation

<b>Definition</b>	The percentage of the total volume of hydrocarbon removed from the environment out of the total hydrocarbon spilled to the environment through recovery methods during oil spill response activities.
<b>Reporting period</b>	The reporting period for this KPI is 1 January 2023 - 31 December 2023.
<b>Scope</b>	Recovery from any inland spill > 1 BBL and offshore spill >50 BBL resulted from Saudi Aramco or operationally controlled affiliates. Saudi Aramco Operational Control. Covers Saudi Aramco Group’s In-Kingdom wholly owned operated assets and entities under the Saudi Aramco Group’s operational control excluding Aramco Trading Company, ASC, AOC, and SAAC.
<b>Data consolidation process</b>	Data is consolidated using Oil Spill Final Reports, Oil Spill Monthly Reports, Oil Spill Quarterly Reports, letters and emails containing oil spill recovery information into an Excel sheet for calculations.
<b>Formula</b>	$\left( \frac{\sum \text{of recovered hydrocarbon volume}}{\sum \text{of hydrocarbon spilled volume} + \sum \text{HC Discharge to Water}} \right) \times 100$ <p>where the inland spill incident is &gt; 1 BBL and offshore spill incident is &gt;50 BBL.</p>
<b>Units</b>	Percentage (%)
<b>Source</b>	Oil spill recovery quantifications are done by the Marine Department and Loss Prevention along with facility owners, depending on spill locations (offshore or inland) and the situation. However, generally, offshore spill recovery is quantified by the amount of hydrocarbon contained and removed from the marine environment. As for inland spill recovery, it is quantified by estimating the collected/vacuumed volumes during removal activities from the environment. All the reported oil spill incidents are investigated by the company. Individual oil spill reports are prepared after investigation which consists of the findings related to the incidents including the volume of recovered hydrocarbon. These reports are the primary source of recovery hydrocarbon data. The Marine Department consolidates individual offshore reports and individual inland reports from Loss Prevention to monthly reports and the Environmental Protection Department makes use of these reports for calculating the final figure of the KPI.

## 8. Environmental Leadership Basis of Preparation

<b>Definition</b>	<p>This KPI is to demonstrate excellence in Saudi Aramco’s Environmental Management System (EMS) performance (ISO 14001:2015). It measures the number of ISO-14001 certified asset-based US&amp;DS organizations over the total number of asset-based US&amp;DS organizations.</p> <p>To secure compliance with ISO 14001 for all in-kingdom wholly-owned operational sites and operationally controlled affiliates, regular audits are carried out at all company facilities on an annual basis (annual surveillance), and every three years for the renewal of the certificates in accordance with the standard provisions.</p>
<b>Reporting period</b>	<p>The reporting period for this KPI is 1 January 2023 - 31 December 2023.</p>
<b>Reporting Scope</b>	<p>Obtain and maintain ISO 14001:2015 certification for all upstream and downstream asset-based operational facilities.</p> <p>The KPI covers In-Kingdom wholly owned Saudi Aramco Group, excluding Aramco Trading Company, ASC, AOC, and SAAC.</p>
<b>Data consolidation process</b>	<p>All Saudi Aramco operating facilities are required to submit their compliance and performance data, including leadership performance, to the Environmental Protection Department (EPD). EPD is responsible for consolidating such data and reporting it to management for measuring compliance and reporting.</p>
<b>Formula</b>	<p>Env. Leadership = <math>\frac{\text{\# of ISO 14001 certified asset-based US\&amp;DS}}{\text{Total \# of US\&amp;DS asset-based organizations}} \times 100</math></p> <p>Where:</p> <p>Asset-based US&amp;DS represent Saudi Arabian Oil Company in-Kingdom wholly-owned operated assets and operationally controlled affiliates (SASREF, Motiva, and ARLANXEO).</p>
<b>Units</b>	<p>Percentage (%)</p>
<b>Source</b>	<p>Operational organizations, ISO-certifying bodies, and Saudi Aramco Environmental Protection Department.</p>

## 9. Net Positive Impact Basis of Preparation

<b>Definition</b>	The Net Positive Impact (NPI) as a concept or target aims at achieving net gains for biodiversity and ecosystem services. This is when overall impacts on biodiversity are outweighed by the biodiversity gains that are achieved through conservation projects. The KPI formula is $[\text{Total Biodiversity Areas (km}^2\text{)} / \text{Group Footprint Area (km}^2\text{)}] \times 100$ . The numerator components are defined as follows: Biodiversity Protection Areas (BPAs): BPAs are places of terrestrial or marine natural assets. Ecological restoration areas (ERAs) involve the process of actively managing the recovery of an ecosystem that has been degraded, damaged, or destroyed. Biodiversity offsetting projects (BOPs): are projects that provide biodiversity benefits but which are not directly associated with the proponent's land availability. Carbon offsetting projects (COPs): are terrestrial and marine plantation projects undertaken with the aim of sequestering carbon and offsetting company emissions such as the mangrove, tree planting, and algae projects. Stewardship areas (SAs): These projects enable the development of limited areas for public education and appreciation of the wildlife, habitats, and management and terrestrial green cover. Physical footprint: refers to the permanent physical area occupied by the facility and measured in square kilometers.
<b>Reporting period</b>	The reporting period for this KPI is 1 January 2023 - 31 December 2023.
<b>Scope</b>	Saudi Aramco Operational Control Covers Saudi Aramco Group's In-Kingdom wholly owned operated assets and entities under the Saudi Aramco Group's operational control excluding Aramco Trading Company, ASC, AOC, and SAAC.
<b>Data consolidation process</b>	Minimum department targets are set relative to the contribution to the total physical footprint, calculated based on available company maps. During the business year, periodic meetings will take place between EP and the involved departments in order to follow up on progress and consolidate data. The BPAs designation process is described in SAEP-359 and the surface area is generally determined through the LUP system.
<b>Formula</b>	$\text{NPI} = \frac{\text{Total Biodiversity Areas (Km}^2\text{)}}{\text{Group Footprint Area (Km}^2\text{)}} \times 100$
<b>Units</b>	Percentage (%)
<b>Source</b>	The source of data for the numerator is generally the LUP system. The area of the polygon demarcated in the LUP is the area that will be adopted. Regarding the denominator, the value will be calculated annually and captured/adopted for reporting purposes. This is in order to account for the annual expansion and the associated increase in physical footprint.

## 10. Health Performance Basis of Preparation

<b>Definition</b>	To demonstrate the effectiveness of the health management system and secure effectiveness in controlling health-related risks.
<b>Reporting period</b>	Quarterly and total year-end. (Quarterly estimates provided until the 10th day upon the quarter end. Final data provided 6 weeks upon quarter end). The reporting period for this KPI is 1 January 2023 - 31 December 2023.
<b>Scope</b>	The scope of this KPI is established to assess the company's performance in resolving health deficiencies within its facilities. The objective of this KPI is to assess the level of implementation of the company's health management systems. Covers Saudi Aramco Group's In-Kingdom wholly owned operated assets and entities under the Saudi Aramco Group's operational control excluding Aramco Trading Company, ASC, AOC, and SAAC.
<b>Data consolidation process</b>	SAP is used in Aramco for reporting & consolidating environmental and health findings.  Major Findings are identified during the Environmental & Health corporate assessments conducted on a scheduled frequency. The findings are based on non-compliance with government regulations and/or Saudi Aramco requirements in regard to Environmental & Occupational Health issues. These findings are logged into the system by Environmental Protection Department employees  Findings are communicated systematically with the proponents in order to resolve outstanding findings within the estimated closure dates below:  Environmental & Health compliance major findings that require capital, BI-19, & non-capital funding shall be closed within 5, 2, and 1 year(s) respectively  Every six months the system sends notifications to proponents to update their status on the open findings until they are successfully resolved after verification from the Environmental Protection Department.
<b>Formula</b>	$\frac{\text{\# of overdue major health findings}}{\text{total \# of open major health findings}} \times 100$ <p>Where: *Major findings:</p> <ul style="list-style-type: none"> <li>• <b>Total Number of Open Environmental Health Findings (CEHA) (#):</b> Total number of pending environmental health findings by the end of each quarter/year. These findings are related to hygienic conditions</li> </ul>



	<p>and practices within company facilities, including but not limited to potable water supply, treatment, and disposal of sanitary wastewater and solid waste, food establishments, etc.</p> <ul style="list-style-type: none"> <li>• <b>Total Number of Open Occupational Health Hazard (OHHA) Findings (#):</b> Total number of pending occupational health findings by the end of each quarter/year. These findings are related to the work environment and practices that may potentially compromise health, including chemical, biological, and physical health hazards</li> <li>• <b>Total Number of Open Hazardous Materials Communication (HAZCOM) Findings (#):</b> Total number of pending Hazardous Materials Communication findings by the end of each quarter/year. These findings are related to the work environment and practices that may potentially compromise workers' health when handling, storing and transporting hazardous chemicals at all company facilities.</li> <li>• <b>Total Number of Open Radiation Protection (RPA) (#):</b> Total number of pending Radiation Protection findings by the end of each quarter/year. These findings are related to the work environment and practices that may potentially impact workers, the public and the environment to the detrimental effects and impact of ionizing radiation exposure.</li> <li>• Major findings are items that are in non-compliance with government regulations and/or Saudi Aramco requirements. The findings should be supported by reference to a specific section of the applicable standard or a specific mandatory requirement.</li> </ul> <p>Overdue findings based on the following criteria:</p> <ul style="list-style-type: none"> <li>• Capital finding: Overdue when the Age of the finding exceeds 5 years.</li> <li>• BI-19 finding: Overdue when the Age of the finding exceeds 2 years.</li> <li>• Non-Capital finding: Overdue when the Age of the finding exceeds 1 year.</li> </ul>
<p><b>Units</b></p>	<p>Percentage (%)</p>
<p><b>Source</b></p>	<p>Saudi Arabian Oil Company in-Kingdom findings are logged into SAP ESHM and backed up with a detailed assessment report; and the major and overdue findings are extracted from this system. Aramco's operationally controlled entities (Arlanxco, Motiva, and Sasref) findings are not logged on the SAP, however, individual reports are sent on a quarterly basis reporting the open and overdue major findings which are considered in the KPI calculation.</p>



## 11. Fatalities Basis of Preparation

<b>Definition (including measurement units)</b>	Number of recordable workforce fatalities.
<b>Reporting period</b>	The reporting period for this KPI is 1 January 2023 - 31 December 2023.
<b>Scope</b>	<p>Saudi Aramco Group reports fatalities for Total Workforce (which includes employees and contractors). Fatalities are reported for all entities under Saudi Aramco’s operational control, which consists of Saudi Arabian Oil Company in-Kingdom wholly-owned operated assets, SASREF, Motiva, ARLANXEO, Aramco Trading Company (ATC), Aramco Services Company (ASC), Aramco Overseas Company B.V. (AOC), and Saudi Aramco Asia Company Ltd. (SAAC).</p> <p>Aramco follows the Occupational Safety and Health Administration (OSHA) Standards for the recording of incidents.</p>
<b>Data consolidation process</b>	<p>SafeLife is used in Saudi Arabian Oil Company in-Kingdom for reporting, consolidating and learning from health and safety incidents. Fatality incidents can be directly logged into the system by any Aramco employee and contractor with system access.</p> <p>Supervisors can also log incidents on behalf of their employee. For contractor incidents, if the contractor does not have access to SafeLife, the responsible safety officer or contractor supervisor may log the incident in the system. Line management are accountable for confirming the completeness and accuracy of the incident record. Aramco’s corporate Loss Prevention determines the classification of an incident using incident data, as well as the investigation report, as needed.</p>
<b>Source</b>	<p>Saudi Arabian Oil Company in-Kingdom fatalities are logged into SafeLife.</p> <p>Aramco’s operationally controlled entities’ fatalities are not logged on SafeLife. Instead, the fatality records are received and validated by Saudi Aramco Affiliate Proponent Organizations and then consolidated by Aramco’s corporate Loss Prevention team for workforce fatality reporting.</p>



## 12. Fatal Accident Rate Basis of Preparation

<b>Definition (including measurement units)</b>	<p>Number of recordable fatalities expressed per 100,000,000 work hours.</p> <p>Fatal Accident Rate = (Number of fatalities x 100,000,000/total work hours)</p>
<b>Reporting period</b>	<p>The reporting period for this KPI is 1 January 2023 - 31 December 2023.</p>
<b>Scope</b>	<p>Saudi Aramco Group reports fatalities for Total Workforce (which includes employees and contractors). Fatalities are reported for all entities under Saudi Aramco’s operational control, which consists of Saudi Arabian Oil Company in-Kingdom wholly-owned operated assets, SASREF, Motiva, ARLANXEO, Aramco Trading Company (ATC), Aramco Services Company (ASC), Aramco Overseas Company B.V. (AOC), and Saudi Aramco Asia Company Ltd. (SAAC).</p> <p>Aramco follows the Occupational Safety and Health Administration (OSHA) Standards for the recording of incidents.</p>
<b>Data consolidation process</b>	<p>SafeLife is used in Saudi Arabian Oil Company in-Kingdom for reporting, consolidating and learning from health and safety incidents as well as working hours. Fatal incidents can be directly logged into the system by any Aramco employee and contractor with system access.</p> <p>Supervisors can also log incidents on behalf of their employee. For contractor incidents, if the contractor does not have access to SafeLife, the responsible safety officer or contractor supervisor may log the incident in the system. Line management are accountable for confirming the completeness and accuracy of the incident record. Aramco’s corporate Loss Prevention determines the classification of an incident using incident data, as well as the investigation report, as needed.</p>
<b>Source</b>	<p>Saudi Arabian Oil Company in-Kingdom fatalities as well as working hours are logged into SafeLife.</p> <p>Aramco’s operationally controlled entities’ fatalities are not logged on SafeLife. Instead, the fatalities records are received and validated by Saudi Aramco Affiliate Proponent Organizations and then consolidated by Aramco’s corporate Loss Prevention team for workforce fatalities reporting.</p>



### 13. Lost time injuries/illnesses rate Basis of Preparation

<b>Definition (including measurement units)</b>	<p>Number of recordable injuries and illnesses that involve one or more days away from work beyond the day the injury occurred.</p> <p>Lost time injuries/illnesses rate = (Number of LTI cases x 200,000/total work hours)</p>
<b>Reporting period</b>	<p>The reporting period for this KPI is 1 January 2023 - 31 December 2023.</p>
<b>Scope</b>	<p>Saudi Aramco Group reports lost time injuries and illnesses (LTIs) Rate for Total Workforce (which includes employees and contractors). LTIs are reported for all entities under Saudi Aramco’s operational control, which consists of Saudi Arabian Oil Company in-Kingdom wholly-owned operated assets, SASREF, Motiva, ARLANXEO, Aramco Trading Company (ATC), Aramco Services Company (ASC), Aramco Overseas Company B.V. (AOC), and Saudi Aramco Asia Company Ltd. (SAAC).</p> <p>Aramco follows the Occupational Safety and Health Administration (OSHA) Standards for the recording of incidents.</p>
<b>Data consolidation process</b>	<p>SafeLife is used in Saudi Arabian Oil Company in-Kingdom for reporting, consolidating and learning from health and safety incidents as well as working hours. LTI incidents can be directly logged into the system by any Aramco employee and contractor with system access.</p> <p>Supervisors can also log incidents on behalf of their employee. For contractor incidents, if the contractor does not have access to SafeLife, the responsible safety officer or contractor supervisor may log the incident in the system. Line management are accountable for confirming the completeness and accuracy of the incident record. Aramco’s corporate Loss Prevention determines the classification of an incident using incident data, as well as the investigation report, as needed.</p>
<b>Source</b>	<p>Saudi Arabian Oil Company in-Kingdom Lost Time Injuries and Illnesses as well as working hours are logged into SafeLife.</p> <p>Aramco’s operationally controlled entities’ LTIs are not logged on SafeLife. Instead, the LTI records are received and validated by Saudi Aramco Affiliate Proponent Organizations and then consolidated by Aramco’s corporate Loss Prevention team for workforce LTI reporting.</p>

## 14. GHG emissions Basis of Preparation

Saudi Aramco’s Greenhouse Gas (GHG) basis for reporting document provides an overview of the reporting boundaries, basic definitions, the basis of calculations, period of reporting, base year, De minimis, and the processes flow, intended to be used for 2023 GHG emissions reporting purposes.

### Purpose

The purpose of this section is to provide an overview of Saudi Aramco’s GHG emissions reporting processes, to ensure consistency across the organization, alignment with industry best practice and support internal and external reporting.

The overarching objective of the Saudi Aramco GHG emissions reporting is to:

- Communicate environmental performance trends in a transparent manner, aligned with industry best practice for GHG reporting;
- Provide relevant information at a level of accuracy commensurate with its intended use, upon which internal and external stakeholders can rely;
- Provide data to develop corporate key performance indicators, used to help determine appropriate emission reduction targets; and
- Develop strategies to help shape policy development and comply with all relevant local regulations.

### GHG Reporting Basis

#### 14.1 Reporting Boundaries

##### Organizational Boundaries

For 2023 GHG emissions reporting purposes, Saudi Aramco accounts for its GHG emissions on an operational control basis.

##### Operational Control definition

An entity is designated to be under Saudi Aramco’s Operational Control, if Saudi Aramco is able to exercise direct operational control over the day-to-day activities of that entity.

For the 2023 GHG emission inventory, reporting boundaries are defined as follows:

- All In-Kingdom wholly-owned operated assets
  - Jazan Refinery (included stabilized units)
- Entities under Saudi Aramco’s operational control:
  - Saudi Aramco Shell Refinery Company (SASREF)
  - Motiva Enterprises LLC
  - Arlanxeo Holding B.V.



- The following entities are excluded due to non-materiality of GHG emissions:
  - Aramco Trading Company (ATC)
  - Aramco Services Company
  - Aramco Overseas Company
  - Saudi Aramco Asia Company

Following IPIECA guidelines, Saudi Aramco reports emissions for three out of the six Kyoto Protocol GHGs relevant to the petroleum industry - carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O). The remaining three GHGs - hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and Sulphur hexafluoride (SF<sub>6</sub>) are not reported since they are not closely associated with petroleum industry.

GHG emissions are converted to total CO<sub>2</sub> equivalent (CO<sub>2</sub>e) emissions by multiplying the emissions of a given GHG constituent by its respective Global Warming Potential (GWP)<sup>1</sup> as specified in Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4). The GWPs used in Saudi Aramco's inventory are provided below:

- CO<sub>2</sub> GWP = 1
- CH<sub>4</sub> GWP = 25
- N<sub>2</sub>O GWP = 298

Operationally controlled entities may elect to use different GWPs as long as these are properly documented and justified (local regulatory requirements, consistency with previous years, etc.).

## 14.2 Definitions

### Operational Boundaries

Operational boundaries involve the specification of the emission sources within, and associated with, each Saudi Aramco facility/asset for GHG accounting and reporting. The goal of prescriptively setting the operational boundaries is to ensure that GHG emissions are reported completely and consistently. Saudi Aramco's primary GHG emissions are from oil and gas industrial operations in the following sectors:

- Onshore and Offshore Oil and Gas Production
- Natural Gas Processing
- Oil and Natural Gas Transmission and Distribution
- Refining
- Chemicals

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<sup>1</sup> Intergovernmental Panel on Climate Change (IPCC), Fourth Assessment Report (AR4), 2007.

For the year 2023, the Company will report direct (Scope 1) and indirect (Scope 2) emission sources from its operations. Other indirect emissions (Scope 3) are not included in the current inventory.

### Direct (Scope 1) Emissions

Direct emissions, also referred to as Scope 1, are emissions from sources within assets under Saudi Aramco’s Operational Control. Direct emissions include the following types of emission sources:

- Fuels combusted in stationary sources on-site
- Flaring
- Burn pits
- Process vents
- Fugitive emissions from leaking components

### Indirect (Scope 2) Emissions

Scope 2 accounts for GHG emissions from the generation of purchased electricity and steam consumed by the company. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organizational boundary of the company. The Company accounts and reports Scope 2 emissions following a location-based method for imported electricity aligned with the World Resources Institute (WRI) guidelines and the American Petroleum Institute (API) Compendium of Greenhouse Gas Methodologies for the Oil and Natural Gas Industry, 2009. In addition, Saudi Aramco utilizes a market-based method for reporting of emissions from utilities (steam & electricity) in line with the GHG Protocol.

The Company accounts for and reports its GHG emissions associated with the generation of imported/purchased electricity and steam (Scope 2) separately from Scope 1 emissions, which is consistent with the practice that has evolved in voluntary corporate GHG emissions reporting.

## 14.3 Basis of Calculations

Saudi Aramco follows the guidelines listed below for reporting and managing greenhouse gas (GHG) emissions:

- International Petroleum Institute Environmental Conservation Association (IPIECA) *Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions, 2011*,<sup>2</sup>

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<sup>2</sup> IPIECA, Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions, 2011



- which sets out the accounting guidance for reporting. The IPIECA Guidelines are aligned with international best practices for corporate GHG accounting.
- World Resources Institute (WRI) and the World Business Council for Sustainable Development (WBCSD) *Greenhouse Gas (GHG) Protocol: A Corporate Accounting and Reporting Standard*, 2015<sup>3</sup> (GHG Protocol).
  - American Petroleum Institute (API) *Compendium of Greenhouse Gas Methodologies for the Oil and Natural Gas Industry*, 2009<sup>4</sup> (referred to as the “API Compendium”) calculation methodologies for quantifying GHG emissions.
  - Other GHG emissions accounting and reporting guidelines as required by national GHG emissions reporting schemes.

#### 14.4 GHG Inventory Principles

Saudi Aramco follows the generally accepted GHG accounting and reporting principles to ensure:

- (1) Reported data represents a faithful, true, and fair account of the organization’s GHG emissions; and
- (2) Reported information is credible and unbiased in its treatment and presentation of the issues.

#### 14.5 Reporting Period

The Company requires that GHG accounting and reporting be carried out in accordance with the principles outlined below. These principles support the quality controls over the GHG data at Saudi Aramco and shall be applied throughout all stages of the reporting process, aligned with the WBCSD GHG Protocol and IPIECA Guidelines.

The GHG emissions reporting period is from January 1<sup>st</sup> till December 31<sup>st</sup> for each calendar year.

#### 14.6 Base Year

Saudi Aramco for in-kingdom wholly owned and operated assets, has selected calendar year 2018 as the base year for reporting to compare against current year metrics to track performance, as well as set and manage reduction targets. The 2018 calendar year was the first year Saudi Aramco reported GHG emissions with confidence in accuracy across the assets in the Kingdom of Saudi Arabia. As such, 2018 was Aramco’s base year to compare against future years.

For entities under Saudi Aramco operational control, 2019 is defined as the base year for reporting to compare against current year metrics to track performance, as well as set and manage reduction targets.

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<sup>3</sup> WRI/WBCSD, *Greenhouse Gas (GHG) Protocol: A Corporate Accounting and Reporting Standard*, 2015

<sup>4</sup> API, *Compendium of Greenhouse Gas Methodologies for the Oil and Natural Gas Industry*, 2009

## 14.7 De minimis

As a Company's GHG emissions inventory matures over time, the basis for exclusion of smaller contributors to the overall emissions inventory will evolve from assumptions to calculations to justify exclusion. For example, a source such as a fire water pump is expected to be insignificant, and the data required to justify that assumption is typically not readily available. Therefore, in the initial years of Saudi Aramco's GHG inventory, key assumptions have been made on the level of materiality of certain source types within the inventory so that the focus can be on collecting accurate data for all material sources.

Sources excluded remain beneath the 1% de minimis threshold for that given source. Collectively, all de minimis sources must be below 5% of the global GHG emissions inventory. Reporting entities may elect to use different de minimis threshold, as long as these are properly documented and justified (local regulatory requirements, consistency with previous years etc).

## 14.8 Process workflow

### 14.8.1 In-Kingdom wholly-owned operated assets

The Essential Suite, Air Module application herein known as Emission Management System (EMS) was selected by Saudi Aramco as the enterprise environmental reporting platform for GHG emissions in 2020 and continues to be used for annual reporting. In cases, where required, Excel sheets shall be used to complement the EMS following the same API Compendium methodologies.

The current methodologies available for GHG reporting are the EMS (source with PI configurations) and manual data uploads (primarily Scope 2 and fugitive emissions). Both systems utilize equations and emissions factors from the API compendium. However, the EMS is considered the primary reporting process tool, where availability of source equipment PI tags such as, fuel amount, composition etc. are used for GHG calculations coupled with manual import data (where no PI configuration exist). In all data processing, reference equations for GHG accounting is based on API Compendium.

The Company has completed transitioning from Excel-based GHG emissions calculations to EMS. However, for new facilities that have not yet been configured into the EMS, the GHG emission calculations will be estimated using the Excel spreadsheet. Once the new facilities are configured in the EMS, they will transition from Excel-based to EMS-based GHG emission calculations.

### 14.8.2 Entities under operational control

For entities under operational control, the following processes have been developed by those entities:



- GHG emissions accounting and reporting practices as required by mandatory national GHG emissions reporting schemes.
- Develop a Basis of Reporting (BoR) document describing the context of 2023 GHG emissions reporting data based on a template developed by Saudi Aramco.
- Submit quality assured and quality controlled 2023 GHG emission data and the BoR document to Saudi Aramco through Business Line and Admin Area representatives.

#### 14.9 Alignment with Saudi Aramco Processes

The Saudi Aramco GHG accounting are aligned with the following internal processes:

- Corporate Flare Monitoring System (CFMS) Program;  
The CFMS allows the facility the ability to monitor their flaring losses in real-time from each individual source in the flare header. CFMS constitutes the basic foundation required to provide opportunity to develop site specific Flare Minimization Plan (FMP) thereby minimizing flaring. CFMS leverages available automation technologies, namely distributed control systems and real-time data historians to translate available real-time measurements of control valves (PCV) openings, pressures, temperatures and other process variables, to flared quantities in standard cubic feet. CFMS flaring figures are validated by the plant engineer and central engineering.
- Leak Detection and Repair (LDAR) Program;  
As part of Saudi Aramco's continuous efforts in managing fugitive emissions from its operations, Company's facilities both onshore and offshore, are required to conduct a Leak Detection and Repair (LDAR) program and estimate the associated fugitive emissions annually. The objective of this program is to conduct comprehensive surveys to monitor, repair, estimate, and control fugitive leaks of Volatile Organic Compounds (VOCs), Hazardous Air Pollutant (HAPs), and Methane (CH<sub>4</sub>).
- Other individual Programs by entities under Saudi Aramco Operational control as described in their BoR document.

#### 14.10 Completeness

Saudi Aramco's GHG inventory accounts for the GHG emissions from all sources and activities that fall within the organizational and operational boundaries of the company. The completeness principle means in practice that:

- Facilities include all emission sources and activities consistent with the guidance in this document. Sources deemed to be less than the de minimis threshold [5% of emissions (in aggregate, if multiple sources)], and not feasible or cost-effective to collect data on a quarterly or annual basis, can be excluded.
- Acquisitions and divestitures are monitored by Facility Environmental Coordinators and Environmental Protection (EP) and reflected in the inventory (and base year, if appropriate).



- The Company has developed and implemented a comprehensive GHG Emissions inventory plan. This plan incorporates annual changes to the GHG accounting and reporting procedures and/or reporting boundaries, updates to GHG emissions calculation methodologies and improvements in data collection and quality control procedures using excel sheets and/or EMS.

#### 14.11 Consistency

Company's GHG inventory allows for comparisons of GHG emissions across departments and facilities. The consistency principle means in practice that:

- Calculation methods used are consistent across the facilities within the inventory;
- Changes to the boundaries or calculation methodologies used over time need to be consistently applied and transparently documented.
- Saudi Aramco Environmental Protection (EP) is responsible for compiling the GHG information from all of the facilities across the corporation in a manner that ensures that the aggregate information is internally consistent and comparable over time.

#### 14.12 Transparency

Saudi Aramco's GHG inventory should be factual, clear, and well documented, such that a third party can review and replicate the calculations. The transparency principle means in practice that:

- A clear data trail must be provided by the Facility-Level Data Coordinators that documents the data flow from source to report;
- Any assumptions used in the estimates are well documented;
- All references to calculation methods or data sources are documented;
- Any data substitutions or exclusions are justified and well documented;
- All processes, tools, methods, data and physical access to select operating facilities at the discretion of an independent verifier are available for their review, validation and assurance

#### 14.13 Accuracy

Saudi Aramco's GHG inventory should be sufficiently accurate to enable intended internal and external users of the data to make informed decisions. The accuracy of the inventory should be improved over time, prioritizing all material emission sources (i.e., the sources contributing the most to the overall emissions). The accuracy principle means in practice that:

- Emissions data, including measurements and estimates, are systematically neither over nor under the true value, as far as can be judged;
- The most accurate calculation methodology (i.e. activity data from flowmeters, etc.) is used to estimate GHG emissions from sources that are material to the facility level inventory, unless demonstrated to not be feasible or cost effective; and
- Uncertainties in the data are reduced as far as practicable.

## 14.14 GHG Emissions Quantification

Per the IPECA Guidelines, when planning the consolidation of GHG data, it is important to distinguish between GHG *accounting* and GHG *reporting*.

- **GHG accounting** concerns the recognition and consolidation of GHG emissions from operations in which a parent company holds an interest, and linking the data to specific operations, sites, geographic locations, activities and owners.
- **GHG reporting** concerns the presentation of GHG data in formats tailored to the needs of various reporting uses.

### GHG Accounting

#### Emissions Quantification Methods

The Company will quantify GHG emissions in accordance with calculation methodologies listed in the 2009 API Compendium.

#### Emissions Reporting Hierarchy

Inventoring of GHG emissions is typically conducted as a ‘bottom-up’ activity by summing emissions from individual sources (or emissions from the total consumption of individual fuel types) at a reporting unit to create an inventory for the reporting unit, and aggregating emissions from the reporting units to create a corporate inventory. Reporting units represent logical groupings of activities and assets for the purpose of reporting GHG data to the parent company, and typically represent the smallest building block of the corporate inventory.

The Company has chosen to group and aggregate emissions for the following reporting groups:

- By emission source types across all reporting units
- By facility
- By Department
- By Administrative Area
- By Upstream and Downstream Business Lines
- By Saudi Aramco wholly in-Kingdom wholly owned assets
- By Entities under Saudi Aramco operational control
- By Corporate level Scope 1 and Scope 2