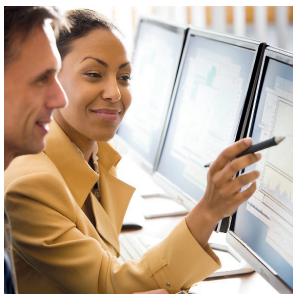
Petroleum industry guidelines for reporting greenhouse gas emissions

Second edition

Climate change
2011



Documents
Document Sharing Hub

Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

Legal note

This voluntary guidance document is designed to serve as a resource for interested companies; the guidance provided by this work does not establish an industry standard as to the nature of a company's public reporting practice. The recommendations in these *Guidelines* on how to report on a particular issue are addressed to those companies who choose to include that issue in their voluntary greenhouse gas (GHG) emissions reporting, and terms such as 'the reporting company should …' are to be understood in this sense.

The terms and definitions used in this document are not necessarily the same as terms and definitions used in various statutes, rules, codes or other authoritative legal documents. Users and readers of this document should refer to relevant legal sources or consult their own legal counsel for explanations as to how the terms and definitions used in this document may differ from the legal terms and definitions used in their particular areas of operation. It should not be implied that the guidance in this document is required to be followed for any national, local or other law. Furthermore, it is not intended to serve as a substitute for existing public reporting requirements and regulations. Any company reporter that has a question as to whether or not reports that follow the information contained herein will meet any specific reporting requirements applicable to their particular operations should consult with the reporter's own legal counsel.

A cautionary note regarding performance indicators

Aggregated, company-level, non-financial performance data, developed using these *Guidelines*, can be informative for comparing relative performance among different companies, such as benchmarking GHG emissions data across the oil and gas industry. A company can use such comparisons to evaluate its own performance relative to peers, and help identify areas for potential improvement. However, limitations to comparability exist due to various factors including the different methods companies may use to measure, normalize and report their emissions. Although efforts have been made throughout these *Guidelines* to improve comparability, report users are advised to exercise caution when using data from voluntary GHG emissions reports to compare performance. For example, comparing two companies that report emissions on a different basis (e.g. equity share vs. operational control described in Chapter 3) could be misleading regarding actual performance. Specific indicators from similar operations can sometimes be usefully compared to help performance management. However, the company-level, aggregate data typically reported in GHG emissions reports may not provide adequate comparability. Where these *Guidelines* mention comparability, it is not intended to imply that data in GHG emissions reports, and therefore companies' performance, are always directly comparable.

Separate from company GHG emissions reporting, industry associations and others may choose to implement specific performance benchmarking studies, which may build upon the guidance in this document.

It is also recognized that some of the guidance is new, and it may take a number of years for companies to begin to report in accordance with this new guidance. This is particularly relevant for reporting based on the financial control approach described in Chapter 3.

OGP Report Number 446

© IPIECA/API/OGP 2011 All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior consent of IPIECA, API and OGP.

This publication is printed on paper manufactured from fibre obtained from sustainably grown softwood forests and bleached without any damage to the environment.

Cover photographs reproduced courtesy of the following: top left and bottom: ©Shutterstock.com; top centre and right: ©iStockphoto.com

Documents
Document Sharing Hub

Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

Petroleum industry guidelines for reporting greenhouse gas emissions

2nd Edition, May 2011

IPIECA

The global oil and gas industry association for environmental and social issues

5th Floor, 209–215 Blackfriars Road, London SE1 8NL, United Kingdom
Telephone: +44 (0)20 7633 2388 Facsimile: +44 (0)20 7633 2389
E-mail: info@ipieca.org Internet: www.ipieca.org

energy API

The American Petroleum Institute

1220 L Street NW, Washington DC, 20005-4070, USA
Telephone: +1 202 682 8000
Internet: www.api.org

OGP

International Association of Oil & Gas Producers

5th Floor, 209–215 Blackfriars Road, London SE1 8NL, United Kingdom
Telephone: +44 (0)20 7633 0272 Facsimile: +44 (0)20 7633 2350
E-mail: reception@ogp.org.uk Internet: www.ogp.org.uk

AVA Documents
Document Sharing Hub

Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

Documents
Document Sharing Hub

Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

Table of Contents

List of Tables iii
List of Figures iii

Acknowledgements iv

1. Introduction 1-1

1.1 Background 1-1
1.2 Purpose 1-1
1.3 Scope 1-2

2. Petroleum Industry Greenhouse Gas Accounting and Reporting Principles 2-1

2.1 Relevance 2-1
2.2 Completeness 2-2
2.3 Consistency 2-2
2.4 Transparency 2-3
2.5 Accuracy 2-3

3. Setting the Boundaries for GHG Emissions Reporting 3-1

3.1 Establishing Organizational Boundaries 3-2
3.1.1 Approaches to Accounting for GHG Emissions: Equity Share and Control 3-3
3.1.2 Application of the Equity Share and Control Approaches within the Petroleum Industry 3-6
3.1.3 Selecting Accounting Based on Equity Share or Control 3-12
3.2 Establishing Operational Boundaries 3-13
3.2.1 Scope 1 GHG Emissions 3-14
3.2.2 Scope 2 GHG Emissions 3-15
3.2.3 Scope 3 GHG Emissions 3-17

4. Designing an Inventory to Track Emissions Over Time 4-1

4.1 Establishing Base Year Emissions 4-1
4.2 Adjusting Base Year Emissions 4-2
4.2.1 Adjusting Base Year Emissions when Using a Fixed Base Year 4-4
4.2.2 Adjusting Base Year Emissions when Using a Rolling Base Year 4-4
4.3 Performance Monitoring 4-5

5. Identification of Industry GHG Emissions 5-1

5.1 Greenhouse Gases 5-1
5.1.1 Petroleum Industry Greenhouse Gases 5-1
5.1.2 Greenhouse Gas Global Warming Potentials 5-2
5.2 Petroleum Industry Greenhouse Gas Emission Sources 5-4

6. Evaluation of Industry GHG Emissions 6-1

6.1 Uncertainties Associated with GHG Inventories 6-1
6.1.1 Limitations and Purposes of Uncertainty Quantification 6-2
6.1.2 Parameter Uncertainties: Systematic and Statistical Uncertainties 6-4
6.2 Relative Uncertainties Associated with Petroleum Industry Emission Sources 6-4
6.2.1 Uncertainties in Emissions from Upstream Petroleum Industry Operations 6-5

Documents
Document Sharing Hub

Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

6.2.2 Uncertainties in Emissions from Downstream Petroleum Industry Operations 6-5
6.3 Assessing Uncertainty in Corporate GHG Emission Inventories 6-7
6.4 Reducing Uncertainties in Petroleum Industry Emission Inventories 6-8
6.5 *De Minimis* Emissions 6-9

7. GHG Emissions Reporting 7-1

7.1 Data Aggregation 7-2
7.1.1 Aggregating by Operational Boundaries 7-3
7.1.2 Aggregating Along other Dimensions 7-4
7.2 Normalization of Emissions Data 7-6

8. Inventory Assurance Processes 8-1

8.1 Inventory Management Systems 8-1
8.1.1 Implementation of Inventory Quality Management Systems 8-2
8.2 Verification 8-5
8.2.1 Objectives 8-5
8.2.2 The Concept of Materiality 8-6
8.2.3 Assessing the Risk of Material Discrepancy 8-6
8.2.4 Establishing the Verification Parameters 8-7
8.2.5 Selecting a Verifier 8-7
8.2.6 Preparing for a GHG Verification 8-8
8.2.7 Using the Verification Findings 8-8

9. References 9-1

Appendix A. Glossary A-1

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

List of Tables

Table 3-1. Equity share and financial control accounting of GHG emissions for common petroleum industry investments....3-7
Table 3-2. Holland Industries—organizational structure and GHG emissions accounting....3-10
Table 5-1. Recommended 100-year GHG global warming potentials from the *Second Assessment Report* (SAR) and *Fourth Assessment Report* (AR4) 5-3
Table 7-1. IPIECA normalization factors for environmental reporting....7-7
Table 8-1. Generic quality management measures 8-3

List of Figures

Figure 3-1. Organizational and operational boundaries of a company 3-2
Figure 3-2. Approaches to reporting GHG emissions from joint ventures....3-3
Figure 3-3. Equity share reporting for joint ventures 3-4
Figure 3-4. Allocation of emissions from PSAs for equity share accounting 3-9
Figure 6-1. Types of uncertainties associated with greenhouse gas inventories 6-3
Figure 6-2. Relative uncertainty in upstream GHG emissions....6-6
Figure 6-3. Relative uncertainty in downstream GHG emissions 6-6
Figure 7-1. Emissions aggregation along operational boundaries....7-4

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

Acknowledgements

These *Guidelines* are the work product of the IPIECA Joint Industry Task Force on Greenhouse Gas (GHG) Reporting. The Task Force was convened under the auspices of the IPIECA Climate Change Working Group in collaboration with the American Petroleum Institute (API). The Task Force is composed of representatives from companies that are members of these two organizations.

The *Guidelines* were reviewed by a select group of stakeholders. Their comments and recommendations were carefully considered by the Task Force and were of benefit to the final version of this document. The stakeholder organizations were:

- Defra
- Ernst & Young
- PwC
- WRI

The Task Force project management was provided by Robert Siveter at IPIECA. Christopher Loreti (The Loreti Group) provided consultant support in drafting this document based on the first edition of the *Guidelines* and input from Task Force members. The following companies and associations participated in the GHG Reporting Task Force:

- Marathon (Chair)
- API
- BP
- Chevron
- ExxonMobil
- Hess
- IPIECA
- Petrobras
- Repsol YPF
- Shell
- Total

Much of the material contained in these *Guidelines* is based on *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard, Revised Edition* (WRI/WBCSD, 2004)[1], which was used directly or adapted for inclusion in this document. The Task Force wishes to acknowledge the generosity and cooperation of WRI and WBSCD in making the *GHG Protocol* available and allowing material from it to be incorporated into these *Guidelines.*

[1] For the sake of brevity, this document is referred to as the *GHG Protocol* within these *Guidelines.*

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

1. Introduction

1.1 Background

The petroleum industry has recognized the need for GHG accounting and reporting guidance that is focused specifically on its operations. To help meet this need, member companies of the American Petroleum Institute (API) first published the *Compendium of Greenhouse Gas Emissions Estimation Methodologies for the Oil and Gas Industry* in April 2001, with a third edition released in August 2009 (referred to as the *Compendium*). The original edition of this publication, *Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions* (referred to as the *Guidelines*) was issued in December 2003 to fulfil the need for industry guidance focused specifically on the accounting and reporting of GHG emissions at the facility through to the corporate level. This report is the first revision of the *Guidelines*.

Since the original version of these *Guidelines* was published, GHG emissions reporting has become much more widespread. Regulatory programmes to limit GHG emissions, such as the European Union Emissions Trading Scheme, have led to the mandatory reporting of emissions in some countries. In other countries, such as the USA, mandatory reporting has been implemented at the national, state or regional level in anticipation of expected emission limitations. For companies that are not required to report emissions, or are required to report only for some of their operations, voluntary corporate reporting has also increased.

Recognizing the need to update the original version of the *Guidelines* to reflect changing practices, IPIECA and API jointly initiated the development of this second edition of the *Guidelines* to continue to promote credible, consistent and reliable GHG accounting and reporting practices from oil and gas operations. To maximize the acceptance and use of these *Guidelines*, they have been developed with the broad participation of petroleum operators. To support the goal of wide acceptance, the *Guidelines* have been designed to strike a balance between flexibility and cost-effectiveness in accounting and reporting and the need for consistency and accuracy in the reported results.

The development of these *Guidelines* proceeded in recognition of the large number of existing GHG accounting and reporting approaches. As part of an international effort to bring greater consistency to corporate GHG reporting, the *GHG Protocol* was developed as a multi-stakeholder effort of the World Business Council for Sustainable Development (WBCSD) and the World Resources Institute (WRI) in 2001, with a revised edition published in 2004 (WRI/WBCSD, 2004). The *GHG Protocol* was carefully considered in its original and revised form in drafting the original version of the *Guidelines*, and this edition continues to build upon the *GHG Protocol* as it has evolved. Because the *GHG Protocol* does not focus specifically on the petroleum industry, however, best practices from it have been supplemented and amended with guidance specific to the petroleum industry. These revised *Guidelines* have also aimed to achieve consistency with the approaches described in the IPIECA publication *Oil and Gas Industry Guidance on Voluntary Sustainability Reporting* (IPIECA, 2010; referred to as the *Sustainability Guidance*).

1.2 Purpose

The purpose of these *Guidelines* is to promote consistency in the voluntary accounting and reporting of petroleum industry GHG emissions. While it is hoped that greater consistency will lead to greater comparability in the emissions information reported by petroleum industry companies, these guidelines are not meant to serve as a guide to industry benchmarking. The levels of greenhouse gas emissions that result from industry operations are highly dependent on the nature of those operations—be they the crude oil processed and products produced by an oil refinery or the geology of the reservoirs from which crude oil and gas are obtained. For this reason, the results obtained by applying these *Guidelines* should not be taken as measures of the inherent GHG emissions efficiency of petroleum industry companies.

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

As the name implies, the purpose of the *Guidelines* is to provide guidance rather than to prescribe standards. Companies vary in how they account for and report GHG emissions. To some extent, this variability may result from the requirements of the mandatory and voluntary reporting programmes in which they participate. These *Guidelines* may be used by companies to understand the implications of the reporting approaches they use and to help them in deciding how to conduct their corporate GHG emissions reporting.

1.3 Scope

Inventorying of GHG emissions by companies 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. These *Guidelines* focus on the accounting of emissions at the level of the reporting unit, and the aggregation and reporting of the results at the corporate level. They do not describe emissions estimation approaches for individual sources, which is the subject of the *Compendium*.

These *Guidelines* have been developed as a complement to the *Compendium* and the IPIECA *Sustainability Guidance.* While the *Compendium* focuses on GHG emissions estimation methodologies for industry sources (how to calculate emissions), the *Guidelines* primarily address GHG accounting and reporting (how to report emissions) for the GHG indicators identified in the *Sustainability Guidance*. Together, these three publications provide a comprehensive set of guidance for the estimation, accounting and reporting of petroleum industry GHG emissions.

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.

Many companies have multiple objectives for GHG reporting, including mandated government reporting, emissions trading schemes and public reporting. In developing a GHG accounting system, a fundamental consideration is therefore to ensure that the system is capable of meeting a range of reporting requirements. Ensuring that data are collected and recorded at a sufficiently disaggregated level, and capable of being consolidated in various forms, will provide companies with maximum flexibility to meet a range of reporting requirements.

As these *Guidelines* should make clear, companies face a range of options when choosing how to account for and report emissions from the facility to the corporate level. Which approach they take will depend on the intended use of the information they are reporting. Reporting emissions from an individual facility as part of a regulatory programme is typically limited to the direct emissions that occur at the site of the facility, and possibly only emissions from sources that exceed a particular size threshold. Emissions are reported for the facility as a whole without regard to how emissions may be allocated among the owners. The rules for reporting these emissions are determined by the specific regulatory requirements. They may or may not correspond either with general industry practice for reporting corporate emissions or with the way the company that owns the facility conducts its corporate accounting and reporting. In considering the broad scope of these *Guidelines*, it is important to bear in mind that, in many cases, the guidance it contains is tailored to specific reporting purposes, and does not necessarily apply for all purposes.

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

The material in these *Guidelines* is organized into seven chapters:

- Petroleum Industry GHG Accounting and Reporting Principles
- Setting the Boundaries for GHG Emissions Reporting
- Designing an Inventory to Track Emissions Over Time
- Identification of Industry GHG Emissions
- Evaluation of Industry GHG Emissions
- GHG Emissions Reporting
- Inventory Assurance Processes

These chapters are followed by a list of references used in developing the *Guidelines*. A glossary is provided as an appendix.

Chapter 2 describes the overarching principles embodied in the *Guidelines* for accounting and reporting GHG emissions from the petroleum industry. As such, it serves as the basis for the guidance contained in the rest of this report.

Chapter 3 provides guidance on establishing boundaries for the reporting of GHG emissions by companies in the petroleum industry. Since this is an area where companies (and reporting programmes) often differ, the *Guidelines* emphasize approaches to promote consistency. In addition, guidance is provided on accounting for emissions that result from operating relationships common in the petroleum industry, such as production sharing agreements, but which are not typically addressed in general guidance on GHG emissions accounting.

Chapter 4 describes how to design an inventory to track emissions over time. It provides guidance on the various approaches that companies may use to set a base year against which to compare emissions. More importantly, it includes guidance on when and how to adjust the base year approach for changes over time so that performance may be tracked on a comparable basis. It also describes various ways in which petroleum industry companies may demonstrate improvement in their emissions performance.

Chapter 5 provides guidance on the identification of industry GHG emissions, both in terms of the types of gases emitted and the sources of emissions. Chapter 6 covers the quantification and uncertainty of reported emissions. Much of the guidance in these two chapters is of a general nature, as it is not the intent of these *Guidelines* to duplicate the material in the *Compendium* or the publication *Addressing Uncertainty in Oil & Natural Gas Industry Greenhouse Gas Inventories: Technical Considerations and Calculation Methods* (API, CONCAWE, IPIECA, 2009), both of which provide detailed guidance for the petroleum industry. A general discussion of uncertainty in GHG inventories is also included in Chapter 6, based on information from the WRI/WBCSD (2003).

The process for reporting GHG emissions is described in Chapter 7. For corporate reporting, companies may aggregate GHG emissions for various purposes and in various ways including by organizational units, industry subsectors, individual facilities or geographic regions. Guidance is given on consistent approaches to promote comparability across companies, while allowing for the diversity of the different activities within the industry. Part of Chapter 7 is devoted to the question of normalization, providing guidance to better allow comparisons of emissions across companies of different sizes operating in various sub-sectors of the industry.

Chapter 8 focuses on inventory assurance processes. It provides guidance on how companies can use internal resources and programmes, as well as external parties, to provide assurance and to improve their inventory processes. Different types of assurance processes and their uses are discussed.

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

This page intentionally left blank

Documents
Document Sharing Hub

Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

2. Petroleum Industry Greenhouse Gas Accounting and Reporting Principles

Companies often adopt or establish sets of principles that serve as the basis for their reporting of environmental information. The principles for GHG accounting and reporting for the petroleum industry listed below are based on those in the *GHG Protocol* (WRI/WBCSD, 2004). The descriptions of the principles that follow build off of the descriptions given in the *Protocol*.

Generally accepted GHG accounting principles, like those for financial accounting, are intended to underpin GHG accounting and reporting to ensure that:

- the reported information represents a faithful, true and fair account of an organization's GHG emissions; and
- the reported information is credible and unbiased in its treatment and presentation of issues.

GHG accounting and reporting practices have continued to evolve and have become more established since the original publication of these *Guidelines*. The principles underlying GHG accounting and reporting, have remained largely unchanged, however. The principles outlined in this chapter are the outcome of a collaborative process involving a wide range of technical, environmental and accounting disciplines.

GHG accounting and reporting should be based on the following principles:

Relevance—Define boundaries that appropriately reflect the GHG emissions of the organizations and the decision-making needs of users.

Completeness—Account for all GHG emission sources and activities within the chosen organizational and operational boundaries. Any specific exclusions should be stated and justified.

Consistency—Use consistent methodologies and measurements to allow meaningful comparison of emissions over time. Transparently document any changes to the data, methods or any other factors in the time series.

Transparency—Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose assumptions and make appropriate references to the calculation methodologies and data sources used.

Accuracy – Ensure that estimates of GHG emissions are systemically neither over nor under actual emission levels, as far as can be judged, and that uncertainties are quantified and reduced as far as practicable. Ensure that sufficient accuracy is achieved to enable users to make decisions with confidence as to the integrity of the reported GHG information.

2.1 Relevance

It is important that an organization's GHG report is relevant. This means that it contains the information that report users—both external and internal to the organization—consider significant and need for their decision-making. Timeliness is a component of relevance, for if information is reported after the time when it can influence decisions, it is no longer relevant.

The selection of reporting boundaries for GHG emissions is an important aspect of relevance. The accounting and reporting boundaries should appropriately reflect the GHG emissions of the organization. The choice of appropriate boundaries depends on the characteristics of the organization, the intended purpose of the GHG information, and the needs of the users. When choosing such boundaries, a number of different factors need to be considered such as:

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

- Organizational structures—operating licenses, ownership, legal agreements, joint ventures, financial and/or taxation boundaries etc.
- Operational boundaries—direct and indirect emissions from the company's assets and activities.
- The business context—nature of activities, geographic locations, industry sector(s), purposes of information, users of information.
- Specific exclusions or inclusions, which should be transparently identified and the rationale provided.

The boundaries should represent the substance and economic reality of the business, and not merely its legal form.

2.2 Completeness

All emissions within the chosen organizational and operational boundaries that are material to users should be reported to allow the reporting organization's emissions to be assessed. In practice, a lack of data or the cost of gathering data may be a limiting factor in the completeness of the inventory. For cases where emissions have not been estimated, or have been estimated at an insufficient level of quality to be included, the potential impacts and relevancy of the exclusion should be transparently documented and explained.

The principle of completeness should not be confused with, or be regarded as conflicting with, the provision of guidance on *de minimis* reporting levels. Sometimes, a minimum emissions accounting threshold is explicitly defined, stating that a source not exceeding a certain threshold may be omitted from the inventory. Technically, such a threshold is simply a predefined and accepted negative bias in estimates (i.e. an underestimate). Some reporting programmes, however, such as The Climate Registry, do not allow for the exclusion of *de minimis* emissions, but instead allow simplified upper bound estimates for them, while others, such as ISO 14064-1 only allow their exclusion if an explanation is given as to why they are excluded. Under EU and US mandatory reporting programmes, calculation methodologies are provided only for those sources that need to be reported. For other sources, which are not considered to be significant, no calculation methodologies are provided, and thus they do not need to be reported.

In practice, most organizations that report GHG emissions exclude *de minimis* emissions, whether explicitly or implicitly, due to the extremely wide range in the magnitude of GHG emissions from their various activities. So long as the totals of emissions that go unreported are not considered significant by the users of the reported information, this should not be considered to be in violation of the principle of completeness.

2.3 Consistency

Users of GHG information will want to track and compare GHG emissions information over time in order to identify trends and to assess the performance of the reporting organization. The consistent application of boundary definitions, accounting practices and calculation methodologies over time is essential for the production of comparable GHG emissions data. The GHG information for all facilities within an organization's reporting boundary must be compiled in a manner that ensures that the aggregate information is internally consistent and consistent over time. If there are changes in the scope, methods, data or any other factors affecting emission estimates, they should be transparently documented and justified.

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

2.4 Transparency

Transparency relates to the degree to which information on the processes, procedures, assumptions and limitations of the GHG inventory are disclosed. Information should be reported in a clear, understandable, factual, neutral and coherent manner. Any changes to the data, methods or other factors affecting a time series of reported emissions should be transparently documented. Information on internal audits or external third-party reviews should be included with the report. A 'transparent' report will provide a clear understanding of the issues in the context of the reporting company, and a meaningful assessment of performance.

To promote independent review, the inventory process should be based on clear and complete documentation and archives (i.e. an audit trail). Information should be recorded, compiled and analysed in a way that enables internal reviewers and external verifiers to attest to its credibility. Sufficient information should be provided to ensure that a third party is able to derive the same results if provided with the same source data. An independent external verification is a good way of increasing transparency and determining that an appropriate audit trail has been established and documentation provided.

2.5 Accuracy

Data should be sufficiently accurate and precise to enable intended users to make decisions with confidence. Because the intended uses of inventory data vary, the necessary level of accuracy will also vary. Organizations should ensure that GHG measurements, estimates or calculations are systemically neither over nor under the true emissions value, as far as can be judged, while recognizing the need to balance the cost-effectiveness of obtaining accurate emissions estimates with the intended use for the emissions information. Uncertainties in GHG calculations should be reduced as far as practicable based on the data available to make the calculations[2]. As a means of promoting credibility in their reported emissions, organizations should report on the measures they take to ensure accuracy in their emissions estimation process.

[2] Guidance on assessing uncertainty in GHG emissions inventories has been developed specifically for the oil and gas industry. See *Addressing Uncertainty in Oil & Natural Gas Industry Greenhouse Gas Inventories: Technical Considerations and Calculation Methods* (API, CONCAWE, IPIECA, 2009).

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

This page intentionally left blank

Documents
Document Sharing Hub

Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

3. Setting the Boundaries for GHG Emissions Reporting

The petroleum industry encompasses a wide variety of activities, ranging from the discovery and production of oil and gas to the delivery of petroleum products to consumers. Oil companies typically divide these activities into three areas:

- upstream—the exploration, development, and production of oil and gas;
- downstream—the refining, processing, distribution, and marketing of products derived from oil and gas, including service stations operations; and
- chemicals—the manufacture, distribution and marketing of chemical products derived from oil and gas (petrochemicals).

While large, integrated oil and gas companies participate in all of these activities, smaller companies may participate in only one—or part of one—of them. In addition, both large and small petroleum companies may engage in one or more activities that are not typically associated with the petroleum industry, including:

- mining;
- power generation;
- natural gas transmission;
- renewable energy systems; and
- specialty chemical production.

As discussed in Chapter 7, the way in which petroleum companies divide their activities varies from firm to firm. Regardless of how they make these divisions, GHG emissions from all of the activities in which petroleum companies are directly engaged should be included in corporate reporting, provided the emissions fall within the inventory boundaries described in this chapter. Reporting should not be limited to only upstream, downstream and petrochemical activities.

Two types of boundaries are referred to in the context of GHG emissions inventories: *organizational boundaries* and *operational boundaries*. Organizational boundaries refer to those assets which fall within the inventory boundary of a company and the way in which the emissions from those assets are accounted for. Operational boundaries refer to the scope of the emissions that are included in the boundary, in particular emissions that are not from a company's assets, but which may occur as a result of the operation of its assets.

Companies vary in their legal and organizational structures; they include wholly-owned assets, incorporated and non-incorporated joint ventures, subsidiaries and others. In setting organizational boundaries, a company selects an approach for consolidating GHG emissions and then consistently applies the selected approach to define those activities and assets that constitute the company for the purpose of accounting and reporting GHG emissions.

After a company has determined its organizational boundaries, it then sets its operational boundaries. This involves identifying emissions associated with its assets, categorizing them as direct emissions—emissions from assets owned or controlled by the company—or indirect emissions—emissions that are a consequence of the activities of the assets but that occur at companies outside of the organizational boundary. Then, the company chooses the scope of accounting and reporting for its indirect emissions.

Figure 3-1 illustrates the relationship between organizational and operational boundaries. Having defined which assets (or companies) fall under the parent company (the organizational boundary), the company must also define which emissions from those assets—in addition to those it owns or controls—should be included in the inventory (the operational boundary).

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

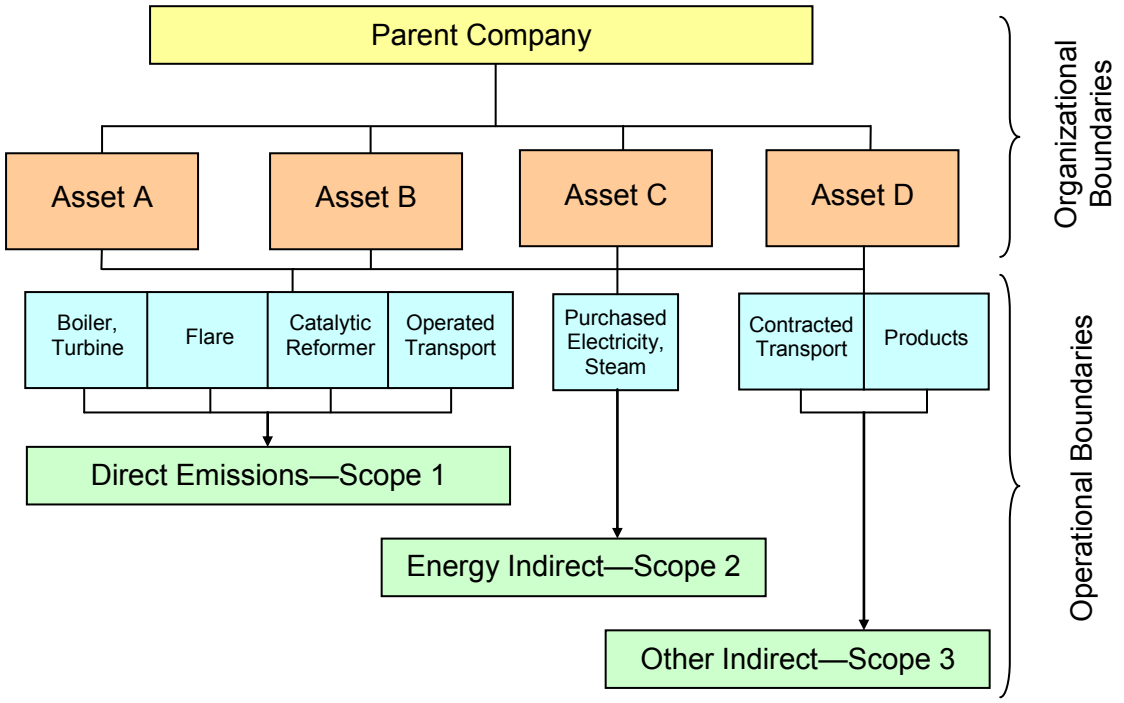


Figure 3-1. Organizational and operational boundaries of a company

The remainder of this chapter describes organizational and operational boundaries as they apply in the petroleum industry. The chapter provides guidance on determining whether GHG emissions fall within the organizational and operational boundaries, and how to account for those emissions if they do. The focus of this chapter is on the accounting of emissions rather than their reporting. Chapter 7 describes how to report emissions across the broad range of activities in which petroleum companies may be involved.

3.1 Establishing Organizational Boundaries

When a company wholly owns and operates an asset, the reporting boundaries for that asset are clear. Emissions from such an asset fall within the company's reporting boundary, and the company should report 100% of the emissions from the asset. When a company owns only part of an asset, owns an asset that is operated by others or operates an asset that it does not own, determining what emissions from that asset fall within its reporting boundaries becomes more complex. These more complex business arrangements often apply in petroleum companies due to the nature of the industry.

Petroleum industry activities are commonly conducted by two or more parties working together in joint ventures[3], instead of by individual firms. These ventures take a variety of legal forms, and may or may not be established as separate legal entities. For the purposes of financial accounting, they are treated according to established rules that depend on the structure of the organization and the relationships among the parties involved. Rules for accounting for GHG emissions from ventures involving more than one party are still evolving, however; the lack of established rules inevitably leads to questions about how the parties participating in these activities should account for and report their emissions.

[3] Unless otherwise indicated, 'joint venture' is used as a generic term in these *Guidelines* for any operations or activities involving more than one party.

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

The purpose of Section 3.1 is to provide guidance on accounting for GHG emissions from petroleum industry activities that involve more than one party. The guidance builds on Chapter 3 of the *GHG Protocol* (WRI/WBCSD, 2004) on organizational boundaries. It has been tailored to the petroleum industry and simplified to minimize the need to understand financial accounting terminology. The material in Tables 3-1 and 3-2 comes from Chapter 3 of the *GHG Protocol* with some minor modifications.

For corporate reporting, these *Guidelines* should be applied consistently. Existing GHG reporting schemes may have other rules that need to be applied for the entities covered by those schemes. For example, governmental trading schemes are usually based on facility emissions, and do not take into account the ownership structure of the facility. Therefore, the organizational boundary issues discussed in this section would not apply to those schemes. This implies that facilities may have to report different data sets for different reporting purposes. Companies should allow for this flexibility in designing their accounting and reporting systems.

3.1.1 Approaches to Accounting for GHG Emissions: Equity Share and Control

Accounting for GHG emissions from joint ventures may be performed in one of three ways, as illustrated in Figure 3-2 and described below. Reporting may be based on a company's *equity share* of ownership or it may be based on whether the company *controls* the joint venture, in which case it reports all of the joint venture's emissions. *Control* may be defined in either of two ways—*operational control* or *financial control.* These *Guidelines* make no recommendation as to which of these three approaches to use. The equity share and operational control approaches are most commonly used within the petroleum industry for reporting GHG emissions.

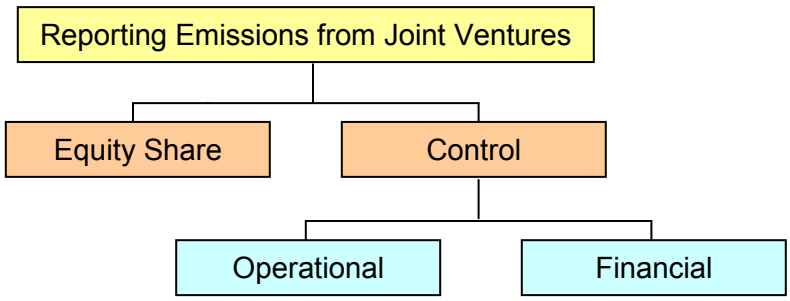


Figure 3-2. Approaches to reporting GHG emissions from joint ventures

Key to applying organizational boundaries on the basis of equity share, operational control or financial control is the concept of the reporting unit. The identification and listing of all of the reporting units that are part of the reporting company for the purpose of GHG emissions reporting should be the starting point for setting organizational boundaries.

Reporting units should be selected to represent the smallest practical building blocks reflecting the internal management of the company and to allow data to be reported at local, country, region or global levels, as appropriate. A reporting unit can be all or part of a subsidiary company, joint venture, investment, facility, plant, office or business location depending on what works best for the company given the way in which it is organized and managed.

Within the oil and gas industry, reporting units are generally grouped by types of upstream and downstream activities, such as exploration, production, drilling, refining, chemical manufacturing and marketing. A company's reporting units manage assets that provide benefits to stakeholders

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

and have intrinsic financial value to the company, but also present associated environmental risks, in particular GHG emissions. Assets may be operated and/or owned by the reporting company. A company will already be organized into groups of activities and assets for financial accounting, and this provides a useful starting point to define the list of reporting units for sustainability reporting.

In the oil and gas industry, ensuring that the company's organizational boundary is correctly described in terms of reporting units can be complex because two or more companies are often commercially involved in an asset, such as in a joint venture, and work together under a variety of legal forms. In order to facilitate consolidation of data by organizational boundary, typically each reporting unit should:

- represent a discrete piece of business that is unlikely to be split during internal restructuring or portfolio change (acquisition or divestments);
- manage assets operated by a single company (i.e. the operator of the reporting unit's assets is either the reporting company itself or another company, so that there is not a mix of different companies operating assets within the reporting unit);
- manages assets which have the same reporting company ownership (i.e. try to avoid creating reporting units that comprise assets with different percentage equity shares); and
- cover a narrow range of related business activities located within one country or region.

3.1.1.1 Equity Share Approach

Under the equity share approach, a company accounts for GHG emissions from reporting units according to its interest in the assets managed by the reporting unit. This reflects economic interest, which is the extent of rights a company has to the risks and benefits flowing from assets. Typically, the share of the risks and benefits in an asset is aligned with the company's percentage ownership of that asset, and equity share will normally be the same as the ownership percentage. Where this is not the case, the economic substance of the relationship the company has with the reporting unit should typically override the legal ownership to ensure that equity share reflects the percentage of economic interest. The principle behind the equity share definition and guidance, that of economic substance taking precedence over legal form, is consistent with international financial reporting. The company should therefore consult with its accounting or legal staff to ensure that the appropriate percentage is applied for each interested operation.

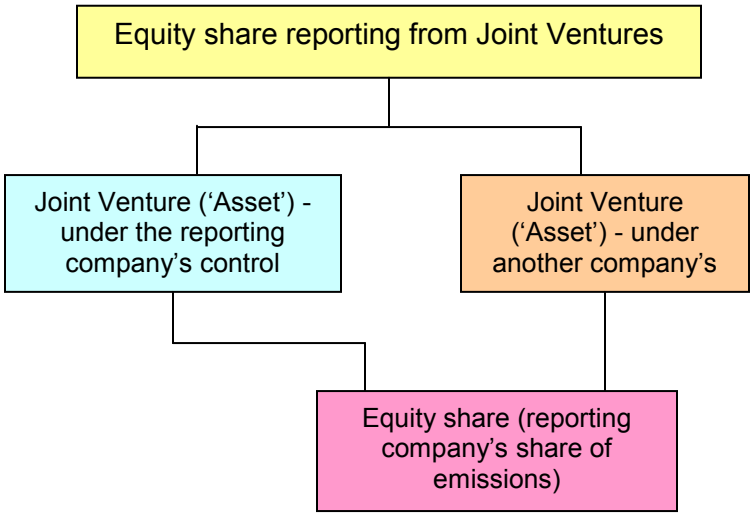


Figure 3-3. Equity share reporting for joint ventures

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

Figure 3-3 illustrates how equity share reporting works for both controlled and non-controlled joint ventures. Regardless of whose control the joint venture is under, emissions are reported based on the reporting company's equity share.

Typically, in consolidating its GHG emissions, a company will apply its equity share factor at the reporting unit level. If the reporting unit corresponds to the joint venture, this means the total emissions from the joint venture will be multiplied by the company's equity share factor.

3.1.1.2 Control Approaches

Under the control approach, a company accounts for 100% of the GHG emissions from assets over which it has control. It does not account for GHG emissions from assets in which it owns an interest but has no control. Control can be defined in either financial or operational terms. Within the petroleum industry, companies that voluntarily report GHG emissions on the basis of control typically do so using operational rather than financial control.

Companies sometimes report emissions only from joint ventures in which they hold more than a 50% interest. This approach may lead to less complete reporting than is recommended by these *Guidelines* because operational control is not limited to majority-held ventures; it also applies to minority ventures where the company has operational control.

Operational Control

Data are collected from each reporting unit about the assets operated by the reporting company, including those assets partly owned by other companies (i.e. an operated joint venture). Conversely this approach excludes data from assets which are partly owned by the reporting unit but operated by another company (i.e. a non-operated joint venture). The operational control approach is thus generally defined to collect and consolidate all data or information from assets which meet either of the following criteria:

- The asset is operated by the company, whether for itself; or under a contractual obligation to other owners or participants in the asset (for example, in a joint venture or other such commercial arrangement).
- The asset is operated by a joint venture (or equivalent commercial arrangement), in respect of which the company has the ability to determine management and board-level decisions of the joint venture.

When a company (i.e. the parent company and its subsidiaries) reports emissions on an operational control basis, it is done by consolidating 100% of the GHG emissions.

The definition of operational control used in these *Guidelines* is consistent with the 'operational approach' defined in the *Oil & Gas Industry Guidance on Voluntary Sustainability Reporting* (IPIECA, 2010). This particular definition was adopted because it is consistent with the way many petroleum industry companies currently account for and report environmental information. Often, companies report on emissions from assets that they operate (i.e. assets for which they hold the operating licence). It is expected that, except in very rare instances, if a company is the operator of a joint venture asset, it will have the authority to implement its operational policies and thus has operational control.

It should be emphasized that having operational control does not mean that a company necessarily has authority to make all decisions concerning a joint venture. Making decisions on major capital investments without the approval of the other parties in the venture, for example, may be beyond its authority. Operational control does mean that a company has authority to implement its operational policies.

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

Financial Control

A company has financial control over an asset if the company has the ability to direct the financial and operating policies of the business with a view to gaining economic benefits from its activities (WRI/WBCSD, 2004; DEFRA, 2009). When reporting on a control basis, common practice within the petroleum industry is to use operational control rather than financial control. These *Guidelines* provide an introduction to the application of the financial control boundary in the petroleum industry. It should be recognized, however, that reporting based on financial control is a rapidly evolving approach, and the discussion here represents one point in time. If companies wish to report on the basis of financial control, they may find more information on the approach in the *GHG Protocol* (WRI/WBCSD, 2004) and in the guidance of The Climate Registry (TCR, 2008) and the UK Department for Environment, Food and Rural Affairs (DEFRA, 2009).

3.1.2 Application of the Equity Share and Control Approaches within the Petroleum Industry

Accounting for GHG emissions on the basis of operational control is relatively straightforward in the petroleum industry because it is common practice in the industry for one company to be designated the operator of a joint venture asset. Accounting for GHG emissions based on equity share or financial control results in closer alignment between GHG accounting and financial accounting but is complicated by the wide variety of organizational relationships that are used within the petroleum industry. Some of the more common arrangements within the industry are listed in Table 3-1, along with guidelines on how to account for emissions based on equity share and financial control. For the sake of simplicity, the descriptions of the investments and relationships among the organizations are provided using common industry terminology, rather than accounting terminology. For situations not covered by this table, company financial accountants should be consulted to determine how the specific investment is handled for financial accounting, and the emissions should be accounted for in an analogous manner.

Several of the types of investments listed in Table 3-1 exist in many industries. In general, application of the equity share approach of apportioning GHG emissions according to the economic interest or benefit derived from the venture would utilize the working/participating interest in the venture, or the ownership share if the venture is conducted as a separate company. The application of the financial control approach has similarities to the equity share approach, especially in the treatment of non-incorporated joint ventures, which are common in the petroleum industry. Where the financial control approach differs most critically from the equity share approach for the petroleum industry is in the treatment of emissions from ventures that are conducted as separate companies (e.g. incorporated joint ventures or associates). Such ventures fall outside the financial control boundary, and therefore their emissions would not be accounted for when reporting on the basis of financial control. However, these types of ventures are common in the petroleum industry, and under international financial reporting standards, production from these ventures is typically accounted for on an equity basis in financial statements. If a company wishes to account for its emissions on a financial control basis, it should consider also accounting for the emissions from these ventures as they would likely be considered relevant by stakeholders. If it does so, it should account for them as if it were accounting using the equity share approach, as this is generally consistent with the approach used to account for such ventures in financial statements. Other differences between the financial control and equity share approach are the treatment of Subsidiary companies and Stock ownership in a publicly traded corporation. These differences can be seen clearly in Table 3-1. These general rules would be applied unless there were specific contractual arrangements that either allocate the GHG emissions to the partners (see below), or that alter the normal practice of allocating benefits in proportion to the equity interest and hence contribution of costs.

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

Table 3-1. Equity share and financial control accounting of GHG emissions for common petroleum industry investments

Type of investment	Description of organizational relationship	Accounting for GHG emissions by equity share	Accounting for GHG emissions by financial control
Subsidiary	The petroleum company either wholly owns the subsidiary, or enough of its voting stock, that it has full control of the subsidiary (e.g. through election of the board of directors).	According to the ownership share of the subsidiary (100% for wholly-owned subsidiaries).	100% of GHG emissions.
Joint venture among two or more oil companies that operates as a separate company.	Several corporations have formed a company by combining some of their existing assets and/or capital. The several corporations are the sole shareholders.	According to the ownership share of each of the parent corporations in the new company.	0% of GHG emissions*.
Joint venture among several oil companies to develop a production asset.	Corporations work in partnership to develop the asset without forming a new company. One serves as operator.	Based on the terms of the arrangement with the other parties—typically according to the working interest.	Based on the terms of the arrangement with the other parties—typically according to the working interest.
Joint venture among a state oil company and several foreign companies to produce oil, as part of a production sharing agreement.	For example, a state oil company has 40% interest in venture, and several companies each have 15% interest or less, including the operator.	Based on company's share of net production.	Not covered specifically by financial control rules.
Stock ownership in a publicly traded corporation—significant share of ownership.	For example, a separate company in which the petroleum company has significant influence[4].	According to the ownership share of the petroleum company in the corporation.	0% of GHG emissions.
Stock ownership in a publicly traded corporation—small share of ownership.	For example, a separate company in which the petroleum company has made an investment, but does not have significant influence[4].	Petroleum company reports no GHG emissions from the company in which it has invested, consistent with financial accounting.	Petroleum company reports no GHG emissions from the company in which it has invested, consistent with financial accounting.

*Under International Financial Reporting Standards, jointly controlled entities may be accounted for using either the proportionate consolidation method or the equity method, although the rule allowing the proportionate consolidation method may change in 2010. Under UK GAAP, unincorporated joint ventures are accounted for using the gross equity method.

[4] Significant influence is defined by accounting standards; in general, ownership of 20% or more of the stock in a company results in a presumption of significant influence.

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

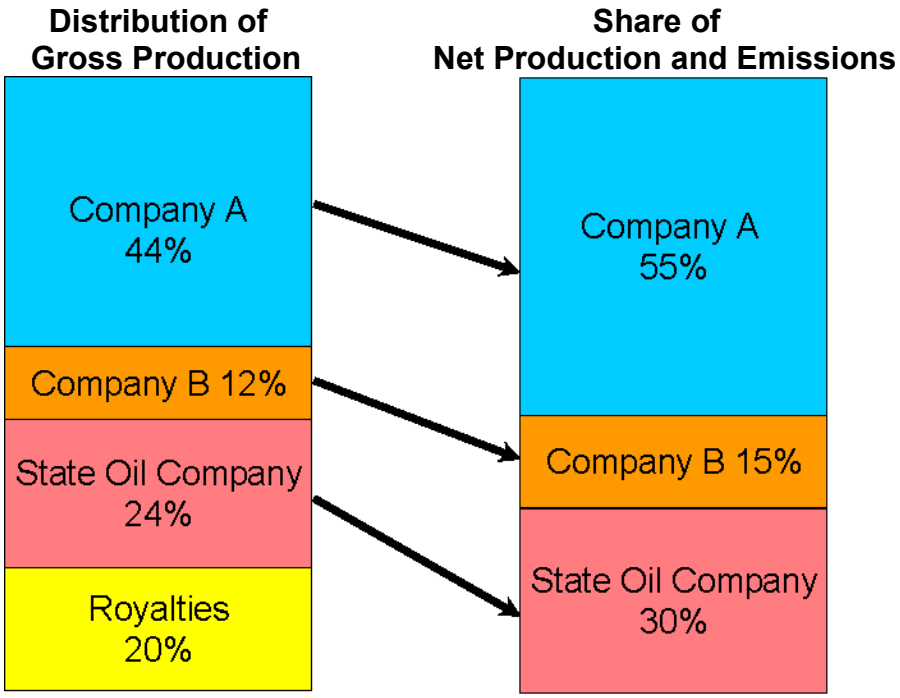
One type of arrangement that alters the normal practice of allocating benefits in proportion to equity is the Production Sharing Agreement (PSA), which is commonly used in upstream petroleum activities. A PSA is an agreement between one or more oil companies and a government entity or state company in which the participating oil companies provide financing and bear the risk of exploration and production activities in exchange for a share of the production remaining after royalties[5] are paid to the government. The company share of this remaining production—sometimes referred to as the company share of net production or entitlement production—should be used as the basis for allocating emissions. As shown in Figure 3-4, all of the parties receiving a share of net production, whether they be state-owned or private companies, receive a proportionate share of emissions, and all of the emissions from the asset are accounted for among the companies. No emissions are allocated to the royalties.

The net share of production used for allocating emissions from PSAs is the production reported in financial accounts or statements prepared according to the requirements of UK Generally Accepted Accounting Principles (GAAP), US GAAP, and the US Securities Exchange Commission (SEC). The relevant net production volumes and the company share can be obtained directly from company financial departments.

The types of investments and joint ventures listed in Table 3-1 are simplifications. In some cases, it may be necessary to account for emissions in two or more steps, for example when a parent company has a subsidiary that holds an interest in another company. In these cases, the allocations of emissions should be carried out from the bottom up, so that the GHG data are first consolidated at the lower level organization prior to a higher parent level consolidation. An example is provided in Table 3-2, which illustrates how to account for GHG emissions for a company with a more complicated set of organizational relationships. For each joint venture, the share of emissions that would be accounted for under equity share, financial control, and operational control approaches is listed.

[5] Including taxes and other levies paid in kind (with oil rather than money).

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011



Note: Royalties include taxes and other levies paid in kind (with oil rather than money).

Figure 3-4. Allocation of emissions from PSAs for equity share accounting

Documents
Document Sharing Hub
Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

Full document details: Petroleum industry guidelines for reporting greenhouse gas emissions 2011

Holland Industries is a fictional chemicals group comprising a number of companies and joint ventures active in the production and marketing of petrochemicals. Table 3-2 outlines the organizational structure of Holland Industries and explains how GHG emissions from the different operations are accounted for under the equity share and operational control approaches.

Note that, in this example, Holland America (not Holland Industries) holds a 50% interest in BGB and a 75% interest in Lolo Industrial. GHG emissions are thus apportioned first at the subsidiary level before they are consolidated at the group level.

Table 3-2. Holland Industries—organizational structure and GHG emissions accounting

Name	Legal structure and partners	Interest held by Holland Industries	Operational and EHS policies	Treatment in Holland industries' financial accounts	Emissions accounted for by Holland Industries		
					Equity share	Financial control	Operational control
Holland America	Incorporated company	83%	Holland Industries	Subsidiary	83%	100%	100%
BGB	Jointly controlled, non-incorporated joint venture	50% by Holland America	Partner	Via Holland America	41.5% (83%x50%)	50% (100%x50%)	0%
Lolo Industrial	Subsidiary of Holland America	75% by Holland America	Holland America	Via Holland America	62.25% (83%x75%)	100% (100%x100%)	100%
Kahuna Chemicals	Non-incorporated joint venture, jointly controlled with 2 other partners: ICT and BCSF	33.3%	ICT	Proportionally consolidated joint venture	33.3%	33.3%	0%

Documents
Document Sharing Hub