



Designation: E2725 – 19

Standard Guide for Basic Assessment and Management of Greenhouse Gases¹

This standard is issued under the fixed designation E2725; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

INTRODUCTION

This guide provides a *uniform* set of options for communicating and planning greenhouse gas (GHG) management as well as strategies for addressing GHGs associated with a facility's operations. This guide may not apply to entities where such GHG assessment and management is already widely available through standard, uniform sets of guidance (for example, the construction of green buildings; mandatory air quality rules), or other standards. This guide provides a *uniform* voluntary framework for identifying management options and steps that may be beneficial to evaluate (GHG) solutions. It provides basic management strategies for existing corporations, commercial businesses, and government facilities, even those currently outside of various voluntary and regulatory schemes. The environmental assessment and management strategies contained in this guide recognize the overall value of existing responses. This guide references and blends similar, effective programs and extends them to a consistent approach that will facilitate communication and be a basic tool for business and industry.

Background—Activities that reduce GHG emissions or limit their atmospheric releases have been initiated internationally. This guide offers a framework of initiatives for individual or local efforts in managing GHG. To facilitate best practices, most GHG management programs establish a baseline of current emissions, establish objectives for reducing or managing those emissions, monitor progress in meeting these objectives, and report (either internally or externally) the results of these efforts. This guide offers useful principles in determining options, and in the selection of prudent activities, based on various scenarios and technology improvements, to enhance preservation of life and environmental conservation.

1. Scope

1.1 *Overview*—This guide presents a generalized systematic approach to voluntary assessment and management of the causes and impacts of GHGs. It includes actions, both institutional (legal) and engineering (physical) controls for GHG reductions, impacts, and adaptations. Options for a tiered analysis provide a priority ranking system, to address the “worst first” challenges of a facility, addressing practicality and cost-benefit.

1.2 *Purpose*—The purpose of this guide is to provide a series of options consistent with basic principles and practices for GHG-related action. This guide encourages consistent and comprehensive assessment and management of GHG outcomes from facility and business operations.

¹ This guide is under the jurisdiction of ASTM Committee E50 on Environmental Assessment, Risk Management and Corrective Action and is the direct responsibility of Subcommittee E50.05 on Environmental Risk Management.

Current edition approved Feb. 1, 2019. Published March 2019. Originally approved in 2010. Last previous edition approved in 2010 as E2725–10. DOI: 10.1520/E2725–19.

1.2.1 The guide also provides some high-level options for the monitoring, tracking and performance to evaluate the effectiveness of the commercial entity's strategy to ensure that a reasonable approach is taken.

1.2.2 This standard ties into the ASTM Committee E50 standards series related to environmental risk assessment and management.

1.3 *Objectives*—The objectives of this guide are to determine the conditions of the facility and or/property with regard to the status of GHGs and actions to be taken to manage and reduce or offset those emissions.

1.3.1 The guide provides a three-tiered decision strategy that focuses on business risk, cost-effective solutions in response to greenhouse gases, and related issues such as the need for energy independence.

1.4 *Limitations of this Guide*—Given the variability of the different types of facilities that may wish to use this guide, and the existence of state and local regulations, it is not possible to address all the relevant standards that might apply to a particular facility. This guide uses generalized language and

examples to guide the user. If it is not clear to the user how to apply standards to their specific circumstances, it is recommended that users seek assistance from qualified professionals.

1.4.1 *Insurance Industry*—The effects of GHG on insurers are not clear. The definition of an insurable occurrence and a commencement point for when insurable claims are made, along with when conditions were discovered and the actionable information leading to an insurable loss is not clear. It may be inappropriate to speculate on GHGs that are highly uncertain for purposes of insurance related to specific events.

1.4.2 This guide does not take a position on the science of climate change, its association with anthropogenic greenhouse gases, or various mathematical models generated by international bodies.

1.4.3 The guide does not address water vapor as a greenhouse gas.

1.4.4 The guide only addresses anthropogenic greenhouse gases.

1.5 The guide uses references and information on the control, management and reduction of GHGs from many cited sources such as the Intergovernmental Panel on Climate Change, ISO, the World Resources Institute, and the National Academy of Sciences.

1.6 Several U.S.-based federal regulatory agencies served as sources of information on existing and anticipated regulation and management of GHGs including the Environmental Protection Agency, the Department of Energy, and the Securities and Exchange Commission.

NOTE 1—New Source Performance Standards regulating methane emissions from natural gas wells are codified in 40 CFR 60 Subpart OOOO.

1.7 This guide relies on current regulatory information about GHGs from various state agencies, including the California Air Resources Board, the Massachusetts and Connecticut Departments of Environmental Protection, the Washington Department of Ecology, the Western Climate Initiative, and the Regional Greenhouse Gas Initiative.

1.8 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.9 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.10 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

[E2114 Terminology for Sustainability Relative to the Performance of Buildings](#)

[E2432 Guide for General Principles of Sustainability Relative to Buildings](#)

2.2 International Standards:³

[ISO 14001 :2015 Environmental Management Systems—Specification with Guidance for Use⁴](#)

[ISO 14064–1 :2006–03–01, Greenhouse Gases—Part 1: Specification with Guidance at the Organization Level for Quantification and Reporting of Greenhouse Gas Emissions and Removals](#)

[ISO 14064–2 Part 2: Specification with Guidance at the Project Level for Quantification, Monitoring and Reporting of Greenhouse Gas Emission Reductions or Removal Enhancements](#)

[ISO 14064–3 Part 3: Specification with Guidance for the Validation and Verification of Greenhouse Gas Assertions](#)

[ISO 14065 Greenhouse Gases—Requirements for Greenhouse Gas Validation and Verification Bodies for Use in Accreditation or Other Forms of Recognition \(ISO 14065:2013 \(E\)\)](#)

2.3 Voluntary Registries:

[California Air Action Registry](#)

[The Climate Registry \(TCR\) – A non-profit corporation and collaboration of states, provinces and tribes in North America. The TRC established a voluntary infrastructure for measuring and reporting greenhouse gas emissions. Its goal is the accurate, transparent and consistent measurement for GHGs.](#)

2.4 Regional Initiatives:

[Midwest Greenhouse Gas Accord](#)

[Regional Greenhouse Gas Initiative](#)

[Western Climate Initiative](#)

2.5 National Initiatives:

[American Clean Energy and Security Act of 2009 \(by Congressmen Waxman and Markey\)](#)

[America’s Climate Security Act of 2007 \(by Senators Lieberman and Warner\)](#)

NOTE 2—These bills were not enacted.

2.6 Government References:

[Congressional Budget Office, 2008, Policy Options for Reducing CO₂ emissions](#)

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard’s Document Summary page on the ASTM website.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.

⁴ Products of ISO/TC 207 for which ASTM E50 was a participant on behalf of ANSI.

National Science and Technology Council, Committee on Environment and Natural Resources, 2008, *Scientific Assessment of the Effect of Global Change on the United States*

United States Climate Change Science Program

US General Accountability Office (GAO) 2011, *Climate Change Issues; Options for Addressing Challenging Carbon Offset Quality*

US General Accountability Office (GAO) 2010, *Coal Power Plants: Opportunities Exist for DOE to Provide Better Information on Maturity of Key Technologies to Reduce Carbon Dioxide Emissions*

National Academy of Sciences, (NAS) 2008, *Understanding and Responding to Climate Change*

National Academy of Sciences (NAS) 2013, *Effects of US Tax Policy on Greenhouse Gas Emissions*

NOTE 3—Links to some references are provided in [Appendix X3](#).

2.7 *Federal Standard*.⁵

40 CFR 60 Subpart OOOO Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution

2.8 *WRI Document*.⁶

WRI Greenhouse Gas Protocol, Scope 1, 2, and 3

3. Terminology

3.1 Definitions:

3.1.1 *allowance*—An authorization to emit a fixed amount of carbon dioxide. Generally one metric ton of emissions equals one allowance.

3.1.2 *baseline/credit*—A type of emissions trading scheme where firms are encouraged to reduce their greenhouse gas emissions below a projected “business as usual” path of increasing emissions. Any reductions below that future path earns credits for the difference which can be sold to other emitters struggling to contain increases to baseline levels.

3.1.3 *business risk*—The likelihood that the operation could be subjected to future government regulations, industry standards, customer demand or shareholder decisions requiring measurement, disclosures, actions and/or planning to document and reduce greenhouse gases.

3.1.4 *cap and trade*—The most popular type of emissions trading scheme where emissions are subject to a cap, permits are issued up to that cap, and a market allows those emitting less than their quota of the cap to sell their excess permits to emitters needing to buy extra to meet their quota.

3.1.5 *carbon dioxide equivalent (CO₂e)* —Schemes that measure other greenhouse gas emissions, such as methane, by computing the amount of CO₂ that would have the same effects.

3.1.6 *carbon footprint*—The impact of human activities in terms of the amount of greenhouse gases they produce. The

⁵ Available from U.S. Government Printing Office, Superintendent of Documents, 732 N. Capitol St., NW, Washington, DC 20401-0001, <http://www.access.gpo.gov>.

⁶ Available from World Resources Institute (WRI), 10 G Street, NE, Suite 800, Washington, DC 20002, <http://www.wri.org>.

emissions associated with the use of power, transport, food and other consumption for an individual, family or organization are added up to give one comparable measure in units of carbon dioxide equivalent.

3.1.7 *carbon tax*—One form of carbon price on greenhouse gas emissions. Set by governments, a price on emissions is fixed and emitters are allowed to emit whatever they want at that price.

3.1.8 *The Climate Registry*—A compact of 43 States, Provinces, and Tribes in the U. S., Canada, and Mexico that have agreed to recognize voluntary carbon measurements and improvements by facilities.

3.1.9 *direct greenhouse gas emission*—Air discharges from sources owned or controlled by the individual or organization.

3.1.10 *emission or removal factor*—Relating activity data to GHG discharge reductions which could include an oxidation component.

3.1.11 *energy conservation*—Performing less work, using less light, heat, and movement.

3.1.12 *energy efficiency*—Performing the same amount of work, using less light, heat, and movement.

3.1.13 *energy indirect greenhouse gas emission*—Discharges to the air from the generation of imported electricity, heat, or steam consumed by the individual or organization.

3.1.14 *Energy Star*—Appliance efficiency rating program for the U. S. Federal Government.

3.1.15 *financial statements*—Include, but are not limited to, statements associated with shareholder reporting, periodic reports, registration statements, loans, mergers, acquisitions, or divestures. Financial statements may include statements outside of SEC filings.

3.1.16 *green buildings*—As defined in Terminology [E2114](#) and Guide [E2432](#).

3.1.17 *greenhouse gases (GHGs)*—Vaporous constituents of the earth’s atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths, including carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

3.1.18 *greenhouse gas activity data*—A quantitative measure of activity that results in an emission or removal. (Examples of activity data include the amount of energy, fuels or electricity consumed, material produced, service provided, or area of land affected.)

3.1.19 *greenhouse gas assertion*—A declaration or factual and objective statement made by the “responsible party” that may be presented at a point of time or may cover a period of time. It should be clear, identifiable, and consistent.

3.1.20 *greenhouse gas emission*—The total mass of a GHG released to the atmosphere over a specified period of time.

3.1.21 *greenhouse gas information system*—The policies, processes and procedures to establish, manage, and maintain GHG information.