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Tracking Emissions Using Oracle
Environmental Accounting and Reporting
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Overview</td>
<td>1</td>
</tr>
<tr>
<td>Global Emissions Reporting Requirements</td>
<td>2</td>
</tr>
<tr>
<td>United States Emissions Reporting</td>
<td>2</td>
</tr>
<tr>
<td>European Union Emissions Reporting</td>
<td>2</td>
</tr>
<tr>
<td>Australia Emissions Reporting</td>
<td>3</td>
</tr>
<tr>
<td>China Emissions Reporting</td>
<td>4</td>
</tr>
<tr>
<td>Scopes of Greenhouse Gas Emissions</td>
<td>4</td>
</tr>
<tr>
<td>Addressing Reporting Requirements Using Oracle Environmental Accounting and Reporting</td>
<td>5</td>
</tr>
<tr>
<td>Leverage Financial Systems to Achieve Compliance</td>
<td>6</td>
</tr>
<tr>
<td>Automate Environmental Data Collection</td>
<td>7</td>
</tr>
<tr>
<td>Calculate and Classify Greenhouse Gas Emissions</td>
<td>7</td>
</tr>
<tr>
<td>Comply with Mandatory and Voluntary Schemes for Greenhouse Gas Reporting</td>
<td>7</td>
</tr>
<tr>
<td>Identify and Drive Opportunities for CO2 Emission, Waste, and Energy Reductions</td>
<td>8</td>
</tr>
<tr>
<td>Oracle Risk and Performance Management Solutions</td>
<td>8</td>
</tr>
<tr>
<td>Oracle Sustainability Solutions for the Eco-Enterprise</td>
<td>9</td>
</tr>
<tr>
<td>Learn More</td>
<td>10</td>
</tr>
</tbody>
</table>
Executive Overview

Organizations around the world are faced with a complex set of emissions reporting requirements. Driven by country-specific regulatory mandates as well as stakeholder requests for voluntary reporting, companies are under mounting pressure to provide energy usage and emissions data reporting. Measuring environmental performance and setting targets are critical steps toward becoming more productive, more profitable, and more sustainable. Monitoring key metrics such as energy, waste, and water usage leads to reductions in greenhouse gas emissions as well as operational efficiency improvements and cost savings. When armed with factual data, organizations can benchmark and affect behavioral change to significantly reduce environmental impacts.

Many organizations are looking to Oracle Applications to help them measure and report on the environmental performance of their organization. Oracle Environmental Accounting and Reporting extends the capabilities of Oracle E-Business Suite and Oracle’s JD Edwards EnterpriseOne applications, enabling organizations to

- Track greenhouse gas emissions and other environmental data against reduction targets
- Obtain accurate, repeatable, and verifiable methodologies for greenhouse gas emissions calculation in accordance with global standards
- Report against both voluntary and legislated emissions reporting standards

This white paper describes some of the emission types included in various global reporting requirements around the globe and how Oracle Environmental Accounting and Reporting helps organizations capture and report the data associated with these emissions. Oracle Environmental Accounting and Reporting has been configured to the international standards outlined by the World Resources Institute and the World Business Council for Sustainable Development.
Global Emissions Reporting Requirements

Across the globe organizations face an increasing amount of legislation designed to measure and to reduce the impact of their operations on the environment. The demand—both internally and externally—to provide sustainability data that is more comprehensive, more accurate, and timelier continues to grow. Studying the regional, national, and state-level legislation on climate change should leave no doubt that policymakers in all countries are committed to carbon regulation.

United States Emissions Reporting

In 2009, the U.S. Environmental Protection agency (EPA) issued the Mandatory Reporting of Greenhouse Gases Rule,1 which requires reporting of greenhouse gas (GHG) data and other relevant information from large sources and suppliers in the United States. The purpose of the rule is to collect accurate and timely GHG data to inform future policy decisions. Facilities that emit 25,000 metric tons or more per year of GHGs are required to submit annual reports to EPA starting September 30, 2011. A variety of U.S. state-level legislation also requires organizations to calculate and report carbon emissions.

In California, The Global Warming Solutions Act of 2006, or Assembly Bill (AB) 32, established a comprehensive program to reduce greenhouse gas emissions from all sources throughout the state. In December 2010 the California Air Resources Board adopted a cap-and-trade program to place an upper limit on statewide greenhouse gas emissions. This is the first program of its kind in the United States. The program will take effect in 2012, and it will place a limit on emissions that will be reduced by 2 percent each year through 2015 and 3 percent each year from 2015 to 2020. The rules apply first to utilities and large industrial plants, and in 2015 will begin to be applied to fuel distributors as well, eventually totaling 360 businesses at 600 locations throughout the State of California. Free credits will be given to businesses to account for about 90 percent of overall emissions in their sector, but they must buy allowances, or credits, to account for additional emissions. Offsets—such as the planting of trees that absorb greenhouse gases—can also help account for up to 8 percent of emissions.

European Union Emissions Reporting

The European Union Emissions Trading System (EU ETS) is the largest multinational emissions trading system in the world. It was launched in 2005 and is a major pillar of EU climate policy.2 The EU ETS currently includes more than 10,000 installations with a net heat excess of 20 megawatts (MW) in the energy and industrial sectors, which are collectively responsible for nearly half of the EU’s emissions.

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1 http://epa.gov/climatechange/emissions/ghgrulemaking.html
2 http://www.environment-agency.gov.uk/business/topics/pollution/32232.aspx
CO2 emissions and 40 percent of its total greenhouse gas emissions. Under the EU ETS, large emitters of carbon dioxide within the EU must monitor and annually report their CO2 emissions, and are obliged every year to return an amount of emission allowances to the government that is equivalent to their CO2 emissions in that year. If a company reduces its emissions, it can keep the spare allowances to cover its future needs or sell them to another company that is short of allowances. The flexibility of trading ensures that emissions are cut where it costs least to do so. The number of allowances is reduced over time so that total emissions fall. In 2020 emissions will be 21 percent lower than in 2005. The system currently has two operating phases. Phase II runs from January 1, 2008 to December 31, 2012, and includes revised monitoring and reporting rules, more-stringent emissions caps, and additional combustion sources. Phase III will run from January 1, 2013 to December 31, 2020, and it will entail major changes including harmonized allocation methodologies and additional greenhouse gases and emission sources.

In 2009, the United Kingdom (U.K.) issued the CRC Energy Efficiency Scheme (2010CRC), a mandatory scheme to improve energy efficiency and cut CO2 emissions in large public and private sector organizations. These organizations are responsible for approximately 10 percent of the U.K.'s CO2 emissions. The scheme is designed to tackle CO2 emissions not already covered by the EU Emissions Trading System. In 2010, organizations that consumed more than 6,000 megawatt hours (MWh) per year of half-hourly metered electricity qualified for full participation and had to register with the Environment Agency, which is the administrator of the scheme. April 2011 to March 2012 is the first full compliance year during which participating organizations purchase allowances to offset emissions. Qualifying organizations must comply with the scheme or face financial and other penalties.

**Australia Emissions Reporting**

In Australia, the Australian Department of Climate Change issued The National Greenhouse and Energy Reporting Act 2007 (The Act). The Act makes registration and emissions reporting mandatory for corporations whose energy production, energy use, or greenhouse gas emissions meet specific thresholds. From July 1, 2008, all controlling corporations were required register with the Greenhouse and Energy Data Officer if their corporate group emitted greenhouse gases or produced or consumed energy at or above the specified thresholds for a financial reporting year. Corporations had to be aware of and report the thresholds in The Act for both their facilities and their corporate groups. Currently for a facility the threshold is 100TJ (terajoules) of energy consumed or 25kt (kiloton) of greenhouse gases emitted, and for a corporation the threshold is 500TJ of energy consumed or 125kt of greenhouse gases emitted.

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3 [http://www.ukcrc.co.uk/crc/carbon-reduction-scheme.htm](http://www.ukcrc.co.uk/crc/carbon-reduction-scheme.htm)
China's latest five-year plan includes a 17 percent cut to carbon emissions per unit of gross domestic product (GDP), and a 16 percent reduction in energy consumption by 2015 as the country looks to meet its international pledge to reduce carbon intensity by 40 to 45 percent from 2005 levels by 2020. Though the government has not yet released official notices on these initiatives, it is possible to gauge the general policy direction by examining several recent proposals from government agencies and think tanks. The three agencies that lead the formulation of China’s environmental tax policy—the Ministry of Environmental Protection (MEP), Ministry of Finance, and State Administration of Taxation—in December 2010 submitted to the State Council a joint environmental tax policy proposal, according to media reports. Under the proposed policy, the government would impose a tax of RMB 2 ($0.31) per kilogram of sulfur dioxide or solid waste; RMB 1 ($0.15) per ton of wastewater; and RMB 10 ($1.53) per ton of carbon dioxide. Authorities would calibrate taxes based on a company’s actual emission volume or machinery production capacities if emission volume is difficult to quantify. In the short term, organizations may not experience significant financial impacts because the government will likely implement these policies slowly, beginning with lower tax rates. In the long term however, organizations that emit sulfur and carbon dioxide may face higher cost burdens as the government implements new market-based mechanisms to reduce environmental pollution.

Scopes of Greenhouse Gas Emissions

It is clear that environmental protection is growing in importance on the political agenda of countries across the globe. To put these policies in context, it is important to better understand how greenhouse gas emissions are segmented. Specifically, greenhouse gas emissions fall into three scopes (see Figure 1).

- Scope 1 emissions are produced by activities at or attributed to a facility (such as an industrial process) or by transport activities that are attributed to that facility (such as the production of electricity)
- Scope 2 emissions are defined as the consumption of electricity that has not been produced at the place of consumption (such as the consumption of electricity by a large commercial property)
- Scope 3 emissions occur outside the boundary of a facility and are a result of day-to-day operations that occur across the wider economy and are not scope 2 emissions

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Addressing Reporting Requirements Using Oracle Environmental Accounting and Reporting

As organizations face increasing legislation regarding the way they manage their businesses and the impact of their operations on the environment, they must address the principles of greenhouse gas and energy reporting (see Table 1). Unfortunately most organizations currently have multiple fragmented systems; manual, error-prone processes; and a lack of actionable business data to address these principles.

**TABLE 1. PRINCIPLES OF GREENHOUSE GAS AND ENERGY REPORTING**

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<thead>
<tr>
<th>PRINCIPLE</th>
<th>DEFINITION</th>
<th>ORACLE ENVIRONMENTAL ACCOUNTING AND REPORTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transparent</td>
<td>Emission estimates must be documented and verified</td>
<td>Each transaction, no matter what its source, is fully captured and auditable.</td>
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<td>Comparable</td>
<td>Emissions must be comparable to emission results from similar corporations in the same industry sector</td>
<td>The solution follows the Greenhouse Gas Protocol standard.</td>
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<td>Accurate</td>
<td>Emission estimates must be accurate to a 95 percent confidence level</td>
<td>The solution uses invoice data and default emission factors as well as standard JD Edwards and Oracle E-Business Suite functionality to ensure the data goes to the right place every time.</td>
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<td>Complete</td>
<td>All identified emissions must be</td>
<td>The solution ensures that an invoice cannot be processed</td>
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</tbody>
</table>
Oracle Environmental Accounting and Reporting enables organizations to capture, transform, and report emissions so they can provide estimates that are transparent, comparable, accurate, and complete. The application helps reduce environmental data management costs, ensures data completeness, avoids manual errors, and provides flexible and scalable data collection mechanisms. In addition to increasing data collection efficiency and reliability, Oracle Environmental Accounting and Reporting provides a single source of truth that facilitates global greenhouse gas regulatory compliance and improves environmental and financial performance.

Oracle Environmental Accounting and Reporting enables organizations to track their greenhouse gas emissions and other environmental data against reduction targets, and facilitates environmental reporting for both voluntary and legislated emissions reporting schemes. The solution works from within an organization’s existing enterprise resource planning (ERP) system and utilizes Oracle’s business intelligence solutions to provide immediate insight into an organization’s environmental data to identify and manage CO2 and cost reduction opportunities—providing rapid ROI.

Leverage Financial Systems to Achieve Compliance

Oracle Environmental Accounting and Reporting enables organizations to capture environmental data either electronically or manually, convert it to greenhouse gas emissions data, comply with mandatory and voluntary greenhouse gas reporting schemes, and identify opportunities for CO2 emission and cost reductions. As an add-on module to Oracle Financials and JD Edwards Financials—both of which seamlessly integrate with existing accounts payable business flows—Oracle Environmental Accounting and Reporting delivers these capabilities without the duplication or double handling of transactions and data, which is intrinsic in other approaches.

Oracle Environmental Accounting and Reporting allows businesses to capture and report their greenhouse gas emissions data by tracking invoices in their financial systems. Monitoring data at the invoicing level enables usage estimates to be measured at the corporate group level and broken down into the component facilities. By tracking usage according to invoices, organizations can incorporate historical information to monitor usage trends. For example, The Australian Department of Climate Change does not require organizations using invoice-based estimates to prepare uncertainty estimates because the invoicing method is deemed highly reliable.

The application captures usage data at purchase order entry and verifies the information during accounts payable processing. This data is then transformed using company-specific emission factors (or default emission factors from publicly available emissions factors) into a volume of carbon dioxide emissions at the corporate, facility, and subfacility level. These calculations are integrated into business
intelligence reports that can be viewed in executive and operational dashboards to monitor and respond to usage changes.

Using these metrics and reporting tools, organizations can reduce forecasting costs, set and track reduction targets, and develop long-term usage trends to create accurate, reliable emission estimates. Furthermore, because the information is part of the financial system, it is auditable and secure. As a result, Oracle Environmental Accounting and Reporting enables organizations to efficiently and effectively manage their carbon footprint while achieving regulatory compliance.

Automate Environmental Data Collection

Oracle Environmental Accounting and Reporting extends the invoice, purchasing, and inventory processes to enable the capture of the necessary data, automatically matching it with the associated transactions. This data can be augmented with additional information from smart meters, fleet management systems, or from any other sources that capture the transactions, including spreadsheets. This approach presents users with a familiar and consistent experience while ensuring data security, accuracy, and consistency. The solution supports all the organizational structures native to the ERP application, including separate facilities, combined facilities, organizational legal structures, and organizational management structures. Similarly the data can also be associated with a particular asset to enable more-detailed analysis of usage patterns.

Calculate and Classify Greenhouse Gas Emissions

Oracle Environmental Accounting and Reporting provides built-in mechanisms for calculating emissions and classifying them as scope 1, 2, or 3 using the Greenhouse Gas Protocol guidelines published by the World Resources Institute, the most widely adopted methodology for calculating greenhouse gas emissions.

Emission transformation factors are stored and can readily be updated over time with date effectiveness to manage the change of emission factors and for recalculation purposes. When the transactions are entered, the system automatically determines what additional data needs to be captured to perform the emissions calculations and associates the transaction with the appropriate default emission factor. If a more accurate emission factor is available for a specific transaction, the end user can override the default as needed.

Comply with Mandatory and Voluntary Schemes for Greenhouse Gas Reporting

Organizations need to accurately communicate greenhouse gas emissions and other environmental impacts to constituents including regulators, customers, shareholders, and employees. Regional regulatory mandates such as the Carbon Reduction Commitment (CRC) in the United Kingdom and Australia’s National Greenhouse and Energy Reporting (NGER) Act require accurate and transparent greenhouse gas reporting.

Information voluntarily disclosed to organizations such as the Carbon Disclosure Project (CDP) also needs to be provided with a high degree of accuracy in order to protect an organization’s credibility.
and brand. Many organizations are realizing that manual spreadsheet-based processes lack the necessary efficiency, security, and reliability.

Identify and Drive Opportunities for CO2 Emission, Waste, and Energy Reductions

Measuring performance and setting targets are important ways for organizations to become more productive, profitable, and sustainable. Monitoring key metrics such as energy, waste, and water lead to greenhouse gas emission reductions, and generally go hand-in-hand with operational efficiency improvements and cost savings. When armed with factual data organizations can benchmark and affect behavioral change to reduce environmental impacts.

Oracle Business Intelligence Enterprise Edition dashboards can quickly and dynamically generate reports that provide emission summaries and trends—including for the Carbon Disclosure Project. Users can drill down into additional levels of detail and perform ad hoc analyses to investigate specific data trends and anomalies—rapidly identifying issues and opportunities alike.

Oracle Environmental Accounting and Reporting enables organizations to establish a baseline of greenhouse gas emissions, energy usage, and other key environmental indicators, as well as set reduction targets. Graphical indicators illustrate whether an organization is performing above, below, or inline with the targets so that corrective actions can be taken as needed to successfully execute on sustainability initiatives. The data also serves as the basis for forecasting and planning.

Product Requirements

Oracle Environmental Accounting and Reporting is available for Oracle E-Business Suite 12.1. It was developed using the native technology of Oracle E-Business Suite, and is backed by a common business analytics layer developed in Oracle Business Intelligence Enterprise Edition Plus, which is a required technology component.

For user of JD Edwards, Oracle Environmental Accounting and Reporting is available for JD Edwards EnterpriseOne 9.0. It also was developed using the native technology of JD Edwards EnterpriseOne, and likewise is backed by a common business analytics layer developed in Oracle Business Intelligence Enterprise Edition, which is a required technology component.

Oracle Risk and Performance Management Solutions

In addition to Oracle Environmental Accounting and Reporting, Oracle provides a broad set of solutions that support the environmental and sustainability initiatives of our customers. Well-designed and implemented risk and enterprise performance management solutions help organizations set environmental and sustainability goals, build them into their operating plans, and track and report progress on a regular basis. Oracle Applications leverage resources to maximize profits and stakeholder value, and achieve more-sustainable success. Oracle provides a comprehensive set of products for

- Sustainability analytics—In addition to Oracle Environmental Accounting and Reporting, Oracle Manufacturing Operations Center's Sustainability Sensor Data Management feature leverages
Oracle's business intelligence platform to provide data from meters, sensors, and other data sources, contextualized in the operations of the organization. The Sustainability Sensor Data Management feature includes innovative core capabilities to monitor energy usage, reduce waste, and reach Greenhouse Gas emission reduction goals.

- Sustainability reporting—These solutions provide regulators, customers, partners, employees, and other stakeholders with information regarding the environmental, social, and economic impact an organization has on its surrounding environment. Collecting and reporting this information can yield cost savings by limiting waste and consumption of natural resources, enhance brand value and reputation with customers and partners, and help attract better staff by offering a great place to work. Oracle Hyperion Financial Management can collect, consolidate, and prepare reports following guidelines such as those presented by the Global Reporting Initiative (GRI) in an efficient, reliable, and accurate manner. Oracle's business intelligence solutions deliver sustainability metrics to internal and external stakeholders via interactive reports and dashboards that provide quick insights into key trends.

- Environmental planning—As a centralized, Excel- and Web-based planning, budgeting, and forecasting solution, Oracle Hyperion Planning integrates financial and operational planning processes to improve business predictability, align the organization, and ensure accuracy.

- Predictive modeling and forecasting—Oracle Crystal Ball solutions provide unparalleled insight into the critical factors affecting risk. With Oracle Crystal Ball, organizations can make the right strategic decisions to reach their objectives and gain a competitive edge under even the most uncertain market conditions.

- Environmental risk and compliance management—Oracle's governance, risk, and compliance solutions help organizations improve their environmental compliance by formalizing the process around sustainability-related initiatives, establishing targets for improving compliance performance, and measuring progress against these targets.

Oracle Sustainability Solutions for the Eco-Enterprise

With these risk and performance management solutions, Oracle embeds environmental data acquisition and reporting into the mainstream of business operations and associated IT infrastructure. In addition to products that focus on an organization’s risk and performance management, Oracle also provides sustainability solutions that help a company manage its IT infrastructure and operations from an environmental and cost perspective (see Figure 2). Successful sustainability initiatives need to be coordinated throughout an entire organization, not just one department. Oracle provides sustainability solutions that are integrated with core business activities across the value chain. Oracle's sustainability solutions have an unmatched breadth and depth of capabilities, and Oracle is continuing to invest and to innovate. As both a global high-technology manufacturer as well as the world's leading business software vendor, Oracle is uniquely positioned to deliver these solutions. Oracle's sustainability solutions leverage the power of hardware and software that is engineered to work together to integrate sustainability initiatives across the organization.
Figure 2. Oracle offers a comprehensive set of applications to transform organizations into sustainable enterprises.

Learn More

Learn more about Oracle’s sustainability solutions at oracle.com/green