



SUSTAINABILITY ACCOUNTING STANDARD  
RENEWABLE RESOURCES & ALTERNATIVE ENERGY SECTOR

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# FUEL CELLS & INDUSTRIAL BATTERIES

## Sustainability Accounting Standard

Sustainable Industry Classification System™ (SICS™) #RR0104

Prepared by the  
Sustainability Accounting Standards Board®

December 2015  
Provisional Standard

# FUEL CELLS & INDUSTRIAL BATTERIES

## Sustainability Accounting Standard

### About SASB

The Sustainability Accounting Standards Board (SASB) provides sustainability accounting standards for use by publicly-listed corporations in the U.S. in disclosing material sustainability information for the benefit of investors and the public. SASB standards are designed for disclosure in mandatory filings to the Securities and Exchange Commission (SEC), such as the Form 10-K and 20-F. SASB is an independent 501(c)3 non-profit organization. Through 2016, SASB is developing standards for 79 industries in 10 sectors.

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## INTRODUCTION

### Purpose & Structure

This document contains the SASB Sustainability Accounting Standard (SASB Standard) for the Fuel Cells & Industrial Batteries industry.

SASB Sustainability Accounting Standards are comprised of **(1) disclosure guidance and (2) accounting standards on sustainability topics** for use by U.S. and foreign public companies in their annual filings (Form 10-K or 20-F) with the U.S. Securities and Exchange Commission (SEC). To the extent relevant, SASB Standards may also be applicable to other periodic mandatory filings with the SEC, such as the Form 10-Q, Form S-1, and Form 8-K.

SASB Standards identify sustainability topics at an industry level, which may constitute material information—depending on a company’s specific operating context—for a company within that industry. SASB Standards are intended to provide guidance to company management, which is ultimately responsible for determining which information is material and should therefore be included in its Form 10-K or 20-F and other periodic SEC filings.

SASB Standards provide companies with standardized sustainability metrics designed to communicate performance on industry level sustainability topics. When making disclosure on sustainability topics, companies can use SASB Standards to help ensure that disclosure is standardized and therefore decision-useful, relevant, comparable, and complete.

SASB Standards are intended to constitute “suitable criteria” as defined by AT 101.23-.32<sup>1</sup> and referenced in AT 701<sup>2</sup>, as having the following attributes:

- *Objectivity*—Criteria should be free from bias.
- *Measurability*—Criteria should permit reasonably consistent measurements, qualitative or quantitative, of subject matter.
- *Completeness*—Criteria should be sufficiently complete so that those relevant factors that would alter a conclusion about subject matter are not omitted.
- *Relevance*—Criteria should be relevant to the subject matter.

### Industry Description

The Fuel Cells & Industrial Batteries industry consists of companies that manufacture fuel cells for energy production and energy storage equipment, such as batteries for primarily industrial or utility-scale purposes. Manufacturers in this industry mainly sell business-to-business products to companies for varied energy generation and storage applications and intensities, from commercial business applications to large-scale energy projects for

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<sup>1</sup> [http://pcaobus.org/Standards/Attestation/Pages/AT101.aspx#at\\_101\\_fn7](http://pcaobus.org/Standards/Attestation/Pages/AT101.aspx#at_101_fn7)

<sup>2</sup> <http://pcaobus.org/Standards/Attestation/Pages/AT701.aspx>

utilities. Companies listed on U.S. exchanges or traded over the counter are primarily headquartered in the U.S. (though some are domiciled in France and China) but have global operations and sell products to a global marketplace.

Note: For the purposes of SASB standards, this industry does not include fuel cells or batteries used in light automotive vehicle applications. See SASB Standards for the Auto Parts industry (TR0102) for details on reporting this business segment. This industry also does not include non-industrial batteries for personal consumer use, which are classified under the Household & Personal Products industry (CN0602).

## Guidance for Disclosure of Sustainability Topics in SEC Filings

### 1. Industry-Level Sustainability Topics

For the Fuel Cells & Industrial Batteries industry, SASB has identified the following sustainability disclosure topics:

- Energy Management
- Workforce Health & Safety
- Product Efficiency
- Product End-of-life Management
- Materials Sourcing

### 2. Company-Level Determination and Disclosure of Material Sustainability Topics

Sustainability disclosures are governed by the same laws and regulations that govern disclosures by securities issuers generally. According to the U.S. Supreme Court, a fact is material if, in the event such fact is omitted from a particular disclosure, there is “a substantial likelihood that the disclosure of the omitted fact would have been viewed by the reasonable investor as having significantly altered the ‘total mix’ of the information made available.”<sup>3,4</sup>

SASB has attempted to identify those sustainability topics that are reasonably likely to have a material effect on the financial condition or operating performance of companies within each SICs industry. SASB recognizes, however, that each company is ultimately responsible for determining what information should be disclosed within the context of Regulation S-K and other guidance.

Regulation S-K, which sets forth certain disclosure requirements associated with Form 10-K and other SEC filings, requires companies, among other things, to describe in the Management’s Discussion and Analysis of Financial Condition and Results of Operations (MD&A) section of Form 10-K “any known trends or uncertainties that have had or that the registrant reasonably expects will have a material favorable or unfavorable impact on net sales or revenues or income from continuing operations. If the registrant knows of events that will cause a material change in the relationship between costs and revenues (such as known future increases in costs of labor or materials or price increases or inventory adjustments), the change in the relationship shall be disclosed.”

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<sup>3</sup> TSC Industries v. Northway, Inc., 426 U.S. 438 (1976).

<sup>4</sup> C.F.R. 229.303(item 303)(a)(3)(ii).

Furthermore, Instructions to Item 303 state that the MD&A “shall focus specifically on material events and uncertainties known to management that would cause reported financial information not to be necessarily indicative of future operating results or of future financial condition.”<sup>2</sup>

The SEC has provided guidance for companies to use in determining whether a trend or uncertainty should be disclosed. The two-part assessment prescribed by the SEC, based on probability and magnitude, can be applied to the topics included within this standard:

- First, a company is not required to make disclosure about a known trend or uncertainty if its management determines that such trend or uncertainty is not reasonably likely to occur.
- Second, if a company’s management cannot make a reasonable determination of the likelihood of an event or uncertainty, then disclosure is required unless management determines that a material effect on the registrant’s financial condition or results of operation is not reasonably likely to occur.

### 3. Sustainability Accounting Standard Disclosures in Form 10-K

#### a. Management’s Discussion and Analysis

For purposes of comparability and usability, companies should consider making disclosure on sustainability topics in the MD&A, in a sub-section titled “**Sustainability Accounting Standards Disclosures**.”<sup>5</sup>

#### b. Other Relevant Sections of Form 10-K

In addition to the MD&A section, it may be relevant for companies to disclose sustainability information in other sections of Form 10-K, including, but not limited to:

- **Description of business**—Item 101 of Regulation S-K requires a company to provide a description of its business and its subsidiaries. Item 101(c)(1)(xii) expressly requires disclosure regarding certain costs of complying with environmental laws:

Appropriate disclosure also shall be made as to the material effects that compliance with Federal, State and local provisions which have been enacted or adopted regulating the discharge of materials into the environment, or otherwise relating to the protection of the environment, may have upon the capital expenditures, earnings and competitive position of the registrant and its subsidiaries.

- **Legal proceedings**—Item 103 of Regulation S-K requires companies to describe briefly any material pending or contemplated legal proceedings. Instructions to Item 103 provide specific disclosure requirements for administrative or judicial proceedings arising from laws and regulations that target discharge of materials into the environment or that are primarily for the purpose of protecting the environment.

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<sup>5</sup> [SEC \[Release Nos. 33-8056; 34-45321; FR-61\] Commission Statement about Management’s Discussion and Analysis of Financial Condition and Results of Operations](#): “We also want to remind registrants that disclosure must be both useful and understandable. That is, management should provide the most relevant information and provide it using language and formats that investors can be expected to understand. Registrants should be aware also that investors will often find information relating to a particular matter more meaningful if it is disclosed in a single location, rather than presented in a fragmented manner throughout the filing.”

- **Risk factors**—Item 503(c) of Regulation S-K requires filing companies to provide a discussion of the most significant factors that make an investment in the registrant speculative or risky, clearly stating the risk and specifying how a particular risk affects the particular filing company.

**c. Rule 12b-20**

Securities Act Rule 408 and Exchange Act Rule 12b-20 require a registrant to disclose, in addition to the information expressly required by law or regulation, “such further material information, if any, as may be necessary to make the required statements, in light of the circumstances under which they are made, not misleading.”

More detailed guidance on disclosure of material sustainability topics can be found in the **SASB Conceptual Framework**, available for download via <http://www.sasb.org/approach/conceptual-framework/>.

## Guidance on Accounting for Sustainability Topics

For each sustainability topic included in the Fuel Cells & Industrial Batteries industry Sustainability Accounting Standard, SASB identifies accounting metrics.

SASB recommends that each company consider using these sustainability accounting metrics when preparing disclosures on the sustainability topics identified herein.

As appropriate—and consistent with Rule 12b-20<sup>6</sup>—when disclosing a sustainability topic identified by this Standard, companies should consider including a narrative description of any material factors necessary to ensure completeness, accuracy, and comparability of the data reported. Where not addressed by the specific accounting metrics, but relevant, the registrant should discuss the following, related to the topic:

- The registrant’s **strategic approach** to managing performance on material sustainability issues;
- The registrant’s **relative performance** with respect to its peers;
- The **degree of control** the registrant has;
- Any measures the registrant has undertaken or plans to undertake to improve performance; and
- Data for the registrant’s **last three completed fiscal years** (when available).

SASB recommends that registrants use SASB Standards specific to their primary industry as identified in the [Sustainable Industry Classification System \(SICSTM\)](#). If a registrant generates significant revenue from multiple industries, SASB recommends that it also consider sustainability topics that SASB has identified for those industries and disclose the associated SASB accounting metrics.

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<sup>6</sup> SEC Rule 12b-20: “In addition to the information expressly required to be included in a statement or report, there shall be added such further material information, if any, as may be necessary to make the required statements, in the light of the circumstances under which they are made, not misleading.”

In disclosing to SASB Standards, it is expected that registrants disclose with the same level of rigor, accuracy, and responsibility as they apply to all other information contained in their SEC filings.

## Users of the SASB Standards

The SASB Standards are intended to provide guidance for companies that engage in public offerings of securities registered under the Securities Act of 1933 (the Securities Act) and those that issue securities registered under the Securities Exchange Act of 1934 (the Exchange Act),<sup>7</sup> for use in SEC filings, including, without limitation, annual reports on Form 10-K (Form 20-F for foreign issuers), quarterly reports on Form 10-Q, current reports on Form 8-K, and registration statements on Forms S-1 and S-3. Disclosure with respect to the SASB Standards is not required or endorsed by the SEC or other entities governing financial reporting, such as FASB, GASB, or IASB.

## Scope of Disclosure

Unless otherwise specified, SASB recommends:

- That a registrant disclose on sustainability issues and metrics for itself and for entities that are consolidated for financial reporting purposes as defined by accounting principles generally accepted in the United States for consistency with other accompanying information within SEC filings;<sup>8</sup>
- That for consolidated entities, disclosures be made, and accounting metrics calculated, for the whole entity, regardless of the size of the minority interest; and
- That information from unconsolidated entities not be included in the computation of SASB accounting metrics. A registrant should disclose, however, information about unconsolidated entities to the extent that the registrant considers the information necessary for investors to understand the effect of sustainability topics on the company's financial condition or operating performance (typically, this disclosure would be limited to risks and opportunities associated with these entities).

## Reporting Format

### Use of Financial Data

In instances where accounting metrics, activity metrics, and technical protocols in this standard incorporate financial data (e.g., revenues, cost of sales, expenses recorded and disclosed for fines, etc.), such financial data shall be prepared in accordance with the accounting principles generally accepted in the United States of America ("US GAAP") and be consistent with the corresponding financial data reported within the registrant's SEC filings. Should accounting metrics, activity metrics and technical protocols in this standard incorporate disclosure of financial data

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<sup>7</sup> Registration under the Securities Exchange Act of 1934 is required (1) for securities to be listed on a national securities exchange such as the New York Stock Exchange, the NYSE Amex, and the NASDAQ Stock Market or (2) if (A) the securities are equity securities and are held by more than 2,000 persons (or 500 persons who are not accredited investors) and (B) the company has more than \$10 million in assets.

<sup>8</sup> See US GAAP consolidation rules (Section 810).



that is not prepared in accordance with US GAAP, the registrant shall disclose such information in accordance with the SEC Regulation G.

## Activity Metrics and Normalization

SASB recognizes that normalizing accounting metrics is important for the analysis of SASB disclosures.

SASB recommends that a registrant disclose any basic business data that may assist in the accurate evaluation and comparability of disclosure, to the extent that they are not already disclosed in the Form 10-K (e.g., revenue, EBITDA, etc.).

Such data—termed “activity metrics”—may include high-level business data such as total number of employees, quantity of products produced or services provided, number of facilities, or number of customers. It may also include industry-specific data such as plant capacity utilization (e.g., for specialty chemical companies), number of transactions (e.g., for Internet media and services companies), hospital bed days (e.g., for health care delivery companies), or proven and probable reserves (e.g., for oil and gas exploration and production companies).

Activity metrics disclosed should:

- Convey contextual information that would not otherwise be apparent from SASB accounting metrics.
- Be deemed generally useful for an investor relying on SASB accounting metrics in performing their own calculations and creating their own ratios.
- Be explained and consistently disclosed from period to period to the extent they continue to be relevant. However, a decision to make a voluntary disclosure in one period does not obligate a continuation of that disclosure if it is no longer relevant or if a better metric becomes available.<sup>9</sup>

Where relevant, SASB recommends specific activity metrics that—at a minimum—should accompany SASB accounting metric disclosures.

ACTIVITY METRIC	CATEGORY	UNIT OF MEASURE	CODE
Number of units sold	Quantitative	Number	RR0104-A
Total storage capacity of batteries sold	Quantitative	Megawatts (MW)	RR0104-B
Total energy production capacity of fuel cells sold	Quantitative	Megawatts (MW)	RR0104-C

## Units of Measure

Unless specified, disclosures should be reported in International System of Units (SI units).

<sup>9</sup> *Improving Business Reporting: Insights into Enhancing Voluntary Disclosures*, FASB Business Reporting Research Project, January 29, 2001.

## Uncertainty

SASB recognizes that there may be inherent uncertainty when disclosing certain sustainability data and information. This may be related to variables such as the reliance on data from third-party reporting systems and technologies, or the unpredictable nature of climate events. Where uncertainty around a particular disclosure exists, SASB recommends that the registrant should consider discussing its nature and likelihood.

## Estimates

SASB recognizes that scientifically based estimates, such as the reliance on certain conversion factors or the exclusion of *de minimis* values, may occur for certain quantitative disclosures. Where appropriate, SASB does not discourage the use of such estimates. When using an estimate for a particular disclosure, SASB expects that the registrant discuss its nature and substantiate its basis.

## Timing

Unless otherwise specified, disclosure shall be for the registrant's fiscal year.

## Limitations

There is no guarantee that SASB Standards address all sustainability impacts or opportunities associated with a sector, industry, or company, and therefore, a company must determine for itself the topics—sustainability-related or otherwise—that warrant discussion in its SEC filings.

Disclosure under SASB Standards is voluntary. It is not intended to replace any legal or regulatory requirements that may be applicable to user operations. Where such laws or regulations address legal or regulatory topics, disclosure under SASB Standards is not meant to supersede those requirements. Disclosure according to SASB Standards shall not be construed as demonstration of compliance with any law, regulation, or other requirement.

SASB Standards are intended to be aligned with the principles of materiality enforced by the SEC. However, SASB is not affiliated with or endorsed by the SEC or other entities governing financial reporting, such as FASB, GASB, or IASB.

## Forward-Looking Statements

Disclosures on sustainability topics can involve discussion of future trends and uncertainties related to the registrant's operations and financial condition, including those influenced by external variables (e.g., environmental, social, regulatory, and political). Companies making such disclosures should familiarize themselves with the safe harbor provisions of Section 27A of the Securities Act and Section 21E of the Exchange Act, which preclude civil liability for material misstatements or omissions in such statements if the registrant takes certain steps, including, among other things, identifying the disclosure as "forward-looking" and accompanying such disclosure with "meaningful cautionary statements identifying important factors that could cause actual results to differ materially from those in the forward-looking statements."

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The following sections contain the disclosure guidance associated with each accounting metric such as guidance on definitions, scope, accounting, compilation, and presentation.

The term “shall” is used throughout this document to indicate those elements that reflect requirements of the Standard. The terms “should” and “may” are used to indicate guidance, which, although not required, provides a recommended means of disclosure.

Table 1. Sustainability Disclosure Topics & Accounting Metrics

TOPIC	ACCOUNTING METRIC	CATEGORY	UNIT OF MEASURE	CODE
<b>Energy Management</b>	Total energy consumed, percentage grid electricity, percentage renewable	Quantitative	Gigajoules (GJ), Percentage (%)	RR0104-01
<b>Workforce Health &amp; Safety</b>	(1) Total recordable injury rate (TRIR) and (2) fatality rate	Quantitative	Rate	RR0104-02
	Discussion of efforts to assess, monitor, and reduce exposure of workforce to human health hazards	Discussion and Analysis	n/a	RR0104-03
<b>Product Efficiency</b>	Average storage capacity of batteries, by product application and technology type	Quantitative	Specific energy (Wh/kg)	RR0104-04
	Average energy efficiency of fuel cells as (1) electrical efficiency and (2) thermal efficiency, by product application and technology type	Quantitative	Percentage (%)	RR0104-05
	Average battery efficiency as coulombic efficiency, by product application and technology type	Quantitative	Percentage (%)	RR0104-06
	Average operating lifetime of fuel cells, by product application and technology type	Quantitative	Hours (h)	RR0104-07
	Average operating lifetime of batteries, by product application and technology type	Quantitative	Number of cycles	RR0104-08
<b>Product End-of-life Management</b>	Percentage of products sold that are recyclable or reusable	Quantitative	Percentage (%) by weight	RR0104-09
	Weight of end-of-life material recovered, percentage of recovered materials that are recycled	Quantitative	Metric tons (t), Percentage (%)	RR0104-10
	Discussion of approach to manage use, reclamation, and disposal of hazardous materials	Discussion and Analysis	n/a	RR0104-11
<b>Materials Sourcing</b>	Percentage of materials costs for items containing critical materials	Quantitative	Percentage (%)	RR0104-12
	Percentage of tungsten, tin, tantalum, and gold smelters within the supply chain that are verified conflict-free	Quantitative	Percentage (%)	RR0104-13
	Discussion of the management of risks associated with the use of critical materials and conflict minerals	Discussion and Analysis	n/a	RR0104-14

# Energy Management

## Description

Manufacturing and research and development (R&D) in the Fuel Cells & Industrial Batteries industry requires significant energy consumption to power cooling, ventilation, lighting, and product-testing systems. Purchased electricity can represent a major share of the energy sources used in the industry and can account for a notable proportion of the total cost of materials and value added. Various sustainability factors are contributing to an increase in the cost of conventional electricity while making alternative sources cost-competitive. These factors include greenhouse gas (GHG) emissions pricing, incentives for energy efficiency and renewable energy, and risks associated with nuclear energy and its increasingly limited license to operate. Energy efficiency efforts can have a significant positive impact on operational efficiency and profitability, especially given the fact that many companies operate on relatively low or negative margins. By improving the efficiency of the manufacturing process and exploring alternative energy sources, including using their own products to power their facilities, fuel cell and industrial battery companies can reduce both their indirect environmental impacts and their operating expenses. These reductions can improve profit margins and, in turn, can help improve the commercial viability of this industry's products.

## Accounting Metrics

### **RR0104-01. Total energy consumed, percentage grid electricity, percentage renewable**

.01 The registrant shall disclose total energy consumption from all sources as an aggregate figure in gigajoules or their multiples.

- The scope includes energy purchased from sources external to the organization or produced by the organization itself (self-generated).
- The scope includes only energy consumed by entities owned or controlled by the organization.
- The scope includes energy from all sources including direct fuel usage, purchased electricity, and heating, cooling, and steam energy.

.02 In calculating energy consumption from fuels and biofuels, the registrant shall use higher heating values (HHV), also known as gross calorific values (GCV), which are directly measured or taken from the Intergovernmental Panel on Climate Change (IPCC), the U.S. Department of Energy (DOE), or the U.S. Energy Information Administration (EIA).

.03 The registrant shall disclose purchased grid electricity consumption as a percentage of its total energy consumption.

.04 The registrant shall disclose renewable energy consumption as a percentage of its total energy consumption.

.05 The scope of renewable energy includes renewable fuel the registrant consumes and renewable energy the registrant directly produces, purchases through a renewable power purchase agreement (PPA) that explicitly

includes renewable energy certificates (RECs), or for which Green-e Energy Certified RECs are paired with grid electricity.

- For any renewable electricity generated on-site, any RECs must be retained (i.e., not sold) and retired on behalf of the registrant in order for the registrant to claim them as renewable energy.
- For renewable PPAs, the agreement must explicitly include and convey that RECs be retained and retired on behalf of the registrant in order for the registrant to claim them as renewable energy.
- The renewable portion of the electricity grid mix that is outside of the control or influence of the registrant is excluded from disclosure.<sup>10</sup>
- Renewable energy is defined as energy from sources that are replenished at a rate greater than or equal to their rate of depletion, consistent with the U.S. Environmental Protection Agency's (EPA) [definitions](#), such as geothermal, wind, solar, hydro, and biomass.

.06 For the purposes of this disclosure, the scope of renewable energy from hydro sources is limited to those that are certified by the Low Impact Hydropower Institute or are eligible for a state Renewable Portfolio Standard.

.07 For the purposes of this disclosure, the scope of renewable energy from biomass sources is limited to the following:

- Energy from biomass sources that meets at least one of the following criteria:
  - Certification to a third-party standard (e.g., Forest Stewardship Council, Sustainable Forest Initiative, Programme for the Endorsement of Forest Certification, or American Tree Farm System);
  - Classification as an "eligible renewable" according to the Green-e Energy National Standard Version 2.5 (2014); or
  - Eligibility for a state Renewable Portfolio Standard.

.08 The registrant shall apply conversion factors consistently for all data reported under this disclosure, such as the use of HHVs for fuel usage (including biofuels) and conversion of kWh to gigajoules (for energy data including electricity from solar or wind energy).

.09 The registrant may choose to disclose the amount of energy that it generates in excess of what it consumes and is net metered through an electric utility.

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<sup>10</sup> SASB recognizes that RECs reflect the environmental attributes of renewable energy that have been introduced to the grid.

# Workforce Health & Safety

## Description

Fuel cell and industrial battery manufacturing workers may be exposed to hazardous substances or workplace accidents that can have chronic or acute health impacts. Chronic health impacts can develop as a result of repeated or prolonged exposure to hazardous substances. Since lead is a key component in many traditional batteries and is absorbed into the body by ingestion or inhalation, battery plant workers can be subject to lead toxicity, which can have a variety of physical and mental health impacts. While injury rates are generally low in the industry, relative to others, companies have faced regulatory action from violations of health and safety standards, some of which have been repeat violations. Companies could also face litigation as a result of fatalities or chronic health impacts from working in fuel cell and battery manufacturing or recycling facilities. Companies that develop a strong safety culture, including through providing health and safety training, protective gear, improved ventilation, and regular health monitoring, can improve workforce health and safety performance and mitigate regulatory and litigation risks.

## Accounting Metrics

### RR0104-02. (1) Total recordable injury rate (TRIR) and (2) fatality rate

- .10 Registrants whose workforce is entirely U.S.-based shall disclose its total recordable injury rate (TRIR) and fatality rate as calculated and reported in the Occupational Safety and Health Administration's (OSHA) Form 300.
- OSHA guidelines provide details on determining whether an event is a recordable occupational incident and definitions for exemptions for incidents that occur in the work environment but are not occupational.
- .11 Registrants whose workforce includes non-U.S.-based employees shall calculate their TRIR and fatality rate according to the U.S. Bureau of Labor Statistics [guidance](#) and/or using the U.S. Bureau of Labor Statistics [calculator](#).
- .12 The registrant shall disclose its TRIR and fatality rate for all employees, including direct full-time employees, contract employees, and seasonal and migrant employees.
- .13 The scope includes all employees, domestic and foreign.
- .14 Rates shall be calculated as:  $(\text{statistic count} / \text{total hours worked}) * 200,000$ .

**RR0104-03. Discussion of efforts to assess, monitor, and reduce exposure of workforce to human health hazards**

- .15 The registrant shall discuss efforts to assess, monitor, and reduce the exposure of employees to human health hazards including, but not limited to, solvents, corrosives, lead (and its compounds), arsenic (and its compounds), cadmium, and sulfuric acid, as well as known or suspected carcinogens, teratogens, and mutagens, and efforts to reduce the occurrence of events including, but not limited to, fires, explosions, freeze burns, and electrocution.
- .16 The registrant shall describe its management approach in the context of short-term (i.e., acute) risks and long-term (i.e., chronic) risks.
- .17 Relevant efforts to discuss include, but are not limited to, risk assessments, risk monitoring, participation in long-term health studies, implementation of technology to control worker exposure, worker use of personal protective equipment (PPE), automation of processes, and phasing out, substituting, or using alternative materials.
- .18 The registrant shall include a description of risk-monitoring policies as they apply to workforce lead exposure, including the monitoring of workforce blood lead levels (BLL) where lead exposure may exist.
- .19 The scope of the workforce shall focus on employees and contract employees in manufacturing or recycling plants but should discuss other members of the workforce as relevant.
- .20 The registrant should discuss company policies regarding maximum workforce BLL thresholds and testing frequencies, including, but not limited to, the following aspects:
  - How the registrant ensures compliance with maximum workforce BLL thresholds and testing frequencies as established by regulatory agencies and governmental or nongovernmental organizations, such as OSHA and the American Conference of Governmental Industrial Hygienists (ACGIH);
  - Whether any elements of company policies are more stringent than regulatory requirements;
  - Whether policies differ across locations with varying regulatory requirements; and
  - How policies are responsive to evolving regulatory requirements.
- .21 The registrant should discuss its performance in adhering to maximum workforce BLL thresholds and testing frequencies as established by company policies and/or applicable regulations, including any legal or regulatory fines or settlements and instances of non-compliance.



# Product Efficiency

## Description

While fuel cells and batteries may be inherently cleaner and more efficient than traditional sources of energy, firms may still improve characteristics of their products through design decisions and win a competitive advantage in capturing a larger share of this growing market. Both customer demand and regulatory requirements are increasing for energy-efficient products with lower environmental impacts and lower total cost of ownership. The widespread adoption of fuel cell technologies, in particular, may be limited because of their high costs relative to competing energy sources. Therefore, design decisions in the Fuel Cells & Industrial Batteries industry that drive energy and thermal efficiency and enhance storage capacities can lower barriers to adoption. As the rate of adoption of fuel cells and industrial batteries increases, it will become even more important to ensure that product design is maximized for efficient energy production or storage. In particular, advances in battery technology to increase storage capabilities and improve charging efficiencies, while lowering costs, are critical for the integration of renewable energy technologies into the grid. Fuel cell and industrial battery manufacturers that are able to improve efficiency in the use phase will be able to satisfy growing demand, pressured by stricter environmental regulations, high energy costs, and customer preferences.

## Accounting Metrics

### RR0104-04. Average storage capacity of batteries, by product application and technology type

- .22 The registrant shall disclose the average storage capacity of batteries by product application and technology type, weighted by unit sales volume per product application and technology type.
- Storage capacity shall be measured as the specific energy, or gravimetric energy density, of batteries, and is calculated as the ratio of nominal energy in watt-hours to the mass of the product in kilograms: watt-hours / kilograms (Wh/kg).
- .23 The registrant shall measure and disclose performance in accordance with the applicable product application and/or technology type standard(s), and shall disclose the standard(s) utilized for performance measurement.
- Applicable standard(s) may include SAE J240—Automotive storage batteries and SAE J2185—Heavy-duty storage batteries.
- .24 The registrant shall disclose performance by the following application types, where applicable: portable, motive, stationary, and “all other,” each further categorized by the following technology types, where applicable: lead-based, nickel-based, lithium-based, sodium-based, and “all other.”
- The registrant may include additional categories of application types and/or technology types where appropriate, including categories for new products with low sales volumes but strategic importance in terms of product efficiency or other attributes.

**RR0104-05. Average energy efficiency of fuel cells as (1) electrical efficiency and (2) thermal efficiency, by product application and technology type**

- .25 The registrant shall disclose the average energy efficiency of fuel cells as (1) electrical efficiency and (2) thermal efficiency, weighted by unit sales volume per product application and technology type.
- Electrical efficiency is calculated as net electricity produced divided by total fuel energy input.
  - Thermal efficiency is calculated as net useful power output divided by total fuel energy input.
  - The registrant shall use lower heating values (LHV) in the calculation of electrical efficiency and thermal efficiency, and shall disclose the heating values used.
- .26 The registrant shall measure and disclose electrical and thermal efficiency in accordance with standard(s) applicable to the product application and/or technology type.
- Applicable standard(s) may include IEC 62282-3-200—Stationary fuel cell power systems and SAE J2615—Testing Performance of Fuel Cell Systems for Automotive Applications.
  - The registrant shall disclose the standard(s) utilized for energy efficiency measurements.
- .27 The registrant shall disclose electrical and thermal efficiency by the following application types, where applicable: portable, motive, stationary, and “all other,” each further categorized by the following technology types, where applicable: direct methanol (DMFC), polymer electrolyte (PEM), alkaline (AFC), phosphoric acid (PAFC), molten carbonate (MCFC), solid oxide fuel cell (SOFC), and “all other.”
- The registrant may include additional categories of application types and/or technology types where appropriate, including categories for new products with low sales volumes but strategic importance in terms of product efficiency or other attributes.
- .28 The registrant should disclose any other fuel cell outputs that have economic value (e.g., hydrogen), including an appropriate measurement of sales-weighted average value, by product application and technology type.

**RR0104-06. Average battery efficiency as coulombic efficiency, by product application and technology type**

- .29 The registrant shall disclose the average energy efficiency of batteries as coulombic efficiency, weighted by unit sales volume per product application and technology type.
- Coulombic efficiency is calculated as energy removed from a battery during discharge divided by the energy used during charging to restore the original capacity.

.30 The registrant shall measure and disclose coulombic efficiency in accordance with standard(s) applicable to the product application and/or technology type.

- Applicable standard(s) may include SAE J240—Automotive storage batteries and SAE J2185—Heavy-duty storage batteries.

.31 The registrant shall disclose coulombic efficiency by the following application types, where applicable: portable, motive, stationary, and “all other,” each further categorized by the following technology types, where applicable: lead-based, nickel-based, lithium-based, sodium-based, and “all other.”

- The registrant may include additional categories of application types and/or technology types where appropriate, including categories for new products with low sales volumes but strategic importance in terms of product efficiency or other attributes.

#### **RR0104-07. Average operating lifetime of fuel cells, by product application and technology type**

.32 The registrant shall disclose the average operating lifetime of fuel cells, weighted by unit sales volume per product application and technology type.

- Operating lifetime of fuel cells is calculated as operating hours until 20% net power degradation occurs.

.33 The registrant shall measure and disclose operating lifetime in accordance with standard(s) applicable to the product application and/or technology type.

- Applicable standard(s) may include IEC 62282-3-200—Stationary fuel cell power systems and SAE J2615—Testing Performance of Fuel Cell Systems for Automotive Applications.

.34 The registrant shall disclose operating lifetime by the following application types, where applicable: portable, motive, stationary, and “all other,” each further categorized by the following technology types, where applicable: direct methanol (DMFC), polymer electrolyte (PEM), alkaline (AFC), phosphoric acid (PAFC), molten carbonate (MCFC), solid oxide fuel cell (SOFC), and “all other.”

- The registrant may include additional categories of application types and/or technology types, where appropriate, including categories for new products with low sales volumes but strategic importance in terms of product efficiency or other attributes.

#### **RR0104-08. Average operating lifetime of batteries, by product application and technology type**

.35 The registrant shall disclose the average operating lifetime of batteries, weighted by unit sales volume per product application and technology type.

- The operating lifetime of batteries is calculated as the number of times the battery can be fully charged and discharged, or “cycles,” until 20% capacity degradation occurs.

.36 The registrant shall measure and disclose operating lifetime in accordance with standard(s) applicable to the product application and/or technology type.

- Applicable standard(s) may include SAE J240—Automotive storage batteries and SAE J2185—Heavy-duty storage batteries.

.37 The registrant shall disclose performance by the following application types, where applicable: portable, motive, stationary, and “all other,” each further categorized by the following technology types, where applicable: lead-based, nickel-based, lithium-based, sodium-based, and “all other.”

- The registrant may include additional categories of application types and/or technology types where appropriate, including categories for new products with low sales volumes but strategic importance in terms of product efficiency or other attributes.

# Product End-of-life Management

## Description

As the rate of adoption for fuel cells and industrial batteries increases and more products reach their end of life, it will become increasingly important to ensure that product design is maximized for end-of-life management and materials efficiency. Fuel cells and batteries contain hazardous materials, which can leach into the environment if these products are improperly disposed of. This can pose significant human health and environmental risks, with possible regulatory impacts for companies in some regions. The emergence of several laws regarding the end-of-life phase of batteries has recently heightened the importance of the issue, creating potential added costs of managing risks as well as opportunities through regulatory incentives. Effective design for disassembly and reuse or recycling will be a key element for ramping up these recovery rates in order to reduce the lifecycle impacts of fuel cells and batteries and mitigate the strain of new production on natural resources. Furthermore, given the input price volatility and resource constraints of materials such as platinum, fuel cell and industrial battery companies that are able to develop take-back and recycling systems and reuse some of the recovered materials in manufacturing are likely to increase their long-term operational efficiency and improve their risk profile.

## Accounting Metrics

### RR0104-09. Percentage of products sold that are recyclable or reusable

.38 The registrant shall disclose the percentage of products, by weight (in metric tons), that are reusable or recyclable, where:

- “Reusable” is defined as a product or packaging that has been conceived and designed to accomplish, within its lifecycle, a certain number of trips, rotations, or uses for the same purpose for which it was conceived, consistent with definitions in ISO 14021:1999, *Environmental labels and declarations—Self-declared environmental claims (Type II environmental labelling)*.
- “Recyclable” is defined a product or packaging that can be diverted from the waste stream through available processes and programs and can be collected, processed, and returned to use in the form of raw materials or products, consistent with definitions in ISO 14021:1999, *Environmental labels and declarations—Self-declared environmental claims (Type II environmental labelling)*.

.39 For products or product materials that are partially made of recyclable or reusable materials, the registrant shall classify the portion of the material that is recyclable or reusable based on a calculation (or estimate, where appropriate) of the weight of each portion.

.40 A product or its components shall be considered recyclable or reusable if this claim is aligned with 16 CFR Part 260, Guides for the Use of Environmental Marketing Claims; Final Rule (also known as the “FTC Green Guides”), including the following elements:

- A product or package shall not be marketed as recyclable unless it can be collected, separated, or otherwise recovered from the waste stream through an established recycling program for reuse or use in manufacturing or assembling another item.

- When recycling facilities are available to a substantial majority (i.e., 60 percent) of consumers, communities where the item is sold, or commercial and industrial customers through established collection infrastructure (public or private), the registrant may consider the product (or product component) recyclable without a qualification.
- When recycling facilities are available to less than a substantial majority of customers or communities where the product is sold, the registrant shall only consider the product (or product components) recyclable if it makes the appropriate qualification to its customers.
- For items that are partially made of recyclable components, the registrant shall only consider those components recyclable if (a) it clearly and prominently qualifies the recyclable claim to avoid deception about which portions are recyclable, and (b) no components significantly limit the ability to disassemble and recycle the product or components of the product (e.g., the size, shape, or assembly method).

**RR0104-10. Weight of end-of-life material recovered, percentage of recovered materials that are recycled**

.41 The registrant shall disclose the weight, in metric tons, of materials recovered, including those recovered through recycling services, product take-back programs, and refurbishment services, where:

- The scope of disclosure shall include products, materials, and parts at the end of their useful life that would have otherwise been disposed of as waste or used for energy recovery, but have instead been collected.
- The scope of disclosure shall include both materials physically handled by the registrant and materials of which the registrant does not take physical possession, but for which it has contracted with a third party the task of collection for the express purpose of reuse, recycling, or refurbishment.
- The scope of disclosure excludes products and parts that are in warranty and have been collected for repairs.

.42 The percentage recycled shall be calculated as the weight of incoming material that was reused or reclaimed, plus the weight of material recycled or remanufactured (through treatment or processing) by the registrant, plus the weight of material sent externally for further recycling, divided by the total weight of incoming recovered material, where:

- A material is recycled if it is used, reused, or reclaimed.
- Reclaimed materials are defined as materials processed to recover or regenerate a usable product.
- Reused materials are defined as recovered products or components of products that are used for the same purpose for which they were conceived.

- Recycled and remanufactured materials are defined as waste materials that have been reprocessed or treated by means of production or manufacturing processes and made into a final product or a component for incorporation into a product.
- Materials sent for further recycling include those materials that are transferred to a third party for the express purpose of reuse, recycling, or refurbishment.
- The scope of recycled and remanufactured products includes primary recycled materials, co-products (outputs of equal value to primary recycled materials), and by-products (outputs of lesser value than primary recycled materials).
- Portions of products and materials that are disposed of in landfills are not considered recycled. Only the portions of products that are directly incorporated into new products, co-products, or by-products shall be included in the percentage recycled.
- Materials incinerated, including for energy recovery, are not considered reused, recycled, or reclaimed. Energy recovery is defined as the use of combustible waste as a means to generate energy through direct incineration, with or without other waste, but with recovery of the heat.

.43 Electronic waste material (e-waste) shall be considered recycled only if the registrant can demonstrate that this material was transferred to entities with third-party certification to a standard for e-waste recycling such as Basel Action Network's e-Steward® standard or the U.S. EPA's Responsible Recycling Practices (R2) standard.

- The registrant shall disclose the standard(s) with which the entities it has transferred e-waste to are compliant.

#### **RR0104-11. Discussion of approach to manage use, reclamation, and disposal of hazardous materials**

.44 The registrant shall discuss its strategies to manage the use of hazardous materials, where:

- Hazardous materials include both hazardous secondary materials, per 40 CFR 260.10, and waste that meets the definition of hazardous waste under Subtitle C of the U.S. EPA's Resource Conservation and Recovery Act (RCRA), per 40 CFR 261.3.
- Hazardous materials include those that display the following characteristics: ignitability, corrosivity, reactivity, or toxicity.

.45 The registrant should identify which hazardous materials are used, its strategies to mitigate risks associated with the use of hazardous materials, and its approach to design for reducing use or substituting with non-hazardous materials.

.46 The registrant shall discuss its approach to design and its process to ensure proper and safe disposal and/or reclamation and recycling of hazardous materials at the product end-of-life stage, including take-back programs and direct contracts with third-party hazardous waste reclamation services.

.47 The registrant shall describe the root cause and its corrective actions for any incidences when its use, reclamation, and/or disposal of hazardous materials deviated from its expected outcomes, such as those resulting in a release to the environment, regulatory non-compliance, and/or human health and safety impacts.



# Materials Sourcing

## Description

Manufacturing certain types of industrial batteries and fuel cells requires an available supply of materials such as lithium, cobalt, nickel, and platinum. In some applications, gold, tantalum, and tin may be necessary to their functionality or production. Access to these materials is critical for the continuous development and scaling of clean energy technologies like fuel cells and industrial batteries. Limited global resources of these materials, as well as their concentration in particular countries that may have poor governance structures or are the subject of geopolitical tensions, expose fuel cell and industrial battery companies to the risk of supply-chain disruptions and input-price increases or volatility. Moreover, a company's reputation can be damaged if it uses gold, tantalum, tin, or other minerals originating from conflict zones. Companies face pressure from legislators, nongovernmental organizations, and peers to track and eliminate the use of tin, tantalum, tungsten, and gold responsible for conflict in the Democratic Republic of the Congo. The limited availability of suppliers that can provide certified conflict-free minerals presents supply-constraint risks to companies in the industry, as well as puts upward pressure on material prices. At the same time, competition from other industries that utilize the same critical materials and/or employ fuel cell and battery technologies is likely to exacerbate supply risks. Fuel cell and industrial battery companies with strong supply-chain standards and the ability to adapt to increasing resource scarcity will be better positioned to protect shareholder value. Innovations at the design phase to reduce dependence on some of these materials will help lower this risk. Companies that are able to limit the use of critical and conflict materials, as well as secure their supply of the materials they do use, will not only minimize environmental and social externalities related to extraction but also protect themselves from supply disruptions, volatile input prices, and reputational and regulatory risks.

## Accounting Metrics

### RR0104-12. Percentage of materials costs for items containing critical materials

.48 The registrant shall calculate the percentage as the materials costs of goods sold, in U.S. dollars, of items that contain critical materials divided by total materials cost of goods sold.

- The scope of disclosure includes materials costs for parts, components, commodities, and associated freight and storage, and excludes those for overhead, labor, recalls, warranties, or other costs of goods sold.

.49 A critical material is defined, consistent with the National Research Council's "Minerals, Critical Minerals, and the U.S. Economy," as a material that is both essential in use and subject to the risk of supply restriction.

.50 At a minimum, the scope of critical materials includes the following minerals and metals:

- Antimony, cobalt, fluorspar, gallium, germanium, graphite, indium, magnesium, niobium, tantalum, and tungsten;
- Platinum group metals (platinum, palladium, iridium, rhodium, ruthenium, and osmium); and

- Rare earth elements, which include yttrium, scandium, lanthanum, and the lanthanides (cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and lutetium).

**RR0104-13. Percentage of tungsten, tin, tantalum, and gold smelters within the supply chain that are verified conflict-free**

.51 The registrant shall calculate the percentage as the number of tungsten, tin, tantalum, and gold smelters and/or refineries within its supply chain that are verified to be conflict-free divided by the total number of tungsten, tin, tantalum, and gold smelters and/or refineries within its supply chain.

.52 A smelter or refiner is considered to be conflict-free if it can demonstrate compliance with:

- The Electronic Industry Citizenship Coalition (EICC) and Global e-Sustainability Initiatives (GeSI) Conflict-Free Smelter Program (CFSP) assessment protocols.
- The Responsible Jewellery Council’s (RJC) Chain-of-Custody (CoC) Standard.
- Due diligence certifications, audits, or programs that are endorsed by the Automotive Industry Action Group (AIAG), including, but not limited to, the iPoint Conflict Minerals Platform.

.53 A smelter or refinery is considered to be within the registrant’s supply chain if it supplies, or is approved to supply, tungsten, tin, tantalum, or gold that is contained in any product the registrant manufactures or contracts to be manufactured.

- The scope includes smelters or refineries that supply material directly to the registrant as well as those that supply material to any of its suppliers of raw materials, components, or subassemblies.

**RR0104-14. Discussion of the management of risks associated with the use of critical materials and conflict minerals**

.54 The registrant shall discuss its strategic approach to managing its risks associated with the use of critical materials and conflict minerals in its products, including physical limits on availability and access, price, and reputational risks, where:

- A critical material is defined, consistent with the National Research Council’s “Minerals, Critical Minerals, and the U.S. Economy,” as a material that is both essential in use and subject to the risk of supply restriction. At a minimum, the scope of critical materials includes the following minerals and metals defined by the National Research Council:
  - Antimony, cobalt, fluorspar, gallium, germanium, graphite, indium, magnesium, niobium, tantalum, and tungsten;
  - Platinum group metals (platinum, palladium, iridium, rhodium, ruthenium, and osmium); and

- Rare earth elements, which include yttrium, scandium, lanthanum, and the lanthanides (cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium, and lutetium).
  - Conflict minerals are defined as tungsten, tin, tantalum, and gold.
- .55 The registrant should identify which materials and minerals present a risk to its operations, which type of risk they represent, and the strategies the registrant uses to mitigate the risk.
- .56 For critical materials, relevant strategies to discuss include diversification of suppliers, stockpiling of materials, expenditures in (R&D) for alternative and substitute materials, and investments in recycling technology for critical materials.
- .57 For conflict minerals, relevant strategies to discuss include due diligence practices, supply chain auditing, supply chain engagement, and partnerships with industry groups or nongovernmental development organizations.

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