ELECTRIC POWER RESEARCH INSTITUTE

Sustainability Metric Compilation for the Electric Power Industry

Results of Industry Interviews and Metric Database Development

2014 TECHNICAL REPORT

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Abstract

This report presents research results regarding sustainability-related metrics used in the electric power industry. *Metrics* are defined as units for measuring performance or status. Specifically, the research was directed at identifying a comprehensive set of metrics applicable to both domestic and international electric utilities. *Sustainability* was defined as being related to 1 of 15 issues identified as part of the Electric Power Research Institute's (EPRI's) 2013 report, *Material Sustainability Issues for the North American Electric Power Industry* (3002000920).

The research team collected information from two broad sources. First, data were collected from 29 interviews with EPRI Energy Sustainability Interest Group (ESIG) participants located in the United States and Canada. Second, metrics were identified by reviewing a wide range of third-party sources that track, assess, and report on companies' sustainability performance. This included industry benchmarking programs such as the Dow Jones Sustainability Index, the Climate Registry, the Global Reporting Initiative, Carbon Disclosure Project (both Climate Change and Water), among others. Regulatory laws and policies such as the Clean Water Act and Endangered Species Act were not reviewed.

During the interviews, ESIG participants were asked a series of questions regarding the benefit and purpose of using metrics for tracking broader sustainability performance, and they were asked to provide feedback on any changes that should be made to the methods for compiling the aggregated list of currently used metrics. During the course of the research, 448 specific metrics were identified.

To EPRI's knowledge, this project represents the most extensive effort to date to compile this type of information for the electric power industry. The research has value for assessing sustainability metrics for the industry, whether for benchmarking, communicating with stakeholders, or setting targets.

Keywords
Benchmarking
Metrics
Stakeholders
Sustainability
Voluntary reporting

Executive Summary

This research effort has generated a comprehensive database of sustainability-related metrics for the electric power industry. The Electric Power Research Institute (EPRI) is not aware of a similar level of effort that has been expended for the industry to date, and the results are potentially of great value as utilities navigate the growing world of sustainability reporting, decide how to respond to ranking surveys, and establish a suite of metrics most suitable for their company.

The research was divided into two main components: interviews and database development. The interviews involved 29 companies and 52 individuals who participate in the EPRI Energy Sustainability Interest Group (ESIG). Interviewees were asked to describe the benefits and uses of sustainability metrics for their organization. They were asked to outline the characteristics that make for effective metrics and to identify any potential issues with using metrics that are intended to inform a company's sustainability position. Interviewees also provided feedback to help optimize the database design and the data captured.

The most frequently cited use of metrics was for "benchmarking against peers," referenced by 21 of the 29 utilities. When utilities were asked to describe characteristics of effective metrics, "normalized" was heard most frequently. The most common concern was establishing consistency for measurement protocols among utilities, so that "apples-to-apples" comparisons could be made.

The second research component was database compilation from a review of 22 common sustainability reporting/ranking sources. Combining this with the interview input resulted in the identification of 448 specific metrics. Each metric was mapped to the most relevant of 15 sustainability issues, which had been identified by EPRI [1].

The database organized the metrics under three sustainability pillars: environmental, social, and economic. Two-hundred forty-nine metrics fell under the environmental pillar, 86 under the social pillar and 113 under the economic pillar. At a more granular level, there were wide variations in the number of metrics identified per material issue. This ranged from 78 for greenhouse gas emissions to only 2 for energy affordability. The 448 metrics were reduced to only 138 when filtered for intensity metrics (which are the most effective for benchmarking purposes, meeting the request for normalized or comparable metrics). Many of the metrics were very similar. For example, 27 of the 78 greenhouse gas emissions metrics measure carbon dioxide equivalent (CO2e) emissions from a variety of different perspectives, including emissions from purchased cooling, purchased electricity, stationary fuel sources, and coal energy production. Further analysis could likely reduce the database to a smaller list simply by combining similar metric types.

This effort is an important first step in identifying and describing the large number of metrics that are commonly used to measure sustainability performance. It is recognized that each utility has unique profiles in terms of ownership, geographical spread, and operational footprints. With a wide range of parameters recorded, the database can serve as a configurable tool to support utilities in identifying the most relevant metrics for their company. Further, the database can be analyzed to identify a smaller set of metrics that are the most useful for benchmarking, communicating with stakeholders, or setting targets.

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Section 1: Introduction

Companies are working to identify the best metrics to use to communicate with stakeholders, predict future performance, and benchmark themselves against their peers.

Companies across many industries are increasingly participating in voluntary sustainability reporting, and there is a growing number of reporting guidelines that companies can follow. This trend also is true in the electric power industry where companies are working to identify the best metrics to use to communicate with stakeholders, predict future performance, and benchmark themselves against their peers. In 2011, the Electric Power Research Institute (EPRI) identified 124 different key performance indicators being used in corporate sustainability reports by electric power companies [2]. With the number of reporting frameworks increasing and the various shareholders, stakeholder groups, and customers who are demanding information, the plethora of metrics currently being used has created a heavy burden of reporting. This burden translates into business and customer cost.

There is value in assessing the set of sustainability-related metrics currently being used in the industry so that companies can choose which are most important to them and their stakeholders. However, a first step is simply compiling the current metrics being used and their purpose.

Fifteen material sustainability issues that are the most relevant to the electric power industry were identified in a 2013 EPRI study [1].

In April of 2013, EPRI published *Material Sustainability Issues for the North American Electric Power Industry: Results of Research with Electric Power Companies and Stakeholders in the United States and Canada* [1]. This report and its associated research identified 15 issues as being most relevant for the electric power industry, as shown in Table 1-1. Each issue was identified, defined, and categorized into one of three "pillars" of sustainability (environmental, social, and economic). While the report presents issues, it does not discuss metrics to track a company's performance on those issues.

The purpose of this study was to identify and compile commonly used metrics for each of the 15 sustainability issues.

Table 1-1
Fifteen material sustainability issues for the electric power utility industry

Sustainability Pillar	#	Material Issue
Environmental	1	Greenhouse gas emissions
	2	Reductions of other air emissions
	3	Water quality
	4	Water availability
	5	Habitat protection and biodiversity
	6	Waste management
Social	7	Public safety and health
	8	Employee safety and health
	9	Job satisfaction
	10	Community support and economic development
	11	Engagement and collaboration
Economic	12	Energy reliability
	13	Energy affordability
	14	Skilled workforce availability
	15	Economic viability of electric utilities

The purpose of this new study was to identify and compile commonly used metrics for each of the 15 sustainability issues. The findings illustrate the large number of metrics being used in the utility industry and provide a comprehensive baseline from which to identify a smaller set of metrics for each issue.

Section 2: Methodology

The methodology for this study included an extensive set of company interviews and database development based on metrics used in utility reporting efforts.

This study did not generate metrics itself. Rather, it addresses two key items: identifying a comprehensive set of existing metrics relevant to sustainability issues for the electric power industry and understanding the purpose of the metric. The methodology for this study included an extensive set of company interviews and database development based on metrics used in utility reporting efforts.

A series of one-hour interviews were conducted with participants of the 2014 EPRI Energy Sustainability Interest Group (ESIG). The purpose was to give ESIG participants the opportunity to contribute their views to the design of the database, provide guidance on the research sources, and gain insights into the purpose of using metrics. In addition, companies were asked the value derived from using sustainability-related metrics as well as challenges they had in using them. The full set of questions is included in Appendix A. Fifty-two individuals across 29 power utilities were interviewed, as shown in Table 2-1.

Fifty-two individuals across 29 power utilities were interviewed.

The interviews informed the design of the database, provided guidance on the research sources, and offered insights into the purpose of using metrics.

Table 2-1
Interviews conducted

#	Utility	Number of People Interviewed
1	Alliant Energy Corporate Services, Inc.	2
2	Ameren Services Co.	1
3	American Electric Power	6
4	BC Hydro	1
5	Bonneville Power Administration (BPA)	1
6	Central Hudson Gas & Electric Corp.	1
7	Consolidated Edison Co. of New York, Inc.	1
8	Consumers Energy	1
9	CPS Energy	2
10	DTE Energy	2
11	Duke Energy Corp.	3
12	Entergy Services, Inc.	1
13	Exelon Corporation	2
14	Hoosier Energy Rural Electric Coop., Inc.	2
15	Hydro One Networks, Inc.	1
16	Los Angeles Dept. of Water & Power	3
17	Madison Gas & Electric Co.	1
18	NRG Energy, Inc.	1
19	OG&E Energy Corporation	1
20	Pacific Gas and Electric	3
21	Portland General Electric Co.	1
22	PSEG Service Corporation	1
23	Salt River Project	3
24	Southern California Edison	1
25	San Diego Gas and Electric	3
26	Southern California Gas	2
27	Tennessee Valley Authority	3
28	Tucson Electric Power	1
29	Xcel Energy Services, Inc.	1
	TOTAL	52

In addition to the interviews, updates were provided via webcasts to all 2014 ESIG participants and at an in-person workshop in May 2014 with 30 companies in attendance. These provided additional opportunities to refine the research approach and solicit input from the group. The 2014 ESIG companies are shown in Figure 2-1.

EPRI's Energy Sustainability Interest Group informed the research.

Figure 2-1
2014 Energy Sustainability Interest Group companies

Laws and regulations, such as the Clean Water Act, were not reviewed as part of this study. Further, factors such as the scientific defensibility or cost-effectiveness of various metrics were not considered in this study.

The study examined 22 unique sources, as shown in Table 2-2, that contained metrics specifically targeted at electric power utilities or that were used and/or applied to the industry. Laws and regulations, such as the Clean Water Act, were not reviewed as part of this study. Further, factors such as the scientific defensibility or cost-effectiveness of various metrics were not considered in this study.

Table 2-2
Metric sources and the number of metrics identified from each source

ID	Metric Source	# of Metrics*
1	Global Reporting Initiative (GRI) G4 Guidelines [3]	110
2	EPRI – *Sustainability Priorities in the Electric Power Industry*, 2011 [2]	100
3	GRI G3.1 Guidelines [4]	99
4	Utility Environmental Benchmarking Forum, 2014 [5]	52
5	Global Water Tool [6]	43
6	Dow Jones Sustainability Index (DJSI)[7]	42
7	GRI G3.1 Electric Utilities Sector Guidance [8]	40
8	eGRID [9]	38
9	Carbon Disclosure Project (CDP) Electric Utilities Information Request, 2014 [10]	35
10	Sustainable Electricity [11]	34
11	GRI G4 Electric Utilities Sector Guidance [12]	32
12	ESIG member interview input	23
13	CDP's 2014 Climate Change Information Request [13]	18
14	CDP's 2014 Water Information Request [14]	17
15	The Climate Registry (TCR) [15]	15
16	Alliance for Water Stewardship [16]	14
17	European Water Partnership [17]	14
18	Water Footprint Network [18]	6
19	Center for Sustainable Organizations: Context-Based Carbon Metric [19]	1
20	Center for Sustainable Organizations: Context-Based Waste Metric [20]	1
21	Center for Sustainable Organizations: Corporate Water Gauge [21]	1
22	Center for Sustainable Organizations: The Social Footprint Method [22]	1

Note: A number of metrics have multiple sources so the sum of all the references is higher than the total number of metrics included.

Twenty-two data sources were reviewed to compile a list of metrics relevant to the electric power industry.

All metrics were mapped to 1 of the 15 sustainability issues.

This study conducted a comprehensive review of metrics contained within each of the documented sources and then mapped each metric to the relevant sustainability issue and purpose.

The database itself, which is a separate EPRI product [23], features 20 separate columns of data. For each column header, the user may filter for one or more data points within that column (for example, the user could filter for only greenhouse gas emissions within the Related Material Issue column). This functionality allows the user flexibility in interrogating the database and returns the metrics that are of greatest relevance to them. Appendix B provides a full breakdown of all 20 database columns.

Section 3: Study Results

Interviews

Interviewees were asked open questions to describe the benefits and uses they saw from sustainability metrics. The project team subsequently reviewed the utility responses and assigned them to specific categories (see Figure 3-1).

Benchmarking against peers was the most frequently mentioned use of metrics.

The most frequently identified benefit or use was "benchmarking against peers," referenced by 21 utilities. Following this were "stakeholder communication/engagement" with 19 references, "measuring/improving performance" and "internal prioritization" with 18 references each, and "increasing/demonstrating transparency" with 15 references. No other item received more than seven references during the interviews.

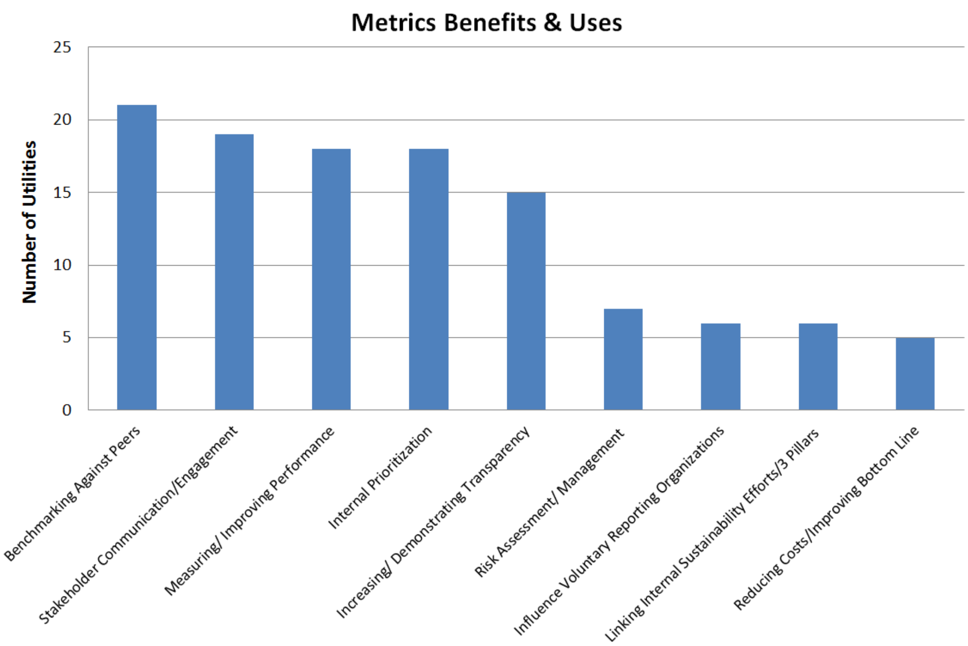

Figure 3-1
Metrics benefits and uses

Other benefits and uses referenced but not shown in Figure 3-1 include reassessing existing metrics (four utilities), enhancing reputation (three utilities), learning best practices (three utilities), employee engagement (one utility), and competitive advantage (one utility).

Interviewees most frequently cited "normalized" when asked to describe characteristics of effective metrics.

The interviews also solicited input on what utilities consider to be the most important characteristics of effective sustainability metrics (see Figure 3-2). As before, this was an open question, and the responses were subsequently categorized. The consolidated responses show that "normalized" was the characteristic identified most frequently, referenced by 16 different utilities (similar references included "benchmarkable" and "comparable," which were included under the "normalized" category). Ten of the interviewees also considered it important for metrics to be "linked to company strategy/goals." Four other characteristics received either five or six citings from the 29 utilities: "contextualized," "cost-effective to measure," "measured consistently from year to year," and "capable of justifying internal cooperation."

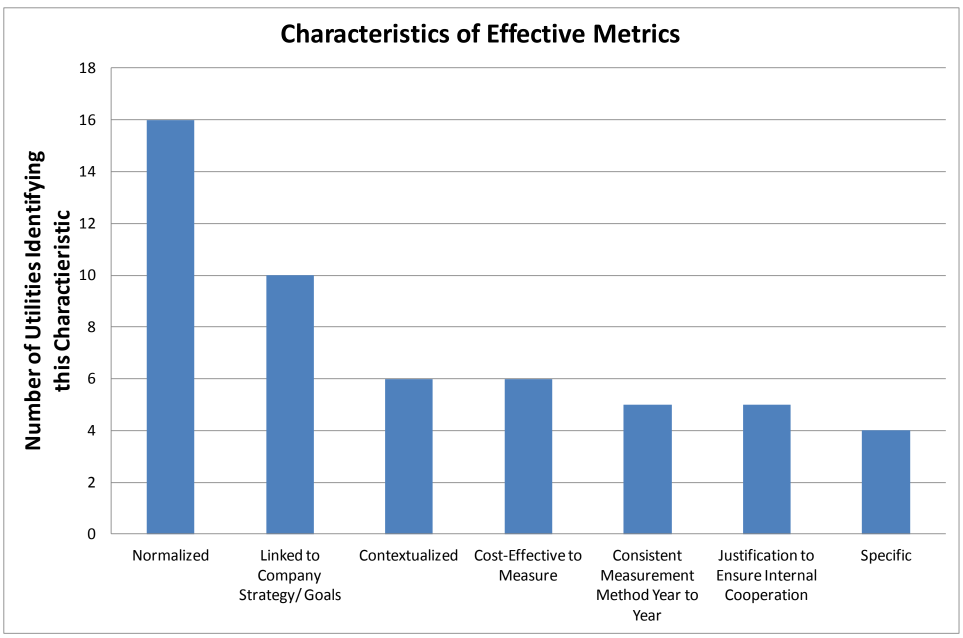

Figure 3-2
Characteristics of effective metrics

The metrics issue of greatest concern to interviewees was establishing consistency around metric measurement and reporting, pointing to concerns that "apples-to-apples" comparisons are not being made.

The following characteristics also were mentioned by three or fewer utilities: measureable, relevant to target audience, actionable, easy to understand, clear calculation method, validated/audited, accurate, timely, and aligned with stakeholder priorities.

In addition to identifying the most important characteristics of effective metrics, the interviewees indicated potential issues with sustainability metrics, as shown in Figure 3-3. By far the issue of greatest comment was regarding consistency around what is included in a measurement, with 14 references. Even when a specific metric is defined, companies may not be using the same boundaries (fleet vehicle emissions, purchased power, company subsidiaries, etc.) and auditing protocols (none, internal, third party) related to the reporting. Of the remaining potential issues, two were cited most frequently: "sensitivity around releasing data" (referenced by seven) and "changing baselines" (referenced by six).

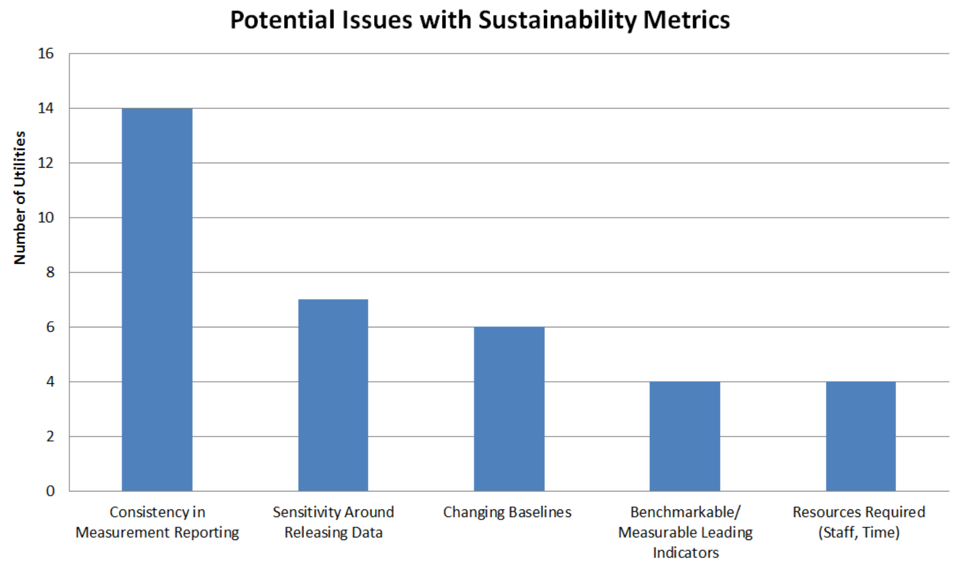

Figure 3-3
Potential issues with sustainability metrics

The project team shared the database structure with the interviewees. Several useful modifications were suggested and applied to increase the rigor and completeness of the database. The changes also increased functionality to allow companies to search the database based on particular characteristics. These included categorizing each metric in terms of leading or lagging.

Metrics were classified as leading or lagging, whether they were related to outcomes, processes, or consequences, and defined as learning, decision making, accountability, or demonstration.

Leading metrics are mostly input-oriented and are harder to measure than lagging metrics. They usually are used as indicators of future performance against a particular measure (for example, the percentage of employees eligible to retire in 5–10 years is a leading indicator of a skills and capability issue). Lagging metrics are mostly output-oriented and are easier to measure. They focus on results at the end of a time period and are typically measures of historical performance (for example, installed electrical capacity of wind-fueled generation).

Metrics also were classified according to whether they are related to outcomes, processes, or consequences. Finally, the metrics were defined in terms of appropriate uses (learning, decision making, accountability, or demonstration). A full description of all the database components can be found in Appendix B.

It is important not to oversimplify by viewing metrics as "positive" or "negative," but rather to recognize that each utility will require different metrics to appropriately measure, manage, and communicate its own sustainability performance.

Overall, a consistent theme that emerged across the interviews was that each utility has its own unique makeup in terms of geographical spread, ownership structure, and operational footprint. This inevitably impacts the relative significance of material issues as well as the metrics that will be most effective for each individual utility. It therefore is important not to oversimplify by viewing metrics as "positive" or "negative," but rather to recognize that each utility will require different metrics to appropriately measure, manage, and communicate its own sustainability performance.

Database

Of the 448 metrics identified, 249 mapped to the environmental pillar, 86 to the social pillar, and 113 to the economic pillar.

A total of 448 metrics were identified across the 15 material issues (see Table 3-1). Breaking them down into the sustainability pillars, 249 mapped to the environmental, 86 to the social, and 113 to the economic pillars. Three material issues stand out significantly in terms of the number of metrics identified. For greenhouse gas emissions, energy reliability, and water availability, 78, 71, and 64 metrics, respectively, were recorded. An important point regarding the count is that a number of these metrics are simply slight variants of a consistent theme. For example, for greenhouse gases, 27 of the 78 metrics measure CO_2e emissions from a variety of different perspectives, including emissions from purchased cooling, purchased electricity, stationary fuel sources, and coal energy production, among others.

After greenhouse gas emissions, energy reliability, and water availability, the next highest number of metrics is related to reductions of other air emissions, with a total of 35 metrics. At the other end of the spectrum are energy affordability and skilled workforce availability, for which only two and eight metrics were identified, respectively.

Greenhouse gas emissions, energy reliability, water availability, and reductions of other air emissions were the material issues with the largest number of metrics identified.

Table 3-1
Number of metrics identified

Pillar	Material Issue	# of Metrics
Environmental	Greenhouse gas emissions	78
	Reductions of other air emissions	35
	Water quality	24
	Water availability	64
	Habitat protection and biodiversity	17
	Waste management	31
Social	Public safety and health	24
	Employee safety and health	20
	Job satisfaction	12
	Community support and economic development	20
	Engagement and collaboration	10
Economic	Energy reliability	71
	Energy affordability	2
	Skilled workforce availability	8
	Economic viability of electric utilities	32
TOTAL		**448**

To achieve a list of "normalized" metrics, database users can search for "intensity" metrics, which are expressed in relative terms versus absolute terms.

As shown in Figure 3-2, 16 of the 29 interviewees considered "normalized" to be a characteristic of effective metrics. The project team translated this input for wanting "normalized," "benchmarkable," and "comparable" metrics to mean specifically that the metrics are intensity based. In other words, the metrics have a denominator that makes them comparable between organizations. An example is greenhouse gas emission per megawatt hour (MWh) of generation (versus absolute greenhouse gas emissions).

In using the database, it is possible to isolate results that fit this criterion by searching only on "intensity" metrics (defined for this project as metrics that are expressed in relative terms, for example, water consumption per [MWh] of electricity generation). Applying this search filter returns 138 metrics, as shown in Table 3-2. For six of the material issues (community support, energy affordability, engagement and collaboration, habitat protection and biodiversity, public safety and health, and skilled workforce availability), the intensity filter reduces the number of metrics to fewer than five. This may serve as a useful initial step to identify a smaller set of metrics that are most useful for benchmarking performance.

Table 3-2
Intensity metrics

Pillar	Material Issue	# of Intensity Metrics
Environmental	Greenhouse gas emissions	25
	Reductions of other air emissions	17
	Water quality	11
	Water availability	15
	Habitat protection and biodiversity	2
	Waste management	9
Social	Public safety and health	3
	Employee safety and health	13
	Job satisfaction	8
	Community support and economic development	4
	Engagement and collaboration	1
Economic	Energy reliability	15
	Energy affordability	1
	Skilled workforce availability	3
	Economic viability of electric utilities	11
TOTAL		**138**

Filtering on intensity metrics in the database results in 138 metrics.

It also is worth considering the role of lagging and leading. As noted above, lagging metrics typically are output-oriented while leading metrics typically are input oriented. Looking at a lagging metric that measures a specific point in time may not be useful for getting a full assessment of an organization. From the 448 metrics, 413 were classified as lagging and 32 as leading, as shown in Table 3-3.

Looking at a lagging metric that measures a specific point in time may not be useful for getting a full assessment of an organization.

The remaining three were classified as leading/lagging since they contained attributes of both. It is worth noting that no leading metrics were identified for the following four material issues: reductions of other air emissions, waste management, job satisfaction, and community support and economic development.

Table 3-3
Leading and lagging metrics

Pillar	Material Issue	# of Metrics		
		Leading	Lagging	Leading/ Lagging
Environ-mental	Greenhouse gas emissions	2	76	0
	Reductions of other air emissions	0	35	0
	Water quality	1	22	1
	Water availability	4	60	0
	Habitat protection and biodiversity	3	14	0
	Waste management	0	31	0
Social	Public safety and health	1	23	0
	Employee safety and health	7	13	0
	Job satisfaction	0	12	0
	Community support and economic development	0	18	2
	Engagement and collaboration	4	6	0
Economic	Energy reliability	6	65	0
	Energy affordability	1	1	0
	Skilled workforce availability	1	7	0
	Economic viability of electric utilities	2	30	0
TOTAL		**32**	**413**	**3**

The 448 metrics were categorized as leading or lagging, resulting in 413 lagging, 32 leading, and 3 leading/ lagging metrics.

Each metric also was classified in terms of process, outcome, and consequence. The source for this classification system was the GEMI Metric Navigator™ [24] from the Global Environmental Management Initiative (GEMI). Process metrics measure the actions or processes that drive the intended outcomes. They include metrics that measure the performance of management processes, as well as technical and operational processes put in place to produce the intended outcomes (an example metric: programs to improve or maintain access to electricity). Outcome metrics are measurements of results. Many of the existing standards have largely focused on outcome metrics (an example metric: monetary value of charitable contributions). Consequence metrics reflect the consequences or effects on the broader system of the intended outcomes (an example metric: energy saved due to conservation and efficiency improvements).

Process metrics measure processes that drive intended results; outcome metrics measure results; and consequence metrics reflect consequences on the broader system of the intended outcomes.

Reviewing how the metrics spread across this classification system (see Table 3-4), 71% of the metrics (318/448) are outcome metrics, 19% (83/448) are consequence metrics, and the remaining 10% (47/448) are process metrics.

The metrics were further categorized in terms of processes, outcomes, and consequences.

Table 3-4
Process, outcome, and consequence metrics

Pillar	Material Issue	# of Metrics		
		Process	**Outcome**	**Consequence**
Environ-mental	Greenhouse gas emissions	6	60	12
	Reductions of other air emissions	0	33	2
	Water quality	3	17	4
	Water availability	8	50	6
	Habitat protection and biodiversity	4	7	6
	Waste management	2	18	11
Social	Public safety and health	2	9	13
	Employee safety and health	2	13	5
	Job satisfaction	2	7	3
	Community support & economic development	3	10	7
	Engagement and collaboration	4	1	5
Economic	Energy reliability	4	66	1
	Energy affordability	1	1	0
	Skilled workforce availability	3	4	1
	Economic viability of electric utilities	3	22	7
TOTAL		**47**	**318**	**83**

Seventy-one percent of metrics are classified as outcome, 19% as consequence and 10% as process.

One further form of analysis conducted on the metrics was to determine the different ways in which the metrics could be used. Four different usage types were defined, and each metric was assigned between one and four different usage types. The source for the different user types was the GEMI Metric Navigator™ [24]. These usage types are:

Four key usages were identified for sustainability metrics: learning, decision making, accountability, and demonstration.

- **Learning**. These metrics produce understanding and insights into opportunities for improvement through the identification and assessment of impacts and issues. The types of metrics that fit into this category include those that could be used for internal benchmarking (for example, monetary value of charitable contributions).
- **Decision making.** These metrics generate insights to support decision making. This type of metrics typically allows the identification of improvement options (for example, customer satisfaction survey results).
- **Accountability.** These metrics provide information to judge the performance of individuals or functions. These metrics often support reporting to stakeholders as well as tracking of performance (for example, nuclear safety performance or fines for non-compliance with environmental impacts).
- **Demonstration.** These metrics convince or reassure stakeholders about an organization's performance. They serve to promote and demonstrate the business case for sustainability within the organization (for example, economic benefits to the community per unit of value added to the company [24].

Each metric can have from one to four uses based on a company's individual approach.

As stated above, each metric can have as few as one or as many as four uses. Different companies and, indeed, different users within individual companies may use each metric in their own specific way. Within this study, a judgment was made for each metric regarding the usage types it was most likely to support. At the same time, it is recognized that a specific company may have its own interpretation of the relevant usage for each metric.

Looking at the results shown in Table 3-5, almost every metric (445/448) was considered to be an accountability metric. A significant number of the metrics (387/448) were classed as learning metrics. With respect to decision making and demonstration, 23/448 and 43/448 metrics, respectively, were captured. Note that these classifications were professional judgments, may be influenced by perspectives, and may be changed during the next phase of this research.

Table 3-5
Metric uses

Pillar	Material Issue	# of Metrics			
		L	DM	A	D
Environ-mental	Greenhouse gas emissions	74	1	78	2
	Reductions of other air emissions	35	0	35	0
	Water quality	19	3	24	1
	Water availability	54	8	62	1
	Habitat protection and biodiversity	8	3	17	1
	Waste management	30	0	31	0
Social	Public safety and health	22	3	24	7
	Employee safety and health	17	0	20	5
	Job satisfaction	10	0	12	0
	Community support & economic development	12	1	20	9
	Engagement and collaboration	5	1	10	3
Economic	Energy reliability	67	0	71	2
	Energy affordability	1	0	2	0
	Skilled workforce availability	5	0	8	0
	Economic viability of electric utilities	28	3	31	12
TOTAL		**387**	**23**	**445**	**43**

L = Learning
DM = Decision making
A = Accountability
D = Demonstration

Ninety-nine percent of all metrics were classified as accountability metrics; 86% as learning metrics, 10% as demonstration metrics, and 5% as decision-making metrics.

Section 4: Limitations

The methodology applied to this project demands that the results be interpreted with certain limitations in mind:

These research results should be interpreted with several limitations in mind.

- While a comprehensive set of metrics has been identified, it is possible that other sustainability metrics for the electric utility industry are referenced in other sources or used by utilities.
- The project team conducted interviews with 29 utilities. While many of these interviews were conducted with staff that were mapped to the "sustainability" or "environmental performance" functions, other staff were invited on occasion. The interview results summarized in this report are representative of only those interviewed.
- The study captures information at only a single point in time, as opposed to tracking the evolution of attitudes or trends.
- Assignments of metrics by their characteristic (outcome, process, accountability, performance, etc) were based on the best professional judgment of the researchers. These classifications may be changed based on future audits and updates.
- The research focused largely on voluntary sustainability reporting programs and did not include a review of U.S. or international laws, regulations, or policies, such as the U.S. Clean Water Act.
- The research did not assess factors such as the cost-effectiveness of collecting metric data.
- The research did not assess the scientific defensibility of metrics.

Section 5: Conclusions

Applying over 400 metrics to an industry suggests opportunities for greater efficiency, cost savings, and optimization of reporting based on the underlying purpose of the disclosure.

In addition to creating a comprehensive database and interview summary, this research resulted in a number of additional insights. With the number of voluntary reporting options growing, it is important to consider the "right" metrics to use. Applying over 400 metrics to an industry suggests opportunities for greater efficiency, cost savings, and optimization of reporting based on the underlying purpose of the disclosure. Of course, the smaller the number of metrics used, the fewer details captured. The outcome of using only the most efficient list of metrics comes with the tradeoff that the company "stories" are not told. It can be very hard to both tell the details and be efficient in reporting.

For the environmental issues, the primary research behind informing metrics that are useful for forecasting future footprint is not well vetted. There is a lack of scientifically based recommendations, for example, on which corporate performance metrics determine if an electric power company is managing its water footprint sustainably. Indeed, the specifics of sustainability itself are still being defined, and the appropriate strategy is likely organization specific. Still, it is important to select metrics with the best information possible so companies can measure, report, and track performance. The predominant challenge is getting to a smaller set of metrics that are accurate, comparable, scientific, and reflect the whole sustainability story.

The diversity of the electric power industry makes it challenging to identify a set of metrics that applies to all companies.

Several important observations were made during the course of this research. The diversity of the electric power industry makes it challenging to identify a set of metrics that applies to all companies. The industry includes companies that are generation, transmission only, vertically integrated, investor-owned, public, and quasi-governmental. For those that are power generators, their primary fuel may be coal, gas, nuclear, or hydro, for example. Some companies operate over many states and stakeholder profiles, and others are only within one state. A metric that is applicable for one company may not be universally informative for other companies. This makes a general comparison across the entire industry difficult.

The diversity of the industry is one of the foundational issues creating complications for benchmarking. The concept of "normalizing" metrics using an equalizing denominator might be one option for converting purely absolute metrics (total greenhouse gas emissions) into something that may be more appropriately compared between companies who have different profiles (total greenhouse gas emissions *per customers served,* for example). Factors such as the number of customers, number of employees, and miles of transmission lines could be used to normalize metrics. In this study we extrapolated the concept of "normalized," "comparable," and "benchmarkable" to metrics that are characterized as "intensity," or ones with a denominator that converts from an absolute number to one that takes into account company diversity.

For current reporting activities, there is concern that companies are not following the same boundaries for collecting data, protocols for data capture, nor applying consistent auditing practices. This may point to issues with making accurate comparisons between companies, even when using the same metric.

EPRI plans to identify a smaller set of metrics that can be used for industry-wide benchmarking and reporting.

A few useful areas of research have been identified:

- Identification of a smaller set of metrics that can be used for industry-wide benchmarking and reporting. Such an effort could reduce the burden of reporting, saving both companies and customers money. It could be instrumental for informing third-party reporting "standards" on the metrics most useful for assessing performance of the electric power industry.

- Considering the scientific defensibility of metrics could help inform the "right" metrics for predicting future ecological impacts. Not all metrics have primary scientific results linking them to the underlying ecological context, although many metrics are used to suggest the current or future "ecological footprint" of an organization.

- Consideration of metrics that already are required by federal and state laws may be a useful addition to the research, rather than looking only at the metrics used by sustainability reporting programs. If companies are already required by law to report certain performance information, the additional burden of "sustainability" reporting could be minimized by using the same data.

- It will be important to advance consistent protocols for reporting metric data, including consistent boundaries and auditing practices. Without the same process for data collection and audit, benchmarking between companies (even using intensity-based metrics) risks inaccurate comparisons.

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Appendix A: Interview Questions

1. What do you understand *sustainability metrics* means to the U.S. power utility industry?

2. What value do sustainability metrics bring to your organization?

3. What sustainability metrics are you currently using?

4. What are the benefits of power utilities developing these metrics?

5. What characteristics make for effective metrics?

6. What are the potential issues with recording sustainability performance against pre-defined metrics?

7. What attributes would you like to be recorded against each metric?

8. What specific metrics would you like to ensure are included in the database?

9. Do you have any other input regarding this research?

Appendix B: Database Structure

Table B-1
Database Structure

Column #	Column Header	Column Header Description
1	Metric #	The number allocated to the metric
2	Metric	Metric name.
3	Metric Description	Description of the metric.
4	Related Material Issue	The material issue to which the metric relates.
5	Mandatory Metric in the U.S.	Shows whether the metric is mandatory for utilities in the U.S. and is shown by either a "Yes" or a "No."
6	Metric Type	Categorizes the metrics according to the type of output required to measure performance against the metric. They are categorized as follows: • Absolute metrics are quantitative metrics that are recorded in absolute terms. • Absolute and intensity metrics are where metrics are split into multiple parts and the measures of performance require both types of output. • Absolute and qualitative metrics are where the metrics are split into multiple parts and the measures of performance require both types of output. • Intensity metrics are relative metrics where performance on a given measure is normalized. • Intensity and qualitative metrics are where the metrics are split into multiple parts and the measures of performance require both types of output. • Numerical metrics are those where an equation or formula is developed to provide a quantitative representation of performance against the metric. • Qualitative metrics are metrics that are recorded in a non-quantitative way. • Unknown metrics are the type of metric that could not be determined from the information in the source document.

Table B-1 (continued)
Database Structure

Column #	Column Header	Column Header Description
7	Measurement Units	The unit of measure for each metric.
8	Leading/Lagging	Each metric is defined as either a lagging or leading metric: • Lagging metrics are typically output oriented and are relatively easy to measure. They focus on results at the end of a time period and are typically measures of historic performance. • Leading metrics are typically input oriented and much harder to measure. They are typically used as forward indicators of performance against a particular measure (for example, "the percentage of employees eligible to retire in 5-10 years" is a leading indicator of a skills and capability issue in a utility.
9	Metric Classification*	Each metric is further defined in terms of whether it is an outcome, process, or consequence metric: • Outcome metrics are measurements of results. Many of the existing metrics standards, such as the Global Reporting Initiative (GRI), have largely focused on outcome metrics (an example metric: charitable contributions). • Process metrics measure the actions or processes that drive the intended outcomes, (that is, the causes) and are usually tied to the action plans to achieve targets. They include metrics that measure the performance of management processes as well as technical and operational processes put in place to produce the intended outcomes (an example metric: programs to improve or maintain access to electricity. • Consequence metrics reflect the consequences or effects on the broader system of the intended outcomes (an example metric: water sources affected by discharge).

Table B-1 (continued)
Database Structure

Column #	Column Header	Column Header Description
10	Metric Uses—Learning	Learning metrics produce understanding and insights into opportunities for improvement through the identification and assessment of impacts and issues (for example, metrics that allow internal benchmarking or to evaluate alternatives).
11	Metric Uses—Decision Making	Decision-making metrics generate insights to support decision making (for example, metrics that allow the identification of improvement options for the utility).
12	Metric Uses—Accountability	Accountability metrics provide information to judge individuals′ or units′ performance (for example, metrics that can be used to report to stakeholders or to track performance).
13	Metric Uses—Demonstration	Demonstration metrics convince or reassure stakeholders about an organization's performance and trends, including demonstrating the connection between environmental, social and financial performance (for example, metrics that help build a business case or promote sustainable development).
14	CDP	The CDP source where the metric was found (if applicable).
15	GRI	The GRI source where the metric was found (if applicable).
16	Additional Source 1	
17	Additional Source 2	
18	Additional Source 3	The name of any additional sources where the metric was found (if applicable).
19	Additional Source 4	
20	Additional Source 5	

*Source: GEMI Metrics Navigator™ [24].

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