IFRS Sustainability

March 2022

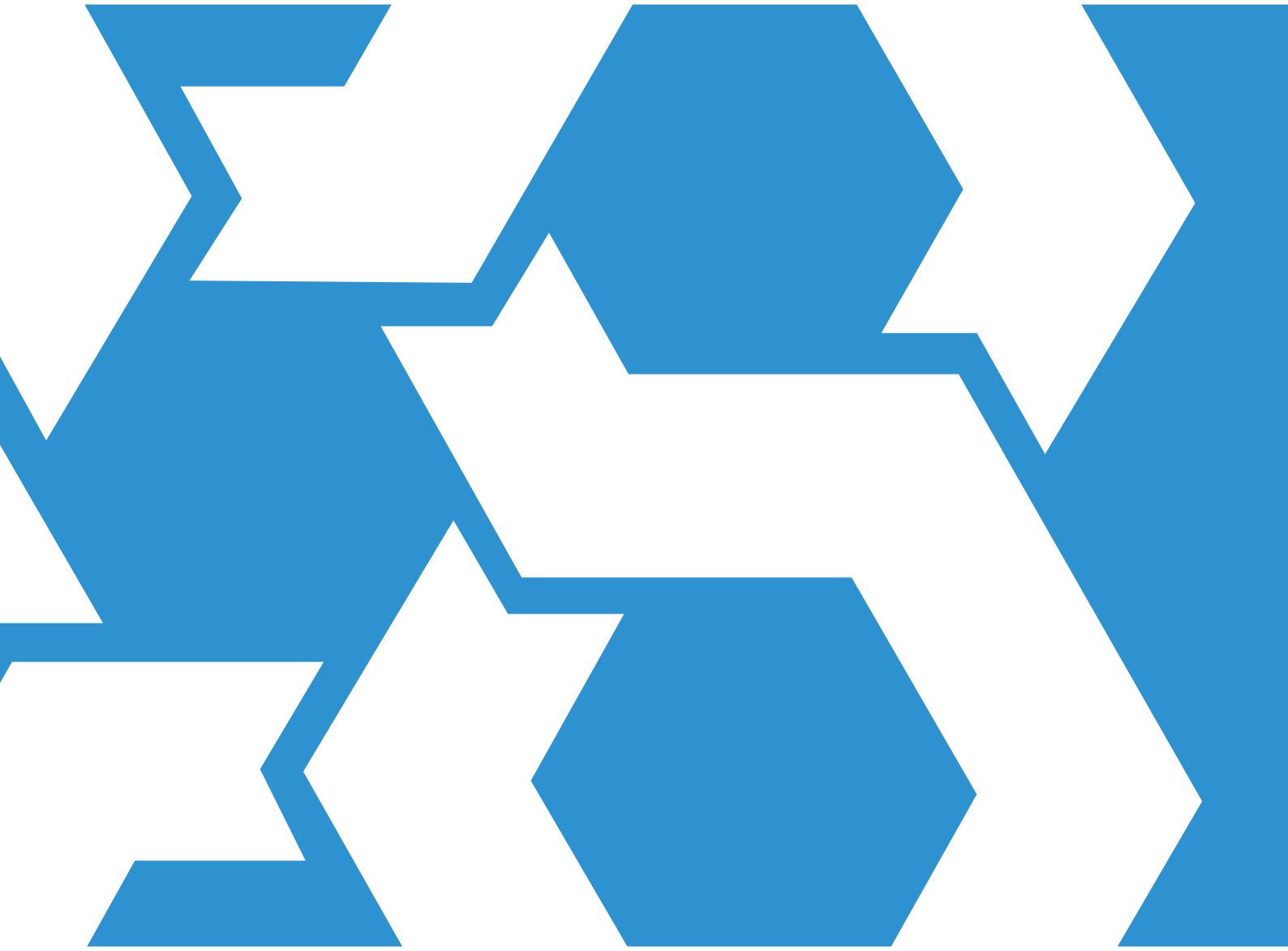
Exposure Draft

IFRS® Sustainability Disclosure Standard

[Draft] IFRS S2 Climate-related Disclosures
Appendix B Industry-based disclosure requirements

Volume B32—Electric Utilities & Power Generators

Comments to be received by 29 July 2022



International Sustainability Standards Board

ED/2022/S2

This industry from Appendix B Industry-based disclosure requirements accompanies the Exposure Draft ED/2022/S2 *Climate-related Disclosures* (published March 2022; see separate booklet). It is published by the International Sustainability Standards Board (ISSB) for comment only. Comments need to be received by 29 July 2022 and should be submitted by email to commentletters@ifrs.org or online at https://www.ifrs.org/projects/open-for-comment/.

All comments will be on the public record and posted on our website at www.ifrs.org unless the respondent requests confidentiality. Such requests will not normally be granted unless supported by a good reason, for example, commercial confidence. Please see our website for details on this policy and on how we use your personal data. If you would like to request confidentiality, please contact us at commentletters@ifrs.org before submitting your letter.

Introduction

This volume is part of Appendix B of [draft] IFRS S2 Climate-related Disclosures *and is an integral part of that [draft] Standard. It has the same authority as the other parts of that [draft] Standard.*

This volume sets out the requirements for identifying, measuring and disclosing information related to an entity's significant climate-related risks and opportunities that are associated with specific business models, economic activities and other common features that characterise participation in this industry.

The industry-based disclosure requirements are derived from SASB Standards (see paragraphs B10–B12 of [Draft] IFRS S2 *Climate-related Disclosures*). Amendments to the SASB Standards, described in paragraph B11, are marked up for ease of reference. New text is underlined and deleted text is struck through. The metric codes used in SASB Standards have also been included, where applicable, for ease of reference. For additional context regarding the industry-based disclosure requirements contained in this volume, including structure and terminology, application and illustrative examples, refer to Appendix B paragraphs B3–B17.

Electric Utilities & Power Generators

Industry Description

The Electric Utilities & Power Generators industry is made up of companies that generate electricity; build, own, and operate transmission and distribution (T&D) lines; and sell electricity. Utilities generate electricity from a number of different sources, commonly including coal, natural gas, nuclear energy, hydropower, solar, wind, and other renewable and fossil fuel energy sources. The industry comprises companies operating in both regulated and unregulated business structures. Regulated utilities maintain a business model in which they accept comprehensive oversight from regulators on their pricing mechanisms and their allowed return on equity, among other types of regulation, in exchange for their license to operate as a monopoly. Unregulated companies, or merchant power companies, are often independent power producers (IPPs) that generate electricity to sell to the wholesale market, which includes regulated utility buyers and other end-users. Furthermore, the industry is divided across regulated and deregulated power markets—referring to how far up the value chain regulated utility operations span. Regulated markets typically contain vertically integrated utilities that own and operate everything from the generation of power to its retail distribution. Deregulated markets commonly split generation from distribution, designed to encourage competition at the wholesale power level. Overall, companies in the industry are challenged with the complex mission of providing reliable, accessible, low-cost power while balancing the protection of human life and the environment.

Note: The SASB Electric Utilities & Power Generators Industry covers activities related only to electricity provision, not to natural gas provision. Some utilities may operate in both electricity and natural gas markets. Utilities undertaking activities related to natural gas sourcing and distribution should also consider the separate Gas Utilities & Distributors Industry Standard (IF-GU).

Sustainability Disclosure Topics & Metrics

Table 1. Sustainability Disclosure Topics & Metrics

TOPIC	METRIC	CATEGORY	UNIT OF MEASURE	CODE
Greenhouse Gas Emissions & Energy Resource Planning	(1) Gross global Scope 1 emissions, percentage covered under (2) emissions-limiting regulations, and (3) emissions-reporting regulations	Quantitative	Metric tons (t) CO_2-e, Percentage (%)	IF-EU-110a.1
	Greenhouse gas (GHG) emissions associated with power deliveries	Quantitative	Metric tons (t) CO_2-e	IF-EU-110a.2
	Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets	Discussion and Analysis	n/a	IF-EU-110a.3

continued...

...continued

TOPIC	METRIC	CATEGORY	UNIT OF MEASURE	CODE
Water Management	(1) Total water withdrawn, (2) total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress	Quantitative	Thousand cubic meters (m^3), Percentage (%)	IF-EU-140a.1
	Number of incidents of non-compliance associated with water quantity and/or quality permits, standards, and regulations	Quantitative	Number	IF-EU-140a.2
	Description of water management risks and discussion of strategies and practices to mitigate those risks	Discussion and Analysis	n/a	IF-EU-140a.3
End-Use Efficiency & Demand	Percentage of electric load served by smart grid technology [31]	Quantitative	Percentage (%) by megawatt hours (MWh)	IF-EU-420a.2
	Customer electricity savings from efficiency measures, by market [32]	Quantitative	Megawatt hours (MWh)	IF-EU-420a.3
Nuclear Safety & Emergency Management	Total number of nuclear power units, broken down by ~~U.S. Nuclear Regulatory Commission (NRC) Action Matrix Column~~ results of most recent independent safety review	Quantitative	Number	IF-EU-540a.1
	Description of efforts to manage nuclear safety and emergency preparedness	Discussion and Analysis	n/a	IF-EU-540a.2
Grid Resiliency	Number of incidents of non-compliance with physical and/or cybersecurity standards or regulations	Quantitative	Number	IF-EU-550a.1
	(1) System Average Interruption Duration Index (SAIDI), (2) System Average Interruption Frequency Index (SAIFI), and (3) Customer Average Interruption Duration Index (CAIDI), inclusive of major event days [33]	Quantitative	Minutes, Number	IF-EU-550a.2

Table 2. Activity Metrics

ACTIVITY METRIC	CATEGORY	UNIT OF MEASURE	CODE
Number of: (1) residential, (2) commercial, and (3) industrial customers served [34]	Quantitative	Number	IF-EU-000.A

continued...

[31] Note to **IF-EU-420a.2** – The entity shall discuss the opportunities and challenges associated with the development and operations of a smart grid.

[32] Note to **IF-EU-420a.3** – The entity shall discuss customer efficiency regulations relevant to each market in which it operates.

[33] Note to **IF-EU-550a.2** – The entity shall discuss notable service disruptions such as those that affected a significant number of customers or disruptions of extended duration.

[34] Note to **IF-EU-000.A** – The number of customers served for each category shall be considered as the number of meters billed for residential, commercial, and industrial customers.

...continued

ACTIVITY METRIC	CATEGORY	UNIT OF MEASURE	CODE
Total electricity delivered to: (1) residential, (2) commercial, (3) industrial, (4) all other retail customers, and (5) wholesale customers	Quantitative	Megawatt hours (MWh)	IF-EU-000.B
Length of transmission and distribution lines [35]	Quantitative	Kilometers (km)	IF-EU-000.C
Total electricity generated, percentage by major energy source, percentage in regulated markets [36]	Quantitative	Megawatt hours (MWh), Percentage (%)	IF-EU-000.D
Total wholesale electricity purchased [37]	Quantitative	Megawatt hours (MWh)	IF-EU-000.E

[35] Note to **IF-EU-000.C** – The length of transmission and distribution lines shall be calculated on a circuit kilometer basis, where a circuit-kilometer is defined as the total length of circuits, regardless of conductors used per circuit.

[36] Note to **IF-EU-000.D** – Generation shall be disclosed by each of the following major energy sources: coal, natural gas, nuclear, petroleum, hydropower, solar, wind, other renewables, and other gases. The scope includes owned and/or operated assets. The scope excludes electricity consumed at the generating facilities.

[37] Note to **IF-EU-000.E** – The scope excludes electricity consumed at the generating facilities.

Greenhouse Gas Emissions & Energy Resource Planning

Topic Summary

Electricity generation represents the largest source of greenhouse gas (GHG) emissions in the world. These emissions, mainly carbon dioxide, methane, and nitrous oxide, are mostly by-products of fossil fuels combustion. The transmission and/or distribution (T&D) segments of the industry are responsible for a negligible amount of its emissions. Electric utility companies could face significant operating and capital expenditures for mitigating GHG emissions as environmental regulations become increasingly stringent. While many of these costs can be passed on to a utility's customers, some power generators, especially in deregulated markets, may not be able to recoup these costs. Companies can reduce GHG emissions from electricity generation mainly through careful planning of their infrastructure investments to ensure an energy mix capable of meeting the emissions requirements set forth by regulations and by implementing industry-leading technologies and processes. Being proactive in cost-effectively reducing GHG emissions can create a competitive advantage for companies and mitigate unanticipated regulatory compliance costs. Failure to properly estimate capital-expenditure needs and permitting costs, or other difficulties in reducing GHG emissions, could result in significant negative impacts on returns in the future in the form of asset write-downs, costs of obtaining carbon credits, or unexpected increases in operating and capital expenditures. Regulatory emphasis on this issue will likely increase in the coming decades, as exemplified by the international emissions-reduction agreement made at the 21st session of the United Nations Conference of the Parties that took place in late 2015.

Metrics

IF-EU-110a.1. (1) Gross global Scope 1 emissions, percentage covered under (2) emissions-limiting regulations, and (3) emissions-reporting regulations

1 The entity shall disclose its (1) gross global Scope 1 greenhouse gas (GHG) emissions to the atmosphere of the seven GHGs covered under the Kyoto Protocol —carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3).

1.1 Emissions of all GHGs shall be consolidated and disclosed in metric tons of carbon dioxide equivalents (CO_2-e), and calculated in accordance with published 100-year time horizon global warming potential (GWP) values. To date, the preferred source for GWP values is the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2014).

1.2 Gross emissions are GHGs emitted into the atmosphere before accounting for offsets, credits, or other similar mechanisms that have reduced or compensated for emissions.

2 Scope 1 emissions are defined and shall be calculated according to the methodology contained in *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard* (GHG Protocol), Revised Edition, March 2004, published by the World Resources Institute and the World Business Council on Sustainable Development (WRI/WBCSD).

2.1 Acceptable calculation methodologies include those that conform to the GHG Protocol as the base reference, but provide additional guidance, such as industry- or region-specific guidance. Examples include, but are not limited to:

2.1.1 *GHG Reporting Guidance for the Aerospace Industry* published by International Aerospace Environmental Group (IAEG)

2.1.2 Greenhouse Gas Inventory Guidance: Direct Emissions from Stationary Combustion Sources published by the U.S. Environmental Protection Agency (EPA)

2.1.3 India GHG Inventory Program

2.1.4 ISO 14064-1

2.1.5 Petroleum Industry Guidelines for reporting GHG emissions, 2nd edition, 2011, published by IPIECA

2.1.6 Protocol for the quantification of greenhouse gas emissions from waste management activities published by Entreprises pour l'Environnement (EpE)

2.2 GHG emissions data shall be consolidated and disclosed according to the approach with which the entity consolidates its financial reporting data, which is generally aligned with the "financial control" approach defined by the GHG Protocol, and the approach published by the Climate Disclosure Standards Board (CDSB) described in REQ-07, "Organisational boundary," of the *CDSB Framework for reporting environmental information, natural capital and associated business impacts* (April 2018).

3 The entity shall disclose (2) the percentage of its gross global Scope 1 GHG emissions that are covered under an emissions-limiting regulation or program that is intended to directly limit or reduce emissions, such as cap-and-trade schemes, carbon tax/fee systems, and other emissions control (e.g., command-and-control approach) and permit-based mechanisms.

3.1 Examples of emissions-limiting regulations include, but are not limited to:

3.1.1 California Cap-and-Trade (California Global Warming Solutions Act)

3.1.2 European Union Emissions Trading Scheme (EU ETS)

3.1.3 Quebec Cap-and-Trade (Draft Bill 42 of 2009)

3.2 The percentage shall be calculated as the total amount of gross global Scope 1 GHG emissions (CO_2-e) that are covered under emissions-limiting regulations divided by the total amount of gross global Scope 1 GHG emissions (CO_2-e).

3.2.1 For emissions that are subject to multiple emissions-limiting regulations, the entity shall not account for those emissions more than once.

3.3 The scope of emissions-limiting regulations excludes emissions covered under voluntary emissions-limiting regulations (e.g., voluntary trading systems), as well as reporting-based regulations ~~[e.g., the U.S. Environmental Protection Agency (EPA) GHG Reporting Program]~~.

4 The entity shall disclose (3) the percentage of its gross global Scope 1 GHG emissions that are covered under emissions reporting-based regulations.

4.1 Emissions reporting-based regulations are defined as regulations that demand the disclosure of GHG emissions data to regulators and/or the public, but for which there is no limit, cost, target, or controls on the amount of emissions generated ~~(e.g., the U.S. EPA Greenhouse Gas Reporting Program)~~.

4.2 The percentage shall be calculated as the total amount of gross global Scope 1 GHG emissions (CO_2-e) that are covered under emissions reporting-based regulations divided by the total amount of gross global Scope 1 GHG emissions (CO_2-e).

4.2.1 For emissions that are subject to multiple emissions reporting-based regulations, the entity shall not account for those emissions more than once.

4.3 The scope of emissions reporting-based regulations does not exclude emissions covered under emissions-limiting regulations.

5 The entity may discuss any change in its emissions from the previous reporting period, including whether the change was due to emissions reductions, divestment, acquisition, mergers, changes in output, and/or changes in calculation methodology.

6 In the case that current reporting of GHG emissions to the CDP or other entity (e.g., a national regulatory disclosure program) differs in terms of the scope and consolidation approach used, the entity may disclose those emissions. However, primary disclosure shall be according to the guidelines described above.

7 The entity may discuss the calculation methodology for its emissions disclosure, such as if data are from continuous emissions monitoring systems (CEMS), engineering calculations, or mass balance calculations.

IF-EU-110a.2. Greenhouse gas (GHG) emissions associated with power deliveries

1 The entity shall disclose gross global greenhouse gas (GHG) emissions associated with electric power delivered to retail customers, resulting from owned power generation and purchased power.

1.1 GHG emissions are defined as emissions to the atmosphere of the seven GHGs covered under the Kyoto Protocol—carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydroflourocarbons (HFCs), perflourocarbons (PFCs), sulfur hexaflouride (SF_6), and nitrogen triflouride (NF_3).

1.1.1 Emissions of all GHGs shall be consolidated and disclosed in metric tons of carbon dioxide equivalents (CO_2-e), calculated in accordance with published 100-year time horizon global warming potential (GWP) values. To date, the preferred source for GWP factors is the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2014).

1.1.2 Gross emissions are GHGs emitted into the atmosphere before accounting for offsets or credits.

2 GHG emissions associated with electric power delivered to retail customers are defined by and shall be calculated according to the methodology established by the numerator in "EPS Metric D-3: Retail Electric Deliveries," contained in the Electric Power Sector Protocol for the Voluntary Reporting Program, June 2009, Version 1.0, provided by The Climate Registry, including 2010 Updates and Clarifications (which clarified that "EPS Metric D-3: Retail Electric Deliveries" was mislabeled as "EPS Metric D-1" in Version 1.0).

2.1 These emissions are generally calculated as the sum of emissions from power generation facilities that are owned by the entity and those from power that was purchased from a third-party, subtracted by the emissions from power that was resold at the wholesale level.

2.2 The scope of GHG emissions shall include all emissions associated from power delivered to retail customers, including emissions associated with power lost in transmission and distribution.

2.3 Emissions factors for power purchased from third-parties are based on the most relevant and accurate method, which will depend on the type of power purchased. The Electric Power Sector Protocol for the Voluntary Reporting Program establishes potential methods.

3 Disclosure corresponds to the numerator in the metric contained in the Electric Power Research Institute's 2018 *Metrics to Benchmark Electric Power Company Sustainability Performance* , "Total CO_2 emissions rate for power deliveries," with the exception of the scope of emissions including all seven GHGs covered under the Kyoto Protocol.

IF-EU-110a.3. Discussion of long-term and short-term strategy or plan to manage Scope 1 emissions, emissions reduction targets, and an analysis of performance against those targets

1 The entity shall discuss its long-term and short-term strategy or plan to manage its Scope 1 greenhouse gas (GHG) emissions.

1.1 Scope 1 emissions are defined according to *The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard* (GHG Protocol), Revised Edition, March 2004, published by the World Resources Institute and the World Business Council on Sustainable Development (WRI/WBCSD).

1.2 The scope of GHG emissions includes the seven GHGs covered under the Kyoto Protocol—carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF_6), and nitrogen trifluoride (NF_3).

2 The entity shall discuss its emission reduction target(s) and analyze its performance against the target(s), including the following, where relevant:

2.1 The scope of the emission reduction target (e.g., the percentage of total emissions to which the target is applicable);

2.2 Whether the target is absolute- or intensity-based, and the metric denominator, if it is an intensity-based target;

2.3 The percentage reduction against the base year, with the base year representing the first year against which emissions are evaluated toward the achievement of the target;

2.4 The timelines for the reduction activity, including the start year, the target year, and the base year;

2.5 The mechanism(s) for achieving the target; and

2.6 Any circumstances in which the target or base year emissions have been, or may be, recalculated retrospectively or the target or base year has been reset.

3 The entity shall discuss its strategy to manage risks and opportunities associated with the GHG emissions regulatory environment, which may include, but are not limited to:

3.1 Any changes it has made or plans to make to its business structure or model

3.2 The development of new technologies or services

3.3 Any changes it has made or plans to make to its operational process, control, or organizational structures

3.4 Influencing the regulatory or legislative process and outcomes, including but not limited to, interactions with regulators, regulatory agencies, utility commissions, legislators, and policymakers

4 The entity may discuss its involvement in green power markets, including the number of customers served (by customer category) and the corresponding electricity generated.

4.1 Green power markets are defined as an optional utility service that allows customers the opportunity to support a greater level of utility company investment in renewable energy technologies.

4.2 The entity may disclose instances where the provision of green power markets are required by state renewable portfolio standards.

5 The entity shall discuss the activities and investments required to achieve the plans and/or targets, and any risks or limiting factors that might affect achievement of the plans and/or targets.

6 The entity shall discuss the scope of its strategies, plans, and/or reduction targets, such as how they relate to different business units, geographies, or emissions sources.

7 The entity shall discuss whether its strategies, plans, and/or reduction targets are related to, or associated with, emissions limiting and/or emissions reporting-based programs or regulations (e.g., the EU Emissions Trading Scheme, Quebec Cap-and-Trade System, California Cap-and-Trade Program), including regional, national, international, or sectoral programs.

8 Disclosure of strategies, plans, and/or reduction targets shall be limited to activities that were ongoing (active) or reached completion during the reporting period.

Water Management

Topic Summary

Electricity generation is one of the most water-intensive industries in the world in terms of water withdrawals. Thermoelectric power plants—typically coal, nuclear, and natural gas—are dependent on large quantities of water for cooling purposes. The industry is facing increasing water-related supply and regulatory risks, potentially requiring capital investment in technology or even resulting in stranded assets. As water supplies tighten in many regions—and electricity generation, agriculture, and community use compete for water supplies in the coming decade—power plants may increasingly be unable to operate at their full capacity, or at all, because of region-specific water constraints. The availability of water is a key factor to consider when calculating the future value of many electricity-generating assets and for evaluating existing proposals for new generation sources. Heightened water scarcity—due to factors such as increasing consumption and reduced supplies as a result of climate change, which could result in more frequent or intense droughts—could prompt regulatory authorities to limit companies' ability to withdraw necessary amounts of water, especially in regions with high baseline water stress. Furthermore, companies must contend with the growing regulations related to the significant biodiversity impacts that such large withdrawals can cause. To mitigate risks, companies can both invest in more efficient water-usage systems for existing plants and place strategic priority on assessing long-term water availability, as well as water-related biodiversity risks, when siting new power plants.

Metrics

IF-EU-140a.1. (1) Total water withdrawn, (2) total water consumed, percentage of each in regions with High or Extremely High Baseline Water Stress

1 The entity shall disclose the amount of water, in thousands of cubic meters, that was withdrawn from all sources.

1.1 Water sources include surface water (including water from wetlands, rivers, lakes, and oceans), groundwater, rainwater collected directly and stored by the entity, and water and wastewater obtained from municipal water supplies, water utilities, or other entities.

2 The entity may disclose portions of its supply by source if, for example, significant portions of withdrawals are from non-freshwater sources.

2.1 Fresh water may be defined according to the local laws and regulations where the entity operates. Where there is no legal definition, fresh water shall be considered to be water that has less than 1,000 parts per million of dissolved solids ~~per the U.S. Geological Survey~~.

2.2 Water obtained from a water utility in compliance with ~~U.S. National Primary Drinking Water Regulations~~ jurisdictional drinking water regulations can be assumed to meet the definition of fresh water.

3 The entity shall disclose the amount of water, in thousands of cubic meters, that was consumed in its operations.

3.1 Water consumption is defined as:

3.1.1 Water that evaporates during withdrawal, usage, and discharge;

3.1.2 Water that is directly or indirectly incorporated into the entity's product or service;

3.1.3 Water that does not otherwise return to the same catchment area from which it was withdrawn, such as water returned to another catchment area or the sea.

4 The entity shall analyze all of its operations for water risks and identify activities that withdraw and consume water in locations with High (40–80 percent) or Extremely High (>80 percent) Baseline Water Stress as classified by the World Resources Institute's (WRI) Water Risk Atlas tool, Aqueduct.

5 The entity shall disclose its water withdrawn in locations with High or Extremely High Baseline Water Stress as a percentage of the total water withdrawn.

6 The entity shall disclose its water consumed in locations with High or Extremely High Baseline Water Stress as a percentage of the total water consumed.

IF-EU-140a.2. Number of incidents of non-compliance associated with water quantity and/or quality permits, standards, and regulations

1 The entity shall disclose the total number of instances of non-compliance, including violations of a technology-based standard and exceedances of quantity and/or quality-based standards.

2 The scope of disclosure includes incidents governed by national, state, and local statutory permits and regulations, including, but not limited to, discharge of a hazardous substance, violation of pretreatment requirements, or total maximum daily load (TMDL) exceedances.

3 The scope of disclosure shall only include incidents of non-compliance that resulted in a formal enforcement action(s).

3.1 Formal enforcement actions are defined as governmental actions that address a violation or threatened violation of water quantity and/or quality laws, regulations, policies, or orders, and can result in administrative penalty orders, administrative orders, and judicial actions, among others. ~~For example, the U.S. Environmental Protection Agency (EPA) provides guidance on the scope of formal enforcement actions in, Informal and Formal Actions, Summary Guidance and Portrayal on EPA Websites.~~

4 Violations shall be disclosed, regardless of their measurement methodology or frequency. These include violations for:

4.1 Continuous discharges, limitations, standards, and prohibitions that are generally expressed as maximum daily, weekly, and monthly averages.

4.2 Non-continuous discharges and limitations that are generally expressed in terms of frequency, total mass, maximum rate of discharge, and mass or concentration of specified pollutants.

IF-EU-140a.3. Description of water management risks and discussion of strategies and practices to mitigate those risks

1 The entity shall describe its water management risks associated with water withdrawals, water consumption, and discharge of water and/or wastewater.

1.1 Risks associated with water withdrawals and water consumption include risks to the availability of adequate, clean water resources, including, but not limited to:

1.1.1 Environmental constraints—such as operating in water-stressed regions, drought, concerns of aquatic impingement or entrainment, interannual or seasonal variability, and risks due to the impact of climate change

1.1.2 Regulatory and financial constraints—such as volatility in water costs, stakeholder perceptions and concerns related to water withdrawals (e.g., those from local communities, non-governmental organizations, and regulatory agencies), direct competition with and impact from the actions of other users (e.g., commercial and municipal users), restrictions to withdrawals due to regulations, and constraints on the entity's ability to obtain and retain water rights or permits

1.2 Risks associated with the discharge of water and/or wastewater, include, but are not limited to, the ability to obtain rights or permits related to discharges, compliance with regulations related to discharges, restrictions to discharges, the ability to maintain control over the temperature of water discharges, liabilities and/or reputational risks, and increased operating costs due to regulation, stakeholder perceptions and concerns related to water discharges (e.g., those from local communities, non-governmental organizations, and regulatory agencies).

2 The entity may describe water management risks in the context of:

2.1 How risks may vary by withdrawal source, including surface water (including water from wetlands, rivers, lakes, and oceans), groundwater, rainwater collected directly and stored by the entity, and water and wastewater obtained from municipal water supplies, water utilities, or other entities; and

2.2 How risks may vary by discharge destinations, including surface water, groundwater, or wastewater utilities.

3 The entity may discuss the potential impacts that water management risks may have on its operations and the timeline over which such risks are expected to manifest.

3.1 Impacts may include, but are not limited to, those associated with costs, revenues, liabilities, continuity of operations, and reputation.

4 The entity shall discuss its short-term and long-term strategies or plan to mitigate water management risks, including, but not limited to:

4.1 The scope of its strategy, plans, goals and/or targets, such as how they relate to different business units, geographies, or water-consuming operational processes.

4.2 Any water management goals and/or targets it has prioritized, and an analysis of performance against those goals and/or targets.

4.2.1 Goals and targets may include, but are not limited to, those associated with reducing water withdrawals, reducing water consumption, reducing water discharges, reducing aquatic impingements, improving the quality of water discharges, and regulatory compliance.

4.3 The activities and investments required to achieve the plans, goals, and/or targets and any risks or limiting factors that might affect achievement of the plans and/or targets.

4.4 Disclosure of strategies, plans, goals, and/or targets shall be limited to activities that were ongoing (active) or reached completion during the reporting period.

5 For water management targets, the entity shall additionally disclose:

5.1 Whether the target is absolute or intensity-based, and the metric denominator if it is an intensity-based target.

5.2 The timelines for the water management plans, including the start year, the target year, and the base year.

5.3 The mechanism(s) for achieving the target, including:

5.3.1 Efficiency efforts, such as the use of water recycling and/or closed-loop systems;

5.3.2 Product innovations such as redesigning products or services to require less water;

5.3.3 Process and equipment innovations, such as those that enable the reduction of aquatic impingements or entrainments;

5.3.4 Use of tools and technologies (e.g., the World Wildlife Fund Water Risk Filter, The Global Water Tool, and Water Footprint Network Footprint Assessment Tool) to analyze water use, risk, and opportunities; and

5.3.5 Collaborations or programs in place with the community or other organizations.

5.4 The percentage reduction or improvement from the base year, where the base year is the first year against which water management targets are evaluated toward the achievement of the target.

6 The entity shall discuss whether its water management practices result in any additional lifecycle impacts or tradeoffs in its organization, including tradeoffs in land use, energy production, and greenhouse gas (GHG) emissions, and why the entity chose these practices despite lifecycle tradeoffs.

End-Use Efficiency & Demand

Topic Summary

Energy efficiency is a low-lifecycle-cost method to reduce greenhouse gas (GHG) emissions, as less electricity needs to be generated to provide the same end-use energy services. Utilities can partake in a wide range of activities to promote energy efficiency and conservation among their customers. Such strategies include offering rebates for energy-efficient appliances, weatherizing customers' homes, educating customers on energy-saving methods, offering incentives to customers to curb electricity use during times of peak demand ("demand response"), and investing in technology such as smart meters, which allows customers to track their energy usage—among many other strategies. These efforts, which save consumers money, can also manifest in lowered operating costs for electric utilities because they can reduce peak demand. Furthermore, depending on the sentiment of the utilities commission in a company's region, energy efficiency can be a regulatory priority before new builds are considered. How an electric utility stands to gain or lose from this trend toward GHG mitigation is significantly predicated on its regulatory environment. Traditional rate structures generally do not give electric utilities an incentive for energy efficiency, and further, they may economically suffer from reductions in customer demand. This is increasingly driving electric utilities, and their regulators and customers, to pursue alternative ratemaking. Such alternative rate design often "decouples" utility revenues from customer consumption, and may also build in explicit incentives for end-use efficiency and demand reductions. Overall, companies whose strategic plan strives to reduce their downside risks from demand fluctuations, gain adequate and timely returns on needed efficiency investments. Further, lowering costs through efficiency initiatives help position utility companies to earn stronger risk-adjusted returns over the long term.

Metrics

IF-EU-420a.2. Percentage of electric load served by smart grid technology

1 The entity shall disclose the percentage of its electric load, in megawatt hours, served by smart grid technology.

1.1 The electric load served by smart grid technology is defined as the amount of electricity delivered to the entity's customers that incorporates the use of smart grid technologies to meet the electricity demand of the consumer.

1.2 A smart grid is defined, consistent with the International Energy Agency (IEA), as an electricity network that uses digital and other advanced technologies to monitor and manage the transport of electricity from all generation sources to meet the varying electricity demands of end users. Smart grids coordinate the needs and capabilities of all generators, grid operators, end users, and electricity market stakeholders to operate all parts of the system as efficiently as possible, minimizing costs and environmental impacts while maximizing system reliability, resilience and stability.

1.3 ~~1.1~~ An electric load is considered to be served by smart grid technology when the technology enables one or more of the distinguishing characteristics ~~set forth in Title XIII of the U.S. Energy Independence Act of 2007.~~ defined by the IEA:

1.3.1 Enables informed participation by customers

1.3.2 Accommodates all generation and storage options

1.3.3 Enables new products, services, and markets

1.3.4 Provides the power quality for the range of needs

1.3.5 Optimizes asset utilization and operation efficiency

1.3.6 Provides resiliency to disturbances, attacks, and natural disasters.

1.4 ~~1.1.1~~ Examples of smart grid technologies include, but are not limited to wide-area monitoring and control, information and communication technology integration, renewable and distributed generation integration, transmission enhancement, distribution grid management, advanced metering infrastructure, electric vehicle charging infrastructure, and customer-side systems ~~demand-response systems, distribution automation, smart inverters, advanced metering equipment, and other smart home and intelligent building control products~~.

~~1.2 According to the Energy Independence Act of 2007, distinguishing characteristics of the smart grid include:~~

~~1.2.1 Increased use of digital information and control technology to improve reliability, security, and efficiency of the electric grid;~~

~~1.2.2 Deployment and integration of distributed resources and generation, including renewable resources;~~

~~1.2.3 Development and incorporation of demand-response programs, demand-side resources, and energy efficiency resources;~~

~~1.2.4 Deployment of "smart" technologies for metering, communications concerning grid operations and status, and distribution automation;~~

~~1.2.5 Deployment and integration of advanced electricity storage and peak-shaving technologies, including plug-in electric and hybrid electric vehicles and thermal-storage air conditioning; and~~

~~1.2.6 Provision of timely information and control options to customers.~~

~~1.3 A smart grid is defined, consistent with the National Institute of Standards and Technology (NIST) Smart Grid Interoperability Standards, as a modernized grid that enables bidirectional flows of energy and uses two-way communication and control capabilities that will lead to an array of new functionalities and applications.~~

2 The percentage of load served by smart grid technology shall be calculated as the total amount of energy load, in megawatt hours, served by smart grid technology divided by the total amount of energy load, in megawatt hours.

~~2.1 The electric load served by smart grid technology is defined as the amount of electricity delivered to the entity's customers that incorporates the use of smart grid technologies to meet the electricity demand of the consumer.~~

3 The entity may discuss the type of smart grid technology through which its electric load is served, the customer types that are utilizing the technology (e.g., residential, commercial, or industrial), whether technologies are owned by the utility or the customer, and any plans for further integration of smart grid capabilities.

Note to **IF-EU-420a.2**

1 The entity shall discuss the opportunities and challenges associated with the development and operations of a smart grid, including, where relevant:

1.1 Demand-response and end-user efficiency opportunities (e.g., smoothing of the demand curve, increased cost-effective electric generation, improved incorporation of distributed generation, and increased generation and transmission efficiency)

1.2 Political and deployment challenges (e.g., opposition to smart grid development, disparate degrees of technology deployment, and economic dis-incentives)

IF-EU-420a.3. Customer electricity savings from efficiency measures, by market

1 The entity shall disclose the total amount of electricity savings delivered to customers, in megawatt hours, from energy efficiency measures during the reporting period, for each of its markets.

1.1 Markets are defined as those operations that are subject to distinct public utility regulatory oversight.

1.2 Electricity savings are defined according to the gross savings approach as the changes in energy consumption and/or demand that results from program-related actions taken by participants in an efficiency program, regardless of why they participated.

1.2.1 The entity may list those markets where it reports electricity savings on a net electricity savings basis, and thus, may be different from the figures disclosed here. Net electricity savings are defined as changes in consumption that are specifically attributable to an energy efficiency program, and that would not have occurred in the absence of the program.

2 Electricity savings shall be calculated on a gross basis but consistent with the methodology set forth in national, state, or local evaluation, measurement, and verification (EM&V) regulations where such savings occur. ~~Examples of U.S. state regulations include, but are not limited to:~~

~~2.1 California Public Utility Commission (CPUC) Decision 09-09-047~~

~~2.2 New York Case 07-M-0458~~

~~2.3 Public Utility Commission of Texas (PUCT) Substantive Rule 25.181~~

~~3~~ ~~Where national, state, or local regulations do not exist, the entity shall calculate energy savings consistent with the measurement and verification methods outlined by the U.S. Department of Energy's (DOE) Federal Energy Management Program (FEMP) M&V Guidelines: Measurement and Verification for Federal Energy Projects, Version 4.0.~~

3 ~~4~~ The scope of electricity savings from efficiency measures includes savings delivered directly by the entity and, where regulations provide, savings substantiated through purchases of efficiency savings credits.

3.1 ~~4.1~~ For any savings from efficiency measures delivered directly by the entity, any efficiency savings credits must be retained (i.e., not sold) and retired or cancelled on behalf of the entity in order for the entity to claim them delivered electricity savings.

3.2 ~~4.2~~ For efficiency savings credits purchased, the agreement must explicitly include and convey that credits be retained and retired on behalf of the entity in order for the entity to claim them.

~~5~~ ~~Relevant regulations governing efficiency savings credits include the following regulations in the U.S.:~~

~~5.1 Connecticut House Bill 7432~~

~~5.2 Nevada Regulation of Public Utilities Chapter 704~~

~~5.3 Pennsylvania Act 129~~

Note to **IF-EU-420a.3**

1 The entity shall discuss regulations related to customer efficiency measures for each of its relevant markets, including:

1.1 The amount or percentage of electricity savings from efficiency measures required by regulations for each market.

1.2 Instances of non-compliance with electricity savings obligations.

1.3 In such instances, the entity shall disclose the difference between the energy savings delivered and the amount required by the regulation.

1.4 Electricity savings delivered that exceed those required by regulations and that resulted in the entity receiving energy efficiency performance incentives, including the value of any such incentives.

~~2~~ ~~Relevant energy-efficiency regulations in the U.S. include, but are not limited to:~~

~~2.1 Illinois Power Agency Act 220 ILCS 5/8-103~~

~~2.2 California Public Utilities Commission Decision 14-10-046~~

~~2.3 Massachusetts Department of Public Utilities Three-Year Energy Efficiency Plan 15-160 to 15-169~~

~~2.4 Texas Senate Bill 1125~~

2 ~~3~~ The entity shall discuss the forms of policy, by each market, that allow for or incentivize energy efficiency, including a discussion of the benefits, challenges, and financial impacts associated with such regulations.

3 ~~4~~ Relevant policy mechanisms to discuss include, but are not limited to:

3.1 ~~4.1~~ Deferral decoupling

3.2 ~~4.2~~ Current period decoupling

3.3 ~~4.3~~ Single fixed variable rates

3.4 ~~4.4~~ Lost revenue adjustments

3.5 ~~4.5~~ Energy efficiency feebates

4 ~~5~~ For markets lacking regulations that allow for or incentivize energy efficiency, the entity shall discuss its stance on and efforts to manage risks and opportunities relating to such regulation.

5 ~~6~~ The entity may discuss any efforts to meet regulations through incentives it has developed for its customers that promote end-use efficiency, including but not limited to, dynamic pricing, energy efficiency rebates, and other measures to subsidize customer energy efficiency.

Nuclear Safety & Emergency Management

Topic Summary

Nuclear incidents, while exceedingly rare, can have significant human health and environmental consequences as nuclear accidents can be severe if they do occur. While owners of nuclear power plants in many regions have operated for decades without any major public safety incidents, the occurrence of infrequent but high-magnitude incidents anywhere in the world can have major impacts on the entire nuclear power industry. Companies that own and operate nuclear plants could face a loss of their license to operate, either entirely or in the operation of nuclear plants, as well as many other financial consequences in the event of an accident—though companies carry insurance and may have legal protections from certain liabilities. Failure to comply with the safety regulations can be extremely expensive to nuclear power operators; in extreme circumstances it can make the continued operation of the plant uneconomical. As a result of significant financial repercussions, both from ongoing safety compliance as well as the materialization of tail risk incidents, companies that own or operate nuclear plants need to be vigilant in the safety compliance, best practices, and upgrades of their facilities. They also need to maintain robust emergency preparedness training for their staff and a strong safety culture. These measures can reduce the probability that accidents will occur and enable a company to effectively detect and respond to such incidents.

Metrics

IF-EU-540a.1. Total number of nuclear power units, broken down by ~~U.S. Nuclear Regulatory Commission (NRC) Action Matrix Column~~ results of most recent independent safety review

1 The entity shall disclose the total number of nuclear power units that it owns and/or operates, where:

1.1 A nuclear power unit is defined~~, consistent with U.S. 10 CFR 50,~~ as a nuclear reactor and associated equipment necessary for electric power generation, including those structures, systems, and components required to provide reasonable assurance that the facility can be operated without undue risk to the health and safety of the public.

2 The entity shall provide a breakdown of nuclear power units that it owns and/or operates by the~~ U.S. Nuclear Regulatory Commission (NRC) Action Matrix Column~~ results of the most recent independent safety review.

~~3 Relevant Action Matrix Columns include, in order of increasing significance:~~

~~3.1 Licensee Response Column~~

~~3.2 Regulatory Response Column~~

~~3.3 Degraded Cornerstone Column~~

~~3.4 Multiple/Repetitive Degraded Cornerstone Column~~

~~3.5 Unacceptable Performance Column~~

2.1 A review is considered independent when conducted by third parties who are not and have not been directly involved with the design or operation of the nuclear power unit.

2.2 For applicable jurisdictions, the entity shall disclose the results of the most recent independent safety review for both regulatory and peer reviews.

2.3 The entity shall disclose the applicable jurisdictional regulation, guideline, or standard under which the safety review was conducted.

IF-EU-540a.2. Description of efforts to manage nuclear safety and emergency preparedness

1 The entity shall discuss its efforts to manage nuclear safety and emergency preparedness, including its efforts to identify, report, and asses initiating events and event sequences relating to nuclear safety and emergency preparedness.

1.1 Initiating events are defined~~, consistent with U.S. 10 CFR 63,~~ as natural or human-induced events that cause an event sequence.

1.2 An event sequence is defined as a series of actions and/or occurrences within the natural and engineered components of a geologic repository operations area that could potentially lead to exposure of individuals to radiation. An event sequence includes one or more initiating events and associated combinations of repository system component failures, including those produced by the action or inaction of operating personnel.

1.3 Disclosure may focus broadly on nuclear safety and emergency management systems, but shall specifically address the systems in place to avoid and manage initiating events, accidents, emergencies, and incidents that could have catastrophic impacts on human health, the local community, and the environment.

2 The entity shall discuss how it manages nuclear safety and emergency preparedness, such as through training, rules and guidelines (and their enforcement), implementation of emergency plans ~~(consistent with those developed in accordance with U.S. 10 CFR 50.47)~~, and use of technology.

3 The entity shall discuss its efforts to create and maintain a culture of nuclear safety and emergency preparedness, including its ~~alignment with the U.S. Nuclear Regulatory Commission's (NRC) Safety Culture Policy Statement and~~ efforts to institute the traits of a positive safety culture, where the traits of a positive safety culture include:

3.1 Leadership safety values and actions

3.2 Problem identification and resolution

3.3 Personal accountability

3.4 Work process

3.5 Continuous learning

3.6 Environment for raising concerns

3.7 Effective safety communications

3.8 Respectful work environment

3.9 Questioning attitude

4 The entity may discuss implementation of the Institute of Nuclear Power Operations (INPO) Principles for a Strong Nuclear Safety Culture and/or the International Atomic Energy Agency's (IAEA) Best Practices in the Utilization and Dissemination of Operating Experience at Nuclear Power Plants.

Grid Resiliency

Topic Summary

Electricity is critical for the continued function of most elements of modern life, from medicine to finance, creating a societal reliance on continuous service. There are potentially high societal costs from major disruptions to electricity infrastructure. Disruptions can be caused by extreme weather events, natural disasters, and cyber attacks. As the frequency and severity of extreme weather events associated with climate change continues to increase, all segments of electric utilities companies—and especially major transmission and distribution (T&D) operations—will face increasing physical threats to their infrastructure. This could result in frequent or significant service disruptions, outages, and the need to upgrade or repair damaged or compromised equipment, all of which may result in substantial costs and damaged perspectives of regulators and customers. The increased usage of smart grid technology has several benefits, including strengthening the resiliency of the grid to extreme weather events. However, this technology can make the grid more vulnerable to cyber attacks, as it provides hackers more entryways into infrastructure systems. Companies need to implement strategies that minimize the probability and magnitude of impacts from extreme weather events and cyber attacks. They can remain competitive in the face of increasing external competition by actively submitting compelling rate cases to improve the reliability, resilience, and quality of their infrastructure.

Metrics

IF-EU-550a.1. Number of incidents of non-compliance with physical and/or cybersecurity standards or regulations

1 The entity shall disclose the total number of instances of non-compliance with physical and/or cybersecurity standards or regulations applicable to electricity infrastructure that is owned and/or operated by the entity.

1.1 The scope of physical and/or cybersecurity standards or regulations includes mandatory, enforceable standards and regulations that are intended to mitigate physical and/or cybersecurity risks related to the reliability and/or resiliency of electricity infrastructure, including the electricity grid.

~~1.1.1 Physical and/or cybersecurity standards or regulations include the North American Electric Reliability Corporation (NERC) Critical Infrastructure (CIP) standards when the standards are applicable to electricity infrastructure that is owned and/or operated by the entity.~~

1.1.1 The entity may disclose instances of non-compliance with ~~1.1.2~~ voluntary physical and/or cybersecurity standards or regulations.

IF-EU-550a.2. (1) System Average Interruption Duration Index (SAIDI), (2) System Average Interruption Frequency Index (SAIFI), and (3) Customer Average Interruption Duration Index (CAIDI), inclusive of major event days

1 The entity shall disclose its (1) System Average Interruption Duration Index (SAIDI), in minutes.

1.1 The SAIDI is defined as the total duration of an interruption for the average customer during the period under reporting.

1.2 The entity shall calculate its SAIDI as the total number of customers interrupted multiplied by the duration of interruptions (i.e., restoration time) divided by the total number of customers served, written as $\sum(r_i \times N_i) / N_T$

1.2.1 $\sum$ = Summation function

1.2.2 r_i = Restoration time, in minutes

1.2.3 N_i = Total number of customers interrupted

1.2.4 N_T = Total number of customers served

2 The entity shall disclose its (2) System Average Interruption Frequency Index (SAIFI).

2.1 SAIFI is defined as the average number of times that a system customer experiences an outage during the period under reporting.

2.2 The entity shall calculate its SAIFI as the total number of customers interrupted divided by the total number of customers served, written as $\sum (N_i) / N_T$

2.2.1 $\sum$ = Summation function

2.2.2 N_i= Total number of customers interrupted

2.2.3 N_T = Total number of customers served

3 The entity shall disclose its (3) Customer Average Interruption Duration Index (CAIDI):

3.1 The CAIDI is defined as the average amount of time required to restore service once an outage has occurred.

3.2 The entity shall calculate its CAIDI as the total number of customers interrupted multiplied by the duration of interruptions (i.e., restoration time, in minutes) divided by the sum of the number of customers interrupted, written as $\sum(r_i \times N_i) / \sum(N_i)$

3.2.1 $\sum$ = Summation function

3.2.2 r_i = Restoration time, in minutes

3.2.3 N_i = Total number of customers interrupted

4 The entity shall disclose its SAIDI, SAIFI, and CAIDI inclusive of major event days, where:

4.1 Major event days are defined, according to IEEE Std 1366, as days in which the daily SAIDI exceeds a threshold value, T_{MED}, where T_{MED} is calculated as follows:

4.1.1 The entity should collect values of daily SAIDI for five sequential years, ending on the last day of the last complete reporting period. If fewer than five years of historical data are available, use all of the available historical data.

4.1.2 If any day in the data set has a value of zero for SAIDI, replace it with the lowest non-zero SAIDI value in the data set—this permits taking the logarithm of every day.

4.1.3 Take the natural logarithm (ln) of each daily SAIDI value in the data set.

4.1.4 Find α (Alpha), the average of the logarithms (also known as the logaverage) of the data set.

4.1.5 Find β (Beta), the standard deviation of the logarithms (also known as the log-average) of the data set.

4.1.6 Compute the major event day threshold, T_{MED}, using the equation: $T_{MED} = e^{(\alpha+\beta)}$.

4.1.7 Any day with daily SAIDI greater than the threshold value T_{MED} that occurs during the subsequent reporting period is a major event day.

Note to **IF-EU-550a.2**

1 The entity shall discuss notable service disruptions such as those that affected a significant number of customers or disruptions of extended duration.

2 For such disruptions, the entity should provide:

2.1 Description and cause of the service disruption

2.2 The total generation or transmission capacity, in megawatts, and population affected by the disruption

2.3 The costs associated with the service disruption

2.4 Actions taken to mitigate the potential for future service interruptions

2.5 Any other significant outcomes (e.g., legal proceedings or related fatalities)

