ELECTRIC UTILITY ALIGNMENT WITH THE SDGs & THE PARIS CLIMATE AGREEMENT

A SCOPING STUDY

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Perrine Toledano, Aniket Shah, Nicolas Maennling, Ryan J. Lasnick

Columbia Center on Sustainable Investment
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Introduction

A.) Purpose and Background

The purpose of this report is to provide a conceptual framework to guide corporate alignment of the electric utility sector with the Sustainable Development Goals (SDGs) and the Paris Climate Agreement (PCA).

The SDGs and the PCA are breakthrough policy agendas for global efforts around sustainable development and climate change. In 2015, the international community formally adopted the SDGs and the PCA to promote sustainable development to achieve economic growth without compromising social inclusion and environmental sustainability. The SDGs put forward a set of seventeen high-level goals, alongside specific and measurable targets and indicators, which would guide development policy in both the high-income and low-income world through 2030. The SDGs marked an evolution from the previous set of development goals, known as the Millennium Development Goals (MDGs), with increased attention on environmental issues, applicability to all countries, and their involvement of various stakeholders, including the private sector and civil society, in their formulation.

The PCA is the first legally binding global agreement to prevent potentially catastrophic impacts of climate change. The PCA calls on its signatories to hold the increase in the global average temperature to, "well below 2°C above pre-industrial levels and pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels."[1] According to the IPCC, for there to be a 66% probability to limit global warming to 1.5°C above the pre-industrial level, the global economy needs to reach net-zero carbon emissions by 2050, and then proceed to negative emissions subsequently.[2] Achieving this goal will require fundamental, deep and rapid shifts in all aspects of the energy, transport, agricultural and industrial systems. Together, these two agreements marked an inflection point in international politics, business, and civil society engagement on the topic of sustainable development.

The electric-utility sector, being at the core of the global energy system, will play a central role in achieving the decarbonization of the world economy and, therefore, efforts to achieve sustainable development. The utility sector is central to global decarbonization efforts with electricity and heat generation making up 41 percent of global emissions in 2017.[3] Furthermore, electricity demand is forecasted to grow significantly, driven by population and economic growth, as well as efforts for broad-based electrification to reduce emissions from the industrial and transport sectors. The decisions of the electric utility sector, through its role in power generation and distribution, will be crucial in determining whether decarbonization of the energy system happens at the needed pace to prevent catastrophic impacts of climate change.

The motivation underlying this report is the growing challenge to understand what it means for an investment to be considered "sustainable" or not. Over the past decade, there has been an increase in global efforts to align business activity and investment behavior with the spirit of sustainable development and climate change. There are many efforts underway around business and sustainability in terms of new industry associations, guiding principles, regulatory proposals, reporting frameworks and evaluation metrics for investors. For example, the UN Global Compact, a UN-driven agency created in 2000 to support responsible business practices, currently has over 10,000 businesses involved.[4]

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Similarly, the UN Principles for Responsible Investing (PRI), has over $85 trillion of global investment capital that is aligned with the organization's six principles of responsible investing.[5] These are just two examples of many dozens of initiatives operating in this topic.

Despite significant activity around private sector alignment with sustainability and climate change, there are four fundamental challenges of this alignment process to date. First, there remains no commonly accepted, mandated standard of sustainability reporting. Organizations such as the Global Report Initiative (GRI) have done an important service in providing frameworks for sustainability reporting, but national regulators do not mandate the use of this framework. Second, there is no commonly accepted definition of what makes a business or a specific investment "sustainable." There are over 125 Environmental, Social and Governance (ESG) data providers that collect and evaluate the sustainability of different investments, ranging from publicly owned stocks to sovereigns.[6] This proliferation of ESG standards has made it challenging for both businesses and market participants to come to common understandings and assessments around sustainability. Third, business alignment with sustainability has generally not focused on critical aspects of business engagement with their supply chains, stakeholders and policymakers. Fourth, many reporting methodologies can be lax in many critical aspects, which opens the way for greenwashing, often giving a relatively free pass to companies that are promising far more than they are delivering.

We believe that the creation of a clear conceptual framework for specific sectors can be a powerful way of focusing the attention of a broad set of stakeholders to pursue meaningful changes for sustainable development. This report is motivated by a belief that conceptual clarity is needed in re-thinking how businesses are or are not promoting sustainable development in general, and the SDGs and PCA specifically. We are hoping to bring rigor to reporting standards to hold companies to account for their real actions, not only their rhetoric. This should result in clearly distinguishing between good and weak performers in the electric utility sector.

B.) Methodology

This report was undertaken with a mixed-methods approach and was conducted in three steps.

First, we conducted desk research and analysis of the current frameworks that exist for corporate sector alignment with the broader sustainability agenda. During this process, we closely examined the various efforts currently underway for corporate sector alignment with sustainability in general and the utility and energy industry specifically. We also participated in a series of normative discussions regarding what the role of business and investment *should* be for the achievement of sustainable development and climate safety. The culmination of this step in the research project was the creation of a conceptual framework for the alignment of business activity with the SDGs and the PCA.

Second, we conducted a broad consultation with industry leaders, policymakers, investors and academics to get feedback on the conceptual framework that we developed. This consultation involved bilateral research meetings with peers across the industry. We also convened a major conference in September 2019 in New York City where we proposed and discussed the conceptual framework.[7]

Third, we developed sector-specific categories for the utilities sector within the broader conceptual framework. These categories sought to bring specificity to the framework for the purposes of the utilities sector. Once those categories were developed, we used the framework to assess how the ten largest electric-utilities in North America and Europe (by market capitalization) were performing. We also cross-referenced the framework and indicators with a large sample of the current initiatives in the space of business alignment with sustainability and climate change.

C.) Structure of Report

This report will be presented in four sections.

First, we propose a four-pillar framework for analyzing corporate alignment with sustainable development in the context of the utility sector.

Second, we evaluate our proposed four-pillar framework with twelve initiatives/frameworks that are already in existence. We identify areas of overlap and divergence between our proposed framework and each of the reviewed frameworks.

Third, we compare this framework with the performance of the ten largest utilities in Europe and the United States, by market capitalization. The ten utilities reviewed are American Electric Power, Duke Energy, Dominion Energy, Électricité de France Energy (EDF Energy), Enel, Engie, Exelon, Iberdrola, NextEra Energy and Southern Company. They all own generation, distribution and transmission assets. To do so, we only used publicly available information (for example, 2019 financial statements, 2018 sustainability reports and related disclosures, press releases) and publicly available tools, such as OpenSecrets.org, Carbon Disclosure Project, Carbon Tracker, Transition Pathway Initiative and InfluenceMap.

Fourth, the final section provides conclusions and recommendations for the next steps.

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Section 1. A four-pillar framework to analyze corporate alignment with sustainable development in the utility sector

The four pillars of the framework aim to answer the following questions:

(1) **Product:** Is the utility a leader in *zero-carbon electricity generation* and is the utility on the path to reach zero carbon emissions by 2050 or earlier?
(2) **Production process:** Is the utility's production process socially and environmentally sustainable?
(3) **Value chain responsibility:** Is the utility's supply and value chain aligned with the SDGs and PCA?
(4) **Citizenship:** Is the utility a good corporate citizen?

Below we outline each of the four dimensions in further detail:

(1) Product: Is the utility a leader in zero-carbon electricity and is the utility on the path to reach zero carbon emissions by 2050 or earlier?

The IPCC states that to limit global warming to 1.5°C by 2030, above which there will be catastrophic consequences, CO2 emissions must decline by 45% from 2010 levels; with the hope of reaching net-zero emissions around 2050.[8] Consequently, this first pillar scrutinizes the utilities' strategies to meet this goal. Utilities can only be PCA-aligned if the timelines of projected CO2 emission intensity (measured as kg of CO2 per MWh for instance), the retirement of fossil fuel capacity, and the ramp up of new clean energy capacity are aligned with what is required according to science. If the trajectories have been validated by the Science Based Target organization that provides third-party validation of whether companies' trajectories are in line with the IPCC's recommendations, it provides additional assurance that companies are on track for timely decarbonization.

To enable their alignment with the PCA's timeline, utilities should use the following instruments:
- Climate scenario planning that is ambitious and in line with not exceeding the 1.5°C scenario by 2050 with a high probability,
- A high carbon price in line with the IPCC (see further explanations below),
- The external verification of the reported Scope 1, 2 and 3 emission estimates.[9]

A utility that takes the climate agenda seriously and embraces its responsibility for achieving the PCA should be transparent on all the above metrics, including disclosing emissions over the three scopes and its exposure to climate change risks. In addition, it should change its incentives structure according to the climate agenda and allocate a meaningful part of senior executives' pay incentive to decarbonization objectives.

Utilities should tap into the potential of the green bond market to channel the trillion-dollar fixed income capital market into clean energy. A study from Boston University reports[10] a significant "untapped potential" in the American utility market and calls on utilities to expand green bond issuance to accelerate the transition of the capital market towards the decarbonization economy.[11] To ensure that green bonds contribute to decarbonization, utilities should disclose what is being financed with the bonds and follow the Green Bond Principles.[12]

(2) Production process: Is the utility's production process socially and environmentally sustainable?

While a utility can situate itself on a decarbonization trajectory in line with science, it could come at the expense of other sustainable development goals. The study, "Mapping the Renewable Energy Sector to the Sustainable Development Goals: An Atlas,"[13] co-authored by CCSI, provides a particularly useful starting point to identify the many points of intersection between renewable energy investments and the SDGs, shedding light on the risks renewable energy operations can pose for sustainable development and human rights.

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The following considerations need to be taken into account in order to not adversely impact other SDGs:

Project design

With the growing number of installed wind farms, solar arrays, and other renewable installations in the coming years, the question of how to dispose of them once retired is becoming acute. According to the International Renewable Energy Agency (IRENA) annual solar PV waste will grow from 43,500–250,000 metric tons in 2016 to 5.5–6 million metric tons in 2050; this is an increase of around 2100% by mid-century.[14] Today when panels are recycled, which seldom happens, only the glass and aluminum are recovered.[15] Utilities should allocate R&D budgets to research renewable specific recycling technology and plan for technology recycling options in the early stages of project development (SDG 12).

Project Siting

The siting of power generation, transmission, and distribution should be decided upon based on a credible, transparent and participatory human rights, environmental, social and health impact assessment (HESHIA). The assessment should not only cover the environmental impacts. Human rights implications of the project should be in line with the UN Guiding Principles on Business and Human Rights. At the core of this analysis sit two main considerations: (1) ensuring that the land acquisition follows due process and respects land tenure and indigenous peoples' collective rights to land (SDG 16), and (2) avoiding competition for non-renewable resources. Avoiding competition for arable land (SDG 2) means "siting land-intensive projects on monitored brownfield sites, former industrial sites, or dual-use sites. These can include capped landfills, abandoned mining sites, former manufacturing sites, or parking canopies, among others."[16] Avoiding competition for water means limiting fresh and non-renewable underground water intake and eliminating polluted waste water.

Moreover, for offshore wind projects, the impact of coastal communities and marine fauna should be assessed and mitigated as these will be most likely affected by project development (SDG 14) and by climate change implications as sea-level rise.[17]

To avoid conflicts of interest between the consulting company performing the social, environmental and human rights impact assessment and the utility, the assessment should be participatory in nature and the results should be made public. The same should be the case for audits during the life of the project (SDG 16).

Genuine consultations with stakeholders should continue during the life of projects through closures. It should avoid "risks of cancellation of licenses or permits, project disruption and delay, bad press, unintended environmental impacts, environmental or economic liabilities, and increased remediation costs, among others."[18]

Production

During this phase, the project should first avoid then minimize, mitigate and remediate human rights, environmental and social impacts. Mitigation recommendations from the HESIA should be implemented. In particular, the project should recycle and reuse water and waste to the extent possible based on the latest available technologies (SDG 6 and 12). Fortunately, renewable energies are much less water intensive than thermal energies.

Utilities should closely monitor methane emissions at its gas facilities (SDG 13). While it has a shorter lifetime, methane is 80-100 times more potent in terms of global warming potential than CO2.[19] Today, methane emissions mostly stem from operations of gas transmission and distribution networks. Leakages often occur when these networks are tested, maintained or shut down. Utilities should develop appropriate techniques to minimize emissions from its gas operations while these are phased out and substituted by renewable energy sources.

Utilities, as any other company, share the responsibility for implementing SDGs 5,8 and 10 by adopting strong labor policies, in line with the International Labor Organization's conventions and recommendations, that are gender sensitive, free from discrimination and respect workers' right to collective bargaining and freedom of association. Furthermore, utilities should also play a critical role in achieving social equity in power access and pricing by deploying outreach programs to socially marginalized populations.

Closure

Closure should be anticipated. This means that reclamation should be provisioned for during the life of the project and social plans should be designed early on to ensure a transition of the workforce and regions depending on the power infrastructure. While most of the world is precipitating towards retiring coal assets prematurely, which implies that the above steps are not tackled properly, these steps should be properly anticipated for gas infrastructures (which need to be retired by 2050) and for renewable energy projects when they close.

(3) Value chain responsibility: Is the company's entire supply and value chain aligned with the SDGs and PCA?

In the spirit of SDG 17, which foresees partnerships to achieve sustainable development, stakeholders along global value chains should work together and share the responsibility to achieve the SDGs and the PCA. The utility sector, therefore, should not only focus on producing and distributing zero carbon electricity, but also seek to work together with upstream suppliers and downstream consumers to improve social, environmental and climate impacts from the electricity value chain.

The utility sector is a key enabler of the main pillars of the world's decarbonization: energy efficiency and decarbonization of electricity, transportation, building heating and cooling sectors, as well as the heavy energy intensive industry (cement, steel, plastic).[20] Utilities should therefore seek to partner with electricity end users to ensure their electrification through:

- Installing charging stations for Electric Vehicles (EV) to accelerate e-mobility and work with car companies to develop pricing models that incentivize purchases of EVs;[21]
- Collaborating with heavy industry and heavy transportation (aviation, ships) to ensure that the use of synthetic fuels relies on green electricity; for instance, hydrogen can replace coking coal in steel making but this heavy industrial process will only get decarbonized if it relies on green hydrogen, ie where renewable energies instead of fossil fuels are used to separate hydrogen from water. As of today only 4% of the global hydrogen production is by water electrolysis;[22]
- Collaborating with authorities and waste generating sectors to develop bio-gas out of waste;
- Collaborating with the building sector and authorities to incorporate decarbonization regulations and incentives into building codes and make consumers aware of electrification options such as heat;
- Collaborating with all relevant actors for urbanization to develop smart cities that use advanced technologies and big data to effectively and sustainably manage everything from transport to the use of energy or water resources in building and public spaces with the goal to reduce energy consumption and reduce CO2 emissions;[23]
- Collaborating with all sectors on solutions to energy efficiency.

The increasing electrification of the economy and additional sourcing from intermitted electricity generation might lead to considerable saturation of the grid if not properly anticipated and planned for. This may have considerable economic and social consequences. For instance, in the United States, it is anticipated that by 2050 electricity demand will increase by 85%, requiring 800GW of additional power generation and $200-$600 billion investments in the transmission networks.[24] Utilities should help ensure the reliability of the grid in a changing energy system. To do this, utilities should implement activities and business models, including:

- Educating consumers on energy efficiency, and provide tools to achieve this;
- Supporting the development of smart grids that self–regulate multiple sources of power generation and uses to compensate for the variability of renewable energy;
- Investing in the deployment of innovative battery systems;
- Deploying smart meters, and devising demand-response services that reward off-peak energy consumption;
- Developing prosumer models where homes and businesses can produce and sell energy back to the grid;
- Contributing to the development of distributed renewable energy such as community solar projects and mini grids to take advantage of the decentralized energy opportunities while not over-investing in transmission and distribution infrastructure;[25]
- Mobilizing the latest technologies, such as artificial intelligence, to better understand the distribution network, consumer demand, and home electrical

devices, and share that knowledge in real-time over the web;[26]
- Collaborating with other utilities across borders and supporting governments in overseeing the development of international interconnected grids as "a more extended grid reduces the variability of power generation relative to the average load and therefore reduces the need for energy storage as a percentage of the average load."[27]

The utility sector can also leverage its purchasing power to influence its supply chains to adopt sustainable practices. This can be done by sourcing materials and products from manufacturers with adequate labor standards, reduced carbon footprints, and records of responsible practices. Furthermore, the sector can collaborate with upstream and downstream actors to develop systems to measure and monitor Scope 3 greenhouse gas (GHG) emissions, and develop programs to reduce these. Because the consensual GHG protocol, adopted by 90% of companies reporting to ESG standards,[28] makes Scope 3 emissions part of the carbon footprint measurement of every company,[29] actors along the value chain have a vested interest to work together to achieve the PCA. Scope 3 emissions for utilities are often associated with the transport of their employees, the transport of fuel, the supply chain, the energy purchased from third parties for sale to end customer.

(4) Citizenship: Is the company a good corporate citizen?

Good corporate citizenship means that corporations have obligations to serve society as a whole, not just the interests of investors, employees or customers. Good corporate citizenship also means that corporations should not undermine directly or indirectly the global goals of the SDGs and the PCA. Good corporate citizenship implies that societal responsibility should underpin every part of the business and corporate governance system.

For the utility sector this means contributing to the achievement of the climate goals by:

- Respecting safety regulations and fulfilling emission targets
- Proactively engaging with planners and regulators regarding the implementation of the energy transition as many aspects of the new economy and energy systems remain to be defined to support sustainable and inclusive growth
- Proactively engaging in public-private-partnerships and sector-wide R&D initiatives to ensure the fast development and deployment of adequate technologies
- Avoiding undermining climate-oriented policy making, including through industry association membership. This aspect is fundamental as there is "growing recognition that a corporation's influence over policy and regulations may have a far more profound impact on climate change than physical emissions associated with operations, suppliers & products,"[30] as it has been evidenced by Influence Map in the context of the United States (US).[31] While companies should be consulted in policy-making and their technical support is welcome to promote the achievement of the SDG and PCA, financial support on their part to policy making, parties, and US Political Action Committees (PACs) should stop.
- Partnering with educational institutions and consumers on topics related to the energy transition and climate change
- Contributing to technology transfer efforts to developing countries to enable them to embrace the energy transition in a timely manner

Apart from supporting the achievement of the PCA, good corporate citizenship in the utility sector includes:

- Help achieve gender equality at all levels, but in particular at senior levels, and implement targets and implement equal pay (SDG 5)
- It doesn't undermine public funding accumulation by embarking in dishonest and aggressive tax planning and tax avoidance strategies through tax base erosion and profit shifting (BEPS) schemes that exploit gaps and mismatches in tax rules to avoid paying tax. On the contrary, a good corporate citizen collaborates with the OECD/G20 Inclusive Framework on BEPS signed up by 130 countries[32] (SDG 1, 16 and 17)
- Putting in place an independent board of directors that supervises SDG compliance and particularly climate change strategies. This also means that the CEO should not be the chairman of the Board of Directors, which is the case in many companies[33]

Table 1: Summary of the Four-Pillar Framework in the context of the Utilities' Activities

Pillar 1	Pillar 2
Reach net zero emissions by 2050 or earlier. Use carbon intensity targets (Co2/MWh) trajectory in line with science based targets Set timeline for fossil fuel retirements and new renewable capacity to reach carbon neutrality by 2050 Adopt climate scenario planning in line with ambitious well below 2 degree scenarios. Disclose climate risk exposure and climate mitigation plans Use high internal carbon price in line with IPCC Externally verify and disclose scope 1, 2 and 3 emissions Allocate part of senior executives' pay to decarbonizataion objectives Participate in green financing initaitives	Follow consultations and due process in land aquisition Have systems in place to avoid or mitigate competition for arable land Minimize fresh water intake, recycle and reuse water and use the latest technologies in doing so Mimize waste and environmental impacts through latest inovations. Implement recylcing plans during early stages of project Mitigate methane leakage at gas plants and pipelines Power operations with renewable energies Adopt strong labor policies Embrace a human rights policy aligned with UNGP principles for both workers and surrounding communities Conduct inclusive consultations prior to project development through to project closure Adopt a credible, transparent, participatory and accountable ESHIA processes from baseline measurement to frequent monitoring Build resilience and adaptative capacity of project affected communities Adopt social equity in power pricing and conduct corporate outreach to marginalized communities including access to energy services Help implement compensation schemes for coal producing regions Anticipate and plan for closure

Table 1: Summary of the Four-Pillar Framework in the context of the Utilities' Activities

Pillar 3	Pillar 4
Contribute to development of smart city models Linkage with non-energy sectors for the electrification of end uses (battery electric vehicles (BEVs), heat pumps for residential and commercial buildings or electric cooking) Help provide green electricity to the fabrication of green synthetic fuels for the hard to abate sectors Accelerate the e-mobility revolution through fast deployment of charging stations Ensure the reliability of the grid in a changing environment and growing electrification demand through the use of the latest technologies, the development of smart grids, prosumer models and support to distributed energy Support the development of interconnected grids Support the development of energy efficiency measures and systems across industries and with consumers Maximize resources to analyze and quantify Scope 3 emissions Develop systems to identify and monitor supply chain impacts, especially as they relate to scope 3 emissions but also environmental impacts, labor protections, human rights	Respect and fulfill emissions and safety regulations Avoid agreessive tax planning and the use of tax havens Adopt responsible and tranparent participation in policy-making that includes not undermining climate-oriented policy making Don't make any monetary contributions to politics and political parties Pro-actively engage with planners and regulators to implement the energy transition Proactively engage with public-private-partnerships and sector-wide R&D Initiatives Adopt diversity targets across firm Pay equity at all levels Ensure independence on the Board of Directors Ensure board-level oversight responsibilities for Paris Alignment Partner with educational institutions and consumers on energy transition and climate education Contribute to technology transfer to developing countries for them to embrace the energy transition

Section 2. Benchmarking the current reporting initiatives and standards against the four-pillar framework

In this section, we evaluate our proposed four-pillar framework with fourteen initiatives that are already in existence. We identify areas of overlap and divergence between our proposed framework and each of the reviewed initiatives.

Understanding that there are many initiatives currently in the field to evaluate corporate sustainability, we determined a sample to use in our assessment. In this sample, we wanted to ensure that the following types of initiatives were represented: 1) peer-to-peer based comparison, 2) standard based comparison, 3) climate specific initiatives, and 4) utility sector specific initiatives (see definitions in the adjacent box). Across these types we then made sure to have a representation of guidelines, reporting frameworks and rating assessments.

When analyzing each initiative, we looked at whether they address each dimension of our four-pillar framework (see table 1). If they addressed one of the dimensions they were given a check, if they did not address the dimension the box was left blank. We then calculated a score of High, Medium, or Low to analyze the overlap of each existing initiative to our four-pillar framework. If an initiative overlapped with more 75% of a pillar they were given a High mark. If they overlapped between 25-75% they were given a Medium mark. If they overlapped with less than 25% they were given a Low mark.

The below initiatives are organized based on their overlap with our four-pillar framework; with the most adherence first and the least last. When frameworks score the same the order with which they are presented is arbitrary. The objective of this assessment is not to criticize any of the reviewed initiatives, but rather to show what dimensions are analyzed.

Box: Definitions

Guidelines: This is a set of recommendations and principles to improve corporate sustainability.

Reporting Framework: A framework turns sustainability guidelines into a reporting instrument on sustainability.

Rating system: An initiative that rates and sometimes ranks corporations using a scoring system.

Peer-to-peer comparison: An initiative that analyzes corporate performance in comparison to other companies that are in the field. Traditionally this is done as a rating.

Standard-based comparison: An initiative that use a recognized high standard to analyze corporate sustainability.

Climate-specific: An initiative that places a specific emphasis on climate impacts from corporate actions.

Utility-specific: An initiative that has either specific questions related to, or are created solely for, the analysis of the utility sector.

Photo Credit: Chelsea on Unsplash

Carbon Disclosure Project ("CDP")[34]

Overview: **The CDP has a high overlap with our framework.** The CDP is an environmental rating system that analyzes company performance related to climate change, water security, and forests. The CDP is not utility specific, but does have a utility section within its scoring scenarios. The scoring system analyzes a company's approach to disclosure, awareness, management, and leadership. These four dimensions are used to look at the effect a company has on climate change, forests, and water security. The initiative uses TCFD recommendations to focus on risk assessment, planning and management across the financial industry as well as questions around how the identified risks have been built into the financial planning process.

Pillar 1: **High overlap.** The CDP places a high emphasis on climate impact with a detailed questionnaire leading to disclosure on all aspects covered by Pillar 1.

Pillar 2: **High overlap.** Throughout its thematic reporting (climate, water and forest) CDP assesses the sustainability of the production processes (use of renewable energies to power operations, minimization of waste and water intake, minimization of methane emissions) but currently it does not look at company interaction with project affected communities.

Pillar 3: **High overlap.** The CDP has specific questions related to engagement with the value chain and computation of Scope 3.

Pillar 4: **Medium overlap.** The CDP has recently adopted a new questionnaire that takes into account the TCFD's recommendations on governance and corporate accountability. There are extensive questions on board oversight for sustainable practices, existing of lobbying efforts, but no requirement to report on internal practices (ie: diversity targets, pay equity, and responsible tax practices).

Sustainalytics[35]

Overview: **Sustainalytics has a high overlap with our framework.** Sustainalytics is a private ESG rating system that was created to analyze the risk arising from environmental, social, and governance factors. Ratings are performed for various sectors including the utility sector. The ratings are composed of three building blocks that contribute to a company's overall rating: Corporate Governance, material ESG issues, and idiosyncratic ESG issues.

Pillar 1: **High overlap.** Sustainalytics monitors the policies and programs introduced by companies to limit carbon emissions in order to see where adjustments and improvements need to be made within the organization. The Sustainalytics evaluation pays particular attention to Scope 1 and 2 emissions which overlaps with what is seen in our Pillar 1.

Pillar 2: **Medium overlap.** Sustainalytics addresses company's environmental usage such as water usage and waste management. Utilities are rated according to their human rights practices and community relations. Sustainalytics leaves out targets on methane leakage.

Pillar 3: **Medium overlap.** Sustainalytics includes environmental and social supply chain incidents when rating utilities. The extent to which utilities are engaging their customers with eco-efficiency programs is also measured.

Pillar 4: **High overlap.** The governance pillar of Sustainalytics includes tax disclosure, as well as events related to lobbying, bribery and corruption, as well as business ethics. The bottom up assessments of Sustainalytics include whether the company has separated the function of the board chairman and CEO.

World Benchmarking Alliance ("WBA")[36]

Overview: **The World Benchmarking Alliance has a high overlap with our framework.** The WBA is a relatively new standard that was launched in 2018 to help monitor corporate progress towards the SDGs. The initiative uses a benchmark system, to be publicly available, that covers food and agriculture, climate and energy, digital inclusion and gender equality, and empowerment to identify keystone companies whose contribution will be vital to achieving the SDGs. It will also rank the world's 2,000 largest companies on their contributions to the SDGs. Some of the first set of benchmarks are still under development. The Seafood Stewardship Index and Automotive Benchmark were launched in 2019, with more coming in 2020 and beyond. The methodology for the Utility Benchmark was published in February 2020. All 2,000 companies are set to be benchmarked by 2023.

Pillar 1: **High overlap.** The WBA is developing proposed benchmarks to look at decarbonization and a transition to clean energy. The goal of the proposed benchmarks is to independently and objectively measure the performance of companies across three industries (one of which will be the electrical industry) that have a major impact on climate change on their contribution to limiting global warming to well below 2°C, using CDP and TCFD data, which should align well with our Pillar 1.

Pillar 2: **High overlap.** Much of the data for the climate and energy benchmark comes from CDP, which aligns well with some of our Pillar 2. The WBA also uses the corporate human rights benchmark[37] to benchmark companies' human rights performance but the utility sector isn't covered. In addition, the WBA will be assessing all companies on core social criteria (the respect for human rights and due diligence and commitments to respect core labor rights) and the results of these core social assessments will impact on the scoring against the decarbonization assessment to underscore the importance to achieve a just transition. Additional social indicators may be added as part of just transition benchmarking (such as managing issues relating to land, water and indigenous people's rights). The WBA mentions the circular economy as one of the transformations they are looking at but how it will be measured remains unclear.

Pillar 3: **Medium overlap.** The WBA plans to address ways that corporations can sustainably source and monitor actions along their value chain, but it is not currently clear what the exact benchmark will be beyond what is already in CDP.

Pillar 4: **Medium overlap.** The core social indicators will provide a high level assessment of companies' approaches to gender equality, tax planning, anti-corruption, political influence/lobbying. There is no mention in any WBA proposed benchmark of measuring utilities' internal policies regarding technology transfer or education on climate change.

The European Union (EU) Sustainable Finance Taxonomy[38]

Overview: **The EU Taxonomy has a high overlap with our framework.** The EU Taxonomy is a proposed initiative created by the European Parliament to regulate and facilitate sustainable investment. The proposal aims at the creation of a unified EU classification system with technical screening criteria for economic activities that "can make a substantial contribution to climate change mitigation or adaptation, while avoiding significant harm to the four other environmental objectives." It aims at creating a common language to spur sustainable finance and it is to be integrated into EU-level requirements for financial market participants that market "environmentally sustainable" within the EU. After reaching a common understanding between co-legislators in December 2019, the taxonomy for green economic activities is now subject to approval by the European Parliament and the Council. The taxonomy is expected to take effect in 2021. The proposed taxonomy would be the most in depth initiative that currently exists. The aim of the taxonomy is to:

Pillar 1: **High overlap.** The EU Taxonomy has a detailed analysis of both mitigation and adaptation processes that can be done by the electricity generation industry to meet the proposed taxonomy criteria. The taxonomy requires a detailed strategy on company Scope 1 and 2 emissions as well as a future retirement strategy.

Pillar 2: **Medium overlap.** The taxonomy's six objectives are climate change mitigation; climate change adaptation; sustainable use and protection of water and marine resources; transition to a circular economy, waste prevention and recycling; pollution prevention and control; protection of healthy ecosystems. As such, the taxonomy closely aligns with the environmental dimensions of Pillar 2 but does not address its social dimensions.

Pillar 3: **High overlap.** One of the main promises of the proposed taxonomy is to better understand the linkages between corporations and all steps along the supply chain and between sectors (energy, transport, agriculture and building) so in that sense the overlap with Pillar 3 is high.

Pillar 4: **Low overlap.** The taxonomy does not address corporate citizenship.

Global Reporting Initiative ("GRI")[39]

Overview: **The GRI has a high overlap with our framework.** The GRI is an initiative for company sustainability reporting. The GRI standards were designed to provide a set of guidelines for companies to analyze their economic, environmental, and social impacts. The initiative is structured as a set of interrelated standards. They are primarily used to help an organization prepare a sustainability report which is based on a set of principles and focuses on topics across all fields.

Pillar 1: **Medium overlap.** The GRI asks for company strategy on Scope 1 and 2 emissions, but does not require participation in green finance, or external verification of Scope 1,2, and 3 emissions.

Pillar 2: **High overlap.** The GRI asks companies to develop an extensive reporting system on their products' environmental impact. The subcategories within the environmental chapter are: energy, water, biodiversity, emissions, waste, environmental compliance, and materials. The GRI only mentions methane leakage as a contributor to GHG emissions, but there is no indicator to measure the emission minimization effort. Similarly, GRI has an extensive social chapter.

Pillar 3: **Low overlap.** The GRI only asks for a cursory company response to Scope 3 emissions and does not require in depth analysis on the linkages between non-energy sector companies. It does require reporting on a company's system to assess the environmental and social impacts of suppliers.

Pillar 4: **High overlap.** The GRI has an entire section dedicated to a company's sustainability governance structure. The GRI's social chapter pays particular attention to responsible and proactive engagement in policy making (standard GRI 415) and has released a new reporting standard called: "GRI 207: TAX 2019." In particular, it will "promote disclosure of the reasons for difference between corporate income tax accrued and the tax due if the statutory tax rate is applied to profit/loss before tax."[40] GRI's social chapter also covers questions related to diversity and pay equity.

Sustainability Accounting Standards Board ("SASB")[41]

Overview: **The SASB has a medium overlap with our framework.** The SASB is a rating system used to help streamline company reporting on sustainability concerns. It has a utility specific standard. The SASB reflects the governance and management of a company's environmental and social impacts arising from the production of goods and services, as well as its governance and management of the environmental and social capitals necessary to create long-term value. The SASB provides a quantitative measurement of the environmental impact as well as breaking down the specific method a company must use to comply with each measurement. However, it does not have specific questions on corporate responsibility or governance.

Pillar 1: **High overlap.** The SASB specifically analyzes a company's reporting on Scope 1 and Scope 2 emissions. SASB uses a scenario analysis to look at company emissions planning and timeline.

Pillar 2: **Medium overlap.** The SASB has several environmental questions related to waste minimization, water usage and grid electrification. There are also questions used to analyze processes along the grid such as management, affordability, and efficiency, but it does not look at relationships with host and affected communities.

Pillar 3: **Medium overlap.** The SASB requires downstream energy stewardship reporting on customer electricity savings resulting from efficiency measures. It also requires utilities to report on the percentage of electric load served by smart grid technology. It lacks requirements for utilities to report on Scope 3 emissions as well as putting on place monitoring systems for the supply chain.

Pillar 4: **Low overlap.** The initiative involves reporting on sustainability management practices, such as board oversight, but it is lacking in overall reporting on corporate citizenship. There no mention of best practices in fair tax adherence and pay equity. The SASB gives companies the choice of whether or not to make lobbying efforts public.

OECD Guidelines for Multinational Enterprises[42]

Overview: **The OECD MNE Guidelines have a medium overlap with our framework.** The OECD MNE Guidelines is a non-binding initiative of recommendations for corporate social action. The Guidelines are not sector or areas specific. The Guidelines provide principles and standards of good practice that companies should follow. The guidelines relate specifically to sustainable stakeholder engagement. It offers practical tools and approaches for managing risks and responding to challenges with the objective of promoting meaningful stakeholder engagement as an integral component of due diligence.

Pillar 1: **Low overlap.** The OECD guidelines do not cover product questions, which is here related to climate issues.

Pillar 2: **Medium overlap.** The OECD guidelines are not tailored to the utility sector and do not address sector specific impact on the environment. Despite this, there are general questions on policies regarding affected communities, avoiding land competition, human rights, labor policies and environmental management system.

Pillar 3: **Low overlap.** Responsible supply chain management is at the core of the guideline but since this is not a utility-specific framework many other issues are not covered, in particular those that pertain to linkages with downstream sectors.

Pillar 4: **High overlap.** The OECD guidelines succeed in analyzing the ethical practices of a company (ie:

bribery and political contribution) and there are extensive questions on company tax policies and the need for a company to disclose taxation. There is no mention of diversity, and board oversight.

Task Force on Climate-related Financial Disclosures ("TCFD")[43]

Overview: **The TCFD has a medium overlap with our framework.** The TCFD is a voluntary climate based disclosure initiative set up to create a set of recommendations on climate-related financial risk. The TCFD is not utility specific, but does address the utility sector in its recommendations. The TCFD is built around four thematic areas that represent core elements of how companies operate: governance, strategy, risk management, and metrics and targets. These pillars or recommendations are supported by eleven disclosures aimed at helping investors and others to understand how reporting companies assess climate-related risks and opportunities.

Pillar 1: **High overlap.** The TCFD reports on Scope 1,2, and 3 emissions as well as requires company data on fossil fuel retirements and climate scenario planning.

Pillar 2: **Medium overlap.** The TCFD encourages the inclusion of metrics on climate-related risks associated with water, energy, land use, and waste. There is no mention of affected communities and how company procedures/practices can potentially harm host countries. The initiative does not address human rights practices.

Pillar 3: **Low overlap.** The TCFD recommendations ask for an improvement in technology to monitor the CO2 emissions of products along with all steps of the value chain as well as measuring climate risks and opportunities along the value chain. It doesn't refer to the other aspects of Pillar 3 such as collaboration with the downstream sectors to accelerate electrification.

Pillar 4: **Low overlap.** The initiative is lacking in its analysis of corporate governance. The TCFD does not do a systematic analysis of company procedures and internal practices, instead of focusing on the output of companies. It ignores important data points like diversity, pay equity, and education or technology transfer. There is little mention in the initiative of the impact of company lobbying and no mention of responsible tax practices.

Climate Action 100+[44]

Overview: **Climate Action 100+ has a medium overlap with our framework.** Climate Action 100+ is an investor initiative launched in 2017 ensuring the world's largest corporate GHG emitters (which include utilities) take critical action to align with the goals of the PCA. Climate Action 100+ analyzes company performance related to climate change without disclosing it. The initiative is based on a three-pillar strategy: Governance: Implement a strong governance framework which clearly articulates the board's accountability and oversight of climate change risks and opportunities; Action: Take action to reduce GHG emissions across the value chain, consistent with the Paris Agreement goal of limiting global average temperature increase to well below 2°C above pre industrial levels and Disclosure: Provide enhanced corporate disclosure in line with the final recommendations of the Task Force on Climate related Financial Disclosures (TCFD).

Pillar 1: **High overlap.** Climate Action 100+ uses data gathered from the Carbon Tracker Initiative (CTI), CDP, TPI, and 2° Investing Initiative (2°ii) to analyze a company's emissions. This puts the initiative in line with all proposed dimensions of Pillar 1.

Pillar 2: **Low overlap.** The Climate Action 100+ initiative analyzes well company quantitative environmental impact, but does not assess company policies and processes regarding impact. The initiative also meets the dimensions in Pillar 2 regarding social and human rights impact.

Pillar 3: **Low overlap.** The only overlap is regarding tracking companies' efforts in Scope 3 data collection.

Pillar 4: **Medium overlap.** Climate Action 100+ relies on data provided by InfluenceMap to analyze each companies' lobbying practices. This is the most in detail analysis of the utility sector's lobbying practices currently being used by any initiative. While the initiative thoroughly analyzes high level practices by the company/board, it does not monitor internal practices mapped out by Pillar 4 such as: diversity, pay equity, education or technology transfer. There is also no mention of corporate responsible tax principles.

Transition Pathways Initiative ("TPI")[45]

Overview: **The TPI has a medium overlap with our framework.** The TPI is a climate specific standard used to measure the effectiveness of company transition to a low carbon economy. The TPI is not solely a utility standard, but it does have a sector specific report that looks at the utility sector. The TPI has been created to assess company preparedness for the transition to a low-carbon economy. The TPI uses a quantitative measurement to evaluate and track the quality of company management of their GHG emissions and of risks and opportunities related to the low-carbon transition.

Pillar 1: **High overlap.** The TPI requires detailed information on all aspects of a company's energy output and asks specific questions on company strategy to limit emissions. This initiative is one of the most up to date corporate strategy and meets all dimensions of Pillar 1.

Pillar 2: **Low overlap.** There is no mention of the sustainable processes that a company must achieve beyond powering businesses with renewable energy.

Pillar 3: **Low overlap.** The TPI pays particular attention to Scope 3 emissions requiring detailed disclosure from companies. There is no other coverage of the interaction with the value chain.

Pillar 4: **Medium overlap.** The TPI is one of the few initiatives that actively look at a companies' external policies regarding lobbying and policy making, but there is no mention of internal practices such as diversity, inclusion, or pay equity. The TPI also does not report on responsible corporate tax principles.

Edison Electric Institute (EEI) and the American Gas Association (AGA) Sustainability[46]

Overview: **The EEI and AGA Sustainability framework has a medium overlap with our framework.** The EEI and AGA Sustainability framework is a reporting template, with the goal of helping electric and gas companies provide the financial sector with more uniform and consistent ESG/sustainability data and information. This framework is utility specific and relies on other well-established frameworks to guide reporting.

Pillar 1: **Medium overlap.** There are several questions regarding quantifying Scope 1 and 2 emissions and encouragement to disclose according to TCFD standards.

Pillar 2: **Medium overlap.** The initiative focuses on issues related directly to the utility sector, such as: methane leakage, freshwater use and waste. The initiative also encourages the company to disclose their policy for community engagement and to quantify certain aspects of the company's labor policy (safety record, diversity). It uses a mix of quantitative measures and very high-level qualitative assessments.

Pillar 3: **Medium overlap.** The initiative asks for company reporting on Scope 3 emissions and linkages to other sectors. It doesn't encourage to put specific monitoring and policies in place in that matter.

Pillar 4: **Low overlap.** The EEI and AGA initiative does not look directly at corporate governance and only invites utilities to follow the TCFD's recommendations for climate oversight. There is no mention of taxation or lobbying in the initiative.

UN Global Compact[47]

Overview: **The UN Global Compact has a low overlap with our framework.** The UN Global Compact is an initiative that creates a set of guidelines for a company's environmental, social, and governance adherence. The UN Global Compact is a call on companies to align strategies and operations to universal principles in order to take actions that advance societal goals. There are 10 principles along 4 categories that include Human Rights, Labor, Environment and Anti-corruption. Despite its comprehensive reporting framework, the Global Compact lacks accountability tools. There are several stages of reporting that allow stalled companies to be a part of the compact even without adhering to the guidelines.

Pillar 1: **Low overlap.** The Global Compact asks companies to join a collaborative platform, committing to climate action.

Pillar 2: **Medium overlap.** The Global Compact has developed strong guidelines on managing the sustainability impact of companies on labor, human rights and environment. Because the Compact is a general organizational initiative it fails to look at utility specific issues.

Pillar 3: **Low overlap.** While the Global Compact encourages companies to have a strong monitoring system of the supply chain's impacts, there is no mention of the responsibility to linkage with the downstream sector and no mention of Scope 3.

Pillar 4: **Medium overlap.** The Global Compact has targeted guidance on diversity, pay equity and board oversight, and encourages productive partnerships as well as technology transfer. Interestingly it has robust guidance on anti-corruption systems but there is no mention of lobbying or tax practices.

Science Based Targets ("SBT")[48]

Overview: **The Science Based Target initiative has a low overlap with our framework.** SBT is an initiative that helps corporations create specific climate related business standards. The SBT is not utility specific, but does work with utility companies to create targets. The Science Based Target initiative is a joint initiative by CDP, the UN Global Compact, the World Resources Institute, and the WWF to increase corporate action on climate change. The goal of the initiative is to set targets for GHG emissions in order to limit global warming to less than 1.5°C / 2°C. While the initiative's targets are comprehensive, they currently lack a lot of sector specific models and only have a few questions related to the utility sector.

Pillar 1: **High overlap.** The SBT is the most in depth initiative that currently looks at corporate involvement in climate change. The SBT's questions/ analysis has been adopted by many other initiatives and match all proposed dimensions of Pillar 1.

Pillar 2: **Low overlap.** The initiative does not focus on non-climate related issues.

Pillar 3: **Low overlap.** The SBT is currently developing a sector specific initiative that looks at Scope 3 emissions and calls for company responsibility along the chain. There are gaps where our Pillar 3 suggests analyzing value chain linkages outside of the sector as well as sustainable sourcing/manufacturing.

Pillar 4: **Low overlap.** The SBT does not address corporate governance.

IFC Performance Standards[49]

Overview: **IFC Performance Standards have a low overlap with our framework.** The IFC Performance Standards is an internal rating system used to monitor company performance in regard to environmental and social investments. This system is used for the IFC to asses which companies to invest in. The initiative is not sector specific and does not directly address the utility sector. The IFC Standards are a set of 8 policies/standards that consist of: risk management, labor, resource efficiency, community, land resettlement, biodiversity, indigenous people, and cultural heritage. The IFC standards have not been updated since 2012 and lack specific targets and methods to measure company impact.

Pillar 1: **Low overlap.** The IFC Performance Standards only requires the company to assess emissions and adopt options to minimize these.

Pillar 2: **Medium overlap.** The IFC Performance Standards have entire sections related to land use, labor, community, resource efficiency and ESIA systems. It is however silent on utility-specific questions.

Pillar 3: **Low overlap.** The IFC Performance Standards ask for companies to monitor social and environmental impacts along the supply chain closely. There is no mention related to the linkage with the downstream sectors or Scope 3 emissions.

Pillar 4: **Low overlap.** There is little mention of corporate citizenship within the IFC Performance Standards. However, the IFC standards do mention gender equity and diversity.

The corresponding table shows the aforementioned initiatives on the X-axis and our sampling criteria in the Y-axis. If the initiative matched with one of the criteria we shaded the corresponding box. We also used color to illustrate the adherence to each pillar, with Green being above 75%, Yellow between 25-75%, and Red below 25%.

Table 2: Selected Sustainability Initiatives and Adherence to the Four-Pillar Framework

Tool → / Qualifyier ↓	CDP	Sustainalytics	World Benchmarking Alliance	EU Taxonomy	GRI	SASB	OECD MNE Guide-lines	TCFD	Transition Pathways Initiative	EEI and AGA Sustaina-bility Frame-work	Climate Action 100+	UN Global Compact	Science Based Targets	IFC Performance Standards
Guidelines														
Reporting Framework														
Rating System based on Standard-based Comparison											*only used inter-nally			*only used inter-nally
Rating System based on Peer to Peer Comparison														
Utility Specific														
Climate Specific														
Pillar 1														
Pillar 2														
Pillar 3														
Pillar 4														

Section 3. Benchmarking ten largest utilities against the four-pillar framework

(1) Is the utility a leader in zero-carbon electricity and is the utility on the path to reach zero carbon emissions by 2050 or earlier?

The review of the major utility companies in the US and Europe highli-ghts a wide spectrum of efforts in becoming zero-carbon electricity providers, in line with the Paris Climate Accords (PCA). For this analysis, we examine the efforts of the chosen utilities along three broad areas: current and future projections and plans to become zero-carbon electricity providers, organizational and governance initiatives to incentivize decarbonization and the use of green finance instruments such as green bonds to raise dedicated financing for the low carbon transition. Although it is clear that all utilities reviewed are making efforts to move towards a lower-carbon future, there remains a significant divergence in efforts, announcements and levels of proactive versus reactive behavior.

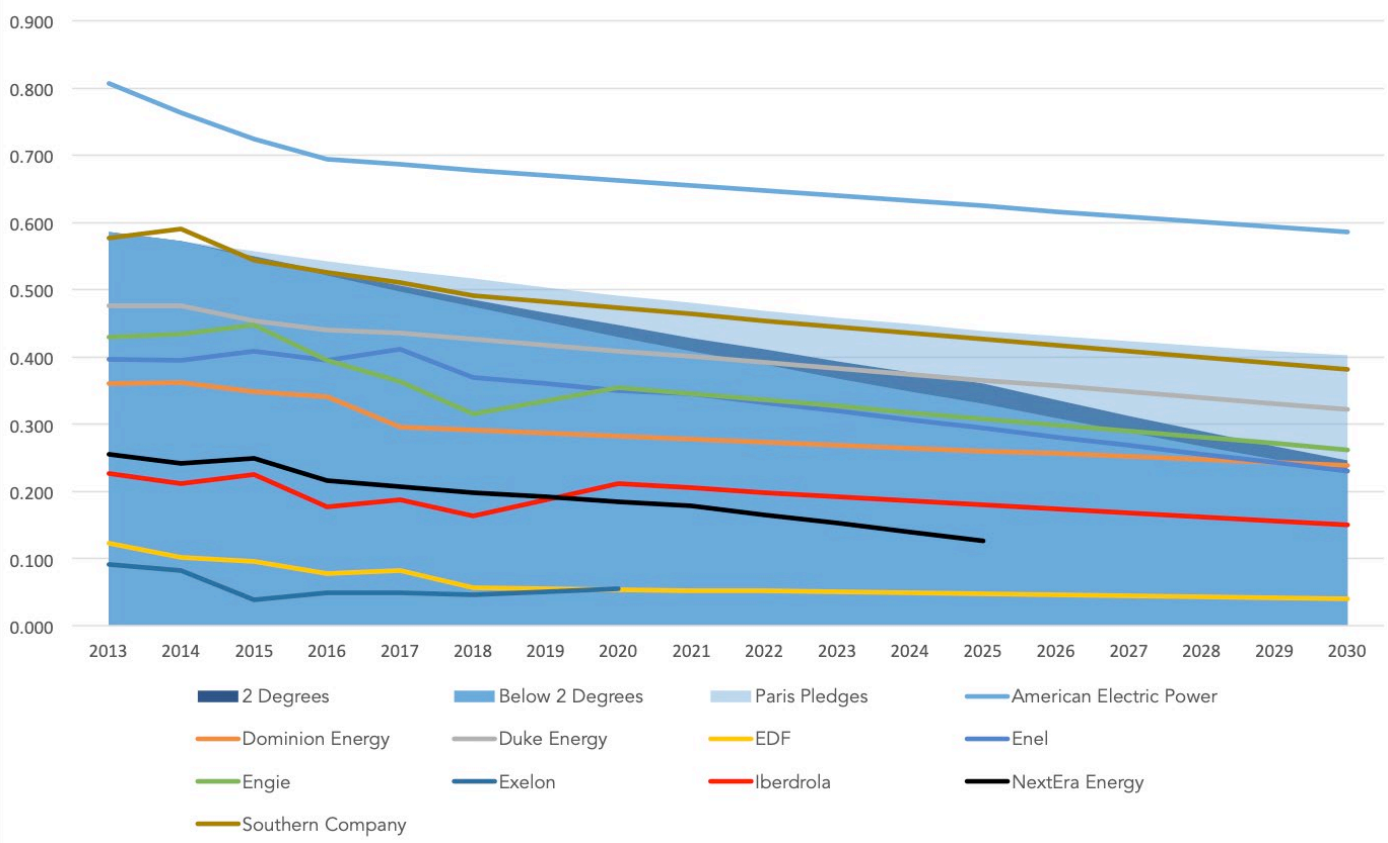
With regards to current and future projections and plans for Paris-alignment, we analyze a broad set of indicators relating to carbon intensity of energy portfolios (current and projected) and plans for the retirement of fossil fuel energy generation. It is important to note that the implications of "Paris-alignment" are based significantly on what assumptions are made around the implications of the agreement, including whether the PCA's targets should be 1.5°C or 2°C, the level of probability of achieving those targets, and assumptions about negative emissions technology. Despite these discrepancies, climate science has clearly established that carbon neutrality should be reached by 2050 to avoid the worse catastrophes of climate change.

According to data collected by the Transition Pathways Initiative (TPI), the carbon intensity of the energy portfolios of the utilities reviewed has a wide range in 2018, spanning from 0.05 to 0.49 metric tons of CO2 per MWh of electricity generated. Every utility analyzed has decreased future projections of their carbon intensities. At the same time, however, only approximately half of the utilities show future carbon intensities aligned with PCA's "Below 2 degrees" scenario. For the other half, two utilities' future carbon intensity will only be aligned with the "2 degrees" scenario by 2030; and for two utilities, the future scenario of carbon intensity is not aligned with the PCA but aligned with cumulated Nationally Determined Contributions (NDCs or "Paris pledges" in Figure 1); finally, for one utility, the future carbon intensity is not even aligned with the NDCs (see Figure 1).[50] According to Carbon Tracker, only two (Exelon and Iberdrola) of the ten utilities that we reviewed are Paris-aligned. This is explained by the fact that the Carbon Tracker's methodology deems that any utility that has coal capacity by 2030 is not Paris-aligned.[51] Companies such as Enel, Iberdrola, Exelon and EDF Energy have been more explicit, stating their desires to be carbon-neutral by mid-century. We highlight that no utility has put forward a full, detailed plan on how they will decarbonize their energy production by 2050, in particular when it comes to gas. We further highlight that some of those utilities that have made significant announcements on their climate change plans are continuing to build or acquire fossil-fuel generation capacity, mostly in the natural gas space.

Relatedly, we examine the use of climate scenario planning and explicit targets for fossil fuel versus renewable energy generation. In general, there is a growing use of climate scenario planning, with most utilities formally using climate scenarios according to their CDP reports. It is important to note however that most companies do not report the specific assumptions that go into the climate scenario modeling and planning,

Photo Credit: Macau Photo Agency on Unsplash

Figure 1: Carbon intensities (reported and targeted) in metric tons of Co2e per MWh electricity generation



Source: TPI, *Management of greenhouse gas emissions and low-carbon transition*: http://www.lse.ac.uk/GranthamInstitute/tpi/the-toolkit/ (last visited December 13, 2019).

and therefore it is not clear what assumptions are driving either the climate scenario or the corporate planning around the climate scenario. Although most of the utilities that we analyze use a target for relative emissions cuts compared to a baseline year, there is a wide discrepancy between the baseline years used and also very little transparency into how these targets are justified and supported by capital expenditure planning.

With regards to organizational and governance initiatives to support the zero-carbon transition, we highlight a significant range in tools and initiatives at the company level. Although eight out of the ten companies analyzed use an internal price of carbon for the purposes of project planning, we highlight that the internal prices used are in the range of $3-$40, significantly below the level of $135-$5500 by 2030 that is considered to be necessary to achieve PCA alignment.[52] It is noteworthy that not a single utility company uses a sufficiently high internal carbon price for project planning. Similarly, we discover that over half of the companies reviewed have external verifications of some combination of their Scope 1, 2 and 3 emissions, but only half of the utilities have verifications for all. Relatedly, we highlight that some utilities are using variable executive compensation as a means to incentivize corporate management decisions on the energy transition. For example, 40% of variable pay for the CEO of Engie is linked to ESG issues, including targets for CO2 reduction.[53]

With regards to the use of green finance as a tool to support the low carbon transition, we observe a growing interest and awareness of the green bond market as one tool to raise debt. There has been significant green bond issuance across the utilities sector. The leaders of green bond issuance, as a percentage of debt outstanding as of 2019, are Engie and Iberdrola, who respectively have 42% and 21% percentage of their debt as green bonds.[54] Only the four European utilities are members of the Green Bond Principles and only these four provide details about the purpose and amount of the green bonds in their sustainability report.[55]

(2) Is the utility's production process socially and environmentally sustainable?

There are issues that all leading utilities report on. These include sustainable water use, waste minimization, environmental stewardship, preserving wildlife and ecosystems, minimizing methane fugitive emissions and labor policies. However, all the issues are not dealt with at the same depth by all utilities.

Sustainable water use: While all utilities mention that they work to reduce non-renewable water intake, only a few have ambitious reduction targets in the near future and Only NextEra mostly uses seawater or reclaimed water for its processes.[56] While many utilities return withdrawn water to the environment, only Iberdrola specifies and monitors that water is returned to the environment in such conditions that it can be used by other sectors.[57] While all utilities monitor the quality of water discharge, most of them do so according to the stringency of the permit requirements instead of doing it according to the highest standards. EDF Energy is a notable exception as it monitors all sites on an hourly or daily basis. Real-time measurements go through EDF Energy's Environmental Management System framework.[58]

Waste minimization: All utilities commit to reducing waste. However, only a few utilities provide a detailed policy for each type of waste and a couple have ambitious targets in place for waste recycling. Only one company, Enel, has made proactive participation in the circular economy a strategic axis as a comparative advantage.[59]

Environmental stewardship: All utilities are committed to preserving wildlife. However, it is not always clear if programs in that regard proceed from a sound environmental diagnostic. Only half of the utilities surveyed describe a strong Environmental Management System. Half of the utilities have an EMS certified ISO14001.

Methane emissions: All utilities operating gas pipelines strive to reduce methane emissions through technology upgrades. In the US, all utilities with ambitious targets (4 out of 7 that we reviewed) belong to the ONE Future Coalition,[60] an industry association dedicated to encouraging members to deploy best efforts to minimize methane emissions with science based targets, as well as the umbrella US EPA Natural Gas STAR's Methane program that facilitates peer-to peer learning and use of latest available technology for emission reductions.[61] A couple of utilities still consider fugitive emissions as being a negligible problem.

Labor policies: All utilities include a commitment to and implementation of a health and safety system for workers, respect of freedom of association and collective bargaining and a non-discrimination policy. Only a subset of utilities has a clear stance on protection for whistle-blowers, anti-corruption and anti-fraud measures, prevention of violence and harassment, the prohibition of forced labor, child labor and the use of force.

Engagement with communities: Social equity in power pricing, outreach to marginalized communities and inclusive consultation processes are not addressed by three utilities despite these having philanthropic programs for communities. Only three utilities seem to have KPIs in place to measure these activities.[62,63] Only Iberdrola, Engie and Enel are engaged in fighting energy poverty in developing countries.[64,65,66] In terms of protecting communities from social impacts, half of the reviewed utilities do not acknowledge compliance with the internationally accepted UN Guiding Principles on Business and Human rights. Less than half of the utilities have programs to minimize the job impact resulting from coal project closures. The job impact from other project (gas and renewable) closures is never discussed.

There are issues related to Pillar 2 that are largely absent from utilities' activities and reporting. These include: **Powering operations with renewable energies** rather than using fossil fuel sources (utilities only marginally use renewables for internal consumption),[67] **building resilience and adaptive capacity of project affected communities** (only two utilities include community preparedness programs to natural disasters and emergency events),[68] **adequately anticipating closure and reclamation** (only two utilities report on this),[69,70] **following due process for land acquisition and avoiding competition with arable land** (only two utilities report on this).[71,72]

(3) Is the utility's supply and value chain aligned with the SDGs and PCA?

The ten reviewed utilities do interact along their value chain but to various degrees.

Downstream, the reviewed utilities are very much involved in developing models for smart cities and piloting them, which involves collaborating with multiple industries and authorities. Consistent with their involvement in smart city models, all reviewed utilities have collaborations in place to advance the Electric Vehicle (EV) market, by installing EV charging infrastructure. Some utilities are more innovative than others in devising new business models to accelerate the EV deployment. For instance, Exelon is a co-founder of the Electric Vehicle Charging Carbon Coalition (EVCCC) with six other organizations from the private and public sectors; the coalition seeks to certify the reduction in GHG emissions resulting from the use of EVs and obtain carbon credits that can then be sold and reinvested into EV infrastructure.[73] A few utilities, such as Iberdrola, EDF Energy, Enel are involved in Vehicle to Grid (V2G) systems enabling EVs' batteries to "play a major role in balancing energy demand and supply and leads to a two-way power flow between an EV and the electricity grid."[74,75] Particularly the European utilities are very active in acquiring start-ups working on EV charging innovation and green mobility programs. All utilities reach out to consumers with a dedicated webpage promoting EV charging tariffs or dedicated phone applications. Dominion, for instance has deployed a tool for consumers to calculate savings.[76]

All reviewed utilities are developing smart grids, mobilizing the latest technology to manage the grid and deploying smart meters. The utilities are reaching out to consumers to encourage the use of efficient home appliances and load management programs, and are using tariff systems to reward off-peak power consumption. All utilities also encourage and are involved in the development of distributed energy (solar and some fuel cells) while integrating the emergence of decentralized energy in grid management models. All utilities invest in the development of innovative battery technologies. Most utilities are involved in coalitions to collaborate on solutions such as Duke Energy being part of the Smart Grid Coalition including 25 utilities, vendors, research labs and government agencies leading the development and commercialization of a field device inter-operability framework.[77] Other interesting initiatives helping authorities to plan for smart grids and cities are mentioned in Pillar 4, below.

Collaboration with other end user sectors that are key to the decarbonization is less systematic among the reviewed utilities. A small subset of utilities collaborates with the building sector. Engie stands out in this regard, by proposing a Building Information Model (BIM) solution which has the objective to generate collaborative work around the virtual 3-D modelling of a building structure to develop energy efficient smart buildings and involving all stakeholders from the design phase to operation (contracting authority, project management, architect, engineering office, financial controller, owner, operator, property manager, asset manager etc.)[78,79] Since 2018, taking advantage of fiscal incentives in place in Italy, Enel X has been proposing solutions to improve building efficiency, in particular in the heating and cooling systems. Smart city model piloting could also generate the change of building codes.[80] For instance, Southern Company's Alabama Power partnered with developers, technology vendors and the OakRidge National Laboratory to create the first energy-efficient community. This pilot project aims to assess how citizens' lives can be improved through the use of the latest smart home technologies, energy efficient appliances, building materials and products.[81]

Collaborating with the heavy industry on green fuels is rarely mentioned in utility reporting and press coverage. Only Engie has a business unit dedicated to renewable hydrogen.[82] However all utilities invest in biogas, although at different levels of ambition.

No utility seems proactively involved in the deployment of international inter-connected grids.

Upstream, only four utilities have developed monitoring systems to monitor the sustainable development performance of their suppliers. Exelon has developed an online screening tool to capture risks associated with environmental compliance and climate change issues prior to contracting. Engie, Enel and EDF Energy also capture other dimensions of sustainability. Engie has deployed the Ecovadis platform, which assesses the sustainability performance of the suppliers using score that is based on 4 topics (environment, human rights, ethics and sustainable purchase)[83],[84] while Enel has put in place a Supplier Qualification System (looking at technical, economic and financial, legal, environmental, safety, human rights and ethics, and integrity requirements).[85] EDF Energy has developed a Sustainable Development Corporate Social Responsibility assessment process that includes supplier audits by external actors. It monitors CSR risks associated with purchases made from suppliers.[86] In the US, three of the six utilities reviewed to participate in the Electric Utility Industry Sustainable Supply Chain Alliance (EUISSCA), an alliance between utilities and their non-fuel suppliers that was set up in 2009 to green the electric utility industry supply chain.[87]

Three of the reviewed utilities dedicate efforts to collaborate and collect Scope 3 emissions along the value chain. Iberdrola developed the "9th Supplier greenhouse gas awareness and measurement campaign" in 2018. Questionnaires with detailed questions on emissions were sent to suppliers in 5 countries where Iberdrola operates. The objective was to encourage suppliers to demonstrate effectiveness in managing, controlling and reducing emissions, and raising awareness on the impact of climate change on their businesses. These questionnaires enabled Iberdrola to assess Scope 3 emissions related to suppliers.[88] ENGIE has developed and deployed "ENGIE Impact's Carbon Management Services" to help companies aggregate, calculate, and track carbon emissions over the three scopes.[89] Interestingly in CDP disclosures we found many utilities declaring that Scope 3 emissions were not material to operations or not applicable.

(4) Is the utility a good corporate citizen?

The review of the major electric utility companies in the US and Europe identifies an important set of observations regarding broad corporate citizenship and the sustainable development/climate agendas. As discussed earlier, good corporate citizenship with regards to sustainable development can be understood in three dimensions: not undermining or preventing broad-scale action on climate change, contributing positive and intentionally towards climate solutions and ensuring that all aspects of the corporation's behavior and function embodies societal responsibility, including corporate governance itself.

From the perspective of not proactively undermining climate change, we analyze whether the electric utilities are responsibly and transparently engaged in policy-making efforts. In practice, there remains a wide range in the levels of transparency regarding how companies in this sector are engaging with the public policy community. There exist various efforts to identify how corporations influence public policy, most notably efforts such as InfluenceMap and OpenSecrets.org, which provide databases to respectively identify and analyze global and US-focused lobbying and donations of corporations and their employees. In the US context, lobbying during the 2016 election cycle ranged from $0-$13,750,000 for the utilities analyzed for this review.[90] It is noteworthy that some of the utilities that were most advanced in their announcements around climate change were amongst the largest lobbying organizations during that election cycle. (It is important to note that it is not clear what, specifically, these companies were lobbying for or against, as the subjects of lobbying efforts are not necessarily reported in detail, despite their registration on the official US register).[91],[92] On a global basis, according to InfluenceMap in which only three of the ten companies analyzed had ratings, we see a range of scores from B- to E of

utilitity companies analyzed. Companies with the lowest scores demonstrated high levels of corporate lobbying against climate change policies. Among the utilities reviewed, according to InfluenceMap, only Iberdrola and Enel have entered Influence Map's A-list of climate policy engagement (while EDF is on the contention list) [93] and only these two display commitment to responsible corporate engagement in climate policy as defined by "We Mean" business platform.[94] Enel is the only utility that has declared to not make political contributions to PACs and political parties as per its Code of Ethics;[95] OpenSecrets.org reveals that this is the only utility not contributing to PACs, with contributions only coming from individuals.

From the perspective of positively encouraging and supporting efforts of climate action, we analyze how electric utilities fulfill their emissions and safety regulations, engage with policymakers and regulators regarding the actualization of the energy transition, partner with educational institutions on the energy transition and other such initiatives. All large-scale electric utilities monitor their compliance with emission and safety regulations and deploy R&D efforts for the energy transition. Half of the utilities collaborate with policymakers and government planners on piloting approaches for the energy transition. For instance, EDF Energy Group has developed a 3D city platform to help local authorities evaluate the impacts of various energy strategies. This is an urban planning tool that enables city councils and mayors to compare various urban development scenarios relating to policies in energy, transport, air quality, water and waste management.[96] Another interesting example comes from Enel and Iberdrola that arepart of the Smart Grids - European Distribution System Operators (E.DSO) which is an interface between European distributors and European institutions that aims at promoting the largescale development and testing of smart grid technologies in real-life situations, as well as new market models and regulations with the goal to achieve the European Union's energy and climate targets.[97] When it comes to engaging with educational institutions on the topic of climate change, only two utilities do so.

From the perspective of corporate behavior and functioning embodying the principles of sustainable development, we observe that the utilities sector, as a whole, has a significant way to go along a few major dimensions. From the perspective of corporate taxation, we calculated a wide range of effective corporate tax rates, ranging from 5% to 26% in 2018, with the European utilities generally having higher effective tax rates than the American one.[98] It is especially difficult to evaluate the corporate tax practices of the businesses analyzed in this study because of a lack of transparency of tax practices. We highlight that various large utilities have had taxation-related scandals that have made the press. Interestingly Enel declares not pursuing aggressive tax planning.[99] Regarding diversity, we highlight that the average number of female board members in the reviewed utility companies is 30%[100]. We also did not find widespread evidence of publicly disclosed pay equity data and targets for the utilities reviewed for this study, with only three companies having such programs in place. Regarding collaboration with developing countries, the topic of technology transfer is generally absent from all disclosures. Last on independent corporate oversight, most utilities have a Board of Directors that is composed of a majority of independent directors (varying from 60% to 95%) but only four utilities specifically identify a board director or committee with climate change oversight.

Section 4. Conclusions

There is a proliferation of initiatives and reporting efforts to assess companies' alignment to the global development objectives of the SDGs and PCA. However, there is no commonly accepted definition, standard, rating or reporting methodology being used. Even when only looking at a single dimension such as climate change, which is key for the utilities sector given its role in the decarbonization of the world economy, the sustainability initiatives diverge in their sustainability assessment.

There are a few reasons for this:

- A serious assessment cannot limit itself to headline reporting (eg: existence of a carbon price or use of climate change scenario) and not enter the details (eg: what is the carbon price? what assumptions are being made to inform the climate change scenario?); it cannot spare an analysis of the track record, or of the future plans;
- A serious deep assessment is tedious and not undertaken by all outfits;
- In many cases self-reporting is too vague to draw conclusions;
- Initiatives comparing company performance to standards use different targets (eg: some initiatives use the 2°C target while others the 1.5°C target);
- Too many initiatives focus on comparative sustainability performance among companies rather than comparing company performance to the necessary actions to achieve the SDGs and the PCA, which proves to be meaningless when the sectorial leader is underperforming as compared to the standards that we need.

These reasons make it difficult for third parties to compare utilities and distinguish between those that are 'green washing' and those that are embarking on structural change to be aligned with the PCA and SDGs.

By taking a step back from existing reporting and rating initiatives, we have developed a conceptual four-pillar framework highlighting that a comprehensive and holistic review of companies to assess whether they are SDG and PCA aligned should include (1) the product that the company produces; (2) the process of how this product is produced; (3) the responsibility the company takes for its value chain; and (4) whether the company is a good corporate citizen. By applying the framework to the 10 largest utilities, we have found that:

1. All utilities analyzed for this report are making some effort to decrease the carbon intensity of their energy portfolios (Pillar 1) but only half of them seems to be in line with the PCA according to one initiative. Judging from the coal retirement pace, only two utilities are aligned with the PCA according to another initiative. Internal organizational efforts at the utility-level to structure and support the transition are underway, but internal carbon prices remain too low and climate scenario planning remains generally opaque. Finally, green finance is a growing tool for the utilities sector to earmark investments for their low carbon transition and attract new types of investors and capital into those projects; however, utilities do not always report what was financed by the green bonds.

2. While utilities' processes encompass several dimensions of social and environmental sustainability (Pillar 2), often these are only partially implemented and some dimensions are left out altogether. Particularly, significant gaps have been identified when it comes to processes related to consultations, human rights, land acquisition processes and anticipating closures. This is problematic for

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renewable power projects, which tend to be more land-intensive than traditional energy sources, as it may lead to conflicts with communities blocking renewable energy project development.

3. While all utilities are involved in developing smart city models and smart grids, installing EV infrastructure, developing battery technologies, and reaching out to consumers for demand-side management and energy efficiency, only a couple of utilities pursue electrification programs that affect all their final end user industries rather than a subset of those. And no utility is proactively involved in the development of international interconnected grids. Moreover, only a few utilities have robust monitoring systems in place to hold suppliers accountable, and Scope 3 emissions in most cases are not comprehensively published or audited by third parties.

4. Three important observations can be made in regard to the corporate citizenship of the companies analyzed for this study (Pillar 4). First, there remains a disconnect between the corporate lobbying efforts of large utilities and their efforts in promoting the importance of sustainable development. We believe that corporate lobbying should be minimized and made transparent in order for investors and civil society to know what the topics discussed and lobbied for were. We note significant lobbying efforts, that could happen indirectly on the part of a non-climate focused trade association they are members of, even among utilities that have made major efforts in climate change mitigation and technology investments to facilitate the energy transition. Finally, we highlight that corporate behavior itself within the utilities sector must significantly improve, especially within corporate tax practice, which remains highly opaque.

In sum, the assessed utilities have sustainability strategies in place and are reporting about the implementation of these across the four pillars of sustainability. This goes to show that the business sector has embraced the SDGs and PCA, which is a great achievement for sustainability and confirms the impact that these international agreements have had. However, the analysis also shows that the pace and degree at which utilities are changing their business practices vary significantly. This can partly be traced back to the regulations in the jurisdictions where they are operating and the stock exchange where they are listed on. It can also be traced back to the fact that today's initiatives and standards are insufficient and sometimes conflict with each other on the definition of adequate sustainability metrics. As a result, third parties cannot distinguish leaders from laggards.

We therefore believe that consolidation and standardization need to occur on what sustainability means for business. This needs to be agreed upon on a sector-by-sector basis and should encompass the four-pillar categories outlined in this report. Clear-cut reporting metrics and indicators are needed to enable the comparison of company performance against each other *and* against the SDGs and PCA. There should be a clear distinction between 'leader in the sector' and 'SDG-aligned'. These two are not synonymous as our analysis has shown.

A third-party assessment or auditing system is necessary to achieve this goal. This consolidated sustainability standard needs to go beyond GHG emissions for utilities. While climate change is clearly a priority for the sector given its key role in the decarbonization of the world economy, the rapid roll-out of renewable energies will, for example, exert land-use pressure. Not holistically addressing sustainability challenges associated with new energy systems will result in risks and conflicts in the future that can jeopardize the speed of the energy transition.

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99 "Enel does not pursue domestic or cross-border behaviours or operations that are merely artificial constructs, or that do not reflect economic reality and offer undue tax advantages by contrasting with the purposes or the spirit of the applicable regulations or tax laws or generate double tax deduction/non-inclusion or double non-taxation, also due to asymmetries between the different tax systems of the jurisdictions involved." Enel, "Tax Strategy," available at: https://www.enel.com/investors/sustainability-performance/tax-strategy (last visited December 13, 2019

100 This is observed from annual reports and websites of all utilities reviewed.

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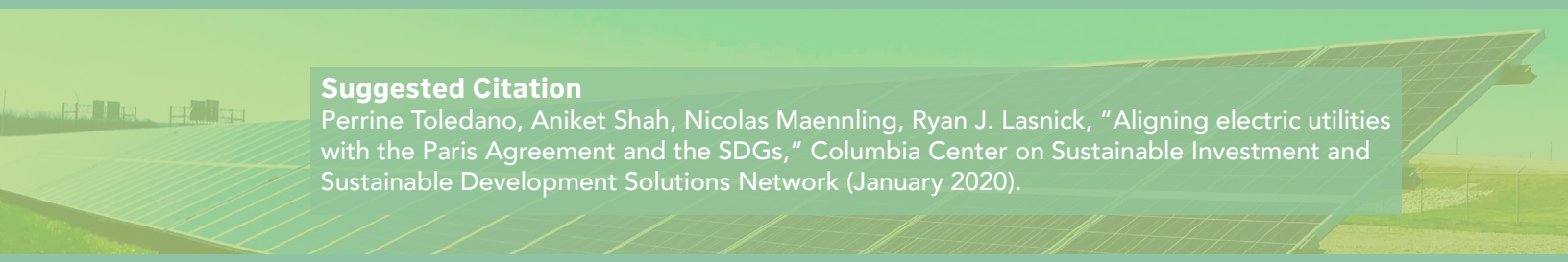

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Columbia Center on Sustainable Investment

Jerome Greene Hall
435 West 116th Street
New York, NY 10027
Phone: +1 (212) 854-1830
Fax: +1 (212) 854-7946