



UNIVERSIDAD PONTIFICIA COMILLAS

ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA (ICAI)

OFFICIAL MASTER'S DEGREE IN THE
ELECTRIC POWER INDUSTRY

Master's Thesis

**TASK FORCE ON CLIMATE RELATED
FINANCIAL DISCLOSURE: FROM EUROPEAN
COMPANIES TO MEXICAN COMPANIES**

Author: Itzel Fernanda Marbán Salinas

Supervisor: Mónica Oviedo

Co-Supervisor: Rosario Sánchez

Madrid, July 2019

Master's Thesis Presentation Authorization

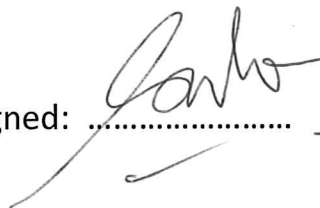
THE STUDENT:

ITZEL FERNANDA MARBÁN SALINAS


.....

THE SUPERVISOR

MÓNICA OVIEDO

Signed:  Date: 23 / 07 / 19

THE CO-SUPERVISOR

ROSARIO SÁCHEZ

Signed:  Date: 23 / 07 / 19

Authorization of the Master's Thesis Coordinator

Dr. Luis Olmos Camacho

Signed: Date://



UNIVERSIDAD PONTIFICIA COMILLAS
ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA (ICAI)

OFFICIAL MASTER'S DEGREE IN THE
ELECTRIC POWER INDUSTRY

Master's Thesis

**TASK FORCE ON CLIMATE RELATED
FINANCIAL DISCLOSURE: FROM EUROPEAN
COMPANIES TO MEXICAN COMPANIES**

Author: Itzel Fernanda Marbán Salinas
Supervisor: Mónica Oviedo
Co-Supervisor: Rosario Sánchez

Madrid, July 2019

Summary

Unpriced climate risk in the capital markets could cause global financial stability concerns, however in order to make the transition to a low carbon economy envisioned by Paris agreement public and private sectors must contribute substantial funds. In 2015, the Financial Stability Board established the Task Force on Climate Related Financial Disclosure (TCFD) in response to the implications of the climate-related issues for the financial sector.

The Task Force recognizes the significant threat climate change poses to the global economy and encourages to disclose consistent, reliable and clear climate-related financial disclosures enabling investors to take into account climate-related risks.

The European utilities have shown the leadership in the alignment with the TCFD recommendation and they play a fundamental role in the decarbonization of the economy. The present master thesis final work identifies and assesses 6 European utilities: Iberdrola, EDF, Engie, Enel, SSE, EDP in their advance implementation of the recommendations of the Task Force on climate related disclosure (TCFD) covering the four main areas: Governance, Strategy, Risk Management and Metrics & Targets.

The aim of this final work is to provide a guideline to the evaluated Mexican companies: Walmart de Mexico, Cemex and Axtel and with the reference of the European utilities; to speed their use of TCFD recommendations by disclosing clear, consistent, transparent and better financial information in the four main areas.

The implementation of TCFD recommendations will provide to the Mexican companies with outstanding advantages. The main advantage is to be included in the portfolio of selected investors. Further benefits are: favored corporate image, improvement of their resource's efficiency, reduce energy cost, development of new products and services, diversify business activities and increase the resilience of their organizations.

Acknowledgement

I would first like to thank my professional supervisors from Iberdrola, Rosario Sánchez and Mónica Oviedo for the correct orientation, support and critical discussion that allowed me reached a good work of my thesis. Also, to thank the Iberdrola Foundation, for the scholarship to study in Spain and allow me to do my internships in Iberdrola Spain.

I would also like to thank my coordinator Luis Olmos of ICAI at Universidad Pontificia de Comillas for his willingness to help and solve my doubts. My friends from the Master Electric Power Industry, specially Diana Lopez-Velarde and Amable Matus to spend days with me in the library writing the thesis, supporting me and giving me a smile, and my professors of the Master for the giving knowledge.

Finally, I must express my very profound gratitude to God and my parents Guillermo Marbán Rubio, Leticia Salinas Villalón and my brother Héctor Guillermo Marbán Salinas for cheering me up, providing me support and continuous encouragement in this year of my Master. This accomplishment would not have been possible without them.

Thank you.

Table of Content

- 1.Introduction and motivation 1**
 - Objectives of the Master Thesis 2
- 2. Methodology and Sources..... 2**
- 3. State of the Art 3**
 - 3.1 Context definition (climate change)..... 3
 - 3.2 TFCF (reason for being, agents involved) 3
 - 3.3 Financial Impacts 7
 - 3.4 Legal requirements linked with TCFD 8
- 4.Benchmarking and analysis of the current implementation of the recommendations of the TFCF 10**
 - 4.1 Comparison by European companies..... 11
 - Governance 13
 - Strategy 15
 - Risk Management..... 20
 - Metrics and targets 23
- 5. Mexican companies who participated in CDP..... 29**
 - 5.1 Comparison by Mexican companies 33
 - Governance 33
 - Strategy 34
 - Risk Management..... 38
 - Metrics and targets 40
- 6. The importance of TFCF for Mexican companies..... 43**
 - 6.1 Main findings for Mexican companies 51
 - 6.2 General recommendations for Mexican companies 55
- 7. Conclusion..... 58**
- 8.Bibliography..... 59**

List of Tables

TABLE 1. CDP QUESTIONNAIRES ACCORDING THE SECTOR	10
TABLE 2. ALIGNMENT BETWEEN CDP CLIMATE CHANGE AND TCFD	11
TABLE 3.CDP CLIMATE CHANGE 2018 EUROPEAN ELECTRIC UTILITIES SCORE.....	12
TABLE 4.EUROPEAN UTILITIES ASSESSING AND MANAGING CLIMATE-RELATED ISSUES (CDP, 2018)	14
TABLE 5.EXAMPLES OF CLIMATE-RELATED RISK AND POTENTIAL FINANCIAL IMPACTS	16
TABLE 6.EXAMPLES OF CLIMATE-RELATED OPPORTUNITIES AND POTENTIAL FINANCIAL IMPACTS	16
TABLE 7.IMPACTS OF CLIMATE-RELATED RISK AND OPPORTUNITIES OF EUROPEAN UTILITIES (CDP, 2018)	17
TABLE 8.SCENARIOS UTILIZED BY SELECTED EUROPEAN UTILITIES IN CDP 2018.....	18
TABLE 9.TIME HORIZONS OF SELECTED EUROPEAN COMPANIES IN CDP 2018.....	18
TABLE 10.SELECTED EUROPEAN UTILITIES FINANCIAL IMPACT CLIMATE-RELATED RISK (CDP 2018)	19
TABLE 11. SELECTED EUROPEAN UTILITIES FINANCIAL IMPACT CLIMATE-RELATED OPPORTUNITIES (CDP 2018).....	20
TABLE 12.RELEVANT RISK UNDER ASSESSMENT BY EUROPE COMPANIES (CDP, 2018)	22
TABLE 13.FREQUENCY MONITORING CLIMATE-RELATED RISK OF SELECTED EUROPEAN UTILITIES (CDP 2018).....	23
TABLE 14.EMISSION INTENSITY (SCOPE 1 AND 2) OF SELECTED EUROPEAN UTILITIES (CDP, 2018).....	25
TABLE 15.INTERNAL CARBON PRICING CDP 2018 ANSWERS OF THE SIX UTILITIES.....	26
TABLE 16.SCOPE 3 EMISSIONS OF SELECTED EUROPEAN UTILITIES (CDP, 2018)	26
TABLE 17.COMMITTED AND APPROVED TO SETTING A SCIENCE-BASED TARGET OF SELECTED EUROPEAN UTILITIES (SCIENCE BASED TARGETS, 2019).....	28
TABLE 18.SELECTED MEXICAN COMPANIES AND CDP CLIMATE CHANGE 2018 SCORE.....	29
TABLE 19.SELECTED MEXICAN COMPANIES ASSESSING AND MANAGING GOVERNANCE CLIMATE-RELATED ISSUES (CDP, 2018).....	34
TABLE 20.IMPACTS OF CLIMATE-RELATED RISK AND OPPORTUNITIES FOR SELECTED MEXICAN COMPANIES (CDP, 2018)	35
TABLE 21.CLIMATE SCENARIOS UTILIZED BY SELECTED MEXICAN COMPANIES (CDP, 2018)	35
TABLE 22.TIME HORIZON OF SELECTED MEXICAN COMPANIES (CDP, 2018).....	36
TABLE 23.MEXICAN COMPANIES FINANCIAL IMPACT CLIMATE-RELATED RISK.....	36
TABLE 24.MEXICAN COMPANIES FINANCIAL IMPACT CLIMATE-RELATED OPPORTUNITIES	37
TABLE 25.RELEVANT RISKS UNDER ASSESSMENT BY ITS RISK MANAGEMENT BY SELECTED MEXICAN COMPANIES (CDP, 2018).....	38
TABLE 26.FREQUENCY MONITORING CLIMATE-RELATED RISK	40
TABLE 27. EMISSION INTENSITY (CDP, 2018).....	40
TABLE 28. SCOPE 3 EMISSIONS OF MEXICAN COMPANIES (CDP, 2018).....	42
TABLE 29.COMMITTED AND APPROVED TO SETTING A SCIENCE-BASED TARGET OF SELECTED MEXICAN COMPANIES (SCIENCE BASED TARGETS, 2019).....	43
TABLE 30. RELEVANT RISK UNDER ASSESSMENT BY EUROPEAN UTILITIES AND MEXICAN COMPANIES	48
TABLE 31. FUNDAMENTAL PRINCIPLES FOR EFFECTIVE DISCLOSURE (TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES, 2017).....	51
TABLE 32. RECOMMENDATIONS FOR CEMEX IN GOVERNANCE	53
TABLE 33. RECOMMENDATIONS FOR AXTEL IN GOVERNANCE	55
TABLE 35. ENHANCEMENT FOR MEXICAN COMPANIES.....	56
TABLE 34. SCORE CLIMATE CHANGE CDP 2016,2017,2018 FOR SELECTED MEXICAN COMPANIES (CDP, 2018)	57

List of Figures

FIGURE 1.RECOMMENDATIONS AND DISCLOSURES FOR EACH THEMATIC AREA OF TCFD (TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES, 2017)..... 4

FIGURE 2.CDP SCORING METHODOLOGY (DOVER CORPORATION, 2010)..... 5

FIGURE 3. GEOGRAPHIC DISTRIBUTION OF RESPONDENTS (TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES, 2019) 6

FIGURE 4.CLIMATE-RELATED RISKS, OPPORTUNITIES, AND FINANCIAL IMPACT (TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES, 2017)..... 7

FIGURE 5.MAJOR CATEGORIES OF FINANCIAL IMPACT (TASK FORCE ON CLIMATE-RELATED FINANCIAL DISCLOSURES, 2017) 8

FIGURE 6. % WITH BOARD OVERSIGHT (CDP, 2018)..... 13

FIGURE 7. % INTEGRATED CLIMATE-RELATED ISSUES INTO MULTI-DISCIPLINARY COMPANY-WIDE RISK IDENTIFICATION, AND MANAGEMENT PROCESSES. (CDP, 2018) 21

FIGURE 8. % WITH INTERNAL PRICE ON CARBON (CDP, 2018) 25

FIGURE 9. % COMMITTED TO SETTING A SCIENCE-BASED TARGET 27

FIGURE 10. % WITH AN APPROVED SCIENCE-BASED TARGET 28

FIGURE 11.WALMART ENERGY 30

FIGURE 12. SUSTAINABLE DEVELOPMENT GOALS (UNITED NATIONS, 2019)..... 31

FIGURE 13. AXTEL SUSTAINABLE MODEL (WALMART DE MEXICO , 2019) 32

FIGURE 14. % OF COMPANIES BY REGION HAVING A BOARD-LEVEL OVERSIGHT OF CLIMATE CHANGE 44

FIGURE 15. % OF COMPANIES BY REGION INTEGRATING CLIMATE IN THEIR BUSINESS STRATEGY (CDP, 2018) 46

FIGURE 16. COMPANIES WITH APPROVED SCIENCE-BASED TARGETS IN THE WORLD 49

FIGURE 17.INTERNAL CARBON PRICING CDP 2018 ANSWERS OF THE MEXICAN COMPANIES 50

FIGURE 18.OVERVIEW OF GHG PROTOCOL SCOPES AND EMISSIONS ACROSS THE VALUE CHAIN (GREENHOUSE GAS PROTOCOL, 2013) 50

FIGURE 19. FIRST APPROACH FOR THE USE OF SCENARIO ANALYSIS 52

FIGURE 20. OPPORTUNITIES FOR DEVELOPMENT LOW EMISSION GOODS AND SERVICES 54

1.Introduction and motivation

This Master Thesis derives from my one-year experience at Master of Electric Power Industry program at the Universidad Pontificia Comillas in Madrid as well four-months internship at Iberdrola as Sustainable Management Department intern in Madrid, Spain. Combining gained knowledge from my academic experience, especially in the course of “Environmental and Renewable Energy Policies” classes held by Dr. Pedro Linares at Escuela Técnica Superior de Ingeniería (ICAI), Universidad Pontificia Comillas, in addition with the practical approach supported by Mónica Oviedo and Rosario Sánchez, I have decided to focus my Master Thesis on the new recommendations of the Task Force on Climate-related Financial Disclosure (TCFD).

As personal interest for environmental topics and knowing more about how Mexican companies are committed to the climate change, I have decided to focus my work in a comparative between European and Mexican companies aligning with TCFD recommendations.

Many times, companies refer to the business climate, but nowadays the investors are demanding even more about financial disclosure about the impact of climate change can have in the business model, because there is no doubt that we are already experiencing dramatic cost implications resulting from extreme weather events and they are unquestionably on the rise, both in frequency and severity recognizing. This challenge committed 197 Nations signed the 2015 Paris Agreement to combat global climate change their goal limit global temperature rise to no more than 2° Celsius above pre-industrial levels.

Unpriced climate risk in the capital markets could cause global financial stability concerns, however in order to make the transition to a low carbon economy envisioned by Paris agreement public and private sectors must contribute substantial funds.

The Financial Stability Board (FSB) is the international body that seeks the effectiveness and stability of the international financial system. It was created after the G-20 Summit in London (April 2009) and integrates all the major economies of the G-20. In order that investors have sufficient information about the risks related to climate change and the way in which each company is managing them, the FSB established in 2015 a Working Group, the Task Force on Climate-related Financial Disclosures (TCFD) led by Michael Bloomberg. (Task Force on Climate-related Financial Disclosures, 2017)

The Task Force encourage companies publish voluntary financial information and its structure with eleven recommendations around four thematic areas that represent the central elements of how organizations operate: governance, strategy, risk management and metrics and objectives. The eleven specific recommendations on how to disseminate specific topics are included in each thematic area and are intended for all organizations in the financial and non-financial sectors.

Given the importance of the TCFD initiative, CDP formerly known Carbon Disclosure Project, which it is the largest repository of environmental information in the world. The

Questionnaire CDP adapted its questions in 2018 to specifically include the content required by TCFD.

The value added of this Master Thesis is to assess how do leading European utilities companies are adopting the recommendations, understand how selected Mexican companies are aligning to TCFD, and to provide a final product to the Mexican companies that will help them in the process to understand and apply the recommendation of TFCF.

Objectives of the Master Thesis

Primary Objective: Help selected Mexican companies with a final product to facilitate the further approach to the TCFD recommendations

Secondary Objective: Benchmarking of the leader utility companies in Europe (degree of progress in aligning the TCFD recommendations)

2. Methodology and Sources

The methodology will be approached by the utilization of wide and detailed database which I have access thanks to my internships, due to the fact that the core data is from CDP companies 'answer aligned with the recommendation of TFCF.

The European companies were selected from the sector of utilities because the leadership shown in the alignment with the TCFD recommendations and their role in the economy decarbonization. Also, the benchmark will help Iberdrola to compare the degree of advance of peers' companies in the sector. The criteria for selecting companies has been: highest ranking in CDP and company's background knowledge about which ones could be the leaders in implementing the recommendations.

In the case of the Mexican companies' selection, the path followed mainly was the companies who got the highest ranking in CDP and criteria to diversify activity sector.

Furthermore, I will be using specific sector reports and benchmarking, and reference documentation about TCFD and its implementation.

Finally, the selected Mexican companies (a sample including several sectors, as TCFD recommendations are applicable to all listed enterprises on the stock exchange), are going to be addressed, assessing their CDP answers, and obtaining gaps where future reporting could focus to improve.

All gathered information will conform a final product for the Mexican companies to speed the use of the TFCF recommendations in their reports, addressing the four main themes of the TFCF recommendations: Governance, Strategy, Risk Management and Metrics and Targets. (Task Force on Climate-related Financial Disclosures, 2017)

3. State of the Art

3.1 Context definition (climate change)

Climate change is one of the most complex issues facing the global economies today and perhaps most misunderstood risk that organization face today are related to climate change. The reduction of greenhouse gases emissions demonstrates a move away from fossil fuel energy and other related industries, to a transition of lower carbon economy which can cause economic losses to companies do not adapt on time.

In 2016, nearly 200 United Nations Frameworks Convention on Climate Change (UNFCCC) members have signed the Paris Agreement, dealing with greenhouse gas emissions mitigation, climate change, adaptation and finance. While this change represents a movement to a lower-carbon economy and likelihood risk in the economic sectors and industries, also create opportunities on climate change mitigation and adaption solutions.

A study made by the risk of climate change depicted that private sector is expected to have present value losses of their current assets from \$4.2 to \$ 43 trillion equal to 30% of current assets in the extreme case of 6° C of warming. (The economist, 2015)This means that investors cannot avoid climate change, therefore, organizations and investors should consider long term strategies and most efficient way to allocate capital.

Companies who develop mechanism for protection against climate change and seize opportunities, including the ability to respond to transition risk and physical risk, are resilient to a lower carbon economy, will last longer and their investors will experience higher return.

Nowadays, many securities regulators and stock markets have begun to recognize that climate risks may be material to investors and financial markets. (Technical expert group on sustainable finance (TEG), 2019)This shift sparked the creation of alternative disclosure frameworks, such as the Task Force on Climate-Related Financial Disclosure (TCFD).

3.2 TFCFD (reason for being, agents involved)

The Task Force report is aimed to help participants of the financial market and industries to understand climate-related risk and opportunities of climate change. These recommendations are for all financial and non-financial organizations with public debt or equity. Moreover, these recommendations are for assets managers and assets owners.

The 32-member Task Force are global; its members were selected by the Financial Stability Board and come from various organizations, including banks, insurance companies, asset managers, pension funds, large non-financial companies, accounting and consulting firms, and credit rating agencies. In its work, the Task Force drew on member expertise, stakeholder engagement, and existing climate-related disclosure regimes to develop a singular, accessible framework for climate-related financial disclosure.

The Task Force Group is structured into eleven specific recommendations on how to disclose specific topics, as shown in the following figure:

Governance	Strategy	Risk Management	Metrics and Targets
Disclose the organization's governance around climate-related risks and opportunities.	Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning where such information is material.	Disclose how the organization identifies, assesses, and manages climate-related risks.	Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities where such information is material.
Recommended Disclosures	Recommended Disclosures	Recommended Disclosures	Recommended Disclosures
a) Describe the board's oversight of climate-related risks and opportunities.	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	a) Describe the organization's processes for identifying and assessing climate-related risks.	a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.
b) Describe management's role in assessing and managing climate-related risks and opportunities.	b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	b) Describe the organization's processes for managing climate-related risks.	b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.
	c) Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario.	c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.

Figure 1. Recommendations and disclosures for each thematic area of TCFD (Task Force on Climate-related Financial Disclosures, 2017)

The compliance of these recommendations has been included in 2018 in the CDP Climate Change questionnaire. The sustainability indexes as CDP, enable to control, and follow multiple aspects like emissions of greenhouse gas emissions and raw material consumptions of the companies.

The methodology used by the CDP consists of using, once the company has decided to be evaluated, request permission for the company to be register and create an account, after this process, the CDP activates the access to the questionnaire, through Online Response System (ORS), which must be answered in a given period, since this process is carried out every year, where it publishes the results of its emissions according to the activities it carries out. CDP has the ability to assess and provide feedback to the companies, their initiatives to contribute to the fight against climate change, therefore CDP methodology is focused on the industry emissions.

In addition, the CDP observes the information published on the companies' website, such as sustainability reports, carbon footprint and environmental footprint; these data are evaluated by means of scores or percentages. The score assesses the level of detail and wide information, as well as the company's awareness of issues related to climate change, management methods and progress towards measures taken in relation to climate change and transparency. Here below is explain the main approach CDP takes in to account at the time to score.

CDP measures the progress of a company towards leadership using a 4 step approach, to score the company:

- Disclosure which measures the completeness of the company’s response.
- Awareness considers the extent to which the company has assessed environmental issues, risks and impacts in relation to its business.
- Management which is a measure of the extent to which the company has implemented actions, policies and strategies to address environmental issues.
- Leadership which looks for particular steps a company has taken that represent best practice in the field of environmental management.

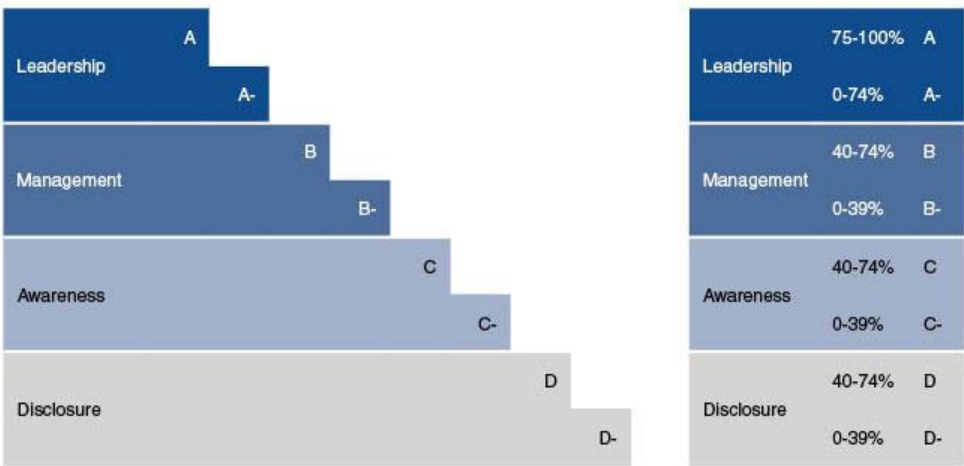


Figure 2.CDP Scoring Methodology (Dover corporation, 2010)

Furthermore, CDP is considered on the top 3 highest quality sustainability questionnaires, regarding its excellence, robustness and accuracy of evaluation, according to Rate the Raters 2019 (RobecoSAM, 2019).

The Task Force distributed the survey to above 3,000 participants, ending up with 485 responses. The figure below depicts the responses are higher in Europe (with 45% form organization headquarter in Europe) than Latin America, Africa, and Asia, which may exhibit lower challenges in adoption of TCFD recommendations in these regions.

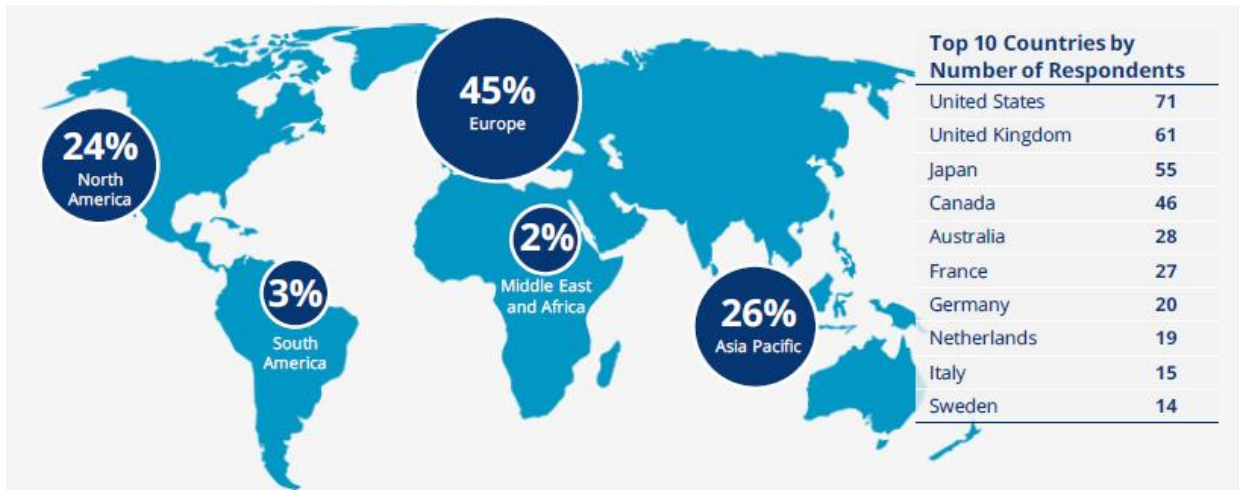


Figure 3. Geographic Distribution of Respondents (Task Force on Climate-related Financial Disclosures, 2019)

Other reasons why the TCFD recommendations are important:

- It can help an organization to understand and mitigate climate-related risks presented by the growing threat of climate change.
- There is growing interest in having a clear and consistent disclosure by investors and shareholders. Effective disclosure focuses on transparency and risk analysis, which leads to well-founded investment decisions and a reduction in capital loss.
- Support from High Level Group of Experts on Sustainable Finance (HLEG), which supports the recommendations of the TCFD to be implemented at the European level.
- More than one hundred investors with 1.8 trillion dollars in assets want 62 of the world's largest banks to implement TFCF recommendations.
- France adopted a similar approach with Article 173, becoming the first country to present mandatory reports related to climate change for institutional investors. The trends show that other countries would follow this approach.
- The TCFD recommendations are incorporated into the credit ratings of Standard and Poor's global ratings. Therefore, it has the potential to give a company a competitive advantage, but it could also negatively affect the qualification of the environmental and climatic risks that a company faces.

The investors, lenders and insurance underwriters, potential users of TFCF, cite the lack of information on the financial implications of climate change, non-comparable information and use of repetitive information, which make difficult for them at the moment to make a decision on how to invest, lend and insure underwriting in medium and long term.

This inadequate information steers to a mispricing of assets and misallocation of capital. The FSB called on the Task Force to develop more standardize, provide source of data, channel troughs is most likely to be transmitted information about climate-related disclosure, in this manner the investors, could make more informed decisions.

3.3 Financial Impacts

Enhance disclosure of the financial impacts of climate-related risk and opportunities is the main aim of the Task Force’s work. Even climate change impact in all economy sectors, there is level and type of exhibition according to the industry sector and geography. The Figure 4. Climate-Related Risks, Opportunities, and Financial Impact ,depicts how TCFD’s recommendation is classified: climate-related risk and opportunities and the financial impacts.

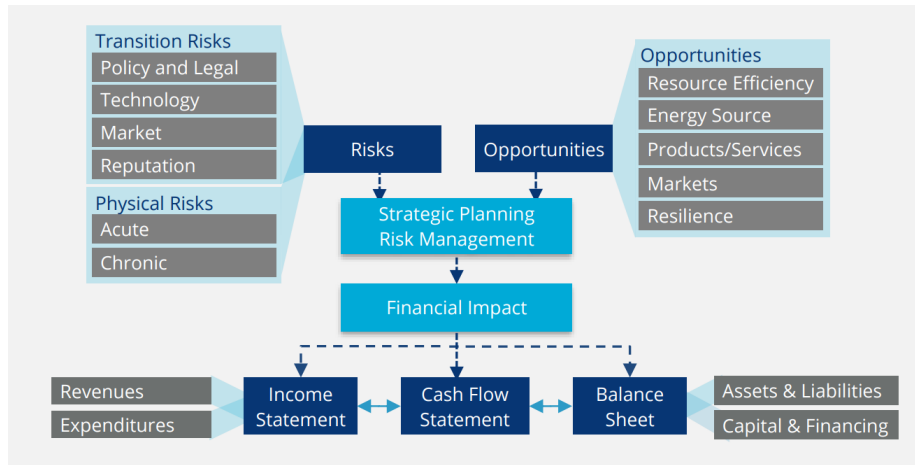


Figure 4. Climate-Related Risks, Opportunities, and Financial Impact (Task Force on Climate-related Financial Disclosures, 2017)

There are four major categories according Task Force which has a major financial impact: revenues, expenditures, assets and liabilities and capital and financing, by means of climate-related risk and opportunities could influence in the short term and long term financial position of any undertaking.

Mainly companies have problems in financial impacts of climate-related issues due to restricted knowledge of climate-related issues with undertakings, just paying attention to short time issues and not foreseen possible future issues, the complexity in quantifying the financial effects of climate-related financial effects.

Income Statement	Balance Sheet
<p>Revenues. Transition and physical risks may affect demand for products and services. Organizations should consider the potential impact on revenues and identify potential opportunities for enhancing or developing new revenues. In particular, given the emergence and likely growth of carbon pricing as a mechanism to regulate emissions, it is important for affected industries to consider the potential impacts of such pricing on business revenues.</p> <p>Expenditures. An organization's response to climate-related risks and opportunities may depend, in part, on the organization's cost structure. Lower-cost suppliers may be more resilient to changes in cost resulting from climate-related issues and more flexible in their ability to address such issues. By providing an indication of their cost structure and flexibility to adapt, organizations can better inform investors about their investment potential.</p> <p>It is also helpful for investors to understand capital expenditure plans and the level of debt or equity needed to fund these plans. The resilience of such plans should be considered bearing in mind organizations' flexibility to shift capital and the willingness of capital markets to fund organizations exposed to significant levels of climate-related risks. Transparency of these plans may provide greater access to capital markets or improved financing terms.</p>	<p>Assets and Liabilities. Supply and demand changes from changes in policies, technology, and market dynamics related to climate change could affect the valuation of organizations' assets and liabilities. Use of long-lived assets and, where relevant, reserves may be particularly affected by climate-related issues. It is important for organizations to provide an indication of the potential climate-related impact on their assets and liabilities, particularly long-lived assets. This should focus on existing and committed future activities and decisions requiring new investment, restructuring, write-downs, or impairment.</p> <p>Capital and Financing. Climate-related risks and opportunities may change the profile of an organization's debt and equity structure, either by increasing debt levels to compensate for reduced operating cash flows or for new capital expenditures or R&D. It may also affect the ability to raise new debt or refinance existing debt, or reduce the tenor of borrowing available to the organization. There could also be changes to capital and reserves from operating losses, asset write-downs, or the need to raise new equity to meet investment.</p>

Figure 5. Major categories of Financial Impact (Task Force on Climate-related Financial Disclosures, 2017)

It is important to take into account that Task Force foster companies to consider historical and future analyses at the moment to account the potential financial impact on climate change, with more focus on future impacts than historical ones. Scenario analysis has a great impact for organizations at the moment to look at their strategic planning or risk management practices.

3.4 Legal requirements linked with TCFD

These recommendations are voluntary, however, there are already companies involved in the field of information transparency and in the fight against climate change, publicly committed to work to include the information recommended by TCFD in their public reports. It is important to mention that in some countries disclosures related to climate change risks are already mandatory and this obligation could be extended to the European or national level.

The main reference is the French regulation, the art. 173 of the French Law on Energy Transition and Green Growth came into force on 1 January 2016 is the world's first legal requirement to disclose climate risk, which requires carbon disclosure requirements for listed undertakings and introducing carbon reporting for assets owners and investment managers. Further, institutional investors need to explain how they take Environmental, Social and Governance (ESG) criteria into account in their risk management, investment policies, impacts on physical and transition risk caused by climate change on their activities and assets. (European Commission, 2018)

France is a leader in terms of mobilizing investors, as proven the United Climate Change Conference (COP21) and Paris Agreement, which focus on the measure to reduce GHG emissions through mitigation, adaptation and resilience of ecosystems for the purposes of

Global Warming. The Law on Energy Transition for Green Growth strengthen France as a pioneer by reporting obligations in their regulation. (European Commission , 2018)

The responsible investment community in France had already manifested disruptive and innovative approaches to ESG integration and climate risk. Such innovation, and also the proof of the investment community's readiness for legislation, facilitate and give confidence for policy makers that an innovative approach could work. (Technical expert group on sustainable finance (TEG), 2019)

Another important legal requirement is the Non-financial reporting Directive(2014/95/EU), which the main objective of the European Union law is to set rules for the companies to disclose information on the way they operate and manage social and environmental challenges.

Directive 2014/95/EU established the rules for larges companies with more than 500 employees and published guidelines on how to report on policies related to environmental protection, social responsibility and treatment of employees, respect for human rights, anti-corruption and bribery and the diversity on company boards in terms of age, gender, educational and professional background.

The European Parliament demonstrate the importance of undertakings disclosure non-financial information helps the measuring, monitoring and managing their performance on the society, taking into account the multidimensional nature of corporate social responsibility (CSR) and the diversity of the CSR policies executed by undertakings harmonize a level of comparability for investors, stakeholder, consumers, to meet their need and easy access to the information on the impact of the business on society. (EUR-Lex, 2014)

During last few years, a clear trend of companies has shown up to publish more information on sustainability, in a transparent, comparable and accurate information. As an example, in 2017, only in Spain, 875 companies have submitted non-financial information reports. It is important to follow the path to achieve the Sustainable Development Goals (SDG) of the UN 2030 Agenda or the Paris Agreement on climate change.

The newest plan in Sustainable Finance published in March 2018 is the European Commission Action Plan on Financing Sustainable Growth, with three main objectives: reorienting capital towards sustainable investment, manage financial risk stemming from climate change, environmental degradation and social issues and foster transparency and long-termism in financial and economic activity. (European Commission , 2018)

The Action Plan was support by a technical expert group on sustainable finance (TEG) set up by the European Commission to help in four key areas trough the development of:

- 1) a unified classification system for sustainable economic activities,
- 2) an EU green bond standard,
- 3) benchmarks for low-carbon investment strategies, and
- 4) guidance to improve corporate disclosure of climate-related information.

In Action 9.2 of the Action Plan, states that the Commission will update the non-binding guidelines (NBGs) to provide further guidance to companies on how to disclose climate-related information, in line with the Task Force on Climate-related Financial Disclosure (TCFD) and the climate-related metrics develop under the new classification system. (Technical expert group on sustainable finance (TEG), 2019)

4. Benchmarking and analysis of the current implementation of the recommendations of the TFCFD

CDP acknowledge the outstanding role of the TCFD in mainstreaming climate-related information and the availability of relevant information for global market, whereby CDP committed to align its information requests with TFCFD’S recommendations, close to introducing a sectoral focus. The convergence between TCFD and CDP will drive companies reporting with TCFD’s recommendations, optimize the load of reporting and accelerate the decision making for the investors, lenders and insurance underwriters.

All this means a priority on board oversight, climate risk assessment and management, and the use of future scenarios analysis to establish the resilience of an action plan of an undertaking to climate risk.

CDP ask to the companies to respond to sector-specific questionnaires:

Cluster Questionnaire	Theme		
	Climate change	Water	Forests
Energy	Oil & gas Coal Electric utilities	Oil & gas Electric utilities	
Transport	Transport vehicle manufacturers Transport services		
Materials	Cement Steel Metals & mining Chemicals	Metals & mining Chemicals	
Agriculture	Food, beverage & tobacco Agricultural commodities Paper & forestry	Food, beverage & tobacco	Paper & forestry

Table 1. CDP questionnaires according the sector

There are many benefits of using CDP’s platform reporting framework that can favor companies to align with TCFD recommendations in their reporting:

- I. Structure: Facilitate comparability between organizations.
- II. A streamlined template: Reducing the duplication of efforts.
- III. Disclosure of decision useful information: CDP puts the information required by TFCFD into a system that can be structure, analyze, compare and track the information transparently.
- IV. Preparation advice: CDP’s system provide help to organizations by means of the disclosure process.
- V. Highlighting what is important: CDP offers guidance on how to submit answers in line with TFCFD recommendations.

- VI. Going further than the TCFD recommendations: CDP ensures tackling aligns a company's actions with the transition to a low-carbon economy, through CDP's advance data, corporate practices, assessments, and disclosures.
- VII. The future: CDP is improving their platform by the Reimagining Disclosure initiative and alignment with the TCFD recommendations. (CDP, 2019)

For all the advantages mention above and more, the following comparison between the European and Mexican companies will be by using the public responses of the companies from CDP 2018 Climate Change information request, which addresses the four main areas of the TCFD recommendations: Governance, Strategy, Risk Management, and Metrics and Targets.

As stated before, CDP has primarily integrated the TCFD's recommendations in their questionnaires and has adjusted the structure of the climate change questionnaire to align more nearly to TFCFD recommendations.

The relation between CDP questionnaire and TFCFD's recommendations is shown in the table below:

Governance	CDP	Strategy	CDP	Risk Management	CDP	Metrics and Targets	CDP
Disclose the organization's governance around climate-related risks and opportunities.		Disclose the actual and potential impacts of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.		Disclose how the organization identifies, assesses, and manages climate-related risks.		Disclose the metrics and targets used to assess and manage relevant climate-related risks and opportunities.	
Recommended Disclosures		Recommended Disclosures		Recommended Disclosures		Recommended Disclosures	
a) Describe the board's oversight of climate-related risks and opportunities.	C1.1 b	a) Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.	C2.1, C2.2b, C2.3, C2.3a, C2.4, C2.4a	Describe the organization's processes for identifying and assessing climate-related risks.	C2.2b, C2.2c	Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.	C4.2
b) Describe management's role in assessing and managing climate-related risks and opportunities.	C1.2, C1.2a	b) Describe the impact of climate-related risks and opportunities on the organization's businesses, strategy, and financial planning.	C2.5, C2.6, C3.1, C3.1c	Describe the organization's processes for managing climate-related risks.	C2.2c, C2.2d	Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.	C6.1, C6.3, C6.5
		c) Describe the potential impact of different scenarios, including a 2° c scenario, on the organization's businesses, strategy, and financial planning.	C3.1a, C3.1d	Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization's overall risk management.	C2.2	Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.	C4.1, C4.1a, C4.1b

Table 2. Alignment between CDP Climate Change and TCFD

4.1 Comparison by European companies

In this section, will be analyzed the answers of CDP Climate Change 2018 related with TCFD recommendations of six European Utilities (Iberdrola SA, EDF, ENGIE, ENEL SpA, SSE and EDP-Energias de Portugal S.A.) consulted on the CDP website, which I have access thanks to my internship in Iberdrola.

The following table shows the 6 European companies obtaining the best score in the Power Sector in 2018:

Company	Country	Sector (CC CDP)	Score Climate Change CDP 2018
Iberdrola	Spain	Electric Utilities	A-
EDF	France	Electric Utilities	A
ENGIE	France	Electric Utilities	A
ENEL	Italy	Electric Utilities	A-
SSE	UK, Great Britain and Northern Ireland	Electric Utilities	A-
EDP	Portugal	Electric Utilities	A-

Table 3.CDP Climate Change 2018 European Electric Utilities score

As it can be seen, the average performance of the companies' response is A- in the Electric Utilities sector.

Iberdrola is a multinational company dedicated to generation, transport and distribution of electricity. The group supplies energy to over 100 million people in the Spain, Mexico, United Kingdom, Brazil, United States and Scotland. It is leading the transition towards a sustainable energy model through investments in renewable energy, smart grids, large-scale energy storage and digital transformation, offering the most advanced products and services to customers. (Iberdrola, 2019)

Iberdrola is one of the electric companies with one of the highest CDP score obtaining and A- rating in 2018.

EDF is an integrated utility, active in all electricity businesses: nuclear, renewable and thermal generation, transmission, distribution, supply, efficiency and energy services and trading. It is the leading player in the French electricity market. (EDF, 2019). EDF scored A in the CDP Climate Change of 2018.

Other utility which will be analyze for this work is ENGIE, a global energy and services group, focused on three core activities: low-carbon power generation, global networks and customer solutions. Driven by the ambition to be leader of the energy transition, ENGIE is committed to take up major global challenges such as climate change and to offer its customers energy production solutions and services that reconcile individual and collective interests. (ENGIE, 2019) ENGIE, has the highest score A in the CDP Climate Change 2018.

ENEL, is a multinational power company and an integrated player in the world's power and gas markets. Enel Group operates in over 30 countries on 5 continents, with an installed capacity of around 88 GW, around 2.2 million kilometers of distribution lines and approximately 72 million customers. The Company operates in Europe, North and Central America, South America, Africa and Asia. Enel has the largest customer base among European competitors and figures among Europe's leading power companies in terms of installed capacity. (ENEL, 2019) Enel scored A- in the CDP questionnaire, the same one as Iberdrola, SSE and EDP.

SSE plc is one of the UK and Ireland’s leading energy companies, involved in the generation, transportation and supply of electricity and in the extraction, storage, transportation and supply of gas. Its purpose is to responsibly provide the energy and related services needed now and in the future. Its vision is to be a leading provider of energy and related services in a low-carbon world. Its strategy is to create value for shareholders and society from developing, owning and operating energy and related infrastructure and services in a sustainable way. SSE supports the drive towards decarbonization of the economy, electrification of transport and modernization of critical infrastructure, it does so with a commitment to maintaining and growing a range of complementary businesses that have energy and related services at their core. (SSE plc, 2019)As it mentioned before, SSE scored A- in the CDP Climate Change 2018.

And finally, EDP Energias de Portugal, S.A. (EDP) is a listed company whose ordinary shares are publicly traded in the Eurolist by NYSE Euronext Lisbon. EDP is a vertically integrated utility company, with operational activities in power generation, distribution and supply of electricity and gas supply. It is the largest generator, distributor and supplier of electricity in Portugal, the third largest electricity generation company in Spain. (EDP, 2019) EDP scored A- in the CDP Climate Change 2018.

The recommendations provided by TCFD will be a guidance for the information that should be analyze in this work. The four areas for the CDP responses Benchmarking Report are: Governance, Strategy, Risk Management and Metrics and Targets, as stated by TCFD.

Governance

Investors, lenders, insurance underwriters are concerning in comprehensive the role at companies’ board plays in be responsible for climate-related issues. This information allows users of climate-related financial disclosures to understand an organization’s governance to assess if board and management are taking enough care of these issues.

The sampling of the studied companies has a high level of commitment to putting climate change risks at the forefront of their business strategy, risk management policies and objectives. In fact, 74% of the companies who answer CDP has an oversight of climate related risk and opportunities, and 94% are companies in the power sector. All selected companies in the sample are considered as leader in this topic.

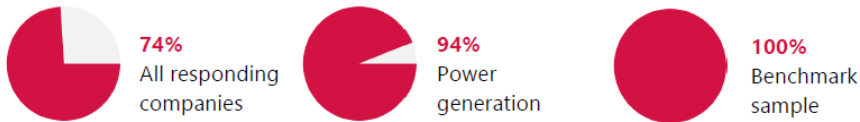


Figure 6. % with Board oversight (CDP, 2018)

The following table show the 6 selected European utilities, which reported the following activities related to the management role in assessing and managing climate-related issues.

	Iberdrola SA	EDF	ENGIE	ENEL SpA	SSE	EDP
Monitoring and overseeing progress against goals and targets for addressing climate-related issues	✓	✓	✓	✓	✓	✓
Monitoring implementation and performance of objectives	✓	✓	✓	✓	✓	✓
Overseeing major capital expenditures, acquisitions and divestitures			✓	✓	✓	✓
Reviewing and guiding annual budgets				✓	✓	✓
Reviewing and guiding business plans		✓		✓	✓	✓
Reviewing and guiding major plans of action	✓	✓	✓	✓	✓	✓
Reviewing and guiding risk management policies	✓	✓	✓	✓	✓	✓
Reviewing and guiding strategy	✓	✓	✓	✓	✓	✓
Setting performance objectives		✓		✓	✓	✓

Table 4. European utilities assessing and managing climate-related issues (CDP, 2018)

As it can be seen in the above table in the Governance mechanism, there are three companies (ENEL SpA, SSE and EDP) who included in their CDP Climate Change 2018 answers all management role considerations, including the process and frequency by which the board committee are informed about climate-related risk, having a major plan of actions, risk management policies, annual budgets, in addition to board oversees their advance in goals and targets to deal with climate-related issues.

The main actions for the companies who has not fulfilled all the aspects related to the management role in assessing and managing climate-related issues mentioned before, may be to manage a top-down approach, assessing responsibilities for the whole organization and starting from the highest level. Whereby, there will be evidences of board and management activities related to the review and judging annual budgets, overseeing major capital expenditures, acquisitions and divestitures and setting performance to a low carbon economy.

For example, ENEL CFO overseeing the capital expenditures in order to achieve the business strategy to a low carbon energy model. According to CDP Climate Change answer, Enel issued 1.25 billion euro through Green Bonds in 2017 and 8.6% of the share capital of Enel is covered by investors that integrate environmental, social and governance (ESG) related issues in their investment portfolio, being climate change their most priority issue. Besides, the CFO also oversees the activities related to the Task Force on Climate Financial Disclosure (TCFD).

Regarding the frequency in management's role assessing climate-related risk and opportunities, 100% of the Benchmarking sample the companies report to the board on climate-related issues more frequently than quarterly.

Other example by Iberdrola, that states that at operative level supports its efforts on climate change issues on two areas that reported directly to the CEO:

a) Environmental Management Team, which is also responsible for:

- Annual revision of the operational limits of the GHG emissions inventory
- Revision of emission factors
- Quantification of the GHG reductions
- Enactment of the environmental targets for the environmental management systems (ISO14001)
- Monitoring the key performance indicators trends,
- Execution of the methodology for calculating direct and indirect emissions of IBERDROLA's activities and the accomplishment of the inventory and the Carbon Footprint Report. These duties are led by Iberdrola Chief Sustainability Officer

b) In 2015, before COP21, a new area was created depending from the CEO and President, Energy Policies and Climate Change Directorate. Under its main responsibilities are:

- Coordination of all climate action projects in the field of Mitigation
- Adaptation and Awareness
- Develop policy positions and assessments in the field of climate policy
- Tackle external stakeholder's relationships within the context of the global climate action agenda

Strategy

Users of climate-related financial disclosures must to comprise how climate-related issues could impact a company's business strategy, and financial planning in the short, medium and long term.

Task Force recommended disclosure on a) Describe the climate-related risk and opportunities the organization has identified over the short, medium and long term, b) describe the impact of climate-related risk and opportunities on the organization's business, strategy, and financial planning, and c) describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2 °C or lower scenario. (Task Force on Climate-related Financial Disclosures, 2017)

Scenario are stories which help to create a future, and guide companies in the decisions make today. Explain all the possible track that will drive to a particular outcome. This allow companies to use a helpful tool to make a critical thinking, instead of exploring alternatives who may have or not have a relevant impact of occurrence.

In the following tables are some examples of Climate-Related Risk and Opportunities with its Potential Financial Impacts:

Type	Climate-Related Risks
Transition Risks	Policy and Legal
	<ul style="list-style-type: none"> - Increased pricing of GHG emissions - Enhanced emissions-reporting obligations - Mandates on and regulation of existing products and services - Exposure to litigation
	Technology
	<ul style="list-style-type: none"> - Substitution of existing products and services with lower emissions options - Unsuccessful investment in new technologies - Upfront costs to transition to lower emissions technology
	Markets
<ul style="list-style-type: none"> - Changing customer behavior - Uncertainty in market signals - Increased cost of raw materials 	
Physical Risks	Reputation
	<ul style="list-style-type: none"> - Shift in consumer preferences - Stigmatization of sector - Increased stakeholder concern or negative stakeholder feedback
	Acute
	<ul style="list-style-type: none"> - Increased severity of extreme weather events such as cyclones and floods
	Chronic
<ul style="list-style-type: none"> - Changes in precipitation patterns and extreme weather variability - Rising mean temperatures - Rising sea levels 	

Table 5.Examples of Climate-Related Risk and Potential Financial Impacts

Type	Climate-Related Opportunities
Resource Efficiency	<ul style="list-style-type: none"> - Use of more efficient modes of transport - More efficient production and distribution processes - Use of recycling - More efficient buildings - Reduced water usage and consumption
Energy Source	<ul style="list-style-type: none"> - Lower-emission sources of energy - Supportive policy incentives - Emergence of new technologies - Participating in carbon market - Energy security and shift towards decentralization
Products and Services	<ul style="list-style-type: none"> - Develop and/or expand low emission goods and services - Climate adaptation and insurance risk solutions - R&D and innovation - Diversify business activities - Shifting consumer preferences
Markets	<ul style="list-style-type: none"> - New markets - Public-sector incentives - Community needs and initiatives - Development banks
Resilience	<ul style="list-style-type: none"> - Participate in renewable energy programs and adopt energy-efficiency measures - Resource substitutes/diversification - New assets and locations needing insurance coverage

Table 6.Examples of Climate-Related Opportunities and Potential Financial Impacts

Forecasting the impacts of climate-related risks and opportunities is necessary for accurate assessment and pricing by investors, lenders, and insurance underwriters. Iberdrola, EDF, ENEL and SSE are the companies which make a forecasting of the impacts of climate-related risk in all their business and financial planning areas.

Business and financial planning areas	Iberdrola SA	EDF	ENGIE	ENEL SpA	SSE	EDP
Access to capital	Impacted	Impacted	Impacted	Impacted	Impacted	Impacted
Acquisitions and divestments	Impacted	Impacted	Impacted	Impacted	Impacted	Impacted
Adaptation and mitigation activities	Impacted	Impacted	Impacted	Impacted	Impacted	Impacted
Assets	Impacted	Impacted	Impacted	Impacted	Impacted	Impacted
Capital expenditures / capital allocation	Impacted	Impacted	Impacted	Impacted	Impacted	Impacted
Investment in R&D	Impacted	Impacted	Impacted	Impacted	Impacted	Impacted
Liabilities	Impacted	Impacted	Question not answered	Impacted	Impacted	Impacted
Operating costs	Impacted	Impacted	Impacted	Impacted	Impacted	Impacted
Operations	Impacted	Impacted	Impacted	Impacted	Impacted	Not yet evaluated
Products and services	Impacted	Impacted	Impacted	Impacted	Impacted	Impacted
Revenues	Impacted	Impacted	Impacted	Impacted	Impacted	Impacted
Supply chain and/or value chain	Impacted	Impacted	Impacted	Impacted	Impacted	Not impacted

Impacted	Impacted
Not impacted	Not impacted
Not yet evaluated	Not yet evaluated
Question not answered	Question not answered

Table 7. Impacts of climate-related risk and opportunities of European utilities (CDP, 2018)

A public available 2°C scenario make reference to a 2°C scenario that is used/referenced and issued by an independent body; wherever possible, supported by publicly available datasets; updated on a regular basis; and linked to functional tools (e.g., visualizers, calculators, and mapping tools) that can be applied by organizations. 2°C scenarios that presently meet these criteria include: IEA 2DS, IEA 450, Deep Decarbonization Pathways Project, and International Renewable Energy Agency. (Task Force on Climate-related Financial Disclosures, 2017)

The scenarios used by the selected European utilities to disclose scenario analysis committed to long-term strategic and financial planning are show in the following table:

Company name	Scenario used
Iberdrola SA	<ul style="list-style-type: none"> • IEA Sustainable development scenario • IEA New Policies Scenario (NPS) • IPCC RCP 8.5
EDF	<ul style="list-style-type: none"> • Internal models
ENGIE	<ul style="list-style-type: none"> • IEA 450 • Own renewable scenario for Europe
ENEL SpA	<ul style="list-style-type: none"> • Not applicable
SSE	<ul style="list-style-type: none"> • NG FES and internal energy/ company FES
EDP	<ul style="list-style-type: none"> • 2DS • IEA 450 • IPCC SRES A1B, A2 and B1 • RCP 2.6

Table 8.Scenarios utilized by selected European utilities in CDP 2018

The utilities had described in CDP questionnaire 2018 what does it mean to be a short, medium and long term horizon, nevertheless, the discrepancy in horizons not make a fair comparison between how the organization provide information for identifying and assessing climate-related risks.

	Short-term	Medium-term	Long-term
Iberdrola SA	1-5	5-30	30-100
EDF	1-5	5-10	10-30
ENGIE	18-20	20-30	30-50
ENEL SpA	0-1	1-3	5-35
SSE	0-3	4-12	13-30
EDP	0-1	1-5	5-50

Table 9.Time horizons of selected European companies in CDP 2018

100% of the selected European utilities, disclose to have a major risk in their direct operations of the value chain, as it shows the table below. EDF is the utility who declared a higher potential financial impact for a total amount of € 330,000,000 and their primary climate risk are related with the physical risk and the acute driver. EDF define the regulation of the market for CO2 emission quotas can have some changes in prices which will affect EDF group and the objective of low-carbon energy solutions. Further, it mentioned about the impact on the increase of water temperature in their plants used to cooling the system, could lead to a deterioration of the water quality, or to an increase in the upstream water temperature, which would imply a loss of efficiency in the energy production, or additional operational costs.

Iberdrola is the utility with the highest reported amounts for management methods, with an amount of € 11,416,098,233.00, which main strategy of the group is having a well-diversified mix of generation power plants in terms of geography and technologies. The generation mix is planned to look for the better expected natural resources during the lifetime of the assets

and taking into account the possible compensation of punctual production reduction for one technology/area with another. For that purpose, it is planned to increase of more than 20% of installed capacity (GW) by 2022 in a diversified mix by country and technologies, which the inversion planning of 11.400 M€ as investment from 2018 to 2022, spread in the following geographical area: USA: 16 %, United Kingdom, Spain and Portugal, 45 %, Mexico: 21 and Brazil 7%.

The table below is a summary on how the 6 utilities describe the climate related risks the organizations have identified over the short, medium, and long term and their potential economic impact:

	Climate-related Risk						
	Where in the value chain does the risk driver occur?	Risk type	Primary climate-related risk driver	Time horizon	Magnitude of impact	Potential financial impact (EUR)	Cost of management (EUR)
Iberdrola	Direct operations	Physical risk	Chronic	Long-term	High	190,000,000.00 €	11,400,000,000.00 €
	Customer	Transition risk	Market	Long-term	Medium-high	100,000,000.00 €	513,233.00 €
	Direct operations	Transition risk	Market	Short-term	Medium-high	40,000,000.00 €	15,585,000.00 €
EDF	Direct operations	Transition risk	Policy and legal	Current	Medium	76,000,000.00 €	160,000,000.00 €
	Direct operations	Physical risk	Acute	Medium-term	High	300,000,000.00 €	400,000,000.00 €
	Direct operations	Physical risk	Acute	Short-term	High	150,000,000.00 €	43,000,000.00 €
ENGIE	Direct operations	Transition risk	Policy and legal	Medium-term	Low	-	250,000.00 €
	Direct operations	Transition risk	Technology	Long-term	Medium	-	100,000.00 €
	Direct operations	Physical risk	Chronic	Medium-term	Low	200,000,000.00 €	100,000.00 €
	Direct operations	Physical risk	Acute	Long-term	Low	-	100,000.00 €
ENEL SpA	Direct operations	Transition risk	Market	Medium-term	Low	5,000,000.00 €	355,000.00 €
	Direct operations	Physical risk	Chronic	Medium-term	Low	33,000,000.00 €	355,000.00 €
	Direct operations	Transition risk	Market	Medium-term	Low	7,000,000.00 €	355,000.00 €
SSE	Direct operations	Physical risk	Chronic	Long-term	Medium	112,890,000.00 €	282,225.00 €
	Direct operations	Physical risk	Acute	Short-term	Low	7,902,300.00 €	22,578,000.00 €
EDP	Direct operations	Transition risk	Policy and legal	Medium-term	High	50,000,000.00 €	740,000,000.00 €
	Direct operations	Physical risk	Chronic	Long-term	Medium-high	60,000,000.00 €	980,000,000.00 €
	Direct operations	Physical risk	Acute	Long-term	Medium	15,000,000.00 €	8,000,000.00 €
	Customer	Transition risk	Market	Medium-term	Medium	35,000,000.00 €	86,000,000.00 €

Table 10. Selected European utilities Financial impact Climate-related Risk (CDP 2018)

Regarding the opportunities of the utilities, Iberdrola leads the selected companies with a total potential estimated financial impact of € 2,800,000,000.00; where mainly is related with the opportunity type of products and services. Iberdrola strategy to realize the opportunity is to be leader in renewable energy generation and increase operational efficiency of the renewable assets. Further, the strategy of the group is to obtain profitable growth in the retail business based on smart solutions as: Smart Energy Services, Smart Home, Smart Mobility and Smart Solar. Also, digitalization of processes and sales will promote with extra efficiencies as promoting e-billing, launching new digital products to customer personalization, leveraging on smart meter and data analytics, giving customer advice about consumption based on data.

At the same case, Iberdrola has estimated the highest cost to realize all above mention opportunities with a total cost of € 28,900,000,000.00. The major cost is related with the investment in Renewables from 2018 to 2022 in USA 31%, United Kingdom 20%, Spain 16%, Mexico 9 % and Brazil 4%.

The second place is occupied by the utility EDF, with a total potential impact of € 2,000,000,000.00, of its opportunities, which means € 80,000,000.00 less than Iberdrola. Its opportunity cost is related with the markets and energy source, having an impact in a medium-high scope. EDF aims to increase their advantage with also investment in low carbon generation. The investment will be around € 7.6 billion in low carbon generation activities.

The following table shows a summary on how the 6 utilities describe the climate related opportunities the organizations have identified over the current, short, medium and long time horizon, the primary climate-related opportunity driver and the potential financial impact with the related cost to implement the opportunity.

Climate-related Opportunities							
	Where in the value chain does the opportunity occur?	Opportunity type	Primary climate-related opportunity driver	Time horizon	Magnitude of impact	Potential financial impact (EUR)	Cost to realize opportunity (EUR)
Iberdrola	Direct operations	Products and services	Development and/or expansion of low emission goods and services	Short-term	Medium-high	1,200,000,000.00 €	11,500,000,000.00 €
	Direct operations	Products and services	Development of new products or services through R&D and innovation	Short-term	Medium-high	1,000,000,000.00 €	15,500,000,000.00 €
	Customer	Products and services	Shift in consumer preferences	Short-term	Medium-high	600,000,000.00 €	1,900,000,000.00 €
EDF	Direct operations	Markets	Other	Current	High	650,000,000.00 €	7,600,000,000.00 €
	Direct operations	Energy source	Other	Current	Medium-high	200,000,000.00 €	10,000,000.00 €
	Direct operations	Markets	Other	Medium-term	Medium	1,150,000,000.00 €	2,000,000,000.00 €
ENGIE	Direct operations	Energy source	Use of supportive policy incentives	Medium-term	Medium-high	800,000,000.00 €	350,000.00 €
	Customer	Products and services	Development and/or expansion of low emission goods and services	Medium-term	Low	100,000,000.00 €	100,000.00 €
	Customer	Products and services	Development and/or expansion of low emission goods and services	Medium-term	Medium	300,000,000.00 €	100,000.00 €
	Customer	Products and services	Development and/or expansion of low emission goods and services	Medium-term	Low	-	50,000.00 €
ENEL SpA	Direct operations	Energy source	Participation in carbon market	Medium-term	Low	5,000,000.00 €	355,000.00 €
	Direct operations	Energy source	Use of lower-emission sources of energy	Medium-term	Low	35,000,000.00 €	355,000.00 €
	Direct operations	Products and services	Shift in consumer preferences	Medium-term	Low	25,000,000.00 €	7,100,000.00 €
SSE	Direct operations	Products and services	Development and/or expansion of low emission goods and services	Medium-term	Medium	- €	- €
	Direct operations	Products and services	Development and/or expansion of low emission goods and services	Short-term	Medium-high	- €	- €
EDP	Direct operations	Energy source	Use of supportive policy incentives	Medium-term	High	145,000,000.00 €	740,000,000.00 €
	Customer	Products and services	Development and/or expansion of low emission goods and services	Long-term	Medium	20,000,000.00 €	420,000,000.00 €
	Customer	Products and services	Development and/or expansion of low emission goods and services	Short-term	Medium-high	134,000,000.00 €	60,000,000.00 €

Table 11. Selected European utilities Financial impact Climate-related Opportunities (CDP 2018)

Risk Management

Shareholders and users of climate-related financial disclosures desire to know how an organization's climate-related risks are detected, judged, managed and to take into account

if those methods are harmonious into existing risk management process. This kind of information helps users of climate-related financial disclosures in assessing the organizations general risk profile and risk management activities.

The three recommendations are:

- a) Describe the organization’s processes for identifying and assessing climate related risks.
- b) Describe the organization’s processes for managing climate-related risks.
- c) Describe how processes for identifying, assessing, and managing climate-related risk are integrated into the organization’s overall risk management.

According to the companies who answered CDP, just 56% integrated climate-related issues into multi-disciplinary company-wide risk identification, assesment , and management process, and 88 % are power generation. It can be seen , that power generation companies have a high degree in evaluate climate- related risks.

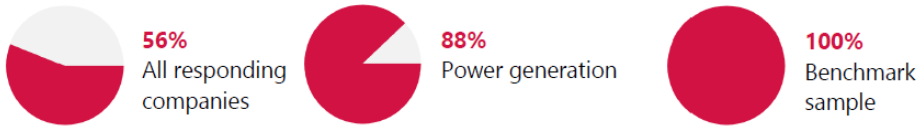


Figure 7. % integrated climate-related issues into multi-disciplinary company-wide risk identification, and management processes. (CDP, 2018)

The Task Force divided climate-related risks into those related to the transition to a lower-carbon economy and those related with the physical impacts of the climate change, the following table display how the European utilities considered their organization's climate-related risk assessments.

Type of Risk	Iberdrola SA	EDF	ENGIE	ENEL SpA	SSE	EDP
Physical Risk						
Acute physical						
Chronic physical						
Transition Risks						
Current regulation						
Downstream						
Emerging regulation						
Legal						
Market						
Reputation						
Technology						
Upstream						

Relevant included	
Not relevant	

Table 12.Relevant risk under assessment by Europe companies (CDP, 2018)

The Table 12.Relevant risk under assessment by Europe companies, represents the different climate related risk types considered in the assessments of the organizations, it can be seen the majority of the companies considered relevant and inclusion of the physical and transition risk as: acute physical, chronic physical, current regulation, downstream, emerging regulation, legal, market, reputation, technology and upstream.

Iberdrola is the exception in the transition risk in the Legal area, due to excellent performance, legal actions against directors and companies for failing to adapt to, mitigate against and inform about climate change are not considered relevant, although it is monitored to check its future relevance. Regarding the current regulation, Iberdrola considered regulation in all the risk assessment of the Group, as there are policy actions which modify energy markets to achieve a different goal and the new regulations may affect Iberdrola strategy.

As other company example, EDF considered technology as a relevant risk to be included, as the utility is using more efficient technologies in terms of CO2 emissions or concerning the digital transformation. Regarding the chronic physical risk, the group states this effect may be difficult to predict and could unfavorable consequences for the financial conditions of the Group.

Engie, takes into account reputation risk, directly and indirectly. ENGIE identifies risks via external tools (e.g. Reprisk), stakeholder (NGOs, Association) meetings and manages risks via SE (stakeholder engagement) policy.

About the frequency and timeframe which the companies monitor climate-related risks 5 out of 6 companies of the sample do it every six months or more frequently, and the only one who monitors annually their risk is EDP. 100% of the benchmarking sampling consider more than 6 years horizon for identifying and assessing climate-related risk. All integrated into multi-disciplinary company-wide risk identification, assessment, and management processes, which accomplish all the utilities of the benchmarking are aligned with the same path to identify risk, and it is consider the best approach to this issue.

	Frequency of monitoring	How far into the future are risks considered?	How the organization’s processes for identifying, assessing, and managing climate-related issues are integrated into your overall risk management.
Iberdrola SA	Six-monthly or more frequently	>6 years	Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes
EDF	Six-monthly or more frequently	>6 years	Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes
ENGIE	Six-monthly or more frequently	>6 years	Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes
ENEL SpA	Six-monthly or more frequently	>6 years	Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes
SSE	Six-monthly or more frequently	>6 years	Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes
EDP	Annually	>6 years	Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes

Table 13. Frequency monitoring climate-related risk of selected European utilities (CDP 2018)

Metrics and targets

Financial information users must to comprise how a company measures and monitors its climate-related risk and opportunities. TCFD suggest companies to disclose the metrics and targets used to evaluate and manage relevant climate-related risks and opportunities where such information is material. Stakeholders can use an organization's metrics and targets to assess its general exposure to climate-related issues and progress in managing or adapting to those issues, as well as provide a basis upon which to compare organizations within a sector or industry.

The three recommended disclosure are:

- a) Disclose the metrics used by the organization to assess climate-related risks and opportunities in line with its strategy and risk management process.
- b) Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks
- c) Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets.

Companies' emissions are the main driver of the increasing temperature of the world, are essential point of policy, legal, regulatory, market and technology responses of the climate change. Companies with more emissions will result in more dramatic transition risks. Therefore, TCFD recommend organization to provide their Scope 1, Scope 2 and Scope 3 (just if is appropriate it) GHG emissions.

The Greenhouse Gas Emission Scope levels are:

- Scope 1 refers to all direct GHG emissions.
- Scope 2 refers to indirect GHG emissions from consumption of purchased electricity, heat, or steam.
- Scope 3 refers to other indirect emissions not covered in Scope 2 that occur in the value chain of the reporting company, including both upstream and downstream emissions. Scope 3 emissions could include: the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g., transmission and distribution losses), outsourced activities, and waste disposal. (IPCC, 2014)

Emissions intensity calculate CO₂ of a company in the essence of other business metric. Thereby, emissions are normalized to account for growth. As it can be seen in the table below of Emission Intensity, historically stakeholders have tracked environmental performances with intensity ratios.

EDP has the highest emission intensity accounting for .1522% of intensity figure, where the gross combined Scope 1 and 2 emissions are 23,961,090.00 tons of CO₂e, of the total revenue of €31.263.300.000,000. SSE has the lowest emission intensity accounting for 0.0351 % of intensity figure, where the gross combined Scope 1 and 2 emissions are 10,960,012.00 tons of CO₂e, of the total revenue of € 35,251,031,400.00. The second lowest emission intensity is followed by Iberdrola with 30,261,687.00 tons of CO₂e of the total revenue of €31,263,300,000.00 with an intensity figure of 0.0968%.







Emission intensity	Company name	S1 S2 emissions (Tons of CO2e)	Revenue (EUR)
	Iberdrola SA	30,261,687.00	€ 31,263,300,000.00
	EDF	51,792,152.60	€ -
	ENGIE	92,813,298.00	€ 65,000,000,000.00
	ENEL SpA	105,892,605.00	€ 74,639,000,000.00
	SSE	10,960,012.00	€ 35,251,031,400.00
	EDP	23,961,090.00	€ 15,745,987,677.00

Table 14. Emission Intensity (Scope 1 and 2) of selected European utilities (CDP, 2018)

Carbon pricing shows the interest of a company to manage energy efficiency to reduce cost, is an internally developed cost of carbon emissions and can be used to help identify revenue opportunities and risk, and guide capital investment decision.

From all the companies who answered CDP Climate Change 2018, just 8 % take into account an internal price on carbon, from that percentage more than the half (54%) are from Power Sector.

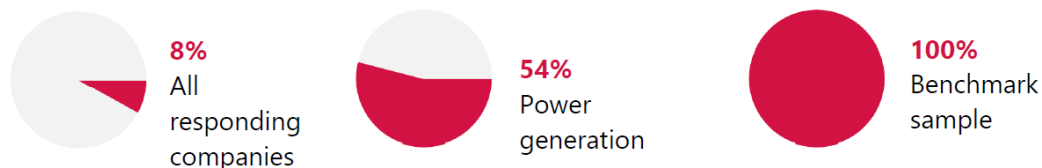


Figure 8. % with internal price on carbon (CDP, 2018)

The only two utilities out of six which use carbon pricing for the Scope 1, Scope 2 and Scope 3 are Iberdrola and Enel as it can be seen in the below. Iberdrola’s main objective for implementing an internal carbon price are Navigate GHG regulations, Drive low-carbon Investment and Stress test investments with an actual price of 30 €/ton using a shadow internal carbon price. Enel’s main objective for implementing carbon pricing are Navigate GHG regulations, Drive energy efficiency, Drive low-carbon investment, Stress test investments and Identify and seize low-carbon opportunities with an actual price of 12 €/ton using a market internal carbon price.

	Objective for implementing an internal carbon price	GHG Scope	Actual price(s) used (€ /ton)	Type of internal carbon price
Iberdrola SA	Navigate GHG regulations Drive low-carbon investment Stress test investments	Scope 1 Scope 2 Scope 3	€ 30.00	Shadow price
EDF	Drive low-carbon investment Identify and seize low-carbon opportunities	Scope 1	-	Other, please specify (Expected real price)
ENGIE	Change internal behavior Drive low-carbon investment Stress test investments Identify and seize low-carbon opportunities	Scope 1	€ 40.00	Other, please specify (Internal price sensitives)
ENEL SpA	Navigate GHG regulations Drive energy efficiency Drive low-carbon investment Stress test investments Identify and seize low-carbon opportunities	Scope 1 Scope 2 Scope 3	€ 12.00	Other, please specify (ETS market price)
SSE	Navigate GHG regulations Drive low-carbon investment Stress test investments Identify and seize low-carbon opportunities	Scope 1 Scope 3	€ 20.32	Implicit price
EDP S.A.	Navigate GHG regulations Stakeholder expectations Change internal behavior Drive energy efficiency Drive low-carbon investment Stress test investments Identify and seize low-carbon opportunities	Scope 1	€ 27.00	Shadow price Implicit price

Table 15. Internal carbon pricing CDP 2018 answers of the six utilities.

About Scope 3 emissions can represent the most significant emission for a company, and great opportunities to reduce GHG, which is critical for stakeholders.

	Iberdrola SA	EDF	ENGIE	ENEL SpA	SSE	EDP
Business travel						
Capital goods						
Downstream leased assets						
Downstream transportation and distribution						
Employee commuting						
End of life treatment of sold products						
Franchises						
Fuel-and-energy-related activities (not included in Scope 1 or 2)						
Investments						
Other (downstream)						
Other (upstream)						
Processing of sold products						
Purchased goods and services						
Upstream leased assets						
Upstream transportation and distribution						
Use of sold products						
Waste generated in operations						

Relevant calculated	
Not relevant	
Question not answered	
Not evaluated	

Table 16. Scope 3 emissions of selected European utilities (CDP, 2018)

It can be observed from the table above that 100% of the benchmarking sample considered “Not Relevant Evaluation”, the emissions of Downstream leased assets, End of life treatment of sold products, Franchises and Processing of sold products.

The majority of the selected utilities considered relevant to calculate the emissions in Scope 3 of the Fuel-and-energy-related activities (not included in Scope 1 or 2) and Purchased goods and Services. EDF is one of the companies which calculate the 4,446,565 tonnes of CO2 emission, using a methodology of GHG protocol and maintenance, office supplies, communications of the Purchased goods and Services. As well the 34,009,909 tonnes of CO2 emission related with Fuel-and-energy-related activities, through the calculation methodology of upstream emissions of purchased fossil fuels (extraction, refining, transportation).

Engie, also takes into account as a relevant evaluation the emissions by Purchased goods and services, with 9,847,667 tonnes of CO2 emission from this activity, the calculation methodology of the group has been calculated with the scope 3 screening tool developed by the GHG protocol in collaboration with Quantis.

Emission reduction targets exhibit the commitment of the companies trying to reduce emissions. Target establish direction and structure to environmental strategy, to be conscious of the companies which are harmonizing and focusing emissions-related efforts.

The Science Base Target give to the companies a clear pathway to future proof growth by identifying how much and how quickly companies need to reduce their Greenhouse gas emissions.

The targets adopted by the companies to reduce the Greenhouse gas GHG are taking into account as Science Base Target, just in the case the targets are aligned with the latest climate science says is necessary to meet the goals of the Paris Agreement. (Science Based Targets, 2019)

In fact, just 3% of all the companies who answered CDP are committed to setting a Science-Based Target and 7% of that are from Power sector.

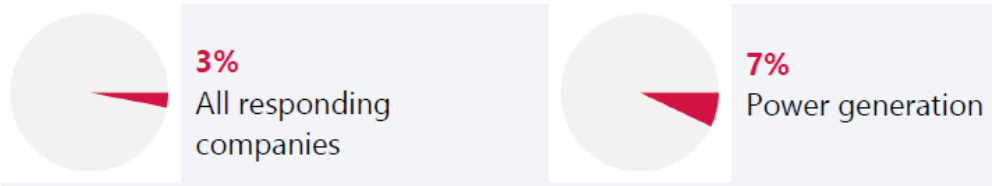


Figure 9. % committed to setting a Science-Based Target

Regarding the percentage of approved Science-Based Target is even less, accounting just the 2% of all responding companies from CDP 2018 and 5% are from the sector of Power.

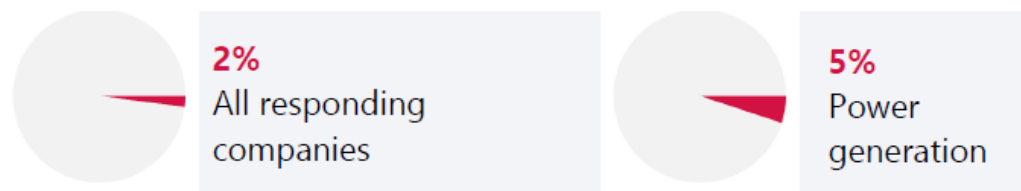


Figure 10. % with an approved Science-Based Target

The transition to a low-carbon economy is underway and accelerating globally. At the moment there are 575 companies committed with science-based climate action and 231 companies have approved science-based targets. (Science Based Targets, 2019)

The table below specified the companies which were already committed to setting a Science Base Target as Iberdrola, SSE and EDP and the ones who already had a Target approved, like Iberdrola, Enel and EDP.

	Long-term target year	Commitment made	Target Approved
Iberdrola	2050	✓	✓
EDF	2035	✓	
ENGIE	2050	✓	
ENEL	2050	✓	
SSE	2030	✓	✓
EDP	2030	✓	✓

Table 17. Committed and approved to setting a Science-Based Target of selected European utilities (Science Based Targets, 2019)

Iberdrola commits to reduce absolute scope 1, 2 and 3 GHG emissions 20% by 2030 from a 2017 base year.

EDP commits to reduce scope 1 and 2 emissions from electricity production 55% per TWH per TWH by 2030, from 205 levels. The company also commits to reduce absolute scope 3.

And Enel Spa commits to reduce CO2 emission 25% per kWh by 2020, from a 2007 base-year. The target includes the decommissioning of 13 GW of fossil power plants in Italy and is a milestone in the long term goal to operate in carbon neutrality by 2050.

5. Mexican companies who participated in CDP

Initially, the first approach taken to select the Mexican companies participated in CDP was based on the highest score in that questionnaire, as it was done with the European companies. Nevertheless, as there is not a wide variety of Mexican companies participating in sustainability reports and indexes the benchmarking sample needed to be reduce. The selected three Mexican companies were harsh to choose due to not all companies requested to respond to CDP do so, also companies who disclose their data fail to provide enough information to CDP were evaluated, and other reason even companies were scored they preferred to not make public upon submission through the CDP online platform their answer to CDP Climate Change. Hence, at the end out of 101 results of companies register in CDP Climate Change, less than 10% was relevant material to work on.

The three Mexican Companies to be analyze are Wal Mart de Mexico, CEMEX and Axtel, as are well known companies in Mexico, had public responses through the CDP online platform and were scored higher or equal to C, and above the lowest level disclosure, D.

Company	Country	Sector (CC CDP)	Score Climate Change CDP 2018
Walmart de Mexico	Mexico	General	B
CEMEX	Mexico	Cement	B
Axtel	Mexico	Information & Communication Technologies	C

Table 18. Selected Mexican companies and CDP Climate Change 2018 score

Walmart de Mexico

Walmart de Mexico was a desire company to analyze using the questions of CDP Climate Change 2018 related with TFCF’s recommendations and provide with a final product to facilitate the further approach to the TCFD recommendations. As the table *CDP Climate Change 2018 Mexican Companies score* show, Walmart score B in the CDP questionnaire 2018, one of the companies with the best score in Mexico. Here below there is a general description of the company which supports the idea of been an outstanding company for this work.

Walmart de Mexico y Centroamerica (MSE: WALMEX) served 2,146 million customers at 3,134 retail units under 16 different banners in 6 countries, supported by distribution, logistics and sourcing operations. Walmart was built on the foundation of saving people

money so they can live better. With sales of \$573 billion pesos in 2017. WALMEX employs 237,055 associates. WALMEX continues to be a leader in sustainability, corporate philanthropy and employment opportunity.

Walmart has a sustainability strategy which aim to reduce the environmental impact of the operation and the products by commercializing through innovation and investment in cutting-edge technologies and collaboration with business partners.



Figure 11. Walmart Energy

Walmart is committed in their stores and distribution centers being supplied with 100% renewable energy, with the purpose of mitigating the effects of climate change.

Therefore, it continues to look for electric power supply options to get closer to their goal and, at the same time, implement initiatives for a more efficient consumption of energy, with the challenge of generating savings over layers of savings for many years. (Walmart de Mexico , 2019)

Cemex

Further, CEMEX is an important company to consider in this work as leader in Mexico to implement a sustainable model which allow to develop resilient and energy efficient infrastructure solutions. CEMEX is tie with Walmart with the highest score compare with Axtel and have been disclosure their carbon strategy and performance for 9 consecutive years, acquiring this year a score of B which means the company has evaluated environmental issues, risks and impacts, but still has a work field to improve. Besides, is a great company in Mexico, as my personal interest I choose CEMEX to be more familiarized with their work and maybe in a future could work in this worldwide company.

CEMEX, S.A.B. de C.V. is a publicly traded stock corporation with variable capital, organized under the laws of Mexico. CEMEX is one of the largest cement companies in the world, based on annual installed cement production capacity as of December 31, 2017, of approximately 92.4 million tons.

CEMEX is the second largest ready-mix concrete company in the world with annual sales volumes of approximately 51.7 million cubic meters and one of the largest aggregate’s companies in the world with annual sales volumes of approximately 147.4 million tons, in each case, based on our annual sales volumes in 2017. CEMEX is also one of the world’s largest traders of cement and clinker. CEMEX, S.A.B. de C.V. is an operating and holding company engaged, directly or indirectly, through its operating subsidiaries, primarily in the production, distribution, marketing and sale of cement, ready-mix concrete, aggregates, clinker and other construction materials throughout the world, and that provides reliable construction-related services to customers and communities in more than 50 countries throughout the world, and maintains business relationships in over 100 countries worldwide.

CEMEX has a rich history of improving the well-being of those it serves through innovative building solutions, efficiency advancements, and efforts to promote a sustainable future. The initiatives are aligned with the Sustainable Development Goals (SDGs) traced by the United Nations Development Program. (CEMEX Mexico, 2019)

It is interesting to observe how Mexican companies, are becoming more aware of addressing the need to limit the rise of global temperatures by taking actions aligned with the SDGs as European companies have been leading in the past years. CEMEX is a clear example to implement the SDGs in their activities.



Figure 12. Sustainable Development Goals (United Nations, 2019)

Axtel

Axtel is one the few Mexican companies which participated in the CDP Climate Change 2018, disclosed their data and provided enough information to CDP. CDP evaluated the company Axtel with a C, which means it has more opportunities for the next year to score a

better result with the recommendations it will be provided. In this section it will be analyzed their answers related with TCFD recommendations, to have the possibility to improve their score. To begin a brief summary of the company and how it is committed to the environment is included below .

Axtel is a Mexican company of Information and Communication Technologies that serves the business, government and mass markets with a robust offer of solutions through its Alestra brand (business and government services) and its Axtel brand (residential services and Small business). With a network infrastructure of 40,000 kilometers and more than 7,200 square meters of white floor that support its portfolio, Axtel enables organizations to be more productive and bring people closer to improve their quality of life.

In 2011, Axtel joined the UN Global Compact, the largest social responsibility initiative in the world. It is part of the Sustainable CPI of the BMV since 2013, of the Dow Jones Sustainability Index since 2017 and has been recognized by CEMEFI as a Socially Responsible Company since 2008. The shares of Axtel, represented by Certificates of Ordinary Participation (CPOs), are listed since 2005 on the Mexican Stock Exchange under the symbol "AXTELCPO".

Axtel has an Environmental Strategy, which looks to reduce the negative impacts from their operating practices on the environment, reviewing their procedures, developing new technologies and improving our methods.

This strategy is the framework of reference and action for all initiatives aimed at continuously improving the performance of the organization, while the Axtel Sustainability Model is the synergistic tool that allows us to coordinate in a comprehensive manner five fundamental issues for the company. (Axtel, 2019)

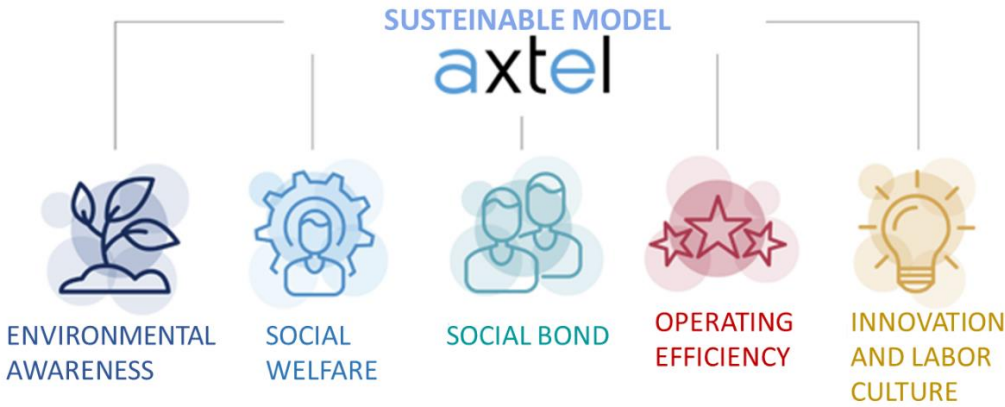


Figure 13. Axtel Sustainable Model (Walmart de Mexico , 2019)

5.1 Comparison by Mexican companies

The analysis will be carried out as it was made for the selected European companies, a benchmarking of the three different Mexican companies approach by the 4 areas of TCFD recommendations (Governance, Strategy, Risk Management and Metrics & Targets) to study their strengths and weakness. All the information used in this chapter will be taken from the website of CDP.

Governance

The area of *Governance* in TCFD can be disclose answering the 3 questions in CDP:

- (C1.1b) Provide further details on the board's oversight of climate-related issues
- (C1.2) Below board-level, provide the highest-level management position(s) or committee(s) with responsibility for climate-related issues
- (C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored. (CDP, 2018)

The table below shows the involvement of Walmart, CEMEX and Axtel at the moment of assessing governance on climate-related issues.

Walmart de Mexico is the only one out of the three Mexican companies from this work, which integrates all the climate-related issues in all the meetings are a scheduled agenda item, into Governance mechanism. Walmart's annual plan is presented with the projects to be implemented, the number of stores impacted, the budget and metrics.

CEMEX was the company which integrates less Governance mechanisms, one of the facts may be the frequency with which climate-related issues are a scheduled agenda item as the Sustainability Committee meets four times a year and is normally briefed by the Corporate Director Sustainability or the Executive VP for Sustainability and Operational Development.

Axtel implemented most of the Governance mechanisms with the exception of Monitoring implementation and performance objectives and overseeing major capital expenditures, acquisitions and divestitures, and the Executives Directors frequently review the climate related issues, during their monthly meeting if the issues are relevant.

	Walmart de Mexico	CEMEX	Axtel
Monitoring and overseeing progress against goals and targets for addressing climate-related issues	✓	✓	✓
Monitoring implementation and performance of objectives	✓	✓	
Overseeing major capital expenditures, acquisitions and divestitures	✓		
Reviewing and guiding annual budgets	✓		✓
Reviewing and guiding business plans	✓		✓
Reviewing and guiding major plans of action	✓	✓	✓
Reviewing and guiding risk management policies	✓		✓
Reviewing and guiding strategy	✓	✓	✓
Setting performance objectives	✓		✓

Table 19. Selected Mexican companies assessing and managing governance climate-related issues (CDP, 2018)

Strategy

Strategy TCFD recommendation can be disclose answering the following points for the companies:

- Describe the climate-related risks and opportunities the organization has identified over the short, medium, and long term.
- Describe the impact of climate related risks and opportunities on the organization's businesses, strategy, and financial planning.
- Describe the resilience of the organization's strategy, taking into consideration different climate-related scenarios, including a 2°C or lower scenario. (Task Force on Climate-related Financial Disclosures, 2017)

The following tables are for the better understanding the Strategy of the three companies with their respective answers of CDP Climate Change 2018.

Walmart de Mexico is the company which has identified more impacts from climate-related risk and opportunities in their business and financial planning areas according their forecast. CEMEX considered to not been impacted by their assets, liabilities, products and services and revenues. While, Axtel has not evaluated the financial planning areas and their business areas seem to not be impacted yet.

Business and financial planning areas	Walmart	CEMEX	Axtel
Access to capital	Impacted	Impacted	Not impacted
Acquisitions and divestments	Not impacted	Impacted	Not impacted
Adaptation and mitigation activities	Impacted	Impacted	Not yet impacted
Assets	Impacted	Not impacted	Not impacted
Capital expenditures / capital allocation	Impacted	Impacted	Not impacted
Investment in R&D	Not impacted	Impacted	Not impacted
Liabilities	Not impacted	Not impacted	Not yet impacted
Operating costs	Impacted	Impacted	Not impacted
Operations	Impacted	Impacted	Not yet impacted
Products and services	Impacted	Not impacted	Not yet impacted
Revenues	Impacted	Not impacted	Not impacted
Supply chain and/or value chain	Impacted	Impacted	Not yet impacted

Impacted	Impacted
Not impacted	Not impacted
Question not answered	Question not answered
Not yet impacted	Not yet impacted
Not evaluated	Not evaluated

Table 20. Impacts of climate-related risk and opportunities for selected Mexican companies (CDP, 2018)

Regarding, the climate-related scenario analysis CEMEX is the only company developing a climate scenario analysis and uses the 2DS as its central scenario to inform their business strategy. Other scenarios taken into account include both more restrictive (B2DS) and less regulated (RCP 4.5 and RCP 6.0) scenarios. Walmart and Axtel are not using climate-related scenario analysis as is something new for these two companies and are not familiar with the process but are anticipate do so in the next two years.

Company name	Scenario used
Walmart de Mexico	Not use climate scenario analysis
CEMEX	2DS B2DS RCP 4.5 RCP 6.0
Axtel	Not use climate scenario analysis

Table 21. Climate Scenarios utilized by selected Mexican companies (CDP, 2018)

The three Mexican companies also consider short, medium and long-term horizon, in this case can be understood as the companies are from different sector and each of them have a methodology which help to identify the risk in a time horizon aligning with its business and financial planning.

	Short-term	Medium-term	Long-term
Walmart	1-2	2-5	5-15
CEMEX	0-3	3-6	6-35
Axtel	1-5	5-10	10-20

Table 22. Time horizon of selected Mexican companies (CDP, 2018)

The following table depicts a summary on how the 3 Mexican companies describe the climate related risks each has identified over the short, medium, and long term and their potential economic impact associated:

Climate-related Risk							
	Where in the value chain does the risk driver occur?	Risk type	Primary climate-related risk driver	Time horizon	Magnitude of impact	Potential financial impact (EUR)	Cost of management (EUR)
Walmart	Direct operations	Transition risk	Policy and legal	Short-term	High	8.369.339,74 €	- €
	Direct operations	Transition risk	Policy and legal	Short-term	High	7.993.061,79 €	- €
	Direct operations	Physical risk	Acute	Current	Medium-high	1.839.757,11 €	- €
	Direct operations	Transition risk	Market	Medium-term	Medium	- €	- €
CEMEX	Direct operations	Transition risk	Policy and legal	Medium-term	High	233.387.083,09 €	250.000.000,00 €
	Direct operations	Physical risk	Acute	Long-term	Medium-high	1.697.360,60 €	29.800.000,00 €
	Supply Chain	Physical risk	Acute	Current	Medium	233.387.083,09 €	- €
	Direct operations	Physical risk	Chronic	Long-term	Medium	4.243.401,51 €	- €
	Client	Transition risk	Reputation	Long-term	Medium-high	212.170.075,53 €	20.000.000,00 €
Axtel	Direct operations	Transition risk	Policy and legal	Short-term	Medium-high	-	-
	Direct operations	Transition risk	Policy and legal	Current	Medium-low	-	-

Table 23. Mexican companies Financial impact Climate-related Risk

Walmart defined all possible risks on its direct operations with a potential financial impact of €18.202.158,64, in both transition and physical risk; due to the primary climate-related transition risk drivers in policy and market in a scope between 2 to 6 years. Mainly the risks identified with higher magnitude of impact are the ones from Policy and Legal, as the government has proposed a cap and trade scheme of reduction emissions by sectors and companies. This can affect Walmart, because already it has a lower emission baseline and to achieve this cap can represent higher cost for the company, primary in the annual energy expenditure.

CEMEX is the company which expects to have the highest potential financial impact risk with a total amount of € 684.885.003,82 and cost of management € 299.800.000,00. Their main risk driver occurs in Direct Operations in the Policy and Legal driver with a high magnitude of impact in which CEMEX is aware of the catastrophic consequence of designing

a bad carbon pricing will cause the economy and climate, the particular concern by the company is the maintenance of fair competition among potential substitute products.

Another high financial impact detected by the company is related with the supply chain, due to a greater severity of extreme weather events such as hurricanes, cyclones and floods. CEMEX is conscious of the consequences for their cement plants, as before some plants stopped operations.

Axtel is the only company of this study which has not mention numerical amount of their potential financial impacts and cost of management, nevertheless the company disclosure their main risk is in the direct operations, derived from policy and legal potential changes, in the short term.

The next table shows a compilation of Walmart, CEMEX and Axtel potential climate-related opportunities in their business:

Climate-related Opportunities							
	Where in the value chain does the risk driver occur?	Opportunity type	Primary climate-related risk driver	Time horizon	Magnitude of impact	Potential financial impact (EUR)	Cost of management (EUR)
Walmart	Direct operations	Energy source	Use of lower-emission sources of energy	Medium-term	Medium-high	3,530,356.65 €	- €
	Supply Chain	Products and services	Development and/or expansion of low emission goods and services	Long-term	Medium	- €	- €
	Direct operations	Energy source	Use of lower-emission sources of energy	Medium-term	Medium-high	- €	- €
CEMEX	Direct operations	Markets	Other: Competitive advantage	Current	Medium-high	339.47 €	16,973,606.04 €
	Client	Products and services	Development and/or expansion of low emission goods and services	Medium-term	High	1,697,360,604.26 €	339,472.12 €
	Client	Resilience	Increased revenue from existing products	Long-term	Medium-high	212,170,075.53 €	- €
	Direct operations	Markets	Positive impacts of reputation	Long-term	High	106,085,037.77 €	21,217,007.55 €
Axtel	Client	Products and services	Better competitive position to reflect shifting consumer preferences	Long-term	High	106,085,037.77 €	- €
	Direct operations	Resources Efficiency	Reduced operating costs (e.g., trough efficiency gains and cost reductions)	Short-term	Medium-high	-	-
	Client	Products and services	Development of new products or services through R&D and innovation	Medium-term	Medium	-	-

Table 24. Mexican companies Financial impact Climate-related Opportunities

Walmart disclosure the opportunity of a potential financial impact in the direct operations related with the Use of lower-emission energy source of energy for an amount of € 3,530,356.65. Walmart expects with the opening of the electricity market in Mexico will have a greater supply of renewable energy with lower cost.

While CEMEX has the highest climate-related risk with the potential to have a substantive financial impact in their business from the selected companies, it also has identified the highest climate-related opportunities which their business with a total amount of € 2,121,701,094.80 and € 38,530,085.72 of management cost in climate-related opportunities. CEMEX is convinced that their commitment and leadership in sustainability and progress in emission reduction will profit from the cap and trade scheme. CEMEX is well on track to reduce its specific emissions by 25% by 2020 compared 1990.

It has also opportunities with their clients, developing low emission goods and services. According to some studies, it concludes that building account for 40% of global energy consumption and GHG emission; CEMEX as innovative company will create materials with

more efficiency standards to satisfy demand of replace existing buildings for a more efficient ones, which will allow them for a higher margin on these products.

Axtel has not share the total amount of potential financial impact and cost of management of their climate-related opportunities in Direct operations and with their Clients, nevertheless the company disclosure that the reduced operating cost and development of new products through R&D and innovation can lead them to higher revenues.

Risk Management

The following points are a guidance for companies to disclose their Risk Management processes:

- a) Describe the organization’s processes for identifying and assessing climate-related risks.
- b) Describe the organization’s processes for managing climate-related risks.
- c) Describe how processes for identifying, assessing, and managing climate-related risks are integrated into the organization’s overall risk management. (Task Force on Climate-related Financial Disclosures, 2017)

The analysis of CDP’s answer of Walmart, CEMEX and Axtel is made through the following table to understand relevance for users of climate-related financial disclosure to evaluate information to determine risk and management activities.

Type of Risk	Walmart	CEMEX	Axtel
Physical Risk			
Acute physical			
Chronic physical			
Transition Risks			
Current regulation			
Downstream			
Emerging regulation			
Legal			
Market			
Reputation			
Technology			
Upstream			
Relevant always included			
Relevant sometimes included			
Not relevant			

Table 25.Relevant risks under assessment by its Risk Management by selected Mexican companies (CDP, 2018)

Mexican companies are also taking into account the transition and physical risks for a lower-carbon economy. For example, Walmart, consider relevant most of the climate-related risk and it has always been included in its Risk Management framework, with the exception of acute physical and legal risk (according to Walmart there is no history in Mexico of litigation related to climatic effect, the only possibility is under the law of environmental responsibility).

For CEMEX, Chronic is a relevant risk but not always included in its risk management. Considering that CEMEX operates a number of terminals and also plants directly on the sea chronic physical risks such as rising sea levels could become a long-term problem for the company. One of the risks which is always taken into account for the company risk management is Technology, which is a key for CEMEX to reduce CO2 footprint, new projects as proprietary low-carbon clinker is key to manage transition risk. In fact, emerging regulation, is a risk that is relevant for the company and is always taking into account, the implementation of the Paris Agreement is a proof on the importance for CEMEX. Reputation risk has also been evaluated as relevant, CEMEX is in constant exchange with its stakeholders to understand their views and expectations, to identify reputational risk and react on time.

In the other hand, Legal risk is considering for them as Not relevant but included, since CEMEX is currently not subject to any climate change-related litigation. Also, Downstream risk has not been identified as relevant, as an example given by the company in extreme weather events on construction activity is hard to distinguish against a background of other factors affecting the sales volumes.

For Axtel, mostly all the risks are relevant and always include in its risk management. The company considers rains, floods, storms, among other natural disasters, as emerging chronic risks that can cause damage to infrastructure, and therefore, business continuity. Other risk to point it out is Acute, it has been evaluated for the company as relevant sometimes included, Axtel takes into account the possibility of increasing the severity of natural disasters which may mean greater damages and longer times of recover.

Walmart monitors annually the company's climate issues, considering the future risk in a scope of 6 years or more. CEMEX monitors with more frequency than Walmart, every six months, considering a scope of more 6 years. Axtel every six months or more and monitors the future risk with a shorten time frame than CEMEX and Walmart, from 1 to 3 years.

	Frequency of monitoring	How far into the future are risks considered?	How the organization's processes for identifying, assessing, and managing climate-related issues are integrated into your overall risk management.
Walmart	Annually	>6 years	Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes
CEMEX	Six-monthly or more frequently	>6 years	Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes
Axtel	Six-monthly or more frequently	From 1 to 3 years	Integrated into multi-disciplinary company-wide risk identification, assessment, and management processes

Table 26. Frequency monitoring climate-related risk

Metrics and targets

TCFD recommends companies to disclose metrics and targets used to evaluate the climate-related risk and opportunities. The following recommendations of TCFD help to material the emission of the companies:

- Disclose the metrics used by the organization to assess climate related risks and opportunities in line with its strategy and risk management process.
- Disclose Scope 1, Scope 2, and, if appropriate, Scope 3 greenhouse gas (GHG) emissions, and the related risks.
- Describe the targets used by the organization to manage climate-related risks and opportunities and performance against targets. (Task Force on Climate-related Financial Disclosures, 2017)

A better way to understand the questions C6.1 and C6.3 from the CDP questionnaire is with the table below which depicts the Scope 1 and Scope 2 emission of the 3 Mexican companies and their intensity level.



Emission intensity	Company name	S1 S2 emissions (Tons of CO2e)	Revenue (EUR)
	Walmart	18,679,042.00	€ 424,631,248,408.72
	CEMEX	46,482,609.00	€ 11,603,157,090.72
	Axtel	84,065.00	€ -

Table 27. Emission intensity (CDP, 2018)

The emission intensity depends on $\frac{\text{tons of CO}_2 \text{ emissions}}{\text{total revenue}}$. CEMEX is the company with the highest intensity emission accounting for 46,482,609.00 tons of CO₂ emission per €424,631,248,498.72 total revenue. The company reduced 4.6% compared to the last year owing to their emission reduction activities like low-carbon materials and fuels, improve energy efficiency and optimize projects and divestment of comparatively CO₂-intensive cement plants.

Walmart's absolute Scope 1 and 2 emissions decreased by 4.4% (19.5 M mt to 18.6 M mt) while its total revenues increased by 2.98% (\$485.8 B to \$500.3 B) from the previous reporting year. This resulted in an 7.20% decrease in its carbon intensity per revenue. Emission reductions can be attributed to reduced energy demand from energy efficiency retrofits and an increase in renewable energy procured.

Axtel emit 84,065.00 tons of CO₂ taking into account the Scope 1 and Scope 2, but do not disclose the total revenue of the company. Axtel decrease their intensity emission by 2.5% compared to 2017. Even though the global emission increased due to an increase in the electric emission factor, the company increased 198,879 subscribers, this allowed them to reduce the emission intensity.

Concerning Scope 3 emissions, are still the indirect emission but not consider in Scope 1 and 2 that occur in the value chain of the company, including the upstream and downstream emissions, which make a great opportunity for companies committed to the reduction of the emissions.

	Walmart	CEMEX	Axcel
Business travel	Relevant calculated	Not relevant	Relevant calculated
Capital goods	Relevant, not yet calculated	Not relevant	Relevant, not yet calculated
Downstream leased assets	Not relevant	Not relevant	Question not answered
Downstream transportation and distribution	Not relevant	Relevant calculated	Relevant, not yet calculated
Employee commuting	Relevant calculated	Not relevant	Relevant, not yet calculated
End of life treatment of sold products	Not relevant	Not relevant	Relevant, not yet calculated
Franchises	Not relevant	Not relevant	Question not answered
Fuel-and-energy-related activities (not included in Scope 1 or 2)	Not relevant	Relevant calculated	Relevant, not yet calculated
Investments	Not relevant	Not relevant	Question not answered
Other (downstream)	Not relevant	Not relevant	Question not answered
Other (upstream)	Not relevant	Not relevant	Question not answered
Processing of sold products	Not relevant	Not relevant	Relevant, not yet calculated
Purchased goods and services	Relevant calculated	Relevant calculated	Relevant calculated
Upstream leased assets	Not relevant	Not relevant	Relevant, not yet calculated
Upstream transportation and distribution	Relevant calculated	Relevant calculated	Relevant, not yet calculated
Use of sold products	Not relevant	Not relevant	Relevant, not yet calculated
Waste generated in operations	Relevant calculated	Not relevant	Not relevant

Relevant calculated	Relevant calculated
Not relevant	Not relevant
Question not answered	Question not answered
Not evaluated	Not evaluated
Relevant , not yet calculated	Relevant , not yet calculated

Table 28. Scope 3 emissions of Mexican companies (CDP, 2018)

The Table 28. Scope 3 emissions of Mexican companies visually represent the degree of advance of the companies disclosing their Scope 3 emissions. Display different aspects of the value chain where the company has opportunities to diminish emissions.

Walmart considered relevant and calculated the emissions of: business travel, employee commuting, purchased goods and services, upstream leases assets and waste generated in operations. The major emissions calculated by the company are in the purchased goods and services, accounting for 784,144 tonnes of CO₂e, the emissions calculation methodology was through emission reported by suppliers in CDP Supply Chain program. On the other hand, Walmart did not consider relevant for emissions realize some aspects of the value chain, as: downstream leased assets, downstream transportation, franchises, processing of sold products and upstream leased assets. It is important to remark, the Fuel and energy related activity is not a relevant due to their energy spend is just less than 5% of the total operation cost, while the company is focused on sourcing energy from renewable energy and reduce the demand on energy and fossil fuels.

CEMEX is the company which considers just a few aspects of the value change to calculate emission as: downstream transportation and distribution, fuel and energy related activities, purchased good and services, upstream transportation and distribution. As well as Walmart, Fuel and energy related activities not included in Scope 1 or 2, are the major emission accounting for 2,021,319 tonnes of CO2, this emission are calculated based on detailed energy consumption figures and emission factors for cradle-to gate GHG emissions from LCA database. Other aspect relevant for Cemex is the Upstream transportation and distribution, considering 1,833,208 tonnes of CO2, the methodology assesses the total GHG footprint on a cradle to gate basis.

Axtel disclose the relevance for the company of Scope 3 emissions just in the business travel, the amount calculated is just 508 metric tonnes of CO2, a very low number compared with Walmart or CEMEX emissions, the methodology used is Transport Tool Excel given by GHP Protocol. Besides, more than the half of the aspects are relevant for the company, are not yet calculated, a reason could be is the amount of Scope 3 emissions is not a huge number necessary to calculate for the company, this is assumed by the author as there are not explanations given.

The table below showed the 3 Mexican companies are already taking Science Based Climate actions, there is not yet a Mexican company with approved Science Base Target.

	Long-term target year	Commitment made	Target Approved
Walmart	2020	✓	
CEMEX		✓	
Axtel	2020	✓	

Table 29. Committed and approved to setting a Science-Based Target of selected Mexican companies (Science Based Targets, 2019)

6. The importance of TFCF for Mexican companies

It is important to highlight the importance of companies to adopt TCFD recommendations, as the demand of awareness and actions related with climate change is increasing nowadays. The companies are more committed to disclose information under TFCF recommendations, since it is not only helping shareholders and investors to correctly pricing assets and allocate capital, also the portfolio of these companies is favored.

The 3 Mexican companies analyzed in this work, has a great opportunity to disclose further/in depth climate-related financial information in their mainstream annual financial filings and

reflect its efforts in indexes as CDP, to be more visible and draw more investors on their companies.

This chapter will be state the finding and suggested improvements for the Mexican companies in the 4 recommendations on climate related financial disclosure: Governance, Strategy, Risk Management and Metrics & Targets.

Governance

In a study developed by CDP with the 2018 responses , European companies are in the fifth place to have a board-level oversight of climate change, accounting for a 87%, and Mexico in the thirteenth place, lower than the average, accounting for 65% companies having a board-level oversight of climate change. Even 73% of the companies reporting to CDP confirmed having a board-level oversight of climate-related risk, Mexican companies faces great opportunities in this area to work on.

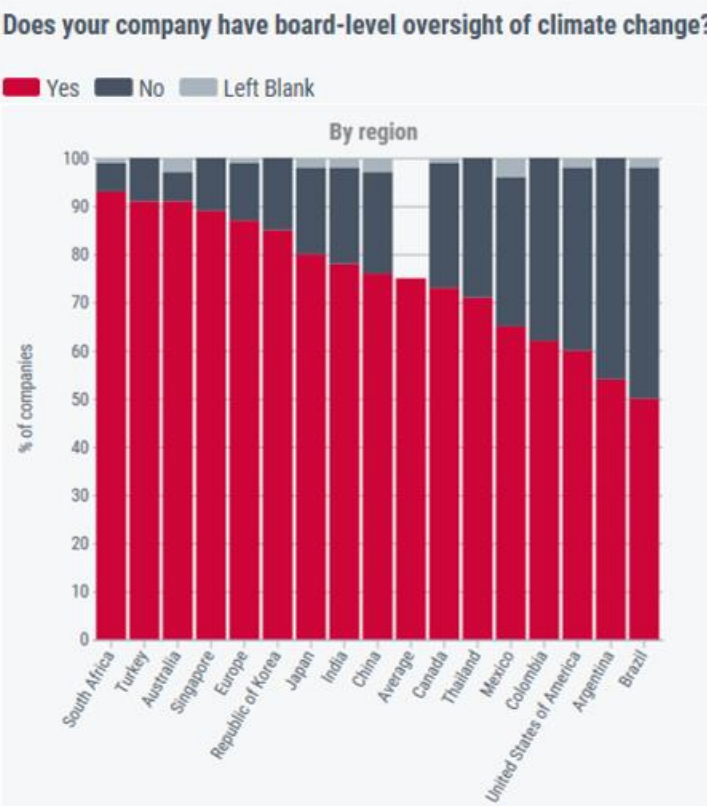


Figure 14. % of companies by region having a board-level oversight of climate change

It is also important to mention, that CEMEX and Axtel could have improvements to realize in the unmarked topics like Overseeing major capital expenditures, Acquisitions and divestitures, Reviewing and guiding business plans, Setting performance objectives, Monitoring implementation and performance of objectives. These tasks should to be fulfilled at least once a year by the board-level and/or management level, to clearly define their role in assessing a managing climate-relates issue. Also, the Executive Board of Directors, and

the person who is responsible for sustainability should be briefed monthly by the department in charge, coordinating, whenever needed, with the Corporate Risk Management Office on sustainability issues, including climate change.

The way the European companies integrate good practices of the Governance mechanism and how Mexican companies can implement in their business are the following:

- Commitment on the top of the business strategy, where the three year period business plan is updated every year aims to establish guidelines and targets.
- Boards meets around 7 times a year and has a formal schedule of matters reserved to approve and review: Group strategy and business development initiatives; annual operating and capital expenditure budgets; and performance against Group strategy, objectives, business plans and budgets.
- Integrate climate change issues as a transversal element of risk and opportunity in its business plans. Therefore, climate change is dealt in all meetings.
- The Board of Directors manages Climate related issues, approving the scope of the policies introduced, as well as outlook and action plans.

Strategy

Shareholders are requiring companies to show they are integrating the actual and potential impacts of climate-related risk and opportunities on their organization's business, strategy and financial planning where such information is material.

In 2018, over 6,000 companies reported to CDP's TCFD-aligned questionnaire, measuring their climate-related risks and opportunities, as well as the associated financial implications. (CDP, 2018).

Due to an increase in the climate change impacts, nowadays a larger number of companies are integrating climate risk into their business strategy, 72% of companies who answer CDP Climate Change 2018 are integrating climate risk. There is a concern with the Mexican companies, they are falling behind the global sample 57.51%. In the other hand, European companies are taking the third place, with 83.56 % reporting the climate change is integrated into their business strategy.

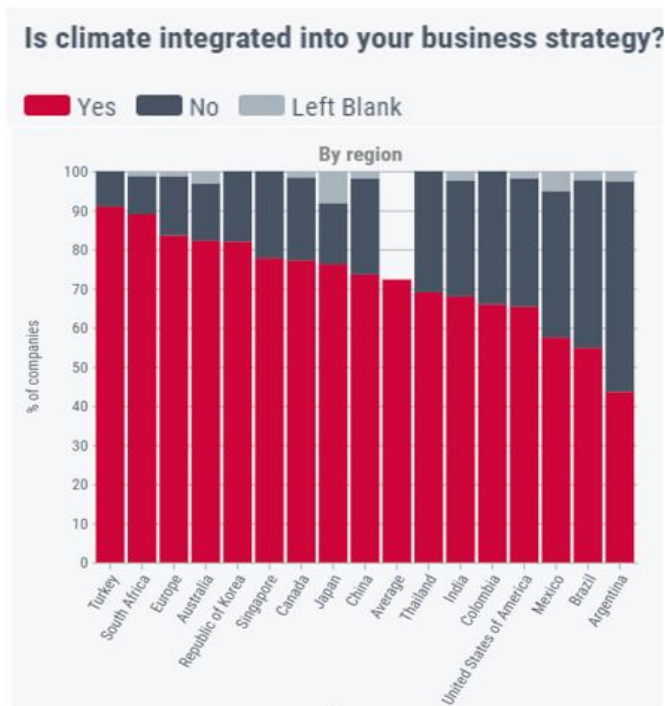


Figure 15. % of companies by region integrating climate in their business strategy (CDP, 2018)

53% of the companies disclosing through CDP identifies climate-related risk. The figure **Error! Reference source not found.** shows the two categories of risk: physical risk, such as extreme weather and increasing global temperatures; and transitional risk to a lower carbon economy, which can entail policy, legal, technology and market changes. There is almost the double number of transitional risks compared to physical risk according to the companies answered CDP Climate Change.

In other aspects to consider with Strategy, can be seen an important difference between Table 7. Impacts of climate-related risk and opportunities of European utilities vs Table 20. Impacts of climate-related risk and opportunities for selected Mexican companies, where it depicts how the companies identify risk and opportunities that had impacted in the financial planning process.

The majority of the European utilities analyzed in this work have identified the impacts of climate-related risk and opportunities for a good assessment and management of the business and financial planning areas. In the other hand the 3 Mexican companies are in a transition to identify more business and financial planning areas.

Axtel is the company which has not evaluated yet the risk an opportunity factored in their financial planning process : Revenues, Operating cost, Capital Expenditures, Acquisition and divestments, Access to capital , Assets and Liabilities; and appointed have not yet been impacted any risk and opportunities in their business as Products and services, Supply chain and/or values chain, Adaptation and mitigation activities, Investment in R&D and Operations, but without information provided . It could be a key factor for the company to

disclose how does the climate change has been affected in their business and financial planning areas, as the European utilities and Walmart and CEMEX do it

Another aspect to take into account for the Mexican companies, is the climate scenario analysis used by the companies committed to long-term strategic and financial planning, as these scenarios are informative, but the improvement itself comes from analyzing climate scenarios. 100% of the European companies are using climate scenario analysis to assess its risks and opportunities, and are considering different scenarios as:

- IEA Sustainable development scenario
- IEA New Policies Scenario (NPS)
- IPCC RCP 8.5
- Internal models
- IEA 450
- NG FES and internal energy/ company FES
- 2DS
- IEA 450
- IPCC SRES A1B, A2 and B1
- RCP 2.6

While, CEMEX is the only Mexican company of this work using publicly available 2° C scenario as it can be seen in the Table 21. Climate Scenarios utilized by selected Mexican companies ; Walmart and Axtel do not use any climate scenario. Mexican companies should include scenario analysis as part of their strategic planning by:

- 1) identifying and defining a range of scenarios, including a 2°C scenario, that provide a reasonable diversity of potential future climate states
- 2) assessing the potential resiliency of their strategic plans to the range of scenarios
- 3) finally detect options for increasing strategic and business resiliency of the company to front face climate-related risks and opportunities by adjustments to their strategic and financial plans. (Financial Stability Board, 2017)

Risk Management

Companies could identify their climate risk and opportunities, once the company detected them all, it is important to examine how they will manage the climate-related impact on their business.

In the Table 26. Frequency monitoring climate-related risk, the Mexican companies disclose different time horizon in the frequency of monitoring climate related risk and how far in the future the companies consider climate related risk. Understanding the time frame of the company for risk analysis provide a deep insight into the assessment procedures employed by the companies.

An improvement area for Walmart can be to monitor more frequently for identifying and assessing climate-related risk, as they have disclosed that twice a year, they have a scheduled meeting where all the member and specialist meet up to identify, asses and manage climate-related issues. For Axtel, the opportunity area will be to consider a wide time scope of more years for the future risks and opportunities assessment. It could be as the other Mexican companies that selected more than 6 years.

Data users need to understand which types of risk are considered in the assessment of the climate- related risks. In the case of the Mexican companies consider “relevant sometimes included” some Physical Risks, while CEMEX considered “Not relevant” two Transition risks (Legal and Downstream); while all the European countries consider relevant all the Physical risk and majority of the Transition risks. Even not all the risk types are relevant for all the companies and their operations, it is important to frequently assess risk types to assess if they may present a significant risk to the business. Also, if the risk is “relevant” must be always included in the analysis, if not it is a danger and must be justified why are not always included, even so it is important to review that assessment periodically.

		Physical Risk		Transition Risk							
		Acute physical	Chronic physical	Current regulation	Downstream	Emerging regulation	Legal	Market	Reputation	Technology	Upstream
Mexican companies	Walmart	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included
	CEMEX	Relevant always included	Relevant always included	Relevant always included	Not relevant	Relevant always included	Not relevant	Relevant always included	Relevant always included	Relevant always included	Relevant always included
	Axtel	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included
European utilities	Iberdrola SA	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included
	EDF	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included
	ENGIE	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included
	ENEL SpA	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included
	SSE	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included
	EDP	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included	Relevant always included

Relevant always included	Relevant always included
Relevant sometimes included	Relevant sometimes included
Not relevant	Not relevant

Table 30. Relevant risk under assessment by European utilities and Mexican companies

Metrics & Targets

As the increasing demand for what investors and lenders are asking, there is a necessity for companies to disclose their metrics and targets to assess and manage climate related risks

and opportunities, including calculating Emission Intensity, which measures CO2 emissions in the context of another business metric, Carbon Pricing and Emission reduction Targets.

Even all the Mexican companies are committed working towards emission reductions targets aligned with what climate science says, there is not even one Mexican company from this work which has approved science-based targets. In the case of the European utilities, there are companies with approved targets (Iberdrola, EDP and ENEL).

In the following figure it can be seen the companies with approved SBT targets around the world, Mexico has not any approved targets yet, while there are already 113 European companies with SBTs approved targets out of the 231 companies. (Science Based Targets, 2019)

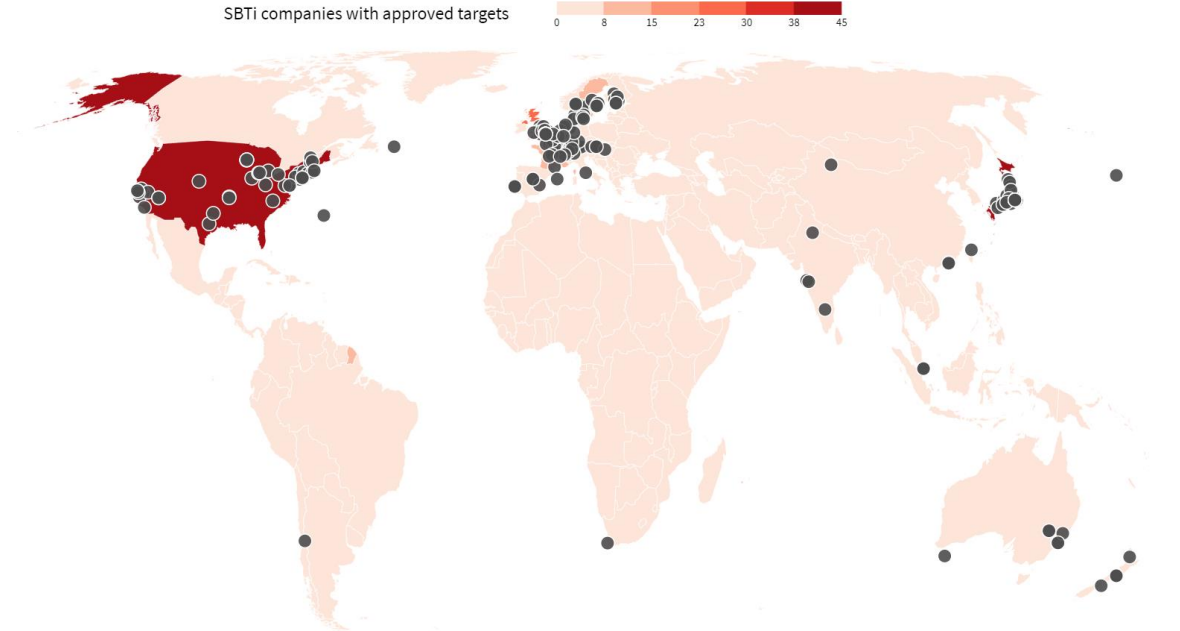


Figure 16. Companies with approved science-based targets in the world

An internal carbon price is one of the Metric recommend by Task Force which estimated the cost of carbon emission by the companies, this internal carbon price allow the companies to identify revenue opportunists and risk related with energy efficiency and to guide a capital investment decision.

Cemex has as an improvement to include internal carbon pricing for Scope 2 and/or Scope 3 emissions. By incorporating this internal price, the company identify low-cost reduction opportunities as well as investment projects that are subject to increased risk under scenario of external carbon pricing and gain an edge over their competitors who ignore these risks and not look forward for low-carbon alternatives in their operations or along the value chain.

Walmart and Axtel, can consider implementing an internal carbon pricing as a planning tool to help identify revenue opportunities and risk, as an incentive to drive energy efficiencies to reduce costs, and to guide investment decisions. (Carbon Pricing Leadership Coalition, 2018)

	Objective for implementing an internal carbon price	GHG Scope	Actual price(s) used (€ /ton)	Type of internal carbon price
Walmart	No, Walmart do not currently anticipate doing so in the next two years	-	-	-
CEMEX	Navigate GHG regulations Change internal behavior Stress test investments Identify and seize low-carbon opportunities	Scope 1	€ 25.46	Shadow price
Axtel	No, Axtel do not currently anticipate doing so in the next two years	-	-	-

Figure 17. Internal carbon pricing CDP 2018 answers of the Mexican companies

Further, Scope 3 emission represents an important metric for the investors, a great opportunity for companies to reduce GHG and achieve GHG-related business objectives. As it is presented in the Table 28. Scope 3 emissions of Mexican companies, Axtel is the company which considers relevant the majority of the aspect in the value chain but has not yet provided calculation on still no calculation on Scope 3 emissions. It is important for the companies to understand and to also account for GHG emissions along their value chain and products portfolio to manage GHG related risk and opportunities.

In general, Mexican companies are in a transition to take into account all the aspects in the value chain and products to calculate Scope 3 emissions. The Technical Guidance for Calculating Scope 3 Emissions can facilitate companies like Axtel with practical guidance on calculating their scope 3 emissions, where it includes methods for calculating GHG emissions for each of the 15 scope 3 categories, data sources and worked examples. (GreenHouse Gas Protocol, 2013)

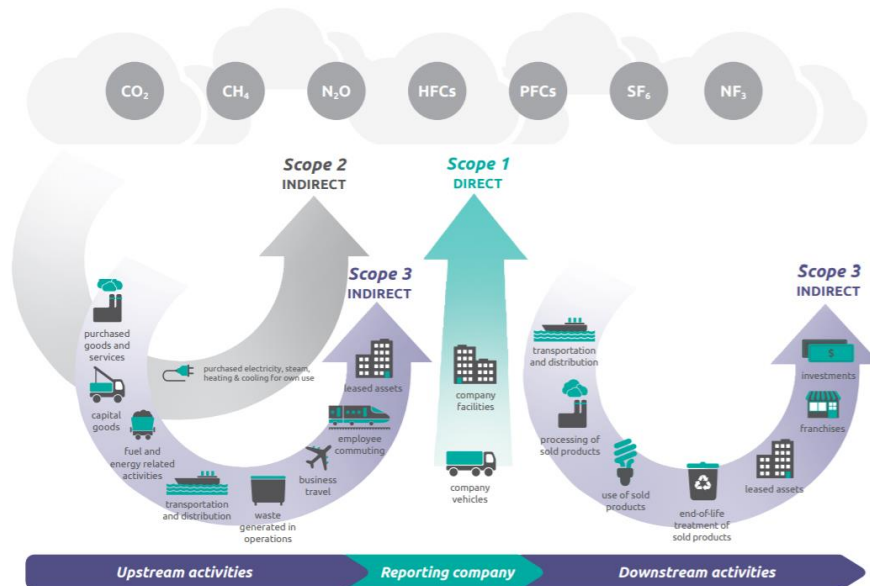


Figure 18. Overview of GHG Protocol scopes and emissions across the value chain (GreenHouse Gas Protocol, 2013)

6.1 Main findings for Mexican companies

The Task Force developed fundamental principles for effective disclosure, which can help to achieve high-quality disclosures that enables Mexican companies with the first approach to understand the impact of climate change on their business.

Fundamental principles for Effective Disclosure	
Principle 1: Disclosures should present relevant information	The company should provide relevant information regarding the climate-related risk and opportunities about: their markets, business, investment strategy and future cash flows.
Principle 2: Disclosures should be specific and complete	The information disclose should be comprehensive, include historical and future information to enable users to assess actual and future financial implications.
Principle 3: Disclosures should be clear, balanced, and understandable	The financial information should be written with the objective to clearly inform the financial sector users, reporting at the level of minimum compliance.
Principle 4: Disclosures should be consistent over time	Information should be consistent over the time, so user can understand the development or impact the climate related issues has over the business model.
Principle 5: Disclosures should be comparable among organizations within a sector, industry, or portfolio.	The company has to prepare information to facilitate a degree of comparability among companies by users.
Principle 6: Disclosures should be reliable, verifiable, and objective	The information must to be defined, collected, recorded and analyzed, to later verify the high quality.
Principle 7: Disclosures should be provided on a timely basis	Information should be delivered to financial user in a time line using the correct media at least on annual basis with the mainstream financial reporting

Table 31. Fundamental principles for effective disclosure (Task Force on Climate-related Financial Disclosures, 2017)

For a better understanding of the Mexican companies, it was identified and analysed the drawbacks and possible opportunities to make clear the connections between climate change issues and their governance, strategy, risk management and metric and targets.

Walmart

To begging with, one of Walmart's strength is related within in the Governance area, as it can be seen before in the analysis section of this work, is the only company disclosing information on the board's oversight of climate- related risk and opportunities and disclose in their mainstream annual financial filings. It is also important to mention, that Walmart

always considers climate-related risk for the assessment of both risks: physical and transitions, which help the company to organize and determine where they stand now and allowing them to make the necessary adjustments in line with reduction targets and increasing readiness for a transition to a low economy.

One important opportunity for the company is to identify and assess more frequently climate related risk, particularly the company can reduce the time horizon from doing it once a year to identifying and assessing every six months as the other Mexican or European utilities does it.

The company is not considering any scenario analysis which helps an organization prepare for both physical and transition risk the economy may face under climate change. The European companies consider a range of scenarios from those of 1.5-2°C to scenarios of 3-4° of warming in order to evaluate the commercial implication, resilience, physical and transitional risk.

The first approach Mexican companies can follow is the use of some parameters as inputs when conduction scenario analysis as: policies, technological development and renewables energies mainly due to the improvements of the technology and price reductions, then the use of the public reference's scenarios as : International Energy Agency's (IEA), Sustainable Development Scenario , New Policies Scenario (NPS), Panel on Climate Change (IPCC) and/or Representative Concentration Pathway (RCP) 8.5 , 4.5 AND 2.6 (align with 2°C Paris Agreement) for demonstrating the resilience of the company in the face of physical and transition risk, quantitative information and optimize strategic decisions.

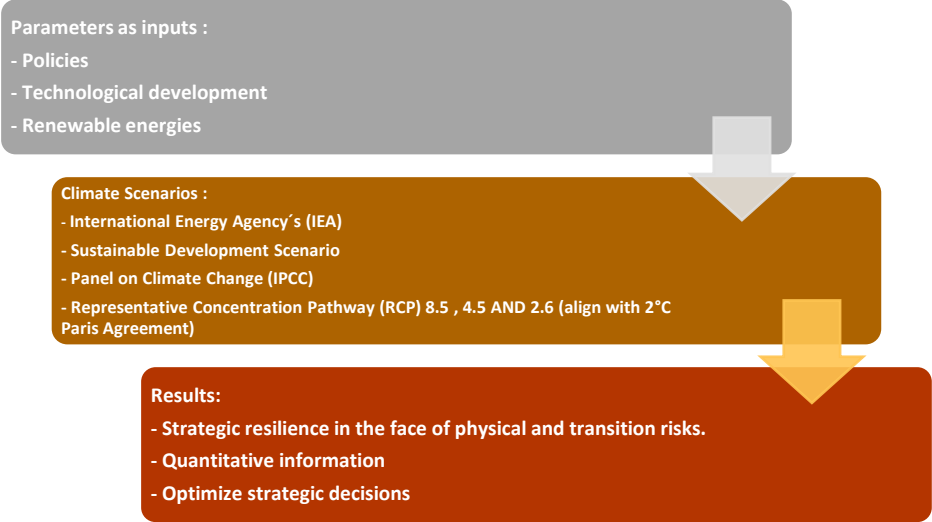


Figure 19. First approach for the use of scenario analysis

Also, is important to highlight the company is not implementing an internal Carbon Pricing for internal use, which may lead inaccurate capital investment decision. Moreover, it was detected in the area Metrics and Targets, that Walmart company disclose the highest Emission Intensity comparing with Cemex and Axtel, which must make the necessary adjustment to reduce the CO2 emissions to reduce their Emission Intensity within Scope 1 and Scope 2.

CEMEX

One of the main strengths of the company is to make the analysis of climatic scenarios for a better disclosure information for investors and well manage possible risk and opportunities with climate related risk, the company also contemplate an Internal Carbon Pricing as a strategy to manage climate-related business risk and prepare for a transition to a lower carbon economy , and calculating all relevant Scope 3 emissions along the value chain which often represents a company’s biggest greenhouse gas , which means the company has a significant opportunities for improvement.

One if the weakness of the company is not always including in their board level meeting all the Governance mechanism, specifically, “Overseeing major capital expenditures” and “Reviewing and Guiding annual budgets, business plans and management policies” for the climate related issues.

Here below I will state some recommendations for Cemex, according how other European utilities are managing governance mechanism:

Governance mechanism	Recommendations
Overseeing major capital expenditures, acquisitions and divestitures	Having a Group Investment Committee in which is in charge to approves investments related to business development and responsible for ensuring all investment are align with the commitment of the company. The committee can be integrated by head of Administration, Finance & Control, Innovability; Legal & Corporate Affairs and Procurements.
Reviewing and guiding annual budgets	Having a management team in which climate related responsibilities are assigned to specific functions that help guide the company with investment and divestments, objectives, business plans and budgets.
Reviewing and guiding business plans	Board meet around 7 times a year and have a formal schedule to approve and review the group strategy and business development initiatives.
Reviewing and guiding risk management policies	Having a Group Risk Committee which main objective of the team is to ensure that the organization involve in the operations of the company decisions concerning risk policy, management and control.

Table 32. Recommendations for CEMEX in Governance

The main opportunity detected for the company in the value chain is related with the “Products and Service”, where the company foresee the necessity of development and/or expansion of low emission goods and services. One of the recommendations that the company might prove is the support for entrepreneurship projects, which means offer to the best start-ups in the sector the opportunity to participate in acceleration programs, hackathons and conferences in order to develop prototypes and potential investment.



Figure 20. Opportunities for development low emission goods and services

Axtel

For Axtel strengths are mainly in the Strategic area, the company understand how the company may be affected over long timeframes from 10 to 20 years through climate-related scenario planning. Axtel has a risk matrix that helps them to establish the occurrence and severity, which then give the potential estimation for the impact.

Regarding the drawbacks of the company, we can see they are not considering all the Governance mechanism like “Monitoring implementation and performance of objectives” and “Overseeing major capital expenditures, acquisitions and divestitures “for the climate related issues. Here below are some recommendation for the improvement in the Governance area:

Governance mechanism	Recommendations
Monitoring implementation and performance of objectives	Board meets to review the performance of the business development initiatives, reviewing effectiveness of the implementation of the objectives with the different management team in which climate related responsibilities are assigned to specific function.
Overseeing major capital expenditures, acquisitions and divestitures	Having a Group Investment Committee in which is in charge to approves investments related to business development and responsible for ensuring all investment are align with the commitment of the company. The committee can be integrated by head of Administration, Finance & Control, Innovability; Legal & Corporate Affairs and Procurements.

Table 33. Recommendations for Axtel in Governance

Further, the company is not using a climate scenario analysis, which according to TCFD recommendations can help companies for a better assessing climate-related issues and improving the disclosure of useful decisions.

Axtel identifies and asses climate related risk every 6 months taking into account a future scope for just 1-3 years, an opportunity area to develop for the company could consider a future risk time horizon for a longer time as the other Mexican companies or European companies considering more than 6 years.

Other pain of the company is not evaluating the potential financial impact related with the risk and opportunities of the climate issues, a suggestion for the company could be to enhance their disclosures by focusing more on the financial implications of the climate change including the investment acquisition of the company supporting the low carbon transition.

6.2 General recommendations for Mexican companies

There are some practical steps which the Mexican companies can follow to enhance their climate-related financial disclosure. For example: considering a Financial focus, Coherence between strategy and activities, Clarity about the basis on which is prepared and the scope of disclosures and Labelling and organizing information. The table below get into the details on how to approach these practical steps.

Practical steps	
Financial focus	Mexican companies can improve their disclosures by focusing more on the financial implications and the response to climate change. Can cover the investment, acquisitions and divestments that support the transition to a low carbon emission, real and expected earnings, efficiencies and development and or management cost.
Coherence between strategy and activities	Mexican companies can provide comprehensive explanations on how the company has planned its strategy and activities supporting a coherent approach to the low carbon transition.
Clarity about the basis on which information is prepared and the scope of disclosure	The Mexican companies might improve the explanation of the methodologies, computation, terminology and definitions used. In order to prepare and communicate climate-related information, including the extent to which businesses and the value chain are within scope of the reported information.
Labeling and organizing information	An improvement implicates reviewing and identifying existing disclosures or internal information sources that the Mexican companies could use to answer the TCFD's recommendations. In some cases, the information already disclosed simply need labelling or cross referencing to highlight the climate related risk and opportunities.

Table 34. Practical steps for Mexican companies

Complementary recommendations for the Mexican companies in the area of Strategy, according to the user perspective (investors and shareholders) required to:

- Identify the specific markets and jurisdictions most likely to affect and provide useful information at the assets level.
- Detail, when it is necessary any quantitative information on changes to capital expenditures (CAPEX), operational expenditures (OPEX) and revenues as a result of actual or possible future changes in policy.
- Granular information about the geographical spread of the assets. The geographical diversification diminishes the physical risk compared with one geography.

For the perspective of the use of scenario analysis, the stakeholders and investors encourage companies to disclosure about strategic resilience based on scenario analyses are most useful when the companies:

- Are transparent about the use of their inputs, parameters and assumption used.
- Include an indication of how trends and development might affect the business model, strategy and finances of the companies.
- Resilience is proved against the range of scenarios, taking into account the 1.5°-2°C scenarios
- Provide insight of the key performance metrics to change under the different scenario analysis.

- Evidence of diversification, innovation, flexibility and business model adaptation in response to future trends with the transition to the low carbon economy.

Regarding, additional recommendations in the area of Metrics & Targets, the investors and other users have expressed interest to understand the possible financial implication of the low decarbonization economy. The recommendations for the Mexican companies are:

- Financial metrics which provide hints of the future business model. The financial planning must integrate capital allocations plans, R&D to support the low-carbon transition, anticipated changes from low carbon business in EBITDA.
- Relevant information where the company is making profit geographically and evaluate the competitiveness cost.
- Disclose information with a scope of the targets.
- Reveal how the carbon intensity will contribute to Paris targets and carbon neutrality.
- Expose significant milestones for long term goals.

Further advantages for the Mexican companies, could be the improvement in their score in questions aligned with TCFD recommendations in the CDP Climate Change questionnaire, as there have not been any improvement for Walmart and Axtel since 2016, and CEMEX score has gone down.

Company	Score Climate Change CDP 2016	Score Climate Change CDP 2017	Score Climate Change CDP 2018
Walmart de Mexico	B	B	B
CEMEX	A-	A-	B
Axtel	C	C	C

Table 35. Score Climate Change CDP 2016,2017,2018 for selected Mexican companies (CDP, 2018)

7. Conclusion

Currently we are experiencing dramatic cost implications resulting from extreme weather events and they are unquestionably on the rise in frequency and severity. Climate change risk are not usually priced in the capital markets, which cause global financial stability concern. However, in order to make a transition to a low-carbon economy envisioned by the Paris agreement, public and private sectors must contribute with substantial funds.

Preventing a tragedy of the Climate Change can be achieved by the Task Force on Climate related Financial Disclosures (TCFD) with the main goal to support efficient capital allocation in the transition to a low carbon economy.

It is important to highlight the importance of disclosure climate-related risk and opportunities to provide useful information for the assessment of the stakeholder's portfolio. Currently, these recommendations are increasingly supported by a wide range of sectors committed to implementing them, while nearly 340 investors with almost 34 billion dollars in assets are encouraging their use to keep or invest in the companies.

The investigation carried out through in this work, documented the importance to disclose climate-related risk and opportunities in a transition to a low carbon of 6 European utilities leading the alignment with TCFD and their role in economy decarbonization and the 3 Mexican companies, to further develop a final product of recommendations for the Mexican companies to speed the use of TCFD recommendations in their mainstream report filings.

The success of the final recommendations for the Mexican companies will depend in the widespread adoption of the companies, and the implementation of the proposal in the four areas: Governance, Strategy, Risk Management and Metrics & Targets.

The evidence of the great disclosure practices from European utilities can help Mexican companies to change their strategy of decision making and risk management process for a better use of TCFD recommendations and more useful financial information for stakeholders.

Mexican companies should consider the risk and opportunities related to climate change in in the Governance and Strategy of their companies, and in their Risk Management processes while considering the best Metrics and Targets required to communicate its work to their stakeholders.

Mexican companies can obtain outstanding advantages after adopting TCFD recommendations and enhancing their climate-related financial disclosures. The main advantage is to be included in the portfolio of selected investors. Further benefits are: favored corporate image, improvement of their resource's efficiency, reduce energy cost, development of new products and services, diversify business activities and increase the resilience of their organizations.

8. Bibliography

- Axtel. (2019). *Axtel Sustentabilidad*. Retrieved from <https://www.axtelcorp.mx/sustentabilidad/>
- Carbon Pricing Leadership Coalition. (2018). *Carbon Pricing and the Task Force on Climate-related Financial Disclosures (TCFD)* . Retrieved from <https://static1.squarespace.com/static/54ff9c5ce4b0a53decccfb4c/t/5b1af63a70a6ad394e707122/1528493626398/33368-TCFD+and+Carbon+Pricing+Executive+Brief-final.pdf>
- CDP. (2018). *CDP response Climate Change 2018*. Retrieved from <https://www.cdp.net/en/responses?utf8=%E2%9C%93&queries%5Bname%5D=&filters%5Bprogrammes%5D%5B%5D=Investor&filters%5Byears%5D%5B%5D=2018>
- CDP. (2018). *Global Climate Change Analysis 2018* . Retrieved from <https://www.cdp.net/en/research/global-reports/global-climate-change-report-2018>
- CDP. (2019). *CDP Technical Note on the TCFD*. Retrieved from https://b8f65cb373b1b7b15feb-c70d8ead6ced550b4d987d7c03fcdd1d.ssl.cf3.rackcdn.com/cms/guidance_docs/pdfs/000/001/429/original/CDP-TCFD-technical-note.pdf?1512736184
- CEMEX Mexico. (2019). *CEMEX Sustainability*. Retrieved from <https://www.cemex.com/sustainability/overview>
- Dover corporation. (2010). *Dover's progress in the Carbon Disclosure Project (CDP)*. Retrieved from <https://www.dovercorporation.com/about-us/sustainability/carbon-disclosure-project>
- EDF. (2019). *EDF*. Retrieved from <https://www.edfenergy.com/>
- EDP. (2019). *EDP energía* . Retrieved from <https://www.edpenergia.es/es/>
- ENEL. (2019). *ENEL*. Retrieved from <https://www.enel.com/>
- ENGIE. (2019). *ENGIE*. Retrieved from <https://www.engie.com/en/>
- Ernst & Young, S.L. (2018, December). *Novedades sobre informacion no financiera y diversidad*. Retrieved from [https://www.ey.com/Publication/vwLUAssets/ey-novedades-sobre-informacion-no-financiera-y-diversidad/\\$FILE/ey-novedades-sobre-informacion-no-financiera-y-diversidad.pdf](https://www.ey.com/Publication/vwLUAssets/ey-novedades-sobre-informacion-no-financiera-y-diversidad/$FILE/ey-novedades-sobre-informacion-no-financiera-y-diversidad.pdf)
- EUR-Lex. (2014). *DIRECTIVE 2014/95/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL* . Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014L0095&from=ES>
- European Commission . (2018). *Action Plan: Financing Sustainable Growth*. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52018DC0097&from=EN>
- Financial Stability Board. (2017). *The Use of Scenario Analysis in Disclosure of Climate-Related Risk and Opportunities*. Retrieved from <https://www.fsb.org/wp-content/uploads/Technical-Supplement-1.pdf>

GreenHouse Gas Protocol. (2013). *Technical guidance for calculating Scope 3 Emissions* . Retrieved from https://ghgprotocol.org/sites/default/files/standards/Scope3_Calculation_Guidance_0.pdf

Iberdrola. (2019). *Iberdrola*. Retrieved from <https://www.iberdrola.com/>

IPCC. (2014). *Climate Change 2014 Mitigation of Climate Change*. Retrieved from https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_frontmatter.pdf

RobecoSAM. (2019). *“Rate the Raters” 2019: Global companies value RobecoSAM CSA as the most useful rating tool*. Retrieved from <https://www.robecosam.com/csa/insights/2019/rate-the-raters-2019.html>

Science Based Targets. (2019). *Science Based Targets*. Retrieved from <https://sciencebasedtargets.org/what-is-a-science-based-target/>

SSE plc. (2019). *SSE*. Retrieved from <https://sse.com/>

Task Force on Climate-related Financial Disclosures. (2017). *Recommendations of the Task Force on Climate-related Financial Disclosures*. Retrieved from <https://www.fsb-tcdf.org/wp-content/uploads/2017/06/FINAL-2017-TCFD-Report-11052018.pdf>

Task Force on Climate-related Financial Disclosures. (2017). *Task Force on Climate-related Financial Disclosures*. Retrieved from <https://www.fsb-tcdf.org>

Task Force on Climate-related Financial Disclosures. (2019). *Task Force on Climate-related Financial Disclosures: Status Report*. Retrieved from <https://www.fsb-tcdf.org/wp-content/uploads/2019/06/2019-TCFD-Status-Report-FINAL-053119.pdf>

Technical expert group on sustainable finance (TEG). (2019). *Report on Climate-related Disclosures* . Retrieved from Report on Climate-related Disclosures

The economist. (2015). *The cost of inaction : Recognising the value at risk from climate change*. Retrieved from https://eiuperspectives.economist.com/sites/default/files/The%20cost%20of%20inaction_0.pdf

United Nations. (2019). *Sustainable Development Goals*. Retrieved from <https://www.un.org/sustainabledevelopment/>

Walmart de Mexico . (2019). *Responsabilidad corporativa Medio Ambiente*. Retrieved from <https://www.walmartmexico.com/responsabilidad-corporativa/medio-ambiente>

