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Towards an effective EU climate disclosure strategy?

An ex-ante evaluation and derivation of an analytical framework, of criteria and indicators regarding the EU Commission's 2018 Action Plan on Financing Sustainable Growth and the 2018 Non-Financial Reporting Directive

Sabina Bals, Markus Groth & Thomas Schomerus
January 2022

[Auf dem Weg zu einer effektiven EU-Klima-Transparenzstrategie?

Eine Ex-ante-Bewertung und Ableitung eines analytischen Rahmens, von Kriterien und Indikatoren für den Aktionsplan 2018 der EU-Kommission zur Finanzierung von nachhaltigem Wachstum und die Richtlinie zur Nachhaltigkeitsberichterstattung von 2018]

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Towards an effective EU climate disclosure strategy? An ex-ante evaluation and derivation of an analytical framework, of criteria and indicators regarding the EU Commission's 2018 Action Plan on Financing Sustainable Growth and the 2018 Non-Financial Reporting Directive[1]

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Abstract:

[The EU climate disclosure strategy regarding the EU Commission's 2018 Action Plan on Financing Sustainable Growth and the 2018 Non-Financial Reporting Directive is not effective enough. More clarity regarding the definition of material climate-related risks for companies and the transparency of their long-term resilience strategies is needed. The EU should implement a more regulative disclosure framework, i.e. the NFI Directive should include stress tests to ensure future-orientation and comparability. Through such reforms and further improvements the EU should take a global lead in transforming the financial system.]

Key Words: climate change, climate-related financial disclosure, financial system, green paradox

Zusammenfassung:

[Die EU-Klimatransparenzstrategie mit dem Aktionsplan der EU-Kommission zur Finanzierung nachhaltigen Wachstums und der Richtlinie zur nichtfinanziellen Berichterstattung von 2018 ist nicht wirksam genug. Mehr Klarheit ist erforderlich hinsichtlich der Definition wesentlicher klimabezogener Risiken für Unternehmen und der Transparenz ihrer langfristigen Resilienzstrategien. Die EU sollte einen stärker regulierenden Rahmen für die Offenlegung einführen, z.B. sollte die NFI-Richtlinie Stresstests enthalten, um eine Zukunftsorientierung und Vergleichbarkeit zu gewährleisten. Durch solche Reformen und weitere Verbesserungen kann die EU eine weltweite Führungsrolle bei der Umgestaltung des Finanzsystems übernehmen.]

Schlüsselwörter: Klimawandel, klimabezogene finanzielle Offenlegung, Finanzsystem, grünes Paradoxon

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Leitung:
Prof. Dr. *Thomas Schomerus*

Redaktion und Layout:
Dr. *Jorge Guerra González*

Korrespondenz:
Thomas Schomerus, Leuphana Universität Lüneburg, Fakultät Nachhaltigkeit, Institut für Nachhaltigkeitssteuerung, Professur Öffentliches Recht, insbesondere Energie- und Umweltrecht, C11.219, Universitätsallee. 1, 21335 Lüneburg
Fon +49.4131.677-1344, Fax +49.413.677-7911, schomerus@uni.leuphana.de

Jorge Guerra González, Leuphana Universität Lüneburg, Fakultät Nachhaltigkeit, Institut für Nachhaltigkeitssteuerung, Professur Öffentliches Recht, insbesondere Energie- und Umweltrecht, C11.221, Universitätsallee 1, 21335 Lüneburg
Fon +49.4131.677-2082, jguerra@uni.leuphana.de

[1] State of research: February 2019.

Contents

1 Introduction

The IPCC special report "Global Warming of 1.5 °C"[2] has shown that even a temperature increase of 1.5 °C compared to pre-industrial levels will have strong impacts on climate change. The overall economic damage by 2100 could regionally be greater if global warming exceeds 1.5 ºC and nears 2 ºC. All target-oriented emission paths towards limiting global warming to 1.5 °C require rapid and far-reaching emission reductions, as well as system transitions in a number of socially and economically significant areas. They can thus exhibit synergies with the United Nations goals for sustainable development (SDGs). The IPCC report on 1.5°C warns especially of the costs of extreme weather events, the interactions of different impacts and negative growth effects in countries of the Southern Hemisphere, illustrating that economic damage even in scenarios below 2°C can be severe[3].

The important role of mitigation and adaptation efforts is highlighted in the Global Risk Report 2018[4]. The risk categories “extreme weather events”, “natural disasters” and “failure of climate change mitigation and adaptation” are among the “top 5” in terms of likelihood and impact.

The impacts of climate change as well as climate politics pose a twofold challenge for financial systems. On the one hand, the financial system and the economy need to be transformed substantially in order to meet the first goal of the Paris Agreement, i.e. ensuring potential increase stays well below 2°C pathway but “pursuing efforts to limit temperature increase to 1.5°C above pre-industrial levels” (Paris Agreement 2015, Art. 2.1.(a)).

On the other, the financial system and the economy have to become resilient to climate-related physical, market, regulative and liability risks, so that financial stability is maintained and climate resilience fostered (Paris Agreement 2015, Art. 2.1 (b)).

In order to reach both targets, finance flows need to be “consistent with a pathway towards low greenhouse gas emissions” (Paris Agreement 2015, Art. 2.1 (c)), the third goal of the Paris Agreement. Thus, “the Tragedy of the Horizon”, a term coined by Carney 2015, referring to the “catastrophic impacts of climate change [that] will be felt beyond the traditional horizons of most [financial] actors – imposing a cost on future generations that the current generation has no direct incentive to fix”[5] needs to be addressed by financial actors and politicians.

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2 IPCC 2018.
3 IPCC 2018.
4 World Economic Forum, 2018.
5 Carney 2015, 3.

Evidence suggests that an early and stable policy framework would allow for smooth asset value adjustments, without disrupting or imposing negative consequences on the financial system, which could be caused by a late and abrupt transition to a well below 2° C mitigation pathway[6].

For a stable transition into a low-carbon financial system and to prepare for climate-related risks, companies need to implement adequate risk response measures[7]. Comparable, clear and forward-looking climate-related financial disclosure is internationally recognized as a crucial practice to identify, assess and respond to climate-related implications[8]. The European Commission and Parliament have taken several steps to introduce climate-related disclosure in the EU. The Action Plan *Financing Sustainable Growth*[9] was published recently, listing short-term political measures to promote a transformation "towards a greener and more sustainable economy"[10] one of them being financial disclosure[11].

So far[12], no scientific analysis has been carried out assessing the effectiveness of the newly extended EU climate-related financial disclosure strategy for aligning financial flows with a well below 2°C scenario and increasing financial resilience against climate-related risks. The strategy requires, therefore, analysis regarding its climate- and financial effectiveness, with a focus on company disclosures. Firstly, this paper introduces the conceptual background and examines the role of the applied theories in discussing climate-related financial disclosure. Evaluation criteria and indicators are then derived from the theoretical discussion and are then applied for analyzing and evaluating the strategy. The paper concludes by critically reflecting the main results and briefly highlighting future need for research.

2 Conceptual background

2.1 Tragedy of the Horizon

Empirical studies show that the financial market is increasingly short-term orientated[13], linked with a preference for short-term assets[14] and a general short-term orientation of market objectives[15]. In the EU, the average holding period of market-traded assets has shortened from the eight years seen two decades ago to

6 Gianfrate 2018, 152.
7 Kolk/Levy et al. 2008.
8 Carney 2018, 5.
9 European Commission, 2018.
10 EU Action Plan 2018, 1.
11 EU Action Plan 2018, Act. 7, 9.
12 State of literature research: February 2019.
13 Martin/Minns, 1995, 141; Pagnotta/Philippon, 2011, 2.
14 Fernández-Olit/de la Cuesta-Gonzáles et al. 2018, 69.
15 Chichilnisky 2016.

eight months in 2018. This is due to a focus on short-term value extraction, high frequency trading and the competition between asset managers and the assessment against benchmarks, making it harder to tolerate periods of company underperformance[16].

Carney[17] argues that the time-horizon of financial and corporate actors is too short to address climate change successfully, as its impacts will mostly be felt in the future. But once the impacts affect financial stability, the chance to pursue a 1.5°C or 2°C pathway will be squandered. Further, Carney suggests a fast but smooth transition to a low-carbon financial system, as earlier action will be less costly[18]. He points out that forward-looking, qualitative and quantitative information is crucial, so that market participants can assess climate-related financial risks and opportunities, and can prepare and react accordingly[19]. Additionally, the robustness of a company's strategy should be evaluated by scenario analysis[20].

2.1 Transparency

Carney and other analysts suggest disclosure of climate-related financial information as a means to overcome the tragedy of the horizon and to smoothen the transition to a low-carbon financial system[21]. In economic theory, the importance of transparent information is highlighted by the complete information condition, one of the five main conditions for a functioning system of markets[22], which prevents adverse selection and moral hazard[23].

Regarding climate change related risks and opportunities, the principal-agent issues in combination with misaligned incentives mean that the long-term horizon of the actor at the end of the investment chain, e.g. pension funds, is not reflected by financial intermediaries. Further, companies' needs for patient capital are not sufficiently considered due to a focus on short-term price performance. Thus, there are shortcomings at both ends of the investment chain[24], as the climate-related risk of an investment, especially a long-term investment, is insufficiently considered on both sides.

Such information asymmetry becomes an information deficit if neither lender nor borrower estimates climate-related risks and opportunities of an investment. Sustainable long-term investment decisions require

16 HLEG 2018, 46.
17 Carney 2015, 2016, 2018.
18 Carney 2015, 3; 2016, 7.
19 Carney 2016, 9.
20 Carney, 2016, 10..
21 E.g. Carney 2018, 2016, 2015; HLEG 2018; TCFD 2017; CDP 2017; Weber 2018.
22 Common/Stagl 2005, 322.
23 Stiglitz/Weiss 1981, 408.
24 HLEG 2018, 12.

transparency regarding long-term climate-related risks and opportunities[25]. Addressing medium- and long-term risks and opportunities, developing strategies for reacting accordingly and disclosing all necessary information for potential investors are crucial for long-term financial stability[26].

2.2 The De-paradoxication of the Green Paradox

The green paradox refers to the observation that climate policies often aim at decreasing demand for fossil fuels without considering the supply side. This can lead to lower carbon emission and fossil fuel prices as demand decreases, and a rise in extraction rates if suppliers feel threatened by the gradual implementation of climate policies. A reversion of the policy effects can be the consequence[27]. This effect can be explained because climate change, as a severe, unconsidered external cost invalidates the Hotelling rule[28].

Van der Werf and Di Maria[29] identify four different imperfect policy approaches which may induce a green paradox. In this context, the implementation lag and the unilateral implementation are of interest.

There are only few empirical assessments of the Green Paradox. Pfeiffer[30] could only identify two[31] which, at least partly, validate the green paradox. Empirical evidence regarding the Clean Air Act Amendments of 1990 illustrates that the specifics of the demand side may affect the potency of the green paradox, as prices decreased but coal consumption did not[32].

Thus, the demand side is often not flexible enough to react to the price decrease by absorbing additional resources and by shifting recourse consumption to earlier points in time[33]. Therefore, going full circle by considering the supply as well as the demand side is recommended, highlighting the necessity to include demand factors when assessing the possibility of a green paradox[34].

Neither a theoretical nor an empirical discussion regarding demand- and supply-side effects of climate-related financial disclosure could be found in the literature.

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25 HLEG 2018, 23.
26 Carney 2018, 2016, 2015; CDP, 2017; TCFD, 2017.
27 Sinn 2008, 360.
28 Jensen et al. 2015, 248.
29 Van der Werf/Di Maria 2012 155, 159.
30 Pfeiffer 2017, 33.
31 Curuk/Sen 2015; Di Maria/Lange et al. 2012.
32 Di Maria/Lange et al 2012.
33 Di Maria et al. 2013, 10.
34 Di Maria et al. 2013, 2.

3 Methods

This article investigates the climate- and financial effectiveness of the EU climate-related financial disclosure strategy. Evaluation criteria and indicators are derived from the previous theoretical discussions. The conceptual background is based on the complete information condition for markets, the consequences of shortsightedness of financial actors in light of sustainability challenges for financial stability (tragedy of the horizon) and the green paradox. Further, policy implications for political disclosure strategies are developed. Based on theoretical reflections, criteria are derived for evaluating the financial and environmental effectiveness of a governmental climate-related financial disclosure strategy for companies. For each criterion qualitative indicators are developed. Since the criteria aim at a holistic political disclosure strategy evaluation, the information that companies are asked to disclose is examined, as well as factors such as credibility and consistency of the strategy.

3.1 Analyzed EU communications

The non-financial disclosure guidelines form the basis of an analysis of the current state of the *Non-Financial and Diversity Information (NFI) Directive* (Directive 2014/95/EU). They set the current requirements for reporting on material environmental information. Activities of the Action Plan which have been enacted by May 2018 are also included within the evaluation of the current state.

The analysis of the future state is mostly based on activities not yet executed as listed in the Action Plan. It lists specific activities to revise and extend the policies currently implemented concerning climate-related financial disclosures.

Table 1 gives an overview of EU-communications regarding climate-related financial disclosures, specifying their types, aims and implications for disclosures.

Table 1: Communications of EU Strategy

Communication	Type	Most relevant Parts	Main Implication for Disclosures
DIRECTIVE 2013/34/EU of 26 June 2013 (Accounting Directive)	Accounting directive on the annual financial statements, consolidated financial statements and related reports of certain types of companies	Article 19.1	Disclosure of principal risks, financial and, if relevant, non-financial environmental indicators in management report
DIRECTIVE 2014/95/EU of 22 October 2014 (NFI Directive)	Directive on disclosure of non-financial and diversity information by large companies	Articles 1 to 4	Inclusion of non-financial statement in management report which includes a disclosure of relevant information on policies, risks and results regarding environmental matters
Guidelines on non-financial reporting (2017/C 215/01)	Guidelines for the NFI Directive developed by the European commission	Section 3 and 4	Sustainable disclosures should be material, strategic and forward-looking, qualitative and consistent
Action Plan: *Financing Sustainable Growth*, 8 March 2018	Action Plan sets out the strategy of European Commission for sustainable finance, building on the High-Level Expert Group's final report from 31 January 2018	Actions 7, 9 and 10	Presentation of short-term political goals regarding an expansion of fiduciary duty, climate-related financial disclosure and, ending short-termism in capital markets
Proposal for a Regulation on disclosures relating to sustainable investments and sustainability risks, 24 May 2018	Proposal aims to harmonize rules on the transparency of financial market participants in the field of sustainable investments. Proposal for a Regulation of the European Parliament and of the Council.	Articles 2 to 4 and 10	Expansion of fiduciary duty to consider information regarding sustainability; Definition of sustainable investment

The European Commission's strategic long-term vision "A Clean Planet for all", which also addresses investments and finance, has not been included in this analysis. It "does not intend to launch new policies" but to set the general direction[35].

3.2 Development of Criteria

3.3 Criterion 1: Climate- and Financially Effective Disclosures

Based on the theoretical understanding of the tragedy of the horizon and the information deficit regarding climate-related information, the criterion *Climate- and Financially Effective Disclosure* is developed. Two indicators are developed to gauge how far the criterion is met.

3.3.1 TCFD's Recommendations as Benchmark - Indicator 1.1

The first indicator, *TCFD's Recommendations as a Benchmark,* considers whether all relevant information is disclosed. The choice of information relevant for climate and financially effective disclosure is based on the

[35] EU Commission 2018, 3.

TCFD's recommendations, which are the most relevant international guidelines and are judged to have the potential to become "a new normal of climate disclosure"[36].

The recommendations include static as well as strategic information and lead to an increase in quantitative financial disclosure, in particular of metrics related to the financial impact of climate-related risks for companies[37]. The recommended disclosures regarding scenario analysis and risk management qualify as future-oriented, especially by helping overcome the tragedy of the horizon, as possible future scenarios and strategies can be considered. This in turn helps to avoid stranded assets, because financial actors can "factor future shifts in policy, technology, the natural environment and consumer choice into their investment decisions"[38]. The disclosures of board oversight and management's role further allow investors to judge the ascribed importance of the climate-related strategy within the company. The inclusion of the Scope 3 GHG emission follows current academic requests, providing a more complete picture of a company's exposure[39].

3.3.2 Material Disclosures Located in Financial Filings - Indicator 1.2

It is crucial where the disclosures are located. Most G20 jurisdictions require companies to disclose material information in their management report. This includes theoretically material climate-related information[40]. It remains problematic for investors to locate climate-related information[41].

As climate-related risks are non-diversifiable and affect nearly all industries, the TCFD recommends that disclosures related to governance and risk management should be included in the mainstream annual financial filings[42]. Disclosures regarding strategy, metrics and targets should only be provided in the annual financial fillings when information is considered material[43]. Thus, the second indicator *Material Disclosures Located in Financial Filings* evaluates the need for governance and risk management and material information regarding metrics, targets and strategy in the mainstream annual filings.

36 HLEG 2018, 24.
37 TCFD 2017, 37.
38 HLEG 2018, 10.
39 Gianfrate 2018, 158.
40 TCFD 2017, 17.
41 OECD and CDSB 2015, 39.
42 TCFD 2017, 17, 34.
43 TCFD 2017, 17, 34.

3.4 Criterion 2: Reduction of Policy Imperfection

Climate-related financial disclosure policy could be exposed to unilateral implementation and to an implementation lag and therefore could cause a green paradox. For this reason, the second evaluation criterion is the *Reduction of Policy Imperfection*.

3.4.1 Multilateral Implementation - Indicator 2.1

Carbon leakage could arise due to a unilateral implementation and high disclosing costs of companies, as well as through an increase of external pressure related to negative disclosures.
As companies sacrifice economic value to meet their short-run earnings targets[44], companies facing high disclosure costs are incentivised to move to locations where disclosure is voluntary.
Disclosures increase transparency, which can enhance external pressure to commit to mitigation, as explained by legitimacy theory[45]. Hence, companies could fear exposure to market risks, as negatively perceived climate information might expose them to external pressure, for instance from non-governmental organizations[46]. Changing the strategy could be costly for a company and might create incentive to leave the country. International support of the disclosure framework is therefore the first indicator derived in this section.

3.4.2 Timely Implementation - Indicator 2.2

An implementation lag of a disclosure strategy could cause carbon leakage. To limit the risk of the green paradox arising between announcement and introduction, the announced measures should be implemented fast, since an increase of extraction capacities needs time[47]. Thus, *timely implementation* after announcement is the second indicator, to assess whether policy imperfections are successfully reduced.
The importance of timely implementation is also given as it increases the chances of staying below a 2°C-temperature increase[48], of transforming the EU financial system towards sustainability[49] and of enabling smooth asset value adjustments, thus reducing the risks of financial instability[50].

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44 Graham/Campbell et al. 2004, 1.
45 Shehata 2014, 20.
46 Sakhel 2017, 104.
47 Di Maria et al. 2013, 19.
48 Friedlingstein et al. 2014.
49 HLEG 2018, 24.
50 Gianfrate 2018, 152.

3.5 Criterion 3: Impact on Demand Side and Supply Side

A political strategy introducing climate-related financial disclosures which reduces policy imperfections is unlikely to cause a green paradox. If complying with certain conditions, it could, however, potentially also dissolve the green paradox created by other climate policies, as climate-related financial disclosure considers supply and demand side.

To do so, the strategy needs to establish sufficient pressure on the supply side, to continuously reduce the extraction of fossil fuels, even if other climate policies focussing on the demand side such as carbon pricing or further subsidies of renewable energies are announced.

The policy framework needs to keep demand price elasticity low, thus restricting reaction to price incentives on the demand side, caused by policy-induced reduced demand of fossil fuels. If it fulfils these conditions, a de-paradoxiation of the green paradox should be the consequence. I follows, that the next criterion to be introduced should be Impact on Demand Side and Supply Side.

3.5.1 Long-term Strategy with Science-based Targets - Indicator 3.1

First, the pressure imposed by disclosures on the supply side to follow a decarbonisation strategy needs to be sufficiently high.

Second, demand elasticity must be kept low, so that a change in the price of fossil fuels does not have an impact on the consumption level. This ensures that even if the supply side reduces the prices, GHG emissions do not increase.

Science-based short, mid and long-term targets in combination with a science-based target setting tool, determining "the company's target trajectory compared to the sector intensity pathway"[51], could be introduced to fulfil both conditions. This permits externals to follow the performance of the company closely, which could encourage companies to comply with the targets because investors could challenge companies to perform better, if they are seen not to be in line with their targets[52]. Further, their disclosure hints at their likeliness to be affected by climate-related risks. This could incentivise companies even further to comply with their strategy. The indicator is therefore called *Long-term Strategy with Science-based targets*.

[51] Science Based Targets Initiative 2015, 9.
[52] Sullivan et al. 2015, 17.

3.5.2 Expanded Fiduciary Duty - Indicator 3.2

Fiduciary duties are essential to the investment process. Despite this, climate-related risks are not yet considered by investors often enough[53]. This indicates that the pressure imposed on a company to follow its divestment strategy can be strengthened, if the consideration of climate-related risks on companies is part of fiduciary duty. It is important to update fiduciary duty in light of current sustainability challenges as "action is needed to modernise definitions and interpretations of fiduciary duty in a way that ensures these duties are relevant to the 21st century investors"[54]. This indicates that currently not all relevant risks and opportunities are considered by investors. According to Sullivan et al. (2015), updating fiduciary duty would mean that investors recognise relevant climate-related risks and how they affect investment returns, manage these risks, challenge companies also to manage climate-related risks effectively and to establish a demonstration process of their possible actions[55]. This increases the pressure for companies to disclose reliable, relevant, future-oriented information and to stick with their disclosed mitigation strategy.

3.5.3 Governmental Commitment to Climate Mitigation - Indicators 3.3

Nevertheless, the lack of a credible climate policy concerning the real economy, like the lack of a robustly defined long-term price for GHG emissions, can lead to non-optimal investment behaviour[56]. If governments do not commit themselves to following an ambitious climate policy in the foreseeable future or if it is perceived that they might not stick to their self-imposed commitment, financial actors will discount the expected carbon price more strongly[57]. It also reduces the short and medium-term climate-related financial risks for companies, as they are less likely to be affected by regulative measures. This means that investors do not need to consider the resilience strategy of companies so much, as fiduciary duty only considers material risks[58]. A strong political commitment in order to gain credibility from companies and financial actors is vital for the effectiveness of carbon policy[59] and the effectiveness of governmental climate-related financial disclosure strategy. Therefore, a further indicator, which can be derived to evaluate a governmental disclosure strategy is the strength of *Governmental Commitment to Climate Mitigation*. This will be evaluated by considering three aspects: i) are the climate goals of the government in line with the Paris Agreement, ii) is

53 HLEG 2018, 20.
54 Sullivan et al. 2015, 9.
55 Sullivan et al. 2015, 17.
56 Gianfrate 2018, 160.
57 Brunner/Flachsland et al. 2012, 2.
58 TCFD 2017.
59 Brunner/Flachsland et al. 2012, 2.

there a strong and reliable commitment to these self-imposed climate goals in the governmental communication, iii) is there a government introduced price for carbon.

The last point is important to synchronize real economy and financial system according to the Brundtland definition of intra- and intergenerational justice in the context of social, ecological and economic development[60]. It is crucial that governments ensure that prices include consistently positive and negative externalities[61]. This enables investors and companies to calculate with a predictable carbon price. However, internal carbon pricing has only a material impact on actors' decisions, if the mandatory carbon prices rise in a predictable policy environment[62].

The pressure on companies to follow their science-based climate resilience strategy can only be expected to be sufficiently high when investors grade climate-related risks as material and relevant.

3.6 Criterion 4: Clear Definition of Material Climate-related Risks

The question whether carbon disclosure should be mandatory or voluntary has been a prominent topic in literature[63], because boundary conditions, such as regulations, are likely to impact carbon disclosures[64]. In the following, it is argued that, instead of discussing the effectiveness of mandatory or voluntary reporting frames, it needs to be discussed how to balance flexibility and obligation around the already mandatory reporting requirements and how to ensure that they are communicated and met.

The reporting of material non-financial information is mandatory for companies in the EU[65], as well as in most G20 jurisdictions[66]. Thus, theoretically a disclosure of climate-related risks is per se broadly mandatory. However, in practice there is a worldwide lack of consensus concerning what is considered a material climate risk, thus imposing reporting challenges for companies[67]. The TCFD's recommendations are meant to help companies comply with the current disclosure obligations[68]. Weber[69] argues that since the recommendations are only voluntary, it is not certain whether they will be adopted by industries[70]. Also, the CDP[71] states that voluntary corporate disclosures are an important step in preparation for mandatory disclosures

60 Carnau 2011, 18.
61 HLEG 2018, 11.
62 World Bank 2017, 35.
63 Hahn/Reimsbach et al. 2015, 87.
64 Hahn/Reimsbach et al. 2015, 82.
65 European Commission 2017, 3.1.
66 TCFD 2017.
67 CDSB 2018, 3.
68 TCFD 2017.
69 Weber 2018, 397.
70 Weber 2018, 384.
71 CDP 2017, 6.

but should not stand alone. While Andrew and Cortese[72] support the view that voluntary disclosures lay good groundwork for the adaption of mandatory disclosures, Mc Farland[73] underlines that voluntary disclosures are not fast enough in effecting changes in disclosure practices. Further, Sakhel's empirical analysis indicates "that companies in regulated industries implement more regulatory response measures than companies that are part of non-regulated industries, while, interestingly, there are no significant differences between the two groups in exposure and responses to physical and market risks"[74]. These findings support the case of mandatory disclosure.

However, commitment also reduces flexibility to adjust the strategy fast enough to new information or newly arising investor or company needs. This creates "a trade-off between valuable commitment and valuable flexibility"[75]. In addition, enforcement of mandatory standards requires extra costs as it raises the tasks for regulation bodies[76]. Needs of different business sectors for climate-related disclosure are very different, making it more difficult to develop a mandatory reporting standard[77]. Regarding criterion 4, consideration is needed as to how the theoretically mandatory disclosure of climate-related risks for companies can be communicated effectively and met. Currently, there is no broadly agreed-upon definition of material climate risk[78]. A criterion for the evaluation of a governmental disclosure strategy is the *Clear Definition of Material Climate-related risks*.

3.6.1 Disclosure of Material Climate-related Risks - Indicator 4

The criterion can be evaluated by assessing whether it is clearly communicated that disclosure of material climate-related risks is mandatory. This can be by considering if there is a definition of material climate-related risks is provided within the disclosing framework. The indicator developed is called *Disclosure of Material Climate-related Risks*, as a disclosure is only guaranteed when it is mandatory and as material climate-related risks are more likely to be disclosed when defined concisely.

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72 Andrew/Cortese 2011, 6.
73 Mc Farland 2009, 281.
74 Sakhel 2017, 104.
75 Brunner/Flachsland et al. 2012, 2.
76 Hahn/Reimsbach et al. 2015, 89.
77 TCFD 2017, 19, 27.
78 TCFD 2016, 15.

3.7 Overview on Criteria and Indicators

The above-described five different evaluation criteria derived from the evaluation of a climate- and financially effective political climate-related financial disclosure strategy. While *Climate- and Financially Effective Disclosure* helps to evaluate whether the disclosed information is effective and transformative, *Reduction of Policy Imperfection*, *Impact on Demand Side and Supply Side, Clear Definition of Material Risks* and *Balance of Requirements and Flexibility* mostly consider the structure and design of the political strategy and its transformative potential. An overview on all the derived criteria, the associated indicators and their potential impacts, most relevant in the previous discussion, is given in table 2.

Table 2 Overview on Criteria and Indicators

Derived from	Criterion	Indicators for success	Impact
Tragedy of the horizon and complete information condition	**1. Climate- and Financially Effective Disclosure**	1.1 TCFD's Recommendations as a Benchmark	• Future-oriented disclosures • All material information considered • Development and Disclosure of long-term resilience strategy
		1.2 Material Disclosures Located in Financial Filings	• Comparability • Recognition as material financial information
Green Paradox	**2. Reduction of Policy Imperfections**	2.1 Multilateral Implementation	• Companies cannot shift to a different country where emitting GHG emissions is cheaper
		2.2 Timely Implementation	• No time to sell / use more fossil fuels for supply side and demand side before implementation
	3. Impact on Demand Side and Supply Side	3.1 Long-term Strategy with Science-Based Targets	• High incentives to stick with resilience strategy • Increased comparability of resilience strategy
		3.2 Expanded Fiduciary Duty	• Effectiveness of disclosure • Financial planning and financial stability enhanced
		3.3 Governmental Commitment to Climate Mitigation	• Effectiveness of disclosure • More ambitious scenario analysis of companies • Improved risks consideration for investors
Discussion about mandatory or voluntary disclosure	**4. Clear Definition of Material Climate-related Risks**	4 Disclosure of Material Climate-related Risks	• Higher importance of future-oriented climate disclosure • Lower liability risks for companies

4 Analysis

In this section, the defined criteria are applied to evaluate the EU strategy on climate-related financial disclosure.

4.1 TCFD's Recommendations as Benchmark - Indicator 1.1

Current State

For assessing if the first indicator for successfully meeting the criterion *Climate- and Financially Effective Disclosure* is currently fulfilled, the NFI Directive must be turned to. This regulates the disclosure of environmental information for most large companies.

It states that large companies must include a non-financial statement in their management report, which is necessary for understanding their development, performance, position and impact regarding, among others, environmental matters (D 2014/95/EU Art. 1.1). The statement needs to be fair, balanced and understandable, comprehensive but concise, strategic, forward-looking, consistent and coherent (2017/C 215/01). Material information on environmental matters should be disclosed (2017/C 215/01, Art. 3.3).

In table 3, it can be seen that many similarities exist between the TCFD's recommendations and Directive 2014/95/EU, as construed by the guidelines on non-financial disclosure (2017/C 215/01, Art. 8-14). Both ask for a description of the responsibilities at board level, for a detailed disclosure of the strategy and its adaptation to short-, medium- and long-term implications or risks. They refer to climate-related scenarios to establish a future-orientation, and both ask for a disclosure of risk management and risk identification processes. Lastly, both refer to targets and metrics, which should be used for disclosure.

Table 3 Comparison of TCFD's recommendations and NFI Directive

	Disclosures recommended by TCFD	**Disclosures required by Directive 2014/95/EU**
Governance	Boards oversight of climate-related risks	• Description of policies pursued (e.g. role and responsibility of board regarding environmental policies) • Description how potential negative impacts are managed and mitigated
	Management's role in managing climate-related risks and opportunities	*No comparable disclosure found*
Strategy	Short, medium and long-term risks and opportunities	• Explanation of short-, medium- and long-term implications of reported information • Identification of relevant material information in a fair, balanced and comprehensive manner • Strengths and vulnerabilities & principal risks
	Impact of risks and opportunities on business, strategy and financial planning	• Insight into business model, strategy and implementation • Linkage between outcome, specific circumstances and risks and assessment of risk management • Main trends and factors that may affect future development
	Resilience of organizations strategy considering climate-related scenarios	• Information based on expected impact of science-based climate change scenarios on its strategy and activities* • Assessment of likelihood on climate-related

		impacts and use of scenario analyses
Risk Management	Process for identifying and assessing risks	• Relevant information on how to identify, assess and manage climate-related risks*
	Process for risk management	• Linkage between outcome, specific circumstances and risks and assessment of risk management • Risk Management
	Integration of above-mentioned processes into organizations´ risk management	*No comparable disclosure found*
Metrics and Targets	Metrics used to assess risks and opportunities	• Specific disclosures explaining actual carbon emissions, carbon intensity and plans to reduce carbon emission* • Non-financial key performance indicators
	Scope 1-3 GHG emissions and related risks	• Energy consumption from non-renewable sources, energy intensity, GHG emissions*
	Targets to manage risks and opportunities and performance against targets	• Targets, benchmarks and commitments (qualitative or quantitative) • Clear and effective explanation of effects from changes

Sources: 2017/C 215/01, 3.4-4.5; TCFD 2017, 14

** not mandatory, only listed as an example*

There are also differences to be found. Often, the TCFD's recommendations are more concrete, for instance when asking for a disclosure of scope 1-3 GHG emissions. The guidelines only mention GHG emissions but do not specify to which scope they are referring. Additionally, the suggested climate-related disclosures are only mentioned in examples, thus neither are complete nor mandatory. Risks and opportunities are often not directly mentioned in the directive guidelines. They do not directly address the management's role in managing climate-related risks and opportunities, nor how the process of climate risk identification is integrated into the companies' risk management. While both suggest creating information based on climate scenarios, differences can also be found here. TCFD's recommendations ask to disclose the resilience of the company's strategy to climate-related scenarios, which includes transition and physical risks and the strategic plans which are developed based on the scenario analysis[79] and defines as well as explains scenario analysis more closely in one chapter[80]. The guidelines only state that" a company may disclose relevant information based on the expected impact of science-based climate change scenarios on its strategies and activities" (2017/C 215/01, Art. 9), but do not explicitly mention that any other than physical risks should be considered or that a strategic plan how to reply to possible impacts should be disclosed, thus weakening the future-orientation of the disclosures.

79 TCFD 2017, 25.

80 Scenario Analysis and Climate-Related Issues, 25-30.

Another important difference can be highlighted. While the TCFD in its final report stresses the importance of quantitative financial information[81], the NFI Directive does not mention that quantitative financial information should be disclosed. On the contrary, already the name of the directive "non-financial information directive" indicates that the disclosed information in the "non-financial statement" is unlikely to be quantitative financial information.

While there are similarities to be found, TCFD's recommendations are more concrete and detailed, offer more advice for users and are more profound as they seem to go a step further, for instance by underlying the importance of qualitative financial information. However, the guidelines of the directive point to the conclusions of TCFD (2017/C215/01, Art. 4.2), which indicate that they could be used when reporting non-financial matters.

To fully assess the indicator, the national implementation of the directive needs to be evaluated.

Announced Strategy

The *Action Plan* announces changes to the current climate-related financial disclosure strategy of the EU. By the second quarter of 2019, the Commission will revise the guidelines on non-financial information, providing further guidance on climate disclosures in line with the TCFD recommendations[82]. However, it remains to be seen if financial quantitative information will be a central piece of the disclosure.

4.2 Material Disclosures Located in Financial Filings – Indicator 1.2

Current State

TCFD recommends climate-related financial disclosure in the financial filings as the risks are non-diversifiable and require special attention[83].

The NFI Directive states that companies "[…] shall include in the management report a non-financial statement", where relevant environmental information needs to be disclosed (D2014/95/EU, Art.1.1). Here it can be seen that member states could decide where and how the non-financial statement should be published, leading to different disclosure locations in the member states, hindering integrated reports. It can also be assumed that the relevance of the disclosed information in the non-financial statement could be considered to a lesser degree than other disclosed information by most investors, as non-financial information might seem less relevant than financial information for stakeholders.

81 TCFD 2017, 37.
82 EU Action Plan 2018, Act. 9.
83 TCFD 2017, 17.

Regarding the current state, it can be concluded that the indicator has not been met. However, the NFI Directive is not so far off the TCFD's recommendations, as the information is recommended to be included in the management report.

Announced Strategy

In the EU's Action Plan no information exists on the location of disclosed sustainability. It remains to be seen if the revision of the NFI Directive will enhance integrated reporting and lead to a mandatory inclusion of climate-related financial disclosures in the financial filings.

4.3 Multilateral Implementation - Indicator 2.1

There are different approaches to evaluating the EU's effort to increase international implementation of climate-related financial disclosures. The HLEG's key recommendations on how the EU should address sustainable finance and climate-related financial disclosure are taken into account.

HLEG suggest that the EU should use its international leadership to "raise reporting standards globally"[84], asking the EU to make "sustainable finance in general, and disclosure in particular, a key priority for diplomatic engagement in 2018"[85]. This can be done, for example, by promoting disclosure at UN level and during G7 and G20 meetings[86]. It points out that the greatest opportunities might lie in cooperating with key countries, notably China[87].

Current State

The EU still needs to strengthen its efforts to bring the topic to the agenda of the different institutions. **In its roadmap for a sustainable financial system the UN recognized sustainability disclosure as a "key consideration for developing principles of sustainable finance"**[88]. Which role the EU takes within the UN in developing and implementing these considerations requires further assessment.

The G20 committed themselves to aligning "finance flows with the goals of the Paris Agreement" under the German presidency in 2017[89] and recognized the importance of climate-related financial disclosure[90]. How-

84 HLEG 2018, 25.
85 HLEG 2018, 26.
86 HLEG 2018, 26, 64.
87 HLEG 2018, 63.
88 UNEP/World Bank Group 2017, 10.
89 G20 2017, 10.
90 G20 2017, 11.

ever, under the current presidency, neither climate-related financial disclosure nor climate finance are priorities[91]. This indicates that it is likely the EU could do more to promote climate-related financial disclosure, for example by convincing the G20 to endorse the TCFD recommendations[92]. The G20 sustainable finance study group, which is co-chaired by China and the UK, could be an instrument to ensure climate-related financial disclosures become mainstream[93].

China and the EU released a joint statement on *Climate Change and Clean Energy* in Brussels in July 2018, agreeing "on the need for sustainable investment and green finance"[94]. This cooperation increases the likelihood that the EU will follow the HLEG's recommendation to strengthen its relations with China.

At the G7 meeting in Charlevoix, Quebec, in June 2018 one of the key topics was climate change. One question of discussion was how the G7 can accelerate the transition to low carbon, climate resilient economies[95]. However, no concrete measures enforcing climate-related financial disclosure were communicated.

Sustainable finance and the need to overcome the tragedy of the horizon seem to be topics in all listed institutions. However, the EU could increase efforts to strengthen climate-related financial disclosure internationally, as disclosure, especially disclosure for companies, does not appear to be on the agenda of all institutions. The EU has not yet formally endorsed the TCFD's recommendations, which would highlight their importance.

Announced Strategy

According to the Action Plan, the EU aims to further discuss internationally sustainable finance, as it describes the Action Plan as "a blueprint for future discussions in international fora to promote a renewed approach to managing the financial system more sustainably"[96]. The Commission announces the promotion of discussions within the Financial Stability Board, the G20, the G7, the United Nations and the International Organisation of Securities Commission. This shows that the European Commission wants to follow the HLEG's recommendation to take a leadership position in promoting sustainable finance. How far the other governmental bodies of the EU will embrace this position remains to be seen in the coming years.

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91 Macri, 2017.
92 HLEG 2018, 24.
93 UNEP Inquiry, 2018.
94 EEAS 2018, point 13.
95 G7 2018.
96 EU Action Plan 2018, 13.

4.4 Timely Implementation – Indicator 2.2

Both, the "revision of the guidelines of the non-financial information as regards climate-related information" and the "fitness check of the EU legislation on public corporate reporting, including the NFI Directive"[97], need careful consideration. The revision is to be published in the second quarter of 2019, and the results of the fitness check are also to be announced in the second quarter of 2019. This will support any future legislative decisions by the European Commission[98]. It remains to be seen how newly appointed EU governmental representatives will react to the fitness check and if a legislation decision will be its consequence. A date for amending the directive has not been announced so far nor has an assurance that the directive will be amended.

Important is also the EU Commissions' legislative proposal to "clarify institutional investors' and asset managers' duties on sustainability and to increase transparency of end-investors"[99]. The proposal was published on 24 May 2018, the European Council and Parliament agreement is expected to be in May 2019. The requirements will then be specified through Delegated Acts, which will hopefully be adopted in 2019[100]. The adoption would therefore be one year after the proposal was published and would still lie within the legislative period of the current EU parliament.

It can be concluded that the Action Plan offers a concrete timeline. The publication of the proposal, two months after the publication of the Action Plan can be considered as fast. Also, the goal to agree upon them by May 2019 can be considered timely. The same can be concluded regarding the revision of the guidelines for the NFI Directive. However, the guidelines are non-binding and it remains to be seen when and whether the NFI Directive will be amended. So far, no timeline has been suggested.

4.5 Long-term Strategy with Science-based Targets - Indicator 3.1

Current State

The approach of science-based targets has mostly been promoted by non-governmental organizations. Neither the TCFD recommendations, nor the NFI Directive state directly that companies should disclose science-based targets or recommend using target trajectories which could help investors to track their efforts in adapting to climate-related risks and embracing climate-related opportunities. Solely the HLEG states that "the commission should explore how to use frameworks for defining global science-based targets for natural

97 EU Action Plan 2018, Act. 9.
98 EU Action Plan 2018, Act. 9.
99 EU Action Plan 2018, Act. 7.
100 European Commission, 2018a.

capital management"[101]. However, by recommending using a 2°C or lower scenario for scenario analysis and to develop a resilience strategy[102], the TCFD refers indirectly to science-based targets.

Announced Strategy

There are no announcements regarding science-based targets to be found in the Action Plan. Therefore, the indicator can be considered as not met.

4.6 Expanded Fiduciary Duty - Indicator 3.2

Current State

The consideration of climate-related risks is not explicitly the duty of investors. The European Commission tabled a legislative proposal, which shall clarify institutional investors' and asset managers' duties regarding sustainability considerations[103]. It is suggested that investors include ESG factors in their investment decisions, as part of their duty to act in the best interest of beneficiaries. The proposal is said to increase transparency for end-investors and comparability between products and to discourage misleading information[104].

Announced Strategy

In accordance with the EU Action Plan, the proposal to clarify institutional investors´ and asset managers´ duties was tabled in the second quarter of 2018. A decision on the proposal[105] will take place in 2019. Should the requirement be adopted, the indicator will be fulfilled.

Governmental Commitment to Climate Mitigation - Indicator 3.3

In order to assess whether the EU commits to climate mitigation goals which are in line with a well below 2°C pathway, whether it has installed an investment-relevant, predictable carbon price and whether it communicates a clear commitment to transforming the financial system towards a low-carbon financial system, following clarification is necessary.

The EU has published three mitigation commitments, for 2020, 2030 and 2050. By 2020 the EU wants to decrease GHG emissions compared to 1990 and primary energy consumption by 20 percent, and to increase

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101 HLEG 2018, 89.
102 TCFD 2017, 27.
103 EU Action Plan 2018 Act. 7; COM (2018)354/F1.
104 European Commission, 2018b.
105 European Commission, 2018a.

the use of renewable energy by 20 percent. In 2017 GHG emissions increased, progress in renewable energy development slowed and energy consumption rose to levels endangering the 2020 target. The EU could however still meet the 2020 targets[106].

The 2030 targets are more ambitious. The EU wants to achieve a minimum reduction of 40 percent in GHG emissions compared to 1990 levels, a 32 percent share of renewable energy in the final energy consumption and at least 32,5 percent energy savings compared with the business-as-usual scenario[107]. Efforts need to be increased if the 2030 targets are to be reached. Current projections of member states show that planned measures are insufficient for reaching the 40 percent reduction target[108].

If it is to meet the longer-term 2050 target to cut GHG emissions by 80 percent or even 95% below 1990 levels, the EU will have to further strengthen its efforts[109].

The price of CO_2 European Emission Allowance for one ton of CO_2 lay between 18.35 and 23.80 Euro in February 2019[110]. According to Nitsch and Lange[111] and Loreck et al. (2014), this is too low to be relevant in influencing investors' decisions. Matthes et al[112]. state that a minimum price of 15 Euro per ton of CO_2 is insufficient to end the extraction of lignite but would cause the closure of coal-fired power plans. The authors suggest a minimum price between 15 and 35 Euro per ton CO_2[113].

To reduce the surplus and improve the system's resilience to future shocks, a market stability reserve started operating in January 2019. It will reduce the number of surplus carbon allowances from 2019-2023[114]. According to Lewis[115], the allowance price is likely to rise beyond 25 to 30 Euro per ton CO_2 over 2020 to 2021. This means, that the carbon price in the EU is likely to reach the minimum price in the coming years. So far, the EU is not fully back on track in installing an ambitious and investing-relevant carbon price.

The European Commission commits less strongly to its efforts to build a sustainable financial system, by choosing more relative wording than suggested by the HLEG. While the HLEG suggests using superlatives[116], in the Action Plan the European Commission does not commit to building the most sustainable financial

106 EEA 2018, 8.
107 European Commission 2019.
108 EEA 2018, 8.
109 EEA 2018, 16.
110 Markets Insider 2019.
111 Nitsch and Lange 2017, 16.
112 Matthes et al. 2018, 12.
113 Markets Insider 2018.
114 Lewis 2018, 10.
115 Lewis 2018, 10.
116 HLEG 2018, 9.

system, but signals the wish to transform Europe's economy into a "greener", "more resilient" economy and its financial system to be in line with "a more sustainable world"[117].

The proposal regarding investors' duties suggests that when defining sustainable investments, a definition of weak sustainability is applied. A sustainable investment can be "any of the following or a combination of any of the following: (i) investments in an economic activity that contributes to an environmental objective, […] (ii) investments in an economic activity that contributes to a social objective, […] (iii) investments in companies following good governance practices"[118]. Any investment that fulfills one of these three conditions will be considered sustainable. Natural capital seems to be substitutable by human or economic capital, and the Constant Natural Capital Rule is not followed[119], because the maintenance of natural capital is not a requirement to this interpretation of a sustainable investment. The application of a definition of weak sustainability opposes the HLEG's recommendations, which state: "It is essential to halt the destruction of natural capital and instead manage it within boundaries that maintain the resilience and stability of natural ecosystems and allow for resources to renew. Breaching the limits of these systems presents risks of severe social, economic and geopolitical consequences"[120]. By defining an investment as sustainable when either one of the sustainable dimensions is considered, the EU disregards this recommendation and the essentiality to protect natural capital.

Despite efforts to reduce GHG emissions, for instance the reform of the EU ETS, the EU is not committing strongly enough to tackle climate change in line with the Paris targets. Therefore, the indicator is mostly not met.

4.7 Disclosure of Material Climate-Related Risks – Indicator 4

Current State

Across EU-jurisdictions, the definition of materiality in regards of non-financial information remains unclear[121]. The NFI Directive states that "information to the extent necessary for an understanding of the undertaking's development, performance, position and impact of its activity" (Article 1, 1) must be disclosed. This wording is found in the implementation acts of many EU countries, with only little guidance on what the

117 EU Action Plan 2018, 2.
118 COM(2018) 354/F1, Art. 2 o i, ii, iii.
119 Döring 2009, 30–31.
120 HLEG 2018, 88.
121 Jeffrey 2017, 4.

"extend necessary" means can be found[122]. This probably leads to inconsistencies in reporting between companies and states[123].

The confusion over materiality prerequisites are further strengthened since for instance, diverging definitions can be found in Germany. The definition of materiality found in German commercial law differs from the definition in frameworks such as the GRI, on which companies rely for a comply and explain basis[124]. Of the Dax-160 countries, 59% use the GRI as a reporting framework, and find themselves confronted with different materiality definitions.

The implementation of the NFI Directive in Germany led to the situation in which no company of the DAX-160 group reported any material net climate risks[125]. German law introduced a dual materiality reservation for non-financial risk reporting (§ 289c III HGB (Germany)), which increases the reporting threshold too far and therefore prevents companies from reporting relevant climate risks. If investors find no risks disclosed in the non-financial statements, they might underestimate the relevant short, medium and long-term risks a company might be facing.

Announced Strategy

The Action Plan does not announce direct activities for redefining materiality in the context of non-financial information, or any other measures for ensuring that climate-related financial information is reported in the financial statement, alongside other material, financial information. In the presence of uncertainties and impediments regarding the definition of material risks, no indications are given on how to consider mid and long-term risks, and as no activities for reducing these uncertainties are mentioned, the indicator is not met.

5 Results and Recommendations

Table 4 Overview on Evaluation Results

Criterion	Indicator	Status	Explanation
Climate and Financially Effective Disclosure	Indicator 1.1: TCFD's Recommendations as a Benchmark	Expected to be met	Currently, the recommendations are considered marginally and mostly in voluntary guidelines. The Action Plan announces measures to align guidelines and NFI directive with the recommendations.
	Indicator 1.2: Material Disclosures Located in Financial	Hardly met	NFI directive suggests disclosing in management report, but in extra "non-financial" statement.

122 Jeffrey 2017, 4.
123 Jeffrey 2017, 2.
124 Behncke/Fink 2018, 33.
125 Behncke/Fink 2018, 58.

	Filings		No changes announced.
Reduction of Policy Imperfections	Indicator 2.1: Multilateral Implementation	Partly met	Disclosure is discussed in most institutions suggested by HLEG. TCFD's recommendations are not yet officially endorsed by EU.
	Indicator 2.2: Timely Implementation	Partly met	Action Plan offers concrete steps which shall be implemented until end of 2019. Date of amendment of NFI directive still open.
Impact on Demand Side and Supply Side	Indicator 3.1: Long-term Strategy with Science-based targets	Hardly met	Science-based targets are not part of the NFI directive and only indirectly mentioned by the Action Plan.
	Indicator 3.2: Expanded Fiduciary Duty	Expectedto be met	Expected to be met, if proposal concerning the extension of institutional investors duties is adopted in 2019.
	Indicator 3.3: Governmental Commitment to Climate Mitigation	MHardly met	Application of weak sustainability definition, climate targets not in line with lower than 2°C pathway and might still not be met. Commitment to transform financial system weaker than recommended by HLEG.
Clear Definition of Material Climate-related Risks	Indicator 4.: Disclosure of Material Climate-related Risks	Not met	Material financial information needs to be disclosed in financial filings, but no definition of material financial climate-related information and not clear where to disclose future-oriented material climate-related information.

When applying the chosen indicators, none of the criteria are fully met. The indicators currently evaluated as most likely to be met are 1.1 *TCFD's recommendations as a benchmark* and indicator and 3.2 *Consideration of climate-related risks on companies as fiduciary duty*. Indicator 1.1 is likely to be met in future, after the Action Plan announcement that the TCFD's recommendations shall be considered in the guideline's revision and because the NFI Directive will undergo a fitness check. Indicator 3.2 is ranked at the same level, as a regulation proposal to expand the current understanding of fiduciary duty has already been published and likely to be enforced in near future.

Only one indicator is not met at all, which can be interpreted as a signal that the EU is on the way to improving its climate-related financial disclosure strategy. This impression is strengthened, when recognizing the difference between the current state and the announcements regarding the future state. Evaluation results of the current state alone would have been far worse than the combination between current and future state. This underlines how some crucial improvements to the EU climate-related financial disclosure strategy are announced in the Action Plan, such as the introduction of more effective disclosure guidelines.

Regarding the first criterion *Climate- and financially effective disclosure*, it can be concluded that the climate-related disclosure requirements of the EU are quite weak. They are neither climate nor financially effective, as they are not required to be in the financial filings, they do not need to be future-oriented and are not based on scientific targets. However, the disclosure requirements are likely to be improved in future.

The second criterion *Reduction of Policy Imperfection* is partly fulfilled, as climate-related financial disclosures are considered internationally, and the EU seems to be pursuing a cooperation with China to further strengthen the international standing of climate-related financial disclosures. By announcing many concrete action points to be implemented by the end of 2019, the European Commission seems to be pushing for a speedy implementation of announced measures. As both indicators are partly met, it is likely that policy imperfections are reduced, again reducing the likelihood of the strategy creating a green paradox.

To use the advantages of climate-related financial disclosure fully to reduce the general likelihood of green paradoxes caused by climate policy (criterion 3), indicators 3.1, 3.2 and 3.3. would need to be met, as they interlink to increase pressure on the supply side to reduce its GHG output and reduce price elasticity of demand regarding fossil fuels. While the EU published a proposal on the expansion of institutional investors' duties regarding the consideration of sustainability criteria, science-based targets have neither been introduced, nor is their introduction planned by the EU, but merely considered indirectly within the TCFD's recommendations. The EU is not keeping up with a well below 2°C mitigation pathway, as clearly demonstrated by its unambitious short- and long-term targets, but also in the price for carbon which is too low for the real economy. Its communication towards sustainability is not as strong as recommended by the HLEG, and by applying a definition of weak sustainability for sustainable investments, it is likely that the pressure on companies to develop an ambitious, forward-looking disclosure strategy will be further reduced.

Criterion 4 *Clear Definition of Material Climate-related Risk* is not met, since, under the current definition uncertainties remain, and the example of the NFI-Directive Implementation in Germany showed that it did not lead to an increase of climate risk disclosure, and no improvements are planned so far.

6 Conclusion

The results of the evaluation of the EU strategy illustrate that it is not effective enough. If the Action Plan were followed ambitiously, the strategy would be more likely to maintain financial stability and to increase climate change mitigation. To be fully effective, the EU needs to ensure that clarity regarding the definition of material climate-related risks for companies and the transparency of their long-term resilience strategies increases. Only if these aspects are disclosed, can there be a possibility of overcoming the tragedy of the horizon with the help of climate-related financial disclosure. To solve the green paradox, a more ambitious climate mitigation policy would be needed, accompanied by an expansion of the concept of investors' duties and by disclosure of science-based targets. Lastly, the EU should follow its announcement on implementing a more regulative disclosure framework, which still ensures sufficient balance.

In a revision, the NFI Directive should be redesigned to follow the TCFD's recommendations and include stress tests to ensure future-orientation and comparability. The Commission should follow the recommendations of the HLEG to align the directive with the TCFDs requirements[126]. It can be concluded that, even though currently climate-related financial disclosure within the EU is not as strategic, forward-looking and detailed as the TCFD's recommendations, it has recognized the need to amend the directive and has announced measures to do so.

The EU should take a lead in transforming the financial system, for instance by mutually enforcing the TCFD's recommendations with China. This could increase the pressure on other nations to introduce mandatory climate-related financial disclosure frameworks and would strongly enhance the effectiveness of disclosures on an international level. Since the international debate on climate-related financial disclosure is not yet part of the UNFCCC climate conferences, including it in the negotiations could be a further measure to ensure that an international reporting framework develops.

Regarding the limits of climate-related financial disclosure, several points can be made. First, the TCFD recommendations lack information on how the financial sector can address climate change in addition to direct climate risks and opportunities. For example, there is no information given on the connection between derivatives or other complex financial products and climate change risks[127].

The analysis of risks and opportunities at company level leaves behind cooperation opportunities essential for development and evolution[128].

Regarding the preceding evaluation, one of its limits is the absence of differentiation between the sectors and varying sizes of companies.

There is still a lack of empirical data which examines the effectiveness of different forms of climate-related financial disclosure. In a rapidly developing field, this is not unexpected. It is just four years since Carney gave the start signal for this new phase of the international debate, but that empirical research is lagging behind is obvious.

Taking into consideration the importance of including demand and supply side in political responses to climate change which focus on the economy, further need for research exists regarding the ability of climate disclosure to dissolve the green paradox.

In combination with the necessary regulation for the real economy, financial disclosures and related fiduciary duties are serious attempts to address the tragedy of the horizon and to use the leverage factor of the

126 HLEG 2018, 24.
127 Weber 2018, 397.
128 Nowak/Sigmund 2000, 21.

financial market for the necessary transformation, aiming to address the mitigation and resilience target of the Paris Agreement.

Climate-related financial disclosure can be seen as a symptom of a change in the financial system, as illustrated by Walker et al.[129]. They describe how, for many, "the financial system is no longer a closed, isolated system; it has evolved into a larger socio-ecological system where finance, social well-being, and planetary health are highly interlinked". The introduction of climate-related financial disclosure can be interpreted as a recognition of the dependency of the financial system on the ecosystem. The EU climate-related financial disclosure was introduced in a combination with disclosure of other sustainability issues. This illustrates that the importance of a social and ecological environment for the financial system is increasingly recognized. This is crucial for ensuring environmental protection, long-term financial stability and sustainable development.

[129] Walker et al. 2018b, 1.

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