LL4F9 DISSERTATION COVER SHEET

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Academic year	2022/23

Course code and title	**LL4F9** **Legal Research and Writing Skills**

Dissertation title	**The Carbon Debt Owed to the Earth":** Are the concept of carbon debt and the attribution of legal personhood for the planet Earth viable legal strategies to boost the carbon credit markets?

Dissertation supervisor	**Veerle Heyvaert**

Word count (maximum 10,000 words)	**0**	**9**	**9**	**4**	**0**

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"The Carbon Debt Owed to the Earth": Are the concept of carbon debt and the attribution of legal personhood for the planet Earth viable legal strategies to boost the carbon credit markets?

1. Introduction

All countries in the world are responsible for the climate change problem. This is because all nations have allowed companies in their territories to release greenhouse gases into the atmosphere. However, some countries are more responsible than others for the very reason that companies in their regions have emitted more CO2. According to the World Resources Institute[1], the United States (US) is the largest emitter, responsible for 16% of the cumulative[2] greenhouse gas (GHG) Emissions, closely followed by China and the European Union (EU), with 15% and 12%, respectively.[3] Developing countries are also responsible for global warming, yet on a much small scale. Therefore, all countries should pay for their emissions, but it is crucial to define how much each country's CO2 "debt" is toward Earth. This article aims to assess whether the concept of carbon debt and the attribution of legal personhood to the Earth are feasible legal strategies to boost the carbon credit markets.

This article is structured as follows. After this introduction, Section two presents the concept of "carbon debt", which is based on the idea that if all countries have emitted GHG, all countries have a carbon debt. The carbon debt concept is then examined under manifold legal perspectives, all driven to increase demand for carbon credits. Section three explores the legal possibility and implications of attributing legal personality to the planet Earth, inaugurating the possibility of having a central legal entity requiring the payment of the carbon debt and registering international carbon credits transactions. In the fourth and final Section, I summarise the findings of the article and contend that the establishment of the concepts of "carbon debt" and the attribution of legal personality to the planet Earth can be viable legal strategies to boost the carbon credit market, leading countries to achieve carbon neutrality.

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[1] Mengpin Ge, Johannes Friedrich and Thomas Damassa, '6 Graphs Explain the World's Top 10 Emitters', (World Resources Institute, 25 Nov 2014)<https://www.wri.org/insights/6-graphs-explain-worlds-top-10-emitters> Accessed on July 16 2023

[2] Ibid Cumulative GHG Emissions from 1990 to 2011.

[3] Discussions of whether it is better to consider the cumulative GHG emissions or per capita GHG emissions will be analysed further.

2. The Carbon Debt

2.1. The Carbon Debt Concept and the Polluter-pay Principle

This dissertation presents a new concept: “carbon debt”. While much has been discussed about carbon credits, almost nothing has been said about the carbon debt. This concept is based on the fact that if all countries have emitted greenhouse gases into the atmosphere, all countries have a carbon debt toward the planet Earth. Considering the polluter-pay Principle, this carbon debt should be paid.

Theoretically, it would be possible to backtrack this calculation from the Industrial Revolution, a hypothesis in which the US and EU would be responsible for more than 50% of the cumulative CO2 Emissions (1850-2011), 27% and 25%, respectively[4]. Considering more recent data, from 1990 to 2011, approximately 50% of the GHG emissions came from the US, China, the EU, and Russian Federation, 16%, 15% and 12%, respectively. Nonetheless, considering that this dissertation aims to deliver solutions aligned with the current legal framework, especially the **Paris Agreement** (Paris)[5], this dissertation suggests that the carbon debt by each country should be measured since 1992 when the **United Nations Framework Convention on Climate Change** (UNFCCC)[6] was signed. Although climate change problems had been discussed well before this date, and the UNFCCC had entered into force only in 1994, since 1992, all signatories' Parties were aware of the climate change problem, and subsequent emissions were made conscious of the harmful consequences for the planet. Moreover, it is sensible to assert that considering the worldwide importance of an international climate change treaty, even countries outside the UNFCCC cannot validly argue that they are unaware of the risks and consequences of emitting GHG.

Procedurally, the carbon debt can be reached in a very straightforward way. Firstly, it is necessary to know how many tons of CO2 have been emitted by each country from 1992 so far. For this purpose, cutting-edge technologies have been developed, such as Richard Heede’s methodology for mapping, quantifying, and tracing cumulative emissions[7]. Secondly, the past GHG emissions should be

[4] Ge, Friedrich and Damassa (n 1).
[5] Paris Agreement [2016] OJ L 282/4.
[6] United Nations Framework Convention on Climate Change [1994] OJ L 33/13.
[7] Richard Heed states that his study “analysis of the historic fossil fuel and cement production records of the 50 leading investor-owned, 31 state-owned, and 9 nation-state producers of oil, natural gas, coal, and cement from as early as 1854 to 2010”. Those methodologies, however, will not be analysed in this dissertation, which will focus on legal solutions to boost the carbon market. For more details, see: Richard Heede, ‘Tracing Anthropogenic Carbon Dioxide and Methane Emissions to Fossil Fuel and Cement Producers’, (2014) V122 (1-2) Climatic change 229 229

transformed into a debt account per country. If the US companies, for instance, had emitted “X” tonnes of CO2 since 1992, and a ton of CO2 is “Y” dollars, to calculate how much the US debt is toward the Planet Earth is required to multiply “X” times “Y” equals the countries’ debt.

This debt should not be paid not in pecuniary money but with carbon credits. This is because the objective is to tackle global warming and not punish the country.[8] Carbon credits are units representing a ton of CO2 avoided or removed from the atmosphere in a real, verified and additional way, and their prices can vary depending on the type and origin. Nevertheless, the amount of GHG emitted remains stable, and on this solid base point, the country’s carbon debt should be estimated.

The carbon debt concept is inspired by the Polluter-pay Principle (PPP). The use of environmental goods, such as the air, creates what economists refer to as externalities. Greenhouse gas is a negative externality arising from producing or consuming goods. Nicolas Sadeleer plays a pivotal role in explaining that the PPP is “an economic rule of cost allocation whose source lies precisely in the theory of externalities. It requires the polluter to take responsibility for the external cost arising from his production”.[9]

Even with the apparent simplicity, the PPP masks several ambiguities. That is because the PPP has gradually shifted from preventing competition distortion to internalising chronic pollution and, finally, as an instrument to guarantee the integral reparation of damages (curative instrument).

The PPP has a “retribution function”, which requires internalising the social cost of pollution. This function has been criticised because, to some extent, it attributes a price to pollution. The criticism comes from the fact that it appears to accept environmental degradation as “inevitable provided that the agent pays: ‘I pay, therefore I pollute’”.[10] By this function, pollution would be just an additional tax to the polluter. It is arguable whether this function should not be tolerable as it perpetuates pollution as long as the price for the pollution is paid.

Another function of the PPP is the “preventive function”, which circumvents some of the criticism outlined above. Under this approach, the PPP should not allow

[8] Article 15, Paris.
[9] Nicolas de Sadeleer, ‘’Environmental Principles: From Political Slogans to Legal Rules (2nd edn, Oxford University Press 2020) 31.
[10] Ibid 43.

pollution. In contrast, it should implement a pollution reduction program by enticing polluters to lower their emissions rather than just paying fines.

The “curative function” of PPP gives one step further by requiring that “instead of simply obliging the polluter to pay for restoration, carried out by the public authorities, it would also ensure that victims could obtain compensation from polluters, including damages resulting from authorised activities”.[11] This dissertation is aligned with the curative function of PPP, by which the planet Earth would claim the carbon debt from countries which should pay for the damage caused by authorised activities. This claim should be “in ratio to the harm they cause”[12], and the victim is the Earth.

Nonetheless, the application of the PPP in climate change attracts many controversies. One of the most acute problems of applying PPP in the climate change problem is that GHGs have been emitted since the Industrial Revolution. Thus, some could argue that current governments, citizens, and companies in industrialised countries should not be liable for past emissions.

As argued by Neumayer[13] and Shue[14], industrialised countries should bear the cost of climate change caused by the ancestors of the people living in the industrialised developed countries.

Simon Caney rejects the proposal made by Neumayer and Shue that the current developed countries should pay for past emissions, arguing that it seems unfair, considering that they are not the actual polluter.[15] Caney, however, overlooks the fact that the current inhabitants of a rich country are not unrelated to the previous generations, as the wealth of the past can influence the present's wealth.[16] This point is borne out by Neumayer, who argues that the industrialised world should acknowledge that a significant portion of its high standard of life is a result of past emissions. Thus, they should not be excused from the responsibility for the adverse side effects that the achievement of a high standard of living unfolded.

This dissertation circumvents this perennial controversy of whether the current governments and citizens should pay for the carbon emission made by past

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[11] Ibid 45.

[12] Anthony Giddens, ‘The Politics of Climate Change’, [2011] Cambridge Polity Press, 79 103.

[13] Neumayer, Eric, ‘In defence of historical accountability for greenhouse gas emissions’ (2000) Vol 33 (2) Ecological economics 185 185.

[14] Henry Shue, 'Subsistence Emissions and Luxury Emissions' (1993) 15 Law & Policy 39 42

[15] Simon Caney ‘Cosmopolitan Justice, Responsibility and Global Climate Change’ (2005) 18 Leiden Journal of International Law 747 756.

[16] ibid 756.

generations. This circumvention is done by establishing a historical moment to define liability. As aforementioned, since 1992, when the UNFCCC was signed, it is unquestionable that global warming has been a knotty problem, carrying dire effects on humankind and the Earth's atmosphere. From this moment forward, all countries were aware of the climate change problem. Thus, from then on, every GHG emission must be accounted for in each country's carbon debt account, and based on the PPP, this debt must be paid.

Conversely, the PPP has been criticised by Simon Caney, who argues that we should apply the "ability to pay" principle instead of the PPP. Caney advocates that the PPP principle should be supplemented by the rule that those in the most advantaged positions should have assigned the duty to grapple with the climate change cost, imposing the primary responsibility to alleviate this problem on the world's wealthiest and affluent part of the globe.[17]

Caney's argument appears reasonable. However, on further reflection, his thesis overlooks the fact that, from a legal certainty perspective, there is no definition or parameter regarding which hypothesis someone could be considered "able to pay". This imprecision could lead to a lack of enforceability and accountability. The concept of wealth is subjective, as is the idea of the ability to pay. The government of China and India, for instance, have under their management a colossal budget, but they also have over a billion people under their responsibility. Are they wealthy countries? The answer is not obvious. In contrast, the concept of "carbon debt" gives much more legal certainty and precision because it is based on objective criteria: the number of tonnes of GHG emitted.

Even so, a further analysis leads to a conclusion that both concepts - the use of the carbon debt concept and the concept of the ability to pay - would lead to a similar result. That is because countries that more have emitted GHGs are also those with the ability to pay, which validates Neumayer and Shue's hypotheses. Nevertheless, the carbon debt concept gives more objectivity to indicate the responsible for the payments.

Notwithstanding, it is arguable whether the carbon debt parameter also has imperfections. For instance, it could be debatable which criteria to use to define the carbon debt, whether it should be the per capita or total GHG emissions. Although

[17] ibid 769.

there is a margin for discussion, both criteria should be used concomitantly and in parallel, preventing rich but not very heavily populated countries from getting free of their responsibilities.

In conclusion, the concept of carbon debt allocates a considerable debt to the developed countries, which should be paid or at least not increased. The developing countries also have carbon debt, although far smaller. This different responsibility is unfolded from a "principle of justice"[18] under the PPP perspective. Under these concepts, this dissertation will construct many legal arguments to enhance the carbon markets.

2.2. Carbon debt and the need to close the carbon gap

The difference between the amount of GHG released into the atmosphere from developed and developing countries is colossal, and this difference generates a "carbon gap", which is one of the origins of the standard of living gap in the world. From a justice perspective, this "carbon gap" must be reduced ethically. This reduction should be done through massive carbon credit purchasing from developed countries.

Climate change is a global problem that can only be tackled with the cooperation of all countries, especially the major emitters. As Christina Voigt and Felipe Ferreira labelled, climate change presents some features of a "global common problem" as it affects the planet as a whole, and no single state "has the capacity to single-handedly achieve effective mitigation".[19] Going one step further, considering that reducing emissions can harm the country's economy regarding Gross Domestic Product (GDP), the countries do not have incentives to reduce their emission unless other countries also take action. Global cooperation can only be achieved if all countries consider the proposed solution fair.

Carbon emissions can be associated with economic growth, and an emission restriction can be detrimental to economic development at first glance. Unquestionably, it would be unfair to require underprivileged countries, where people are living in misery and facing hunger, to bear the cost of addressing climate change while the affluent societies in the northern hemisphere live in an astonishingly high standard of living and

[18] Giddens (n 12) 105.

[19] Christina Voigt and Felipe Ferreira, 'Dynamic Differentiation': The Principles of CBDR-RC, Progression and Highest Possible Ambition in the Paris Agreement' (2016) 5 Transnational Environmental Law 285 287.

release enormous amounts of GHGs. That is why Henry Shue states that emissions from developing countries should increase to the level that those additions GHG emissions "provide a minimally decent standard of living".[20] It is not reasonable to require misery people to reduce their emissions while wealthy countries keep emitting or making not ambitious contributions. Shue ideas seem to be fully aligned with the idea of closing the carbon gap: "any strategy of maintaining affluence for some people by keeping other people at or below subsistence is, I take it, patently unfair because so extraordinarily unequal – intolerable unequal".[21]

By the same token, Anthony Giddens develops the concept of "development imperative"[22], by which developing countries have the right to become more prosperous. The rationale is that developed countries have the right to continue growing. Still, the need for development is much less urgent than for developing countries, considering that they already achieved some equilibrium, albeit a dynamic one. Giddens concludes that developed countries must promote significant and intense cuts in their GHG right now. In contrast, "developing nations can increase their emissions for a period to permit growth, after which they must begin to reduce them".[23] Under Paris (Article 2.1), the parties agreed on establishing a collective budget for future emissions with a cap of "well below 2ºC above pre-industrial levels". This tiny buffer should be used primarily by developing countries, not by wealthy ones, thereby reducing the carbon gap. A crucial stage has been reached regarding climate change, and only a few more tonnes of GHG will be admitted under Paris. These last emissions should be allowed to the poorest part of the globe to progress, permitting them to get out of extreme poverty.

Shue and Giddens' reasoning is very much in line with the concept of "carbon debt". If all countries have emitted GHG, all countries have a "carbon debt", but industrialised countries have much more colossal debt than developing countries. Thus, developed countries must reduce their emissions as fast as possible, while developing countries should try to reduce their emission provided that it does not restrict their possibility of achieving a minimal standard of living.

This concept is related to Eric Neumayer's ideas, who developed the concept of "Historical Emission Debt" of a country, by which the big emitters of the past should

[20] Shue (n 14) 42.
[21] Ibid 42.
[22] Giddens (n 12) 98.
[23] Ibid 99.

take on the most significant reductions in emissions in the future, “as the accumulation of greenhouse gases in the atmosphere is mostly their responsibility, and the absorptive capacity of nature is equally allocated to all human beings no matter when or where they live”.[24] Therefore, the “carbon gap” between developed and developing countries must be reduced ethically. This concept directly relates to Giddens, who argues that while industrialised countries should immediately make drastic GHG emissions reductions, developing still need to increase their GHG emissions, allowing them to achieve a minimum level of development. In the future, “[t]he two groups of countries will then progressively converge”.[25]

In summary, developing countries should be authorised to increase their “carbon debt” in the amount required to achieve a minimal standard of living. On the other hand, developed countries should restrict their emissions drastically, preventing the increase of their “carbon debt” and, as a result, avoiding the enlargement of the “carbon gap”. Where emission avoidance is not possible, developed countries must immediately offset their emissions through massive carbon credits purchases, avoiding enlarging the carbon gap. The need to buy carbon credit to prevent the growth of the carbon gap will create demand, boosting the carbon credit market.

2.3. Carbon debt as a tool to improve the insufficient concept of NDCs

One of the main concepts of Paris is the NDCs, which are the carbon reduction pledges made by the Parties of Paris. The problem with the NDCs concept is the lack of criteria to define the NDC's ambition at the state level. This lack of standards makes the NDC concept deficient and loose. This section of the dissertation aims to demonstrate how the idea of carbon debt can provide a more objective parameter for defining the NDC.

In the current literature, Alexander Zahar is unique in drawing attention to the deficient NDC concept. According to him, Paris stated two categories of obligations. First, there is an individual state obligation at the state level, which he defines as the S-Ambition (State-Ambition). Second, there is a collective obligation at the treaty level:

[24] Neumayer (n 13) 185.
[25] Giddens (n 12) 99.

T-ambition (Treaty-Ambition). The T-Ambition is to keep global warming well below 2ºC, but no clear guidance exists for the S-ambition.[26]

Under Paris, there are many individual State binding obligations, such as: i) to "prepare, communicate and maintain successive nationally determined contributions that it intents to achieve" (art. 4.2); ii) [e]ach Party's successive nationally determined contribution will represent a progression beyond the Party's current nationally determined contribution and reflect the highest possible ambition (Art. 4.3); c) "[e]ach Party shall communicate a nationally determined contribution every five years (Art. 4.9); d) each Party should report accurately (art. 4.13), etc. On the other hand, Paris does not provide a systematic and holistic mechanism to guarantee that the consortium of States will reach the objective of keeping global warming well below 2ºC.

Examining Paris holistically, it is clear that the majority of the individual obligations are procedural in nature, aiming to achieve transparency in State actions. Even the obligation to define an NDC, which is not procedural, but a substantial obligation, requires only the obligation to "declare" its ambition. The concept of highest possible ambition (art. 4.3) can be whatever a state decides it should be, as "the treaty does not define this term and does not provide for any process to revel, rationalise, debate, standardise, or otherwise inform the determination of a state's ambition".[27]

What is clear is that the wording of Paris was crafted to guarantee that only some provisions could be characterised as legally binding obligations, a hypothesis where verbs like "shall" were applied. In contrast, other provisions were drafted to prevent mandatory obligations, a hypothesis that verbs such as "will" or "recognise" were used.[28]

With regard to the NDCs definition, it was drafted deliberately loose. Because of this, some experts advocate that an individual mechanism should be created to make clear how to define or establish a fair NDC[29]. However, creating clear guidance for the NDC could be against the "spirit" of Paris, which is to get free of binding mitigation reductions. Conversely, getting the NDC definition free of guidance or parameters is systematically deficient, allowing unfair or rhetorical ambitions NDCs.

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[26] Alexander Zahar, 'Collective obligation and individual ambition in the Paris Agreement' (2020) 9:1 Transnational Environmental Law 165 168.
[27] Ibid 169.
[28] Robert Falkner, 'The Paris Agreement and the new logic of international climate politics' (2016) 92 International Affairs 1107 1117.
[29] Zahar (n 26) 181.

Alexander Zahar maintains that an agreed formula should be established as a starting point, notwithstanding negotiations should be able to moderate the formulaic results. Paris, though, does not provide such a mechanism. To address this problem, Zahar supports the idea that the Global Stocktake (art. 14) could be used, as explained further.[30]

National states, especially the developed ones, have routinely avoided the concept of NDC individualisation. In 2014, at COP-20, the Lima Call for Climate Action invited each Member State to explain why their NDCs are fair and ambitious.[31] The objective was to encourage the states to justify their ambitions. Nevertheless, many States have avoided disclosing the rationale behind their NDC. This avoidance results from a predilection to retain the detail of the reasonings to themselves "because they do not want to be impugned for failing to consider relevant criteria – or because they do not actually know how to justify ambition claims".[32] The most problematic consequence of this resistance is that it creates an obstacle to achieving the collective goal of keeping global warming well below 2ºC. That is because the Parties of Paris have a collective target reduction, which only can be achieved if all parties collaborate in their highest possible ambitions. Still, no definition or parameter exists to determine whether a given party's NDC is fair or adequate.

It is misguided to think that the non-binding characteristic of the NDC can be calculated arbitrarily or unfairly. After Zahar had examined the content of the state reports submitted, he noticed that most NDCs declarations merely asserted that the "proposed mitigation targets and actions are ambitious, or constitutes a fair contribution, most such claims are purely assertive and quickly move on to other matters".[33] Each state defines its NCD as completely disconnected, uncoordinated, and independent from the other states. This practice results in isolationism, as one state's practice is completely divorced from the practice of the other states.

The disconnection between the collective target to keep global warming well below 2ºC and the collective contributions made by the Parties of Paris will be assessed in 2023, through the mechanism established in Article 14, the so-called Global Stocktake. By this mechanism, experts will assess the collective progress

[30] ibid 182.
[31] Decision 1/CP.20, 'Lima Call for Climate Action' (14 Dec. 2014), UN Doc. FCCC/CP/2014/10/Add.1, para. 14.
[32] Zahar (n 26) 182.
[33] ibid 182.

toward implementing the Paris Agreement and how far (or not) the planet is from the "well below 2ºC". Yet, the wording of Article 14 does not establish any obligation to assess the S-ambition, which is the individual progression.

Notwithstanding, Alexander Zahar supports the opinion that the Paris Rulebook decision about the "global stocktake" is ambiguous, allowing the interpretation that the global stock could play the role of the individual forum.[34] His point is that if the objective of the global stocktake is to provide information to the Paris parties, it is mandatory to promote a comparative assessment of the state-level effort.

Although Zahar developed a fair and well-meant rationale, he overlooks the fact that the developed countries prefer to avoid creating clear individual targets, even if they are not binding as there are the NDCs. The transition from the Kyoto Protocol to the Paris Agreement proves that powerful countries cannot be forced into drastic emissions cuts.[35] As explained by Falkner, one of the main reasons why the US did not ratify the Kyoto Protocol was the reluctance to tie themselves into a legally binding mitigation reduction.[36]

Although the major developed industrialised countries cannot be legally forced under Paris to solve the climate problem they created, the disclosure of the carbon debt, state-by-state, could provide a more objective parameter for the definition of the NDC, functioning as a soft-law mechanism. From a justice perspective, the greater the carbon debt, the more ambitious the NDCs should be. These comparations should be made through a blended approach considering overall carbon emission per country and per-capita carbon emission. The top emitters on both criteria should be under constant spotlight.

The carbon debt concept, therefore, can be a powerful tool for comparations of the fairness and adequacy of the NDCs, improving the legal framework of the Paris Agreement, which promotes the enhancement of the carbon market.

2.4. Carbon debt and naming-and-shaming strategies

Naming-and-shaming strategies are a workable solution to address problems like climate change. That is because, under Paris, the mitigation reduction pledges are

[34] ibid 186.
[35] Falkner (n 28) 1008.
[36] Ibid 1119.

non-binding. However, this freedom can lead a nation to release an evident unambitious NDC to meet its carbon debt. In that case, peer pressure from other countries and civil society is expected to increase. In this context, a blended approach of naming-and-shaming strategies with the idea of carbon debt can boost the States' commitment to release more ambitious NDCs, especially in the case of developed industrialised countries.

There are three ways by which the naming-and-shaming strategies can operate. The first is based on other states' peer pressure. The second is civil society's peer pressure. A third methodology of naming-and-shaming is unfolded by the concept of "carbon debt", as I will analyse next.

Concerning peer pressure from other states, under Article 4.9 Paris, each Party shall communicate its NDC every five years and be informed of the outcomes of the global stocktake. This global stocktake will likely create peer pressure on the treaty's Parties. Therefore, this disclosure clarifies which treaty parties "have delivered their pledges and whether new and more ambitious pledges are needed to meet the temperature target"[37]. Thus, this review mechanism is expected to "create regular moments for naming-and-shaming strategies to deployed against those countries that fall short of the international expectations".[38] As already mentioned, in a legal context where the NDCs are not binding, self-determined, and the compliance regime is based on a non-punitive and non-adversarial approach, "international review and peer pressure will be the main multilateral tools for parties to strengthen the credibility of their pledges".[39] A growing number of countries are expected to fulfil their pledges, creating a positive spiral strengthening, and the naming-and-shaming strategy will impose their strength over those that fail to achieve their target.

Two kinds of critics can be raised against this point. First, if many countries fail to achieve their NDCs, the naming-and-shaming strategy will fail, and a negative spiral weakening could occur. The second criticism is that some countries do not care about the negative reputational consequences of their misbehaviour toward the environment. The US, for instance, refused to ratify the Kyoto Protocol. Under President Donald Trump's administration, the US withdrew from the Paris Agreement, only rejoining after

[37] Ibid 1121.
[38] Ibid 1121.
[39] Ibid 1121.

the election of President Joe Biden in 2020[40]. What is more, after the Copenhagen Conference in 2009 and intense peer pressure from other countries over China and India to commit themselves to mitigation targets, they prevailed in resisting binding commitments.

Although the limitations outlined above, naming-and-shaming strategies are still the best alternative in a non-binding legal context. That is because dire extreme environmental events have been observed all over the planet, and it is expected that the climate change problem will remain at the top of the agenda in the future. Furthermore, under Paris, the NDC are not binding, and there is no prospect of a return to binding commitments in a Kyoto Protocol style. In this context, it seems sensible to assert that naming-and-shaming strategies are the leading strategies to deal with climate change and push countries to lofty ambitions.

The second way the naming-and-shaming strategy can operate is through peer pressure from civil society. This pressure works predominantly in two moments: when the NDCs are released and when it is assessed if the NDCs were successfully achieved. This pressure comes from domestic and international civil societies, such as Non-Governmental Organizations (NGOs). It is expected that, as in other contexts, civil society will play a role in monitoring the NDC's achievements, applying naming-and-shaming strategies over those who fail to reach their targets, as well as over those that release evident non-ambition targets.[41]

A criticism of the peer pressure from civil society is that whereas it can work reasonably well in democratic societies, it overlooks the fact that these NGOs cannot properly develop their functions in autocratic societies.[42] Even in democratic countries, if the country has a vast territory, the level of autonomy of an NGO can vary depending on the region. In Brazil, for instance, an NGO operating in the middle of the Amazon Forest has much narrower independency than those operating in urban areas. There have been reported cases of assassination of NGO leaders by loggers and land grabbers.[43] Although the limitation of peer pressure from civil society, the international

[40] Oliver Milman, 'Biden returns US to Paris climate accord hours after becoming president' (The Guardian 20 January 2021) <https://www.theguardian.com/environment/2021/jan/20/paris-climate-accord-joe-biden-returns-us> Accessed 20 July 2023.

[41] Christopher L. Pallas and Johannes Urpelainen, 'NGO monitoring and the legitimacy of international cooperation: a strategic analysis' (2012) 7.1 *Review of International Organizations* 1 1.

[42] Falkner (n 28) 1123.

[43] Sue Branford, 'Deaths of Phillips and Pereira shine light on a region of the Amazon beset by violence' (Mongabay, 16 June 2022) <https://news.mongabay.com/2022/06/death-of-phillips-and-pereira-shine-a-light-on-a-region-beset-by-violence/> Accessed 20 July 2023.

NGOs have played a crucial role, substituting the weak function developed by local NGOs and domestic society[44].

A third method of naming-and-shaming strategy works by comparing the NDCs and the country's carbon debt. As already said, some countries have been emitting loads of GHG since the Industrial Revolution. If all those emissions were considered, their carbon debt could be enormous. All countries should pay for their carbon debt, but developed and industrialised countries will have more considerable debt. Developing countries also have a carbon debt toward the Earth, but their carbon debt is much smaller than the wealthy developed countries. Therefore, the concept of carbon debt can operate as an objective parameter for defining the NDC.

All countries should play a concomitant two-level game. They should achieve carbon neutrality and pay their carbon debt as soon as possible. In line with Paris, developed countries should reach carbon neutrality as quickly as possible, taking the lead by undertaking economy-wide absolute reduction targets. Developing countries should also continue enhancing their mitigation efforts and be encouraged to move toward economy-wide emission reductions or limitation targets over time in light of different national circumstances (Paris, art. 4.4). Hence, the NDCs of developed countries should be designed considering that they already have a considerable carbon debt, and developing countries should preferentially use the remaining buffer for GHG emissions allowed by Paris.

The US, the EU, China, Russian Republic, among others, are the countries that have more emitted GHG into the atmosphere. After disclosing the carbon debt of these countries, the second step should be multiplying it by the current market price of the carbon credit, disclosing the carbon debt of each wealthy country. The creditor, in turn, should be the planet Earth as a legal entity, a point that will be analysed further in this dissertation. Wealthy countries should achieve carbon neutrality as soon as possible; otherwise, their carbon debt will increase even more, enlarging the carbon gap. Cap-and-trade systems must be applied, but this mechanism can only reduce the amount of carbon emission year by year; it does not prevent GHG emissions from occurring. Only when a country reaches carbon neutrality, its carbon debt will stop increasing.

The countries have two options. First, they can still be emitting GHG until they achieve carbon neutrality, a hypothesis in which they are still increasing their carbon

[44] Amanda Murdie and Johannes Urpelainen, 'Why pick on us? Environmental INGOs and state shaming as a strategic substitute' (2015) 63.2 Political Studies 353 372.

debt yearly. Secondly, they can offset the emission they cannot avoid by buying carbon credits, preventing the increase of their carbon debt.

Whatever approach is taken, disclosing the carbon debt gap between developed and developing countries is beneficial. It will create peer pressure, enhancing the naming-and-shaming strategies over the major emitters, pushing them to more ambitious NDC and driving them to offset the emissions that cannot be avoided by purchasing carbon credits, boosting the carbon markets.

3. The Earth as a legal entity

3.1. The legal possibility of attributing legal personality to the planet Earth

Once established the concept of carbon debt, it is the moment to define who the creditor is. This dissertation argues that it is legally possible to attribute legal personality to the Earth, which can require the settlement of the carbon debt due by the countries.

This point was inspired by the seminal article of Christopher D. Stone, who argued that it is not unusual that when the legal system attributes legal rights to a new "entity", the proposal can be considered "odd or frightening or laughable".[45] This is because "until the rightless *thing* receives its rights, we cannot see it as anything but a *thing* for the use of 'us' – those who are holding rights at the time".[46]

To demonstrate this point, Stone traces the cases of black people, Jews, women, etc., who were considered rightless in specific contexts and up to a certain point in the evolution of the civilisations. A crucial stage has been reached in climate change. It now is the time to give a new step in our evolution and attribute legal personality to the Earth as an independent entity with its own rights, especially the right to protect its atmosphere.

Francisco Carnelutti explains that legal personality is unfolded where there is a collective interest aiming to act as one unique entity. This phenomenon erupts into the economic and legal conditions required to create a legally independent entity. Therefore, the legal personality is a way to protect a collective interest.[47] In the case of climate change most human beings on this planet are concerned or affected by the

[45] Christopher D Stone, 'Should Trees Have Standing? Toward Legal Rights for Natural Objects' (1972) 45 Southern California Law Review 450 455.
[46] ibid 455
[47] Francisco Carnelutti, 'General Theory of Law' [1995] Private Law Publisher 153 155.

dire consequences of climate change. Thus, there is a collective interest in creating a global legal entity that aims to protect itself from the major emitters.

Notably, the fact that the Earth cannot speak is irrelevant to the attribution of legal personality. As Stone explains, "[c]orporations cannot speak either; nor can states, estates, infants, incompetents, municipalities or universities"[48]. In all these cases, someone else will speak for them.

The definition of a representant to act on behalf of the Earth is paramount. It is sensible to sustain that the protection of the Earth should be done in the same way that it is done in the case of legally incompetent persons– for example, human beings who have become incapable. In this case, someone else should represent the incompetent person. As pointed out by Stone, even corporations can become incompetent when bankrupted, a hypothesis in which a court will appoint a trustee. Stone suggests that "we should have a system in which, when a friend of a natural object perceives it to be endangered, he can apply to a court for the creation of a guardianship.[49]

Susana Borras maintains that human beings should act as "trustees of the Earth rather than being mere stewards".[50] Stellina Jolly and K.S. Roshan Menon highlight, nevertheless, that the guardian should have a manifested and unflagging dedication to the environment to be an appropriate representative of the interests of nature.[51] By the same token, someone will have to represent the Earth and act on behalf[52] of it, requiring the countries to amortise their carbon debt.

The question of who would represent Earth can be answered in at least two manners. From a traditional perspective, this attribution should be guided by international bodies such as the United Nations. Nonetheless, from a transnational law perspective, NGOs and other private and public entities with indisputable reputations in environmental affairs also could take the lead and act on behalf of the Earth. Although the traditional international approach attracts more international legitimacy, it can be dogged by bureaucracies and political gridlocks. On the other hand, in a more modern approach, Transnational law represents "the expression of a desire to

[48] Stone (n 45) 464
[49] ibid 464
[50] Susana Borras, 'New Transitions from Human Rights to the Environment to the Rights of Nature' (2016) 5(1) *Transnational Environmental Law* 113 114
[51] Stellina Jolly and K.S. Roshan Menon, 'Of Ebbs and Flows: Understanding the Legal Consequences of Granting Personhood to Natural Entities in India' (2021) 10(3) Transnational Environmental Law 467 483.
[52] Borras (n 50) 129.

challenge and transcend the mainstream organization of law, which imposes a rigid, binary division of law into either national law or international law".[53] Notably, this binary division should not be considered an intrinsic characteristic of the legal system. Previously the Enlightenment Era, for instance, commercial relationships were ruled by the *lex mercatoria*, a non-state law free of geographic borders[54]. Moreover, an exciting approach was adopted by the Constitution of Ecuador, which "allows a citizen or group to present a case before the Constitutional Court of Ecuador in respect of a violation that (…) affects the Earth as a whole"[55]. Yet, this dissertation will not analyse the transnational environmental law nor the Constitutional Court of Ecuador. That is because transnational law is a vast topic that would deserve a specific essay to be explored in detail. The only point that must be established here is that there is no legal impediment to the attribution of legal personality to the planet Earth.

The attribution of rights to nature to the Earth does not mean, though, that the environment will have the same rights as human beings or that humans cannot inflict any harm on the environment. Bearing this limitation in mind, Stone said, "to say that the nature environment should have rights is not to say anything silly as that no one should be allowed to cut down a tree".[56] For the purpose of this thesis, the attribution of legal personality to the planet Earth does not mean that any GHG can be emitted into the atmosphere. Defending such a radical point of view in favour of protecting the environment could lead to an opposing result, which is a dearth of protection of the environment.

The rights of nature thesis are built under the premise that it requires a transition from an anthropocentric approach to a biocentric one. Traditionally, environmental protection is based on an anthropocentric approach, by which the environment is protected for the benefit, enjoyment, and dignity of human beings. This is because the idea of rights is based on the anthropocentric notion of property, which requires the superiority of the human being over the environment. As a result, the atmosphere is protected not because they have their intrinsic value but because they benefit human beings.

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[53] Veerle Heyvaert and Leslie-Anne Duvic-Paoli, 'Research Handbook on Transnational Environmental Law' [2020] Edward Elgar Publishing 2 3.

[54] For a critical view in relation to transnational law, we recommend the following text: Olaf Dilling and Till Markus 'The Transnationalisation of Environmental Law' (2018) 30 Journal of Environmental Law 179.

[55] Borras (n 50) 140.

[56] Stone (n 45) 457.

Under a “biocentric approach”, nature becomes not the object of protection but a subject of rights. It is noteworthy that “the recognition of a right of nature represents an integrated, holistic view of all life and all ecosystems”.[57] As a result, every form of life has the right to exist, continue, preserve, and replenish its life cycles. Although seemingly bold, the right of nature theory is not an untested or novel theory. The United States, Bolivia, Colombia, Ecuador, and New Zealand are examples of countries where the rights of nature have already been applied. In some cases, the rights of nature are deemed a constitutional right (Ecuador[58]), while in others, they are introduced through legislation (the US[59], Bolivia[60] and New Zealand[61]).

Attributing the recognition of the rights of nature cannot only protect the environment but also save human beings from the catastrophic consequences of climate change. That is because by providing tools for the Earth to defend itself from uncontrolled emission of greenhouse gases, human beings are not protecting only the environment but themselves. Humans should remember that they are also part of the environment. Climate change can cause death, floods, heat waves, wildfire, food insecurity, water insecurity, migration, etc.[62] All these consequences will directly affect human beings themselves. Humans have the terrible habit of considering themselves as not part of nature, but we are, holistically and inseparably. Nature is not a third party; we are part of nature intrinsically.

Once created, Earth should be authorised to require countries to “pay” their carbon debt. As aforementioned, this payment should not be made in pecuniary currency but in carbon credits. That is because the objective here is not to make this new legal entity richer but to hold the increase in the global average temperature to well below 2ºC above pre-industrial level. Money, nevertheless, will be needed to buy the carbon credits.

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[57] Borras (n 50) 129.
[58] Ibid 136.
[59] “More than 24 towns and cities in the US have implemented ordinances that arguably are premised upon the rights of nature”. See Borras (50) 137.
[60] Borras (50) 135.
[61] See David Boyd, ‘The Rights of Nature: A Legal Revolution That Could Save the World’ (ECW Press 2017) 171 and Katherine Sanders, ‘Beyond Human Ownership? Property, Power and Legal Personality for Nature’ (2018) 30.2 Journal of Environmental Law 207 211.
[62] Climate change: a threat to human wellbeing and health of the planet. Taking action now can secure our future (IPCC, Berlin 28 Feb 2022) <https://www.ipcc.ch/2022/02/28/pr-wgii-ar6/> Accessed 20 July 2023

In a nutshell, there are no legal impediments to the attribution of legal personality for the Earth. A centralised legal entity requiring countries to pay their carbon debt in carbon credits could remarkably boost the carbon market.

3.2. Planet Earth as a legal entity and litigation change litigation

The attribution of legal personhood for the Earth opens a new greenfield for climate change litigation. This section argues that the Earth could bring action against countries requiring them to compensate their carbon debt through carbon credits.[63]

Experts in climate change litigation have asserted that although the first wave of climate change litigation had partially failed, struggling with complex legal issues such as prove of causation, proof of harm and standing, a new context is now open. A new wave of climate change litigation has benefited from breakthrough scientific innovations, a change in the legal discourse and the institutional context.[64] These changes can contribute to both private and public climate change litigation.

From the scientific perspective, a growing resilience of climate science has been observed, mainly based on the Intergovernmental Panel on Climate Change (IPCC) studies. In the *Urgenda* case, "courts in civil law jurisdictions are willing to embrace the IPCC assessment reports as incontrovertible evidence of climate change as a serious humanitarian and planetary threat".[65] Concerning private climate change litigation, science has also played a paramount role in quantifying businesses' historical emissions. In the *Lliuya v RWE* case[66], based on scientific evidence, the German Court held the company liable for the floodings occurring in Peru. Based on partial causation, RWE was considered a co-contributor to climate change[67].

Furthermore, a change in the legal discourse has been observed. The proof of causation has always been a burdensome obstacle for climate change litigation. However, inspired by the tobacco and asbestos precedents, where the troublesome proof of causation was circumvented, similar flexibilisation is expected concerning

[63] This essay is focused on climate change litigation having the countries as defends, seeking restitution of the carbon debt, but there are no restrictions of having the Earth as a claimant applying for damages in respect of private companies as well. Private climate litigation, however, will not be the focus of the analysis in this dissertation.

[64] Geetanjali Ganguly, Joana Setzer and Veerle Heyvaert, 'If at First You Don't Succeed: Suing Corporations for Climate Change' (2018) 38(4) Oxford Journal of Legal Studies 841 868.

[65] Ganguly (n 64) 851.

[66] *Lliuya v RWE* [2018] Essen Regional Court Case No. 2 O 285/15

[67] Ganguly (n 64) 855

climate change litigation by adopting the concept of partial causation[68]. Having the Earth as the plaintiff and countries as a defendant can make it even easier to seek compensation. That is because there is no need to demonstrate the causal link between carbon emission and specific damage. The simple fact that GHG is being emitted is enough to seek carbon credit compensation.

Moreover, there is also an institutional and constitutional change running. Many countries have incorporated environmental protection as a fundamental right, and it is observed a rise of transnational judicial networks. The *Urgenda*[69] and *Leghari*[70] decisions are unquestionable proof of this change, especially in the case of public climate litigation.[71]

In the Urgenda case, the Dutch Supreme Court held that the Dutch State fell short of its duty of care under tort law to protect its inhabitants and their human rights responsibilities. Therefore, the court considered the established 19% emission reduction target insufficient and raised it to 25%. This decision was based not only on the duty of care of the Duty Civil Code but also on the European Convention of Human Rights[72], Article 2 (Right to life) and Article 8 (Right to privacy and enjoyment of the home) and the IPCC report. Similarly, in "the Leghari case, the Lahore High Court determined that the national government's delay in implementing Pakistan's climate policy constituted a breach of the country's human rights obligations".[73] These two cases had a transnational impact and are paramount for comprehending the international context.

On further reflection, it is noteworthy that the plaintiff in *Urgenda* was an NGO, which carries much less legitimacy than the Earth as a legal entity to litigate climate change. Plus, although the concept of carbon debt is new, it is constructed over a well-established idea of credit and debt, making its comprehension and application more accessible to the courts. It is odd to think that if a citizen had his car hit by a police car, the legal system is well-designed to consider it a state's debt, allowing this citizen to seek damage against the state. In contrast, the legal system does not design any

[68] ibid 855

[69] Stichting Urgenda v Government of the Netherlands [2015] Dutch Supreme Court No. 19/00135 ECLI:NL:HR:2019:2006 [2019]

[70] Ashgar Leghari v Federation of Pakistan [2015] Lahore High Court Green Bench [2015] WP No 25501

[71] Ganguly (n 64) 861.

[72] Convention for the Protection of Human Rights and Fundamental Freedoms (European Convention on Human Rights, as amended) [1950].

[73] Ganguly (n 64) 844.

mechanism for the payment of the carbon debt. This dissertation supports that there are no legal obstacles to allowing the planet Earth seeks the payment of the carbon debt; what is needed is a mindset shift.

Theoretically, these claims can be based on both anthropocentric or ecocentric approaches. Adopting an anthropocentric approach, this claim could be based on the concept of the environment as a human right. Adopting an ecocentric approach, the Earth should be considered the owner of its rights. From the anthropocentric approach, the protection of the Earth's atmosphere aims to protect the environment for the benefit of humans, while from the ecocentric approach, the protection of the Earth's atmosphere seeks to defend the Earth itself from whoever damages it. Although these different viewpoints, both lead to the same direction, the protection of the atmosphere. Therefore, whatever approach is adopted, both authorised the Earth to claim the payment of the carbon debt.

Furthermore, it seems sensible to concede the Earth the right to sue countries not only to pay their carbon debt but also to seek an injunction to require them to include in their public budgets a percentage for the massive purchase of carbon credits. While countries like the US and China have invested US$750.00 and $237.00 Billion in military expenditure per year (data from 2023), the entire regulated carbon market roughly has a market value of only US$ 100 Billion.[74] These figures demonstrate how climate change has been undervalued.

Notwithstanding, opponents to this rationale could argue that this kind of action would be unacceptable as it could violate the separation of powers between the government and the judiciary. Plus, they could say that the definition of the public budget is a political question which courts cannot examine.[75]

As a matter of fact, it would be simple and less controversial if the Parliament included this obligation in the public budget. However, it had not occurred so far, and it is unlikely that it would happen. The inaction of the elective representative should not lead to judicial inaction. This dissertation acknowledges that the thesis developed here

[74] McKinsey & Company, "Putting carbon markets to work on the path to net zero: How investors can help decarbonise the economy and manage risk-adjusted returns" (McKinsey&Company, October 2021) <https://www.mckinsey.com/capabilities/sustainability/our-insights/putting-carbon-markets-to-work-on-thepath-to-net-zero> Accessed 30 November 2022.

[75] There are precedents in the US that have denied access to an environmental claim based on the "political question doctrine": "Under American constitutional law, the political question doctrine prescribes that courts can exclusively adjudicate on questions of law, which are deemed justiciable. Therefore, courts will generally refrain from adjudicating questions that are inherently political". Ganguly (n 64) 848.

is audacious and will face some challenges. Nonetheless, the Earth is facing dire and unpredictable climate change phenomena, which can cause destruction and death of people. These events will pressure the courts for more progressive and bold decisions because preventing climate change is not an option but a need for humankind. For this reason, the study of law is considered a human science. That is because the law is influenced by society, and society influences the interpretations by the courts. The comprehension of this cyclical and intrinsic process is pivotal in hermeneutics and the interpretation of the law.

Finally, the simple fact of the Earth as a legal entity demands the carbon debt payment can raise awareness and push the countries toward more ambitious NDCs. That is because the higher the NDC, the lower the carbon debt's growth. Emissions not avoided will, as a result, increase the carbon debt. This is particularly serious in the case of developed countries, as it increases the carbon gap. Thus, the Earth could focus on these cases to concentrate their claims.

To sum up, it is expected that climate change litigation with the Earth as the plaintiff, claiming the payment of the carbon debt through carbon credits, can boost the carbon credit market.

3.3. The Earth as a central registry clearinghouse to avoid double-counting

One of the main concerns about international carbon trading is the risk of double counting. Establishing the Earth as a central registry clearinghouse for international trading could help alleviate this thorny issue, enhancing legal certainty.

There are a great variety of emission trading mechanisms. Still, it is possible to divide these mechanisms into three broad groups, which are: i) the Regulated Carbon Market (RCM), ii) the Voluntary Carbon Market (VCM), and iii) the “Internationally Transferred Mitigation Outcomes” (ITMOs).[76]

Generally, while the RCM operates under the “allowance unit” concept, VCM and ITMOs trade “offset units”. Allowance units are produced by the government or regulatory body running the emissions trading system, and they are allocated to participants by auction, sale, or free allocation. By contrast, offset units are usually

[76] ‘Capacity building programme for Article 6.2 implementation and operationalization Support Guide for UNDP Article 6.2 Training Course’ (Learning for nature UNDP 2023)<https://www.learningfornature.org/wp-content/uploads/2020/07/Support_Guide_UNDP_UNFCCC_23.01.2023-compressed.pdf> Accessed 20 July 2023 1 16.

created by private actors, representing a GHG emission reduction outside of an emissions trading scheme. The offset unit is typically the result of a project that either removes GHG from the atmosphere, such as by planting trees, or reduces GHG emissions that would otherwise take place, such as by implementing cleaner technology in a factory that produces fewer emissions. [77]

Nonetheless, international trading of carbon credits increases the risk of double counting. Double counting occurs when more than one country counts the same emission reduction or removal for its NDC, which constitutes a breach of Article 4.13 Paris Agreement. This article expressly prohibits double counting and requires nations to make the corresponding adjustments to prevent it.

A corresponding adjustment occurs when "a transferring Party adds back the transferred emissions into its national account whilst the receiving Party subtracts them from its account"[78]. The fundamental concept of corresponding adjustments is based on the idea that the countries' NDC "should be adjusted to reflect the transfer (export) or receipt (import) of mitigation outcomes"[79]. Explaining the practicalities of corresponding adjustments about the ITMOs, the graph below makes the concept clear:[80]

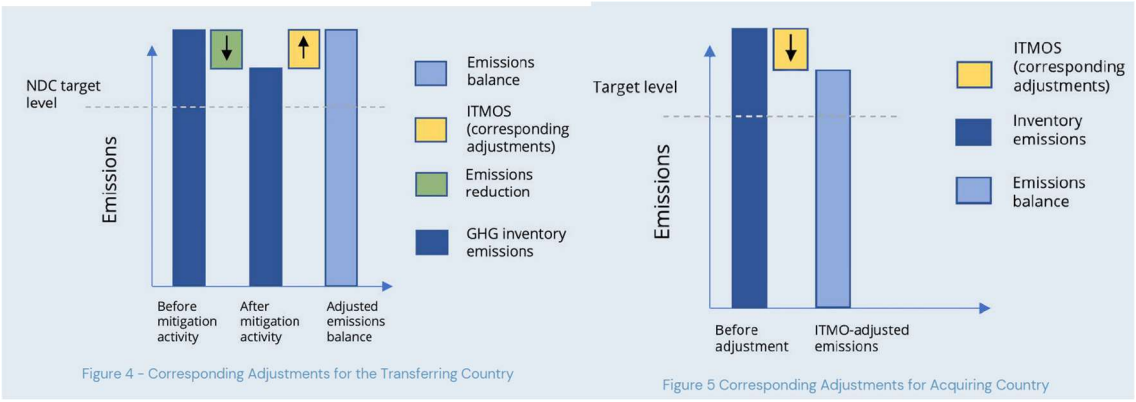

Figure 4 – Corresponding Adjustments for the Transferring Country

Figure 5 Corresponding Adjustments for Acquiring Country

When the companies open an account in a registry, they can buy and sell carbon units, and this negotiability "represents one of their key uses"[81] for developing the carbon market. However, variations in the design of emissions trading schemes can

[77] James Munro, 'Carbon Units and Emissions Trading Schemes', Emissions Trading Schemes under International Economic Law (First Edition Oxford University Press 2018) 33.
[78] Nigel Howorth, 'Enabling the Voluntary Carbon Market in the Context of the Paris Agreement'(Clifford chance 8 December 2022)< https://www.cliffordchance.com/expertise/services/esg/esg-insights/voluntary-carbon-market-decarbonisation.html> Accessed 20 July 2023.
[79] Capacity building programme for Article 6.2 implementation and operationalization Support Guide for UNDP Article 6.2 Training Course Access (n 76) 18:
[80] Capacity building programme for Article 6.2 implementation and operationalization Support Guide for UNDP Article 6.2 Training Course (n 76) 19
[81] Munro (n 77) 35

hamper the prospects for a market linkage[82]. Having a centralised legal entity such as the Earth as a clearinghouse, where all international carbon credit transactions were registered, under defined standards, would prevent double-counting, providing legal certainty that the corresponding adjustments were correctly made and boosting the carbon market internationally.

4. Conclusion

In this dissertation, I have argued that the concept of carbon debt and the attribution of legal personality to the Earth can boost the carbon credit markets. To examine this question, I have claimed that if all countries have emitted GHG, all of them are responsible for climate change and have a carbon debt. On the basis of this concept, I have put forward many legal interpretations aiming to galvanise the carbon market.

First (2.1), I maintained that the payment of the carbon debt is aligned with the polluter-pay principle, and all GHG emissions occurred after the UNFCCC should account for each country's carbon debt. In this item, it is explained both: (i) the choice of the UNFCCC as a historic moment for counting the carbon debt and; (ii) the impact of the carbon emission of the past generations on the wealthy of the current generations. This first item also explains why the concept of carbon debt circumvents some controversies about intergenerational justice. Plus, I have argued that the carbon debt should be paid not in pecuniary money but with carbon credits because the objective is, in line with Paris, to tackle global warming and not punish the countries. Further ahead, I have also advocated the position that the concept of carbon debt brings more legal certainty than the other concepts, such as the ability to pay principle. Furthermore (2.2), I have argued that there is a carbon gap between developed and developing countries, which should be closed or reduced. Since Article 2.2 of the Paris Agreement created a tiny buffer of emissions that can still be done (well below 2ºC), developing countries should use this buffer predominately. Developed countries should still be reducing overall emissions, but unavoidable emissions should be immediately offset by carbon credits, preventing the enlargement of the carbon gap. Moreover, I have challenged the adequacy of the NDC concept, arguing that it is deficient and loose at the state level (2.3). That is because no legal guidance or parameters exist for the NDC definition. Furthermore, I have argued that the states have resisted justifying their

[82] David Freestone and Charlotte Streck, 'Legal Aspects of Carbon Trading: Kyoto, Copenhagen, and beyond, [First Edition, Oxford University Press 2009) 114.

ambitions. In this context, the carbon debt can be a feasible solution to provide guidance for defining the NDCs, and improving the Paris legal framework. Moreover, carbon debt can be used as a modality of the naming-and-shaming strategy (2.4). In addition to peer pressure from other states and civil society, disclosing the carbon debt can operate as a powerful soft-law mechanism, morally forcing developed countries with large carbon debt to reduce their emissions or offset those that cannot be avoided through massive purchasing of carbon credits internationally.

Furthermore, I have argued that it is legally possible to attribute legal personality to the planet Earth (3.1), which can require the payment of the carbon debt through carbon credits. In addition, I have argued that the Earth, as a legal entity, could raise actions regarding unpaid carbon debts (3.2). Considering the recent advances in climate change litigation, I have supported the Earth can initiate proceedings to apply for an injunction to require the inclusion of the carbon debt in the national state public budget. Plus, I have advocated that even if those claims fail, these actions could raise awareness for the climate change problem. Finally, I have maintained that having the Earth as a central counterparty can play a pivotal role in avoiding double counting, providing legal certainty for the legal framework, and boosting the carbon market.

To this end, I assert that the creation of the concept of carbon debt and the attribution of legal personality for the planet Earth are workable solutions to stimulate the carbon credit markets.

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