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A review of greenhouse gas emission liabilities as the value of renewable energy for mitigating lawsuits for climate change related damages

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ABSTRACT

Anthropogenic global climate change has large and mounting negative economic impacts. Companies and nations responsible for greenhouse gas (GHG) emissions are thus acquiring considerable potential liabilities. If litigation becomes widespread, renewable energy technologies (RETs) potentially offer emitters reduced liability for climate change. This benefit has been ignored because of the lack of knowledge of potential liabilities. To overcome this information deficit, this paper reviews recent literature on the potential for climate change litigation and methods to quantify liability for climate change. Next, the top 10 emitters in the U.S. are identified and their potential liability is quantified using standard GHG emission costs. Potential liabilities are explored in depth with a single case study company comparing the results of the fractional liability from only natural disasters within the U.S. for a single year to a sensitivity of the future costs of carbon emissions from other sources of emission-related liability. Then classes of potential climate change litigants are identified and their capacity to bring such lawsuits is evaluated. The results show that the net income available to shareholders of large companies could see a significant reduction from the emissions liability related to only natural disasters in the U.S. from a single coal-fired power plant. Finally, a rough estimate of the economic risk associated with future scenarios and existing organized international potential litigants is quantified. The results show that potential liability for climate change for the Alliance of Small Island States is over $570 trillion. It is concluded that as emitters begin to be held liable for damages resulting from GHG emissions resulting in climate change, a high value for liability mitigation would provide additional powerful incentives for deployment of renewable energy technologies.

Contents

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1. Introduction

Renewable energy technologies (RETs) have well established benefits including: i) improving environmental sustainability [1–3], ii) improving public health [4–6], iii) creating jobs [6–9] and iv) financial benefits [10–12]. The average price of completed solar photovoltaic (PV) systems has dropped 33% since 2011 [13], and the cost of electricity generated from wind also dropped more than 43% in the past four years [14]. As the economic costs of RETs have decreased they are now competitive with traditional electricity sources in many regions [10–12]. Perhaps one of RETs greatest benefits, however, is the value they bring for mitigation of greenhouse gas (GHG) emissions and the concomitant climate change [15–19]. Both global GHG emissions [20–22] and global atmospheric carbon dioxide (CO_2) concentrations are increasing rapidly [23,24]. The resultant climate change is well established with a high confidence as are the negative impacts on natural and socio-economic systems [25,26] including: i) higher temperatures and heat waves that result in thousands of deaths from hyperthermia [27–29], ii) crop failures [30,31] that aggravate global hunger [32–34], iii) power outages [35,36], iv) rising sea levels that cause low-lying coastal areas to submerge gradually [37,38], v) erosion of shorelines [37,38], vi) increased risk of flooding [39], and saltwater intrusion [37,40], vii) strong storms that cause more damage to coastal environments, increased risk of floods, [41–44], viii) droughts, [45] and ix) fire [43,46,47]. These negative externalities have been shown to be due to human activities with the confidence level of 95% (primarily combustion of fossil fuels, which are the dominant cause of global warming from 1951 to 2010) [48,49].

Emission trading has been considered as a solution to climate change in order to limit greenhouse gas emissions [50–53]. Unfortunately, it has some disadvantages including relying on a complicated system [54], carbon price uncertainty [55], and encouraging industries that are the most dependent on coal and oil to maintain the status quo because the permits have been historically inexpensive [56]. Thus, at the present time, emissions trading as a method of mitigating climate change has essentially failed [57–59], so another method is needed.

A method gaining traction to bring these negative externalities into the market is the use of litigation, which provides a different path to motivate reducing corporate actions resulting in climate change [60–69]. If such GHG emission litigation becomes widespread, then the one of the core benefits of RETs for emitters would be a reduction in the liability for climate change. This economic benefit is currently often ignored because of the lack of knowledge of the potential liabilities. To provide the necessary data, this paper first reviews recent literature on the potential for climate change litigation and the seven methods to quantify liability for climate change. Then, a formulation is developed to estimate the liability for GHG emitters considering i) pollution factor (which is a fraction of emissions produced by each major polluter over the overall emissions), ii) probability of human contribution to natural disasters, and iii) estimated cost of disasters. Next, the top 10 emitters in the U.S. are identified and their potential liability is quantified using standard carbon costs and this method. Potential liabilities are explored in depth with a single company comparing the results of the fractional liability from only natural disasters within the U.S. for a single year to a sensitivity of the future costs of carbon emissions from other sources of emission-related liability. Finally, potential climate change victims (potential litigants) are identified and their capacity to bring such lawsuits is evaluated. The results are discussed and conclusions are drawn about the potential value for RETs to reduce GHG emission liability.

2. Background

GHG emissions liability is created from present emissions, but can also extend into the past. For example, Farber [62] argued that not only American's ancestors, but also people who are living in U.S. currently are responsible for past emissions resulting in climate change due to the profit they have had from uncontrolled GHG emissions. Similarly he argued that a moral responsibility exists for Americans to limit their emissions to prevent causing damage to other people (specifically those living in poor nations) [62]. Similarly, Kilinsky showed the victims that are losing their land, culture, and themselves due to climate change, should be put in top priority for compensation [66]. Public awareness of climate change will shift to what solutions are available for the climate change problem from questioning reality of climate change when the urgency of emission reduction becomes validated by courts and credible institutions [66]. Already good reasons may exist for liability imposition on governments for disastrous events [65]. It is believed that tort law could be applied to climate change and tort based lawsuits are possible from a legal point of view [65]. Although it has been pointed out that tort law is not the only method that can be utilized against climate change, it could be an important part [67]. For climate change litigants, public nuisance law has been considered to be a promising cause of action, and litigants can sue potential defendants due to their interference with public rights under public nuisance law [65]. Other studies have concluded that emitters should be responsible for the impacts of their excess emissions and should be obliged to buy long term insurance in order to cover their share of climate change costs for future for minimizing risks in case of insolvencies [68].

Because of these potential litigation-related losses, it is believed that a some corporations' welfare is affected significantly by GHG emissions, and as such lawyers working on behalf of corporations need to be well educated about risks that would be imposed due to climate change in order to warn clients subsequently [64]. For example, gas-producing companies can be significantly affected by controlling GHG emissions [63]. Thus, it has been pointed out that corporations need to scrutinize whether to disclose their GHG emissions to the SEC in order to reduce the risks, because litigation could arise and corporations would face a negative shareholder response due to such disclosures [63]. It is shown that the price of remedial