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The Competing Roles of Renewable Energy in Biodiversity Governance: A Comparative Case of China, the European Union and the United States

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Abstract: Renewable energy's negative impact on biodiversity conservation is a topic that has been worked on recently. In addition to such academic interest, countries started paying more attention to biodiversity conventions. However, there has not been a study that compares how different countries approach the issue. This study aims to fill the gap in the literature via documentary analysis. China, the European Union (EU) and the United States (US) cases are compared to find out how countries view renewables' impact on biodiversity, what motivations push them to act and what they do ignore/prioritise. While the environmental agency has seen renewable energy as a positive dimension of biodiversity governance in China, it delivers a little concern about the negative impacts on ecological systems. In the EU, since climate change is the main focus, biodiversity gets limited attention relative to climate change, even in biodiversity-related works. There is no official work on biodiversity conservations in the US, and its underlying is not investigated in this work. In addition to all these, there is not an attempt to have normative points. The aim is to find how governments see and react against the problem.
Keywords: Biodiversity Governance, Renewable Energy, China, the European Union, the United States

Biyoçeşitlilik Yönetiminde Yenilenebilir Enerjinin Rakip Rolleri: Çin, Avrupa Birliği ve Birleşik Devletler Vakalarinin Karşilaştirmasi

***Özet**: Yenilenebilir enerjinin biyolojik çeşitliliğin korunması üzerindeki olumsuz etkisi, son zamanlarda üzerinde çalışılan bir konudur. Bu tür akademik ilgiye ek olarak, ülkeler de biyolojik çeşitlilik sözleşmelerine daha fazla önem vermeye başlamıştır. Ancak, farklı ülkelerin konuya nasıl yaklaştığını karşılaştıran bir çalışma literatürde bulunmamaktadır. Bu çalışma, literatürdeki boşluğu dokümanter analiz yoluyla doldurmayı amaçlamaktadır. Bu çalışma, literatürdeki boşluğu belgesel analiz yoluyla doldurmayı amaçlamaktadır. Çin, Avrupa Birliği (AB) ve Amerika Birleşik Devletleri (ABD) vakaları, ülkelerin yenilenebilir enerjilerin biyolojik çeşitlilik üzerindeki etkisini nasıl gördüklerini, hangi motivasyonların onları harekete geçmeye ittiğini ve neyi göz ardı ettiklerini / önceliklerini bulmak için karşılaştırmaktadır. Çin'deki çevre kurumu yenilenebilir enerjiyi biyolojik çeşitlilik yönetiminin olumlu bir boyutu olarak görürken, ekolojik sistemler üzerindeki olumsuz etkiler hakkında ise endişe taşıyor. AB'de, iklim değişikliği ana odak noktası olduğundan, biyoçeşitlilikle ilgili çalışmalarda bile biyoçeşitlilik, iklim değişikliğine nazaran sınırlı ilgi görmektedir. ABD'de biyoçeşitliliğin korunmasıyla ilgili resmi bir çalışmanın olmamasıyla birlikte bunun altında yatan neden bu çalışmada incelenmemiştir. Tüm bunlara ek olarak,*

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normatif inceleme bulunmamaktadır. Amaç, hükümetlerin sorunu nasıl gördüğünü ve buna nasıl tepki verdiğini bulmaktır.
Anathar Kelimeler: *Biyoçeşitlilik yönetimi, Yenilenebilir enerji, Çin, Avrupa Birliği, Birleşik Devletler*
JEL Codes: *F55, F64, H77, Q28, Q57*

GENİŞLETİLMİŞ ÖZET

Araştırmanın Amacı

Konvansiyonel enerji kaynaklarının biyoçeşitliliğe ve küresel ısınmaya olan olumsuz etkisi bilinen bir olgudur. Hatta yakın zamanda, fosil yakıtlara alternatif olarak görülen yenilenebilir enerjinin de biyoçeşitliliğe olumsuz etkisi araştırılmaya başlanmıştır. Bu çalışma, devletlerin mevzubahis etkiye nasıl yaklaştıklarını ele almaktadır.

Araştırma Soruları

Ülkelere göre, yenilenebilir enerji biyoçeşitliliğin korunmasına her zaman yardımcı mıdır?

Biyoçeşitlilikle ilgili küresel ve ulusal kararlar açısından ülkelerin motivasyonları nelerdir?

Ülkeler biyoçeşitliliğin korunmasını veya enerji tedariğini birbirleri için feda ediyor mu?

Literatür Taraması

Yenilebilir enerjinin biyoçeşitliliğe olumsuz etkisine devletlerin nasıl yaklaştığını ele alan çalışma, çevre yönetiminin (*environmental governance*) sınırları dahilindedir. Dolayısıyla konuya dair yaklaşım öncelikle çevre yönetimi üzerine çalışmalarla başlanması gerekmektedir. Mevzubahis alanın zaman içerisinde nasıl evrildiğini, buraya yönelen dikkatin ne gibi konu başlıklarına yoğunlaştığını öncelikle olarak ortaya koymaktadır. Bunun ertesinde ise biyoçeşitliliğin, çevre yönetimi içerisindeki yeri tesbit ediliyor. Son nokta, biyoçeşitlilik yönetimi diye adlandırabilir. Çalışmanın literatüre katkısı ise devletlerin nasıl yaklaştığını ele alan bir çalışmanın eksikliğidir.

Metodoloji

Çin, Avrupa Birliği ve Birleşik Devletler olmak üzere üç olay incelemesini karşılaştıran bu çalışma, kalitatif metodu kullanmaktadır. Bu çalışmada örneklemdeki devletlerin konu ile alakalı resmî dokümanları incelenmekte ve bu devletler birbiriyle kıyaslanmaktadır. Bu mukayese teorinin çizmiş olduğu çerçevenin (sorunlar, çözümler, sebepler ve değer yargıları) tespiti üzerine ilerlemektedir. Toplanan veriler çevrimiçi kaynaklardan edinilmiştir. Hem Avrupa Birliği hem de Birleşik Devleter ile ilgili dokümanlar makalenin de orijinal dili olan İngilizce, Çinle alakalı bilgiler ise Çince kaynaklardan sağlanmıştır. Çince verilerin İngilizceye çevrilmesi de bu alanın İngilizce literatürüne katkısıdır.

Bulgular ve Sonuç

Araştırma bulgularına göre Çin'in küresel biyoçeşitlilik yönetimine artan ilgisi, Çin'den bu konuya dair beklentileri de artırmaktadır. Öte yandan her ne kadar Avrupa Birliği biyoçeşitlilik yönetiminde öncü rol almış olsa da biyoçeşitliğe dair vurgular, biyoçeşitlilik odaklı çalışmalarda bir küresel ısınma kadar dikkat çekmemektedir. Bir diğer ifadeyle, Avrupa Birliği günümüzde biyoçeşitlilik yönetiminde Çin kadar fazla öncü rolde değil. Araştırma bulgusuna göre her ne kadar yenilenebilir enerji de biyoçeşitlilik üzerine olumsuz etkilere sahip olsa da fosil yakıt endüstrisine alternatif olarak görülmektedir. Bu durum hem Çin hem de Avrupa Birliği belgelerinde yenilenebilir enerjinin biyoçeşitlilik üzerindeki negatif etkilerinin sınırlı kalmasına sebep olmaktadır. Bu noktada Birleşik Devletler'de biyoçeşitliliğin korunmasına yönelik çabaların yok denecek kadar az olduğu tespit edilmiştir. Halbuki biyoçeşitlilik için ciddi zararları olan biyoyakıtı en fazla üreten ülke de Birleşik Devletler'dir. Bunun neden kaynaklandığı bu çalışmanın kapsamına dahil değildir, ancak ortaya çıkan tablo üzerinden ülkelerin farklı yaklaşımlarının küresel bir eyleme olanak sağlamadığını belirtmek mümkündür.

1. Introduction

Governments' attempt and academic research on mitigating climate change have been an issue since the 1970s. It has led to global environmental governance (GEG) debates and its inevitable connection with energy supply. As the most consumed and environmentally dangerous ones, fossil fuels have always been the centre of attention. However, increasing social interest in energy supply has created new dynamics in the GEG. On the one hand, the future energy supply sources are accepted as renewables because of social acceptance, technological innovation, political pressures and economic advantage. On the other hand, although climate change mitigation is followed as part of environmental consideration, biodiversity has become an environmental governance issue. It is a fact that renewables are preferred over fossil fuels because of lower emissions. However, another point is analysed in the literature review that renewables are not always biodiversity-friendly. It shapes our first research question that *is renewable energy always helpful for conserving biodiversity according to countries?* How do governments interpret it?

One of the most significant issues in GEG is how many environmental considerations are ignored/preferred relative to energy-economic preferences. It merely finds a reflection in the biodiversity. In the global arena where the

state computes in the political-economic race, prioritising biodiversity problems can be problematics. Thus, a matter should be investigated globally and nationally. *What are the motivations for countries in terms of biodiversity-related decisions globally and nationally?* For answering the question, various cases should be evaluated. China, the European Union (EU) and the United States (US) are investigated in this research. While the EU is the leading actor for biodiversity conservation, China has become the other main pusher power for biodiversity research. Lastly, as one of the biggest actors in the world political-economically, the US does not participate in biodiversity conventions. There is another fact that the US is the biggest biofuels producer, while biofuel production causes biodiversity problems, including water and food security. Thus, *do countries sacrifice biodiversity conservation or energy supply for one another?*

This research has found that renewable energy helps conserving biodiversity compared to fossil fuels; the negative impact of renewables on biodiversity is ignored. Weak attention of energy institutions does not help governments to realise how the importance of biodiversity. Thereby, the countries are not able to separate positive and negative aspects of biodiversity governance. Although the governments show their efforts to establish monitoring and assessing the impacts and damages, the motivations for biodiversity conservations stay limited to the view that sees renewables more preferable to fossil fuels. It merely affects the global and national attention of the countries. While the US is the biggest biofuels producer country, its participation in the Biodiversity Convention would cause other domestic political problems. Thus, a global issue's research cannot be limited to global governance. Such a fact also shows that countries' approach to biodiversity conservation-energy supply relationships differentiate. Generally, however, the lack of investigation leads to biodiversity-related decisions that remain weak against harmful energy supplies.

Firstly, how the GEG has changed through time will be shown. This historical oriented literature review will show how biodiversity joined the process at the end. How the interaction between biodiversity conservation-renewable energy is perceived can only be understood via GEG analysis. Secondly, a framing approach will be introduced. It is the determiner of the founding that will be discussed. Thus, the analysis section will follow. In the case of China, the EU and the US will be given separately. Since each case has its dynamics, it is challenging to provide a similar amount of data. Specifically, the US case was more problematic since there is no governmental work on the issue. Lastly, the funding will be discussed.

2. The Literature on Global Environmental Governance and Energy Interaction

Fossil fuels are the primary driver of climate change. Because of their significant share in energy consumption, energy has been the key issue for climate change (IPCC, Renewable energy sources and climate change mitigation, 2013). Thus, mitigating climate change attempts cannot ignore the "energy" section because climate change and energy are inextricably interlinked (Gunningham, 2012). Those attempts are called environmental governance. The literature on energy part in environmental governance will be examined.

GEG has been discussed since the 1970s (Najam, Papa, & Taiyab, 2006). The Foundation of the United Nations Environment Programme (UNEP) in 1972 (UN, United Nations Conference on the Environment, 5-16 June 1972, Stockholm , 1972) was followed by environmental treaties (CITES, 1973) (CLRTAP, 1979). Other international cooperation attempts followed them in the 1980s and 1990s, such as the 1987 Montreal Protocol (UNEP, About Montreal Protocol, 1987), 1992 Earth Summit in Rio de Janerio (UN, United Nations Conference on Environment and Development (Earth Summit) (3-14 June 1992, Rio de Janeiro, Brazil), 1992) and 1997 Kyoto Protokol (UNFCC, 1997). However, they were established in the era of the neo-liberal world. As a reflection of liberalism in International Relations, regime theory has been dominant in institutional studies and practices (Auer, 2000) (Young, 1989). Those neo-institutionalist approaches firstly prioritise the market dimensions. Thus, in the connection between energy and environment, economic outcomes were the dominant determiner.

However, the 21st century has brought a new energy paradigm to replace with the traditional one (Jefferson, 2000). The highest priority of economic growth has given its position to understand the links between economy and ecology. Attracting private capital is still important, but government interference to environmental governance is more visible than it used to be. The cohesion between public and private or market and state is needed (Lemos & Agrawal, 2006). GEG has become an issue that should be solved by global cooperation and harmony (Falkner, 2014). However, besides governmental and private attempts, civil society-based organisations such as nongovernmental organisations (NGOs) also joined the governance process (Jefferson, 2000) (Lemos & Agrawal, 2006). Interconnection of market-, government- and society-based interests is the fundamental part of the governance because the green environment and green economy have become

interconnected (UNEP, Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication - A Synthesis for Policy Makers, 2011).

The necessity of cohesion in environmental governance comes from power multipolarity (IPCC, Summary for policymakers, 2014) (Kottari, 2016). However, such multipolarity/polycentrism is not only in the GEG but also in global energy governance (Florini & Sovacool, 2011). Energy's role leads to more complexity in environmental governance because there is not only one energy sources that cause the debates. A new paradigm also includes the limitations on fossil fuels (Jefferson, 2000). Such a complex structure, which had a various interest of different actors, sometimes leads "too localized" or "too centralized" approach at the governance level (Butler & Macey, 1996). GEG's fragmentation is positively related to the lack of cooperation and coordination, inefficient use of resources and being outside of the environmental arena (Najam, Papa, & Taiyab, 2006). For examining the energy complexity part of environmental governance, non-fossil fuels should be considered.

Renewable energy has been shown as an alternative to non-renewables in GEG (RAMSAR, 2012). The combination of environmental governance and energy has pushed the expansion of renewable energy for mitigating climate change (Kottari, 2016). However, renewable energy is not free of environmental impacts but at least provides low- or zero-carbon. It is the point where GEG becomes more complicated complex. Providing low- and zero-carbon does not prevent other environmental impacts (Allison, Root, & Frumhoff, Thinking globally and siting locally – renewable energy and biodiversity in a rapidly warming world, 2014). This situation has led biodiversity to be more key in the mid-2000s. The main target is mitigating climate change with renewable energy, but it also includes the prospects for biodiversity conservation (CBD, 2010). Environmentally acceptable energy scope has been expanded.

Renewable energy's potential impacts on biodiversity have been studied by different views, including Clemmer et al. (2013), Lovich and Ennen (Lovich & Ennen, 2013). Inside of those, Gasparatos et al. (2017) combine and analyse all sorts of renewable energy's negative impact and positive outcomes in terms of biodiversity. Again, climate change and biodiversity are two distinct environmental challenges globally (Santangeli, ve diğerleri, 2016). Water's position in renewable's impact on biodiversity creates a water-energy connection (RAMSAR, 2012). However, water the key for food when the societal dynamics are considered. Such interconnectedness has led the debate on how to govern food-energy-water nexus (Weitz, Strambo, Kemp-Benedict,

& Nilsson, 2017). It only started in the late 2000s. The investigation of integrated water management approach (Benson, Gain, & Rouillard, 2015), the nexus approach (UNEP, Environmental Governance and the 2030 Agenda Progress and Good Practices in Latin America and the Caribbean, 2018) and the attention of science-policy division (van Gevelt, 2020) have provided multifaceted focus on the issue. Bioenergy as using plant- and animal-based matter to produce renewable energy is the most related energy type in food-energy-water nexus.

GEG, which is connected to energy production and consumption, has evolved through time. The latest version of its recognises biodiversity as a distinct important area. Although various interpretations have studied biodiversity and its connection with energy, those studies do not investigate in parallel with the complexity of the governance issue. For doing that, how different governments approach the issue and what they prioritise should be considered. If the necessity of coordination and cooperation in global governance is essential (Falkner, 2014), it should be operationalised on biodiversity. Countries negotiation talks can express what they prioritise and according to which dynamics include national, regional, global and sub-national levels, NGOs, economic growth and energy supply.

This study shows varieties of approaches in terms of the relation between renewable energy orientation and biodiversity governance. It is and will be a complex issue, because there is a global wave towards renewables, while climate change considerations have widening and deepening into new areas. Biodiversity governance rapidly becomes a key issue for environmental regulations.

3. Theoretical Framework and Methodology: A Framing Approach

Framing implies an effective communication system constructed across communities for a long time. This is one reason why some misinterpretations of scientific facts can be adopted by people very successfully. The stories meet the expectations of the audiences (Lakoff, 2010, s. 72). While framing emphasises the information and the audiences, it has been employed and developed widely in the mass media, communication and journalism studies. While agenda setting refers to raising an issue as an essential topic, framing is a way of linking the existing knowledge issues. The purpose of the framing is to persuade the audiences to understand and adopt the ideas and information constructed in the media (Scheufele & Tewksbury, 2007, s. 11).

The typology of frames is a crucial element of the framing approach. Their categorisation depends on the topics and purposes of the research. Djerf-

Pierre et al. (2016) identify five renewable energy frames: economic, environmental, science and technology, political and civil society frames. The categorisation demonstrates a clear boundary between different sectors and fields. Nevertheless, it does not show differences in each frame. For example, while economic opportunity and economic burden are categorised as the economic frame, they might have competing implications for stakeholders and lead to various policy outcomes. Economic opportunity can potentially develop renewable energy, while the economic burden does not work like this. In addition to practical actions, morality can be constructed as a frame. O'Neill et al. (2015) analyse the various frames, including moral, religious and ethical dimensions of climate change issues and discover how they either enhance or constrain climate mitigation actions. Moral judgements are a critical element of identifying the responsibility for taking the actions.

Framing has a feature of changing and evolving rather than a static condition. Climate change issues have been constructed from doubt about the reality to various discussions on solutions. This research employs the framing approach developed by Entman (1993). His approach identifies problems, causes, moral judgements and solutions. A dynamic understanding of the framing is employed to observe and identify the dominant frames over time and across the cases selected.

Frames refer to roles, frames and their relations. Framing can be understood as a process of constructing specific stories and frames repeatedly and usually. As a result of this, the frames evolve to be a stable system of ideologies (Lakoff, 2010, s. 73). It is vital to summarise the agencies for constructing the frames. The relations between the roles of the agencies and the frames help understand the complicated politics of biodiversity. Emphasising and/or opposing the frame reflects its global politics and negotiations position.

While a wide range of studies on framing climate change (Midtun, Coulter, Gadzekpo, & Wang, 2015) (Hoffman, 2011) (Wu, 2009) (Nisbet, 2009) attention to biodiversity remains very weak in the political sciences, media and communication and international studies. Like other GEG issues, biodiversity has complicated and complex issues and can be framed as various concerns. The invasive alien species (IAS) is a critical issue of biodiversity governance requiring governmental action to control the spread of the species and mitigate the negative impacts. However, the IAS has been framed as various security concerns such as water security (Demirbilek, 2020), energy security (Masters & Norgrove, 2010) and food security (Witt, 2014), which poses a threat to human health; damages the national natural and ecological

systems; influences markets and trade; requires global governance. The various frames reflect the complicated nature of the issues (Scott, 2016). While the biodiversity negotiations offer a platform for global solutions, they have not yet achieved many agreements, including biofuels and synthetic biology. While biofuels are an option of renewable energy, they have been framed around disagreements over scientific findings, certainties and risks, and response (Scott, 2016, s. 7). This article does not focus on a specific topic of biodiversity conservation but instead discovers how renewable energy, particularly fossil fuels, has been framed in terms of biodiversity politics.

As Entman's framing approach is employed, this article sets the four frames as a framework to show the problems, causes, moral judgements and solutions of renewable energy in biodiversity governance. The problems are defined as the arguments for recognising the benefits of renewables to biodiversity and other environmental governance. An alternative interpretation of this is a concern about renewable energy's negative impacts on biodiversity. Different explanations can explain the two competing ideas. The damage to biodiversity can be caused by the operations of the renewable energy facilities impacting biodiversity, such as killing birds and fishes and threatening the food supply. Conversely, the benefits to biodiversity and climate change are dependent on framing renewables as green energy. Moral judgements are categorised by identifying the actors having the responsibilities and obligations to address the concerns. Solutions are the policies designed and implemented to achieve the actions. This work operationalises Entman's framing approach on the relations between renewable energy and biodiversity (see Table 1).

Table 1. *Framing Relations Between Renewable Energy and Biodiversity*

Framing elements	**Disadvantages**	**Advantages**
Problems	Damage to biodiversity	Contribution to biodiversity
Causes	The survival of birds and fishes is affected by the renewables; Competing with food supply	Renewables are green energy
Moral judgements	African countries	Brazil, EU
Solutions	Stop incentives to biofuels	Balance food supply and biofuels production

This paper compares three different case studies that are China, the EU and the US. The comparative case would distinguish the complexity of the contexts (Yin, 2009). In the literature, the problematic issues of biodiversity-renewables relations find their reflections specifically in the EU and China. While the EU is the initiative actor for biodiversity considerations in the early

2010s, China considers biodiversity factor in mitigating climate change politics. Both actors can be accepted as having biodiversity-considered policies. How their governments approach the issue should be investigated. The comparison of the cases, however, requires diversity. While the EU and China are leading countries, the US do not participate in biodiversity negotiations. The US attends only as an observer, although it is the most significant biofuels producer. Biofuels is one of the biggest issues in biodiversity-energy supply issue. The documents that have been investigated were collected via online sources. In those, China case's documents do not exist in English literature, so their translation from Chinese to English also creates another contribution of this study. The framework helps us to uncover both negative and positive aspects of the relations between renewable energy and biodiversity.

4. Analysis Part

The relevant documents will be analysed according to the energy types, environment related themes. In such a problematic area, both problems and solutions should be considered. Then, a comparison of different cases would help to respond to our research questions, namely *Is renewable energy always helpful for conserving biodiversity according to governments?*, *What are the motivations for countries in terms of biodiversity-related decisions globally and nationally?* and *Do countries sacrifice biodiversity conservation or energy supply for one another?*

4.1. China

According to the 13th Five-Year Plan for Development of Biomass Energy, the biomass is framed as a solution to addressing climate change and achieving environmental and ecological protection. However, it does not raise a link between biomass and biodiversity in the official document. The development of biomass is just framed as being relevant to food security. China's strategy emphasises that the development of ethanol is in control of the governmental plan.

Table 2. *Framing relations between renewable energy and biodiversity in China*

Energy type	**Themes**	**Frames**
The Thirteenth Five-Year Plan for the Development of Renewable Energy		
Biofuels	Food security	Encourage but under control
Renewable energy	Climate change	A solution to climate change
Hydropower	River ecological conservation	A damage
Wind power	Vegetation management	A damage

Table 2 Devamı: *Framing relations between renewable energy and biodiversity in China*

13th Five-Year Plan for Development of Biomass Energy		
Biomass	Climate change	A solution
Biomass	Food security	Development but under control
The 2019 Report of China's international cooperation on renewable energy		
Renewable energy	Climate change	A solution to climate change
China's Fifth National Report for the Convention on Biological Diversity		
Clean energy	Climate change	A solution to climate and biodiversity
Energy	Biodiversity	Biodiversity offers materials to energy
Biomass energy	Ecological agriculture	A solution to biodiversity
Biofuels	Biodiversity	Monitoring and assessing

The Plan for the Development of Renewable Energy is similar to the Plan for Biomass Energy, placing the development of biofuels in control of the governmental plan for food security. While hydropower is seen as an essential renewable energy option, it has been framed with a concern about ecological impacts over rivers. The construction of hydropower projects is required with conserving the natural and ecological environment. Wind power is linked to a requirement for environmental protection, soil conservation and vegetation restoration. The 2019 Report of China's international cooperation on renewable energy constructs the renewables to address climate change and ecological conservation. It does not mention the impacts of renewables on ecological systems and biodiversity.

According to the China's Fifth National Report for the Convention on Biological Diversity, the biomass energy is framed as an option of clean energy for achieving poverty eradication and addressing climate change. It is important to note that this report illustrates the China's implementations of the National Biodiversity Strategy and Action Plan. It recognises an incomplete environmental management system for monitoring and assessing biofuels production impacts on the biodiversity conservation. This means that China does not ignore the potential links between biofuels and biodiversity. The report raises the importance of food security, but it has not yet linked it to biofuels. The research uncovers an interesting finding that the National Report frames clean energy as a solution to biodiversity through being used to replace the coal consumption and thus reduce the pollutants and their impacts on biodiversity.

In this sense, the main findings from the governmental reports (see Table 2) show that renewable energy, including biomass energy, is framed as a positive contribution to addressing climate change. However, the gaps between the energy and environmental sectors are identified in terms of biofuels' concerns. First, the energy sector focuses on the competing relations between biofuels production and food supply. The environmental sector recognises a concern about the biofuels' impacts on biodiversity, while the concern remains very weak in the document. Food security has not yet been framed as an issue related to biofuels by the environmental agency. Second, the energy agencies have raised concerns about the negative impacts of renewable energy, including hydropower and wind power and require strict measures on evaluating the risks. The environmental agency has not extended its attention and concerns to a broader range of renewable energy sectors. Instead, it emphasises that biodiversity conservation has a contribution to the development of energy industries. The contrast between the energy and environmental agencies reflects that the renewables' impacts have not yet substantially framed in the biodiversity sector. This finding also demonstrates a requirement for mainstreaming biodiversity conservation into the energy sector.

4.2. The European Union

The primary motivation behind the EU's approach to biodiversity is related to conventional energy sources such as oil, gas, coal. Production and consumption of those sources make mitigating climate change difficult. Renewables are preferred because of environmental considerations. However, renewable's impact on biodiversity started shaping the documents more than ever. Prioritising biodiversity conservation has recently become an essential issue in environmental considerations. Thus, mitigating climate change and conserving biodiversity has become two separate issues in energy consumed supranational power. The supranational character of the EU should be investigated in the policy process. Although the European region has important cases related to biodiversity, those cases are under the control of EU-member countries. The coherency between national-supranational levels is required.

EU (2014) illustrates the importance of mitigating climate change and biodiversity. The mainframe is shaped according to solutions to biodiversity and environmental risk management. A new wave of unconventional energy sources is shown as one of the possible ways in solutions.

Table 3. *Framing Relations Between Renewable Energy and Biodiversity in EU*

Energy type	Themes	Frames
EU's fifth report to the CBD		
Unconventional energy resources	Climate Change and Biodiversity	A solution to biodiversity and environmental risk management
European Commission (COM)'s mid-term review report of the EU biodiversity strategy to 2020		
Wind energy	Climate change	A solution to climate change
Hydropower	Biodiversity	Integrating with biodiversity
European Commission (COM)'s final report on EU biodiversity strategy to 2030		
Renewable energy	Climate change and Biodiversity	A solution to climate change and biodiversity
Bioenergy	Climate change, Biodiversity and food security	A solution and a danger to biodiversity
European Commission (COM)'s guidance document on wind energy developments and EU nature legislation		
Wind energy	Climate change and biodiversity	A solution and a damage to biodiversity
Renewable energy	Climate change	A solution to climate change
Institute for European Environmental Policy (IEEP)'s mid-term review report of Delivering Synergies between Renewable Energy and Nature Conservation Messages for Policy Making up to 2030 and Beyond		
Renewable energy	Climate change and Biodiversity	A solution to biodiversity A damage to biodiversity
Biofuels, Bioliquids and Bioenergy	Environmental protection	A damage to biodiversity
EKLIPSE's report on EU renewable energy policies and global biodiversity		
Renewable energy	Climate change, Biofuels and Water-food-energy nexus	A solution and a damage to biodiversity
Fossil fuels	Climate change	A damage to climate change

COM (2015) shows that renewable energy should be organized as compatible with biodiversity issues such as birds. In wind power and hydropower, renewable energy is found more preferable on conventional energy production and mining. In this way, both a solution to climate change and integrating with biodiversity are planned to succeed.

IEEP (2015) demonstrates renewable energy and biofuels separately that should be organized as compatible with biodiversity. On the one hand, renewable energy is found as both a solution and damage to biodiversity, while on the other hand, biofuels are only analysed via their negative impact on biodiversity. Policy synergy of renewables and biodiversity is looked for with supranational attempt.

To mitigate climate and environmental risks, the EU (2020) attempts different renewable energy variants, including the bioenergy. Renewables are found as a solution to biodiversity and climate change. Such energy generation would lead to a win-win in terms of the energy-environment. However, bioenergy's negative impacts on climate change, biodiversity and food security are also mentioned.

COM (2020) illustrates that wind energy should be organized as compatible with biodiversity issues such as birds because of its risks to biodiversity. Renewable energy, however, is found more preferable to conventional energy production and mining. Renewables cause positive opinions regarding their impact on mitigating climate change because they are compared with conventional energy sources. In this document, both supranational and national level attempts are mentioned.

The EU-funded EKLIPSE project (2020) only summarises vital EU policies, supporting technologies, and known impacts on biodiversity. Since it is a research project, it analyses both pros and cons of renewable energy in terms of biodiversity. Since it analyses all renewables, it presents both negative and positive impacts on biodiversity. The main push is seen as a negative impact of fossil fuels on climate change.

As shown in the literature review, certain studies argue the negative impact of energy production on biodiversity. EU policymakers seem to be aware of it (see Table 3); however, the renewables are focused on making renewables and biodiversity compatible. It seems it will be the main issues for addressing climate change in the EU area. On the one hand, renewables are chosen to replace with fossil fuels because of environmental considerations, but on the other hand, renewables damage the environment in biodiversity issue. Here, as in China, biofuels seem to be a more problematic point than other renewables. It is environmentally more hurtful than the other sources because it affects the soil and water where it is produced. It is directly connected to food and water security. Lastly, the EU attempt to work on biofuel's negative impact on the environment is accepted as an initiative policy for other countries, although it has not been successful yet (Greenpeace, 2012).

4.3. The United States

The US has never ratified the Convention to Biological Diversity; thus, it is not a member (instead just an observer) to the international negotiations. Because of this reason, we could not find the relevant documents. However, the US has a vital role in biofuels industries as the leading biofuel producer country by 45.5% world share while it does not have a biodiversity policy. It

is found quite problematic in research that investigates how governments approach renewables-biodiversity interaction. Again, there is no governmental source to be analysed in the US case.

However, environmental organisations (e.g. WWF, Greenpeace, Sierra Club, NRDC, EDF) as one of the leading groups for shaping environmental policies can be researched. Although those organisations have worked on biofuels' impact on biodiversity or food prices, they do not react against it as they do to fossil fuels. It seems that polarized environmental politics reflects environmental policies and studies in the US. According to framing analysis, such a picture should be accepted as moral aspects of environmental politics. In all relevant works, fossil fuels are investigated, and biofuels are preferred with the emissions theme. The frame, thereby, is constructed against conventional sources' negative environmental impact. Climate benefits of renewables are the main argument of the studies, although renewables are not always compatible with environmental issues.

It cannot be denied that renewable's harm to individual birds and bats or from the fragmentation of species' habitat are worked in the US in an academic sense (Allison, Root, & Frumhoff, Thinking globally and siting locally – renewable energy and biodiversity in a rapidly warming world, 2014) or carefully researched by NGOs (ABC, 2014), these stay as the individual attempts. Since this research focuses on the government's decisions, they cannot be included. They have only led small-impacts regulations, but not the high-impact decisions (USFWS, 2012). While biofuels can be accepted as the biggest issue for biodiversity-renewable production relations, there is no attempt to solve this.

5. Discussion and Conclusions

China has witnessed a rise in biodiversity conservation in its official documents. This is mainly because the GEG has been rising on the global political stage and, thus, global biodiversity governance receives much attention from the political sphere. China is scheduled to hold the Biodiversity Conference in 2020 (delayed to 2021 due to Covid-19). This raises global expectations to see China play an important role in enhancing global biodiversity governance. However, the common theme of the EU biodiversity-related studies is that even the biodiversity-oriented works do not get attention as much climate change. Although the EU is one of the leading actors that has raised its concerns, global biodiversity governance has not witnessed the EU's leadership role.

The mainstreaming of biodiversity into various industrial sectors has been required clearly in biodiversity policies' documents. The energy sector is one of the targets of biodiversity mainstreaming. On the one hand, the fossil fuel sectors have confronted challenges and pressures from biodiversity governance and are thus required to phase out. On the other hand, the renewable energy sectors have been seen as a solution to fossil fuels' impacts on biodiversity, although they also have a negative impact on it.

While environmentalists raise concerns about renewable energy having potential damages to biodiversity, China and the EU documents have demonstrated limited attention to the issues. This is substantial because renewable energy has been framed as the foremost solution to global environmental challenges, including biodiversity conservation. The positive dimension of renewable energy has a dominant position in global biodiversity governance, while the negative impacts have been discursively marginalised.

Renewables are a rising option in the economic, industrial and energy systems and thus, they require more researches on their impacts on ecological systems. It is not very clear to what extent renewable energy contributes to a decrease in the number of species and even their losses. The governments show their efforts to establish monitoring and assessing the impacts and damages except for the US.

While food supply and security are essential concern for biodiversity conservation, it is substantially identified as an energy-driven issue. The energy sector is in charge of planning renewable energy facilities, and it thus has to consider the environmental and ecological impacts. This is not to say the environmental sector does not concern with the effects while setting the development of renewables as a priority rather than a target to challenge. Similarly, biodiversity has been driven by GEG rather than global energy institutions. This can explain why renewable energy's positive dimension has been framed very clearly while the negative one has received fragile attention to the biodiversity agenda.

As a response to the research questions, although renewable energy helps conserving biodiversity compared to fossil fuels, the negative impact of renewables on biodiversity is ignored. Such a picture reflects the motivations of countries in biodiversity issue. Leaving fossil fuels and mitigating climate change has become the central theme of GEG, while such motivations are not enough to push for biodiversity conversation. It shows the importance of separation decisions' level as global and national. As the leading biofuels producer, the US does not participate in the global governance of the issue. No matter how other countries investigate nationally, a global solution has not

been reached yet. It leads to a weak investigation of the negative dimension of energy supply in the biodiversity conservation issue.

However, in addition to its contribution, the theory's negative side should also be mentioned. Although the theory helps to analyse discursive aspects of the documents via analysing roles, frames and relations, underlying reasons behind the debates cannot be caught up with. The research questions are responded to on the three cases, but domestic politics and how the theory's frame cannot analyse the domestic policy process work. Only the documents and the comparisons of them are studied. Thus, it is challenging to have normative suggestions for making the policy process more efficient. This work has only demonstrated how different countries hold renewable's impact on biodiversity governance. Lastly, the most challenging part of the work is that collecting empirical sources. Since the worked topics are still emerging, there has not been strong attention by the governments. Moreover, the US has not even paid sufficient attention. Such a new issue causes asymmetric data of the cases, but only this kind of new work would help make future ones more efficient.

Renewable's negative impact on biodiversity has worked under the GEG studied, although it is still very recent debate. How governments approach the issue, however, has not been studied yet. This work has compared three crucial cases regarding attention on biodiversity, high investments in renewables and climate change considerations. Collecting various aspect of three cases has helped to conclude this research according to the questions. Governments are aware of the potential impacts of renewables on biodiversity, but not clearly. Countries have their context, so the motivations for approaching the biodiversity conservation differentiate. However, it causes to make difficult determining the problems and acting against them globally. In continuation of this, how countries view the energy supply-biodiversity conservation balance become controversial.

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